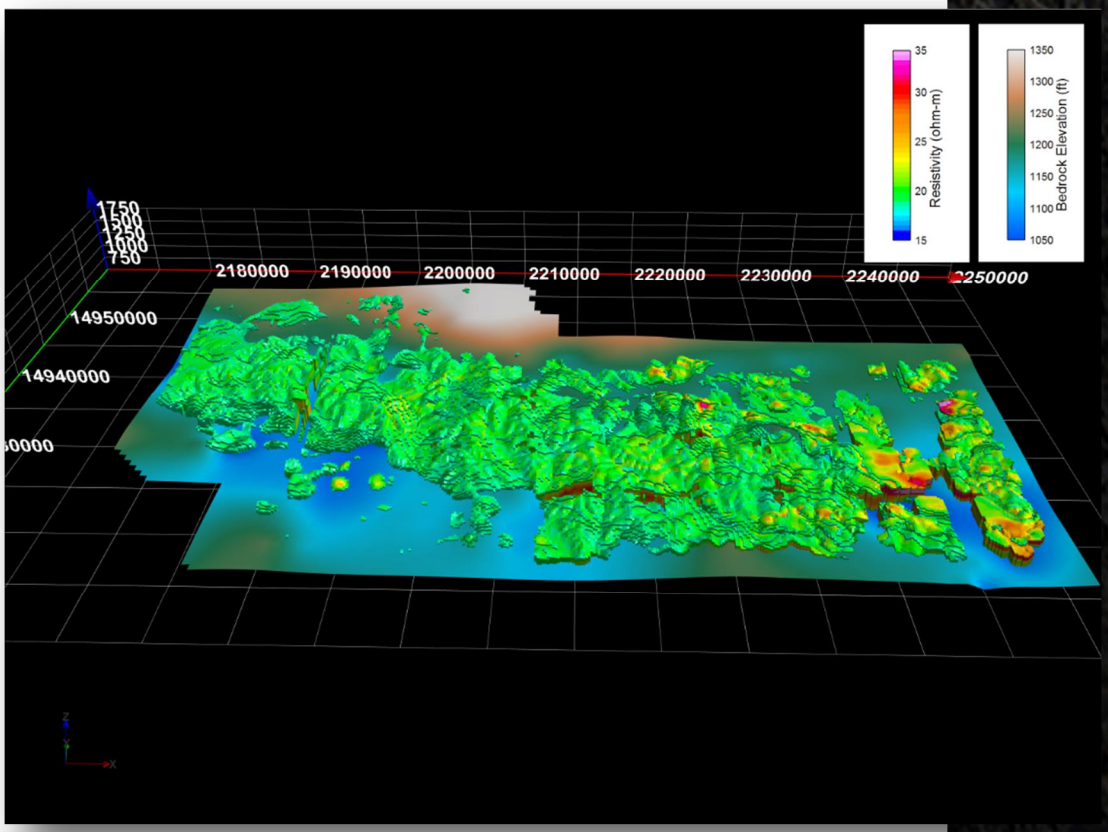
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Hydrogeologic Assessment and Framework Development of the Aquifers beneath the Brainard-Valparaiso Area of the Lower Platte South Natural Resources District in Eastern Nebraska



Prepared for:

Lower Platte South Natural Resources District
3125 Portia Street
Lincoln, NE 68521

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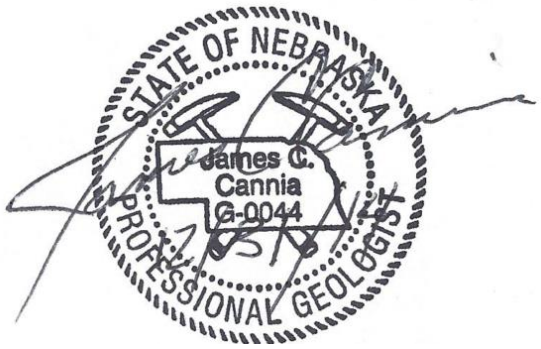


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Abbreviations

2D Two-dimensional
3D Three-dimensional
A* m^2 Ampere-Square Meter
AEM Airborne Electromagnetic
ac-ft Acre-feet
asl Above sea level
bgs Below ground surface
BH Borehole
CSD Conservation and Survey Division, University of Nebraska-Lincoln
cfs Cubic feet per second
dB/dt Change in amplitude of magnetic field with time
DGPS Differential global positioning system
DV Dwight-Valparaiso (aquifer)
ENWRA Eastern Nebraska Water Resources Assessment
FT Fourier transform
ft/d Feet per day
GIS Geographic Information Systems
GRI Gamma Ray Index
gpm Gallons per minute
IGRF International geomagnetic reference field
in/yr Inches per year
LAS Log ASCII Standard
LCI Laterally Constrained Inversion
MAG Magnetic (data, field of method); Magnetometer (instrument)
mgd Millions of gallons per day
mg/l Milligrams per liter
mi^2 Square miles
mya Million years ago
NAD83 North American Datum of 1983
NAVD North American Vertical Datum
NDNR Nebraska Department of Natural Resources
NOGC Nebraska Oil and Gas Commission
NPI Neutron Porosity Index
NRD Natural Resources District
NWIS National Water Inventory System
PA Profile Analyst (Encom)
ρ_{model} Modeled Resistivity
Rx Receiver
SCI Spatially Constrained Inversion
TDS Total Dissolved Solids
TEM Transient Electromagnetic
TDEM Time-Domain Electromagnetic (common term when referring to ground-based TEM)
Tx Transmitter
USGS United States Geological Survey
UTM Universal Transverse Mercator coordinate system
v/m^2 Volts per meter squared
XRI Exploration Resources International
ybp Years before present

Executive Summary

Exploration Resources International (XRI) is pleased to submit our report to the Lower Platte South Natural Resources District (LPSNRD) titled ñ**Hydrogeologic Assessment and Framework Development of the Aquifers beneath the Brainard-Valparaiso Area of the Lower Platte South Natural Resources District in Eastern Nebraska.**ò This project began in August 2013 to address the water resource concerns of the LPSNRD in the area near the towns of Brainard and Valparaiso. This hydrogeologically complex area has undergone increased groundwater development in recent years, which prompted the LPSNRD to seek additional information on the aquifers underlying the district. XRI entered into an agreement with LPSNRD to undertake a hydrogeologic study of the area.

The scope of work for this project was as follows:

1. SCOPE OF WORK:

   An Airborne Electromagnetic (AEM) survey will be flown over a specified area near the towns of Brainard-Valparaiso within the LPSNRD to support creation of the hydrogeological framework of this area. This framework will be provided as preliminary AEM data and as a final product in an interpretive report. The AEM survey will be flown at approximately 300 meter (984 feet) spacing in a north-south direction and approximately 1500 meter (4,920 feet) spacing in an east-west direction. Approximately 1,360 kilometers (845 miles) of AEM survey will be flown.

   A. The Contractor shall acquire an AEM survey flown over the LPSNRD to provide the hydrogeological framework, commencing on approximately August 1, 2013. Status reports of the flying will be provided to the LPSNRD daily, including the areas flown, production rates, and flight plan for the following day.

   B. The Contractor shall process and quality assure/quality control all of the data collected from the AEM and ground system.

   C. The Contractor shall invert the AEM data and then derive a 3D electrical model of the surveyed area. These inverted georeferenced data will be delivered to the LPSNRD.

   D. The Contractor shall provide a hydrogeologic framework report that will include maps of aquifer(s), estimate of aquifer(s) volume, map of aquifer(s) relationship to current test holes and production groundwater wells, and a map of estimated potential recharge areas. The report will also include all data and metadata files. The report will be delivered in PDF digital format.

2. SCHEDULE of Work 2014:

   Upon completion of the AEM survey, the Contractor will begin on or before September 1, 2014, the geophysical processing, including numerical inversions to create a preliminary dataset to be shared with the LPSNRD.

   Post geophysical processing, the Contractor will begin development of the hydrogeologic framework. At times during its development, interaction with LPSNRD staff will be needed to keep both parties apprised of progress. After completion of the framework, an interpretive publication will be produced and

reported out to the LPSNRD. The final report will be delivered by December 31, 2014.

The AEM data was successfully collected by October 2013, including all quality control, quality assurance, and initial inversions of the data. In total, 827 line-miles of data were collected during the survey. Data interpretation and report writing started in September 2014 and will be completed with final delivery of this report to LPSNRD. All contracted activities within the scope and schedule of work were met or exceeded.

Interpretation of the AEM data collected in 2013 provided a superior subsurface characterization of the principal aquifer that correlated with pre-existing geologic information. The interpretation also provided a new understanding of the glacial and bedrock features present in the subsurface. Lithologic descriptions from test holes (University of Nebraska-Conservation and Survey Division) and registered well records (Nebraska Department of Natural Resources) provided the most useful historical information in the development of the new hydrogeologic framework. Additional supporting data included historic cross sections and a limited number of geophysical logs from the Conservation and Survey Division.

The AEM provided detailed verification and quantification of the paleovalleys that underlie the glacial sediments in the project area. The glacial sediments were mapped in three dimensions (3D) to show the distribution of aquifer materials and aquicludes across the project area. Of particular importance are the location, orientation, and connectivity between the deposits comprising the principal aquifer and the local streams that originate in the project area. Also revealed in the hydrogeologic framework were locations at the land surface where potential for recharge to the principal aquifer is likely the greatest. Three-dimensional characterization of the glacial till and loess areas provides insight into the confined and unconfined nature of the groundwater system and where water quality management could be impacted by the presence or absence of these materials. The principal aquifer is characterized by the three-dimensional hydrogeologic framework to a level not achievable by other means such as cross-section interpolation of geologic units between test holes.

Within the project area, the principal aquifer is estimated to contain nearly 884,000 acre-feet of fresh (non-brackish) water. Cretaceous bedrock aquifers units were identified and mapped in 3D within the depth of investigation of around 900 feet. In the LPSNRD, brackish and saline groundwater is known to exist in the bedrock strata. These waters can be mapped in 3D by AEM methods, however, there is limited historical data or new supporting data available to confirm these waters exist in the project area. The body and appendices of the report contains the information used in the AEM interpretation and development of the hydrogeologic framework.

1.0 Introduction

1.1 Purpose and Scope

Sound management of groundwater and surface water in eastern Nebraska has become increasingly important when considering the pressures placed on the resource by the ever-increasing demand for agricultural production and derivative energy products worldwide, population growth and urbanization, potential contamination from natural and anthropogenic sources, industrial needs, and the persistent threat of drought. The combination of these stresses on water resources has increased the need for detailed hydrogeologic frameworks of the subsurface in the Lower Platte South Natural Resources District (LPSNRD). For the LPSNRD to effectively develop and utilize its groundwater management plan, detailed information on the districtôs aquifers is of critical importance. In particular, the LPSNRD needs to understand the aquifer characteristics, interconnection with surface water, interconnection with adjacent aquifers, and connection to the existing groundwater production wells. Eight (8) University of Nebraska-Lincoln Conservation and Survey Division (CSD) test holes are present in or near the project area. These test holes are vital to the understanding of the subsurface conditions of the area, but they cannot provide enough information to complete a detailed hydrogeologic framework.

Selection of the appropriate approaches to resource management is essential to securing a viable water supply for Nebraskaôs natural resources districts (NRDs). Implementation of these activities can be expensive both monetarily and in the duration of time to design and implement. Such projects are often challenged by other interests as to their effectiveness and suitability to provide equitable water use within a district or basin. Therefore, it was recommended that airborne electromagnetic (AEM) surveys be performed to supplement the test hole information to develop a new hydrogeologic framework of the project area. The AEM survey provides nearly continuous sampling of the subsurface. It is acquired quickly without trespass onto private property. Once acquired, it can then be analyzed and related to the geologic materials composing the aquifer. Historical AEM work in eastern Nebraska indicated that time domain AEM is the most suitable method for mapping glacially-derived aquifers overlain by thick till sequences found across much of the eastern part of the state (Abraham and others, 2011a). Detailed hydrogeologic frameworks will give greater confidence to regulators, investors, and the public in water management decisions and practices because the understanding of the natural system is represented in detail never before achieved. The maps and diagrams produced by this study allow the LPSNRD to show the subsurface in a visual depiction that the layperson can easily understand. This information also allows for future exploration of undeveloped potential groundwater resources.

Pre-existing geologic information in the form of test-hole logs, interpretive cross sections, groundwater quality information, groundwater levels, aquifer characteristics, and borehole geophysical logs must be part of any AEM investigation. Each of these items were utilized in developing the hydrogeologic framework for this project. The aquifer frameworks developed from the AEM data allow the user to visualize the subsurface in three dimensions (3D) so that a 3D evaluation of the aquifer can be made in order to estimate various percentages of the aquifer materials and their location/relationship to existing extraction wells.

1.2 Previous Work

Use of AEM technology to map and evaluate groundwater resources has gained momentum over the last 20 years domestically and internationally. The state of Nebraska

has been on the forefront of implementing AEM for water resources management over the last decade with projects across the state in a variety of geologic settings. In recent years, the Eastern Nebraska Water Resources Assessment (ENWRA) has coordinated efforts between area NRDs, CSD, the U.S. Geological Survey (USGS) and Exploration Resources International Geophysics, LLC (XRI) in support of several projects designed to characterize glacial outwash and buried paleovalley aquifers across the eastern part of the state. In March 2007, AEM methods were implemented to characterize the hydrogeologic conditions in the Platte River valley near Ashland, as well as in areas underlain by glacial till near Firth and Oakland, Nebraska (Smith and others, 2007; Hanson and others, 2012). In the following years, individual reports utilizing the AEM data collected in 2007 were released by the USGS and CSD. In 2009, a multi-faceted investigation incorporating the 2007 AEM data and 2009 ground-based geophysical techniques was conducted by the USGS to characterize the hydrogeologic setting near Oakland, Nebraska. In 2009, the Lower Platte South NRD funded development of a 3D hydrostratigraphic framework of the subsurface near Swedeburg, Nebraska that was developed from an AEM survey (Smith and others, 2011; Divine and Korus, 2013). Also in 2009, the Lower Platte South NRD funded a similar investigation of the hydrostratigraphy near Sprague, Nebraska (Smith and others, 2011; Divine and Korus, 2012). In 2013, the Lower Elkhorn NRD funded XRI for an AEM survey near the towns of Clarkson and Howells, Nebraska to characterize the extent of the Quaternary aquifer beneath the area following the drought of 2012 (Abraham and others, 2013). In the fall of 2014, XRI completed a large AEM survey in northeast Nebraska, including much of the Lower Elkhorn NRD and parts of the Lewis and Clark, Lower Platte North, Lowe Platte South, and Papio-Missouri River NRDs (published report expected in early 2015). AEM surveys of the subsurface in the glacial terrain of eastern Nebraska have followed a progressive, long-term plan spanning nearly 8 years. This body of work shows the continuing advancements in the science and application of AEM to solve the groundwater-related need for detailed information in support of management purposes.

In regards to site-specific, non-geophysical, previous work related to hydrogeologic investigations, Druliner and Mason (2001) conducted an evaluation of the five principal aquifers in the LPSNRD in the mid-1990s, which included the portion of the LPSNRD investigated in this report.

1.3 Project Area Description

The project area covers over 99 square miles (mi^2) (63,360 acres) of the Dwight-Valparaiso Groundwater Reservoir (LPSNRD GWMP, 1995) area in Butler, Saunders, and Lancaster counties, Nebraska. AEM data were acquired in three separate flight blocks, hereinafter referred to as "blocks" in the text of this report. The survey area covers parts of areas C) Oak-Middle Creek and D) Oak Creek which are outlined in the LPSNRD Groundwater Management Plan (LPSNRD GWMP, 1995). The north and south blocks straddle the Butler-Saunders county line, and the east block is entirely within Saunders County. The south block's southern edge borders the Seward-Butler and Saunders-Lancaster county lines, and a small section (approximately 1 mi^2) of this block extends southward into Lancaster County (Figure 1-1). Population centers in the project area (Figure 1) include the towns of Dwight (pop. 202) and Valparaiso (pop. 562) in the south block and Brainard (pop. 328) in the north block (U.S. Census Bureau). Agriculture in the form of both irrigated and non-irrigated cropping practices, as well as livestock grazing is the main economic activity of the area.

1.3.1 Physiography

The project area is situated within Nebraskaôs Rolling Hills Topographic Region (Conservation and Survey Division, 1973). This physiographic setting is predominately a hilly upland landscape with moderate to steep slopes and rounded hilltops. The hills in the area are composed of glacial till mantled by wind-transported silt deposits (loess). Local relief within the project area ranges from nearly 1,700 feet (ft) above sea level (asl) in the north block down to approximately 1,230 ft asl in the east block, for a total local relief of nearly 500 ft in the project area. These areas are characterized with steeply-sloped hills separated by narrow, vegetated valleys. The topography in the Valparaiso area and in the east block, in particular, has considerably less relief than the north and south blocks.

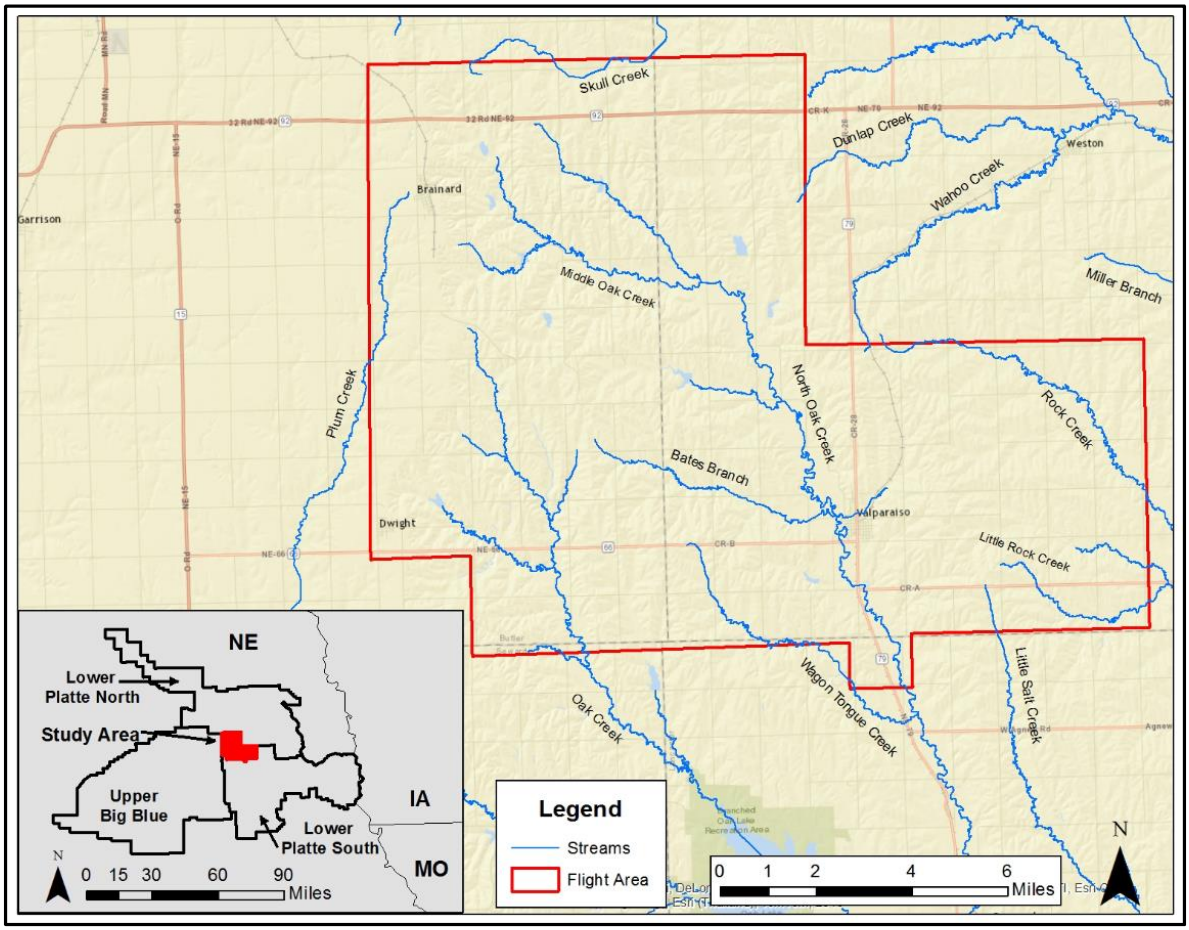


Figure 1-1 – Project area location. The regional inset map displays the neighboring NRD boundaries. County boundaries are shown in a gray dashed line, and the local drainages are shown with blue lines.

1.3.2 Climate Conditions

The project area is located within a continental humid, microthermal climate region based on the simplified Köppen climate classification system. These regions are known for severe winters and hot summers and cover much of the eastern half of the United States (Peel and others, 2007). At Seward, Nebraska, approximately 9.5 miles southwest of the south block, the mean annual high and low temperatures are 61.8 and 38.6 degrees Fahrenheit (F), respectively, with an overall annual average temperature of 50.2 F. Mean annual precipitation at Seward, is 28.2 inches per year, with an average of 22 inches of snowfall in the winter (www.usclimatedata.com, 2014). Sixty-five percent of the annual

precipitation occurs during the five-month period of April through August in the project area. Near-surface average annual wind speed (at 98 ft above land surface) across the project area ranges from 12 to 14.5 miles per hour (Nebraska Energy Office, 2012), and lake evaporation rates in the project area range from 42 to 44 inches per year (Nebraska Dept. of Environmental Quality, 2012).

1.3.3 Surface Hydrology

The rolling upland hills of the project area serve as the source areas for four local watersheds that dissect the terrain in dendritic patterns. Across the north block is a watershed divide that separates the northward-draining Skull Creek watershed and southward-draining Oak Creek watershed. On the eastern edge of the north block, tributary drainages to the Wahoo Creek watershed slope east/northeastward. Just east of Valparaiso, a local watershed divide separates the Oak Creek watershed from the Rock Creek watershed that originates near the center of the east block and flows southeastward. The Skull Creek drainage flows directly into the Platte River north of the project area. The southward flowing Oak and Rock Creek drainages empty into Salt Creek in central Lancaster County, and Wahoo Creek empties into Salt Creek approximately two miles upstream of the Salt Creek-Platte River confluence.

USGS topographic maps indicate that most of the surface-water drainages within the project area are intermittent. However, these maps are over forty years old and may not reflect the contemporary hydrologic flow system that has likely been altered due to changes in land use, land conservation and irrigation practices, and modifications that may have increased or decreased surface water runoff and/or altered plant evapotranspiration patterns. Terracing of agricultural fields, which can affect runoff and potential groundwater recharge is practiced at many locations across the project area. In addition to agricultural practices influencing the project area's hydrologic cycle, most of the drainages crossing the project area contain abundant riparian vegetation, including large stands of deciduous trees, which can remove and transpire shallow groundwater from streambed deposits mantling the drainages. During a project area reconnaissance visit in September 2014, XRI geologists observed live flow in several upland streams near Brainard and Valparaiso. The presence of this flow may be due to the changes in land use practices over the past several decades. No USGS or Nebraska Department of Natural Resources (NDNR) flow gages are available on any tributary within the project area, and comparison of recent precipitation patterns with runoff would need to be conducted to ascertain whether flow in the project area drainages have become semi- to fully perennial.

Several surface water impoundments are present within the project area, ranging in size from about one to over 25 acres. Most of these impoundments were constructed for flood control in the steeply-sloped terrain present in the north and south blocks (and the area between the blocks) (Dick Ehrman, Water Resources Specialist, LPSNRD, personal comm., October 9, 2014).

1.3.4 Hydrologic Flow System

The movement of water from a source area to a location of discharge, whether along surface pathways or through porous or fractured subsurface media is defined as a hydrologic flow system for an area of interest. Such systems can be regional in extent (e.g. the High Plains aquifer) or a local watershed that contributes surface and/or subsurface flow to a larger river or groundwater system. As noted in the previous section, the uplands in the western half of the project area serve as the source area for three local surface watersheds (Figure 1). Influx of water into the project area is primarily from precipitation (there are no diversions of surface water supplies into the area from other basins), much

of which becomes runoff to the drainages that flow to the north, east, and south toward the Platte River and Salt Creek (Druliner and Mason, 2001). Without suitable stream gages or estimates of surface flow in the project area, it is not possible to calculate a formal water budget. However, based on the mean annual precipitation rate at Seward, the project area outlined in red in Figure 1 receives nearly 150,000 acre-feet of water annually from precipitation.

During precipitation events, the steeply sloped catchments, particularly in the western half of the project area, concentrate runoff that (1) provides ephemeral surface flow and, (2) provides potential recharge to the underlying groundwater-flow system. The downward component of precipitation-derived recharge to aquifers in the project area is largely dependent upon the amount of precipitation, as well as the permeability and thickness of glacial till and loess units that comprise the upland hills in the area. In the areas containing thicker deposits of glacial till, movement of water through the clay- and silt-rich unsaturated zone to the principal aquifer is likely very slow considering the low permeabilities typical of these types of materials (Fetter, 1994). The presence of local, shallow groundwater-flow systems are likely in the uplands of the project area near Brainard and Dwight. During wet periods, these local groundwater-flow systems can also contribute flow to upper order surface drainages and hillside seeps where phreatophytes can directly tap near-surface saturated zones.

Relatively rapid entry of precipitation and runoff into the principal aquifer occurs only where unconsolidated deposits are close to the land surface or are overlain by thin to no glacial till or loess (Gosselin and others, 2001). These shallow areas occur primarily on the eastern one-third of the north block, in the eastern quarter of the south block, and in scattered areas across the east block. Examples of these areas are displayed in the AEM output images in following sections of this report. Druliner and Mason (2001) demonstrate that regional groundwater movement through the principal aquifer units underlying the project area is from the northwest to the southeast, toward the Salt Creek surface drainage.

The hydrologic flow system has been altered by land use changes since settlement of the project area. First, clearing of land and conversion of prairie pastures to row crops modified the flux of soil moisture by decreasing evapotranspiration from plants, increasing the chance for deep percolation, and increasing the potential for surface runoff and erosion. Also, an increase of groundwater irrigation since the 1950s in the project area has further altered the system by drafting groundwater from the area aquifers. Application of groundwater to the land surface for irrigation further increased the potential for deep percolation and surface runoff by increasing the total amount of water available.

1.3.5 Land and Water Use

The project area is primarily rural, with scattered farmsteads present in the region between the towns. Land use is a mix of grazing pastures as well as irrigated and non-irrigated crop production. Evaluation of the NDNRÕs registered well database revealed a total of 93 registered irrigation wells within the project area (Figure 1-2). Figure 1-3 displays the progression of irrigation well development in the project area from the 1950s through the early 2000s. This figure demonstrates a general northward progression in well development since the mid-20th century, with construction of wells in the north block not occurring until the 1990s. Many more unregistered wells are also present within the project area bounds (Dick Ehrman, Water Resources Specialist, LPSNRD, personal comm., October 9, 2014).

In the east block, irrigation wells are scattered across much of the area, whereas their distribution is more concentrated in isolated areas in the north and south blocks. NDNR records indicate a total of over 10,900 irrigated acres associated with these wells within the three blocks. Registered pumping rates for irrigation wells with suitable records range from 200 to 1,322 gallons per minute (gpm), with an average 823 gpm. Domestic wells are scattered across the area (Figure 1-2). These wells are typically less indicative of total aquifer potential as homeowners normally construct wells in the first available saturated material capable of producing yields needed for in-home use and landscaping irrigation. However, patterns of distribution of domestic wells can reveal general trends in productive zones in the aquifer as well as where groundwater users could be a risk from contamination. Production rates in domestic wells in the project area range from 3 to 45 gpm, with an average rate of 11 gpm. No industrial wells are present in the area. Review of public water supply well records obtained from the NDNR for the towns of Dwight, Brainard, and Valparaiso indicate that wells serving those communities range in production rates from 50 to 448 gpm.

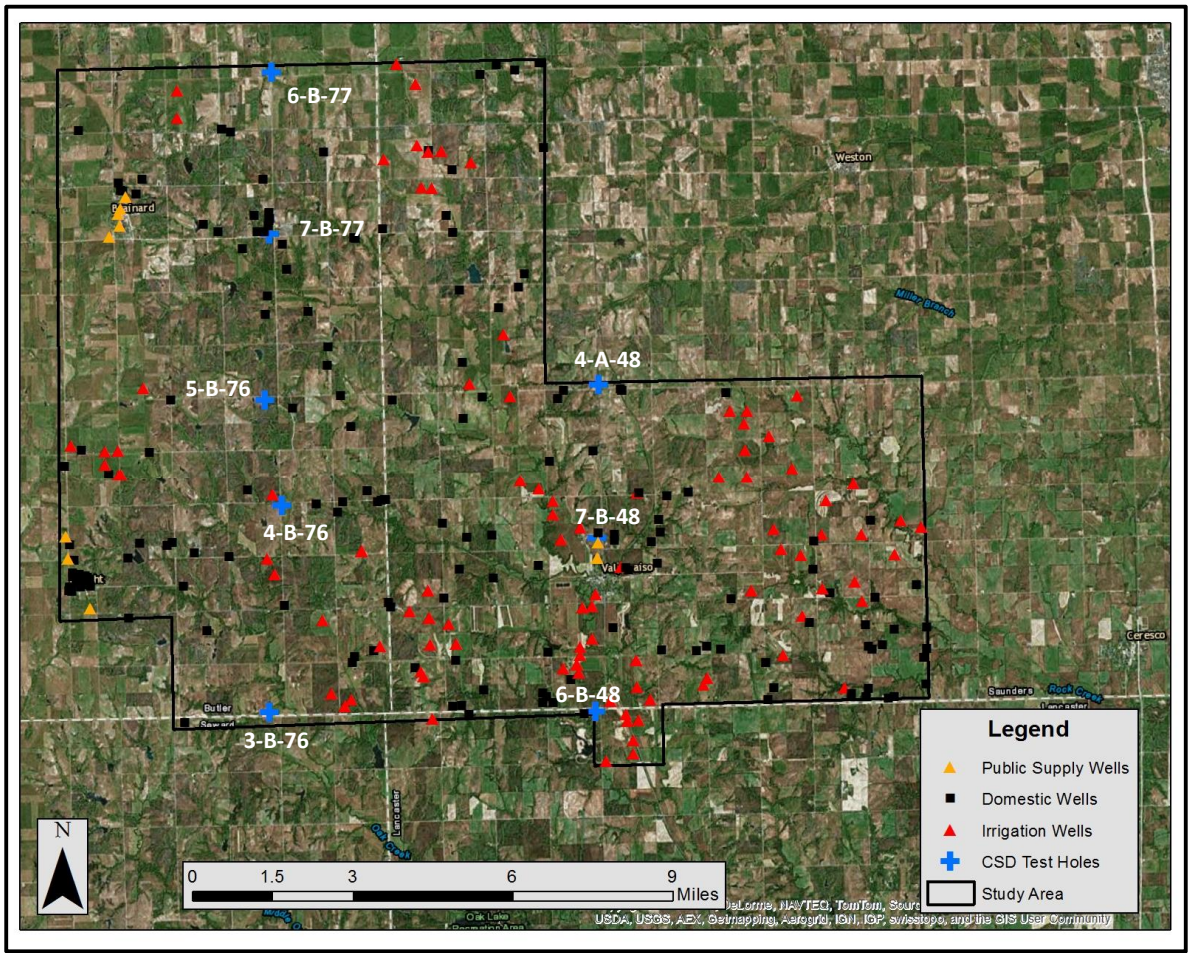


Figure 1-2 – Locations of registered wells by use and CSD test holes in the project area. CSD test hole identification numbers are plotted next to the hole location.

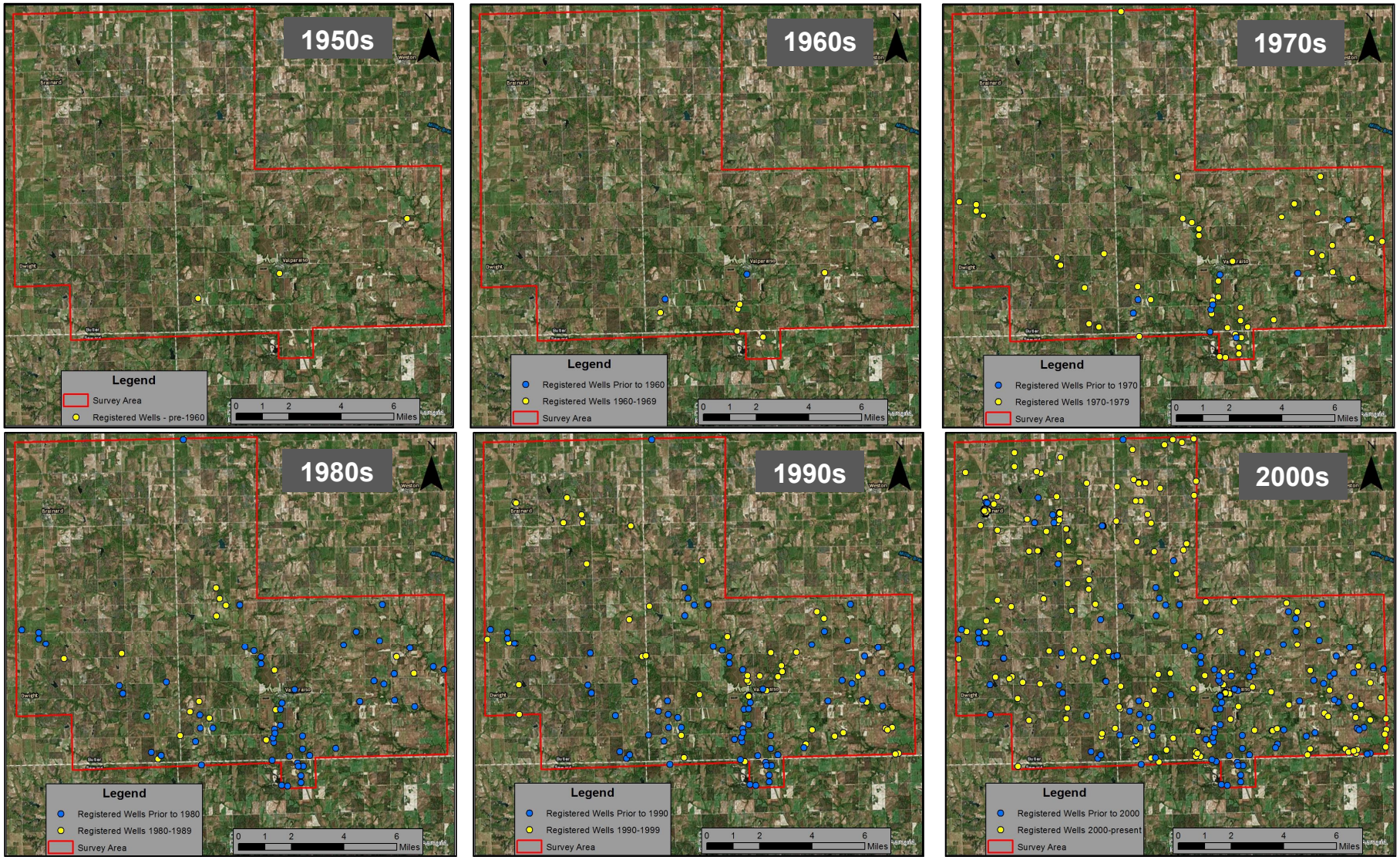


Figure 1-3 – Progression of groundwater development in the project area, 1950-2014, by decade.

2.0 Geophysical Methodology

2.1 Airborne Electromagnetic Survey

2.1.1 Method

Airborne electromagnetic (AEM) surveys, flown with either helicopter or fixed-wing aircraft, increasingly have been employed to characterize aquifers and their geologic setting (Fitterman and Deszcz-Pan, 1998; Wynn, 2002; Jørgensen and others, 2003; Paine and Minty, 2005; Møller and others, 2009; Viezzoli and others, 2010; Abraham and others, 2011a; Abraham and others, 2011b; Jorgensen and others, 2012; Oldenborger and others, 2013; Lawrie and others, 2013). Such AEM surveys can provide characterization of electrical properties of earth materials from the near surface (3 to 10 feet bgl) to depths approaching 2,000 ft. Typical AEM systems transmit an electromagnetic (radio-frequency) signal that interacts with the earth to generate (induce) secondary currents. Those secondary currents are a function of the subsurface electrical resistivity, which is controlled by the amount of mineralogical clay, gravel, water content (and the dissolved solids in the water), metallic mineralization, and void space. Figure 2-1 shows a generalized schematic of the AEM process. Measurements of the secondary currents are recorded either in the time domain (where the signal is a train of pulses and measurements are taken between the primary field pulses as a function of time as the secondary currents decay) or in the frequency domain (where the signal is a continuous wave and measurements are taken at the frequency of the primary field and its harmonics, which are still present). Using numerical imaging and inversion, depth sections of

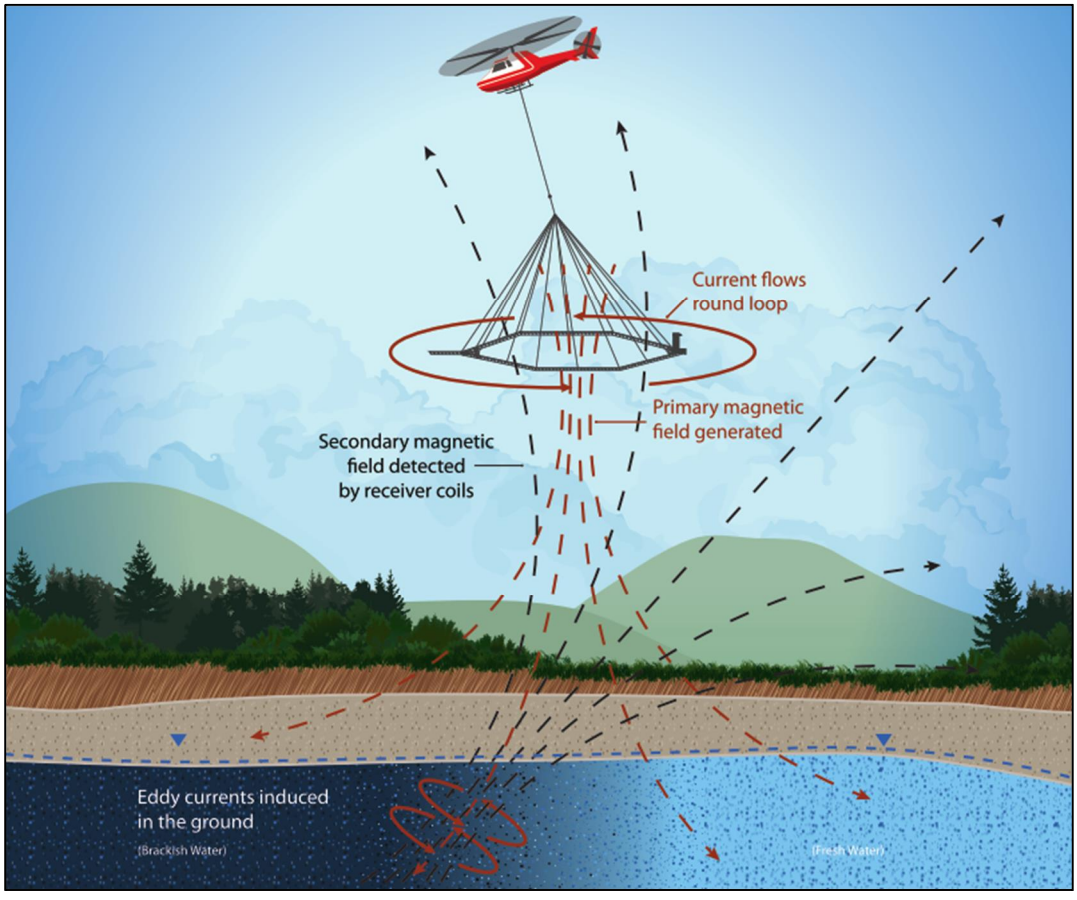


Figure 2-1 – Generalized schematic of the basic geophysics incorporated in the AEM in-flight data acquisition process.

estimated electrical resistivity can be created along the survey flight lines. Interpolations between flight lines provide an estimation of the three-dimensional (3D) distribution of electrical resistivity and is represented as a 3D resistivity model.

Obtaining a reliable AEM-derived resistivity model requires complete system characterization including 1) geometry; 2) frequencies (times) and bandwidth; 3) transmitter waveform characteristics; 4) timing; and 5) accurate modeling (Christiansen and others, 2011). Poor AEM modeling assumptions can lead to errors in the resulting resistivity models and, in turn, the hydrologic and geologic interpretations (Viezzoli and others, 2013). These effects can include erroneous resistive or conductive layers and skewed estimates of depth to interfaces. Inverting AEM data with an incomplete system description will commonly lead to a reasonable, but incorrect earth resistivity model that fits the data to within measured or estimated data errors.

Electromagnetic geophysical methods detect variations in the electrical properties of rocks. In particular, electrical resistivity, or its inverse, electrical conductivity. Electrical resistivity can be correlated with geologic units on the surface and at depth using lithologic logs to provide a 3D picture of subsurface geology. In the upper crust, the resistivities of geologic units are largely dependent upon their fluid content, pore-volume porosity, effective porosity, and conductive mineral content (Keller, 1989). While there is not a one-to-one relationship between lithology and resistivity, there are general correlations that can be made using typical values, even though values can be found at other localities that may fall outside of the ranges presented herein (Palacky, 1987). Fluids within the pore spaces and fracture openings can reduce electrical resistivities in what would otherwise be a resistive rock matrix, especially if the fluids are high in dissolved solids.

Resistivity can also be lowered by the presence of electrically conductive clay minerals, graphitic carbon, and metallic mineralization. For example, it is common for altered volcanic rocks to contain replacement minerals that have resistivities 10 times lower than those of the surrounding rocks (Nelson and Anderson, 1992). Fine-grained sediments, such as clay-rich alluvium, marine shales, and other mudstones, are normally conductive from a few ohm-m to a few tens of ohm-m (Keller, 1987; Palacky, 1987). Metamorphic rocks (non-graphitic) and unaltered, unfractured igneous rocks are normally moderately to highly resistive (a few hundreds to thousands of ohm-m). Carbonate rocks can have similarly high resistivities depending on their fluid content, porosity, and impurities (Keller, 1987; Palacky, 1987). Fault zones may be moderately conductive (tens of ohm-m) when composed of rocks fractured enough to have hosted fluid transport and consequent mineralogical alteration (Eberhart-Phillips and others, 1995). Higher subsurface temperatures cause higher ionic mobility that reduces rock resistivities (Keller, 1987; Palacky, 1987). Tables of electrical resistivity for a variety of rocks, minerals, and geological environments are in Keller (1987) and Palacky (1987).

2.1.2 AEM Measurements

The AEM measurements in the project area were completed with the SkyTEM 304 system. The SkyTEM system is a rigid frame, dual-moment transient electromagnetic (TEM) system developed over the past ten years (Sørensen and Auken, 2004). In contrast to the other TEM systems, the SkyTEM system has the receiver coil positioned slightly behind and above the transmitter wire in a ñmullòposition, where the intensity of the primary field is minimized. The SkyTEM system was initially designed for groundwater mapping, and to this end employs two transmitter moments with different currents and different numbers of transmitter wire turns. The low current, or low moment (LM) mode, with a moment of 3,140 (number of turns × current × amp × area (m^2) - also known as

NIA), is used to record early-time data which constrain the near-surface information, while the high current, or high moment (HM) mode, with a moment of 145,000 NIA, improves the signal-to-noise ratio at late time gates and greater depths.

The SkyTEM 304, has a transmitter area of 314 m^2, and is intermediate between the SkyTEM 101 system, used for very near-surface applications, and the SkyTEM 508, designed for deeper investigations. The SkyTEM 304 system records data at time gates ranging from 1.6 ɛs to 11 ms. The gates analyzed in the LPSNRD survey fall between 9.6 ɛs and 7.0 ms, with the latest recorded gates being too noisy for use, and the gates before 5 ɛs contaminated by residual primary field.

The SkyTEM system is calibrated to a ground test site in Lyngby, Denmark where the system was developed (HGG, 2010; HGG, 2011; Foged and others, 2013). Approximately 827 line miles (1,331 km) were flown within the three project area blocks (Figure 2-2). Flight operations began on 13 August and continued through 22 August 2013.

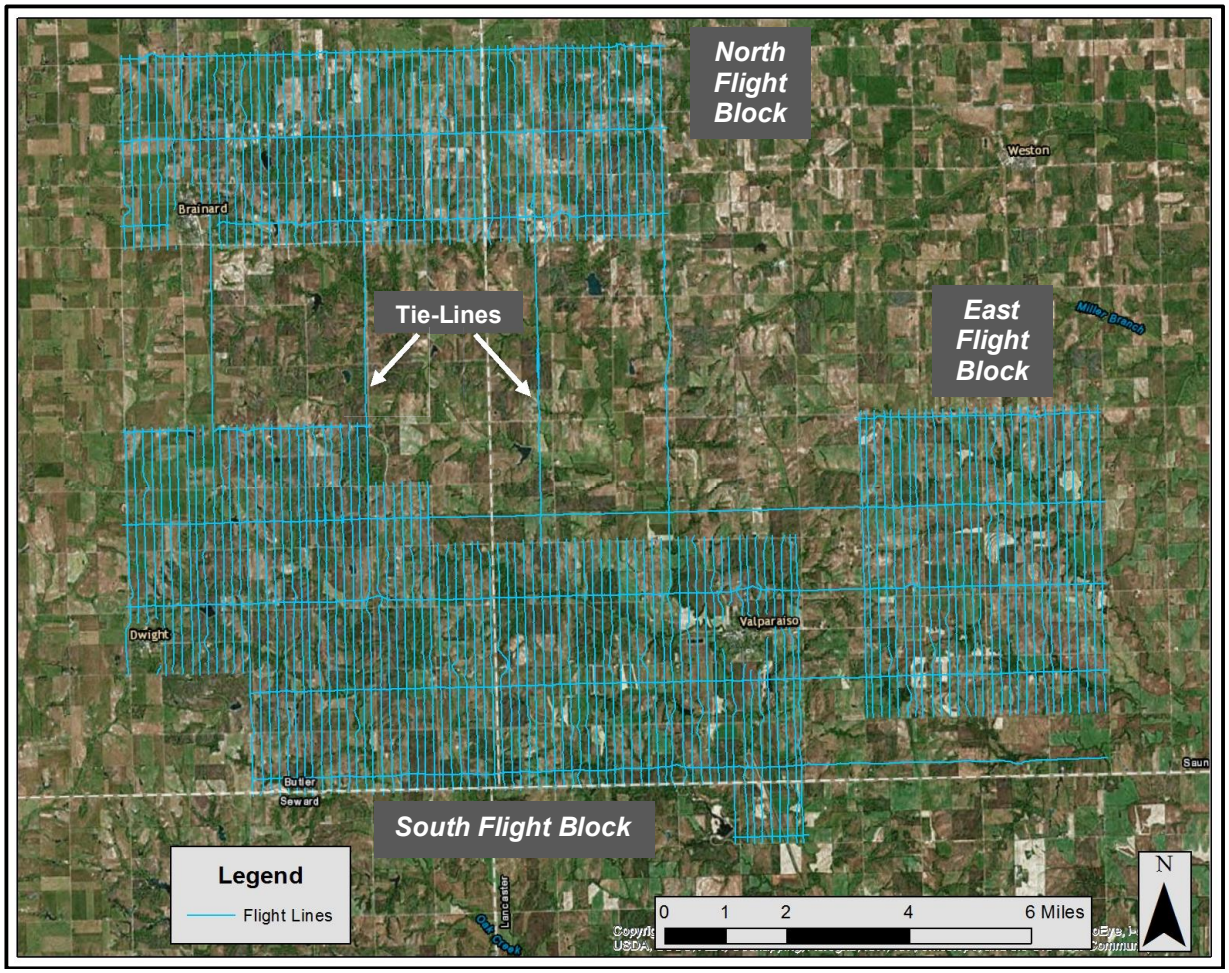


Figure 2-2 – Flight line locations over the project area.

2.1.3 Project Area Infrastructure

Four types of utilities (pipelines, wells, railroads, and power/telephone lines) were located in the study area to include in the AEM data processing. Metallic infrastructure can alter the electromagnetic signal from the subsurface, therefore it is critical to identify these locations for proper inversion the data. Pipeline data were purchased from Platts (www.platts.com) in the form of a Geographic Information Systems (GIS) shapefile. A GIS shapefile of wells in the state of Nebraska was downloaded from the NDNR. A GIS shapefile of railroads in the state of Nebraska was downloaded from The National Map of the United States (U.S. Geological Survey- http://nationalmap.gov/small_scale/). Power and telephone lines in the area were located and marked in Google Earth. The locations of the power and telephone lines were then digitized into shapefiles in ArcMap. Maps of the four utilities were exported in GeoTIFF and .kmz formats for map creation (Figure 2-3) and were used during data processing and interpretation.

The only subsurface pipeline traversing the project area cuts across the northwest quarter of the north block. Numerous power lines cross each of the blocks, many that are near and parallel to the north-south tie lines. Only limited extents of power lines are present along the tie-lines. The only railroad tracks in the project area trend north-south on the east side of the south block near Valparaiso.

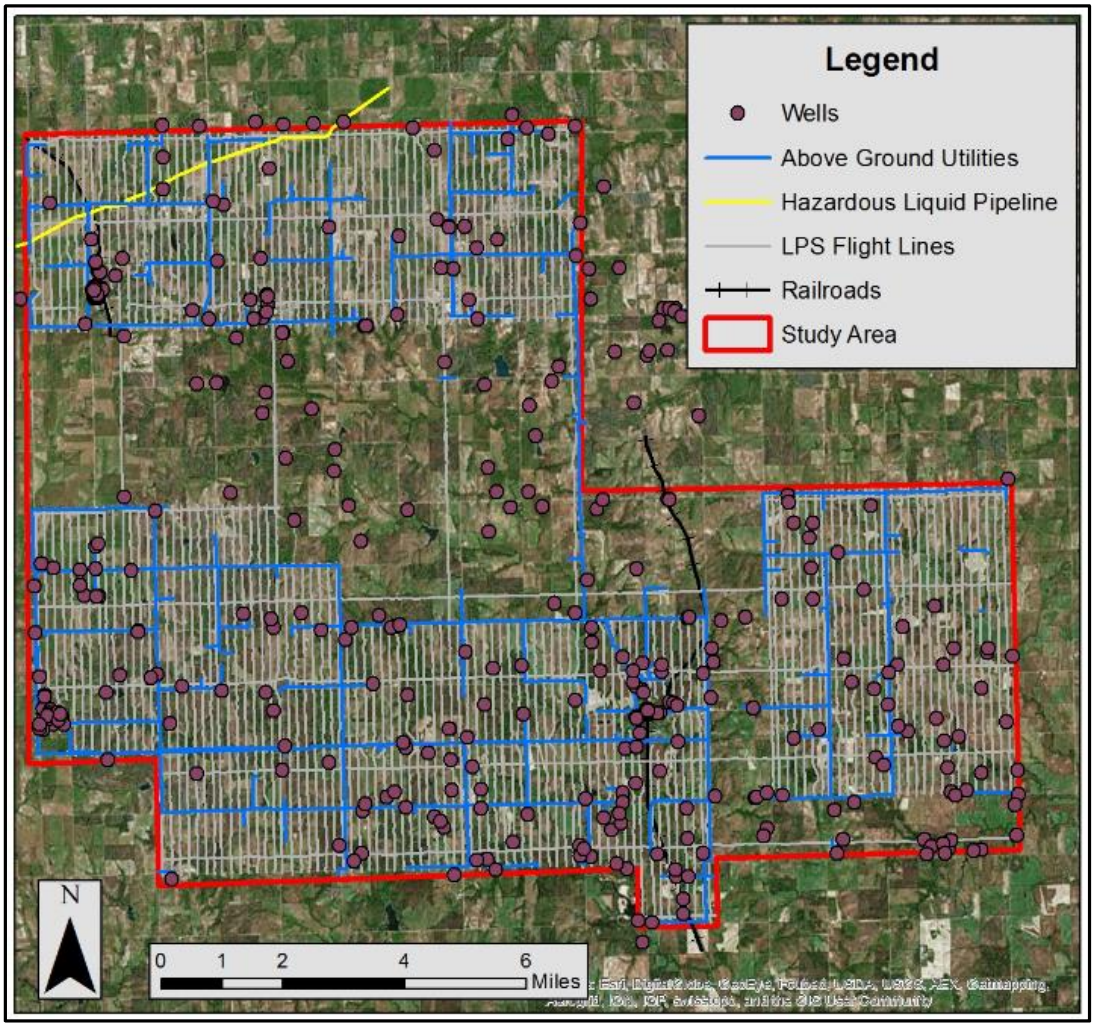


Figure 2-3 – Above ground and subsurface infrastructure in the project area.

2.1.4 AEM Data Processing

The software program Aarhus Geophysics Workbench version 4.1.1.768 (Aarhus Geophysics, 2013) was used for the processing and inversion of the AEM data. The Aarhus Geophysics Workbench was developed by the Hydrogeophysics Group at the University of Aarhus in Aarhus, Denmark (Auken and Christiansen, 2004; Viezzoli and others, 2008; Auken and others, 2009; Christiansen and Auken, 2012; Aarhus Geophysics, 2013). The Workbench is a complete processing and inversion tool and can be used with many types of AEM data. The Workbench is specifically well suited for editing AEM data and removing electromagnetic couplings to power lines and pipelines. Geosoft Oasis Montaj version 8.1 (Geosoft, 2014) and other XRI proprietary processing software were also used in the data processing of the airborne data collected during this project.

2.1.4.1 Automatic Processing

The data were first subjected to automatic processing algorithms provided within the Workbench program. GPS locations were filtered using a stepwise, second-order polynomial filter of 9 seconds with a step length of 0.5 seconds. Filters were also applied to both tilt meter readings - a median filter of 3 seconds and an average filter of 2 seconds. The TEM data are then corrected for tilt deviations from level. The sensor altitude data are corrected using a series of two polynomial filters. The length of both eighth-order polynomial filters were set to 30 seconds with shift lengths of 6 seconds. The lower and upper thresholds were 1 and 30 meters, respectively. The TEM data were subjected to several different filters including slope, sign, and trapezoidal filters. The Cap Sign Filters cull data when the value changes sign and began at 1.5×10^{-5} seconds for the Low Moment and 1×10^{-4} seconds for the High Moment. The noise level for the Cap Sign Filter was set to 5×10^{-7} ms*v/m^2 with a slope of -0.5 for the Low Moment and 2×10^{-7} ms*v/m^2 with a slope of -05 for the High Moment. The cap slope filter removed four time gates before the change in sign for both moments. The cap slope filter uses the same time periods, noise levels, and noise slopes as the Cap Sign Filter and removes sounding data if the second order derivative of the dB/dt curve is outside of the specified minimum and maximum slopes. The minimum slope was -0.5 and the maximum slope was 0.5 for both moments. The Average Sign Filter works on the averaged data, removing data when a change in sign occurs. The Average Slope Filters were not used on this data set. Trapezoidal filters were used to average the TEM sounding data. The times used to define the trapezoidal filters for the Low Moment were 1×10^{-5}, 1×10^{-4}, and 1×10^{-3} with widths of 2, 5 and 10 seconds. The times used to define the trapezoid for the High Moment were 1×10^{-4}, 1×10^{-3}, and 1×10^{-2} with widths of 5, 10, and 20 seconds. The spike factor and minimum number of gates were both set to 25 percent for both soundings.

After processing, which included elimination of some data due to signal interference, the remaining AEM data coverage for the three blocks was 576.7 miles, which was about 70 percent of the total data collected in the project area (Figure 2-4).

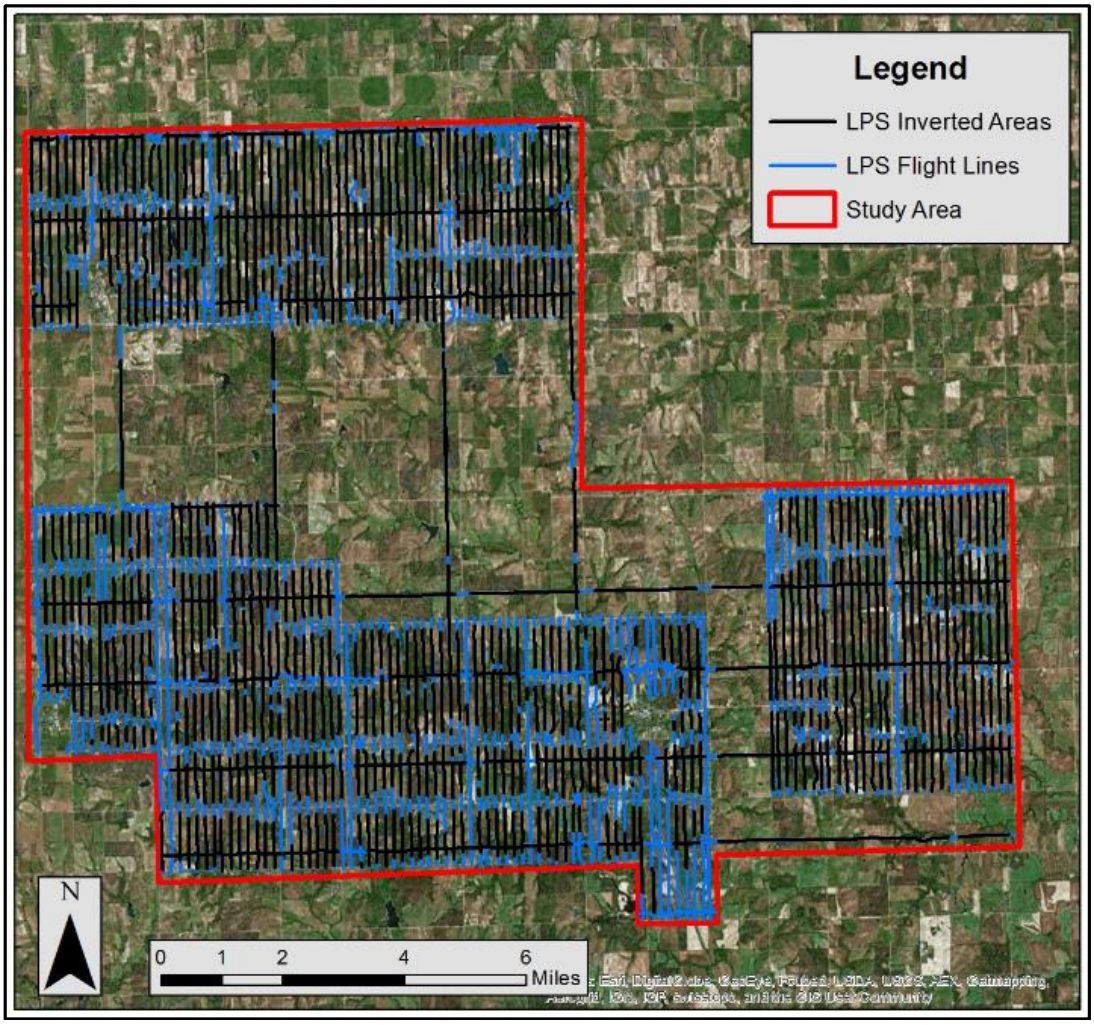


Figure 2-4 – Flight lines with data removed (blue) due to signal interference compared to total collected data points (black).

2.1.4.2 Power Line Noise Intensity (PLNI)

The PLNI assists in identifying possible sources of noise from power lines. The PLNI is produced by performing a spectral frequency content analysis on the raw received Z-component SkyTEM data. For every Low Moment data block, a Fourier Transform (FT) is performed on the latest usable time gate data. The FT is evaluated at the local power line transmission frequency (60 Hz) yielding the amplitude spectral density of the local power line noise. Pipelines are not mapped by the PLNI. Each of the blocks contain some level of interference along above-surface utilities The PLNI data for each block in the project area are presented in Figures 2-5 through 2-7.

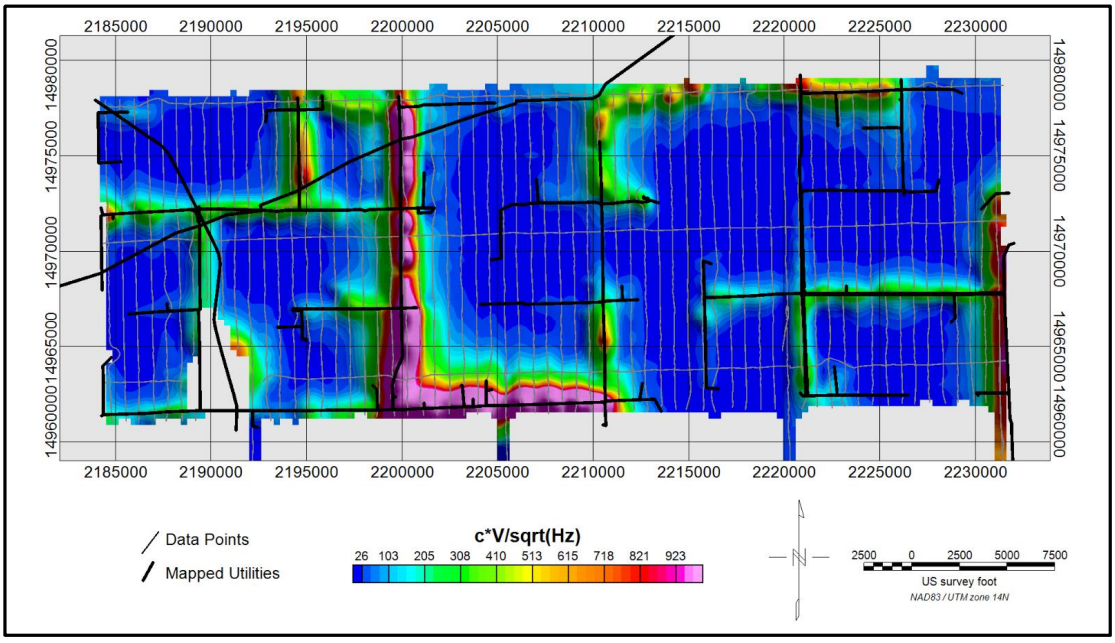


Figure 2-5 – Power Line Noise Intensity (PLNI) data for the north block. Mapped utilities are shown in black.

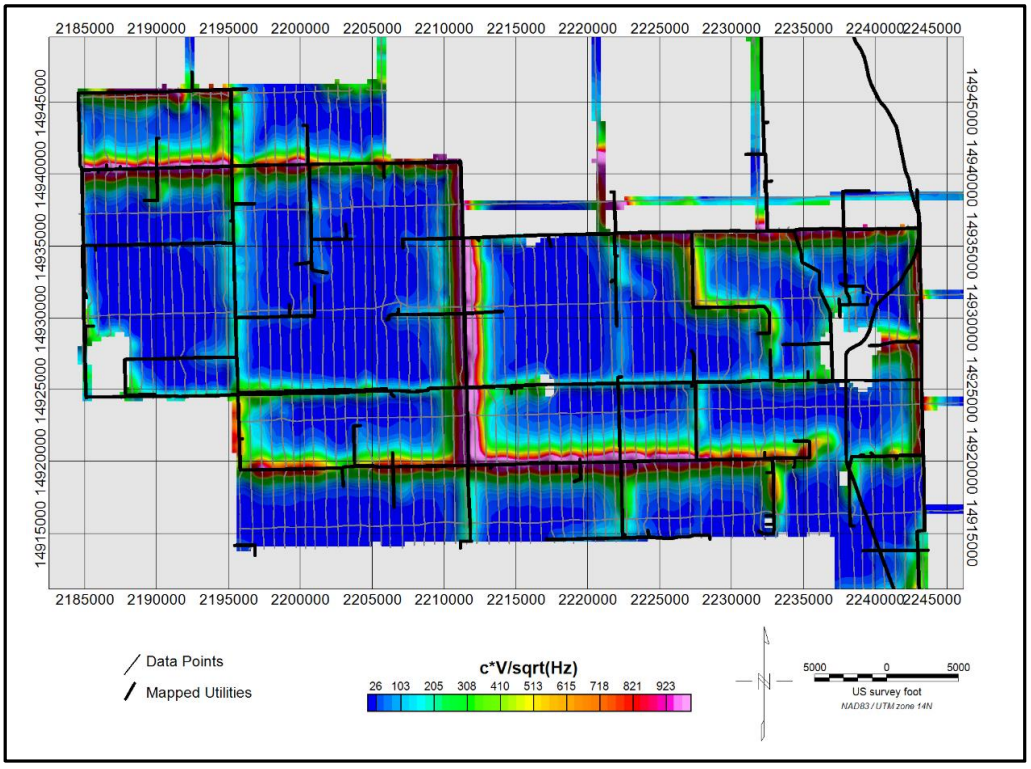


Figure 2-6 – Power Line Noise Intensity (PLNI) data for the south block. Mapped utilities are shown in black.

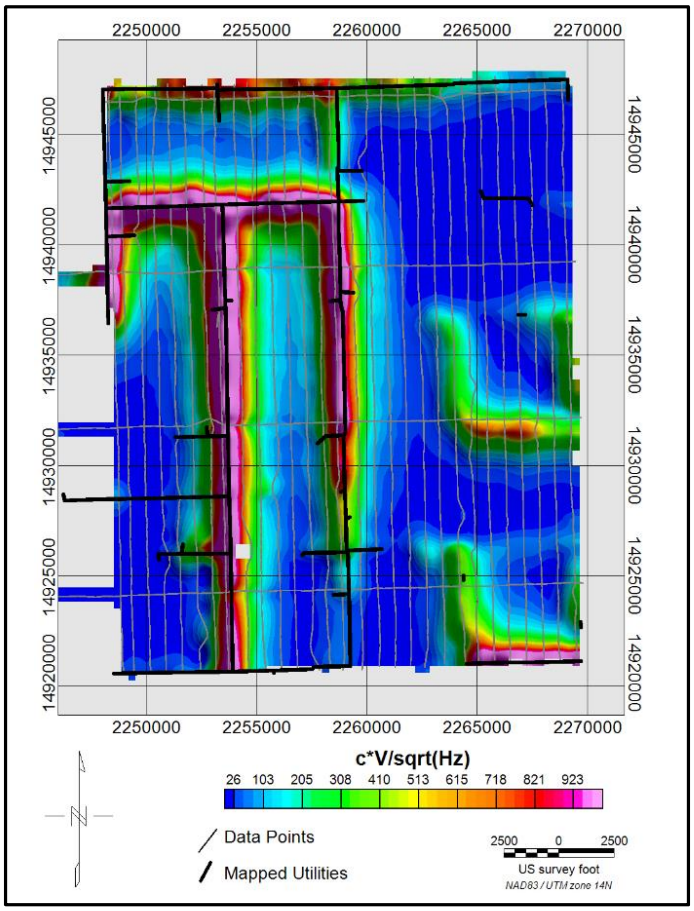


Figure 2-7 – Power Line Noise Intensity (PLNI) data for the east block. Mapped utilities are shown in black.

2.1.4.3 Magnetic Data Processing

To emphasize small anomalies caused by surface and subsurface ferrous metal, the Analytical Signal of the magnetic Total Field data was calculated. These data were processed using Oasis Montaj 8.0. They were first corrected for the diurnal drift (a four point non-linear filter was applied to Base Station 4 data). Next, the International Geomagnetic Reference Field (IGRF) was removed. Lastly, to emphasize the anomalies caused by surface and subsurface metal, the Analytic Signal of the magnetic data (Geosoft, 2014) was calculated and are displayed in figures 2-8 through 2-10.

2.1.4.4 Manual Processing and Laterally-Constrained Inversions

After the implementation of the automatic filtering, the TEM data were manually examined using a sliding 2 minute time window. The data were examined for possible coupling with surface and buried metal as well as for late time-gate noise levels. Data affected by these were removed. In addition, the results of the automatic filtering processes were monitored. In some instances, TEM data that were removed by the automatic filters were re-included. The magnetic Total Field data as well as the 60 Hz power line data were also used to remove coupling.

The TEM data were then inverted using a laterally-constrained inversion (LCI) algorithm. A starting model consisting of 30 layers each with a starting resistivity of 12 ohm-m was

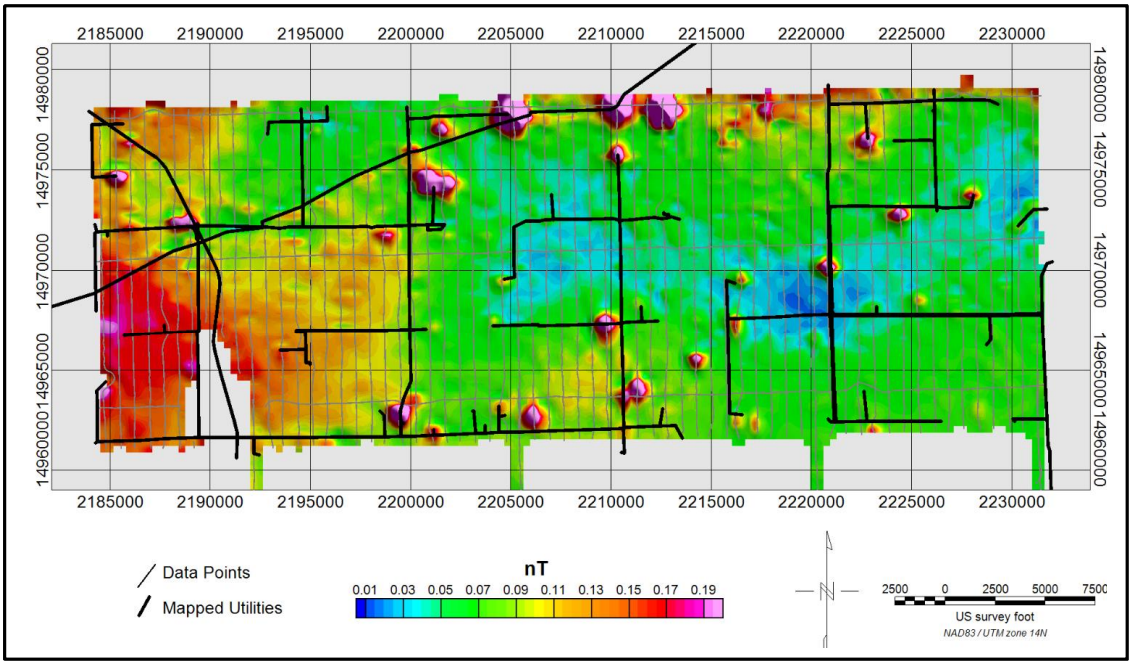


Figure 2-8 – Display of the magnetic field Analytical Signal in the north flight block.

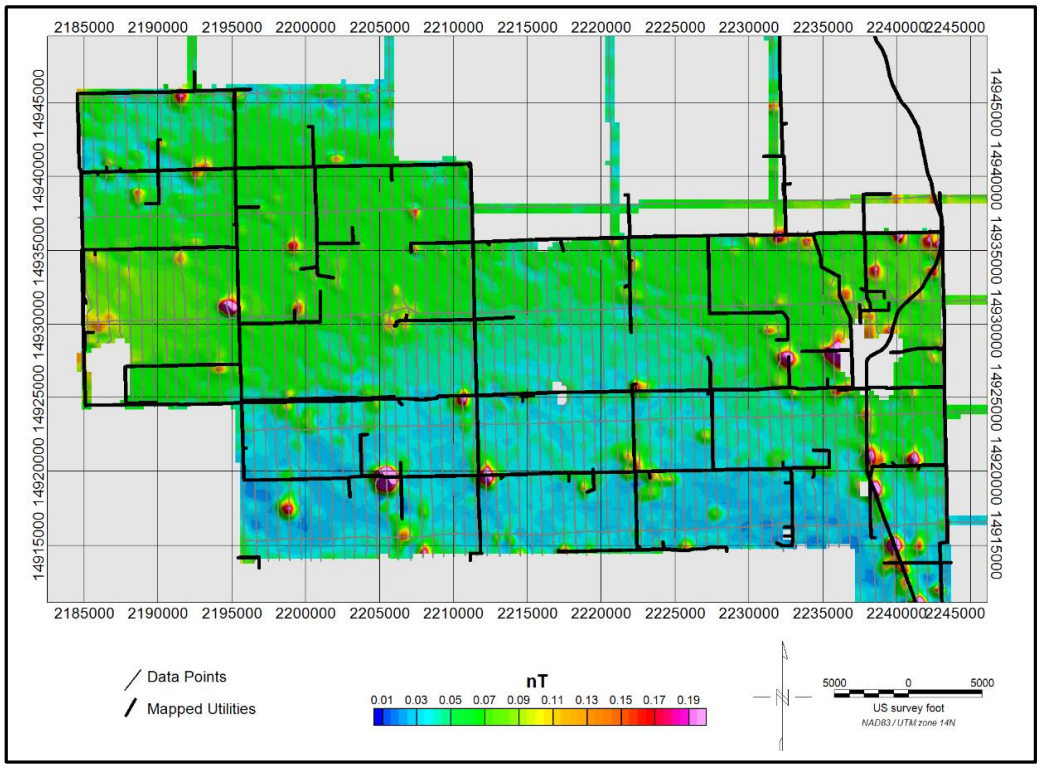


Figure 2-9 – Display of the magnetic field Analytical Signal in the south flight block.

used. This model went to a depth of over 800 ft with the thickness of the layers increasing with depth. The vertical resistivity standard deviation was set to 2, while the lateral resistivity standard deviation was set to 1.6. Following the LCI, profile and depth slices were created to examine the results of the inversion. When remaining electromagnetic couplings were identified in the sections, the data were again manually edited and additional LCIs were performed.

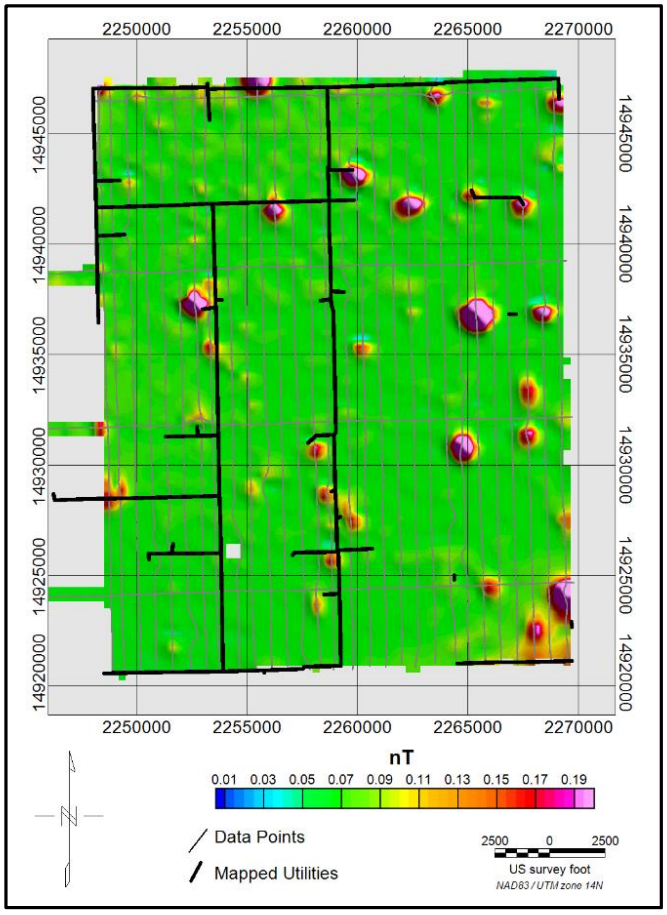


Figure 2-10 – Display of the magnetic field Analytical Signal in the east block.

2.1.4.5 Spatially Constrained Inversion

After the results of the second LCI were determined to be free of couplings, a spatially-constrained inversion (SCI) was performed. Each of the infill grids and the reconnaissance grid were processed using an SCI analysis. A starting model consisting of 30 layers with an initial resistivity of 12 ohm-m was used. This model again went to a depth of beyond 800 ft with the thickness of the layers increasing with depth. The vertical resistivity standard deviation was set to 2, while the lateral resistivity standard deviation was set to 1.6. The SCI created sections in which the inversions are spatially constrained. The approximate section size selected was 100 soundings, with a minimum of 50 soundings. Once again the inversion results via profiles and depth slices were examined. If any remaining electromagnetic coupling was detected, it was removed and the inversions run again.

The resulting models were then exported from the Aarhus Workbench as ASCII XYZ data files. After exporting, the resulting models were run through an XRI-customized code that combines any partial grid lines and inserts null values where data has been removed due to coupling. The purpose of this code was to organize the models for display in visualization software, Encom Profile Analyst (PA) (Pitney Bowes Software).

2.1.4.6 Data display and interpretation

The interpretation of the AEM inversion resistivity models included integration with GIS files that provided X, Y, and Z coordinates (PitneyBowes, 2013). Prior to interpreting the AEM data, several complementary datasets were included and graphically displayed in 2D and 3D GIS environments. Complementary data included test hole lithology and geophysical logs (including Natural Gamma and electrical resistivity), TDEM resistivity models, airborne measurements of the intensity of 60 hertz power-line interference, airborne measurements of the magnetic Total-Field intensity, airborne photographs, and a 90 meter (295 ft) digital elevation model (DEM). Other maps identifying roads, power lines,

pipelines, towns, and geology, were also used. The AEM inversions were displayed as colored resistivity sections within the GIS environment. The resistivity data were plotted using the same color scale, and all of the datasets were placed in the same projected coordinate system. This allowed for data to be examined at many scales and to be interactively displayed and/or hidden in order to fully investigate how the geophysical data interrelate with the complementary datasets.

2.1.4.7 AEM Data Ground-Truth

The processed AEM data were checked against lithologic information from boreholes within close proximity of the flight lines, as well as any available down-hole geophysical logs. Lithologic data from CSD test holes and borehole logs from the NDNR registered well database were collected and processed for direct comparison with the AEM data in PA. General agreement between the lithologic and AEM data occurs across the project area, although small deviations occur in some locations, especially where wells approached the maximum threshold distance (750 ft) from the flight lines. These comparisons will be discussed in later sections of this report.

Five (5) downhole geophysical logs (ñe-logsò) were available within the project area from Sargent Irrigation, Inc., with four e-logs in the south block and one in the north block. The resistivity data in these e-logs were not used as constraints on the resistivity in the inversion modeling process, but were compared to the final AEM results following processing. Overall, the contacts revealed by the e-logs between major geologic material types (i.e. till to outwash) were in agreement with the AEM data. However, the resistivities revealed in the e-logs were consistently higher than the AEM results, particularly for the 64-inch resistivity tool. The resistivities indicated by the e-logging tool appear to exceed the expected resistivities of materials in the project areaôs subsurface as well as other areas surveyed with AEM applications in eastern Nebraska. It is of the opinion at XRI that the e-log resistivity values are erroneous and the usefulness of these logs is limited beyond comparison of general material contacts. The frequency or quality of calibration of the e-logging tool used for these logs is unknown, and a lack of proper calibration could be the source of the discrepancy in the two data sets.

2.2 Ground-Based Geophysical Investigation

2.2.1 Ground-Based TDEM Instrumentation

As discussed above in Section 2.1, a combination of airborne and ground-based geophysical datasets were acquired for this project. The WalkTEM system, developed by ABEM (2012), was used to collect ground-based TDEM data for comparison/verification with the airborne data and to fill in areas where AEM could not be acquired. The WalkTEM is a dual-moment system alternating transmission of two different moments (ôhighô and ôlowô current) and frequencies (ABEM, 2013). The WalkTEM transmits a bipolar square current into a large loop. Once the current is shut off, the WalkTEM begins measuring the change in the induced magnetic field at successive times. The WalkTEM components are presented in Figure 2-11 and schematics of the layout of the system are presented in Figure 2-12. The system setup for this project consisted of a 40 meter square transmitter loop and two receiver coils: a 10 meter square loop (receiver RC200) with an effective area of 2,152.8 ft^2 (200 m^2) and a half meter square loop (receiver RC5) with an effective area of 53.8 ft^2 (5 m^2). The smaller coil has better near surface resolution and the larger coil images deeper.



Figure 2-11 – ABEM WalkTEM time-domain electromagnetic system (ABEM, 2012).

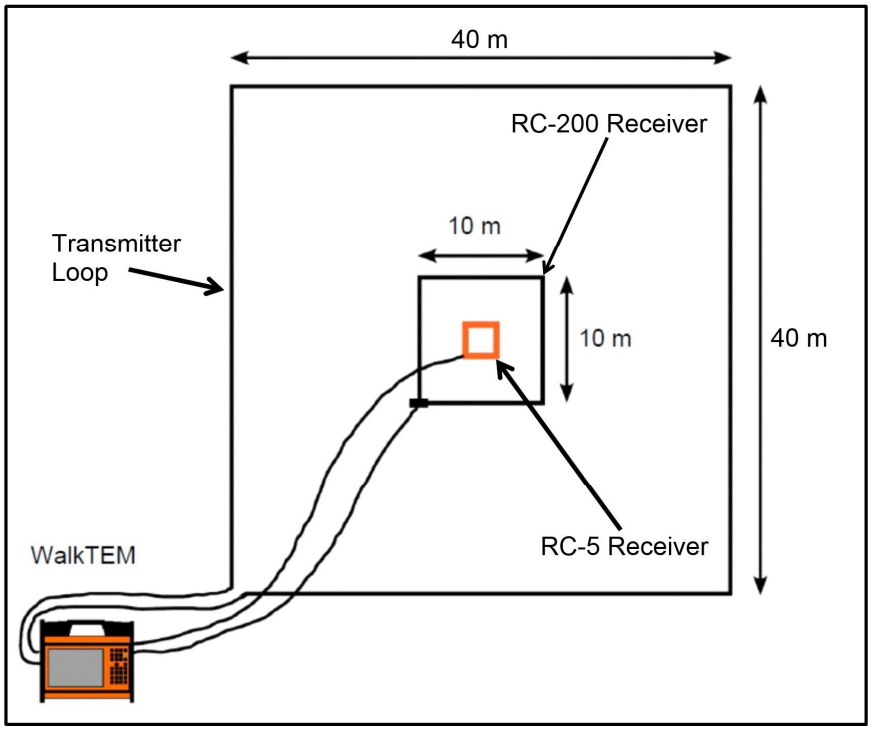
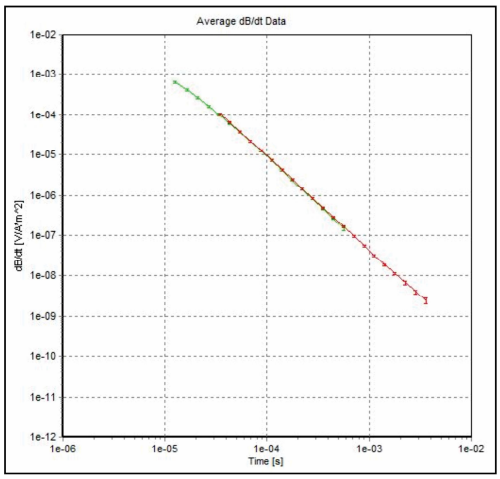


Figure 2-12 – Typical WalkTEM field layout used in the LPSNRD TDEM survey.

2.2.2 Ground-Based TDEM Data Processing and Inversion

Once the ground-based TDEM data were acquired, the data were preprocessed and óconvertedôwithin the WalkTEM acquisition unit prior to storage. Then the WalkTEM óprojectsôwere downloaded from the WalkTEM via a USB memory stick. Editing and inversion of the ground-based TEM data was accomplished via software developed at Aarhus University, namely ñViewTEMò(version 1.0.1.19 (ViewTEM, 2014)). ViewTEM allows for editing of the acquired data prior to calculation of a one-dimensional inversion result. The same inversion kernel is used in the SkyTEM Workbench program. Once the data were sufficiently edited to remove late (or early) time noise, each dataset was inverted starting with a 30-layer, 50 ohm-m halfspace. Once an inversion was deemed reasonable, the result was exported as an ASCII formatted file and then converted into a ñFrom-Toòformat for input into Oasis Montaj as a drillhole project which was then imported into Encom Profile Analyst for inclusion with the airborne inversion, geophysical, and lithological logging results. All ground-based TDEM data and modeling results are presented in Appendix 4. Figure 2-13 shows an example of a dual-moment TDEM dB/dt sounding curve (ñdB/dtòrepresents a time-varying magnetic field) and the corresponding inverted electrical resistivity earth model.



#	Res	ResSTD	Thk	ThkSTD	Dep	DepSTD
1	17.6	1.599	2.2	1.001	2.2	1.001
2	13.7	1.372	2.5	1.001	4.8	1.001
3	8.7	1.420	2.9	1.001	7.6	1.001
4	5.9	1.304	3.2	1.001	10.8	1.000
5	6.6	1.362	3.6	1.001	14.5	1.000
6	8.5	1.397	4.1	1.001	18.6	1.000
7	8.8	1.418	4.6	1.001	23.2	1.000
8	7.5	1.417	5.2	1.001	28.5	1.000
9	6.2	1.401	5.9	1.001	34.4	1.000
10	5.7	1.400	6.7	1.001	41.0	1.000
11	5.9	1.426	7.5	1.001	48.6	1.000
12	6.2	1.464	8.5	1.001	57.1	1.000
13	6.1	1.479	9.6	1.001	66.7	1.000
14	5.3	1.512	10.8	1.001	77.5	1.000
15	4.3	1.545	12.2	1.001	89.7	1.000
16	3.6	1.466	13.8	1.001	103.5	1.000
17	3.8	2.480	15.6	1.001	119.1	1.000
18	5.2	3.130	17.6	1.001	136.7	1.000
19	8.5	3.800	19.9	1.001	156.6	1.000
20	8.5	4.500				

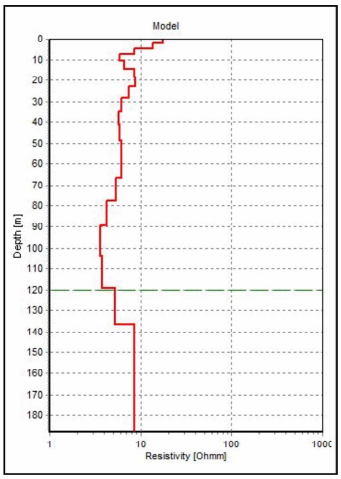


Figure 2-13 – An example of conversion of a TDEM DB/DT sounding curve to a resistivity earth model. The left panel is a dB/dt curve recorded by an Rx coil with the use of a dual-moment Tx, the low moment is plotted in green and the high moment in red. The center panel is a table of the numerical results from inverting this dB/dt curve for material resistivity. The right panel shows a plot of the resistivity earth model with depth.

2.2.3 LPSNRD Ground-Based TDEM Data Acquisition

Ground-based TDEM data were acquired in early September 2013 at various locations across the project area. The locations of the ground-based TDEM soundings are presented in Figure 2-14 and listed in Table 2-1.

Table 2-1- Positional and data information of ground-based LPSNRD soundings. Position information is projected in WGS84, UTM Zone 13 North, and NAVD88 with coordinates in feet.

Sounding ID	Easting (ft)	Northing (ft)	Elevation (ft)	Date of Acquisition
LPS-TEM2	2254974	14936824	1364	9/11/2013
LPS-TEM4A	2196518	14968253	1556	9/10/2013
LPS-TEM4B	2206976	14919389	1424	9/10/2013
LPS-TEM5	2222449	14925121	1485	9/11/2013
LPS-TEM8	2207167	14940353	1588	9/11/2013
LPS-TEM9	2192653	14930358	1547	9/10/2013
LPS-TEM11	2238393	14916153	1336	9/11/2013

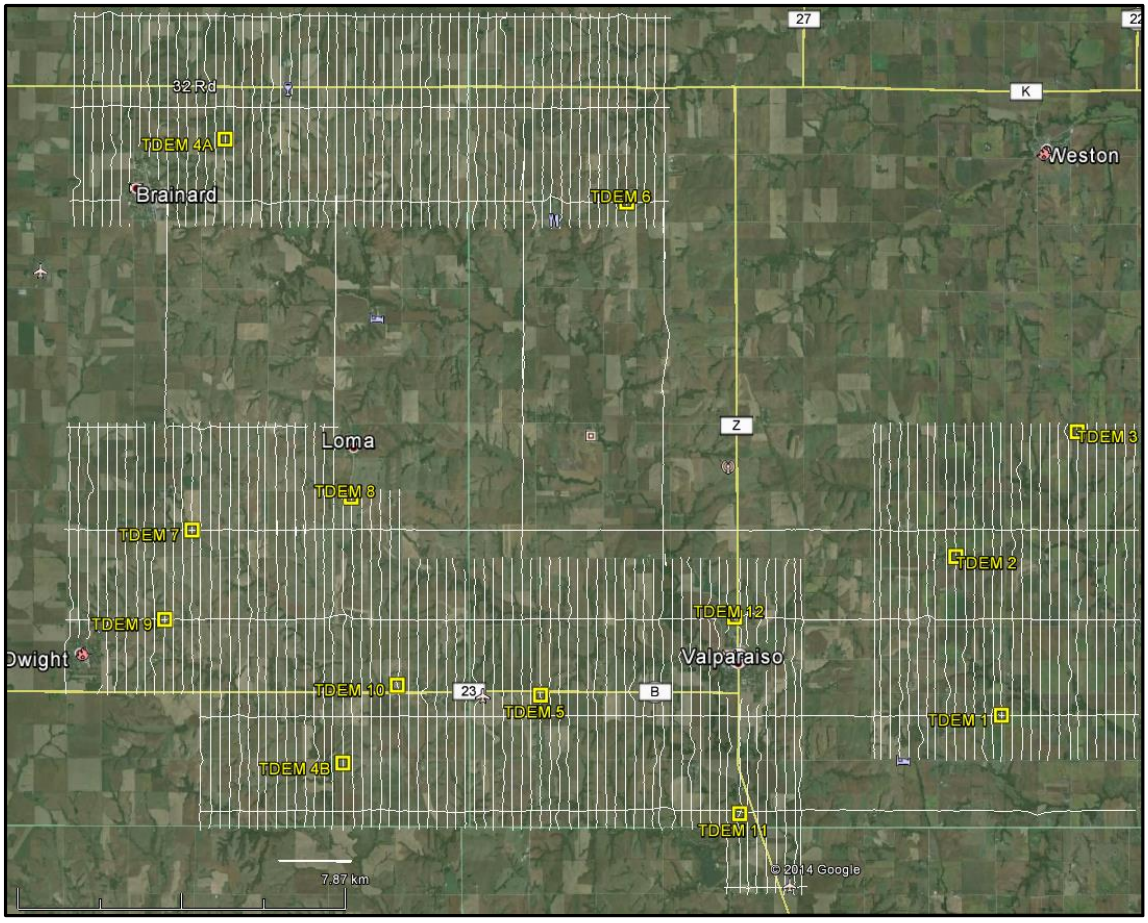


Figure 2-14 – Location of LPSNRD ground-based TDEM soundings.

2.2.4 Ground-Based TDEM Inversion Results

The inversion results for the ground-based TDEM soundings acquired in the project area are presented in Figure 2-15. The TDEM inversion results present layered-earth information similar to what was observed in the AEM inversion models.

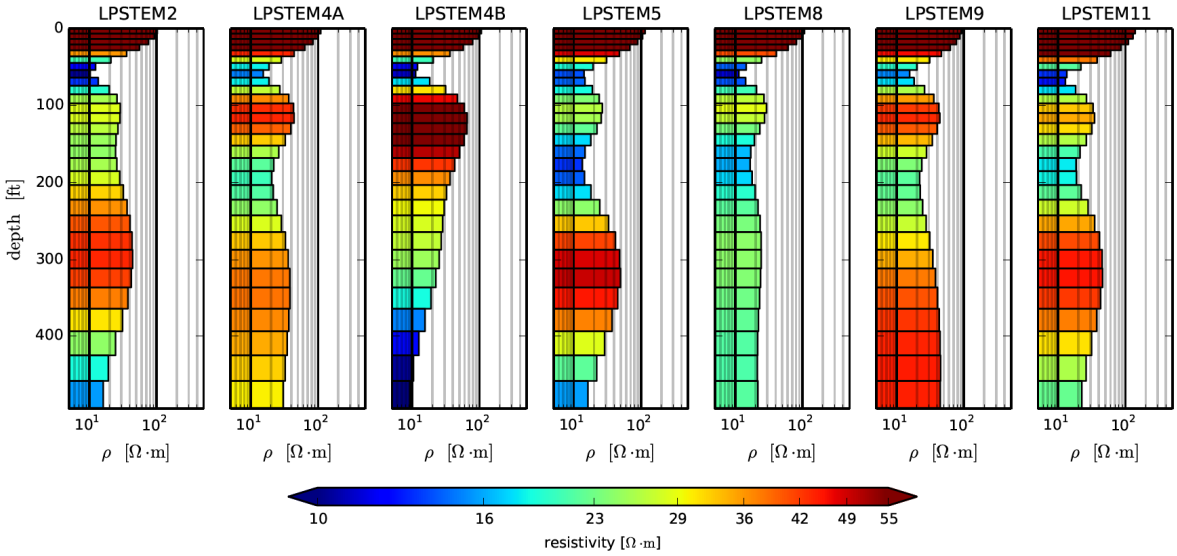


Figure 2-15 – LPSNRD survey area ground-based TDEM inversion results. Sounding locations are shown in Figure 2-14.

3.0 Project Area Hydrogeology

3.1 Geologic Setting

The project area is underlain by unconsolidated Quaternary and Holocene deposits that overlie consolidated, Cretaceous sedimentary strata. Nearly the entire Cenozoic Era (65 mya to present time) occurred between the geologic events that formed the Cretaceous bedrock and the overlying Quaternary units deposited during the Pleistocene Epoch (2.6 mya ï 10,000 years before present). During this span of time, erosional processes created an undulating paleo-landscape upon the bedrock beneath the project area, including valleys and ridges composed of the consolidated strata. This landscape was further altered during Pleistocene time as continental ice sheets (glaciers) encroached into the upper present-day Midwest and scoured the landscape. Sand and gravel deposits transported by meltwater from the edges of and beneath the Pleistocene ice sheet comprise many of the present day aquifers utilized across eastern Nebraska (along with alluvial aquifer systems). Figure 3-1 displays the geologic time scale with CSDõs lithostratigraphic sequence that underlies the state of Nebraska.

The aquifer system in the project area is classified within the CSDõs ñNebraska Glacial Driftò Groundwater Region classification. Within this region, the principal groundwater resources are found in sand and gravel units that fill buried valleys (paleovalleys) that have subsequently been buried by fine-grained overburden. In areas where buried valley sediments are not present, groundwater development occurs in subsurface intervals where isolated pockets of groundwater occupy the void spaces of coarse-grained deposits that overlie or are contained within glacial till (University of Nebraska-Lincoln Conservation and Survey Division, 1998). Within the Cretaceous bedrock, the Dakota Formation serves as an aquifer where appreciable thicknesses of transmissive sandstone are present. This aquifer is utilized across much of eastern Nebraska as a secondary groundwater source, including several wells within the project area.

3.1.1 Surficial Geology

The unconsolidated, Quaternary and Holocene deposits are comprised primarily of glacial till (intermixed silt, clay, gravel, and sand), sand and gravel glacial outwash deposits, and wind-deposited loess (silt). The thickness of these deposits varies across the project area, ranging from less than 150 ft to nearly 450 ft where topographic lows in the bedrock surface are present. The till and outwash were deposited along the southern edge of the several-hundred feet thick Laurentide Ice Sheet (Mathews, 1974; Dyke and others, 2002) that advanced and retreated across northeast Nebraska during pre-Illinoian time (2.6 million to 300,000 ybp) of the Pleistocene Epoch. The glacial deposits in the project area result from the abrasion of soils and outcrops of the pre-glacial landscape as the Laurentide Ice Sheet advanced across the present-day upper Midwest. Remnants of bedrock ñpluckingò by the ice sheets is evident in the glacial till from drillerõs logs across the project area.

Glacial till is present across most of the project area with thickness ranging from less than 25 ft to over 400 ft. The thickness and structure of till is dependent upon location of deposition, i.e. within or adjacent to the ice sheet. Where ice sheet movement stagnated, thick, extensive accumulations of till would result in remnant landform features known as moraines. ñEndòor terminal moraines represent the furthest extent of the ice sheet, whereas recessional moraines formed during stagnant periods as the ice retreated from its maximum extent. Till deposited beneath the glacier in less thick, but more extensive sheet-like veneers form what are defined as ground moraines. It is believed that the upland

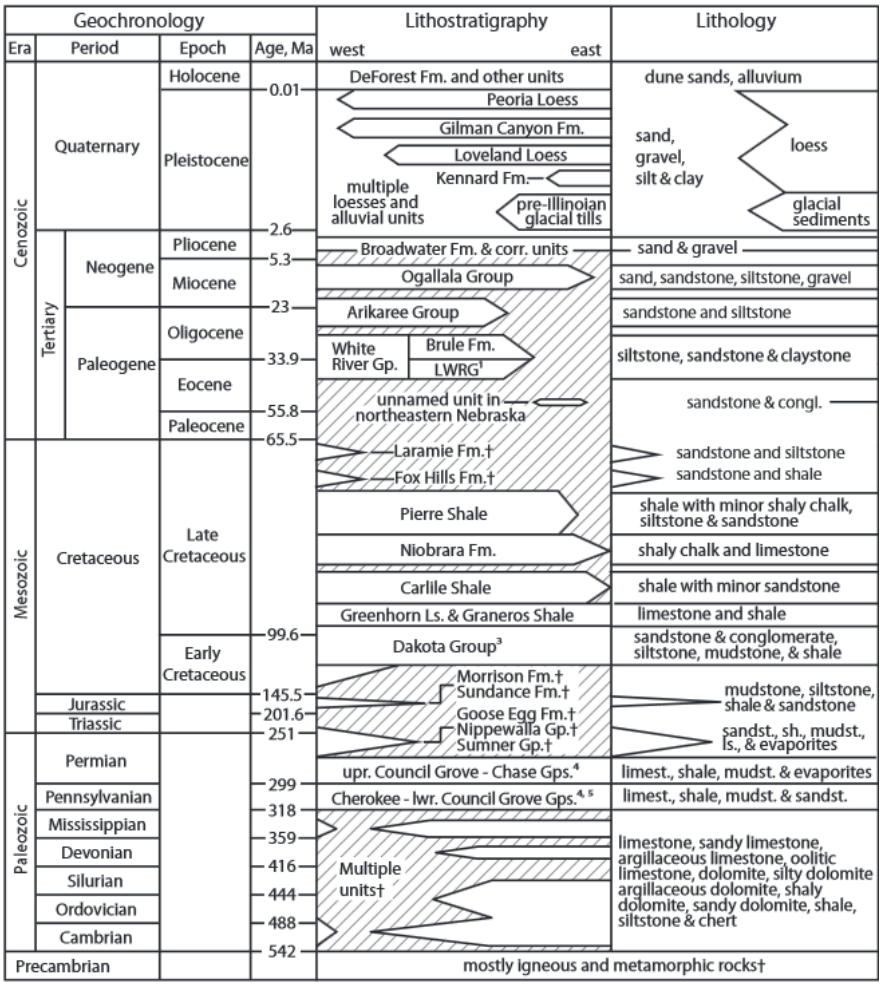


Figure 3-1 – Geologic time scale with litho-stratigraphic sequence of strata underlying Nebraska as defined by UNL-CSD (Korus and Joeckel, 2011).

areas of thick till deposits in the western half of the north and south blocks represent a recessional moraine complex, as the glacial maximum of the ice sheet in Nebraska reached approximately 35 miles further west in York and Polk counties (University of Nebraska-Lincoln Conservation and Survey Division, 2009a). In the south block, ground moraine features are evident in the subsurface as well. Reed and Dreezen (1965) defined the material forming the moraine complex in the western half of the project area as the Cedar Bluffs Till. The Cedar Bluffs moraine feature extends northward from the project area into Colfax County, Nebraska and southward into northeast Kansas, and is one of several north-south trending moraine complexes that control modern-day surface drainage patterns in eastern Nebraska. The CSDâs generalized till thickness map (Figure 3-2) indicates that glacial till is at least 50 ft thick across the project area, and can exceed 150 ft. The thickest areas of glacial till are found in the project areaâs far northern portion, as well as in an isolated area in the south-central section of the project area. The AEM survey offers much greater detail in defining the overall thickness of the glacial till deposits and could serve as the basis for future refinement of the CSDâs maps.

Melting and subsequent runoff from the ice sheetâs edge resulted in sorting and deposition of sand and gravel units across the project area, most notably in the eastern half of the north block, in a northwest-southeast trending feature in the south block, and below much of the east flight block.

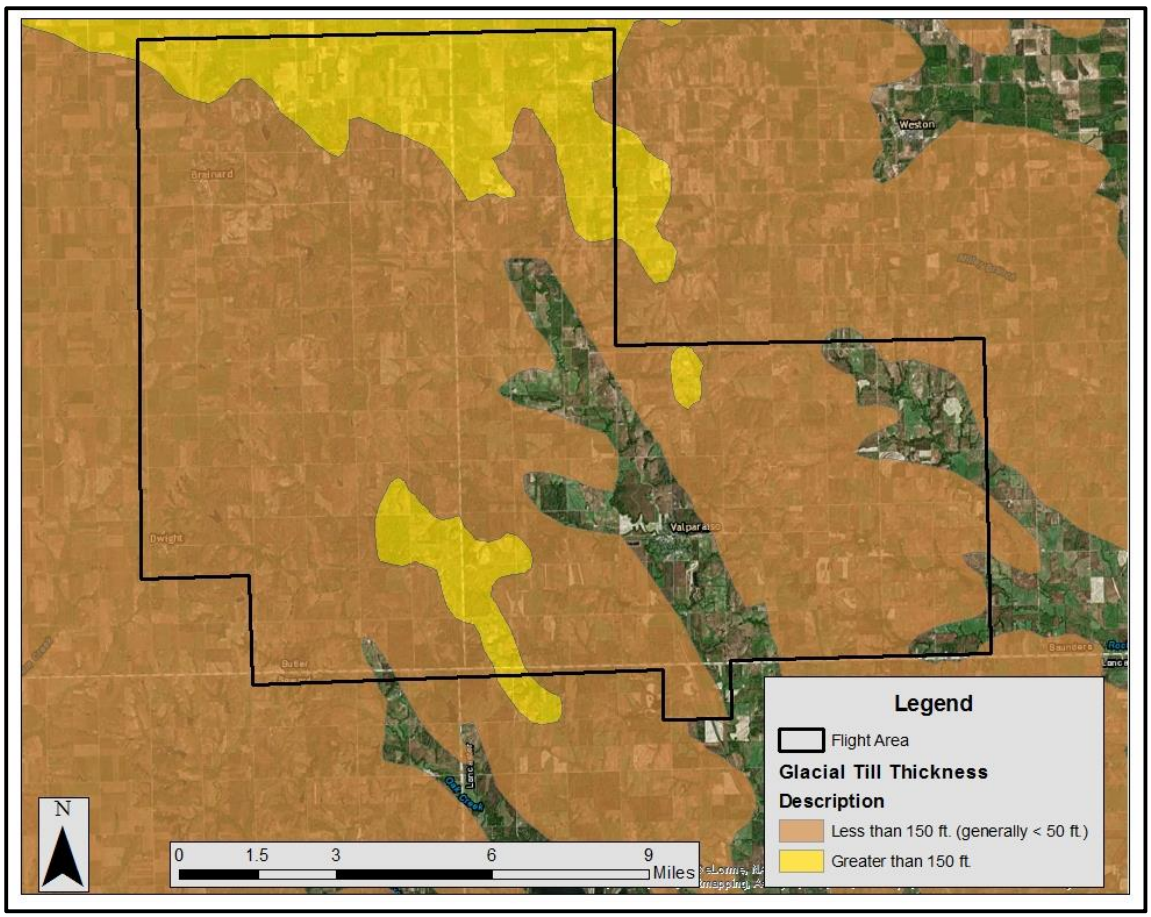


Figure 3-2 – Thickness of glacial till deposits in the project area (CSD, 2009a).

Meltwater, transporting coarser sediment down-gradient from the ice sheet through pre-existing depressions and valleys formed in the Cretaceous bedrock, would deposit materials in these topographic lows that now serve as aquifers. Following deposition, further glacial advances and retreats would bury these deposits as displayed in the simplified diagram of outwash depositional processes in Figure 3-3.

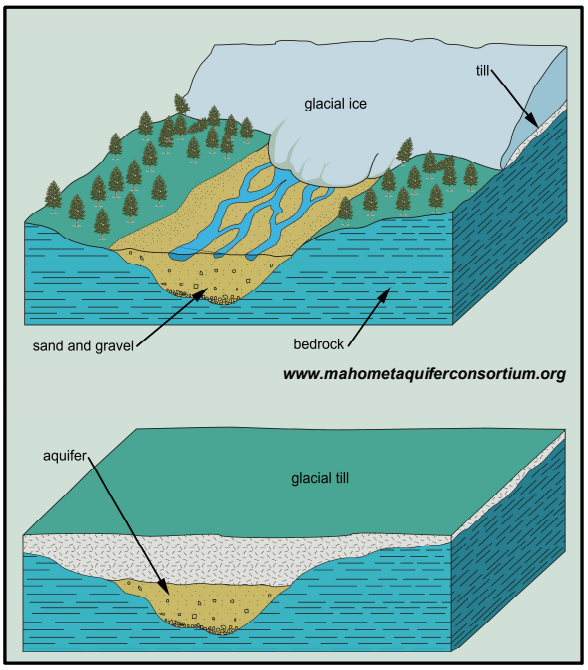


Figure 3-3 – Simplified diagram demonstrating the genesis of a buried glacial outwash aquifer.

In later times of the Pleistocene Epoch, following the retreat of the ice sheet from the present-day project area, climate patterns persisted such that sequences of wind-blown silt deposits (loess) blanketed the glacially-deposited till. Three sequences of loess are present in eastern Nebraska, with the oldest being the 25 ft thick (maximum) Loveland Loess deposited during the Illinoian stage of the Pleistocene (160,000-120,000 ybp).

The Gillman Canyon Loess, deposited during the Wisconsinan stage of the Pleistocene (45,000-25,000 ybp), reaches a maximum thickness in eastern Nebraska of 5 ft. The most extensive loess deposit present across the project area and much of the Midwestern United States is the Peoria Loess. This material was deposited late in the Pleistocene as the Laurentide Ice Sheet made its final northward retreat during the closing of the Ice Age (25,000-14,000 ybp). Maximum thickness of the Peoria Loess in eastern Nebraska typically ranges from 30 to 40 ft in the project area (Bettis and others, 2003; Mason and others, 2003; Mason and others, 2008). Paleosols formed above the Loveland Loess (Sangamon) and the Peoria Loess (Brady) serve as markers in the Pleistocene stratigraphic sequence in eastern Nebraska. Although regional maps indicate the presence of these loess deposits in eastern Nebraska, drillerôs logs from the NDNR registered well database and the AEM output cross sections do not provide the level of detail and resolution to discriminate the paleosols or separate loess units in the project area. Following deposition of these deposits, subsequent erosion and re-deposition of materials began to form the project areaôs modern day landscape.

3.1.2 Bedrock Geology

Underlying the Quaternary deposits in the project area is a sequence of sedimentary strata that were deposited when central North America was inundated by the mid-continent seaway during the Cretaceous Period (65 - 130 mya). As the seaway transgressed and regressed across present-day Nebraska, varying sedimentary rock types were deposited, including marine shale, limestone, and near-shore sandstone as well as continental deposits (fluvial and beach derived sandstones, low-energy claystones). The types and thicknesses of these deposits are a function of the depth and proximity to the shoreline of the sea in the area, as well as fluvial processes occurring along the seawayôs eastern margin. The project area is underlain primarily by the regionally-extensive Dakota Formation (Figure 3-4), a unit composed primarily of sandstone interbedded with coal, conglomerate, shale, and mudstone. The varying stratigraphic sequence originated due to fluctuating conditions of the seaway and fluvial processes of rivers and streams draining the continental landscape to the north and east. Total thickness of the formation near the type section in Dakota County, NE and Woodbury County, IA ranges from approximately 330 ft to nearly 500 ft (Witzke and Ludvigson, 1994). Total thickness of this unit is not known in the project area from documented maps or reports. However, review of deep drillerôs logs from the Nebraska Oil and Gas Commissionôs (NOGC) website indicated that the Dakota Formation is at least 140 ft thick in the project area, and possibly as thick as 560 ft, although the log notes for the thicker interval in this range are suspect. Figure 3-5 displays the shoreline margin depositional conditions that served as the origin of the Dakota Formation beneath the project area. Understanding the varying depositional conditions and resulting sedimentary strata is important when interpreting AEM results, as transitions between coarse and fine-grained units are apparent in the survey output data. The Dakota Formation is a viable groundwater source in many locations in eastern Nebraska and will be discussed in further detail in following sections.

Layered atop the Dakota Formation in the western half of the project area are the marine deposits of the Carlile Shale, Greenhorn Limestone, and Graneros Shale (Burchett, 1986). These units were deposited in deeper water (shale) and marginal marine (limestone) settings of the western interior seaway. These units form a northwest-southeast striking ridge or ñbedrock highò in the western portion of the project area between the north and south blocks. The presence of this bedrock high is clearly evident in the AEM models. Along the axis of this bedrock high, loess and till are the predominant Quaternary deposits mantling the bedrock high, and there is a general absence of high capacity wells along this

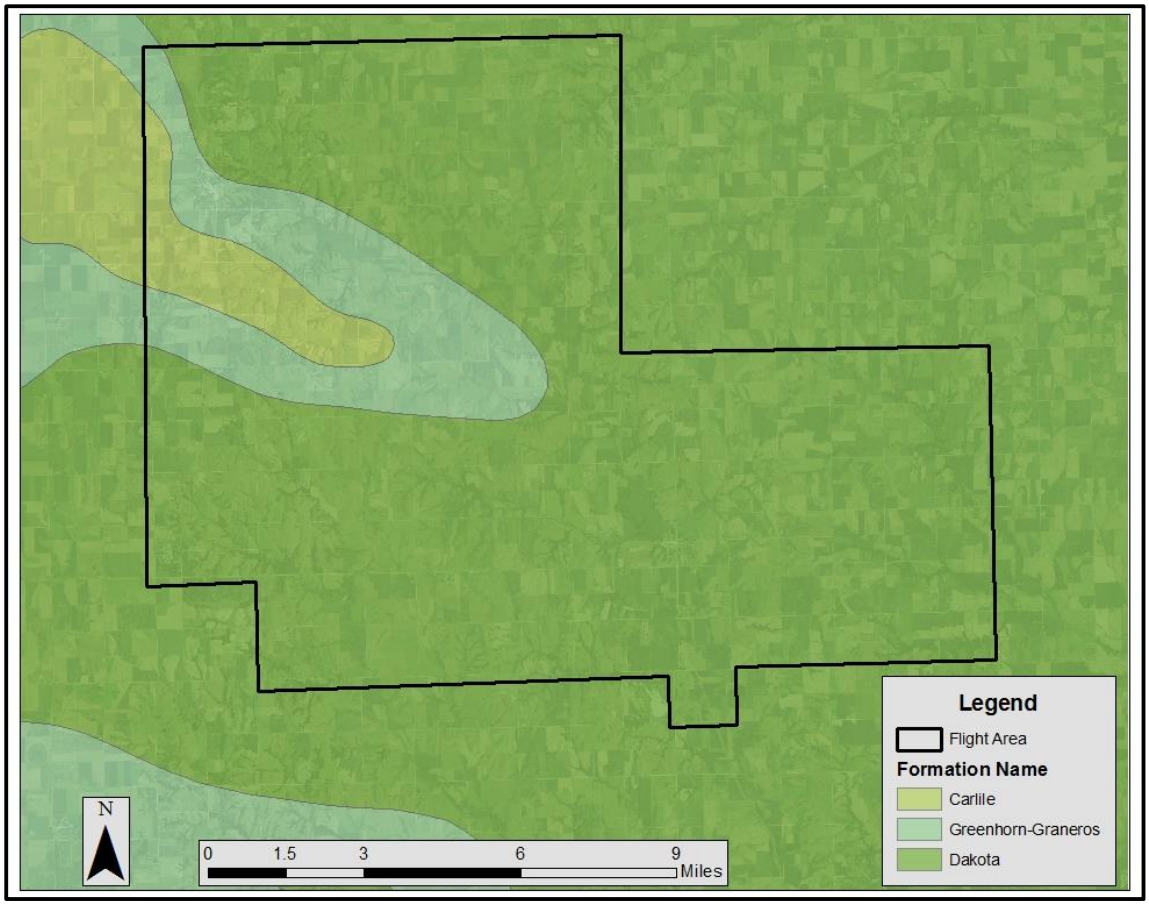


Figure 3-4 – Bedrock geology underlying the Quaternary deposits in the project area (CSD, 2009).

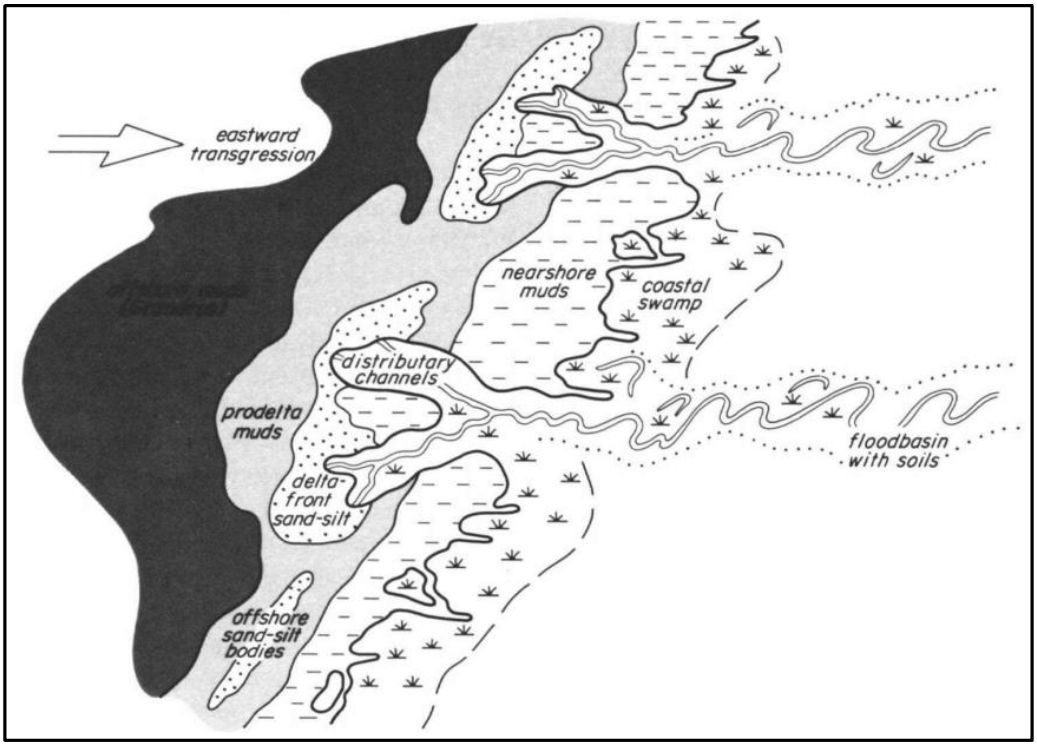


Figure 3-5 – Depositional environment of the Dakota Formation sediments during the Cretaceous Period in eastern Nebraska and western Iowa (Witzke and Ludvigson, 1994).

bedrock trend. The only opportunity for wells in this area appears to be primarily from isolated seams of coarse deposits at the base of or within the till, as most of the coarse outwash deposits to the north and south of this area are missing.

The outcropping and near-surface portions of these formations were subject to extensive weathering, degradation, and erosion during the Quaternary period. As the continental ice sheet extended across the project area, the abrasive power of the ice altered and eroded (ñpluckedò) the bedrock land surface as demonstrated in Figure 3-6, which resulted in bedrock materials being lodged within the till units. Besides the Dakota Formation, none of the Cretaceous bedrock units are known to produce beneficial amounts of potable water in the project area.

Beneath the Dakota Formation are Paleozoic marine shale and carbonate units along with evaporites and clastic deposits. Due to the conflicting stratigraphic names assigned in the NOGC logs and the lack of deep bedrock maps specifically beneath the project area, it is not possible to concisely identify lithostratigraphic formations beneath the Dakota Formation in the AEM results. Review of the NOGC drillerôs logs within the project area indicate that most of the interval immediately beneath the Dakota Group were shale units interbedded with carbonates. Understanding the composition of these units, even without the ability to identify the stratigraphic nomenclature of the specific strata present is important in interpreting the AEM results, as the systemôs depth of investigation was within the Paleozoic sequence. Prior ENWRA studies (Korus and others, 2013) note that limestones within the Council Grove and Admire Groups support domestic wells in southeastern Nebraska and some larger capacity wells in northeast Kansas. However, it is unclear as to whether these units are productive aquifers within the project area.

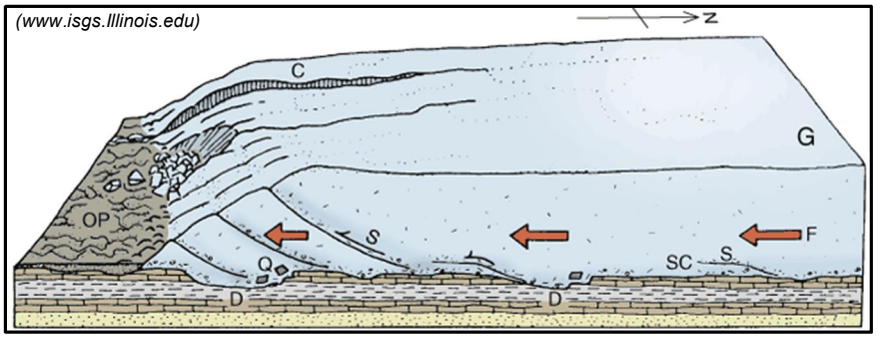


Figure 3-6 – Schematic diagram showing the "plucking" process of bedrock material within the ice sheet that becomes part of the till deposits in the end and ground moraines.

3.2 Hydrogeologic Characteristics in the Quaternary System

The buried glacial outwash described in prior sections of this report serves as the principal aquifer beneath the project area. Secondary aquifers within the Quaternary system include water-saturated, perched, or isolated sand and gravel units found in the Pleistocene till that typically support small yield domestic or livestock wells. Druliner and Mason (2001) named the aquifer underlying the project area the ñDwight-Valparaiso aquiferò(DV) in their assessment of hydrogeologic and water quality in the Lower Platte South NRD in the 1990s. This naming convention was based on the nearby towns and not on any lithostratigraphic categorization. Thus, the glacial outwash deposits described hereinafter in this report will be termed the ñprincipal aquifer,òand will correspond to findings of the ñDwight-Valparaiso aquiferòas described in Druliner and Mason (2001) in the following sub-sections of this report.

3.2.1 Aquifer Structure

The aggregate thickness of the principal aquifer's sand and gravel ranges from less than 10 ft to over 200 ft within the project area. At many locations, intervals of outwash sand and gravel are interbedded with clay and/or silt deposits, but the total overall sequence of sand and gravel beneath the main body of till is considered the principal aquifer of the area. The sand and gravel is not fully saturated at all locations, particularly in the east block. The character of the saturated material and confined versus unconfined status of the aquifer will be discussed in following subsections of this report.

As previously described, the project area is devoid of viable aquifer deposits along the bedrock high that exists between the north and south blocks. Each block of the AEM survey reveals unique patterns of outwash distribution in the subsurface. The most distinguishing characteristic of the outwash deposition is the lack of strong connection between the principal aquifer units in the north and south block due to the bedrock ridge. In addition to the lack of lateral connectivity of the principal aquifers, the connectivity to the land surface and potential recharge areas varies considerably across the project area. In much of the north block and the western half of the south block, thick deposits of till and loess, some exceeding 400 ft, lie above the principal aquifer. In the northeast corner of the north block, the eastern half of the south block, and most of the east block, the principal aquifer is covered by only a thin veneer of ground moraine till and/or loess and likely receives the largest influxes of recharge in the project area. The till/loess deposits create confined conditions in the aquifer across much of the project area. As the fine-grained deposits thin eastward, the level of confinement lessens and in much of the east block, water table conditions persist. Depth to groundwater can vary from less than 20 ft in the southern margins of the project area to over 200 ft in the northern extent of the project area (Figure 3-7).

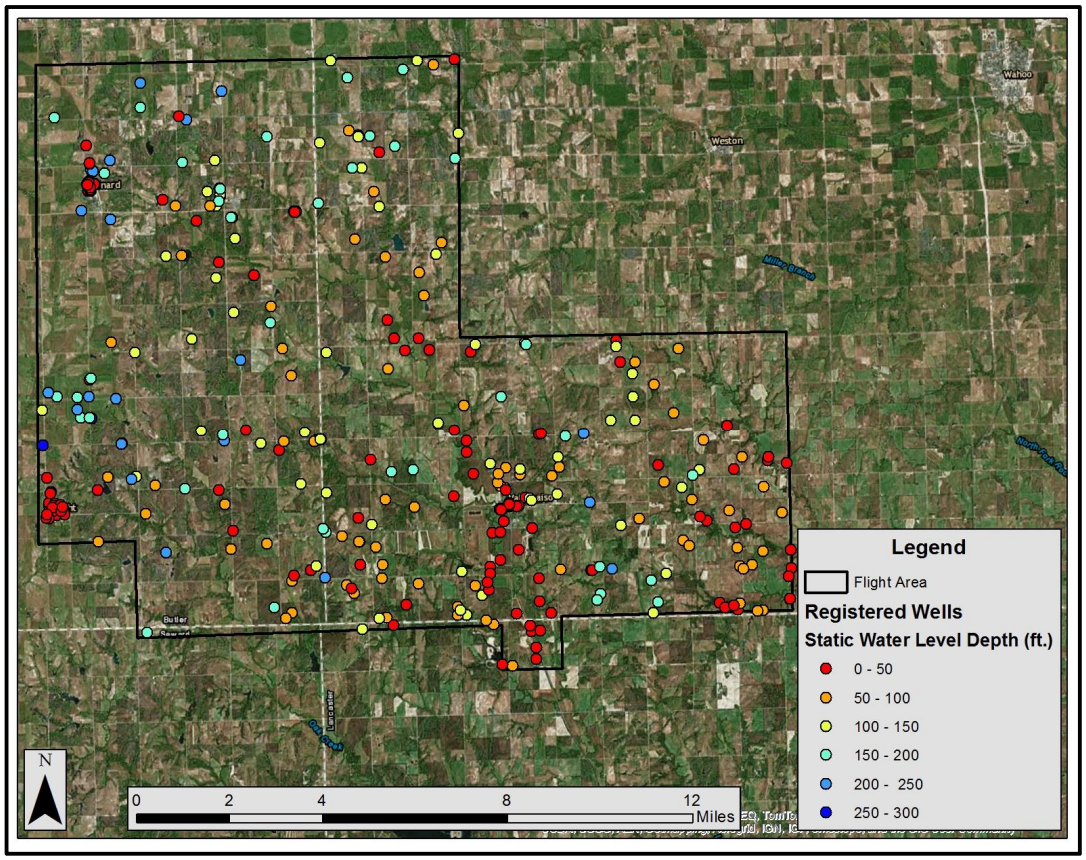


Figure 3-7 – Map of depth to static water levels (in feet) for wells across the project area (NDNR registered well database).

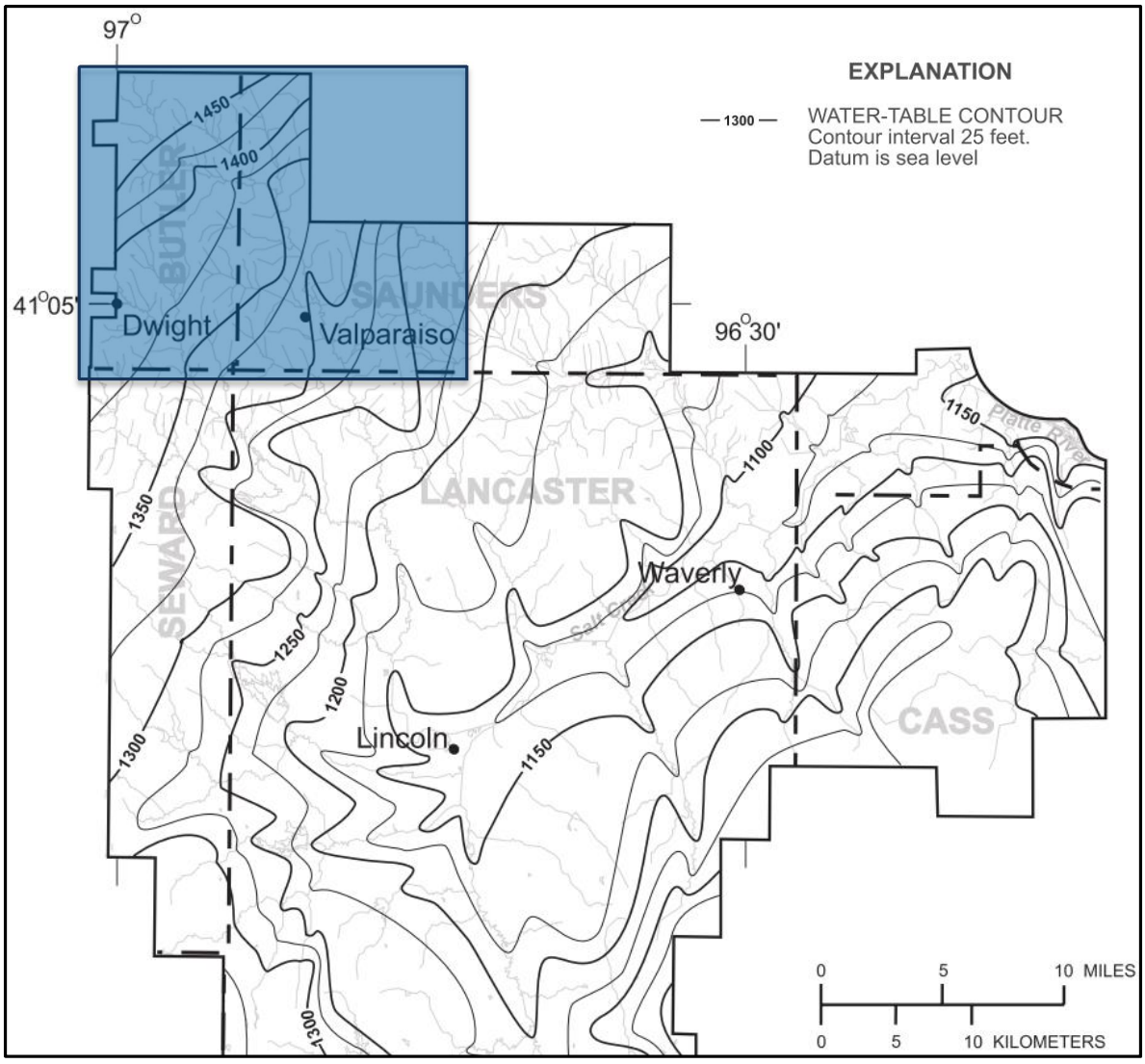


Figure 3-8 – Water table configuration of the Lower Platte South NRD in 1994 (Druliner and Mason, 2001), with the project area highlighted in the shaded box.

Despite the physical disconnect of the coarse aquifer materials by the bedrock high in the western half of the project area, Druliner and Mason (2001) mapped a regional water table with a northwest to southeast gradient of 0.003. The gradient generally follows the topography of the project area from the topographic high of the uplands near Brainard to Oak Creek Valley near Valparaiso (Figure 3-8).

3.2.2 Aquifer Parameters

The principal aquifer is capable of yielding pumping rates that exceed 1,300 gallons per minute (gpm) in parts of the project area, most notably in the east block northeast of Valparaiso. Transmissivity, the term used to describe the capacity of the total aquifer thickness to transmit water, expressed herein in units of gallons per day per square foot (gpd/ft) of aquifer under a hydraulic gradient of 1 ft per ft (ft/ft), ranges from 50,000 to 150,000 gpd/ft in the areas where high yield irrigation wells are present. The highest mapped transmissivities as defined in Summerside and others (2005) are present along the northwest to southeast trending paleovalley in the south block (150,000 gpd/ft or greater) and in the eastern half of the north block (100,000 to 150,000 gpd/ft).

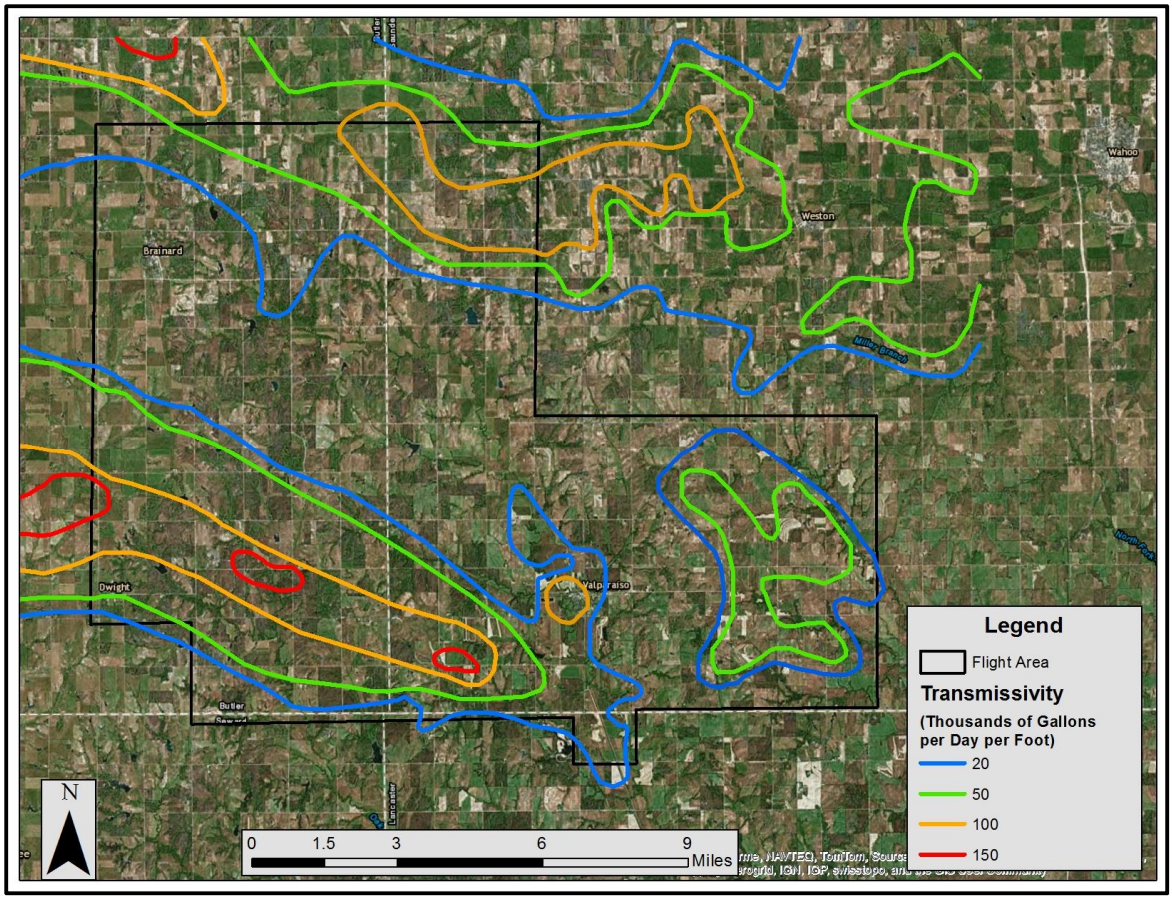


Figure 3-9 – Transmissivity of the principal aquifer as defined in the Fremont-Omaha quadrangle map. Contour intervals are in thousands of gallons per day per foot (Summerside and others, 2005).

Transmissivity in the area between the north and south blocks underlain by the bedrock high is less than 20,000 gpd/ft. The transmissivity values were determined by assignment of hydraulic conductivity values to each interval in CSD test hole logs (Figure 1-2) with a unique lithologic description. These hydraulic conductivity values were then multiplied by the total thickness of the interval. These values were then added to get a total transmissivity, then multiplied by 7.48 to express the values in gpd/ft. Because considerable distances lie between the CSD test holes, and this method of calculating transmissivity uses empirical data in the form of textbook permeability values, uncertainty exists in the transmissivity values displayed in Figure 3-9 between the data points.

Specific yield, a dimensionless term that expresses the volume of water drainable from porous media under the influence of gravity (relative to a unit volume) is 0.15 across most of the project area (Figure 3-10), with slightly lower values along the southern boundary southeast of Dwight (Summerside and others, 2005). Specific yield was calculated for this report by assigning a table value from Johnson (1967) to each unique interval in the test hole data. Values assigned to each layer were weighted by each layer's thickness, with a weighted-average then calculated for the entire principal aquifer thickness. These values were then interpolated to the Fremont-Omaha quadrangle displayed in Summerside and others (2005).

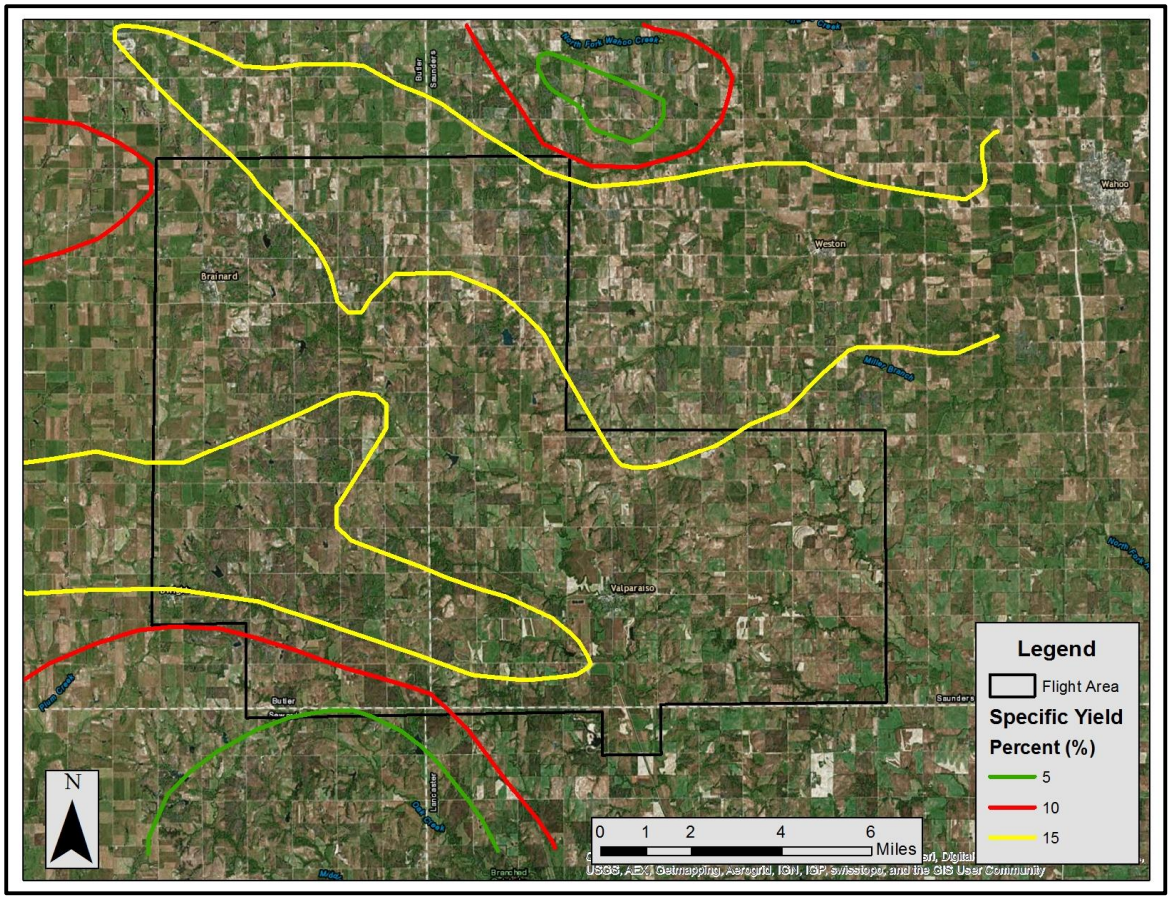


Figure 3-10 – Specific yield values of the principal aquifer as defined in the Fremont-Omaha quadrangle map (Summerside and others, 2005).

3.2.3 Connectivity to Surface Water

The water table in the principal aquifer appears to be in close connection with North Oak Creek on the eastern edge of the south block. In this area, glacial till is mostly absent and coarse deposits are present close to, or at, the land surface. The Valparaiso 7.5 minute quadrangle map (USGS) indicates this creek was intermittent in 1967. However, land use changes have likely altered the surface hydrology of the project area over the last several decades. With this area likely being a recharge area to the principal aquifer, it is expected that during wet precipitation patterns, elevated water table conditions will persist and supply base flow to North Oak Creek. In late September 2014, XRI geologists observed live flow in several of the project area watersheds. However, it is unclear whether this live flow was derived from baseflow or runoff. Considering the time of year these observations were made, it is possible that baseflow was contributing to this observed flow. It is also possible that the water table could be in communication with the Wahoo Creek as the drainage directly overlies coarse deposits in the northeast quarter of the north block. In other parts of the project area, first-order drainages incise into the glacial till but the principal aquifer is still not in direct connection with the drainages as the till thickness beneath the stream creates separation from the underlying aquifer. The water table contours (Figure 3-8) in Druliner and Mason (2001) indicate general gaining conditions in the Salt Creek drainage system, including near Valparaiso. However, specific determination of gaining or losing conditions in the project area's surface water drainages is not possible without further assessment of local gradients in the individual watersheds.

3.2.4 Connectivity to Adjacent Aquifers

The principal aquifer continues southeastward into Lancaster County and the Salt Creek drainage as indicated by the configuration of the water table in Druliner and Miller (2001). It is unclear as to whether the topographic high present in the western half of the north block also causes a groundwater flow divide where flow would move north/northwestward to the Platte River. The degree of connectivity of the glacial outwash is unknown beyond the project area, but it is expected to vary by the configuration of the buried paleovalleys. However, Olsson Associates (2009) report show connection of a paleovalley aquifer with the Platte River Valley. This paleovalley aquifer ñbends to the south and becomes the Valparaiso aquifer in the Lower Platte South NRD as defined by Druliner and Mason (2001).ò

In areas where glacial outwash directly overlies the Dakota Formation, it is highly likely that the principal aquifer is in some level of connection with the bedrock aquifer source. The degree of this connection is not known, however, and the site specific vertical water level gradients would need to be measured from a nested well with screens isolated in each aquifer interval. If strong upward communication of the two aquifer units is present with the principal aquifer receiving Dakota Formation groundwater, the water quality at the base of the Quaternary aquifer could be chemically altered by this upwelling of Cretaceous groundwater.

3.2.5 Use of Water Level Information for AEM Interpretation

Inclusion of groundwater levels, either confined or unconfined, is extremely useful in assessment of aquifer conditions with the AEM data. This information provides insight into the saturated thickness of an aquifer and where confined or unconfined conditions may persist, which is critical to understanding the volume of water in storage, flow gradients, and recharge areas. To incorporate water level information into a useful dataset suitable for incorporation with the AEM resistivity models, historic water levels were processed in GIS, interpreted to a grid, and imported into Encom PA software. The water level surface developed for this evaluation was created using static water level data from the NDNR registered well database along with measurements from the USGSôs National Water Information System (NWIS) database. Both data sources were utilized to allow for sufficient coverage interpretable data across the project area, and each incorporate wells screened only in the Quaternary deposits.

Although more recent and consistent in the timeframe of water level measurements, the number of observations in the NWIS database alone fell far short of providing sufficient coverage to create a water level surface across the entire project area. Thus, to alleviate this lack of data, static water levels from the NDNR registered well database were incorporated. The NDNR data has static water levels dating back several decades, which introduces potential for error or inconsistencies in the overall timeframe and season in which the measurement was taken. However, since identification of where confined conditions exist and at what general magnitude was a primary goal of this investigation, use of this temporally variable data was necessary as a preliminary evaluation in concert with the AEM data. Further refinement and improvement of this evaluation would require a comprehensive, project area-wide set of data measured in the same year and season, ideally prior to irrigation season when precipitous declines in the groundwater water levels often occur. It will also be imperative to have detailed well construction logs to accompany the above data.

Comparison of the limited NWIS water level data from the spring of 2012 indicated that some water levels measured at that time were similar (<5 ft) to the original static levels

reported in the NDNR registered well database at the time of construction, some of which were developed several decades prior to 2012. For example, at well G-035514 in the southeast corner of the south block, the 2012 measurement was less than 5 ft different than the static level measured in 1971, and at G-097147 in northeast corner of the south block, the depth to water in 1998 and 2012 differed by less than 3.5 ft.

Because the data used to create the interpolated water level surface across the project area utilizes both potentiometric head values from confined wells and water table measurements from unconfined wells, it is not prudent to call the interpolated surface either ñpotentiometricò or ñwater tableò exclusively. Hereafter, the interpolated data will be referred to as the ñwater level surfaceò in this report. The water level surface data is displayed as a blue dashed line in the AEM profile figures in the remainder of this report and in Appendix 6.

3.3 Cretaceous Aquifer Conditions

The sandstone intervals of the Dakota Formation underlying the project area are capable of supporting high volume production wells as indicated by NDNR registered well log information. Figure 3-11 shows 17 registered wells that tap the sandstone units underlying the unconsolidated Quaternary deposits in the project area. The sandstones of the Dakota Formation in eastern Nebraska are considered part of the Maha aquifer (Miller and Appel, 1997; Gosselin and others, 2001), which is the uppermost aquifer interval in the overall Dakota aquifer system that spans beneath the High Plains of Nebraska, Kansas, and eastern Colorado. Although not as prolific in utilization as the overlying alluvial and buried glacial outwash deposits for aquifer sources, use of the Maha aquifer is not negligible in eastern Nebraska. Gosselin and others (2001) cited a study by Lawton and

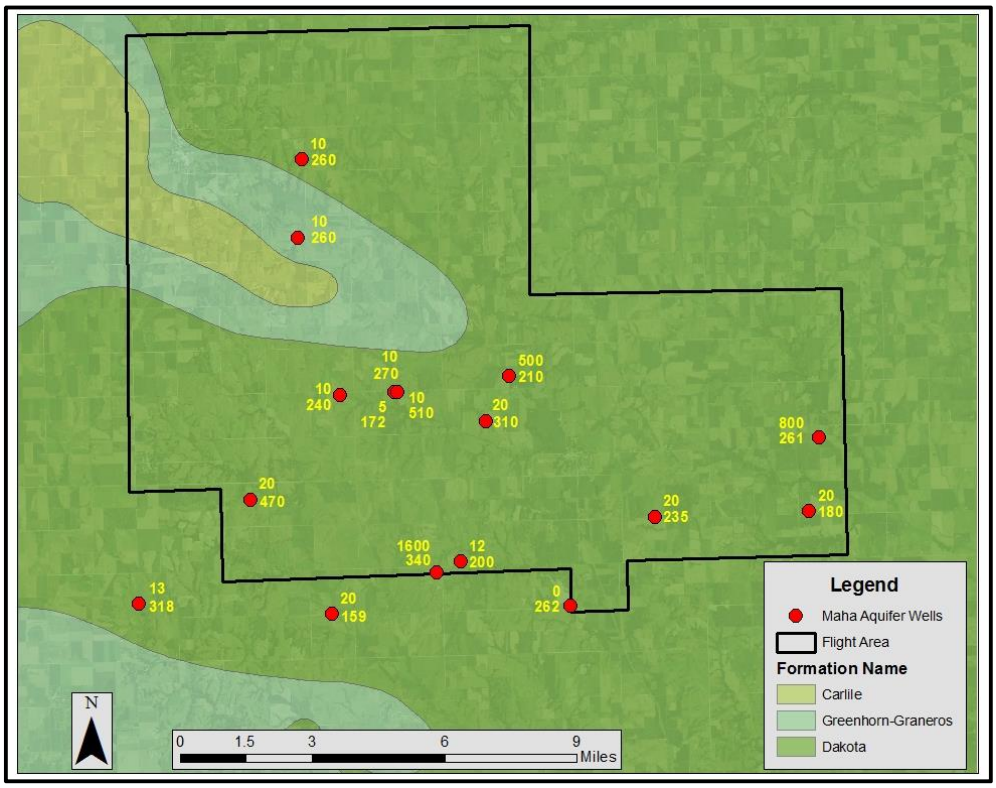


Figure 3-11 – Maha aquifer wells in the project area. The top value is the registered pumping rate, the second number is the bottom depth of the well (NDNR registered well database).

others (1984) that indicated as early as the 1980s, 37 communities in eastern Nebraska relied on groundwater from the Maha aquifer, at a yield of 6 to 8 million gallons per day, and irrigation withdrawals approached 27 million gallons per day from this aquifer source. It is expected that Maha aquifer withdrawals in eastern Nebraska have increased considerably since this information was reported. Helgesen and others estimated that nearly 1.8 billion ac-ft of drainable water is present beneath Nebraska in all of the individual aquifers within the Dakota aquifer, including brackish and saline water which is more common in western and central Nebraska. Most of the information regarding the hydrogeologic characteristics and hydraulic parameters of the Maha aquifer are available from regional studies, whereas the most detailed localized information regarding the aquifer resource involves water quality data.

3.3.1 Aquifer Structure

Ellis (1984) presented a structural map of the ñDakota aquifer systemò in eastern Nebraska which indicates the unit thinning eastward with a relatively steep gradient immediately beneath the project area (Figure 3-12). From west to east across the project area, the unit thins from approximately 500 ft to about 200 ft. The system thickens northwestward to over 900 ft in north-central Nebraska, where the top of the system is about 500 ft lower in elevation than beneath the project area.

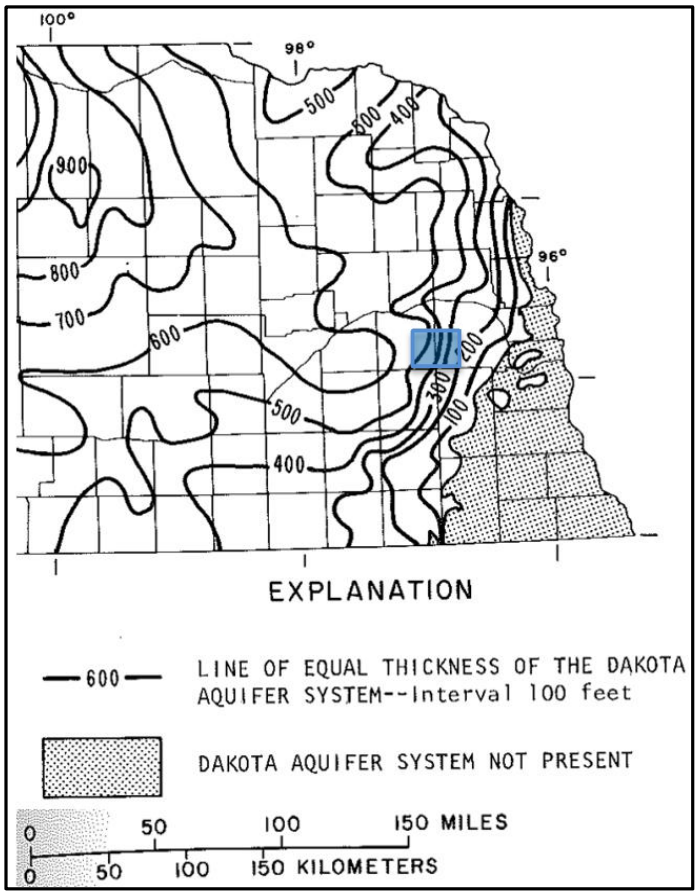


Figure 3-12 – Thickness of the Dakota aquifer system/Maha aquifer in eastern Nebraska (Ellis, 1984). The project area is shown in the shaded blue box.

Although the Dakota aquifer system is confined across much of its regional extent, the project area is situated in close proximity to areas identified as where the aquifer is unconfined or where the potentiometric head is very close to the water table elevation (Helgesen and others, 1993). The general direction of groundwater flow beneath the project area in this unit is generally eastward. Using contours from a map in Miller and Appel (1997), the eastward flow gradient is approximately 0.0015.

3.3.2 Aquifer Parameters

Available aquifer parameter data are based primarily from regional aquifer evaluations. Transmissivity within the Maha aquifer beneath the project area ranges from around 7,500 to 75,000 gpd/ft (converted from reported values of 1,000 to 10,000 ft^2/d). Just west of the project area, transmissivities exceed 75,000 gpd/ft (converted from 10,000 ft^2/d) beneath a several-county area (Figure 3-13). Very little information exists on the porosity of the Maha aquifer. Helgesen and others (1993) present a regional porosity map within the Dakota

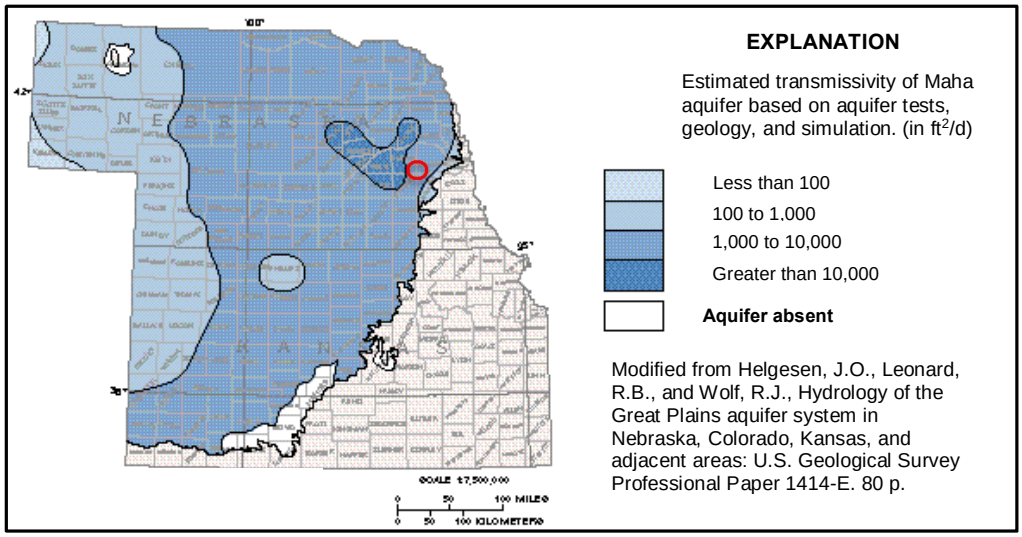


Figure 3-13 – Transmissivity of the Maha aquifer, in feet squared per day (Helgesen and others, 1993). The project area is shown by the red circle.

aquifer based on borehole geophysical logs and laboratory-derived values from literature from the oil and gas industry. The nearest contour to the project area, which sits north-south across central Nebraska is 0.3. This value represents the maximum amount of water stored in the aquifer per unit volume. However, this does not represent the drainable volume from the aquifer, as capillary forces prevent all the water between pore spaces from being released. Specific yield estimates for sandstones in the Dakota aquifer in Kansas and Colorado range from 0.1 to 0.2. No storage coefficient values for the confined portion of the system have been identified in literature on the Dakota aquifer. However, Helgesen and others (1993) report a specific storage value of 9.5×10^{-7} per ft of aquifer. Multiplying this by 300 ft, the average thickness of the Maha aquifer beneath of the project area (Figure 3-12) results in a storage coefficient of 2.9×10^{-4}.

3.3.3 Connectivity to Surface Water and Recharge

Recharge to the Maha aquifer beneath the project area is limited to locations where the bedrock is relatively close to the land surface, which occurs most often along deeply-incised surface drainages. In other regions of the Dakota aquifer, recharge occurs via infiltration of precipitation along exposed outcrops or shallow subcrops (Helgesen and others, 1993). However, this pathway of recharge is highly limited in the project area. Gosselin and others (2001) identified calcium bicarbonate type waters (±magnesium) as indicative of recent, local precipitation sources. This type of water signature was identified in Saunders County where the aquifer is unconfined. This area is the most likely source of recharge where bedrock is within relatively short vertical distances and hydraulic communication with overlying glacial outwash and/or younger alluvial deposits in the area drainages.

3.3.4 Connectivity to Adjacent Aquifers

Communication with overlying buried glacial outwash aquifers likely occurs, but specific quantification of these fluxes is not known. Gosselin and others (2001) identified specific geochemical signatures in the groundwater that indicated a source from overlying glacial outwash. The amount of communication between these two groundwater flow systems is not well understood and likely changes locally due to the amount of pumping that occurs from both aquifers. Upward vertical communication of groundwater from underlying bedrock units also likely occurs, as the high saline sources in the Maha Aquifer southeast

of the project area in Lancaster County have been identified as being sourced from the underlying Paleozoic units. However, the quantification of this upward flux is not reported in the literature (Helgesen and others, 1993).

3.4 Water Quality

Understanding the water quality of a hydrogeologic framework can aid in understanding flow system dynamics such as recharge and discharge areas, flow paths, potential interaction with other aquifers, and trends in water chemistry that can impact human health. This section discusses the characterization of groundwater and surface-water systems in the LPSNRD through historic water samples. Assessment of the water quality within the project area was completed through evaluation of water samples electronically supplied by the LPSNRD and the USGS. Additional water-quality data are available (e.g., specific local studies from consultants, municipalities, or other agencies). Previous studies (e.g., Ginsberg, 1983; Joekel and Clement, 1999; Druliner and Mason, 2001; and Harvey et. al., 2007) documented water quality and/or the interconnection of groundwater and saline wetlands within or near the project area.

A total of 600 historic water-quality samples were analyzed to determine water chemistry characteristics of the project area– 453 classified as water samples from the principal aquifer (Dwight-Valparaiso (DV)), 123 classified as water samples from outside the DV aquifer (Rest of Area), 4 water samples from the Dakota Formation, and 20 surface water samples. The 20 surface water quality samples are not discussed in detail as that discussion is beyond the scope of this report. They are, however, included in selected graphs for comparison purposes.

3.4.1 Quaternary Aquifer Water Quality

The principal aquifer within the project area is the Quaternary sand and gravel paleovalleys interbedded with silt and clay. The paleovalley aquifers incised bedrock formations of Cretaceous age and underlie loess and till deposits. Consequently, the conceptual model of the water quality indicates older water within the paleovalley aquifers that largely are unaffected by land use, except where the aquifers lie within feet to tens of feet of the land surface. Perched and isolated sand and gravel systems typically are shallower than the paleovalley aquifers and their water-quality characteristics could be considerably different.

For this report, all water-quality data compiled from samples collected from Quaternary principal aquifers (e.g., paleovalley) are classified as DV samples. Water-quality data compiled from samples collected from Quaternary secondary aquifers are classified as "Rest of Area" (RA). Most water-quality data compiled for this report were limited to selected field parameters (e.g., pH and specific conductance); alkalinity (HCO_3^-) and major ions [calcium (Ca^{2+}), magnesium (Mg^{2+}), sodium (Na^+), potassium (K^+), sulfate (SO_4^{2-}), chloride (Cl^-); and total dissolved solids (TDS).

Ionic chemical composition of water samples collected in the DV aquifer are predominantly classified as water of a calcium-carbonate type (Figure 3-14) with Ca^{2+} and HCO_3^- being the predominant cation and anion, respectively. Thirty-nine samples contained specific conductance readings that exceeded 1,000 µS/cm at 25°C. However, none of the chemical analyses of total dissolved solids (TDS) in DV aquifer samples exceeded 1,000 mg/L (maximum 988 mg/L, Table A2-1, Appendix 2), which would be a lower threshold characteristic indicating brackish water. Consequently, all water samples collected from the DV aquifer were considered to have characteristics of fresh water.

As mentioned, the predominant ions in the project area were Ca^{2+} and HCO_3^{-}. With respect to depth in the DV aquifer, the largest concentrations of TDS (greater than the median of 484 mg/L), Ca^{2+} (greater than the median of 116 mg/L), and Cl^{-} greater than the median of 8 mg/L) were typically found in wells less than 200 ft deep (Figure 3-15). Chloride and Ca^{2+} show a marked difference in concentration above and below 200 ft. Sodium also had large concentrations (greater than the median of 17 mg/L) at depths above 200 ft. Two larger peak concentrations were observed from wells greater than 200 ft deep (Figure 3-15). Moreover, most of Na^{+} concentrations larger than 17 mg/L were present in wells greater than 200 ft deep.

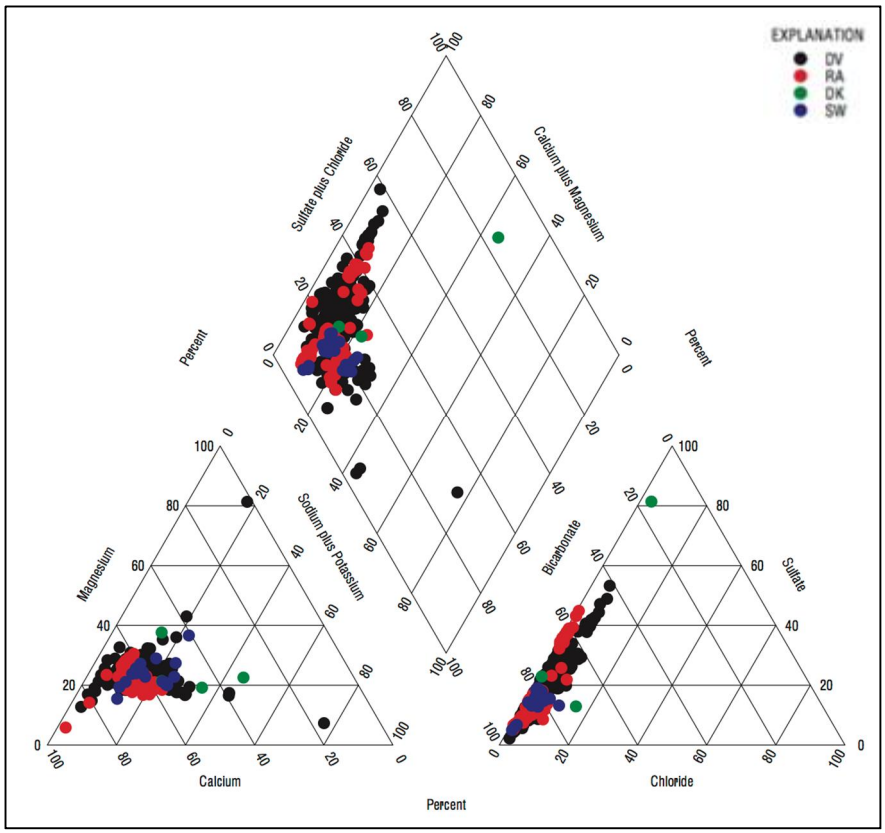


Figure 3-14 - Ionic composition of water from samples collected in and near the project area (DV, Dwight-Valparaiso aquifer; RA, Rest of Area, DK, Dakota Formation; SW, surface water (data from LPSNRD and USGS).

Larger Na^{+} concentrations in groundwater samples from the DV aquifer, whether from shallower or deeper wells, could result from DV groundwater mixing with groundwater from the Dakota Formation, especially because of the shape of the paleovalley aquifer, which allows for the presence of the bedrock surface at varying depths along the valley ñwalls.ò Increasing concentrations of Na^{+} and decreasing concentrations of Ca^{2+} at depth may also result from Na^{+}-Ca^{2+} ion exchange due to longer residence times associated with deeper systems, as deeper groundwater generally having the older flow paths (written comm., JK Bölke, U.S. Geological Survey, 2008). These hypotheses were not investigated for this investigation. Further data collection would be required for a comprehensive analysis as to cause and effect. Groundwater quality in the east block of the project area appears

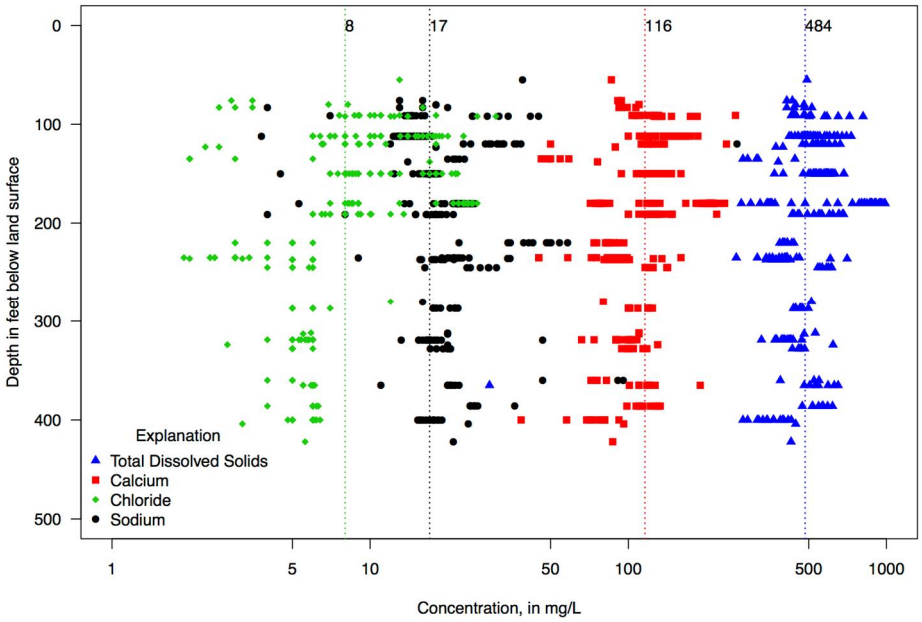


Figure 3-15 - Concentrations of total dissolved solids, calcium, chloride, and sodium versus depth of groundwater samples from the Dwight-Valparaiso aquifer in or near the project area (longitude; dashed vertical line with number indicate median concentration of constituent; source of data- LPSNRD and USGS).

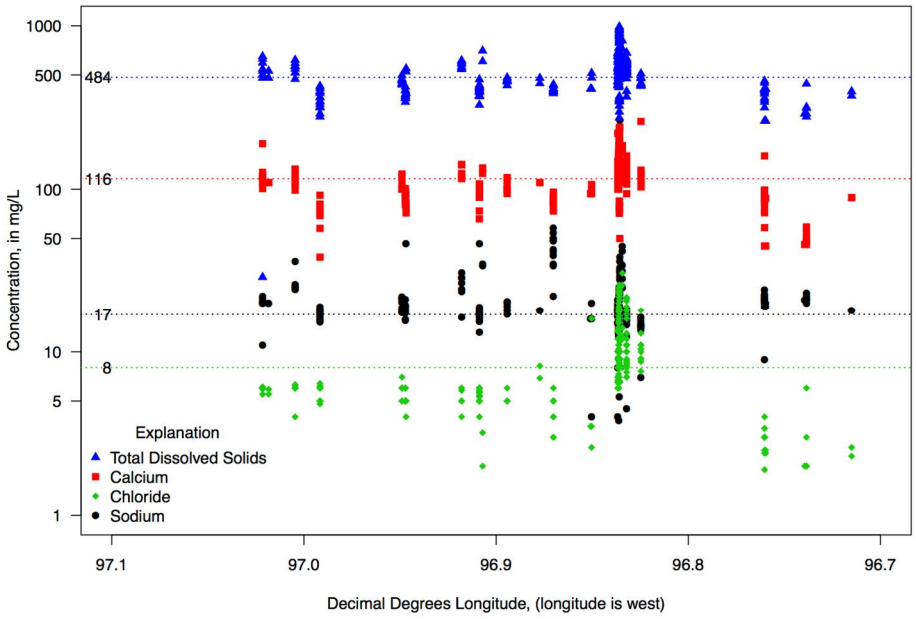


Figure 3-16 - Concentrations of total dissolved solids, calcium, chloride, and sodium versus longitude of groundwater samples from the Dwight-Valparaiso aquifer in or near the project area (decimal degrees west longitude; dashed horizontal line with number indicate median concentration of constituent; source of data- LPSNRD and USGS).

dissimilar to that in the north and south blocks of the project area. Excluding one sample, all concentrations of Ca^{2+}, Cl^{-}, and TDS in the east block were below median concentrations for the project area (Figure 3-16). Concentrations of Na^{+} in groundwater in the east block were mostly above median concentrations for the project area, but well below concentrations to the west. In general, these concentrations along with groundwater flow indicate groundwater within project areaôs north and south blocks likely flows along the paleovalley to discharge points within the stream valleys. However, groundwater in the east block either is discordant with the groundwater flow of the west blocks (i.e., separate recharge area than that to the west) or streams within the project area are losing and diluting the groundwater as it moves easterly. The likely scenario is groundwater in the east block is discordant with the groundwater flow in the two western blocks and the recharge area for the east block is local or remote from the two western blocks of the project area.

Median concentrations of major ions (Figure A2-1 (Appendix 2)) do no indicate substantial differences between water samples collected from the principal aquifer and those collected from the RA. However, statistically significant differences (Ů=0.05, all p-values <0.01) occur between mean concentrations of Ca^{2+}, Mg^{2+}, Na^{+}, SO_4^{2-}, and Cl^{-} concentrations from samples collected from the DV aquifer and those collected from the RA. In addition, surface-water samples typically appear more similar to samples from the RA than samples from the DV aquifer (Figure A2-1).

3.4.2 Cretaceous Aquifer Water Quality

Five wells sampled in the project area were classified as Dakota Formation (Maha aquifer) wells. Due to the small sample size (n = 5) only the minimum, mean, and maximum statistics are presented (Table A2-2, Appendix 2). Use of a small population size makes direct comparisons between the DV and the Maha aquifer non-ideal. Consequently, a caveat is expressed in using any implied comparisons beyond qualitative. With that caveat in mind, the apparent mean concentration for specific conductance, Na^{+}, SO_4^{2-}, and TDS are substantially greater in samples from the Dakota aquifer than in samples from the DV aquifer. Yet even with the small sample size the mean TDS concentration (812 mg/L) indicates groundwater that is less than brackish (1,000 to 10,000 mg/L).

4.0 Interpretation of AEM Results

4.1 Frameworks of the Principal Aquifer

The AEM resistivity model of the project area reveals the character of the Quaternary deposits and the bedrock surface across the project area with a level of 3D detail that would otherwise be unobtainable with currently available borehole information and interpretive techniques. A suite of two- and three-dimensional, full-page size interpretive imagery from the AEM survey are presented in Appendix 1, and the full set of AEM flight-line profiles for each block are included in Appendix 6. For organizational efficiency in the main body of this report, only select, smaller images of the AEM resistivity output are included within the text (each are also included in full-page size in the Appendix 1). Figures of the AEM output imagery presented in Appendix 1 are denoted with the letter A in the name.

Once the inversion process of the AEM data was finalized, senior XRI geophysicists and geologists interpreted the data using Encom PA by selecting contacts between the bedrock and Quaternary deposits for every flight line and tie-line in the project area. This process was aided by use of lithologic information from CSD and NDNR borehole logs. Following this separation of the consolidated and unconsolidated deposits, the aquifer and non-aquifer Quaternary materials were separated by resistivity thresholds selected in Encom PA.

Output generated from the survey (Figure 4-1a through 4-3a) shows distinct contrasts between electrically conductive materials (clay and silt) and more electrically resistive sediments (coarse deposits). The conductive zones are interpreted as glacial till and loess, whereas the resistive intervals indicate the extent and thickness of the outwash sand and gravel deposits that comprise the principal aquifer in the project area. There is no evidence in the historical work that saline water is present in the survey area, which could also cause the electrical conductivity in the surveyed sections to increase. The geologic descriptions from borehole logs across the project area match the geophysical results reasonably well, particularly the CSD test hole information. Deviations do occur in some areas as most boreholes are not located directly along a survey flight-line or where drillers logs lack sufficient detail in the descriptions of the cuttings. In addition to the Quaternary deposits, the character of the bedrock surface has been isolated to display the topography underlying the Quaternary system (Figures 4-1b through 4-3b). The subsurface topography is a result of the advance of, and subsequent erosion created by, the pre-Illinoian ice sheet.

4.1.1 AEM Representation of the Quaternary Deposits

The principal aquifer materials can be delineated with various thresholds of resistivity, as displayed in the following figures and in the appendices. Intervals in the subsurface with higher resistivity values correspond to locations with greater potential for productive aquifer materials. Figures 4-1a through 4-3a (Figures A1-1 through A1-3 in Appendix 1) show the entire resistivity framework of the Quaternary deposits for the three blocks. Each of the three blocks contain intervals of considerably higher resistivities levels, some of which correspond to pre-glacial fluvial deposits and glacial outwash deposits that partially fill the bedrock paleovalleys. Figures A1-4 through A1-21 in Appendix 1 show the same blocks as 4-1a through 4-3a, but with horizontal slices removed at select depth intervals to reveal the variation in resistive material distribution.

Three slightly different ranges of resistivity are used for each flight block to delineate the principal aquifer. The 3D voxels and 2D maps in Figures 4-4 through 4-6 (Figures A1-22

through A1-27 in Appendix 1) display these resistive zones, with minimum resistivity thresholds of 21, 18, and 24 ohm-m for the north, south, and east blocks, respectively. The voxels are plotted on top of the bedrock surface with resistivity levels below the thresholds not displayed. 2D maps (Figures 4-4b through 4-6b) show the extent of the principal aquifer materials in plan view, with resistivity ranges of 21-33, 18-27, and 24-42 ohm-meter ranges for the north, south, and east blocks, respectively. Figures A1-28 through A1-33 show similar configurations as figures 4-4 (a, b) through 4-6 (a, b) (A1-22 through A1-27), but only with the resistivity materials (with same resistivity thresholds) at or below the interpolated water level surface discussed in Section 3.2.5. These sub-water level surface resistivity figures demonstrate the level of saturation in the principal aquifer materials in each of the three blocks. In the north and south blocks, most of the materials are below the water level surface, indicating that confined conditions are likely present in these areas. In the east block, comparison of figures A1-26/27 and A1-32/33 indicate that a considerable extent of resistive materials are found above the water level surface. These unsaturated resistive features indicate where recharge to the principal aquifer in this block is likely to occur in comparison with areas overlain by till and loess. These areas will be discussed in more detail in following sections.

In the north block (Figures 4-4a, b), resistive materials greater than 21 ohm-m are present in approximately the eastern 80 percent of the block with varying thickness that ranges from less than 20 ft upwards to over 300 ft (Figure 4-7a), with the thickest areas underlying the southeastern quarter of the block. Resistivities exceeding 30 ohm-m underlie much of the eastern 1/5th of the north block, with smaller intervals present along the block's north boundary and at scattered locations in the south-central extent of the block. The aquifer materials thin to less than 100 ft in the southwest quarter of the resistivity voxel. The north block is essentially devoid of aquifer materials in the western 1/5th of the area. The highest resistivities (greater than 35 ohm-m) are in isolated pockets the northeastern corner of the block. The thickness of the saturated portion of the aquifer material greater than 21 ohm-m is similar in extent to the overall aquifer material distribution (Figure A1-43). This indicates that across much of the north block, the water level surface is either at or above the base of the confining material, thus exhibiting confined to semi-confined conditions.

In the south block, aquifer materials with resistivities greater than 18 ohm-m occupy most of the northwest-southeast trending paleovalley (Figures 4-5a, b) as well as in discontinuous intervals to the north and south of the main body of resistive material. In general, resistivity values are overall lower than those in the north and east blocks. Resistivities decrease below 18 ohm-m along very well defined trends to the north and south of the paleovalley axis, and only isolated pockets of material at 18 ohm-m are present near the bedrock high in the northwest quarter of the block. The most extensive areas of resistivities greater than 24 ohm-m detected in the south block are present mostly in the eastern half of the paleovalley, with an isolated interval located in the west-central portion of the block. The highest resistivities in the south block are located in isolated pockets in the eastern quarter of the area, with some that correspond to the subsurface underlying the modern-day North Oak Creek drainage. The thickest portions of the principal aquifer based on the resistivity voxel ranges are just west of the middle of the paleovalley, where thicknesses approach 400 feet (Figure 4-8a, b). Throughout much of the paleovalley, the aquifer materials exceed 150 ft in thickness (Figure 4-8a). Much like the north block, the portion of aquifer materials greater than 18 ohm-m below the water level surface (Figure A1-44) is nearly identical to the overall aquifer material thickness voxel in Figure 4-8a. This indicates that the water level surface is either at or above the top of the aquifer, thus indicating confined to semi-confined conditions throughout most of the south block.

In the east block, aquifer material is present beneath nearly the entire area, evident at a resistivity of 24 ohm-m (Figures 4-6a, b). The most extensive intervals of restive material greater than 24 ohm-m are in the west-central and in the northeast corner of the block. The only areas with materials less than 24 ohm-m were found in isolated zones in the southern quarter and the western edge of the block. These resistive features do not necessarily correspond to full saturation, as indicated in Figure A1-45 where the resistive features below the water level surface are much smaller in area than the overall restive zones displayed in Figures 4-6a, b (A1-26 and A1-27). The thickest extent of the principal aquifer material, approaching 285 ft, is located in the east-central portion of the block within the interpreted eastward draining paleovalley (Figure 4-3a, b). However, the saturated thickness in this section is less than the full thickness of the aquifer materials greater than 24 ohm-m, thus indicating unconfined conditions can be present (Figure A1-53 indicates some portion of the aquifer overlying the paleovalley could be confined). In this section, the saturated thickness of the outwash filling the paleovalley ranges from around 180 ft to 210 feet (Figure A1-45). This figure also demonstrates where resistive materials are absent below the water level surface. This does not indicate that no aquifer is present, but conditions conducive for high-yielding wells are less likely. The absence of registered wells in many parts of the east block as indicated in Figure 1-3 is further supported by distribution of saturated resistive material displayed in Figure A1-45. It is possible that wells can be developed in areas where no thickness is mapped, particularly from perched zones or from where less resistive materials are present. However, the long-term productivity and yield of these wells may be less than in the thicker, more extensive zones of resistive material.

In the east block, interpretation of the bedrock surface-outwash contact in the paleovalley mapped on the east side of the block proved difficult (southern half of flight lines 702501 through 702901 in Appendix 7). The continuity in the detected resistivity at the base of the presumed outwash, along with the shape of the valley led XRI to include the resistive units as part of the principal aquifer, although an NDNR borehole log indicated that bedrock was present in this area above the depth of the interpreted contact. Overall, the interpretation as it was made in this investigation should not significantly affect the volume of water calculated for the system or impact the district's groundwater management plan, but it does add uncertainty to the interpretation of the east block. This is an area where further refinement using alternative geophysical techniques, as in high resolution seismic reflection, could provide a more definitive interpretation of where this contact is specifically situated in the subsurface.

Dissected glacial till and loess, indicated by the lower resistivity areas, is thickest in the western half of the south block and in most of the western quarter of the north block. In each of these blocks, till thickness can exceed 450 ft in places, and is at least 150 ft over much of the remainder of the blocks (Figures 4-7b and 4-8b). In the area between the north and south block, the bedrock high that exists appears to have control on the location and extent of glacial outwash deposits. Very limited higher resistivity intervals are present where the bedrock high exists. In the east block, the thickness of the till/loess sequence is around 200 ft near the southwest corner of the block but decreases to only a thin veneer 50 ft or less across the central and eastern portions of the block (Figure 4-9b). The thickness and extent of the loess and till deposits can have implications for groundwater recharge as well as water-quality protection, and will be discussed in more detail in a later section of this report. Larger versions of the till thickness figures are shown in Appendix 1 in Figures A1-46 through A1-48.

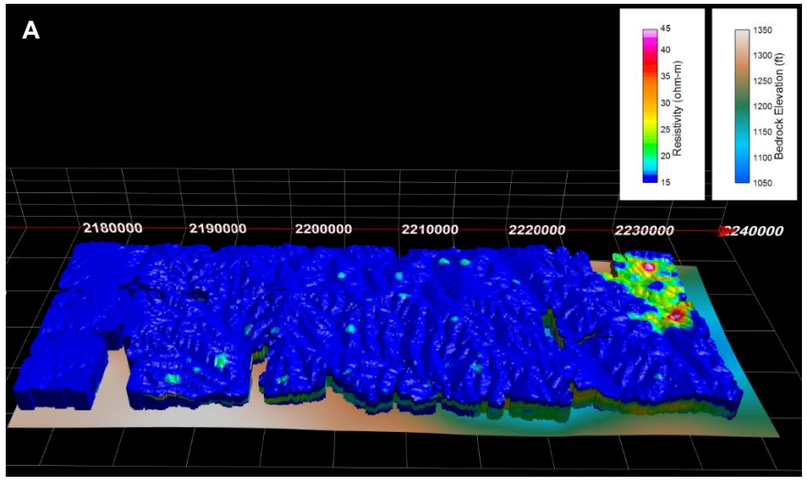


Figure 4-3 – Features of the north block, including the overall resistivity model above (A) and the interpreted bedrock surface beneath the Quaternary deposits below (B).

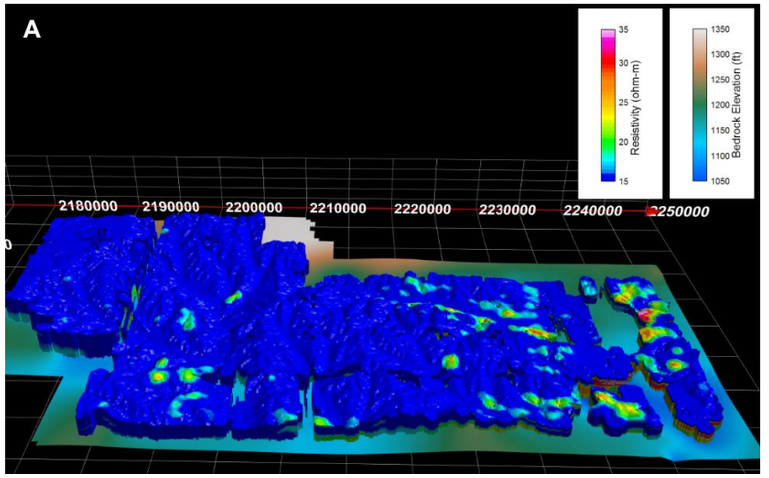


Figure 4-2 – Features of the south block, including the overall resistivity model above (A) and the interpreted bedrock surface beneath the Quaternary deposits below (B).

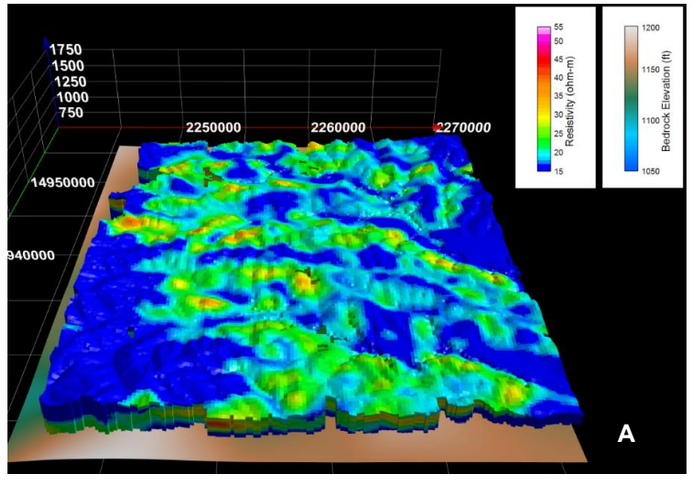
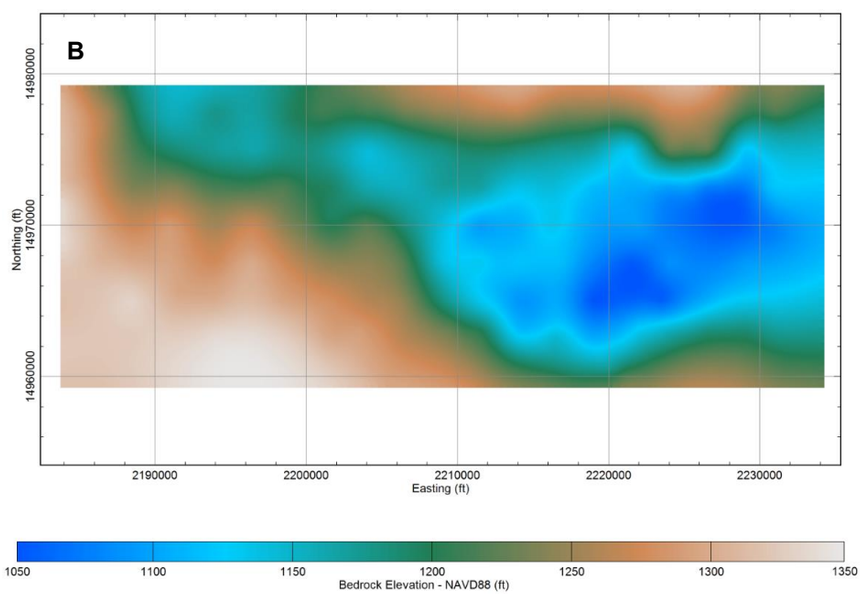
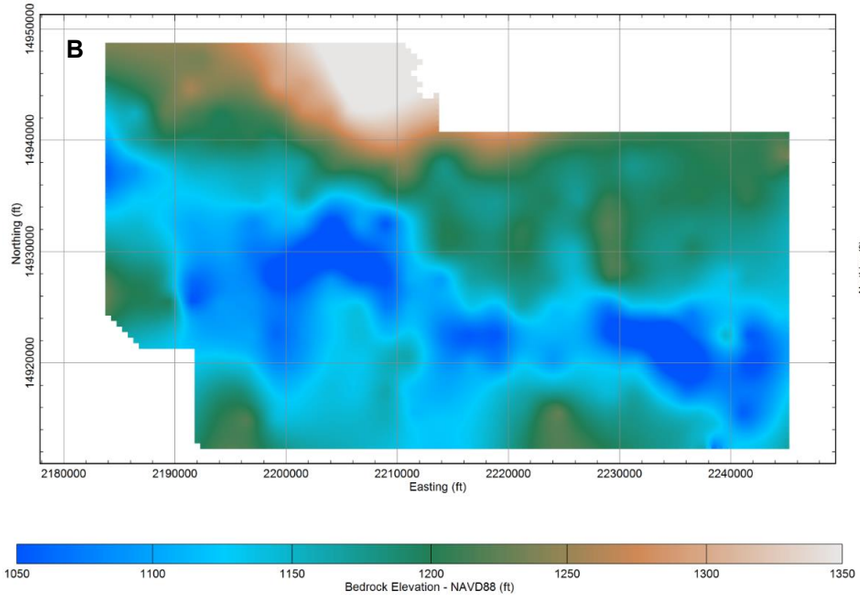
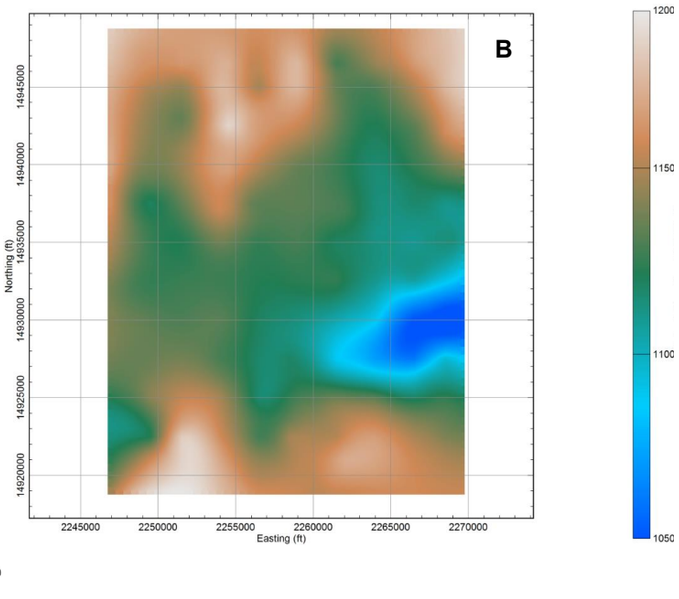


Figure 4-1 – Features of the east block, including the overall resistivity model above (A) and the interpreted bedrock surface beneath the Quaternary deposits below (B).







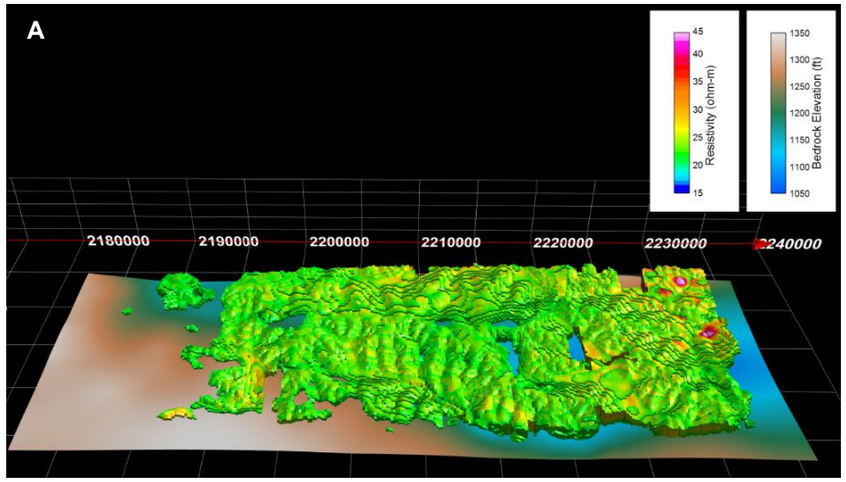


Figure 4-4 – Extent of the principal aquifer materials in the north block greater than 24 ohm-m in resistivity, with 3D representation above (A) and 2D map view below (B).

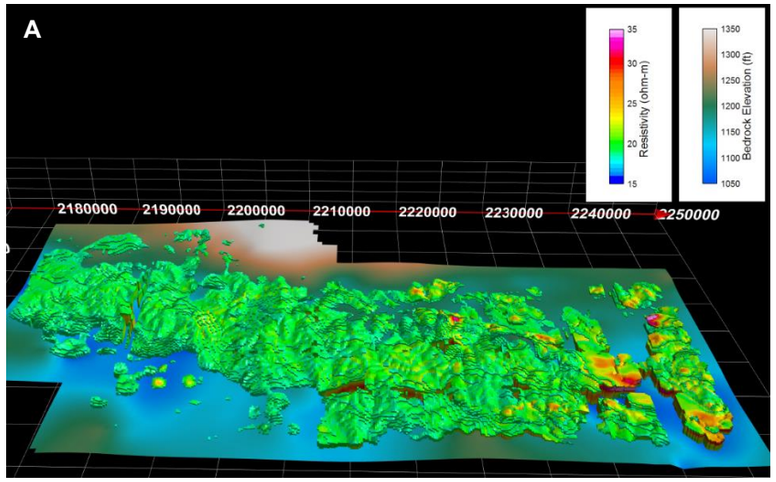


Figure 4-6 – Extent of the principal aquifer materials in the south block greater than 18 ohm-m in resistivity, with 3D representation above (A) and 2D map view below (B).

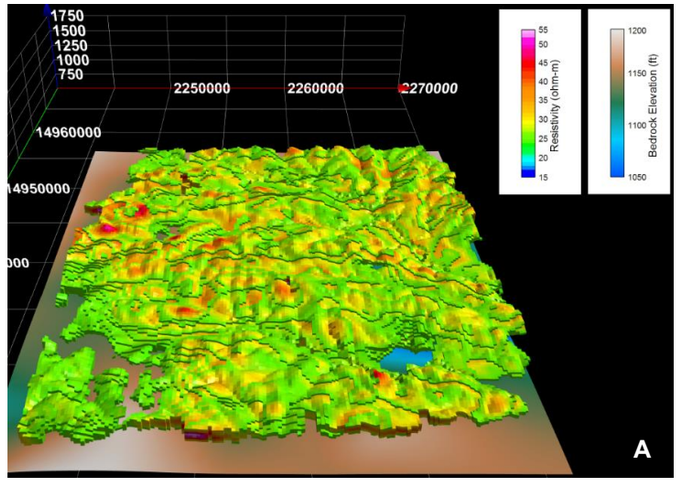
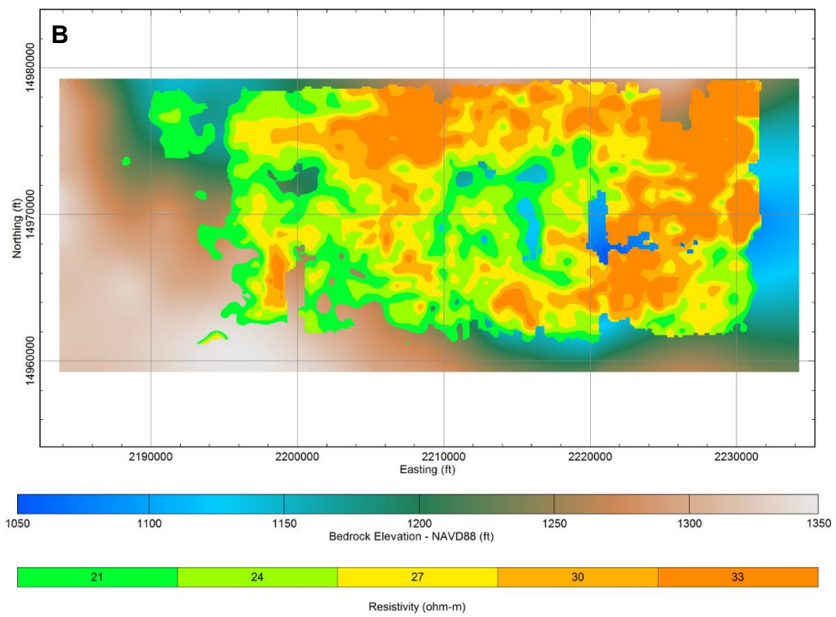
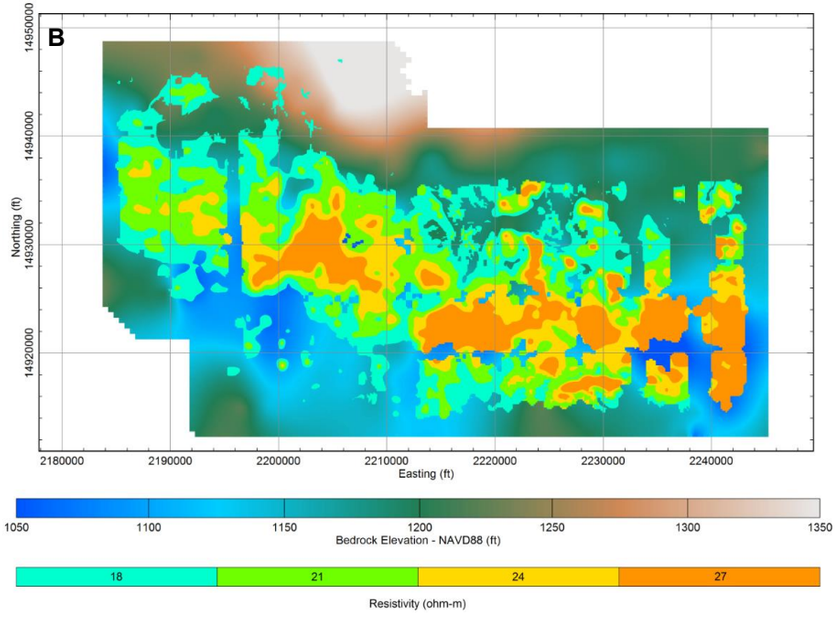
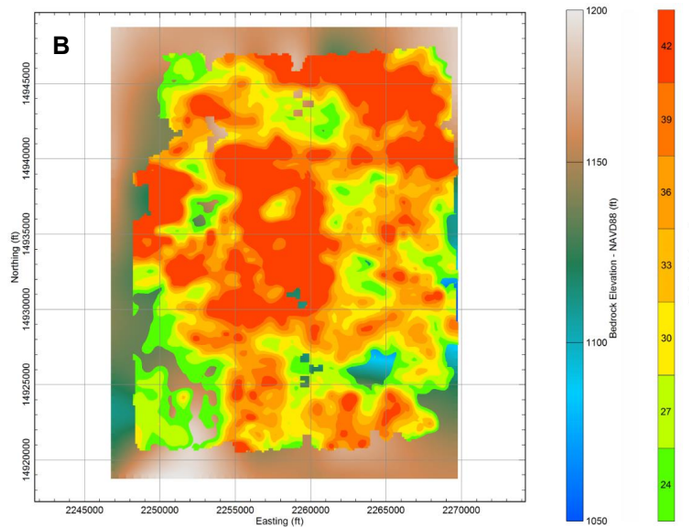


Figure 4-5 – Extent of the principal aquifer materials in the east block greater than 21 ohm-m in resistivity, with 3D representation above (A) and 2D map view below (B).







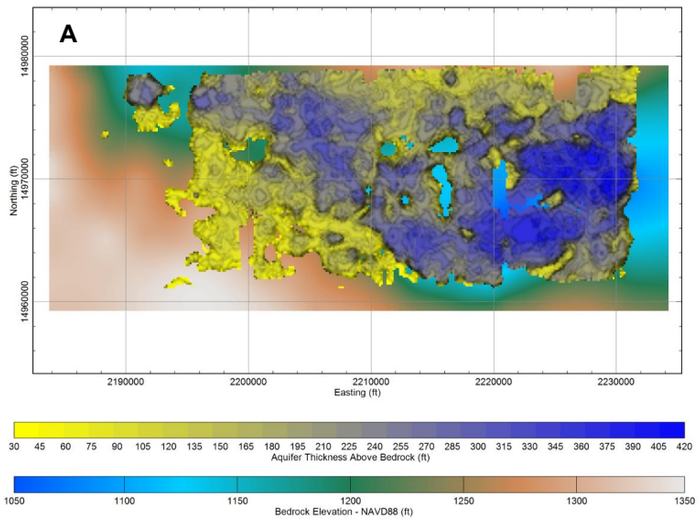


Figure 4-7 – Thickness of the principal aquifer materials in the north block (A), and the thickness of the till/loess sequence overlying the principal aquifer (B).

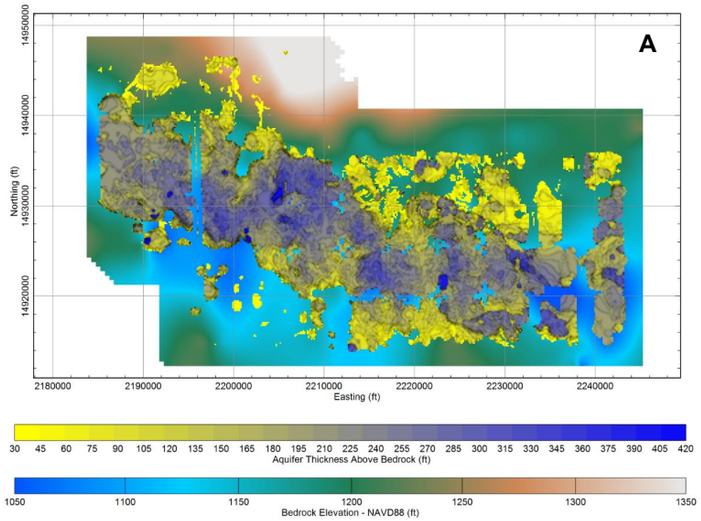


Figure 4-8 – Thickness of the principal aquifer materials in the south block (A), and the thickness of the till/loess sequence overlying the principal aquifer (B).

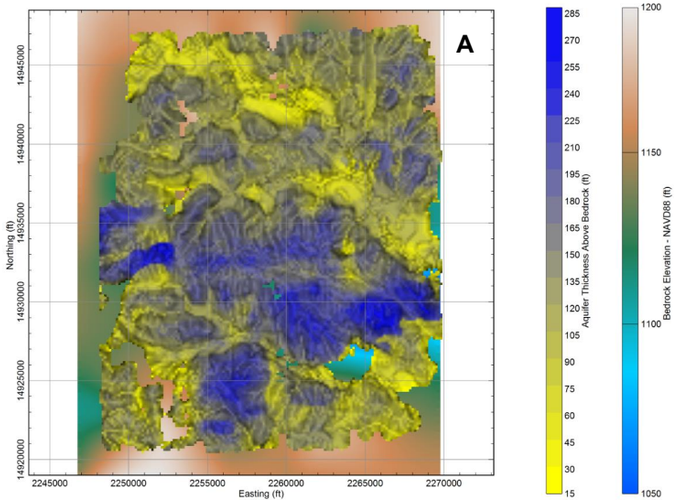
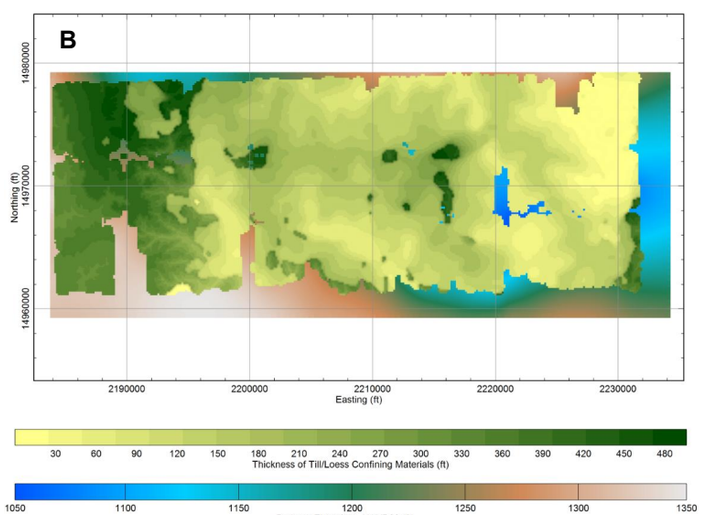
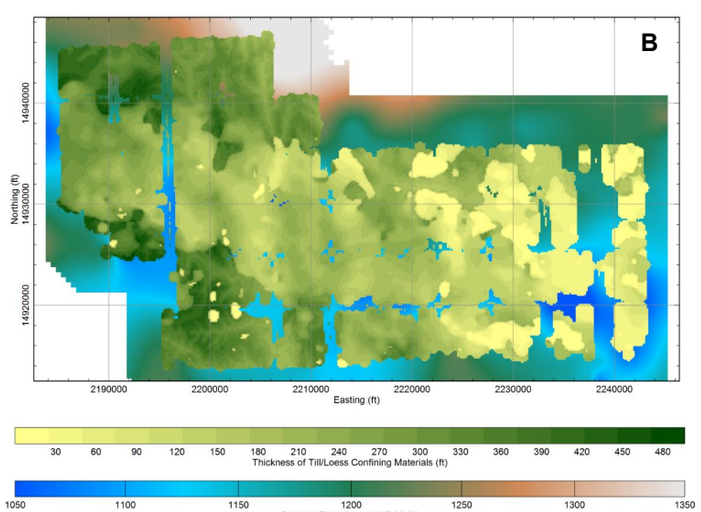
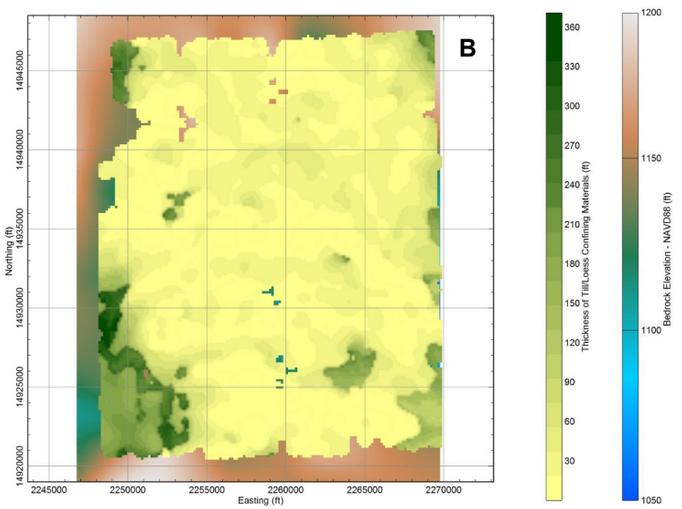


Figure 4-9 – Thickness of the principal aquifer materials in the east block (A), and the thickness of the till/loess sequence overlying the principal aquifer (B).







4.1.2 AEM Representation of the Bedrock Strata

The AEM data reveals in detail the character of the bedrock surface (figures 4-1b through 4-3b), including the extent and orientation of the bedrock paleovalleys carved into the Cretaceous sedimentary strata that are partially filled with glacial material. The paleovalley in the north block is oriented west to east and widens considerably near the middle of the block. In the south block, an extensive paleovalley trends northwest to southeast beneath much of the block. The valley narrows in the middle, but widens near the blockôs eastern side where its orientation turns southward. The lowest and highest elevations in the north and south blockôs paleovalleys are approximately 1,050 and 1,350 ft asl, respectively, for a total relief in the bedrock topography of around 300 ft in the western half of the project area.

Due to thicker till sequences in the north block, depth to bedrock can approach 500 ft in the northern portion of the project area, whereas maximum depth to bedrock in the south block approaches 450 feet. In the east block, the headward area of a third paleovalley is revealed by the AEM data, with two tributary valleys feeding this paleovalley from the north. The axis of the valley is oriented eastward, but it is unknown how the paleovalley trends beyond the project area. In contrast to the paleovalleyôs minimum elevation (around 1,050 ft asl), the highest areas (approximately 1,200 ft asl) are in the north-central portions of the block and along the south boundary for maximum relief in the bedrock surface of around 150 ft.

The bedrock ridge or ñhigh,ò composed of Carlile Shale and the Greenhorn and Graneros Formations, located between the north and south blocks is clearly evident in the bedrock surface (northern fringe of the south block and southwestern quarter of the north block, Figures 4-1b and 4-2b). The ridge appears to have controlled pre-Pleistocene drainages and is overlain primarily by till and loess, with isolated coarse deposits suitable for possible low-yield well development. Additional elevated bedrock areas are apparent on the northern edge of the north block and the southern boundary of the south block, but the extent of these beyond the project area is not known. On the southern slope of the bedrock high, smaller southward-oriented incisions in the bedrock are apparent.

Although not as apparent as the major bedrock high between the north and south blocks, the paleovalleys in the south and east blocks are separated by a slight rise in the surface in the vicinity of the town of Valparaiso near registered well G-155650.

Figures A1-37/38/39 show imagery of the resistive intervals in the upper bedrock. The AEM survey was capable of mapping resistivity values up to 300 ft into the bedrock in many locations of the project area. The figures use a resistivity threshold of 18 ohm-m. Overall, the south block has considerably more resistive material than the other blocks (Figure A1-38), with most of upper bedrock in the eastern half of the block having resistivities in the 23-25 ohm-m range. The north block has a slightly higher maximum resistivities (25-27 ohm-m), but these intervals are located only in isolated areas along the eastern and northwestern boundaries of the block. The highest resistivities (26-30 ohm-m) in the east block are limited only to small zones in the southeast and northeast quarters of the block.

4.1.3 3D Frameworks and Interpretation

4.1.3.1 Hydrogeologic Characterization

Figures A1-1 through A1-21 display 3D resistivity frameworks for the three blocks in the project area. These figures capture the extent and variability of resistivities in the subsurface to depths exceeding 600 ft bgl in places. These resistivities can be related to specific lithologies by correspondence with lithologic borehole data as well as a limited number of downhole geophysical logs provided from well drillers. The overarching objective of the AEM process is to translate the resistive nature of the subsurface materials into the hydrogeologic character of the principal aquifer. To demonstrate this translation, a complete suite of flight lines from each block are presented in Appendix 7 that show the corresponding aquifer intervals with the corresponding resistivities mapped along the "slice" of the subsurface created along the AEM profiles. Test hole and NDNR-sourced driller's report lithology logs are also displayed on these profiles to demonstrate how these AEM intervals correspond to the subsurface geology. Alongside these lithologic profiles are markers of the static water level reported in the associated NDNR well record. Note that the height of the reported static water level surface (blue fill) may not correspond exactly to the dashed water level surface included on these profiles at all locations due to interpolation of the surface across large, data-deficient areas. Also included in these figures is a demarcation of the Quaternary-Cretaceous bedrock contact.

In addition to display of the principal aquifer materials revealed by the AEM survey, the non-aquifer confining materials are also evident in the AEM profiles and designated as "confining material" in the interpretive profiles. Figure 4-10 displays a sample of these interpretive sections from the north block, including resistive material in the bedrock. These profiles show in specific detail the thickness and elevation of the principal aquifer and the overlying confining materials in the subsurface at intervals of 800 feet distance between each profile across the entire widths of each block. Evident in these profiles is the vertical proximity of the principal aquifer with the land surface and the materials that separate them. In Figure 4-10 the principal aquifer underlies 100 to 200 ft of till and loess. However, in the east block profiles shown in Appendix 6, this confining unit is not present across most of the area. The ability to characterize the extent and thickness of the glacial till and eolian loess is a critical feature that the AEM resistivity model delineates in regards to assessing recharge potential to the principal aquifer (this topic will be discussed in following sections).

Each profile line from the AEM flights is included in Appendix 7. These interpretations highlight the geologic character of the subsurface in ways otherwise unachievable with traditional interpolation of test hole lithologic data alone. The Quaternary and upper Cretaceous features discussed in previous subsections of this report are clearly evident in the profiles.

4.1.3.2 Depositional Features

Although beyond the purview of this project, it is worth a brief discussion regarding the glacially-forged structure in the till and outwash deposits that are evident in the AEM profiles, particularly in the east block. It is postulated that these features are related to deposition of both till and outwash at various stages of advance, stagnation, and retreat of the pre-Illinoian ice sheet. Two pre-Illinoian advances of the Laurentide Ice Sheet have been identified in eastern Nebraska (Reed and Dreezen, 1965), with the earliest advance reaching its westward maximum in York County, Nebraska. The second advance terminated generally within the project area, forming the Cedar Bluffs Moraine complex (Reed and Dreezen, 1965). The multiple advancements/retreats created complex depositional features, as the earliest deposited features were reworked by later advances

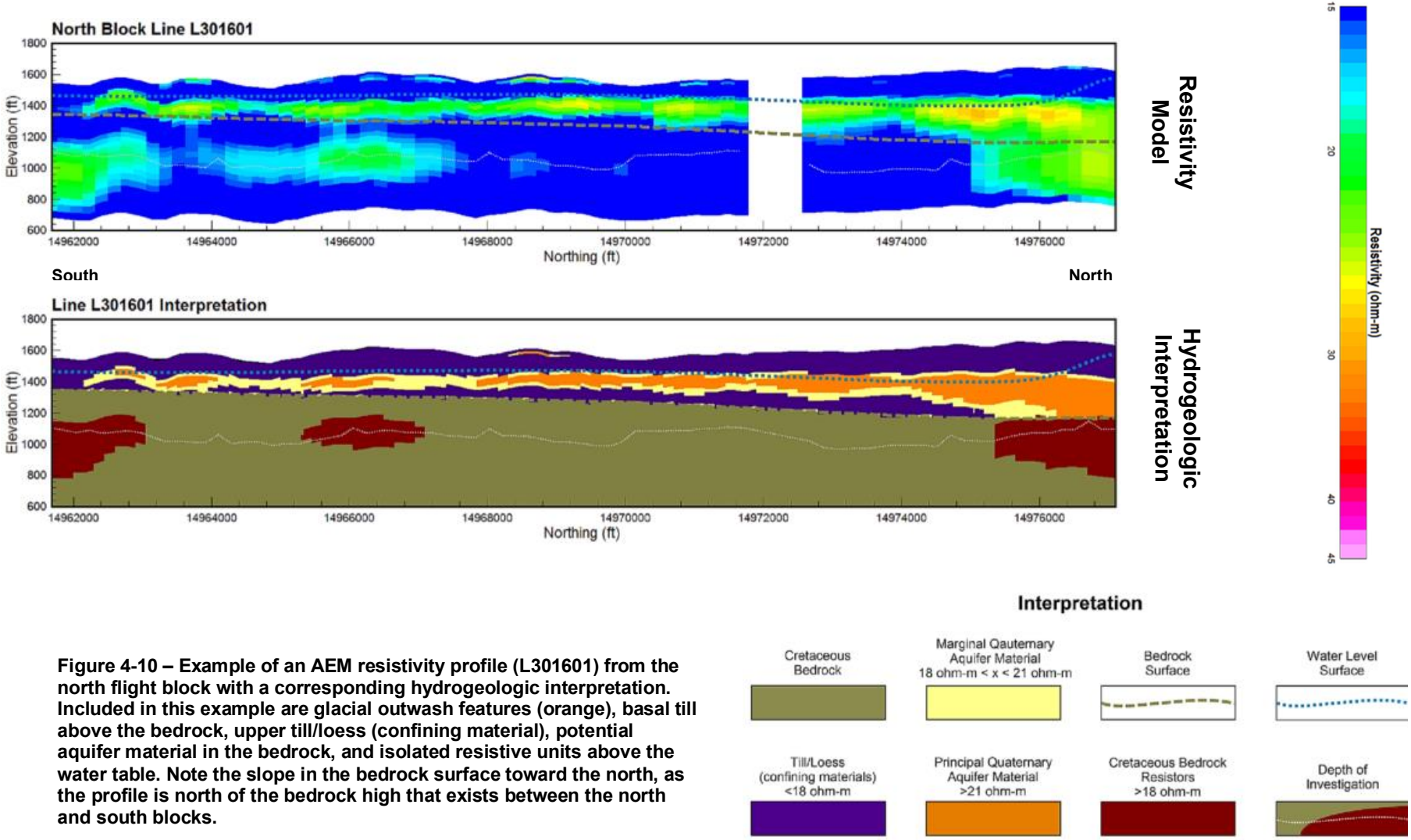


Figure 4-10 – Example of an AEM resistivity profile (L301601) from the north flight block with a corresponding hydrogeologic interpretation. Included in this example are glacial outwash features (orange), basal till above the bedrock, upper till/loess (confining material), potential aquifer material in the bedrock, and isolated resistive units above the water table. Note the slope in the bedrock surface toward the north, as the profile is north of the bedrock high that exists between the north and south blocks.

and retreats. The orientation of the mapped moraine systems by Reed and Dreezen (1965) indicate that the advancing ice sheet moved general from the east/northeast towards the west/southwest. Because of this slight northeast-southwest direction of movement, cross sections of the remnant geomorphological features do not identically parallel the AEM profiles. However, depositional features are evident even with the non-parallel arrangement between the AEM flight lines and the primary axis of ice sheet flow. Along the southern tie line of the east block, distinct concentric features in the AEM data (Figure 4-11) indicate possible tunnel-feature deposits beneath and within the till. These features represent intervals where meltwater in tunnels within the ice sheet transported coarse debris, which eventually filled up the cavity within the ice. As the ice sheet retreated and deposited till or other variably-sorted material around the tunnel-derived coarse material, the concentrically-shaped features remained and are now evident in the AEM as more resistive features.

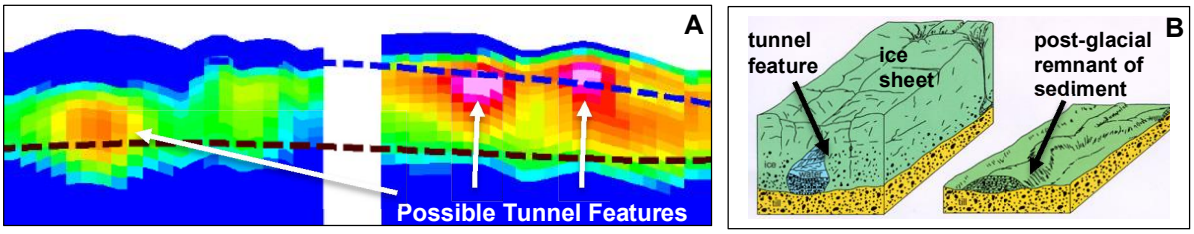


Figure 4-11 – Examples of possible tunnel-sediment structures within the southernmost west-east tie-line in the east block (A). The cartoon drawing in box B displays the conceptual model regarding how such formations develop within the glacial environment.

Figure 4-12 shows a distinct channelized shape in a north-south flight line from the east block that would indicate a west/southwest direction of meltwater flow from the ice sheet. The numerous, shallow resistive features, apparent in the north-south flight lines of the east block appear to be outwash deposits that formed a dissected outwash plain that overlies older ground moraine till. This depositional setting may also contain remnants of individual outwash fans released directly from the ice sheet margin. Figures 4-13a-c display such features in a north-south flight line (Figure 4-13a) near the center of the east block, and the corresponding depositional environment and post-glacial landscape is shown in Figures 4-13b and 4-13c.

Figure 4-14 shows a portion of the southernmost AEM tie-line in the project area where an apparent ñthrustingòof coarse (resistive) deposits were shed from the glacial margin over an area of older pre-Illinoian till. A secondary, smaller feature is also apparent just east of the larger thrusting feature displayed in Figure 4-14. These deposits likely originated as meltwater emerged from the glacial margin and deposited an assortment of coarse debris from sub-glacial or tunnel-sources within the ice directly onto the pre-existing, sloped, till surface.

Each of these interpretations in figures 4-11 through 4-14 are highly preliminary and further, more detailed research on the individual features would be required to definitively characterize the glacially-derived, geomorphological features and subsurface deposits identified in the AEM data.

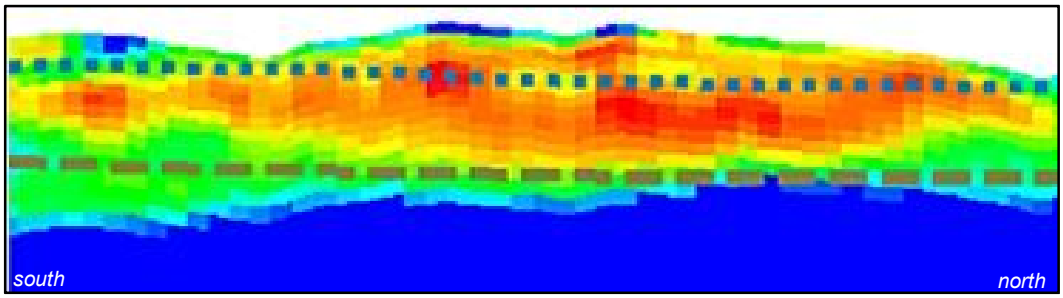


Figure 4-12 – Example of a possible outwash channel as indicated by the higher resistivities (red-yellow-orange colors) in the east block, facing westward along the axis of the channel. The blue dotted line indicates the position of the interpolated water level surface, and the green dashed line is the bedrock-glacial material contact.

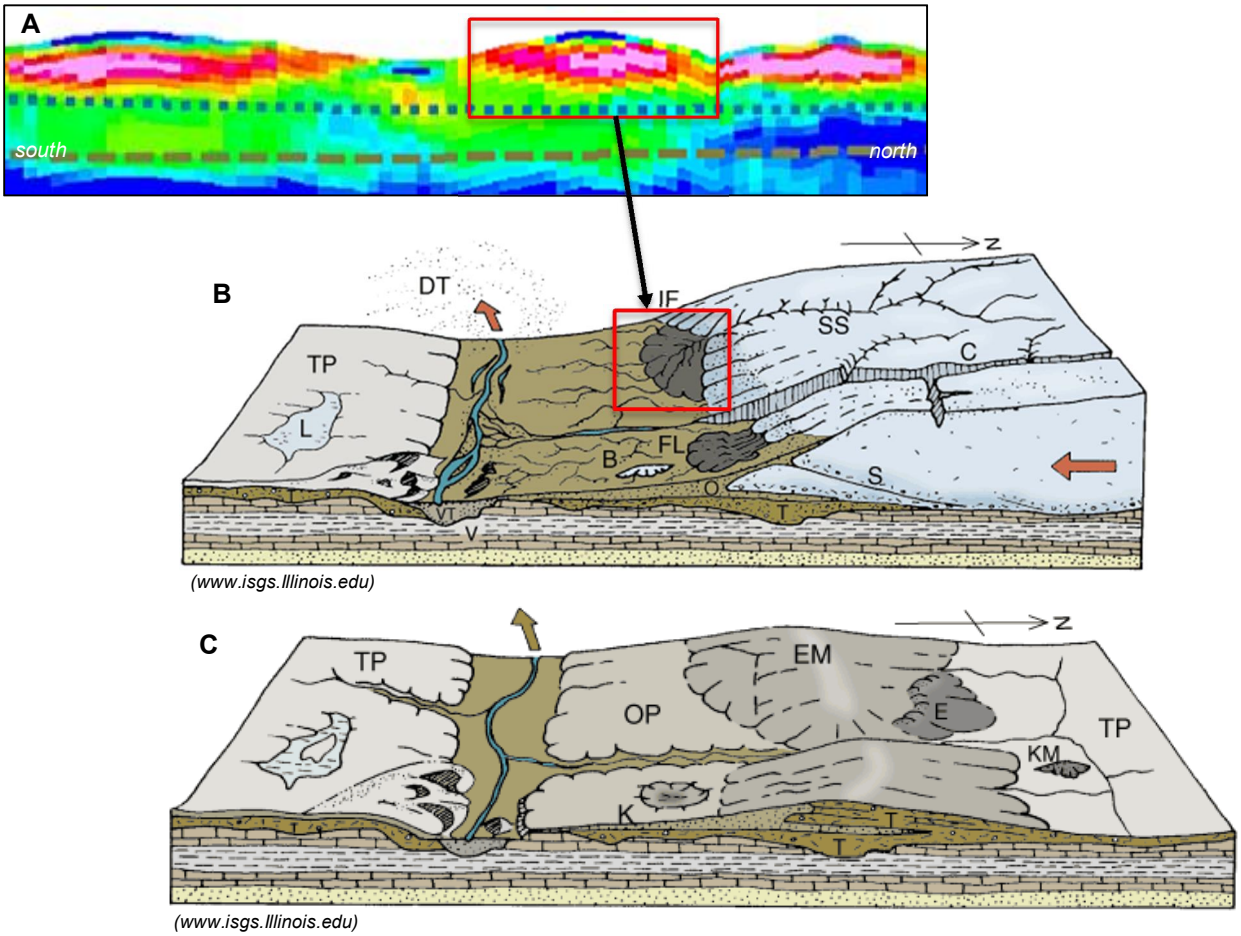
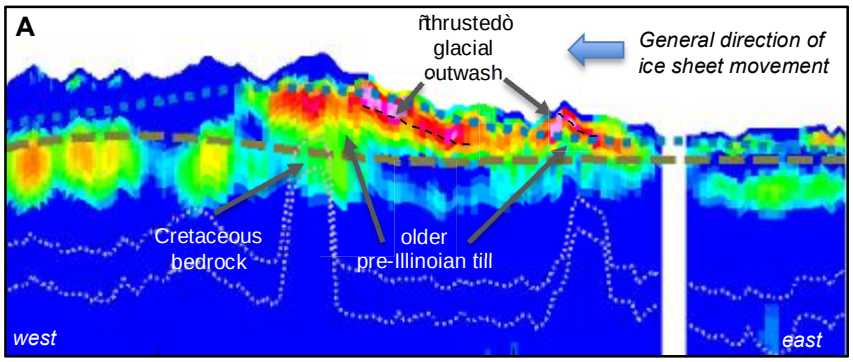
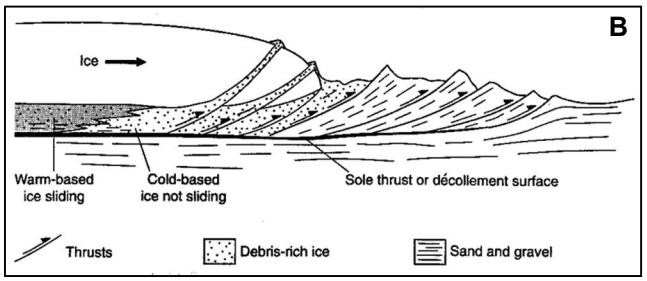


Figure 4-13 – Example of possible outwash fan feature in the east block (A) with the glacial margin environment from which these deposits possibly originated (B), and the remnant post-glacial landscape indicating an outwash plain (OP) to the left of the moraine structure (EM). Note that the AEM profile in 23a is facing westward.





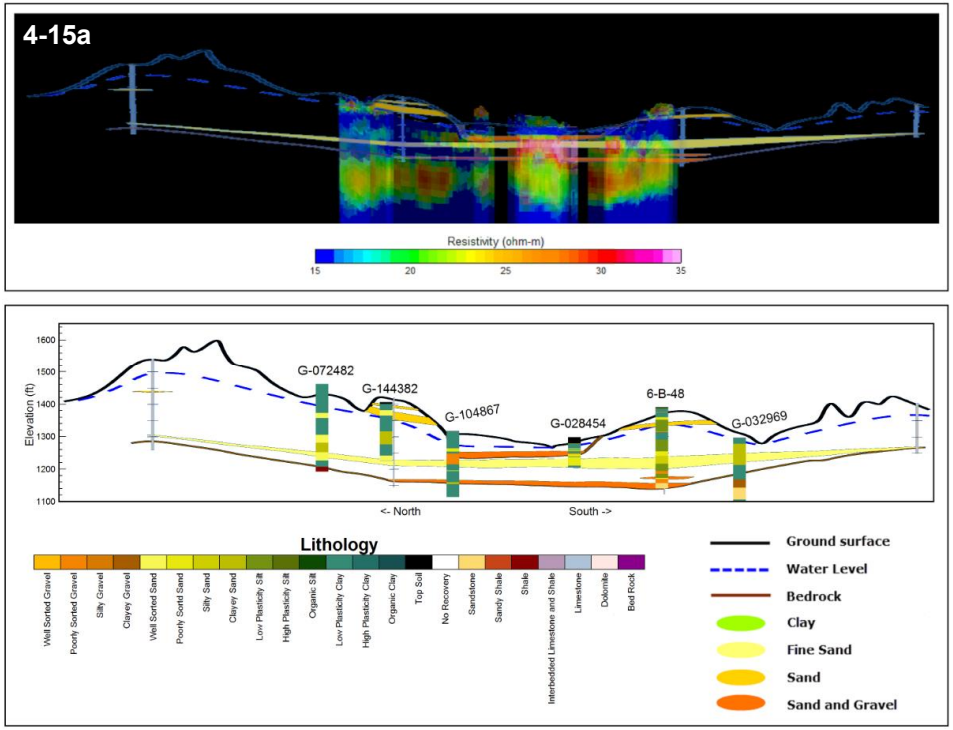
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Figure 4-14 – (A) Example of a possible "thrust" feature of coarse-grained (resistive) deposits (red-pink-orange colors) within the moraine complex on the eastern edge of the southernmost AEM tie-line in the project area (black dash line). To the left (B) is an interpretive model representing the formation process for these thrust features. (Note the direction of ice movement is opposite in the two figures).

4.1.4 Comparison with Historic Cross Sections

XRI acquired hand-drawn CSD cross-sections of the geology located in the south block of the project area. Two of these cross-sections contained detailed information suitable for integration with the AEM data. For this comparison, the cross sections (SAU-205 and SAU-216) were geospatially-referenced for direct insertion into the AEM processing software, which allowed for side-by-side comparison of AEM profiles and historic stratigraphic data in the project areaôs south block.

Figures 4-15a and 4-15b show these comparisons, with the locations of the cross sections shown on the inset map. NDNR borehole data are also included on the figures and show generally good matches with the cross-sections as well. In this area, the Quaternary deposits revealed in the AEM data match relatively well with the historic cross section data, including along SAU-216, where a considerably thick resistive unit in the AEM data matches closely with a thick unit of poorly-sorted gravel indicated on the cross section. These comparisons also contrast how historic data, developed by drawing straight lines between borehole data points, cannot capture the variability in the subsurface as revealed by the AEM data. Despite their simplicity, these cross sections do provide additional interpretive insight into the characterization of the subsurface in the project area and correlate resistivity patterns with subsurface lithology. Full size versions of these figures are available in figures A1-49 and A1-50 of Appendix 1.



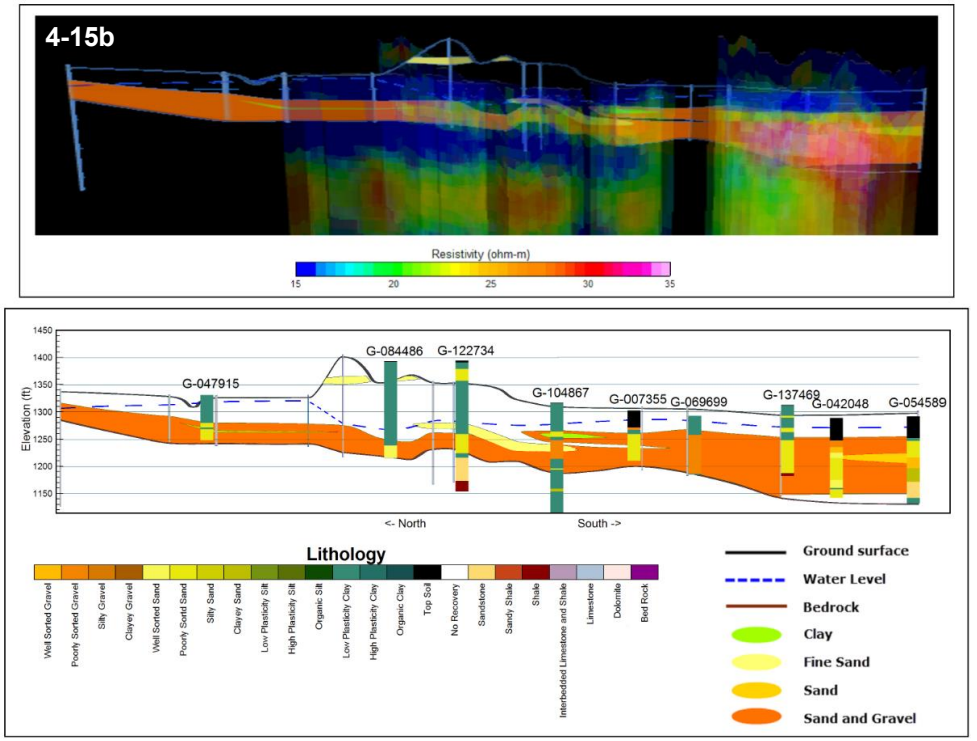
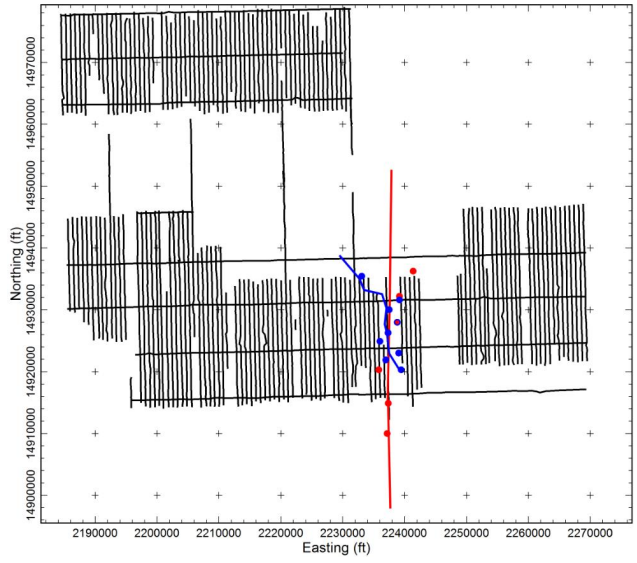


Figure 4-15 – Historic cross-sections compared with AEM profile data. SAU-205 in figure 4-15a (above) and located along the red line on the inset map to the right, shows the principal aquifer materials in yellow that correspond to resistive units in the AEM data. SAU-216 (Figure 4-15b) shows a similar comparison along the blue line indicated on the inset map.



4.2 Estimation of Aquifer Volume and Water in Storage

Three-dimensional digital representation of the subsurface resulting from the AEM method provides users the ability to more accurately estimate total aquifer volume and the amount of extractable water present. For this calculation, separate resistivity thresholds are applied for each block. The volumes of aquifer material are calculated using minimum resistivity thresholds of 21, 18, and 24 ohm-m for the north, south, and east blocks, respectively. Below these values, the resistivities from the AEM data are considered to represent confining (aquitard) materials, or areas where the presence of fine-grained material prohibits the development of high-yielding wells. Although Druliner and Mason (2001) used a specific yield value of 0.20 to estimate extractable water volumes in the DV aquifer, this analysis uses a more conservative value of 0.15 as mapped by Summerside and others (2005) in this area (Figure 3-10). Using this average specific yield, the north block extractable water volume is estimated to be 344,062 ac-ft. The extractable volume is estimated to be 452,715 ac-ft in the south block and 86,817 in the east block for a total estimated volume in the project area flight blocks of 883,594 ac-ft. These ranges are summarized in Table 4-1. These values are overly conservative, as portions of the AEM data were removed during the inversion process due to interference from infrastructure at the land surface. Also, these volumetric estimates consider only the volume of water assumed in the pore spaces of the principal aquifer material defined by the resistivity threshold levels and do not account for the amount of ñconfinedò water under pressure (head above the aquifer). This volume of water would add to the values reported in Table 4-1. However, too much uncertainty exists in developing an average level of head above the top of the aquifer across the entire project area, as well as defining a representative storativity term for the confined aquifers. Thus, the volumes listed in Table 4-1 are only conservative estimates, as parts of the subsurface were removed from the inversion process and the amount released from the decline in pressure are not considered.

Table 4-1 ï Estimates of extractable water content in the principal aquifer underlying the separate blocks in the project area. Numbers in the table are rounded from the values reported in the text.

Flight Block	Resistivity Threshold (ohm-m)	Aquifer Volume (ft^3)	Extractable Water Volume	
			(billions ft^3)	ac-ft (thousands)
North	21	9.9×10^{10}	14.9	344.1
South	18	1.3×10^{11}	19.7	452.7
East	24	2.5×10^{10}	3.8	86.8
	TOTAL	2.6×10^{11}	38.5	883.6

4.3 Comparison to Existing Test Holes and Extraction Wells

4.3.1 Existing Test Holes with AEM Interpretation

Figure 4-16 exhibits a comparison of borehole lithology with the AEM data along the tie-line in the southern portion of the south block. Comparison of the boreholes and the AEM output generally match well. It should be noted that very few well CSD test hole or NDNR borehole locations lie directly on a flight line, and that some deviation should be expected between the borehole lithology and the geophysical information due to the inherent

complexity of glacial depositional environments. In some areas, disagreement exists between the geophysical data and the borehole lithologic descriptions, particularly at some well locations in the east block. This condition could occur due to geologic, and thus geophysical conditions changing within short lateral distances, which can be exacerbated by a lithology log being far from the profile.

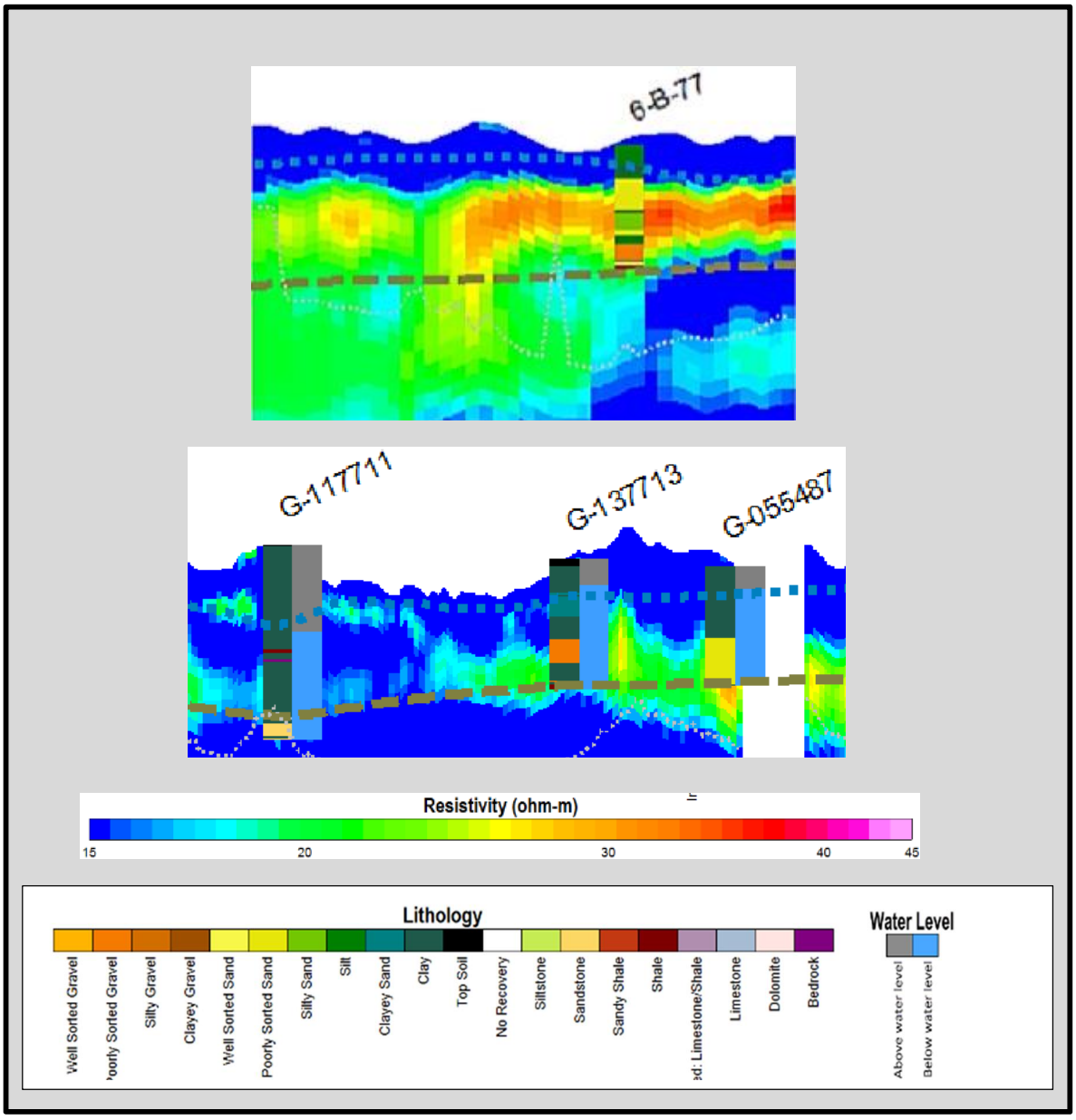


Figure 4-16 – Example comparison of AEM survey data and lithologic descriptions from a CSD test hole (upper image- from the north block) and NDNR driller's logs for a section of a tie-line in the southwest corner of the south block (lower image). The orange and yellow lithology colors represent coarse deposits that correspond to resistivities of 20 ohm-m or greater. The dark blue in the AEM section represents till and loess that corresponds to silt, clay, and clay-rich sand in the lithology logs.

4.3.2 Evaluation of CSD Test Hole Cuttings

Early in the review process of developing the lithologic description database, a key information source, utilized in developing the 3D framework models and for "truthing" the AEM data, provided inconsistent information. This was discovered in several of the drillers' lithology logs from the NDNR's online registered well database. The issues in question regarded what appeared to be bedrock material of varying thicknesses being reported at depths well above expected elevations of the Cretaceous bedrock surface. Although viewing of these specific cuttings from NDNR registered well drillers' reports was not possible, examination of cuttings from the nearest CSD test holes was feasible, as all test-hole cuttings are stored and available for view at the agency's headquarters in Lincoln, Nebraska.

In September 2014 lithologic samples and geologist field logs from CSD test holes were evaluated to determine the quality of the project area's drillers' logs obtained from the NDNR registered wells database. Some NDNR drillers' logs describe upper bedrock interval of shale, limestone, or sandstone overlying unconsolidated sediments. Greg Steele, Research Hydrologist at XRI Geophysics, with assistance from James Goeke, CSD emeritus Research Hydrogeologist, examined selected CSD test-hole cuttings and geologist field logs to determine (1) if bedrock units overlie unconsolidated sediments, (2) depth of Cretaceous bedrock, and (3), primary color changes from Quaternary sediments and Cretaceous bedrock at their respective contact. Cuttings were re-examined along with their associated geologist field logs for test holes 6-B-77 and 7-B-77; whereas only the geologist log was examined for test holes 4-A-48, 5-A-48, 6-B-48, 7-B-48, 8-B-48, 3-B-76, 4-B-76, 5-B-76, and 8-B-77.

CSD test holes in and around the project area typically did not penetrate the bedrock units more than 15 ft. Thus it was not possible to determine precisely if unconsolidated sediments lie at depth below Cretaceous deposits. However, one CSD test hole (7-B-48) did document about 34 ft of sandy siltstone in the Quaternary units which, lithologically, was not too dissimilar to some NDNR driller logs descriptions. Limestone, shale, and sandstone were not found overlying unconsolidated units in and CSD test-hole descriptions. It is possible that some consolidated materials noted in drillers' reports listed on the NDNR database could have been encountered, but were actually fragments of dislodged bedrock from areas to the northeast crossed by the ice sheet that became entrapped within the ice and later deposited within the till.

4.4 Evaluation of Confined vs. Unconfined Conditions

The hydrostratigraphic frameworks resulting from the AEM survey, along with water level data from the NDNR registered well database and the LPSNRD were evaluated to characterize the extent and level of confinement of the potentiometric surface/water table. Both confined and unconfined conditions persist in the subsurface, and the combination of the AEM data with interpolated water level surface has aided in further understanding the spatial variability in these conditions.

Evaluation of the aquifer conditions with the AEM data involved combining an interpolated and gridded water level surface with the hydrostratigraphic framework in Encom Profile Analyst software. Assembly of the static water level surface involved gathering static water levels from NDNR registered well records and converting the depth to a water surface elevation in feet above sea level, followed by interpolation to a gridded surface. The AEM grid was horizontally sliced with this water level surface, which revealed where and to what extent the height that the water level surface was above the principal aquifer materials, which is defined by the more resistive intervals in the AEM model.

The result of this data integration (Figure 4-17) displays where confined conditions persist in the subsurface and at what approximate thickness, in feet. Overall, much of the principal aquifer in the north and south blocks is under some degree of confinement. Conditions are the opposite in the east block where unconfined conditions are present over much of the area where thick intervals of coarse deposits contain the water table. In the south block, it is possible that groundwater extraction for irrigation over time in the unconfined alluvium underlying North Oak Creek, as well as in the confined portions of the aquifer beneath the uplands can create semi-confined conditions during certain part of the year. However, these levels appear to recover to confined conditions. The key to this relationship and interaction of wells is to understand gradients between the aquifer units and seasonal trends in the water levels in each aquifer. If long-term drought persisted in the region, continuous pumping could render more of the aquifer unconfined. Larger versions of each image in Figure 4-17 are available in Figures A1-51 through A1-53 in Appendix 1.

Figure 4-18 shows examples of the placement of the water level surface in AEM cross sections where confined conditions prevail (4-18a), where conditions transition from confined to unconfined (4-18b), and exclusively unconfined (4-18c) conditions exist. Appendix 7 contains profiles for each flight line in the three blocks, and the water level surfaceôs placement in the subsurface is indicated in the Quaternary interpretations.

To further substantiate the AEM interpretation of the aquifer conditions across the project area, static water levels in NDNR registered wells were evaluated in relation to the screened intervals of the wells and the extent and thickness of the confining material above the screen. To reiterate the fact that the NDNR registered well static water levels span a considerable range in time and season of measurement, this evaluation should be considered useful only for evaluating general trends across the project area and not representative of present conditions. Regarding the most recent data available, 2012 and 2014 water levels from the USGSôs NWIS database and the LPSNRD indicated that confined conditions existed at all measurement points that span across the entire south block, including at wells located within and near the Oak Creek valley near Valparaiso. The level of confinement range over several dozen feet among these wells, however. Because of the wide span of time that exists between static water level measurements in the NDNR registered well database, development of a detailed, comprehensive map of the level of confinement across the project area was not considered appropriate. Overall, the aquifer is under the greatest degree of confinement in the north and south blocks, where the potentiometric surface can exceed levels over 400 ft above the top of the coarse material unit hosting the well screen. The level of confinement is typically between 0 and 50 ft along the bedrock ridge between the north and south blocks as well as in the east block, where unconfined conditions are also present in the thick, shallow coarse-grained deposits.

Review of the LPSNRD recorder well data, most of which covers relatively short spans of time in 2012 and 2014, indicate that water levels fluctuate from 10 to over 50 ft seasonally, but generally show recoveries close to the non-growing season conditions. At the Valparaiso monitoring well (051995), the water level recoveries appear to show confined aquifer characteristics with rapid recoveries following the minimum seasonal water level (LPSNRD unpublished data, 2014). Graphs of the continuous recorder data are presented in Appendix 5.

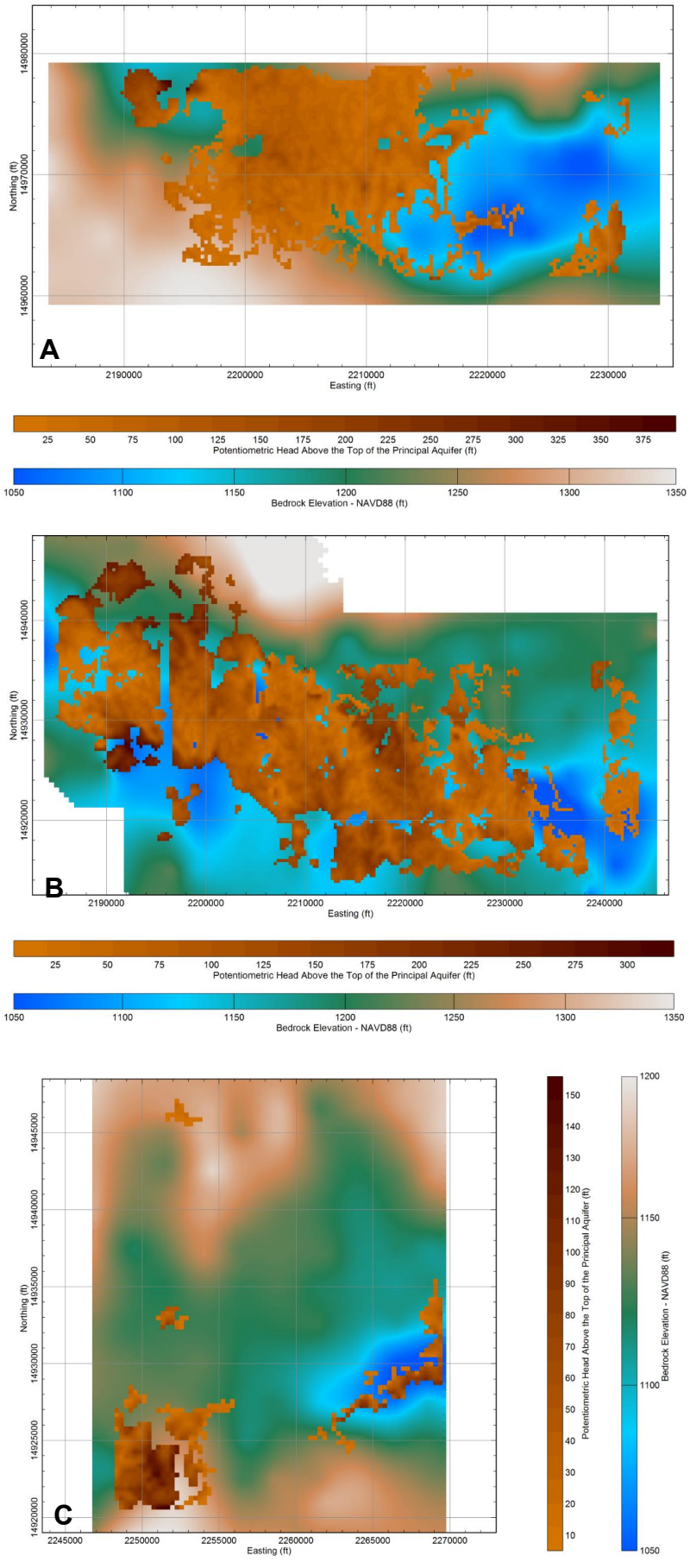
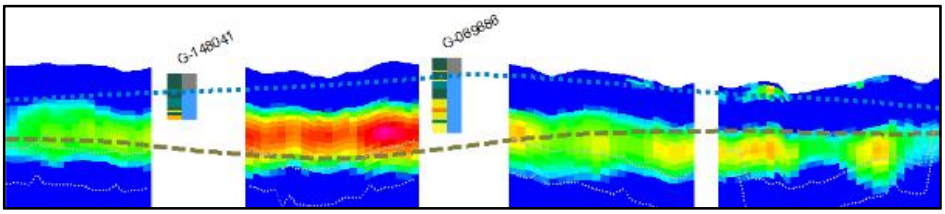
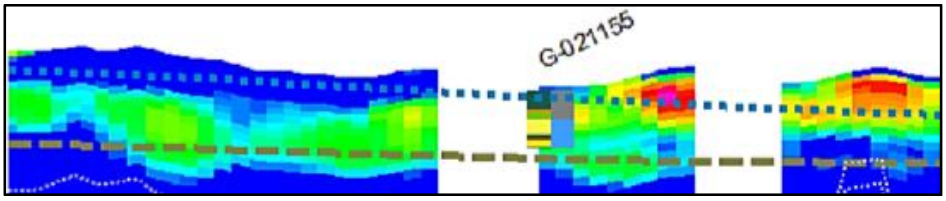


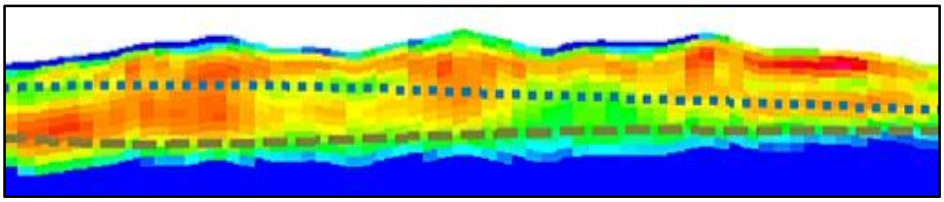
Figure 4-17 – Level of potentiometric head in feet above the principal aquifer in the A) north block, B) south block, and C) east block based on the interpolated water level surface from the USGS and NDNR.



A. confined



B. confined to unconfined transition



C. unconfined

Figure 4-18 – Position of water level surface in three different aquifer settings. The top profile (A) exemplifies where the water level surface is entirely within the glacial till from the south flight block; the middle profile (B) displays where the water level surface transitions from confined to unconfined conditions in the east block; and the bottom profile (C) shows where the water level surface is entirely unconfined in the central portion of the east block. The dashed lines on the sections represent the water table (short blue marks) and the interpreted Quaternary-Cretaceous contact (long brown marks.)

In conclusion, the principal aquifer is under some degree of confinement within the project areaûs north and south blocks, with unconfined conditions primarily found in the east block. The extent of connection between the principal aquifer and surficial sources of recharge through thick zones of till is unknown, although it is highly likely that semi-confined (leaky) conditions exist within the project area. If no leaky conditions existed, then over long term spans of time, the system must receive recharge in isolated areas where the principal aquifer is near the surface or only thinly mantled by till and loess, or alternatively from lateral recharge from beyond the project boundary. These sources must exist for water levels to recover after dry periods as indicated in the LPSNRD continuous recorder well data at Valparaiso.

4.5 Groundwater Recharge Areas

Recharge to the groundwater flow system depends on multiple factors: precipitation rate, soil type, composition and thickness of the vadose zone, surface slope, density and type of vegetation, land use practice, and the availability of aquifer in the subsurface. The greatest chance for recharge in the project area, in terms of the physiographic conditions, occurs in areas where the landscape is relatively flat and where the upper soil horizon and vadose zone allow for rapid infiltration and downward transmittal of water below the root zone. The source of water available for potential recharge is from precipitation and excess irrigation applications that exceed the crop irrigation demand or directly becomes surface

runoff. Thus, irrigation practice can play a significant role recharge potential. Even if the physiographic characteristics are favorable for recharge (minimal slope, permeable soil, thin vadose zone), timely irrigation application can limit the amount of deep percolation available to reach the saturated zone. Thus, the identification of potential recharge areas described in this section relate to the physiographic and geologic characteristics revealed by the AEM data primarily, and not land use, irrigation, or cropping practices.
Much of the land surface in the project area, aside from the valleys, is steeply-sloped to hummocky. In these upland areas, several factors limit the potential for recharge to reach the principal aquifer. First, the overall thickness of the till can exceed 400 ft in places. The combination of the depth to the principal aquifer and the low permeability of the till and loess limits the potential for water to reach the saturated zone within a time period suitable to replenish the aquifer after lengthy periods of pumping. Second, the overall surface slope in the uplands enhance rapid runoff and reduces the potential for infiltration, except in catchments where erosion control practices (terraces and stock ponds created by small dams) where runoff collects and does not immediately flow out of the watershed. The soils mapped in the upland areas are primarily silt, silty-clay or clay loams, some of which locally have slopes exceeding 50 percent in some locations (Kerl and others, 1982).

Based solely on the topography within the project area, the areas with the greatest likelihood of recharge would be in the broader valleys where incised streams can allow direct communication of surface runoff with aquifer materials. The highest recharge rates are expected to occur along the generally flat, broad valleys within the project area. However, as revealed in the AEM resistivity profiles, even the drainages that cross the area can be underlain by more conductive (fine-grained) material that limits the hydraulic connection between the drainages and the principal aquifer.

Although based on a coarse, statewide modeling assessment that does not incorporate local conditions, Szilagyi and others (2005) estimate that annual recharge to the aquifer across the project area ranges from 2.5 to 3.1 inches per year (converted from millimeters). The map displaying this range in estimated recharge rates was too coarse to identify topographic-controlled patterns in recharge, and these values should be considered only as a first-cut estimate of potential recharge rates in the area.

The thick upland till and loess deposits in the north block limit the potential for recharge to the principal aquifer. Conventional conceptualization of a flow system, as described previously in this report would characterize recharge occurring along the drainage valleys in the block. However, the AEM data shows that in most of the block, the streams are still separated from the principal aquifer by the till and loess. Figure 4-19 displays the full Quaternary deposit extent of the AEM data for the eastern two-thirds of the north flight block. This figure displays the limited extent of where resistive materials are present at the land surface near the northeast corner of the flight block. This is the primary area in the north block with the greatest potential for recharge to the principal aquifer. Figure 4-20 (A1-54) shows a 2D representation of the flight block with the extent of the resistive materials greater than 21 ohm-m near the land surface. The orange area represents where coarse material is present immediately at the land surface, bright red indicates where resistive material is less than 20 ft bgl, and the outer dark red color indicates where coarse material is around 30-35 ft bgl. A small, isolated zone of resistive material in the 30-35 ft depth range is present southwest of this main body near the Hunters Slough drainage. The other remaining resistive materials displayed on this map are inconsequential in areal extent to be considered major recharge areas. Figure 4-21 shows a north-south cross section through this main resistive body at the surface in the northeast corner of the block to exemplify the subsurface character of this conceptualized recharge zone.

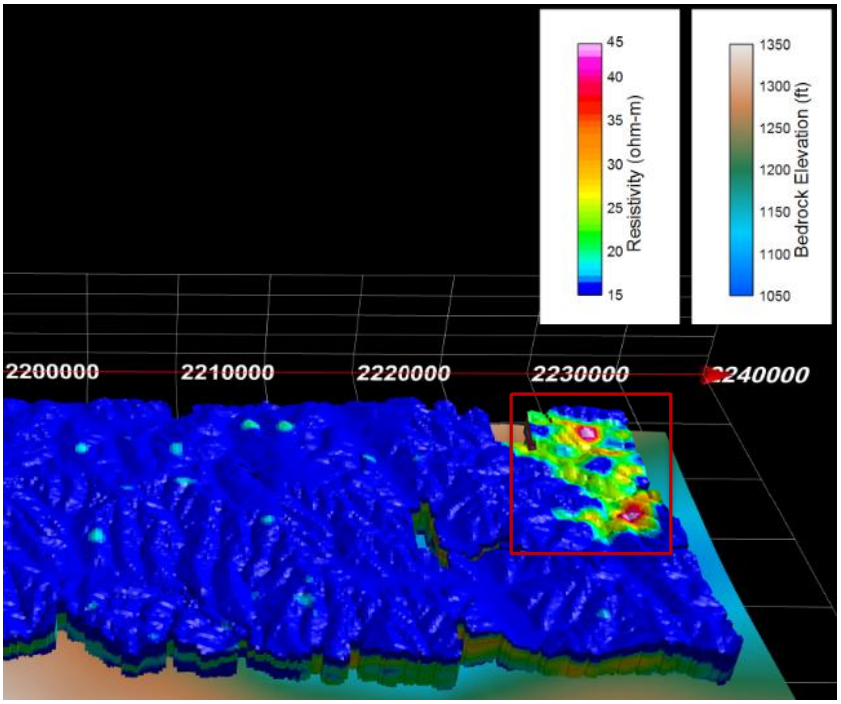


Figure 4-19 – The resistivity model of the eastern two-thirds of the north flight block displaying the detected resistivities at the land surface (red box).

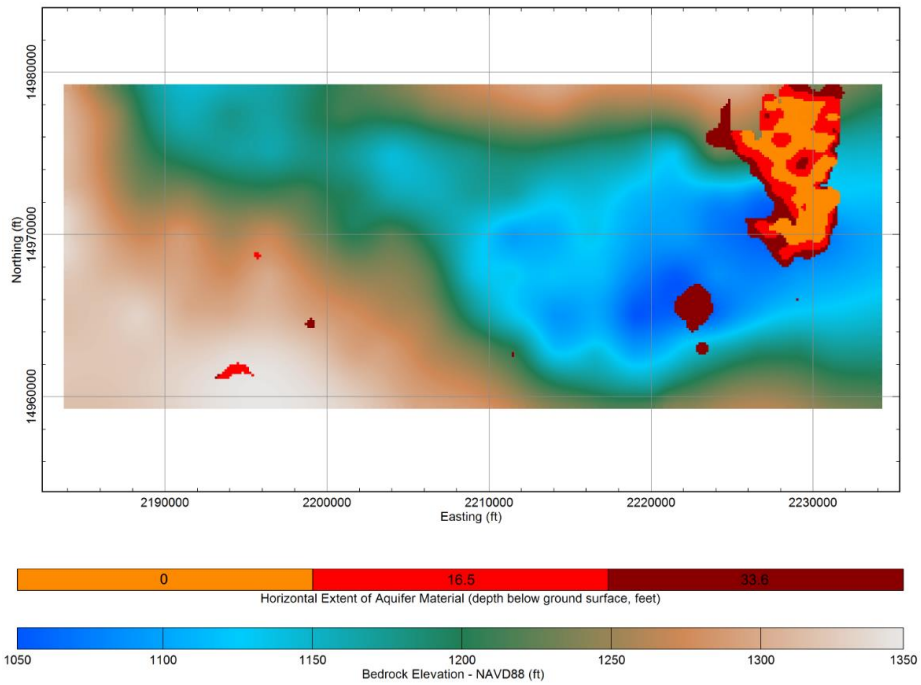


Figure 4-20 – 2D representation of the resistive material 21 ohm-m or greater at or near the land surface in the north block. The orange zone displays where resistive materials are at the land surface. The red zone indicates resistive material in the 15-20 ft bgl depth, and dark red indicates where resistive materials are in the 30-35 ft bgl depth range.

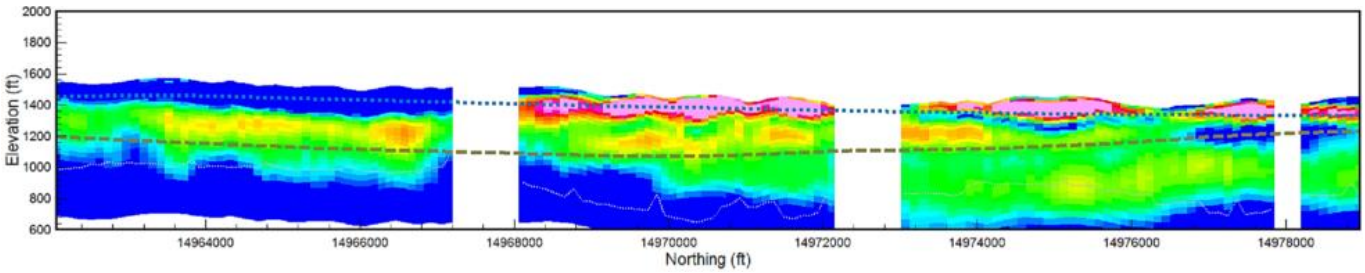


Figure 4-21 – Cross section (L306301) on east side of north block showing the resistive intervals near the land surface that are conducive for recharge to the principal aquifer.

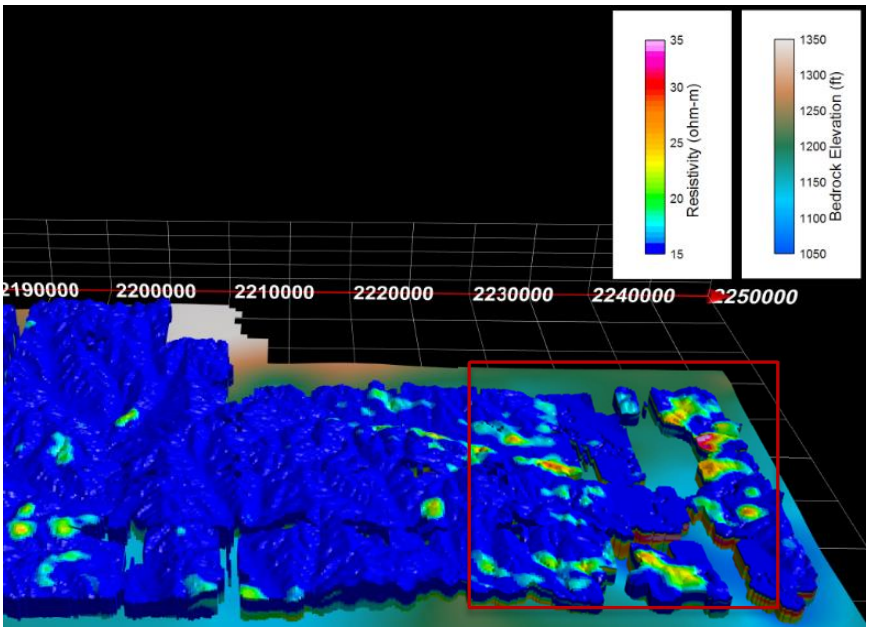


Figure 4-22 – The resistivity model of the eastern two-thirds of the south flight block displaying the detected resistivities at the land surface (red box).

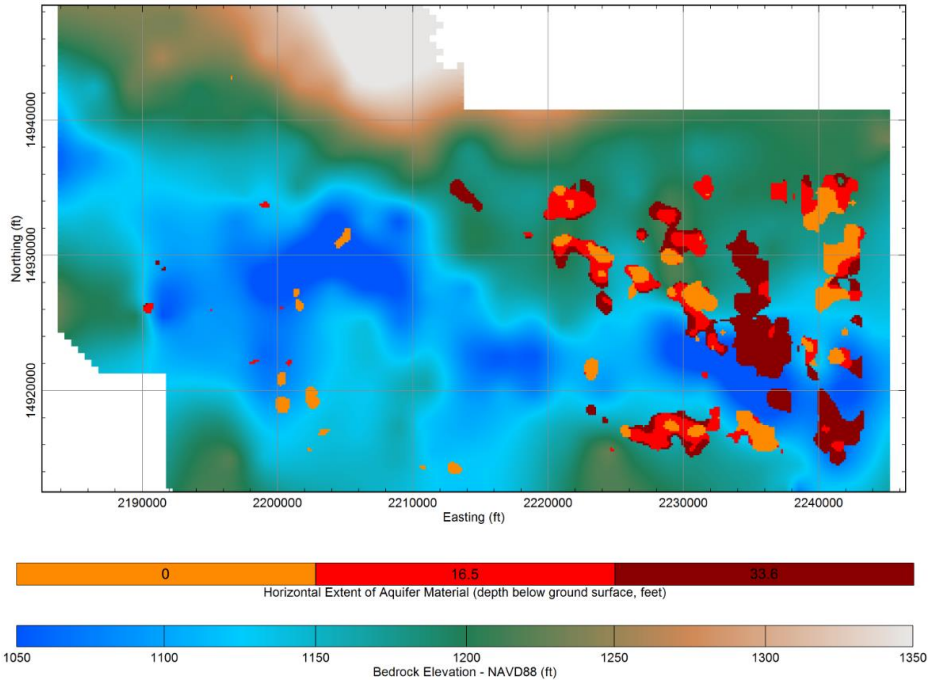


Figure 4-23 – 2D representation of the resistive material 18 ohm-m or greater at or near the land surface in the south block. The orange zone displays where resistive materials are at the land surface. The red zone indicates resistive material in the 15-20 ft bgl depth, and dark red indicates where resistive materials are in the 30-35 ft bgl depth range.

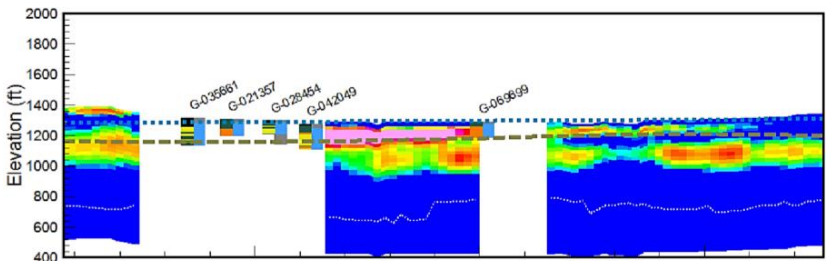


Figure 4-24 – Cross section (L506901) on east side of south block showing the resistive intervals near the land surface that are conducive for recharge to the principal aquifer.

In the south block, the AEM displays resistive (coarse-grained) deposits at the land surface that are limited to mostly isolated intervals in the eastern one-third the block (Figure 4-22) and in a few areas near the southwest corner of the block. Beneath the North Oak Creek valley near Valparaiso, potential for recharge occurs where resistive material is within 10 ft of the land surface (Figure 4-23, A1-55). Although this interval is overlain by till and/or loess, review of the 7.5 minute Valparaiso topographic map (USGS) indicates that North Oak Creek in this area is incised at least 20 ft below the valley bottomland to the east and west. This incision of North Oak Creek could form a connection to the shallow portion of the principal aquifer where sufficiently deep. Figure 4-24 shows a north to south profile in this area (L506901) to demonstrate where the resistive zones are close to the land surface and the subsurface character of these deposits in the North Oak drainage near Valparaiso. Recharge is expected to occur in this area directly from North Oak Creek when hydraulic gradients cause losing conditions to occur, as well as from precipitation through the thin (15-20 ft) zone of till/loess above the aquifer (4-23).

In the east block, the AEM survey revealed an extensive pattern of resistive deposits at or near the land surface (Fig 4-25). These near surface resistive features are the remnants of an outwash plain or possibly coalesced outwash fans that were dissected and later overlain with loess as discussed in section 4.1.3.2. As revealed in section 4.4, many of these features have a considerable thickness above the water table. With a lack of extensive confining material atop these coarse-grained features, recharge to the principal aquifer is likely to be widespread across much of the east block. Figure 4-26 (A1-56) is a 2D representation of where materials with resistivities greater than 24 ohm-m are at or near the land surface. This figure reveals that across much of the block, resistive materials are present at the or within a shallow depth of the land surface. Figure 4-27 shows a north-south AEM profile (L701001) across the western portion of the block exemplifying the considerable extent and thickness of unsaturated coarse material that is present just beneath the land surface. These extensive, near-surface coarse deposits include the Rock Creek valley and two tributary drainages to this system. Unlike the drainages in the north and south blocks, Rock Creek valley is underlain with coarse deposits close to the land surface with minimal fine material present. Although the presence of the extensive resistive materials near the surface creates conditions conducive for recharge to the principal aquifer, the lack of confining material in the east block increases the potential for non-point source impacts to the subsurface water quality. The map distribution of coarse deposits in Figure 4-26 can serve as a guide to where the principal aquifer is vulnerable to excessive agri-chemical applications or other sources of pollution.

In summary, the areas where highest recharge to the principal aquifer is likely to occur are in 1) the northeast quarter of the north block where highly resistive, coarse material underlie an eastwardly thinning mantle of loess and till, particularly in the Wahoo Creek tributary drainages; 2) the valley of North Oak Creek near Valparaiso in the south block; and 3) widespread areas of the east block where unsaturated material is at or close to the land surface. Any recharge to the principal aquifer underlying the upland till is likely restricted to isolated areas where the surface topography allows for runoff to collect and slowly infiltrate through the till along preferential pathways such as deeply incised gullies and depressions that collect runoff. To more fully characterize the distribution and rates of recharge to the principal aquifer, as well as the aquifer-streambed connection in drainages underlain by resistive material, more localized geophysical, geochemical, and test hole investigations are recommended.

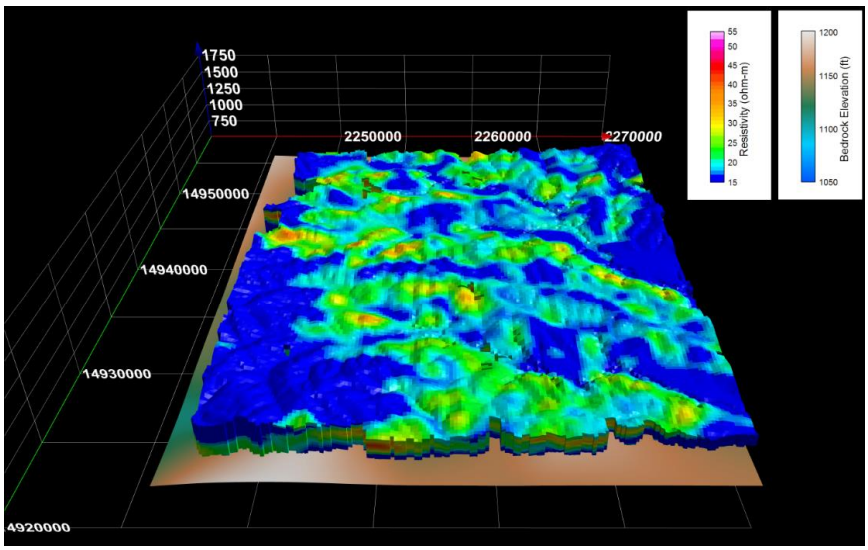


Figure 4-25 – The resistivity model of the of the east flight block displaying the detected resistivities at the land surface.

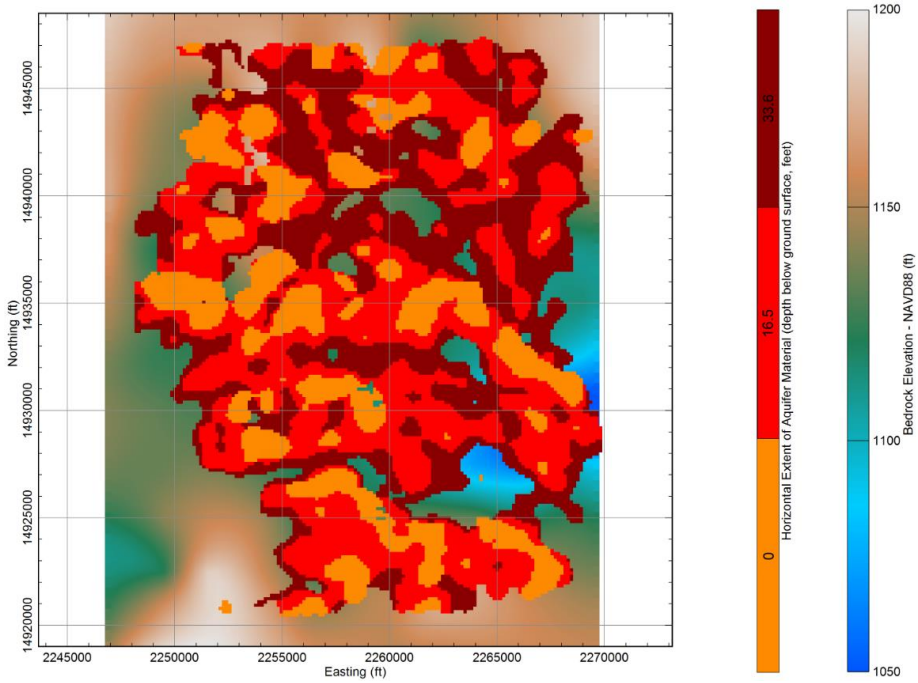


Figure 4-26 – 2D representation of the resistive material 21 ohm-m or greater at or near the land surface in the east block. The orange zone displays where resistive materials are at the land surface. The red zone indicates resistive material in the 15-20 ft bgl depth, and the dark red areas indicate where resistive materials are in the 30-35 ft bgl depth range.

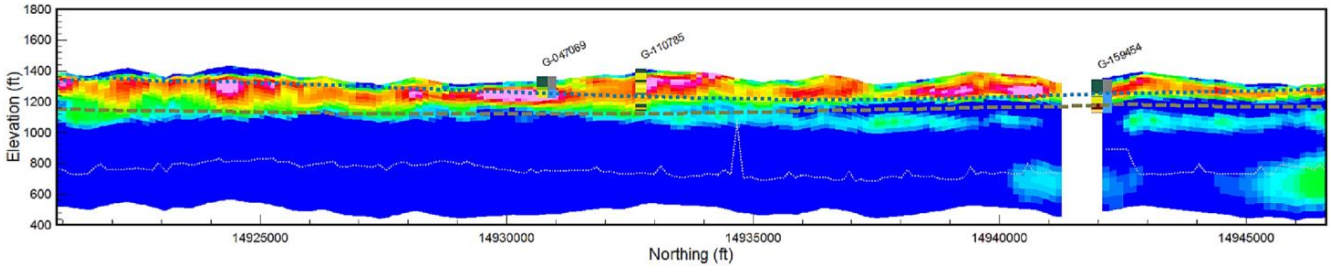


Figure 4-27 – Cross section (L701001) in the western half of east block showing the resistive intervals near the land surface that are conducive for recharge to the principal aquifer.

4.6 Potential for Groundwater Development in the Bedrock Aquifer

The SkyTEM 304 AEM system implemented in this project provided resolution of the subsurface strata to depths approaching 700 ft. Previous results from Abraham and others (2011a) indicated that the sandstone portions of the Dakota Formation are detectible using systems like the SkyTEM 304 that implement time-domain techniques. The penetration depth of the technology applied in this project allowed for delineation of the bedrock strata, including the Dakota Formation, which hosts the Maha aquifer in eastern Nebraska.

Figure 3-11 in section 3.3 displays the currently existing wells screened in the bedrock within the project area. NDNR registered well records indicate a total of 17 wells screened in the bedrock, with 15 of these within or near the south and east blocks. The screened bedrock intervals of these wells are typically 10 to 20 ft, with the longest intervals listed at 60 ft (2 wells). It is not clear if more productive wells could have been developed in the narrowly screened wells if thicker sandstone intervals were available to be screened, or whether the production encountered was suitable for the intended use of the well. As indicated on the map in Figure 3-11, the registered pumping rates vary from 5 to 1,600 gpm. Most wells pump less than 20 gpm, but three of the wells exceed 500 gpm. The well with a listed rate of 1,600 gpm (G-053578), has a bottommost interval (38 ft) described as ñfine sand or sandstone,ò with 40 ft of sand and gravel above it. The screened interval of this well is not provided, therefore, it is possible that this well screens the bottommost unconsolidated deposits and the bedrock interval to yield the high registered pumping rate. Water-quality data of the Maha aquifer is limited, but of the samples evaluated from bedrock wells in the project area, the TDS level was 812 mg/l which falls within the range of fresh water conditions. Mean concentrations of the other common major ions sodium and SO_4^{2-} are notably higher than concentrations encountered in the overlying principal aquifer, however.

With the presence of productive Maha aquifer wells within the project area, the question as to whether the bedrock wells with higher production rates are located in resistive bodies in the bedrock could be evaluated with the AEM framework. Although most wells produce low yields, either by design or due to the limits of the aquifer, the AEM data of resistivity in the bedrock was compared with locations and pumping rates of the registered Maha aquifer wells. Overall, no pattern was discernible from this review. Most of the wells are screened at the very top of the bedrock interval, and most were not situated in areas with higher bedrock resistivities at 25 ohm-m or greater. This is not to minimize the potential for sighting productive Maha aquifer wells in the project area using the AEM data, however. This was a cursory evaluation to determine if any general trends were revealed in the survey.

The total number of registered bedrock wells in the NDNR database was limited in areal extent and depth to thoroughly evaluate a potential relationship between bedrock well productivity and mapped resistivities. The maximum thickness of resistive sandstone in the Dakota Formation with resistivity greater than 21 ohm-m approaches 400 ft in the western portion of the north block. However, the lateral extensiveness of the higher resistive zones in the north and east blocks are considerably less than in the south block. The thicknesses of the resistive portions of the Dakota Formation in the south block are typically in the 100-300 ft range, but are however much more extensive than the other blocks (Figure A1-38, AEM profiles in Appendix 7). To characterize the potential for well development, it is recommended that test wells be installed and aquifer tests conducted in areas where the thickest portions of the most extensive resistive bodies are present, which are primarily in the south block of the project area.

5.0 Summary and Recommendations

An AEM survey were performed in the Brainard-Valparaiso, Nebraska area (ñproject areaò) to develop a hydrogeologic framework of the subsurface in this part of the LPSNRD. The development of the hydrogeologic framework was supported by traditional geologic information, including CSD test holes and NDNR registered well database drillerôs logs. The hydrogeologic framework developed from the AEM data was used to visualize the subsurface of the project area in three dimensions. A 3D evaluation of the AEM data characterized the extent, thickness, and type of materials that comprise the principal aquifer formed from the unconsolidated Quaternary deposits in the subsurface. In the north block, the principal aquifer was present with a maximum thickness exceeding 300 ft in the eastern half of the block. The principal aquifer in the south block trends northwest to southeast, and is thickest in the west central portion of the block where aquifer materials approach 280 ft in thickness. The most geographically extensive deposits of aquifer materials revealed in the AEM survey exist beneath the east block. The principal aquifer is not as thick in this block in comparison with areas to the west, with maximum thickness around 200 ft near the southern boundary of the block. The principal aquifer in the east block is mostly unconfined with an unsaturated zone comprised of coarse material over much of the block.

Glacial deposits (till) and eolian loess mantle much of the project area, with thicknesses ranging from over 300 ft beneath the south block to negligible thicknesses in some the valleys that cross the blocks. These fine-grained deposits have low permeability, assuming that vertical fracture sets are minimal. The thicker portions of these deposits limit the potential for groundwater recharge in the project area, but also minimize the potential for downward transport of contaminants to the principal aquifer. The till-loess deposits that blanket the principal aquifer also create confined aquifer conditions across much of the project area. This investigation included evaluation of the potentiometric surface/water table in relation to the elevation of the top of the principal aquifer/base of the confining unit above the screened intervals in registered wells. The potentiometric surface was created from interpolation of all available static water levels from the NDNR registered well database and the USGSôs NWIS database. The highest levels of confinement are primarily in the north and south blocks where the till and loess deposits are thickest. The potentiometric surfaces approach water table conditions near the valleys that are present in each block. It should be noted that this evaluation uses data that likely does not represent current conditions, as the only water levels available across much of the area were static measurements taken at the time of well construction. However, the water levels do correspond to local geologic conditions in general, in that confined conditions are mapped where expected (beneath thick till/loess deposits) and the potentiometric surface approaches water table conditions in areas where the till/loess sequence is thin or absent (drainage valleys, areas devoid of thick till). The greatest uncertainty exists primarily in the magnitude of the level of confinement and exactly where conditions transition from confined to unconfined.

Evaluation of the water quality of the principal aquifer indicated that the system is predominantly calcium-carbonate type water, with calcium and bicarbonate being the predominant cation and anion, respectively, in the groundwater flow system. An understanding of the project areaôs water quality is needed as large changes in salinity can affect the AEM signal from the subsurface. Concentrations of salinity that could affect the AEM signal were not detected, however. Major ion concentrations (sodium, calcium, and chloride) show distinct trends depending on depth within the principal aquifer. Sodium concentrations appear to increase, especially at depths below 200 ft bgl, whereas calcium and chloride levels decrease with depth. TDS concentrations within the aquifer are all

below 1,000 mg/l, indicating fresh water throughout the flow system. In the east block, the major ions chloride, calcium and TDS were markedly below the median concentrations from samples taken across the entire project area. This indicates that groundwater in the east block possibly has different recharge source zones in comparison to the principal aquifer beneath the north and south blocks. This condition fits with the 3D framework of the principal aquifer, where in the east block, more resistive materials appear near the land surface. These outwash deposits likely act as a direct conveyance route of recharge to the principal aquifer, in comparison to conditions in the western blocks where thick till and loess deposits limit direct connection of precipitation-derived recharge to the principal aquifer.

The estimation of the volume of extractable water within the aquifer pore spaces in each block indicated near 884,000 ac-ft were calculated in total for the three blocks (approximately 344,000, 453,000, and 87,000 ac-ft for the north, south, and east blocks, respectively). The tie line areas between the blocks did not have these calculations. Recharge from precipitation and/or irrigation runoff to the principal aquifer is dependent upon several factors. However, in regards to the hydrogeologic framework, the geologic influences visible from the AEM data include the thickness/absence of till and loess deposits and the presence of coarse-grained materials near or at the land surface. Considering these factors, groundwater recharge potential is highest where coarse deposits are present at the land surface as indicated by high resistivities in the AEM data. The most extensive areas where this occurs is in the east flight block. Resistive material is present at or near the land surface only in limited areas in the north and south blocks.

The AEM system utilized in this investigation was capable of capturing the resistive nature of the upper Cretaceous bedrock underlying the Quaternary deposits in the project area. Several resistive zones with considerable thickness were identified, presumably in the more sandy intervals of the Dakota Formation. In eastern Nebraska, the aquifer resources of the Dakota Formation are classified as the Maha aquifer. This aquifer is utilized by at least 17 wells within or immediately adjacent to the blocks. Registered pumping rates in these wells range from 5 to 1,600 gpm. TDS levels from water samples retrieved from bedrock wells in the project area fall within the fresh water range (<1,000 mg/l). Thus, with the knowledge that wells already exist and produce from this bedrock aquifer source in the project area, along with the newly-acquired AEM data that identifies coarser (higher resistivity) zones within the Dakota Formation, considerable potential exists for expanding use of this aquifer as a groundwater resource. Local production capability and water quality would need to be investigated at each new potential well site, as variability in the coarseness of the materials is evident in the AEM data.

Based on the findings of this AEM investigation and development of the hydrogeologic framework of the project area, several opportunities exist to further enhance the understanding the principal aquifer in the Brainard-Dwight-Valparaiso area and support the LPSNRDôs groundwater management plan, including:

- An area-wide water level measurement program to characterize the degree of confinement of the water levels in the aquifer at the present time. Ideally, capturing a set of water levels in the same season across the area will reduce the amount of uncertainty in historic water levels used from various sources used to create the interpolated water level surface used in this report.

- A test hole program that includes penetration through the Dakota Formation, ideally in the south block area where the most extensive resistors were detected in the AEM survey. Following drilling and lithologic analysis, water quality testing and

assessment of potential well yield via aquifer tests is recommended. If possible, use of observation wells is recommended to fully characterize the nature of the aquifer's permeability and storage capacity. It is suggested that future test hole sites be selected with knowledge gained from the AEM survey.

- Installation of flow gages on the major drainages that flow through the project area to determine the perennial vs. intermittent nature of the streams, as well as providing insight into the volume of baseflow produced from the groundwater system that feeds the Platte River watershed.

- In concert with the previous item, understanding the connection of perennial flow with groundwater levels near the streams, particularly North Oak Creek near Valparaiso, will improve understanding of the aquifer-stream connection and provide more accurate inputs for assessing stream depletion from area wells. Improved understanding could be gained by continuous recorders from multi-level piezometer nests in the watershed, as well as characterization of the streambed sediments and aquifer materials immediately below and adjacent to the stream.

- The AEM survey identified areas where a greater probability of groundwater recharge is likely to occur. It is recommended that test areas are selected based on the highly resistive zones identified in the east block to conduct recharge studies, which could include soil moisture probes in the vadose zone and piezometers screened at the water table to track the responses in water levels to precipitation events and anthropogenic activities at the land surface. As a contrast, sites could be selected in the north or south blocks where relatively thin intervals of till and loess overlie the coarser aquifer deposits to determine the contrast in potential recharge based on the differing geologic character as identified in the AEM survey. Additional tracer studies could be added to the future recharge sites to determine the time of travel from the land surface to the aquifer. Finally, LPSNRD should cooperate with adjacent NRDs to investigate potential recharge areas and effects of groundwater withdrawals in portions of the aquifers underlying the north and south blocks which may extend into these adjacent NRDs.

- In the eastern quarter of the east block, selection of the bedrock surface proved difficult in an area where the shape of the paleovalley and the continuous resistivities identified in the AEM indicated unconsolidated glacial outwash, but NDNR borehole logs indicated possible bedrock in this area. However, during the interpretation process, the valley was included as part of the principal aquifer. This inclusion adds only a small percentage to the overall saturated thickness and does not make a considerable impact to the total volume of water estimated in storage. However, to clearly delineate where the contact between the outwash and bedrock exists in this area, which could be important if the AEM data was to be transferred to defining layer elevations in a groundwater model, a seismic survey is recommended. Jorgensen and others (2012) successfully mapped complex glacial depositional features along with contacts with pre-Pleistocene deposits in Denmark using a combination of AEM, seismic surveys, downhole geophysics, and borehole interpretation. The seismic component of this study was key in identifying the specific contacts between materials that the AEM was unable to resolve.

- AEM surveys along with other techniques should be used to determine the fresh-brackish and saline groundwater within the LPSNRD. The AEM can be used in a reconnaissance mode, which follows widely spaced lines across selected areas that are used to select locations for fill-in block flights that collect data for greater

resolution of the subsurface. The additional benefit to this work is it is a historical snap shot in time that maps the interface between fresh brackish and saline groundwater that can be compared to future work to track the movement of the front. An additional benefit would be a calculated volume of fresh, brackish, and saline water in storage.

- Detailed mapping of brackish-water springs within the district would evaluate groundwaterï surface water interactions. A comprehensive investigation using highly-detailed airborne surveys along with ground-based applications could improve the understanding of the source and fate of brackish-water discharge in riparian areas of known brackish-water springs.

- Additional AEM surveys could be conducted in and around the current project area to further the understanding of the hydrogeologic framework of the area. This work would be performed on a scale that is appropriate for the LPSNRD and perhaps include areas in neighboring NRDs that share the same aquifers. A key part of this work is to map the extent and character of the Maha aquifer beneath the district.

- Perform detailed high-resolution surveys of the stream valleys where the understanding of the relationship between groundwater and surface water can be enhanced. This will help identify with greater precision the areas that need to be a part of the basin integrated management plan with greater precision.

- Utilize aquifer characterization techniques in conjunction with the AEM survey areas to improve the understanding of important changes in hydraulic conductivity, storage, and yield. These maps can then be used directly with future groundwater modeling endeavors.

In conclusion, the AEM survey of the Brainard-Valparaiso area substantiated the current understanding of the groundwater resources underlying this area in a level of detail unavailable with prior investigative methods and available data. The principal aquifer is constrained by the bedrock topography forming the paleovalleys in the western two blocks, but is generally more widespread and more unconstrained by bedrock in the east block. Much of the project area is overlain by fine-grained till and loess deposits of varying thickness, and recharge to the system is restricted to areas where these deposits are thin to absent, or where coarse materials are present at or near the land surface. The Cretaceous bedrock strata is already tapped by a small number of users in the project area. The AEM data revealed areas where further development of this alternative groundwater resource could occur.

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Appendix 1
AEM Interpretive Imagery

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Figure A1-14: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block with a horizontal slice of material at a depth of 200 ft bgl and above removed from the southern two-thirds of the block.

Figure A1-15: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block with a horizontal slice of material at a depth of 250 ft bgl and above removed from the southern two-thirds of the block.

Figure A1-16: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 30 ft bgl and above removed from the middle one-third of the block.

Figure A1-17: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 60 ft bgl and above removed from the middle one-third of the block.

Figure A1-18: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 90 ft bgl and above removed from the middle one-third of the block.

Figure A1-19: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 120 ft bgl and above removed from the middle one-third of the block.

Figure A1-20: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 150 ft bgl and above removed from the middle one-third of the block.

Figure A1-21: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 180 ft bgl and above removed from the middle one-third of the block.

Figure A1-22: 3D voxel of Quaternary resistive materials greater than 21 ohm-m overlying the interpreted Cretaceous bedrock surface in the north flight block.

Figure A1-23: 2D map of resistivities from 21 to 33 ohm-m overlying the interpreted Cretaceous bedrock surface in the north flight block.

Figure A1-24: 3D voxel of Quaternary resistive materials greater than 18 ohm-m overlying the interpreted Cretaceous bedrock surface in the south flight block.

Figure A1-25: 2D map of resistivities from 18 to 27 ohm-m overlying the interpreted Cretaceous bedrock surface in the south flight block.

Figure A1-26: 3D voxel of Quaternary resistive materials greater than 24 ohm-m overlying the interpreted Cretaceous bedrock surface in the east flight block.

Figure A1-27: Resistivity model of all Quaternary materials above overlying the interpreted Cretaceous bedrock surface in the east flight block.

Figure A1-28: 3D voxel of Quaternary resistive materials greater than 21 ohm-m beneath the interpolated water level surface and above the interpreted Cretaceous bedrock surface in the north flight block.

Figure A1-29: 2D map of resistivities from 21 to 33 ohm-m below the interpolated water level surface and above the overlying the interpreted Cretaceous bedrock surface in the north flight block.

Figure A1-30: 3D voxel of Quaternary resistive materials greater than 18 ohm-m beneath the interpolated water level surface and above the interpreted Cretaceous bedrock surface in the south flight block.

Figure A1-31: 2D map of resistivities from 18 to 27 ohm-m below the interpolated water level surface and above the overlying the interpreted Cretaceous bedrock surface in the south flight block.

Figure A1-32: 3D voxel of Quaternary resistive materials greater than 24 ohm-m beneath the interpolated water level surface and above the interpreted Cretaceous bedrock surface in the east flight block.

Figure A1-33: 2D map of resistivities from 24 to 42 ohm-m below the interpolated water level surface and above the overlying the interpreted Cretaceous bedrock surface in the east flight block.

Figure A1-34: 2D map of interpreted Cretaceous bedrock surface elevations in the north flight block.

Figure A1-35: 2D map of interpreted Cretaceous bedrock surface elevations in the south flight block.

Figure A1-36: 2D map of interpreted Cretaceous bedrock surface elevations in the east flight block.

Figure A1-37: 3D voxel of resistivities in the north flight block below the interpreted bedrock surface with all resistivities below 21 ohm-m set as semi-transparent and all resistivities above 21 ohm-m set as opaque with the resistivity levels defined in the scale in the upper right.

Figure A1-38: 3D voxel of resistivities in the south flight block below the interpreted bedrock surface with all resistivities below 21 ohm-m set as semi-transparent and all resistivities above 18 ohm-m set as opaque with the resistivity levels defined in the scale in the upper right.

Figure A1-39: 3D voxel of resistivities in the east flight block below the interpreted bedrock surface with all resistivities below 21 ohm-m set as semi-transparent and all resistivities above 24 ohm-m set as opaque with the resistivity levels defined in the scale in the upper right.

Figure A1-40: Total voxel thickness of the Quaternary deposits in the north block, with thickness ranging from 30 to over 400 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted bedrock surface.

Figure A1-41: Total voxel thickness of the Quaternary deposits in the south block, with thickness ranging from 30 to over 400 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted bedrock surface.

Figure A1-42: Total voxel thickness of the Quaternary deposits in the east block, with thickness ranging from 15 to 285 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted Cretaceous bedrock surface.

Figure A1-43: Total voxel thickness of the Quaternary deposits beneath the water level surface and above the Cretaceous bedrock in the north block, with thickness ranging from 15 to 350 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted Cretaceous bedrock surface.

Figure A1-44: Total voxel thickness of the Quaternary deposits beneath the water level surface and above the Cretaceous bedrock in the south block, with thickness ranging from 15 to 360 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted bedrock surface.

Figure A1-45: Total voxel thickness of the Quaternary deposits beneath the water level surface and above the Cretaceous bedrock in the east block, with thickness ranging from 15 to 225 ft. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted bedrock surface.

Figure A1-46: Total thickness of glacial till and loess above the principal aquifer in the north block, with thickness ranging from 0 to over 480 feet.

Figure A1-47: Total thickness of glacial till and loess above the principal aquifer in the south block, with thickness ranging from 0 to over 480 feet.

Figure A1-48: Total thickness of glacial till and loess above the principal aquifer in the east block, with thickness ranging from 0 to over 360 feet.

Figure A1-49: Historic cross-section SAU-205 in profile view with the AEM data in the south block. The lithologic color codes of the historic cross section are shown in the bottom right of the figure, and the lithology color codes for the CSD and NDNR boreholes are displayed on the color bar to the left. The location of the profile is shown in red on Figure 4-14 in the main body of the report.

Figure A1-50: Historic cross-section SAU-216 in profile view with the AEM data in the south block. The lithologic color codes of the historic cross section are shown in the bottom right of the figure, and the lithology color codes for the CSD and NDNR boreholes are displayed on the color bar to the left. The location of the profile is shown in red on Figure 4-14 in the main body of the report.

Figure A1-51: Level of potentiometric head in feet above the top of the principal aquifer in the north block based on the interpolated water level surface created from NDNR and USGS water levels.

Figure A1-52: Level of potentiometric head in feet above the top of the principal aquifer in the south block based on the interpolated water level surface created from NDNR and USGS water levels.

Figure A1-53: Level of potentiometric head in feet above the top of the principal aquifer in the east block based on the interpolated water level surface created from NDNR and USGS water levels.

Figure A1-54: 2D map representing the areas of potential recharge in the north block. Orange areas indicate resistive material 21 ohm-m or greater at the land surface, red areas indicating resistive material within 16 ft of the land surface, and maroon areas indicating areas with resistive material within 33 ft of the land surface.

Figure A1-55: 2D map representing the areas of potential recharge in the south block. Orange areas indicate resistive material 18 ohm-m or greater at the land surface, red areas indicating resistive material within 16 ft of the land surface, and maroon areas indicating areas with resistive material within 33 ft of the land surface.

Figure A1-56: 2D map representing the areas of potential recharge in the east block. Orange areas indicate resistive material 24 ohm-m or greater at the land surface, red areas indicating resistive material within 16 ft of the land surface, and maroon areas indicating areas with resistive material within 33 ft of the land surface.

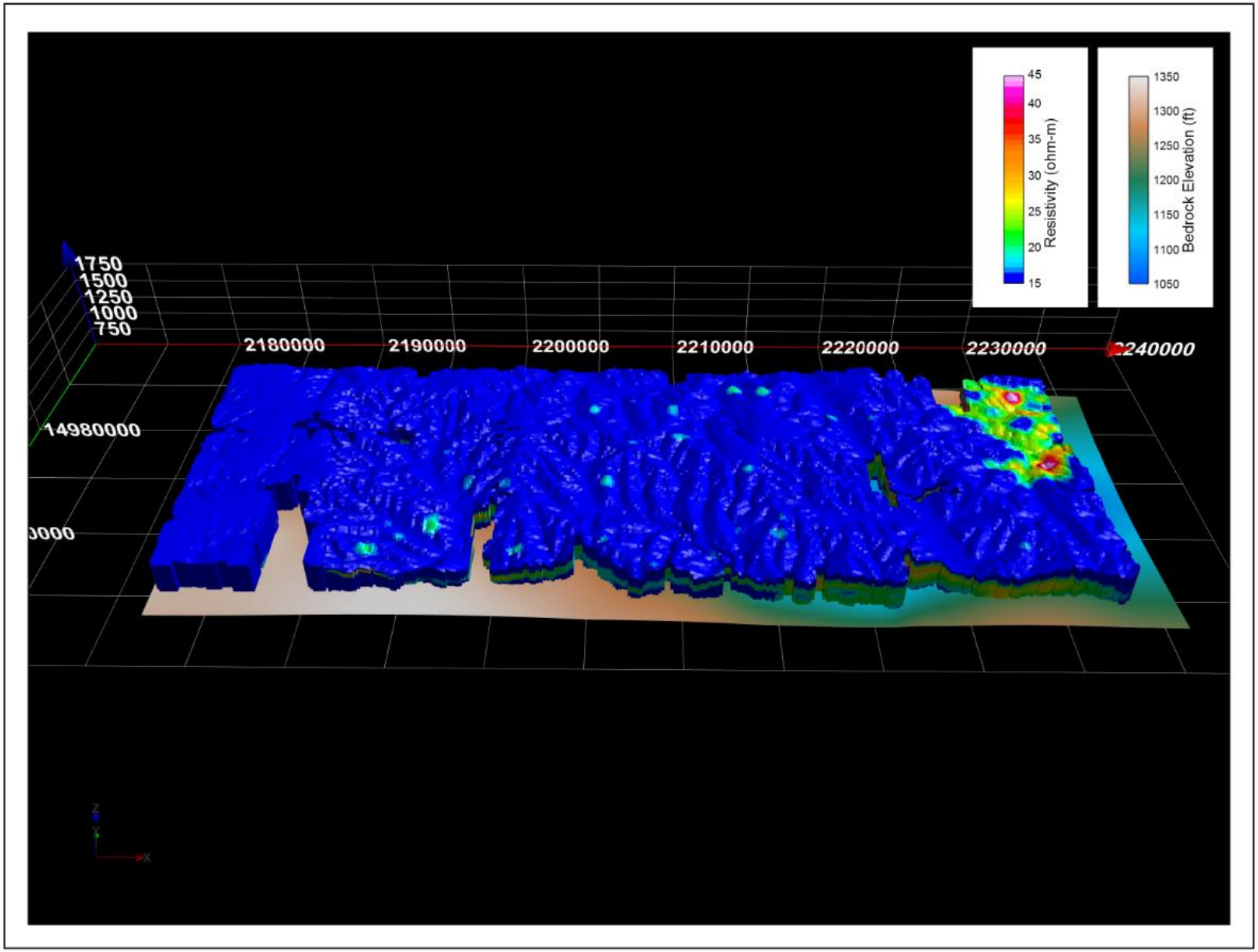


Figure A1-1: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the north flight block.

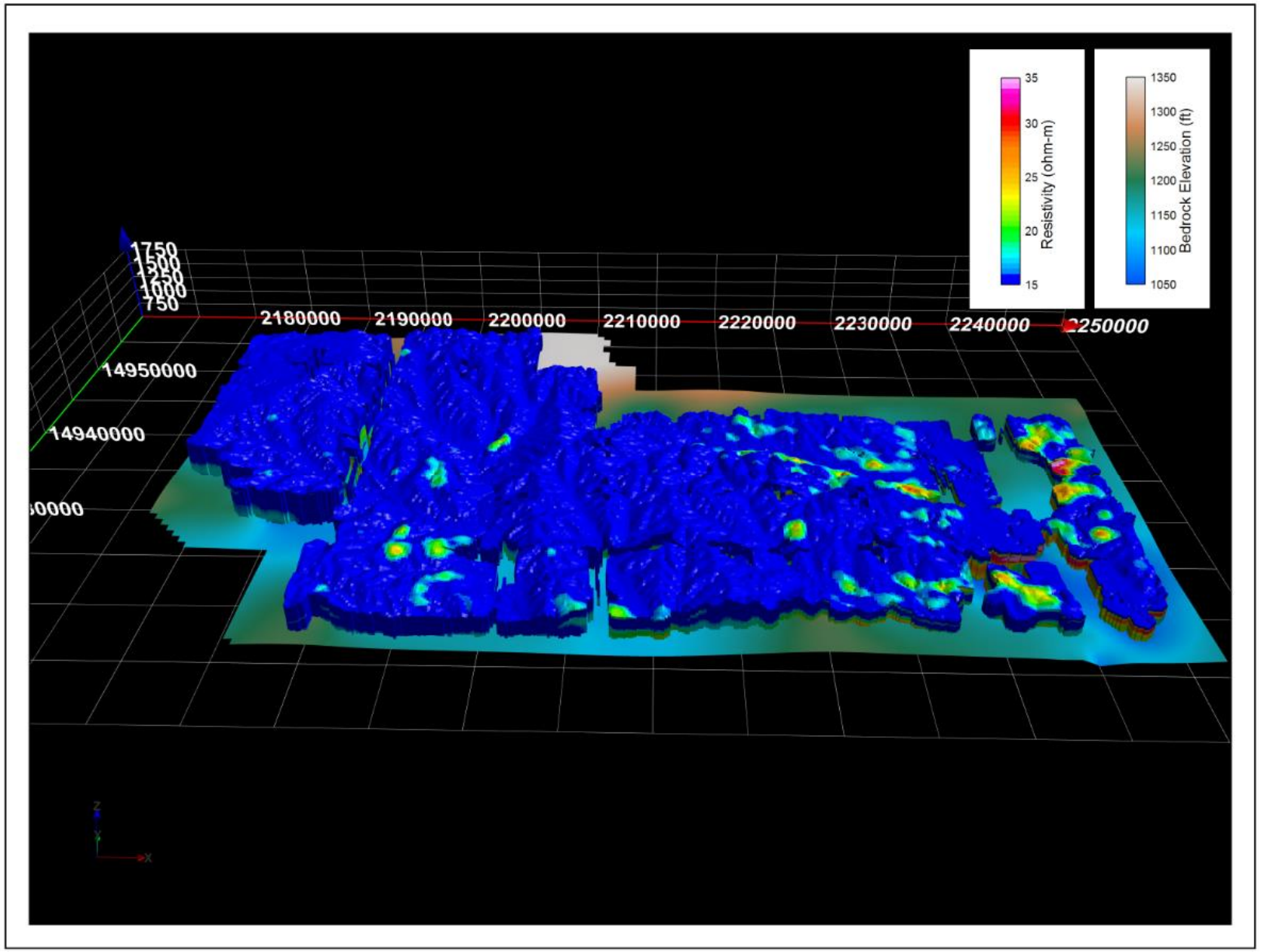


Figure A1-2: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block.

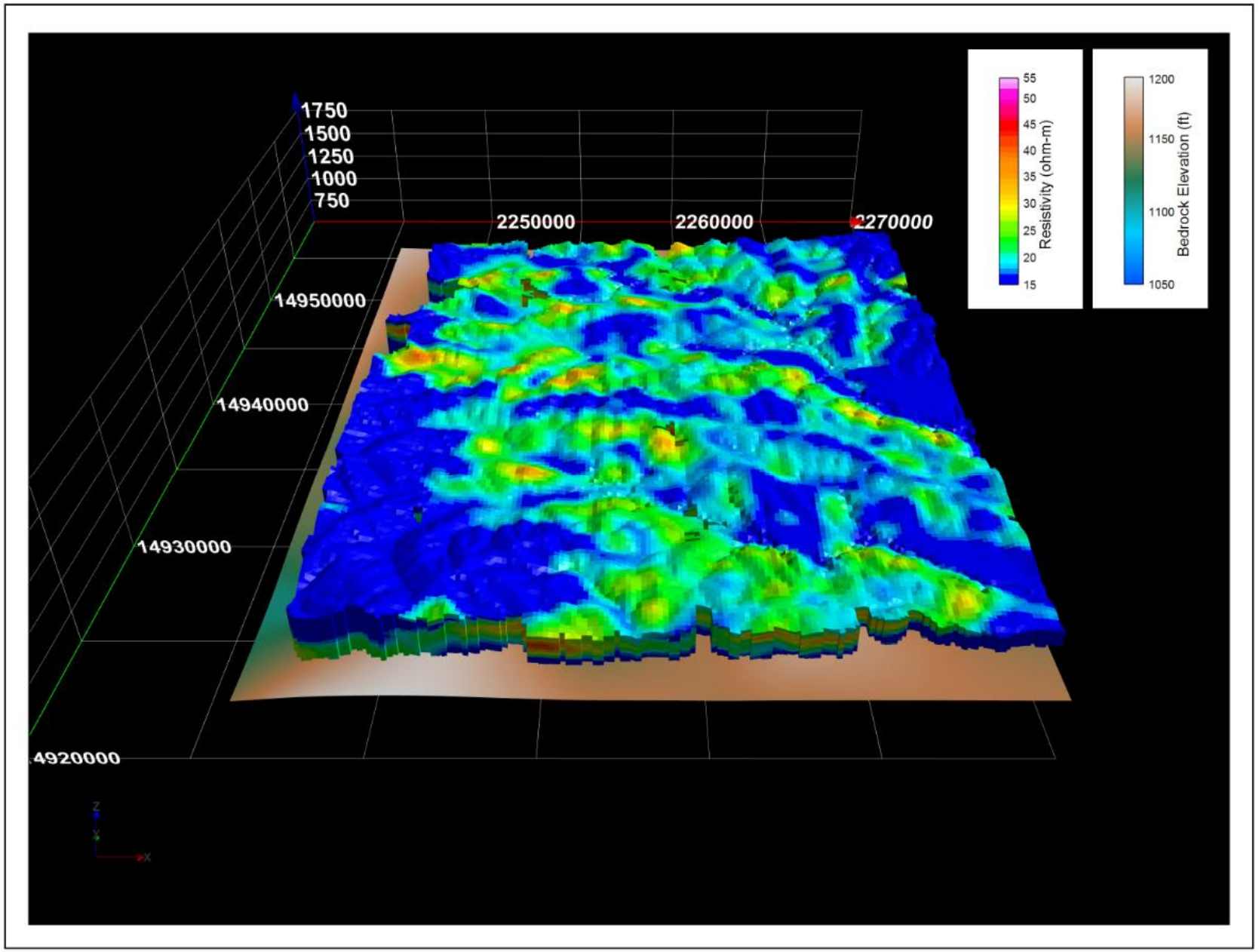


Figure A1-3: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block.

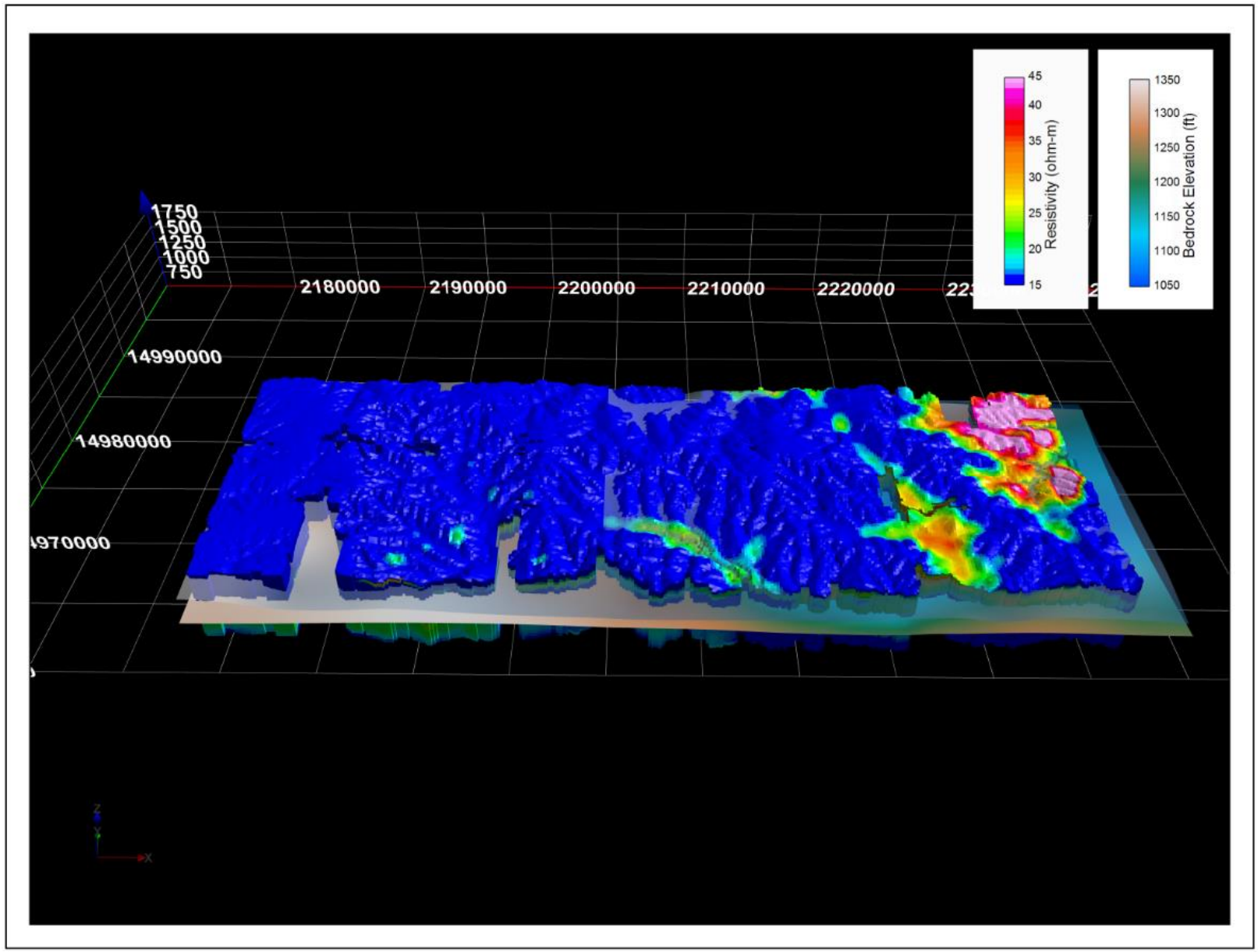


Figure A1-4: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the north flight block with a horizontal slice of material at a depth of 50 ft bgl and above removed from the eastern half of the block.

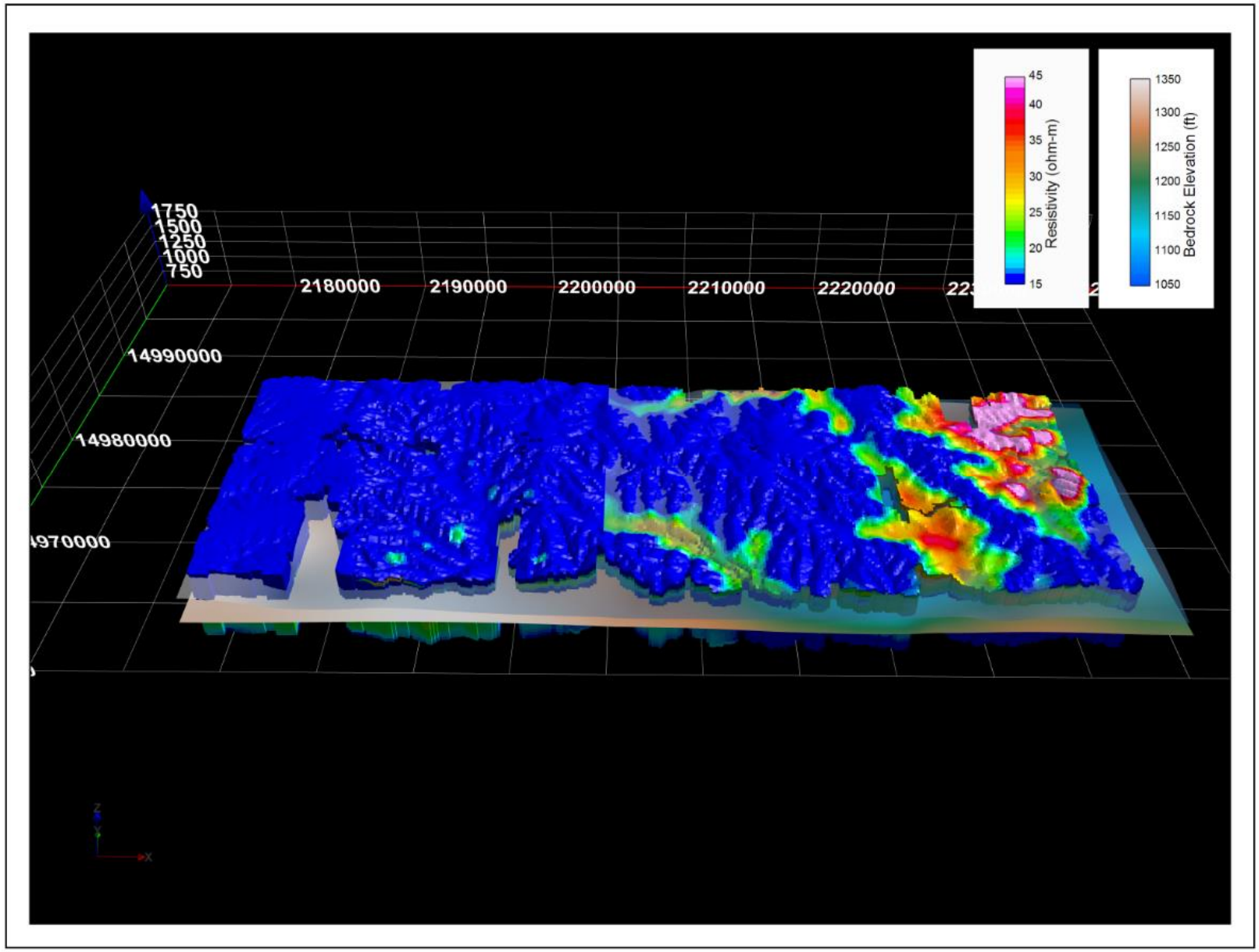


Figure A1-5: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the north flight block with a horizontal slice of material at a depth of 75 ft bgl and above removed from the eastern half of the block.

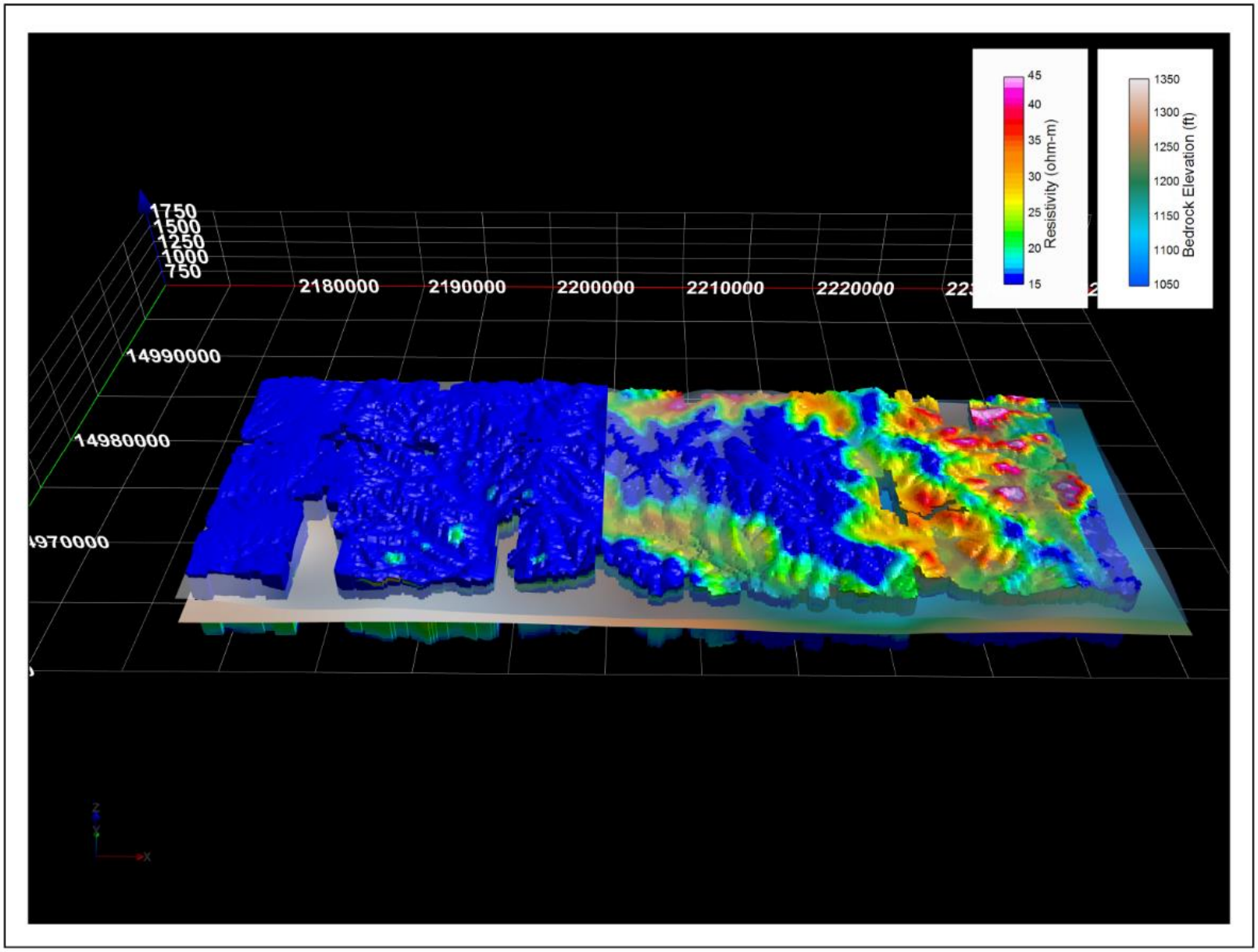


Figure A1-6: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the north flight block with a horizontal slice of material at a depth of 100 ft bgl and above removed from the eastern half of the block.

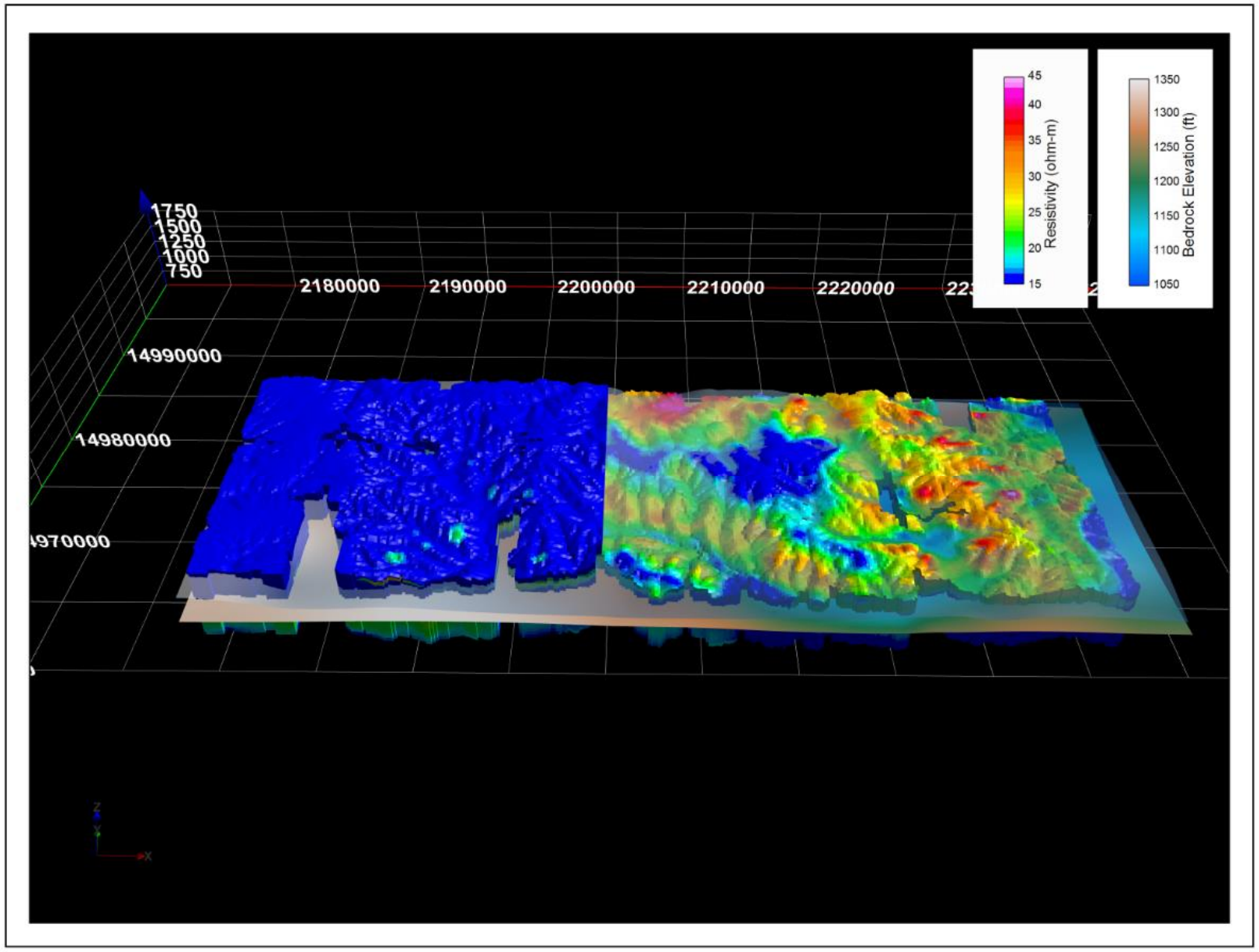


Figure A1-7: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the north flight block with a horizontal slice of material at a depth of 150 ft bgl and above removed from the eastern half of the block.

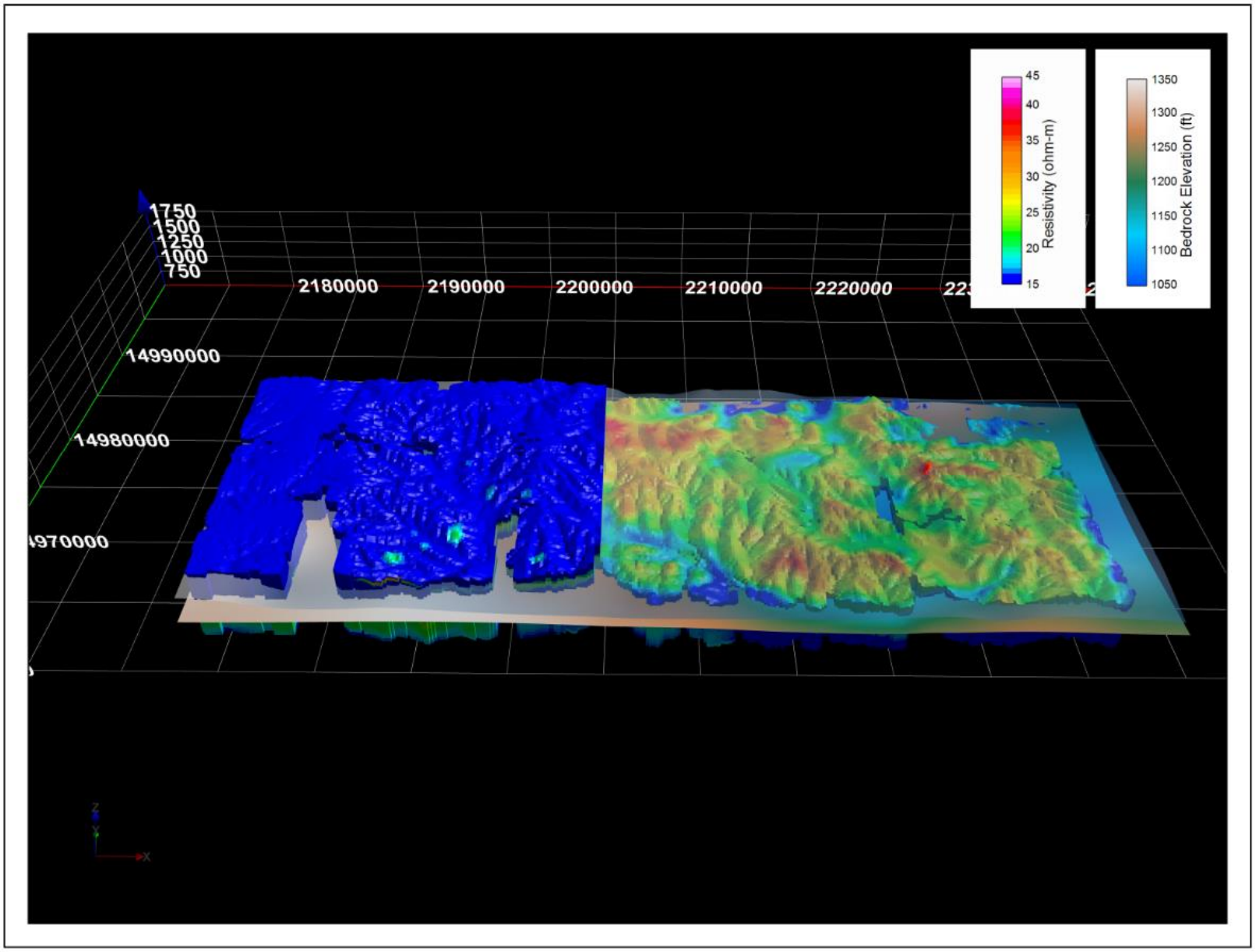


Figure A1-8: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the north flight block with a horizontal slice of material at a depth of 250 ft bgl and above removed from the eastern half of the block.

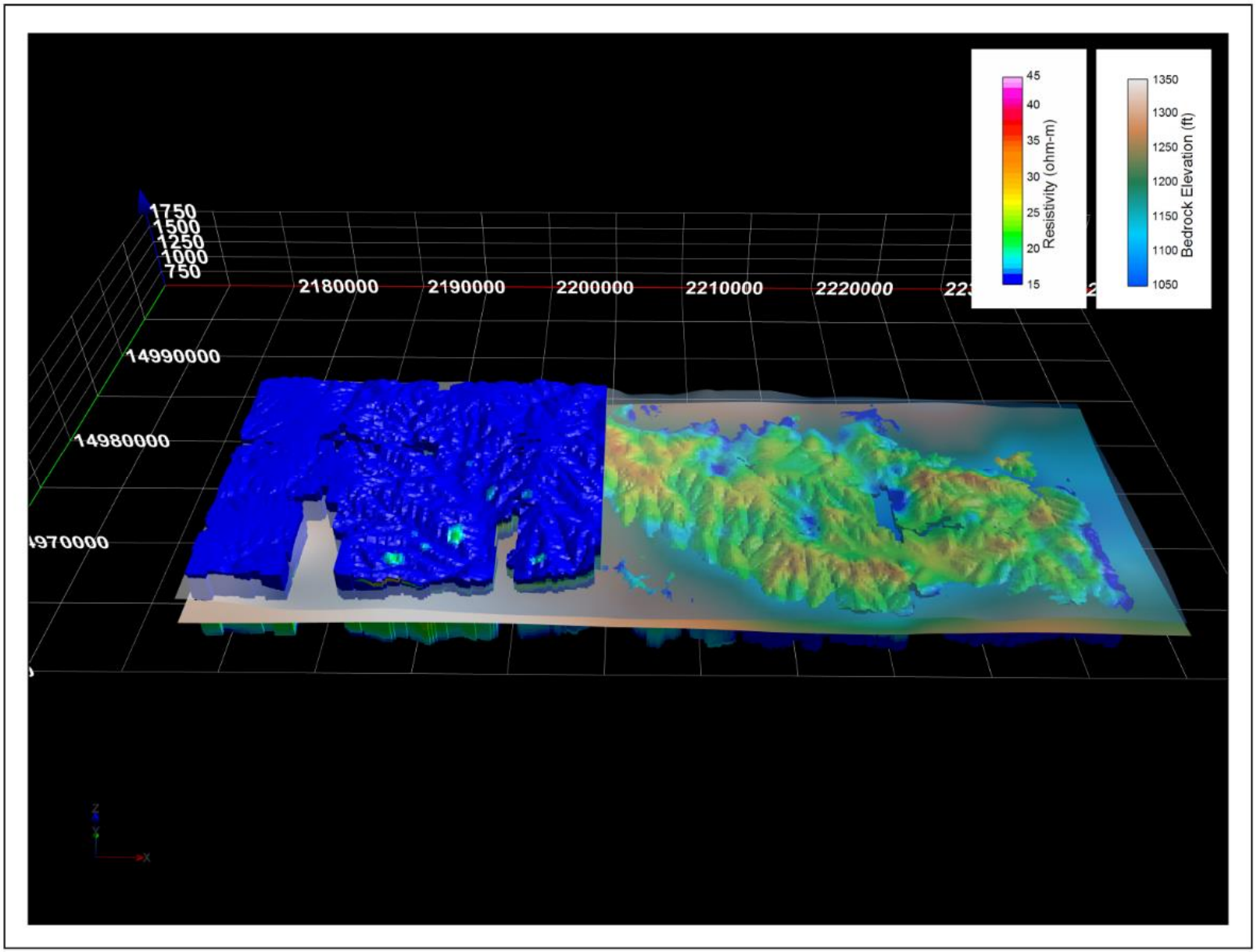


Figure A1-9: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the north flight block with a horizontal slice of material at a depth of 350 ft bgl and above removed from the eastern half of the block.

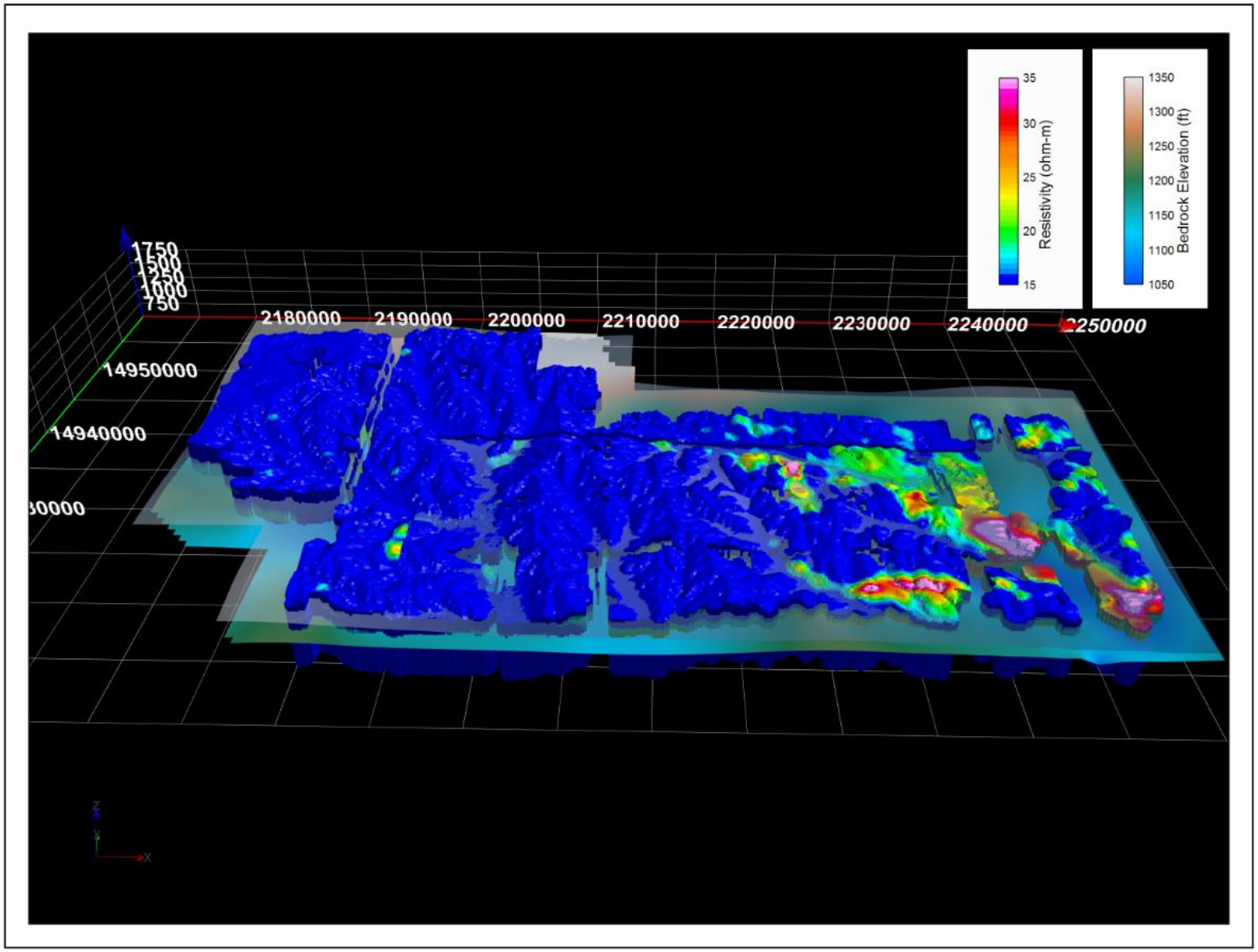


Figure A1-10: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block with a horizontal slice of material at a depth of 50 ft bgl and above removed from the southern two-thirds of the block.

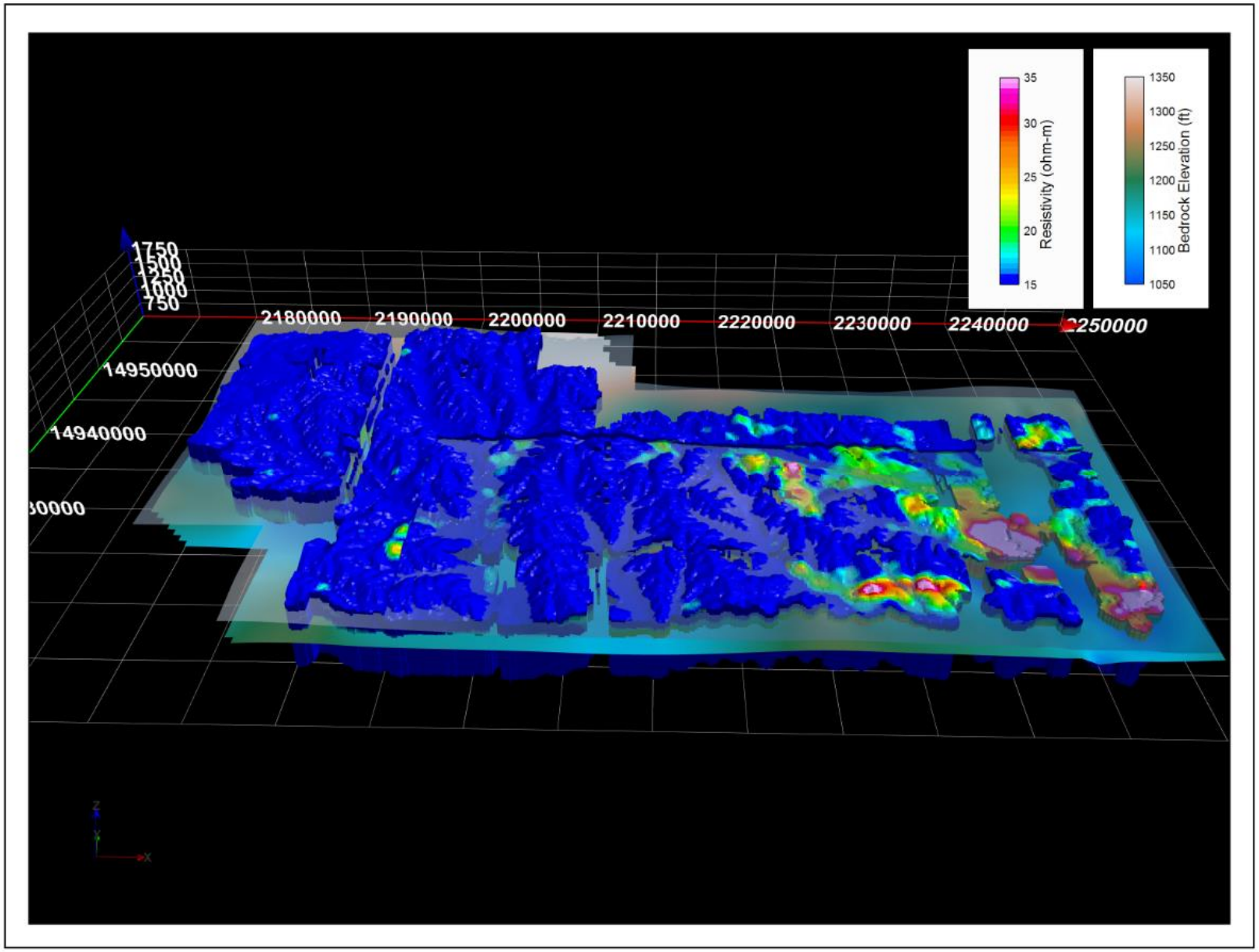


Figure A1-11: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block with a horizontal slice of material at a depth of 75 ft bgl and above removed from the southern two-thirds of the block.

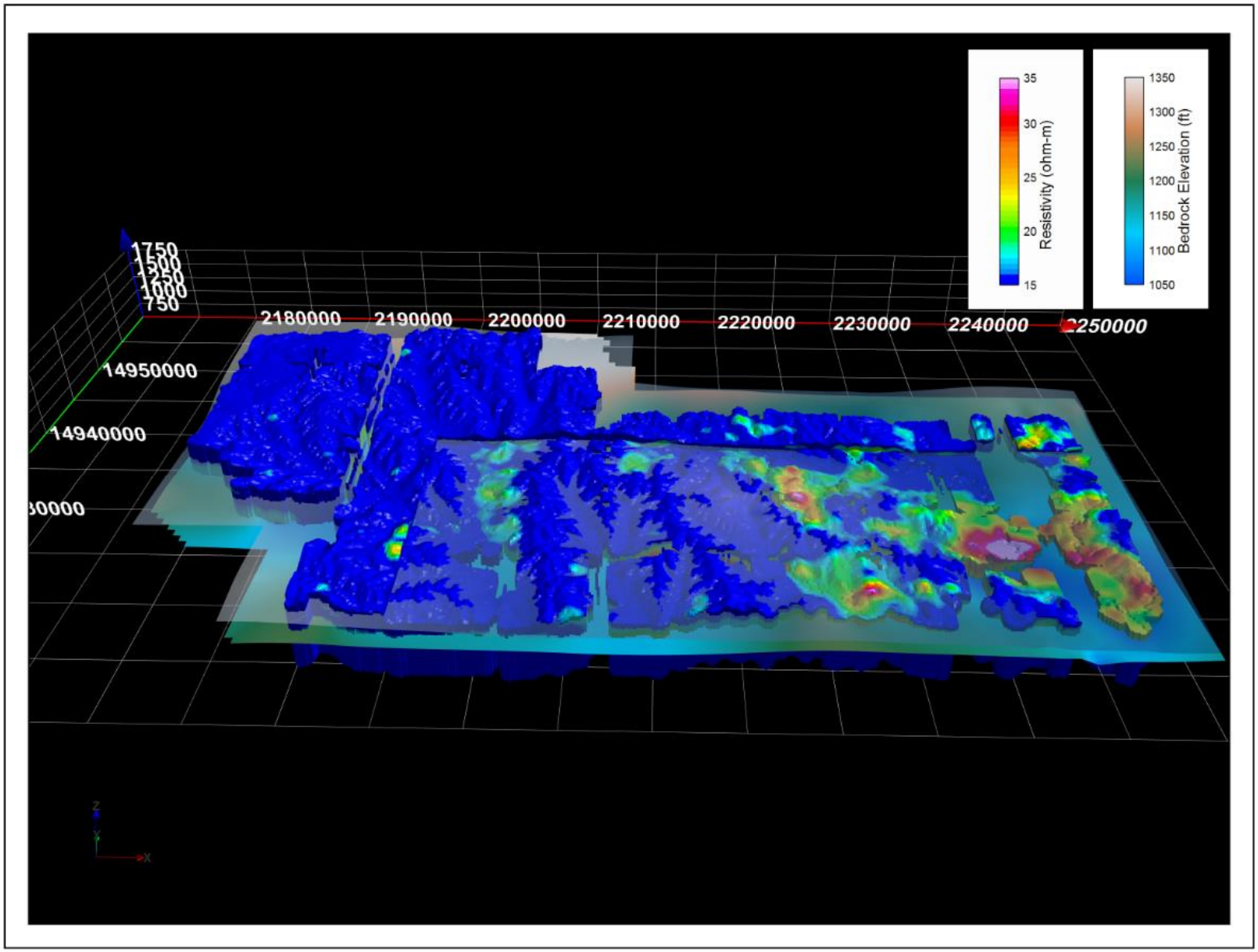


Figure A1-12: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block with a horizontal slice of material at a depth of 100 ft bgl and above removed from the southern two-thirds of the block.

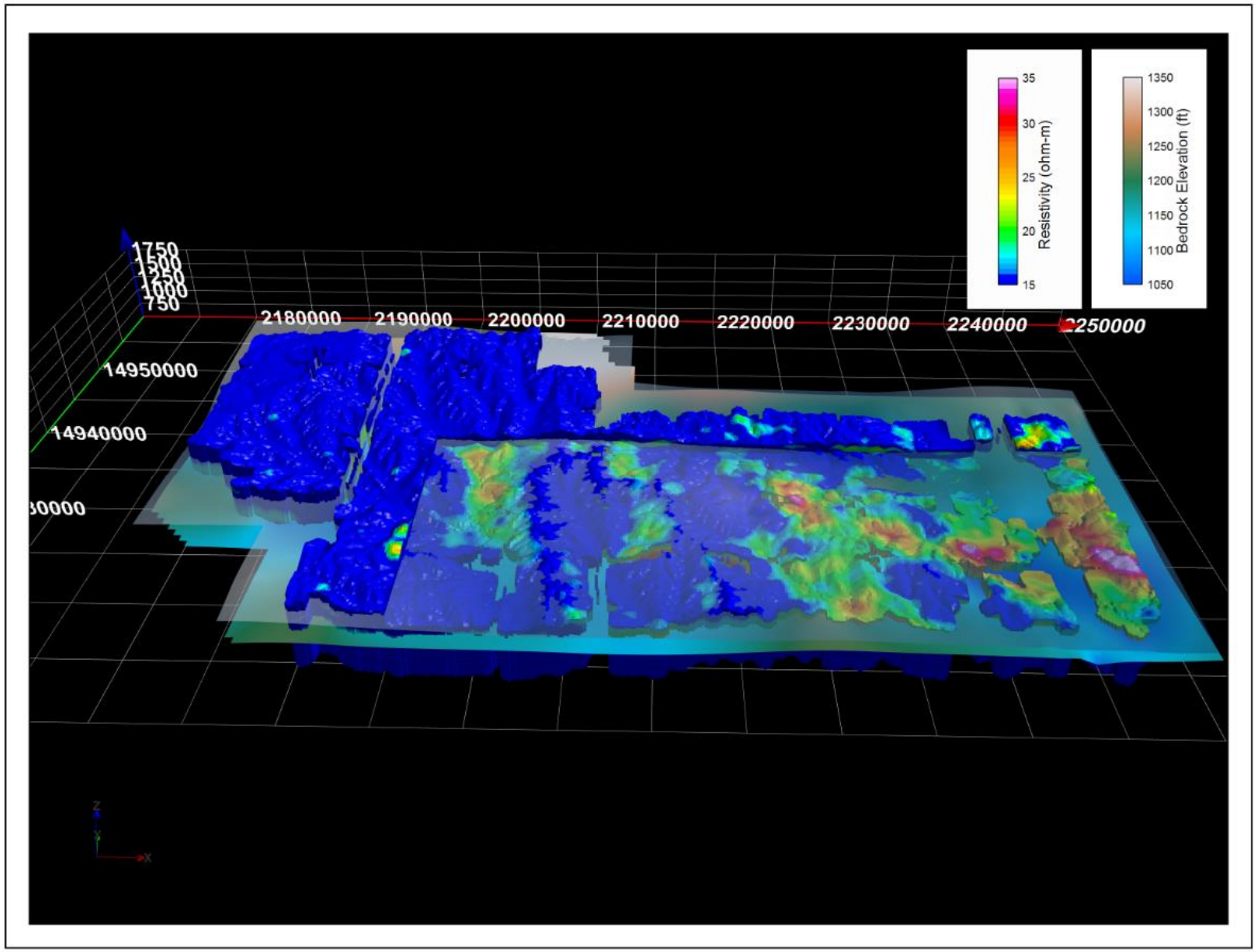


Figure A1-13: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block with a horizontal slice of material at a depth of 150 ft bgl and above removed from the southern two-thirds of the block.

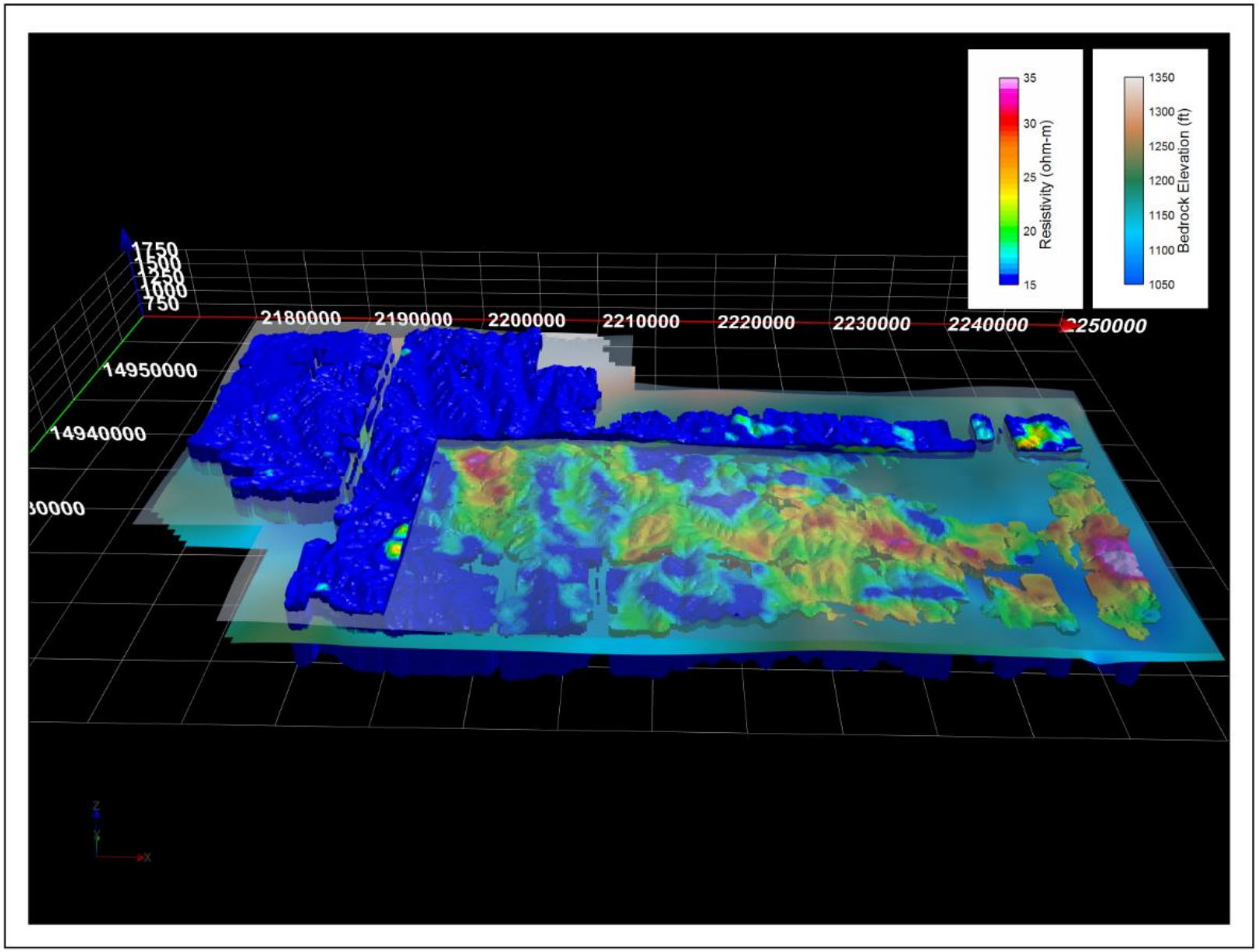


Figure A1-14: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block with a horizontal slice of material at a depth of 200 ft bgl and above removed from the southern two-thirds of the block.

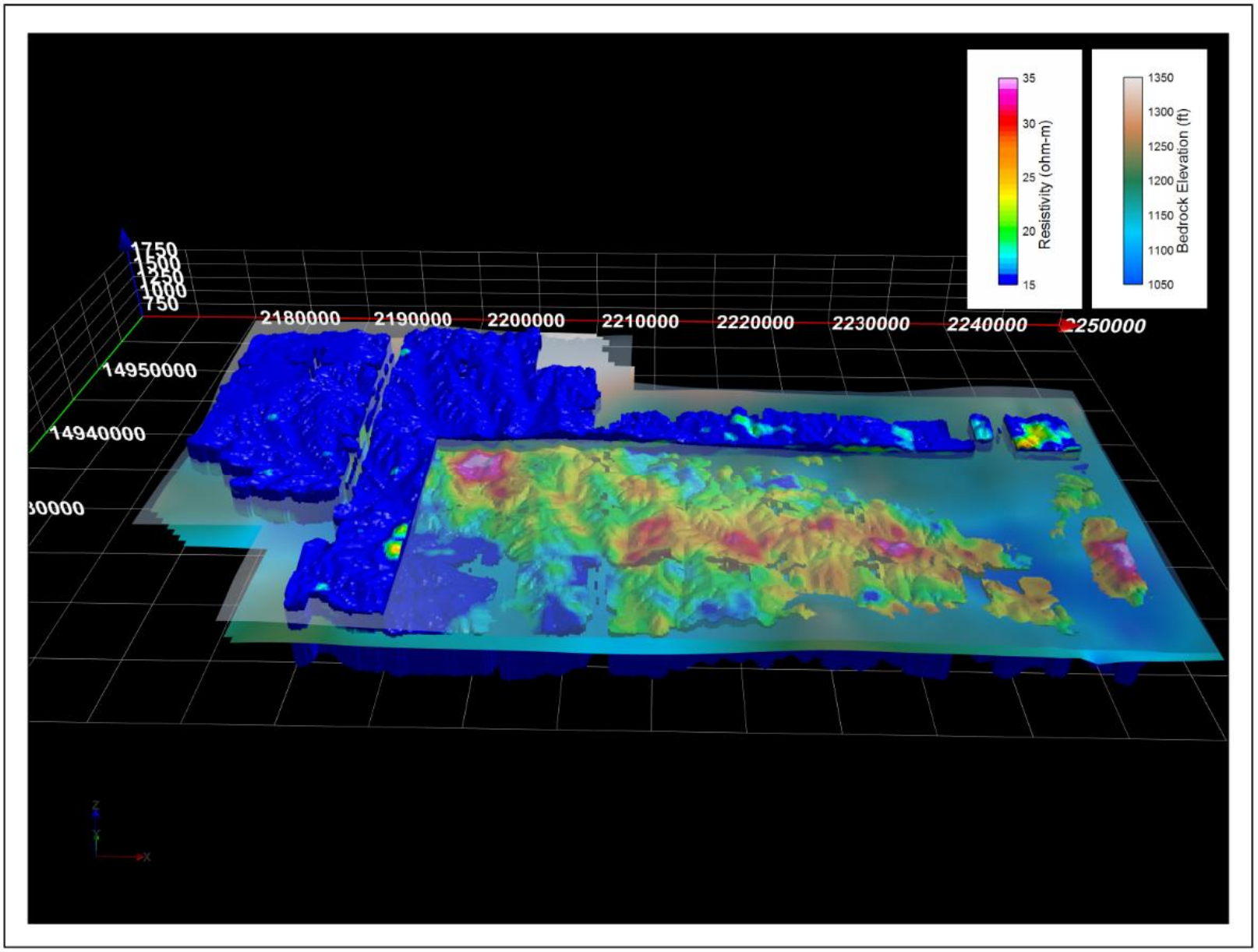


Figure A1-15: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the south flight block with a horizontal slice of material at a depth of 250 ft bgl and above removed from the southern two-thirds of the block.

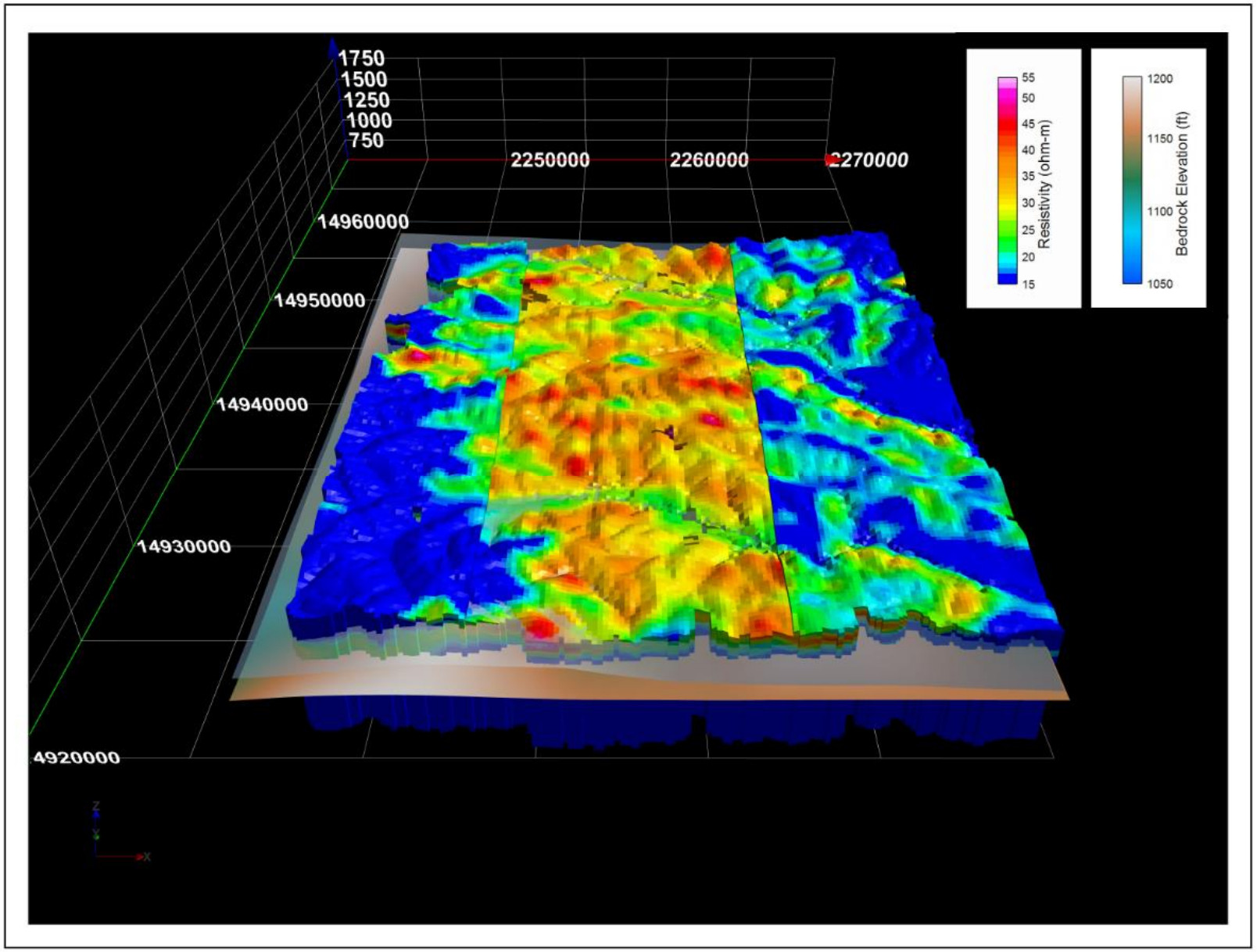


Figure A1-16: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 30 ft bgl and above removed from the middle one-third of the block.

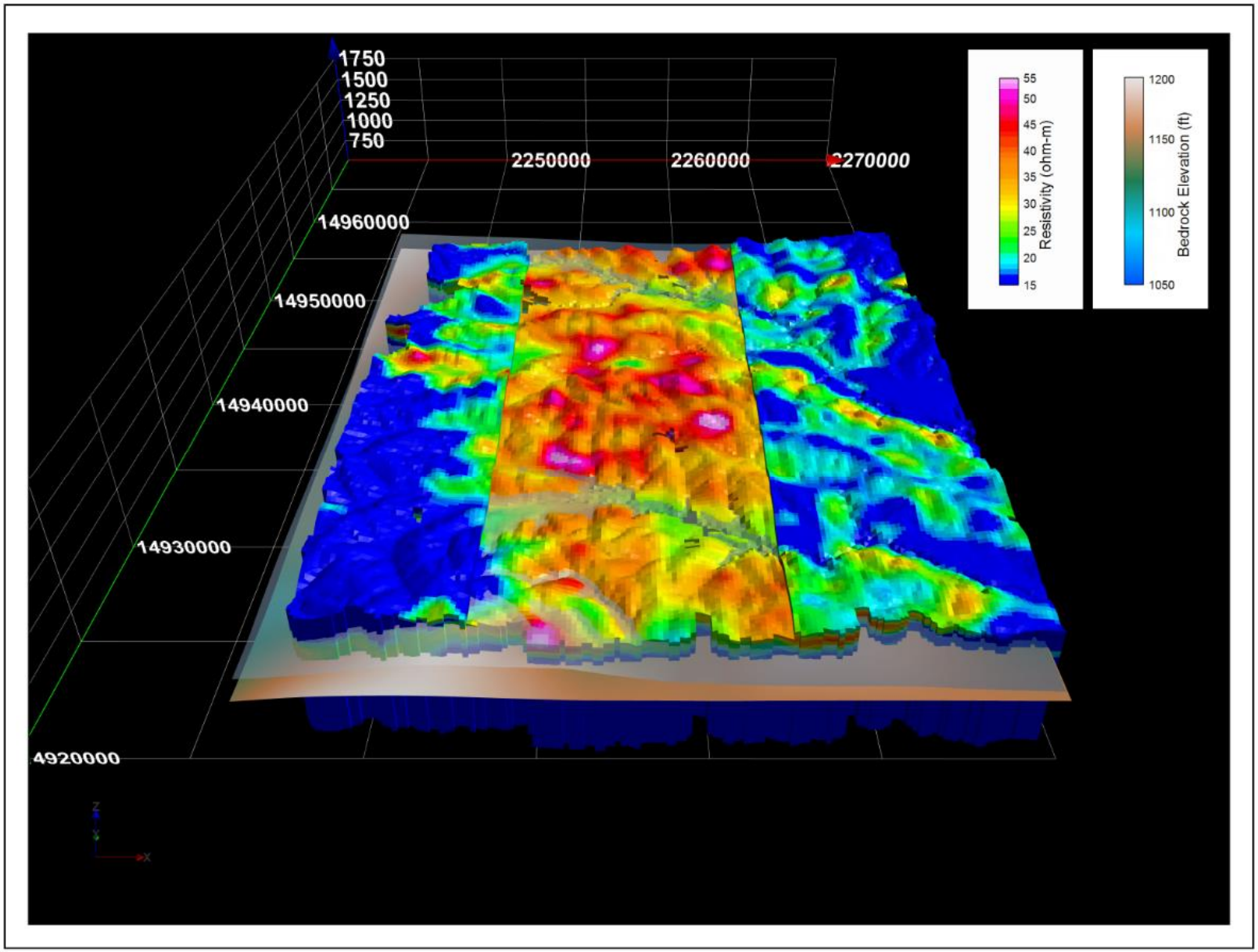


Figure A1-17: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 60 ft bgl and above removed from the middle one-third of the block.

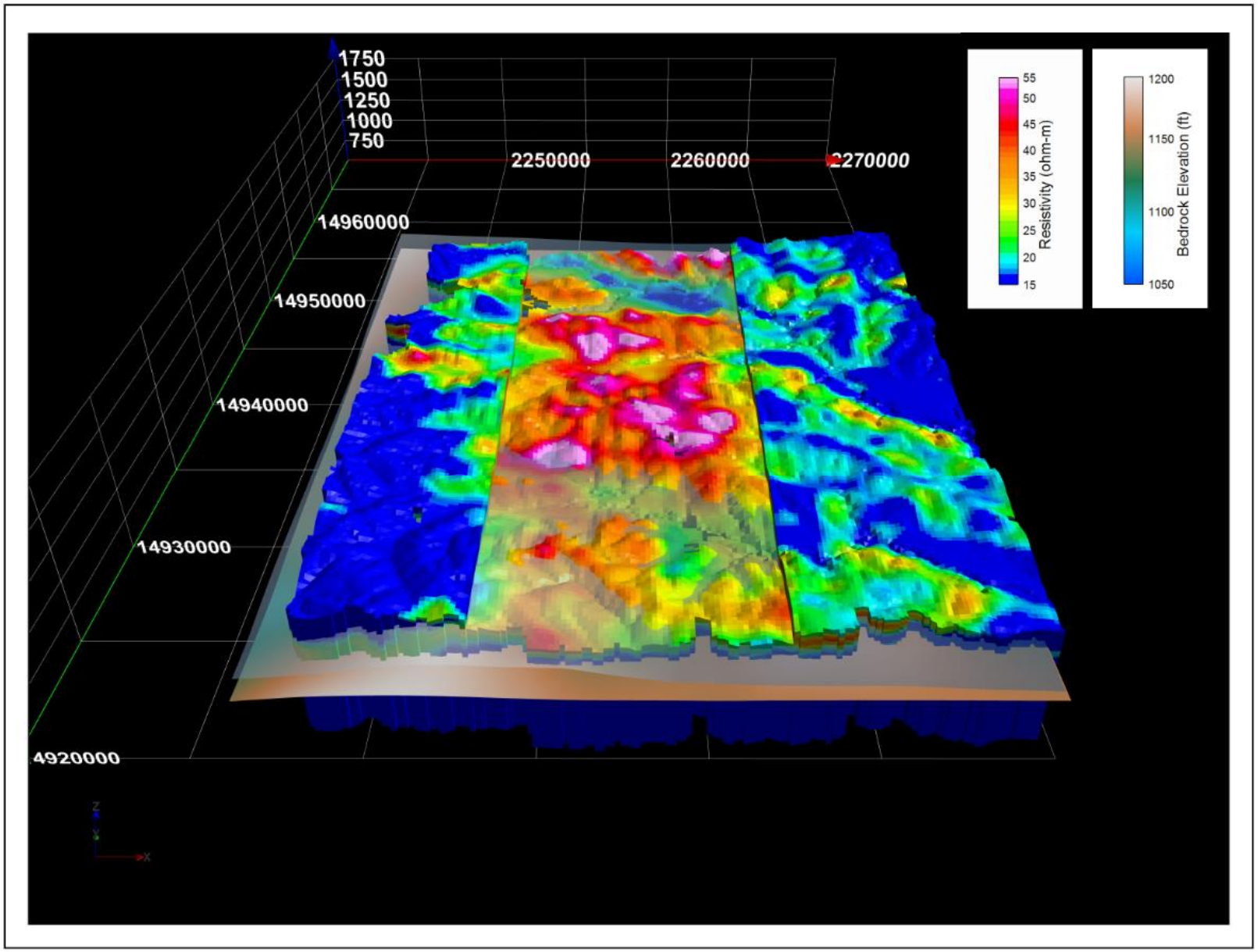


Figure A1-18: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 90 ft bgl and above removed from the middle one-third of the block.

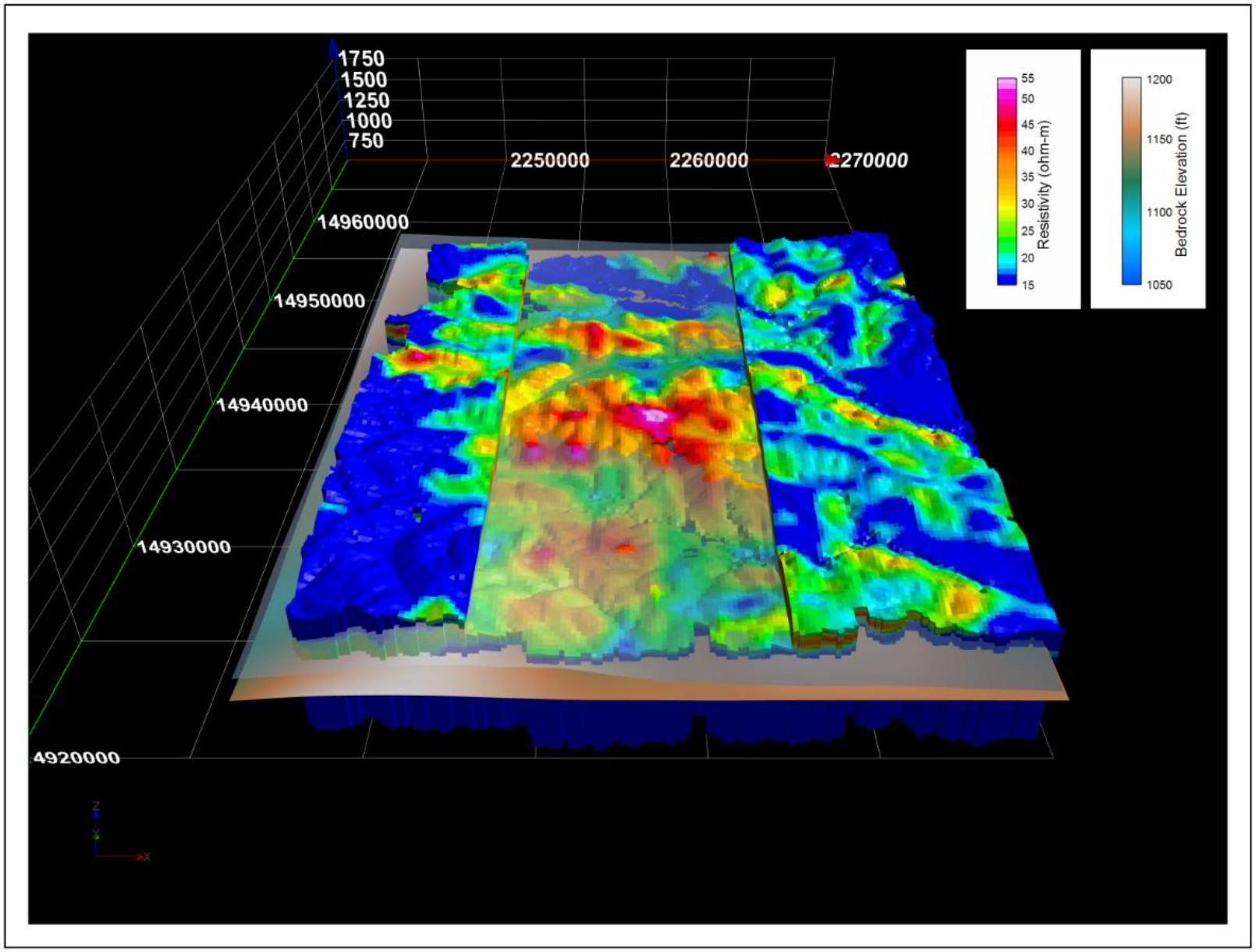


Figure A1-19: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 120 ft bgl and above removed from the middle one-third of the block.

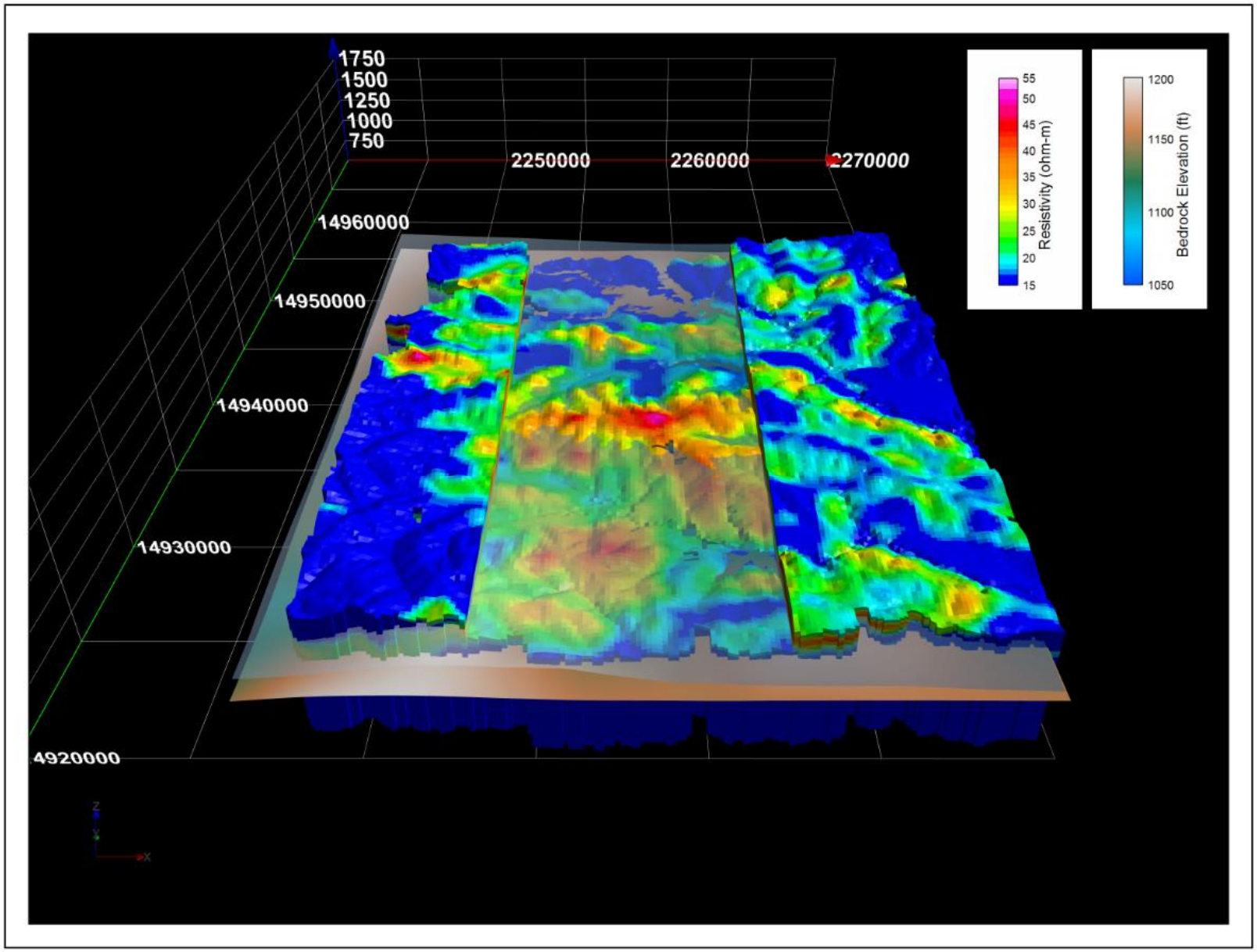


Figure A1-20: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 150 ft bgl and above removed from the middle one-third of the block.

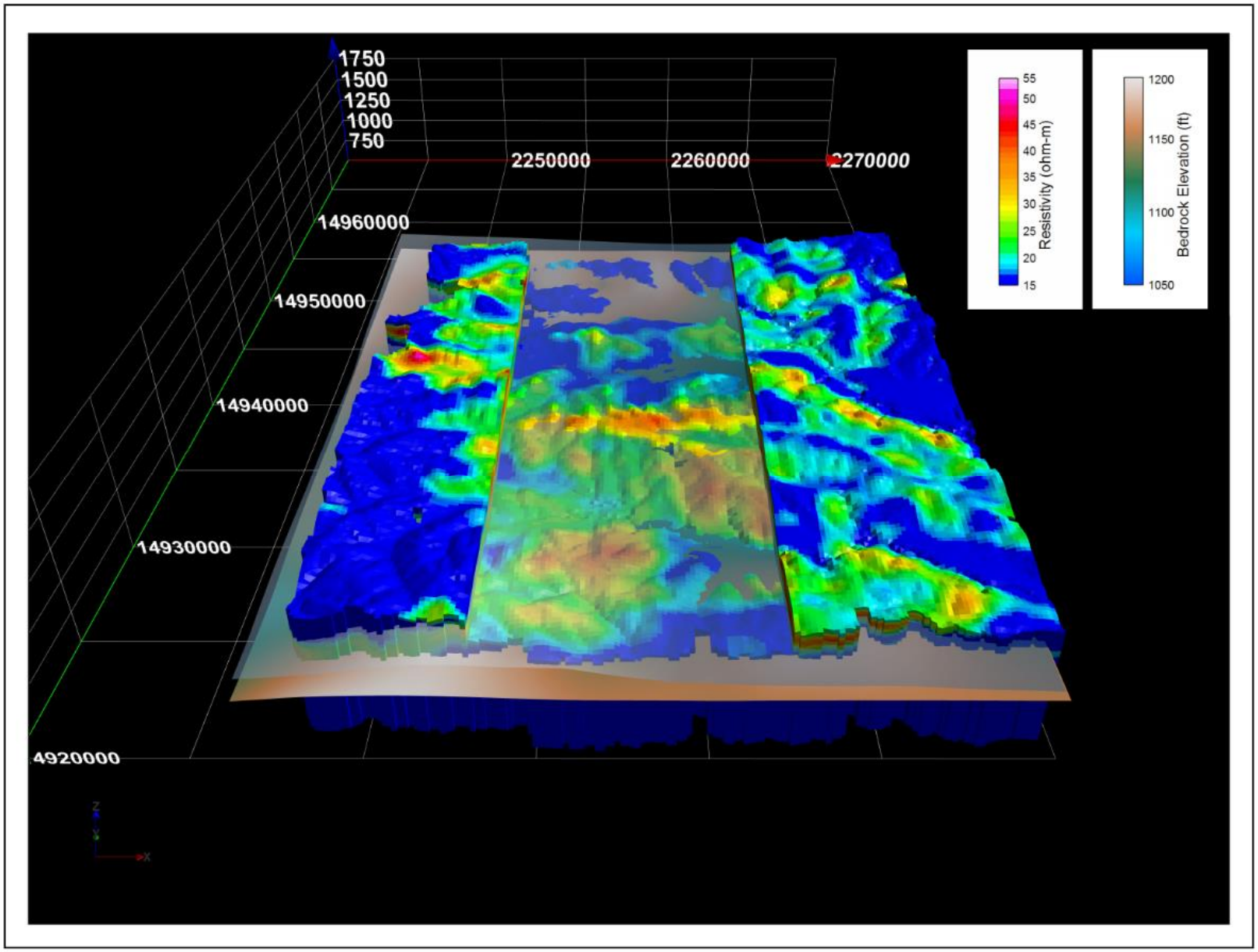


Figure A1-21: Resistivity model of all Quaternary materials overlying the interpreted Cretaceous bedrock surface in the east flight block with a horizontal slice of material at a depth of 180 ft bgl and above removed from the middle one-third of the block.

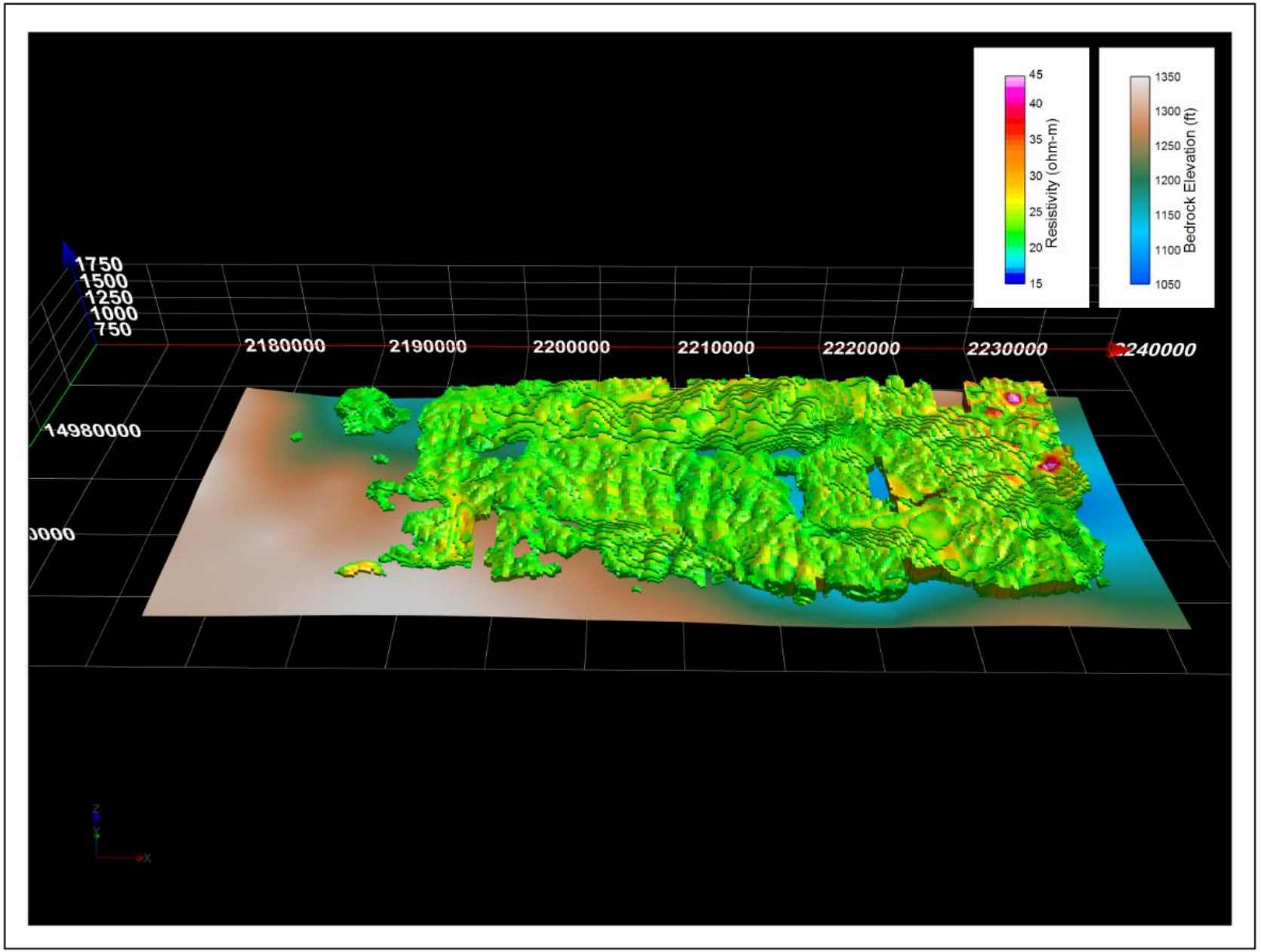


Figure A1-22: 3D voxel of Quaternary resistive materials greater than 21 ohm-m overlying the interpreted Cretaceous bedrock surface in the north flight block.

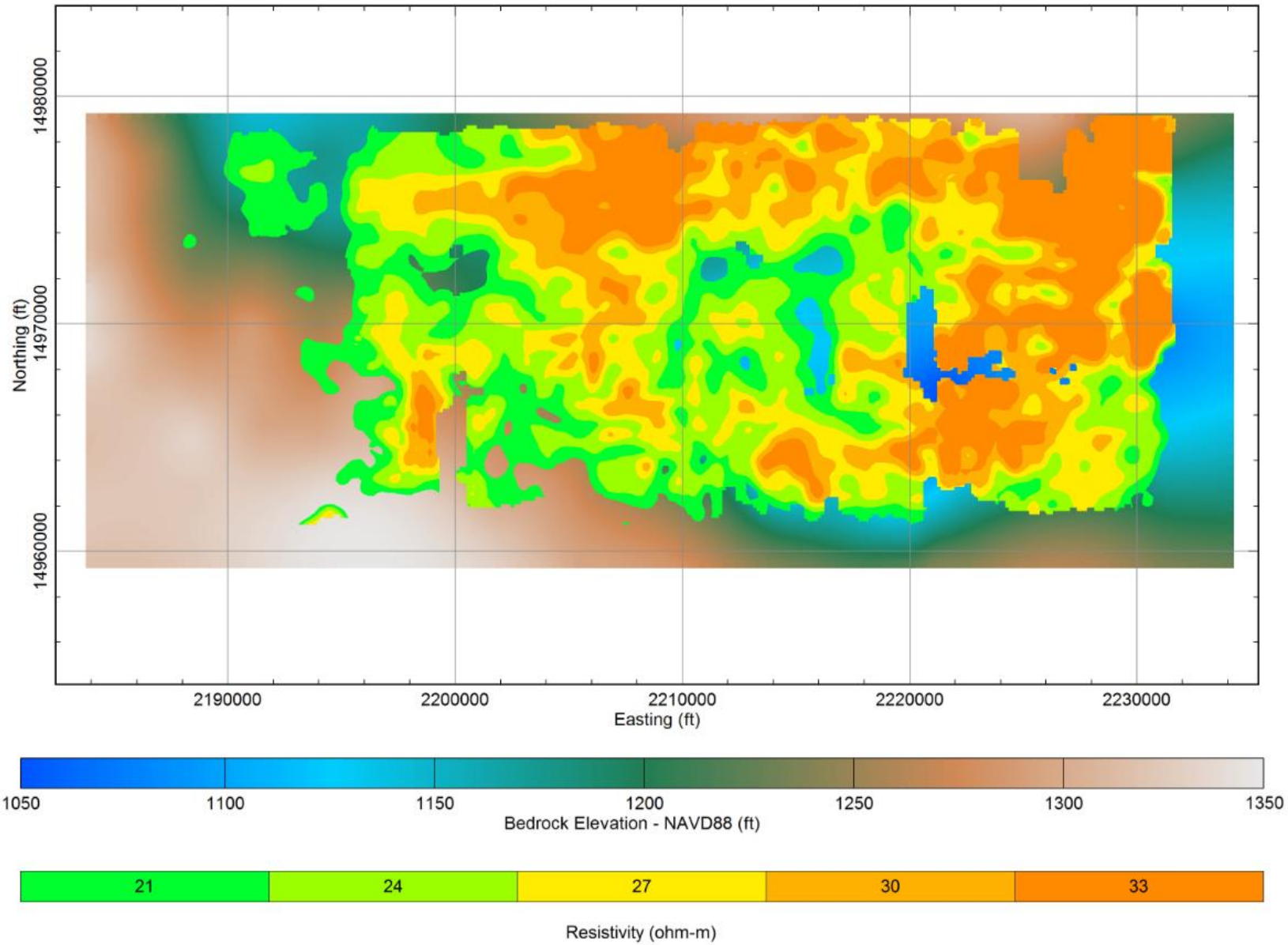


Figure A1-23: 2D map of resistivities greater than 21 ohm-m overlying the interpreted Cretaceous bedrock surface in the north flight block.

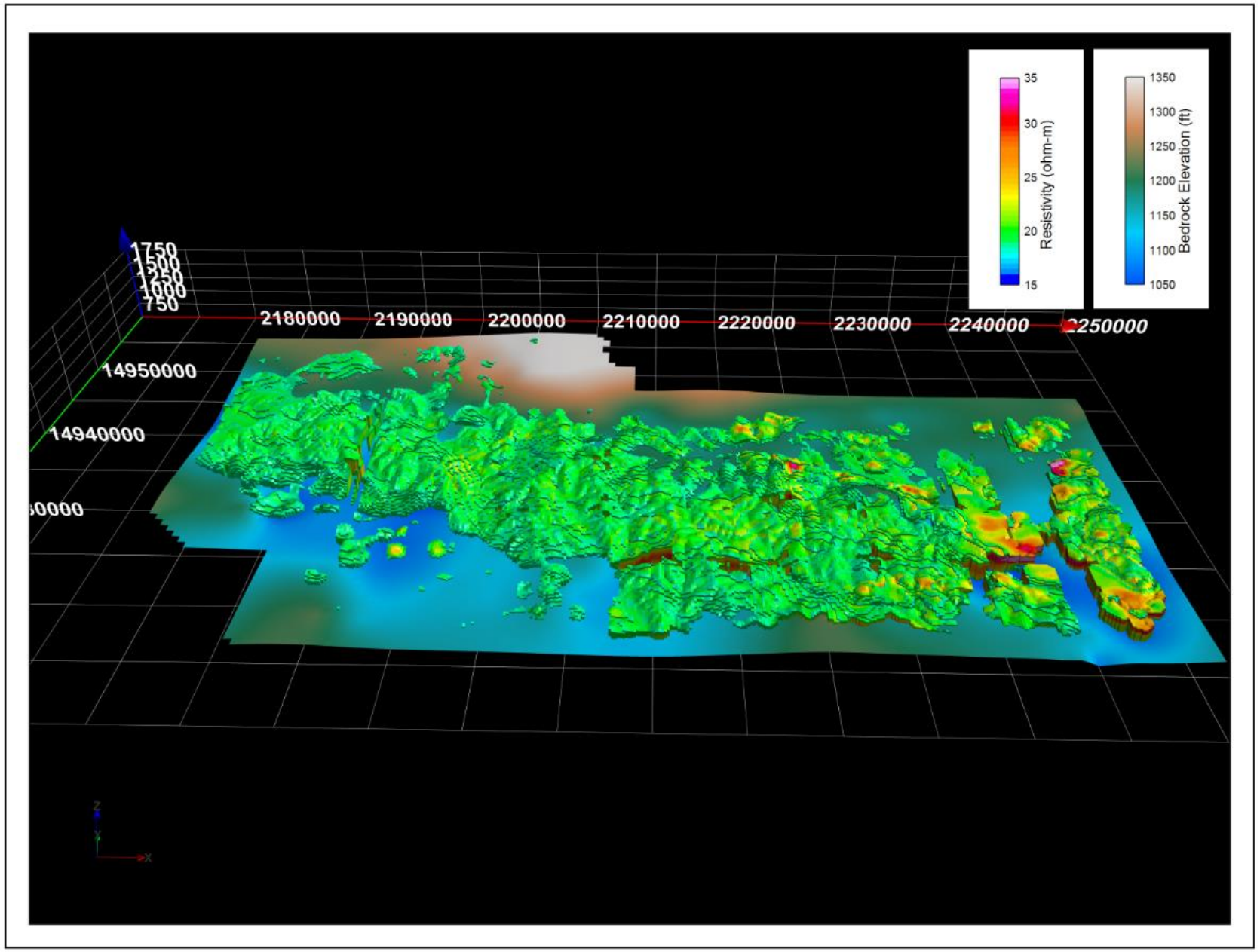


Figure A1-24: 3D voxel of Quaternary resistive materials greater than 18 ohm-m overlying the interpreted Cretaceous bedrock surface in the south flight block.

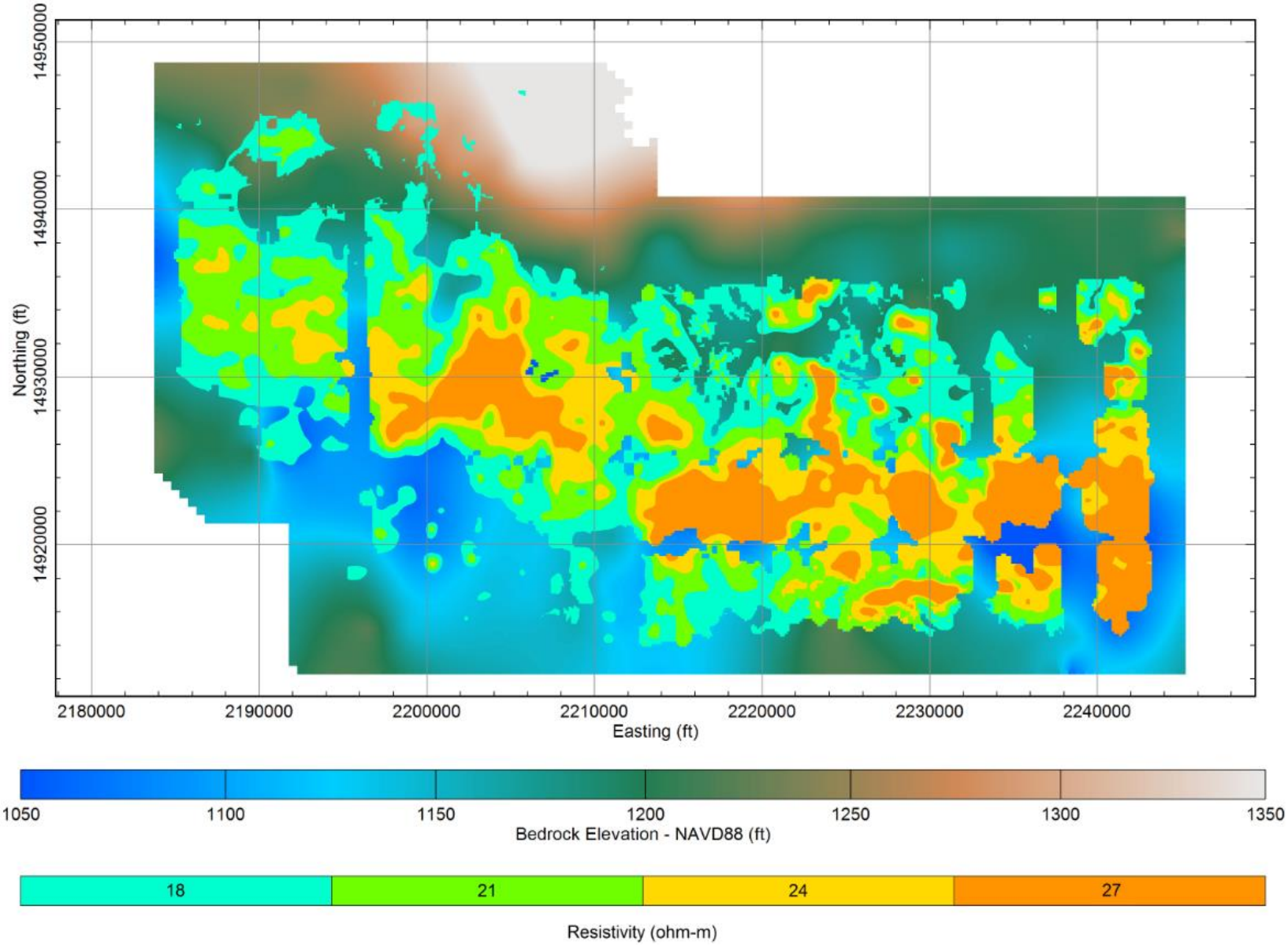


Figure A1-25: 2D map of resistivities greater than 18 ohm-m overlying the interpreted Cretaceous bedrock surface in the south flight block.

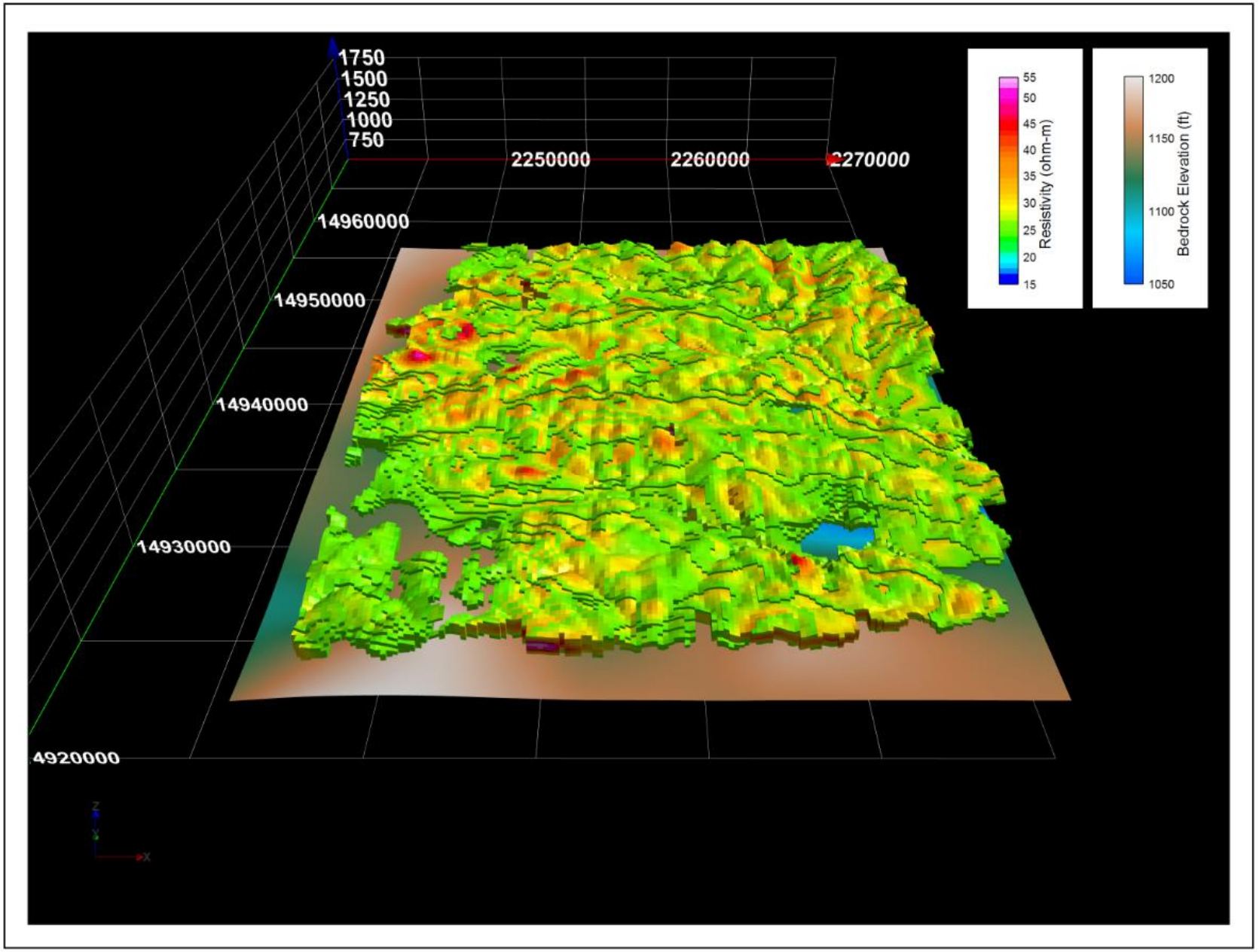


Figure A1-26: 3D voxel of Quaternary resistive materials greater than 24 ohm-m overlying the interpreted Cretaceous bedrock surface in the east flight block.

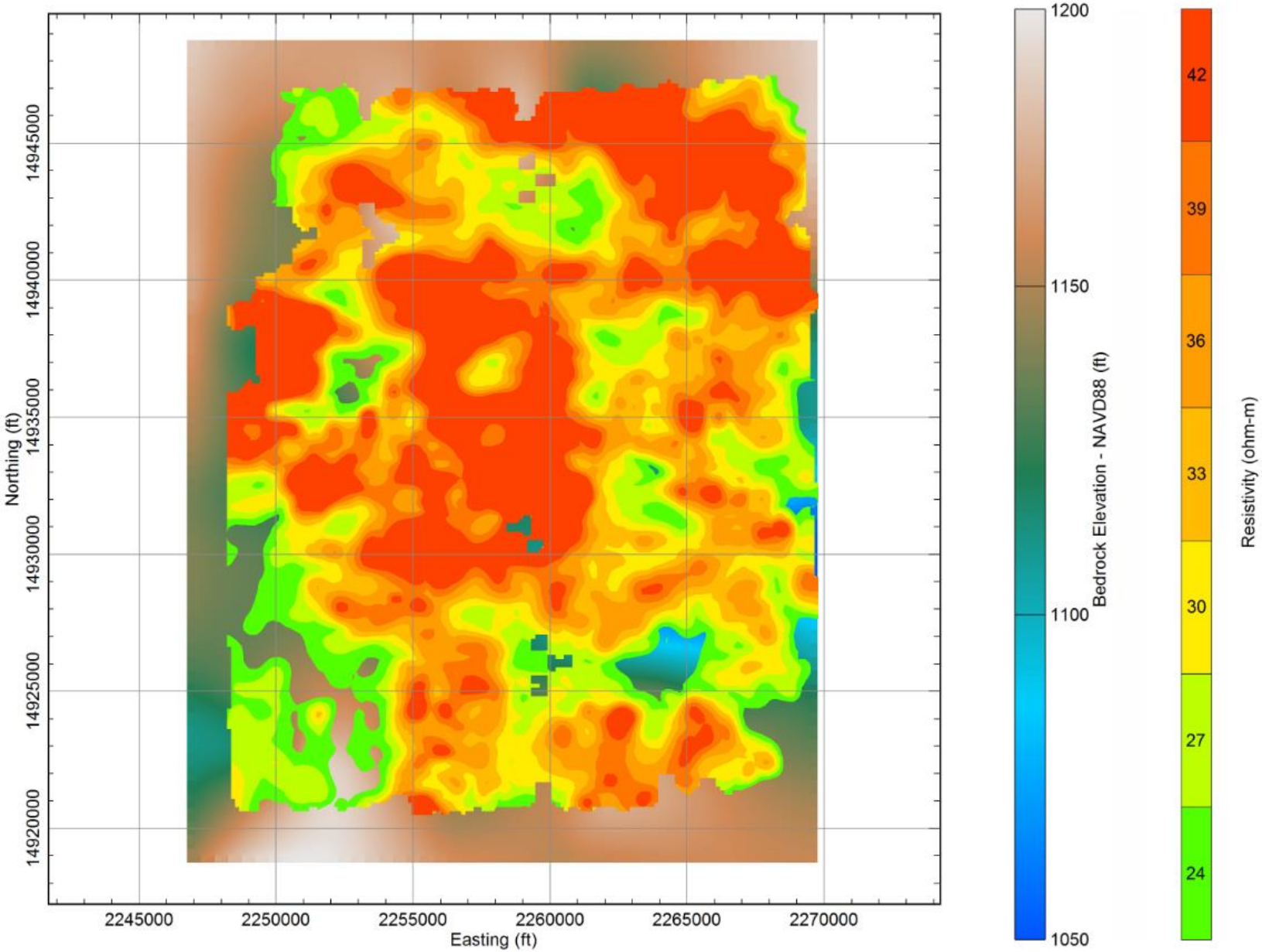


Figure A1-27: 2D map of resistivities greater than 24 ohm-m overlying the interpreted Cretaceous bedrock surface in the east flight block.

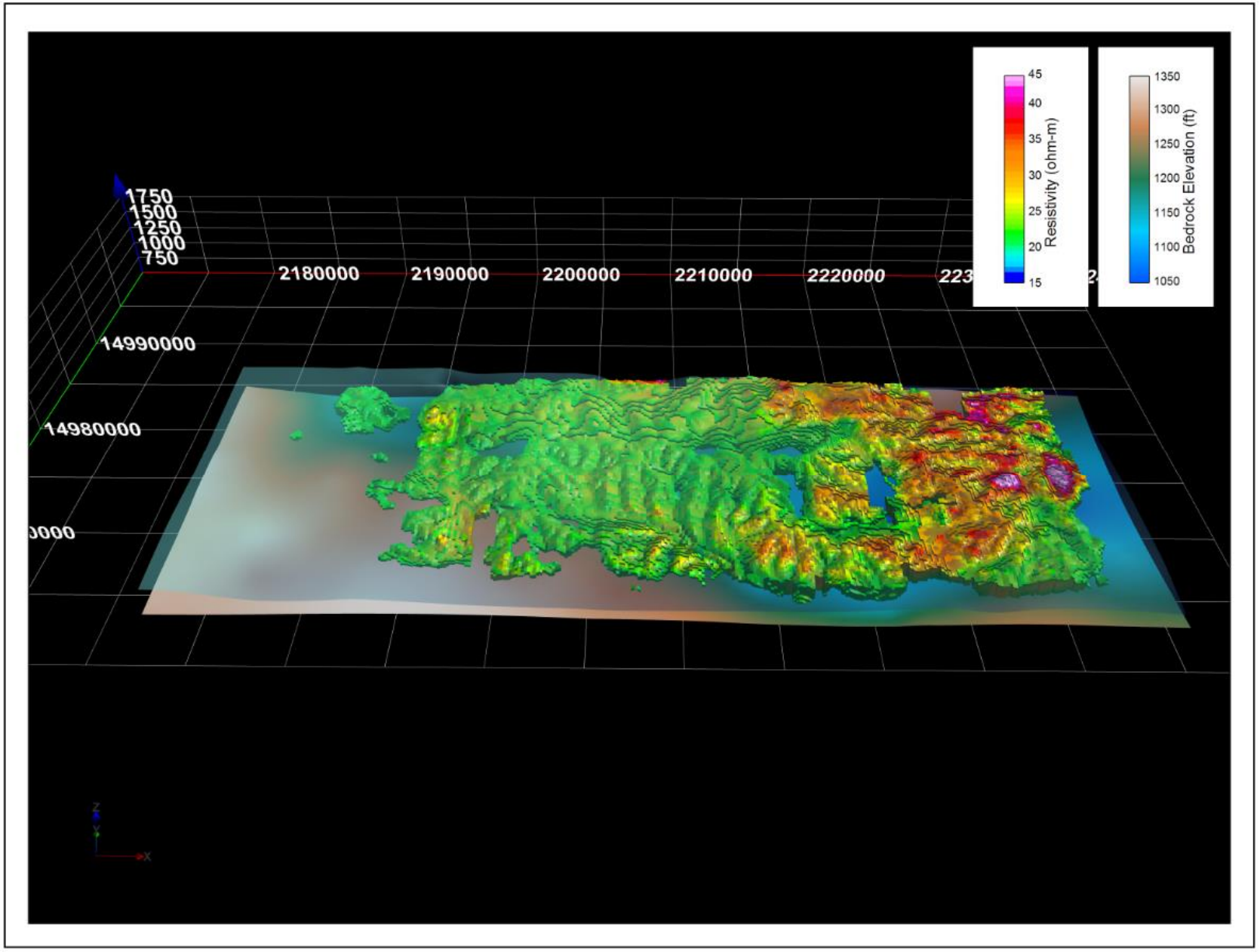


Figure A1-28: 3D voxel of Quaternary resistive materials greater than 21 ohm-m beneath the interpolated water level surface and above the interpreted Cretaceous bedrock surface in the north flight block.

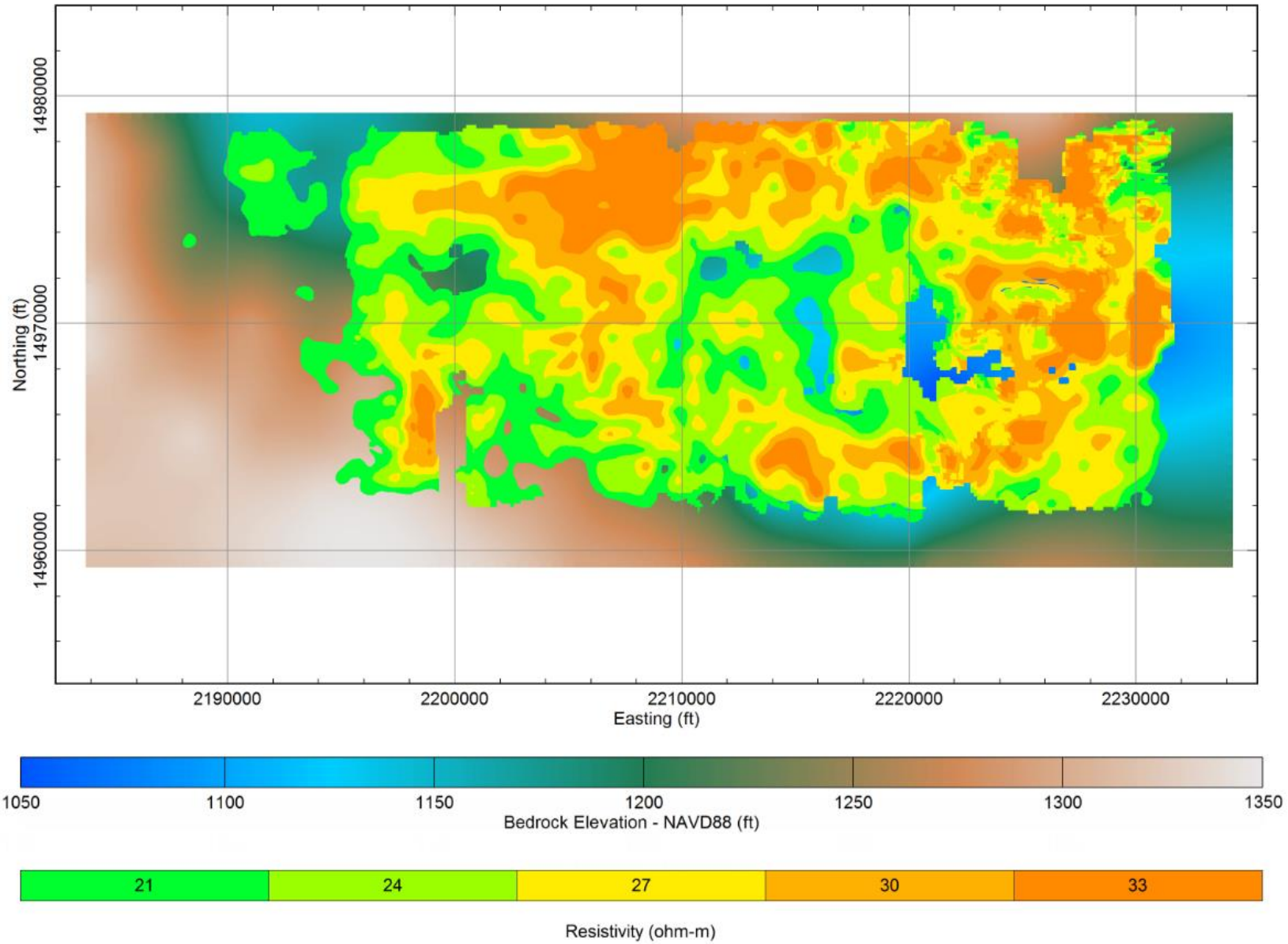


Figure A1-29: 2D map of resistivities greater than 21 ohm-m below the interpolated water level surface and above the overlying the interpreted Cretaceous bedrock surface in the north flight block.

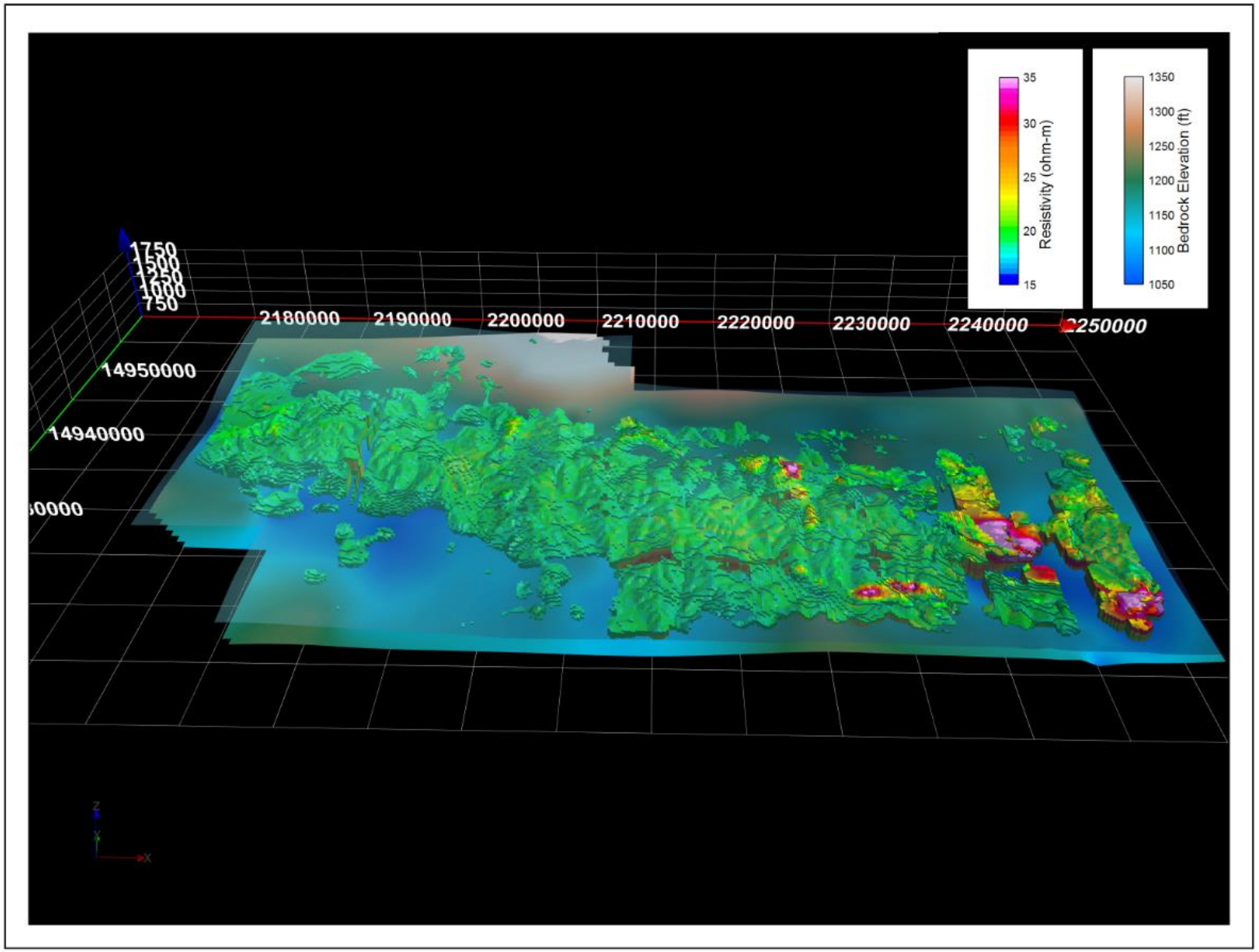


Figure A1-30: 3D voxel of Quaternary resistive materials greater than 18 ohm-m beneath the interpolated water level surface and above the interpreted Cretaceous bedrock surface in the south flight block.

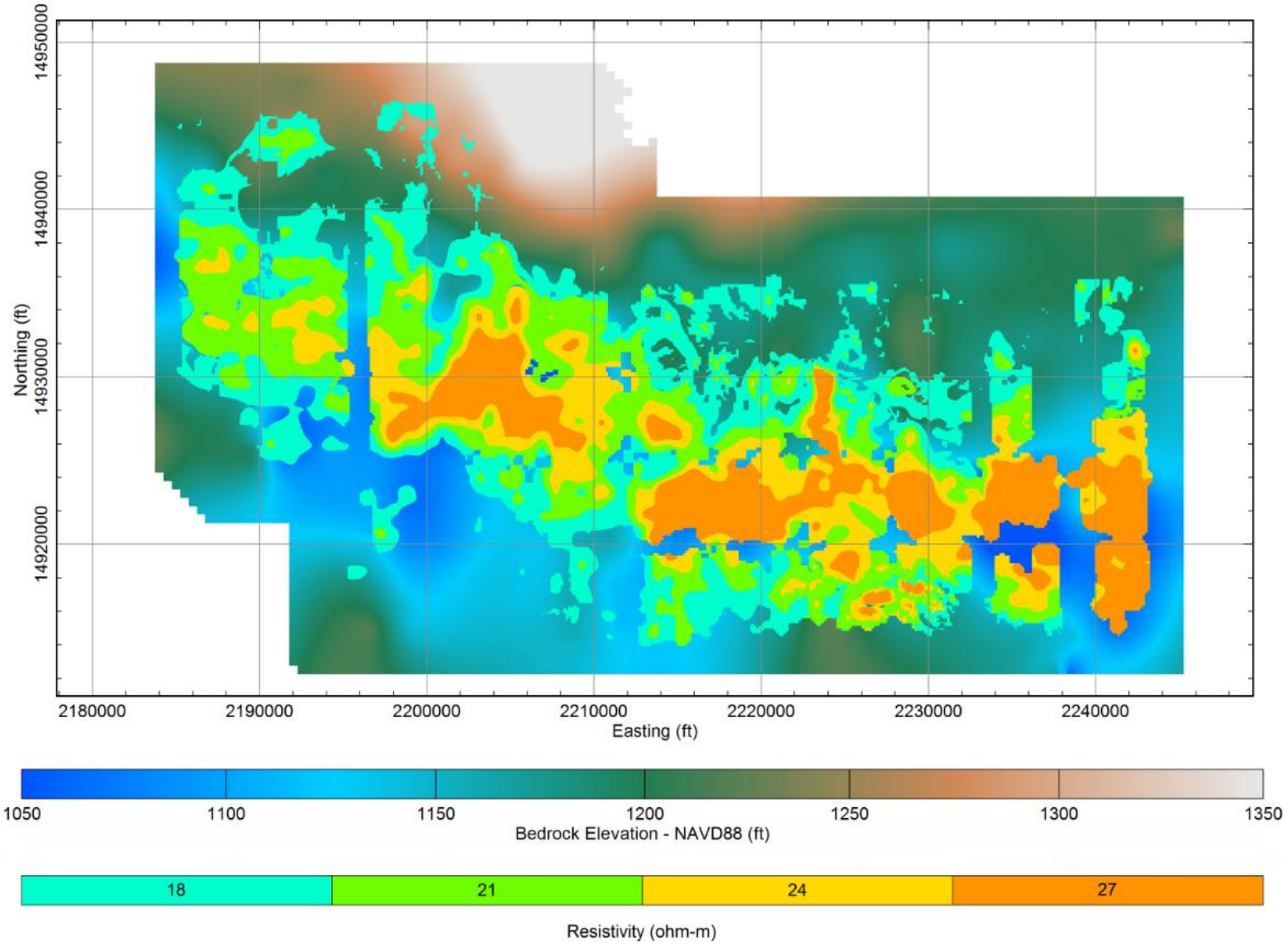


Figure A1-31: 2D map of resistivities greater than 18 ohm-m below the interpolated water level surface and above the overlying the interpreted Cretaceous bedrock surface in the south flight block.

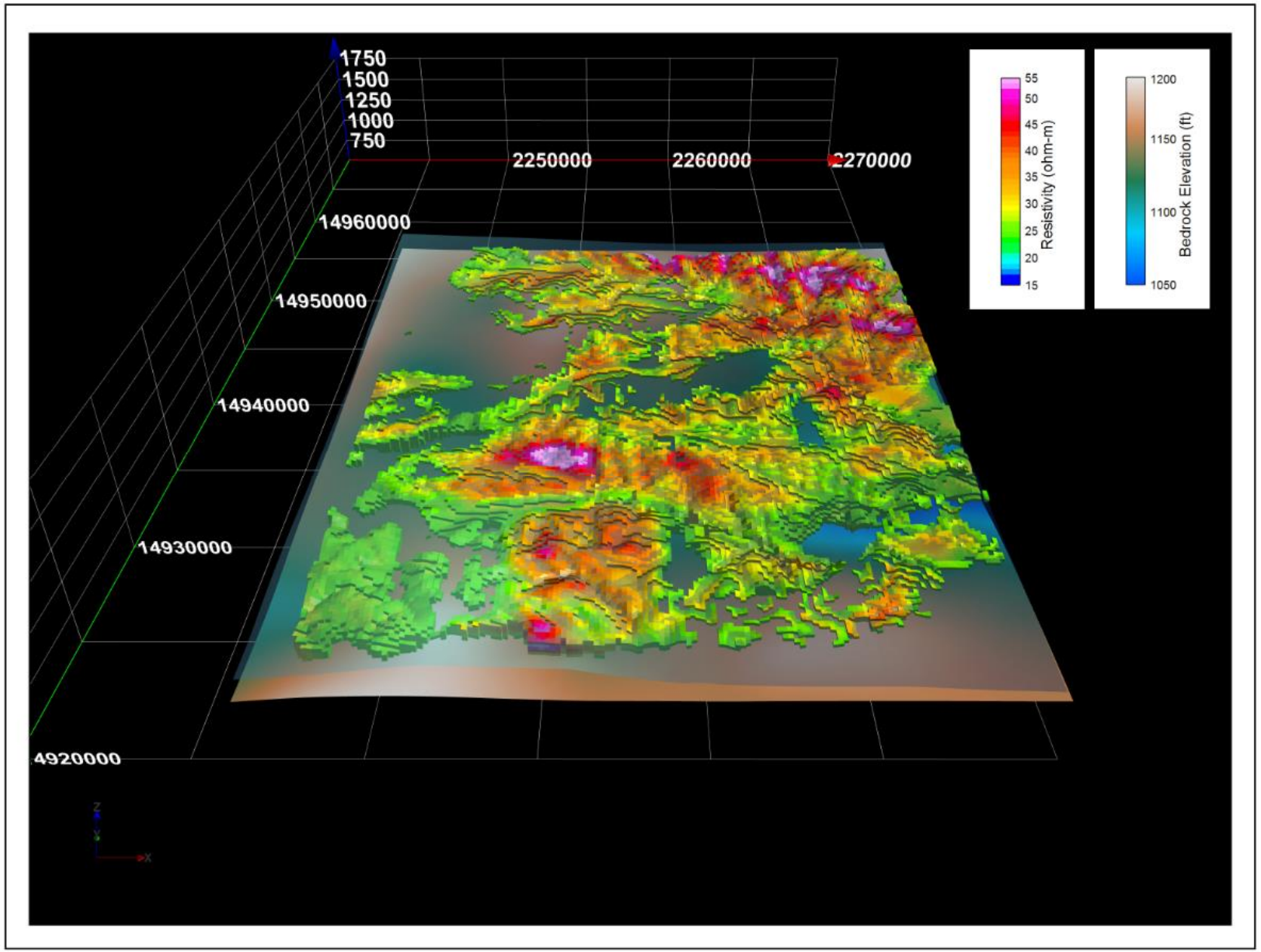


Figure A1-32: 3D voxel of Quaternary resistive materials greater than 24 ohm-m beneath the interpolated water level surface and above the interpreted Cretaceous bedrock surface in the east flight block.

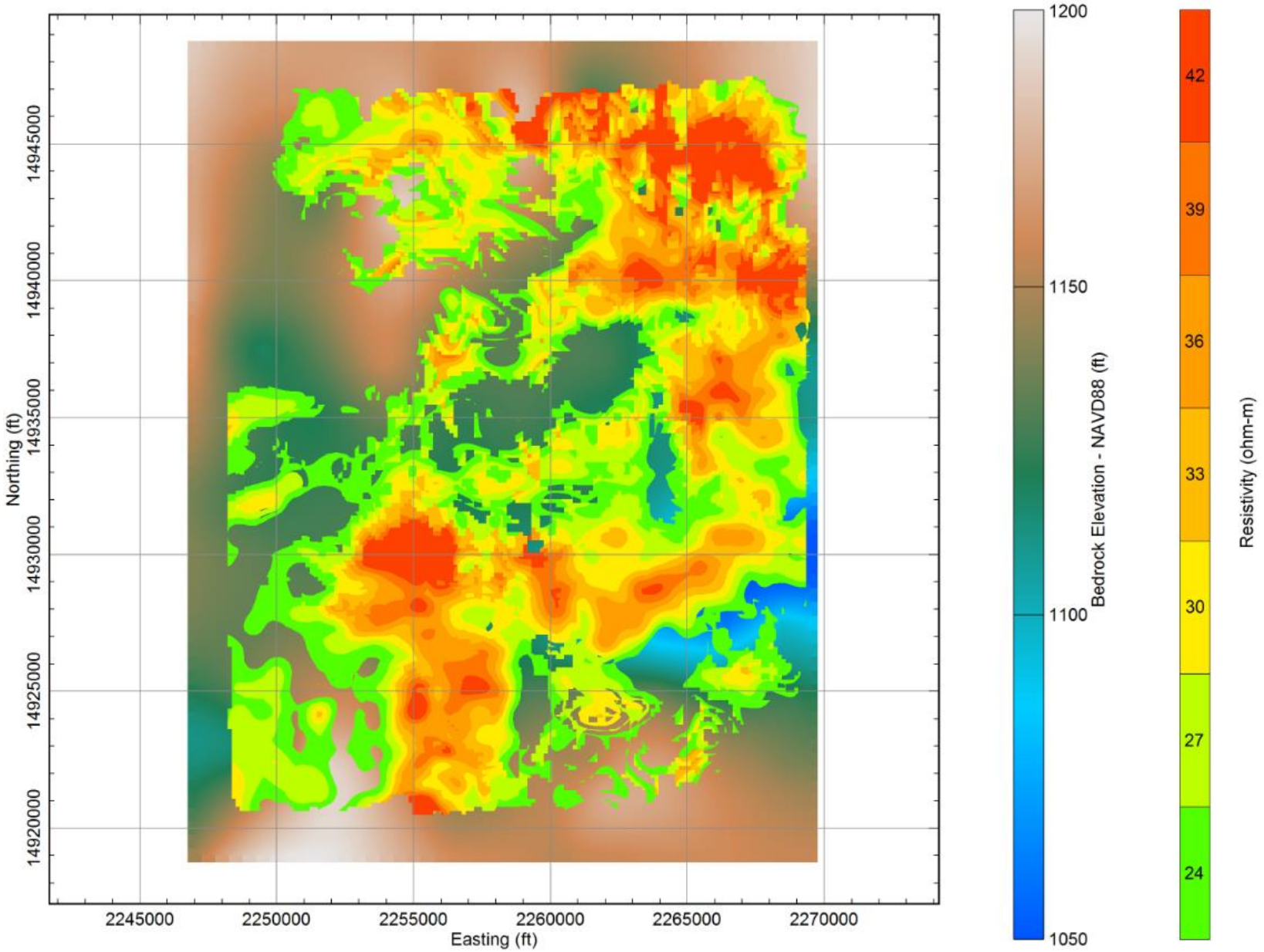


Figure A1-33: 2D map of resistivities greater than 24 ohm-m below the interpolated water level surface and above the overlying the interpreted Cretaceous bedrock surface in the east flight block.

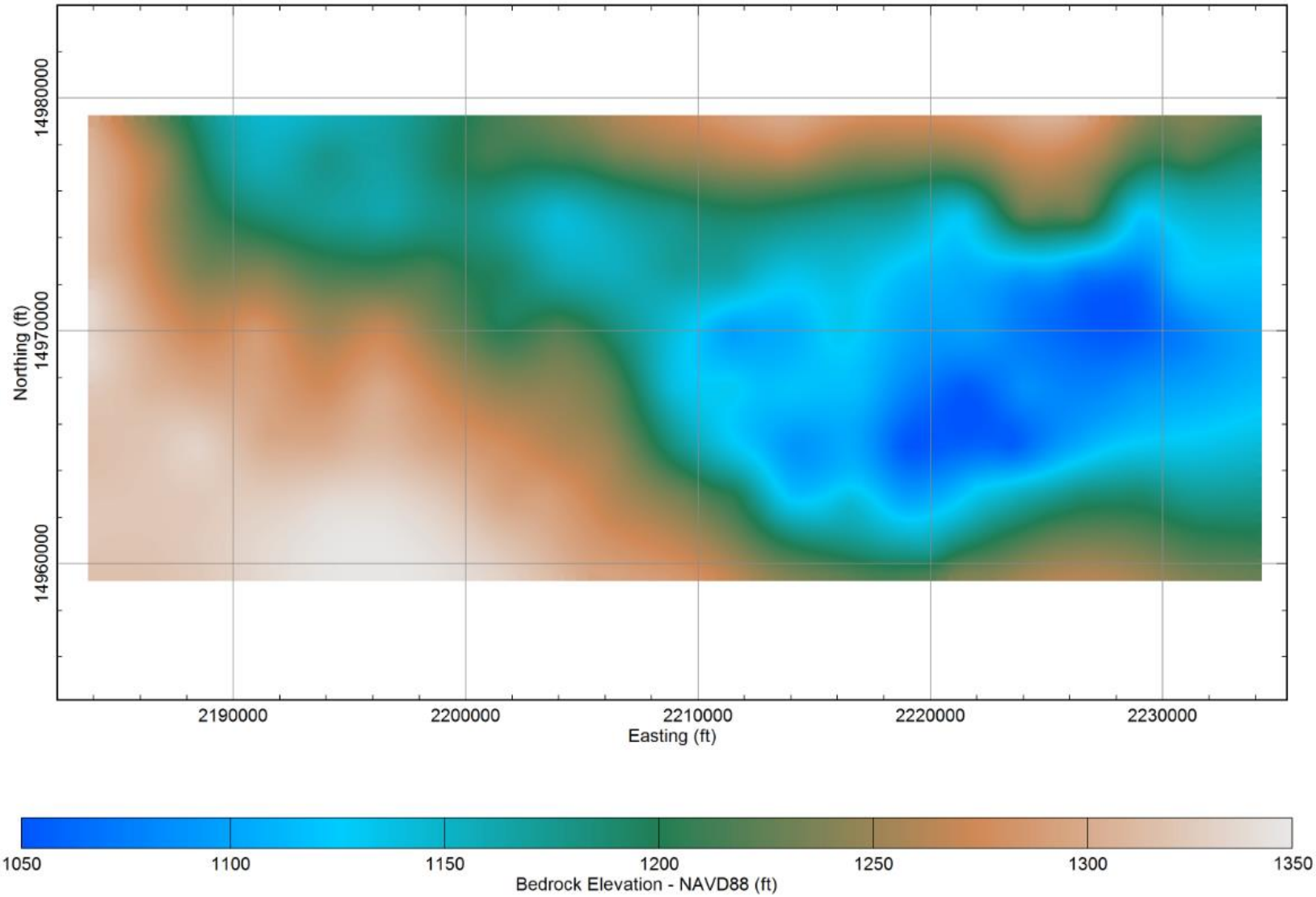


Figure A1-34: 2D map of interpreted Cretaceous bedrock surface elevations in the north flight block.

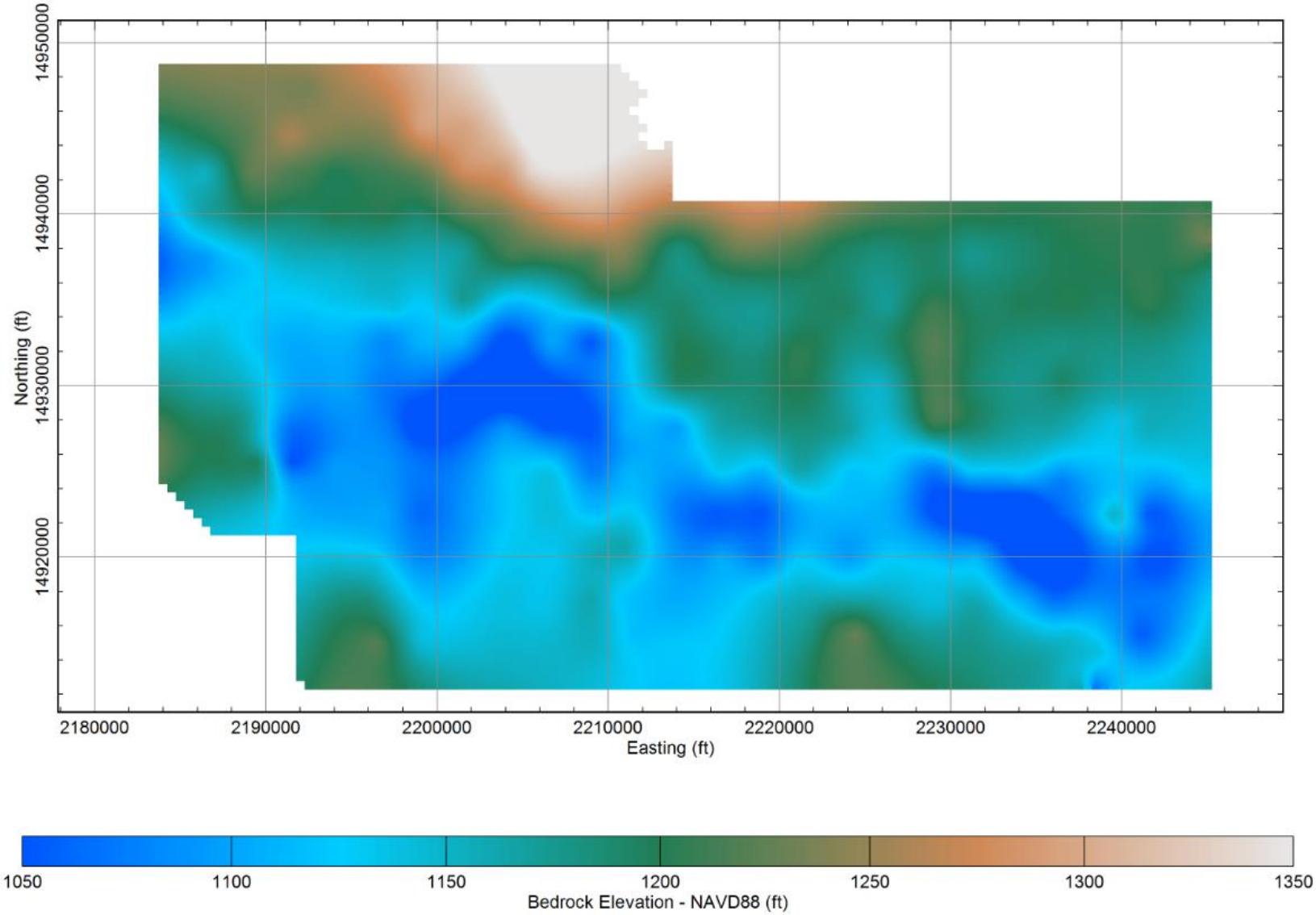


Figure A1-25: 2D map of interpreted Cretaceous bedrock surface elevations in the south flight block.

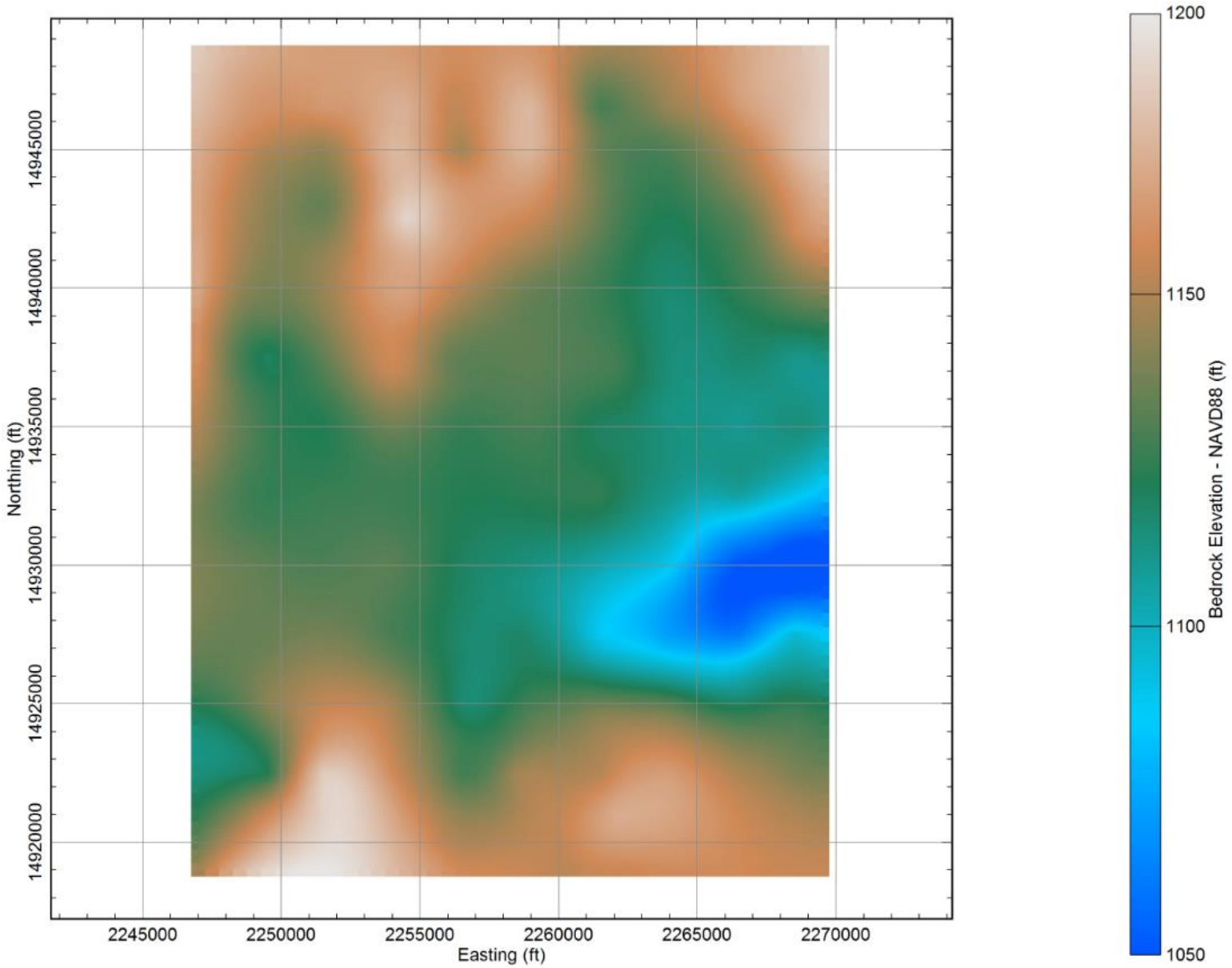


Figure A1-36: 2D map of interpreted Cretaceous bedrock surface elevations in the east flight block.

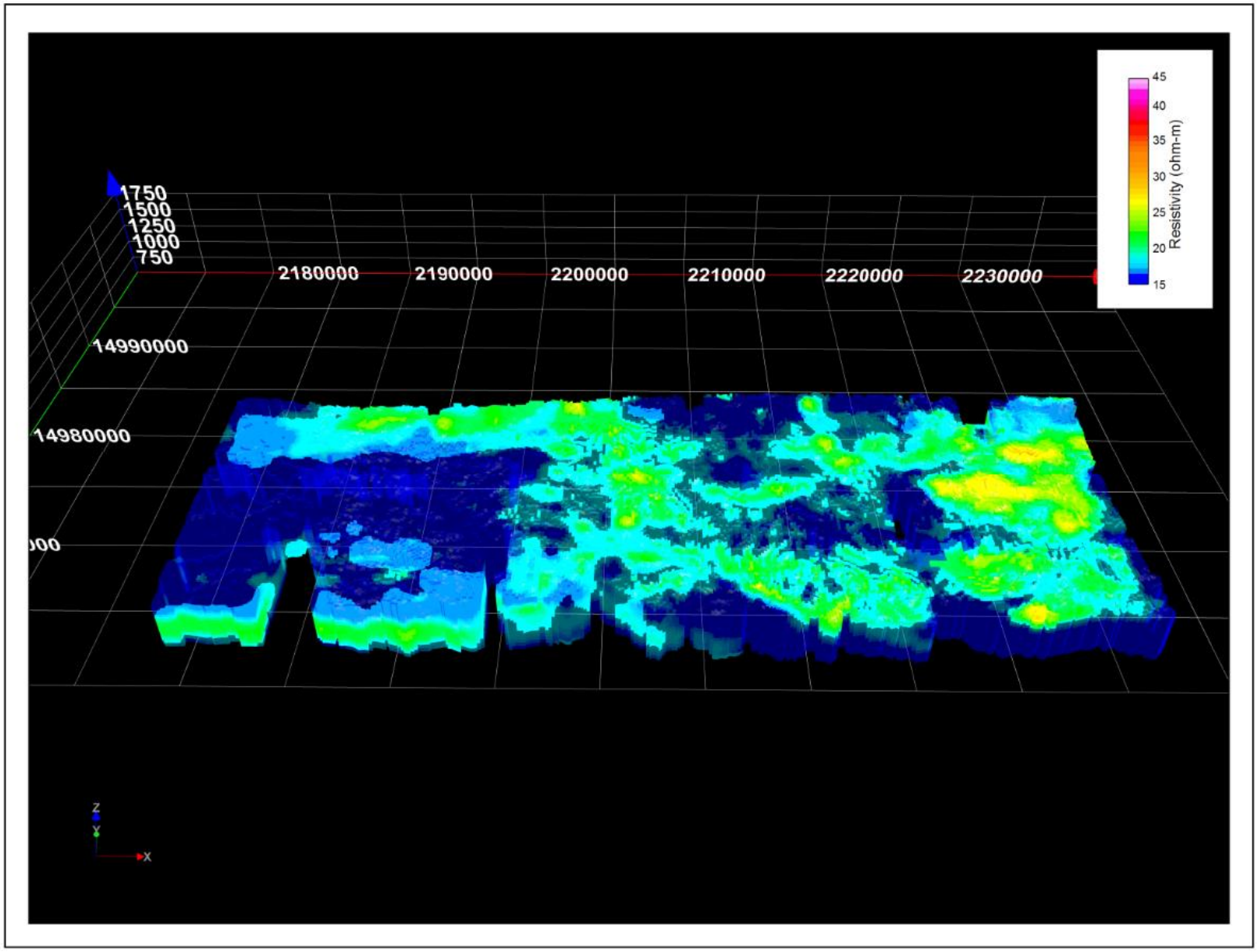


Figure A1-37: 3D voxel of resistivities in the north flight block below the interpreted bedrock surface with all resistivities below 21 ohm-m set as semi-transparent and all resistivities above 18 ohm-m set as opaque with the resistivity levels defined in the scale in the upper right.

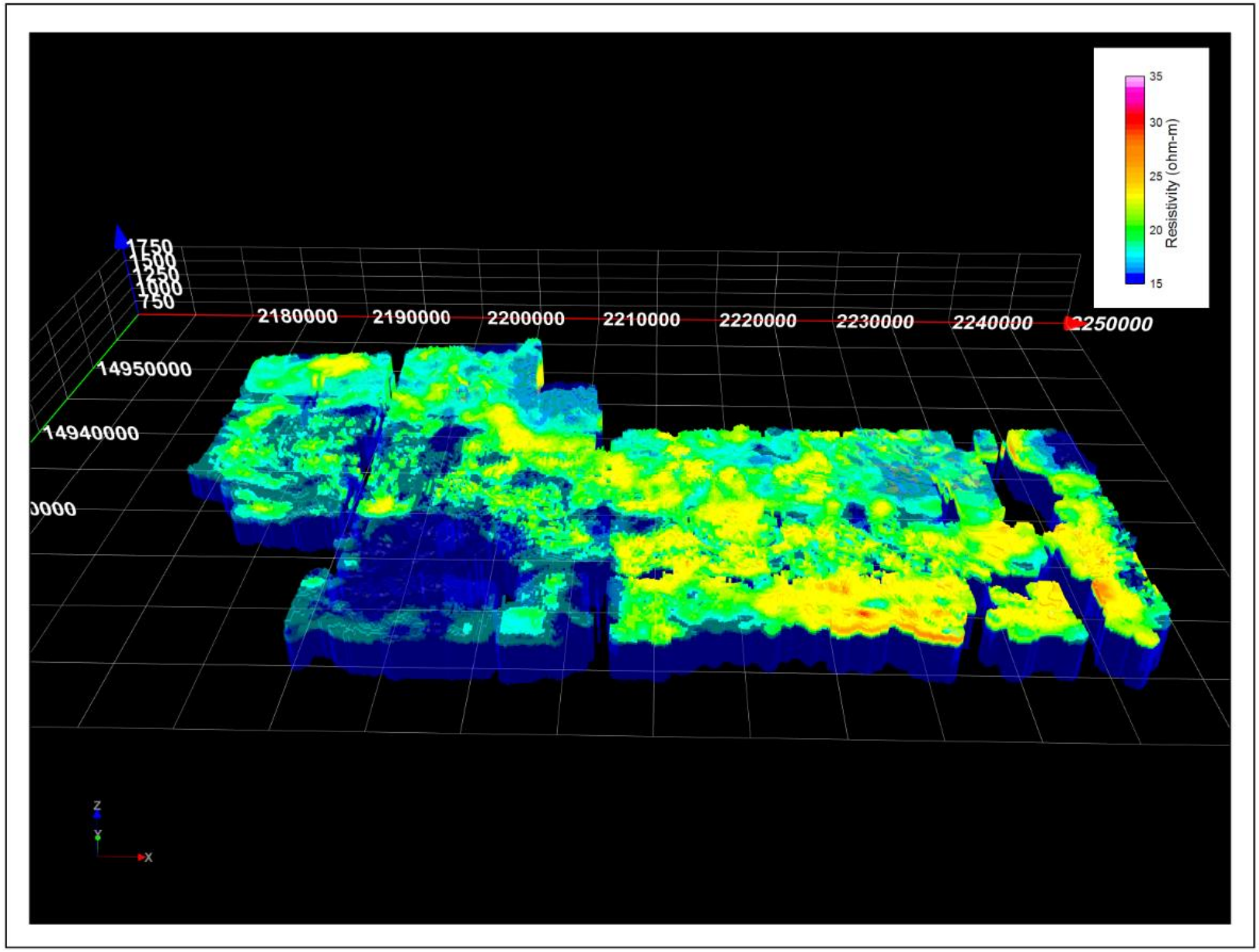


Figure A1-38: 3D voxel of resistivities in the south flight block below the interpreted bedrock surface with all resistivities below 18 ohm-m set as semi-transparent and all resistivities above 18 ohm-m set as opaque with the resistivity levels defined in the scale in the upper right.

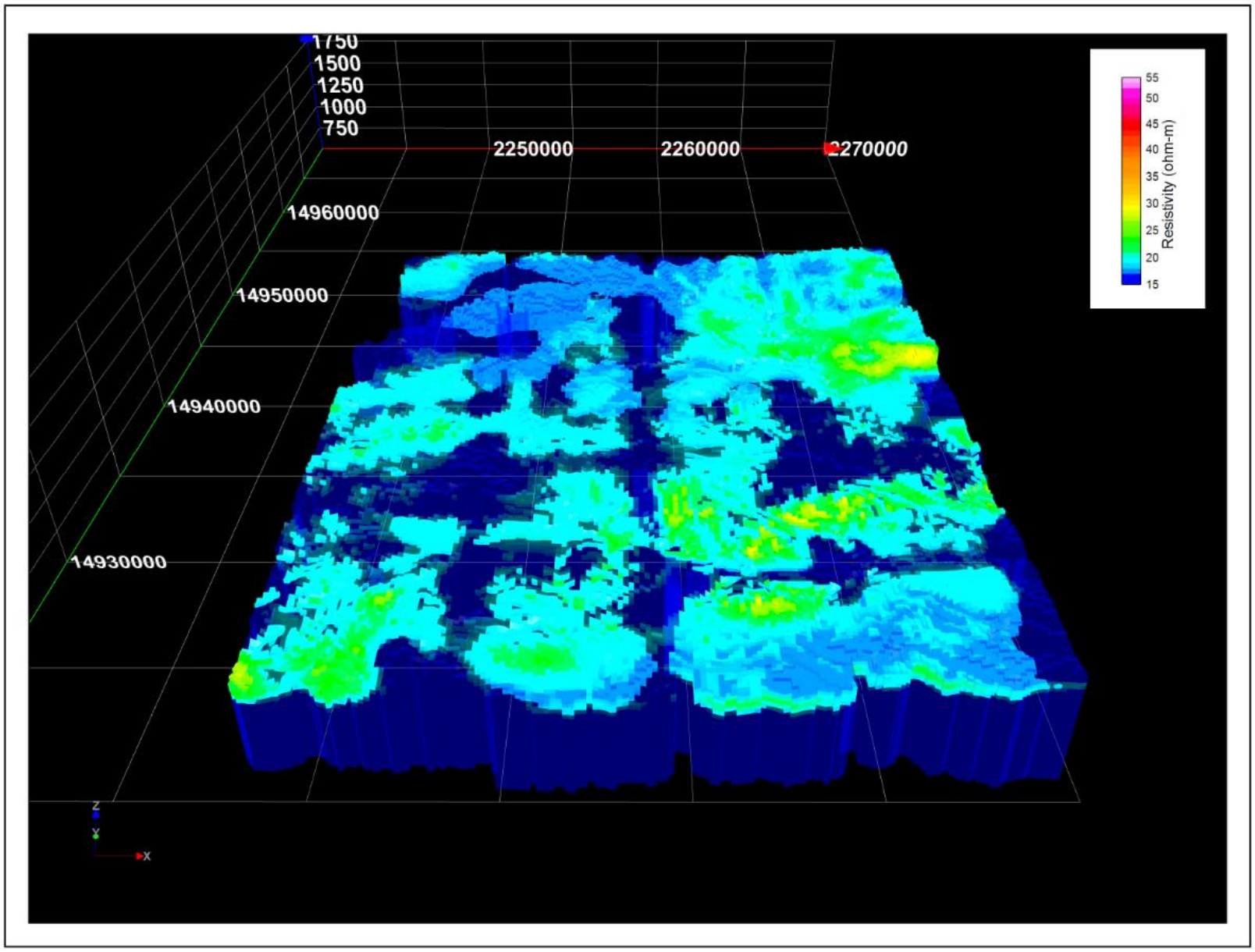


Figure A1-39: 3D voxel of resistivities in the east flight block below the interpreted bedrock surface with all resistivities below 24 ohm-m set as semi-transparent and all resistivities above 24 ohm-m set as opaque with the resistivity levels defined in the scale in the upper right.

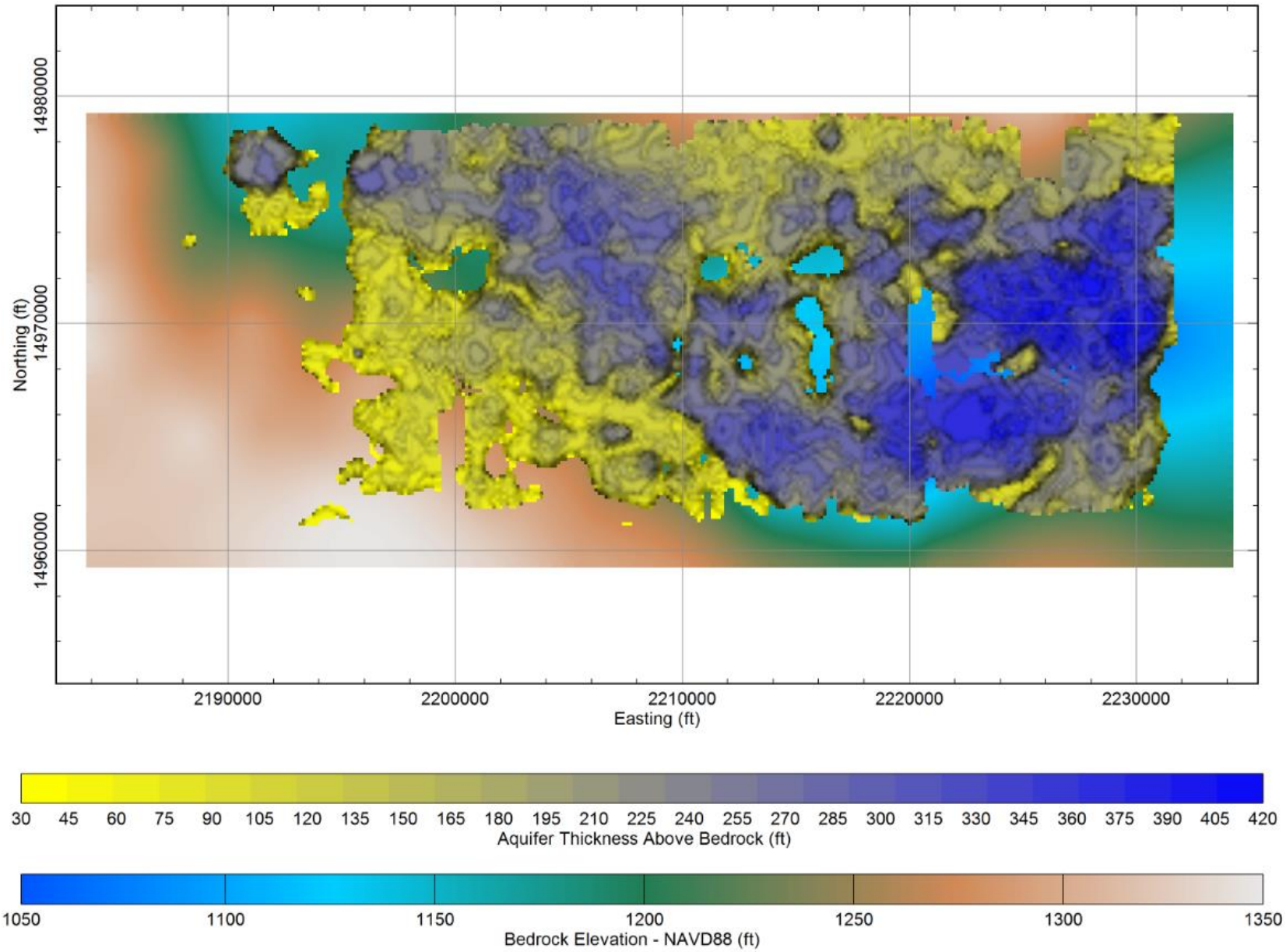


Figure A1-40: Total voxel thickness of the Quaternary deposits in the north block, with thickness ranging from 30 to over 400 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted bedrock surface.

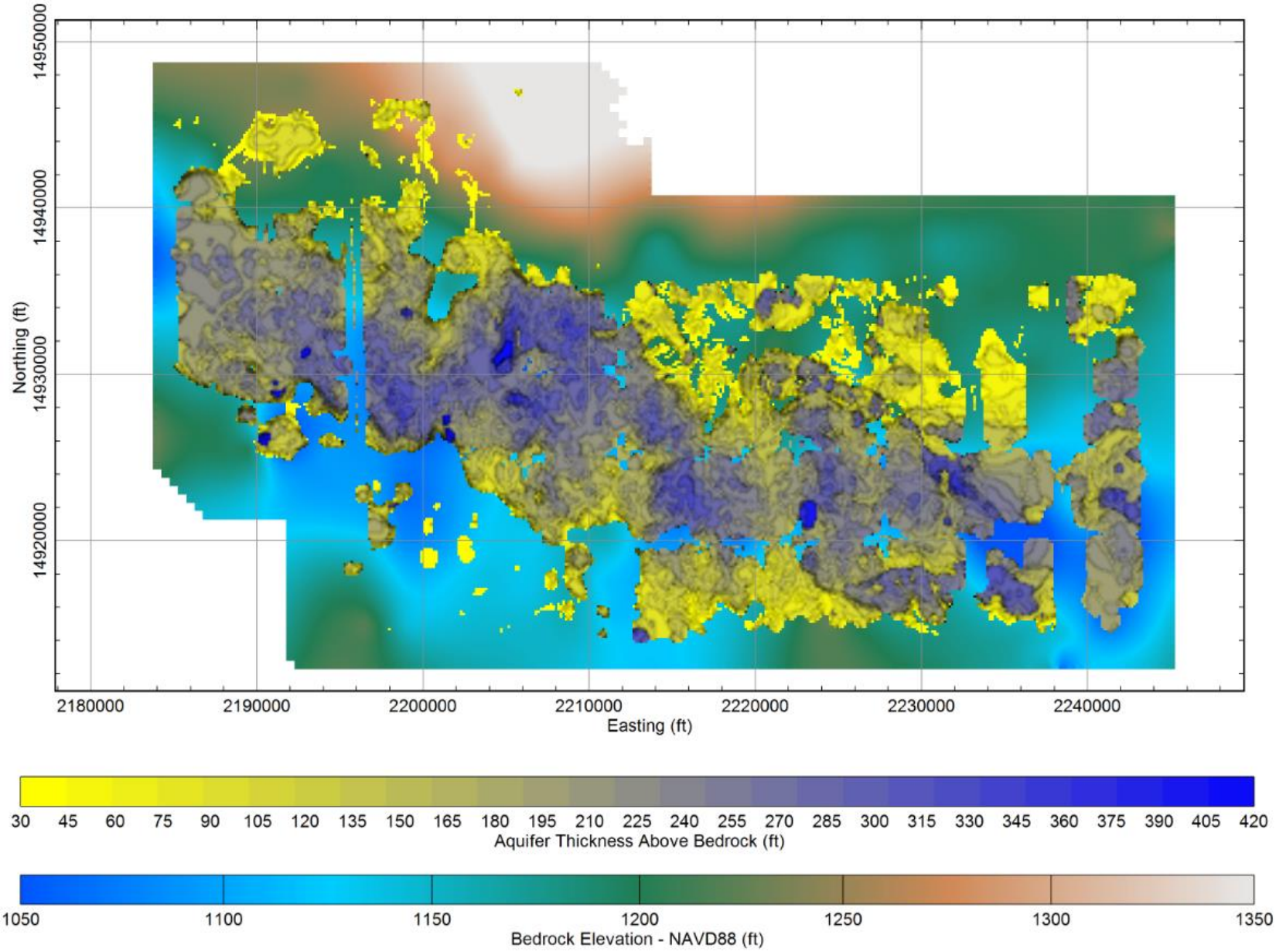


Figure A1-41: Total voxel thickness of the Quaternary deposits in the south block, with thickness ranging from 30 to over 400 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted bedrock surface.

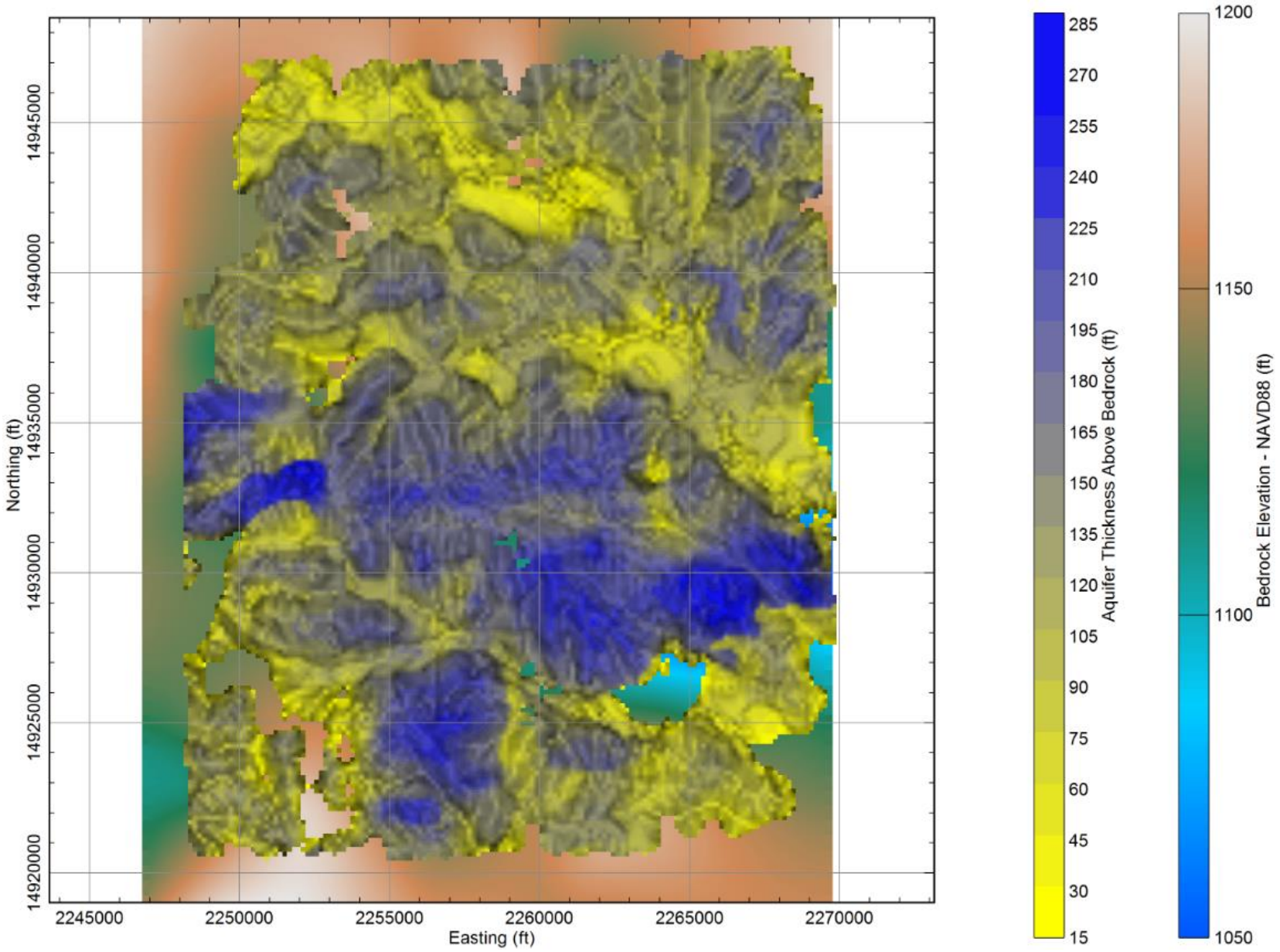


Figure A1-42: Total voxel thickness of the Quaternary deposits in the east block, with thickness ranging from 15 to 285 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted Cretaceous bedrock surface.

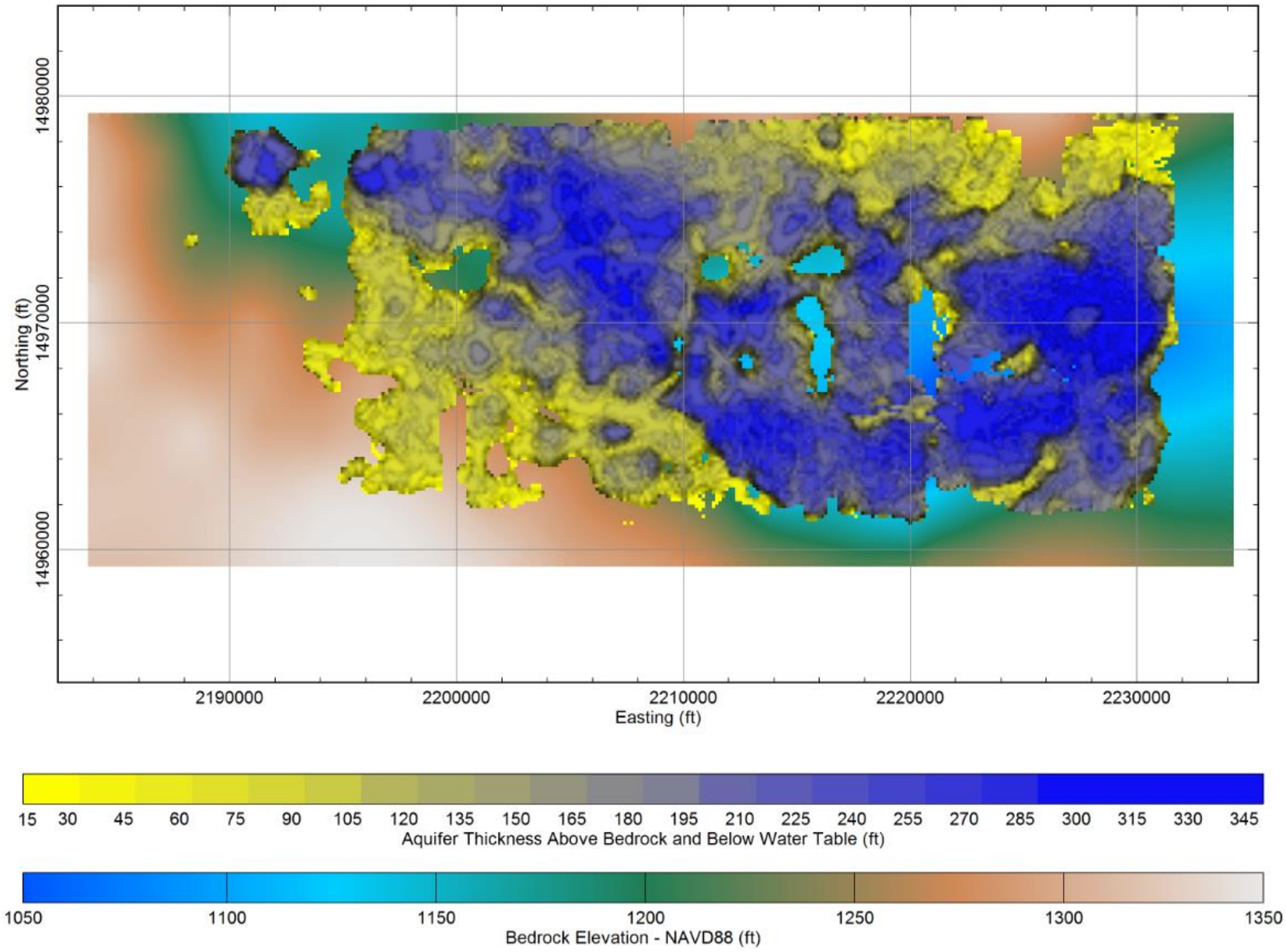


Figure A1-43: Total voxel thickness of the Quaternary deposits beneath the water level surface and above the Cretaceous bedrock in the north block, with thickness ranging from 15 to 350 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted Cretaceous bedrock surface.

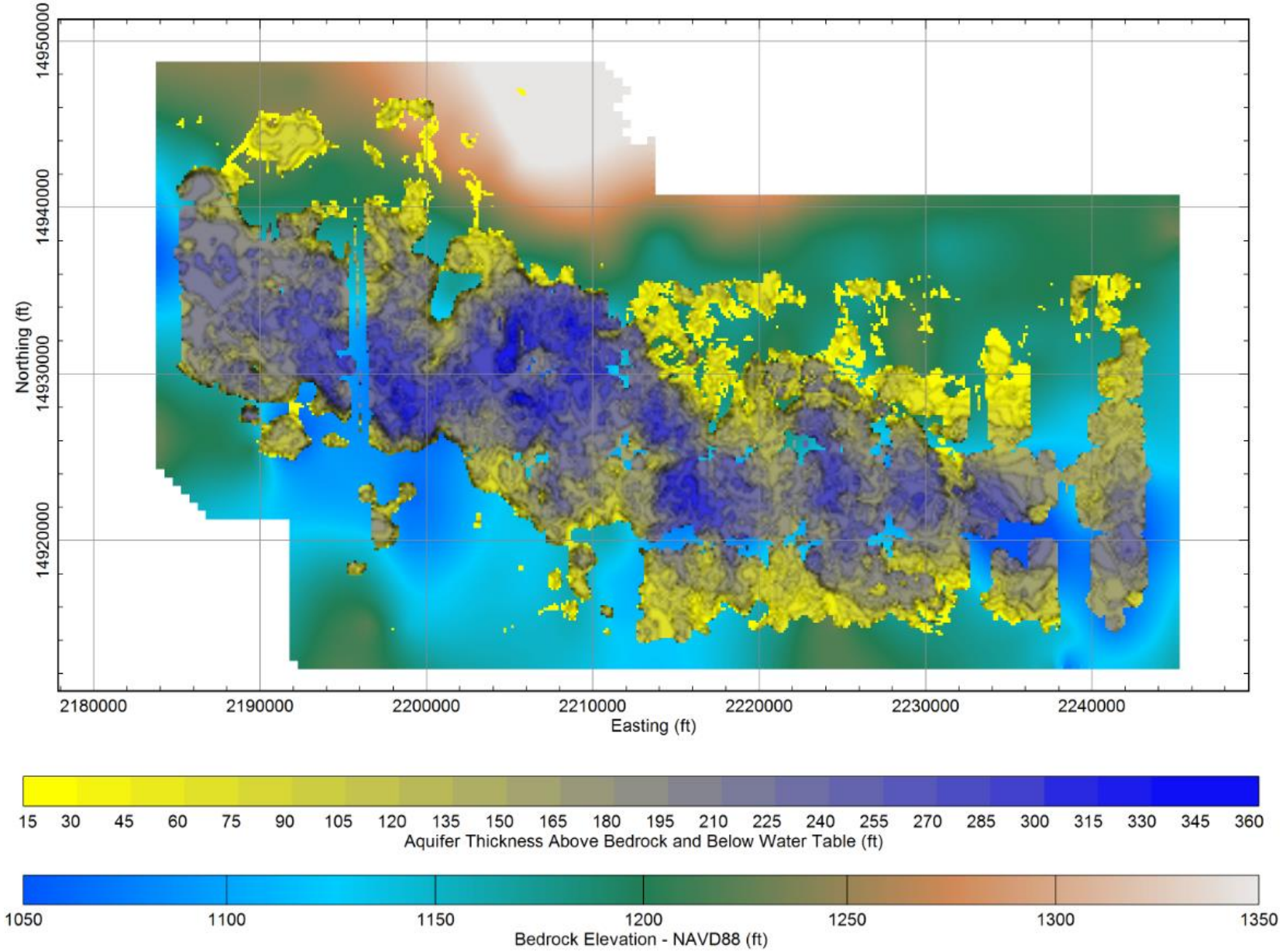


Figure A1-44: Total voxel thickness of the Quaternary deposits beneath the water level surface and above the Cretaceous bedrock in the south block, with thickness ranging from 15 to 360 feet. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted bedrock surface.

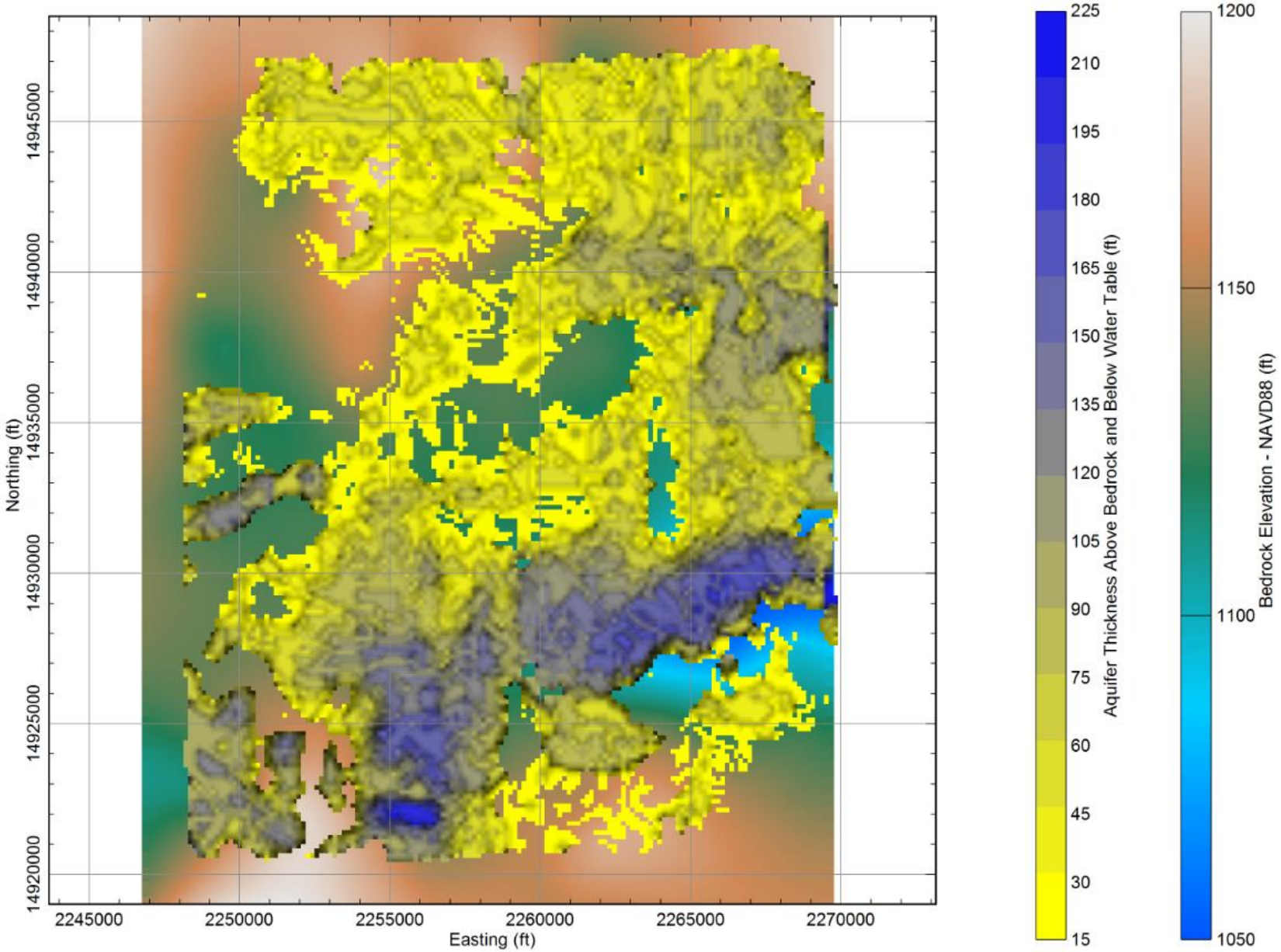


Figure A1-45: Total voxel thickness of the Quaternary deposits beneath the water level surface and above the Cretaceous bedrock in the east block, with thickness ranging from 15 to 225 ft. Blank areas indicate where less permeable to no aquifer material is present. The voxel overlies the interpreted bedrock surface.

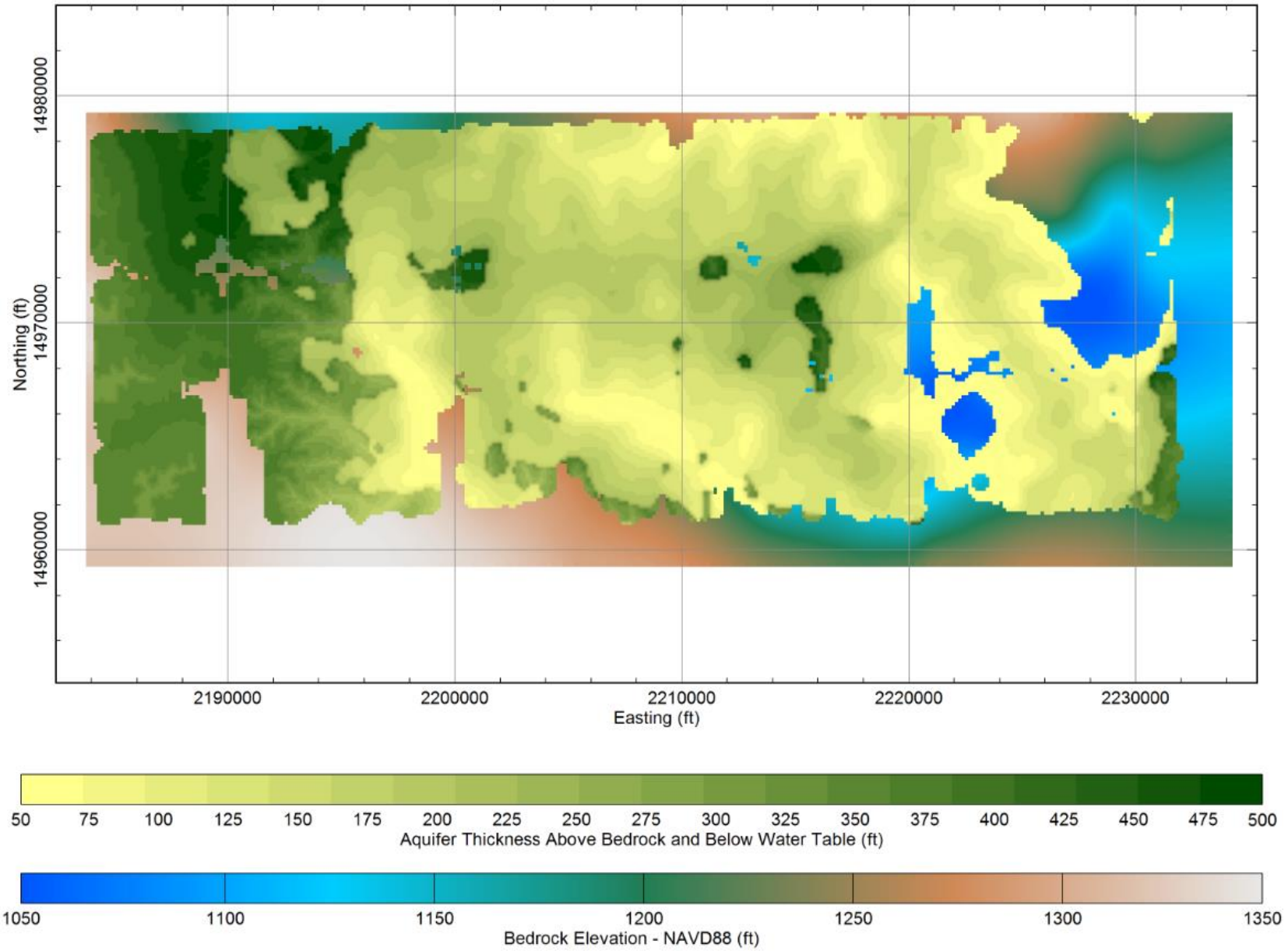


Figure A1-46: Total thickness of glacial till and loess above the principal aquifer in the north block, with thickness ranging from 0 to nearly 500 feet.

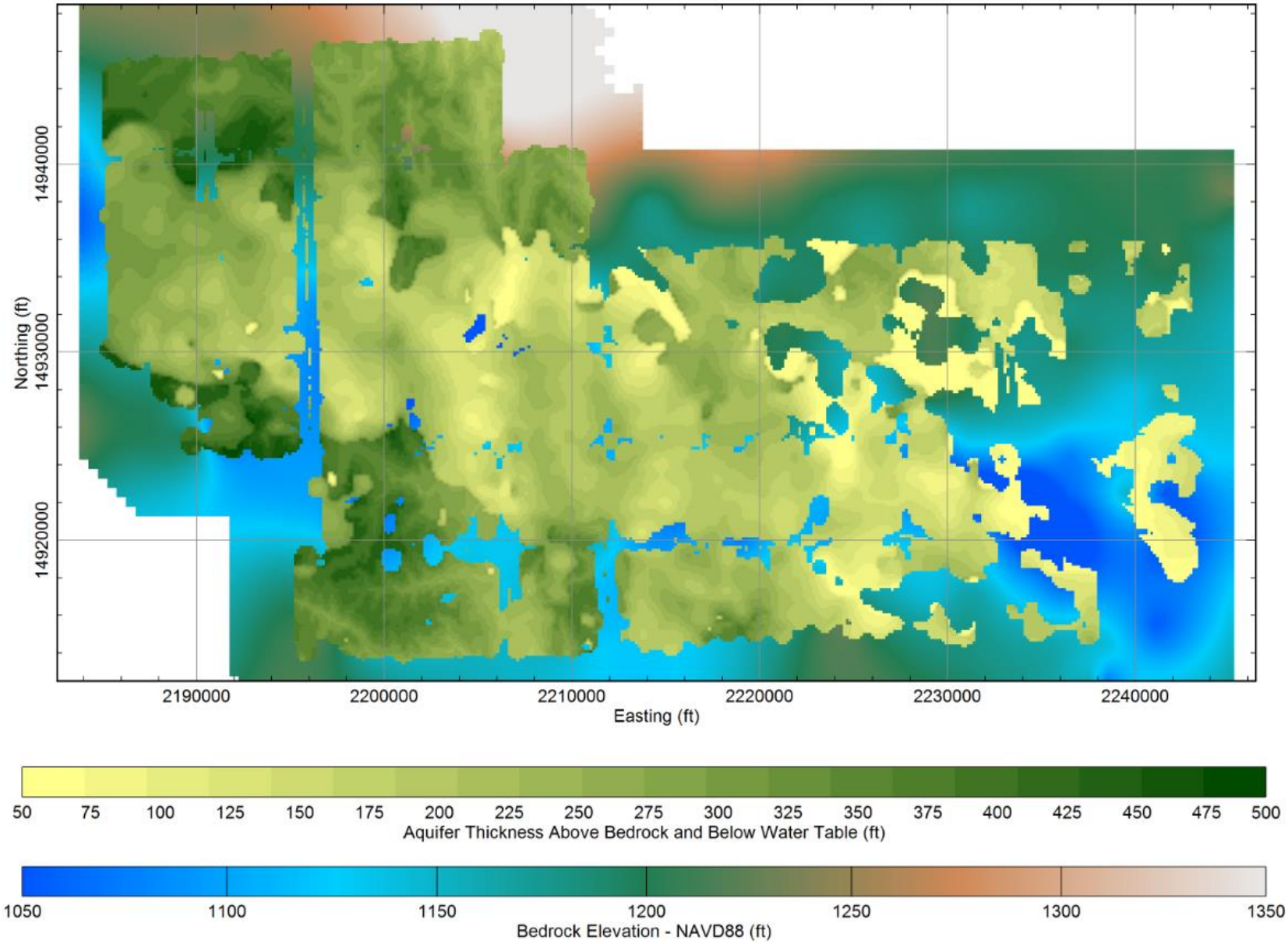


Figure A1-47: Total thickness of glacial till and loess above the principal aquifer in the south block, with thickness ranging from 0 to over 480 feet.

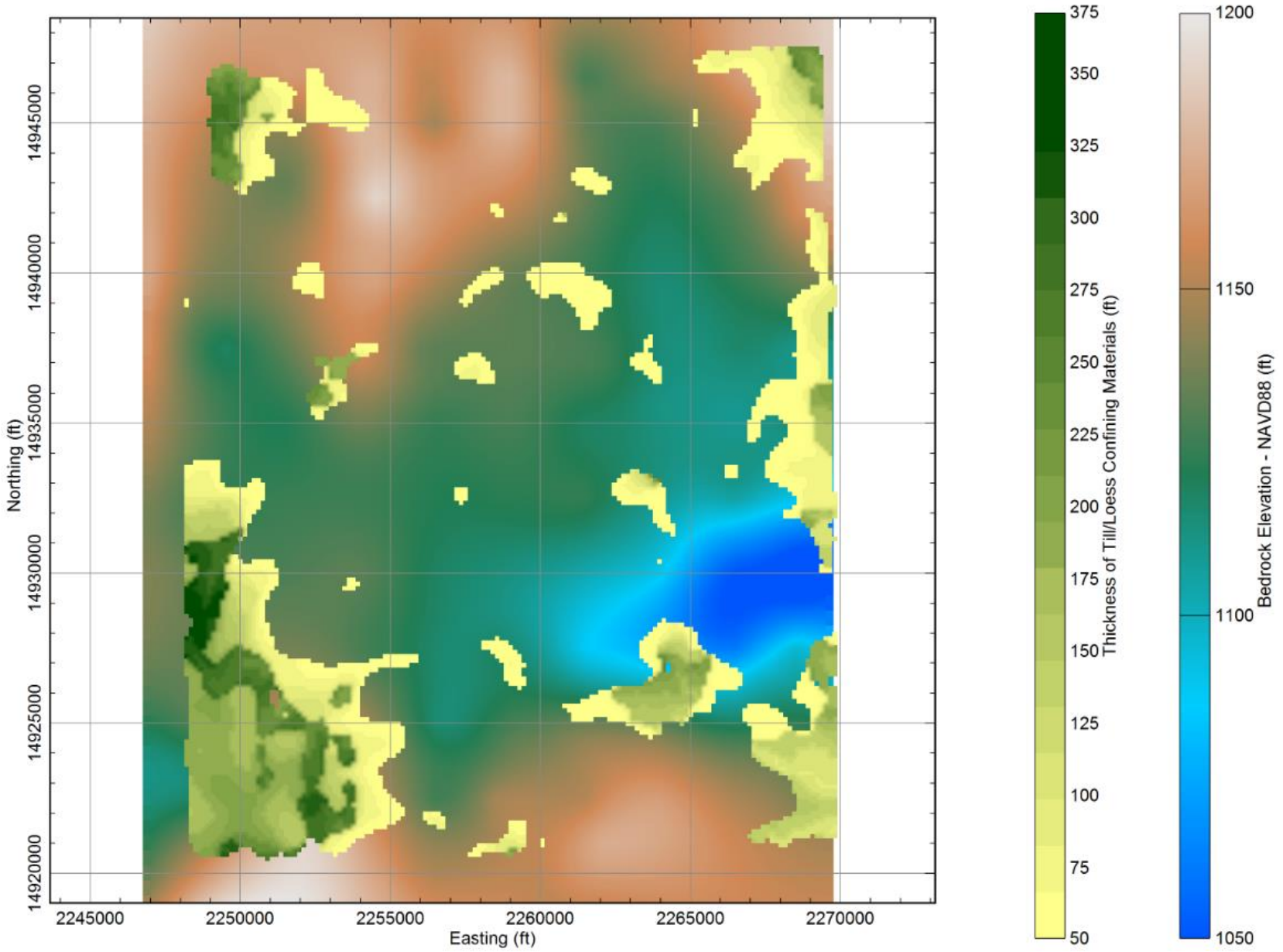


Figure A1-48: Total thickness of glacial till and loess above the principal aquifer in the east block, with thickness ranging from 0 to 375 feet.

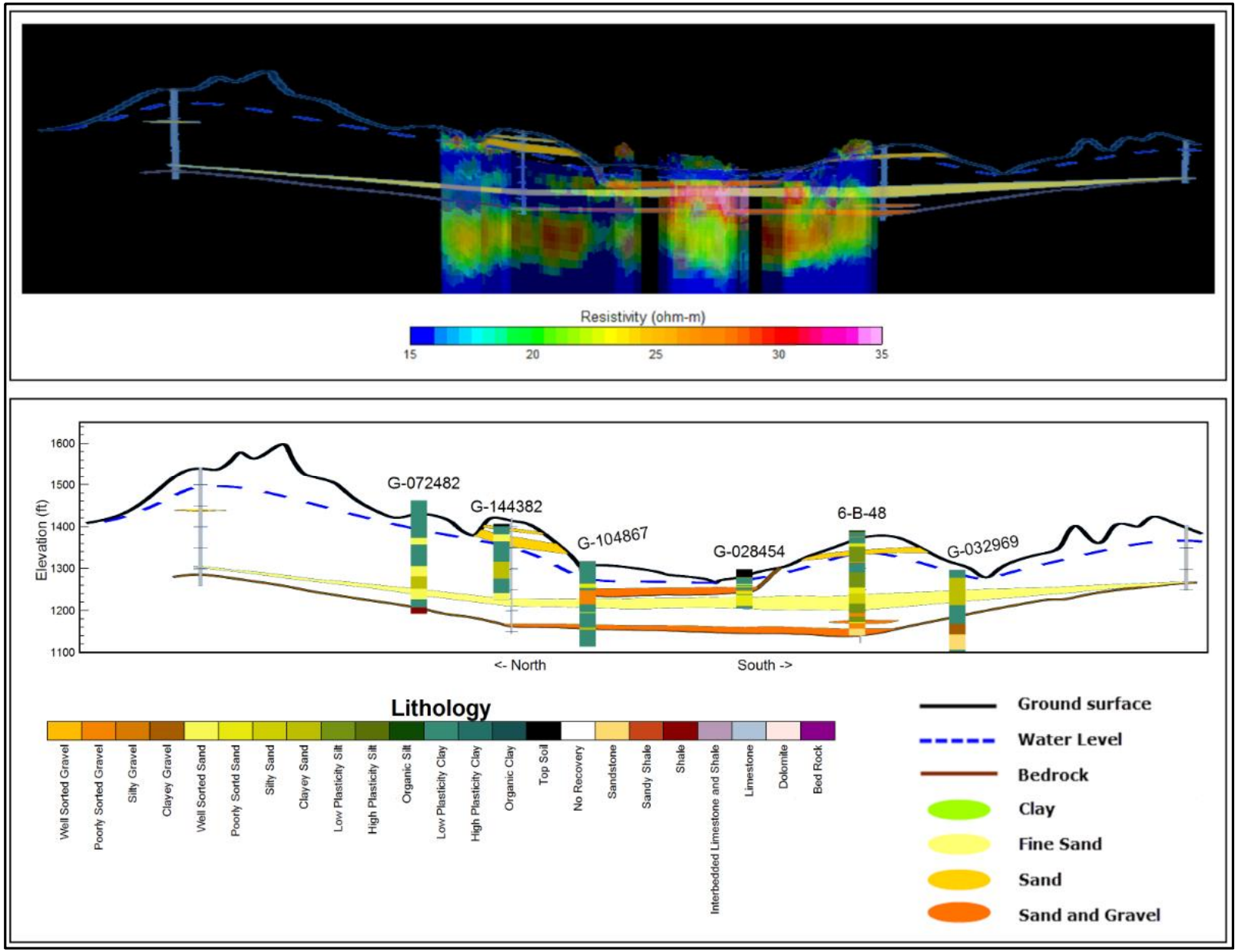


Figure A1-49: Historic cross-section SAU-205 in profile view with the AEM data in the south block. The lithologic color codes of the historic cross section are shown in the bottom right of the figure, and the lithology color codes for the CSD and NDNR boreholes are displayed on the color bar to the left. The location of the profile is shown in red on Figure 4-14 in the main body of the report.

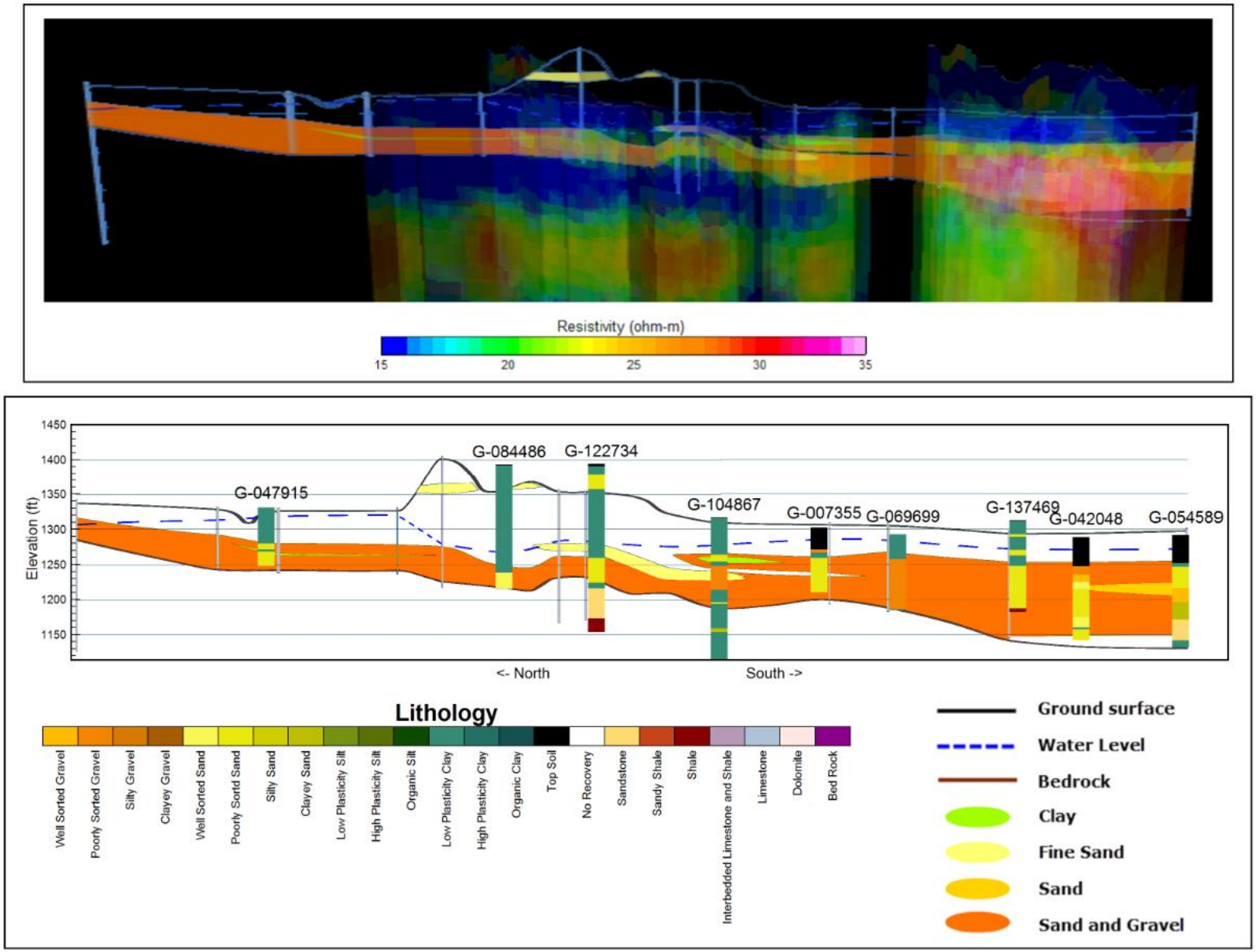


Figure A1-50: Historic cross-section SAU-216 in profile view with the AEM data in the south block. The lithologic color codes of the historic cross section are shown in the bottom right of the figure, and the lithology color codes for the CSD and NDNR boreholes are displayed on the color bar to the left. The location of the profile is shown in red on Figure 4-14 in the main body of the report.

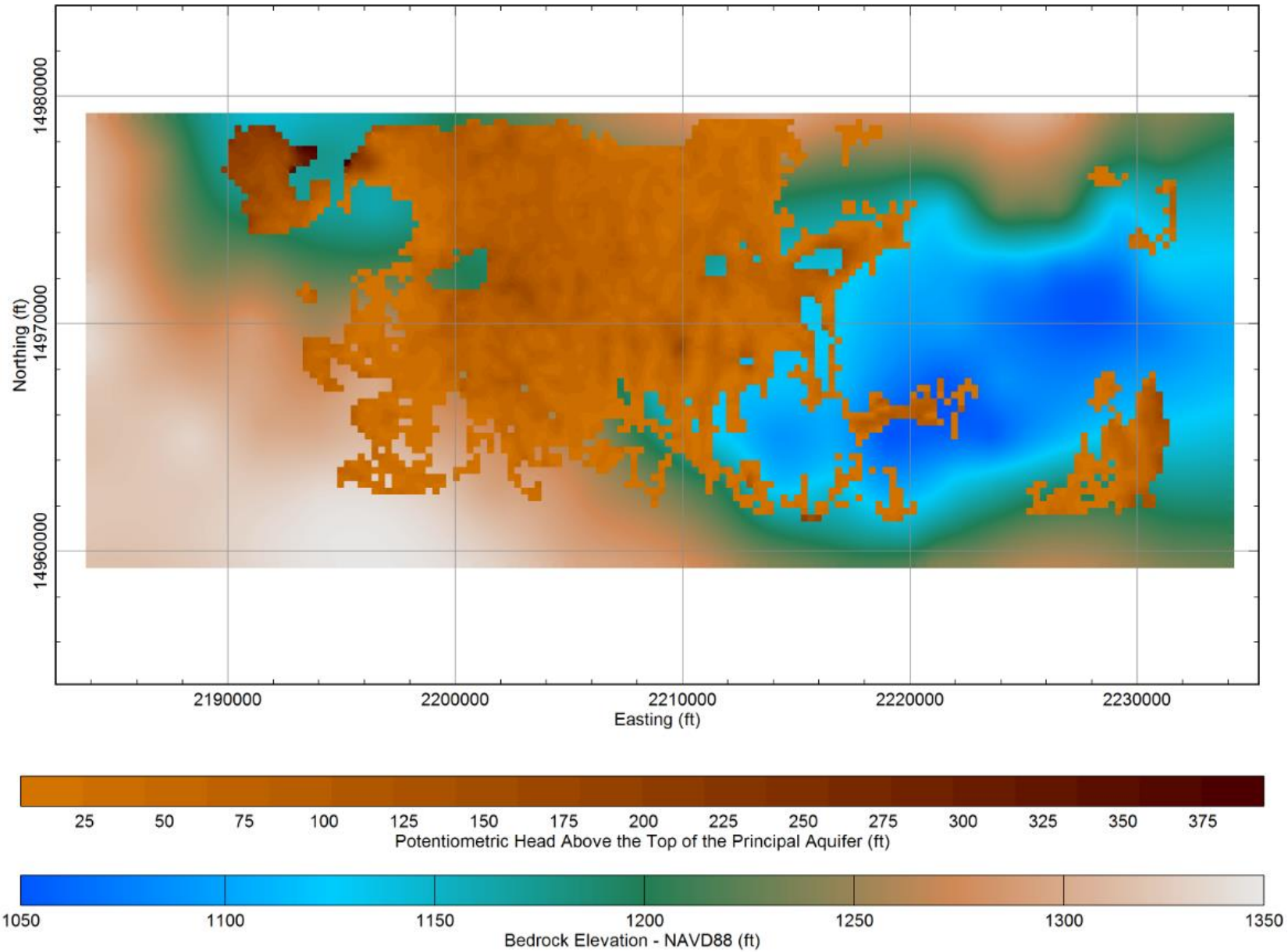


Figure A1-51: Level of potentiometric head in feet above the top of the principal aquifer in the north block based on the interpolated water level surface created from NDNR and USGS water levels.

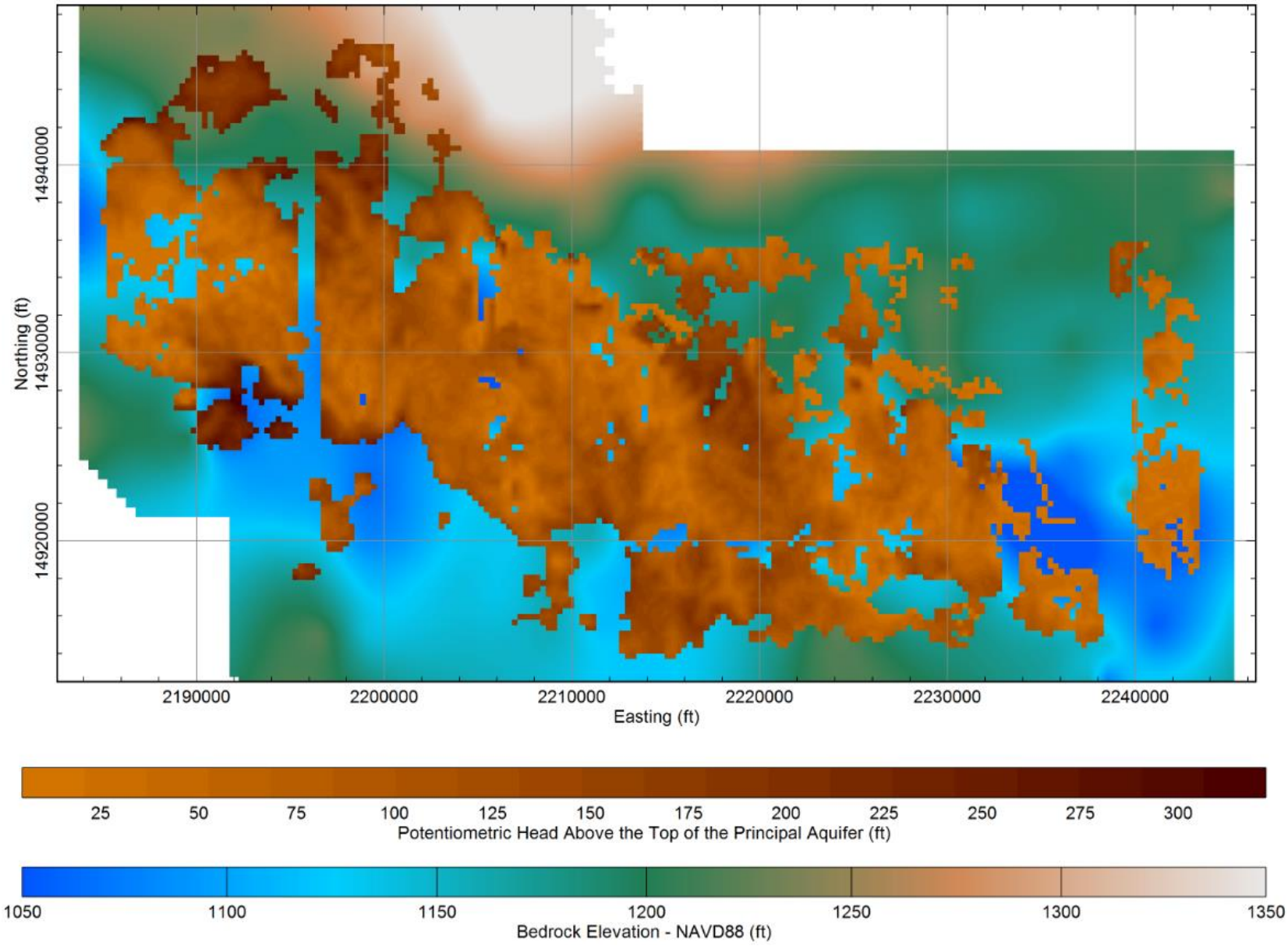


Figure A1-52: Level of potentiometric head in feet above the top of the principal aquifer in the south block based on the interpolated water level surface created from NDNR and USGS water levels.

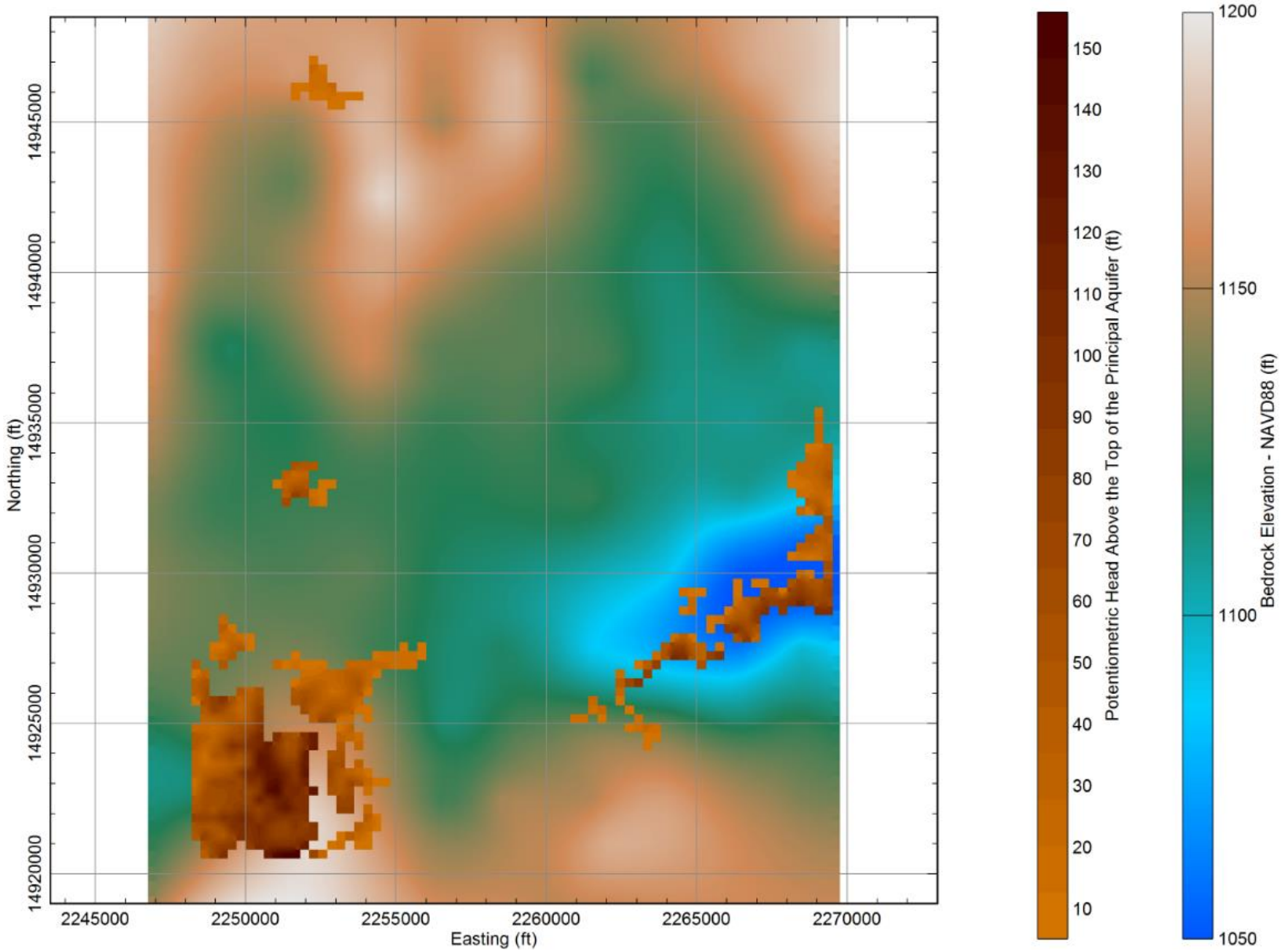


Figure A1-53: Level of potentiometric head in feet above the top of the principal aquifer in the east block based on the interpolated water level surface created from NDNR and USGS water levels.

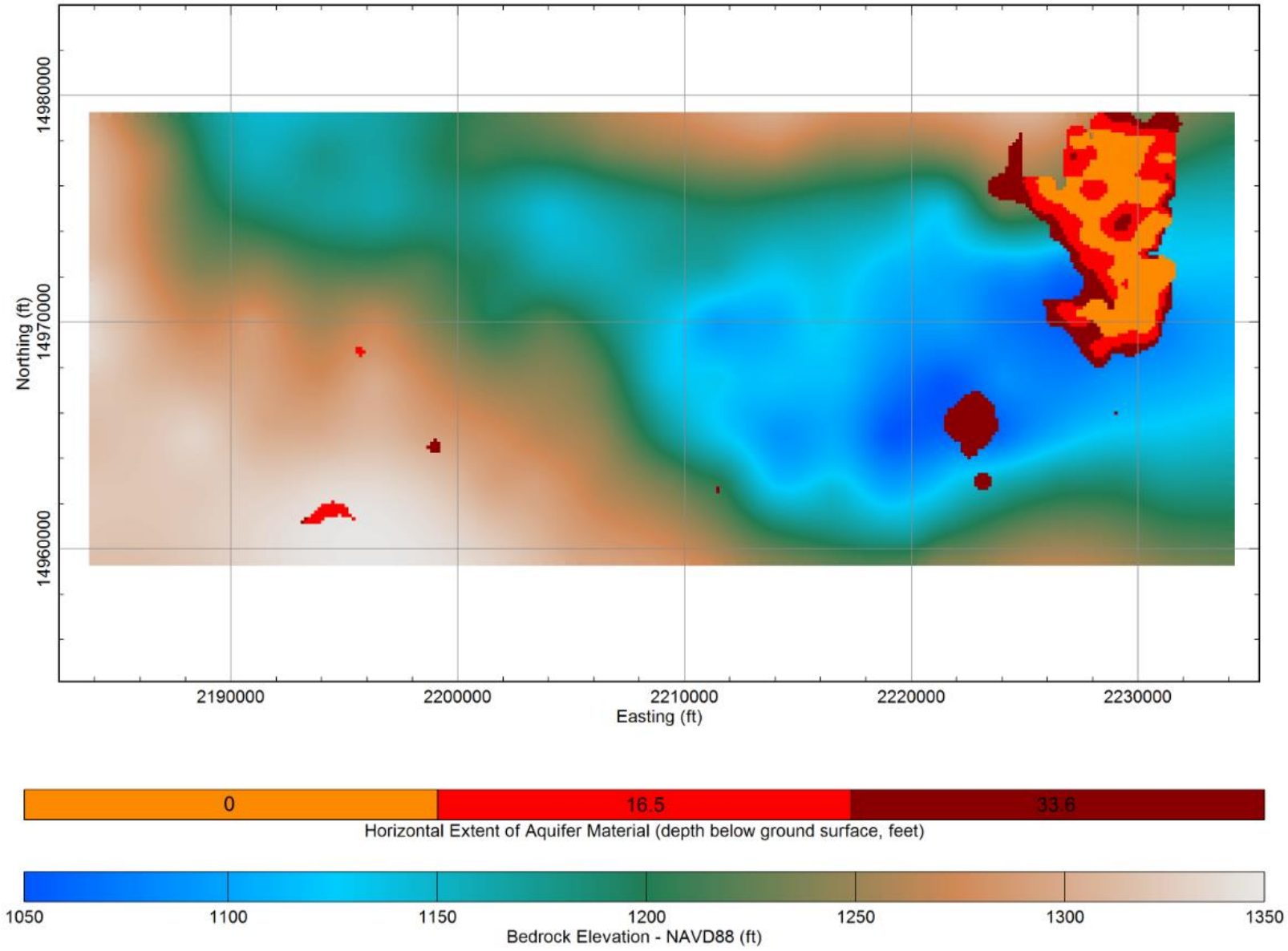


Figure A1-54: Two-dimensional map representing the areas of potential recharge in the north block. Orange areas indicate resistive material 21 ohm-m or greater at the land surface, red areas indicating resistive material within 16 ft of the land surface, and maroon areas indicating areas with resistive material within 33 ft of the land surface.

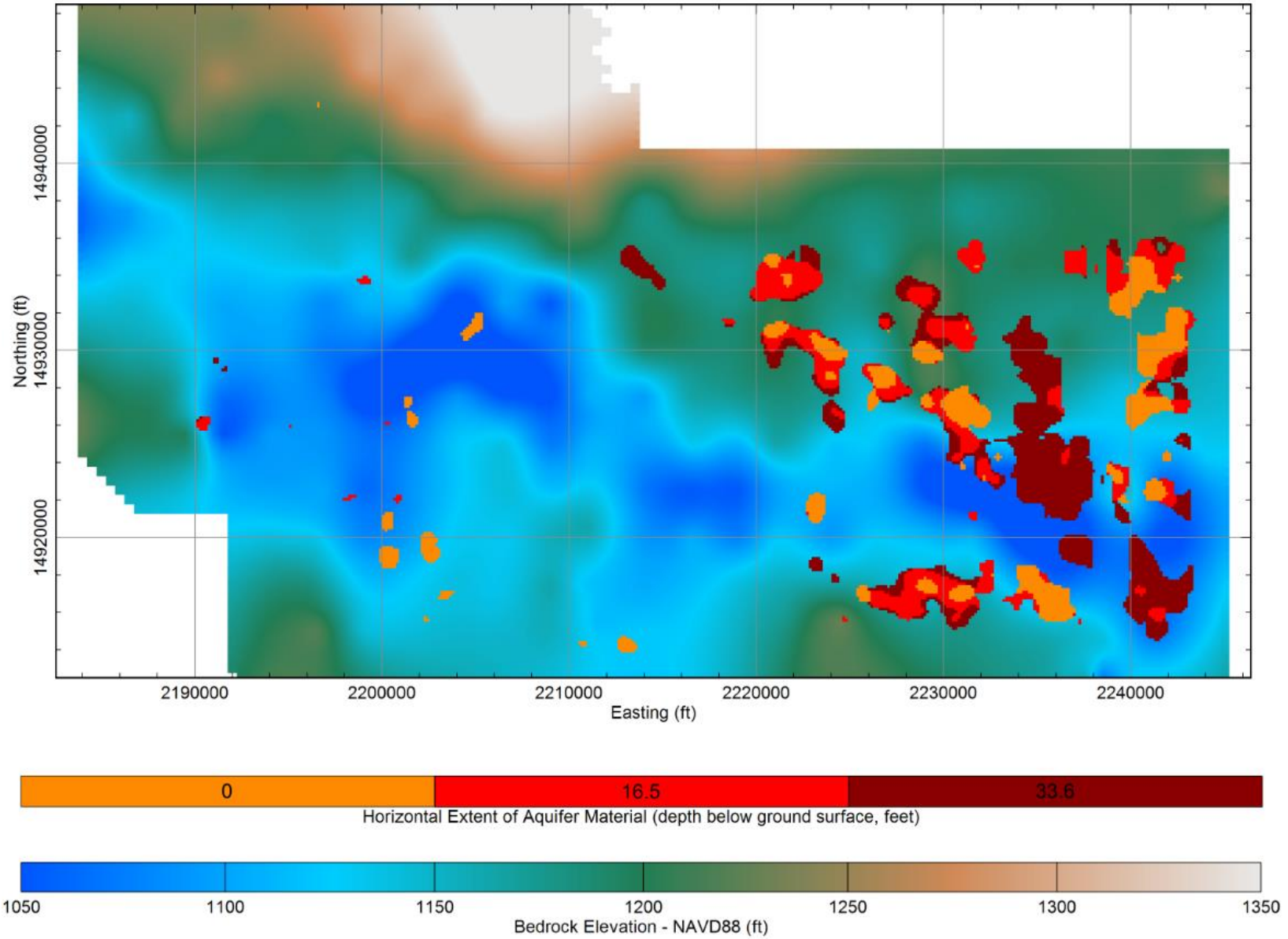


Figure A1-55: Two-dimensional map representing the areas of potential recharge in the south block. Orange areas indicate resistive material 18 ohm-m or greater at the land surface, red areas indicating resistive material within 16 ft of the land surface, and maroon areas indicating areas with resistive material within 33 ft of the land surface.

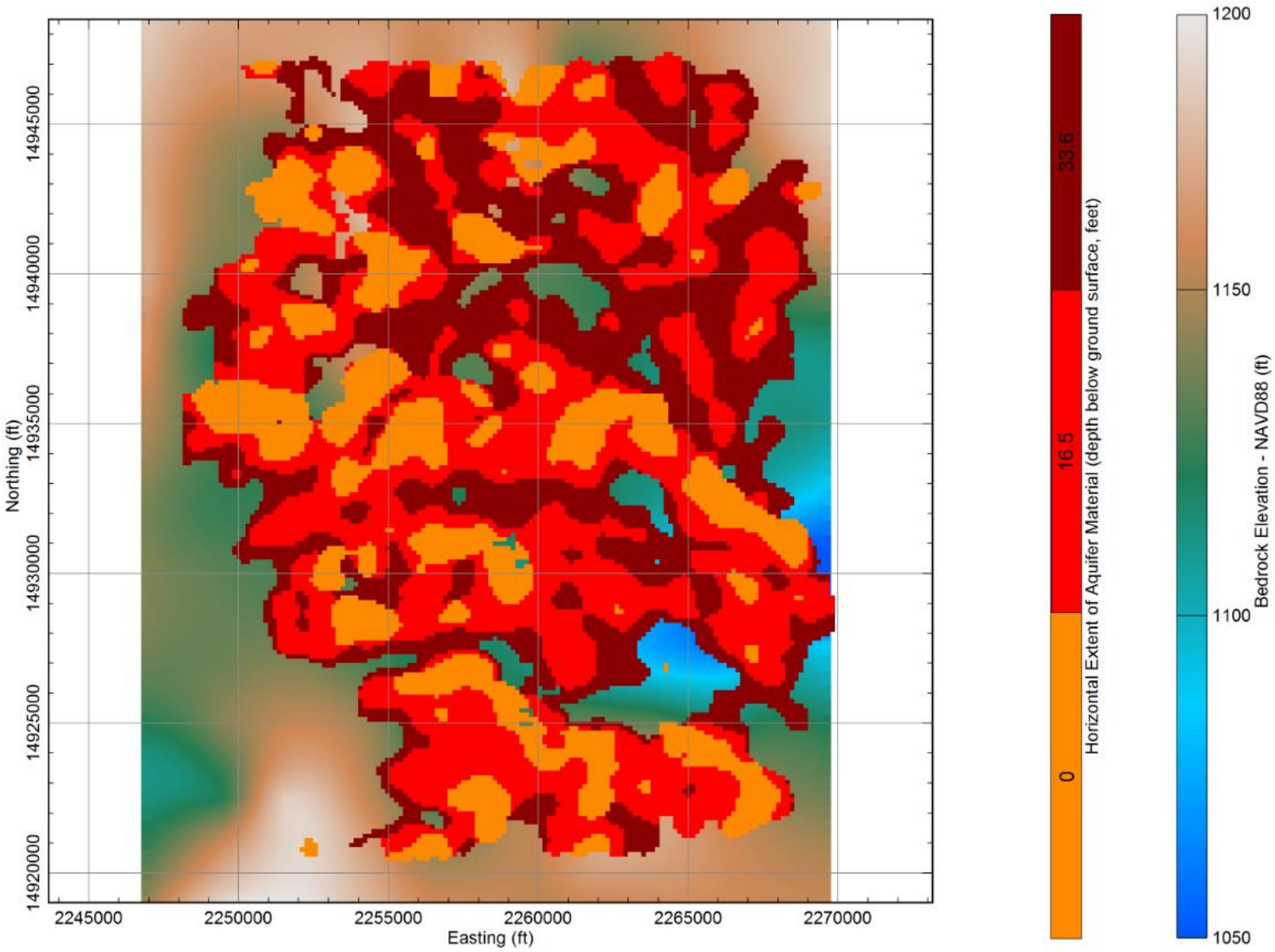


Figure A1-56: Two-dimensional map representing the areas of potential recharge in the east block. Orange areas indicate resistive material 24 ohm-m or greater at the land surface, red areas indicating resistive material within 16 ft of the land surface, and maroon areas indicating areas with resistive material within 33 ft of the land surface.

Appendix 2
Water Quality Data Interpretation and Maps

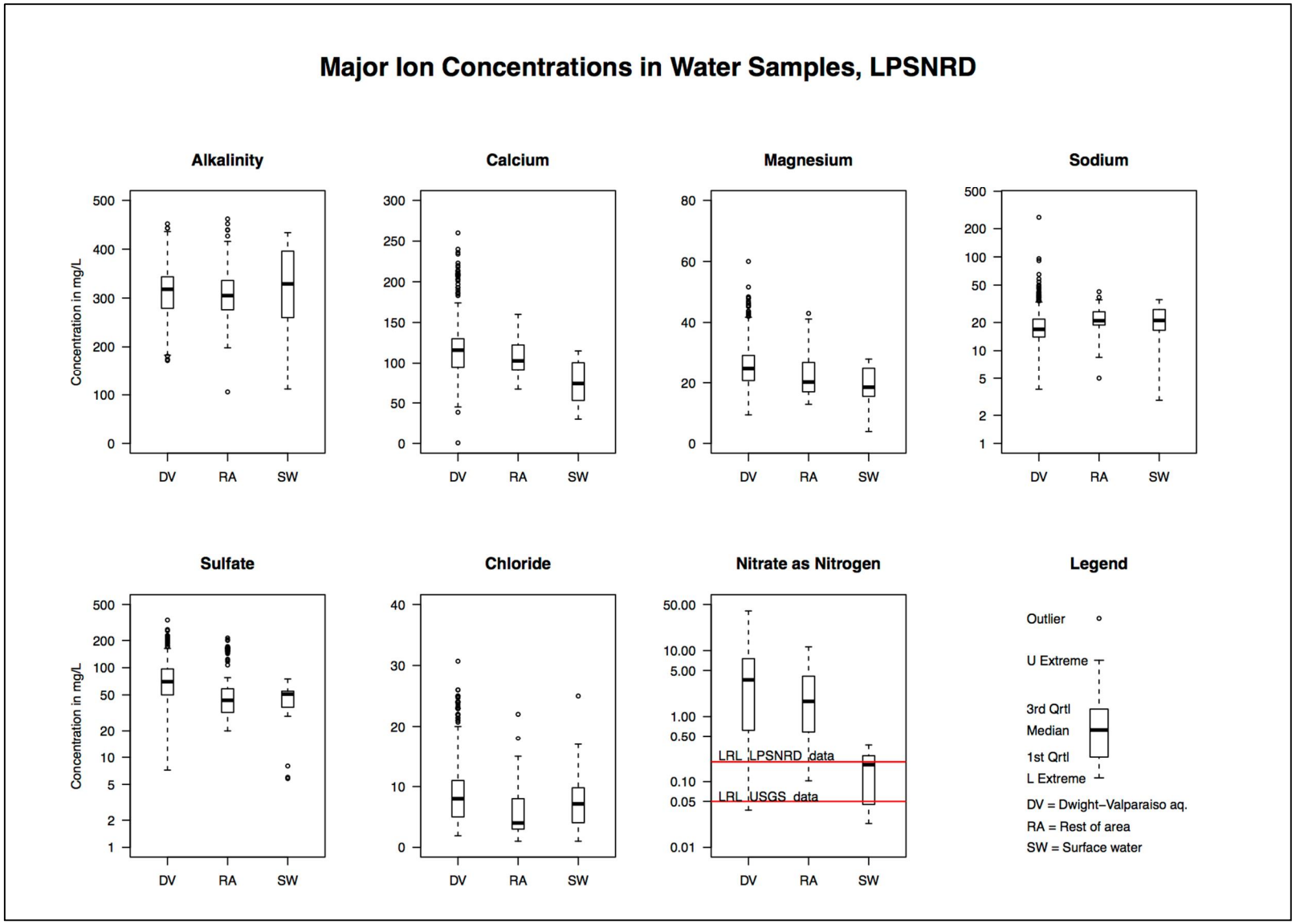


Figure A2-1: Distribution of selected chemical constituents by aquifer from water samples in or near the project area, Lower Platte South NRD (Alkalinity as CaCO3; LRL, laboratory reporting limit; LPSNRD, Lower Platte South Natural Resources District; USGS, U.S. Geological Survey; Qtrl, statistical quantile; U, upper; L, lower (data from Lower Platte South NRD and USGS; Cretaceous Dakota aquifer not shown due to small sample size).

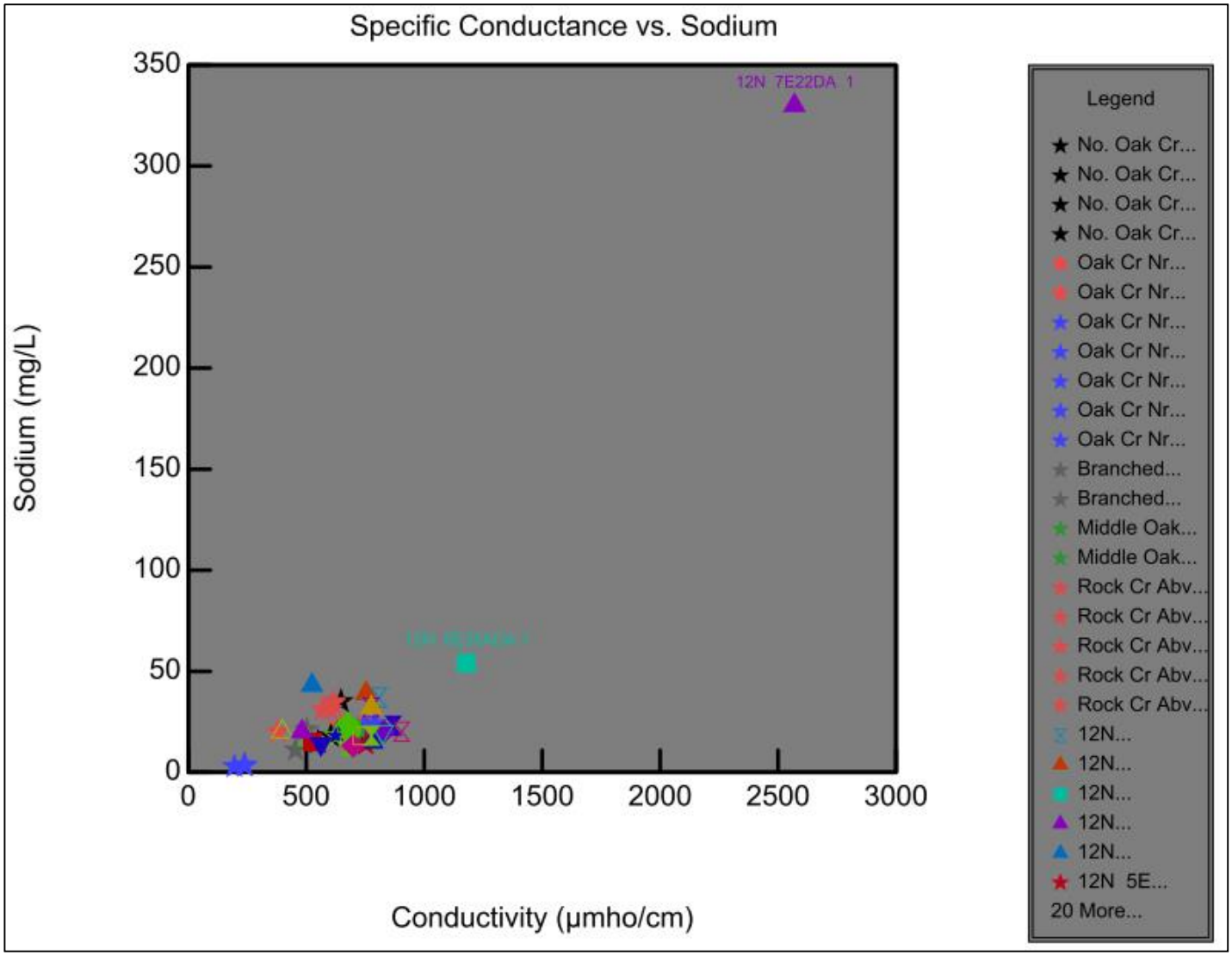


Figure A2-2: Specific conductance vs. sodium at surface and groundwater sample locations across the project area (source: USGS).

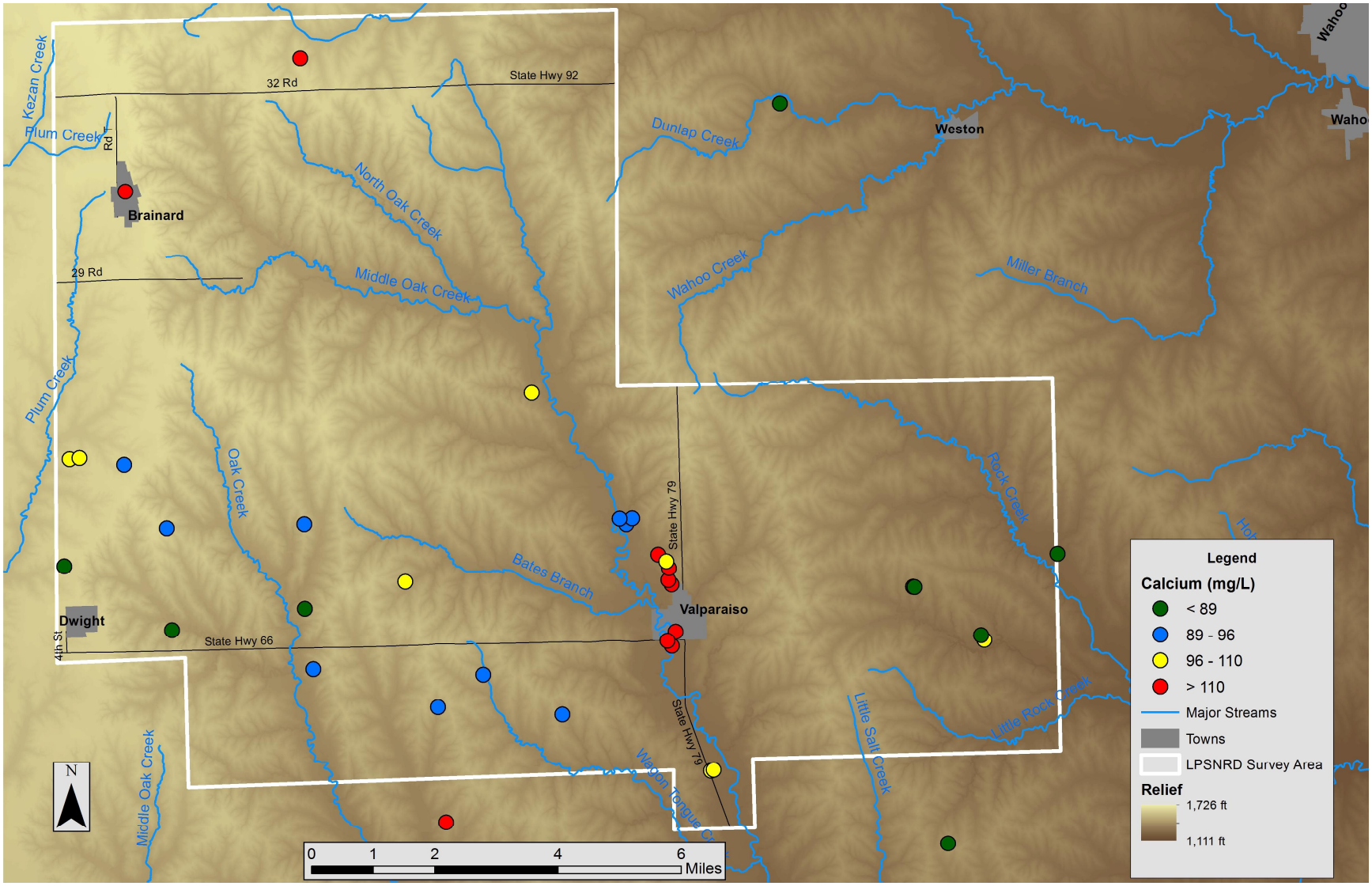


Figure A2-2: **Median concentration of calcium in groundwater samples within and near the LPSNRD (Source: LPSNRD & USGS).**

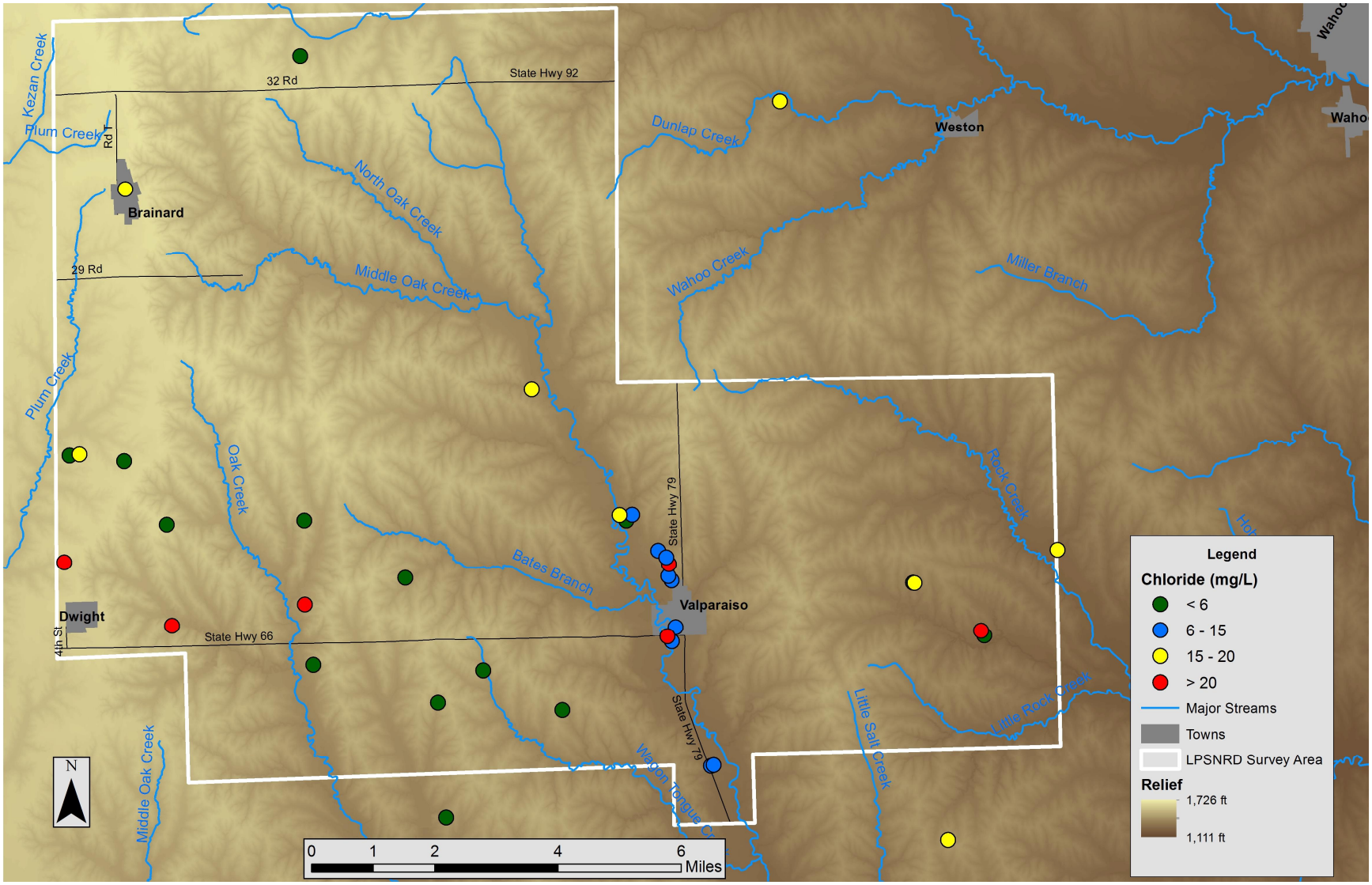


Figure A2-3: Median concentration of chloride in groundwater samples within and near the LPSNRD (Source: LPSNRD & USGS).

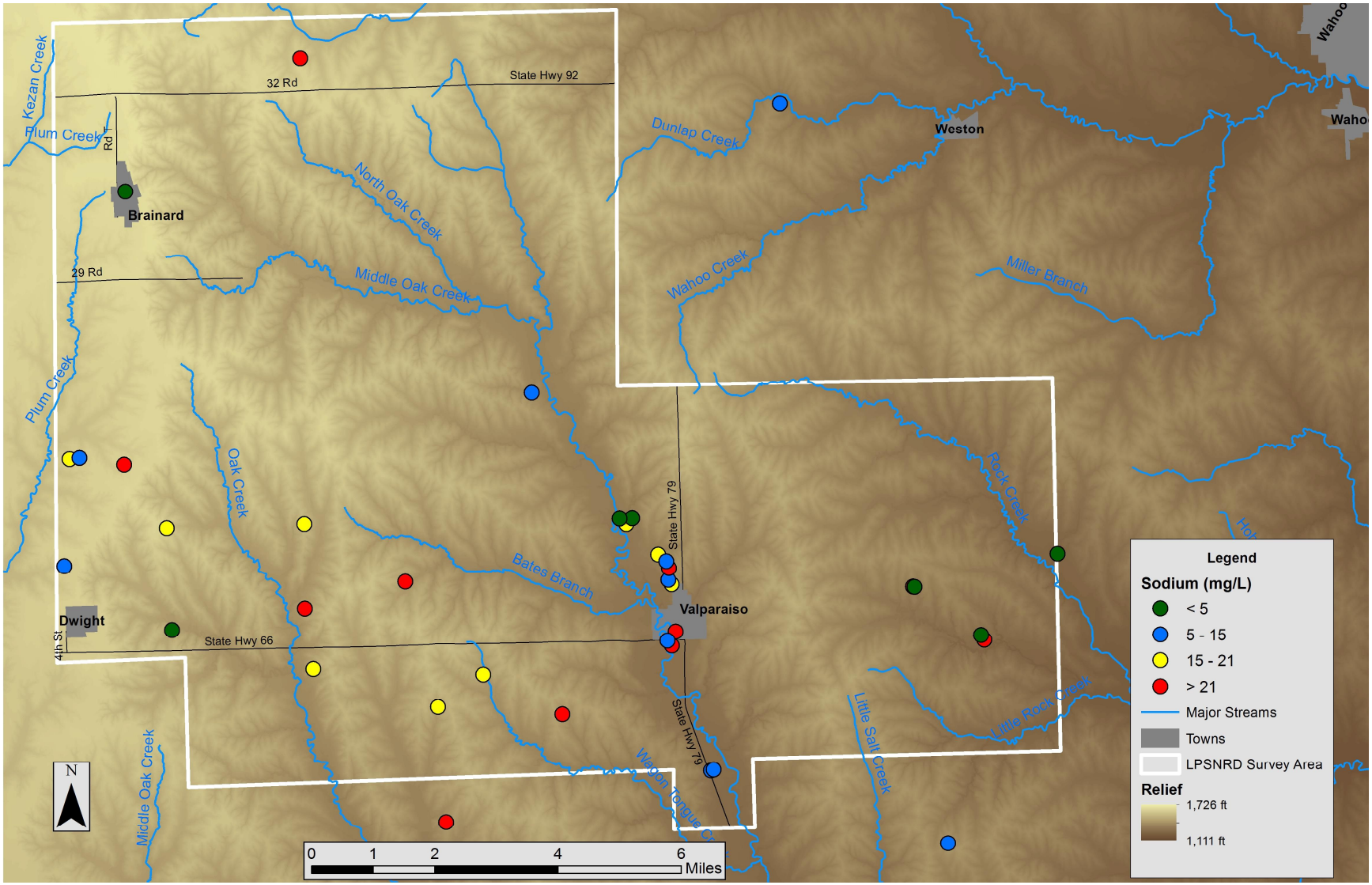


Figure A2-4: Median concentration of sodium in groundwater samples within and near the LPSNRD (Source: LPSNRD & USGS).

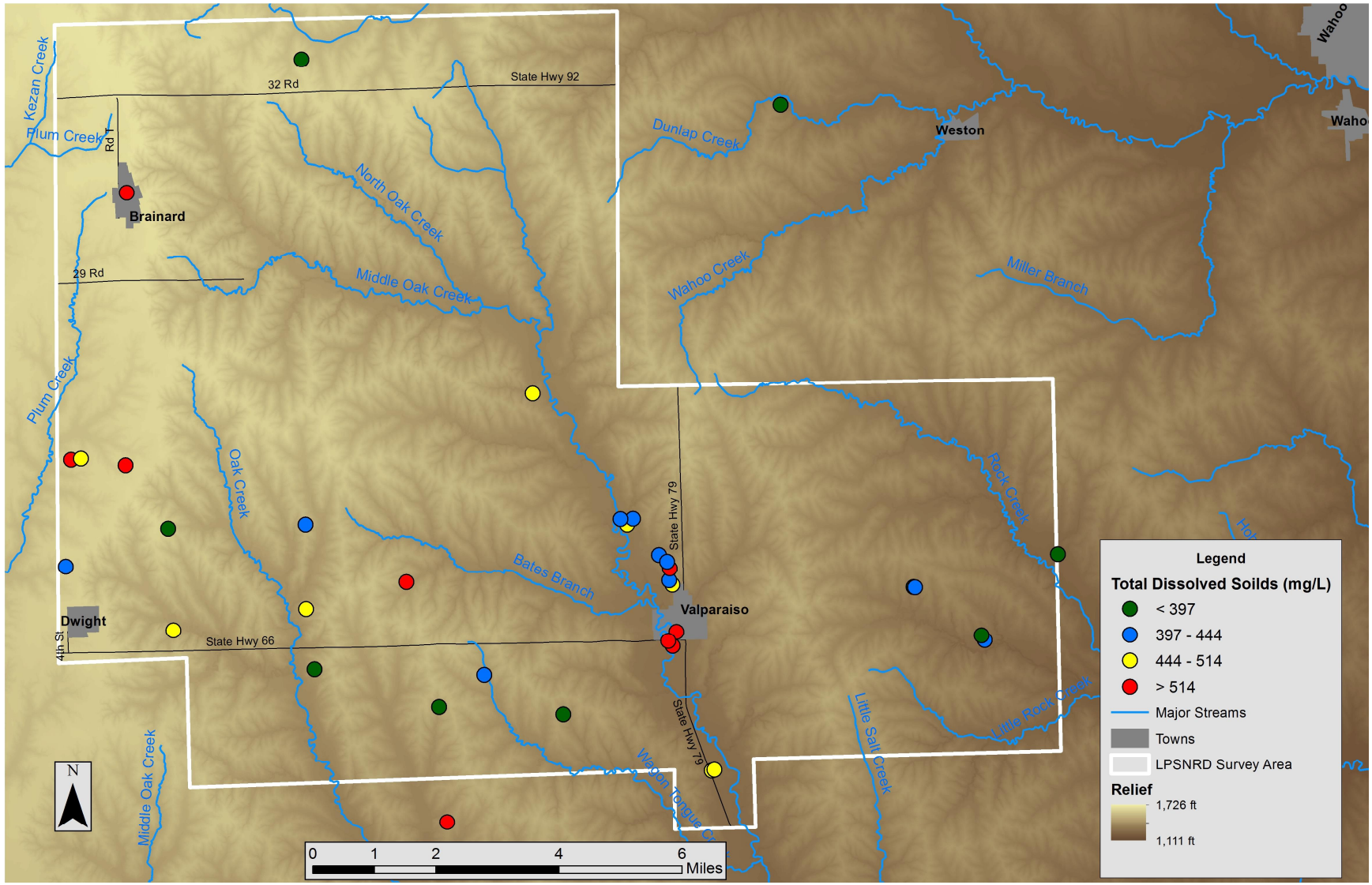


Figure A2-5: Median concentration of total dissolved solids in groundwater samples within and near the LPSNRD (Source: LPSNRD & USGS).

Table A2-1: Summary table of water quality parameters evaluated in project area wells.

Results of water-quality samples from sites in or near the project area, Lower Platte South NRD [Depth in feet; specific conductance , in microSiemens per centimeter at 25°C; pH in standard units; other units in milligrams per liter unless specified; NA, no sample or not available]

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
DV	A-017212	8/6/1996	NA	551	7.5	282	270	95	16.0	7.5	6.0	93.0	3.7	0.33	55	<0.05	0.02	400	0.5	2.37	0.66	0.33	0.27
DV	A-017212	7/29/1997	NA	604	7.3	290	270	170	19.0	7.0	8.9	60.0	6.0	0.4	3.3	0.4	0.07	400	1.6	4.24	0.78	0.30	0.19
DV	A-017212	9/22/1998	NA	644	7.5	230	268	62	19.0	11.0	6.1	62.7	NA	0.68	NA	NA	NA	450	4	1.55	0.78	0.48	0.44
DV	A-017212	7/14/1999	NA	669	7.72	357	273	107	21.3	13.9	7.4	59.0	6.0	0.2	25	<0.05	0.03	480	3.5	2.67	0.88	0.60	0.45
DV	A-017212	4/27/2000	NA	649	7.88	354	276	106	21.1	13.7	6.4	58.0	5.0	0.2	28	<0.05	0.02	472	4	2.64	0.87	0.60	0.45
DV	A-017212	7/13/2000	NA	710	7.7	422	292	129	23.9	14.2	8.0	72.0	8.0	0.2	32	<0.05	0.03	555	7.1	3.22	0.98	0.62	0.43
DV	A-017212	10/3/2000	NA	675	7.61	371	287	111	22.3	13.9	6.9	63.0	7.0	0.3	27	<0.05	0.02	467	6.1	2.77	0.92	0.60	0.45
DV	A-017212	1/22/2001	NA	652	7.48	379	283	114	22.7	14.4	6.8	64.0	7.0	0.3	28	<0.05	0.03	467	5.8	2.84	0.93	0.63	0.46
DV	A-017212	7/11/2001	NA	712	7.4	368	290	111	21.4	15.5	6.9	71.0	7.0	0.2	26	<0.05	0.06	487	5.8	2.77	0.88	0.67	0.50
DV	A-017212	10/30/2001	NA	651	7.57	395	242	116	25.2	15.5	7.4	71.0	8.0	0.2	28	<0.05	0.03	417	6.3	2.89	1.04	0.67	0.48
DV	A-017212	1/10/2002	NA	673	7.45	365	275	108	22.8	14.7	7.7	64.0	6.0	0.2	27	<0.05	0.02	515	5.6	2.69	0.94	0.64	0.47
DV	A-017212	4/15/2002	NA	700	7.81	393	241	119	22.5	14.9	7.4	58.0	6.0	0.2	30	<0.05	0.02	450	5.7	2.97	0.93	0.65	0.46
DV	A-017212	7/23/2002	NA	783	7.3	372	281	114	21.1	14.5	7.0	84.2	8.7	0.3	56.7	<0.05	0.032	564	8	2.84	0.87	0.63	0.46
DV	A-017212	11/4/2002	NA	712	7.2	371	284	114	20.9	14.2	7.0	70.6	7.3	0.3	55.6	<0.05	0.021	496	4.4	2.84	0.86	0.62	0.45
DV	A-017212	1/9/2003	NA	722	7.4	357	267	110	19.9	13.4	7.0	66.7	6.3	0.2	55.3	<0.05	0.025	384	6	2.74	0.82	0.58	0.44
DV	A-017212	5/6/2003	NA	794	7.4	364	275	111	20.9	14.0	7.0	75.8	7.8	0.3	55.5	<0.05	0.03	488	7	2.77	0.86	0.61	0.45
DV	A-017212	7/24/2003	NA	783	7.48	416	292	125	24.6	15.5	7.6	81.0	8.0	NA	24	<0.05	0.03	570	8.9	3.12	1.01	0.67	0.47
DV	A-017212	10/8/2003	NA	768	7.2	423	281	127	25.2	15.5	8.1	83.0	9.0	0.2	23	<0.05	0.02	528	9	3.17	1.04	0.67	0.46
DV	A-017212	7/28/2004	NA	824	7.3	376	264	112	23.1	14.8	7.0	67.5	8.5	0.3	57.7	<0.05	0.024	508	8.6	2.79	0.95	0.64	0.47
DV	A-017212	4/12/2005	NA	644	7.2	339	257	104	19.4	13.3	7.0	49.4	4.8	0.4	62.1	<0.05	0.012	408	3.8	2.59	0.80	0.58	0.44
DV	A-017212	11/1/2005	NA	689	7.58	369	277	112	21.6	14.3	7.4	51.0	5.0	0.5	28	<0.05	0.01	408	6.2	2.79	0.89	0.62	0.46
DV	A-017212	4/25/2006	NA	644	7.53	352	278	107	20.7	14.0	7.2	56.0	5.0	0.3	25	<0.05	0.01	412	4.6	2.67	0.85	0.61	0.46
DV	A-017212	10/16/2006	NA	654	8.21	369	282	112	21.7	14.1	7.0	63.0	7.0	0.3	26	<0.05	0.01	434	5.3	2.79	0.89	0.61	0.45
DV	A-017212	4/27/2007	NA	655	7.78	470	276	104.1	20.6	18.8	7.3	58.0	6.0	0.3	26.64	<0.05	0.01	438	5.1	2.60	0.85	0.82	0.62
DV	A-017212	9/4/2007	NA	706	8.04	296	272	89	17.7	11.3	NA	64.0	7.0	0.2	NA	<0.05	0.01	426	6.5	2.22	0.73	0.49	0.40
DV	A-017212	5/14/2008	NA	585	7.4	329	266	100.06	19.3	14.1	6.5	57.0	6.0	0.2	25.08	<0.05	0.01	430	4	2.50	0.79	0.61	0.48
DV	A-017212	12/10/2008	NA	610	7.52	296	270	88.95	17.9	14.1	7.0	52.0	5.0	0.3	22.65	<0.05	<0.01	438	3.3	2.22	0.74	0.61	0.50
DV	A-017212	5/12/2009	NA	568	7.33	277	269	85.87	15.2	12.4	5.6	45.0	4.0	0.3	23.13	<0.05	<0.01	418	2.3	2.14	0.62	0.54	0.46
DV	A-017212	11/5/2009	NA	657	7.44	293	264	89.05	17.2	12.4	6.1	54.0	5.0	0.3	23.36	<0.05	<0.01	406	5.5	2.22	0.71	0.54	0.45
DV	A-017212	5/26/2010	NA	613	7.36	308	260	94.84	17.2	12.9	6.6	48.0	5.0	0.3	23.6	0.01	0.01	372	3.4	2.37	0.71	0.56	0.45
DV	A-017212	11/9/2010	NA	628	7.41	327	274	100.98	18.2	12.7	6.4	59.0	6.0	0.3	25.26	<0.05	<0.01	358	5.3	2.52	0.75	0.55	0.43
DV	A-017212	6/8/2011	NA	592	7.34	278	264	84.63	16.0	11.9	6.0	45.0	4.0	0.3	24.79	<0.05	<0.01	384	2.1	2.11	0.66	0.52	0.44
DV	A-017212	11/1/2011	NA	596	7.45	255	267	74.48	17.1	22.1	3.2	51.0	5.0	0.3	14.71	<0.05	0.01	398	2.6	1.86	0.70	0.96	0.85
DV	A-017212	5/16/2012	NA	703	7.21	311	278	96.47	17.4	31.2	4.2	71.0	14.0	0.2	14.8	<0.05	0.18	450	2.1	2.41	0.72	1.36	1.09
DV	A-017212	5/23/2012	NA	602	7.47	311	262	96.47	16.1	31.2	4.2	71.0	3.8	0.3	14.8	<0.05	0.03	384	1.4	2.41	0.66	1.36	1.10
DV	A-017212	5/23/2012	NA	703	7.21	278.8	278	85.14	17.4	11.8	6.3	43.7	14.0	0.2	24.96	<0.05	0.18	450	2.1	2.12	0.72	0.51	0.43
DV	A-017212	12/3/2012	NA	603	7.46	305.7	265	93.73	17.4	12.6	6.4	48.4	4.8	0.2	26.96	<0.05	<0.01	342	2.45	2.34	0.72	0.55	0.44
DV	A-017212	5/23/2013	NA	596	7.55	285.1	261	88.24	15.7	12.1	6.1	40.2	3.6	0.3	25.35	<0.05	<0.01	350	1.65	2.20	0.65	0.52	0.44
DV	A-017212	10/1/2013	NA	609	7.5	313.8	268	95.94	18.0	13.0	6.4	47.1	5.4	0.3	24.36	<0.05	0.01	388	3.82	2.39	0.74	0.56	0.45
DV	G-007355	4/21/2003	92	925	7.1	452	376	135	27.9	24.9	9.0	90.6	12.4	0.3	41.4	<0.05	0.297	576	0.4	3.37	1.15	1.08	0.72
DV	G-007355	8/21/2003	92	1131	7.06	627	452	185	39.0	41.8	12.6	134.0	26.0	0.4	14	<0.05	0.43	720	4.9	4.62	1.60	1.82	1.03
DV	G-007355	10/8/2003	92	855	7	455	382	133	29.3	25.0	9.1	85.0	12.0	0.3	16	<0.05	0.68	502	0.5	3.32	1.21	1.09	0.72
DV	G-007355	7/28/2004	92	1380	7.1	584	443	174	39.2	44.9	12.0	172.0	30.7	0.2	36.8	<0.05	0.812	812	5.1	4.34	1.61	1.95	1.13
DV	G-007355	7/11/2006	92	957	7.87	502	413	147	32.7	31.6	10.8	99.0	14.0	0.2	18	<0.05	0.81	588	1.4	3.67	1.35	1.37	0.87
DV	G-007355	7/9/2009	92	842	7.29	438	379	128.06	28.8	28.5	9.2	97.0	8.0	0.3	17.46	<0.05	0.57	576	2.1	3.20	1.18	1.24	0.84
DV	G-007355	7/25/2011	92	1018	7.19	436	422	125.97	29.4	34.3	11.0	109.0	14.0	0.3	15.14	<0.05	0.33	650	2.2	3.14	1.21	1.49	1.01
DV	G-028676A	7/25/1995	NA	801	7.2	370	304	110	23.0	13.0	6.0	68.0	8.7	0.3	42	0.007	<0.01	485	7.1	2.74	0.95	0.57	0.42
DV	G-028676A	8/6/1996	NA	710	7.3	392	310	120	22.0	8.2	5.2	100.0	9.0	0.4	45	<0.05	<0.01	520	8.3	2.99	0.91	0.36	0.26
DV	G-028676A	7/29/1997	NA	699	7.2	360	330	210	27.0	6.0	6.6	54.0	5.0	0.4	2.1	1.2	0.02	490	17	5.24	1.11	0.26	0.15
DV	G-028676A	9/22/1998	NA	654	7.4	400	303	120	25.0	10.0	5.9	57.0	9.7	0.79	NA	NA	NA	490	6.7	2.99	1.03	0.44	0.31
DV	G-028676A	7/14/1999	NA	778	7.55	424	309	126	25.8	13.5	6.2	54.0	11.0	0.2	20	<0.05	<0.01	562	8.7	3.14	1.06	0.59	0.40
DV	G-028676A	4/27/2000	NA	772	7.78	433	314	129	26.5	13.7	5.8	57.0	12.0	0.3	21	<0.05	<0.01	542	10.9	3.22	1.09	0.60	0.41
DV	G-028676A	7/13/2000	NA	755	7.57	447	329	136	25.6	13.3	5.8	64.0	10.0	0.4	23	<0.05	<0.01	577	8.5	3.39	1.05	0.58	0.39
DV	G-028676A	10/3/2000	NA	744	7.31	429	334	128	26.1	14.0	6.3	61.0	9.0	0.5	20	<0.05	<0.01	485	6.9	3.19	1.07	0.61	0.42
DV	G-028676A	1/22/2001	NA	745	7.3	435	328	129	26.8	14.6	5.9	62.0	10.0	0.3	21	<0.05	<0.01	513	8.4	3.22	1.10	0.64	0.43
DV	G-028676A	4/9/2001	NA	773	8.64	397	329	118	24.1	13.6	6.9	61.0	11.0	0.3	21	<0.05	<0.01	495	8.3	2.94	0.99	0.59	0.42
DV	G-028676A	7/11/2001	NA	788	7.21	418	325	126	24.9	15.5	5.5	65.0	11.0	0.4	21	<0.05	<0.01	528	8.2	3.14	1.02	0.67	0.47
DV	G-028676A	10/30/2001	NA	745	7.34	460	309	135	29.6	16.0	6.8	73.0	11.0	0.3	21	<0.05	<0.01	443	6.7	3.37	1.22	0.70	0.46
DV	G-028676A	1/10/2002	NA	771	7.29	436	303	128	27.6	15.3	7.0	67.0	11.0	0.3	21	<0.05	<0.01	578	7.6	3.19	1.14	0.67	0.45
DV	G-028676A	4/15/2002	NA	845	7.78	475	299	144	27.7	15.4	7.0	67.0	11.0	0.2	23	<0.05	<0.01	540	8.7	3.59	1.14	0.67	0.44
DV	G-028676A	7/23/2002	NA	821	7.1	398	320	122	22.6	14.4	6.0	69.0	11.0	0.4	44.9	<0.05	<0.01	540	4.2	3.04	0.93	0.63	0.44
DV	G-028676A	11/4/2002	NA	796	7	430	328	131	24.8	15.2	6.0	72.1	11.2	0.3	43.9	<0.05	<0.01	544	5.6	3.27	1.02	0.66	0.45
DV	G-028676A	1/9/2003	NA	801	7.2	425	316	130	24.3	14.8	6.0	69.4	10.8	0.3	43	<0.05	<0.01	376	6.9	3.24	1.00	0.64	0.44
DV	G-028676B	8/16/1994	NA	790	7.2	430	341	130	26.0	13.0	7.0	83.0	13.0	0.4	38	<0.05	0.026	545	6.8	3.24	1.07	0.57	0.39
DV	G-028676B	7/24/1995	NA	885	7.1	400	318	120	25.0	13.0	6.9	81.0	13.0	0.2	37	0.023	0.04	518	7.1	2.99	1.03	0.57	0.40
DV	G-028676B	8/6/1996	NA	780	7.3	383	340	130	24.0	7.9	5.2	127.0	12.0	0.3	37	<0.05	<0.01	560	5.6	3.24	0.99	0.34	0.24
DV	G-028676B	7/29/1997	NA	771	7.1	420	360	210	41.0	8.5	7.3	74.0	13.0	0.4	19	1.6	0.04	590	16	5.24	1.69	0.37	0.20
DV	G-028676B	9/22/1998	NA	747	7.4	320	340	84	26.0	9.5	7.2	85.0	NA	0.75	NA	NA	NA	550	5.6	2.10	1.07	0.41	0.33
DV	G-028676B	7/14/1999	NA	860	7.64	483	344	145	28.8	13.9	6.7	75.0	12.0	0.3	16	<0.05	0.02	595	7.5	3.62	1.18	0.60	0.39
DV	G-028676B	4/27/2000	NA	860	7.8	494	366	148	29.4	14.1	5.9	82.0	13.0	0.4	18	<0.05	0.01	608	7.9	3.69	1.21	0.61	0.39
DV	G-028676B	7/13/2000	NA	828	7.6	518	356	158	29.5	13.8	6.8	84.0	12.0	0.5	21	<0.05	0.04	633	6.4	3.94	1.21	0.60	0.37
DV	G-028676B	10/3/2000	NA	787	7.28	459	353	138	27.4	13.3	6.6	73.0	9.0	0.5	17	<0.05	0.03	528	5.5	3.44	1.13	0.58	0.38

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
DV	G-028676B	1/22/2001	NA	769	7.33	472	349	141	28.4	14.1	6.6	77.0	11.0	0.4	18	<0.05	<0.01	535	5.6	3.52	1.17	0.61	0.40
DV	G-028676B	4/9/2001	NA	814	8.58	434	360	130	25.8	13.2	7.6	77.0	11.0	0.3	18	<0.05	<0.01	532	5.6	3.24	1.06	0.57	0.39
DV	G-028676B	7/11/2001	NA	838	7.22	454	351	137	26.5	14.8	6.9	81.0	11.0	0.1	17	<0.05	0.04	568	6	3.42	1.09	0.64	0.43
DV	G-028676B	10/30/2001	NA	758	7.37	481	276	141	30.6	15.0	6.9	82.0	11.0	0.3	19	<0.05	0.02	482	4.5	3.52	1.26	0.65	0.42
DV	G-028676B	1/10/2002	NA	808	7.3	460	351	136	28.9	14.6	7.6	77.0	10.0	0.4	18	<0.05	0.02	598	5.5	3.39	1.19	0.64	0.42
DV	G-028676B	4/15/2002	NA	882	7.73	504	315	154	28.9	14.9	7.7	78.0	10.0	0.3	20	<0.05	0.03	517	5	3.84	1.19	0.65	0.41
DV	G-028676B	7/23/2002	NA	804	7.2	400	324	123	22.5	13.5	6.0	73.0	9.3	0.3	38.8	<0.05	0.036	516	0.7	3.07	0.93	0.59	0.42
DV	G-028676B	11/4/2002	NA	800	7	437	332	134	24.7	13.8	7.0	74.3	9.5	0.3	37.2	<0.05	<0.01	488	3.6	3.34	1.02	0.60	0.41
DV	G-028676B	1/9/2003	NA	804	7.2	455	342	140	25.4	13.4	7.0	73.8	9.1	0.3	37.6	<0.05	<0.01	480	4.2	3.49	1.04	0.58	0.39
DV	G-028676B	5/6/2003	NA	896	7.3	422	333	129	24.2	13.2	6.0	76.3	9.8	0.4	37	<0.05	0.023	516	3.9	3.22	1.00	0.57	0.40
DV	G-028676B	7/24/2003	NA	810	7.31	452	344	136	26.7	13.8	7.5	69.0	9.0	0.3	16	<0.05	0.04	506	4.3	3.39	1.10	0.60	0.40
DV	G-028676B	10/8/2003	NA	799	7.1	441	338	133	26.0	13.7	7.4	70.0	9.0	0.3	15	<0.05	0.03	548	4.6	3.32	1.07	0.60	0.40
DV	G-028676B	7/28/2004	NA	880	7.1	421	329	126	25.5	14.1	7.0	65.1	8.6	0.3	39.5	<0.05	0.057	500	3.7	3.14	1.05	0.61	0.42
DV	G-028676B	4/12/2005	NA	814	7.2	440	232	134	25.6	13.8	7.0	74.3	9.0	0.3	40.2	<0.05	0.017	476	4.1	3.34	1.05	0.60	0.40
DV	G-028676B	11/1/2005	NA	792	7.15	439	344	133	26.0	14.1	6.7	59.0	7.0	0.6	19	<0.05	0.03	448	3.8	3.32	1.07	0.61	0.41
DV	G-028676B	4/25/2006	NA	800	7.3	460	352	139	27.3	14.4	7.2	78.0	10.0	0.3	16	<0.05	0.01	530	3.7	3.47	1.12	0.63	0.41
DV	G-028676B	10/16/2006	NA	753	7.77	445	335	135	26.2	13.8	6.5	71.0	9.0	0.3	17	<0.05	0.03	482	3.6	3.37	1.08	0.60	0.40
DV	G-028676B	4/27/2007	NA	793	7.72	296	349	138.46	27.6	17.4	7.4	74.0	9.0	0.3	18.76	0.01	<0.01	510	3.9	3.45	1.13	0.76	0.50
DV	G-028676B	9/4/2007	NA	824	7.88	389	342	117.4	23.6	12.1	6.5	75.0	9.0	0.3	15.49	<0.05	0.02	474	3.5	2.93	0.97	0.52	0.38
DV	G-028676B	5/14/2008	NA	742	7.57	396	343	119.91	23.5	13.2	5.9	78.0	10.0	0.4	15.37	<0.05	0.02	518	3.2	2.99	0.97	0.58	0.41
DV	G-028676B	12/10/2008	NA	798	7.41	380	339	113.81	23.1	13.6	6.6	76.0	10.0	0.3	14.18	<0.05	<0.01	524	3.1	2.84	0.95	0.59	0.43
DV	G-028676B	5/12/2009	NA	762	7.2	393	349	121.2	22.1	13.6	6.1	78.0	9.0	0.3	15.08	<0.05	0.01	526	2.3	3.02	0.91	0.59	0.42
DV	G-028676B	11/5/2009	NA	813	7.32	397	335	119.93	23.6	13.5	6.6	72.0	8.0	0.3	16.34	<0.05	0.01	494	2.5	2.99	0.97	0.59	0.42
DV	G-028676B	5/26/2010	NA	799	7.17	408	349	124.82	23.4	13.3	6.9	75.0	9.0	0.3	15.2	<0.05	<0.01	496	2.3	3.11	0.96	0.58	0.41
DV	G-028676B	11/9/2010	NA	754	7.26	403	347	123.34	23.0	13.1	6.3	72.0	8.0	0.3	16.16	<0.05	<0.01	422	2.5	3.08	0.94	0.57	0.40
DV	G-028676B	6/8/2011	NA	790	7.15	396	348	119.85	23.4	13.0	6.5	74.0	9.0	0.3	16.37	<0.05	<0.01	500	2.4	2.99	0.96	0.57	0.40
DV	G-028676B	11/1/2011	NA	702	7.27	352	309	107.24	20.5	14.7	6.4	59.0	9.0	1.2	21.6	<0.05	<0.01	464	<0.2	2.68	0.84	0.64	0.48
DV	G-028676B	5/23/2012	NA	832	7.16	408.1	351	123.8	24.0	13.0	6.5	76.5	9.9	0.3	16.36	<0.05	0.03	516	2.7	3.09	0.99	0.57	0.40
DV	G-028676B	12/3/2012	NA	779	7.21	404.8	345	123.3	23.5	13.0	6.7	72.0	8.6	0.3	17.59	<0.05	<0.01	430	2.37	3.08	0.97	0.57	0.40
DV	G-028676B	5/23/2013	NA	828	7.32	427.4	352	131	24.4	13.9	6.9	74.0	9.3	0.3	16.61	<0.05	0.03	488	2.79	3.27	1.00	0.61	0.41
DV	G-028676B	10/1/2013	NA	757	7.22	405.6	344	123.1	23.8	13.4	6.7	68.5	7.5	0.3	16.07	<0.05	0.01	494	2.28	3.07	0.98	0.58	0.41
DV	G-033528	7/25/1995	120	870	7.1	410	368	120	27.0	23.0	7.7	96.0	6.5	0.3	38	0.3	0.72	541	0.28	2.99	1.11	1.00	0.70
DV	G-033528	7/18/1997	120	762	7.4	380	400	240	34.0	12.0	9.1	120.0	6.6	0.4	1.1	0.7	0.69	600	0.3	5.99	1.40	0.52	0.27
DV	G-033528	8/30/1999	120	888	7.72	443	368	125	31.4	32.6	10.4	121.0	9.0	0.3	16	<0.05	0.61	473	1.7	3.12	1.29	1.42	0.95
DV	G-033528	7/27/2000	120	861	7.28	480	378	138	32.4	31.8	9.8	112.0	8.0	0.4	16	0.1	0.63	568	1.7	3.44	1.33	1.38	0.90
DV	G-033528	7/18/2001	120	935	7.33	444	333	124	32.0	38.4	11.0	121.0	10.0	0.4	17	<0.05	0.6	632	2.9	3.09	1.32	1.67	1.12
DV	G-033528	6/28/2002	120	968	7.2	440	384	130	27.9	31.1	9.0	21.9	9.1	0.3	31.5	0.211	0.662	600	0.8	3.24	1.15	1.35	0.91
DV	G-033528	7/15/2003	120	906	7.34	183	376	50	13.6	264.0	8.3	114.0	10.0	0.5	12	<0.05	0.14	488	1.4	1.25	0.56	11.48	12.08
DV	G-033528	8/11/2004	120	979	7.3	458	367	130	32.4	36.2	11.0	141.0	11.5	0.3	35.8	0.165	0.627	532	2.5	3.24	1.33	1.57	1.04
DV	G-033528	7/13/2005	120	916	7.42	468	332	135	31.7	33.0	11.3	111.0	10.0	0.5	17	<0.05	0.65	544	1.8	3.37	1.30	1.44	0.94
DV	G-033528	7/5/2006	120	866	7.66	472	364	137	31.5	29.5	10.6	88.0	8.0	0.1	17	<0.05	0.67	662	1.2	3.42	1.30	1.28	0.84
DV	G-033528	7/17/2007	120	716	7.83	423	366	121	29.4	28.0	10.0	101.0	8.0	0.4	16	<0.05	0.62	520	1.3	3.02	1.21	1.22	0.84
DV	G-033528	7/30/2008	120	828	7.45	404	361	119.18	25.8	24.5	9.2	95.0	8.0	0.6	15.2	<0.05	0.61	516	0.5	2.97	1.06	1.07	0.75
DV	G-033528	7/22/2009	120	868	7.44	400	359	114.95	27.4	31.0	9.7	101.0	8.0	0.3	14.87	<0.05	0.58	578	2.6	2.87	1.13	1.35	0.96
DV	G-033528	7/25/2011	120	877	7.33	393	364	112.21	27.6	28.9	10.5	96.0	9.0	0.3	15.08	<0.05	0.42	566	1.4	2.80	1.13	1.26	0.90
DV	G-035717	8/14/1995	91	754	7.5	360	303	110	21.0	14.0	8.8	60.0	7.6	0.3	35	0.005	0.57	446	1.6	2.74	0.86	0.61	0.45
DV	G-035717	7/17/1997	91	650	6.9	340	340	260	24.0	7.0	8.7	71.0	8.7	0.4	7	0.8	0.6	510	<0.2	6.49	0.99	0.30	0.16
DV	G-035717	8/3/2000	91	707	7.36	401	328	121	23.5	14.7	8.0	57.0	9.0	0.2	19	<0.05	0.6	447	1	3.02	0.97	0.64	0.45
DV	G-035717	7/31/2001	91	743	7.24	436	287	131	25.8	16.3	9.3	59.0	11.0	0.4	19	<0.05	0.67	477	1.2	3.27	1.06	0.71	0.48
DV	G-035717	7/8/2002	91	747	7.3	342	339	104	19.8	14.5	8.0	59.8	9.1	0.3	41.5	<0.05	0.642	440	0.3	2.59	0.81	0.63	0.48
DV	G-035717	7/8/2003	91	736	7.53	413	320	126	23.3	15.1	9.0	61.0	10.0	0.2	17	<0.05	0.61	484	0.3	3.14	0.96	0.66	0.46
DV	G-035717	7/19/2004	91	795	6.9	379	331	115	22.8	14.2	10.0	60.1	10.4	0.3	38.6	0.036	0.679	436	<0.2	2.87	0.94	0.62	0.45
DV	G-035717	7/13/2005	91	744	7.51	413	286	127	23.3	14.5	9.2	61.0	11.0	0.4	18	<0.05	0.4	428	0.7	3.17	0.96	0.63	0.44
DV	G-035717	6/26/2006	91	711	7.62	403	349	124	22.6	14.5	9.1	57.0	11.0	0.3	17	<0.05	0.71	432	0.3	3.09	0.93	0.63	0.44
DV	G-035717	7/5/2007	91	735	8.28	349	323	106.43	20.4	13.6	8.5	62.0	13.0	0.3	15.78	<0.05	0.58	436	0.4	2.66	0.84	0.59	0.45
DV	G-035717	7/7/2009	91	695	7.32	339	312	103.34	19.6	15.8	8.3	63.0	18.0	0.3	16.34	<0.05	0.5	446	16.1	2.58	0.81	0.69	0.53
DV	G-047651	8/23/1994	365	830	7.3	390	332	110	29.0	20.0	8.1	100.0	5.9	0.4	49	0.006	0.067	530	1.9	2.74	1.19	0.87	0.62
DV	G-047651	7/27/1995	365	825	7.1	390	261	110	29.0	20.0	7.5	97.0	5.5	0.4	47	<0.05	0.24	480	1.5	2.74	1.19	0.87	0.62
DV	G-047651	8/27/1997	365	710	6.9	370	330	190	60.0	11.0	8.3	81.0	5.5	0.3	5.1	0.35	0.22	29	1.5	4.74	2.47	0.48	0.25
DV	G-047651	8/4/1999	365	795	7.4	432	324	120	33.9	22.1	8.1	101.0	6.0	0.4	23	<0.05	0.2	650	1.6	2.99	1.39	0.96	0.65
DV	G-047651	7/27/2000	365	759	7.19	433	329	121	31.4	20.8	7.5	95.0	6.0	0.4	23	NA	0.3	545	1.4	3.02	1.29	0.90	0.62
DV	G-047651	8/8/2001	365	810	7.44	437	295	118	33.7	21.4	8.4	97.0	6.0	0.2	23	<0.05	0.3	628	1.4	2.94	1.39	0.93	0.63
DV	G-047651	7/8/2002	365	811	7.2	352	337	101	24.2	20.5	8.0	19.0	6.1	0.3	51.4	<0.05	0.269	504	0.9	2.52	1.00	0.89	0.67
DV	G-047651	7/8/2003	365	800	7.28	450	327	127	31.9	20.4	8.0	106.0	6.0	0.3	22	<0.05	0.05	594	1.5	3.17	1.31	0.89	0.59
DV	G-047915	7/16/1984	83	NA	7	368	340	99	NA	20.0	NA	36.0	16.0	0.37	NA	0.4	1.4	514	0.1	2.47	#VALUE!	0.87	#VALUE!
DV	G-047915	7/25/1995	83	510	7.3	320	315	94	21.0	16.0	7.0	44.0	3.5	0.3	35	0.068	0.85	411	0.19	2.35	0.86	0.70	0.55
DV	G-047915	7/21/1998	83	614	7.2	328	331	107	21.0	4.0	5.5	38.0	2.6	0.5	NA	NA	NA	481	1.8	2.67	0.86	0.17	0.13
DV	G-048577	7/27/1984	135	NA	7.3	228	172	50	NA	20.0	NA	34.0	6.0	0.29	NA	<0.05	<0.01	442	7.4	1.25	#VALUE!	0.87	#VALUE!
DV	G-048577	8/26/1994	135	441	6.9	170	174	46	13.0	21.0	3.7	18.0	2.0	0.3	49	0.008	0.002	290	1.6	1.15	0.53	0.91	1.00
DV	G-048577	8/2/2007	135	447	7.54	176	181	48.7	13.0	23.2	3.2	17.0	2.0	0.2	22.25	<0.05	<0.01	278	7	1.22	0.53	1.01	1.08
DV	G-048577	7/7/2009	135	452	7.36	196	206	54.44	14.9	22.2	4.3	25.0	2.0	0.3	20.28	<0.05	<0.01	314	0.6	1.36	0.61	0.96	0.97
DV	G-048577	7/20/2011	135	482	7.4	205	226	58.83	14.0	21.4	5.5	27.0	3.0	0.3	19.86	<0.05	<0.01	318	2.3	1.47	0.58	0.93	0.92
DV	G-055048	8/29/1994	235	399	7	150	183	45	9.4	20.0	4.4	7.2	2.4	0.3	50	0.02	0.001	262	3.2	2.00	#VALUE!	0.70	#VALUE!
DV	G-055048	8/15/1995	235	632	7.1	290	271	88	18.0	19.0	5.4	66.0	2.5	0.2	46	3	0.021	412	3.1	1.12	0.39	0.87	1.00
DV	G-055048	7/18/1997	235	653	7.4	260	270	160	18.0	9.0	6.0	60.0	1.9	0.4	5.7	0.2	<0.01	460	1.2	2.20	0.74	0.83	0.68
DV	G-055048	9/2/1999	235	589	7.36	301	248	87	20.0	22.1	6.1	57.0	3.0	0.2	24	<0.05	<0.01	413	2.4	3.99	0.74	0.39	0.25
DV	G-055048	8/3/2000	235	615	7.17	327	270	97	20.2	20.4	5.8	65.0	3.0	0.2	23	<0.05	<0.01	403	2.1	2.17	0.82	0.96	0.79

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
OV	G-055048	7/18/2001	235	620	7.05	286	233	83	18.8	22.8	5.9	64.0	4.0	0.3	25	<0.05	<0.01	412	2.4	2.42	0.83	0.89	0.70
OV	G-055048	6/28/2002	235	651	7	298	259	91	17.1	21.3	5.0	63.6	3.4	0.2	42.3	<0.05	<0.01	448	2	2.07	0.77	0.99	0.83
OV	G-055048	7/8/2003	235	624	7.21	331	253	99	20.1	22.3	5.9	61.0	3.0	NA	21	<0.05	<0.01	342	2.5	2.27	0.70	0.93	0.76
OV	G-055048	7/19/2004	235	579	6.6	248	213	71.9	16.6	24.2	6.0	41.8	3.4	0.3	49.6	<0.05	<0.01	352	3.6	2.47	0.83	0.97	0.76
OV	G-055048	7/12/2005	235	630	7.22	327	222	98	20.0	21.0	6.0	66.0	3.0	0.3	26	<0.05	<0.01	362	2.1	1.79	0.68	1.05	0.95
OV	G-055048	6/29/2006	235	608	7.63	310	270	92	19.4	21.2	5.7	54.0	3.0	0.2	22	<0.05	<0.01	384	2.5	2.45	0.82	0.91	0.71
OV	G-055048	7/5/2007	235	506	8.06	199	207	58.28	13.1	21.1	5.1	31.0	3.0	0.3	21.63	<0.05	<0.01	316	6.1	2.30	0.80	0.92	0.74
OV	G-055048	7/28/2009	235	664	7.21	278	262	83	17.3	21.0	5.3	65.0	3.0	0.3	19.84	<0.05	<0.01	408	2	1.45	0.54	0.92	0.92
OV	G-055048	7/27/2011	235	619	7.15	255	248	75.27	16.5	21.7	5.6	56.0	3.0	0.3	19.55	<0.05	<0.01	394	3.4	2.07	0.71	0.91	0.77
OV	G-060001	7/16/2004	245	982	6.8	455	372	124	35.2	30.9	9.0	124.0	5.8	0.3	48.9	<0.05	0.096	564	<0.2	1.88	0.68	0.94	0.83
OV	G-060001	7/13/2005	245	881	7.44	476	297	141	30.1	23.7	7.9	112.0	5.0	0.4	25	<0.05	<0.01	542	1.7	3.09	1.45	1.34	0.89
OV	G-060001	6/20/2006	245	860	7.77	481	394	142	30.7	24.5	8.1	109.0	6.0	0.3	24	<0.05	<0.01	610	1.5	3.52	1.24	1.03	0.67
OV	G-060001	7/23/2007	245	873	8.37	422	348	124.81	26.8	16.3	7.7	113.0	4.0	0.3	22.93	<0.05	<0.01	552	4.2	3.54	1.26	1.07	0.69
OV	G-060001	7/30/2008	245	887	7.4	425	372	120.26	30.2	28.8	8.3	125.0	6.0	0.4	19.73	0.02	0.02	596	0.2	3.11	1.10	0.71	0.49
OV	G-060001	7/22/2009	245	879	7.27	427	368	124.35	28.3	28.8	7.7	116.0	5.0	0.3	21.14	<0.05	<0.01	614	0.8	3.00	1.24	1.25	0.86
OV	G-060001	8/2/2011	245	781	7.6	404	376	116.17	27.8	26.7	7.9	110.0	5.0	0.3	20.68	<0.05	0.01	586	0.4	3.10	1.16	1.25	0.86
OV	G-067893	7/24/1995	191	781	7.3	350	282	100	25.0	15.0	9.0	69.0	6.5	0.3	35	0.17	0.38	432	0.65	2.90	1.14	1.16	0.82
OV	G-067893	7/29/1997	191	731	7.2	360	360	220	33.0	8.0	9.6	60.0	6.7	0.4	0.35	0.6	0.41	460	0.3	2.50	1.03	0.65	0.49
OV	G-067893	7/21/1998	191	677	7.4	376	354	122	21.0	4.0	6.7	54.0	6.0	0.4	NA	NA	NA	601	2.1	5.49	1.36	0.35	0.19
OV	G-067893	8/30/1999	191	771	7.75	413	348	117	28.6	16.5	9.4	71.0	7.0	0.1	17	<0.05	0.4	438	<0.2	3.04	0.86	0.17	0.12
OV	G-067893	8/9/2000	191	829	7.33	503	345	146	33.3	18.6	8.7	107.0	8.0	0.5	19	0.16	0.31	653	8.3	2.92	1.18	0.72	0.50
OV	G-067893	7/18/2001	191	851	7.27	425	303	121	29.6	19.8	9.1	100.0	9.0	0.3	20	<0.05	0.33	547	4.9	3.64	1.37	0.81	0.51
OV	G-067893	8/10/2001	191	928	7.58	519	303	147	36.6	21.0	8.9	122.0	10.0	0.2	19	0.01	0.3	682	9.5	3.02	1.22	0.86	0.59
OV	G-067893	6/28/2002	191	959	7.1	459	322	137	28.2	17.8	6.0	23.8	9.2	0.3	36	0.162	0.317	620	6.4	3.67	1.51	0.91	0.57
OV	G-067893	7/23/2002	191	940	7.2	430	328	127	27.2	16.6	8.0	123.0	10.1	0.3	39.8	0.143	0.247	676	7.6	3.42	1.16	0.77	0.51
OV	G-067893	8/12/2003	191	888	7.28	505	330	148	32.5	19.0	9.0	114.0	9.0	0.4	20	<0.05	0.27	656	7.6	3.17	1.12	0.72	0.49
OV	G-067893	8/3/2004	191	888	7.3	443	322	128	30.2	18.0	9.0	107.0	13.5	0.4	43	0.168	0.27	552	8.3	3.69	1.34	0.83	0.52
OV	G-067893	7/6/2005	191	811	7.61	450	342	130	30.4	18.1	9.1	83.0	7.0	0.3	18	<0.05	0.33	454	0.3	3.19	1.24	0.78	0.53
OV	G-067893	7/12/2006	191	842	7.84	458	333	133	30.6	17.3	9.5	85.0	12.0	0.2	20	<0.05	0.26	524	7.4	3.24	1.25	0.79	0.53
OV	G-067893	7/17/2007	191	716	7.98	381	346	109.89	25.9	15.0	8.7	81.0	6.0	0.4	15.78	<0.05	0.26	494	2	3.32	1.26	0.75	0.50
OV	G-067893	8/7/2009	191	867	7.32	407	329	118.95	26.8	18.0	8.2	90.0	8.0	0.3	18.5	<0.05	0.21	562	5.6	2.74	1.06	0.65	0.47
OV	G-070473	7/16/2004	400	677	7	310	264	79.8	26.8	19.0	7.0	66.7	6.1	0.4	45.5	1.45	0.172	396	0.7	2.97	1.10	0.78	0.55
OV	G-070473	10/14/2004	400	639	7.1	322	298	81.1	29.0	17.6	7.0	45.6	6.4	0.4	56.9	0.602	0.122	416	1	1.99	1.10	0.83	0.66
OV	G-070473	1/14/2005	400	649	7.3	300	277	79.2	24.7	16.5	6.0	37.3	4.8	0.4	52.6	0.312	0.097	428	0.7	2.02	1.19	0.77	0.60
OV	G-070473	4/26/2005	400	584	7.3	273	259	73	21.9	15.3	6.0	39.3	6.2	0.4	49.2	0.194	0.085	332	0.3	1.98	1.02	0.72	0.59
OV	G-070473	7/6/2005	400	582	7.71	302	258	80	24.9	18.2	7.0	37.0	5.0	0.3	23	<0.05	0.07	316	0.4	1.82	0.90	0.67	0.57
OV	G-070473	10/28/2005	400	648	7.61	350	297	92	29.2	17.7	7.6	47.0	6.0	0.6	30	<0.05	0.08	290	1.1	2.00	1.02	0.79	0.64
OV	G-070473	1/18/2006	400	604	8.01	319	288	80	28.9	18.5	7.7	42.0	5.0	0.7	27	0.01	0.04	364	<0.2	2.30	1.20	0.77	0.58
OV	G-070473	4/19/2006	400	561	7.43	302	261	81	24.1	17.0	7.0	39.0	5.0	0.3	25	<0.05	0.06	400	0.4	2.00	1.19	0.80	0.64
OV	G-070473	7/20/2006	400	637	8.36	315	281	81	27.3	17.7	7.8	44.0	6.0	0.2	25	<0.05	0.06	388	1	2.02	0.99	0.74	0.60
OV	G-070473	6/20/2007	400	565	7.88	285	264	77.01	22.5	15.6	6.7	39.0	6.0	0.5	24.8	<0.05	0.06	344	0.4	2.02	1.12	0.77	0.61
OV	G-070473	6/10/2008	400	583	8	262	261	71.14	20.6	15.7	6.0	39.0	5.0	0.2	18.89	<0.05	0.06	346	0.3	1.92	0.92	0.68	0.57
OV	G-070473	9/15/2009	400	585	7.71	248	259	57.68	25.2	17.1	7.2	35.0	5.0	0.3	17.37	0.01	0.06	320	<0.2	1.77	0.85	0.68	0.60
OV	G-070473	6/30/2011	400	469	7.76	204	245	38.45	26.2	17.5	7.0	12.0	6.0	0.4	15.21	0.13	0.15	278	<0.2	1.44	1.04	0.74	0.67
OV	G-070473	6/30/2011	400	572	7.82	265	275	68.97	22.7	16.1	6.6	34.0	6.0	0.4	21.25	0.04	0.05	366	10.1	0.96	1.08	0.76	0.76
OV	G-070766	3/24/1988	319	NA	7.8	252	284	91	NA	17.0	NA	54.0	6.0	0.28	NA	0.8	0.5	376	<0.2	1.72	0.93	0.70	0.61
OV	G-070766	11/6/2001	319	579	7.42	335	260	103	18.4	18.9	6.2	48.0	6.0	0.2	20	<0.05	0.49	412	<0.2	2.27	#VALUE!	0.74	#VALUE!
OV	G-070766	1/10/2002	319	589	7.52	309	245	94	17.5	16.8	6.7	48.0	6.0	0.2	19	<0.05	0.49	470	<0.2	2.57	0.76	0.82	0.64
OV	G-070766	4/10/2002	319	578	7.77	330	250	102	17.9	17.2	6.2	51.0	5.0	0.1	21	<0.05	0.49	435	<0.2	2.35	0.72	0.73	0.59
OV	G-070766	7/23/2002	319	622	7.1	287	269	89.6	15.2	15.5	6.0	59.1	5.4	0.2	41.6	0.133	0.491	404	<0.2	2.54	0.74	0.75	0.58
OV	G-070766	10/22/2002	319	681	7.2	241	274	73.7	13.7	13.2	5.0	59.9	5.6	0.2	37.5	0.111	0.419	400	<0.2	2.24	0.63	0.67	0.56
OV	G-070766	1/8/2003	319	610	7.2	316	273	100	16.0	16.4	6.0	48.5	5.3	0.2	39.4	0.112	0.524	328	<0.2	1.84	0.56	0.57	0.52
OV	G-070766	5/1/2003	319	640	7.3	287	263	89.6	15.3	16.0	6.0	50.9	5.8	0.3	43.8	0.151	0.515	396	<0.2	2.50	0.66	0.71	0.57
OV	G-070766	7/24/2003	319	616	7.31	324	274	101	17.4	16.8	6.7	51.0	5.0	NA	18	<0.05	0.49	374	<0.2	2.24	0.63	0.70	0.58
OV	G-070766	10/1/2004	319	709	7	326	272	100	18.4	18.3	7.0	74.5	5.7	0.4	44.7	0.036	0.49	428	<0.2	2.52	0.72	0.73	0.57
OV	G-070766	7/28/2005	319	668	7.29	350	277	108	19.4	17.6	6.9	73.0	4.0	0.2	20	<0.05	0.58	418	<0.2	2.50	0.76	0.80	0.62
OV	G-070766	7/20/2006	319	687	8.27	343	283	105	19.6	18.0	7.6	72.0	5.0	0.3	21	<0.05	0.57	422	<0.2	2.69	0.80	0.77	0.58
OV	G-070766	7/20/2007	319	623	8.37	290	265	89.81	15.8	15.4	6.3	51.0	6.0	0.3	17.1	<0.05	0.48	372	<0.2	2.62	0.81	0.78	0.60
OV	G-070766	6/11/2008	319	645	7.71	230	264	65.96	15.8	46.6	3.0	33.0	6.0	0.3	11.73	<0.05	<0.01	370	7.2	2.24	0.65	0.67	0.56
OV	G-070766	9/9/2009	319	663	7.39	327	275	101.58	17.8	17.1	6.8	74.0	5.0	0.3	17.75	<0.05	0.5	426	<0.2	1.65	0.65	2.03	1.89
OV	G-070766	9/21/2011	319	584	7.65	285	269	89.53	14.7	16.6	6.5	50.0	5.0	0.2	18.47	<0.05	0.47	392	<0.2	2.53	0.73	0.74	0.58
OV	G-071040	7/11/2005	328	743	7.53	401	282	118	25.9	20.5	7.5	84.0	5.0	0.3	24	<0.05	0.43	432	<0.2	2.23	0.60	0.72	0.60
OV	G-071040	7/19/2006	328	759	8.36	390	318	114	25.6	20.0	8.2	82.0	5.0	0.3	21	<0.05	0.44	482	<0.2	2.94	1.07	0.89	0.63
OV	G-071040	7/2/2007	328	719	7.99	342	311	100.39	22.3	17.1	7.4	78.0	5.0	0.4	19.22	0.01	0.37	466	<0.2	2.84	1.05	0.87	0.62
OV	G-071040	8/6/2008	328	723	7.69	337	305	99.74	21.3	18.1	6.2	82.0	6.0	0.3	16.31	<0.05	0.39	456	<0.2	2.50	0.92	0.74	0.57
OV	G-071040	7/7/2009	328	684	7.42	358	304	104.59	23.4	20.4	7.4	81.0	5.0	0.3	18.96	<0.05	0.37	468	<0.2	2.49	0.88	0.79	0.61
OV	G-071040	7/18/2011	328	694	7.29	NA	314	94.23	21.8	19.2	7.3	82.0	5.0	NA	NA	0.24	0.37	458	<0.2	2.61	0.96	0.89	0.66
OV	G-097146	7/6/1998	150	688	7.4	360	280	94	25.0	4.5	6.7	120.0	8.6	0.5	NA	NA	NA	500	4.6	2.35	0.90	0.83	0.65
OV	G-097146	6/30/1999	150	823	7.61	440	298	124	31.4	16.8	8.7	103.0	10.0	0.3	26	<0.05	0.24	553	9	2.35	1.03	0.20	0.15
OV	G-097146	11/3/1999	150	846	7.32	468	302	132	32.9	17.8	8.7	110.0	8.0	0.3	27	<0.05	0.18	585	9.9	3.09	1.29	0.73	0.49
OV	G-097146	1/13/2000	150	857	7.85	463	307	130	33.0	17.5	8.0	112.0	8.0	NA	25	<0.05	0.18	590	11	3.29	1.35	0.77	0.51
OV	G-097146	4/26/2000	150	862	7.94	511	314	147	34.2	18.0	9.0	117.0	11.0	0.4	25	<0.05	0.19	587	12.7	3.24	1.36	0.76	0.50
OV	G-097146	4/26/2000	150	867	7.92	508	316	146	34.3	18.1	8.6	117.0	11.0	0.4	25	<0.05	0.19	585	13.9	3.67	1.41	0.78	0.49
OV	G-097146	7/13/2000	150	880	7.5	550	314	160	36.2	18.6	9.4	125.0	13.0	0.5	34	<0.05	0.19	685	15.4	3.64	1.41	0.79	0.50
OV	G-097146	10/3/2000	150	833	7.47	469	322	134	32.0	16.9	8.5	112.0	11.0	0.5	26	<0.05	0.18	588	12.6	3.99	1.49	0.81	0.49
OV	G-097146	1/22/2001	150	819	7.3	477	305	136	32.8	17.7	8.2	112.0	11.0	0.4	27	<0.05	0.17	598	13	3.34	1.32	0.74	0.48
OV	G-097146	4/9/2001	150	791	8.19	438	312	125	29.9	16.7	9.3	109.0	10.0	0.4	27	<0.05	0.12	590	11.6	3.39	1.35	0.77	0.50

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
DV	G-097146	7/11/2001	150	852	7.27	442	312	126	30.2	18.4	8.2	113.0	10.0	0.3	26	<0.05	0.23	607	10.2	3.12	1.23	0.73	0.49
DV	G-097146	10/30/2001	150	736	7.32	447	234	125	32.3	18.0	8.5	101.0	9.0	0.2	27	<0.05	0.13	535	7.5	3.14	1.24	0.80	0.54
DV	G-097146	1/10/2002	150	801	7.39	435	276	123	30.8	17.6	9.3	101.0	9.0	0.4	27	<0.05	0.14	622	10.5	3.12	1.33	0.78	0.53
DV	G-097146	4/15/2002	150	859	7.82	478	269	138	31.4	18.1	8.6	103.0	9.0	0.2	29	<0.05	0.12	578	8.9	3.07	1.27	0.77	0.52
DV	G-097146	7/23/2002	150	796	7.1	378	289	110	24.9	15.6	8.0	93.8	8.3	0.3	54.8	<0.05	0.086	560	6.9	3.44	1.29	0.79	0.51
DV	G-097146	11/4/2002	150	753	6.9	390	298	114	25.6	16.7	8.0	86.4	7.5	0.3	55	<0.05	0.125	528	4.8	2.74	1.02	0.68	0.49
DV	G-097146	1/9/2003	150	762	7.3	393	289	115	25.7	15.4	8.0	88.9	7.0	0.3	55	<0.05	0.11	368	6	2.84	1.05	0.73	0.52
DV	G-097146	5/6/2003	150	846	7.2	383	292	111	25.7	16.2	7.0	94.4	8.5	0.3	58.8	<0.05	0.128	520	5.4	2.87	1.06	0.67	0.48
DV	G-097146	7/24/2003	150	796	7.31	424	302	122	28.7	16.9	8.4	91.0	8.0	0.3	24	<0.05	0.12	554	6.2	2.77	1.06	0.70	0.51
DV	G-097146	10/7/2003	150	750	7.16	405	297	116	27.4	16.6	8.9	87.0	7.0	0.3	23	<0.05	0.09	476	5.5	3.04	1.18	0.74	0.51
DV	G-097146	8/3/2004	150	792	7.3	397	292	114	27.4	17.0	8.0	99.3	8.8	0.4	58.6	<0.05	0.094	508	6.2	2.89	1.13	0.72	0.51
DV	G-097146	4/25/2005	150	812	7.2	383	288	111	25.7	15.6	7.0	107.0	8.1	0.3	50.4	<0.05	0.096	508	6.7	2.84	1.13	0.74	0.52
DV	G-097146	10/29/2005	150	780	7.43	422	302	122	28.6	17.1	8.0	91.0	8.0	0.7	29	<0.05	0.08	398	7	2.77	1.06	0.68	0.49
DV	G-097146	4/25/2006	150	805	7.38	446	303	128	30.8	17.7	8.8	105.0	10.0	0.3	24	<0.05	0.1	536	9.3	3.04	1.18	0.74	0.51
DV	G-097146	10/19/2006	150	743	7.92	410	297	118	28.1	16.8	8.5	92.0	8.0	0.3	26	<0.05	<0.01	528	6.8	3.19	1.27	0.77	0.52
DV	G-097146	5/1/2007	150	813	7.72	396	301	118	28.8	16.6	8.2	102.0	10.0	0.3	25.13	<0.05	0.01	532	10.2	2.94	1.16	0.73	0.51
DV	G-097146	7/27/2007	150	880	8.12	389	298	111.04	27.1	14.7	8.3	103.0	11.0	0.3	24.28	<0.05	0.06	580	11.4	2.94	1.19	0.72	0.50
DV	G-097146	5/14/2008	150	749	7.22	430	294	124.26	29.3	17.7	6.7	83.0	11.0	0.1	24.71	0.02	0.15	584	11.9	2.77	1.11	0.64	0.46
DV	G-097146	9/10/2008	150	862	7.38	402	297	114.53	27.9	18.0	8.5	103.0	12.0	0.3	21.43	<0.05	0.15	620	16	3.10	1.20	0.77	0.52
DV	G-097146	5/12/2009	150	878	7.22	442	311	129.69	28.4	17.1	7.7	115.0	16.0	0.3	23.3	<0.05	0.23	682	13.5	2.86	1.15	0.78	0.55
DV	G-097146	11/5/2009	150	970	7.39	444	308	128.31	30.2	17.1	8.1	107.0	17.0	0.3	23.71	<0.05	0.17	620	16.4	3.24	1.17	0.75	0.50
DV	G-097146	5/26/2010	150	934	7.21	464	309	134.79	30.8	17.1	8.6	105.0	18.0	0.3	22.17	<0.05	0.22	572	16.2	3.20	1.24	0.74	0.50
DV	G-097146	11/9/2010	150	876	7.25	452	316	132.17	29.5	16.8	7.8	104.0	18.0	0.3	23.89	<0.05	0.21	546	8.5	3.36	1.27	0.74	0.49
DV	G-097146	6/8/2011	150	876	7.2	450	308	130.17	30.5	17.3	8.3	97.0	18.0	0.3	25.48	0.02	0.25	596	14.8	3.30	1.21	0.73	0.49
DV	G-097146	11/1/2011	150	790	7.24	357	314	107.53	21.1	12.4	5.7	64.0	19.0	0.3	19.86	<0.05	<0.01	522	11.2	3.25	1.26	0.75	0.50
DV	G-097146	5/23/2012	150	962	7.26	458	318	131.6	31.4	16.6	8.4	95.5	21.4	0.3	24.78	<0.05	0.31	612	15.1	2.68	0.87	0.54	0.40
DV	G-097146	12/3/2012	150	923	7.24	481.4	322	139.3	32.4	17.2	8.6	102.0	20.7	0.3	26.64	<0.05	0.31	552	16.4	3.28	1.29	0.72	0.48
DV	G-097146	5/23/2013	150	962	7.26	467	319	136	30.9	16.9	8.5	100.0	21.8	0.4	24.58	<0.05	0.3	592	15.4	3.48	1.33	0.75	0.48
DV	G-097146	10/1/2013	150	894	7.24	459.8	316	132.7	31.2	16.7	8.3	99.0	21.4	0.3	23.28	<0.05	0.28	632	15.7	3.39	1.27	0.74	0.48
DV	G-097147	7/6/1998	112	684	7.3	380	310	100	22.0	3.8	4.1	62.0	10.0	0.44	NA	NA	NA	420	8.9	3.31	1.28	0.73	0.48
DV	G-097147	7/14/1999	112	762	7.53	424	326	128	24.8	12.3	5.4	36.0	11.0	0.2	18	<0.05	<0.01	523	9.4	2.50	0.91	0.17	0.13
DV	G-097147	11/3/1999	112	767	7.6	420	324	126	25.6	12.8	5.5	41.0	11.0	0.3	20	<0.05	<0.01	503	9.6	3.19	1.02	0.54	0.37
DV	G-097147	1/13/2000	112	774	7.82	422	328	125	26.2	13.0	5.6	40.0	11.0	NA	17	<0.05	<0.01	487	12.1	3.14	1.05	0.56	0.38
DV	G-097147	4/26/2000	112	764	7.95	457	324	139	26.2	13.0	5.5	39.0	14.0	0.3	17	<0.05	<0.01	482	13.3	3.12	1.08	0.57	0.39
DV	G-097147	4/26/2000	112	763	7.9	462	328	140	26.5	13.0	5.6	38.0	14.0	0.3	17	<0.05	<0.01	470	12.7	3.47	1.08	0.57	0.38
DV	G-097147	7/13/2000	112	769	7.51	470	329	143	26.6	12.9	5.9	64.0	14.0	0.4	22	<0.05	<0.01	532	6.7	3.49	1.09	0.57	0.37
DV	G-097147	10/3/2000	112	1040	7.19	620	413	186	36.9	15.5	6.1	106.0	23.0	0.7	18	<0.05	<0.01	730	20.1	3.57	1.09	0.56	0.37
DV	G-097147	1/22/2001	112	888	7.25	538	366	161	32.3	14.8	6.2	110.0	18.0	0.4	18	<0.05	<0.01	673	7.7	4.64	1.52	0.67	0.38
DV	G-097147	4/9/2001	112	926	8.16	517	375	156	30.7	14.3	6.9	103.0	19.0	0.4	18	<0.05	<0.01	647	14	4.02	1.33	0.64	0.39
DV	G-097147	7/11/2001	112	882	7.21	458	352	138	27.4	15.1	5.5	97.0	16.0	0.3	18	<0.05	<0.01	603	5.2	3.89	1.26	0.62	0.39
DV	G-097147	10/30/2001	112	939	7.29	589	360	174	37.1	17.4	6.7	110.0	20.0	0.3	18	<0.05	<0.01	602	10.7	3.44	1.13	0.66	0.43
DV	G-097147	1/10/2002	112	846	7.25	485	320	144	30.1	15.3	6.6	91.0	14.0	0.4	18	<0.05	<0.01	628	4.3	4.34	1.53	0.76	0.44
DV	G-097147	4/15/2002	112	925	7.71	538	319	164	30.7	15.3	6.2	96.0	15.0	0.3	19	NA	<0.01	542	4.1	3.59	1.24	0.67	0.43
DV	G-097147	7/23/2002	112	1040	7.1	511	340	157	28.8	14.8	7.0	102.0	18.5	0.3	36	<0.05	<0.01	700	13	4.09	1.26	0.67	0.41
DV	G-097147	11/4/2002	112	995	7	545	377	167	30.8	16.4	7.0	107.0	17.6	0.3	34.7	<0.05	<0.01	576	7.1	3.92	1.18	0.64	0.40
DV	G-097147	1/9/2003	112	919	7.2	493	362	151	28.0	14.9	7.0	97.0	15.4	0.3	34.3	<0.05	<0.01	520	7.3	4.17	1.27	0.71	0.43
DV	G-097147	5/6/2003	112	965	7.2	482	370	147	27.8	14.4	6.0	96.9	16.7	0.3	35.5	<0.05	<0.01	576	5.3	3.77	1.15	0.65	0.41
DV	G-097147	7/24/2003	112	934	7.26	524	375	158	30.9	15.5	6.9	97.0	15.0	0.5	15	<0.05	<0.01	588	4.4	3.67	1.14	0.63	0.40
DV	G-097147	10/7/2003	112	979	7.24	548	375	166	32.0	16.1	7.4	114.0	17.0	0.4	14	<0.05	<0.01	626	7.1	3.94	1.27	0.67	0.42
DV	G-097147	8/5/2004	112	860	7.2	464	348	139	28.4	15.7	7.0	100.0	13.1	0.3	37	<0.05	<0.01	552	4.5	4.14	1.32	0.70	0.42
DV	G-097147	4/25/2005	112	842	7.2	415	350	126	24.2	13.2	6.0	92.0	10.4	0.4	32.5	<0.05	<0.01	484	1	3.47	1.17	0.68	0.45
DV	G-097147	10/28/2005	112	861	7.29	489	363	149	28.5	14.7	7.2	95.0	11.0	0.7	18	<0.05	<0.01	454	1.9	3.14	1.00	0.57	0.40
DV	G-097147	4/26/2006	112	777	7.3	452	342	137	26.8	14.3	6.1	87.0	8.0	0.3	16	<0.05	<0.01	508	0.4	3.72	1.17	0.64	0.41
DV	G-097147	10/19/2006	112	787	8	455	352	137	27.3	14.0	7.5	89.0	10.0	0.3	16	<0.05	<0.01	524	0.6	3.42	1.10	0.62	0.41
DV	G-097147	5/1/2007	112	774	7.7	479	334	125.4	25.3	13.5	5.8	86.0	8.0	0.4	16.29	<0.05	<0.01	496	<0.2	3.42	1.12	0.61	0.40
DV	G-097147	7/27/2007	112	807	7.8	398	366	120.3	23.9	12.5	6.8	87.0	7.0	0.2	16.41	<0.05	<0.01	480	0.2	3.13	1.04	0.59	0.41
DV	G-097147	5/14/2008	112	688	7.25	400	331	121.22	23.8	13.8	5.9	77.0	6.0	0.2	15.79	<0.05	<0.01	480	0.3	3.00	0.98	0.54	0.39
DV	G-097147	12/10/2008	112	729	7.33	365	329	110.41	22.0	14.0	6.1	75.0	6.0	0.3	14.2	<0.05	<0.01	494	0.5	3.02	0.98	0.60	0.42
DV	G-097147	5/12/2009	112	724	7.18	376	333	116.36	20.9	13.2	5.2	80.0	6.0	0.3	15.46	<0.05	0.01	510	0.3	2.75	0.90	0.61	0.45
DV	G-097147	11/5/2009	112	806	7.22	378	341	113.92	22.6	16.1	14.4	83.0	7.0	0.3	15.25	<0.05	<0.01	492	<0.2	2.90	0.86	0.57	0.42
DV	G-097147	5/26/2010	112	762	7.22	399	335	122.12	22.8	13.0	6.1	75.0	7.0	0.3	14.55	<0.05	0.02	442	0.2	2.84	0.93	0.70	0.51
DV	G-097147	11/9/2010	112	743	7.2	413	342	127.38	23.2	12.9	5.8	83.0	7.0	0.4	16.56	<0.05	<0.01	428	<0.2	3.05	0.94	0.57	0.40
DV	G-097147	6/8/2011	112	756	7.12	386	339	116.84	22.7	13.2	5.7	77.0	6.0	0.3	16.57	<0.05	<0.01	476	0.6	3.18	0.96	0.56	0.39
DV	G-097147	11/1/2011	112	743	7.17	402	343	119.64	24.9	15.3	7.1	69.0	7.0	0.3	24.74	0.01	0.01	484	0.5	2.92	0.93	0.57	0.41
DV	G-097147	5/23/2012	112	781	7.17	373.1	336	113.1	22.0	12.7	5.5	60.5	6.4	0.3	16.35	<0.05	<0.01	494	4.4	2.99	1.02	0.66	0.47
DV	G-097147	12/3/2012	112	807	7.13	420.2	353	127.8	24.6	13.5	6.0	78.5	8.8	0.2	17.52	<0.05	<0.01	456	2.98	2.82	0.91	0.55	0.40
DV	G-097147	5/23/2013	112	800	7.18	404.5	337	123.9	23.1	13.7	5.9	69.6	7.3	0.3	16.6	<0.05	<0.01	496	3.69	3.19	1.01	0.59	0.41
DV	G-097147	10/1/2013	112	987	7.16	504.4	409	152.7	29.9	16.6	6.8	92.1	17.6	0.3	14.79	<0.05	<0.01	644	9.06	3.09	0.95	0.59	0.42
DV	G-097148	7/7/1998	180	1088	7.3	660	332	167	42.0	5.3	6.3	336.0	24.7	0.53	NA	NA	NA	913	8.3	3.81	1.23	0.72	0.46
DV	G-097148	7/14/1999	180	1260	7.47	723	348	213	45.4	21.8	8.7	188.0	22.0	0.6	18	<0.05	0.02	963	29.6	4.17	1.73	0.23	0.13
DV	G-097148	11/3/1999	180	1250	7.48	715	352	208	47.0	22.4	8.5	203.0	18.0	0.6	19	<0.05	<0.01	910	32.3	5.31	1.87	0.95	0.50
DV	G-097148	1/13/2000	180	1262	7.75	700	357	203	46.3	21.8	7.6	209.0	18.0	0.3	18	<0.05	0.01	898	32.5	5.19	1.93	0.97	0.52
DV	G-097148	4/27/2000	180	1229	7.68	723	366	213	45.6	21.6	7.9	198.0	24.0	0.8	20	<0.05	<0.01	945	35	5.06	1.90	0.95	0.51
DV	G-097148	4/27/2000	180	1233	7.61	718	360	211	45.6	21.7	7.6	192.0	24.0	0.7	20	<0.05	<0.01	953	37.7	5.31	1.88	0.94	0.50
DV	G-097148	7/13/2000	180	1243	7.46	792	365	236	48.4	22.6	8.9	211.0	25.0	1.1	19	<0.05	<0.01	945	36.6	5.26	1.88	0.94	0.50
DV	G-097148	10/3/2000	180	1201	7.29	712	359	209	45.2	21.7	8.4	194.0	23.0	0.9	19	<0.05	<0.01	880	36.8	5.89	1.99	0.98	0.50
DV	G-097148	1/22/2001	180	1158	7.18	710	350	208	45.4	22.2	8.2	205.0	24.0	0.6	19	<0.05	0.01	875	35.6	5.21	1.86	0.94	0.50

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
DV	G-097148	4/9/2001	180	1248	8.59	655	352	193	41.4	21.3	8.8	201.0	23.0	0.5	19	<0.05	<0.01	905	34.8	5.19	1.87	0.97	0.51
DV	G-097148	7/11/2001	180	1281	7.11	659	353	193	42.2	23.1	7.5	210.0	23.0	0.3	18	<0.05	0.01	980	36	4.82	1.70	0.93	0.51
DV	G-097148	10/30/2001	180	1216	7.18	773	295	223	51.6	24.1	8.5	256.0	26.0	0.7	20	<0.05	0.01	903	32.9	4.82	1.74	1.00	0.56
DV	G-097148	1/10/2002	180	1275	7.2	724	384	209	47.9	24.9	8.7	225.0	24.0	0.9	19	<0.05	<0.01	988	33.9	5.56	2.12	1.05	0.53
DV	G-097148	4/15/2002	180	1406	7.64	786	318	234	48.0	23.5	8.3	227.0	25.0	0.9	20	<0.05	0.02	935	39.9	5.21	1.97	1.08	0.57
DV	G-097148	7/23/2002	180	1300	7	623	344	187	37.7	19.5	7.0	214.0	22.9	0.3	39.5	<0.05	<0.01	864	15.2	5.84	1.97	1.02	0.52
DV	G-097148	11/4/2002	180	1270	7	691	341	208	41.7	22.0	8.0	212.0	23.3	0.3	38.7	<0.05	<0.01	840	26.4	4.67	1.55	0.85	0.48
DV	G-097148	1/9/2003	180	1280	7.1	693	344	208	42.1	21.0	8.0	213.0	23.7	0.3	38.3	<0.05	0.015	784	34.2	5.19	1.72	0.96	0.52
DV	G-097148	5/6/2003	180	1400	7.1	689	341	207	41.7	22.3	8.0	223.0	24.1	0.4	40.6	<0.05	0.012	860	29	5.19	1.73	0.91	0.49
DV	G-097148	7/24/2003	180	1315	7.15	739	352	218	46.3	22.2	8.8	221.0	22.0	0.9	17	<0.05	<0.01	876	32.5	5.16	1.72	0.97	0.52
DV	G-097148	10/7/2003	180	1260	6.97	698	340	206	43.6	22.0	8.4	212.0	22.0	0.6	16	<0.05	<0.01	868	30.9	5.44	1.90	0.97	0.50
DV	G-097148	8/5/2004	180	1290	7	683	342	201	43.7	21.7	8.0	225.0	24.8	0.4	42.3	<0.05	0.015	820	30	5.14	1.79	0.96	0.51
DV	G-097148	4/25/2005	180	1260	7.1	614	336	183	37.6	20.9	6.0	264.0	23.0	0.4	35	<0.05	0.01	804	29.2	5.01	1.80	0.94	0.51
DV	G-097148	10/29/2005	180	1210	7.49	684	348	203	42.9	21.7	7.7	189.0	21.0	0.9	20	<0.05	<0.01	738	29.4	4.57	1.55	0.91	0.52
DV	G-097148	1/18/2006	180	1245	7.48	721	370	214	45.4	21.2	8.9	210.0	23.0	1.3	19	<0.05	<0.01	800	31.4	5.06	1.76	0.94	0.51
DV	G-097148	4/26/2006	180	1150	7.29	668	340	197	42.7	22.0	7.6	193.0	21.0	0.4	17	<0.05	<0.01	824	27	5.34	1.87	0.92	0.49
DV	G-097148	10/19/2006	180	723	7.92	402	320	118	26.1	23.0	5.2	68.0	13.0	0.4	15	<0.05	<0.01	484	9.5	4.92	1.76	0.96	0.52
DV	G-097148	5/1/2007	180	608	7.77	1640	277	84.71	19.5	24.4	3.2	33.0	9.0	0.4	13.72	<0.05	<0.01	370	1.9	2.94	1.07	1.00	0.71
DV	G-097148	7/26/2007	180	1024	8.01	453	319	132.56	29.3	17.6	5.7	115.0	25.0	0.3	15.48	<0.05	0.03	648	19.9	2.11	0.80	1.06	0.88
DV	G-097148	3/7/2008	180	613	8.06	285	274	83.08	18.8	24.2	3.2	32.0	9.0	0.4	13.98	<0.05	<0.01	350	2.4	3.31	1.21	0.77	0.51
DV	G-097148	5/14/2008	180	800	7.2	429	312	125.96	27.7	18.9	4.7	69.0	24.0	0.3	16.19	<0.05	<0.01	588	16.8	2.07	0.77	1.05	0.88
DV	G-097148	9/10/2008	180	551	7.43	247	268	71.28	17.0	25.4	3.6	27.0	8.0	0.4	12.37	<0.05	<0.01	360	2.8	3.14	1.14	0.82	0.56
DV	G-097148	5/12/2009	180	556	7.32	258	275	76.05	16.5	24.9	3.3	26.0	9.0	0.4	13.42	<0.05	<0.01	354	2.1	1.78	0.70	1.11	0.99
DV	G-097148	11/5/2009	180	613	7.38	263	264	76.16	17.8	24.5	3.4	25.0	9.0	0.4	14.37	<0.05	<0.01	324	2.5	1.90	0.68	1.08	0.95
DV	G-097148	5/26/2010	180	726	7.57	361	326	110	20.9	14.2	5.3	67.0	7.0	0.4	14.08	<0.05	0.01	428	2	1.90	0.73	1.07	0.93
DV	G-097148	11/9/2010	180	563	7.41	264	275	77.78	16.9	21.9	3.1	23.0	9.0	0.4	14.38	<0.05	0.01	274	1.9	2.74	0.86	0.62	0.46
DV	G-097148	6/8/2011	180	579	7.36	255	270	74.41	17.0	23.0	3.2	23.0	9.0	0.4	14.71	<0.05	0.01	344	1.9	1.94	0.70	0.95	0.83
DV	G-097148	11/1/2011	180	566	7.36	404	273	123.4	23.5	13.6	6.2	22.0	9.0	0.5	17.3	<0.05	<0.01	346	2	1.86	0.70	1.00	0.89
DV	G-097148	5/23/2012	180	597	7.33	258.3	276	75.01	17.3	21.8	3.1	22.5	8.3	0.5	14.18	<0.05	0.02	346	1.5	3.08	0.97	0.59	0.42
DV	G-097148	12/3/2012	180	579	7.27	272.9	274	79.62	18.0	23.1	3.4	23.1	8.2	0.4	15.7	<0.05	<0.01	298	1.62	1.87	0.71	0.95	0.83
DV	G-097148	5/23/2013	180	617	7.3	269.7	277	79.12	17.5	22.8	3.2	24.6	8.6	0.4	14.33	<0.05	<0.01	360	2.62	1.99	0.74	1.00	0.86
DV	G-097148	10/1/2013	180	569	7.32	271.4	276	78.78	18.1	23.4	3.3	22.4	8.5	0.4	14.01	<0.05	<0.01	356	1.74	1.97	0.72	0.99	0.85
DV	G-115762	7/2/2002	386	807	7.2	459	352	133	30.8	25.3	7.0	19.9	6.2	0.3	40.9	<0.05	0.408	564	0.9	1.97	0.75	1.02	0.87
DV	G-115762	7/8/2003	386	840	7.32	467	338	130	34.0	25.3	7.6	107.0	6.0	0.4	21	<0.05	0.19	568	2.1	3.32	1.27	1.10	0.73
DV	G-115762	7/19/2004	386	893	6.8	417	340	114	31.7	24.8	8.0	106.0	6.3	0.4	47.3	<0.05	0.248	516	1.7	3.24	1.40	1.10	0.72
DV	G-115762	7/11/2005	386	825	7.48	438	284	122	32.3	24.4	7.7	102.0	6.0	0.4	26	<0.05	0.25	472	1.8	2.84	1.30	1.08	0.75
DV	G-115762	7/5/2006	386	817	7.41	455	344	128	32.9	24.4	8.2	87.0	6.0	0.2	22	<0.05	0.28	618	1.8	3.04	1.33	1.06	0.72
DV	G-115762	7/17/2007	386	861	7.76	417	366	112	33.4	36.3	4.5	136.0	4.0	0.4	15.26	<0.05	0.04	592	8.2	3.19	1.35	1.06	0.70
DV	G-115762	7/28/2008	386	792	7.41	390	333	110.73	27.7	24.5	6.9	104.0	6.0	0.3	19.28	<0.05	0.08	518	2.1	2.79	1.37	1.58	1.09
DV	G-115762	7/7/2009	386	779	7.26	390	329	107.23	29.8	26.2	6.6	107.0	6.0	0.4	19.44	<0.05	<0.01	568	2.6	2.76	1.14	1.07	0.76
DV	G-115762	7/18/2011	386	776	7.13	NA	327	98.75	28.1	25.6	7.7	105.0	6.0	NA	NA	<0.05	0.04	546	2.1	2.68	1.23	1.14	0.81
DV	G-127257	8/11/2004	236	1040	7.4	474	363	125	39.4	34.1	14.0	181.0	3.2	0.3	48.1	0.293	0.454	704	0.2	2.46	1.16	1.11	0.83
DV	G-127257	8/19/2005	236	972	7.51	505	374	135	40.8	34.9	13.5	173.0	2.0	0.4	23	<0.05	0.46	606	<0.2	3.12	1.62	1.48	0.96
DV	G-127358	7/28/2004	NA	907	6.8	431	320	129	26.3	16.5	6.0	66.7	12.1	0.4	44.4	<0.05	0.005	512	5.5	3.37	1.68	1.52	0.96
DV	G-127358	4/12/2005	NA	795	7.1	420	302	128	24.4	15.4	6.0	65.0	9.5	0.4	44.7	<0.05	<0.01	500	6.2	3.22	1.08	0.72	0.49
DV	G-127358	11/1/2005	NA	775	7.08	418	322	126	25.1	15.7	6.2	52.0	7.0	0.6	21	<0.05	<0.01	438	5.3	3.19	1.00	0.67	0.46
DV	G-127358	4/25/2006	NA	753	7.29	427	327	129	25.4	15.6	6.5	64.0	9.0	0.4	19	<0.05	<0.01	504	5.5	3.14	1.03	0.68	0.47
DV	G-127358	10/16/2006	NA	738	7.86	428	328	130	25.2	15.5	6.3	65.0	9.0	0.3	20	<0.05	<0.01	540	5.8	3.22	1.04	0.68	0.46
DV	G-127358	4/27/2007	NA	756	7.64	350	328	121.9	24.7	16.9	5.9	61.0	9.0	0.3	20.6	0.01	<0.01	466	6	3.24	1.04	0.67	0.46
DV	G-127358	9/4/2007	NA	779	7.98	386	321	115.92	23.4	13.7	6.4	60.0	9.0	0.5	18.68	<0.05	<0.01	476	5.9	3.04	1.02	0.73	0.51
DV	G-127358	5/14/2008	NA	681	7.12	374	313	113	22.3	14.2	4.3	55.0	9.0	0.3	18.66	<0.05	<0.01	478	6.5	2.89	0.96	0.60	0.43
DV	G-127358	12/10/2008	NA	716	7.34	356	314	106.88	21.6	15.0	6.2	50.0	11.0	0.3	17.23	<0.05	<0.01	476	7.2	2.82	0.92	0.62	0.45
DV	G-127358	5/12/2009	NA	710	7.2	365	320	111.56	20.8	14.2	5.5	52.0	11.0	0.4	18.04	<0.05	<0.01	492	7.4	2.67	0.89	0.65	0.49
DV	G-127358	11/5/2009	NA	779	7.22	371	317	111.5	22.3	13.9	5.7	53.0	10.0	0.3	18.98	<0.05	<0.01	480	5.2	2.78	0.86	0.62	0.46
DV	G-127358	5/26/2010	NA	734	7.15	371	313	113.29	21.6	13.3	5.7	51.0	11.0	0.4	18.1	<0.05	<0.01	476	5.4	2.78	0.92	0.61	0.45
DV	G-127358	11/9/2010	NA	714	7.23	383	321	117.45	21.8	12.9	5.6	51.0	10.0	0.4	19.75	<0.05	<0.01	392	4.6	2.83	0.89	0.58	0.42
DV	G-127358	6/8/2011	NA	713	7.16	341	317	103.19	20.4	12.2	5.4	48.0	10.0	0.4	18.92	<0.05	<0.01	446	5.2	2.93	0.90	0.56	0.41
DV	G-127358	11/1/2011	NA	698	7.21	303	314	92.6	17.3	12.7	6.5	49.0	10.0	0.4	25.91	<0.05	0.01	430	6	2.57	0.84	0.53	0.41
DV	G-127358	5/23/2012	NA	745	7.24	353.9	312	106.7	21.3	12.3	5.5	49.0	9.7	0.4	19.17	<0.05	<0.01	456	5	2.31	0.71	0.55	0.45
DV	G-127358	12/3/2012	NA	733	7.21	391.8	320	118.9	23.1	13.7	6.0	50.7	9.7	0.3	21.7	<0.05	<0.01	418	5.89	2.66	0.87	0.53	0.40
DV	G-127358	5/23/2013	NA	746	7.22	377.7	316	115.1	21.9	13.2	5.7	49.8	9.6	0.4	19.74	<0.05	<0.01	432	4.99	2.97	0.95	0.60	0.43
DV	G-127358	10/1/2013	NA	719	7.22	374.8	322	113.9	22.0	13.5	5.8	51.6	9.5	0.3	18.7	<0.05	<0.01	486	4.62	2.87	0.90	0.57	0.42
DV	G-137713	11/22/2005	237	627	7.77	306	282	92	18.5	18.9	7.4	50.0	6.0	0.2	19	<0.05	0.6	360	<0.2	2.84	0.90	0.59	0.43
DV	G-137713	1/18/2006	237	614	7.6	324	282	98	19.3	19.3	7.8	51.0	5.0	0.6	20	<0.05	0.47	372	0.3	2.30	0.76	0.82	0.67
DV	G-137713	4/19/2006	237	598	7.22	312	274	94	18.7	19.4	7.3	50.0	5.0	0.2	20	<0.05	0.53	424	<0.2	2.45	0.79	0.84	0.66
DV	G-137713	7/12/2006	237	623	7.84	333	294	101	19.6	21.1	6.8	47.0	5.0	0.2	18	<0.05	0.57	342	<0.2	2.35	0.77	0.84	0.68
DV	G-137713	10/5/2006	237	607	7.82	315	274	95	19.0	19.4	7.3	51.0	6.0	0.3	19	<0.05	0.53	364	<0.2	2.52	0.81	0.92	0.71
DV	G-137713	2/1/2007	237	617	7.69	268	290	80.55	16.0	15.6	6.6	49.0	6.0	0.5	17.32	<0.05	0.44	374	<0.2	2.37	0.78	0.84	0.67
DV	G-137713	4/18/2007	237	606	7.61	289	276	87.23	17.4	17.3	6.5	49.0	6.0	0.3	17.18	<0.05	0.45	404	<0.2	2.01	0.66	0.68	0.59
DV	G-137713	7/3/2007	237	605	7.96	278	269	83.8	16.6	15.8	5.9	47.0	5.0	0.4	19.28	<0.05	0.44	362	<0.2	2.18	0.72	0.75	0.63
DV	G-137713	6/26/2008	237	607	7.81	268	265	81.24	15.9	17.7	6.2	48.0	5.0	0.2	18.17	<0.05	0.48	364	<0.2	2.09	0.68	0.69	0.59
DV	G-137713	5/20/2009	237	580	7.42	285	273	86.83	16.5	18.8	6.5	49.0	5.0	0.3	17.85	0.01	0.46	402	0.6	2.03	0.65	0.77	0.66
DV	G-137713	9/21/2011	237	587	7.68	292	278	89.36	16.9	18.0	7.1	49.0	6.0	0.3	19.92	<0.05	0.42	382	<0.2	2.17	0.68	0.82	0.68
DV	G-137714	11/22/2005	220	673	7.83	277	281	83	16.9	50.3	6.8	68.0	6.0	0.2	19	<0.05	0.55	396	<0.2	2.23	0.69	0.78	0.65
DV	G-137714	1/18/2006	220	673	7.72	292	307	88	17.5	49.2	7.3	67.0	5.0	0.6	20	<0.05	0.59	396	<0.2	2.07	0.70	2.19	1.86
DV	G-137714	4/19/2006	220	663	7.46	276	295	83	16.7	54.2	7.3	69.0	5.0	0.2	21	<0.05	0.53	438	<0.2	2.20	0.72	2.14	1.77
DV	G-137714	7/12/2006	220	698	7.72	294	309	89	17.4	58.2	6.6	62.0	4.0	0.2	19	<0.05	0.62	400	<0.2	2.07	0.69	2.36	2.01

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
DV	G-137714	10/5/2006	220	663	7.93	280	294	84	17.0	48.2	6.5	61.0	5.0	0.3	19	<0.05	0.63	412	<0.2	2.22	0.72	2.53	2.09
DV	G-137714	1/29/2007	220	672	7.8	249	307	75.43	15.1	42.7	6.2	55.0	5.0	0.3	18.81	<0.05	0.55	386	<0.2	2.10	0.70	2.10	1.77
DV	G-137714	4/20/2007	220	657	7.52	279	295	83.55	16.8	41.2	6.4	54.0	5.0	0.2	18.77	<0.05	0.58	414	<0.2	1.88	0.62	1.86	1.66
DV	G-137714	6/25/2007	220	652	7.79	249	317	73.64	15.5	39.4	6.1	41.0	4.0	0.2	18.29	<0.05	0.59	396	<0.2	2.08	0.69	1.79	1.52
DV	G-137714	6/26/2008	220	662	7.94	270	301	81.63	16.2	35.0	6.4	44.0	5.0	0.2	20.1	<0.05	0.65	404	<0.2	1.84	0.64	1.71	1.54
DV	G-137714	9/9/2009	220	685	7.42	307	337	91.94	18.7	34.2	7.1	35.0	3.0	0.3	19.95	0.01	0.69	412	<0.2	2.04	0.67	1.52	1.31
DV	G-137714	9/21/2011	220	648	7.76	318	339	96.08	19.1	22.1	8.4	37.0	3.0	0.3	22.08	<0.05	0.6	430	<0.2	2.29	0.77	1.49	1.20
DV	G-137715	11/22/2005	287	775	7.71	404	328	119	26.0	21.9	6.9	93.0	6.0	0.2	19	<0.05	0.66	444	<0.2	2.40	0.79	0.96	0.76
DV	G-137715	1/18/2006	287	752	7.69	409	339	121	25.9	21.4	8.8	87.0	5.0	0.8	17	<0.05	0.47	446	<0.2	2.97	1.07	0.95	0.67
DV	G-137715	4/19/2006	287	728	7.21	399	317	119	24.7	20.4	7.7	88.0	5.0	0.4	20	<0.05	0.42	498	<0.2	3.02	1.07	0.93	0.65
DV	G-137715	10/5/2006	287	738	8.01	415	321	124	25.7	21.3	8.0	89.0	7.0	0.3	18	<0.05	0.49	462	<0.2	2.97	1.02	0.89	0.63
DV	G-137715	2/1/2007	287	748	8	340	322	101.41	21.4	17.6	6.5	88.0	6.0	0.4	16.59	<0.05	0.39	464	<0.2	3.09	1.06	0.93	0.64
DV	G-137715	4/18/2007	287	740	7.6	367	313	108.91	23.0	18.8	7.0	86.0	6.0	0.2	16.22	<0.05	0.4	474	<0.2	2.53	0.88	0.76	0.58
DV	G-137715	10/9/2008	287	688	7.64	330	311	100	19.5	17.6	6.2	83.0	5.0	0.2	16	0.01	0.2	436	<0.2	2.72	0.94	0.82	0.60
DV	G-137715	6/30/2011	287	712	7.3	335	319	100.27	20.6	18.1	6.4	81.0	6.0	0.4	17.47	0.01	0.73	468	<0.2	2.50	0.80	0.77	0.60
DV	G-155600	7/9/2010	360	719	7.36	290	314	82.32	20.8	46.6	5.8	80.0	4.0	0.4	18.91	0.01	0.62	388	<0.2	2.50	0.85	0.79	0.61
DV	G-155600	6/14/2011	360	883	7.21	269	436	75.64	19.3	95.7	3.7	15.0	5.0	0.6	20.55	0.16	1.12	548	<0.2	2.05	0.85	2.03	1.68
DV	G-155600	6/30/2011	360	843	7.28	260	443	71.69	19.6	91.1	3.9	8.0	5.0	0.5	20.61	0.03	1.09	524	17.8	1.89	0.79	4.16	3.59
DV	NR-99908enes	8/10/2001	NA	1070	7.31	605	318	170	43.1	21.5	7.8	163.0	12.0	0.4	20	<0.05	<0.01	942	18.2	1.79	0.80	3.96	3.48
DV	NR-99908enes	6/28/2002	NA	1120	7	555	352	165	34.6	22.1	8.0	32.2	10.4	0.4	39.4	<0.05	0.015	748	14.1	4.24	1.77	0.94	0.54
DV	NR-99908enes	7/23/2002	NA	1040	7.2	500	332	148	31.6	19.1	8.0	141.0	10.2	0.4	42.2	<0.05	<0.01	668	12	4.12	1.42	0.96	0.58
DV	NR-999LBenes	8/26/1994	NA	683	7	310	272	91	20.0	13.0	5.3	41.0	2.9	0.4	47	<0.05	0.001	432	11	3.69	1.30	0.83	0.53
DV	NR-999LBenes	7/25/1995	NA	700	7	310	271	92	20.0	13.0	5.2	40.0	3.0	0.4	45	<0.05	<0.01	439	13	2.27	0.82	0.57	0.45
DV	NR-999LBenes	8/6/1996	NA	620	7.1	308	270	100	19.0	10.0	4.2	76.0	2.4	0.43	48	<0.05	<0.01	430	11	2.30	0.82	0.57	0.45
DV	NR-999LBenes	7/29/1997	NA	633	6.9	300	280	0.7	23.0	6.0	5.4	45.0	2.6	0.5	0.65	0.1	<0.01	410	36	2.50	0.78	0.44	0.34
DV	NR-999LBenes	8/12/1998	NA	656	7.2	324	266	130	35.0	65.0	8.0	35.0	2.4	0.25	NA	NA	NA	460	9.7	0.02	0.95	0.26	0.38
DV	NR-999LBenes	7/26/1999	NA	672	7.4	369	272	107	24.5	14.0	4.9	41.0	4.0	0.2	23	<0.05	<0.01	463	13.1	3.24	1.44	2.83	1.85
DV	NR-999LBenes	8/3/2000	NA	681	7.16	365	280	107	23.3	13.8	5.1	44.0	3.0	0.4	22	<0.05	<0.01	418	16.7	2.67	1.01	0.61	0.45
DV	NR-999LBenes	7/24/2001	NA	698	7.02	365	241	108	22.8	15.0	5.3	42.0	5.0	0.4	22	<0.05	<0.01	440	14.8	2.67	0.96	0.60	0.45
DV	NR-999LBenes	7/23/2002	NA	688	7	328	254	98.9	19.6	12.5	3.0	39.1	3.5	0.4	47.3	<0.05	<0.01	488	9.6	2.69	0.94	0.65	0.48
DV	NR-999LBenes	8/5/2003	NA	691	6.88	382	280	113	23.4	14.2	5.5	39.0	4.0	0.3	22	<0.05	<0.01	420	15.1	2.47	0.81	0.54	0.42
DV	NR-999LBenes	8/5/2003	NA	700	6.89	366	284	109	22.6	13.9	5.1	39.0	6.0	0.4	22	<0.05	<0.01	424	<0.2	2.82	0.96	0.62	0.45
DV	NR-999LBenes	8/3/2004	NA	720	7.1	356	277	105	22.9	14.6	5.0	41.6	3.6	0.4	48.6	<0.05	<0.01	460	12	2.72	0.93	0.60	0.45
DV	NR-	9/6/1994	NA	776	7.3	340	375	90	27.0	32.0	13.0	39.0	4.1	0.3	50	0.15	0.45	481	<0.2	2.62	0.94	0.64	0.48
DV	NR-	7/24/1995	NA	777	7.4	320	332	86	26.0	32.0	22.0	37.0	3.8	0.3	50	0.23	0.45	457	0.05	2.25	1.11	1.39	1.07
DV	NR-	8/20/1996	NA	660	7.8	317	390	92	25.0	30.0	9.2	39.0	3.3	0.4	49	0.3	0.39	480	<0.2	2.15	1.07	1.39	1.10
DV	NR-	7/21/1998	NA	664	7.4	336	376	83	23.0	7.0	9.5	33.0	2.9	0.6	NA	NA	NA	508	2.4	2.30	1.03	1.31	1.01
DV	NR-	8/4/1999	NA	773	7.53	370	379	97	31.3	39.9	12.5	46.0	4.0	0.4	23	<0.05	0.45	523	<0.2	2.07	0.95	0.30	0.25
DV	NR-	10/3/2000	NA	750	7.54	366	389	98	29.2	37.6	12.4	41.0	4.0	0.4	23	<0.05	0.44	477	<0.2	2.42	1.29	1.74	1.27
DV	NR-	8/23/2001	NA	795	7.58	377	339	101	30.1	40.4	13.1	44.0	3.0	0.3	24	0.04	0.47	477	<0.2	2.45	1.20	1.64	1.21
DV	NR-	9/18/2002	NA	798	7.4	336	391	92.3	25.6	38.6	13.0	44.7	4.0	0.3	52.7	0.172	0.455	532	<0.2	2.52	1.24	1.76	1.28
DV	NR-	8/8/2003	NA	775	7.59	376	380	101	29.9	42.0	11.7	44.0	3.0	0.3	22	<0.05	0.41	550	<0.3	2.30	1.05	1.68	1.30
DV	NR-	9/13/2004	NA	798	7.4	333	379	89.7	26.3	36.9	12.0	41.7	4.3	0.4	51.3	0.166	0.423	468	<0.2	2.52	1.23	1.83	1.33
DV	NR-	9/28/2007	NA	771	8.24	330	369	87.69	26.8	34.0	10.7	39.0	4.0	0.4	21.9	0.02	0.44	468	<0.2	2.24	1.08	1.61	1.25
DV	NR-	7/9/2009	NA	711	7.52	336	364	90.36	26.8	37.6	13.0	41.0	4.0	0.4	22.42	0.01	0.4	460	<0.2	2.19	1.10	1.48	1.15
DV	NR-	6/14/2011	NA	774	7.35	341	371	93.97	25.8	34.1	11.9	39.0	3.0	0.3	23.13	0.01	0.44	472	<0.2	2.25	1.10	1.64	1.26
DV	12N 5E 2ABBC1	8/14/1995	91	754	7.5	361	NA	110	21.0	14.0	8.8	60.0	7.6	0.3	35	5	570	446	NA	2.34	1.06	1.48	1.14
DV	12N 5E34BD 1	6/5/1970	55	755	7.3	310	391	86	23.0	39.0	9.2	70.0	13.0	0.4	48	9700	1350	492	NA	2.74	0.86	0.61	0.45
DV	12N 5E35DA 1	6/5/1970	120	809	7.3	370	383	114	21.0	37.0	6.1	31.0	18.0	0.3	38	20	330	558	23	2.15	0.95	1.70	1.36
DV	12N 6E 9BD 1	12/9/1960	NA	627	7.8	280	343	80	18.0	18.0	NA	21.0	7.5	0.5	28	190	NA	NA	NA	2.84	0.86	1.61	1.18
DV	13N 3E13DA 1	8/18/1977	422	690	7.7	310	390	87	23.0	21.0	7.1	37.0	5.6	0.4	51	70	240	427	NA	2.00	0.74	0.78	0.67
DV	13N 4E 6CDBC1	8/23/1994	312	830	7.3	394	NA	110	29.0	20.0	8.1	100.0	5.9	0.4	49	6	67	530	NA	2.17	0.95	0.91	0.73
DV	13N 4E 6CDBC1	7/27/1995	313	825	7.1	394	NA	110	29.0	20.0	7.5	97.0	5.5	0.4	47	< 3.0	240	480	NA	2.74	1.19	0.87	0.62
DV	13N 4E20DBDA	9/6/1994	NA	776	7.3	336	NA	90	27.0	32.0	13.0	39.0	4.1	0.3	50	150	450	481	NA	2.74	1.19	0.87	0.62
DV	13N 4E20DBDA	7/24/1995	NA	777	7.4	322	NA	86	26.0	32.0	22.0	37.0	3.8	0.3	50	230	450	457	NA	2.25	1.11	1.39	1.07
DV	13N 5E15BBAB	8/26/1994	76	683	7	310	NA	91	20.0	13.0	5.3	41.0	2.9	0.4	47	< 3.0	1	432	NA	2.15	1.07	1.39	1.10
DV	13N 5E15BBAB	7/25/1995	76	700	7	312	NA	92	20.0	13.0	5.2	40.0	3.0	0.4	45	< 3.0	< 1.00	439	NA	2.35	0.86	0.70	0.55
DV	13N 5E15BBB 1	7/25/1995	83	510	7.3	321	NA	94	21.0	16.0	7.0	44.0	3.5	0.3	35	68	850	411	NA	2.27	0.82	0.57	0.45
DV	13N 5E15DBDC	7/24/1995	191	781	7.2	353	NA	100	25.0	15.0	9.0	69.0	6.5	0.3	35	170	380	432	NA	2.30	0.82	0.57	0.45
DV	13N 5E22AACA	8/16/1994	NA	790	7.2	430	341	130	26.0	13.0	7.0	83.0	13.0	0.4	47	<3.0	26	545	6.8	2.50	1.03	0.65	0.49
DV	13N 5E27AAB 1	7/25/1995	120	870	7.2	411	NA	120	27.0	23.0	7.7	96.0	6.5	0.3	38	300	720	541	NA	3.24	1.07	0.57	0.39
DV	13N 6E14CCBA	8/18/1994	123	626	7.6	292	NA	89	17.0	18.0	5.3	46.0	2.6	0.3	45	6	< 1.00	397	NA	2.99	1.11	1.00	0.70
DV	13N 6E14CCBA	7/27/1995	123	NA	NA	288	NA	89	16.0	18.0	4.6	39.0	2.3	0.3	44	10	< 1.00	373	NA	2.22	0.70	0.78	0.65
DV	13N 6E20ABDC	8/29/1994	235	399	7	151	NA	45	9.4	20.0	4.4	7.2	2.4	0.3	50	20	1	262	NA	2.22	0.66	0.78	0.65
DV	13N 6E20ABDC	8/15/1995	235	632	7.1	294	NA	88	18.0	19.0	5.4	66.0	2.5	0.2	46	< 3.0	21	412	NA	1.12	0.39	0.87	1.00
DV	13N 6E28AABB	8/26/1994	NA	441	6.9	170	174	46	13.0	21.0	3.7	18.0	2.0	0.3	49	8	2	290	7.4	2.20	0.74	0.83	0.68
DV	14N 4E17CB 1	8/19/1977	324	905	7.5	460	420	130	33.0	20.0	4.3	170.0	2.8	0.3	47	80	460	621	NA	1.15	0.53	0.91	1.00
DV	14N 5E12AC 1	6/29/1948	NA	483	8	210	234	47	23.0	20.0	5.6	68.0	6.0	0.2	45	NA	NA	330	NA	3.24	1.36	0.87	0.57
DV	14N 5E32DCCD	8/29/1994	80	778	7.3	365	NA	110	22.0	18.0	5.9	58.0	8.2	0.3	43	160	33	479	NA	1.17	0.95	0.87	0.85
DV	14N 5E32DCCD	8/15/1995	80	737	7.4	365	NA	110	22.0	18.0	4.8	46.0	6.9	0.3	39	11	20	445	NA	2.74	0.91	0.78	0.58
DV	15N 3E20CBC 1	8/19/1977	404	675	7.6	330	380	96	22.0	24.0	7.6	65.0	3.2	0.3	39	40	400	445	NA	2.74	0.91	0.78	0.58
DV	15N 4E10CAC 1	8/19/1977	138	563	7.2	250	200	76	15.0	14.0	8.0	75.0	17.0	0.2	51	250	20	381	NA	2.40	0.91	1.04	0.81
RA	G-028518	12-Aug-04	NA	1040	7.2	476	330	132	35.3	20.6	5.0	162.0	3.2	0.3	54.2	<0.05	0.482	560	1.9	1.90	0.62	0.61	0.54
RA	G-028518	19-Aug-05	NA	893	7.3	502	336	140	36.9	20.6	4.8	162.0	2.0	0.3	24	<0.05	0.47	560	1.5	3.29	1.45	0.90	0.58
RA	G-028518	21-Aug-06	NA	892	7.58	509	351	143	36.9	19.8	4.2	155.0	1.0	0.2	24	<0.05	0.35	590	1.6	3.49	1.52	0.90	0.57
RA	G-028518	20-Jun-07	NA	850	7.87	436	332	122.65	31.4	17.1	3.7	162.0	3.0	0.5	23.88	<0.05	0.42	596	1.5	3.57	1.52	0.86	0.54
RA	G-028518	10-Jun-08	NA	898	7.77	443	338	124.28	32.4	18.0	3.7	149.0	2.0	0.2	20.57	<0.05	0.59	600	1.7	3.06	1.29	0.75	0.51

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
RA	G-028518	09-Jun-09	NA	916	7.14	447	323	127.16	31.5	20.0	4.3	164.0	2.0	0.3	20.34	<0.05	0.44	602	1.2	3.10	1.33	0.78	0.53
RA	G-028518	18-May-10	NA	861	7.12	439	325	127.4	29.5	19.6	4.3	156.0	2.0	0.3	19.72	<0.05	0.43	588	1	3.17	1.30	0.87	0.58
RA	G-028518	06-Jun-12	NA	866	7.1	462.2	332	129.4	33.8	18.7	4.0	162.0	2.3	0.3	23.43	<0.05	0.48	614	1.4	3.18	1.21	0.85	0.58
RA	G-028518	21-Aug-03	NA	893	7.14	535	336	152	37.1	19.9	5.2	164.0	3.0	0.4	21	<0.05	0.22	616	1.6	3.23	1.39	0.81	0.53
RA	G-028519	12-Aug-04	NA	1050	7.2	476	336	132	35.3	19.8	4.0	155.0	3.0	0.3	53.6	0.096	0.699	568	1.8	3.79	1.53	0.87	0.53
RA	G-028519	17-Aug-05	NA	891	7.12	502	344	140	37.0	20.3	4.7	143.0	2.0	0.3	22	<0.05	0.65	574	1.5	3.29	1.45	0.86	0.56
RA	G-028519	21-Aug-06	NA	892	7.67	517	350	145	37.7	19.6	3.8	146.0	1.0	NA	24	<0.05	0.66	580	1.7	3.49	1.52	0.88	0.56
RA	G-028519	20-Jun-07	NA	851	7.75	420	341	113.98	32.8	17.1	3.7	152.0	3.0	0.3	24.98	<0.05	0.3	592	1.8	3.62	1.55	0.85	0.53
RA	G-028519	10-Jun-08	NA	816	7.77	322	307	93.69	21.2	42.6	5.9	76.0	22.0	0.3	13.87	<0.05	0.03	486	3.9	2.84	1.35	0.74	0.51
RA	G-028519	09-Jun-09	NA	920	7.12	426	343	121.01	30.0	17.6	4.1	154.0	2.0	0.2	19.8	0.01	0.54	656	1.3	2.34	0.87	1.85	1.46
RA	G-028519	18-May-10	NA	878	7.1	458	334	131.84	31.1	18.4	4.4	160.0	2.0	0.3	20.67	<0.05	0.56	604	1.5	3.02	1.24	0.76	0.52
RA	G-028519	06-Jun-12	NA	893	7.1	481.5	343	133.4	36.0	18.2	4.2	168.0	2.2	0.2	23.44	<0.05	0.67	636	1.4	3.29	1.28	0.80	0.53
RA	G-028519	21-Aug-03	NA	NA	7.05	540	346	153	37.7	19.4	4.7	151.0	2.0	0.3	22	<0.05	0.59	614	1.7	3.33	1.48	0.79	0.51
RA	G-028520	12-Aug-04	NA	1090	7.2	501	342	137	38.4	21.6	5.0	170.0	3.8	0.3	53.6	0.142	0.204	612	2.2	3.82	1.55	0.84	0.52
RA	G-028520	19-Aug-05	NA	935	7.35	534	341	146	41.1	22.7	4.4	171.0	3.0	0.3	24	<0.05	0.21	608	2.4	3.42	1.58	0.94	0.59
RA	G-028520	09-Jun-09	NA	1005	7.11	480	330	129.82	37.7	22.1	5.6	200.0	2.0	0.3	22.81	<0.05	0.65	624	2.6	3.64	1.69	0.99	0.60
RA	G-028520	21-Aug-03	NA	930	7.05	561	349	157	40.3	22.0	4.7	166.0	4.0	0.4	21	<0.05	0.17	636	2.8	3.24	1.55	0.96	0.62
RA	G-032956	06-Jul-05	98	719	7.48	349	332	106	20.4	24.3	7.6	55.0	7.0	0.3	20	<0.05	0.87	378	<0.2	3.92	1.66	0.96	0.57
RA	G-032956	26-Jun-06	98	688	7.59	366	326	111	21.5	24.6	8.4	52.0	7.0	0.3	19	<0.05	0.85	434	<0.2	2.64	0.84	1.06	0.80
RA	G-032956	02-Jul-07	98	695	8.09	309	320	93.04	18.7	21.4	6.5	54.0	6.0	0.3	19.66	<0.05	0.7	432	<0.2	2.77	0.88	1.07	0.79
RA	G-032956	28-Jul-09	98	761	7.36	331	325	99.75	19.8	25.8	7.6	57.0	8.0	0.3	19.23	<0.05	0.72	450	<0.2	2.32	0.77	0.93	0.75
RA	G-034779	20-Jul-04	123	641	6.8	299	275	90.6	17.5	19.9	5.0	43.6	3.1	0.3	45.5	<0.05	<0.01	388	1.2	2.49	0.82	1.12	0.87
RA	G-034779	26-Jun-06	123	585	7.63	310	283	96	17.1	18.3	5.1	41.0	3.0	0.2	20	<0.05	<0.01	344	0.9	2.26	0.72	0.87	0.71
RA	G-034779	02-Jul-07	123	588	8.05	254	265	78	14.3	16.5	4.1	41.0	3.0	0.4	20	<0.05	<0.01	378	1	2.40	0.70	0.80	0.64
RA	G-034779	30-Jul-08	123	593	7.48	286	277	89.66	15.1	22.0	4.6	49.0	4.0	0.3	19.68	<0.05	<0.01	364	1.6	1.95	0.59	0.72	0.64
RA	G-034779	27-Jul-95	123	626	7.6	290	261	89	16.0	18.0	4.6	39.0	2.3	0.3	44	0.01	<0.01	373	0.84	2.24	0.62	0.96	0.80
RA	G-034779	18-Aug-94	123	NA	NA	290	284	89	17.0	18.0	5.3	46.0	2.6	0.3	45	0.006	<0.01	397	0.73	2.22	0.66	0.78	0.65
RA	G-034779	27-Jul-00	123	560	7.35	310	279	95	17.6	19.0	4.2	40.0	2.0	0.1	22	<0.05	<0.01	368	1.1	2.22	0.70	0.78	0.65
RA	G-034779	31-Jul-01	123	600	7.22	325	238	99	18.6	22.2	5.2	44.0	4.0	0.3	22	<0.05	<0.01	380	1.2	2.37	0.72	0.83	0.66
RA	G-034779	28-Jun-02	123	634	7.1	301	273	94.7	15.7	18.9	5.0	45.0	3.4	0.2	40.7	<0.05	<0.01	404	0.6	2.47	0.77	0.97	0.76
RA	G-034779	04-Aug-03	123	612	7.13	331	286	101	18.6	20.4	4.9	51.0	3.0	NA	22	0.03	<0.01	404	1	2.36	0.65	0.82	0.67
RA	G-034779	18-Jul-97	123	551	7.4	250	280	160	17.0	8.5	5.2	38.0	2.0	0.3	0.5	0.3	<0.01	400	0.6	2.52	0.77	0.89	0.69
RA	G-041721	19-Jul-04	115	664	6.8	304	277	93.2	17.2	20.4	5.0	51.7	3.1	0.3	45	<0.05	<0.01	384	0.5	3.99	0.70	0.37	0.24
RA	G-041721	06-Jul-05	115	591	7.49	295	240	91	16.4	22.9	3.9	41.0	3.0	0.2	22	<0.05	<0.01	318	2.1	2.33	0.71	0.89	0.72
RA	G-041721	22-Jun-06	115	606	7.84	316	271	98	17.2	20.0	4.3	48.0	3.0	0.2	22	<0.05	<0.01	442	0.7	2.27	0.67	1.00	0.82
RA	G-041721	05-Jul-07	115	587	8.1	259	250	79.51	14.4	19.6	3.6	45.0	3.0	0.3	19.75	0.02	<0.01	358	3.2	2.45	0.71	0.87	0.69
RA	G-041721	07-Jul-09	115	562	7.37	262	253	81.11	14.5	20.9	4.2	45.0	3.0	0.2	19.32	<0.05	<0.01	378	2.9	1.98	0.59	0.85	0.75
RA	G-041721	01-Aug-00	115	577	7.45	301	269	92	17.0	22.4	4.0	43.0	3.0	0.2	21	<0.05	<0.01	332	2.3	2.02	0.60	0.91	0.79
RA	G-041721	31-Jul-01	115	584	7.3	319	238	97	18.2	26.5	4.4	43.0	6.0	0.3	22	<0.05	<0.01	387	2.2	2.30	0.70	0.97	0.80
RA	G-041721	28-Jun-02	115	642	7.2	301	257	95.1	15.3	23.4	4.0	45.8	3.8	0.2	40.5	<0.05	<0.01	428	2.1	2.42	0.75	1.15	0.92
RA	G-041721	08-Jul-03	115	585	7.22	320	260	99	17.2	23.4	4.6	43.0	4.0	NA	21	<0.05	<0.01	338	2.5	2.37	0.63	1.02	0.83
RA	G-041721	18-Jul-97	115	555	7.3	250	260	440	17.0	10.0	5.3	48.0	2.6	0.3	1.7	0.9	0.02	410	1.7	2.47	0.71	1.02	0.81
RA	G-041721	21-Jul-98	115	520	7.1	270	254	80	16.0	5.0	3.4	34.0	2.4	0.4	23	<0.05	<0.01	446	2	10.98	0.70	0.44	0.18
RA	G-041721	02-Sep-99	115	603	7.69	320	272	97	18.7	20.8	4.8	50.0	3.0	0.2	NA	<0.05	<0.01	413	0.9	2.00	0.66	0.22	0.19
RA	G-043300	13-Aug-84	240	NA	7.2	368	308	108	NA	26.0	NA	25.0	18.0	0.33	NA	3.6	0.4	452	11.4	2.42	0.77	0.90	0.72
RA	G-055408	19-Jul-04	104	795	6.8	351	312	105	21.6	29.9	8.0	77.7	8.7	0.3	39.4	0.553	0.418	444	<0.2	2.69	#VALUE!	1.13	#VALUE!
RA	G-055408	26-Jun-06	104	672	7.53	338	314	104	19.0	31.7	8.1	57.0	8.0	0.3	17	<0.05	0.17	446	<0.2	2.62	0.89	1.30	0.98
RA	G-065265	19-Jul-04	80	779	6.7	363	318	108	22.8	21.2	5.0	49.2	6.6	0.4	41.8	<0.05	0.019	428	3.2	2.59	0.78	1.38	1.06
RA	G-065265	22-Jul-05	80	732	7.48	398	328	121	23.3	20.3	5.1	49.0	7.0	0.3	20	<0.05	0.02	402	3.8	2.69	0.94	0.92	0.68
RA	G-065265	19-Jul-06	80	749	8.39	380	325	114	23.2	20.6	5.4	50.0	7.0	0.3	20	<0.05	0.02	550	5	3.02	0.96	0.88	0.63
RA	G-065265	26-Jul-07	80	764	8.02	342	348	102.64	20.6	17.9	5.3	59.0	8.0	0.4	17.89	<0.05	0.02	442	4.6	2.84	0.95	0.90	0.65
RA	G-065265	13-Aug-08	80	722	7.31	363	317	112.05	20.3	20.8	4.9	48.0	8.0	0.2	17.44	<0.05	0.02	474	6.8	2.56	0.85	0.78	0.60
RA	G-065265	15-Jul-09	80	670	7.32	331	312	100.15	19.8	22.1	4.8	48.0	6.0	0.3	17.17	<0.05	0.02	432	4.7	2.80	0.84	0.90	0.67
RA	G-065265	15-Aug-95	80	737	7.4	370	295	110	22.0	18.0	4.8	46.0	6.9	0.3	39	0.011	0.02	445	4.8	2.50	0.82	0.96	0.75
RA	G-065265	29-Aug-94	80	778	7.3	370	347	110	22.0	18.0	5.9	58.0	8.2	0.3	43	0.16	0.033	479	1.2	2.74	0.91	0.78	0.58
RA	G-065265	01-Aug-00	80	696	7.47	389	328	116	23.6	21.9	4.5	47.0	8.0	0.3	19	<0.05	0.02	435	4.5	2.74	0.91	0.78	0.58
RA	G-065265	24-Jul-01	80	734	7.62	374	294	110	23.7	24.0	5.1	46.0	9.0	0.3	19	0.03	0.08	477	4.8	2.89	0.97	0.95	0.69
RA	G-065265	28-Jun-02	80	788	7	375	336	115	21.2	20.3	5.0	45.3	8.1	0.3	37.9	<0.05	0.018	472	3.1	2.74	0.98	1.04	0.77
RA	G-065265	11-Jul-03	80	725	7.12	409	331	122	24.6	21.6	5.2	45.0	8.0	0.2	20	<0.05	0.02	478	3.6	2.87	0.87	0.88	0.65
RA	G-065265	30-Aug-99	80	717	7.85	367	321	108	23.3	20.6	4.9	49.0	7.0	0.1	19	<0.05	0.02	408	4.1	3.04	1.01	0.94	0.66
RA	G-074837	21-Jul-04	255	554	6.5	242	198	72.3	14.8	19.9	5.0	30.3	4.6	0.3	52.1	<0.05	<0.01	364	8.4	2.69	0.96	0.90	0.66
RA	G-074837	06-Jul-05	255	538	7.35	257	203	78	15.0	20.5	4.3	31.0	5.0	0.3	25	<0.05	<0.01	308	8.9	1.80	0.61	0.87	0.79
RA	G-074837	12-Jul-06	255	546	7.88	271	210	83	15.6	20.5	4.7	31.0	4.0	0.1	23	<0.05	<0.01	310	10.6	1.95	0.62	0.89	0.79
RA	G-074837	02-Jul-07	255	533	7.9	220	201	67.1	12.9	16.8	4.9	31.0	4.0	0.3	23.5	<0.05	<0.01	332	10.9	2.07	0.64	0.89	0.77
RA	G-074837	30-Jul-08	255	525	7.16	238	204	73.46	13.2	20.4	4.6	33.0	5.0	0.3	22.65	0.01	<0.01	346	9.3	1.67	0.53	0.73	0.70
RA	G-074837	07-Jul-09	255	509	7.12	229	206	68.92	13.7	20.6	5.0	32.0	4.0	0.3	22.8	<0.05	<0.01	370	9.1	1.83	0.54	0.89	0.81
RA	G-084063	13-Sep-04	NA	644	6.8	265	260	78.1	17.0	30.0	5.0	27.6	10.2	0.4	47.9	<0.05	<0.01	372	4.5	1.72	0.56	0.89	0.84
RA	G-084063	17-Aug-05	NA	629	6.9	292	326	86	18.7	31.5	5.1	32.0	10.0	0.2	20	<0.05	<0.01	370	4.8	1.95	0.70	1.31	1.13
RA	G-084063	11-Jul-08	NA	598	7.23	267	252	80.93	15.7	25.8	4.1	29.0	13.0	0.3	20.48	<0.05	<0.01	394	5.3	2.15	0.77	1.37	1.13
RA	G-084063	11-Jun-09	NA	645	6.91	254	268	76.93	15.1	29.3	4.7	30.0	9.0	0.3	19.24	<0.05	<0.01	386	4.1	2.02	0.64	1.12	0.97
RA	G-084063	08-Aug-12	NA	572	7.82	238.8	254	71.64	14.6	26.3	4.5	26.2	8.0	0.3	20.78	<0.05	<0.01	352	4.1	1.92	0.62	1.28	1.13
RA	G-084063	04-Jun-13	NA	659	7.18	291.7	278	87.65	17.7	33.3	5.4	32.2	11.4	0.3	20.69	<0.05	<0.01	404	4.1	1.79	0.60	1.14	1.05
RA	G-084063	27-Aug-03	NA	NA	NA	NA	282	89	18.4	32.9	5.0	31.0	9.0	0.3	19	<0.05	<0.01	NA	5	2.19	0.73	1.45	1.20
RA	G-084064	13-Sep-04	NA	703	6.8	287	278	86.6	17.1	32.9	5.0	34.8	13.0	0.3	46.4	<0.05	<0.01	380	5.5	2.22	0.76	1.43	1.17
RA	G-084064	17-Aug-05	NA	721	7.13	330	305	99	20.1	37.1	5.4	43.0	15.0	0.2	20	<0.05	<0.01	420	6	2.16	0.70	1.43	1.20
RA	G-084064	23-Aug-06	NA	673	7.39	310	295	93	19.0	34.2	4.1	33.0	12.0	0.1	22	<0.05	<0.01	408	4.4	2.47	0.83	1.61	1.26
RA	G-084064	11-Jul-08	NA	671	7.34	301	288	91.9	17.2	34.4	4.6	37.0	13.0	0.3	20.01	<0.05	<0.01	412	6.4	2.32	0.78	1.49	1.19

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
RA	G-084064	11-Jun-09	NA	716	6.83	290	284	88.19	17.1	34.9	5.3	40.0	14.0	0.2	20.01	<0.05	<0.01	444	4.9	2.29	0.71	1.50	1.22
RA	G-084064	08-Aug-12	NA	648	7.06	285.5	271	85.71	17.4	30.9	5.3	36.8	13.9	0.2	22.17	<0.05	<0.01	382	4.3	2.20	0.70	1.52	1.26
RA	G-084064	04-Jun-13	NA	660	7.04	287.3	278	86.12	17.6	33.1	5.4	32.5	11.2	0.3	20.63	<0.05	<0.01	406	4.55	2.14	0.71	1.35	1.13
RA	G-084064	27-Aug-03	NA	NA	NA	NA	290	98	18.2	33.2	5.1	38.0	13.0	0.2	19	<0.05	<0.01	NA	5.9	2.15	0.72	1.44	1.20
RA	G-094905	02-Aug-07	215	570	7.83	233	266	70.28	14.3	25.9	5.6	22.0	5.0	0.3	18.49	0.01	0.23	366	<0.2	2.45	0.75	1.44	1.14
RA	G-094905	30-Jun-08	215	556	7.7	223	270	67.59	12.9	24.3	5.2	23.0	5.0	0.2	16.51	<0.05	0.21	402	<0.2	1.75	0.59	1.13	1.04
RA	G-094905	01-Jul-09	215	492	7.36	244	269	73.88	14.4	31.3	6.7	23.0	5.0	0.4	17.99	<0.05	0.22	324	<0.2	1.69	0.53	1.06	1.00
RA	G-107747	27-Jul-04	160	860	7.1	399	383	116	26.6	17.6	6.0	27.1	3.8	0.3	53.9	0.117	0.011	488	<0.2	1.84	0.59	1.36	1.24
RA	G-107747	19-Aug-05	160	850	7.52	474	452	138	31.4	18.3	6.9	28.0	3.0	0.2	24	<0.05	0.01	466	<0.2	2.89	1.09	0.77	0.54
RA	G-107747	21-Aug-06	160	834	7.45	475	440	138	31.6	18.0	7.4	25.0	2.0	NA	24	<0.05	0.01	516	<0.2	3.44	1.29	0.80	0.52
RA	G-107747	20-Jun-07	160	775	7.99	400	427	116.59	26.2	15.5	5.7	25.0	4.0	0.3	25.07	<0.05	0.01	464	<0.2	3.44	1.30	0.78	0.51
RA	G-107747	10-Jun-08	160	744	7.88	356	380	103	23.9	16.6	6.1	25.0	8.0	0.3	22	<0.05	0.04	452	<0.2	2.91	1.08	0.68	0.48
RA	G-107747	15-Sep-09	160	830	7.21	402	416	117.37	26.5	17.0	6.8	22.0	4.0	0.2	22.02	<0.05	0.03	462	<0.2	2.57	0.98	0.72	0.54
RA	G-107747	10-May-11	160	823	7.23	433	462	127.14	28.2	17.1	6.8	20.0	4.0	0.5	22.02	0.02	0.03	516	<0.2	2.93	1.09	0.74	0.52
RA	G-107747	05-Nov-01	160	764	6.47	468	350	135	31.2	20.6	6.7	32.0	6.0	0.2	24	<0.05	0.03	535	0.3	3.17	1.16	0.74	0.50
RA	G-107747	11-Jul-01	160	792	7.25	397	390	114	26.6	34.0	5.9	38.0	8.0	0.2	23	<0.05	0.04	495	0.3	3.37	1.28	0.90	0.59
RA	G-107747	10-Jan-02	160	773	7.29	443	439	126	30.4	21.1	7.5	33.0	5.0	0.3	24	<0.05	0.03	567	0.3	2.84	1.09	1.48	1.05
RA	G-107747	10-Apr-02	160	701	7.62	432	331	125	28.7	18.9	6.6	38.0	3.0	0.2	30	<0.05	0.02	513	0.3	3.14	1.25	0.92	0.62
RA	G-107747	23-Jul-02	160	814	7.2	403	106	120	24.9	16.5	6.0	31.1	4.5	0.2	51.7	0.797	0.013	520	<0.2	3.12	1.18	0.82	0.56
RA	G-107747	22-Oct-02	160	844	7	347	394	102	22.3	14.9	6.0	31.8	4.3	0.2	46.4	0.037	<0.01	492	<0.2	2.99	1.02	0.72	0.51
RA	G-107747	08-Jan-03	160	786	7.2	424	396	127	25.8	15.9	6.0	31.3	4.0	0.2	50.7	0.159	<0.01	396	<0.2	2.54	0.92	0.65	0.49
RA	G-107747	01-May-03	160	850	7.2	418	410	123	26.8	17.1	7.0	30.2	4.6	0.3	53.8	0.77	0.02	476	<0.2	3.17	1.06	0.69	0.48
RA	G-107747	30-Jul-03	160	725	7.24	388	374	112	25.6	17.0	6.6	32.0	4.0	0.2	25	<0.05	<0.01	416	0.3	3.07	1.10	0.74	0.52
RA	G-107747	09-Oct-03	160	764	7.17	417	380	122	26.9	17.4	6.8	32.0	4.0	0.2	22	<0.05	<0.01	482	0.5	2.79	1.05	0.74	0.53
RA	G-110389	05-Aug-04	NA	655	7.3	316	299	97.2	17.8	22.3	5.0	45.8	3.3	0.2	42.3	<0.05	<0.01	396	2.1	3.04	1.11	0.76	0.53
RA	G-110389	19-Jul-05	NA	651	7.64	335	316	104	18.2	22.4	4.6	42.0	3.0	0.2	18	<0.05	<0.01	364	<0.2	2.43	0.73	0.97	0.77
RA	G-111121	13-Sep-04	NA	674	7	279	290	86.5	15.2	31.5	5.0	26.9	8.7	0.4	43.2	<0.05	<0.01	376	3.3	2.59	0.75	0.97	0.75
RA	G-111121	17-Aug-05	NA	644	7.24	305	292	95	16.4	32.9	5.4	28.0	8.0	0.2	19	<0.05	<0.01	406	3.7	2.16	0.63	1.37	1.16
RA	G-111121	23-Aug-06	NA	665	7.43	310	304	97	16.5	31.3	4.9	30.0	10.0	0.1	21	<0.05	<0.01	398	4.3	2.37	0.67	1.43	1.16
RA	G-111121	11-Jul-08	NA	644	7.38	299	289	95.08	15.1	30.3	4.6	31.0	12.0	0.3	19.33	<0.05	<0.01	424	3.5	2.42	0.68	1.36	1.09
RA	G-111121	11-Jun-09	NA	685	6.97	292	288	91.52	15.1	32.7	5.2	31.0	9.0	0.3	19.31	<0.05	0.02	392	4	2.37	0.62	1.32	1.08
RA	G-111121	08-Aug-12	NA	667	7.18	296.8	290	92.61	15.9	31.5	5.1	32.5	11.6	0.3	20.95	<0.05	<0.01	384	4.1	2.28	0.62	1.42	1.18
RA	G-111121	04-Jun-13	NA	682	7.11	304.9	298	94.79	16.6	32.2	5.5	33.1	11.8	0.2	19.92	<0.05	<0.01	416	3.45	2.31	0.66	1.37	1.12
RA	G-111121	27-Aug-03	NA	884	NA	NA	296	94	16.0	32.4	4.0	24.0	7.0	0.3	17	<0.05	<0.01	NA	3.9	2.37	0.68	1.40	1.14
RA	G-150519	18-May-10	NA	973	7.08	500	329	138.11	37.7	21.3	5.9	213.0	2.0	0.3	21.15	<0.05	0.7	668	2.8	2.35	0.66	1.41	1.15
RA	G-150519	06-Jun-12	NA	958	7.13	523.6	338	138.8	43.0	22.1	6.7	204.0	2.3	0.3	26.42	<0.05	0.78	690	2.6	3.45	1.55	0.93	0.59
RA	G-155601	01-Oct-07	177	771	8.09	358	285	102.78	24.6	27.1	4.1	117.0	NA	0.4	15.28	0.01	0.09	466	<0.2	3.46	1.77	0.96	0.59
RA	G-155601	07-Mar-08	177	753	8.02	374	288	108.57	24.8	24.6	4.3	121.0	3.0	0.2	15.79	0.01	0.36	504	<0.2	2.56	1.01	1.18	0.88
RA	G-155601	26-Jun-08	177	731	7.78	336	280	97.99	22.1	25.2	4.3	107.0	3.0	0.3	15.64	<0.05	0.03	458	<0.2	2.71	1.02	1.07	0.78
RA	G-155601	15-Sep-09	177	794	7.38	356	295	104.68	23.1	26.5	4.7	124.0	4.0	0.3	14.73	<0.05	0.08	468	<0.2	2.44	0.91	1.10	0.85
RA	G-155630	30-Jun-11	361	841	7.04	413	314	121.43	26.9	22.1	6.1	165.0	5.0	0.2	23.86	0.01	0.13	606	<0.2	2.61	0.95	1.15	0.86
DK	G-049390	7/27/1984	280	NA	7.7	364	332	80	NA	16.0	NA	29.0	12.0	0.4	NA	0.1	0.2	512	1.1	3.03	1.11	0.96	0.67
DK	12N 6E35ADA :	3/19/1974	53	1180	7.1	450	344	130	30.0	54.0	9.5	49.0	44.0	0.5	58	1400	< 10	772	NA	3.24	1.23	2.35	1.57
DK	12N 7E17CBBB	8/15/1995	195	525	6.9	181	NA	51	13.0	43.0	3.5	21.0	3.4	0.3	38	5	< 1.00	346	NA	1.27	0.53	1.87	1.97
DK	12N 7E22DA 1	3/21/1969	160	2570	7.7	880	296	208	89.0	330.0	16.0	1240.0	37.0	3.5	6.9	7200	250	2090	0.023	5.19	3.66	14.36	6.82
DK	13N 5E 2BB 1	6/6/1969	295	528	7.8	260	279	59	28.0	15.0	8.6	66.0	1.7	0.4	22	60	NA	341	0.136	1.47	1.15	0.65	0.57
SW	No. Oak Cr Nr V	9/8/1971	NA	648	7.8	290	351	74	25.0	35.0	9.3	51.0	14.0	0.5	NA	20	260	383	NA	1.85	1.03	1.52	1.27
SW	No. Oak Cr Nr V	11/12/1971	NA	759	7.9	380	430	110	25.0	20.0	8.7	53.0	8.2	0.4	NA	10	230	440	NA	2.74	1.03	0.87	0.63
SW	No. Oak Cr Nr V	3/23/1972	NA	606	7.9	290	347	82	20.0	18.0	7.3	52.0	9.7	0.4	NA	20	860	362	NA	2.05	0.82	0.78	0.65
SW	No. Oak Cr Nr V	5/3/1972	NA	550	7.3	250	284	74	17.0	15.0	15.0	51.0	7.0	0.4	NA	10	600	326	NA	1.85	0.70	0.65	0.58
SW	Oak Cr Nr Agne	11/17/1967	NA	726	7.6	370	397	101	28.0	22.0	6.8	75.0	4.4	0.3	21	50	610	457	NA	2.52	1.15	0.96	0.71
SW	Oak Cr Nr Agne	7/18/1968	NA	648	7.8	300	362	80	26.0	23.0	10.0	56.0	6.1	0.5	16	70	510	396	0.045	2.00	1.07	1.00	0.81
SW	Oak Cr Nr Raym	5/5/1964	NA	790	8.3	400	434	115	27.0	24.0	8.6	71.0	8.4	0.4	21	80	250	499	0.181	2.87	1.11	1.04	0.74
SW	Oak Cr Nr Raym	5/24/1964	NA	238	7.4	120	138	35	6.7	3.8	5.9	8.0	1.5	0.5	9.4	70	0	140	0.361	0.87	0.28	0.17	0.22
SW	Oak Cr Nr Raym	6/8/1964	NA	743	8.1	370	425	107	25.0	22.0	8.8	62.0	8.0	0.4	15	170	60	458	0.045	2.67	1.03	0.96	0.70
SW	Oak Cr Nr Raym	6/13/1964	NA	241	7	120	138	36	6.1	3.1	6.0	5.8	1.0	0.4	9.7	730	120	138	0.361	0.90	0.25	0.13	0.18
SW	Oak Cr Nr Raym	6/15/1964	NA	196	7.2	91	112	30	3.9	2.9	5.2	6.0	1.0	0.5	7.9	310	0	114	0.248	0.75	0.16	0.13	0.19
SW	Branched Oak F	11/17/1967	NA	456	7.4	210	249	61	15.0	11.0	12.0	33.0	4.1	0.4	5.6	80	110	267	0.023	1.52	0.62	0.48	0.46
SW	Branched Oak F	7/18/1968	NA	503	7.9	210	271	44	24.0	21.0	12.0	43.0	6.0	0.4	0	110	0	284	0.045	1.10	0.99	0.91	0.89
SW	Middle Oak Cr I	11/17/1967	NA	722	7.6	360	395	103	26.0	21.0	6.3	72.0	4.0	0.3	24	50	450	454	NA	2.57	1.07	0.91	0.68
SW	Middle Oak Cr I	7/18/1968	NA	700	7.8	350	407	100	24.0	21.0	9.3	54.0	3.4	0.5	35	60	720	450	0.181	2.50	0.99	0.91	0.69
SW	Rock Cr Abv Cer	3/14/1974	NA	616	8	260	331	77	17.0	35.0	6.0	52.0	17.0	0.6	30	NA	NA	404	NA	1.92	0.70	1.52	1.33
SW	Rock Cr Abv Cer	4/8/1974	NA	570	7.9	240	300	70	16.0	31.0	5.7	40.0	9.9	NA	NA	NA	NA	326	NA	1.75	0.66	1.35	1.23
SW	Rock Cr Abv Cer	4/29/1974	NA	602	8.1	250	327	74	17.0	31.0	5.7	40.0	11.0	NA	NA	NA	NA	341	NA	1.85	0.70	1.35	1.20
SW	Rock Cr Abv Cer	5/30/1974	NA	380	7.6	160	200	45	12.0	20.0	8.9	29.0	7.3	NA	NA	NA	NA	240	NA	1.12	0.49	0.87	0.97
SW	Rock Cr Abv Cer	6/14/1974	NA	616	8.1	250	307	73	16.0	34.0	5.7	42.0	25.0	NA	NA	NA	NA	352	NA	1.82	0.66	1.48	1.33

Table A2-2: Summary table of water quality parameters evaluated in project area wells- Maha aquifer wells only.

Results of water-quality samples from sites in or near the project area, Lower Platte South NRD [Depth in feet; specific conductance , in microSiemens per centimeter at 25°C; pH in standard units; other units in milligrams per liter unless specified; NA, no sample or not available

Source	Site	Date	Depth, in feet	Specific conductance	pH, in	Hardness	Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Fluoride	Silica	Iron	Manganese	Total dissolved solids	Nirate as N	Calcium, in millequivalents	Magnesium, in millequivalents	Sodium, in millequivalents	Sodium Adsorption Ratio
DK	G-049390	7/27/1984	280	NA	7.7	364	332	80	NA	16.0	NA	29.0	12.0	0.4	NA	0.1	0.2	512	1.1	3.03	1.11	0.96	0.67
DK	12N 6E35ADA 1	3/19/1974	53	1180	7.1	450	344	130	30.0	54.0	9.5	49.0	44.0	0.5	58	1400	< 10	772	NA	3.24	1.23	2.35	1.57
DK	12N 7E17CBBB1	8/15/1995	195	525	6.9	181	NA	51	13.0	43.0	3.5	21.0	3.4	0.3	38	5	< 1.00	346	NA	1.27	0.53	1.87	1.97
DK	12N 7E22DA 1	3/21/1969	160	2570	7.7	880	296	208	89.0	330.0	16.0	1240.0	37.0	3.5	6.9	7200	250	2090	0.023	5.19	3.66	14.36	6.82
DK	13N 5E 2BB 1	6/6/1969	295	528	7.8	260	279	59	28.0	15.0	8.6	66.0	1.7	0.4	22	60	NA	341	0.136	1.47	1.15	0.65	0.57

Appendix 3
Metadata

Data Delivery File Structure

The acquired and processed data are provided digitally with this report. The file structure on the included disk follows the flow chart in Figure A3.1 below.

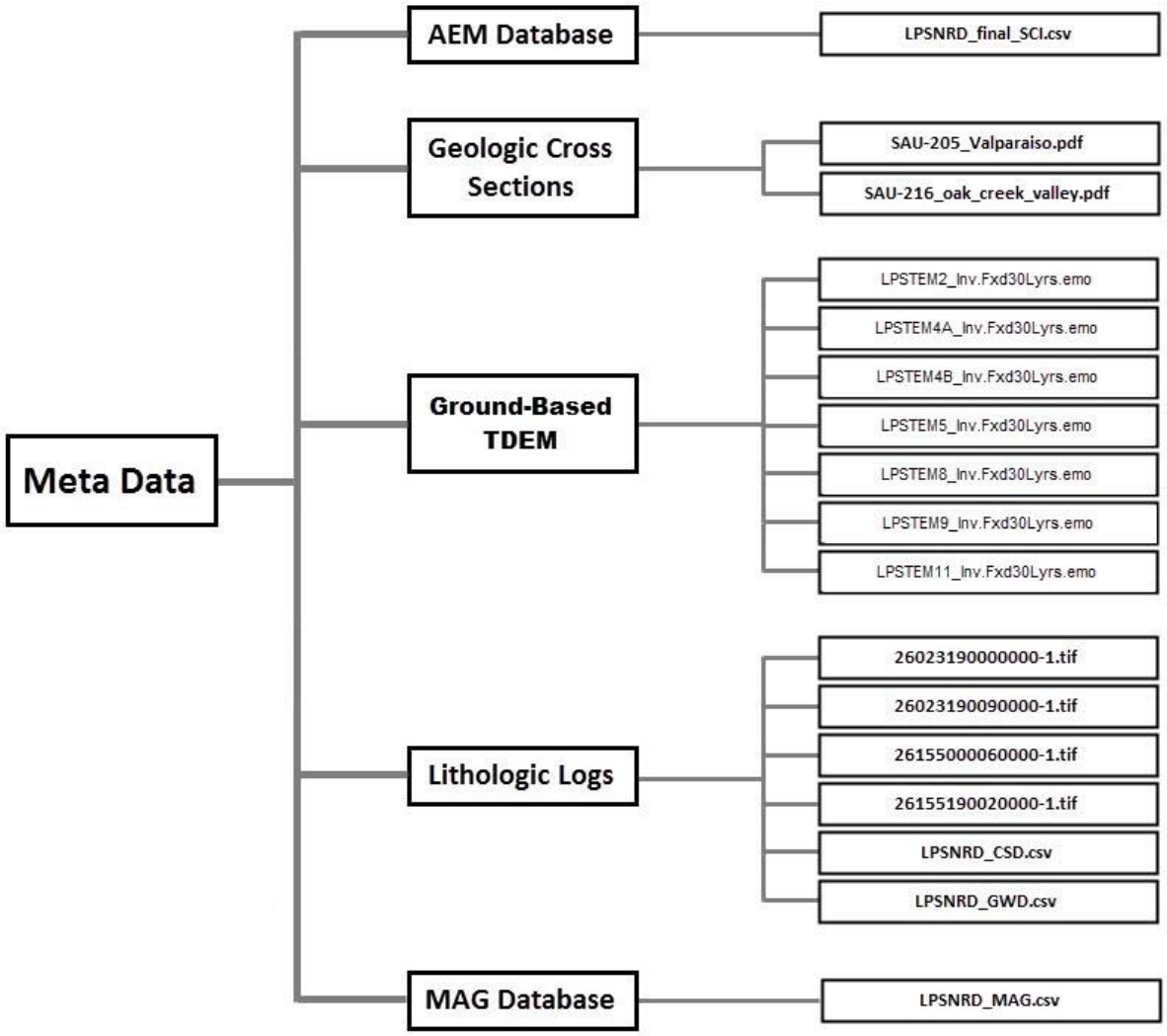


Figure A3-1 - Flow Chart of file structure for delivery of metadata.

AEM Database

The final processed AEM data (spatially constrained inversion results) for the project area is provided in a comma separated file (LPSNRD_fial_sci.csv). Parameters for the processed data file are listed in Table A3-1.

Table A3-1: Parameters for processed AEM data file. Null value = -9999.99 (Occurs where data were removed).

Parameter	Description	Unit
Line	Flight Line Number	N/A
ChordLength	Distance between points	Feet [ft]
X_ft	Easting NAD83 UTM Zone 14 North	Feet [ft]
X_m	Easting NAD83 UTM Zone 14 North	Meters [m]
Y_ft	Northing NAD83 UTM Zone 14 North	Feet [ft]
Y_m	Northing NAD83 UTM Zone 14 North	Meters [m]
DEM_ft	Digital Elevation Model, NAVD88	Feet [ft]
TOPO_m	Helicopter recorded topography, NAVD88	Meter [m]
ALT	Recorded altitude	Meter [m]
INVALT	Inverted altitude	Meter [m]
INVALTSTD	Standard deviation of inverted altitude	Meter [m]
DELTAALT	Difference between recorded and inverted altitude	Meter [m]
DOI_LOWER	A numerical lower estimate of the depth of investigation	Feet [ft]
DOI_UPPER	A numerical upper estimate of the depth of investigation	Feet [ft]
NUMDATA	Number of time gates utilized in inversion	N/A
RECORD	Unique field identification number assigned to each inverted AEM sounding	N/A
SEGMENTS	Identifies if low moment, high moment, or both were used in the inversion	N/A
RESDATA	Residual of individual sounding	N/A
RESTOTAL	Residual of SCI section	N/A
TOP_ft[xx*]	Inverted layer top (bgl)	Feet [ft]
BOT_ft[xx*]	Inverted layer bottom (bgl)	Feet [ft]
RES_[xx*]	Inverted layer resistivity value	ohm-meter [ϱ-m]
RES_STD_[xx*]	Standard deviation of resistivity for inverted layer	Ohm-meter [ϱ-m]
SIGMA_I[xx*]	Inverted layer conductivity value	Siemens/meter [S/m]
Bedrock	Interpreted bedrock surface (asl)	Feet [ft]
WT	Interpreted subsurface water level (asl)	Feet [ft]

*** A TOTAL OF 30 INVERTED LAYERS.**

MAG Database

The final processed magnetic data for the project area is provided in a comma separated file (LPSNRD_MAG.csv). Parameters for the processed data file are listed in table A3-2.

All recorded data are time stamped in order to correlate independent data sets. The time stamps are in Coordinated Universal Time/Greenwich Mean Time (UTC/GMT) which is a +6 hour difference from Central Standard Time. Time stamps are one of the two following formats.

- Date and time defined as: yyyy/mm/dd hh:mm:ss.sss
- Date and time values defined as the number of days since 1900/01/01 and seconds of the day: ddddd.sssssssss (decimal days).

Table A3-2: Parameters for processed MAG data file.

Parameter	Description	Unit
Line	Flight Line Number	N/A
Alt	DGPS Altitude	Meters above sea level
AngleX	Angle (in flight direction)	Degrees
AngleY	Angle (perpendicular to flight direction)	Degrees
Bmag_Diur	Diurnal Variation - magnetic base station data	nanotesla [nT]
Bmag_raw	Total Magnetic Intensity ï raw magnetic data ï magnetic base station data	nanotesla [nT]
Curr_1	Current, High Moment	Amps
Curr_2	Current, Low Moment	Amps
Date	Date	yyyymmdd
DateTime	DateTime Format	Decimal days
DEM	Digital Elevation Model	Meters above sea level
E_NAD83	UTM Zone 14N (NAD83)	Meter [m]
Fid	Unique Fiducial Number	Seconds
Flight	Name of Flight	yyyymmdd.ff
GdSpeed	Ground Speed	Kilometers/hour [km/h]
Height	Filtered Height Measurement	Meters [m]
HM_X_G15[xx*]	Normalized High Moment X-RxCoil value	pV/(m^4*A)
HM_Z_G15[xx*]	Normalized High Moment Z-RxCoil value	pV/(m^4*A)
IGRF_TMI	Calculated IGRF-10	nanotesla [nT]
Lat	Latitude, WGS84	Decimal Degrees
Lon	Longitude, WGS84	Decimal Degrees
LM_X_G10[xx*]	Normalized Low Moment X-RxCoil value	pV/(m^4*A)
LM_Z_G06[xx*]	Normalized Low Moment Z-RxCoil value	pV/(m^4*A)
Mag_cor	Residual Magnetic Field ï corrected for diurnal, lag, heading and IGRF	nanotesla [nT]
Mag_fil	Filtered Magnetic Data	nanotesla [nT]
Mag_raw	Raw Magnetic Data ï total magnetic intensity - despiked	nanotesla [nT]
N_NAD83	UTM Zone 14N (NAD83)	Meter
PLNI_60Hz	Power Line Noise Intensity. Amplitude spectral density of the power line noise	N/A

Parameter	Description	Unit
R_BmagInterp	Interpolated base mag data	nanotesla [nT]
R_BmagInterp_nl	Interpolated base mag data with a nonlinear filter applied	nanotesla [nT]
R_Dec	Declination	Degrees
R_Inc	Inclination	Degrees
R_Magraw_int_nl	Raw magnetic data, interpolated with a nonlinear filter applied	nanotesla [nT]
R_Magraw_Interp	Raw magnetic data, interpolated	nanotesla [nT]
R_TotalField	Regional magnetic field	nanotesla [nT]
RMF	Residual Magnetic Field ï IGRF removed ï final corrected and leveled magnetic data	nanotesla [nT]
Time	Time	hhmmss.sss
TMI	Total Magnetic Intensity ï final corrected and leveled magnetic data; IGRF recalculated	nanotesla [nT]

***High and low moment measurement channels correspond with the time gate numbers listed in Table A3-3.**

Time gates

There are a total of 38 time gates, table A3-3 presents the gate number, the gate center, gate width and a comment concerning time gate usage.

Table A3-3: Time gate information.

Gate No.	Gate Center (µs)	Gate Width (µs)	Comment	Gate No.	Gate Center (µs)	Gate Width (µs)	Comment
0	-0.385	1.57	Not Used	19	172.115	38.57	Low and High Moment
1	1.615	1.57	Not Used	20	216.115	48.57	Low and High Moment
2	3.615	1.57	Not Used	21	271.615	61.57	Low and High Moment
3	5.615	1.57	Not Used	22	342.115	78.57	Low and High Moment
4	7.615	1.57	Not Used	23	431.615	99.57	Low and High Moment
5	9.615	1.57	Low Moment Only	24	544.615	125.57	Low and High Moment
6	11.615	1.57	Low Moment Only	25	687.115	158.57	Low and High Moment
7	13.615	1.57	Low Moment Only	26	867.115	200.57	Low and High Moment
8	16.115	2.57	Low Moment Only	27	1094.615	253.57	Low and High Moment
9	19.615	3.57	Low Moment Only	28	1382.115	320.57	Low and High Moment
10	24.115	4.57	Low Moment Only	29	1745.115	404.57	High Moment Only
11	29.615	5.57	Low Moment Only	30	2203.115	510.57	High Moment Only
12	36.615	5.57	Low Moment Only	31	2781.615	645.57	High Moment Only
13	45.615	9.57	Low Moment Only	32	3512.615	815.57	High Moment Only
14	56.615	11.57	Low and High Moment	33	4436.115	1030.57	High Moment Only
15	70.115	14.57	Low and High Moment	34	5602.615	1301.57	High Moment Only
16	87.115	18.57	Low and High Moment	35	7075.615	1643.57	High Moment Only
17	109.115	24.57	Low and High Moment	36	8936.115	2076.57	High Moment Only
18	137.115	30.57	Low and High Moment	37	11286.115	2622.57	High Moment Only

Ground-Based TDEM

The final processed ground-based TDEM data for the project are provided in series of .emo files that may be read with any text editor. The .emo file is the inversion output file, it contains model parameters, model parameter analyses, forward responses, inversion settings, etc. Parameters for the .emo inversion files are listed in table A3-4.

Table A3.4. Parameters for processed TDEM inversion file.

Line Number(s)	Description						
1-42	Inversion setup information, contains information about which data and model files have been used.						
43+	The lines following line 43 contain information on the inversion result with respect to models and data.						
Norm's (0..NIte)	The norm (residual) progress through the iteration steps.						
	Ite_#	Data	Vcon	Hcon	Depth	Apri	Total
	Iteration number	Residuals for data	Vertical con-straints	Horizontal con-straints	Depth con-straints	Model prior	Total residual
Parameters (0..NIte)	Model Parameters (layer resistivity and thickness) through the iteration steps. The parameters listed for the last iteration are the final inversion result.						
Analysis:	Parameter analysis on prior values.						
Apriori parameters	Prior model parameters (starting model)						
Constraints:	Constraints (with respect to the starting model)						
Data type ID	Forward Data						
	Time	Inp_Data	STD	WaveID	FltID	DSet#	Ite#...
	Micro-second	Input data	Data standard deviation	Wave form ID	Filter ID	Data set	Forward data for each iteration step

Water Table

The last column of data in the AEM database (LPSNRD_fial_sci.csv) is an interpreted water table surface. This data is obtained from the United States Geological Survey National Water Information System Web Interface: http://waterdata.usgs.gov/nwis/gw.

Lithological Logs

A total of two hundred thirty-six (236) lithological logs were obtained from three different sources for this project. The majority of lithological logs, two hundred twenty-five (225), were obtained from the Nebraska Department of Natural Resources Registered Groundwater Wells Data Retrieval website. Seven (7) lithological logs were obtained from the Nebraska Statewide Test-hole Database. The remaining four (4) lithological logs were from deeper wells, obtained from the Nebraska Oil and Gas Conservation Commission.

The lithologies listed in the various databases reports were assigned a pre-defined lithologic category for representation in various data processing and visualization software used for this project. All lithological logs are reported in English depth units, and the locations for all logs have been converted from their original format to Eastings and Northings (ft.) in UTM zone 14N. The two hundred twenty-five (225) lithological logs obtained from the Nebraska Department of Natural Resources Registered Groundwater Wells Data Retrieval website can be located through the following link: http://data.dnr.nebraska.gov/wells/Menu.aspx

An individual well log can be located by following the steps outlined in Figure A3-3. Table A3-4 lists all Nebraska Department of Natural Resources well registration numbers used for this project along with their positional information in Easting and Northings (UTM) and elevation (NAVD 88) in ft. Table A3-4 is also provided with the Meta data as a comma separated file with the following na me: LPSNRD_GWD.csv.

Step 1: Submit an indication that the search will occur by well registration number

- ☐ Well ID
- ☐ Owner's Name
- ☐ Owner's Address
- ☐ County
- ☐ Natural Resources District
- ☐ Section Township Range
- ☑ Registration Number
- ☐ Well Type
- ☐ Status Code
- ☐ Well Filing Date
- ☐ Well Completion Date
- ☐ Well Decommission Date
- ☐ NRD Well Permit Number

Submit

Step 2: Submit the well registration number for the lithological log being obtained

Enter the complete registration number with six digits. (Example G-058784)
Registration Number:

Submit

Step 3: Click the "Logs" link in the first column.

Return to Search Page
Nebraska Department of Natural Resources
Database Through: 11/5/2014
Processed: 11/6/2014 2:23:46 PM

REGISTERED GROUNDWATER WELLS DATA RETRIEVAL

Note:
Information on Public Water Supply Wells is not available through this interface. Contact the Department of Natural Resources (Data Bank) at 402-471-2363 for more information. All registration documentation for water wells registered after January 1, 1969, except Public Water Supply wells, are now available.

Due to possibility of a well being in more than one series, an individual well might be listed more than once.

1 Records found.

Registration# Well ID Permit Number Well Log	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced	Acres Irrig Gallons/Min Static Level Pumping Level Series	Pump Col Dia Pump Depth Well Depth	Owner's Name and Address Owner ID
G-021155 WellID: 27441 Other Info Logs View as PDF	I A	Saunders Lower Platte South 13N 6E 19 SESE 570 S 990 E Map It	4/12/1960 2/2/1961	50 500 gpm 83 ft 153 ft PRO	6 in --- 170 ft	Max Hakel OwnerID: 21874 Valparaiso ,NE 68065

Data copy of requested wells.
Data copy of Geo Logs for requested wells.
Data copy of Casing Screen for requested wells.
Data copy of Grout Gravel for requested wells.

Step 4: The next web page to appear will be the log of the registered well searched for.

Return to Search Page
Nebraska Department of Natural Resources
Database Through: 11/5/2014
Processed: 11/6/2014 2:24:55 PM

Registration Number G-021155, Well ID 27441

Geo Logs

FromDepth	ToDepth	Description	Color	Density	Composition
0	3	TOP SOIL			Other
3	8	SILTY CLAY			Other
8	58	YELLOW CLAY			Other
58	62	GRAVEL AND PEBBLES			Other
62	86	FINE SILTY SAND			Other
86	130	VERY FINE SAND			Other
130	137	STRIP CLAY			Other
137	150	GRAVEL STREAKS AND CLAY			Other
150	168	SAND AND GRAVEL			Other
168	170	CLAY			Other

Figure A3-3: Instructions for obtaining lithological logs from the Nebraska Department of Natural Resources registered groundwater wells used for this project.

Table A3-4: List of Nebraska Department of Natural Resources registered groundwater wells used for lithological logs for this project with positional information.

Well Registration	Easting	Northing	Elev.	Well Registration	Easting	Northing	Elev.	Well Registration	Easting	Northing	Elev.
G-007355	2237301	14926307	1302	G-069699	2236009	14924951	1293	G-104867	2238800	14928016	1317
G-021155	2252794	14926626	1341	G-069885	2222772	14923355	1509	G-105160	2232060	14916570	1404
G-021357	2235464	14919360	1307	G-069886	2218897	14924579	1545	G-105218	2264997	14925957	1259
G-028454	2235824	14920322	1298	G-070473	2193742	14935158	1601	G-105567	2225851	14977816	1513
G-032248	2219988	14918666	1464	G-070766	2216939	14919846	1475	G-106044	2250682	14925856	1417
G-033528	2236968	14925090	1300	G-071040	2220705	14926665	1533	G-106052	2186089	14972295	1665
G-033782	2190102	14938155	1652	G-072482	2241391	14936290	1462	G-108684	2226244	14916820	1400
G-035358	2204814	14929818	1423	G-074837	2252033	14943227	1387	G-109481	2231639	14929117	1323
G-035661	2235643	14918503	1316	G-082143	2216412	14935656	1431	G-110061	2195890	14973509	1591
G-042048	2236946	14921908	1289	G-083240	2240520	14928664	1396	G-110785	2254980	14932726	1410
G-042049	2235795	14921127	1274	G-084486	2239162	14931636	1393	G-112493	2195387	14931414	1511
G-047069	2255655	14930741	1362	G-085138	2200617	14967224	1599	G-112649	2232573	14920596	1380
G-047651	2185339	14941022	1613	G-085821	2199879	14962263	1471	G-112668	2192121	14931339	1538
G-047854	2188682	14940469	1613	G-087149	2190960	14929837	1505	G-112919	2212233	14935436	1496
G-047915	2233083	14935471	1331	G-088469	2190327	14938144	1654	G-112920	2196479	14927115	1468
G-047916	2233117	14934151	1302	G-089859	2215699	14935428	1455	G-112933	2211698	14934372	1444
G-048413	2220855	14923956	1451	G-090757	2242788	14931445	1414	G-113393	2190031	14967087	1679
G-048577	2263744	14925598	1269	G-095325	2189049	14938197	1636	G-115762	2190021	14940544	1637
G-049390	2205511	14928245	1475	G-095615	2203493	14963889	1571	G-116505	2232423	14916210	1400
G-049648	2239840	14929009	1349	G-096538	2265694	14921331	1327	G-116653	2196598	14913605	1576
G-050570	2252126	14940614	1405	G-097146	2236950	14930320	1355	G-117213	2250183	14946288	1370
G-051627	2241419	14917160	1285	G-097147	2236672	14930717	1343	G-117599	2202830	14936610	1517
G-051628	2242767	14915873	1287	G-097148	2236736	14931721	1408	G-117711	2198803	14922735	1501
G-052451	2211156	14916503	1481	G-098344	2203795	14962249	1523	G-118090	2204959	14964203	1596
G-052489	2188691	14939147	1641	G-099151	2190431	14966258	1672	G-119544	2204499	14962299	1563
G-054173	2259674	14932181	1356	G-099694	2227138	14927926	1430	G-120167	2204331	14967488	1530
G-054174	2259761	14926861	1289	G-100177	2264331	14921200	1326	G-120320	2227013	14932164	1430
G-054588	2241363	14919800	1321	G-100522	2190240	14966350	1681	G-121737	2240252	14928927	1392
G-054589	2239441	14920296	1292	G-100534	2249677	14920871	1473	G-122734	2237475	14930043	1394
G-054591	2268084	14934787	1257	G-100989	2258895	14931520	1397	G-123074	2220066	14966644	1486

Well Registration	Easting	Northing	Elev.	Well Registration	Easting	Northing	Elev.	Well Registration	Easting	Northing	Elev.
G-054967	2223482	14921387	1494	G-102475	2224010	14915343	1442	G-123369	2194842	14931076	1561
G-055048	2257652	14930125	1354	G-103369	2186340	14940589	1624	G-123538	2220702	14970281	1480
G-055125	2249568	14937903	1437	G-103802	2258490	14923541	1347	G-123935	2197570	14930349	1549
G-055487	2210278	14923719	1448	G-104587	2240583	14925526	1341	G-124639	2223134	14915244	1466
G-055678	2256751	14938760	1354	G-155273	2204989	14963575	1602	G-125450	2191748	14966000	1599
G-056921	2257304	14946054	1322	G-155290	2264559	14933607	1308	G-125504	2189138	14961748	1667
G-060001	2214147	14930537	1480	G-155302	2229322	14978316	1417	G-126351	2258825	14928801	1341
G-061980	2213130	14915885	1411	G-155600	2205110	14975312	1627	G-126382	2216056	14935543	1427
G-065496	2234113	14918974	1366	G-156071	2217130	14929558	1494	G-127247	2257787	14924168	1326
G-127387	2213422	14920143	1429	G-156828	2234846	14917908	1382	G-141415	2232153	14970580	1516
G-127997	2193103	14940369	1620	G-157122	2190897	14912968	1533	G-055773	2217557	14978845	1513
G-128237	2237553	14932359	1427	G-157559	2208564	14909097	1356	G-074246	2211584	14979343	1527
G-129041	2204854	14962833	1570	G-159138	2206456	14925186	1445	G-064385	2208964	14979204	1585
G-129886	2195218	14945581	1567	G-159454	2254496	14941984	1345	G-153579	2206314	14979105	1592
G-130072	2219467	14976890	1581	G-159534	2195882	14976270	1652	G-167713	2203891	14979343	1553
G-131905	2209625	14935188	1483	G-161117	2190248	14942691	1636	G-063719	2195803	14979025	1602
G-133411	2216998	14925037	1542	G-163962	2185527	14910270	1519	G-091285	2204540	14954087	1436
G-135140	2232100	14915615	1372	G-165496	2266901	14922865	1303	G-150959	2204819	14955882	1458
G-137469	2239013	14923014	1313	G-165842	2216213	14962570	1488	G-146759	2206510	14950170	1536
G-137703	2200971	14929989	1528	G-166091	2216352	14969435	1540	G-129835	2207299	14944776	1631
G-137713	2206242	14923091	1466	G-166099	2192374	14967444	1644	G-080726	2232744	14939547	1394
G-137714	2227582	14919219	1434	G-166125	2213200	14919528	1441	G-054996	2229865	14937515	1344
G-137715	2205460	14935464	1543	G-166326	2252334	14937909	1387	G-163720	2184775	14934965	1603
G-139814	2222474	14963903	1455	G-166327	2263025	14927533	1333	G-118089	2231707	14978978	1420
G-141209	2204956	14963372	1594	G-166999	2220708	14970158	1480	G-054459	2232987	14963931	1531
G-142635	2189489	14913592	1564	G-167390	2222059	14970271	1500	G-139348	2243428	14929362	1433
G-143103	2210309	14970161	1579	G-167391	2219659	14970856	1504	G-155630	2247151	14928443	1504
G-144382	2239167	14932211	1406	G-167593	2221100	14966614	1486	G-116997	2247301	14920701	1427
G-145154	2189506	14913521	1563	G-167617	2266962	14930227	1285	G-094537	2254154	14919584	1420
G-146308	2188675	14910971	1548	G-167675	2215964	14921186	1513	G-094905	2255888	14920312	1340
G-146685	2204895	14964313	1591	G-167966	2224939	14969107	1563	G-086117	2269287	14948369	1409
G-148041	2219447	14919050	1469	G-168833	2200261	14972444	1628	G-129039	2248332	14921143	1440
G-149729	2264001	14923285	1314	G-169366	2198595	14971778	1566	G-032969	2237163	14910016	1297

Well Registration	Easting	Northing	Elev.	Well Registration	Easting	Northing	Elev.	Well Registration	Easting	Northing	Elev.
G-151199	2222288	14925904	1509	G-169418	2262001	14936922	1287	G-101688	2236172	14914540	1372
G-151760	2216751	14925446	1543	G-169681	2242978	14931387	1417	G-129845	2224776	14914472	1389
G-151816	2201147	14972129	1652	G-170027	2254147	14934371	1360	G-053578	2221182	14913992	1455
G-152858	2198425	14962986	1490	G-170067	2258677	14931551	1394	G-096640	2191072	14923959	1579
G-153462	2190031	14967155	1678	G-170073	2213200	14919533	1441	G-150519	2189131	14961739	1667
G-155144	2224555	14931906	1413	G-170560	2218517	14977596	1536	G-058478	2184826	14932003	1609
G-155269	2223788	14928745	1418	G-171541	2186234	14940475	1623	G-127358	2237486	14929891	1386
G-065497	2260136	14935539	1344	G-132205	2192487	14960745	1672	G-154245	2201705	14947117	1581
G-066283	2205273	14936165	1555	G-126705	2202276	14960556	1460	G-063179	2195803	14979025	1602
G-067257	2212492	14915211	1409	G-118208	2206351	14960996	1582	G-057853	2199032	14978935	1630
G-067893	2235789	14932882	1362	G-146949	2220336	14958482	1425	G-172586	2205418	14912448	1398
G-068240	2263634	14932218	1345	G-119472	2231772	14967686	1513	G-146579	2206510	14950170	1536

The seven (7) lithological logs that were obtained from the Nebraska Statewide Test-hole Database can be located through the following link:
http://snr.unl.edu/data/geologysoils/NebraskaTestHole/NebraskaTestHoleIntro.asp

Table A3-5 lists all Nebraska Statewide Test-hole Database wells used for this project along with their positional information in Easting and Northings (UTM) and elevation (NAVD 88) in ft. The detailed lithology logs are also provided with the Meta data as a comma separated file with the following name: LPSNRD_CSD.csv.

Table A3-5: List of Nebraska Statewide test-hole database wells used for lithological logs for this project with positional information.

CSD Test Hole	Easting	Northing	Elev.
3-B-76	2205103	14914560	1433
4-B-76	2206210	14935231	1136
5-B-76	2205075	14945835	1610
6-B-48	2237342	14914883	1148
6-B-77	2205549	14977885	1561
7-B-48	2237798	14931852	1166
7-B-77	2205310	14962168	1535

The remaining four (4) lithological logs were from deeper wells, obtained from the Nebraska Oil and Gas Conservation Commission which can be obtained through the following link:
http://www.nogcc.ne.gov/olNOGCCOnlineGIS/

Table A3-6 lists all Nebraska Oil and Gas Conservation Commission wells used for this project along with their positional information in Easting and Northings (UTM) and elevation (NAVD 88) in ft. Image files of the lithological logs for all of the Nebraska Oil and Gas Conservation Commission wells used for this project are provided with the Meta data as .tif files are named according to Well ID.

Table A3-6: List of Nebraska Oil and Gas Conservation Commission wells used for lithological logs for this project with positional information.

Well ID	Easting	Northing	Elev.
26023190000000-1	2203408	14958450	1429
26023190090000-1	2188129	14962836	1651
26155000060000-1	2234282	14947041	1486
26155190020000-1	2245137	14971040	1378

Geologic Cross Sections

Two historic geologic cross sections were obtained from the LPSNRD and used in the interpretation of the AEM data. The cross sections were geo-located using the positions of the wells listed in Table A3-10 with Easting and Northings in feet (UTM). The images of the two cross sections are provided with the Meta data as .pdf files with the following file names:

SAU-205_Valparaiso.pdf
SAU-216_oak_creek_valley.pdf

Table A3-10: List of positional information for historic geologic cross sections.

Cross Section	Well ID	Easting	Northing
SAU-205_Valparaiso	4-A-48	2237924.361	14946818.87
SAU-205_Valparaiso	7-B-49	2237775.413	14931700.02
SAU-205_Valparaiso	6-B-48	2237319.283	14914731.59
SAU-205_Valparaiso	3-A-48	2237955.791	14898918.17
SAU-216_oak_creek_valley	9-SE-NW	2229701.036	14938586.75
SAU-216_oak_creek_valley	15-NW-NW	2232761.563	14935241.61
SAU-216_oak_creek_valley	15-NW-SW	2233503.024	14933279.7
SAU-216_oak_creek_valley	15-SE-NW	2236222.807	14932607.13
SAU-216_oak_creek_valley	84-1	2236924.242	14930209.1
SAU-216_oak_creek_valley	81-1	2236544.326	14927938.55
SAU-216_oak_creek_valley	81-5	2237604.024	14926140.67
SAU-216_oak_creek_valley	27-SE-NE	2237863.01	14923130.8
SAU-216_oak_creek_valley	35-NE-NW	2239421.587	14920172.9

Appendix 4
Ancillary Geophysical Data

Instrumentation

Instrumentation of the SkyTEM includes a time domain electromagnetic (TDEM) system (one transmitter [Tx] and two receivers [Rx] positioned orthogonally in line with the x and z axes) and a magnetometer as well as data acquisition systems for both of these instruments. The SkyTEM also includes two each of laser altimeters, inclinometers/tilt meters and DGPS receivers. Positional data from the frame mounted DGPS receivers are recorded by the TDEM data acquisition system. The magnetometer includes a third DGPS receiver, this positional data is recorded by the magnetometer data acquisition system. Figure A4-1 gives a simple illustration of the SkyTEM frame and instrument locations, the image is viewed along the +z axis looking at the horizontal x-y plane. The axes for the image are labelled with distance in meters. The square symbols denote the locations of the altimeters, the triangles denote the DGPS positions and the circles denote the inclinometers. The magnetometer is located on a boom off the front of the frame (right side of image, arrow indicates +x direction as well as direction of flight). The TDEM Tx coil is located around the octagonal frame and the Rx Coils (x and z) are located at the back of the frame, left side of image).

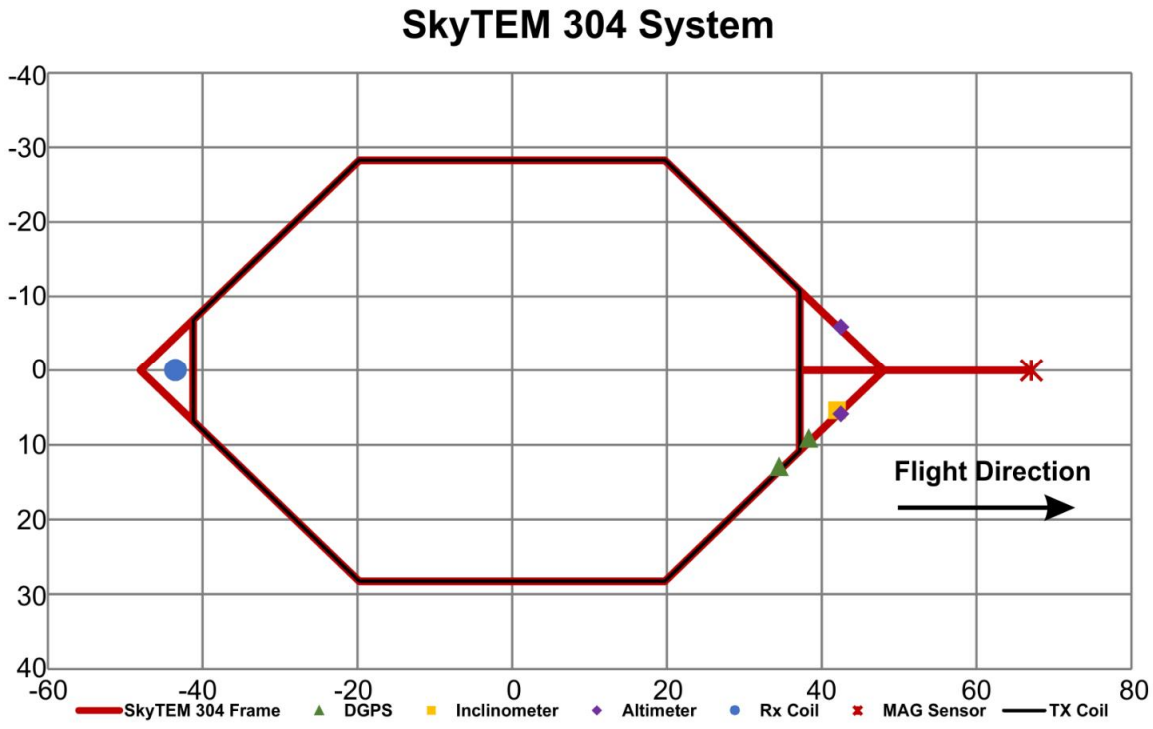


Figure A4-1: Simple illustration of SkyTEM frame showing instrumentation location.

The coordinate system used defines the +x direction as the direction of flight, the +y direction is defined 90° to the right and the +z direction is downward. The center of the transmitter loop, mounted to the octagonal SkyTEM frame is used as the origin when considering instrumentation positions. Table A4.1 lists the positions of the instruments (in meters) and Table A4.2 lists the corners of the transmitter loop (labeled in red numbers in Figure A4-1).

Table A4-1: Instrumentation position on the SkyTEM frame.

Instrument	DGPS 1	DGPS 2	Inclinometer 1	Inclinometer 2	Altimeter HE1	Altimeter HE2	X Rx Coil	Z Rx Coil
X	9.90	9.90	-11.65	-11.65	5.13	5.13	-13.60	-12.50
Y	2.69	3.66	0.50	0.50	7.85	-7.79	0.00	0.00
Z	-0.28	-0.28	-0.37	-0.37	-0.13	-0.13	-0.02	-2.21

Table A4-2: Corner positions of TX loop on the SkyTEM frame.

TX Corners	1	2	3	4	5	6	7	8
X	5.68	11.87	11.87	5.68	-5.68	-11.87	-11.87	-5.68
Y	8.22	2.03	-2.03	-8.22	-8.22	-2.03	2.03	8.22

Magnetometer base station locations are listed in Table A4-3. Table A4-3 gives the type of base station and positional information in Easting and Northings (UTM) and elevation (NAVD 88) in ft.

Table A4-3: Locations of magnetometer base stations.

Instrument	X, Easting	Y, Northing	Elevation
Primary Magnetometer Base Station	2214602	14910977	1378
Secondary Magnetometer Base Station	2214579	14911065	1381

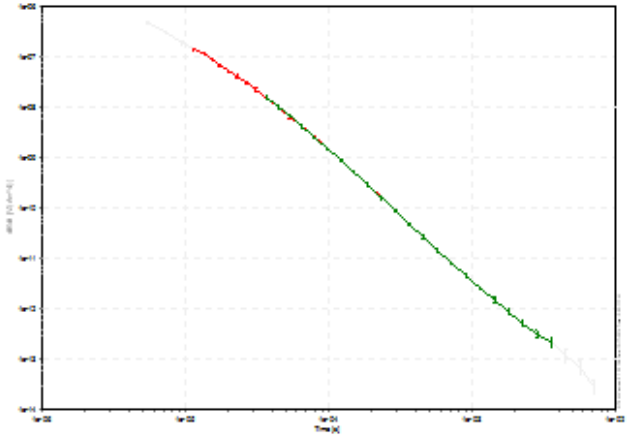
Ground-Based TDEM Inversions

The results of the final inversion of the ground-based TDEM data area presented on pages 173-179. Each page contains a plot of the change in the magnetic field with respect to time (dB/dt Plot, upper left), a plot of the apparent resistivity with respect to time (App. Res. Plot, lower left) and a plot of the final inverted earth resistivity model (Model, right).

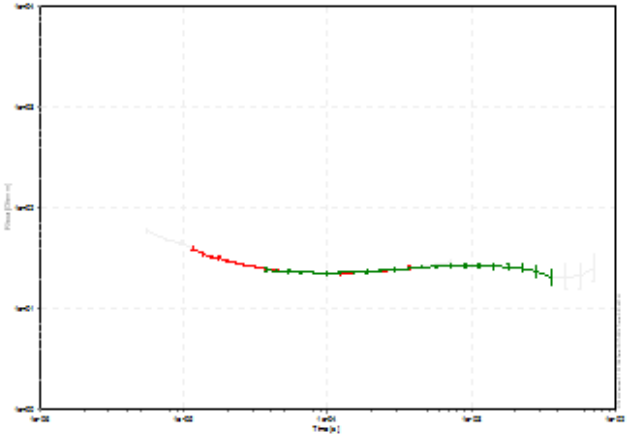
Ground TDEM Model Results

LPS-TEM2

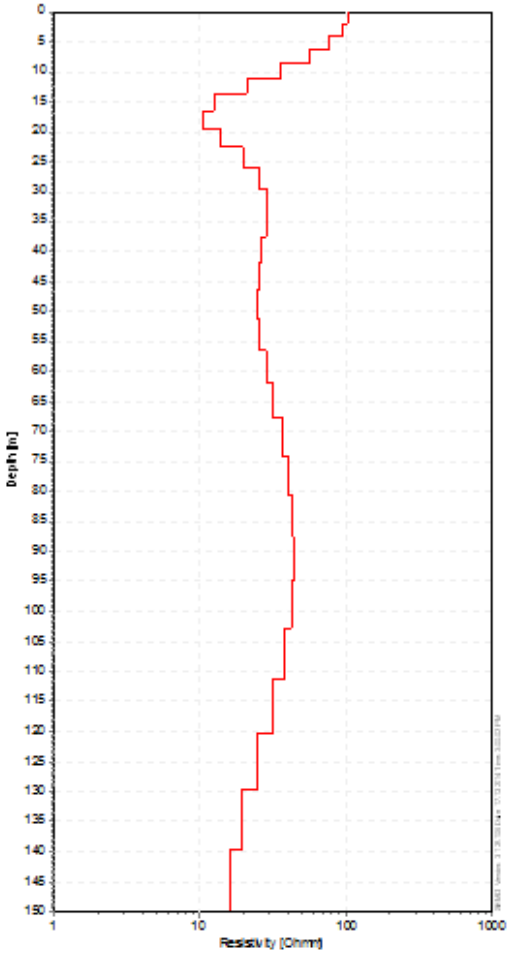
dB/dt Plot



App. Res. Plot

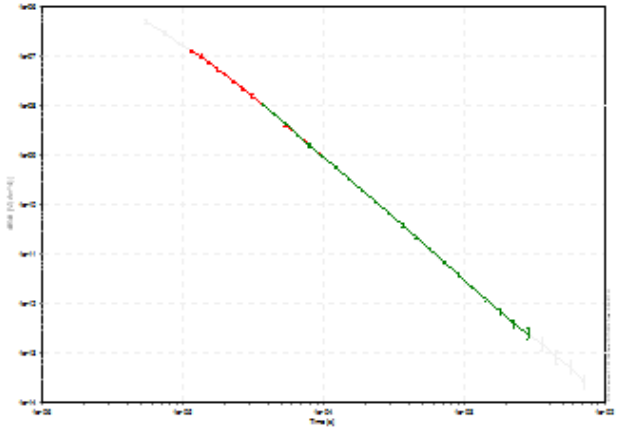


Model

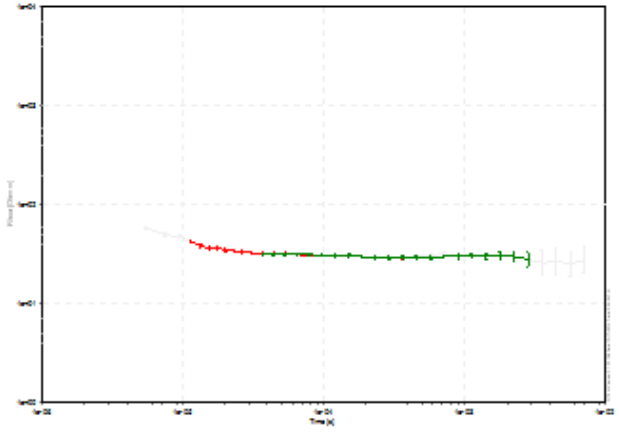


LPS-TEM4A

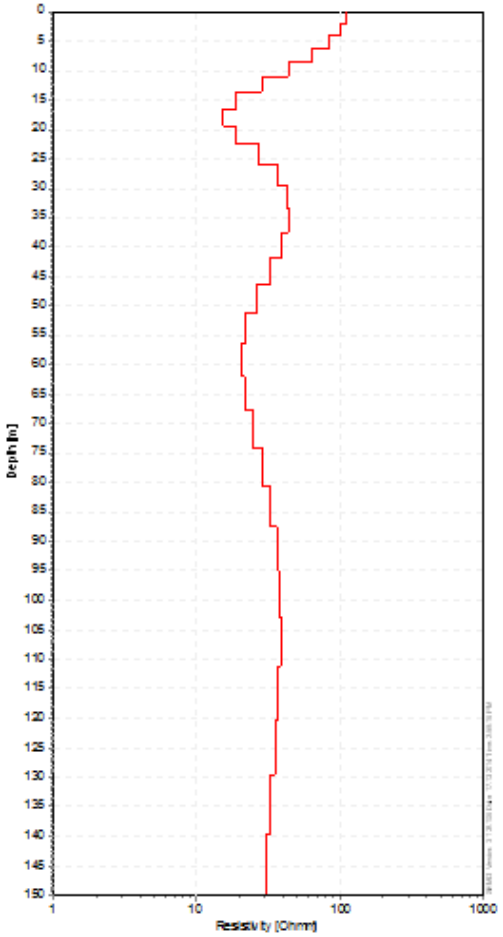
dB/dt Plot



App. Res. Plot

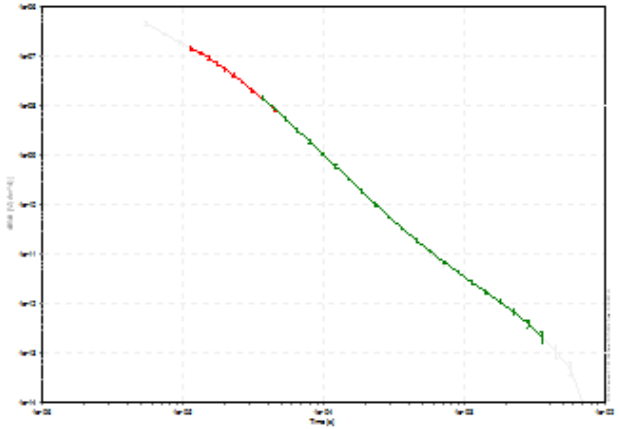


Model

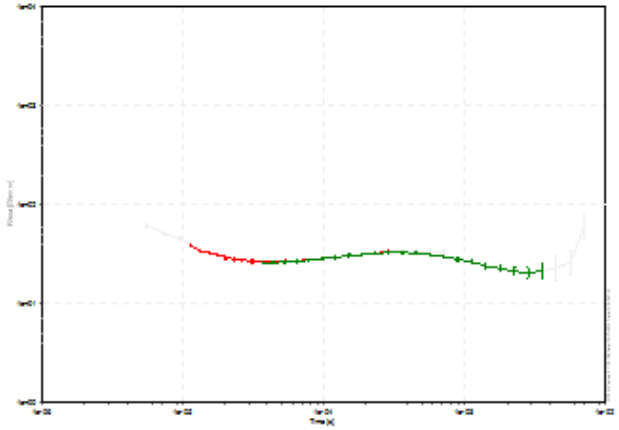


LPS-TEM4B

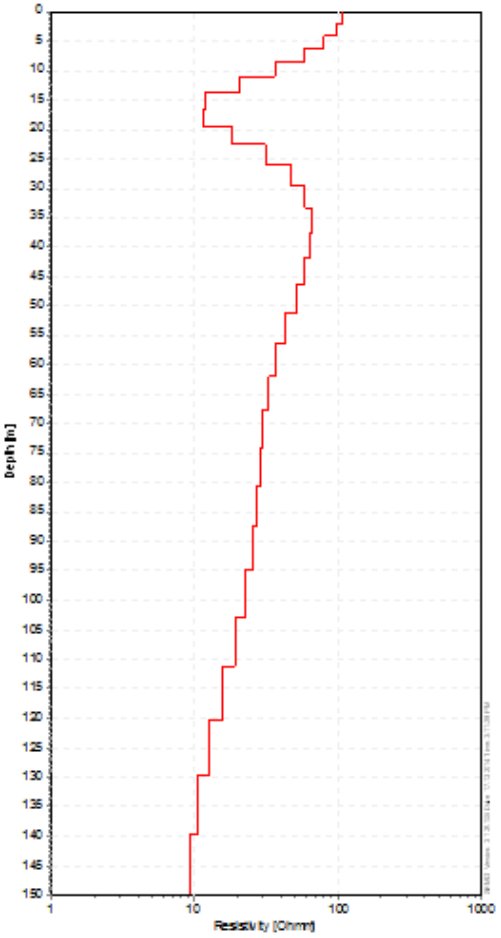
dB/dt Plot



App. Res. Plot

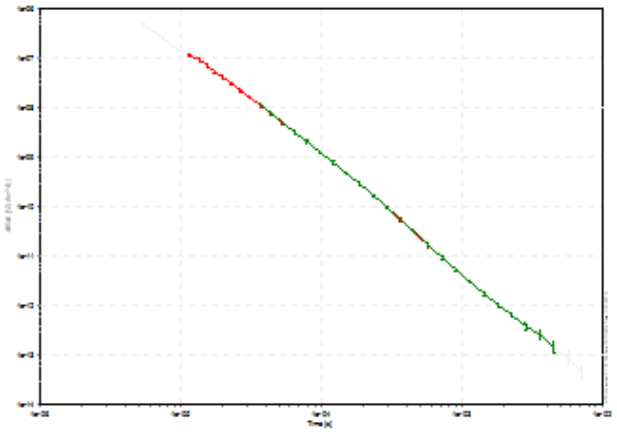


Model

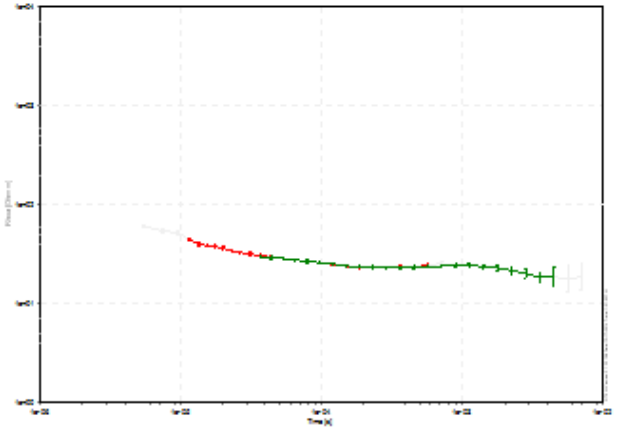


LPS-TEM5

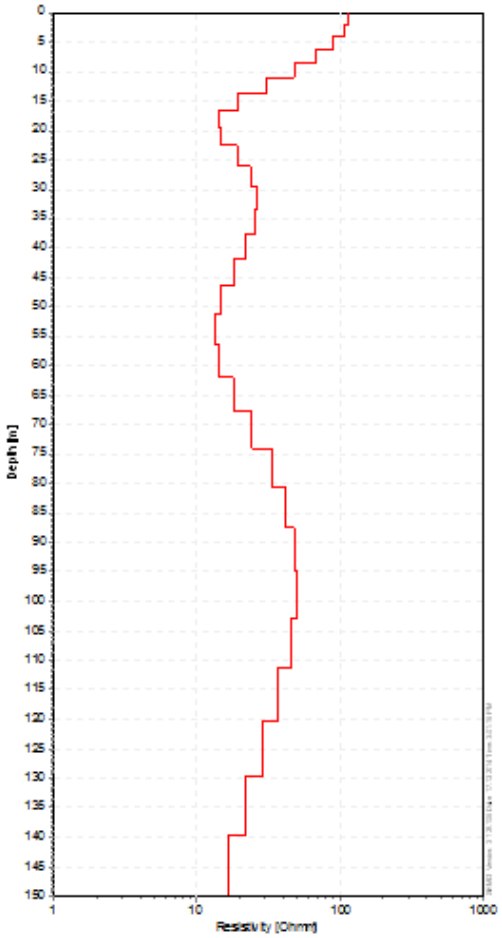
dB/dt Plot



App. Res. Plot

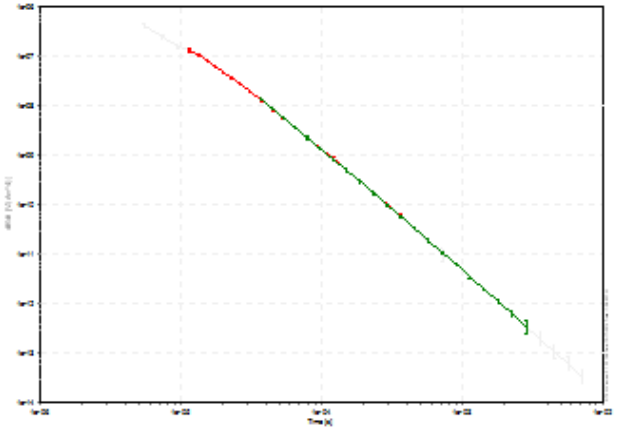


Model

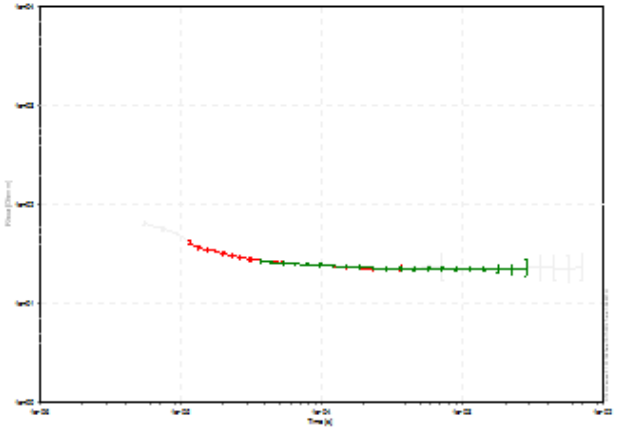


LPS-TEM8

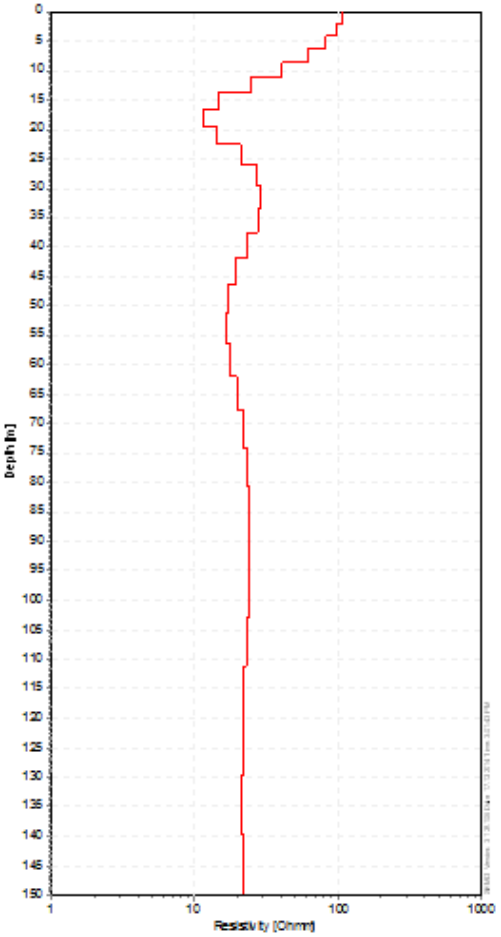
dB/dt Plot



App. Res. Plot

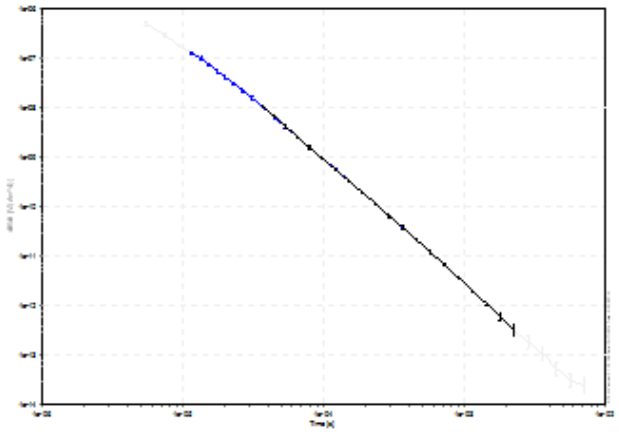


Model

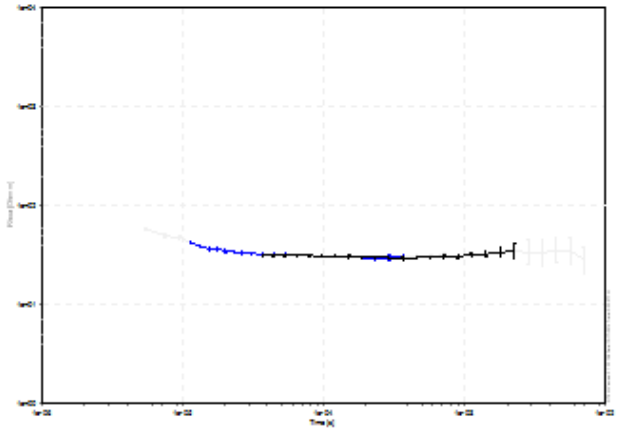


LPS-TEM9

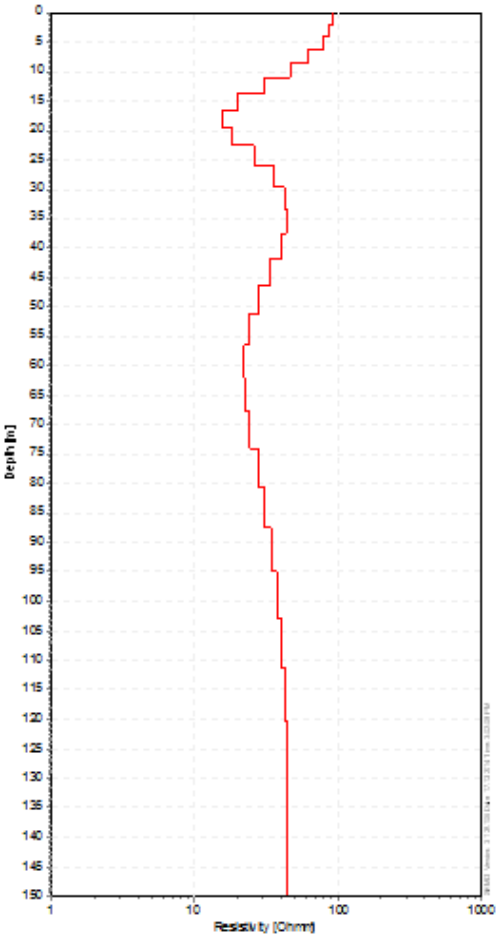
dB/dt Plot



App. Res. Plot

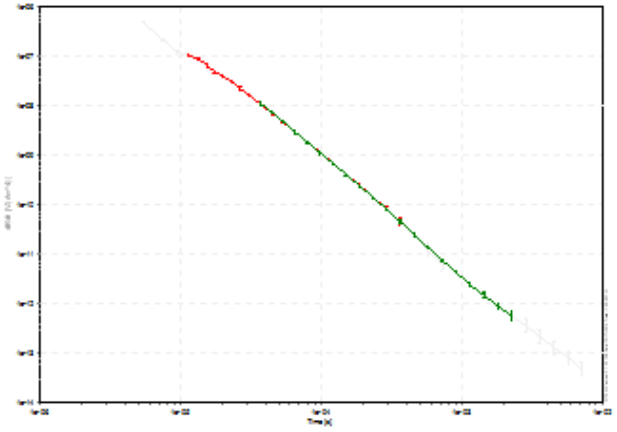


Model

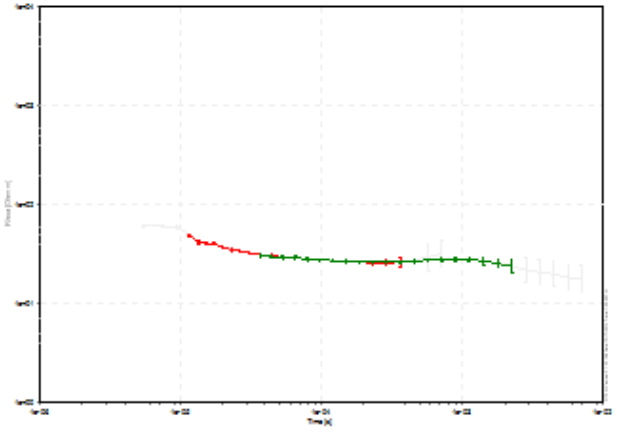


LPS-TEM11

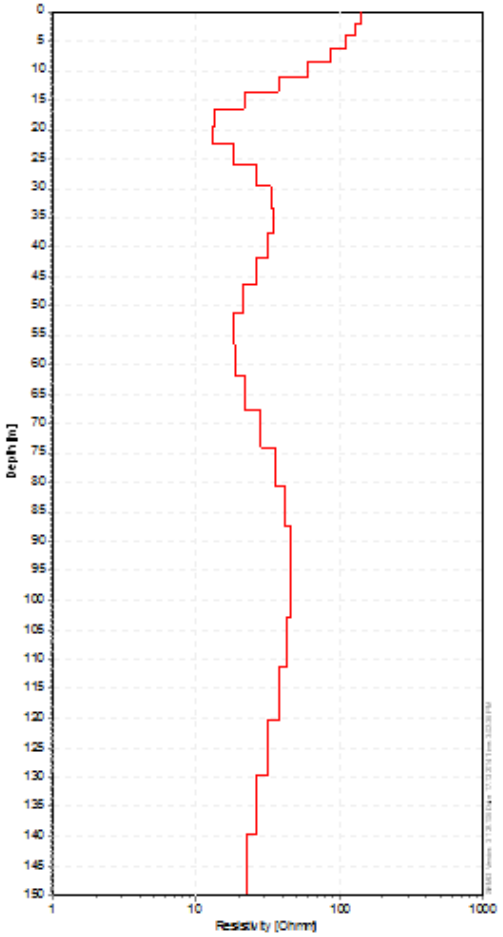
dB/dt Plot



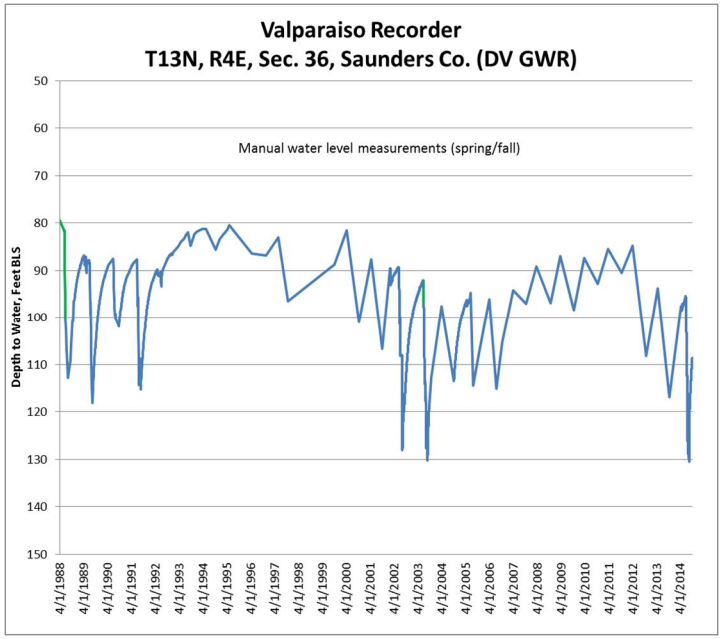
App. Res. Plot

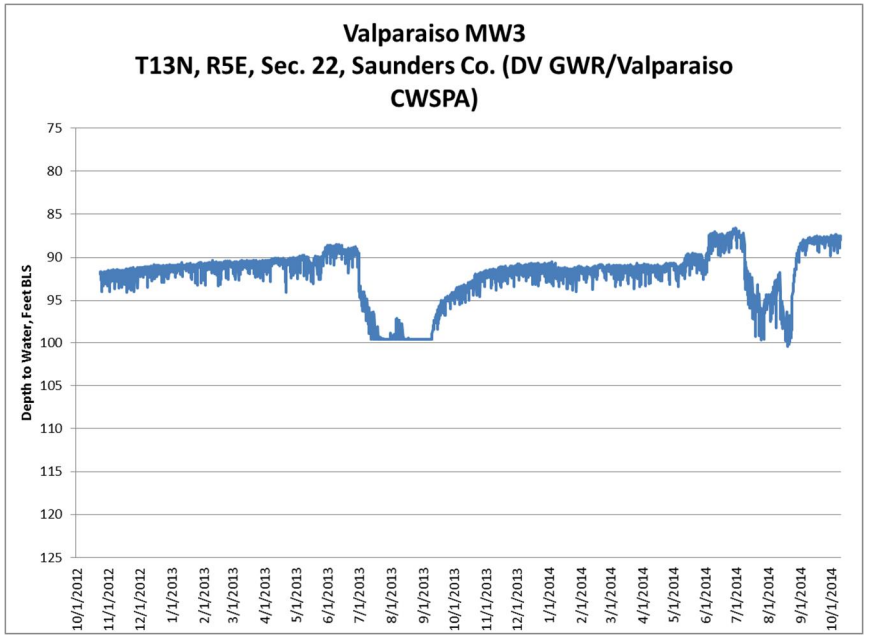


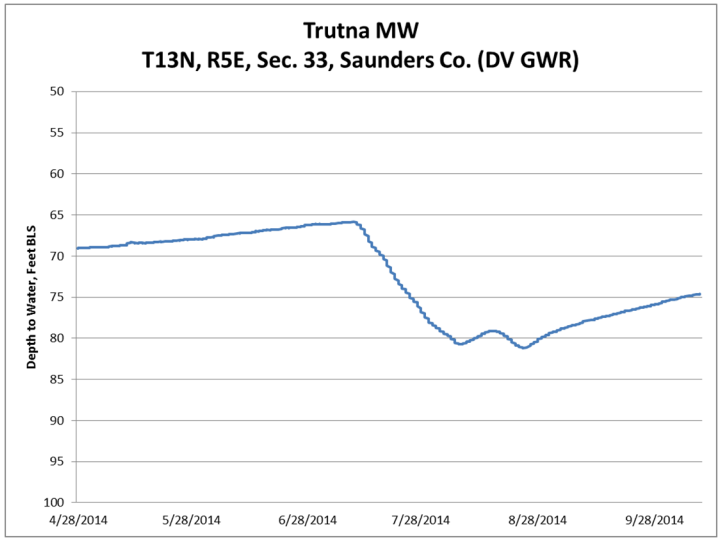
Model

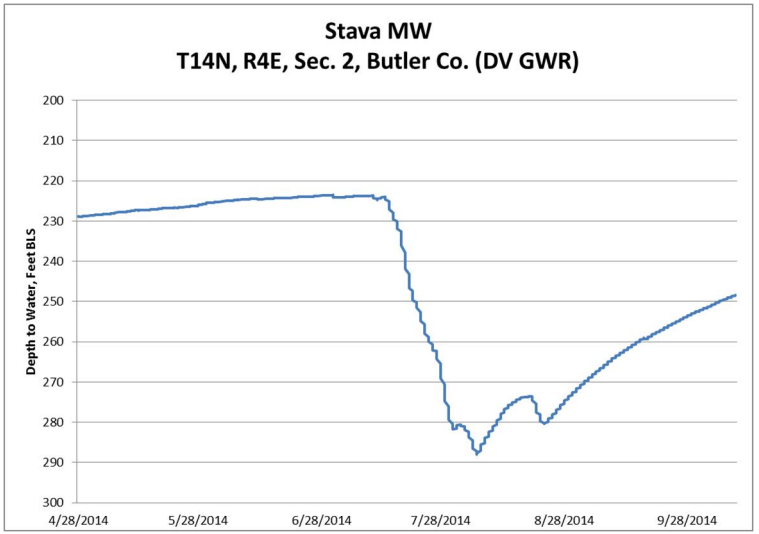


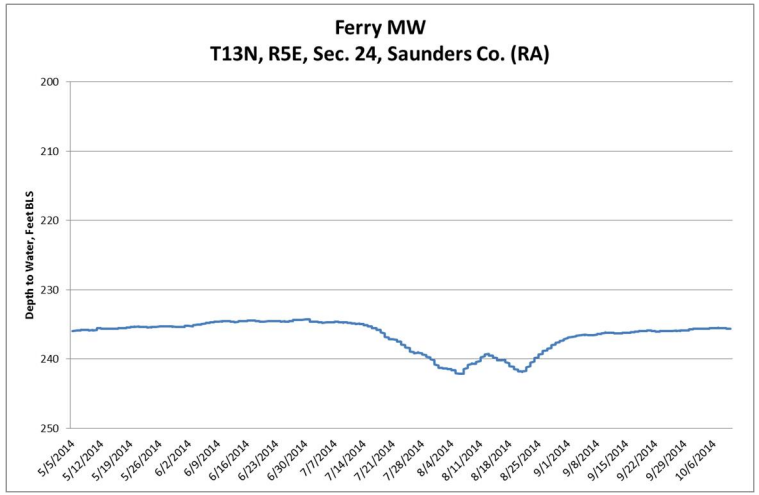
Appendix 5
LPSNRD Recorder Well Data

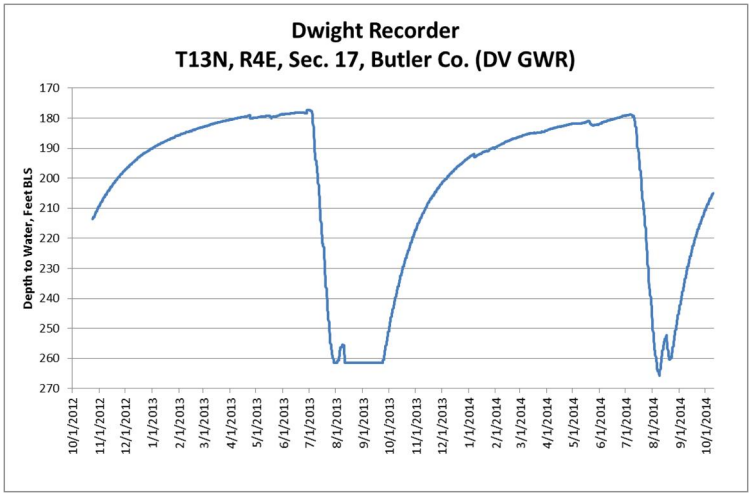

Valparaiso Recorder
T13N, R4E, Sec. 36, Saunders Co. (DV GWR)
Manual water level measurements (spring/fall)
Depth to Water, Feet BLS
50
60
70
80
90
100
110
120
130
140
150
4/1/1988
4/1/1989
4/1/1990
4/1/1991
4/1/1992
4/1/1993
4/1/1994
4/1/1995
4/1/1996
4/1/1997
4/1/1998
4/1/1999
4/1/2000
4/1/2001
4/1/2002
4/1/2003
4/1/2004
4/1/2005
4/1/2006
4/1/2007
4/1/2008
4/1/2009
4/1/2010
4/1/2011
4/1/2012
4/1/2013
4/1/2014


Valparaiso MW3
T13N, R5E, Sec. 22, Saunders Co. (DV GWR/Valparaiso CWSPA)
Depth to Water, Feet BLS
75
80
85
90
95
100
105
110
115
120
125
10/1/2012
11/1/2012
12/1/2012
1/1/2013
2/1/2013
3/1/2013
4/1/2013
5/1/2013
6/1/2013
7/1/2013
8/1/2013
9/1/2013
10/1/2013
11/1/2013
12/1/2013
1/1/2014
2/1/2014
3/1/2014
4/1/2014
5/1/2014
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014


Trutna MW
T13N, R5E, Sec. 33, Saunders Co. (DV GWR)
Depth to Water, Feet BLS
50
55
60
65
70
75
80
85
90
95
100
4/28/2014
5/28/2014
6/28/2014
7/28/2014
8/28/2014
9/28/2014


Stava MW
T14N, R4E, Sec. 2, Butler Co. (DV GWR)
Depth to Water, Feet BLS
200
210
220
230
240
250
260
270
280
290
300
4/28/2014
5/28/2014
6/28/2014
7/28/2014
8/28/2014
9/28/2014


Ferry MW
T13N, R5E, Sec. 24, Saunders Co. (RA)
Depth to Water, Feet BLS
200
210
220
230
240
250
5/5/2014
5/12/2014
5/19/2014
5/26/2014
6/2/2014
6/9/2014
6/16/2014
6/23/2014
6/30/2014
7/7/2014
7/14/2014
7/21/2014
7/28/2014
8/4/2014
8/11/2014
8/18/2014
8/25/2014
9/1/2014
9/8/2014
9/15/2014
9/22/2014
9/29/2014
10/6/2014


Dwight Recorder
T13N, R4E, Sec. 17, Butler Co. (DV GWR)
Depth to Water, Feet BLS
170
180
190
200
210
220
230
240
250
260
270
10/1/2012
11/1/2012
12/1/2012
1/1/2013
2/1/2013
3/1/2013
4/1/2013
5/1/2013
6/1/2013
7/1/2013
8/1/2013
9/1/2013
10/1/2013
11/1/2013
12/1/2013
1/1/2014
2/1/2014
3/1/2014
4/1/2014
5/1/2014
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014

Appendix 6
Historic Cross Sections

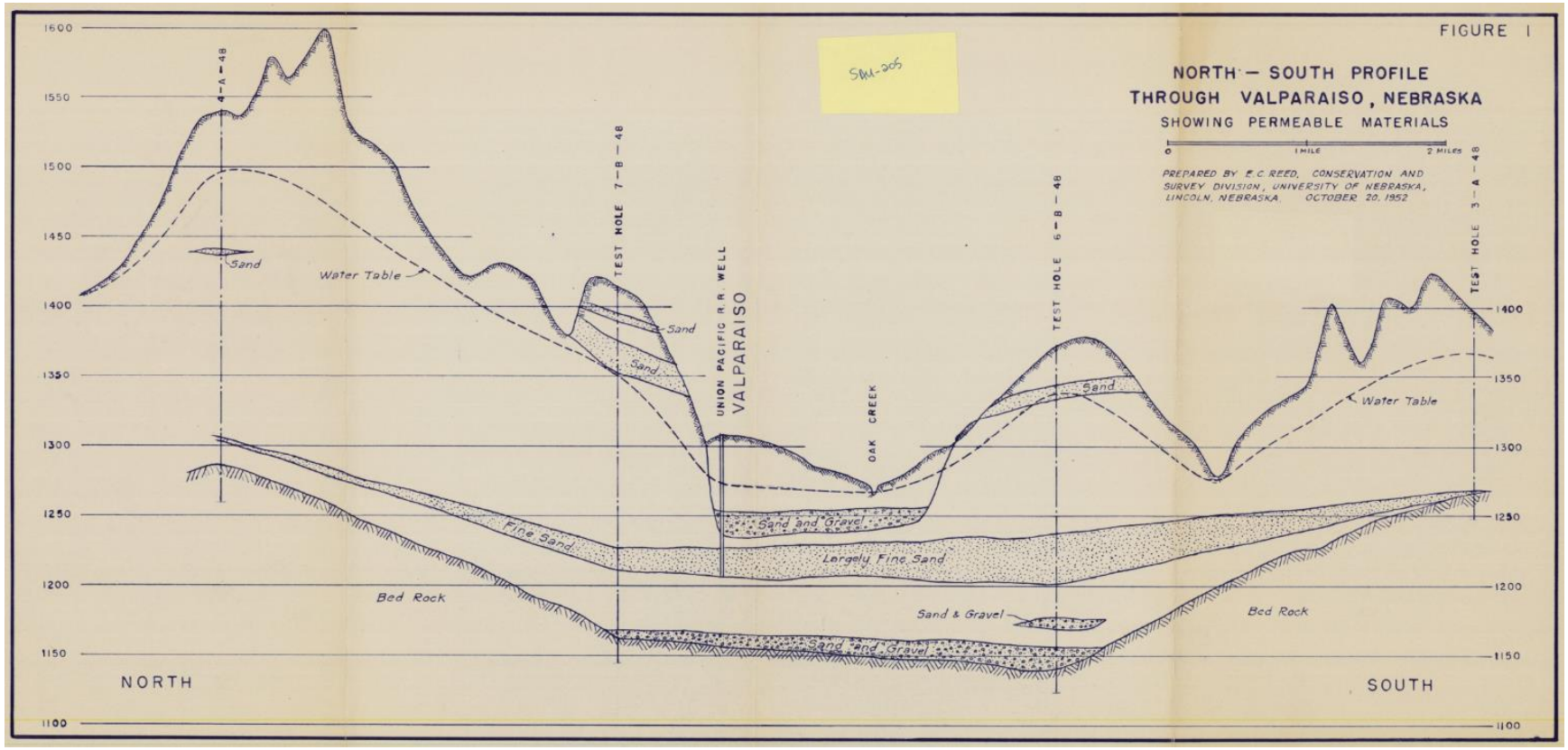


Figure A6-1: Cross section SAU-5 represented in Figure 4-15.

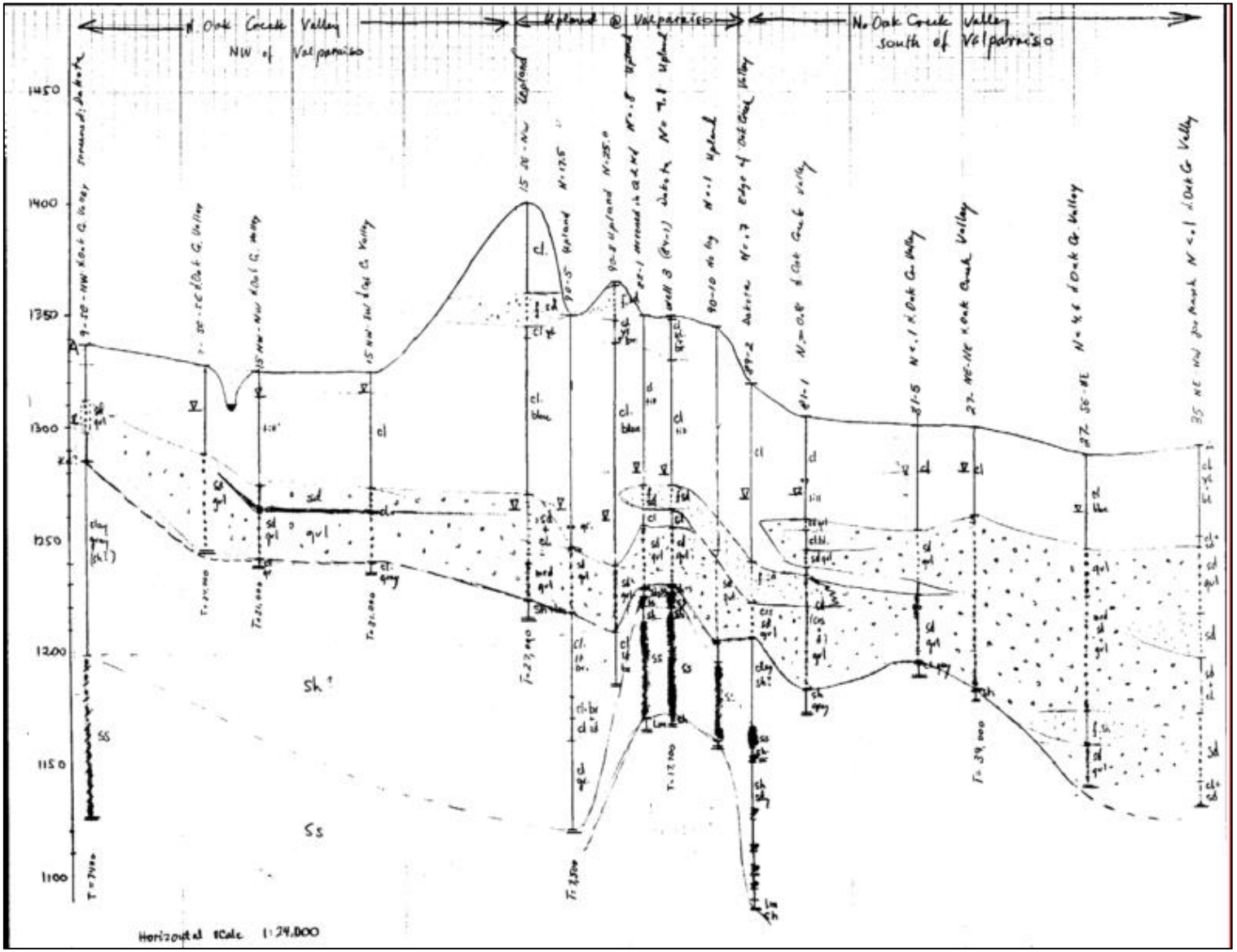


Figure A6-2: Cross section SAU-6 represented in Figure 4-15.

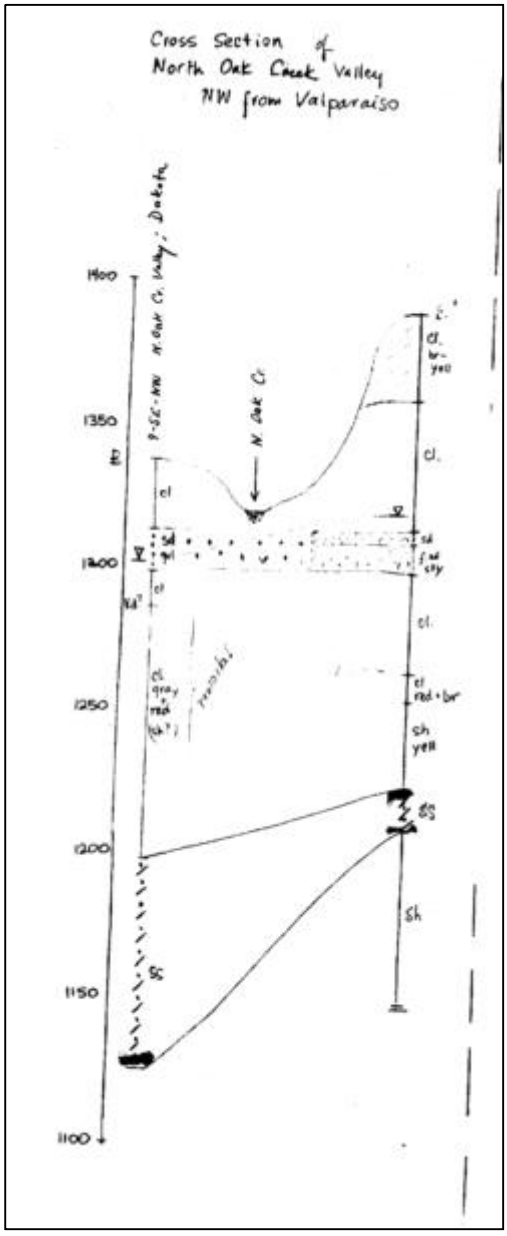
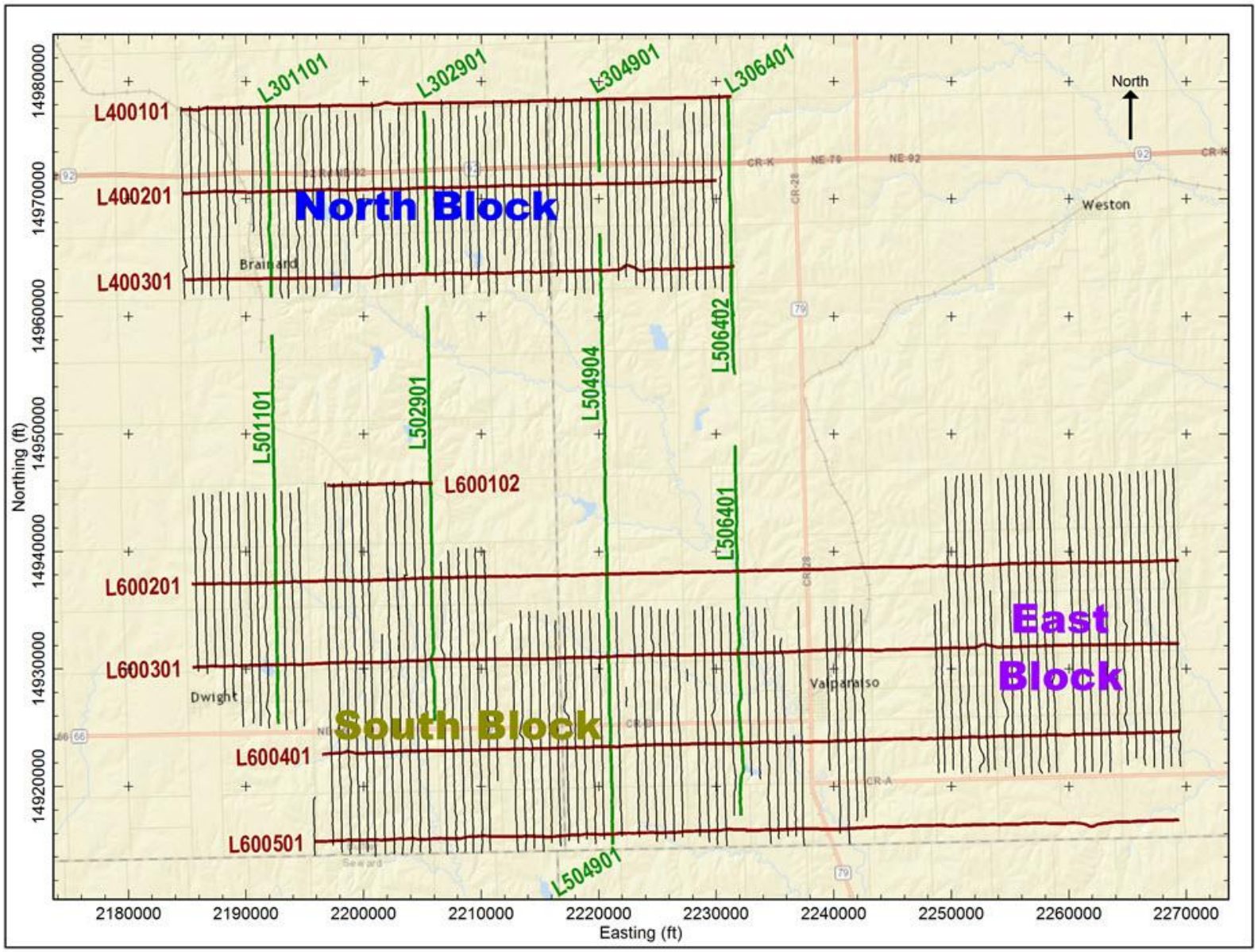


Figure A6-3: Cross section at north Oak Creek from SAU-6.

Appendix 7

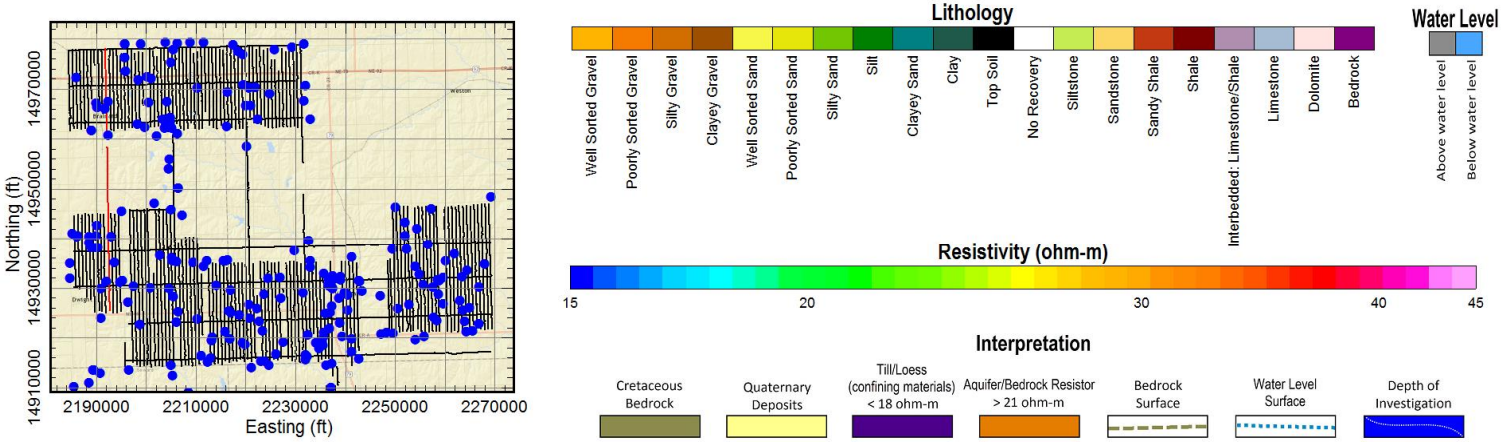
AEM Results- Flight Line Profiles and Hydrogeologic Interpretations

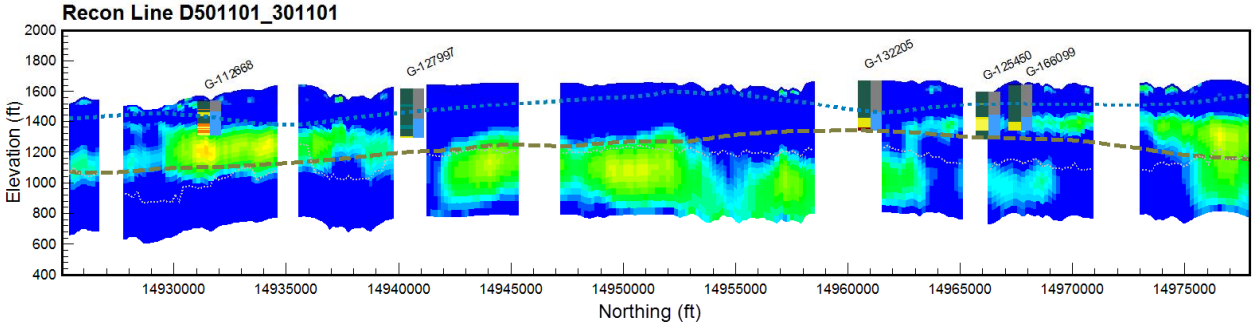
Tie-Lines between Flight Blocks
Reference Map

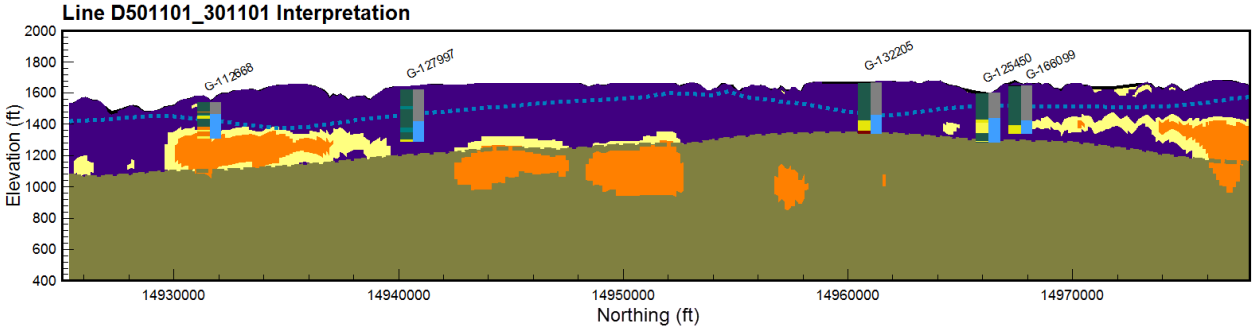

L301101
L302901
L304901
L306401
L400101
L400201
L400301
North Block
L506402
L501101
L502901
L504904
L600102
L506401
L600201
L600301
East Block
South Block
L600401
L600501
L504901
North
Weston
Brainard
Dwight
Valparaiso
Seward
CR-K
NE-79
NE-92
CR-28
CR-A
Northing (ft)
14980000
14970000
14960000
14950000
14940000
14930000
14920000
Easting (ft)
2180000
2190000
2200000
2210000
2220000
2230000
2240000
2250000
2260000
2270000

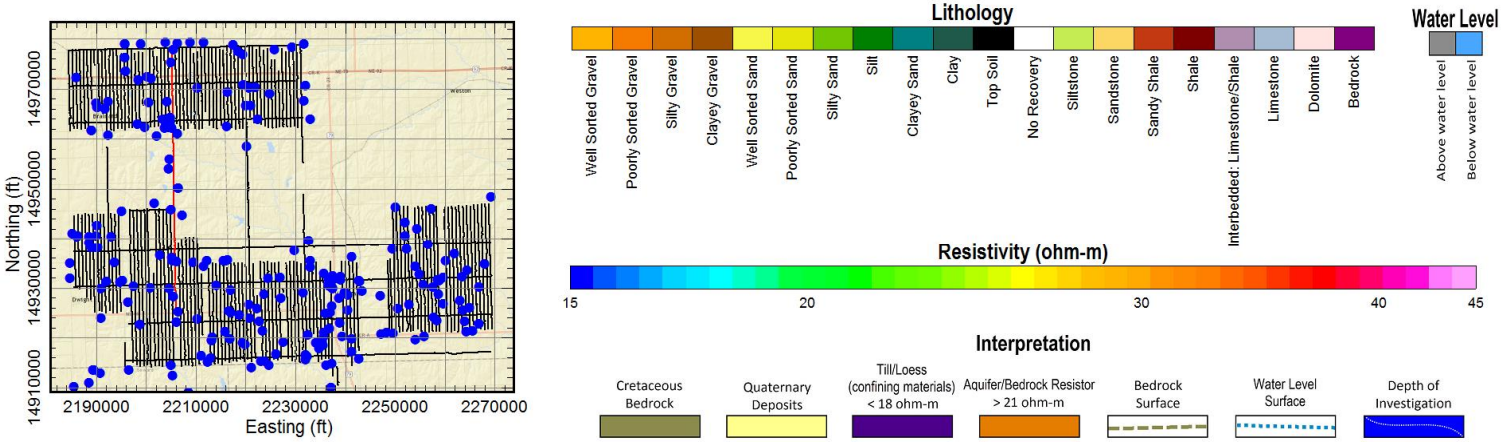
Tie-Lines between Flight Blocks

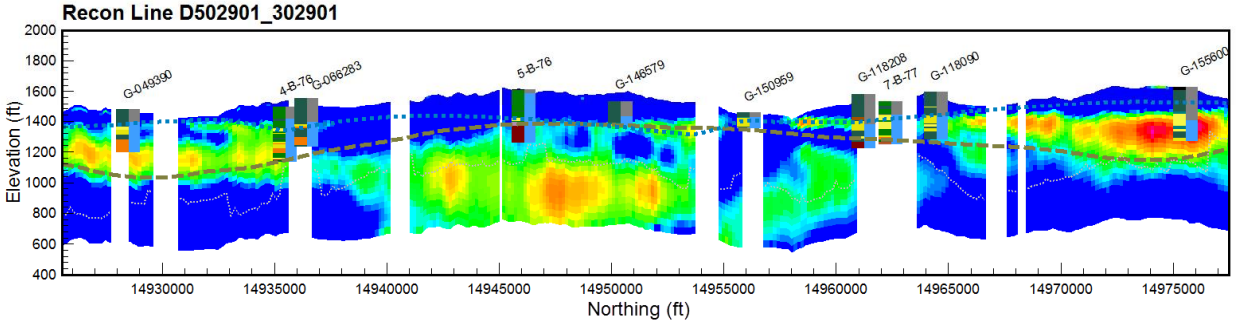
Quaternary Interpretations with Boreholes and NDNR Water Levels

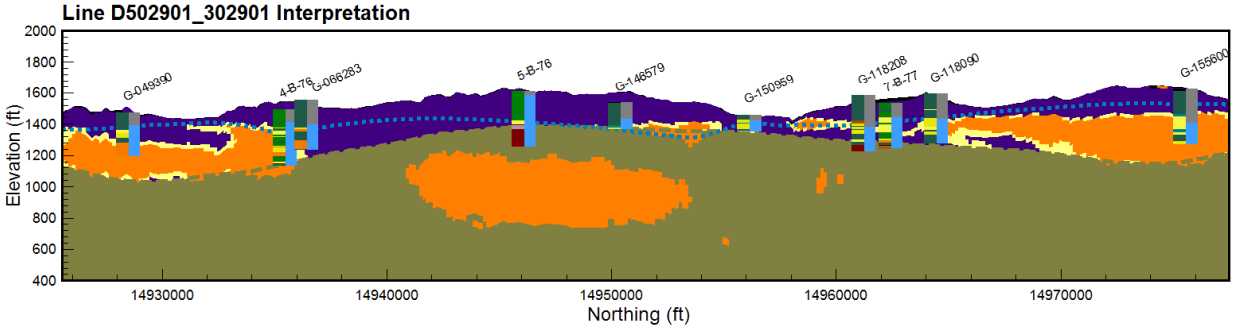

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

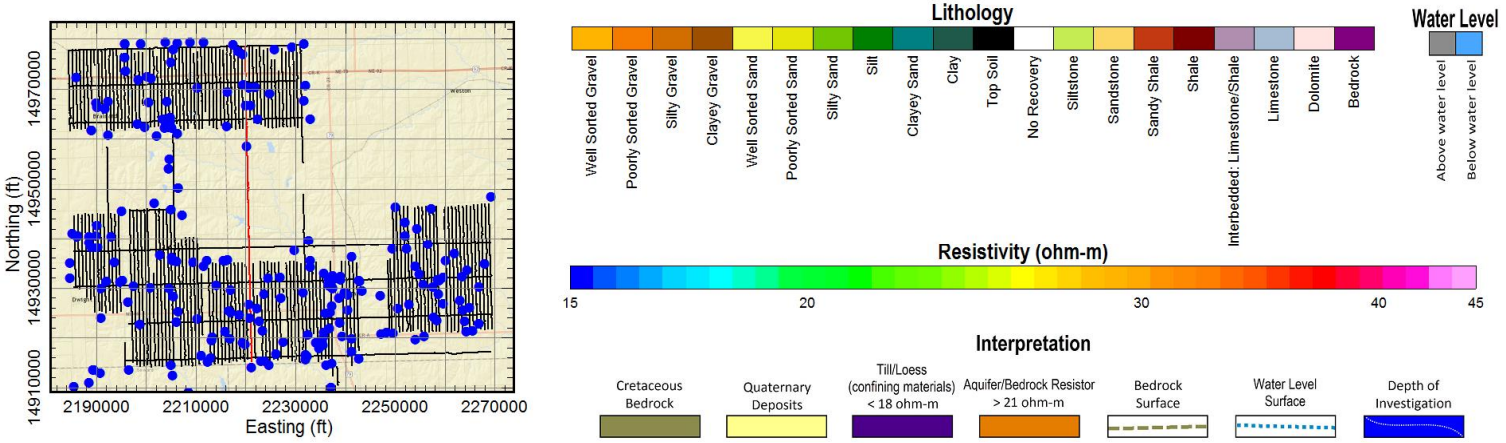

Recon Line D501101_301101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112668
G-127997
G-132205
G-125450
G-166099
14930000
14935000
14940000
14945000
14950000
14955000
14960000
14965000
14970000
14975000
Northing (ft)

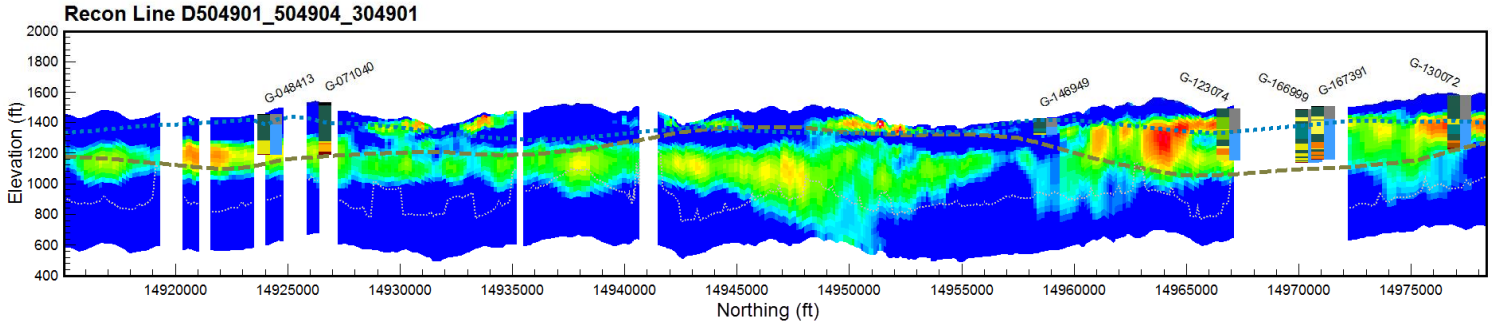

Line D501101_301101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112668
G-127997
G-132205
G-125450
G-166099
14930000
14940000
14950000
14960000
14970000
Northing (ft)

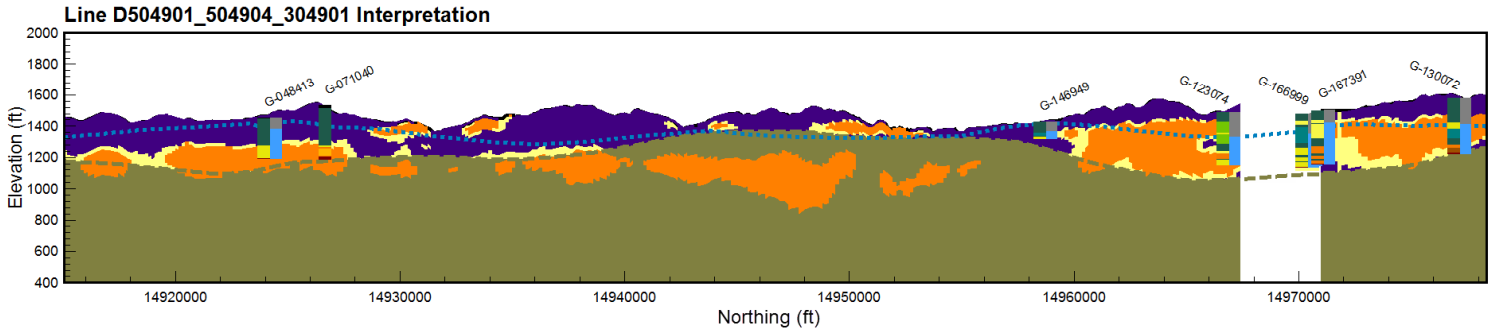

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

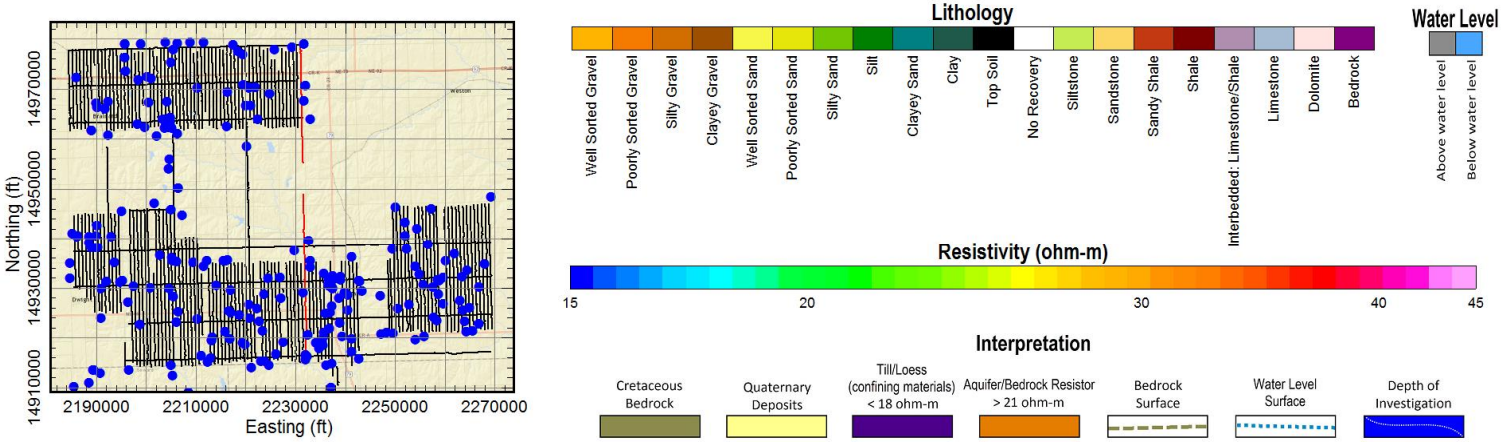

Recon Line D502901_302901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-049390
4-B-76
G-066283
5-B-76
G-146579
G-150959
G-118208
7-B-77
G-118090
G-155600
14930000
14935000
14940000
14945000
14950000
14955000
14960000
14965000
14970000
14975000
Northing (ft)

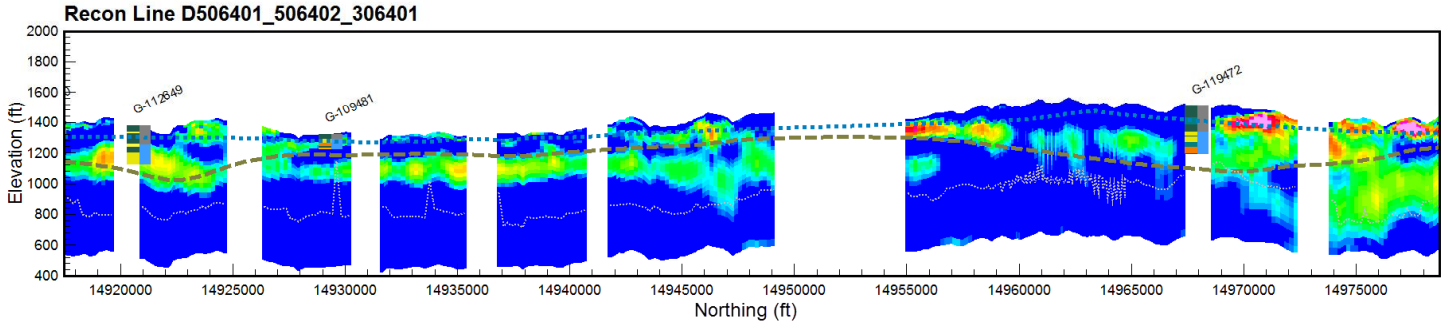

Line D502901_302901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-049390
4-B-76
G-066283
5-B-76
G-146579
G-150959
G-118208
7-B-77
G-118090
G-155600
14930000
14940000
14950000
14960000
14970000
Northing (ft)

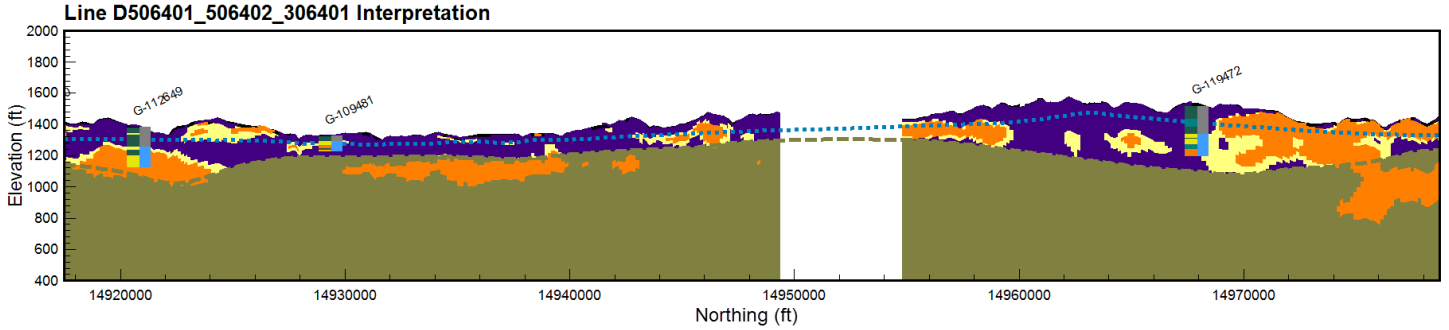

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

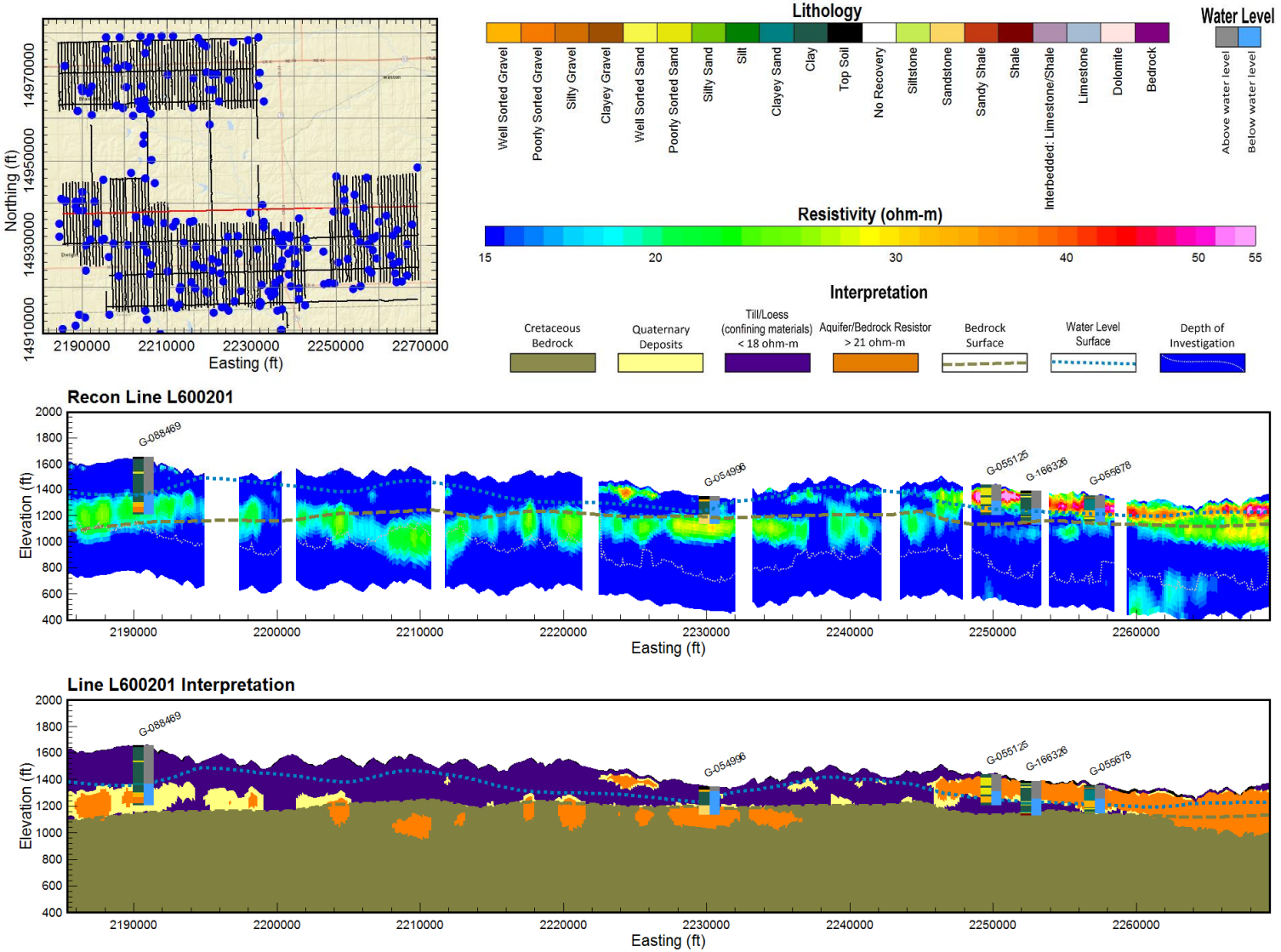

Recon Line D504901_504904_304901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-048413
G-071040
G-146949
G-123074
G-166999
G-167391
G-130072
14920000
14925000
14930000
14935000
14940000
14945000
14950000
14955000
14960000
14965000
14970000
14975000
Northing (ft)

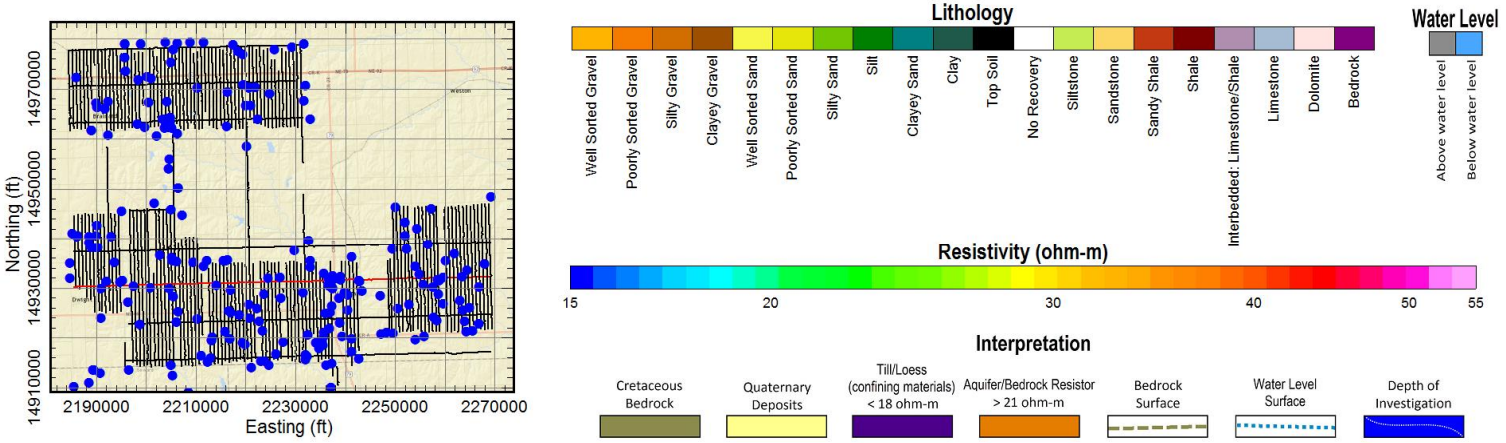

Line D504901_504904_304901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-048413
G-071040
G-146949
G-123074
G-166999
G-167391
G-130072
14920000
14930000
14940000
14950000
14960000
14970000
Northing (ft)


Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

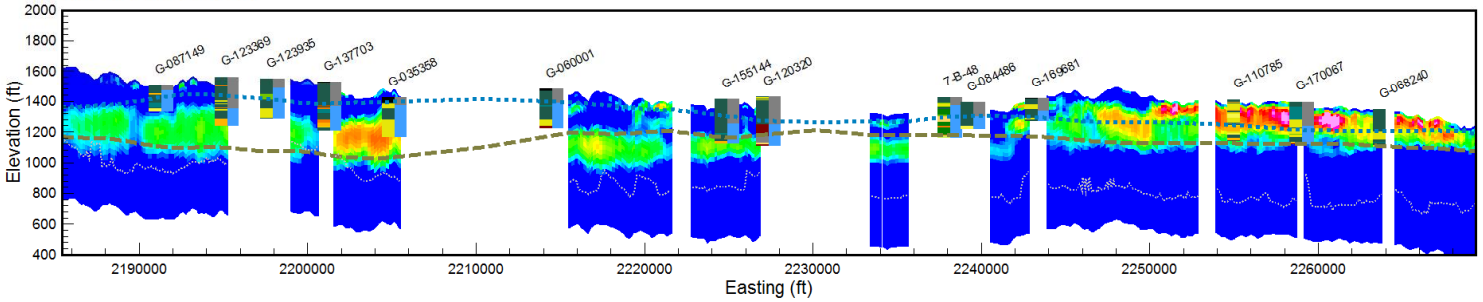

Recon Line D506401_506402_306401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112649
G-109481
G-119472
14920000
14925000
14930000
14935000
14940000
14945000
14950000
14955000
14960000
14965000
14970000
14975000
Northing (ft)


Line D506401_506402_306401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112649
G-109481
G-119472
14920000
14930000
14940000
14950000
14960000
14970000
Northing (ft)

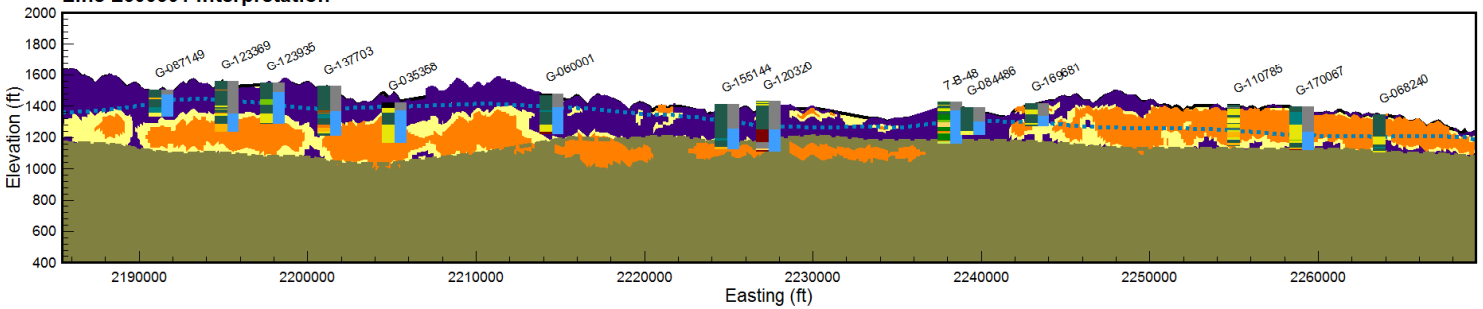

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
Recon Line L600201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-088469
G-054996
G-055125
G-166326
G-056678
2190000
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)
Line L600201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-088469
G-054996
G-055125
G-166326
G-056678
2190000
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)

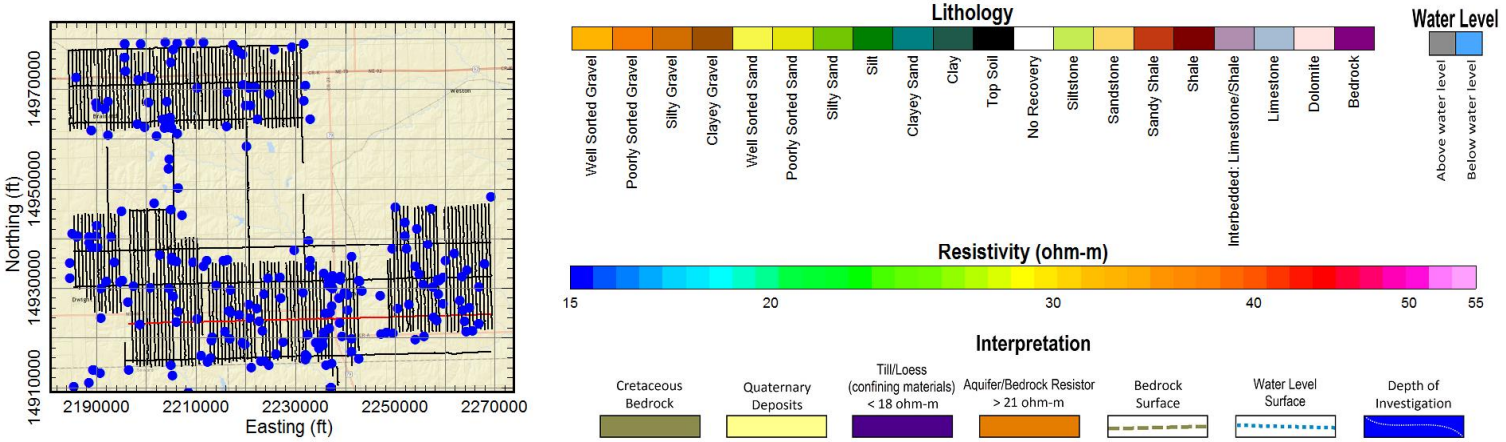


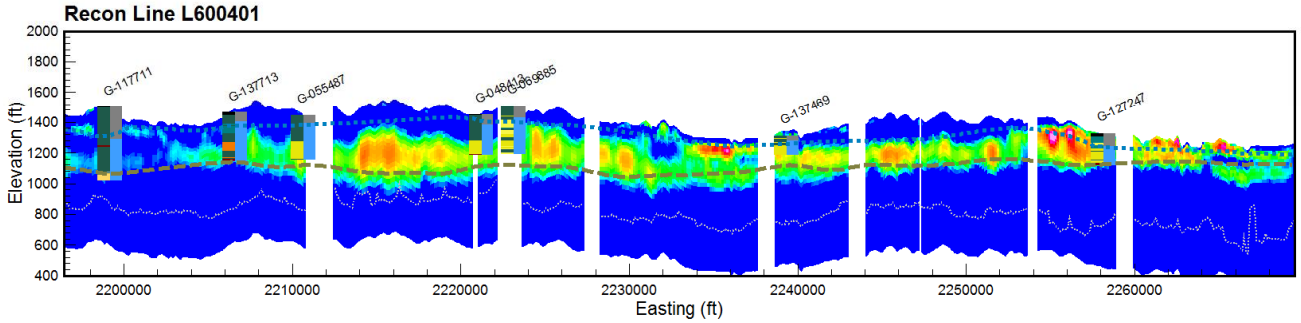
Recon Line L600301

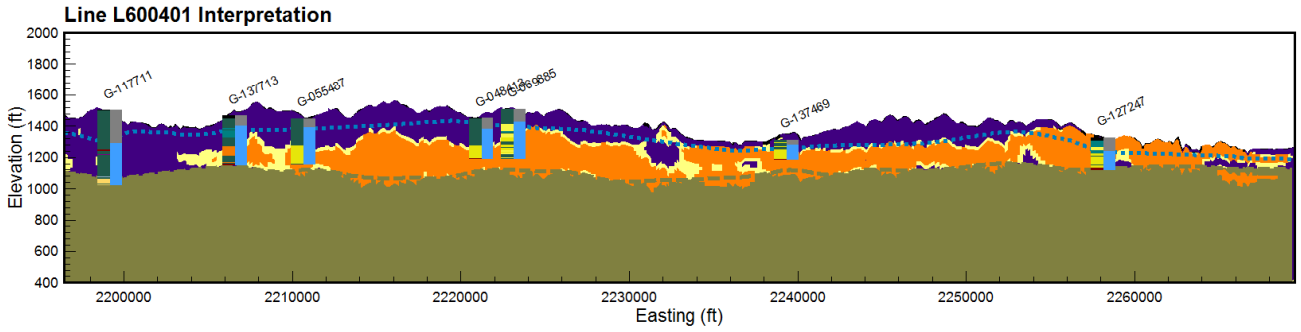


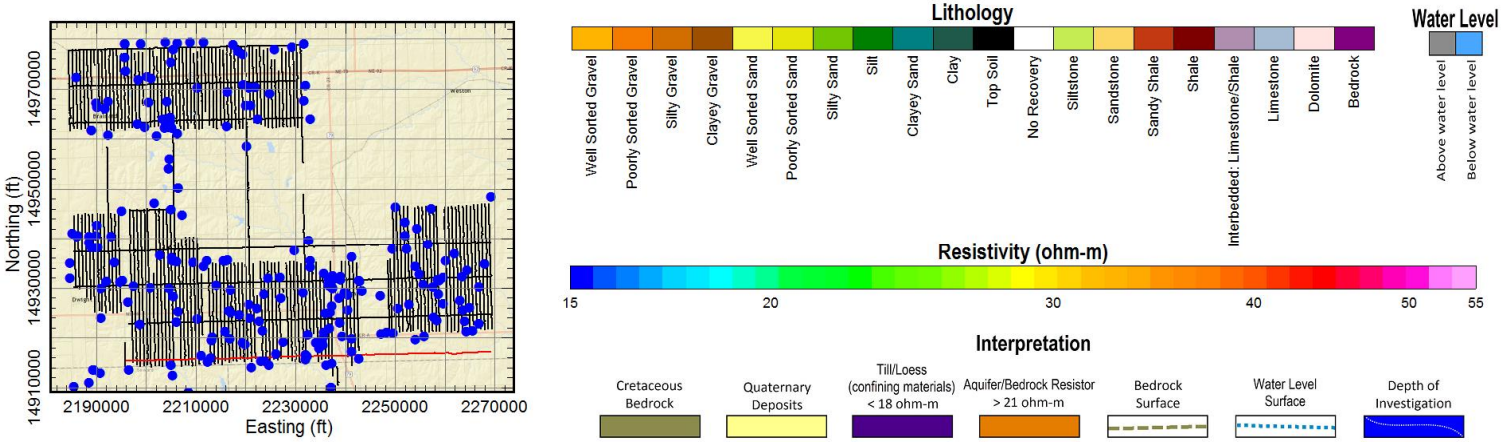
Line L600301 Interpretation

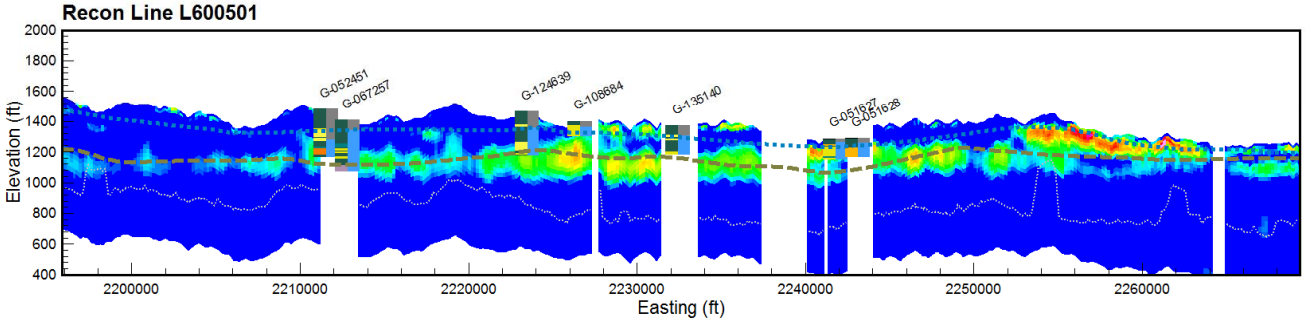


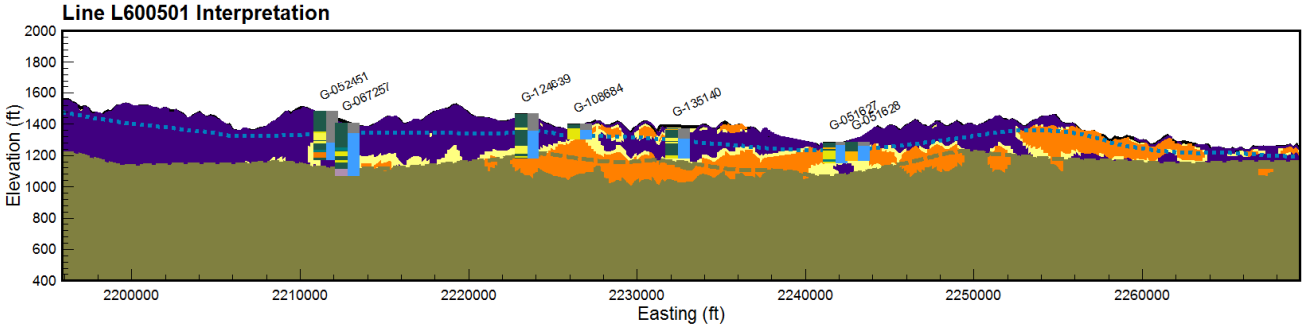

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation


Recon Line L600401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117711
G-137713
G-055487
G-137469
G-127247
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)

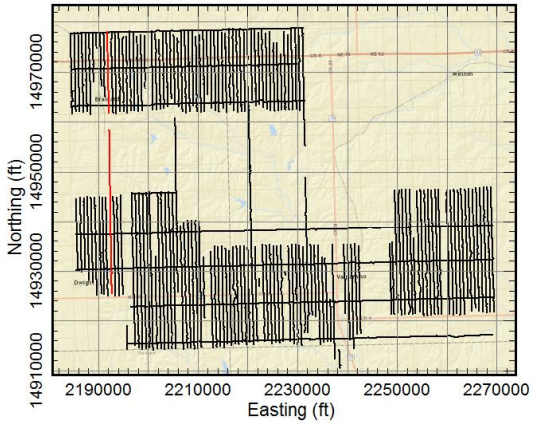

Line L600401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117711
G-137713
G-055487
G-137469
G-127247
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)

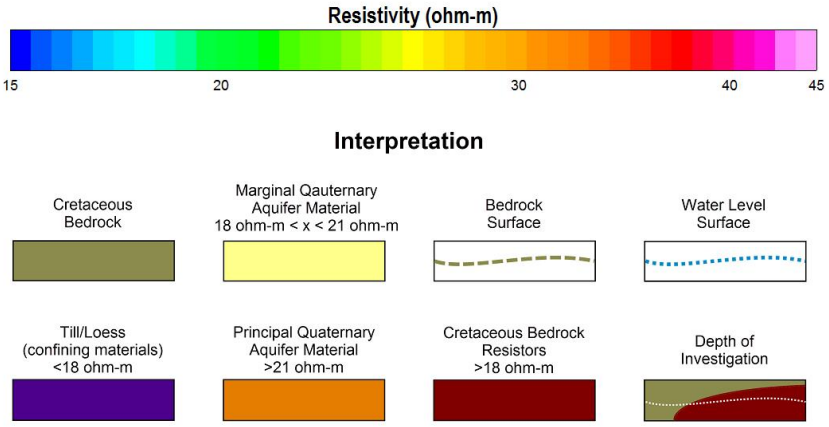

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation


Recon Line L600501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-052451
G-067257
G-124639
G-108684
G-135140
G-051627
G-051628
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)

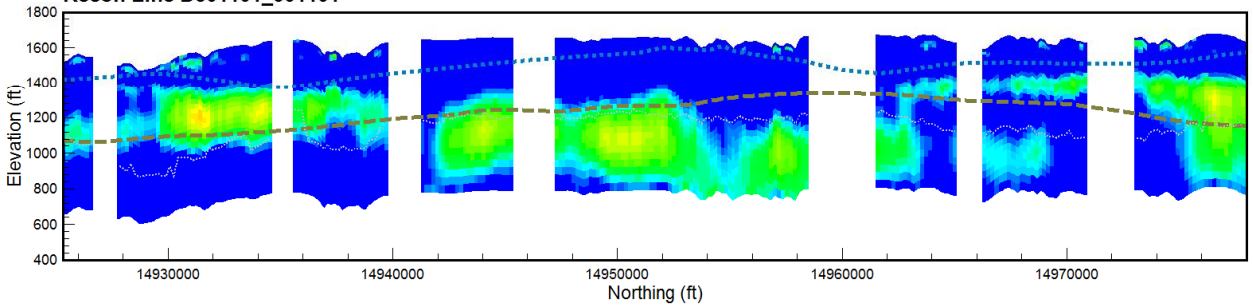

Line L600501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-052451
G-067257
G-124639
G-108684
G-135140
G-051627
G-051628
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)

Tie-Lines between Flight Blocks
Bedrock Interpretations

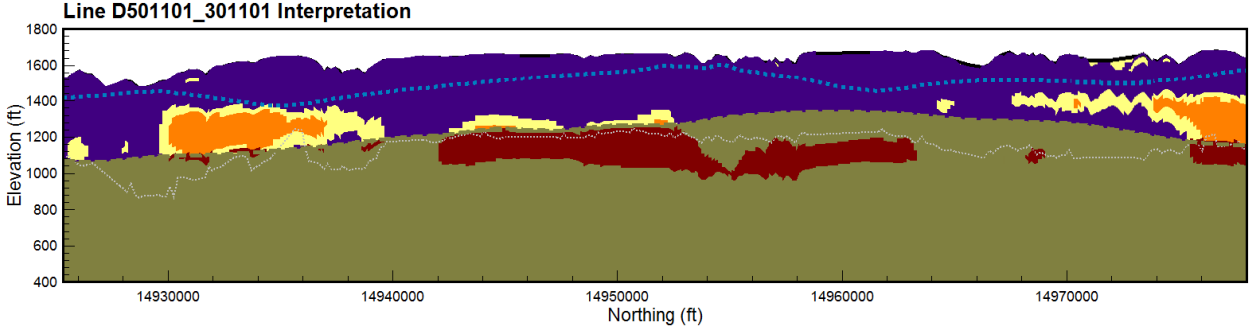


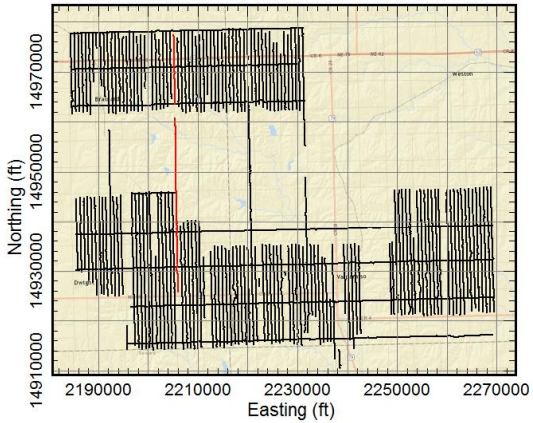


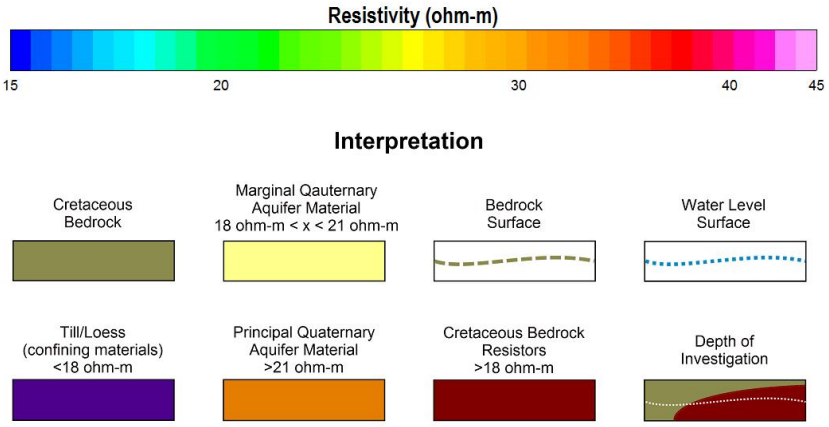
Recon Line D501101_301101

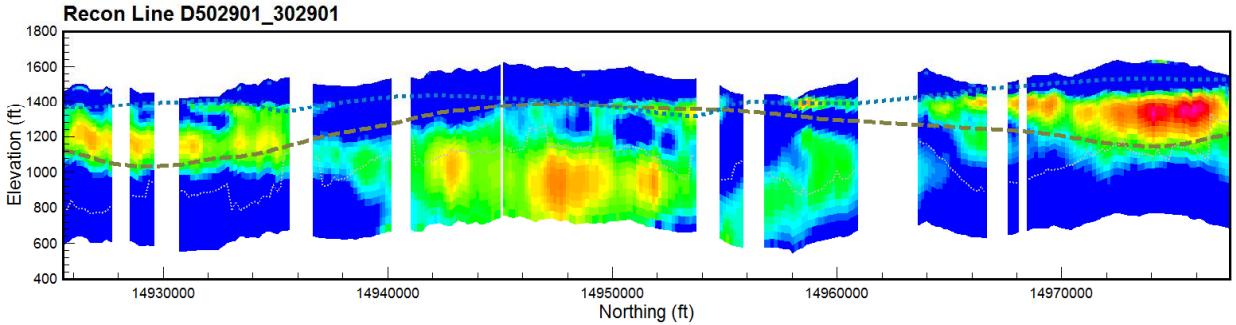


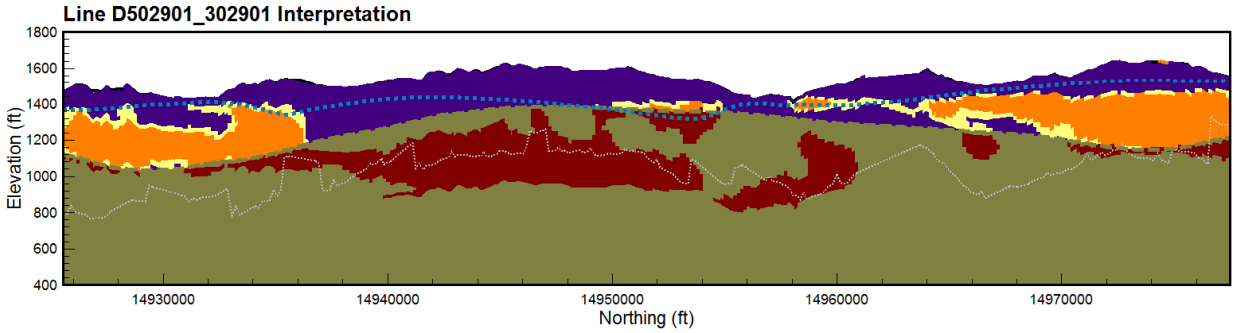
Line D501101_301101 Interpretation

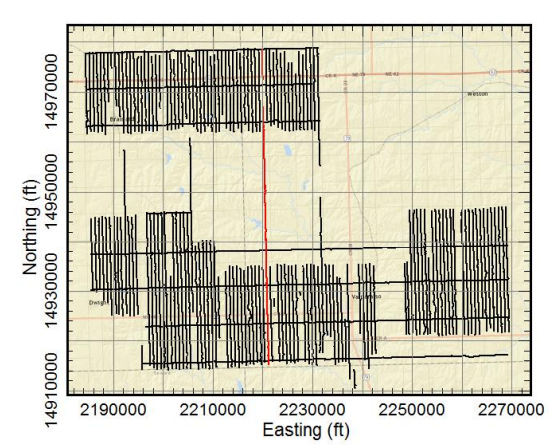


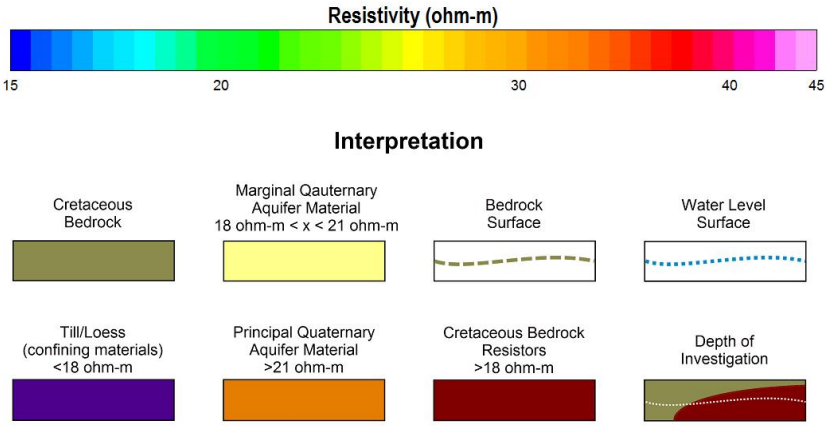

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)

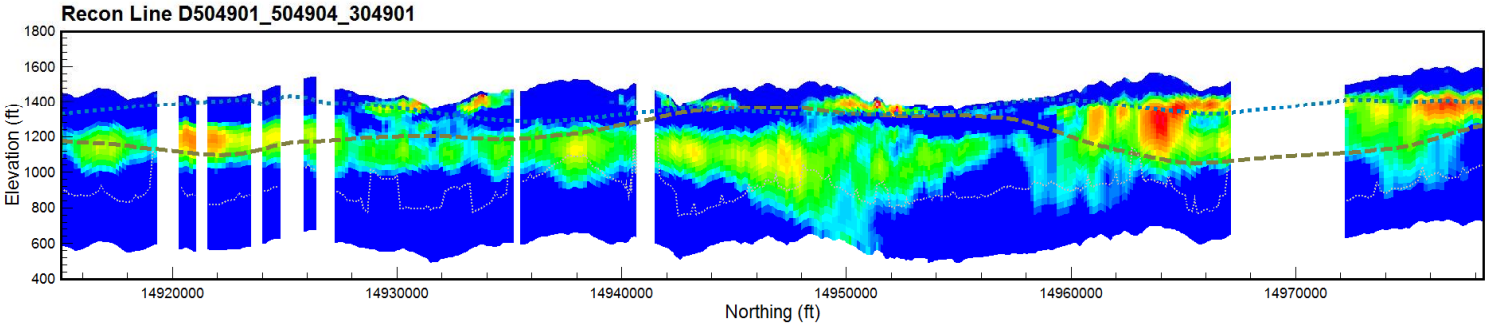

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

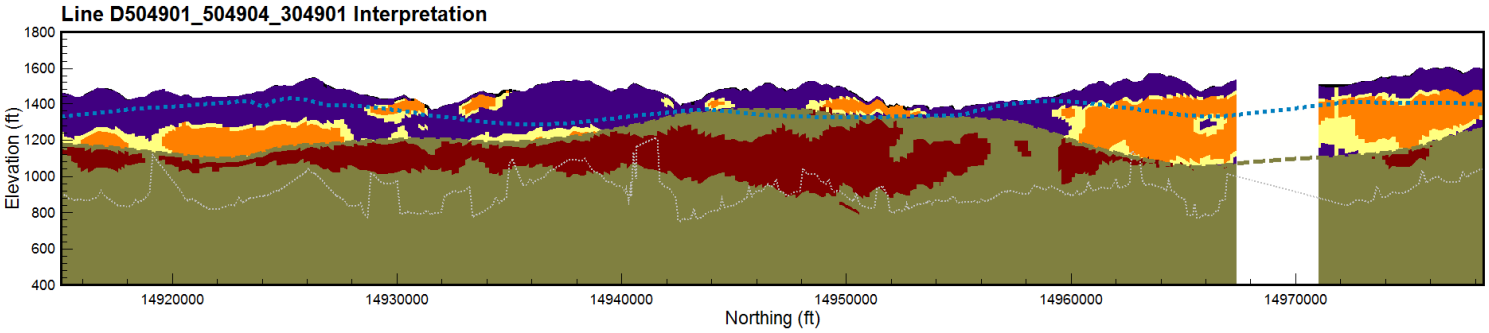

Recon Line D502901_302901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14930000
14940000
14950000
14960000
14970000
Northing (ft)

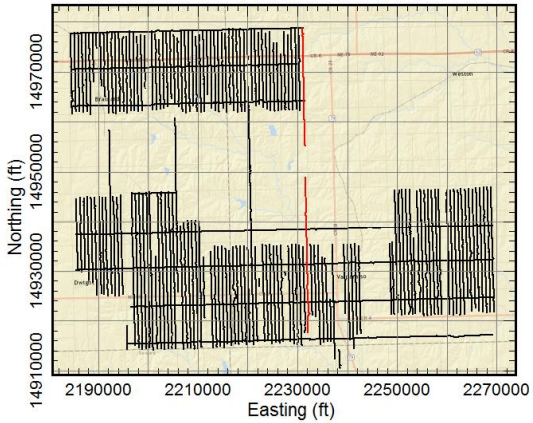

Line D502901_302901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14930000
14940000
14950000
14960000
14970000
Northing (ft)

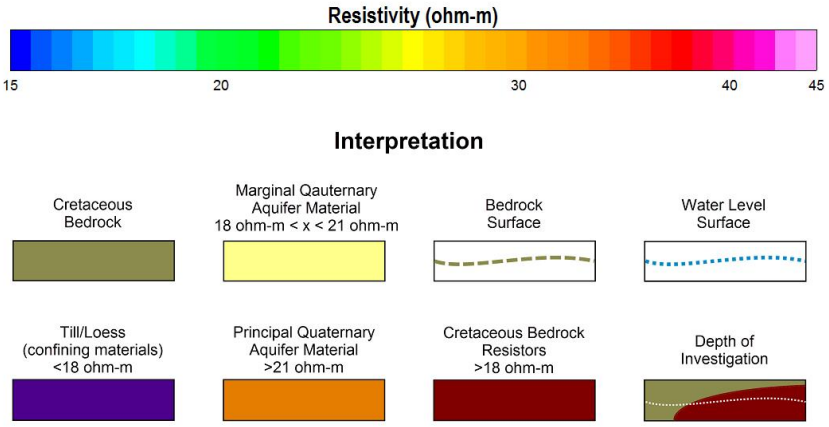

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)

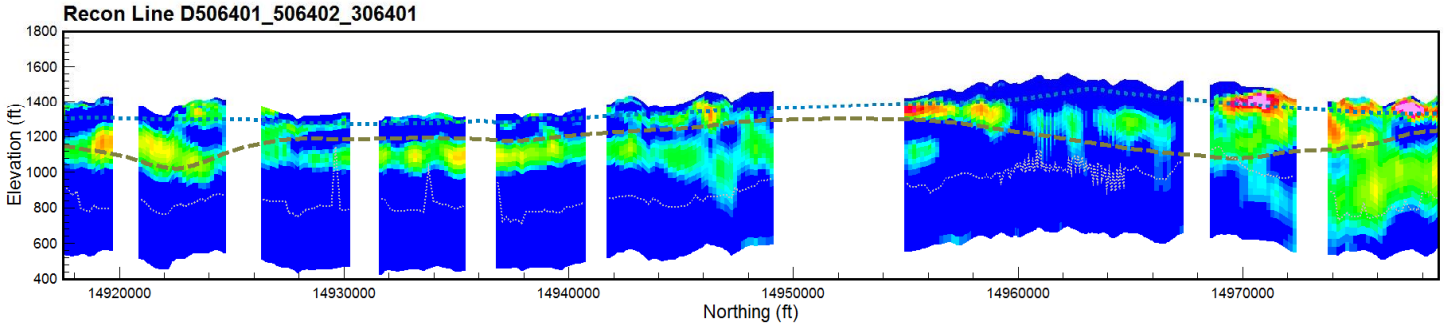

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

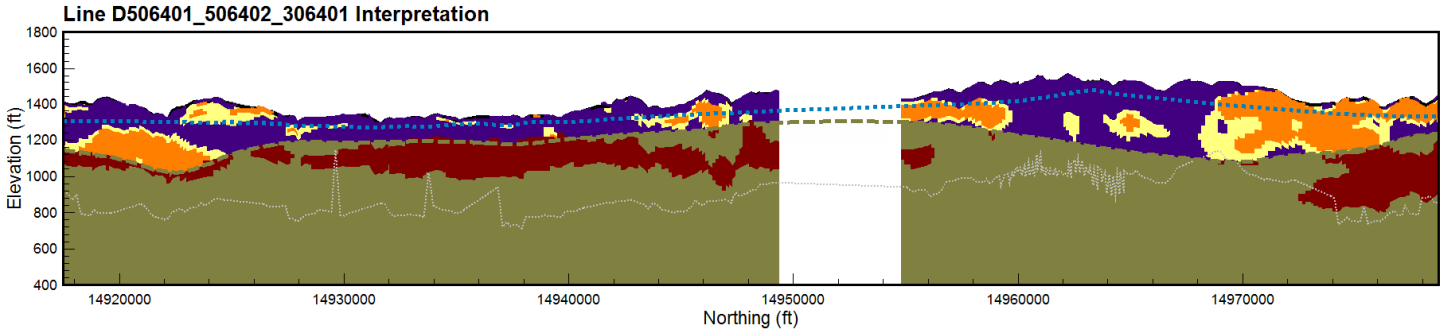

Recon Line D504901_504904_304901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14920000
14930000
14940000
14950000
14960000
14970000
Northing (ft)

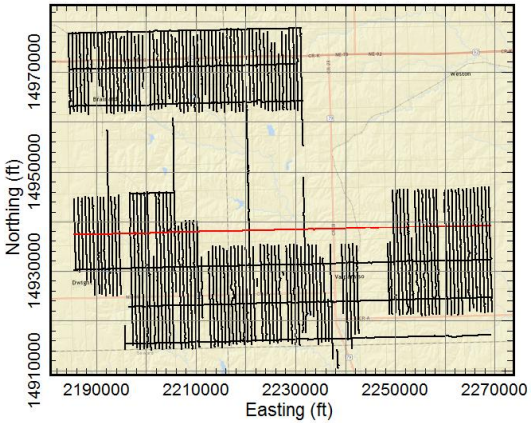

Line D504901_504904_304901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14920000
14930000
14940000
14950000
14960000
14970000
Northing (ft)

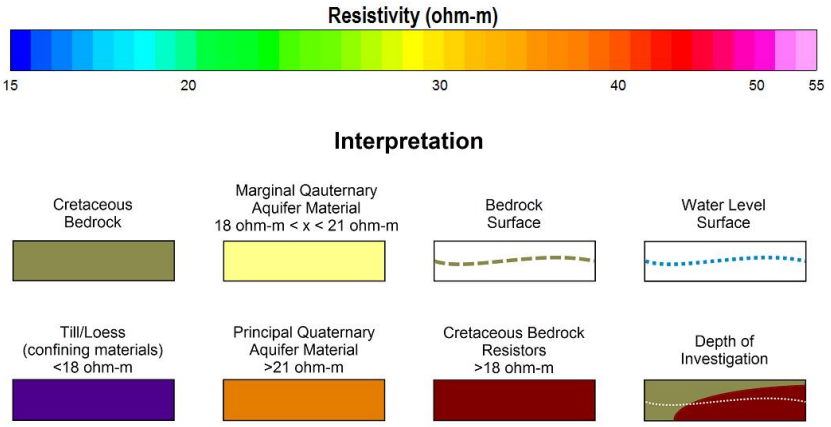

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)


Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

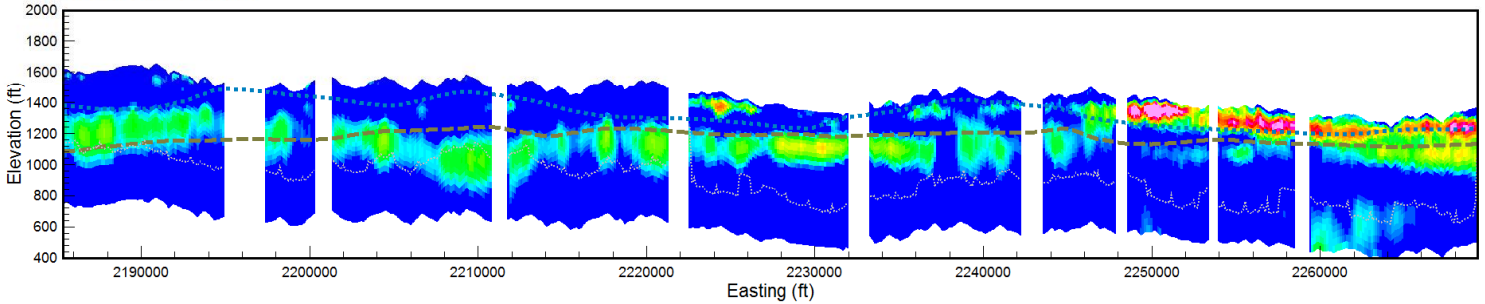

Recon Line D506401_506402_306401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14920000
14930000
14940000
14950000
14960000
14970000
Northing (ft)


Line D506401_506402_306401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14920000
14930000
14940000
14950000
14960000
14970000
Northing (ft)

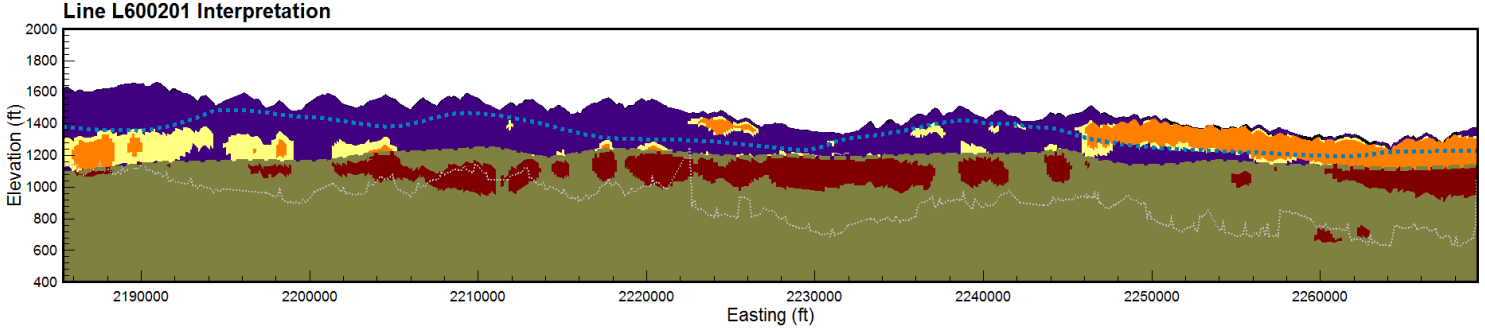


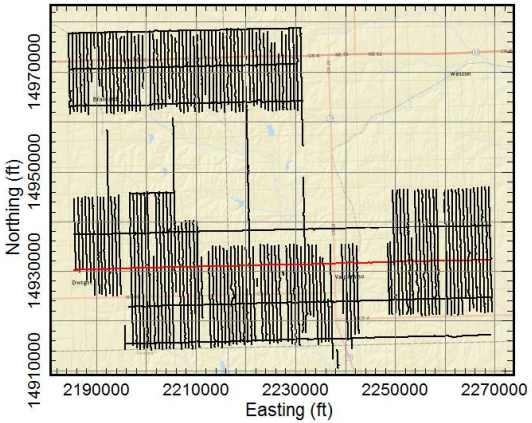


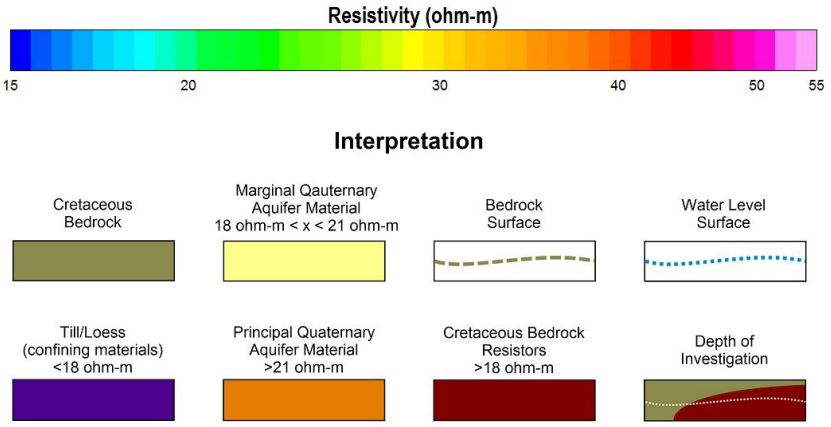
Recon Line L600201

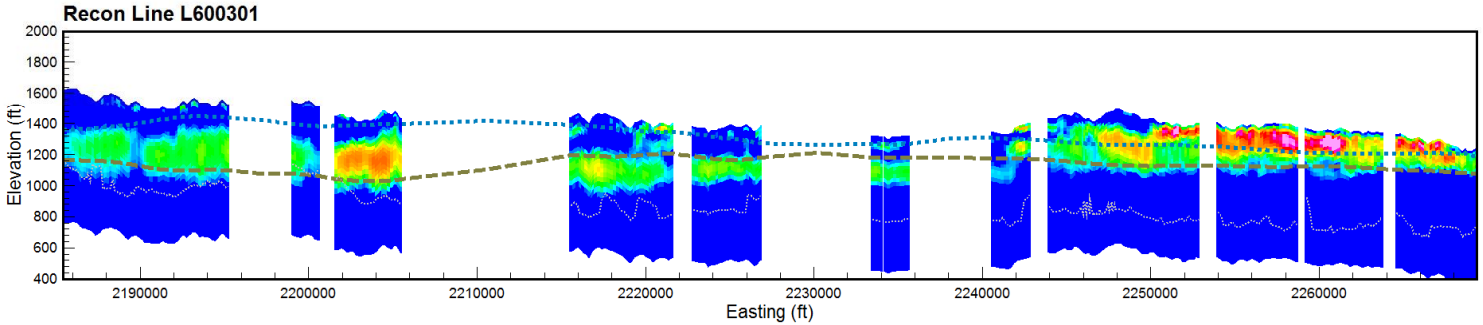


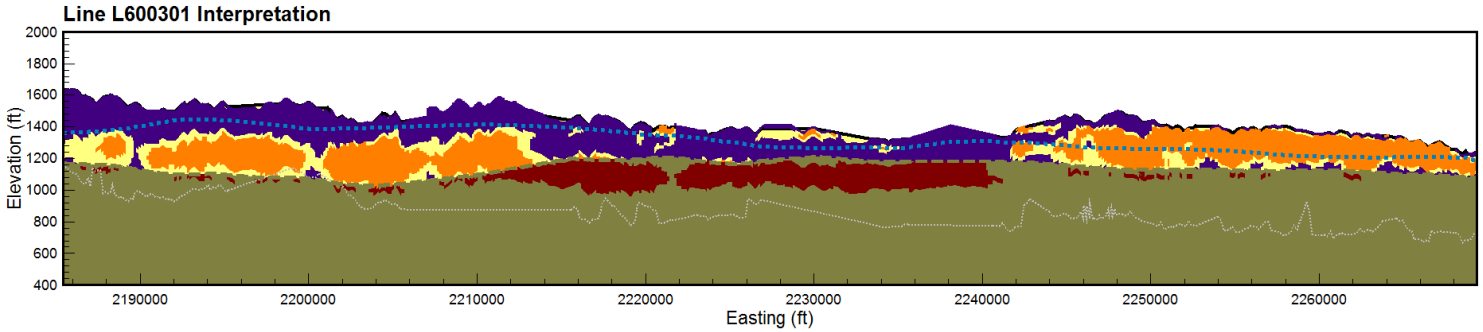
Line L600201 Interpretation

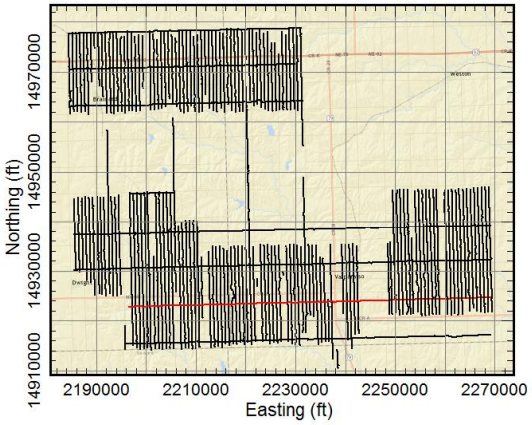


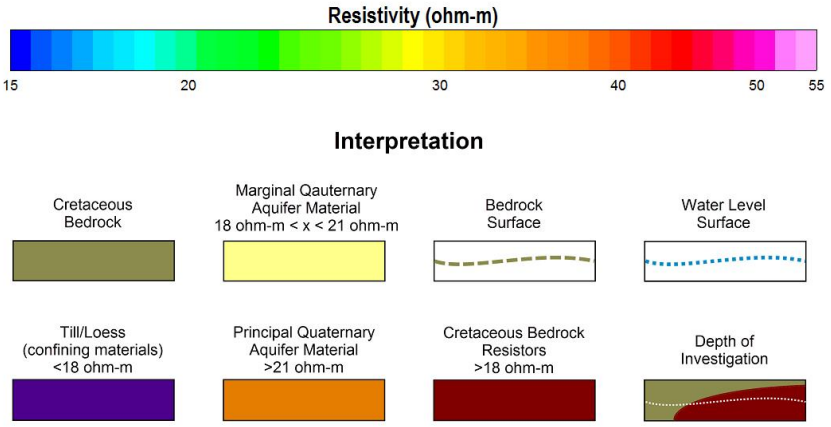

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)

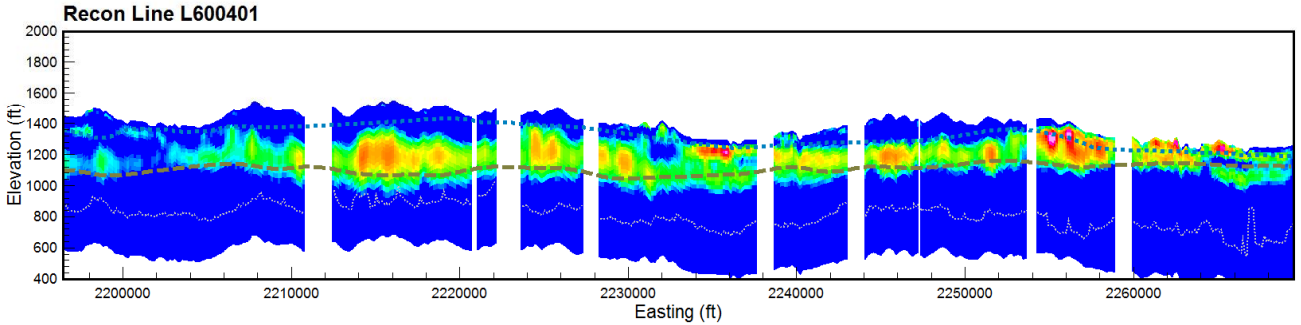

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

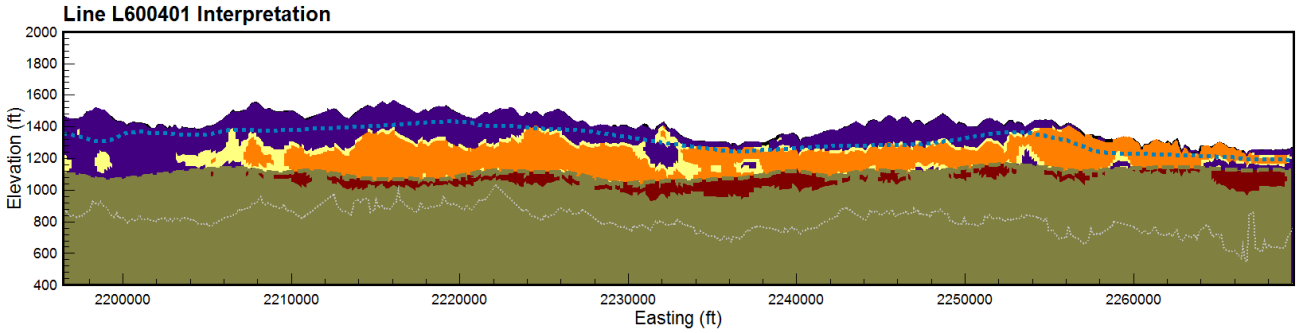

Recon Line L600301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
2190000
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)

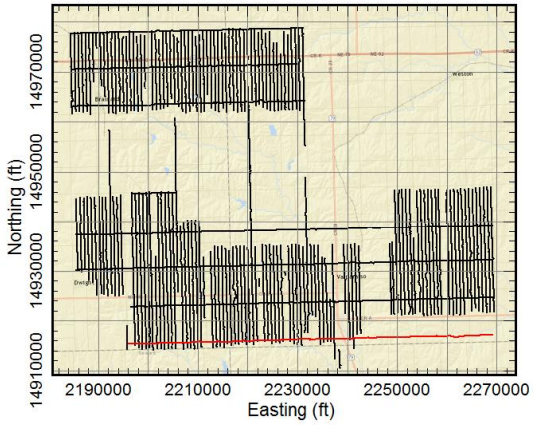

Line L600301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
2190000
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)

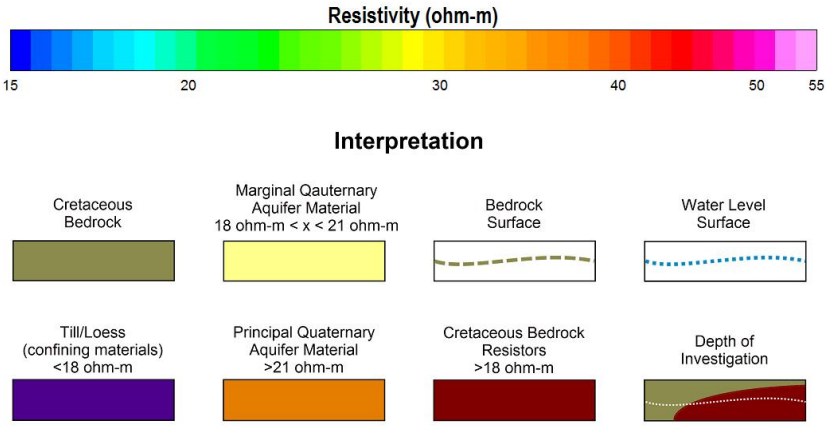

Northing (ft)
14970000
14950000
14930000
14910000
2190000
2210000
2230000
2250000
2270000
Easting (ft)


Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

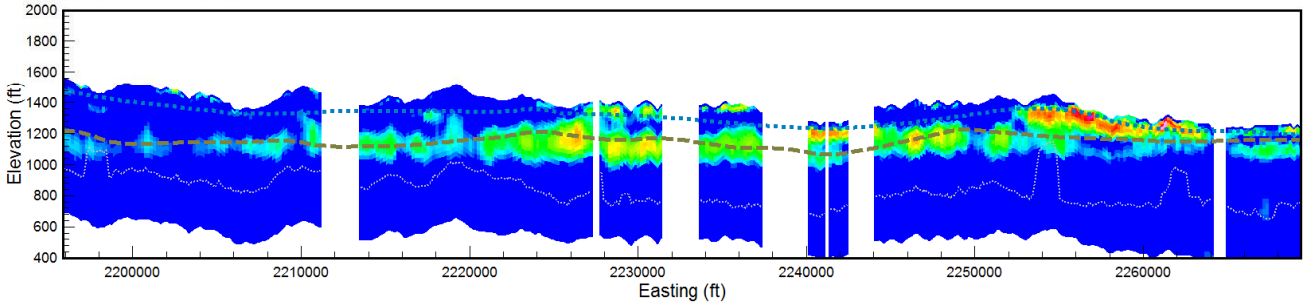

Recon Line L600401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)


Line L600401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
2200000
2210000
2220000
2230000
2240000
2250000
2260000
Easting (ft)

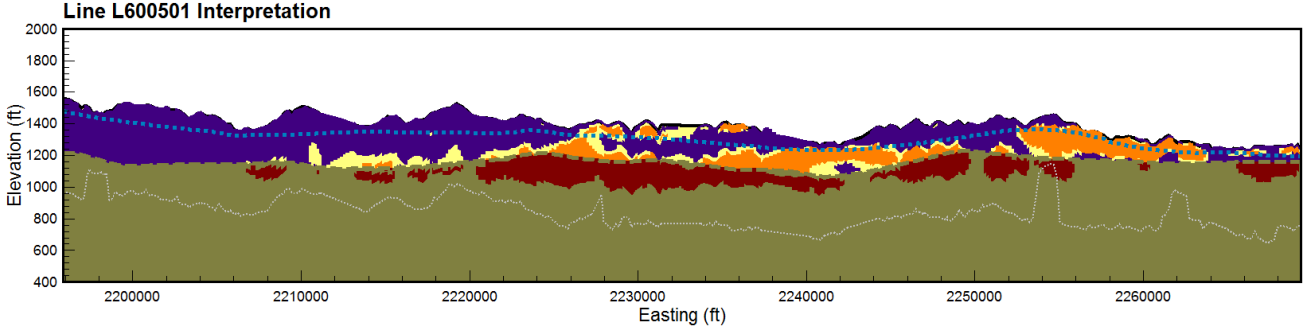




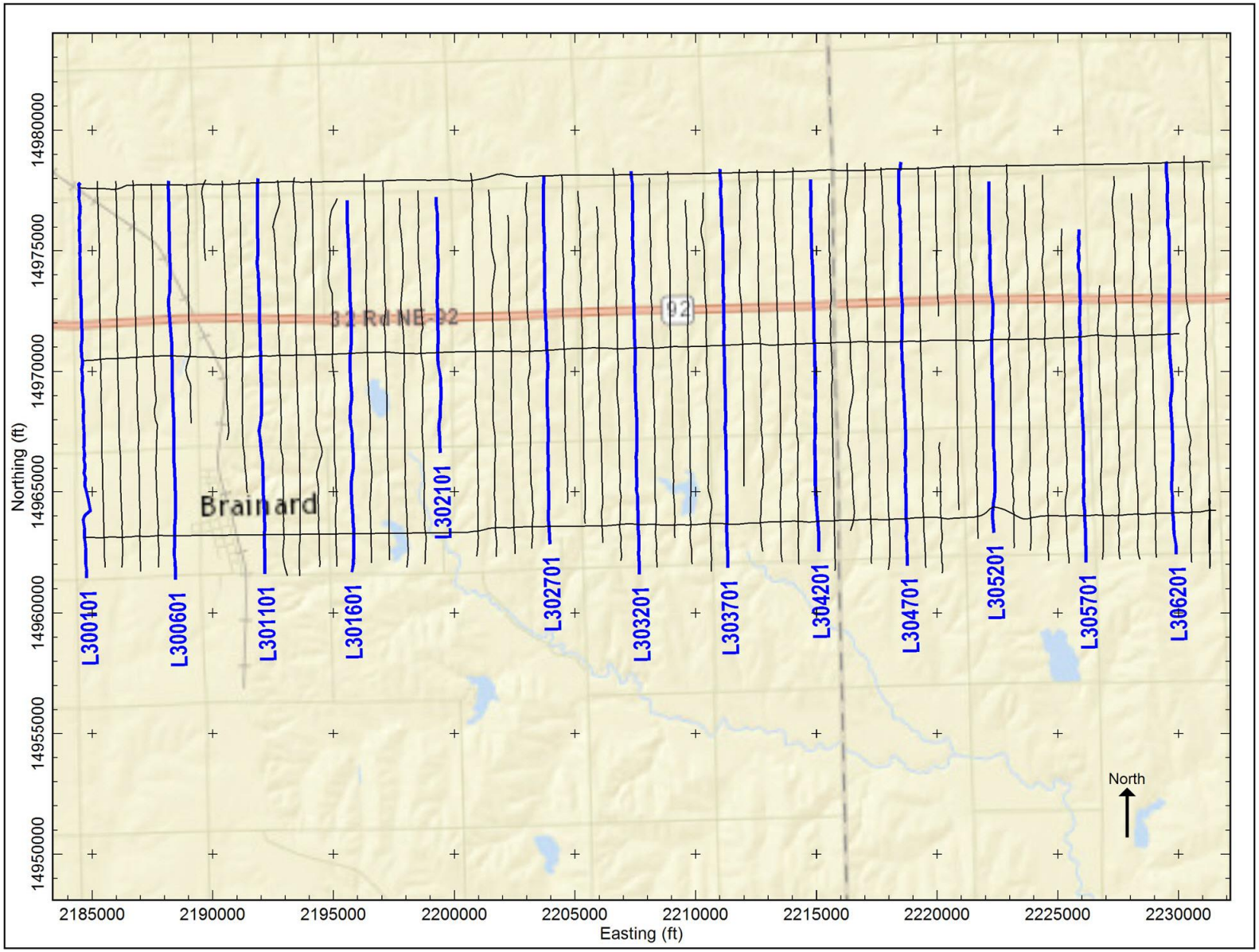
Recon Line L600501



Line L600501 Interpretation

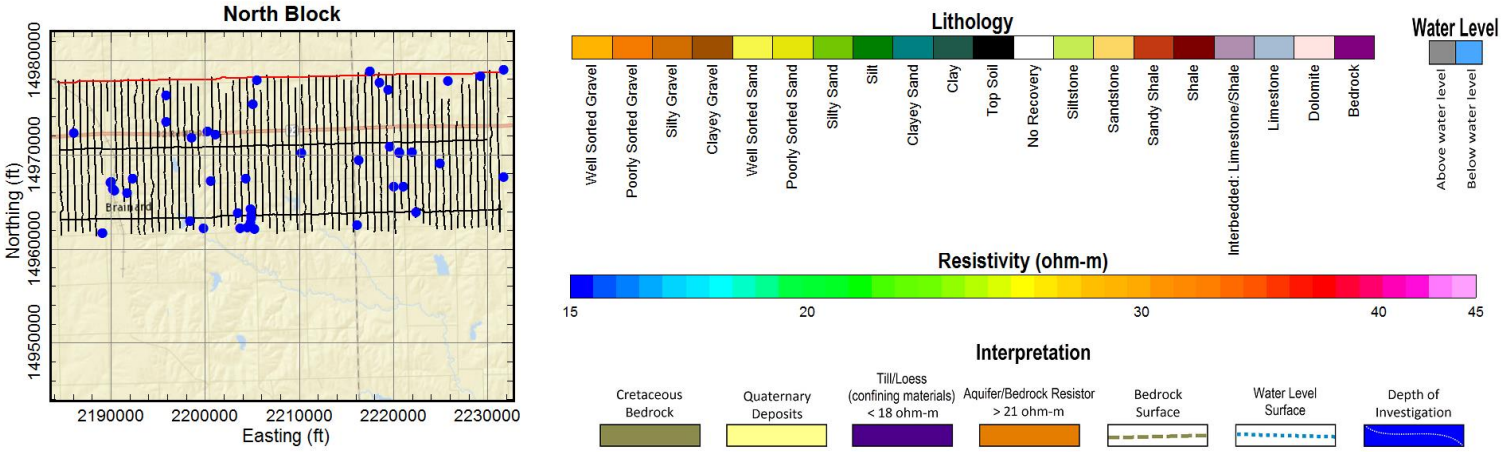


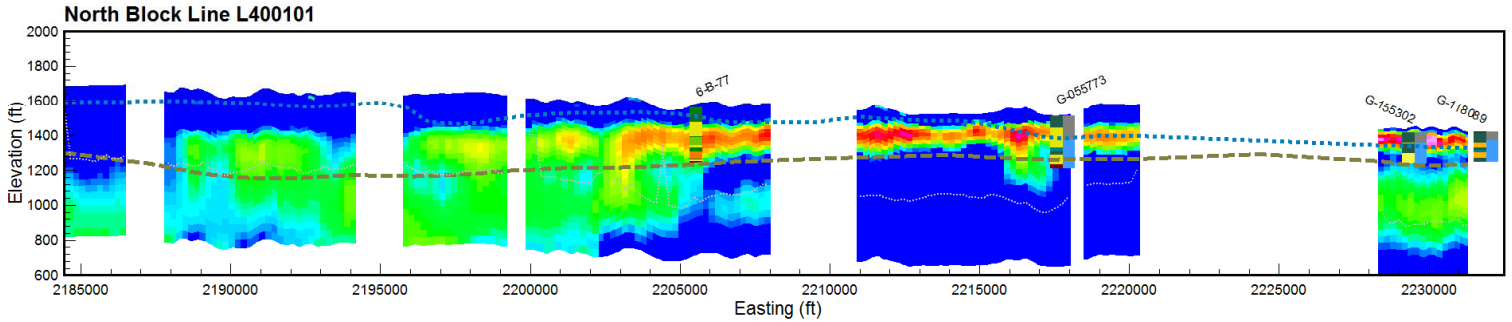
North Flight Block Profiles
Reference Map

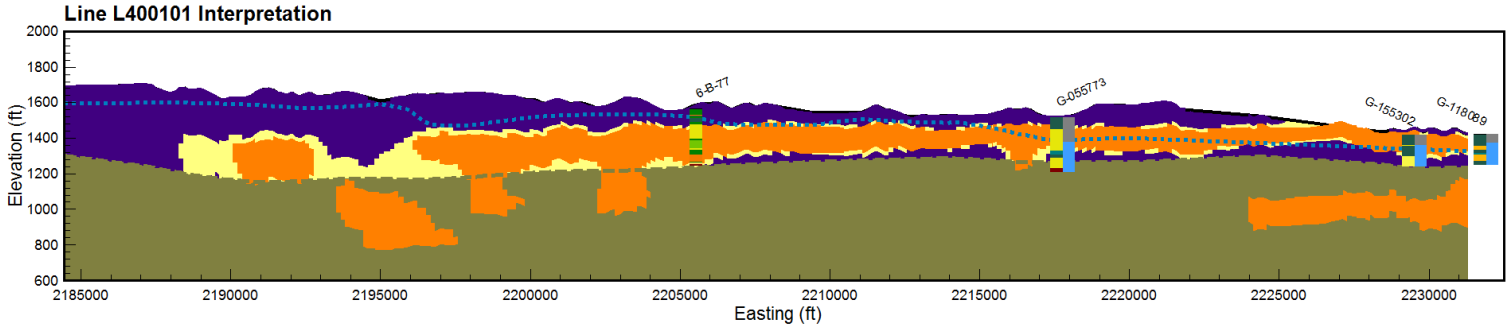

Northing (ft)
14980000
14975000
14970000
14965000
14960000
14955000
14950000
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)
33 Rd NE
92
Brainard
L300101
L300601
L301101
L301601
L302101
L302701
L303201
L303701
L304201
L304701
L305201
L305701
L306201
North

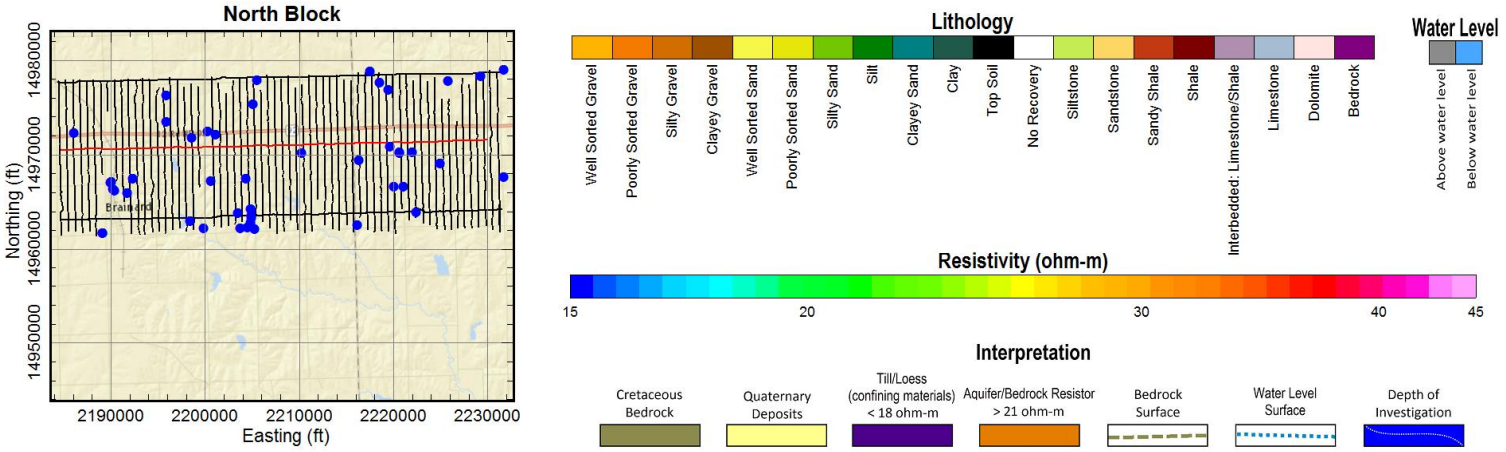
North Flight Block Profiles

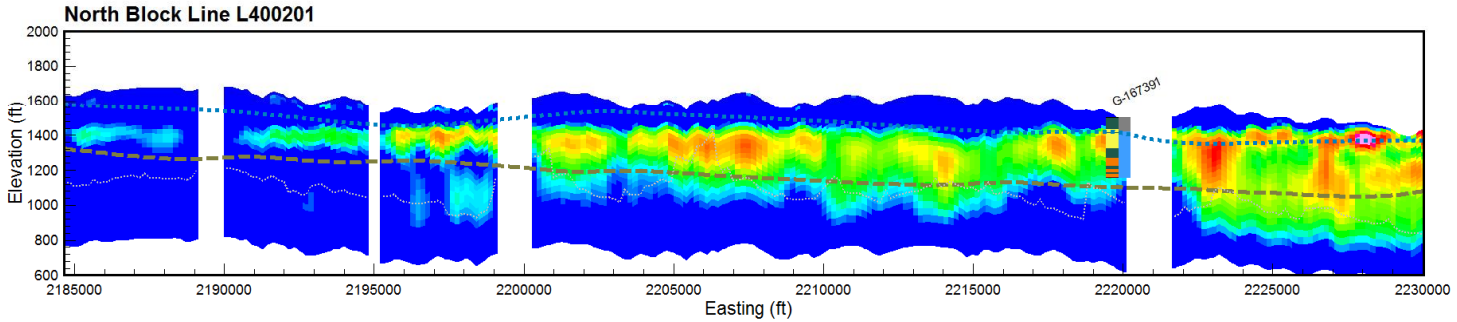
Quaternary Interpretations with Boreholes and NDNR Water Levels

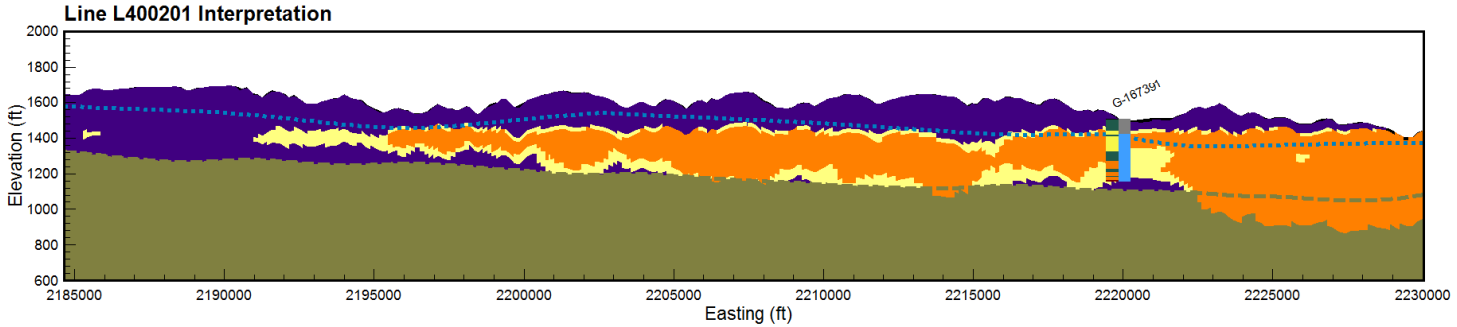

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

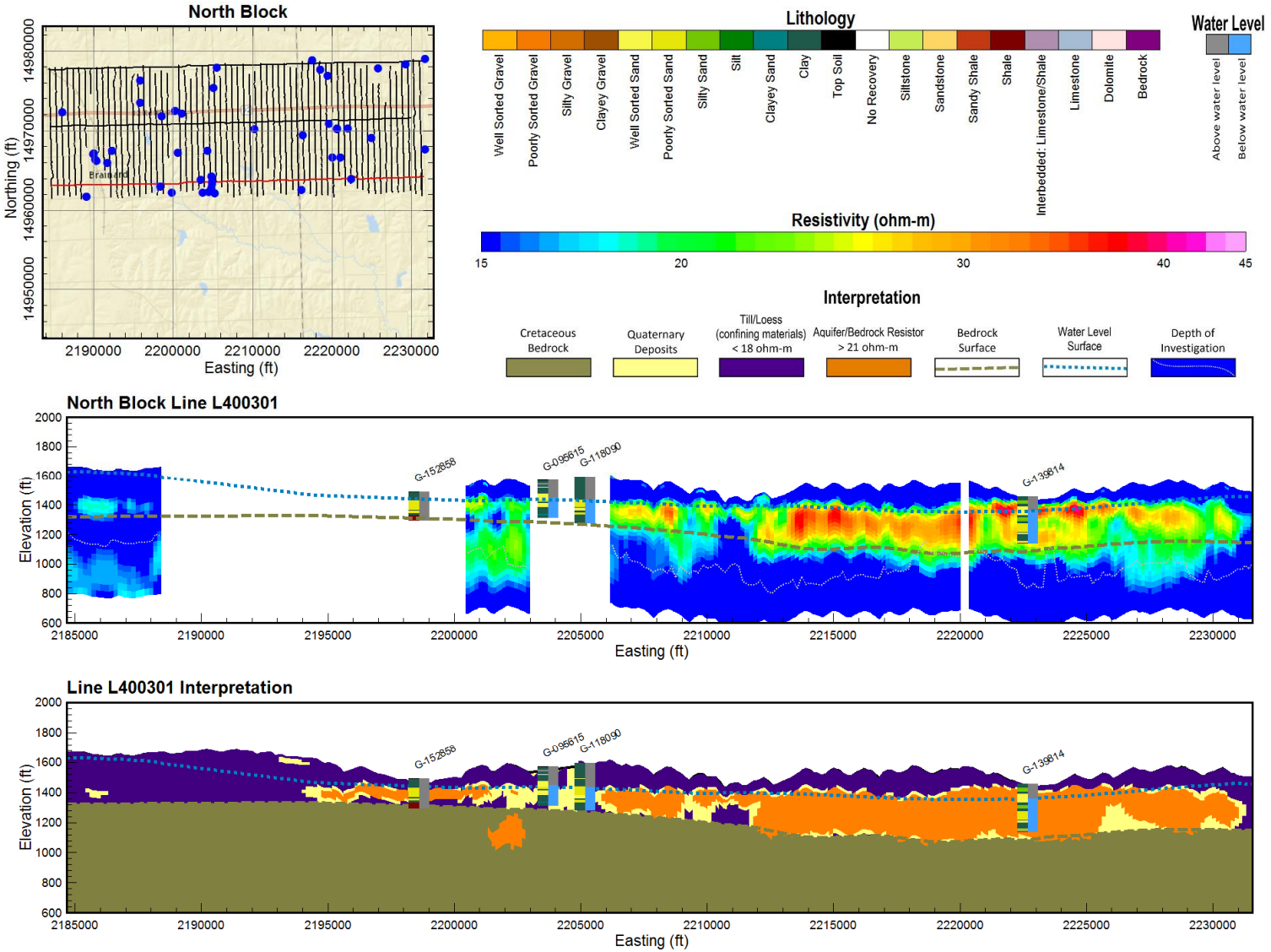

North Block Line L400101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
6-B-77
G-055773
G-155302
G-118089
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

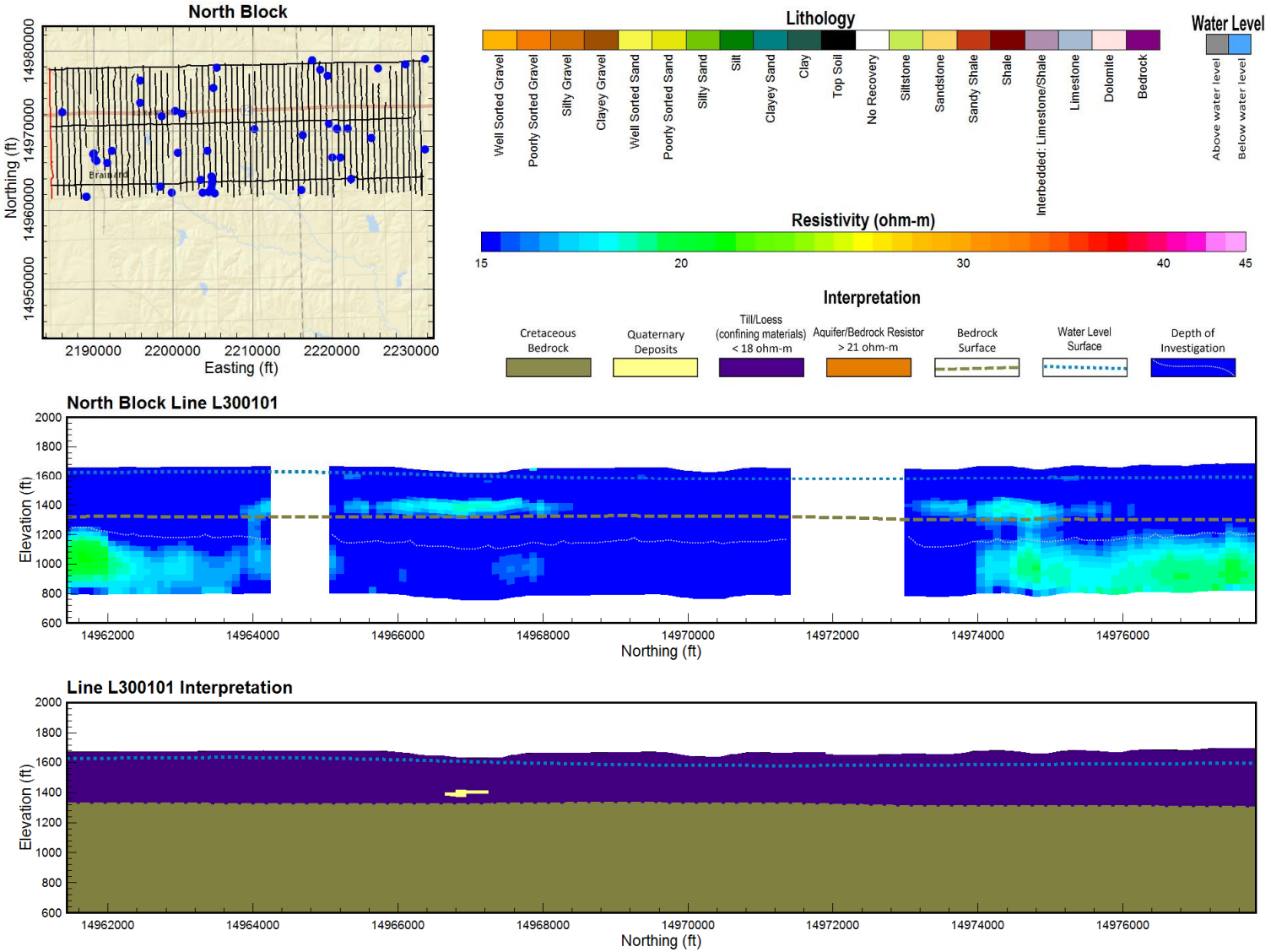

Line L400101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
6-B-77
G-055773
G-155302
G-118089
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

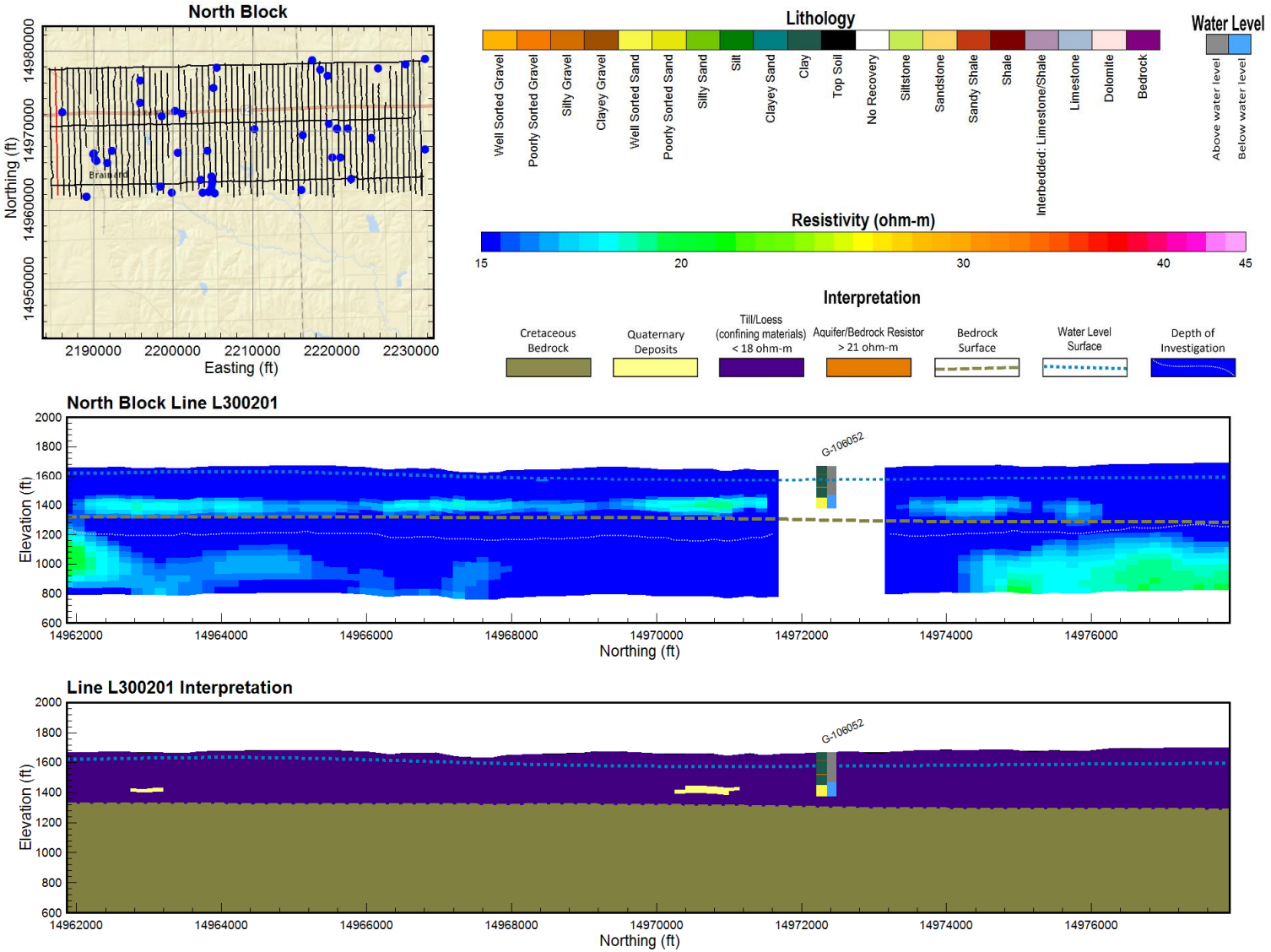

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

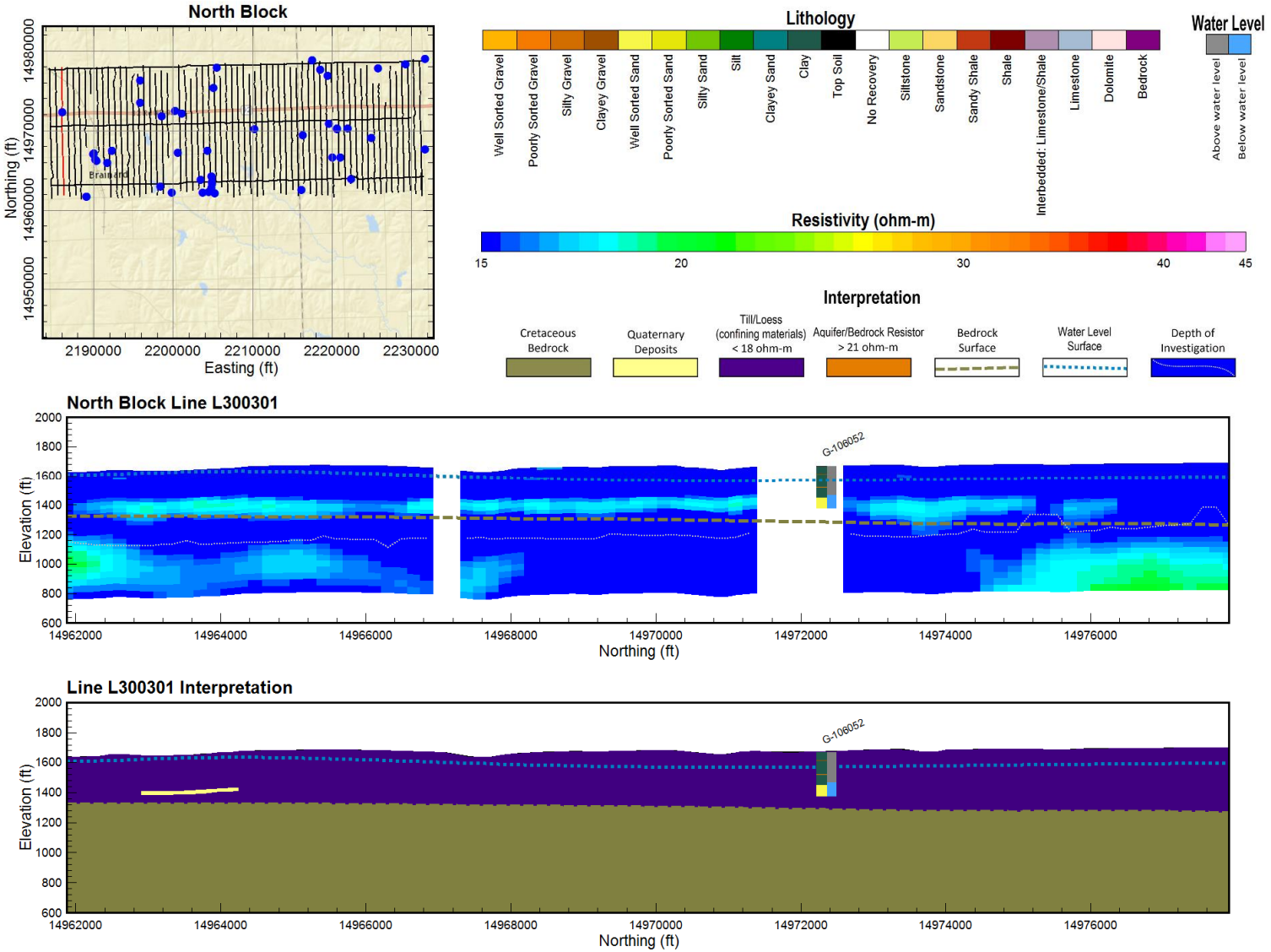

North Block Line L400201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167391
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

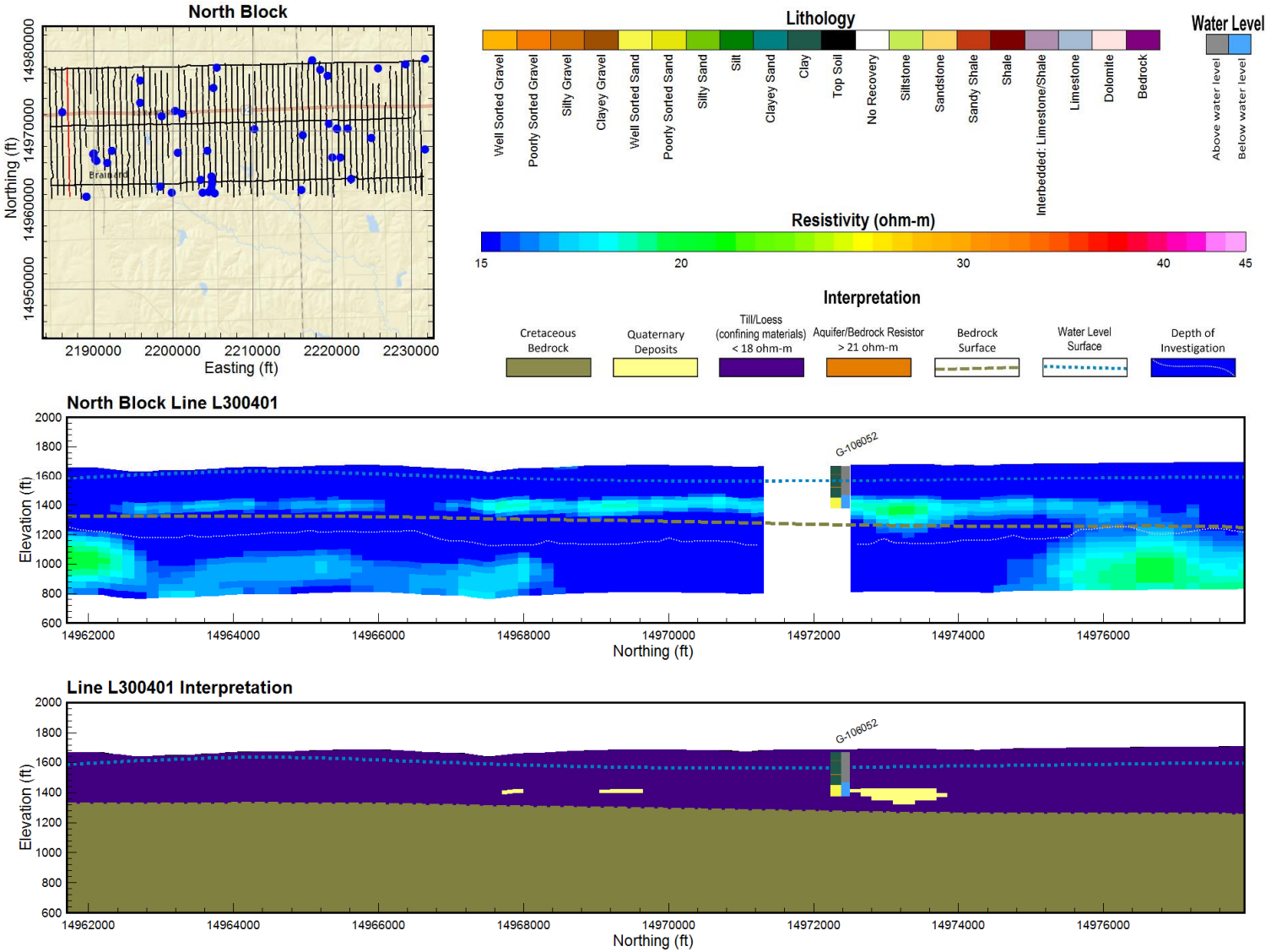

Line L400201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167391
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

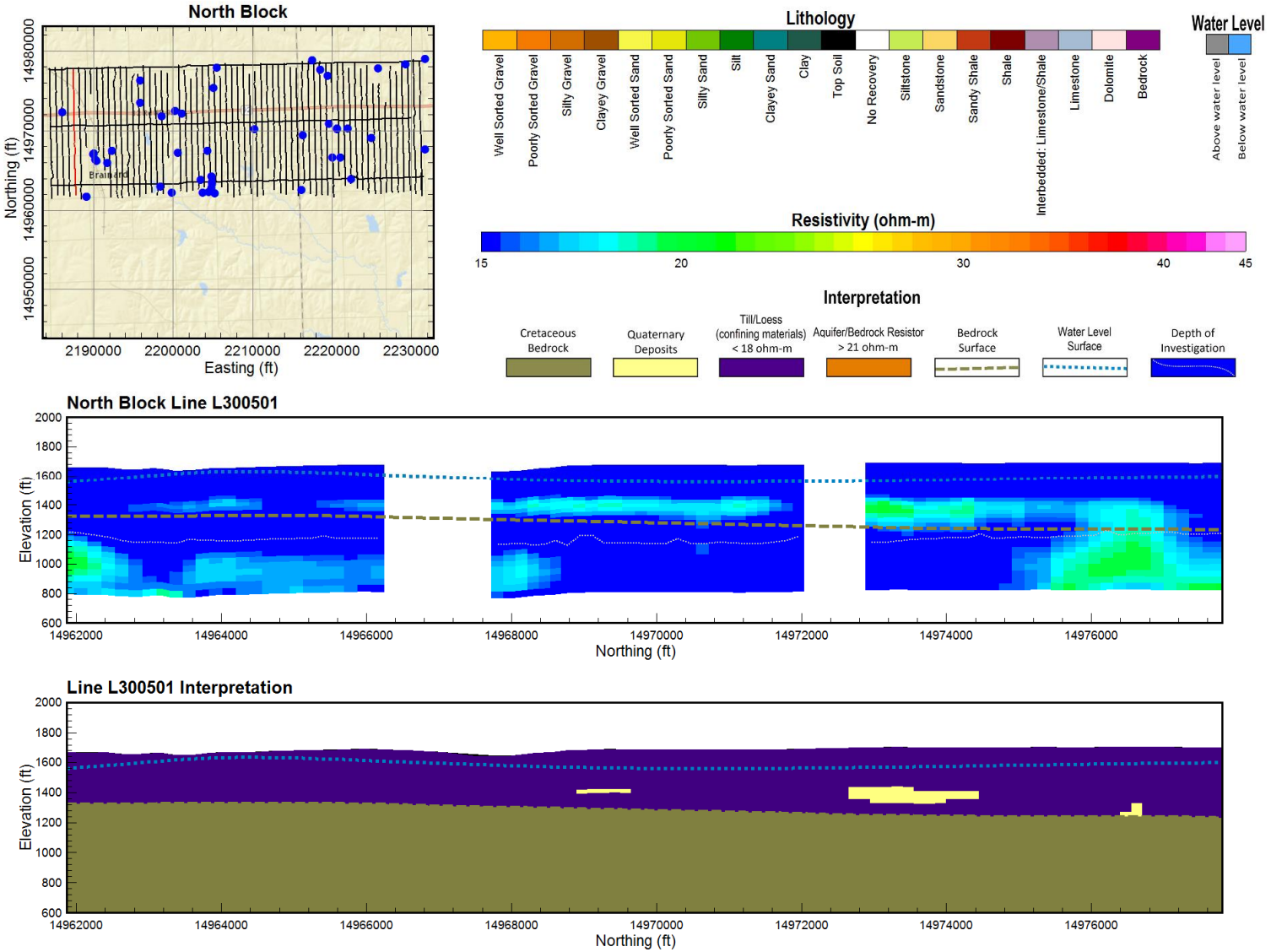

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L400301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-152858
G-095615
G-118090
G-139814
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)
Line L400301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-152858
G-095615
G-118090
G-139814
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

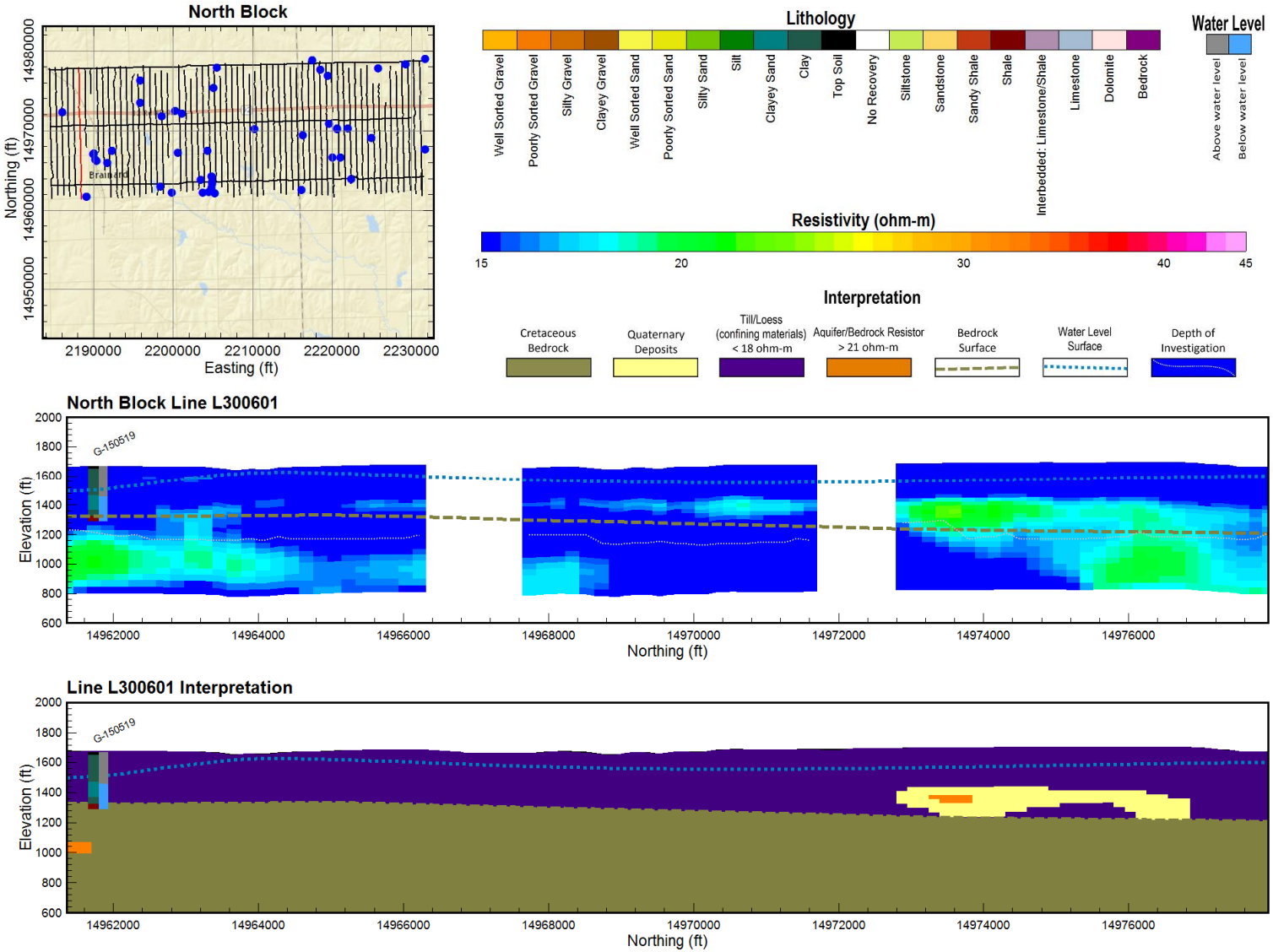

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L300101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L300101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

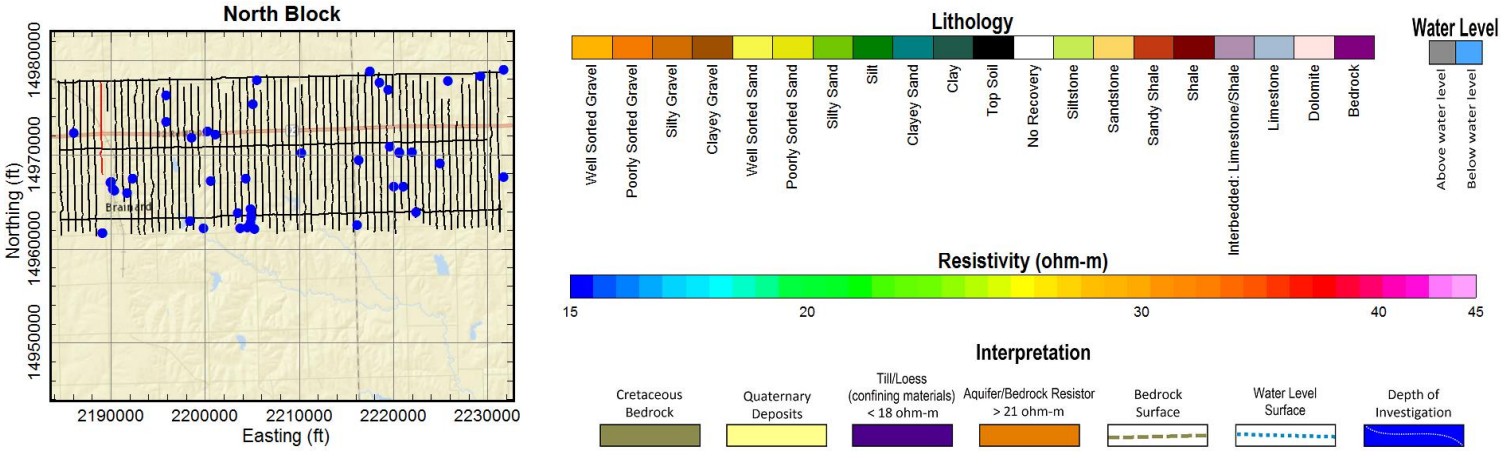

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L300201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-106052
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L300201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-106052
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

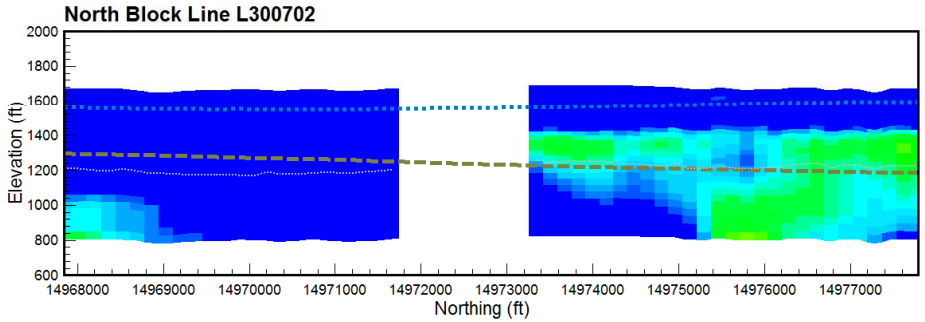

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L300301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-106052
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L300301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-106052
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

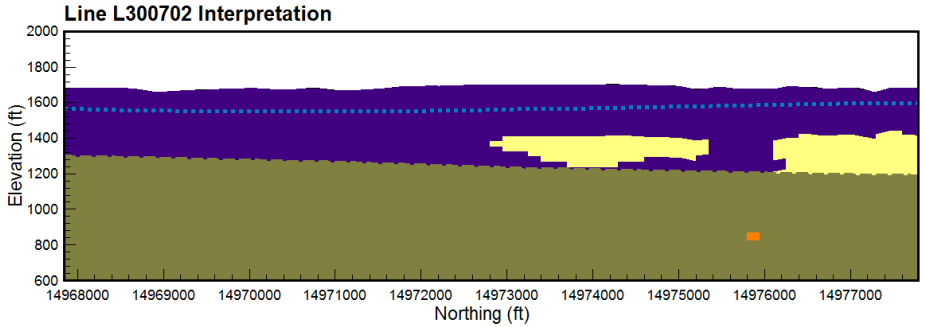

North Block
Northing (ft)
14980000
14970000
14960000
14950000
Brainard
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L300401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-106052
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L300401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-106052
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

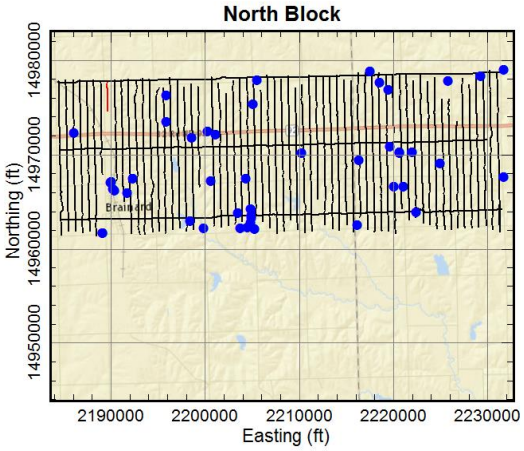

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L300501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L300501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

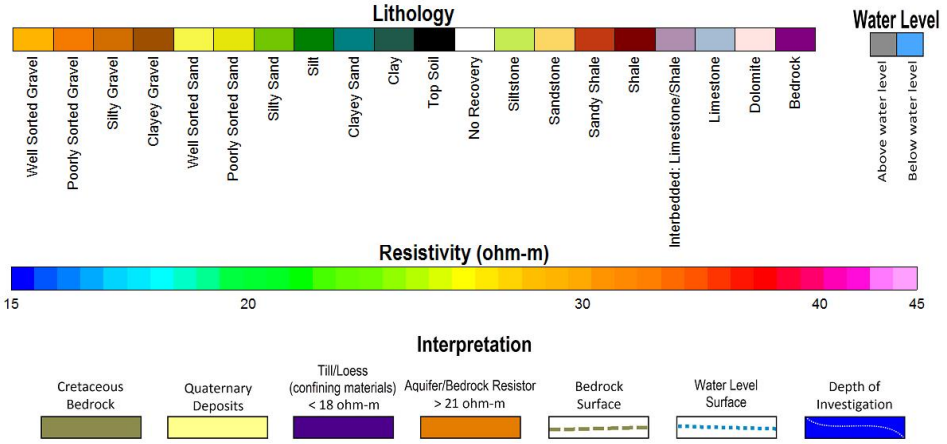

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L300601
G-150519
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L300601 Interpretation
G-150519
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

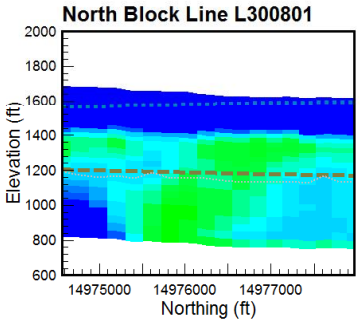

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

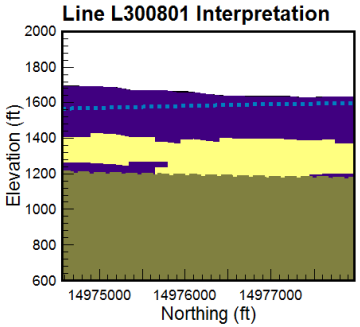

North Block Line L300702
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14968000
14969000
14970000
14971000
14972000
14973000
14974000
14975000
14976000
14977000
Northing (ft)

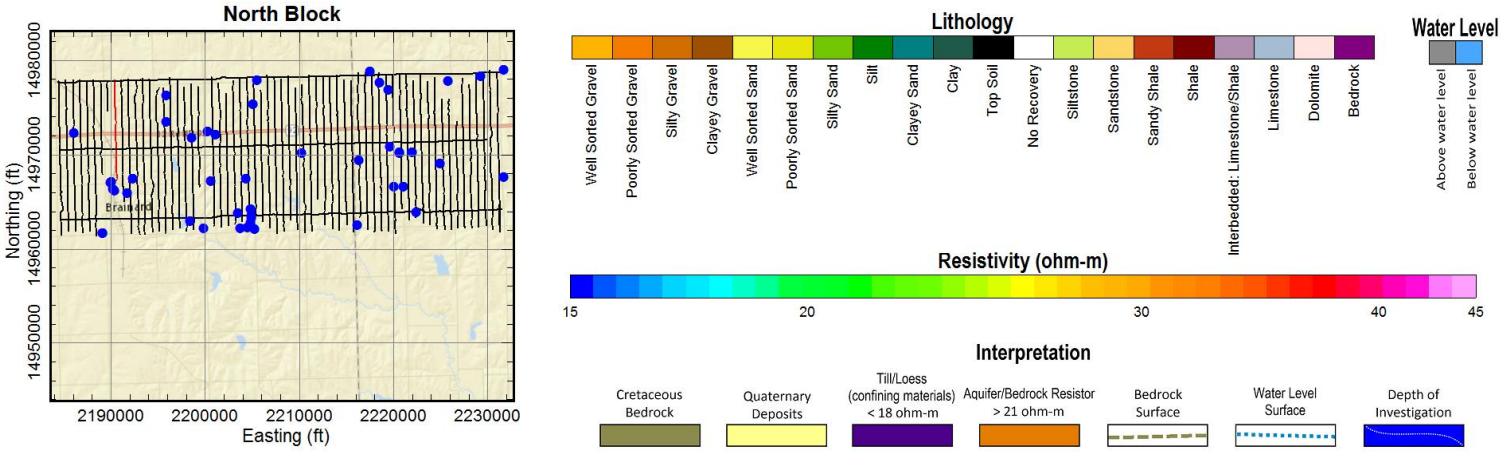

Line L300702 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14968000
14969000
14970000
14971000
14972000
14973000
14974000
14975000
14976000
14977000
Northing (ft)

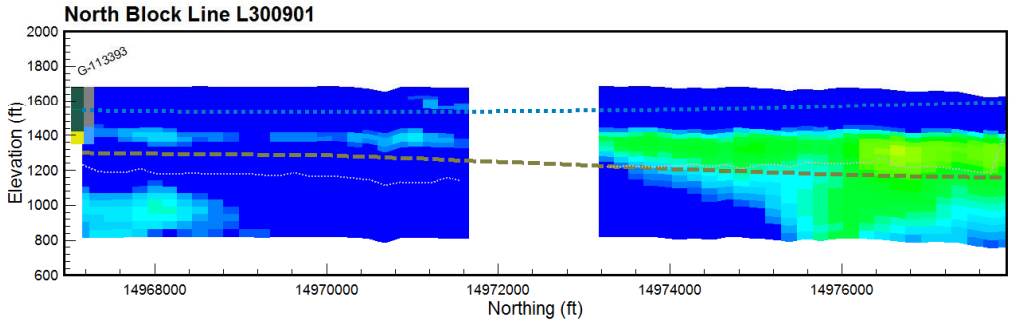

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

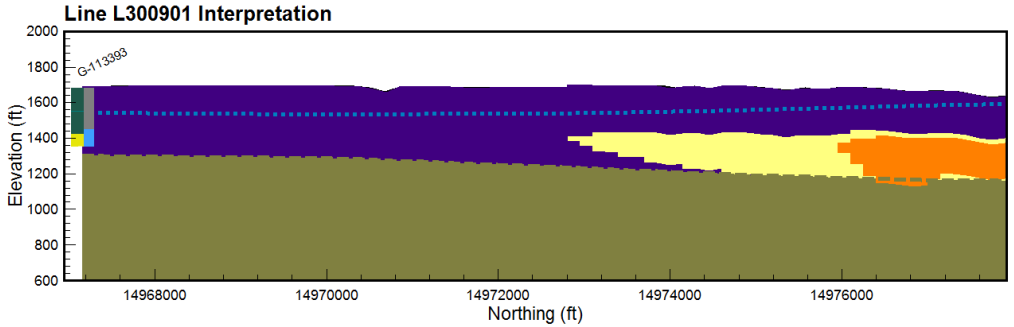

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

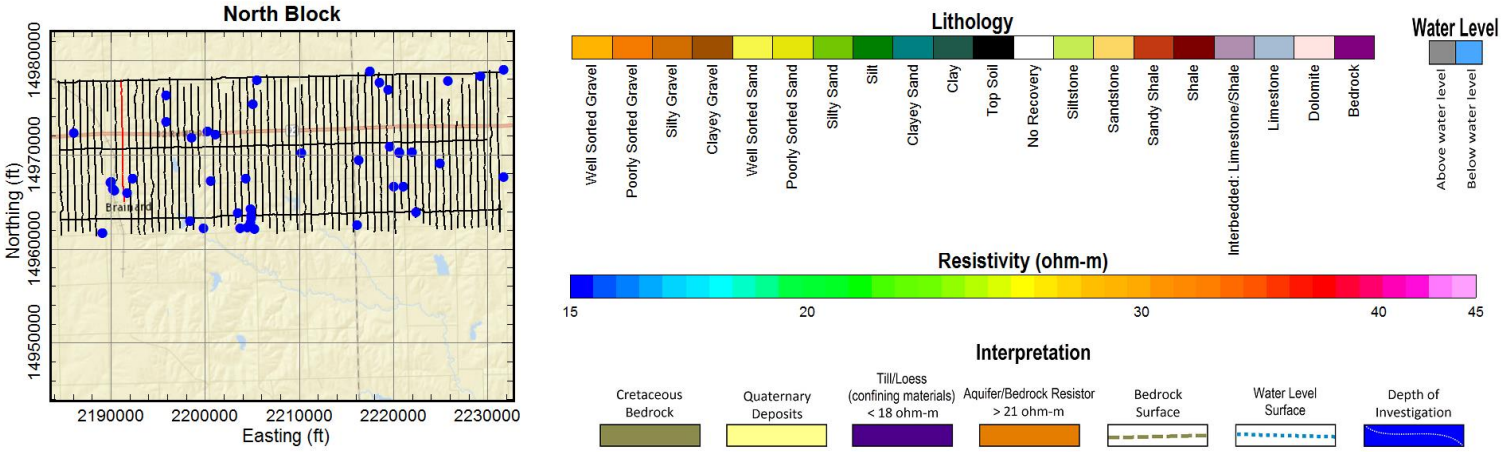

North Block Line L300801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14975000
14976000
14977000
Northing (ft)

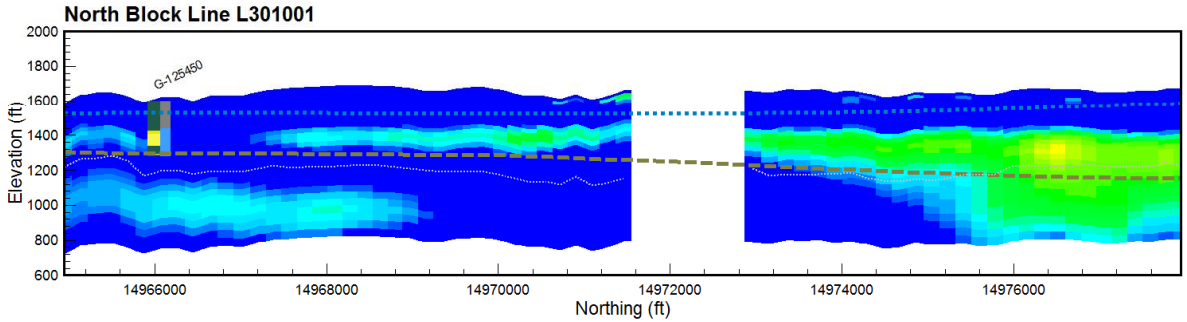

Line L300801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14975000
14976000
14977000
Northing (ft)

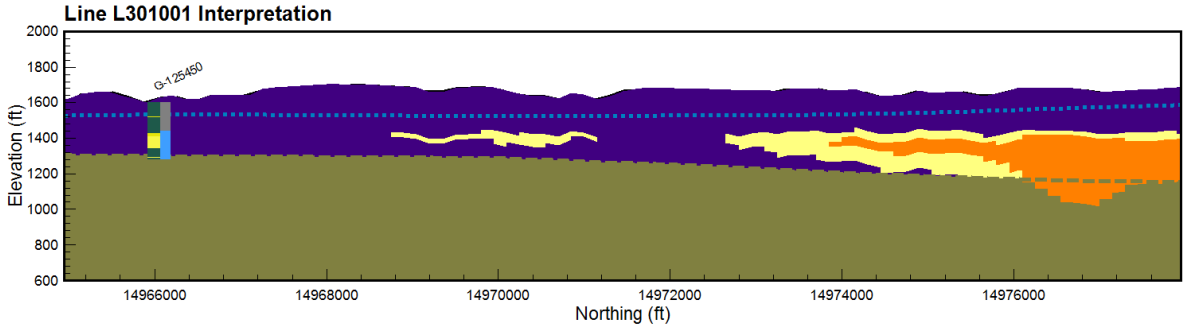

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

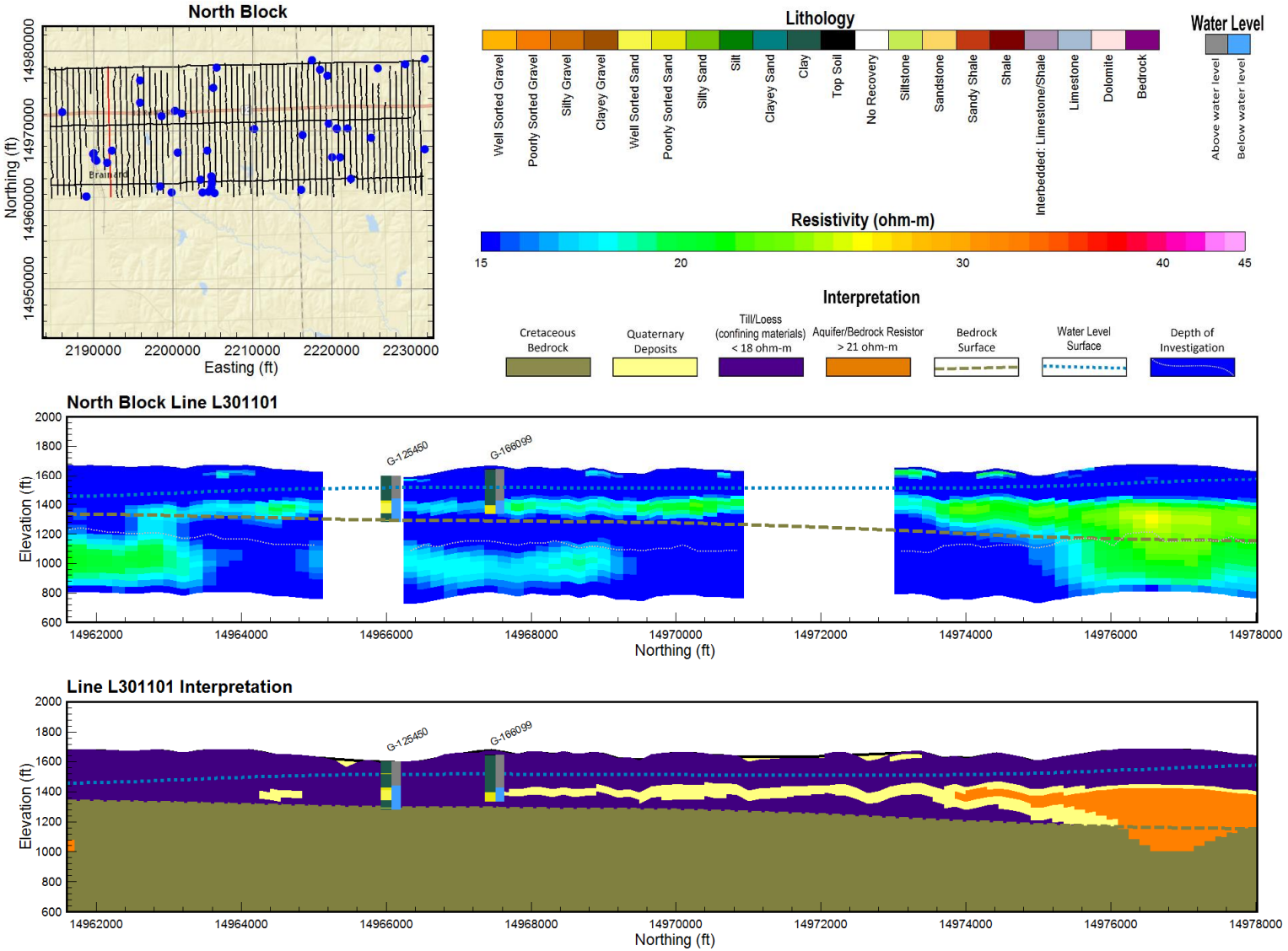

North Block Line L300901
G-113393
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14968000
14970000
14972000
14974000
14976000
Northing (ft)

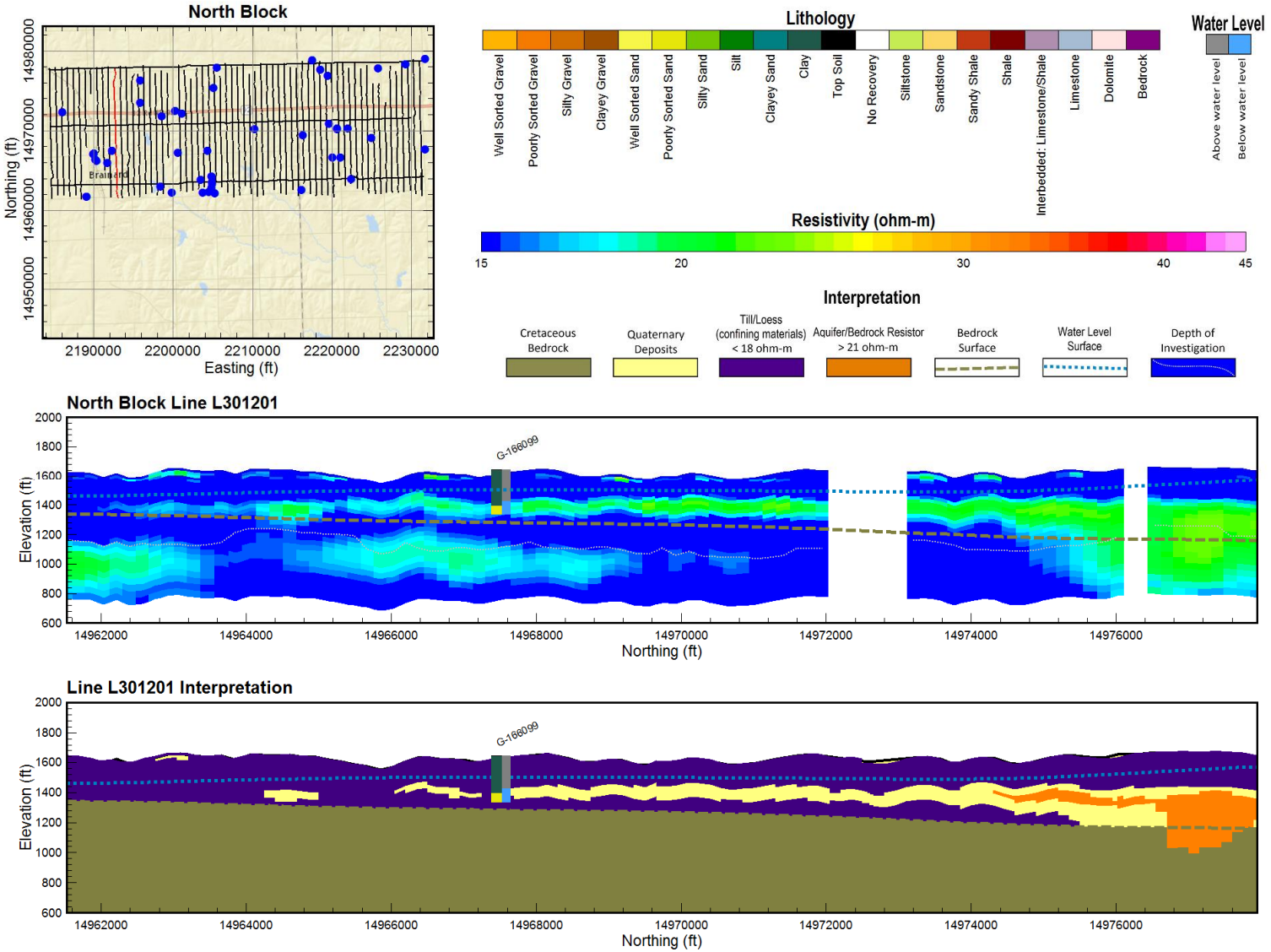

Line L300901 Interpretation
G-113393
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14968000
14970000
14972000
14974000
14976000
Northing (ft)

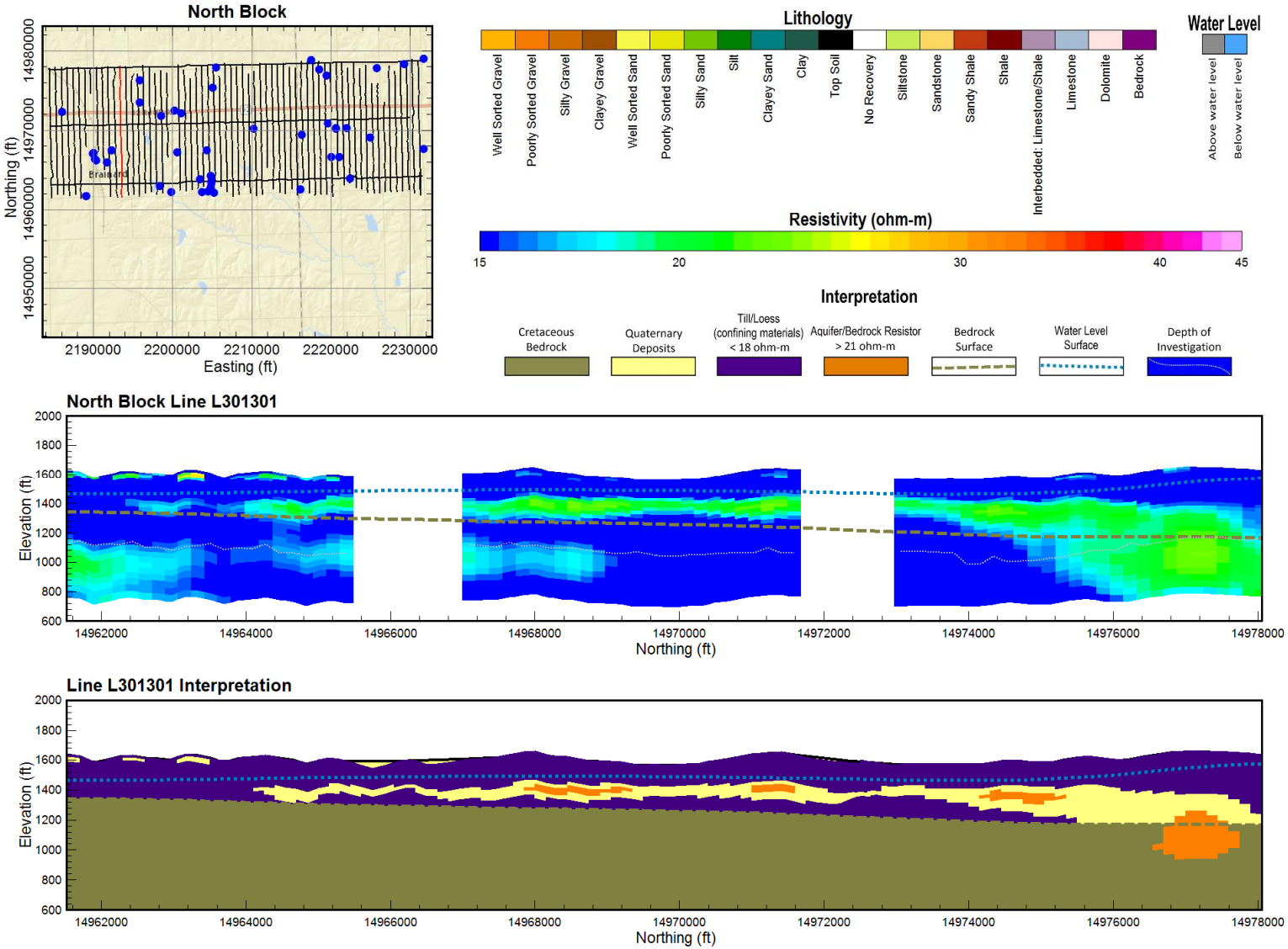

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

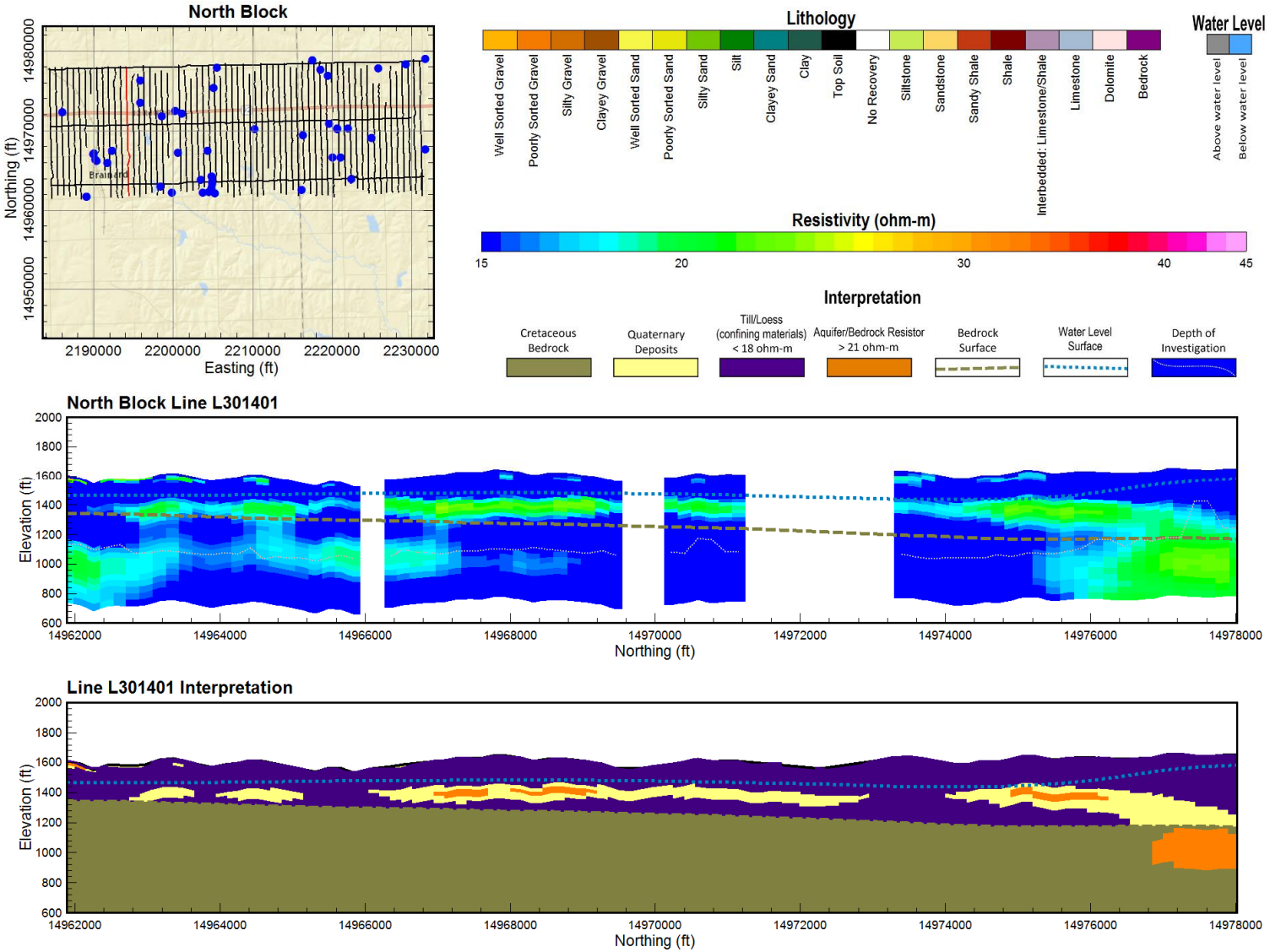

North Block Line L301001
G-125450
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

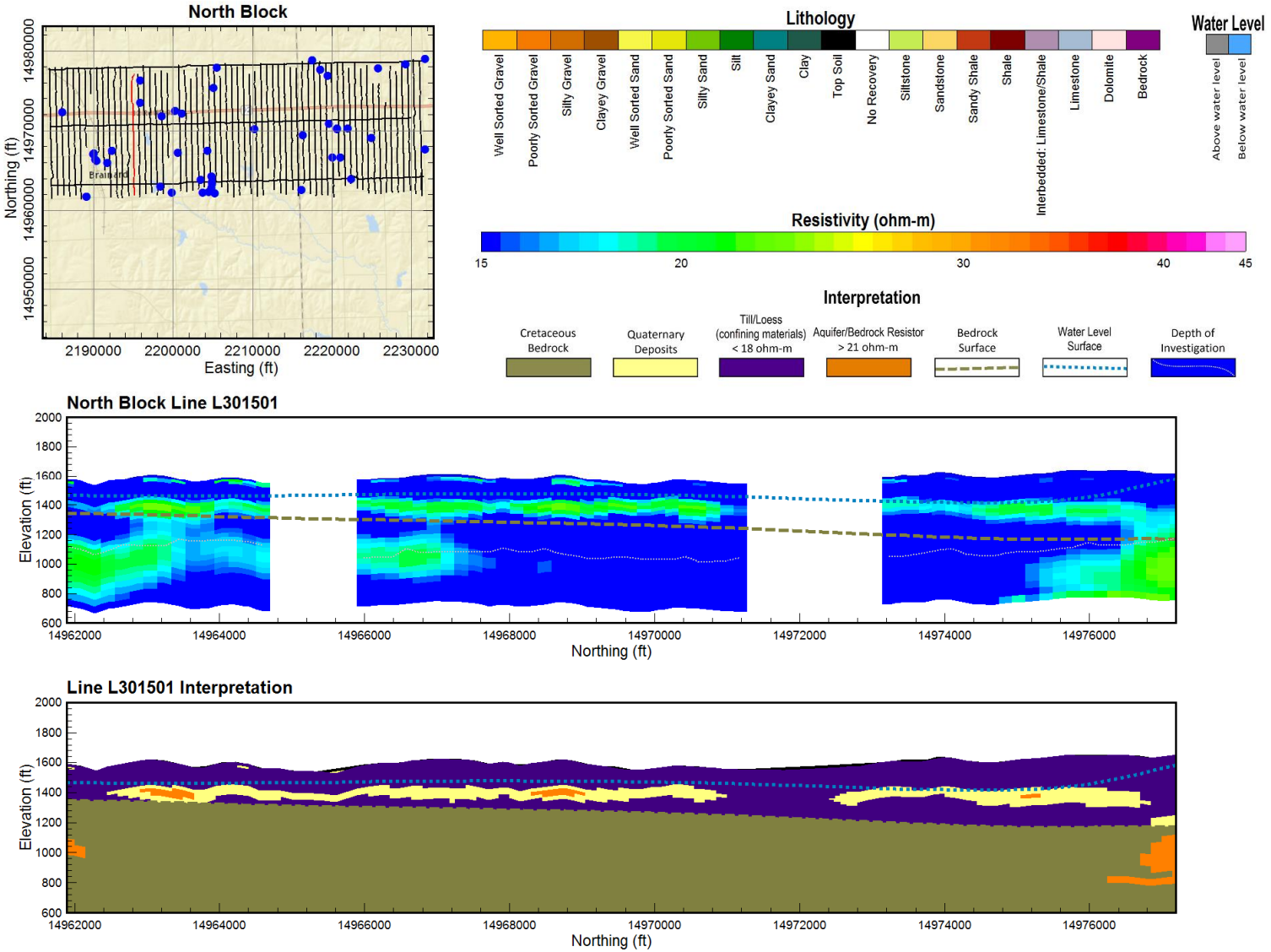

Line L301001 Interpretation
G-125450
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

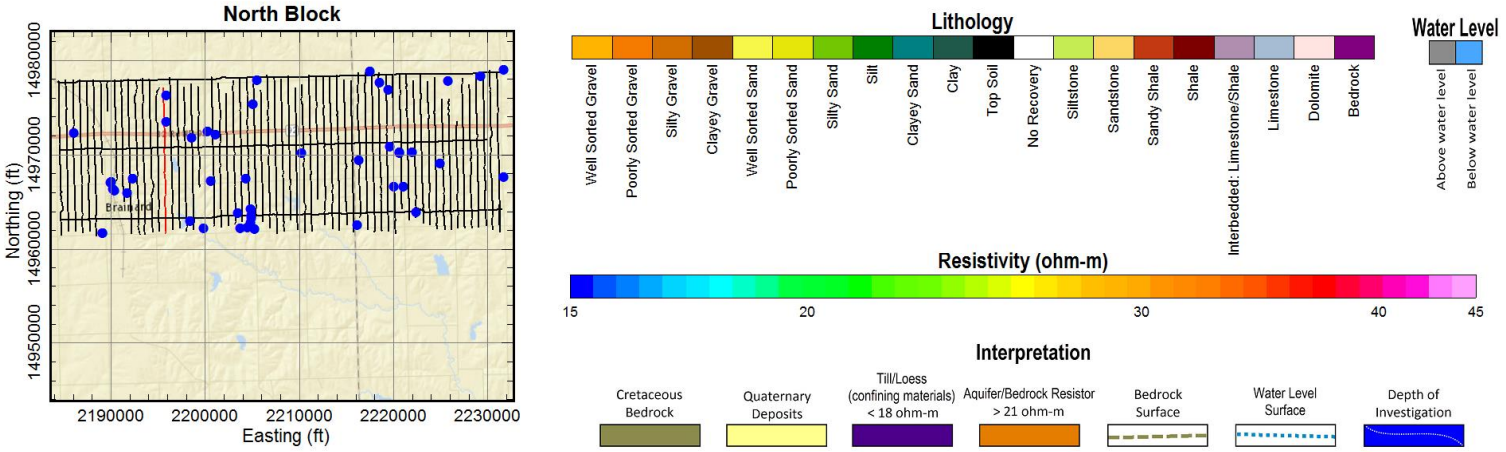

North Block
Northing (ft)
14980000
14970000
14960000
14950000
Brainard
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L301101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-125450
G-166099
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L301101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-125450
G-166099
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

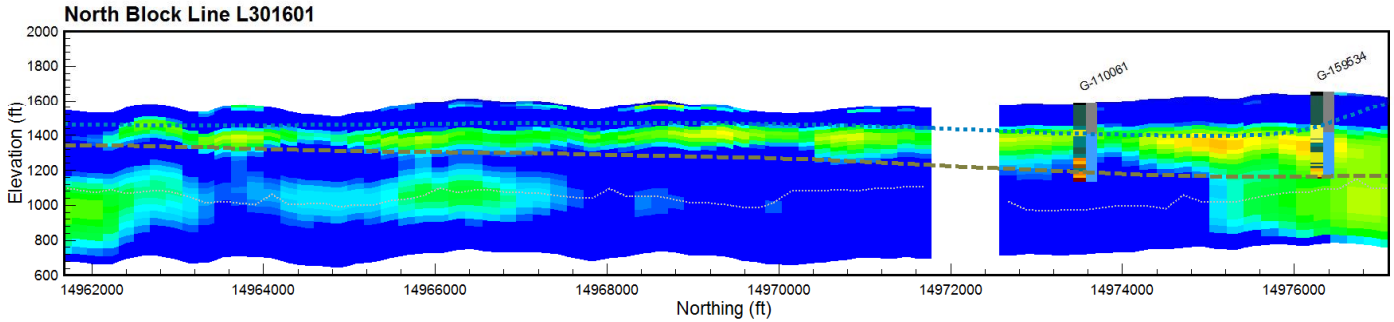

North Block
Northing (ft)
14980000
14970000
14960000
14950000
Brainard
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L301201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-166099
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L301201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-166099
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

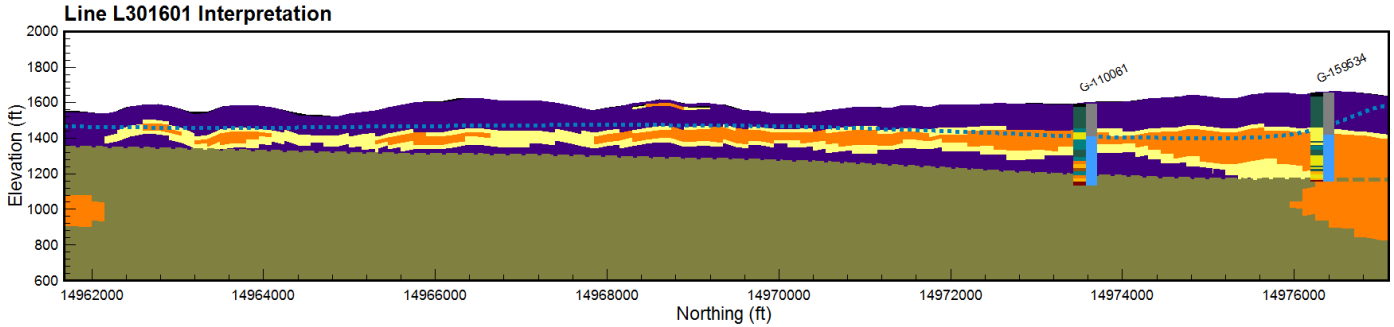

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L301301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L301301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

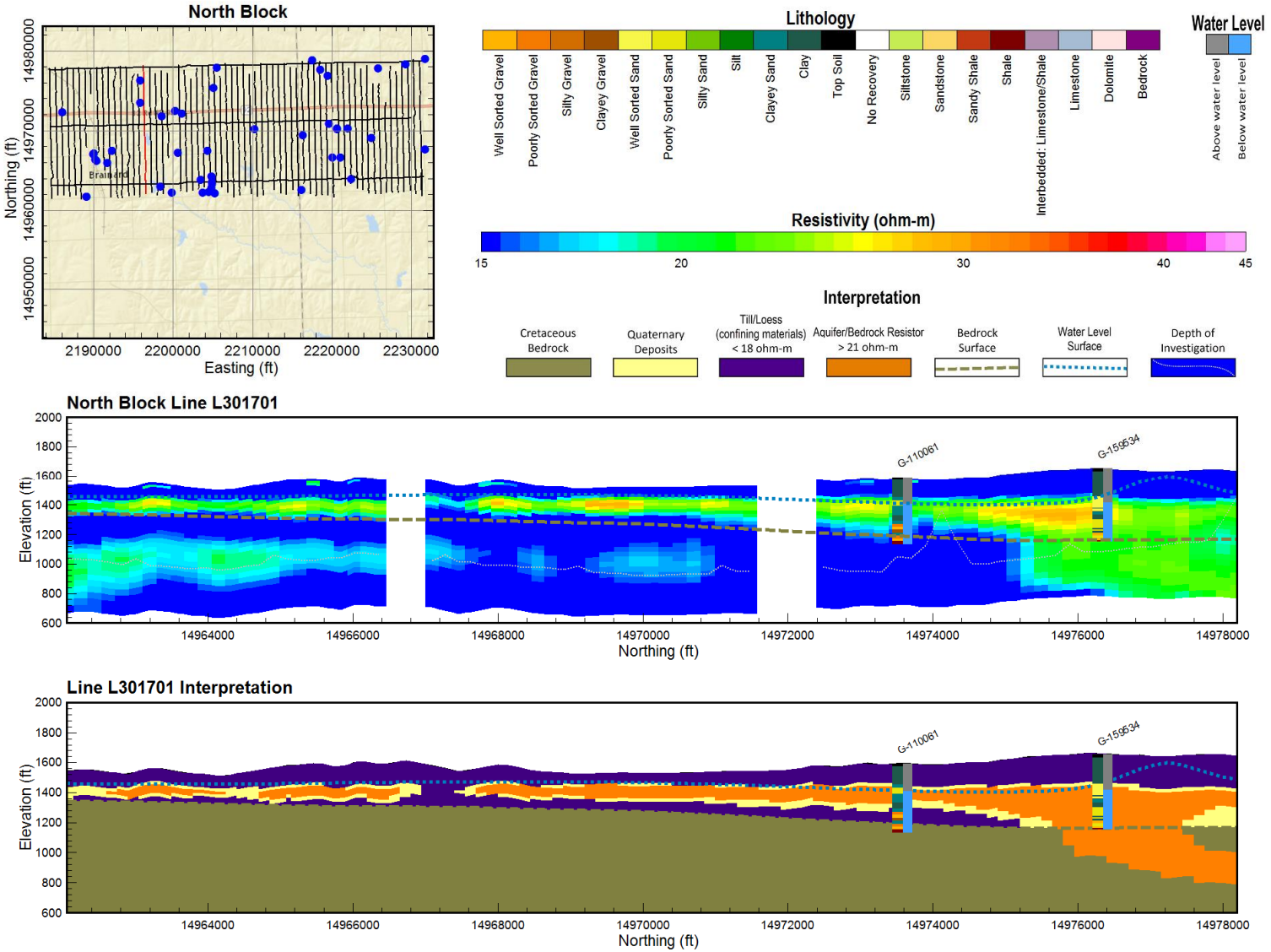

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L301401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L301401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

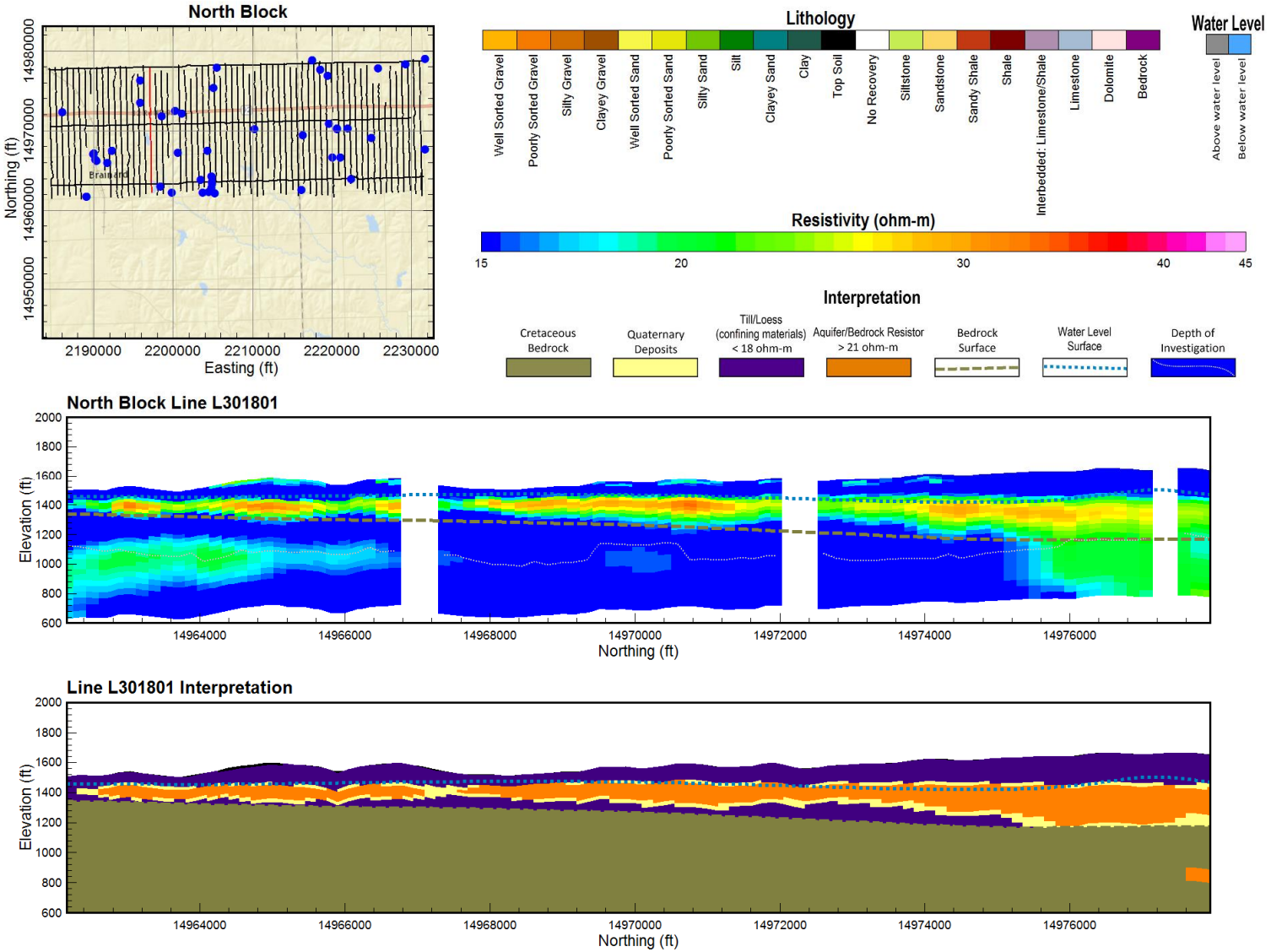

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L301501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L301501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

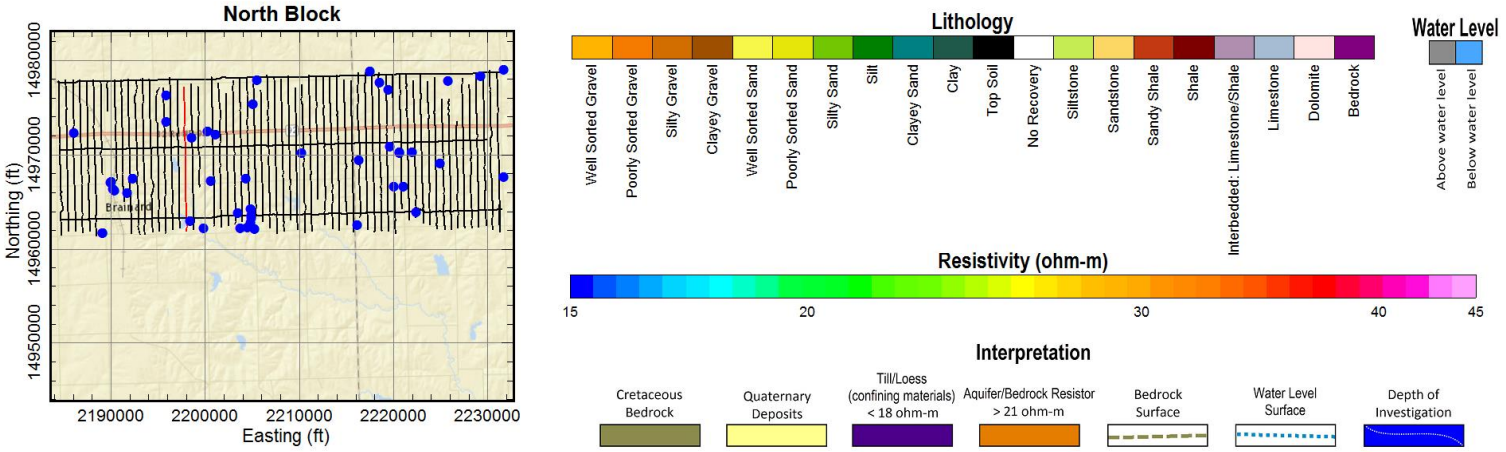

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

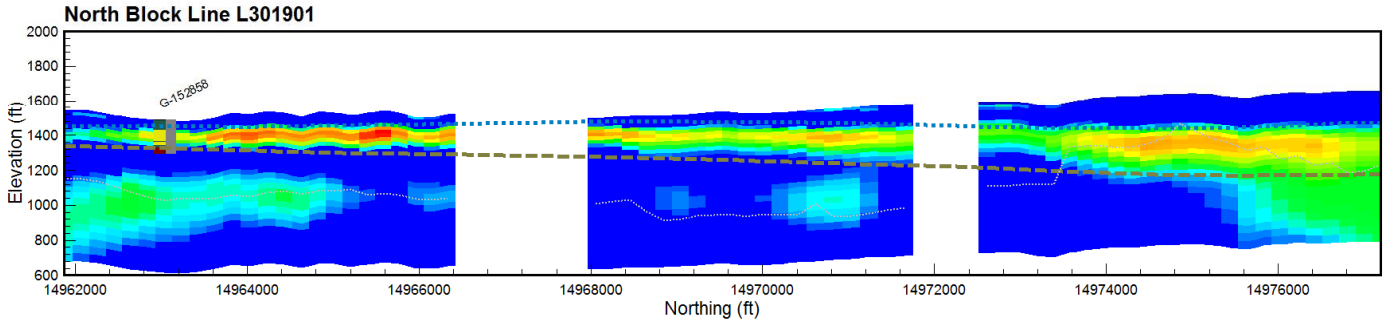

North Block Line L301601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-110061
G-159534
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

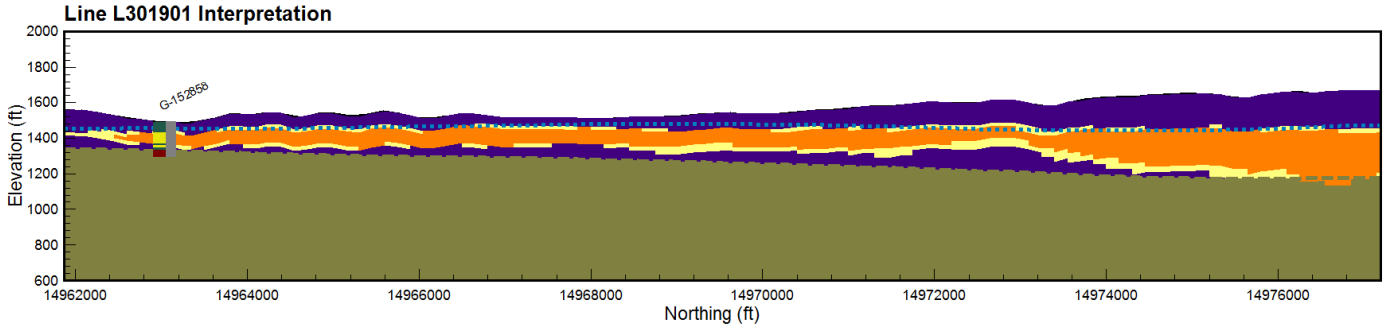

Line L301601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-110061
G-159534
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

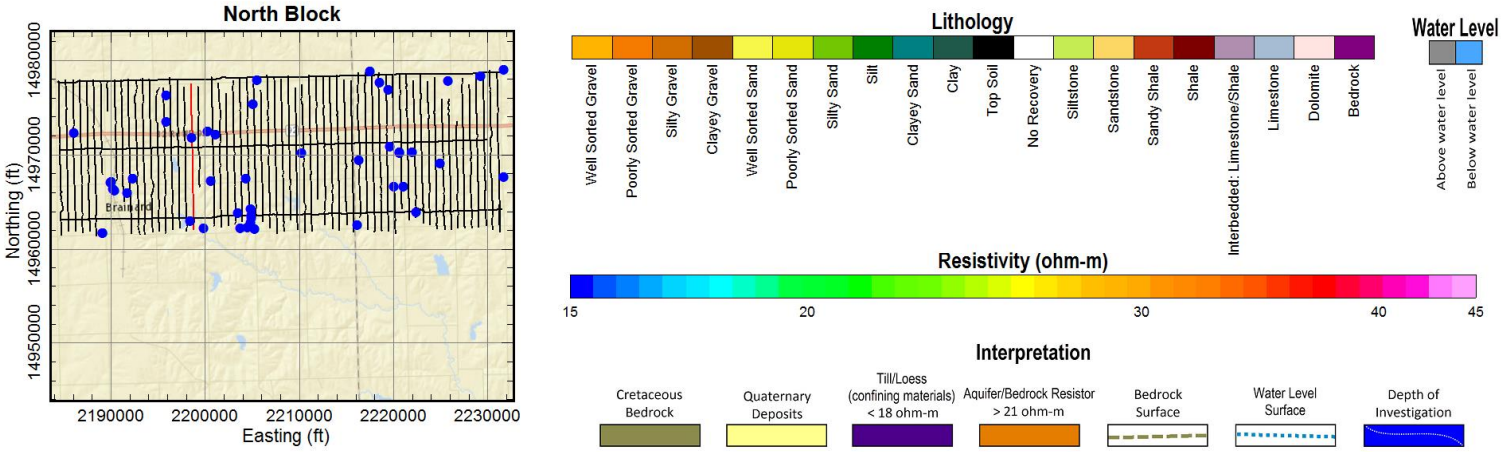

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L301701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-110061
G-159534
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L301701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-110061
G-159534
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

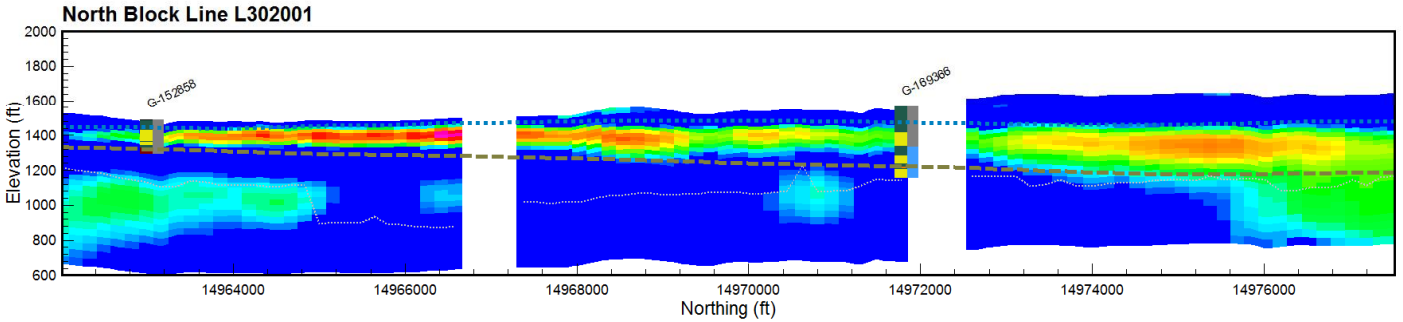

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L301801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L301801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

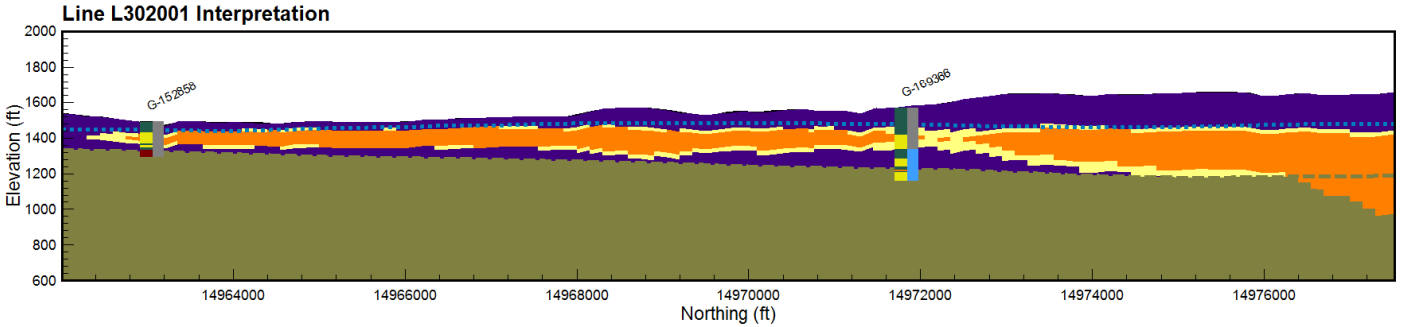

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

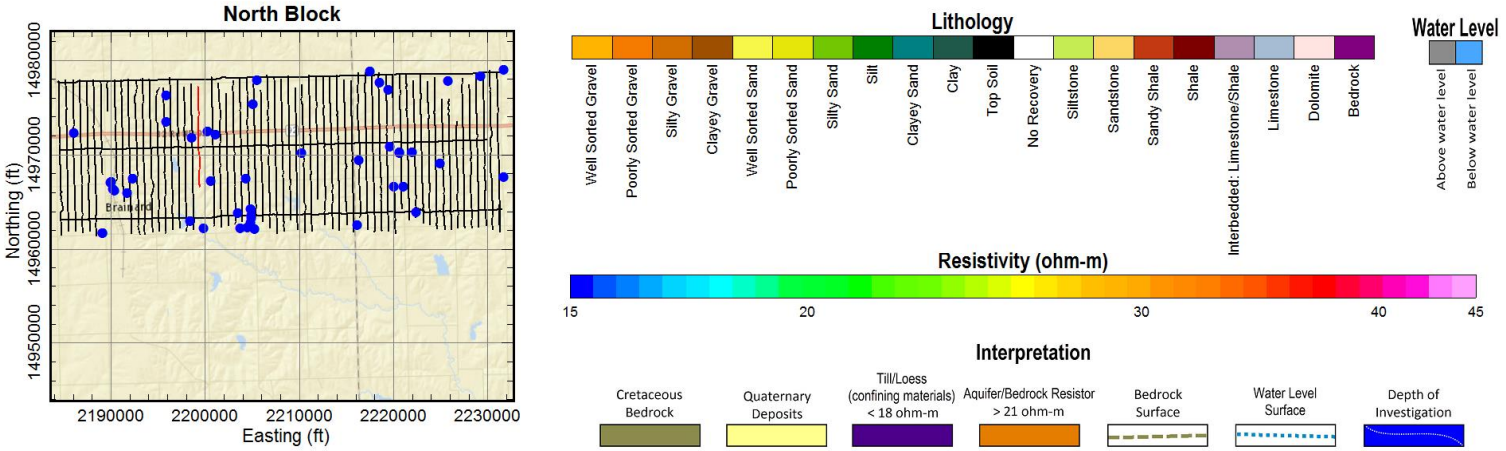

North Block Line L301901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-152868
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

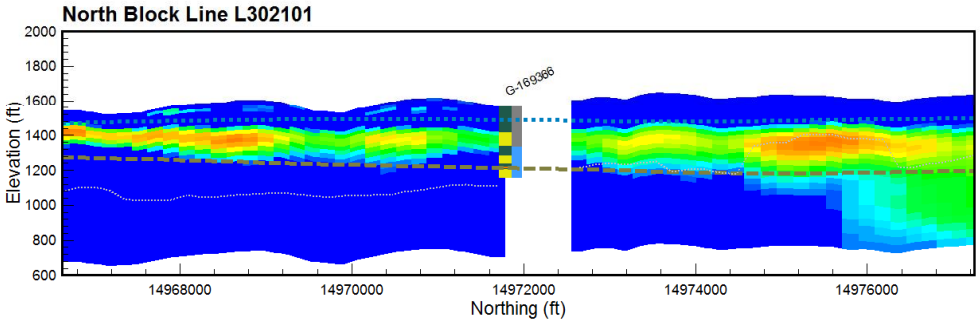

Line L301901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-152868
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

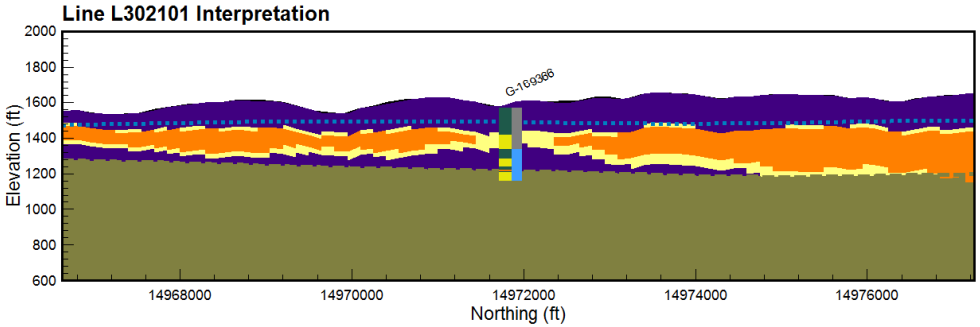

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

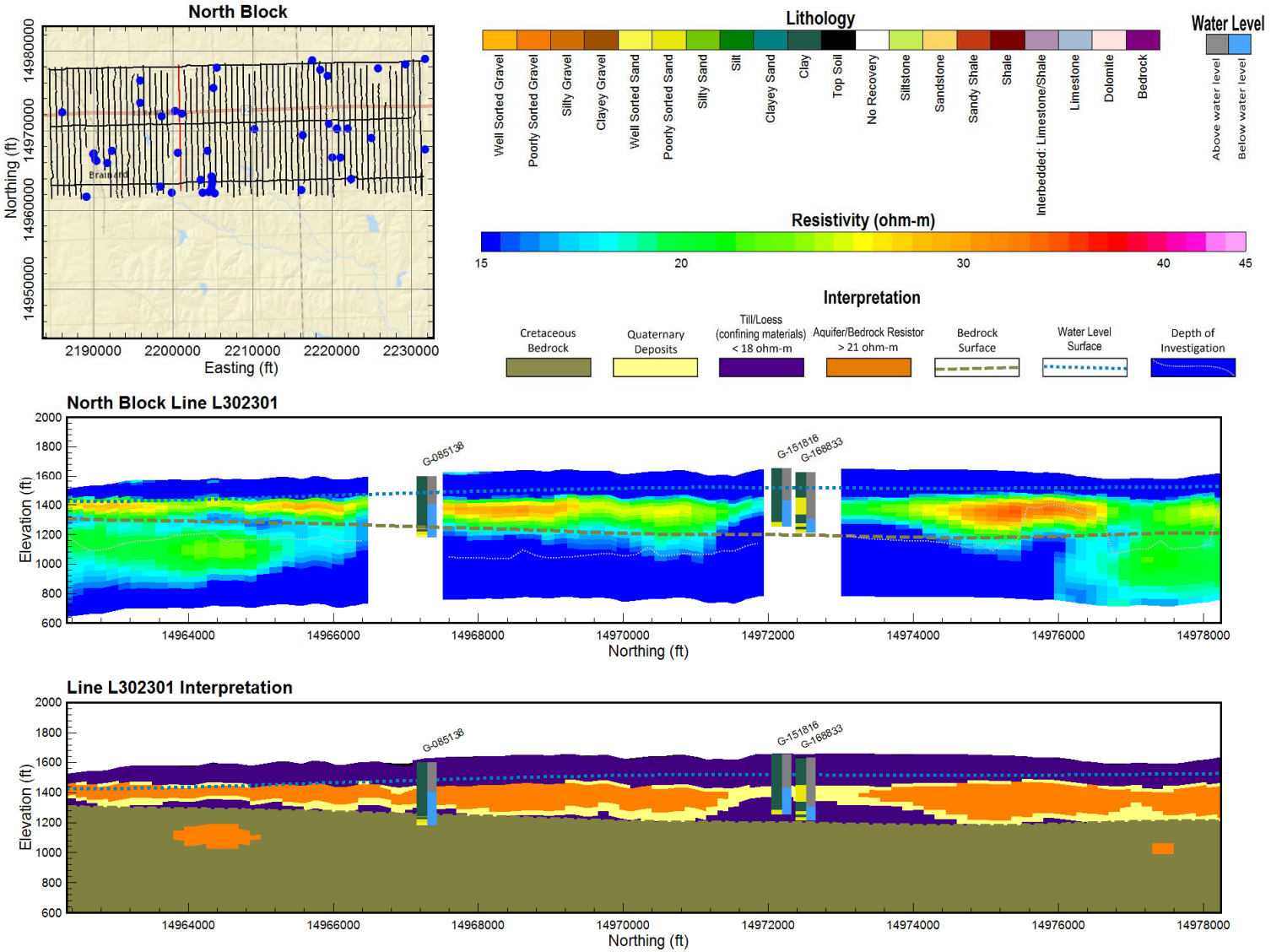

North Block Line L302001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-152858
G-169366
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

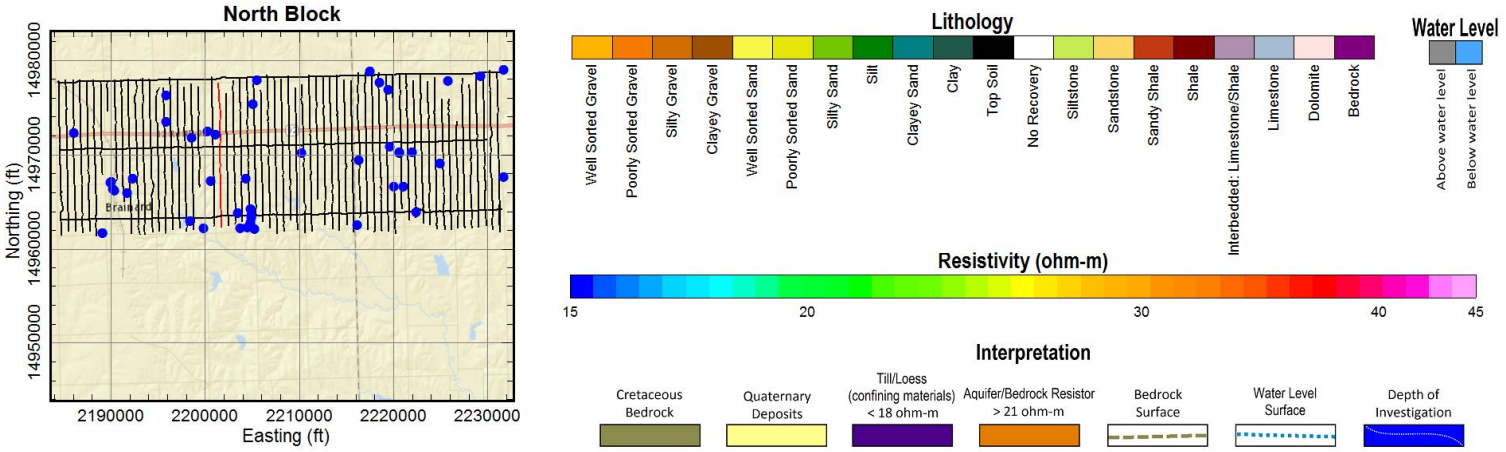

Line L302001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-152858
G-169366
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

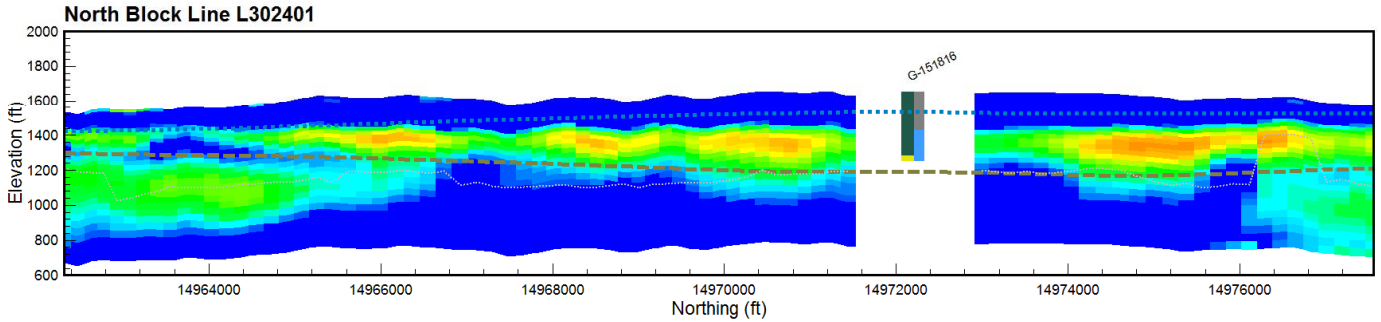

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

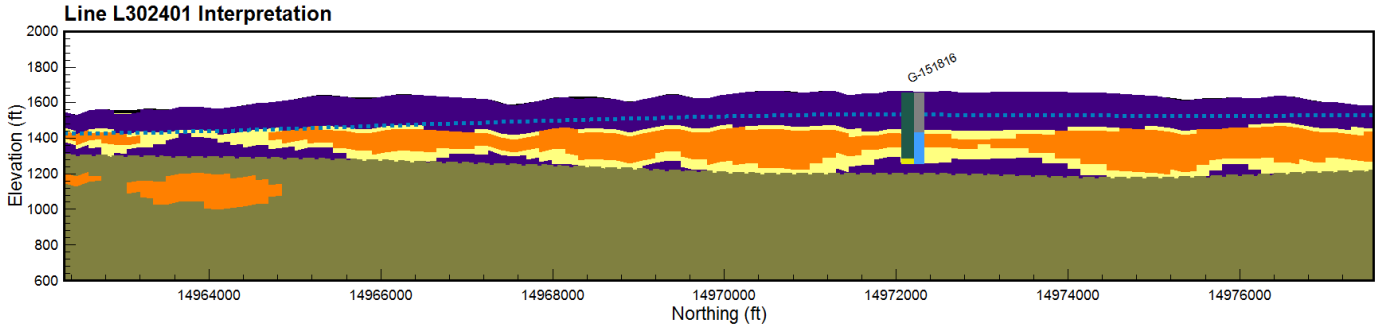

North Block Line L302101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-169366
14968000
14970000
14972000
14974000
14976000
Northing (ft)

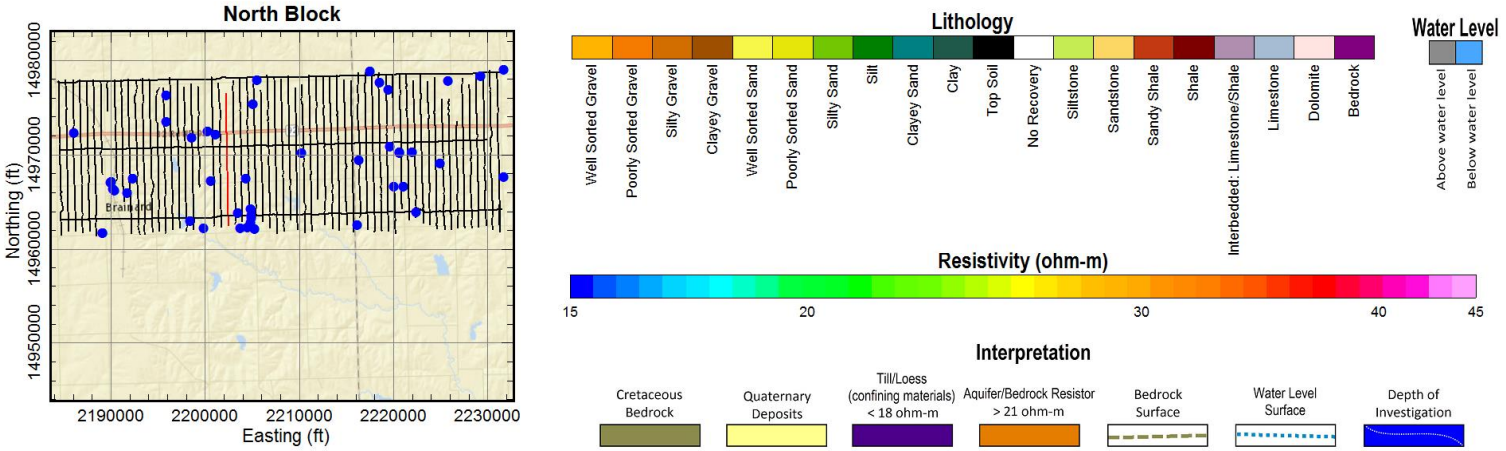

Line L302101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-169366
14968000
14970000
14972000
14974000
14976000
Northing (ft)

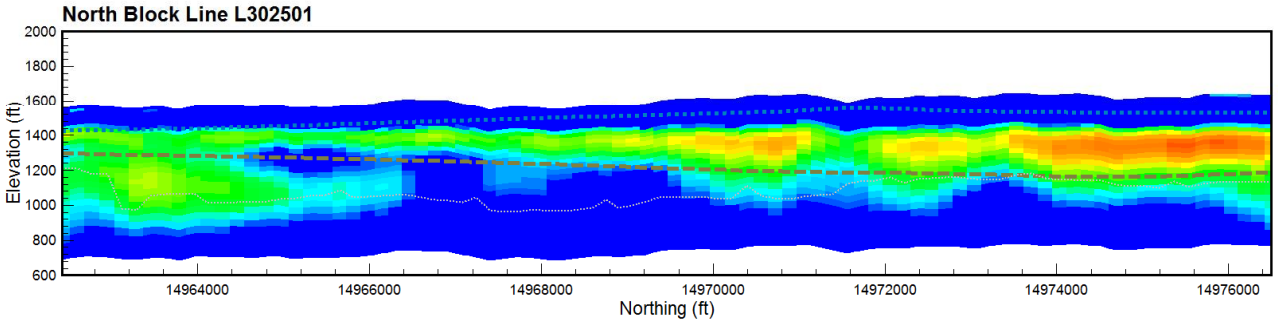

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L302301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-085139
G-151816
G-168833
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L302301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-085139
G-151816
G-168833
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

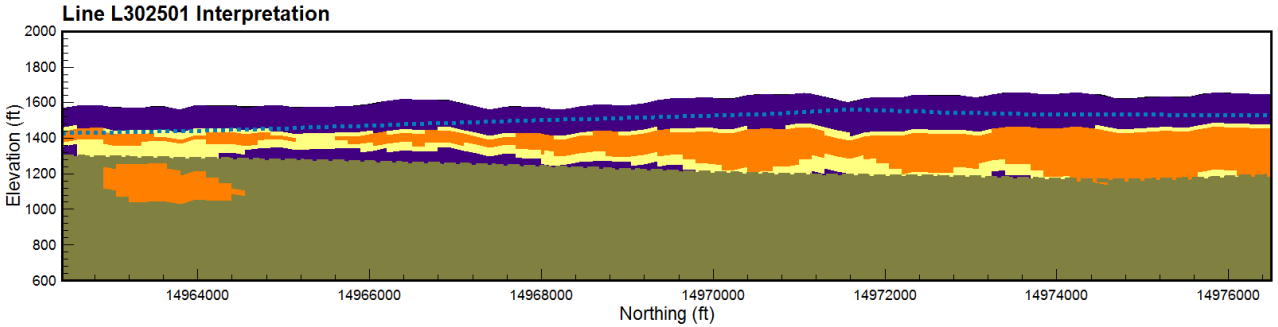

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

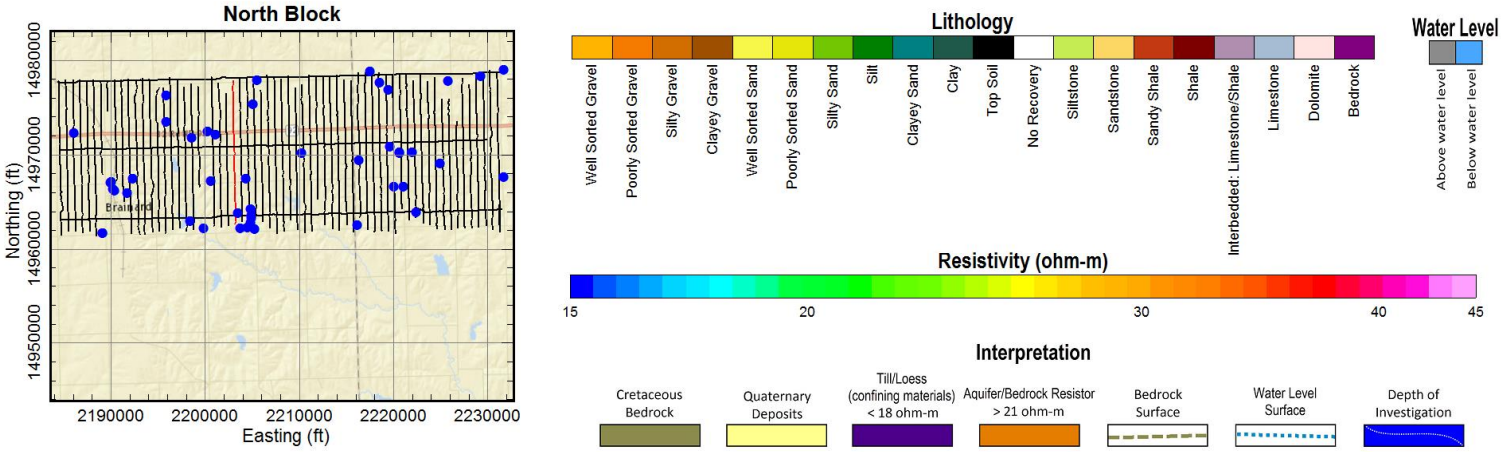

North Block Line L302401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-151816
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

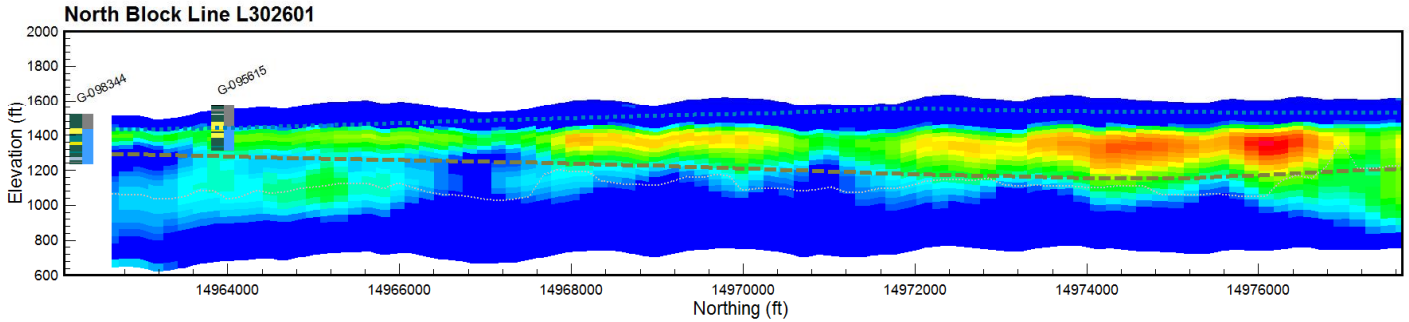

Line L302401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-151816
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

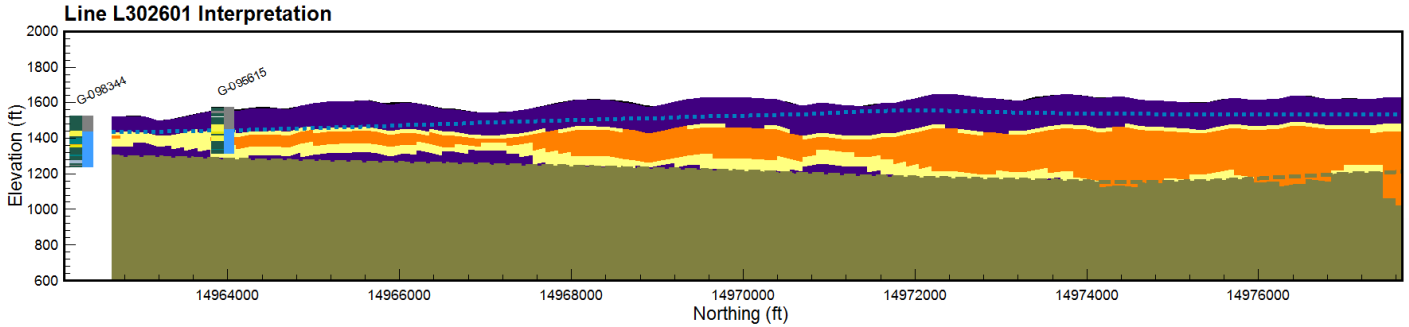

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

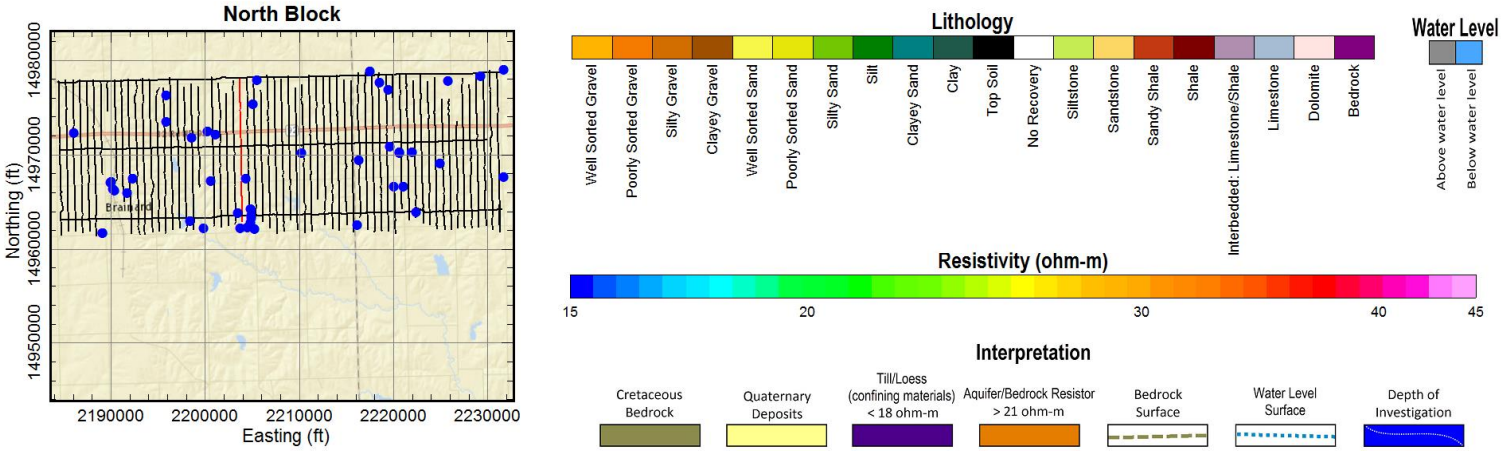

North Block Line L302501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

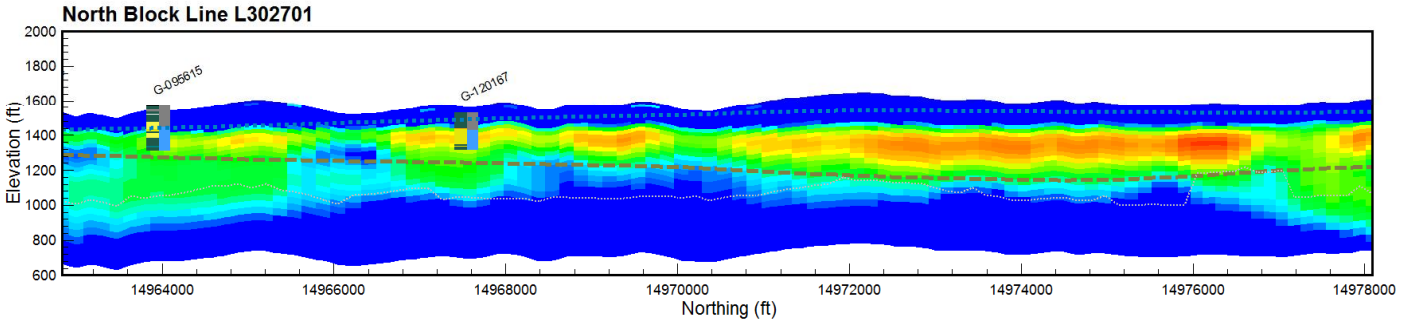

Line L302501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

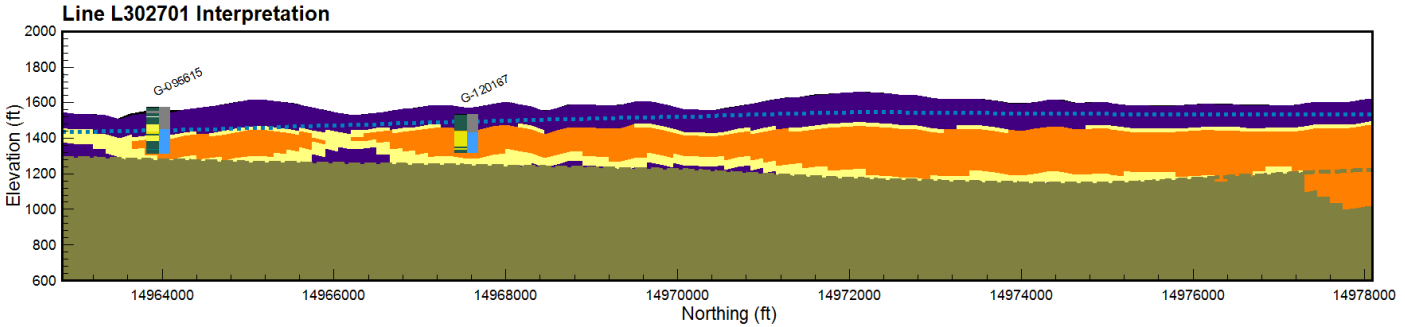

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

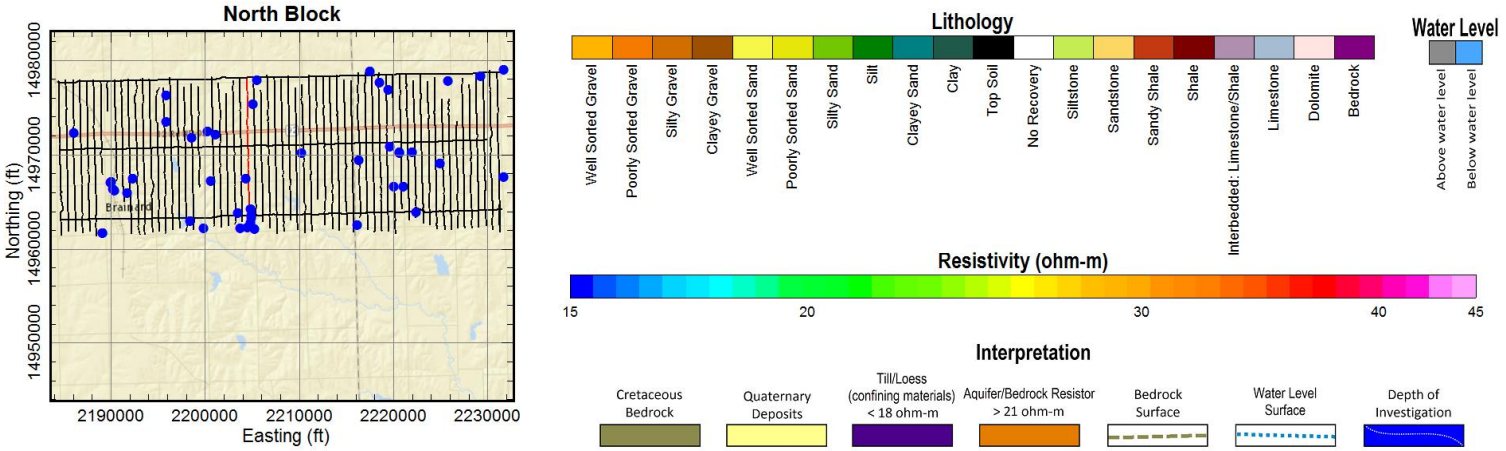

North Block Line L302601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-096344
G-096615
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

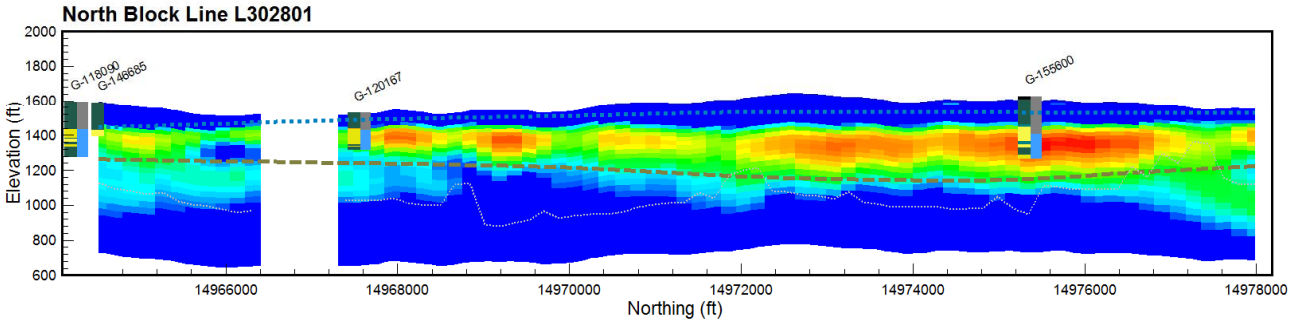

Line L302601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-096344
G-096615
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

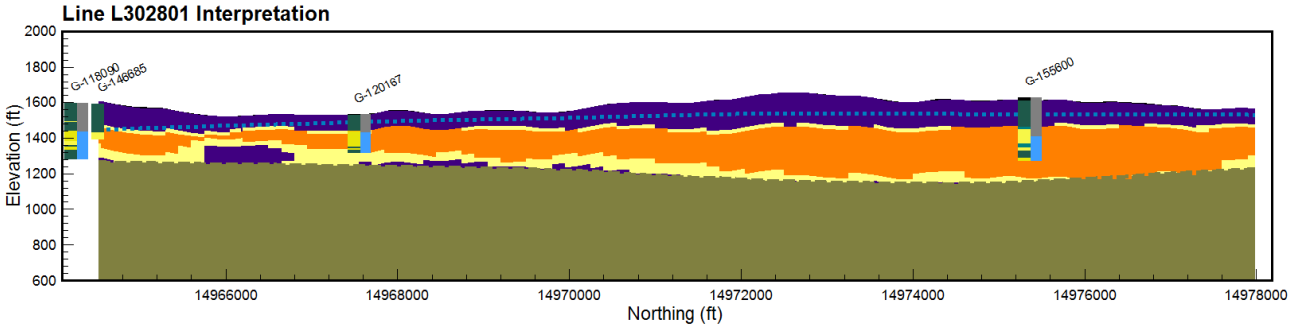

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

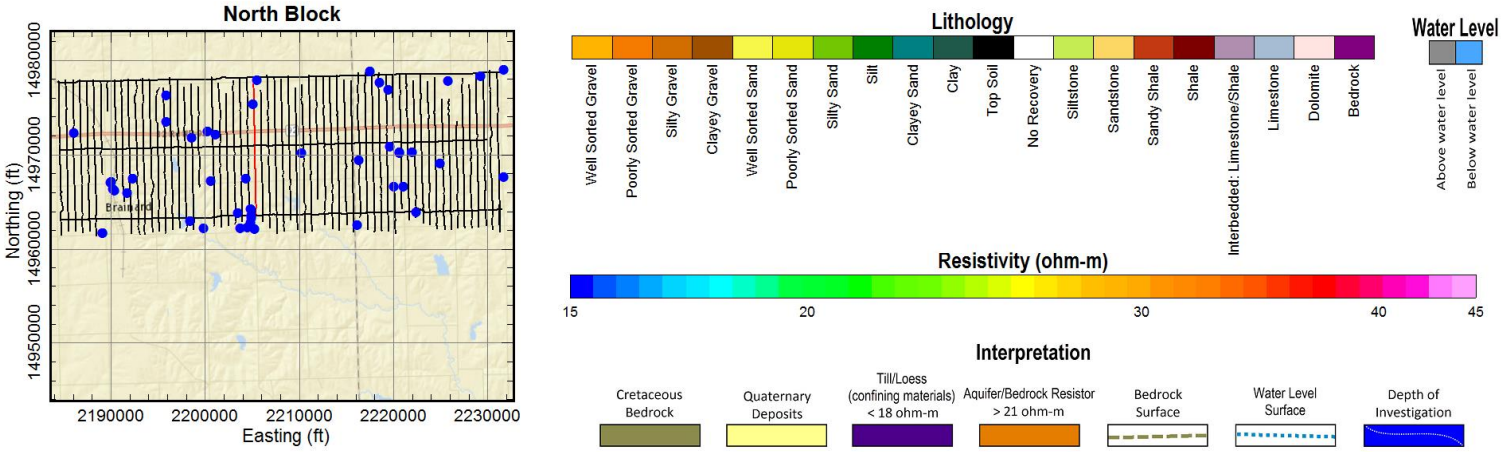

North Block Line L302701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-095615
G-120167
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

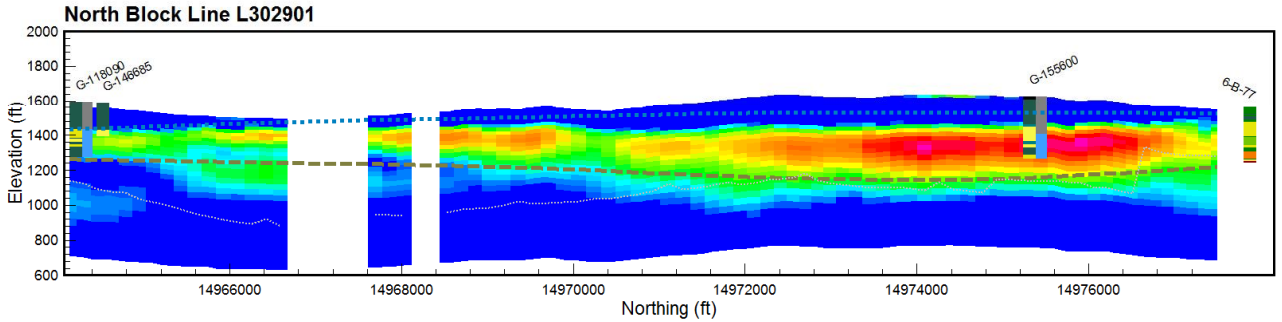

Line L302701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-095615
G-120167
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

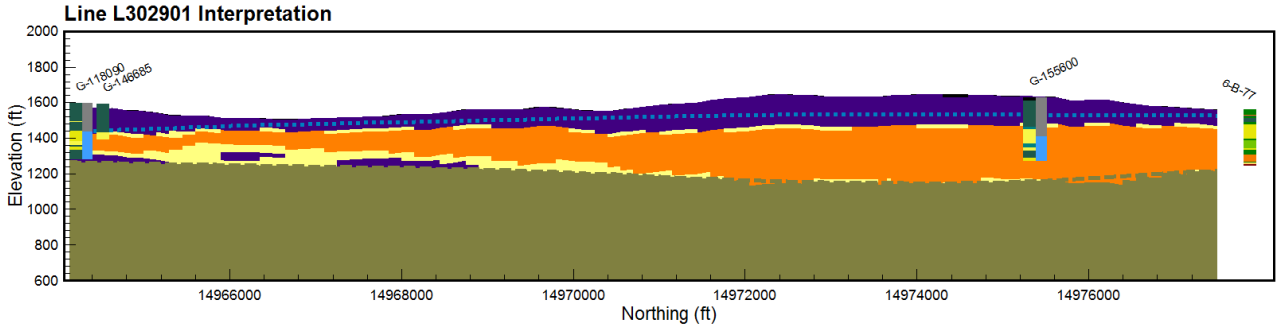

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

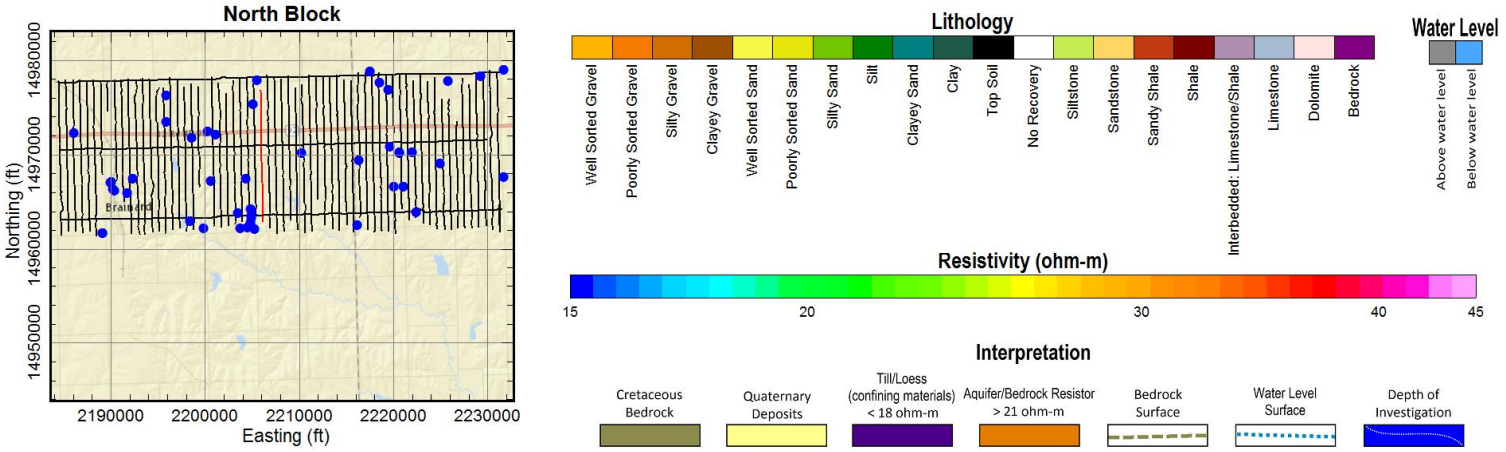

North Block Line L302801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-118090
G-146685
G-120167
G-155600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

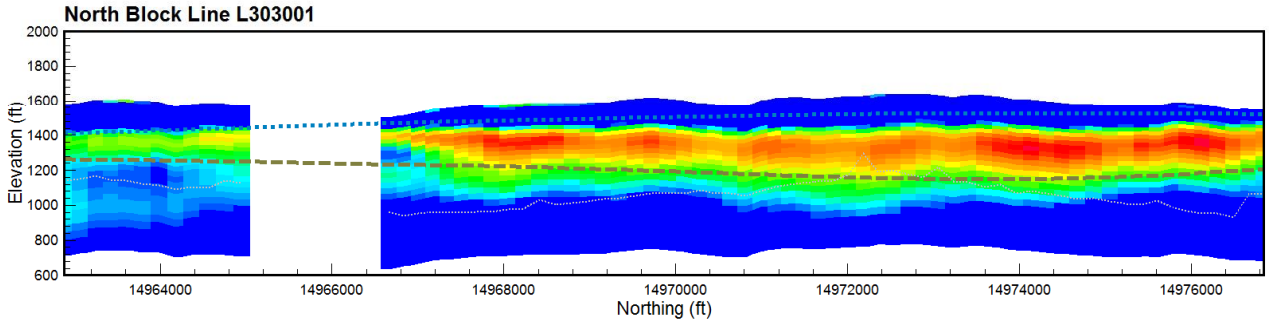

Line L302801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-118090
G-146685
G-120167
G-155600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

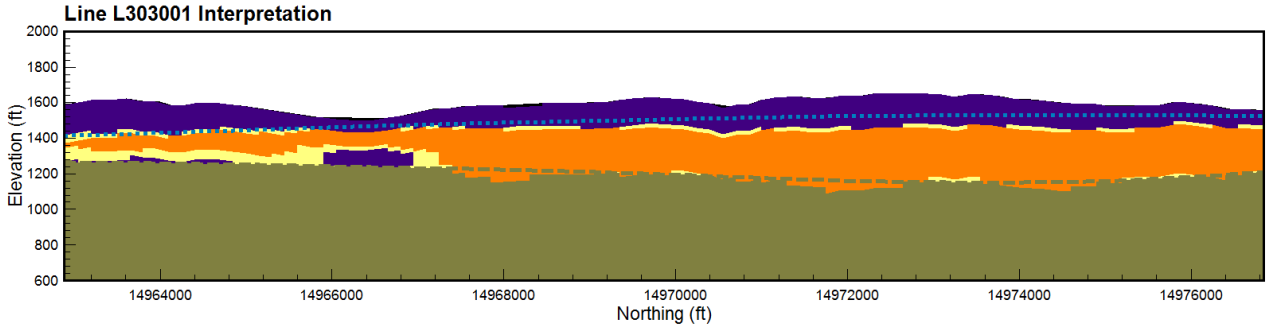

North Block
Northing (ft)
14980000
14970000
14960000
14950000
Brainard
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

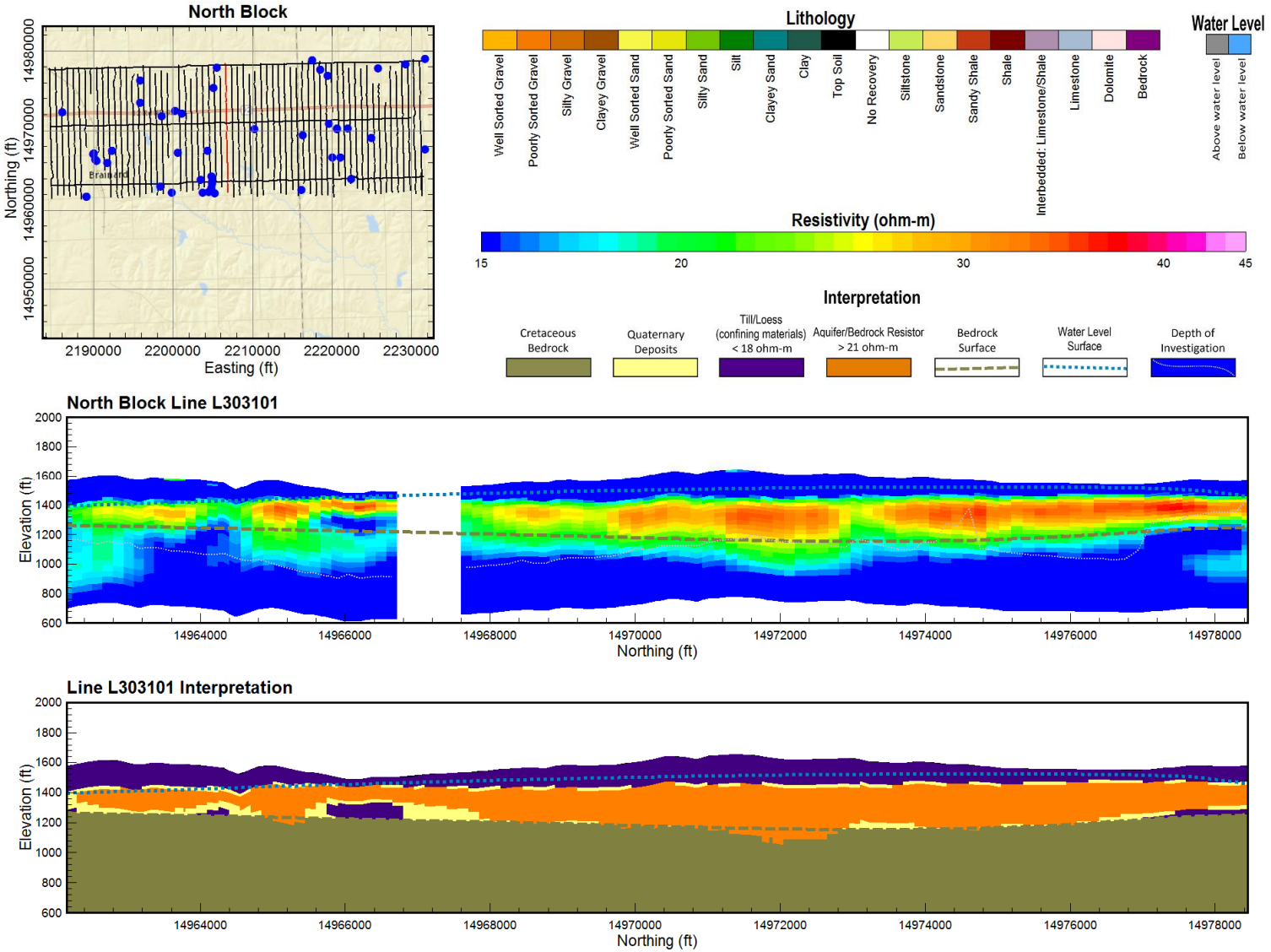

North Block Line L302901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-118090
G-146685
G-155600
6-B-77
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

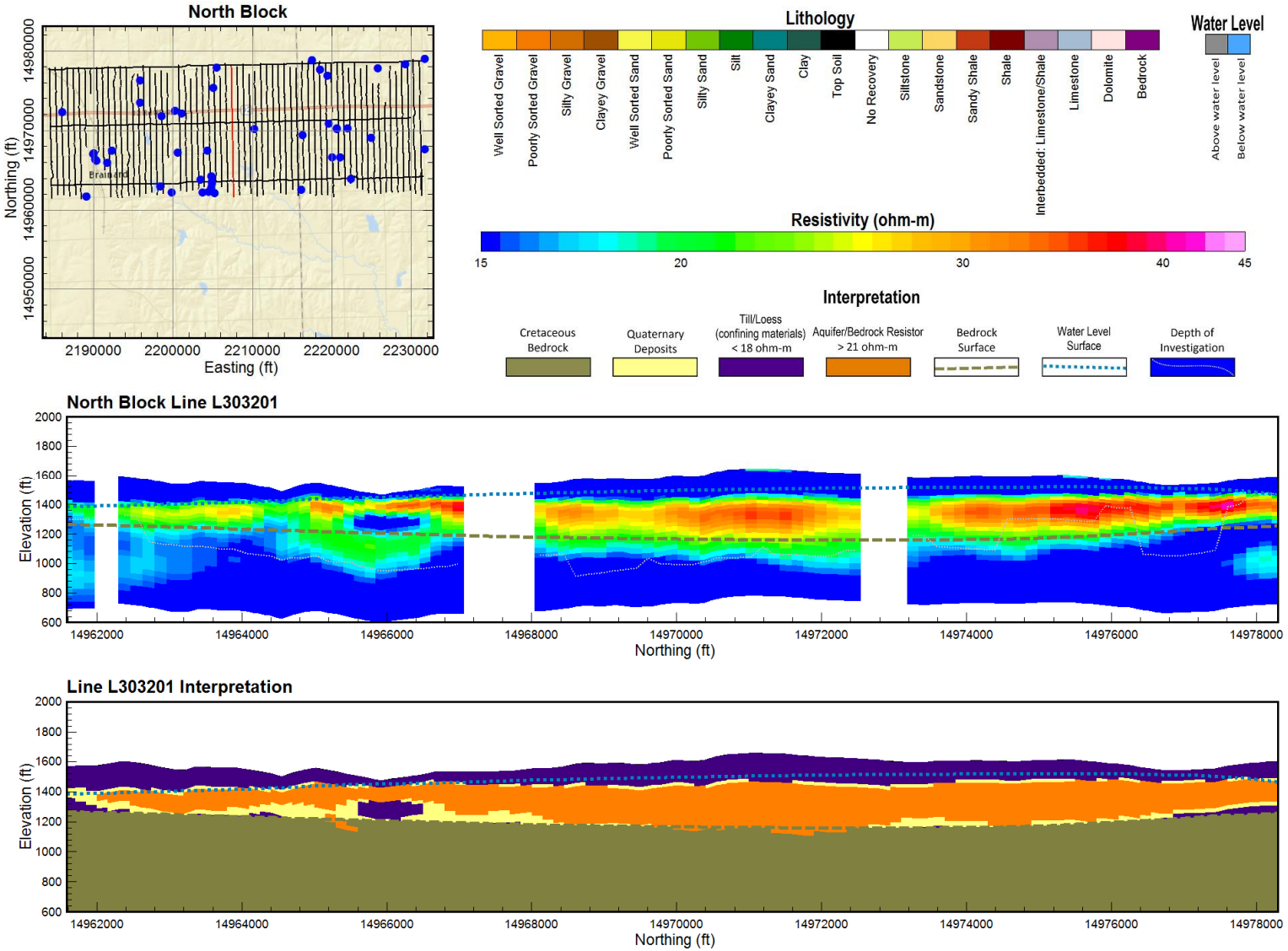

Line L302901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-118090
G-146685
G-155600
6-B-77
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

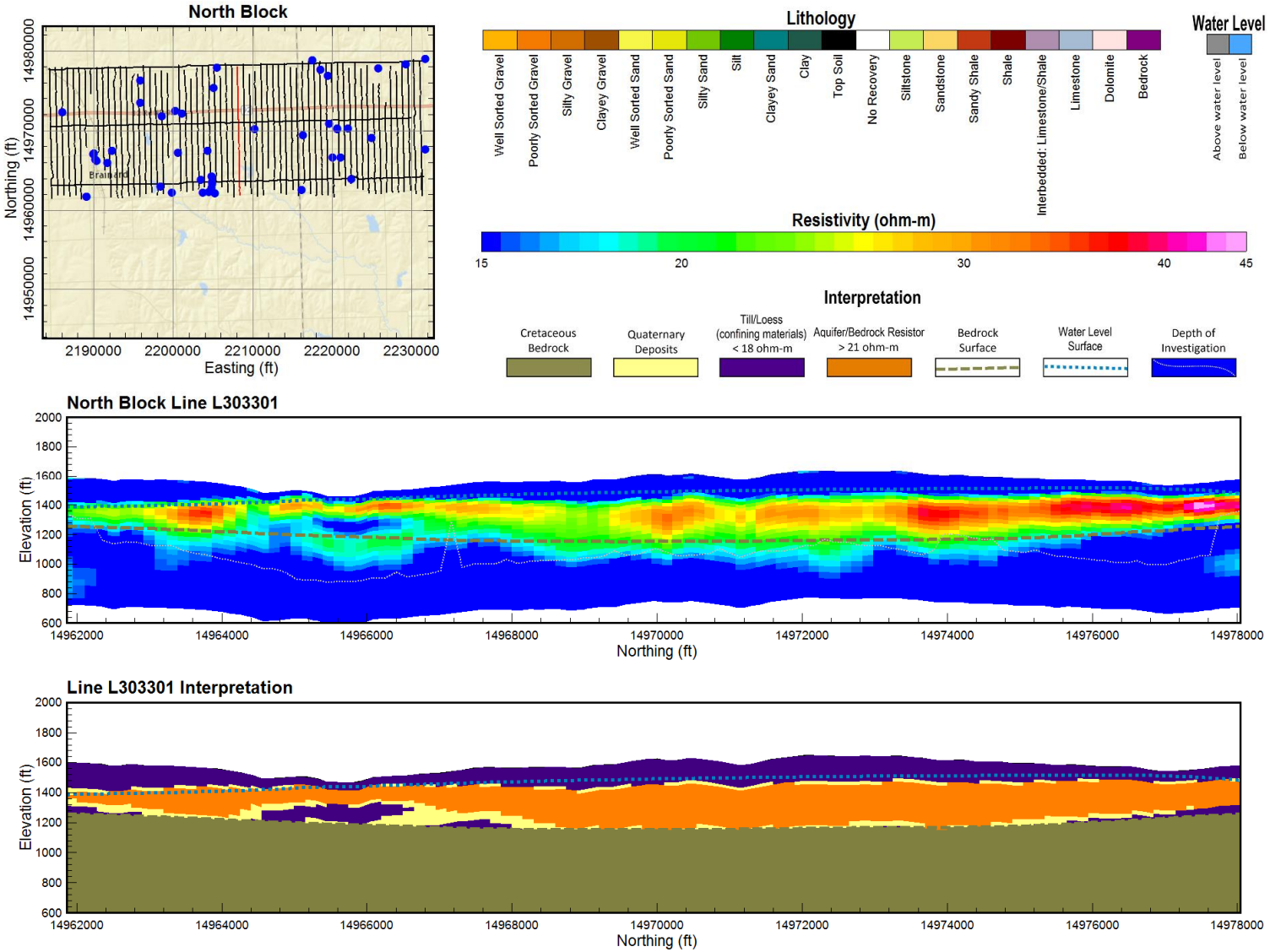

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

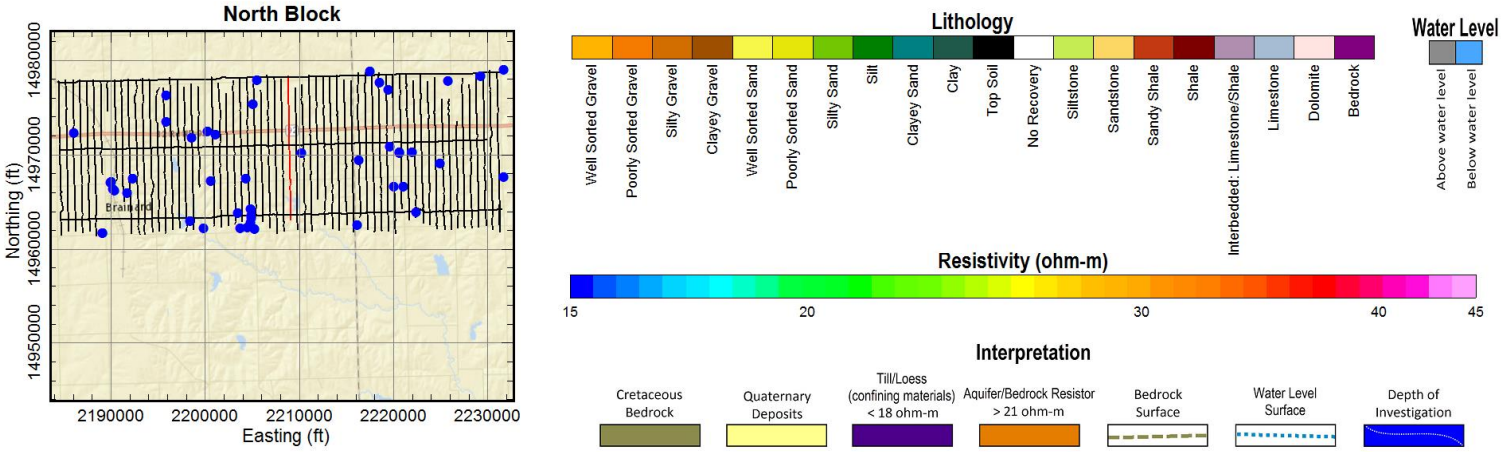

North Block Line L303001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

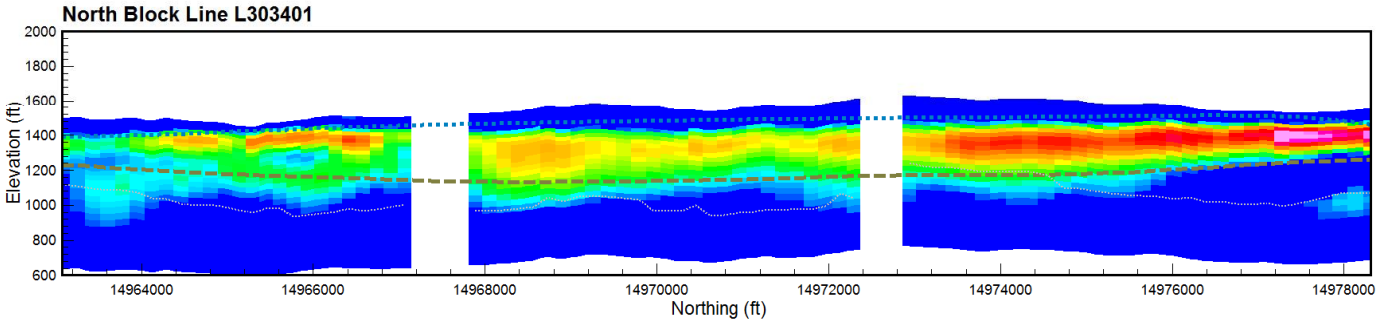

Line L303001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

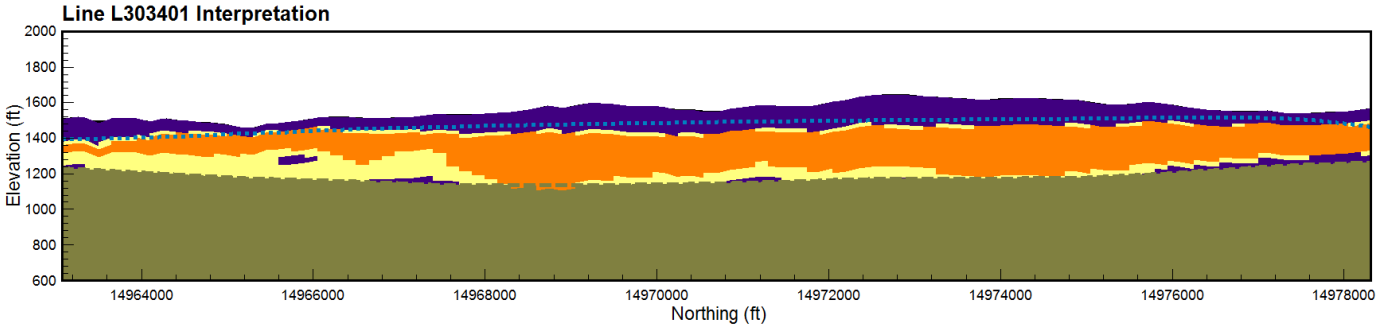

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L303101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L303101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

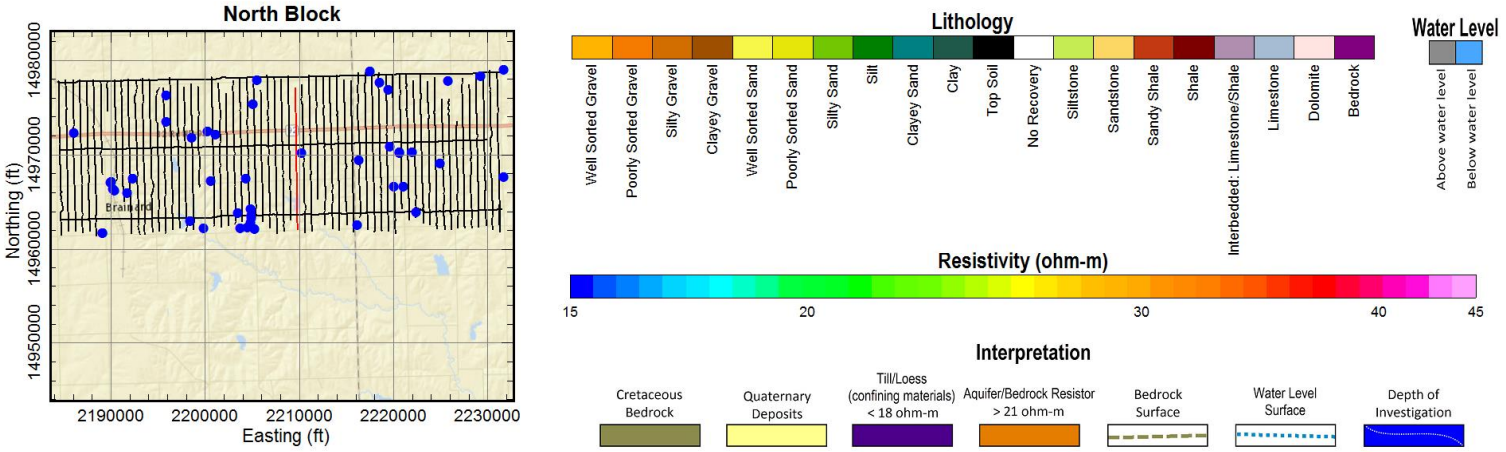

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L303201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L303201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

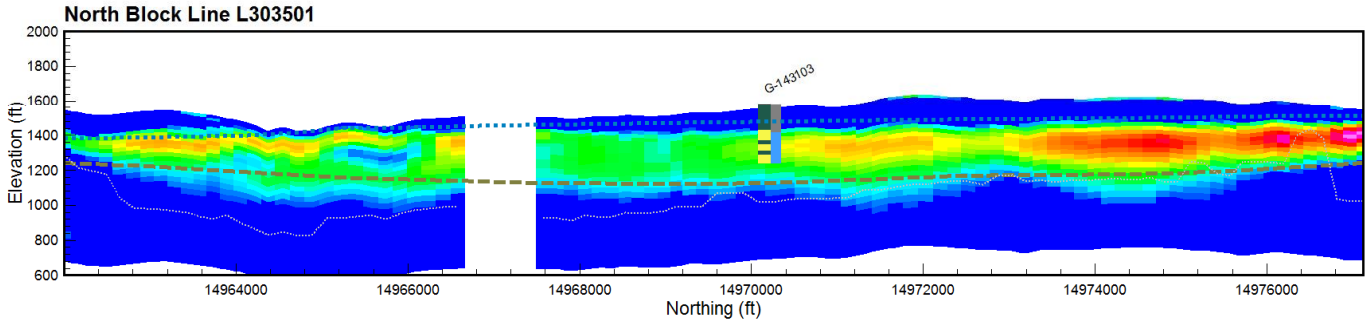

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L303301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L303301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

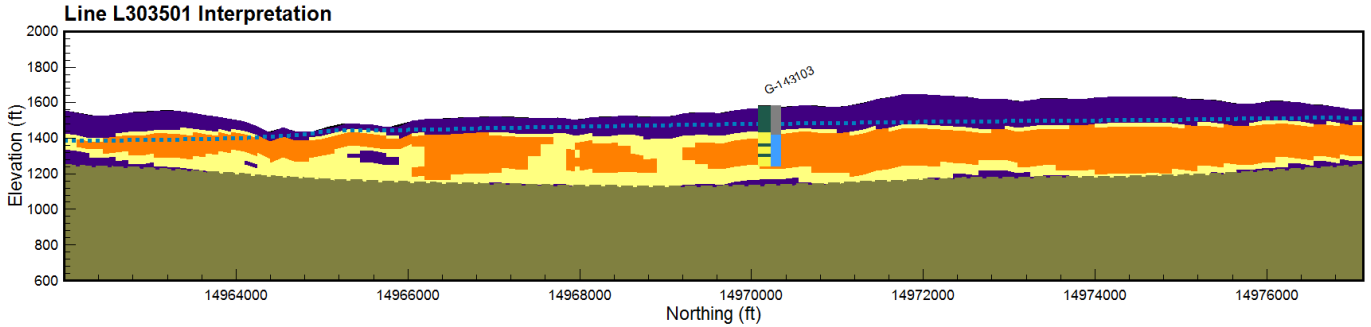

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

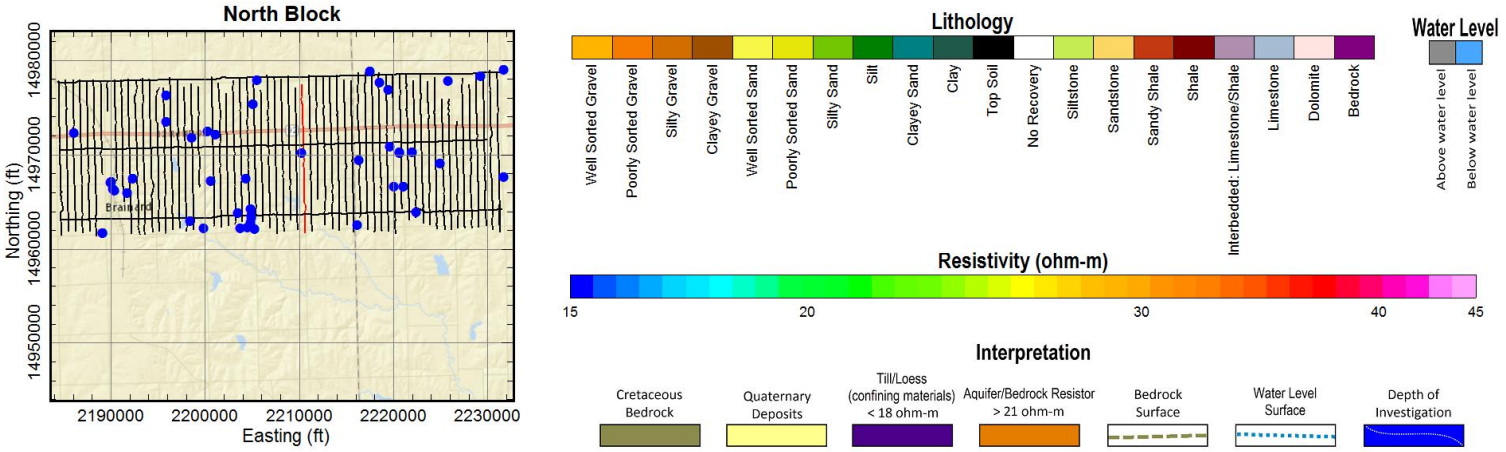

North Block Line L303401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

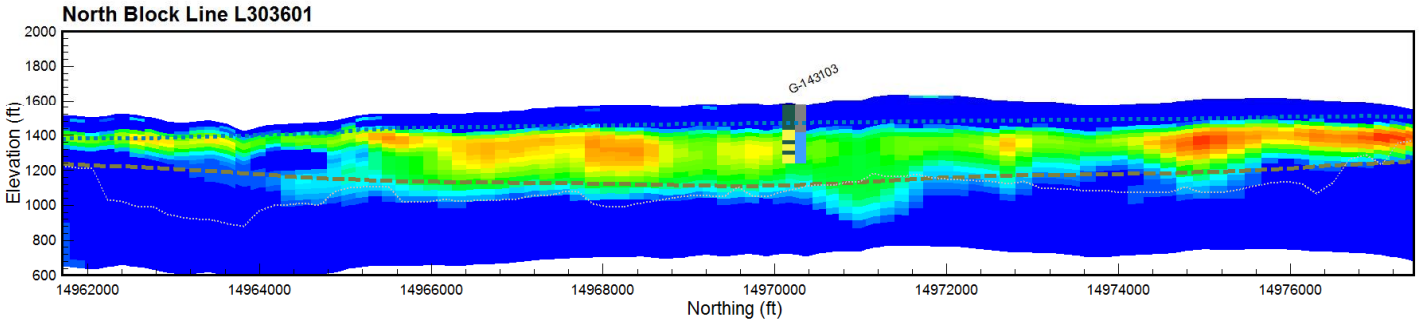

Line L303401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

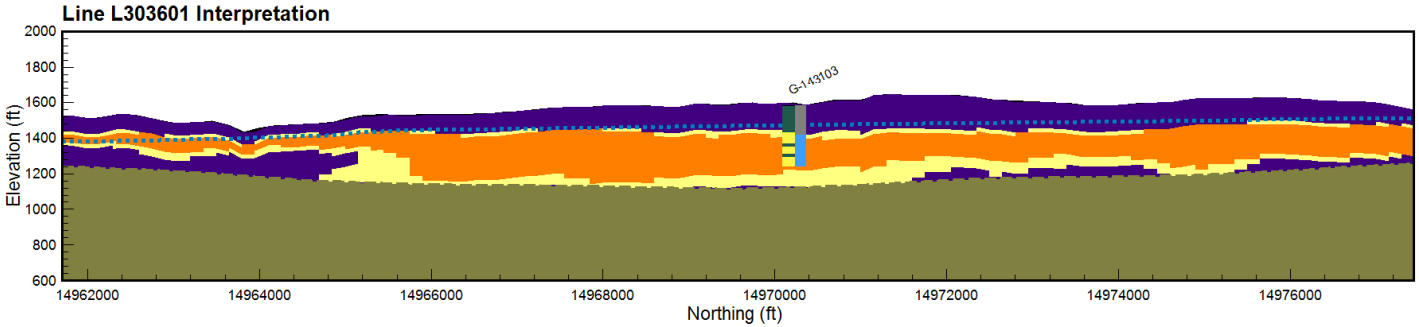

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

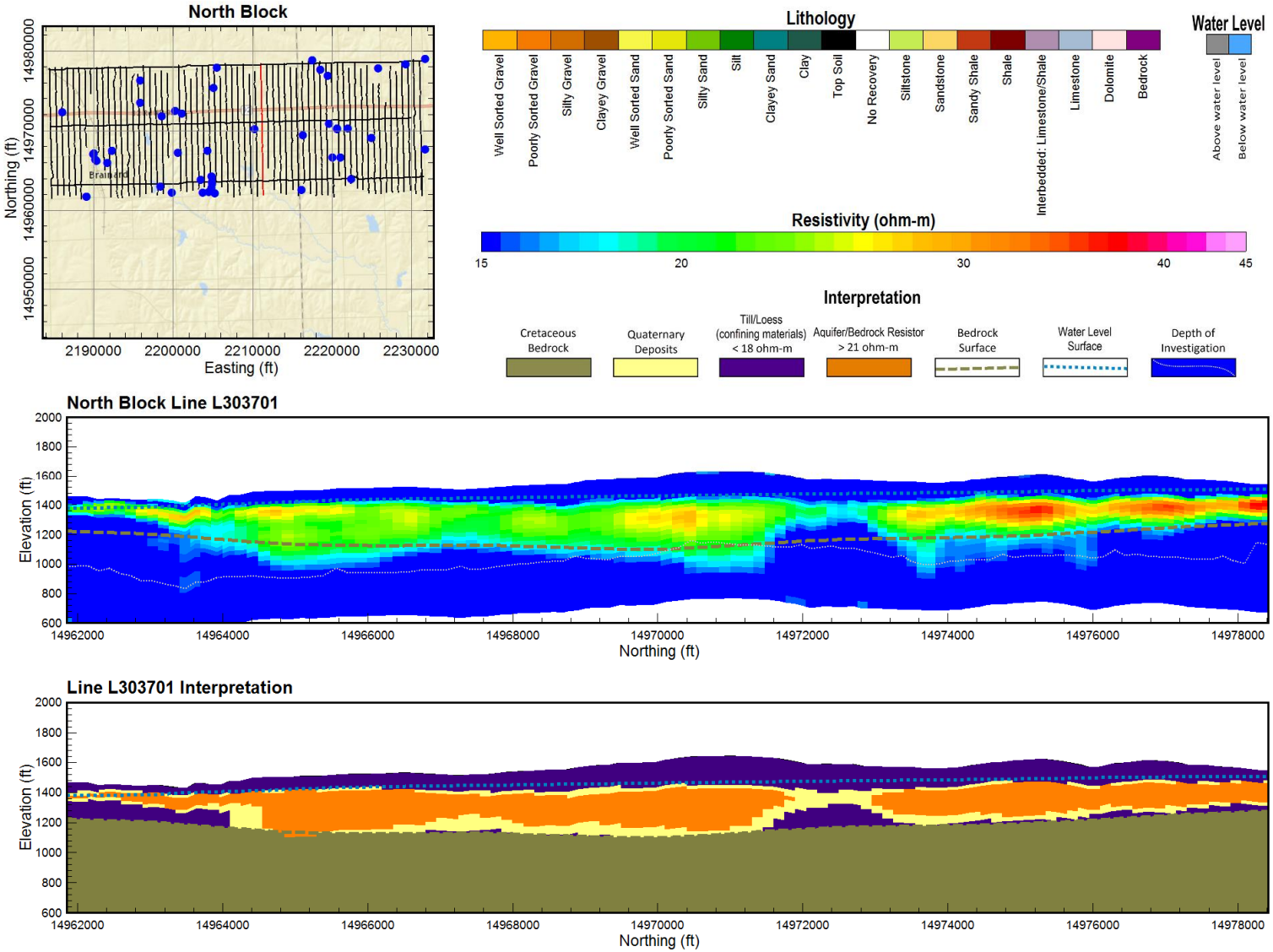

North Block Line L303501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-143103
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

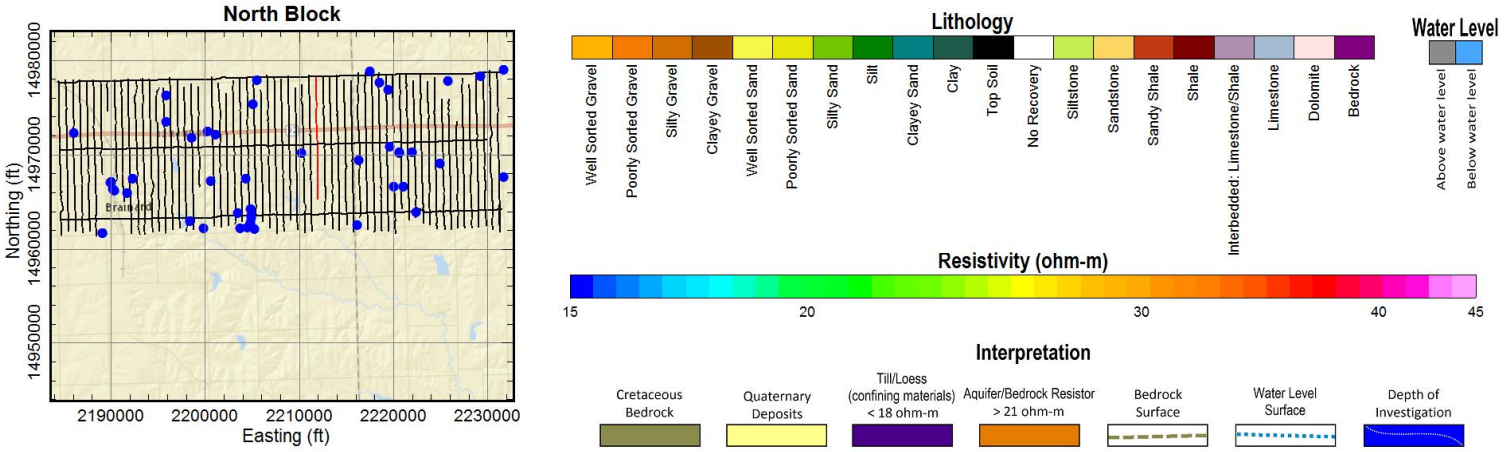

Line L303501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-143103
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

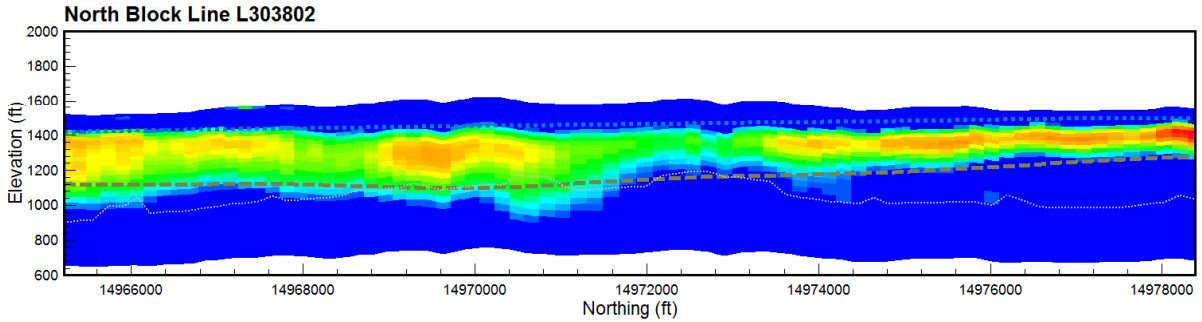

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

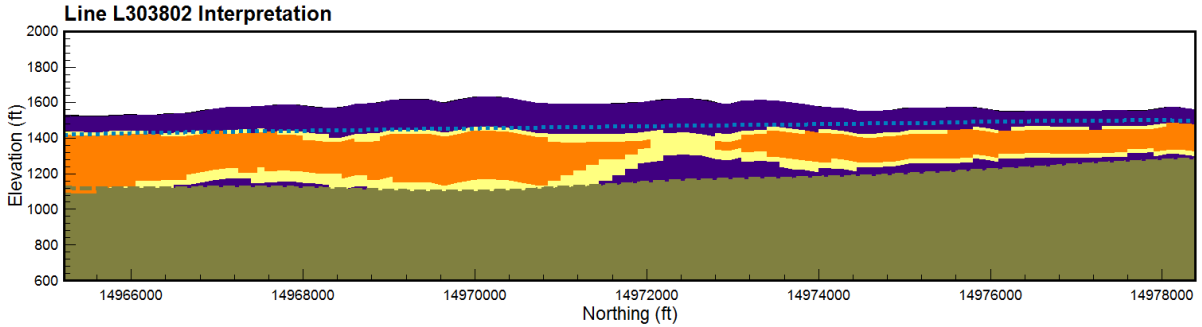

North Block Line L303601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-143103
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

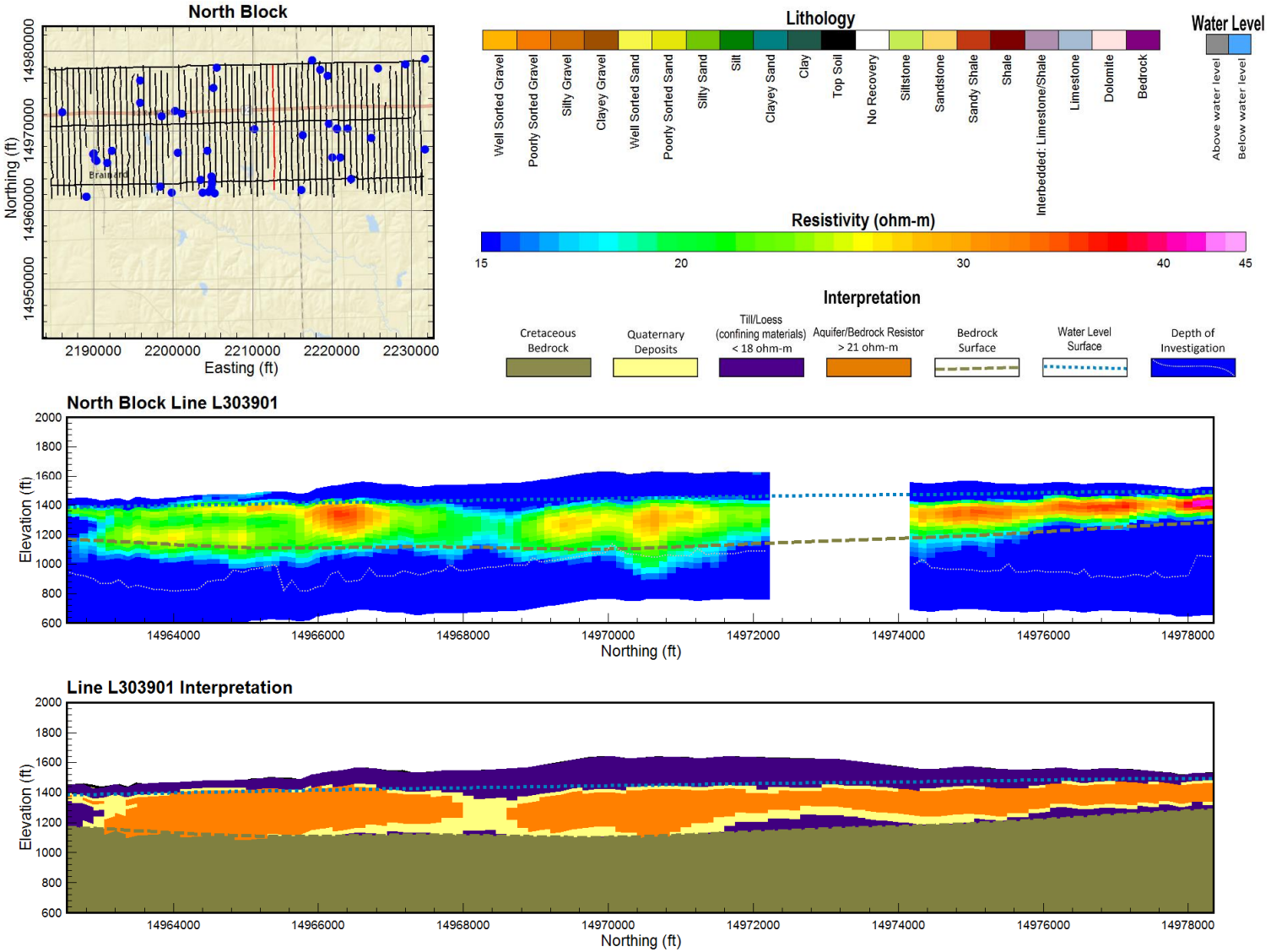

Line L303601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-143103
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

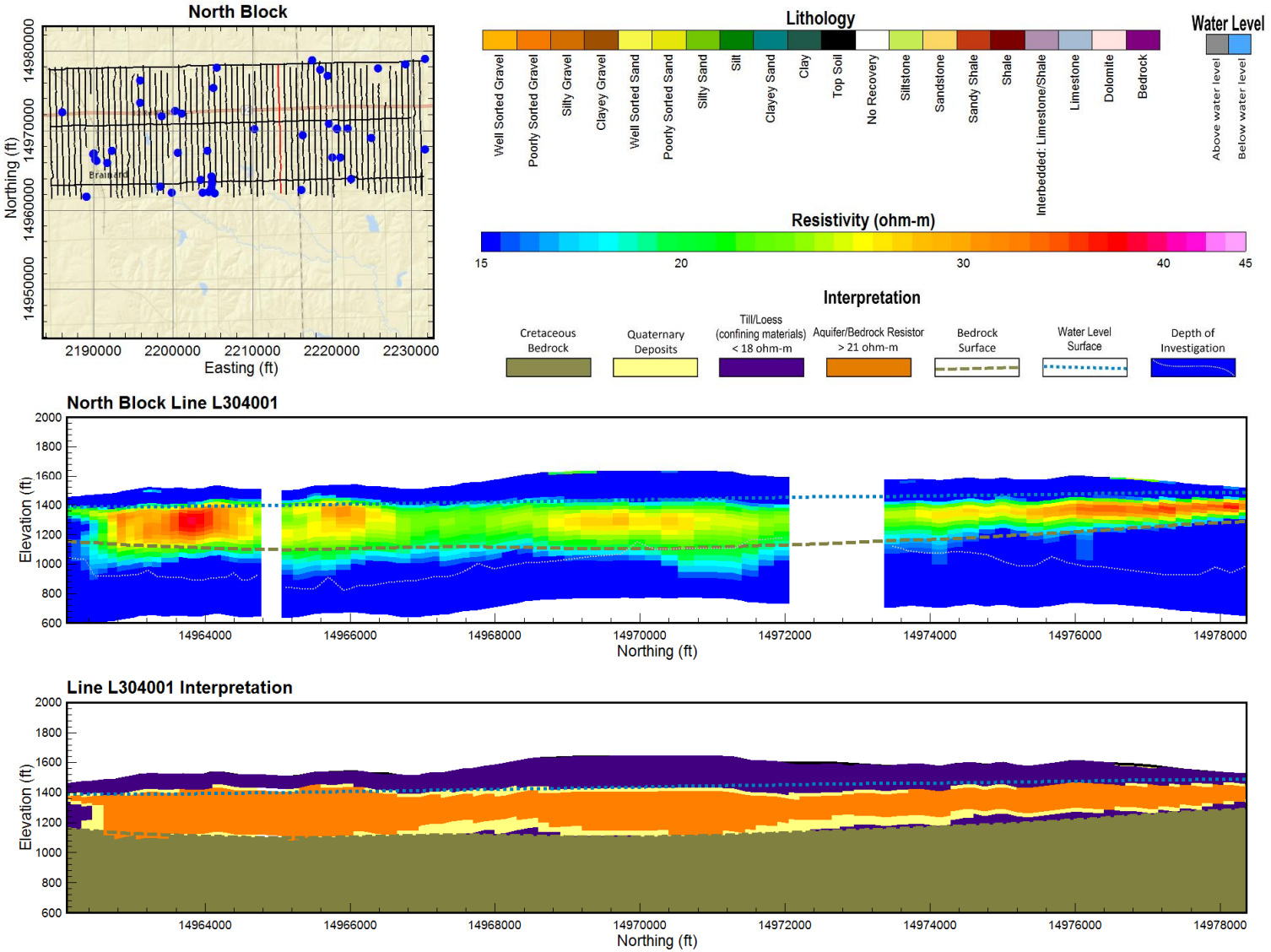

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L303701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L303701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

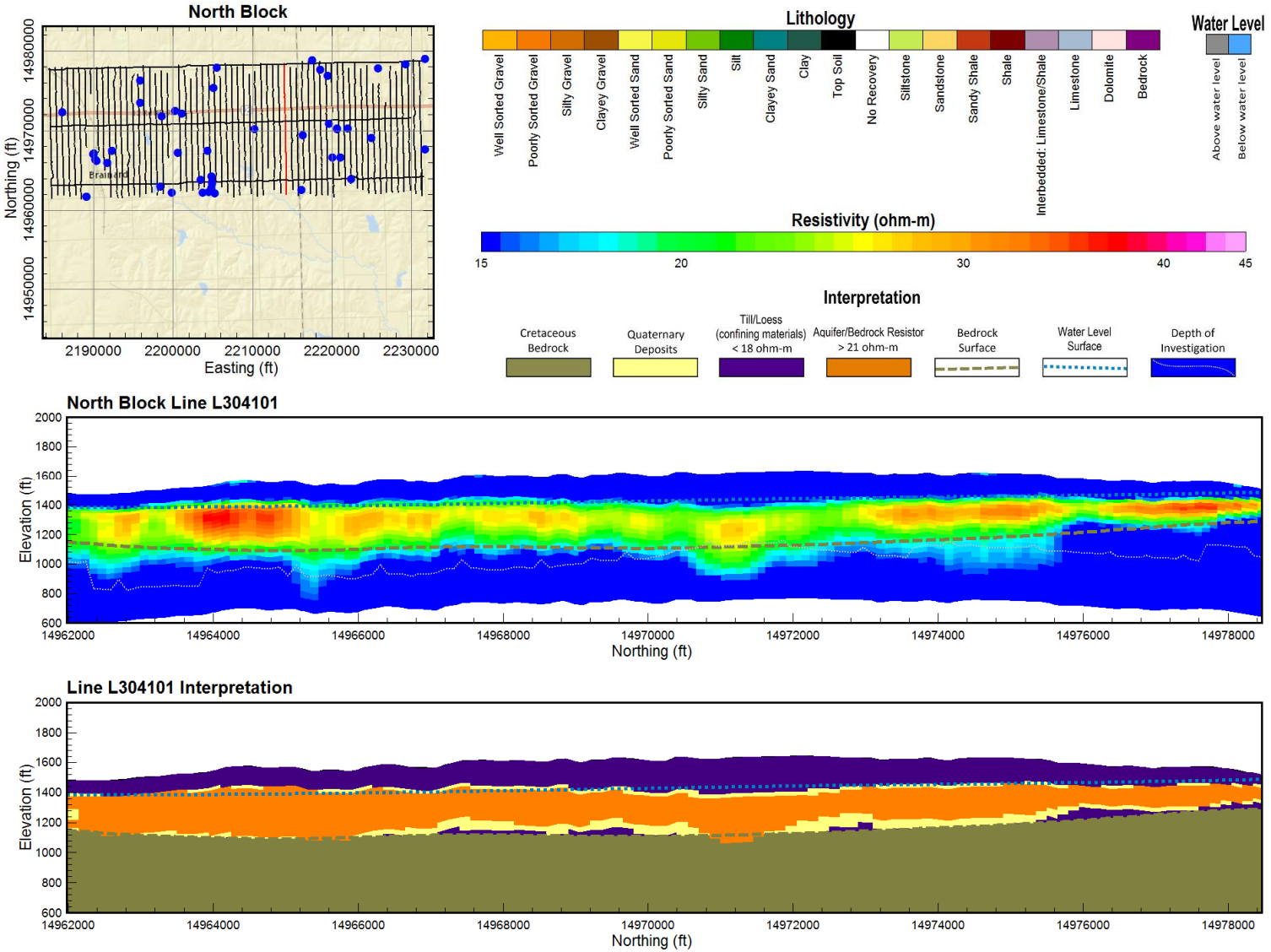

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

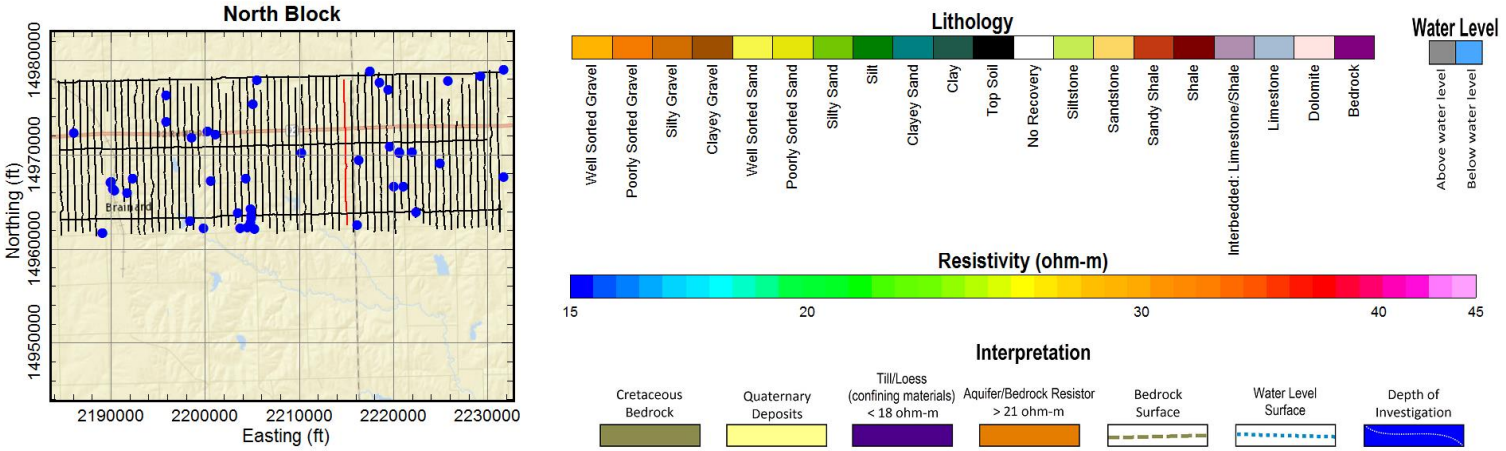

North Block Line L303802
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

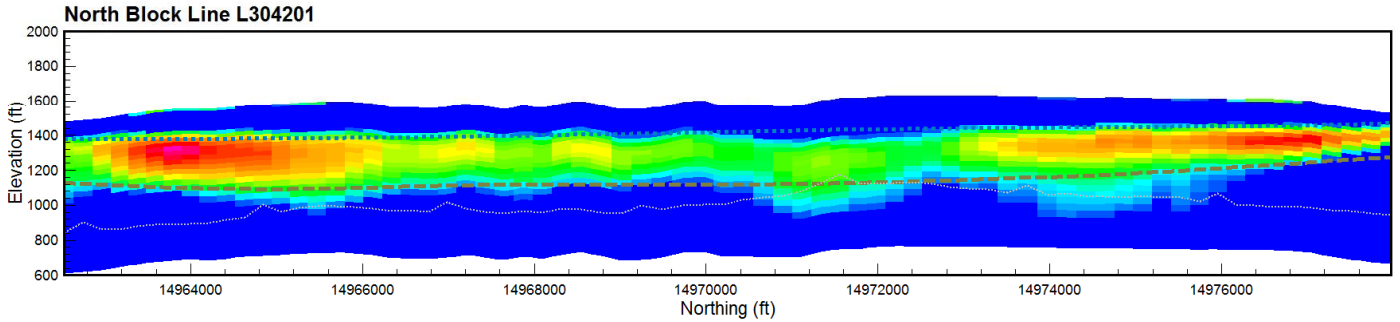

Line L303802 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

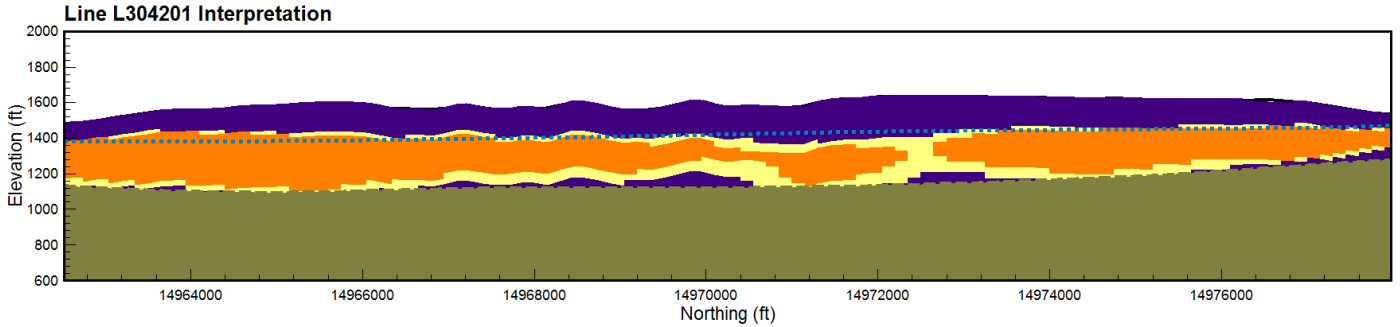

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L303901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L303901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

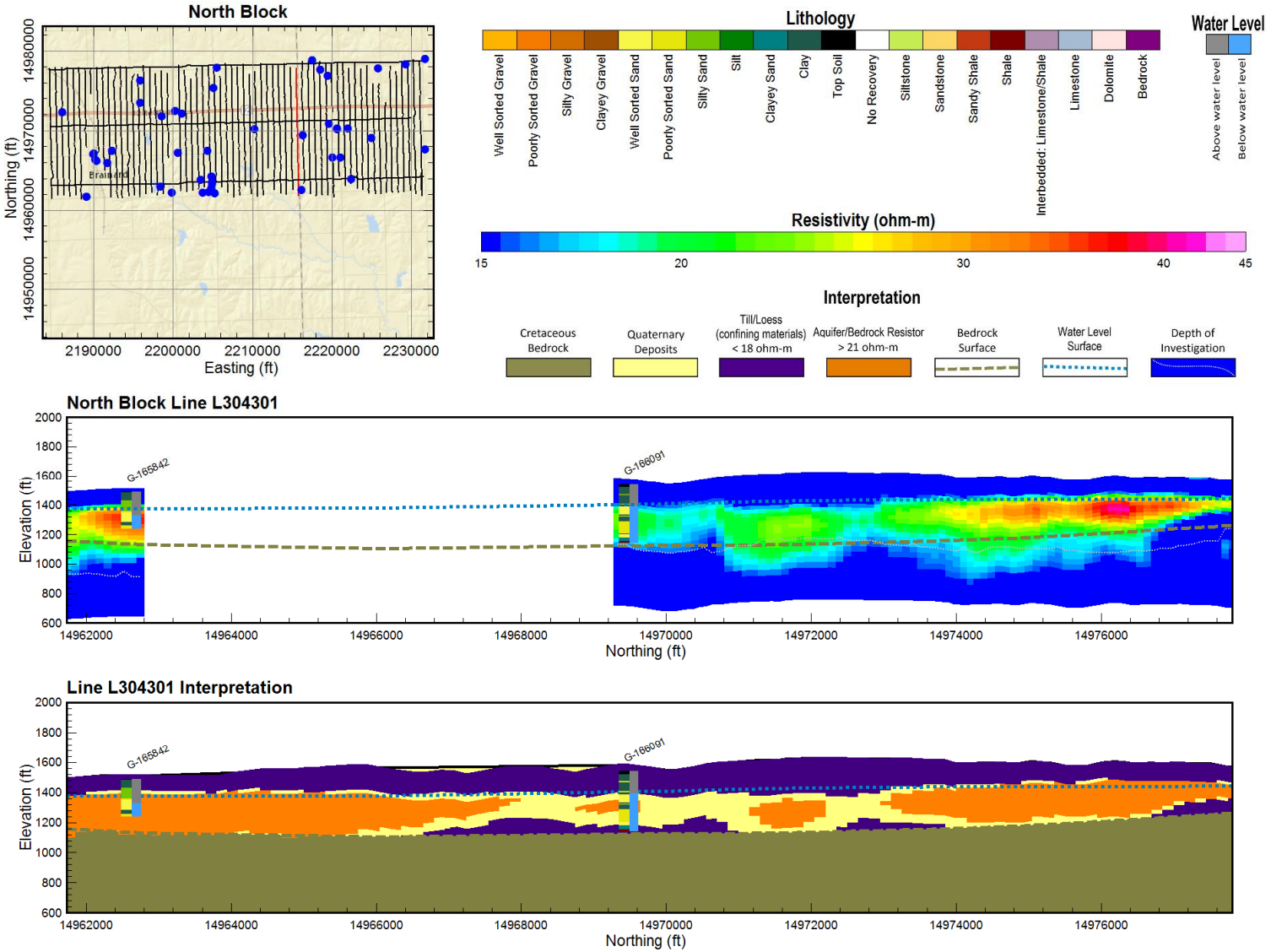

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L304001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L304001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

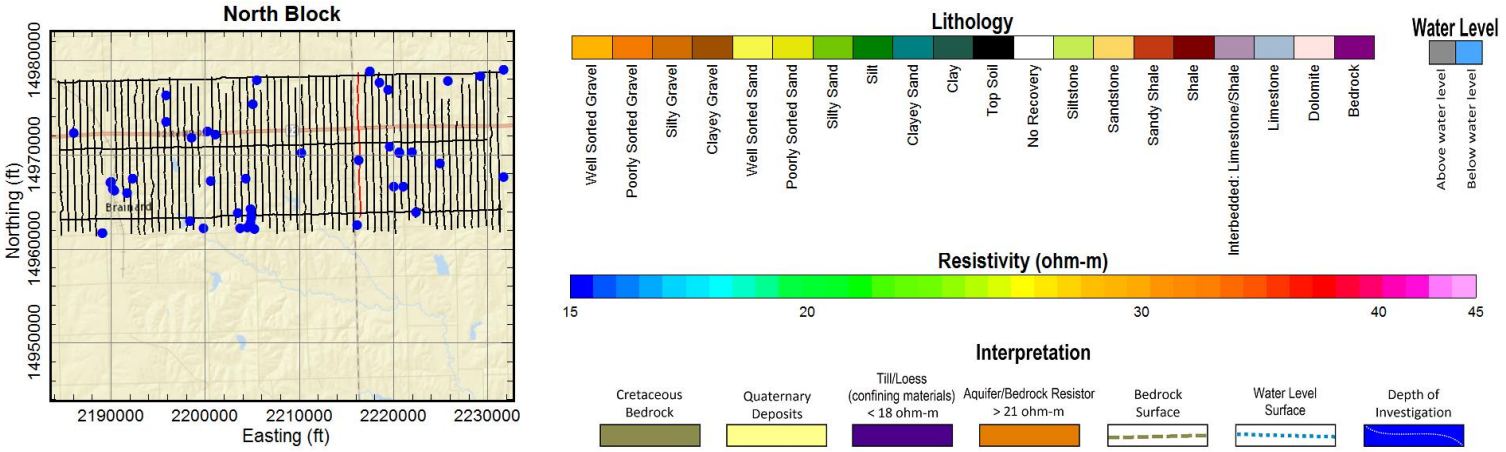

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L304101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L304101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

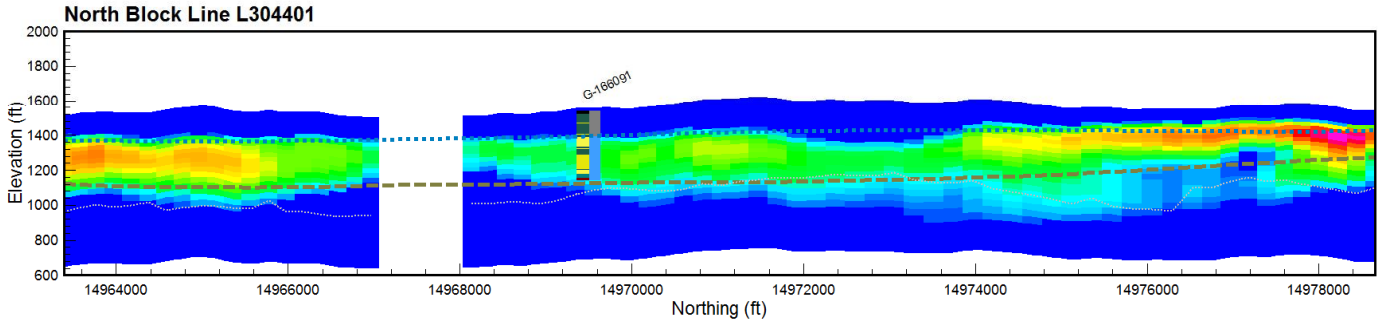

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

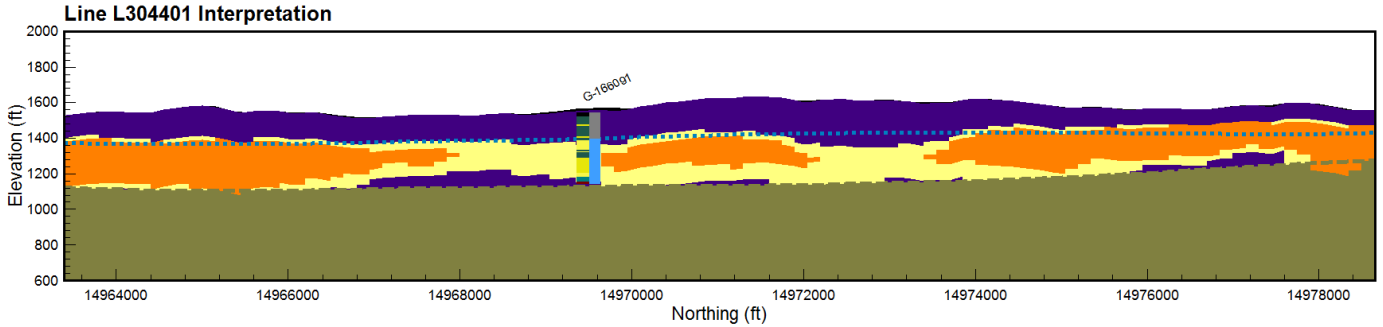

North Block Line L304201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

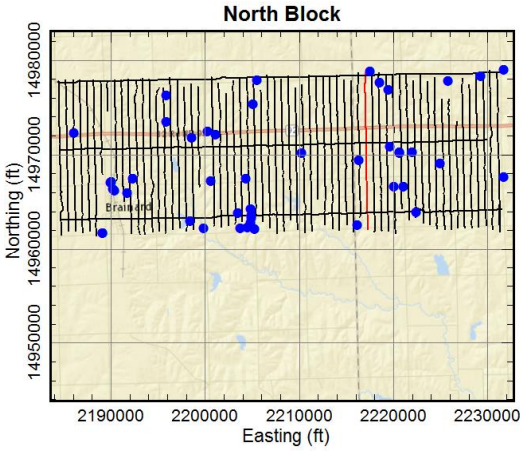

Line L304201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

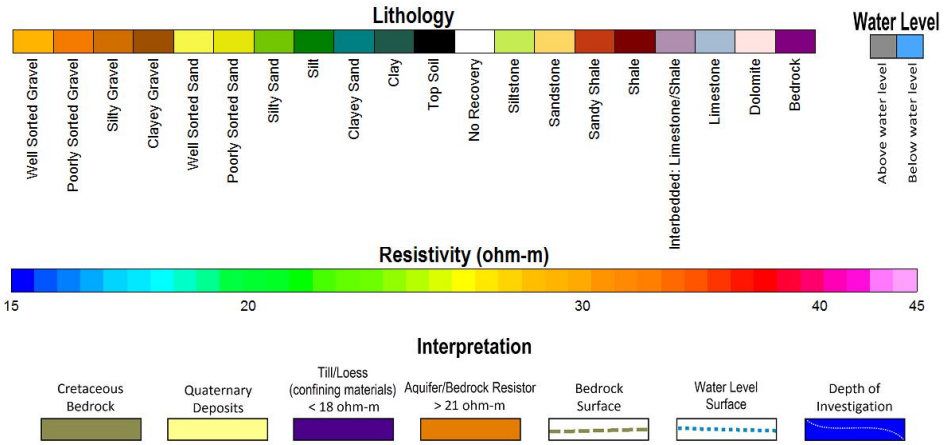

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L304301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-165842
G-166091
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L304301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-165842
G-166091
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

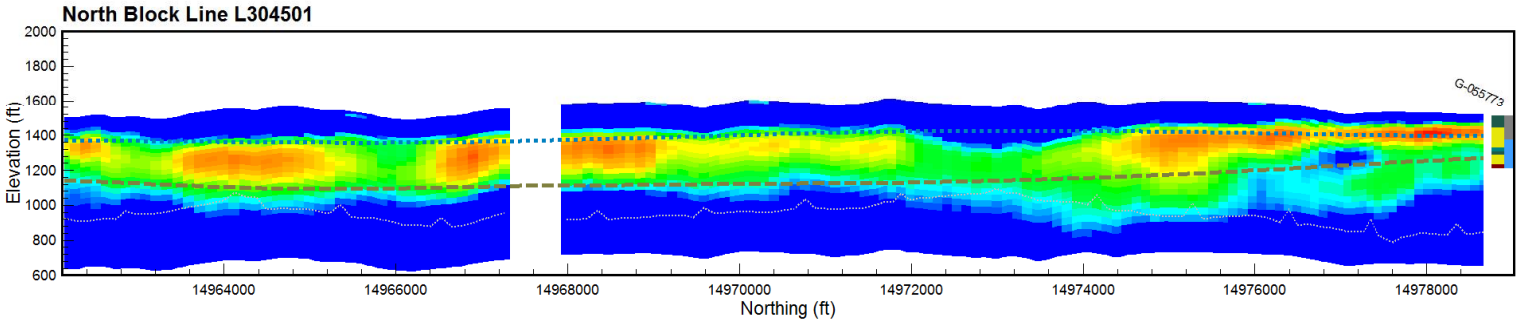

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

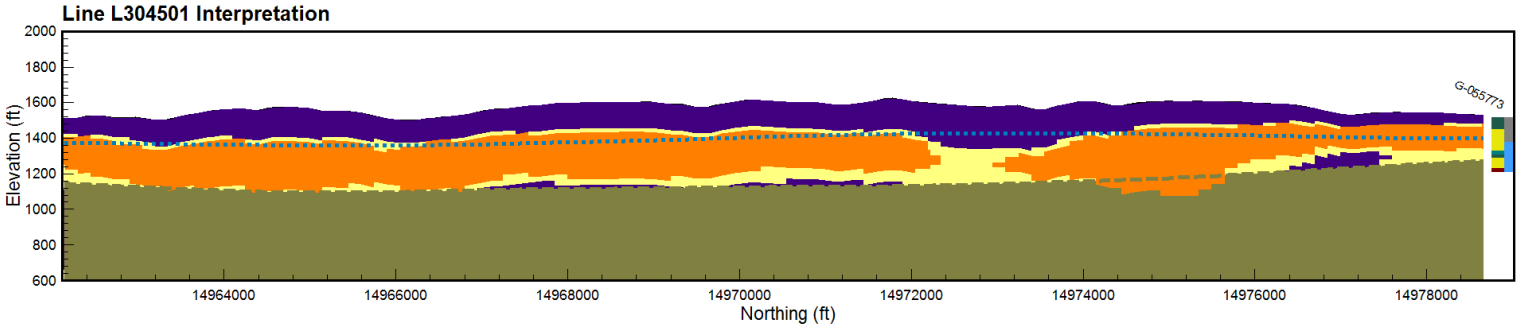

North Block Line L304401
G-166091
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

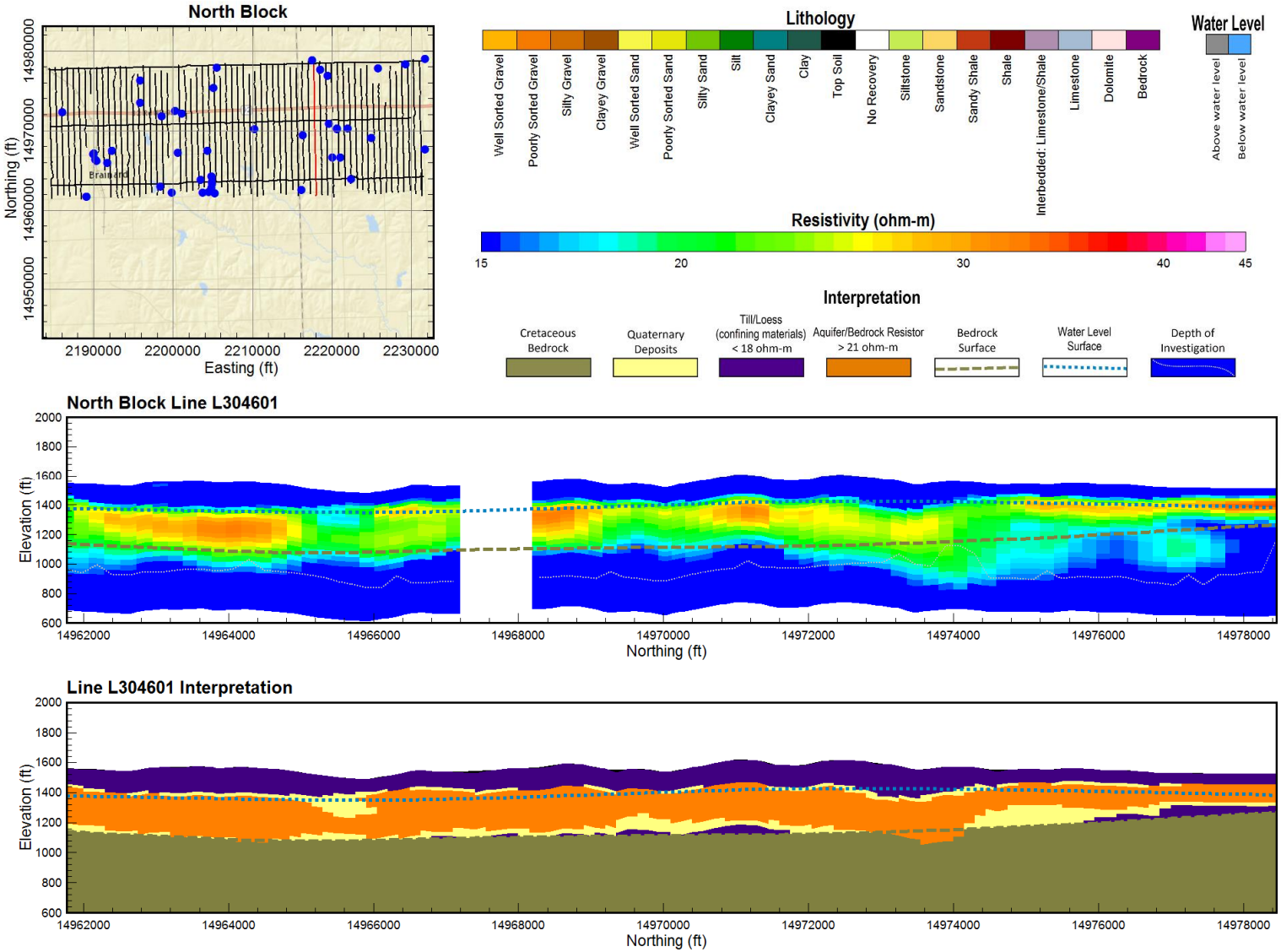

Line L304401 Interpretation
G-166091
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

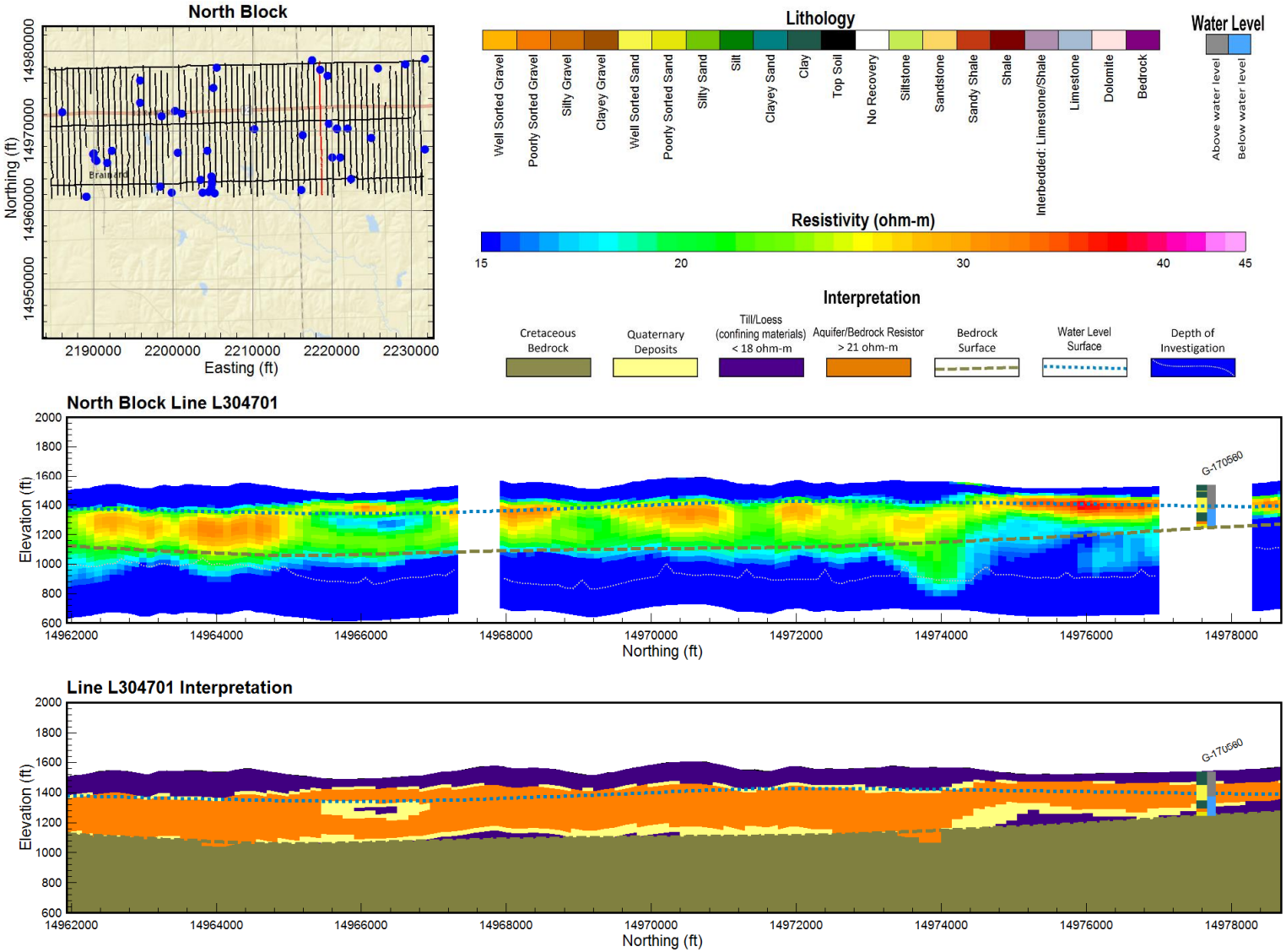

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard

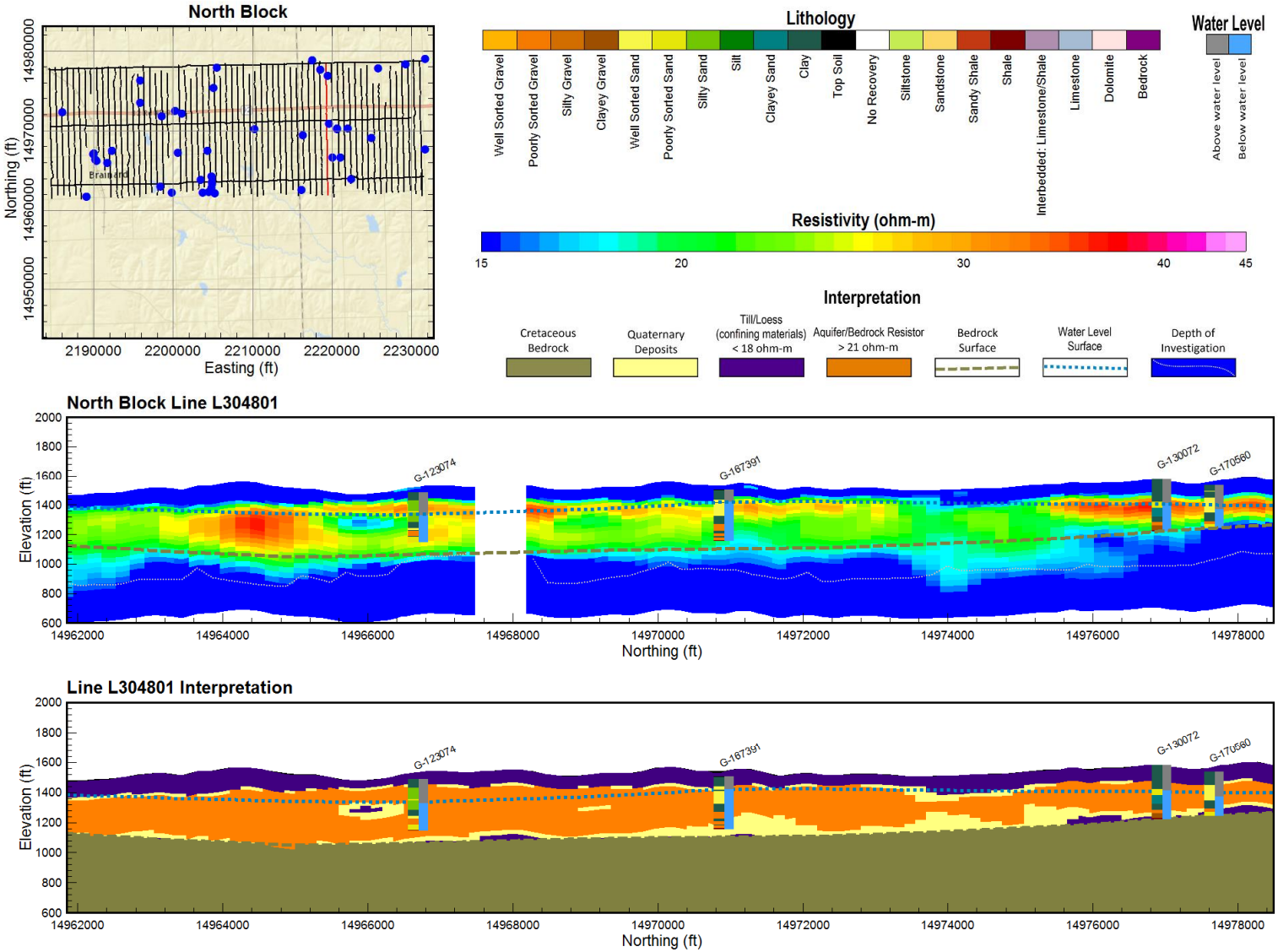

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

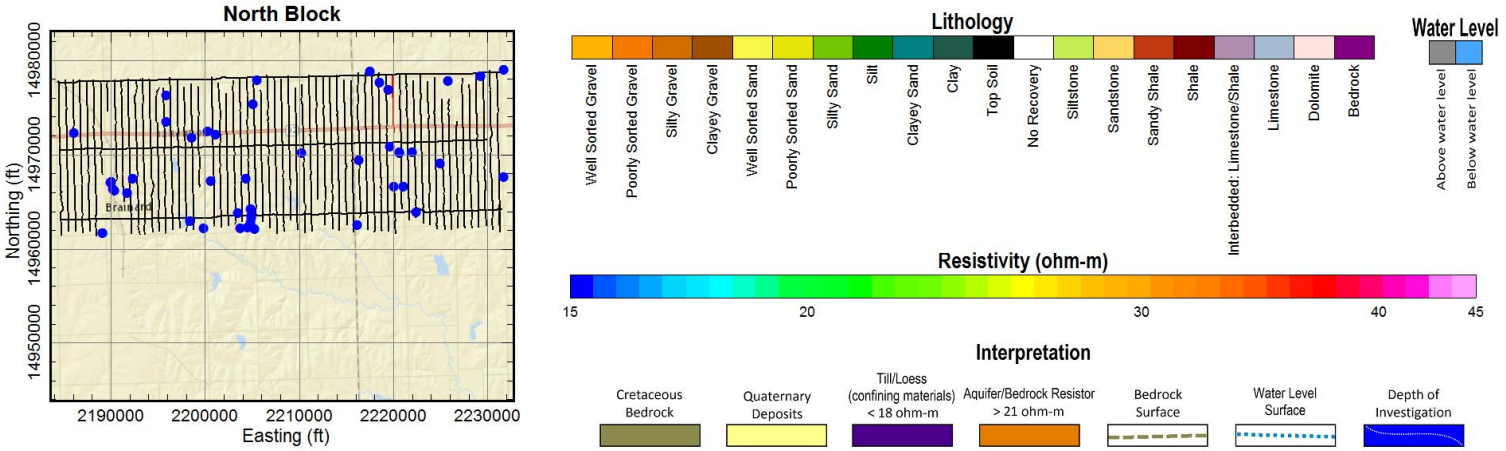

North Block Line L304501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
G-055773

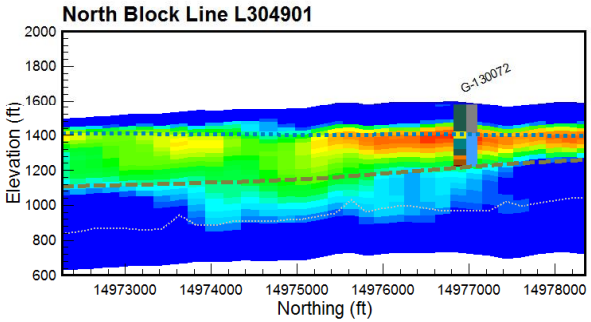

Line L304501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
G-055773

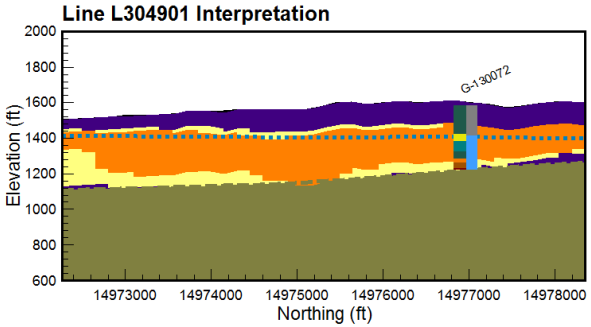

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L304601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L304601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

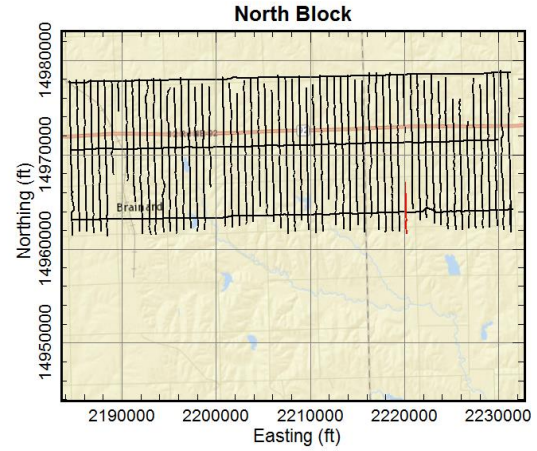

North Block
Northing (ft)
14980000
14970000
14960000
14950000
Brainard
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L304701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-170560
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L304701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-170560
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

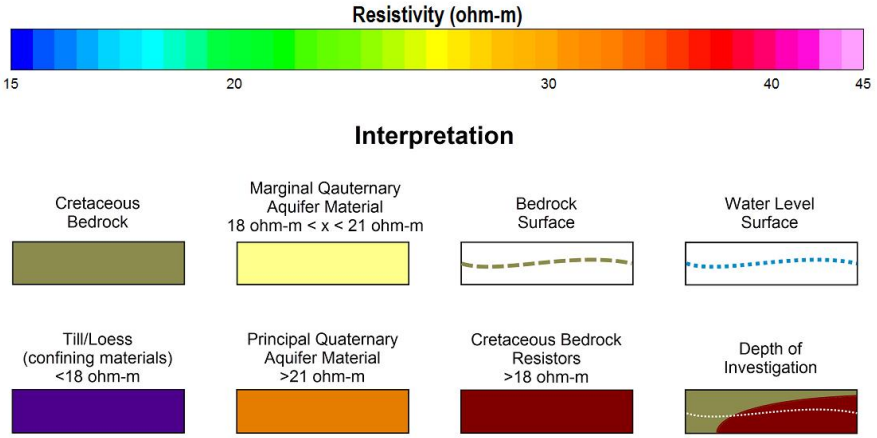

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L304801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-123074
G-167391
G-130072
G-170560
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L304801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-123074
G-167391
G-130072
G-170560
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

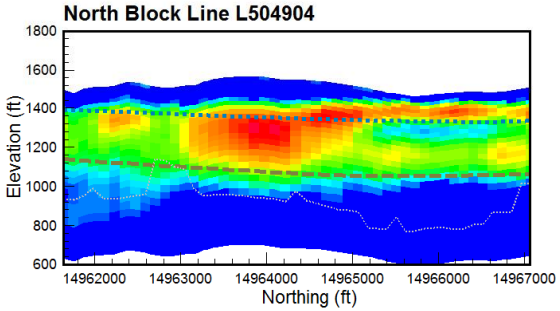

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

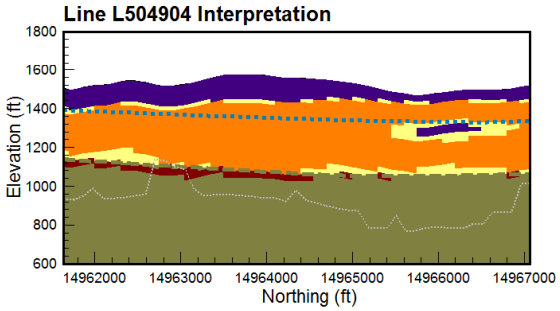

North Block Line L304901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-130072
14973000
14974000
14975000
14976000
14977000
14978000
Northing (ft)

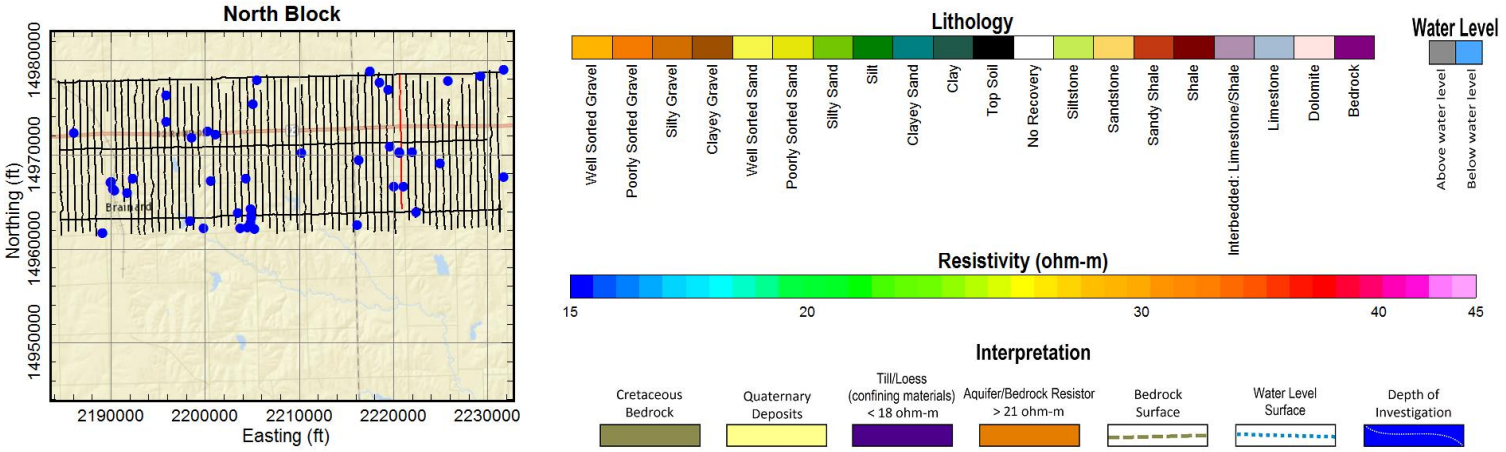

Line L304901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-130072
14973000
14974000
14975000
14976000
14977000
14978000
Northing (ft)

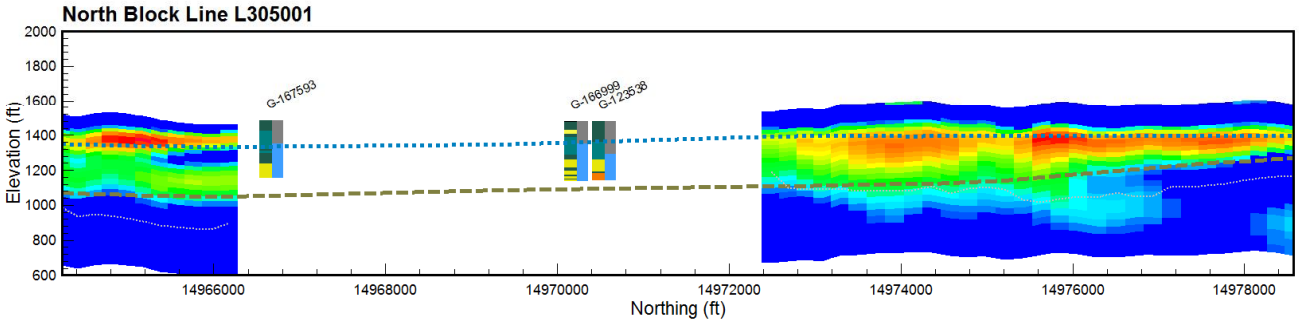

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

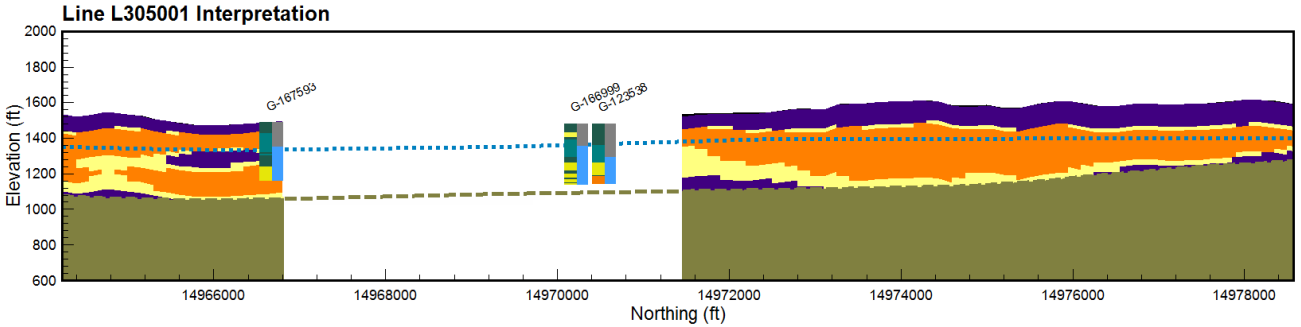

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

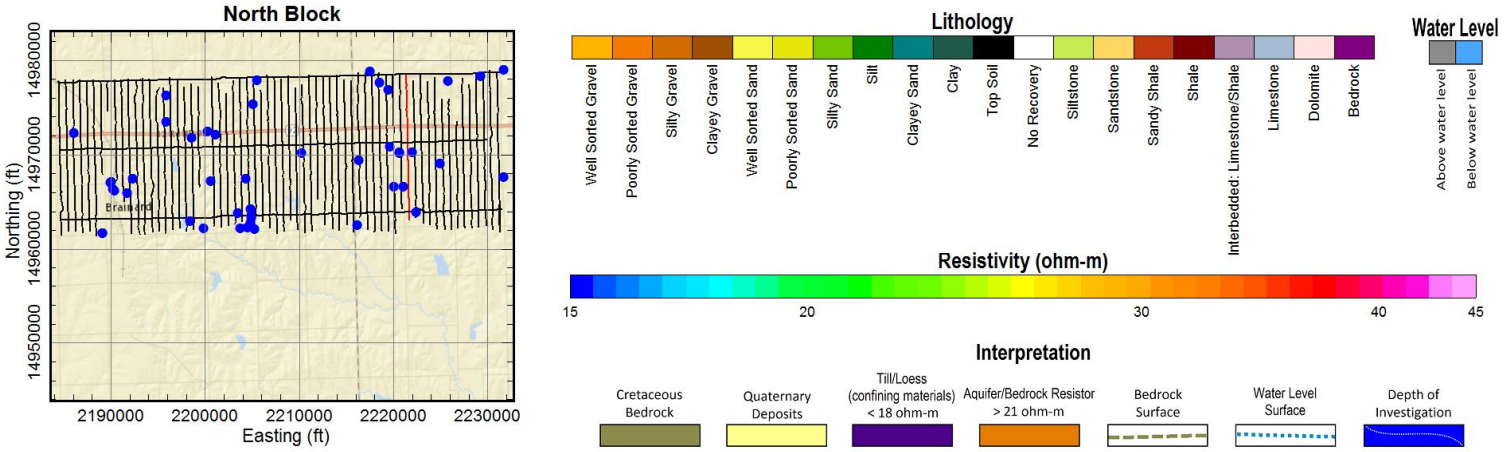

North Block Line L504904
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14963000
14964000
14965000
14966000
14967000
Northing (ft)

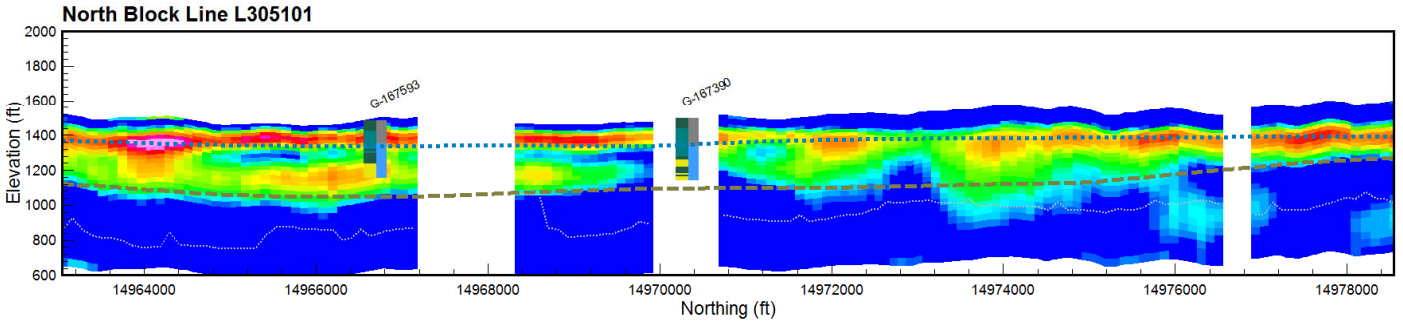

Line L504904 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14963000
14964000
14965000
14966000
14967000
Northing (ft)

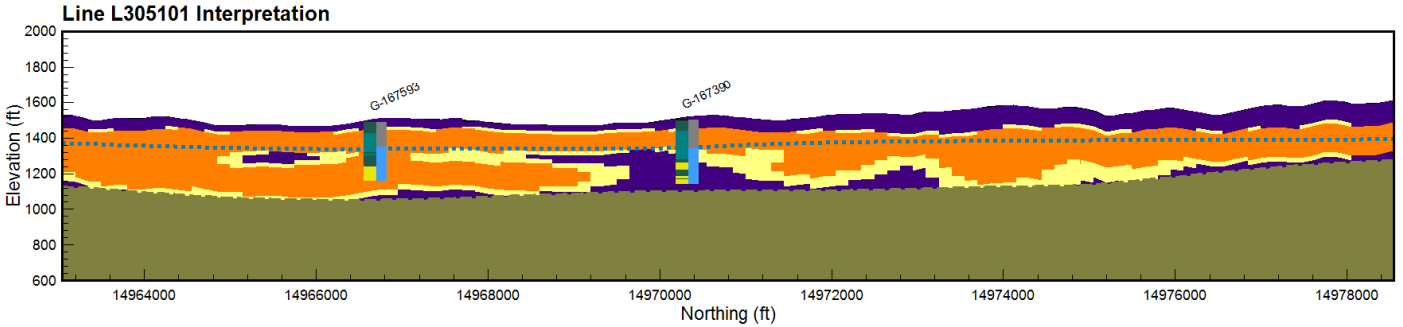

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

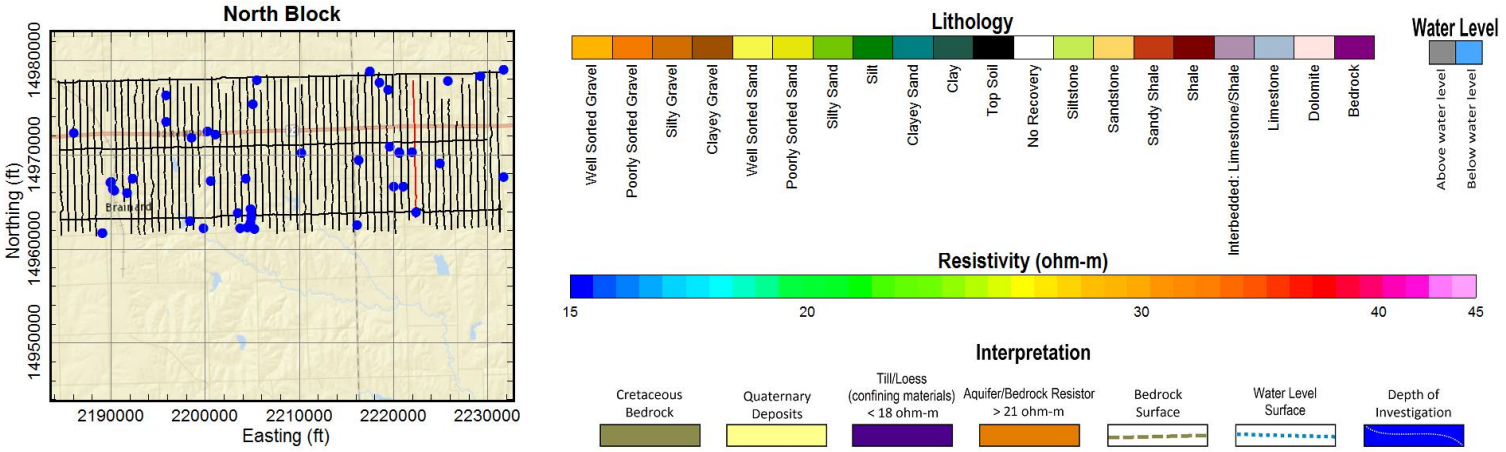

North Block Line L305001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167593
G-166999
G-123538
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

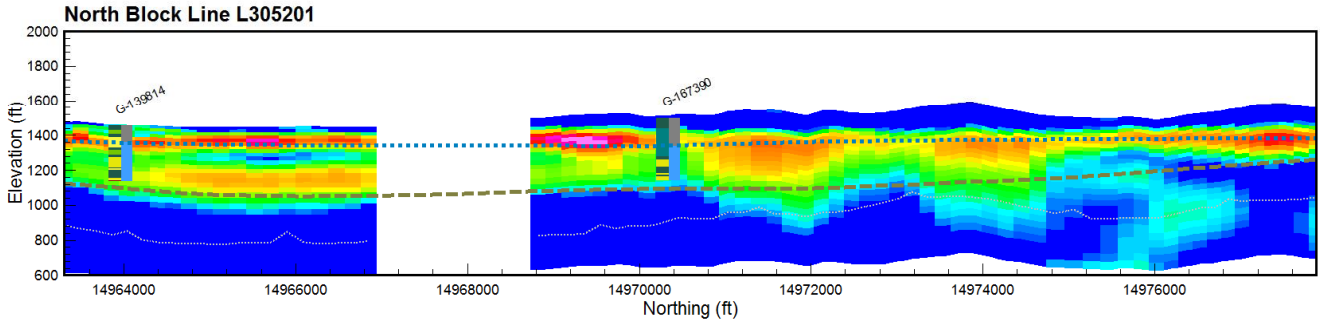

Line L305001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167593
G-166999
G-123538
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

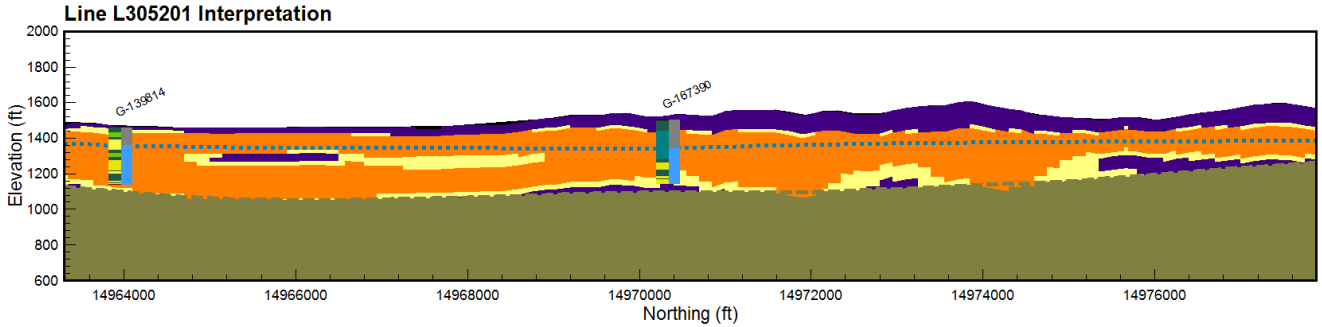

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

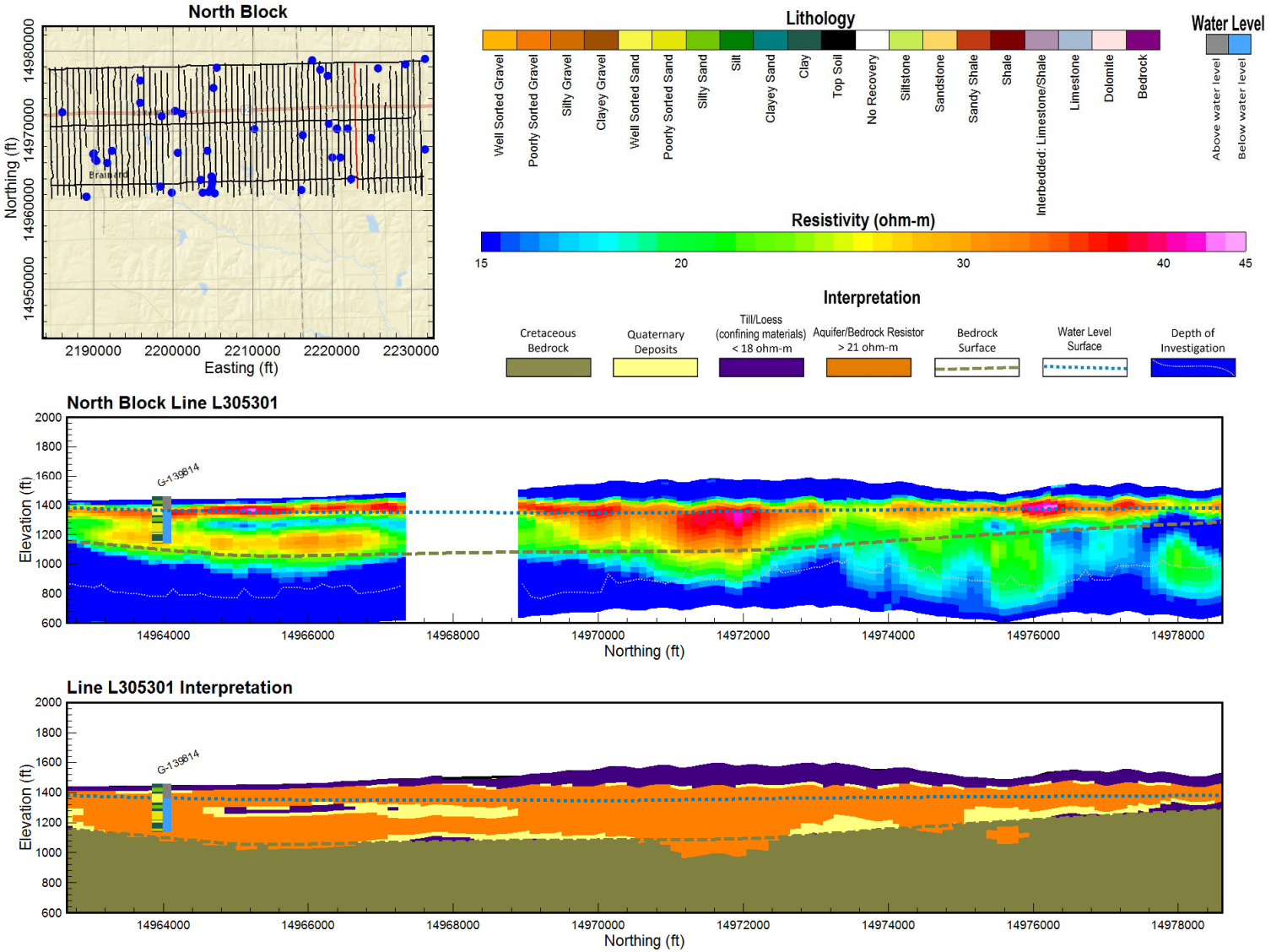

North Block Line L305101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167593
G-167390
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

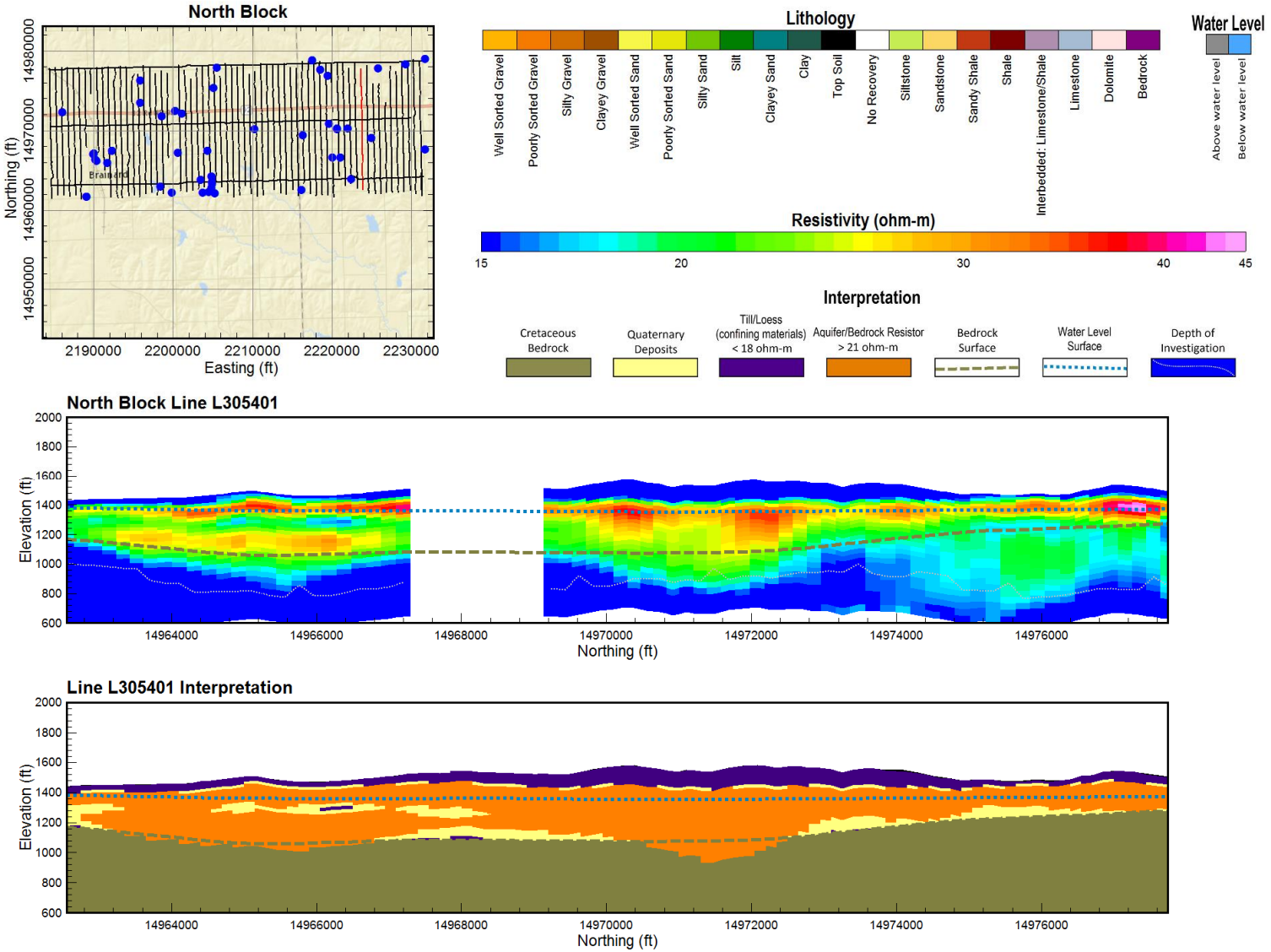

Line L305101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167593
G-167390
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

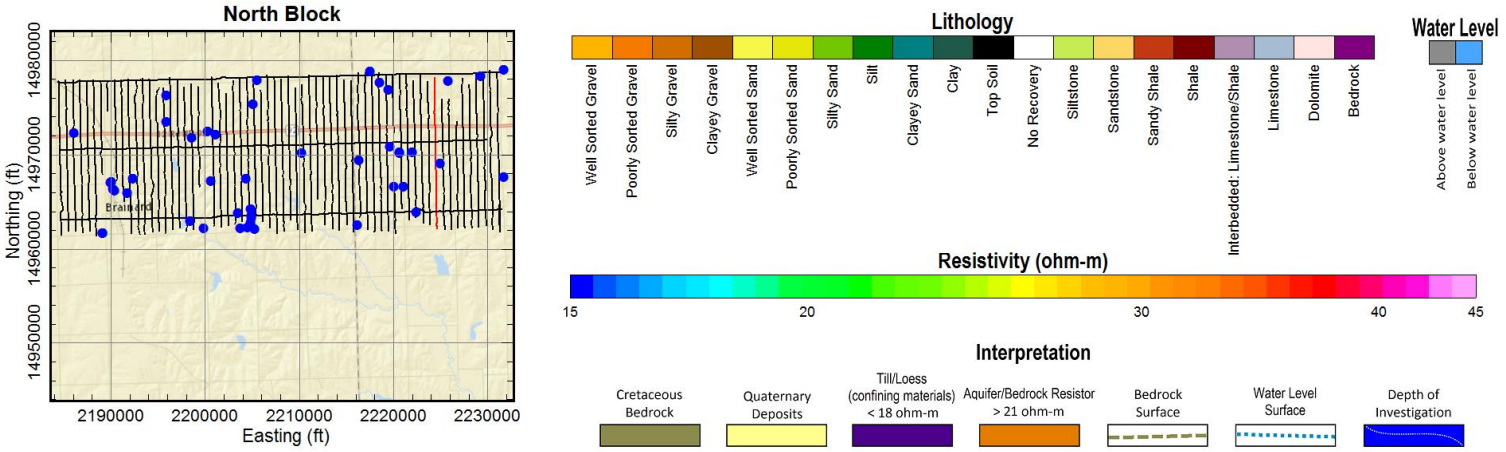

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

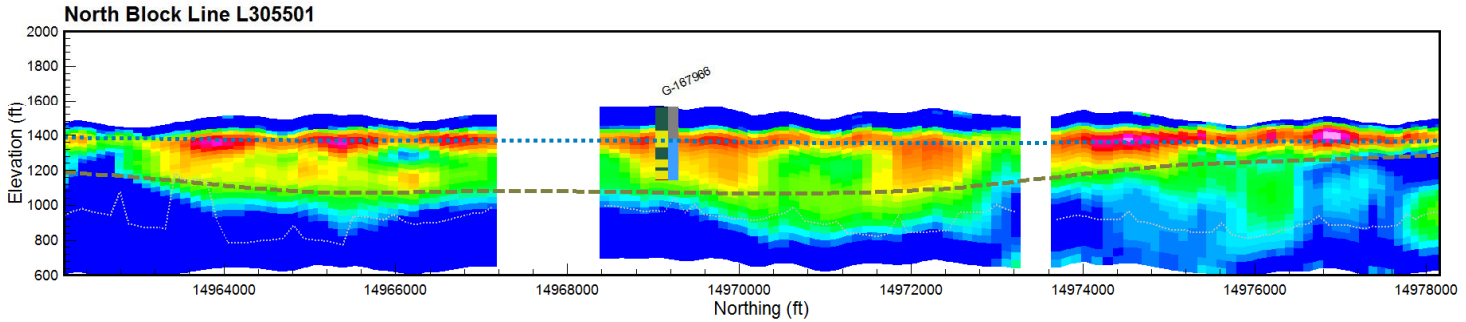

North Block Line L305201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-139814
G-167390
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

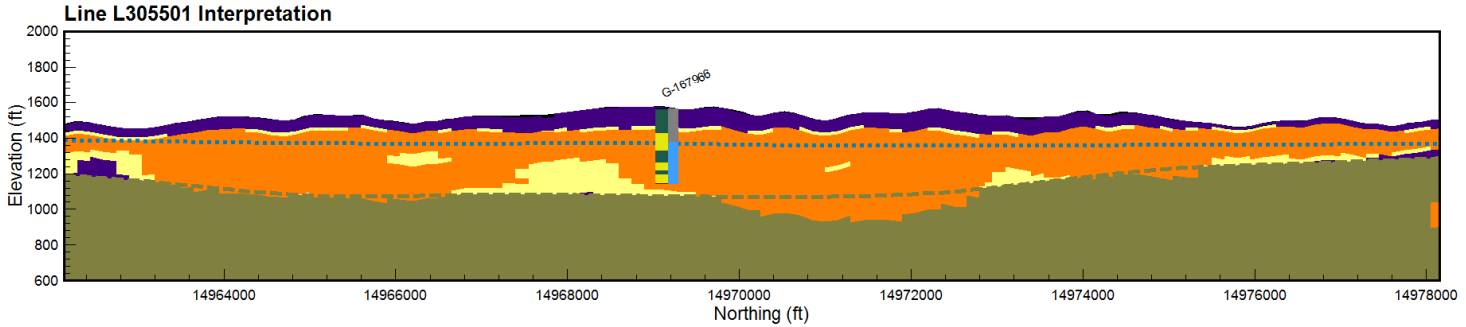

Line L305201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-139814
G-167390
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

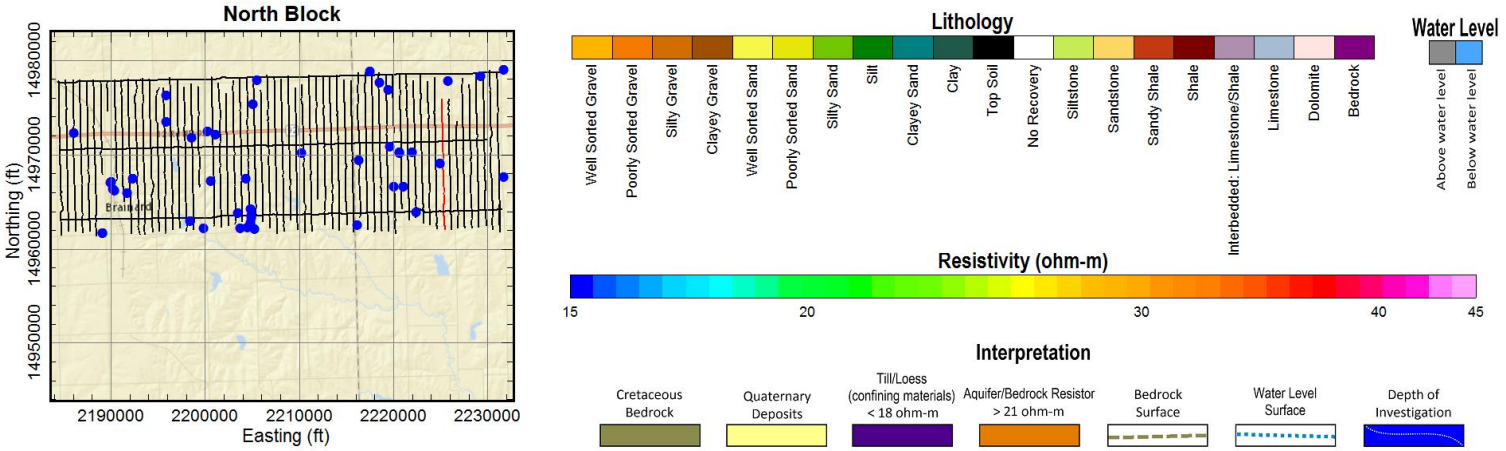

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L305301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-139814
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L305301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-139814
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

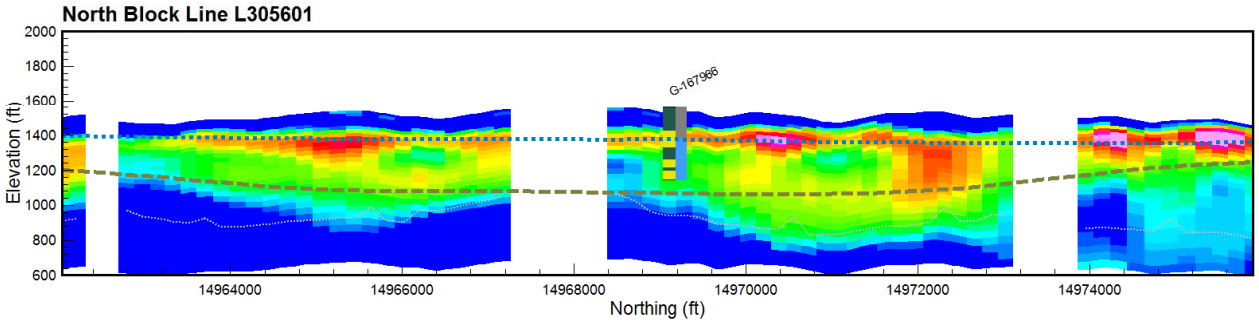

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L305401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L305401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

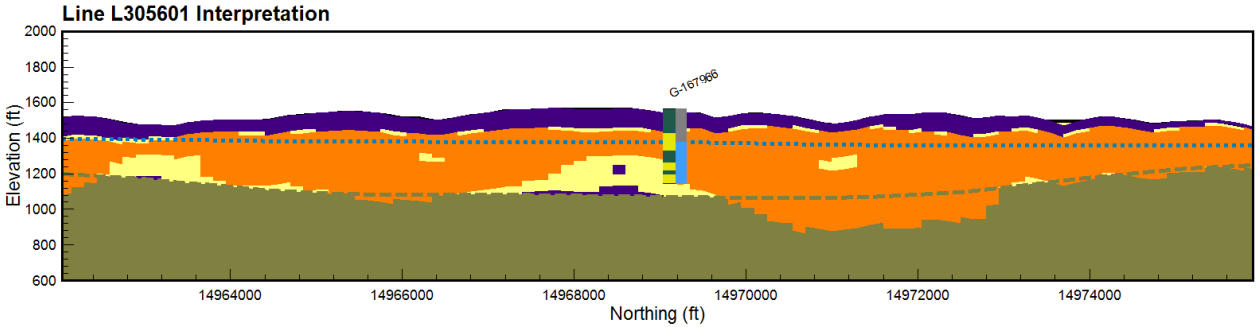

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

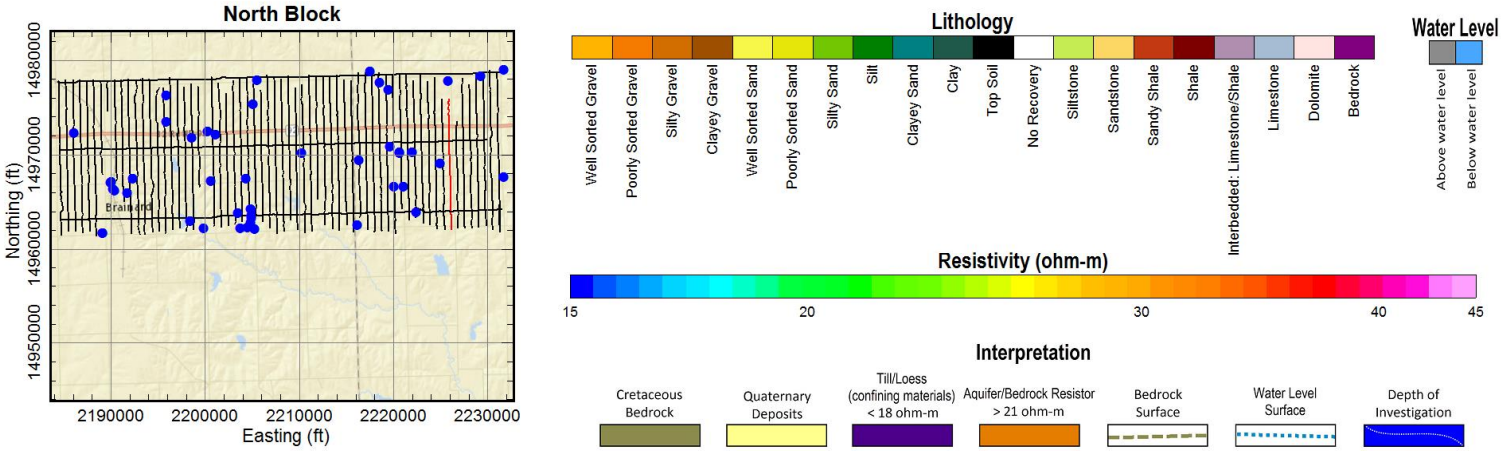

North Block Line L305501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167966
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

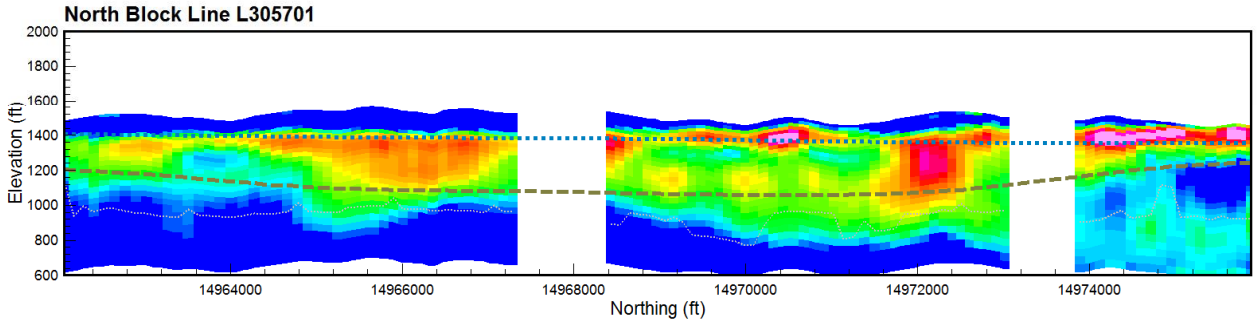

Line L305501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167966
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

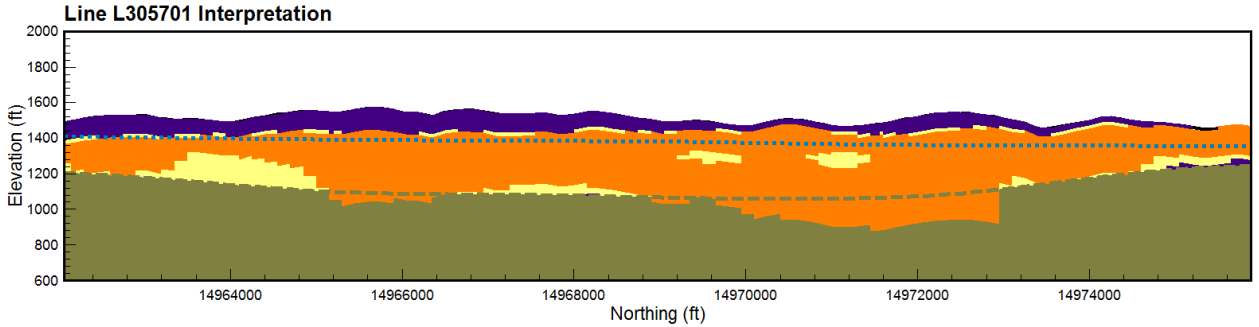

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

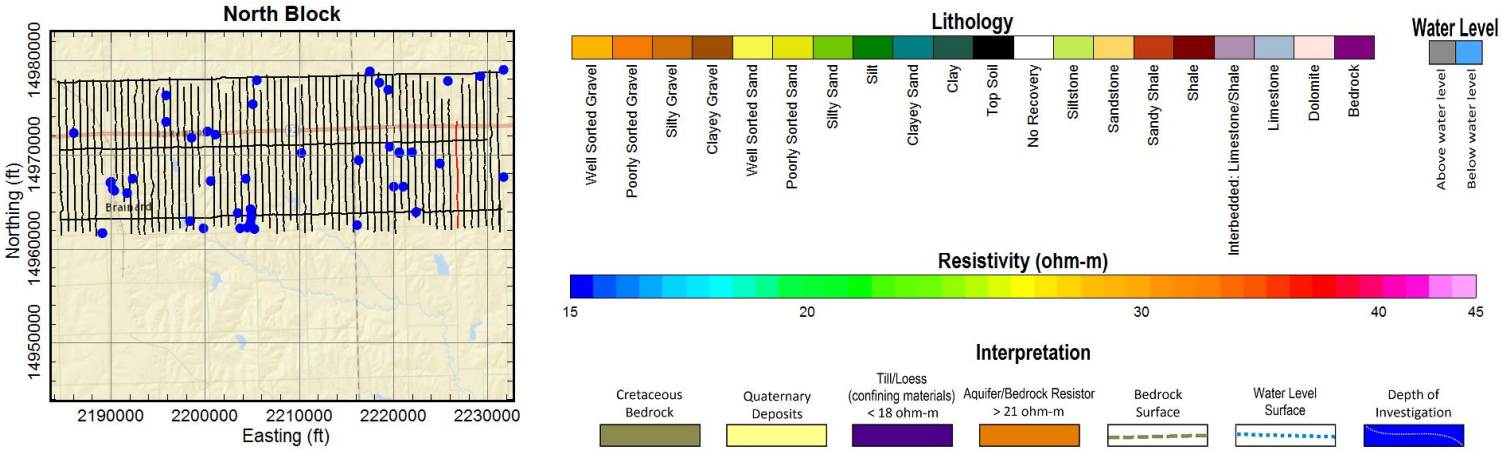

North Block Line L305601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167966
14964000
14966000
14968000
14970000
14972000
14974000
Northing (ft)

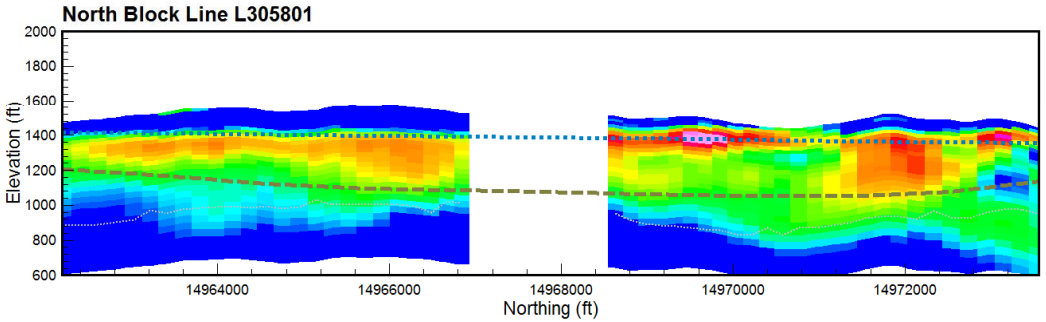

Line L305601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167966
14964000
14966000
14968000
14970000
14972000
14974000
Northing (ft)

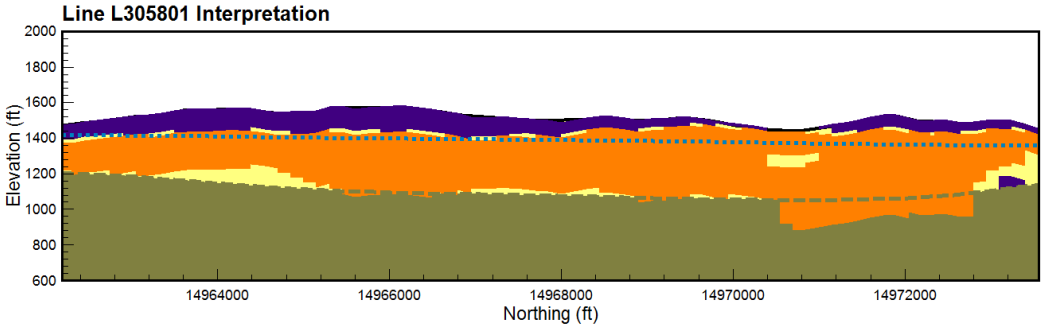

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

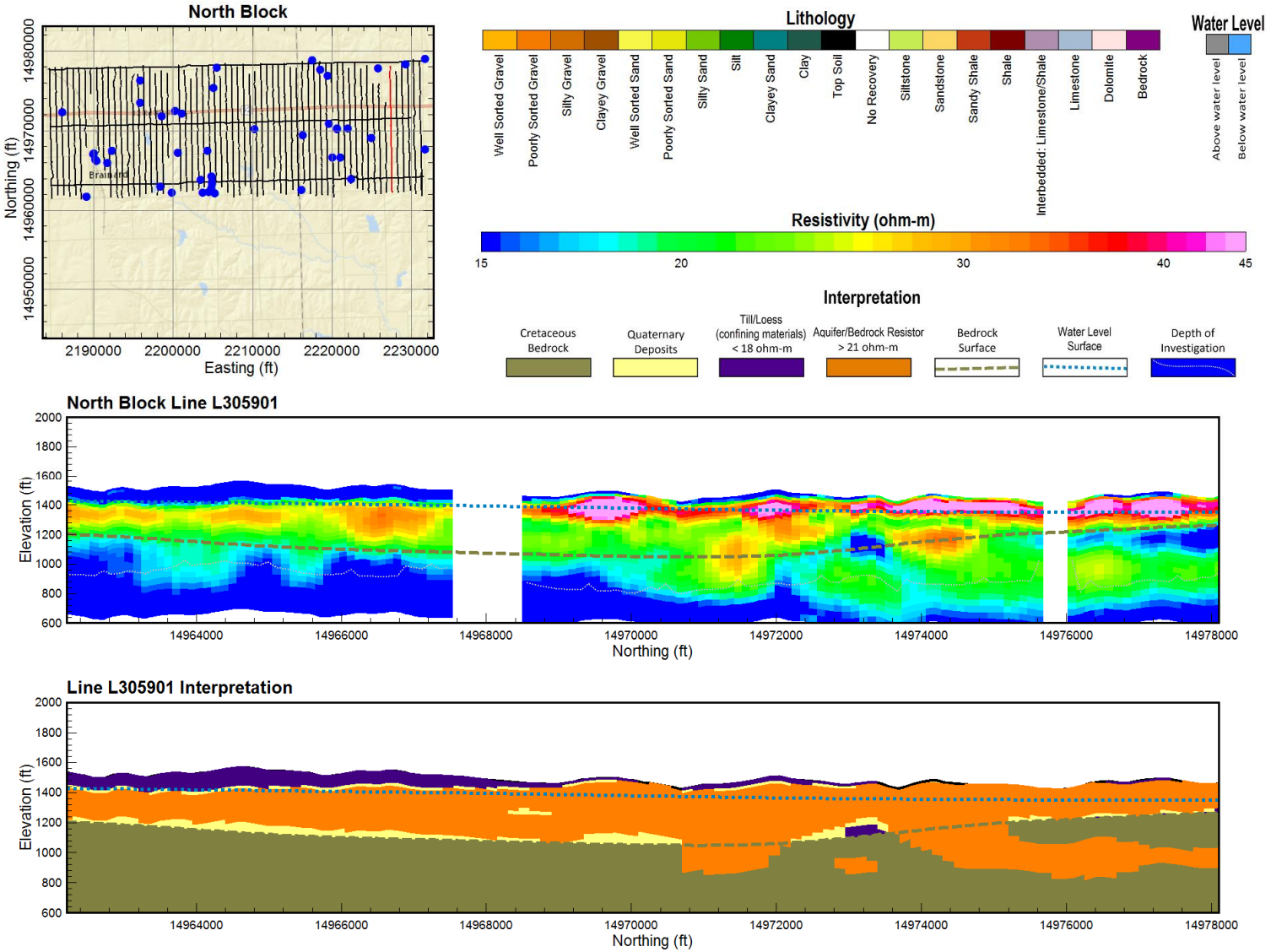

North Block Line L305701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
Northing (ft)

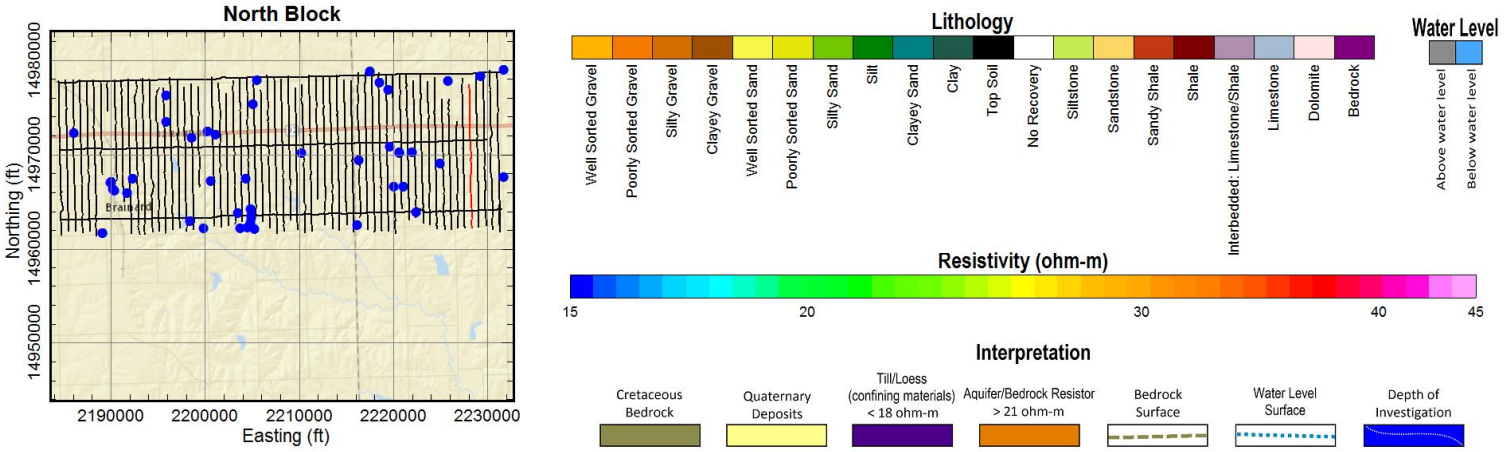

Line L305701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
Northing (ft)

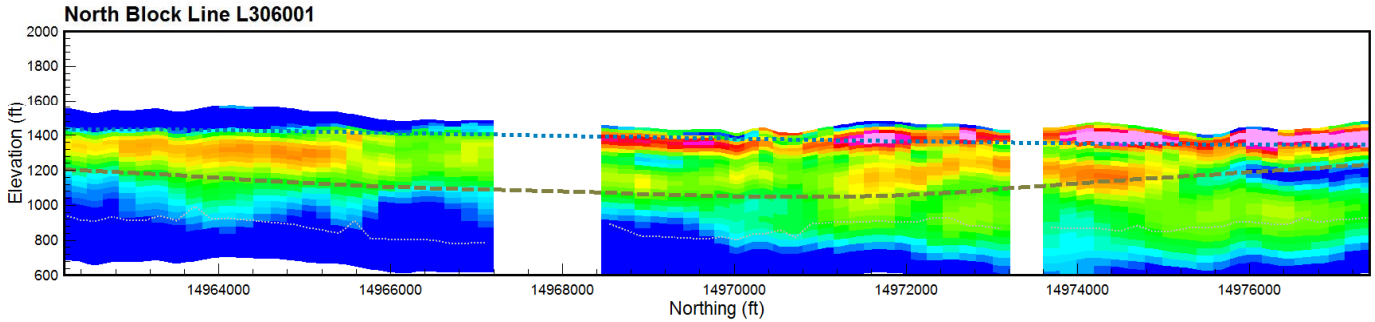

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

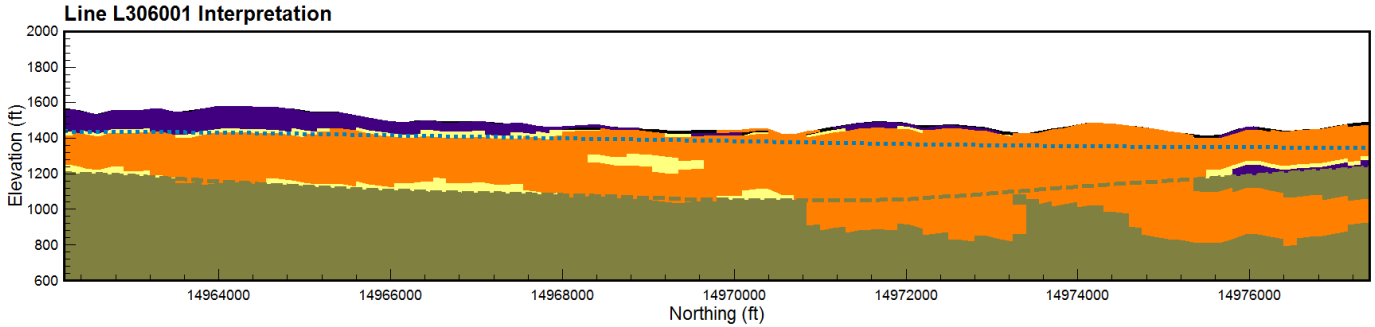

North Block Line L305801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
Northing (ft)

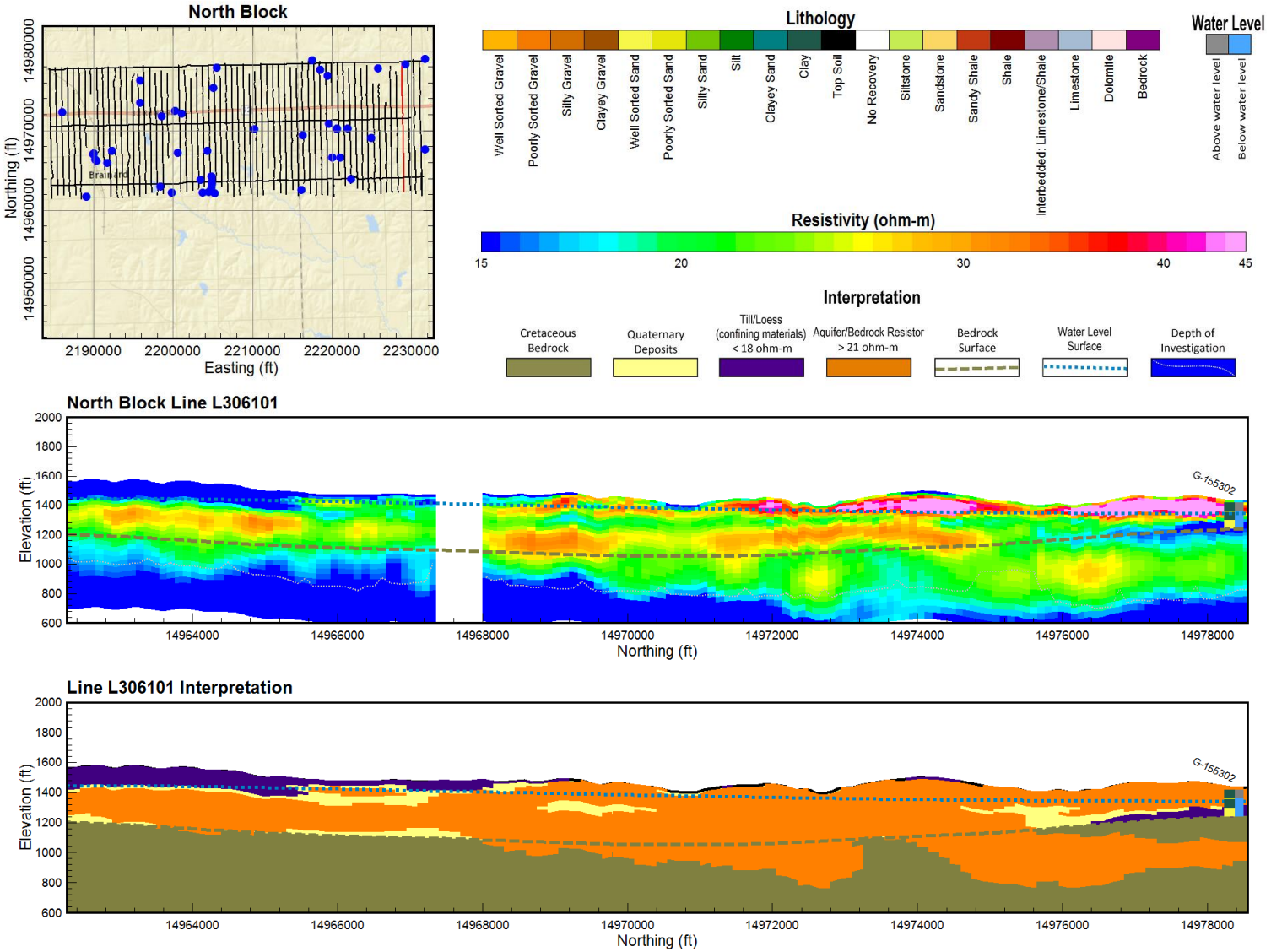

Line L305801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
Northing (ft)

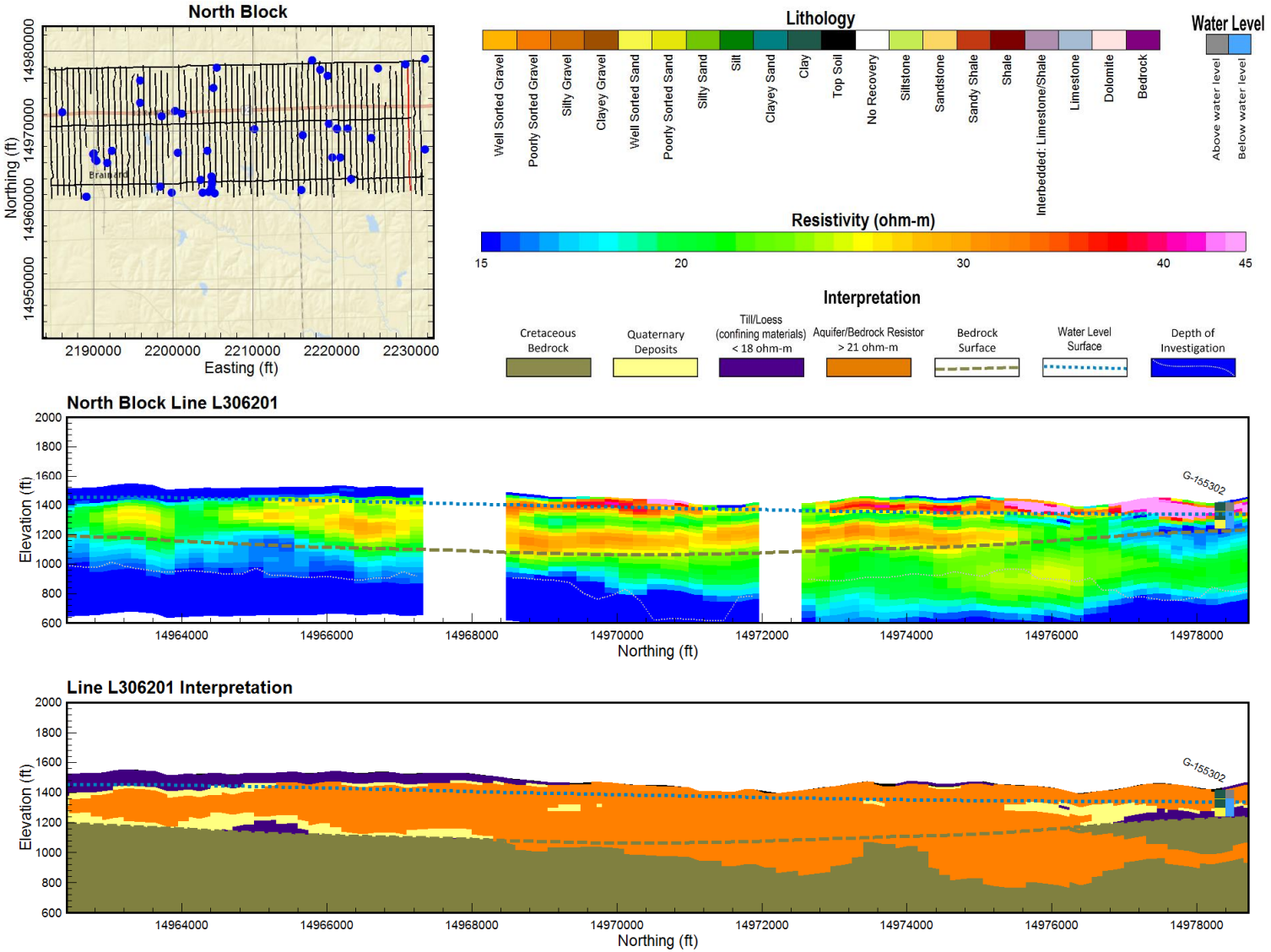

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L305901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L305901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

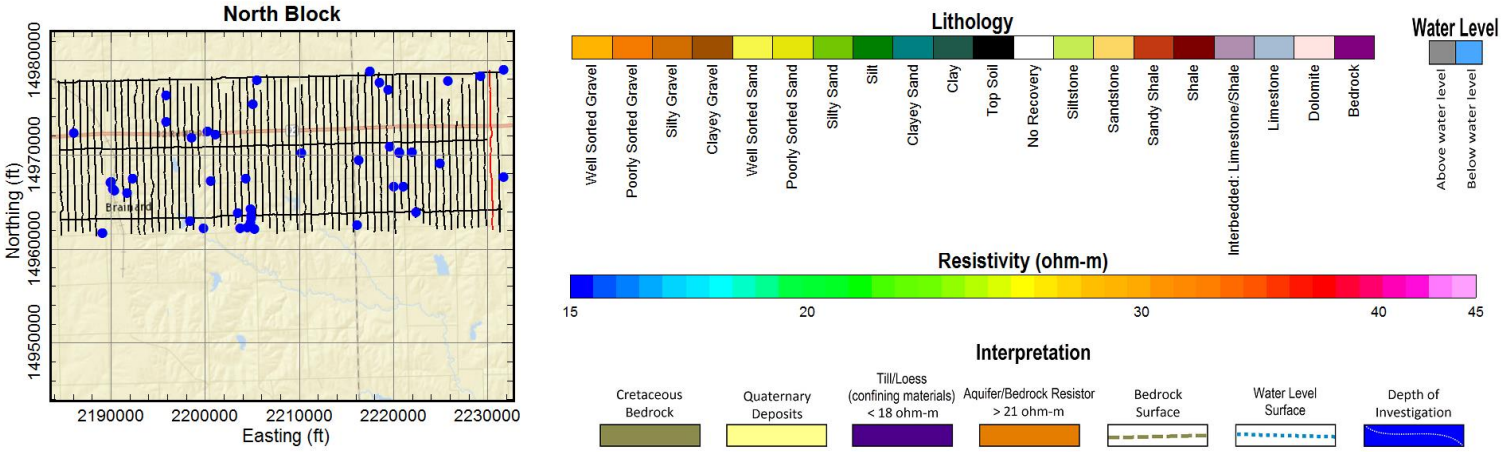

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

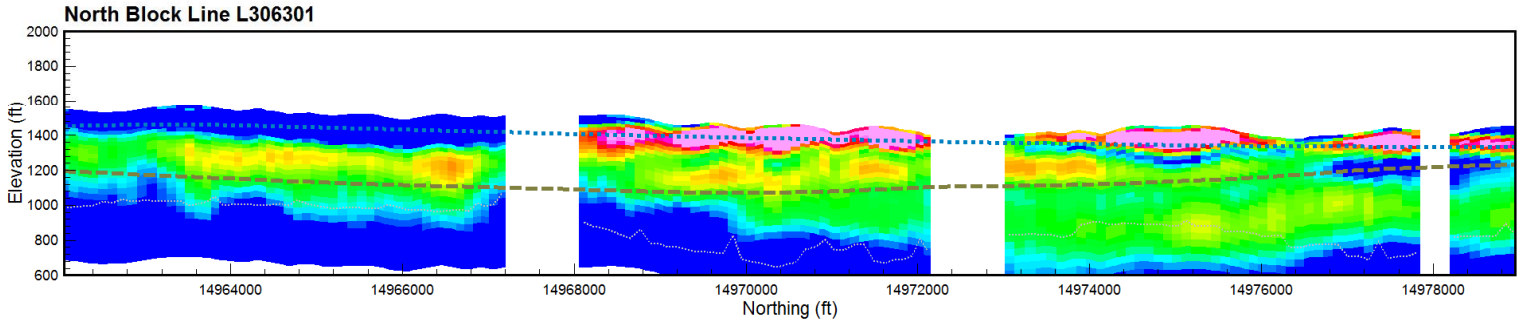

North Block Line L306001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

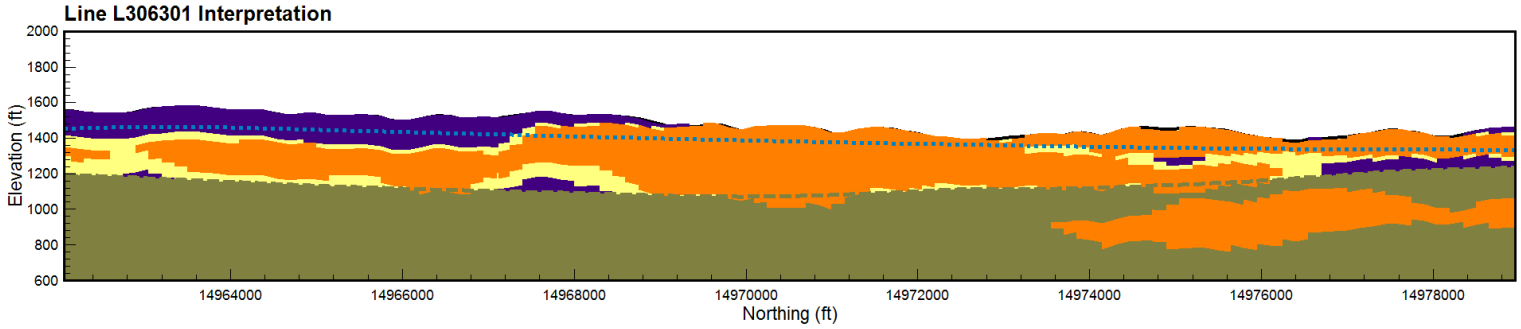

Line L306001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

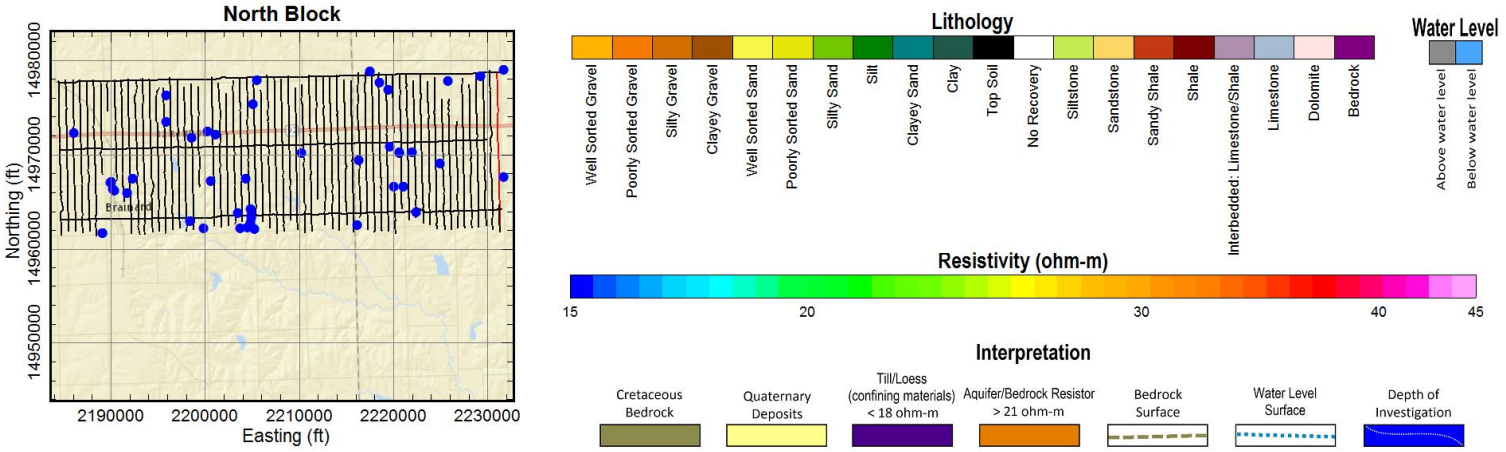

North Block
Northing (ft)
14980000
14970000
14960000
14950000
Brainard
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L306101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-155302
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L306101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-155302
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

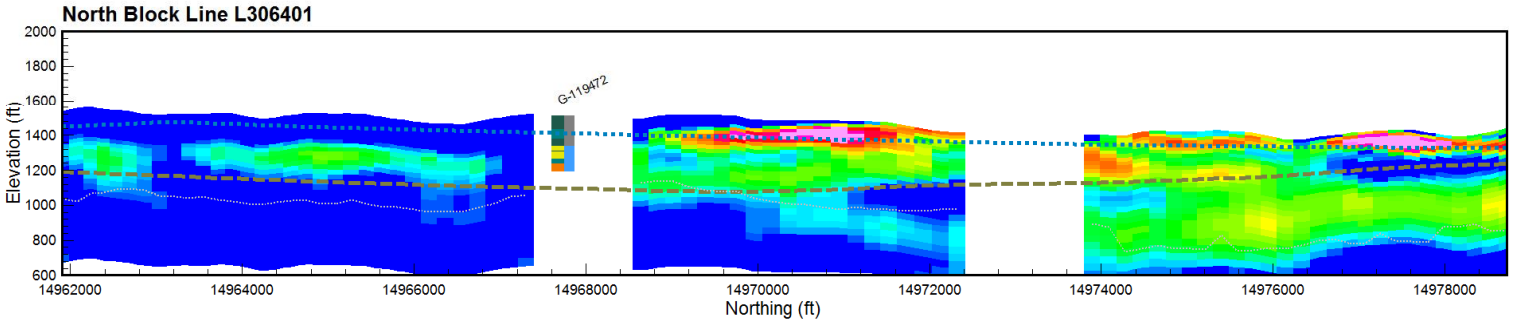

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
North Block Line L306201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
G-155302
Line L306201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
G-155302

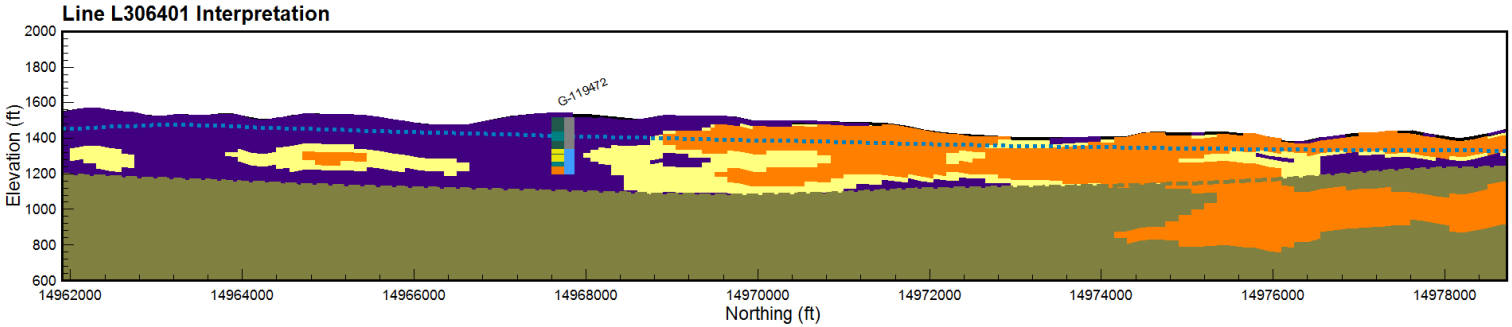

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

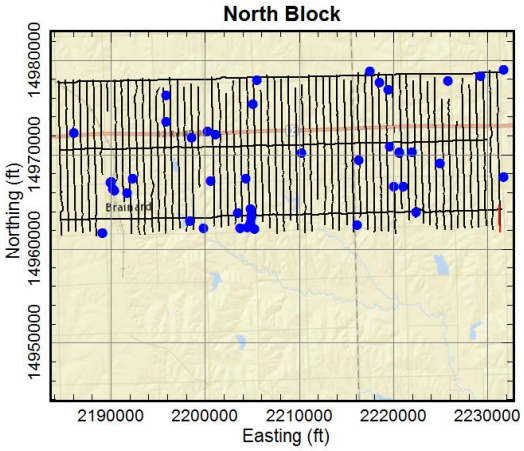

North Block Line L306301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

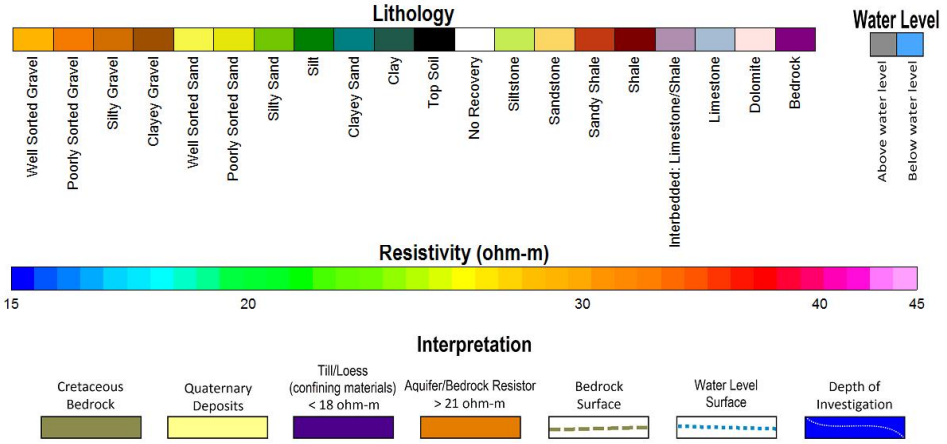

Line L306301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

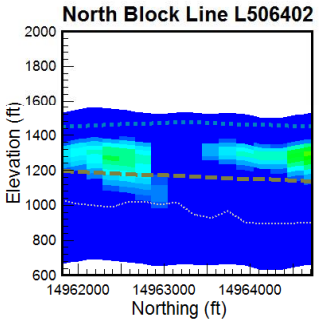

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

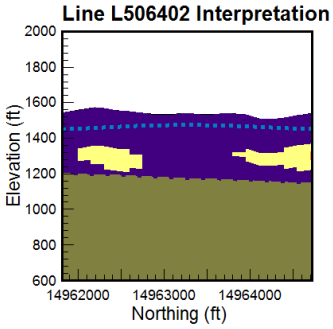

North Block Line L306401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-119472
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)


Line L306401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-119472
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

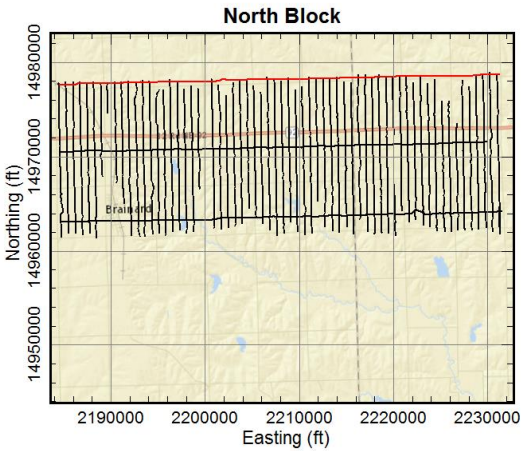

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Brainard

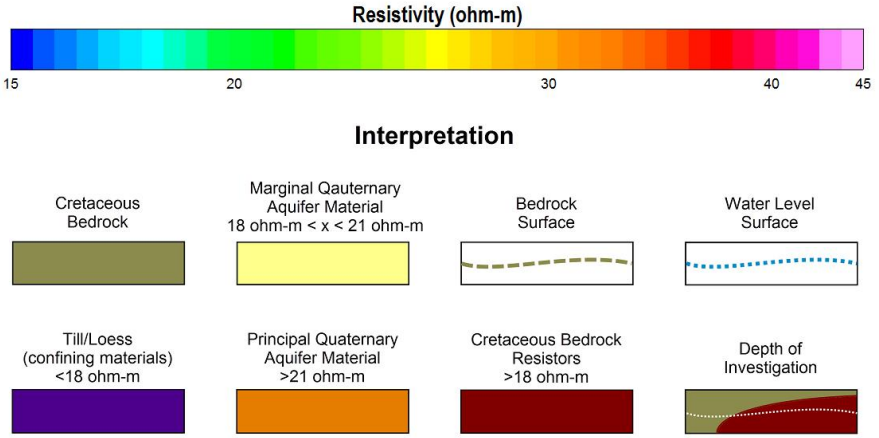

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 21 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

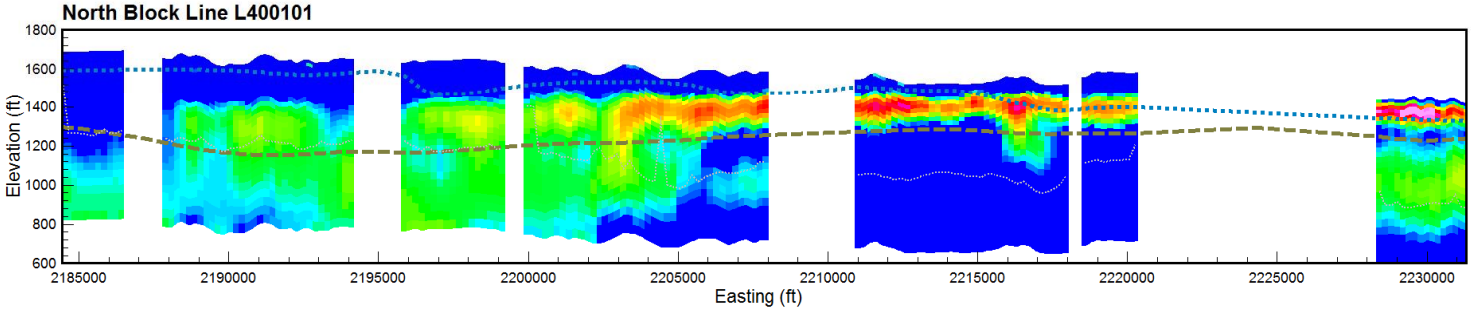

North Block Line L506402
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14963000
14964000
Northing (ft)

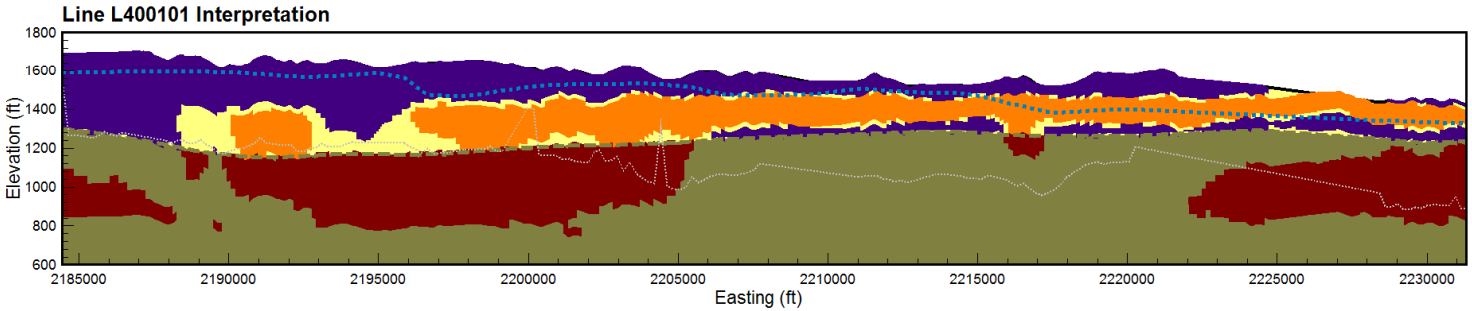

Line L506402 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14962000
14963000
14964000
Northing (ft)

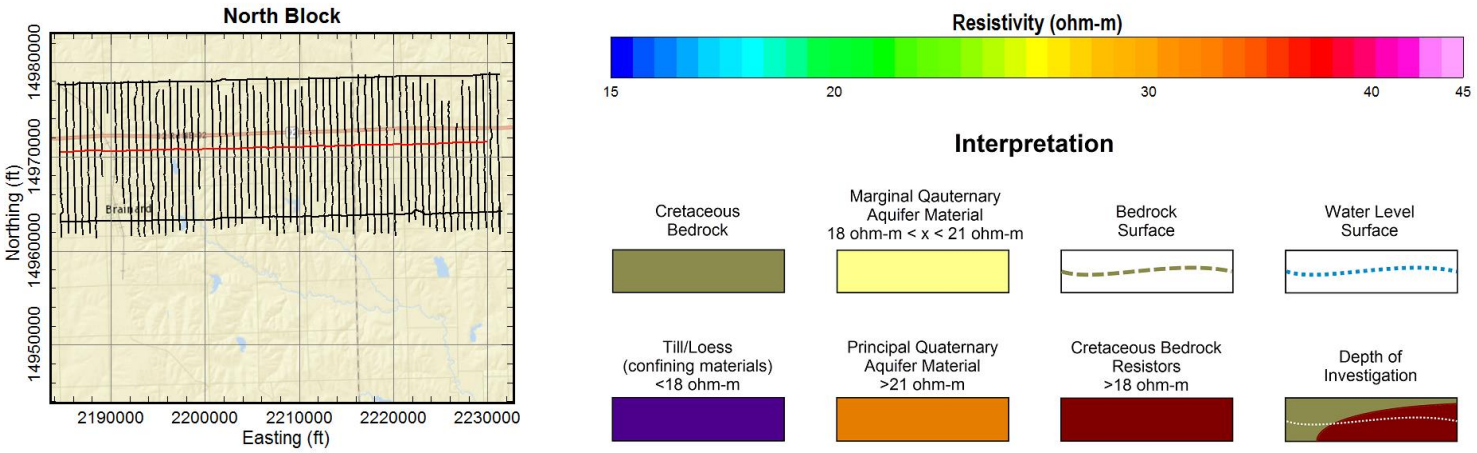
North Flight Block Profiles
Bedrock Interpretations

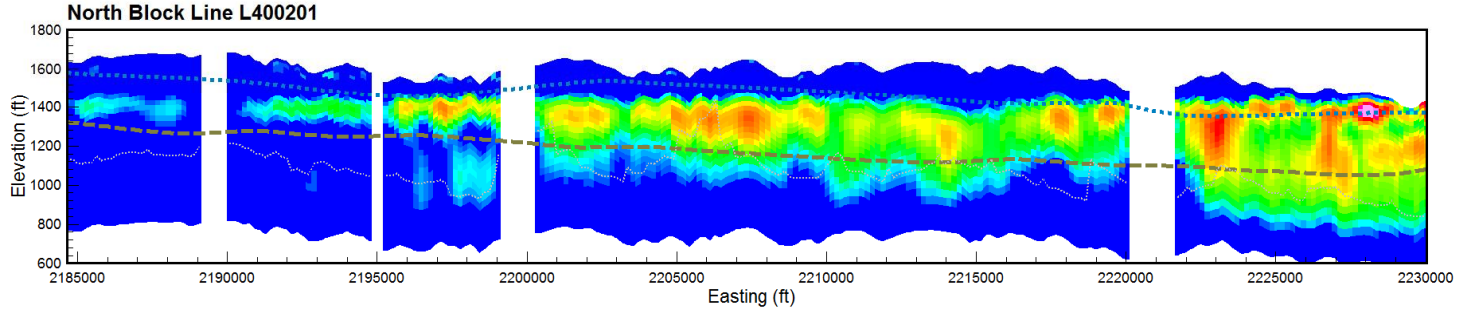

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

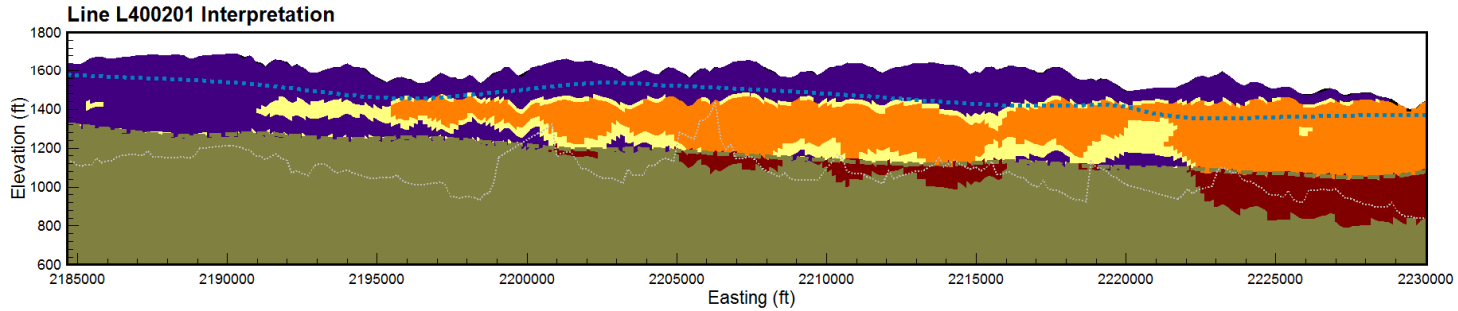

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

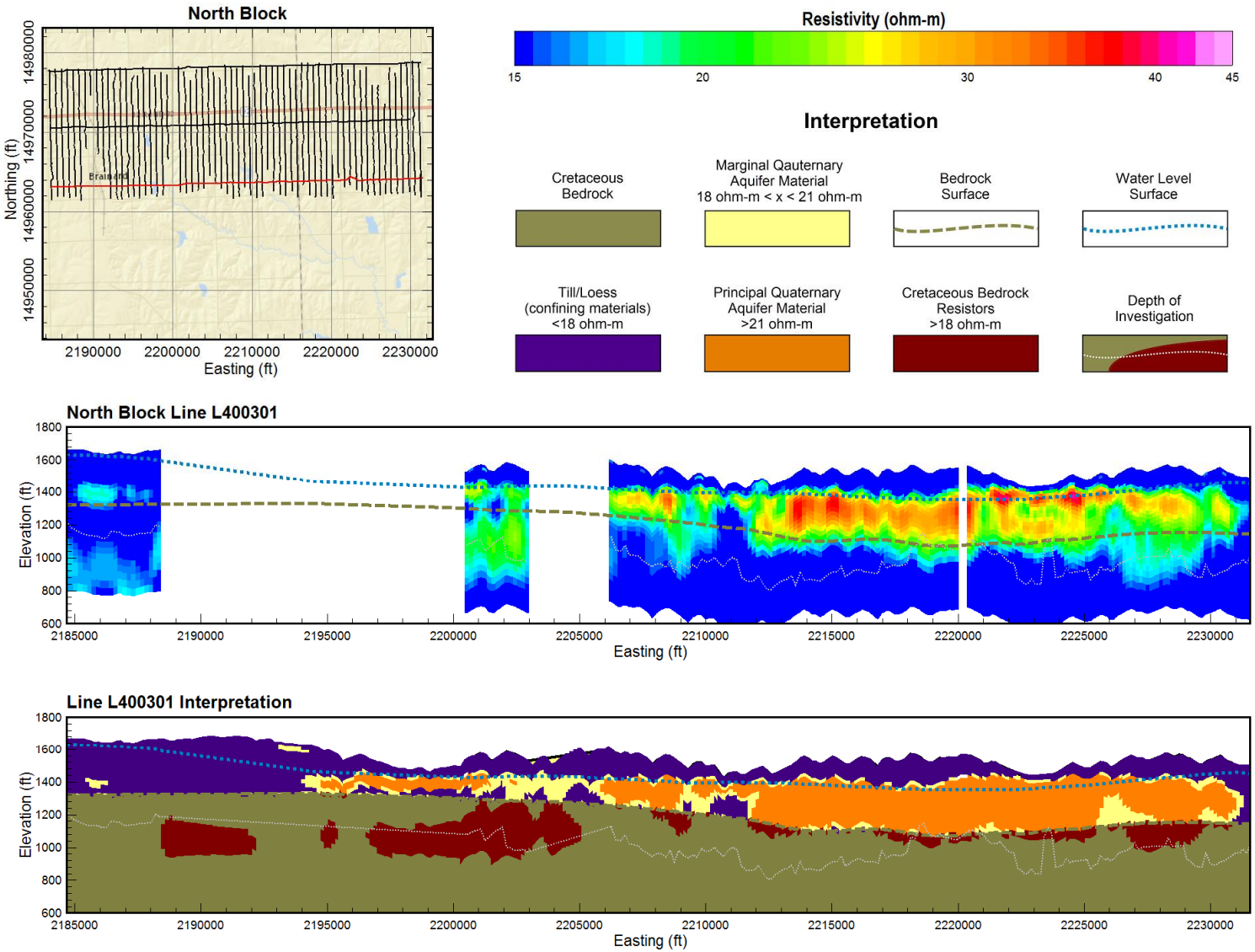

North Block Line L400101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

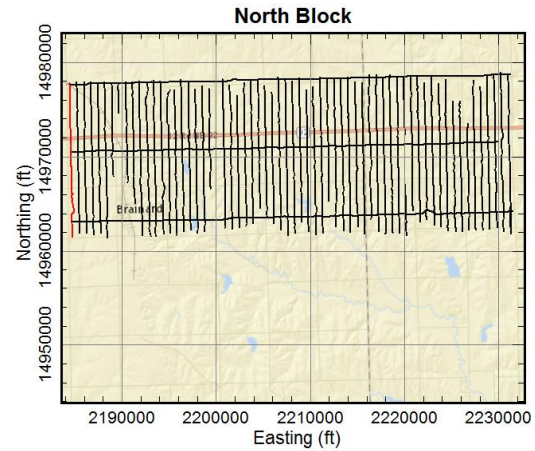

Line L400101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

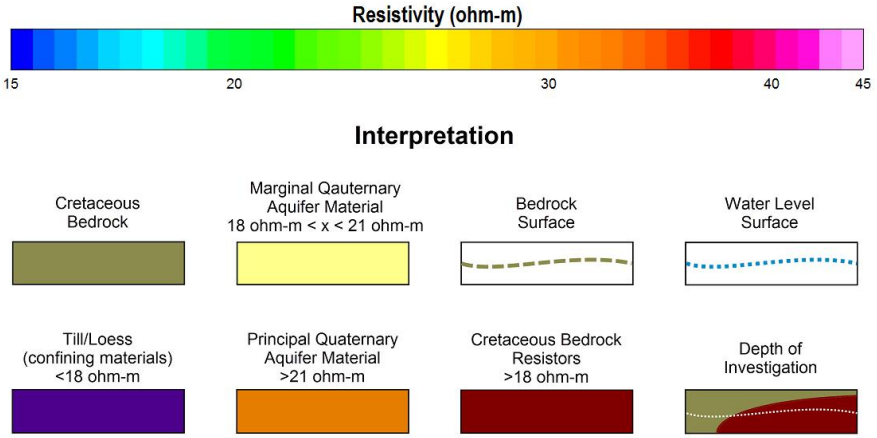

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

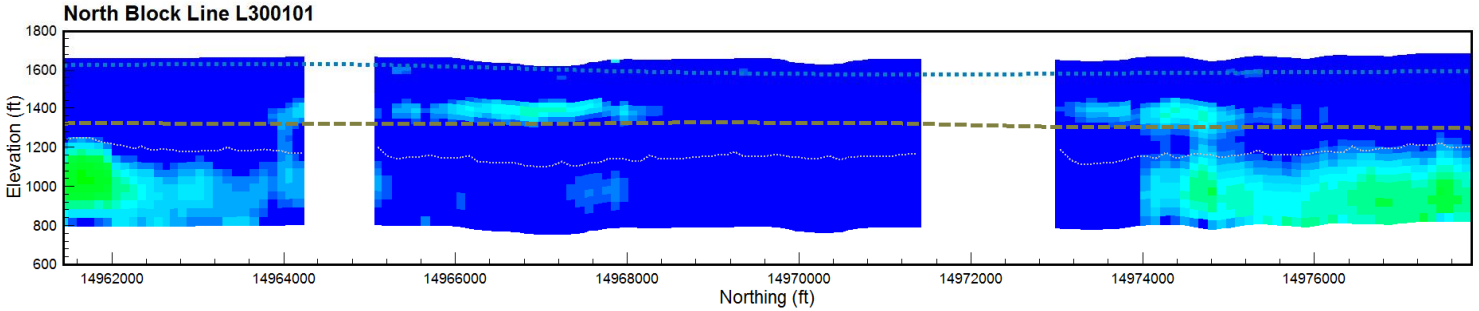

North Block Line L400201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

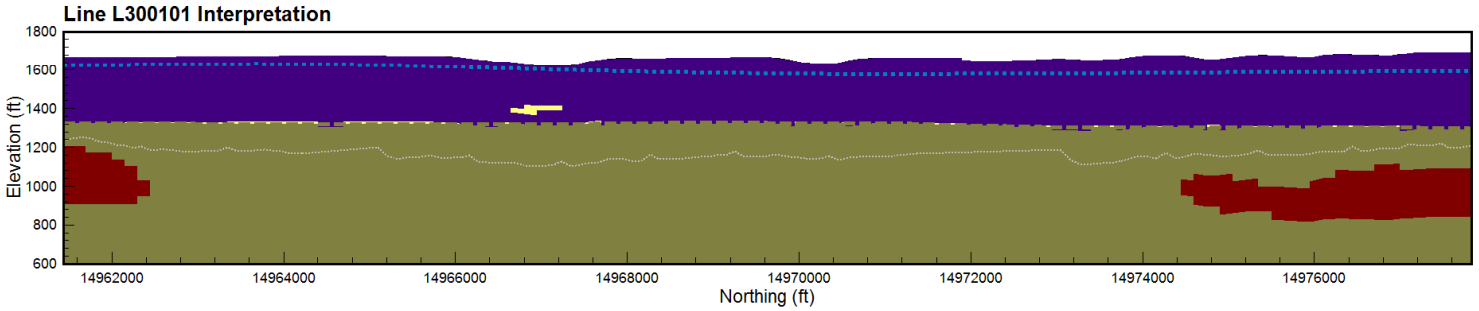

Line L400201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

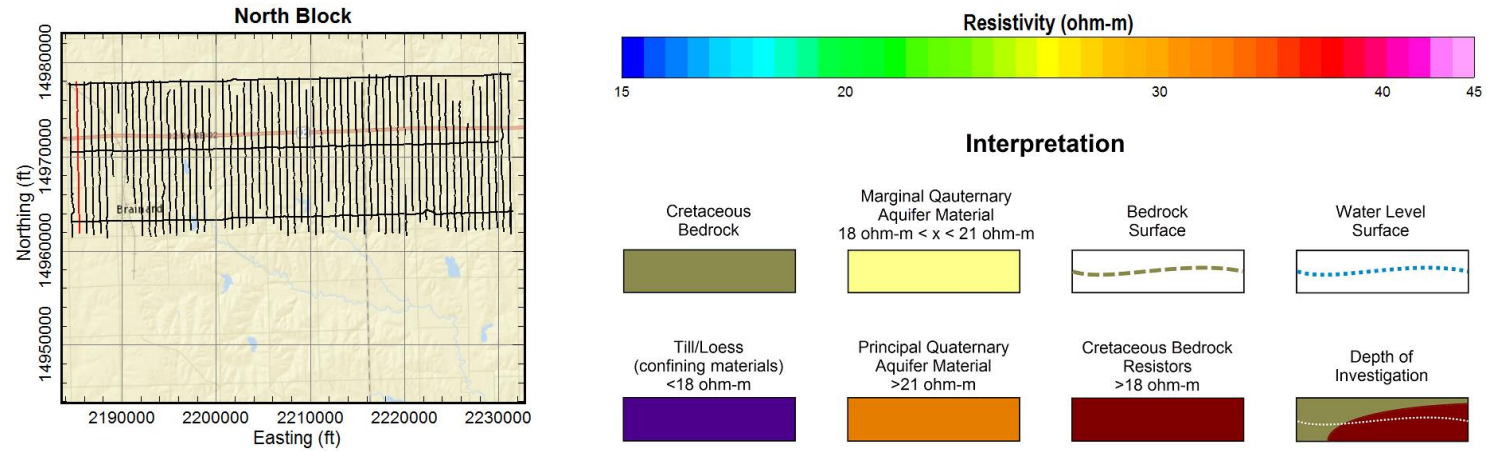

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation
North Block Line L400301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)
Line L400301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2185000
2190000
2195000
2200000
2205000
2210000
2215000
2220000
2225000
2230000
Easting (ft)

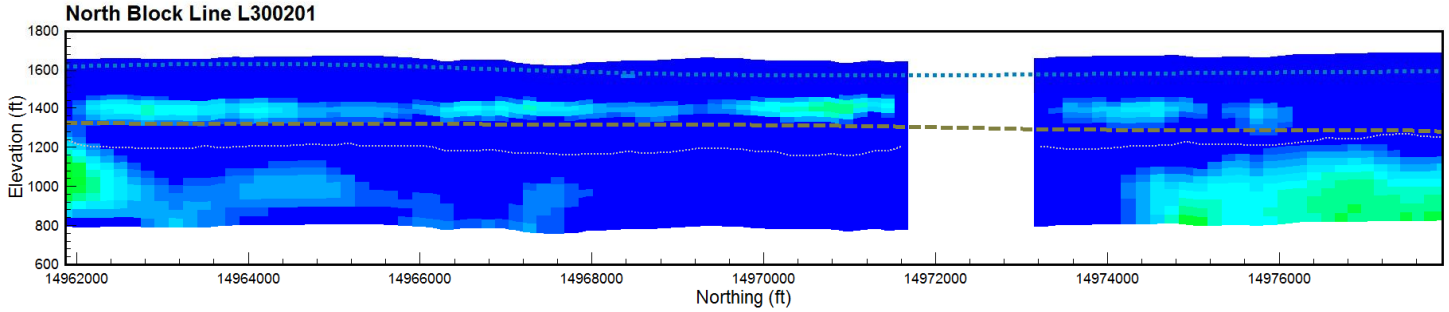

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

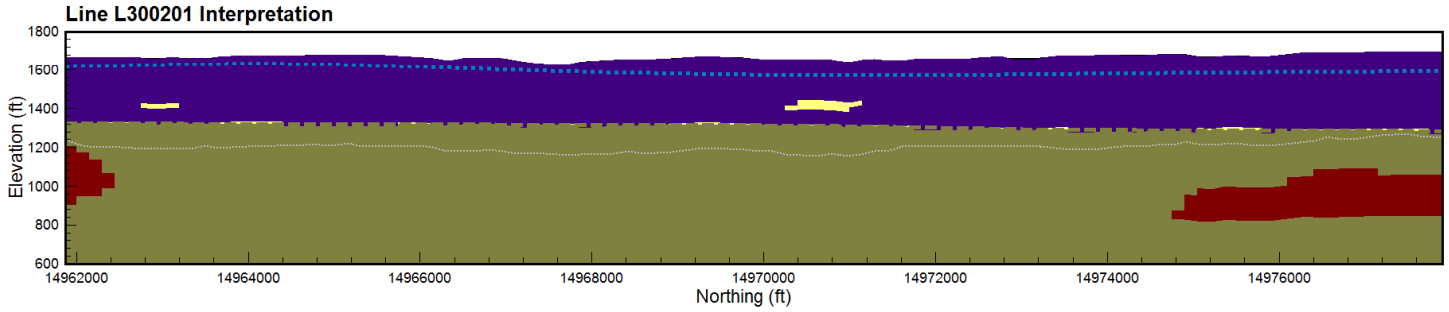

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

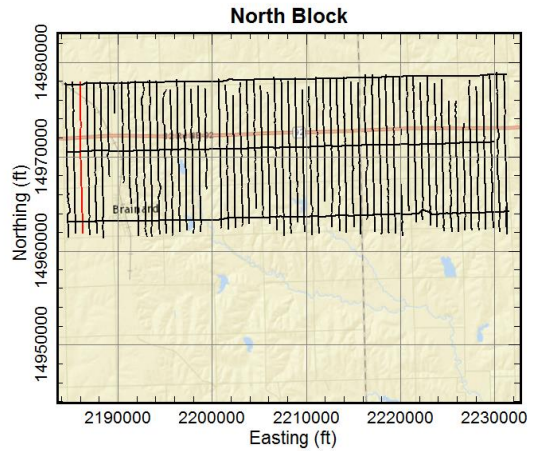

North Block Line L300101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

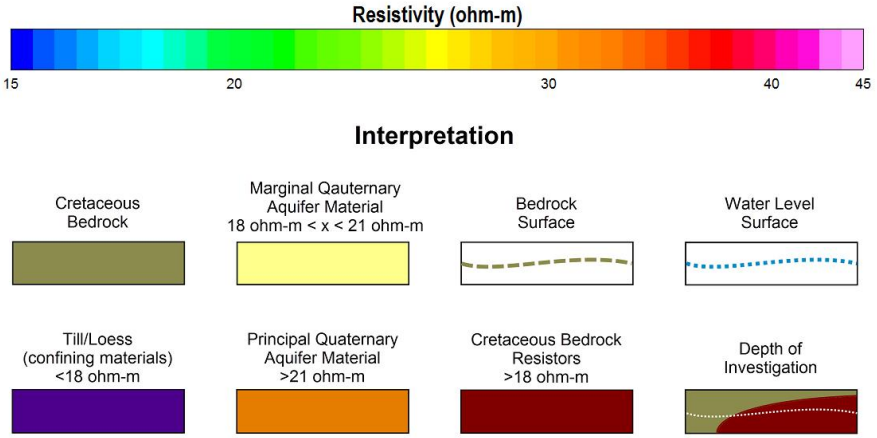

Line L300101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

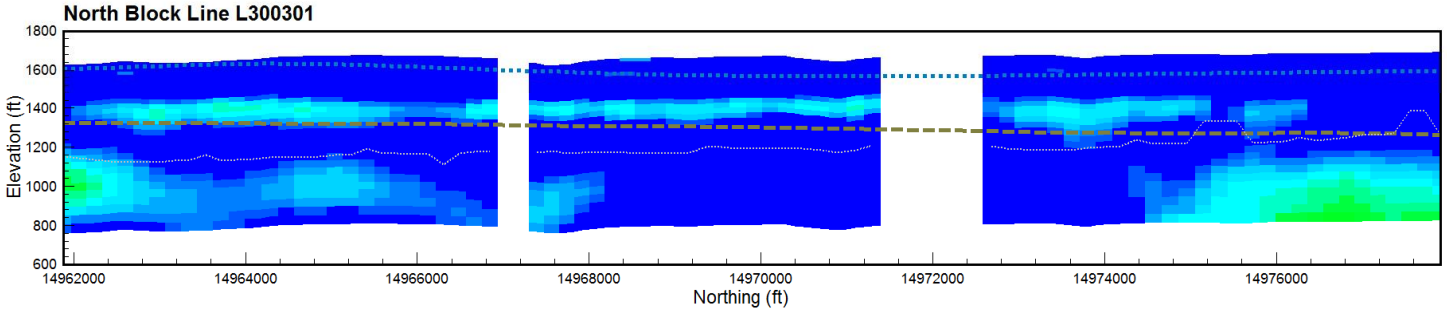

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

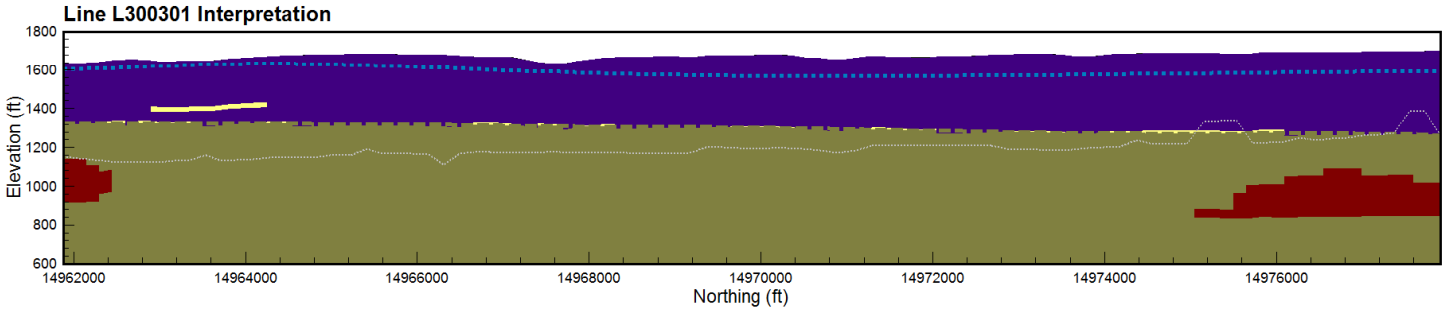

North Block Line L300201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

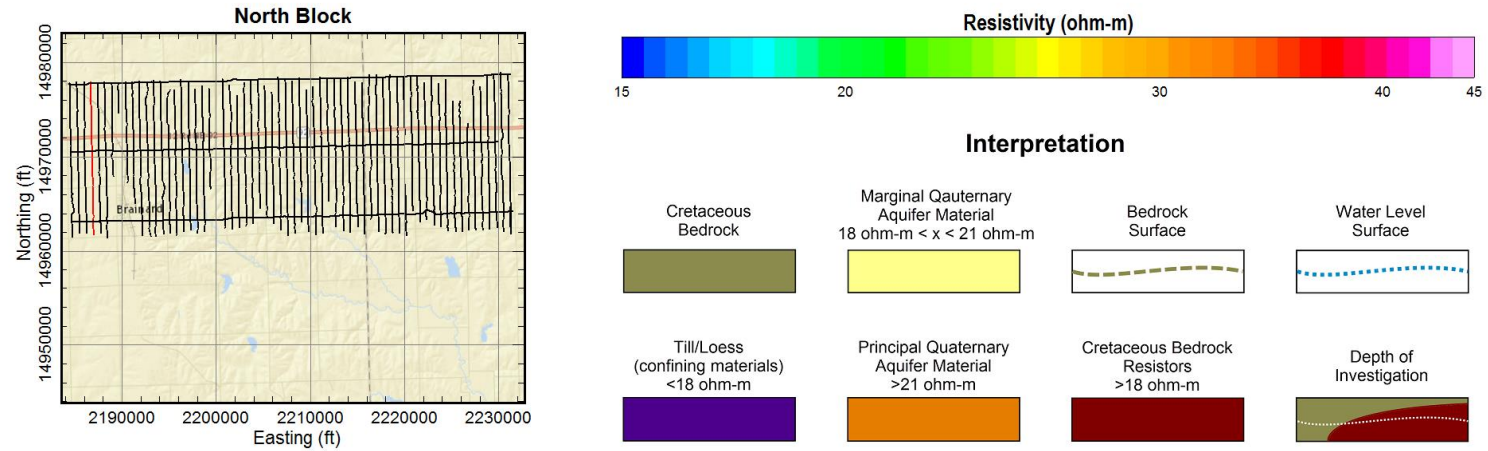

Line L300201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

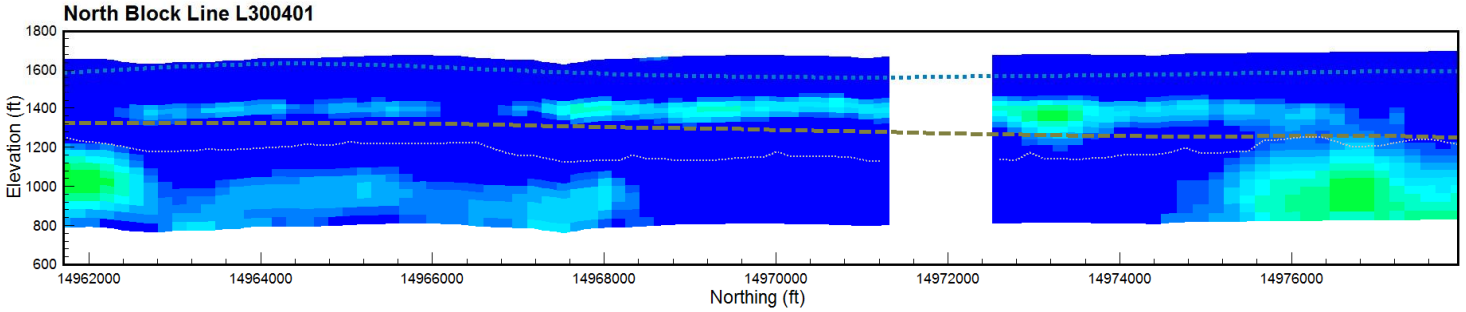

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

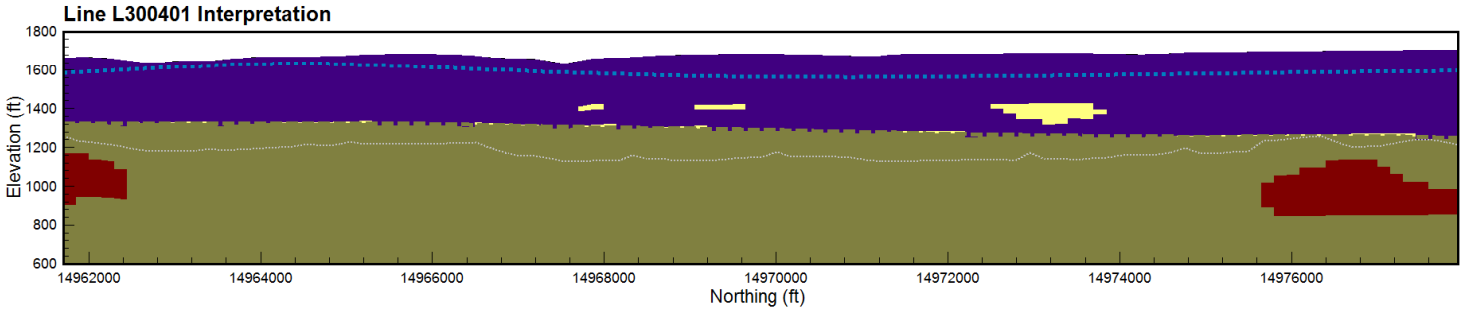

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

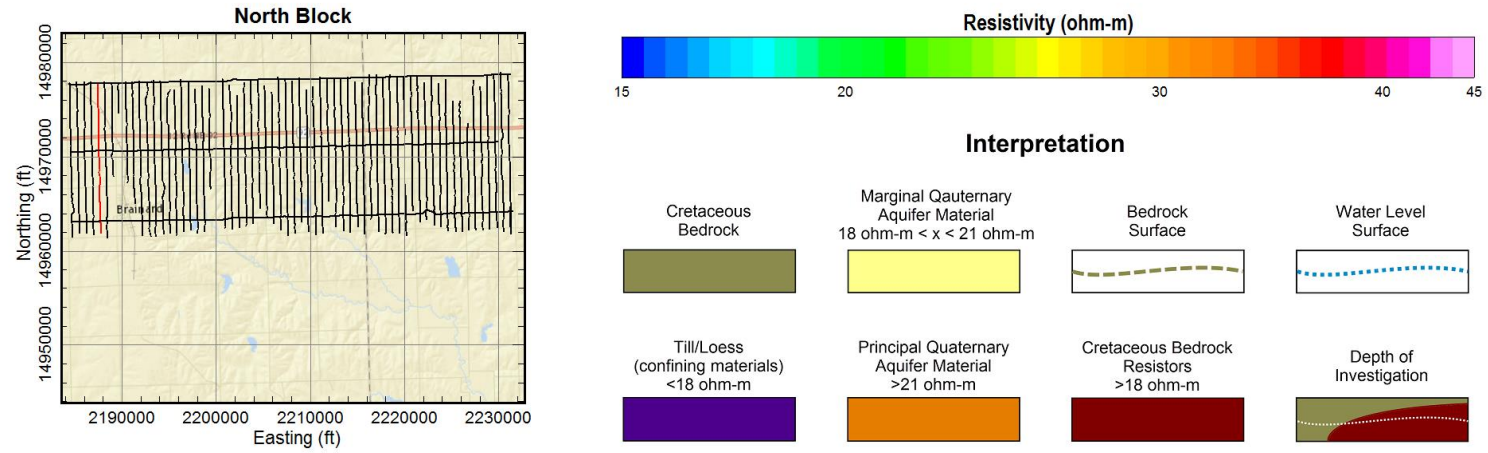

North Block Line L300301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

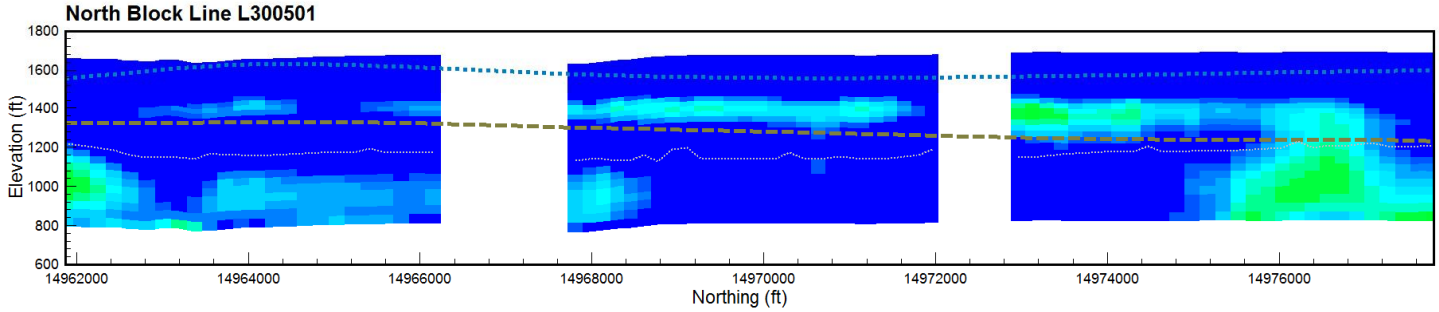

Line L300301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

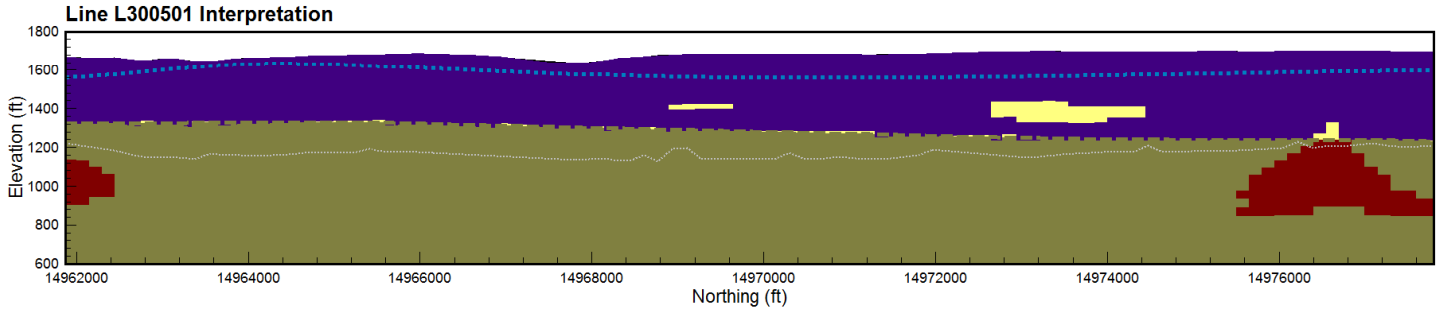

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

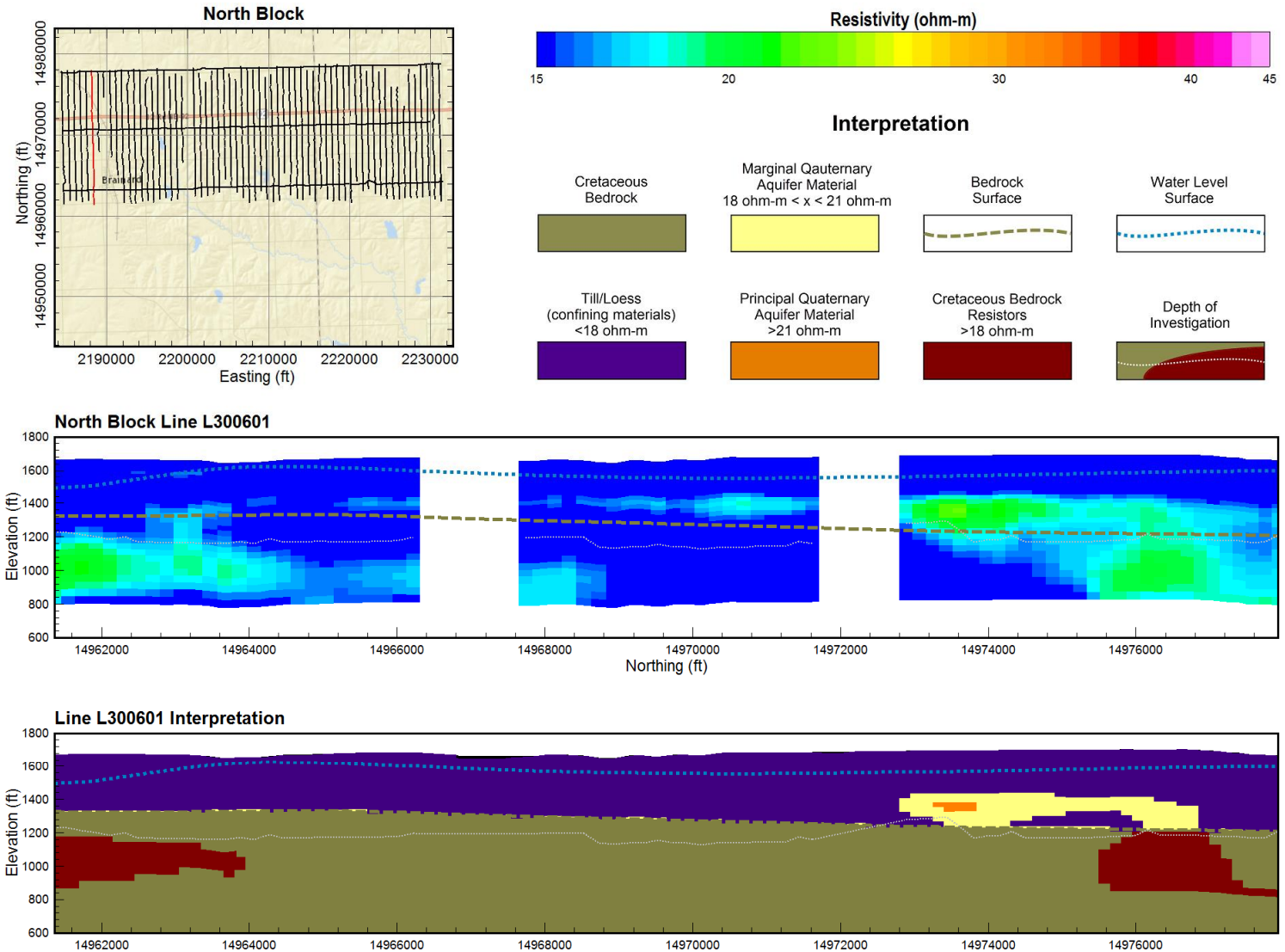

North Block Line L300401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

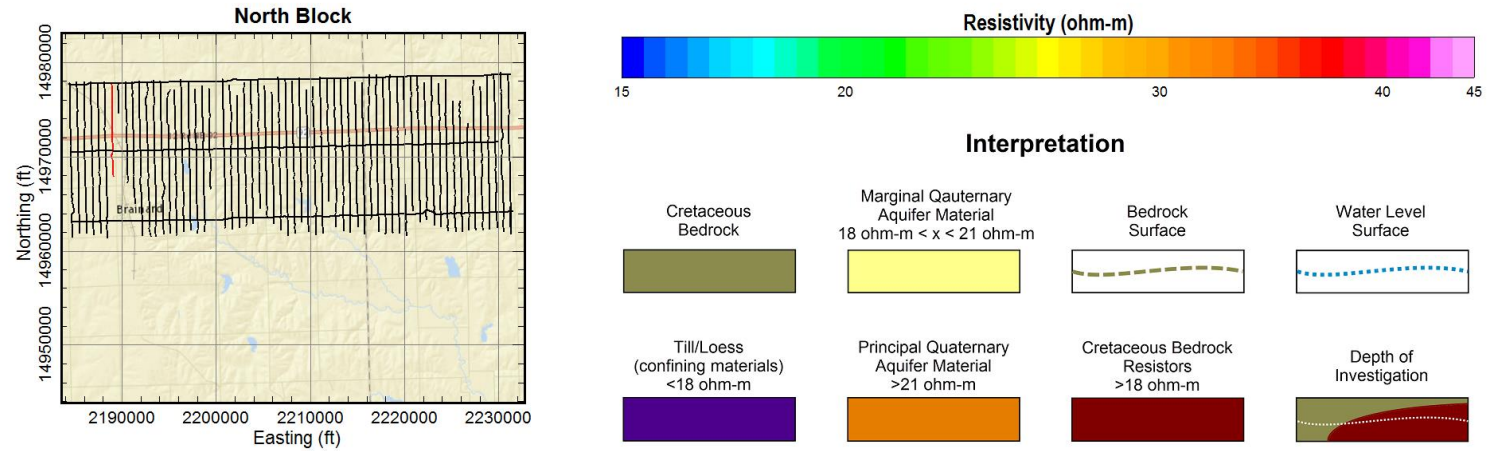

Line L300401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

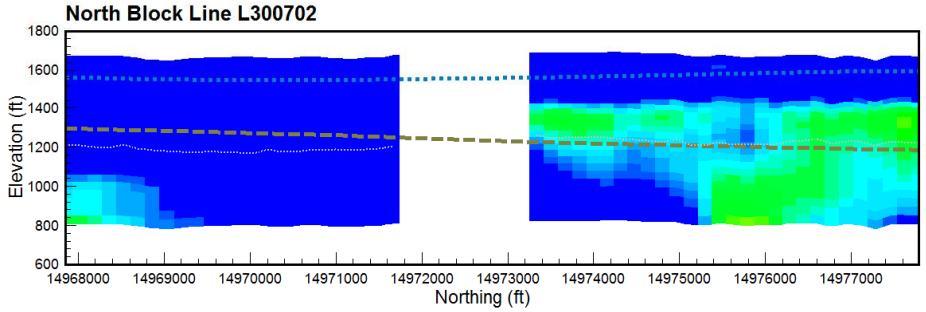

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

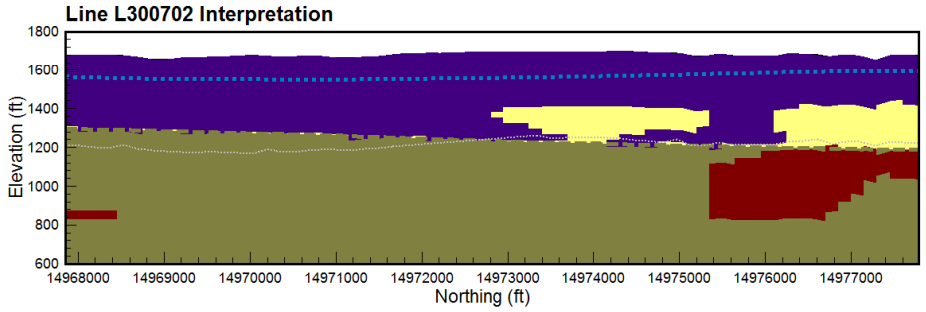

North Block Line L300501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

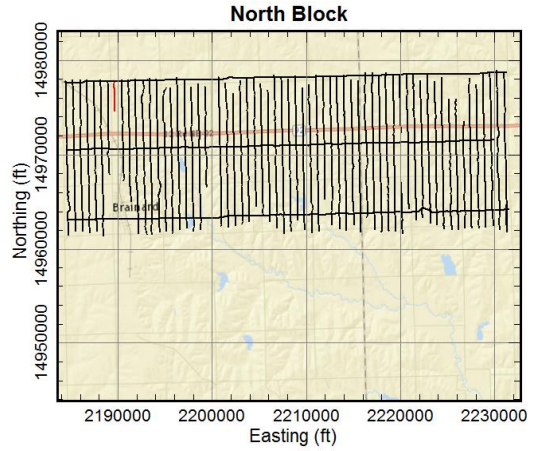

Line L300501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

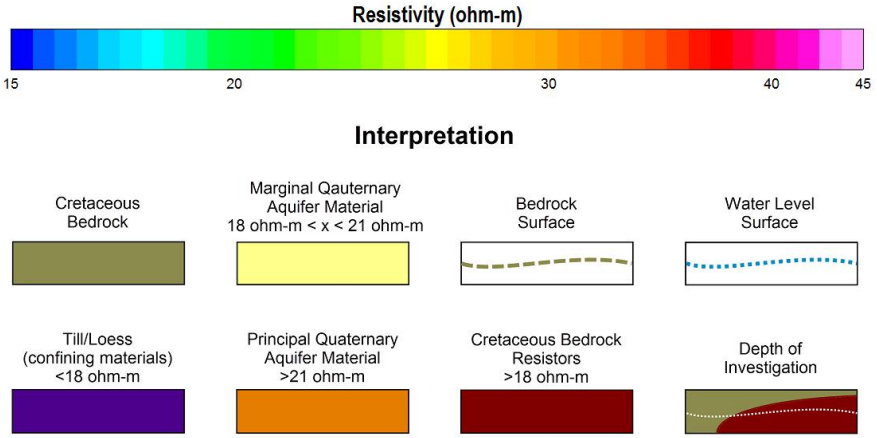

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation
North Block Line L300601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)
Line L300601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

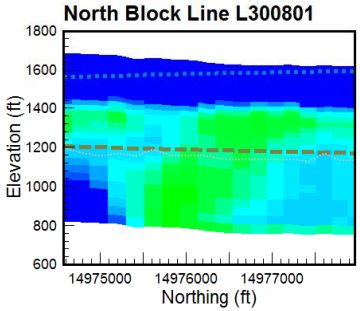

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

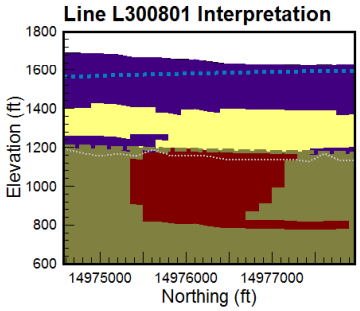

North Block Line L300702
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14968000
14969000
14970000
14971000
14972000
14973000
14974000
14975000
14976000
14977000
Northing (ft)

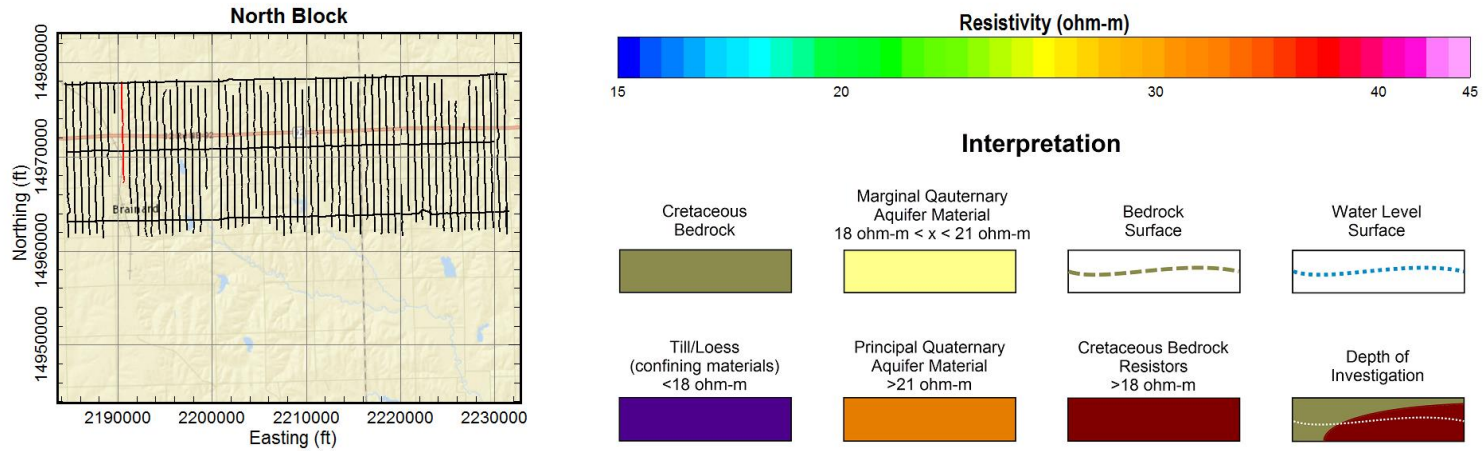

Line L300702 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14968000
14969000
14970000
14971000
14972000
14973000
14974000
14975000
14976000
14977000
Northing (ft)

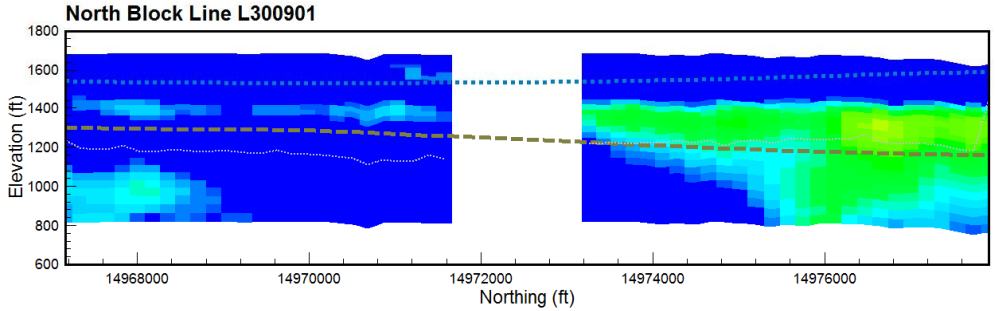

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

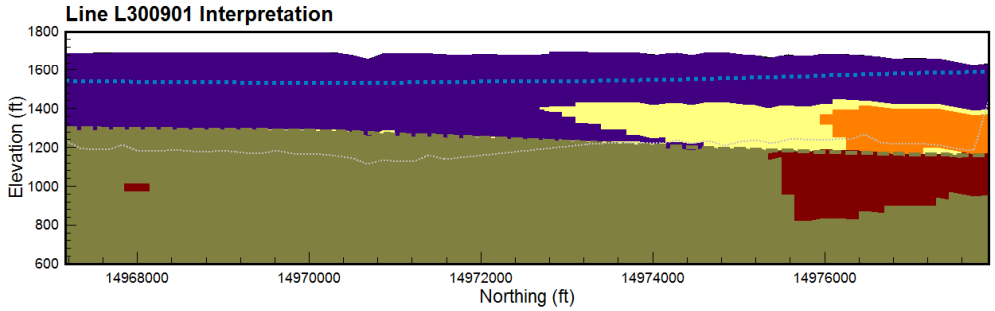

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

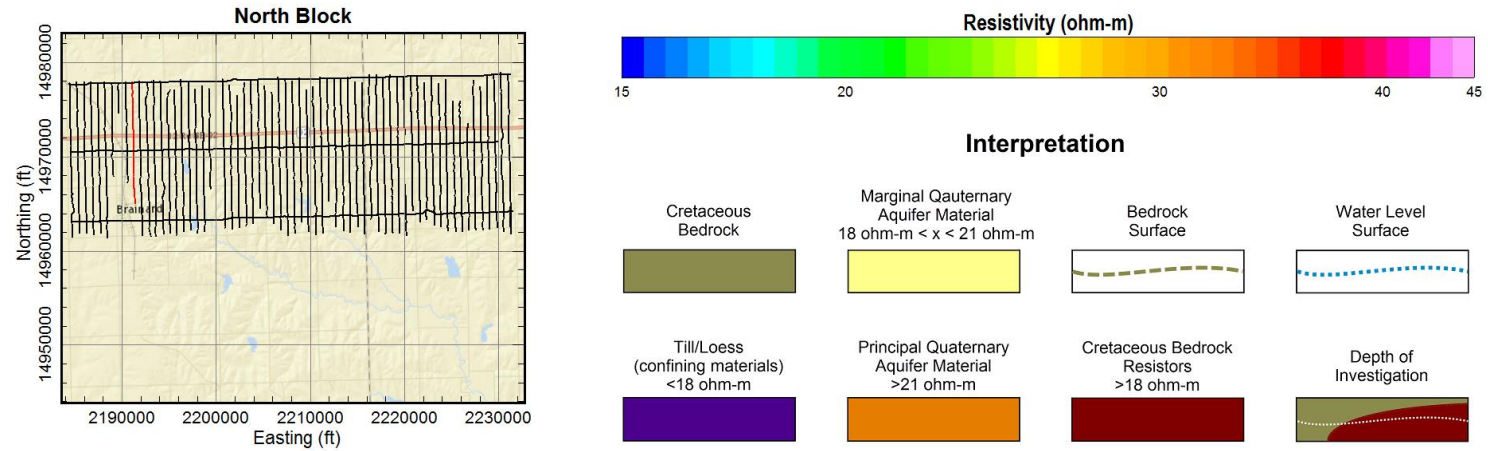

North Block Line L300801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14975000
14976000
14977000
Northing (ft)

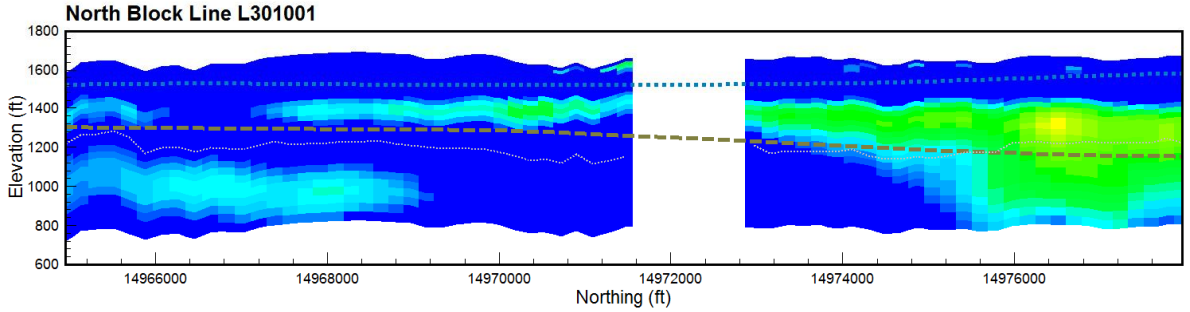

Line L300801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14975000
14976000
14977000
Northing (ft)

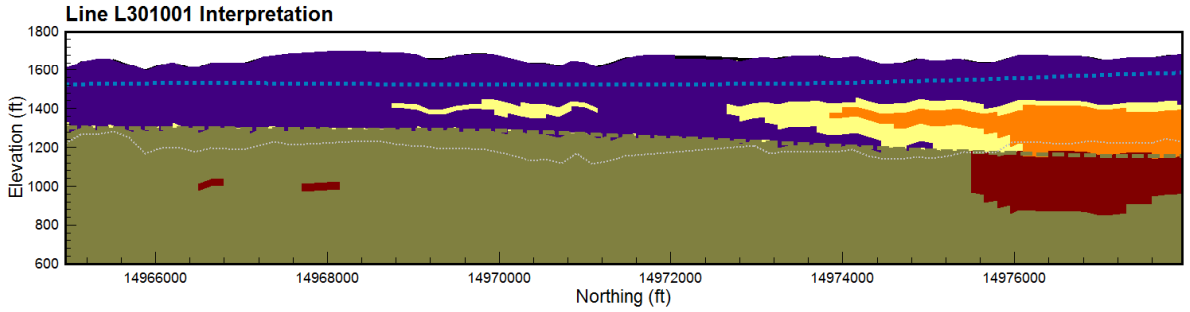

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

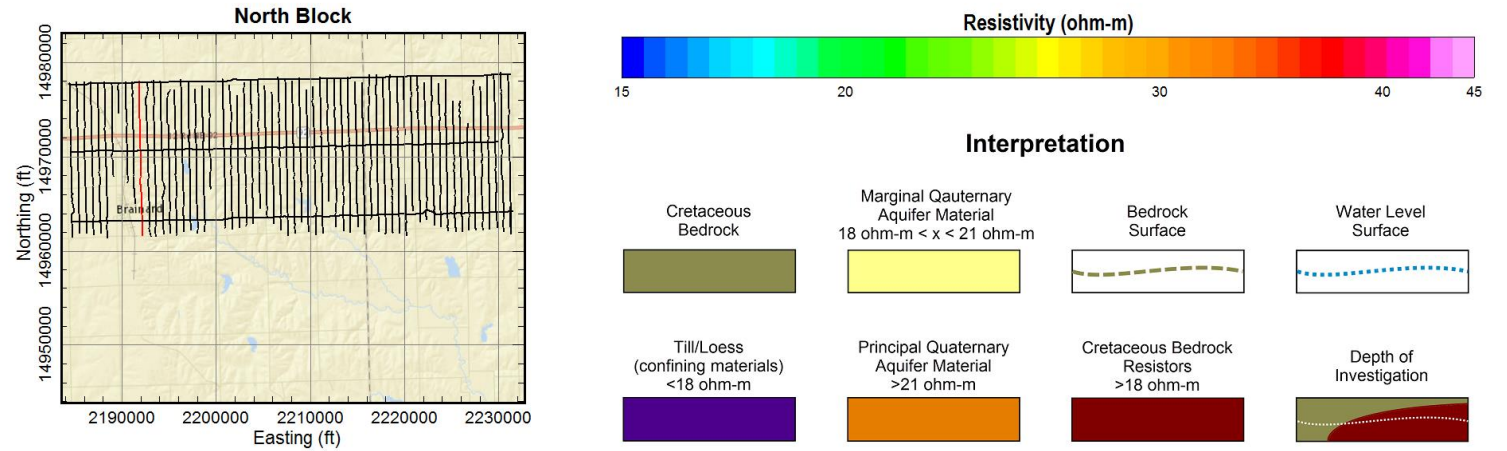

North Block Line L300901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14968000
14970000
14972000
14974000
14976000
Northing (ft)

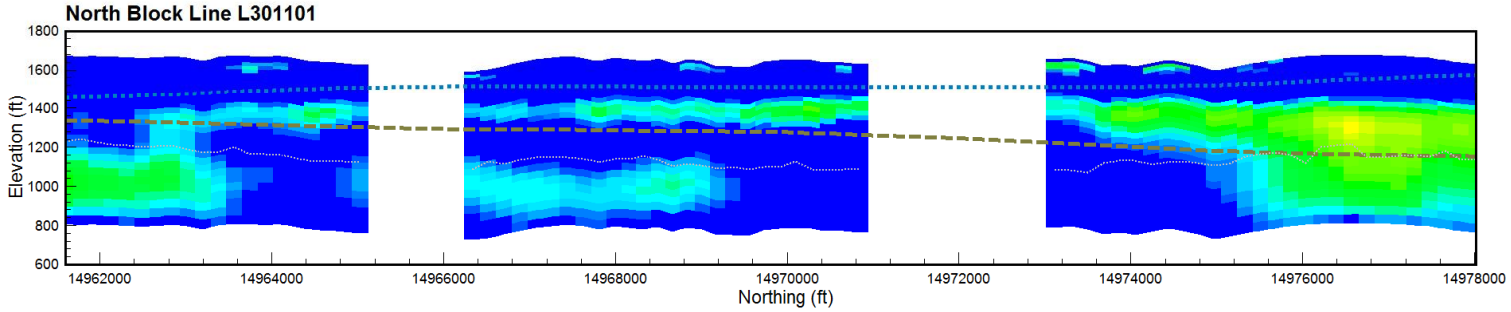

Line L300901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14968000
14970000
14972000
14974000
14976000
Northing (ft)

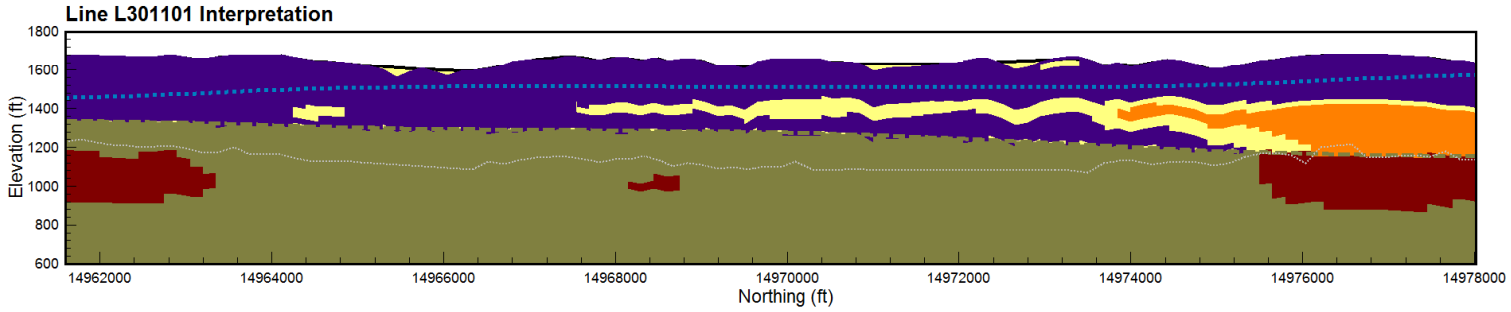

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

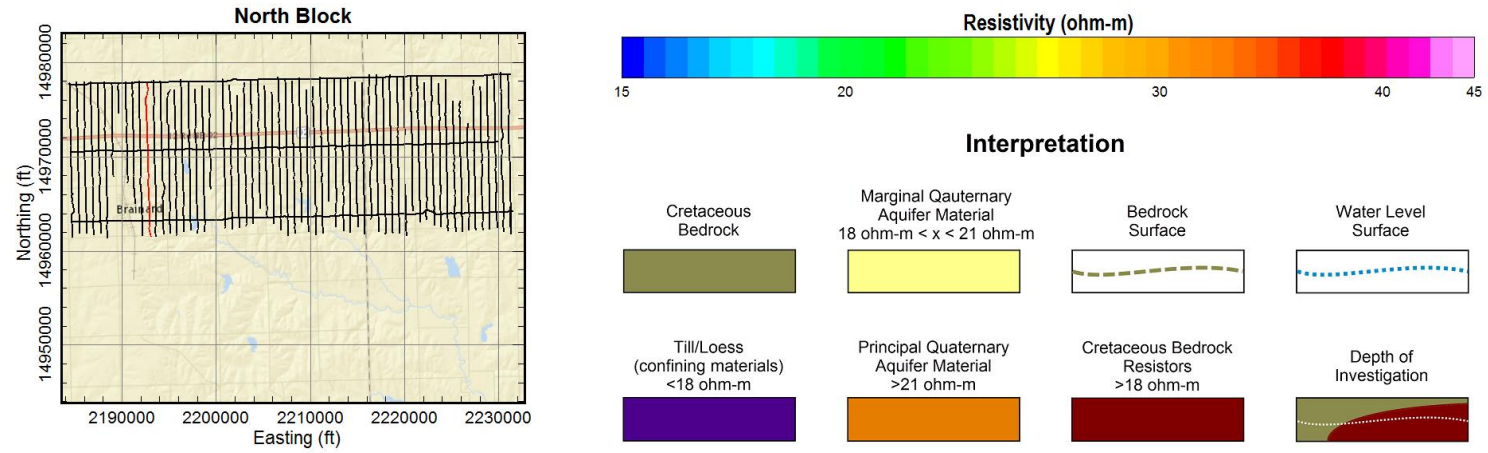

North Block Line L301001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

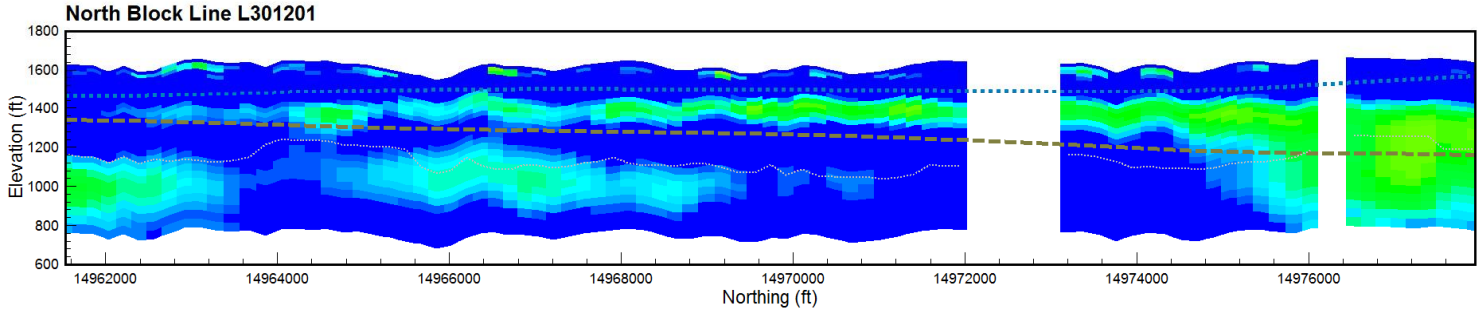

Line L301001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

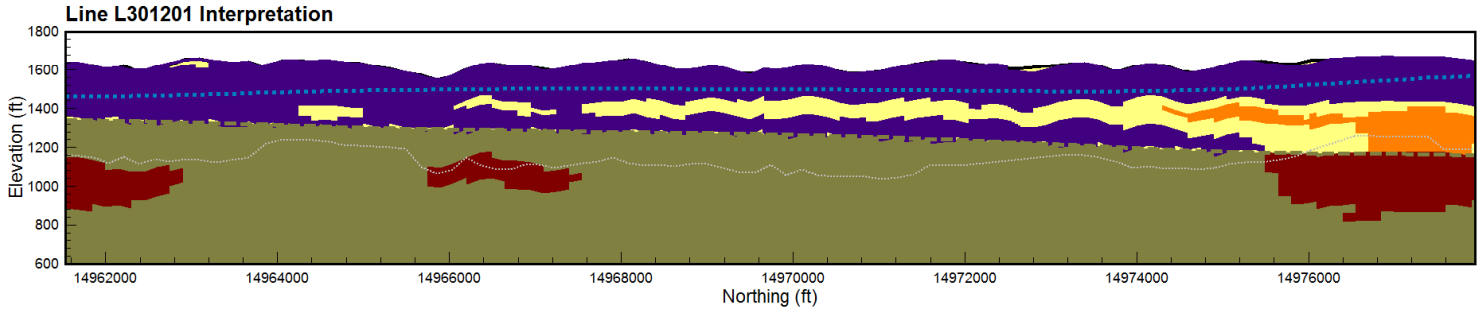

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

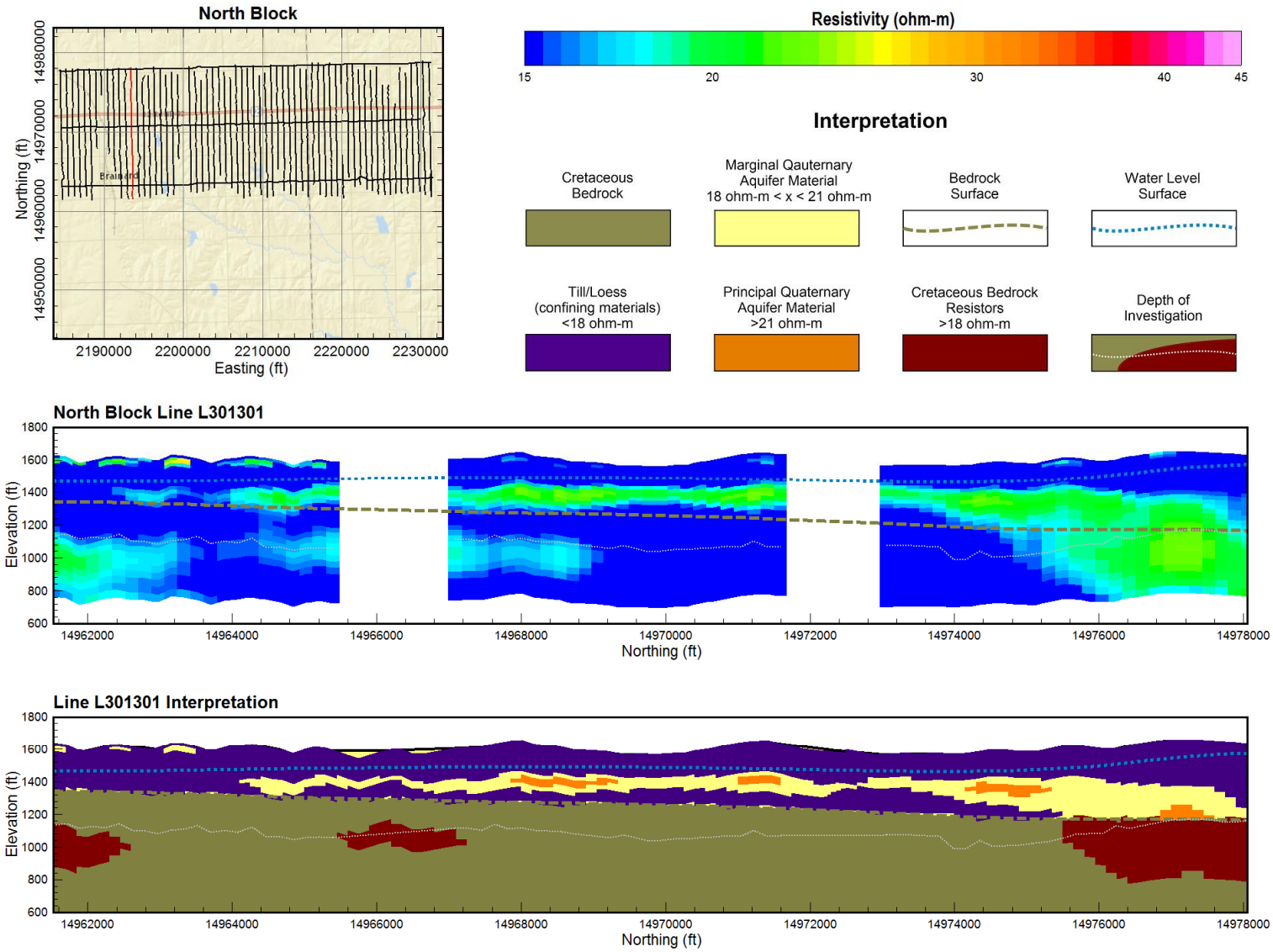

North Block Line L301101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

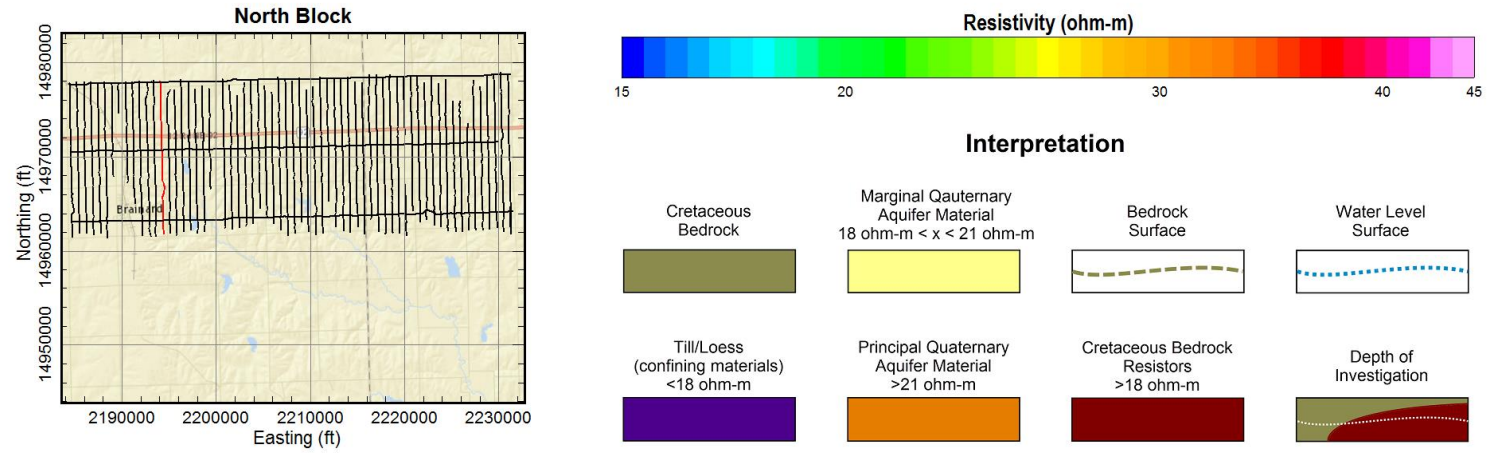

Line L301101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

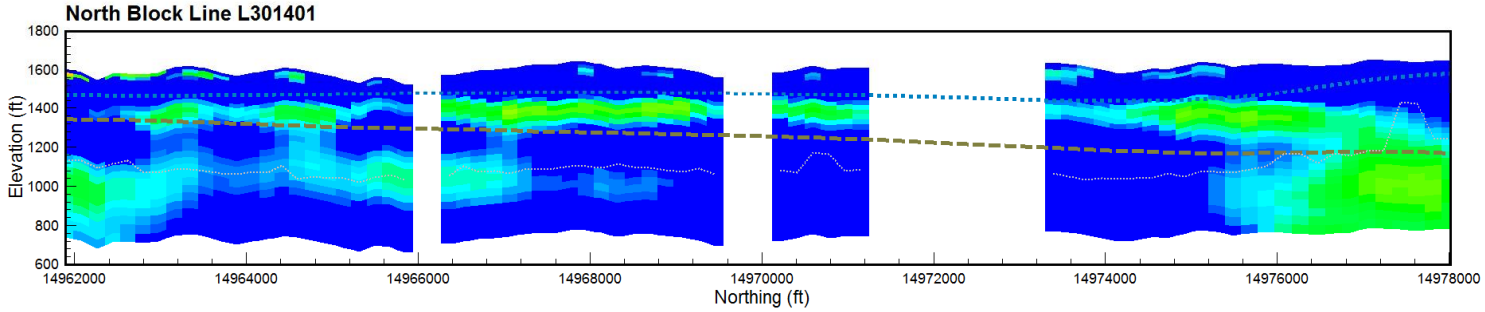

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

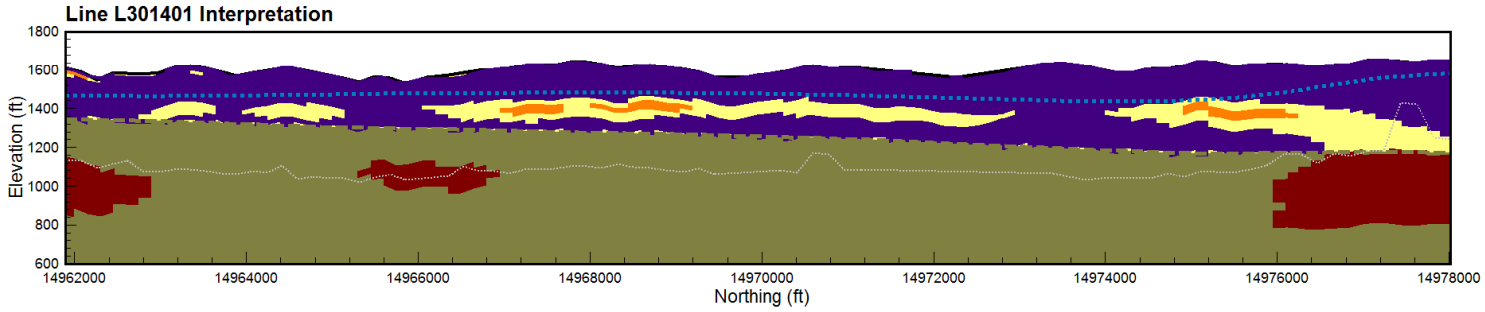

North Block Line L301201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

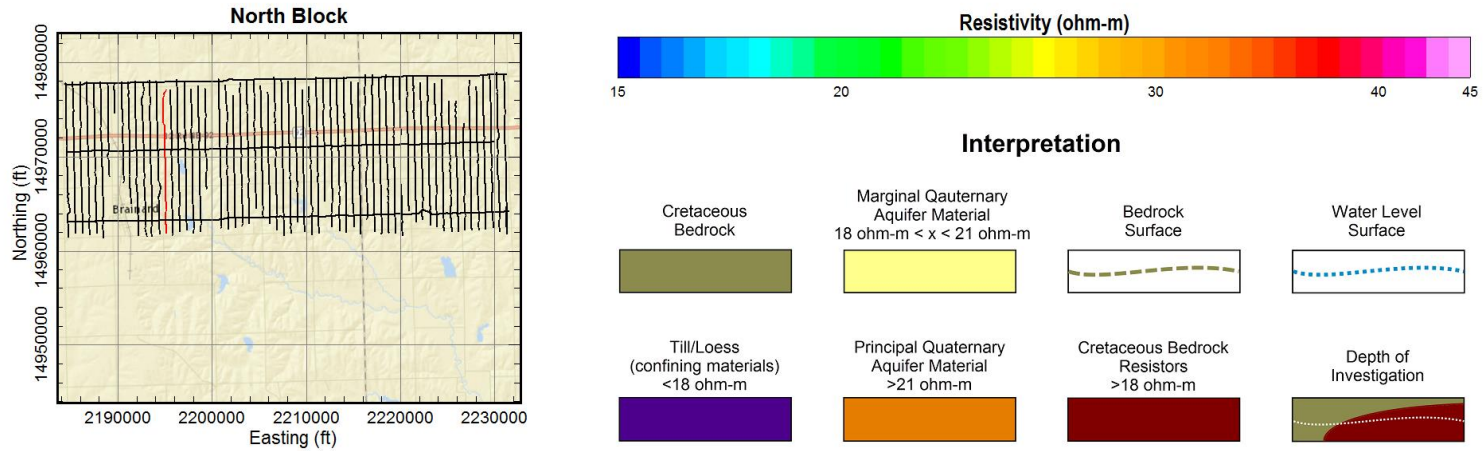

Line L301201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

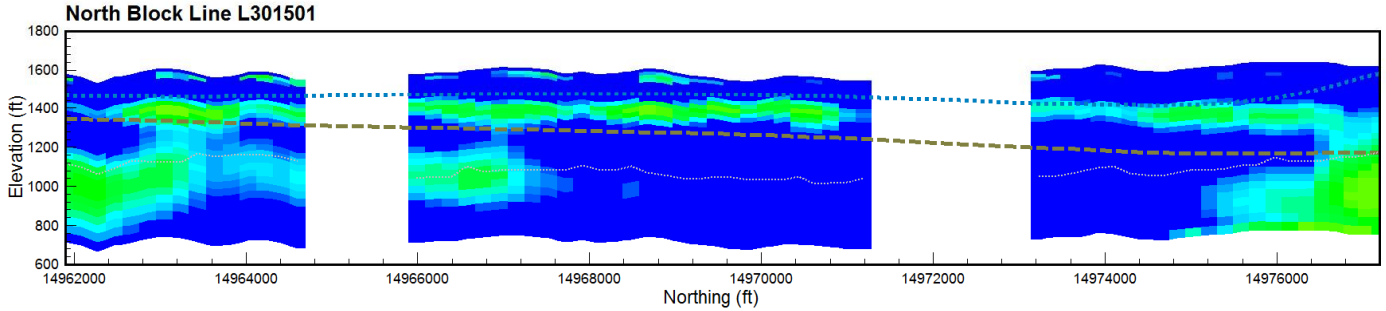

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation
North Block Line L301301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L301301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

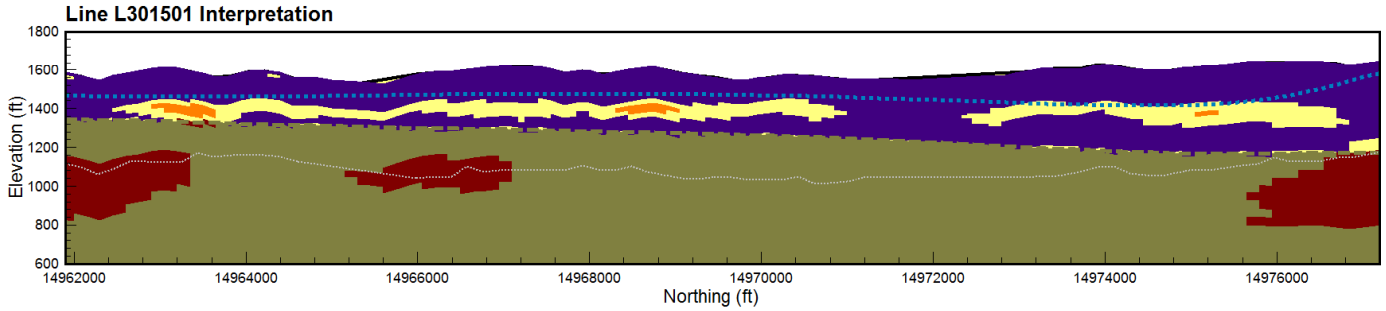

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

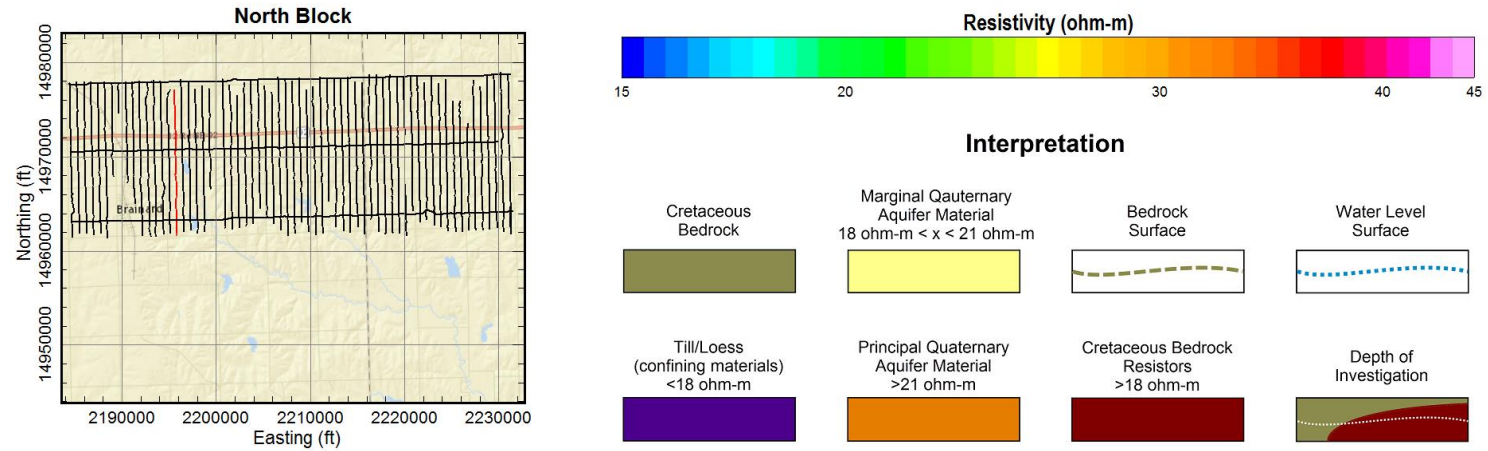

North Block Line L301401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

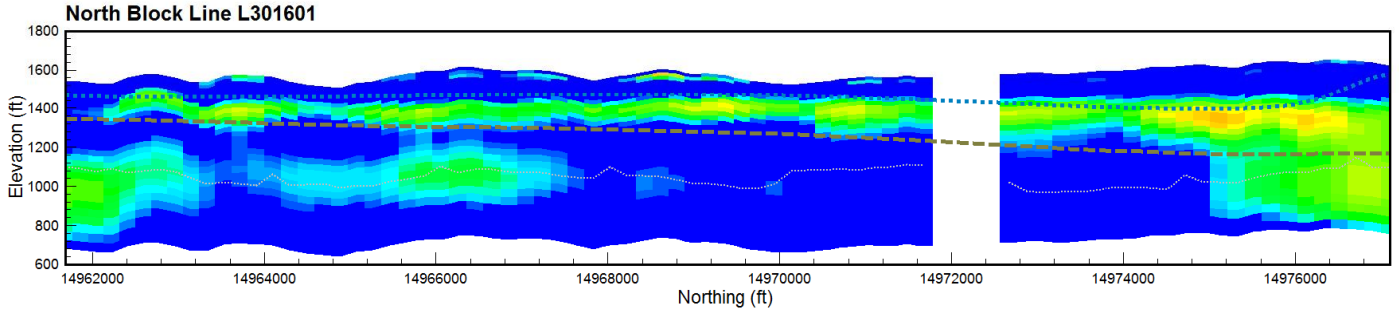

Line L301401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

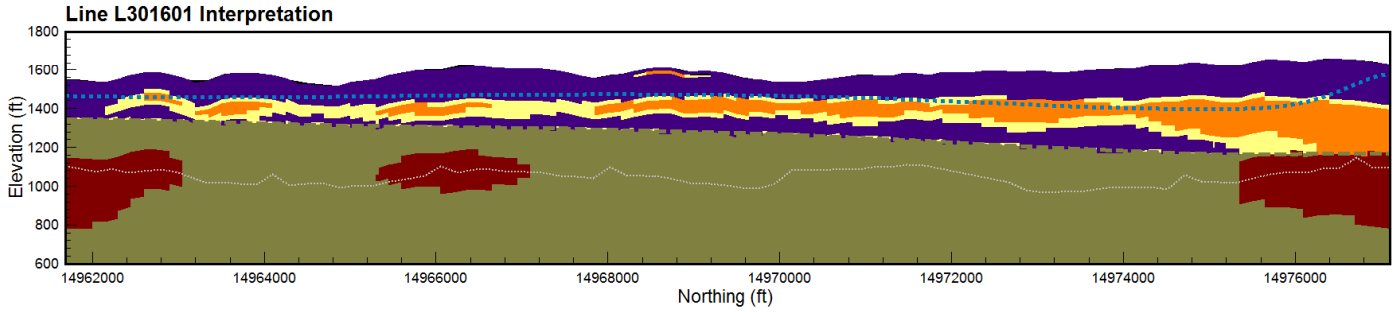

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

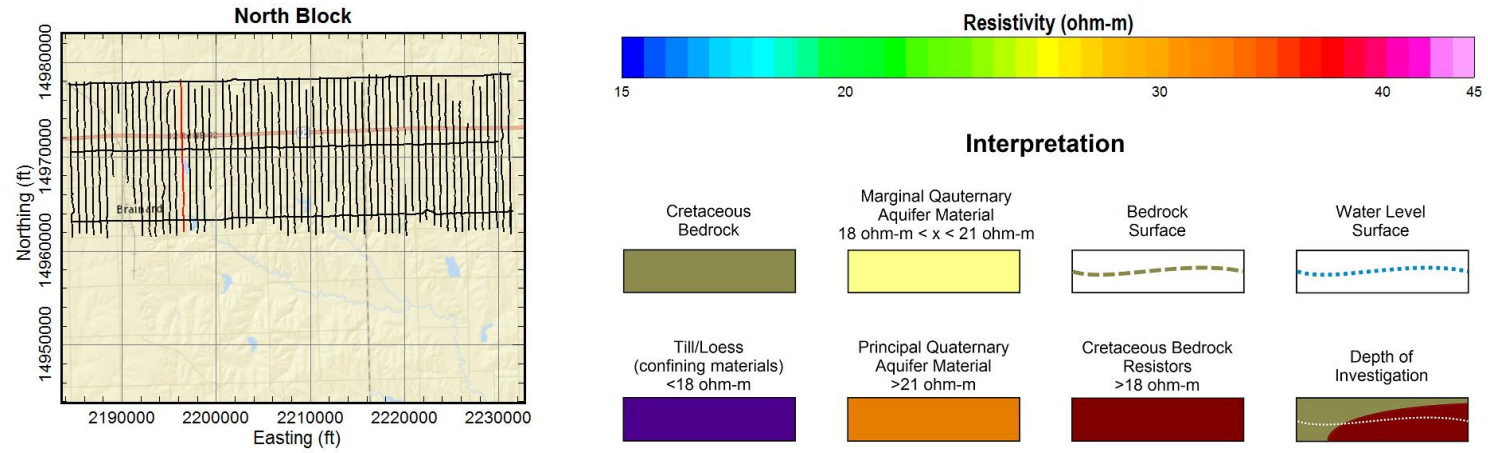

North Block Line L301501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

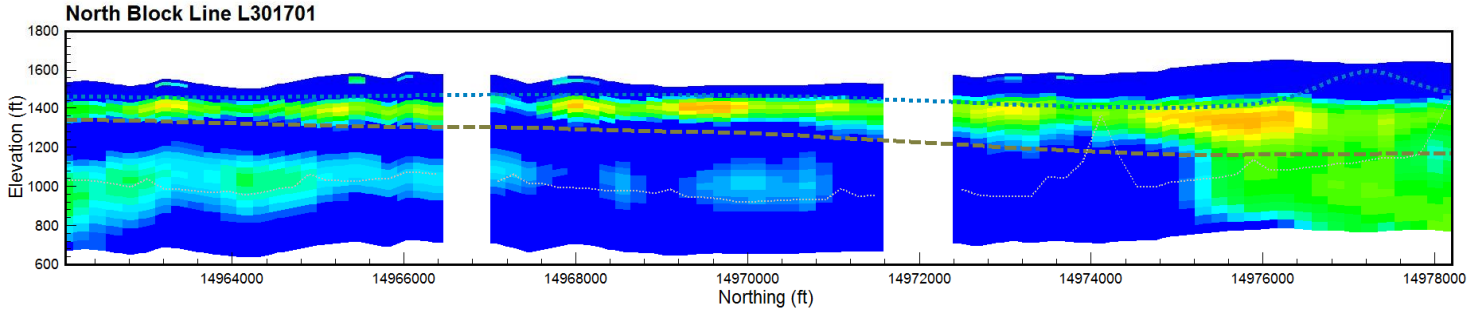

Line L301501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

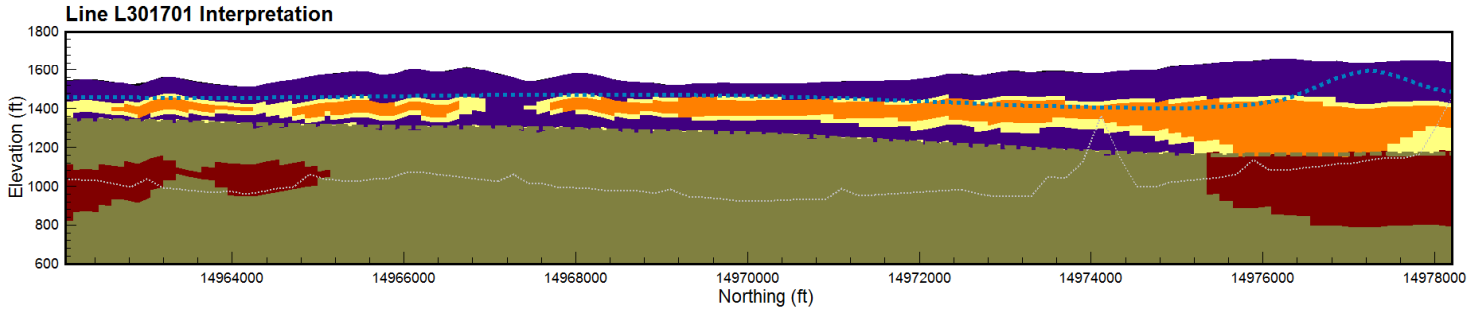

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

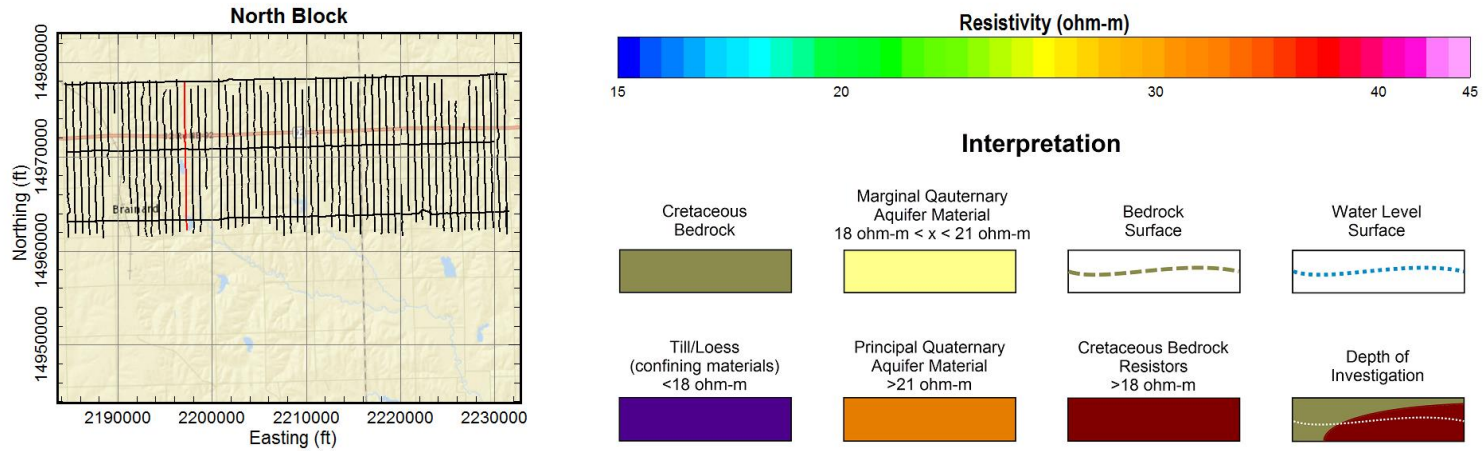

North Block Line L301601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

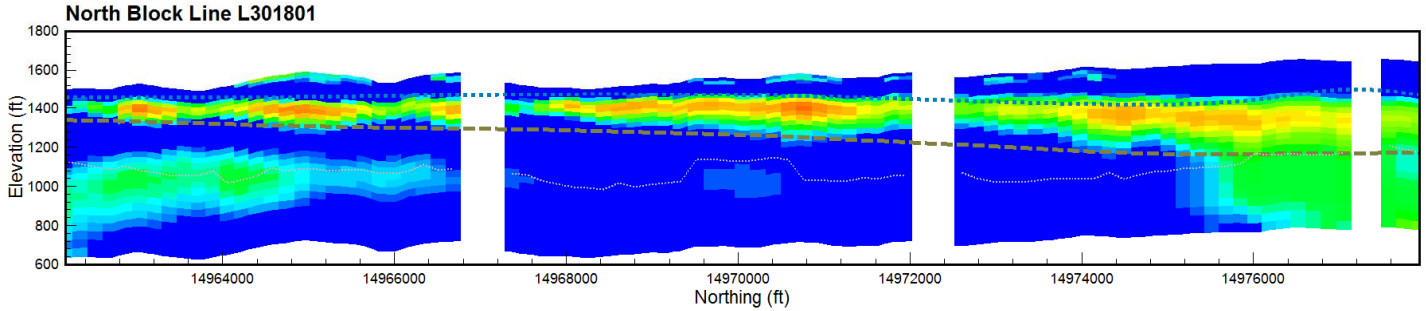

Line L301601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

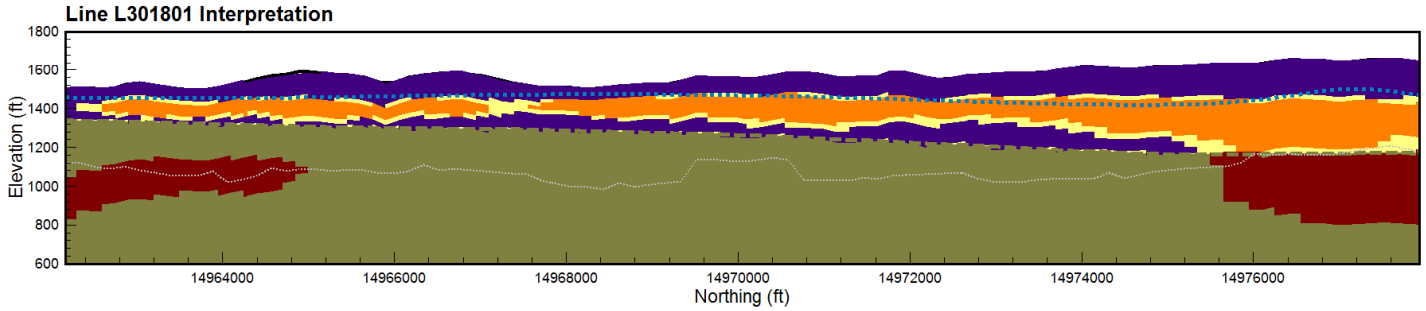

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

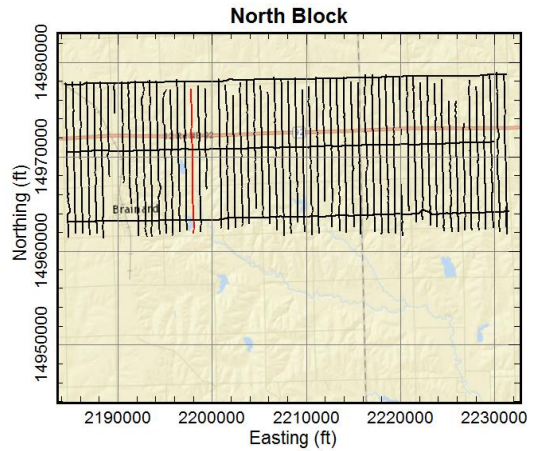

North Block Line L301701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

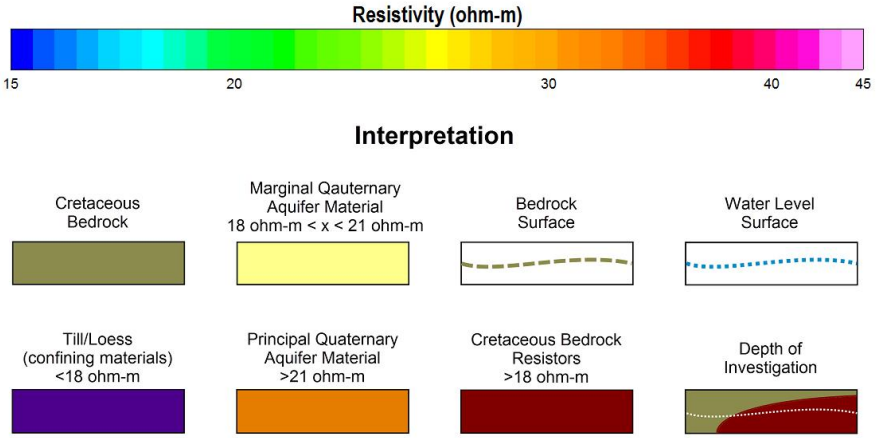

Line L301701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

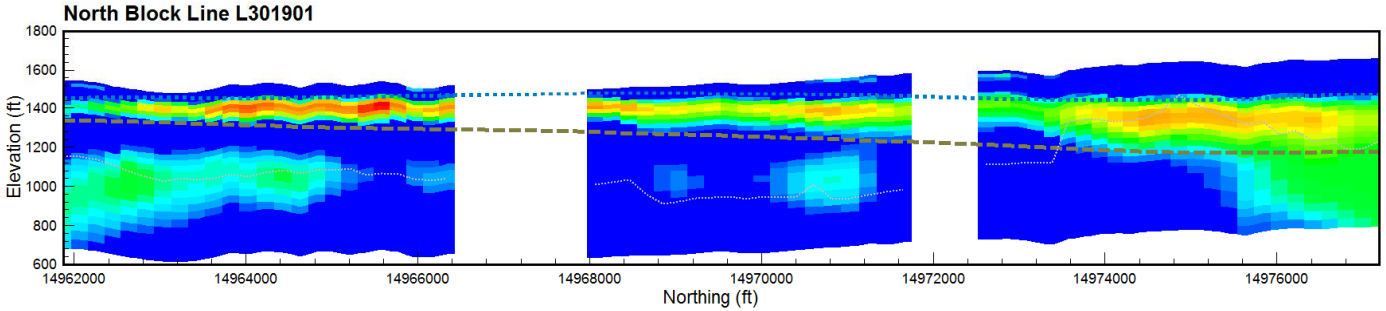

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

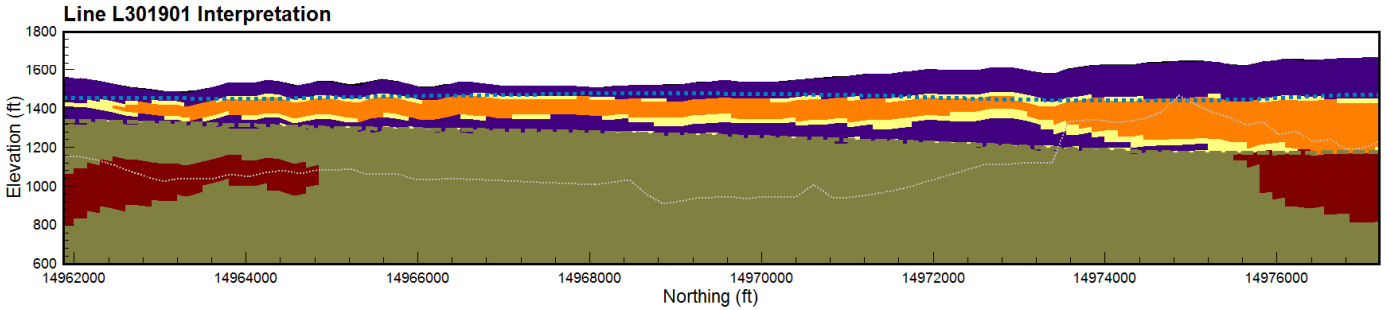

North Block Line L301801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

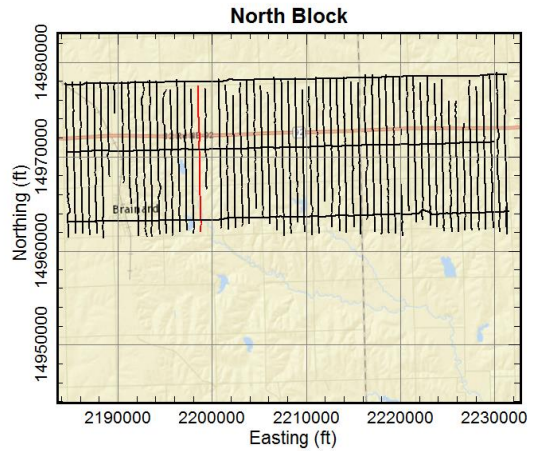

Line L301801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

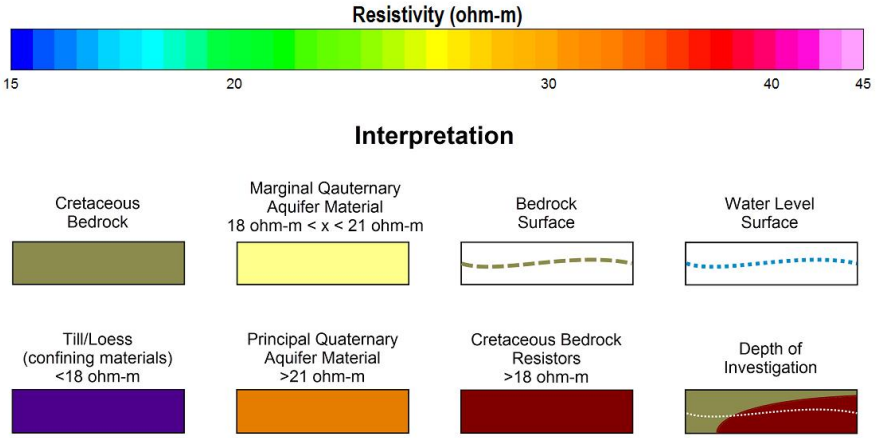

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

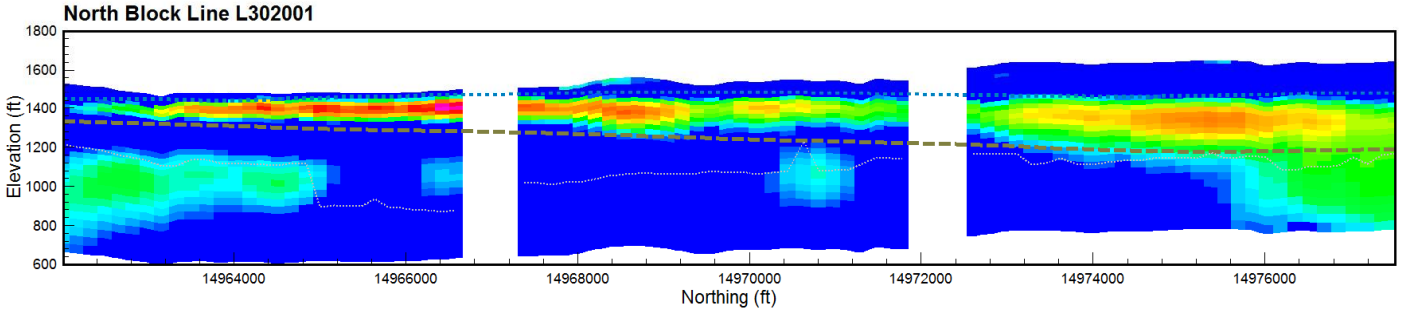

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

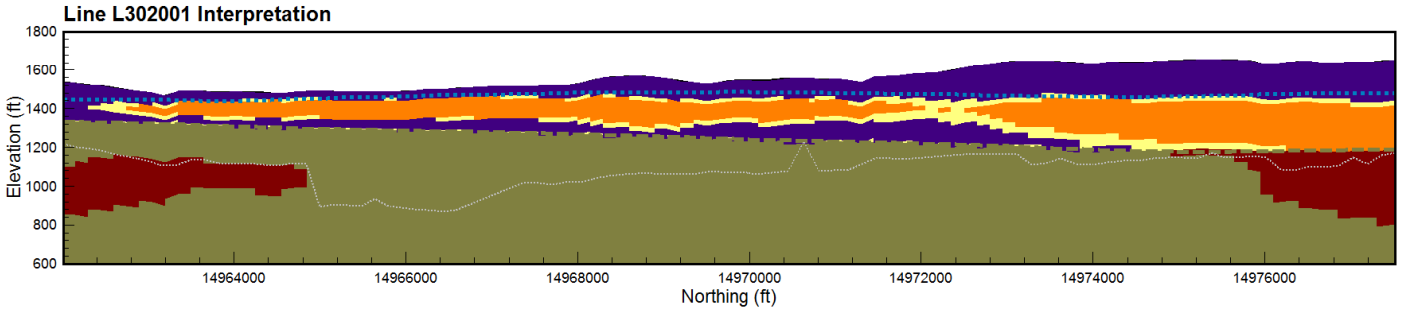

North Block Line L301901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

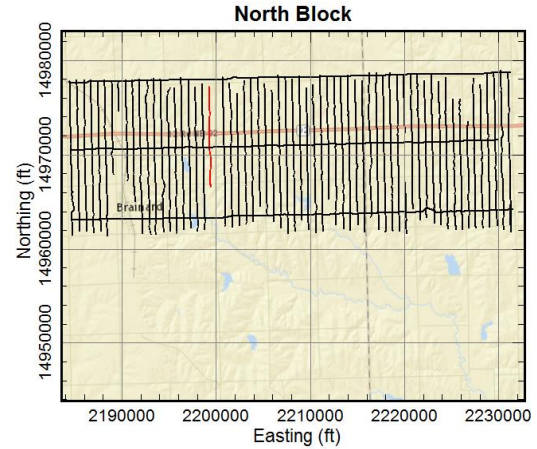

Line L301901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

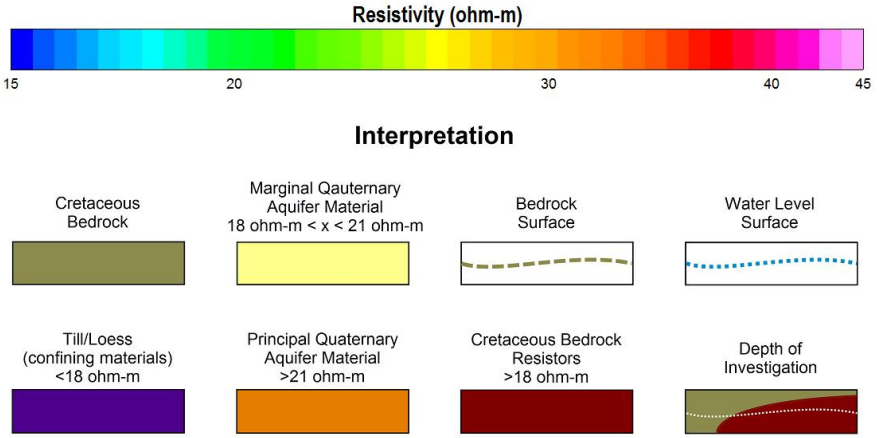

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

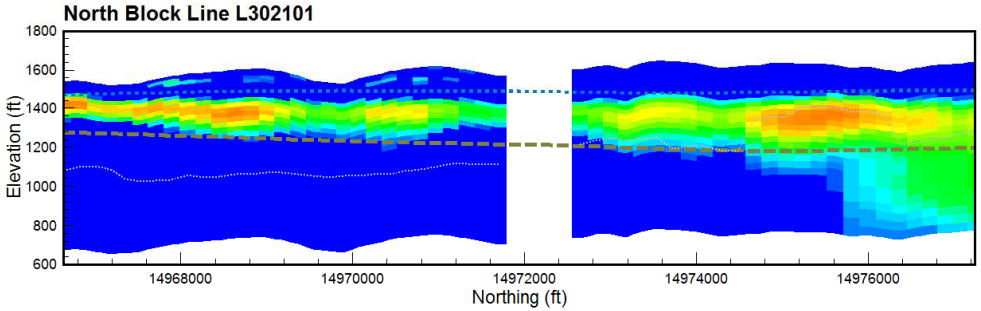

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

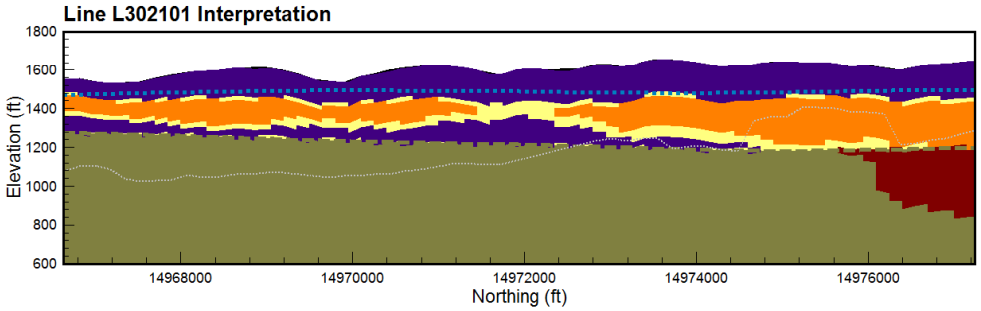

North Block Line L302001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

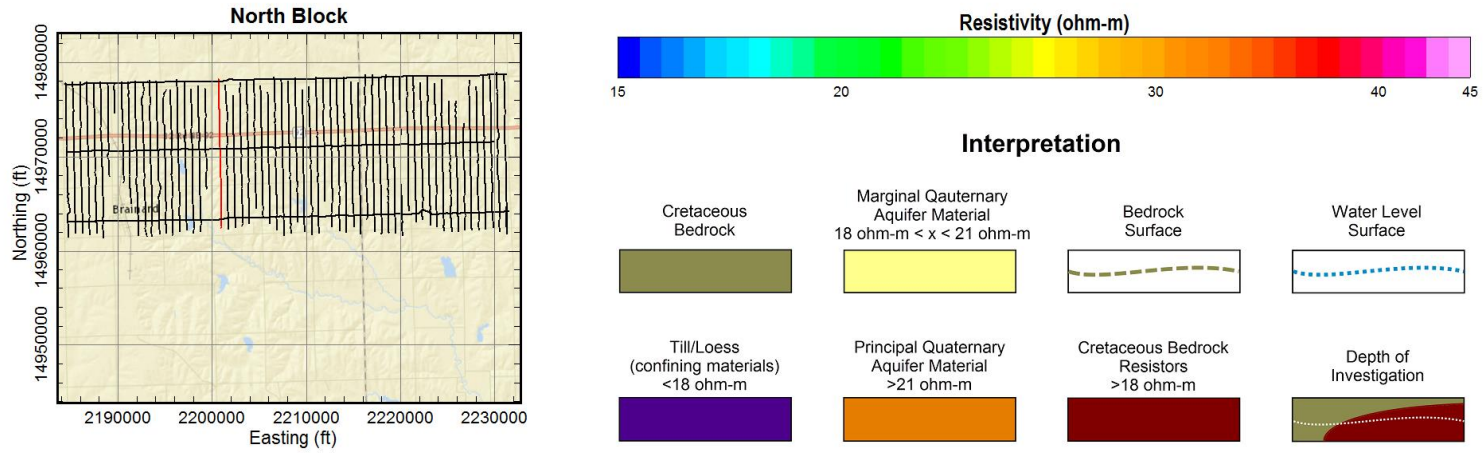

Line L302001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

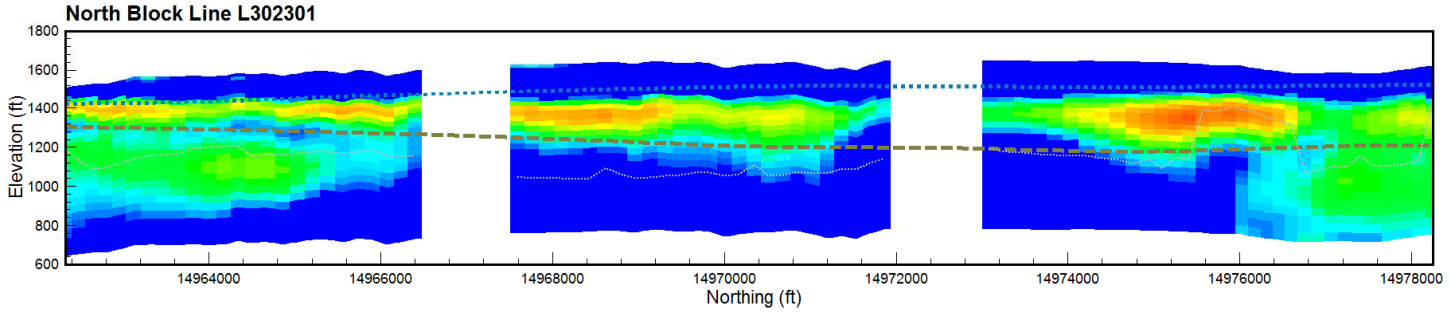

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

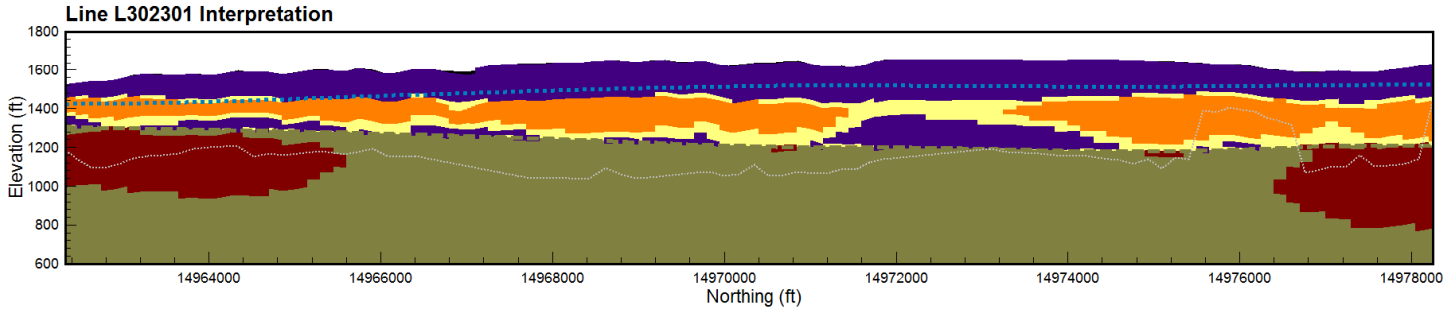

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

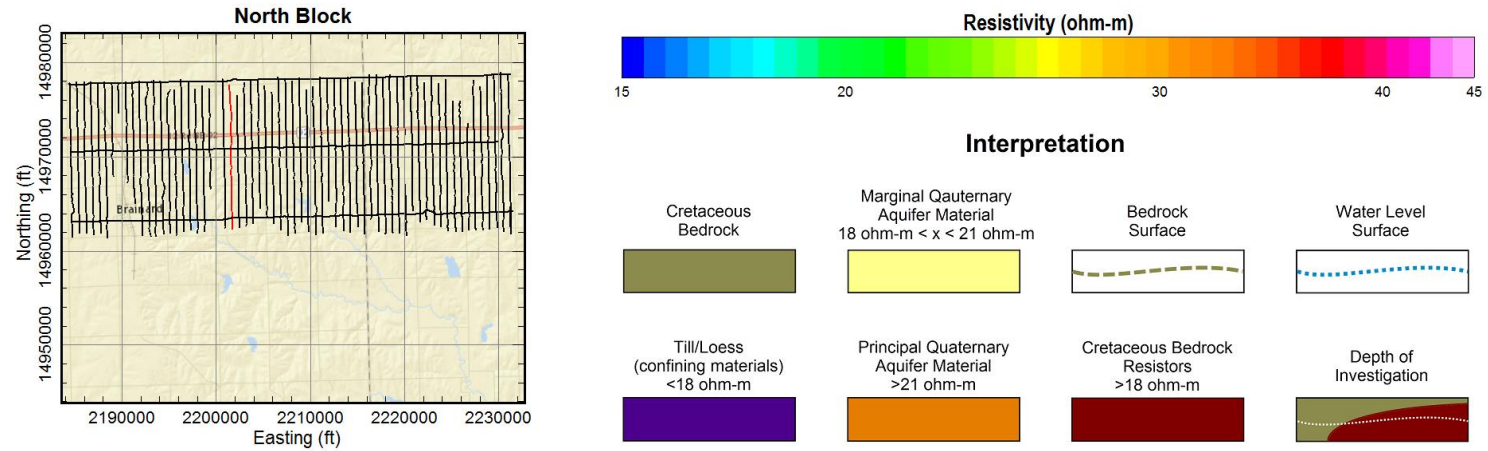

North Block Line L302101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14968000
14970000
14972000
14974000
14976000
Northing (ft)

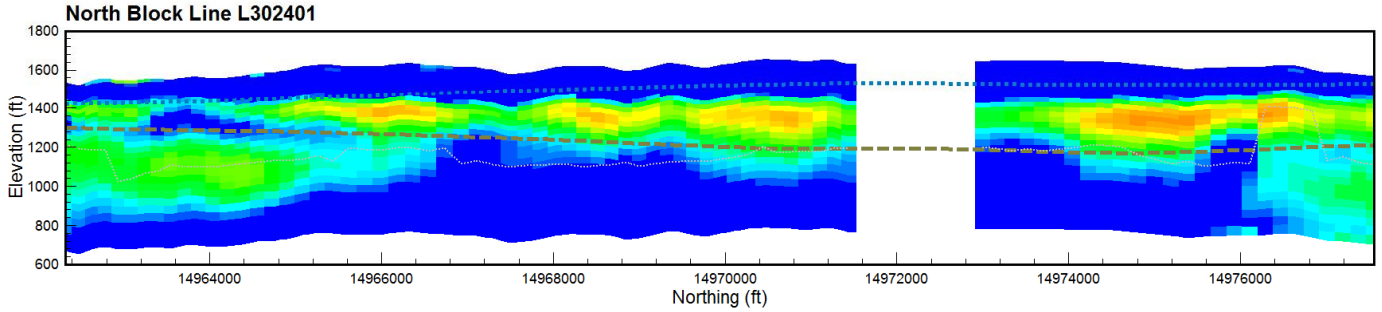

Line L302101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14968000
14970000
14972000
14974000
14976000
Northing (ft)

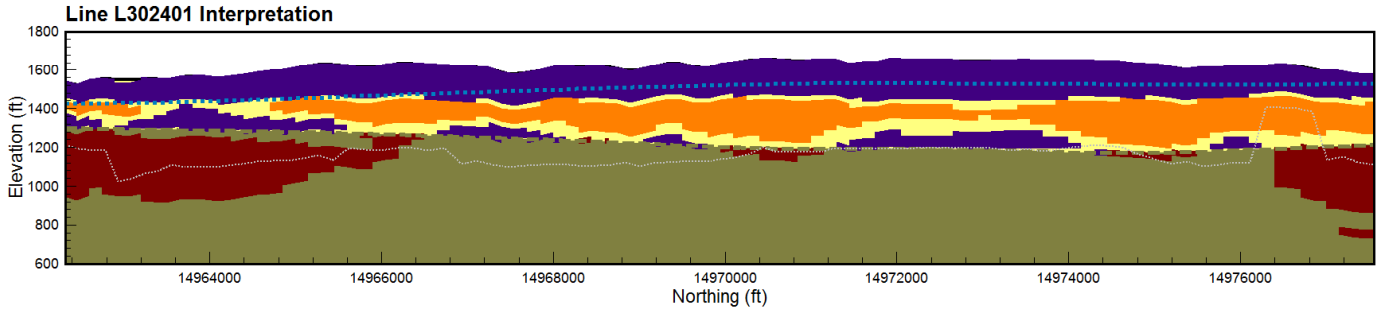

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

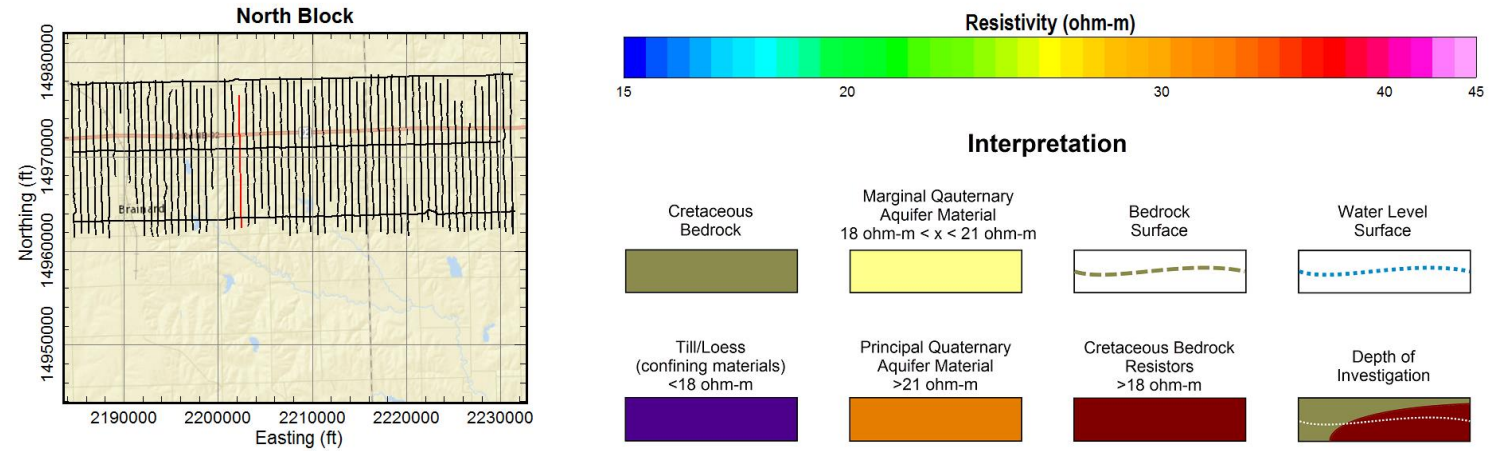

North Block Line L302301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

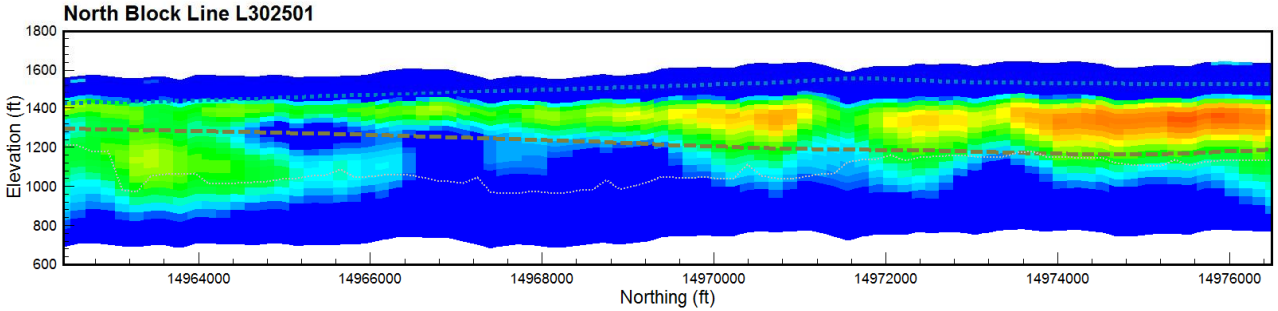

Line L302301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
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14974000
14976000
14978000
Northing (ft)

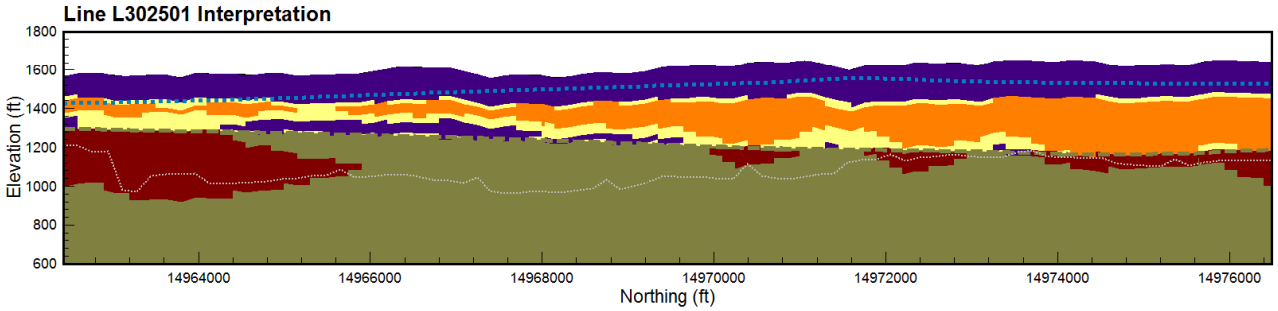

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

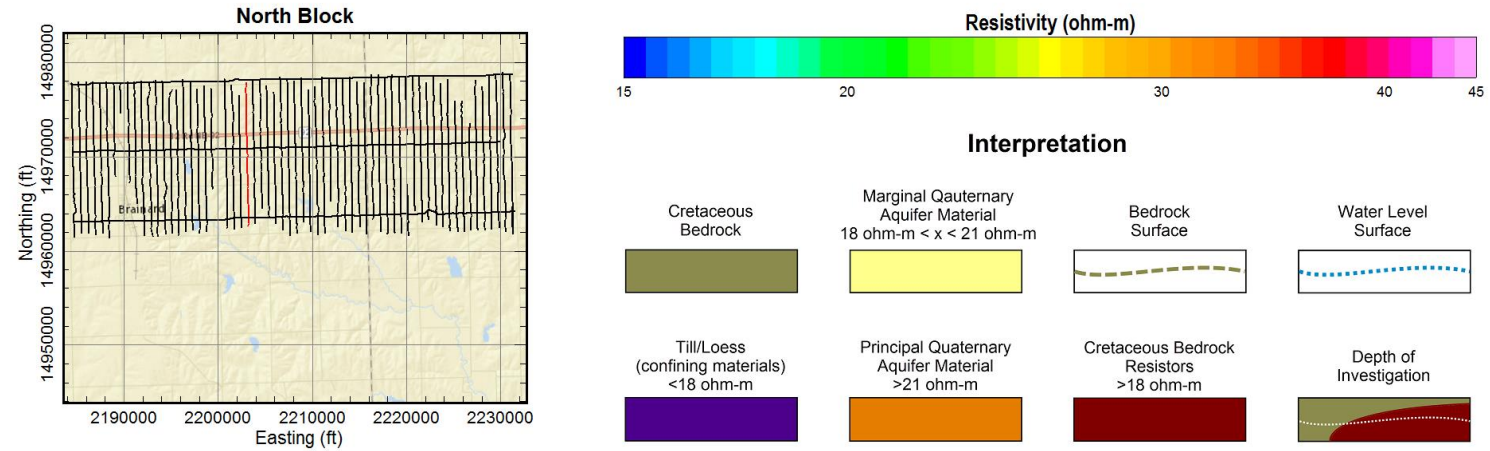

North Block Line L302401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

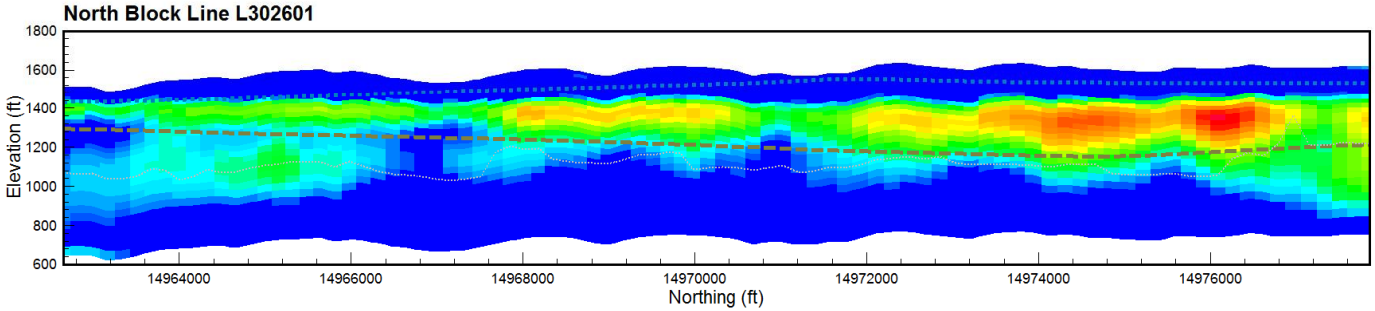

Line L302401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

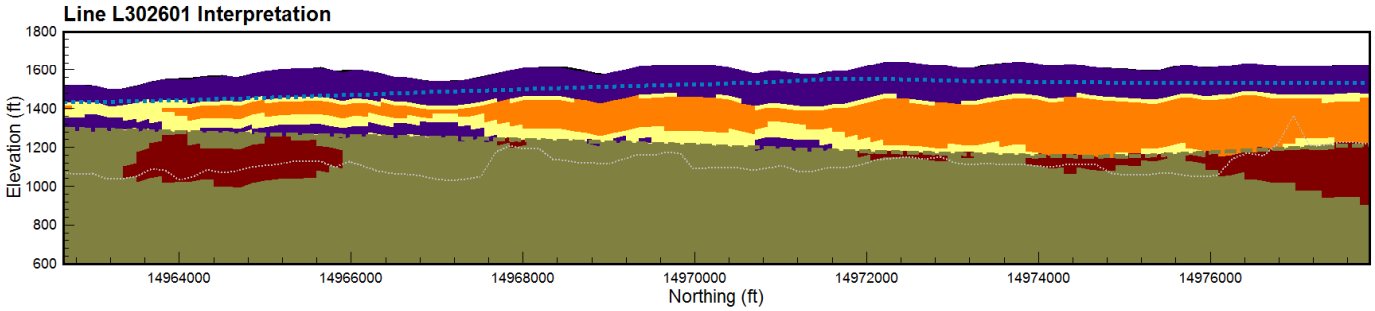

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

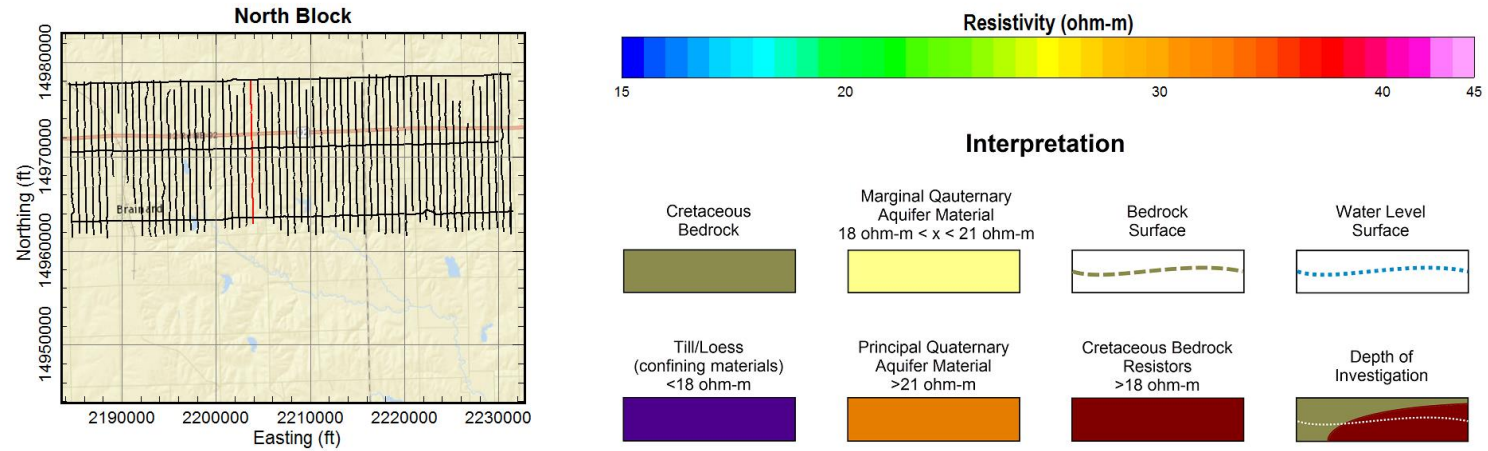

North Block Line L302501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

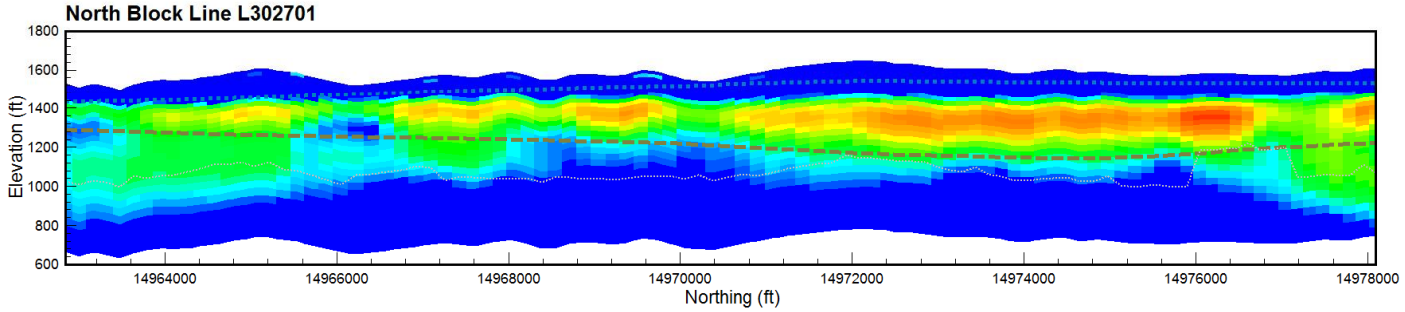

Line L302501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

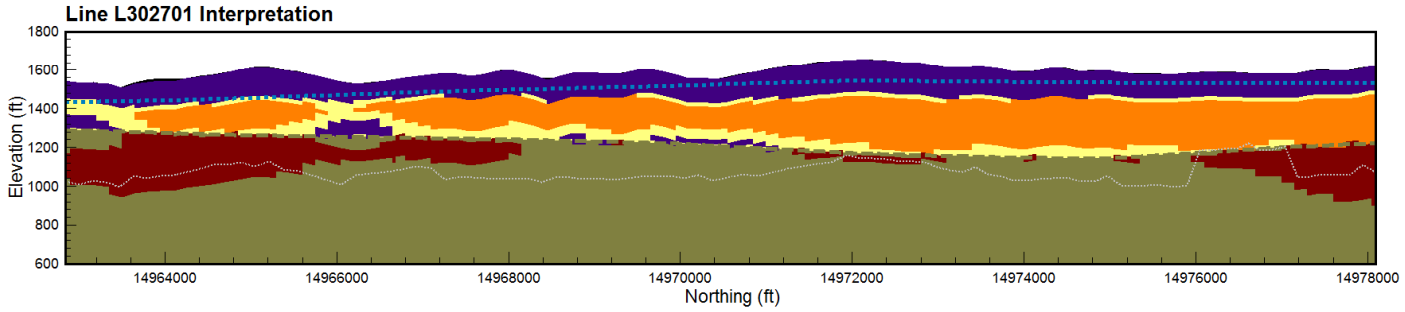

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

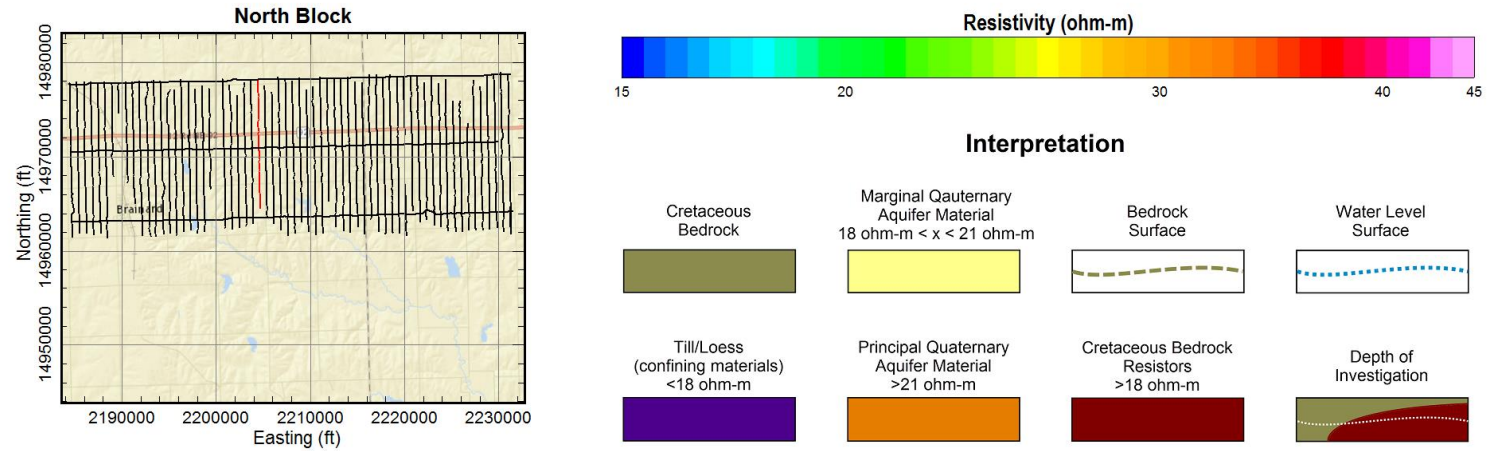

North Block Line L302601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

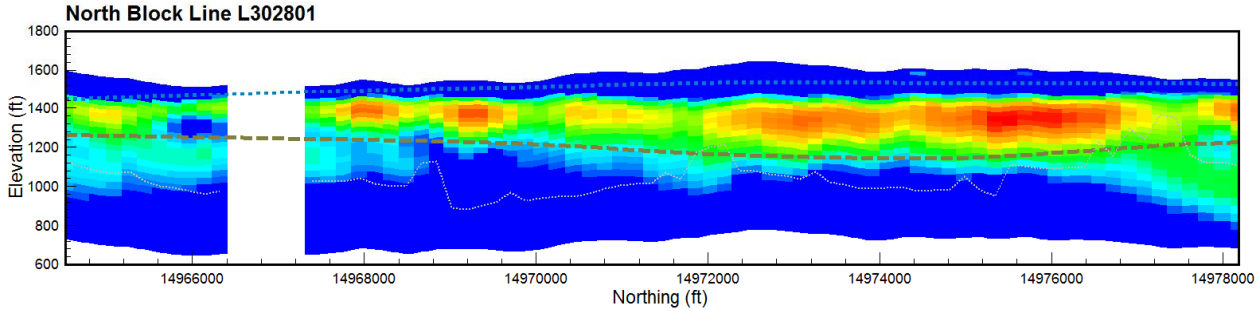

Line L302601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

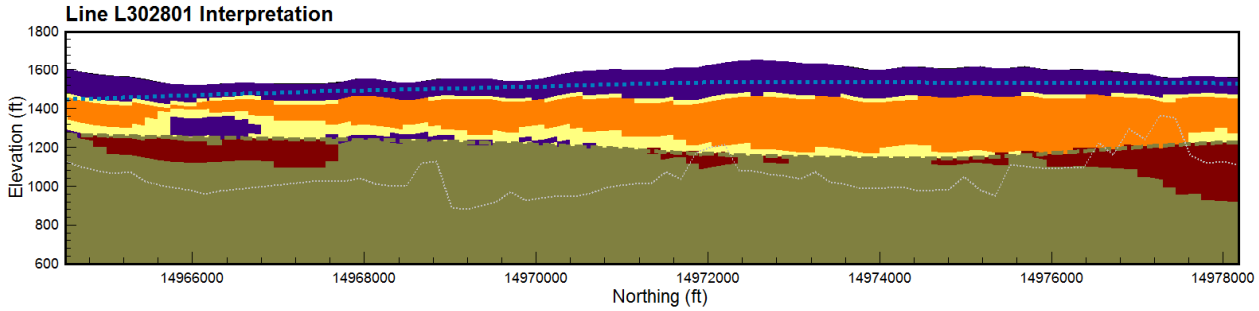

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

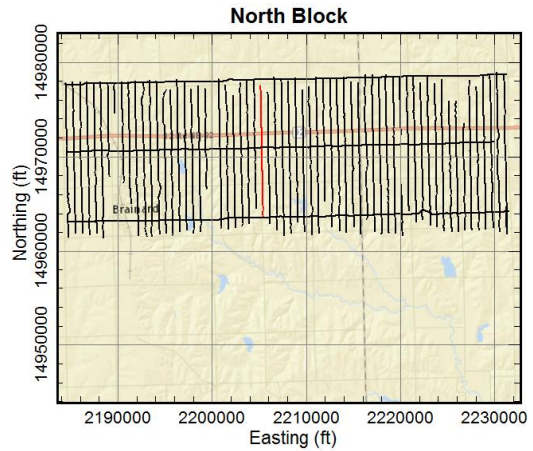

North Block Line L302701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

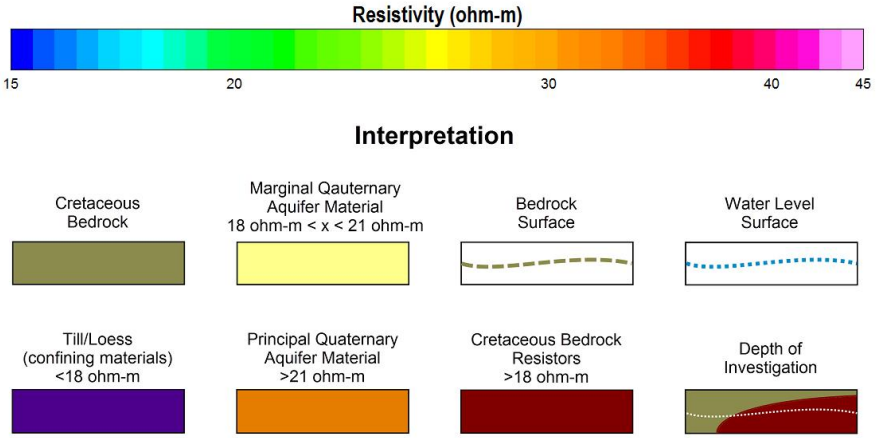

Line L302701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

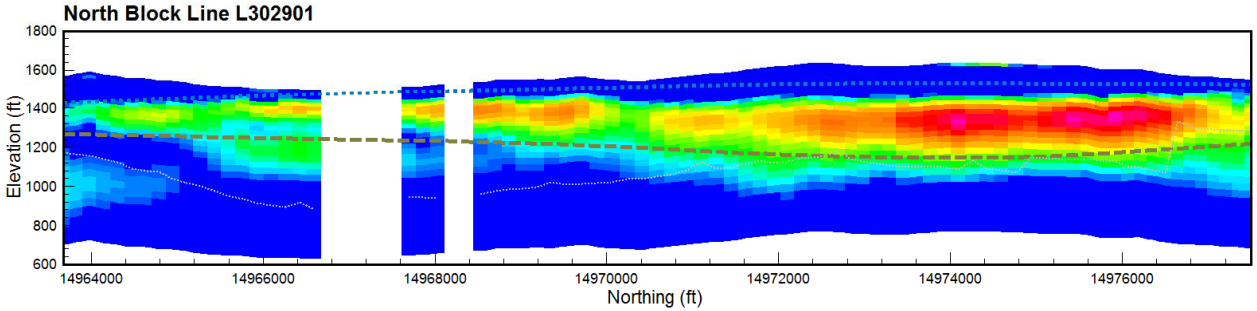

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

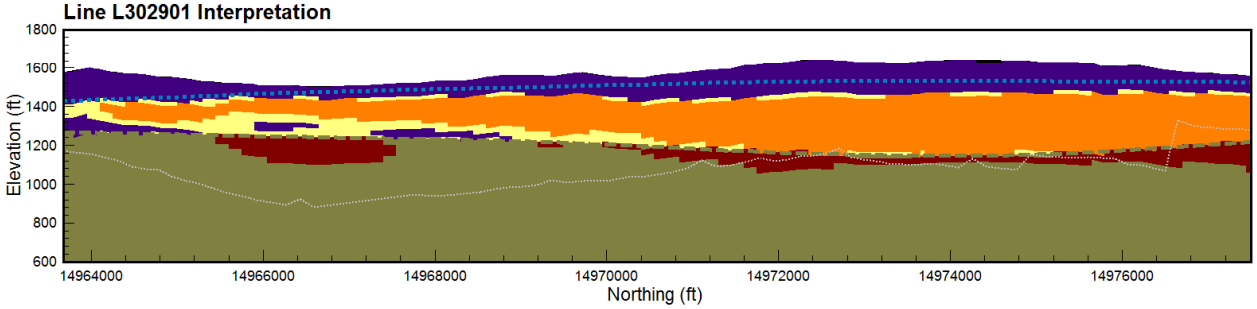

North Block Line L302801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

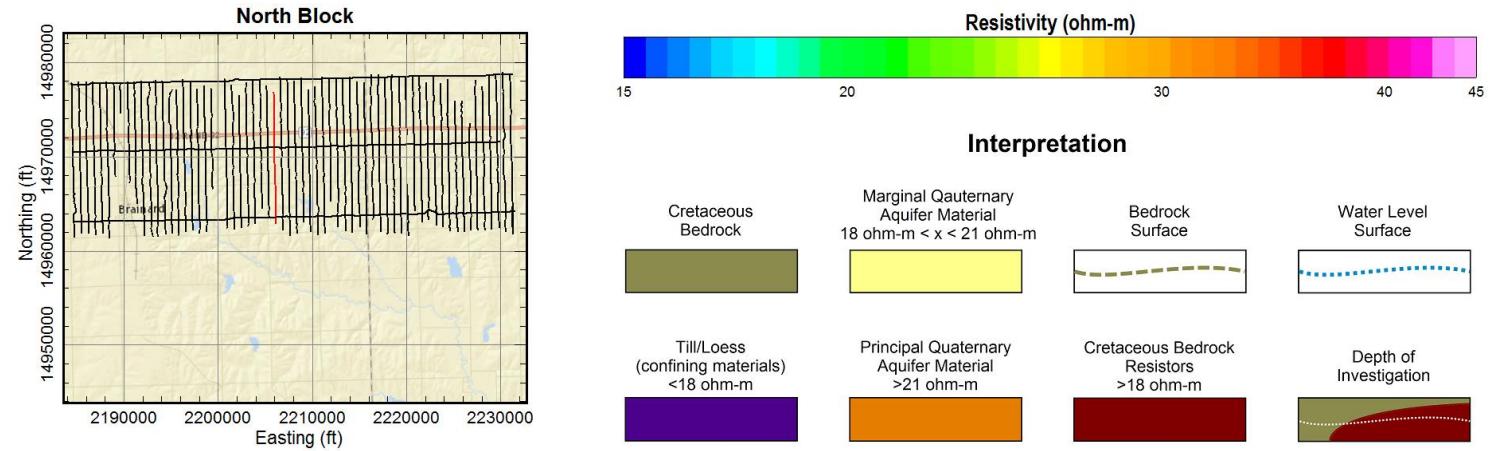

Line L302801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

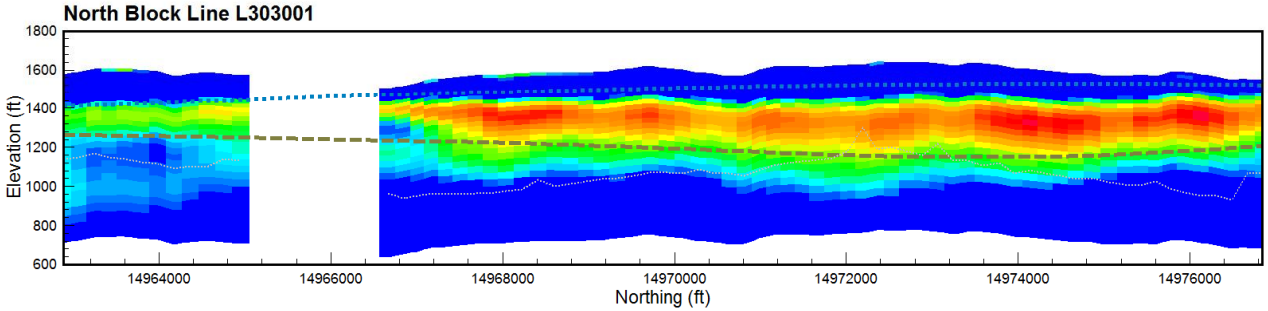

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

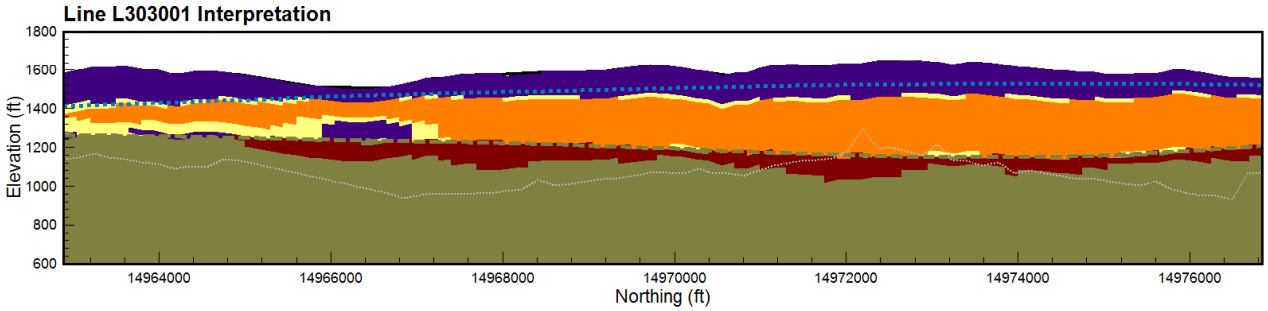

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

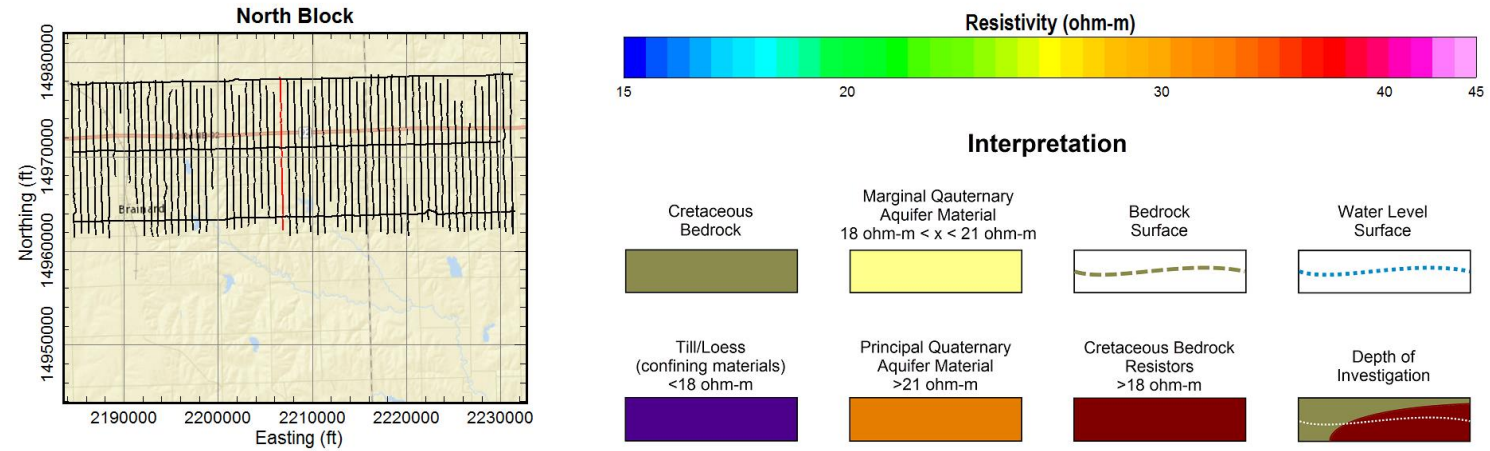

North Block Line L302901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

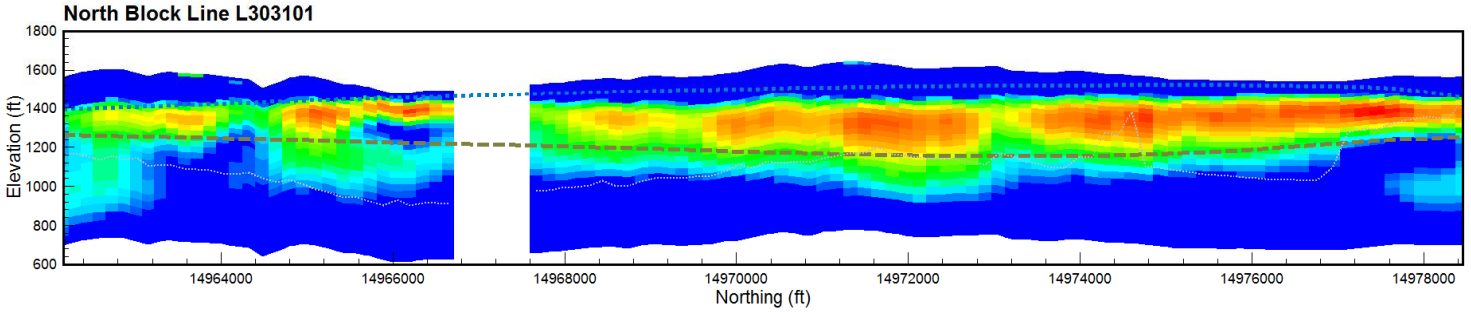

Line L302901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

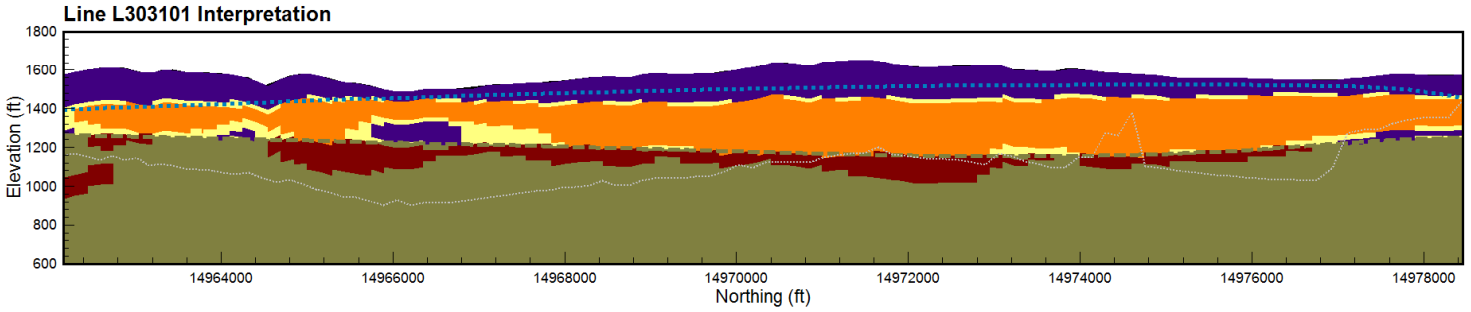

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

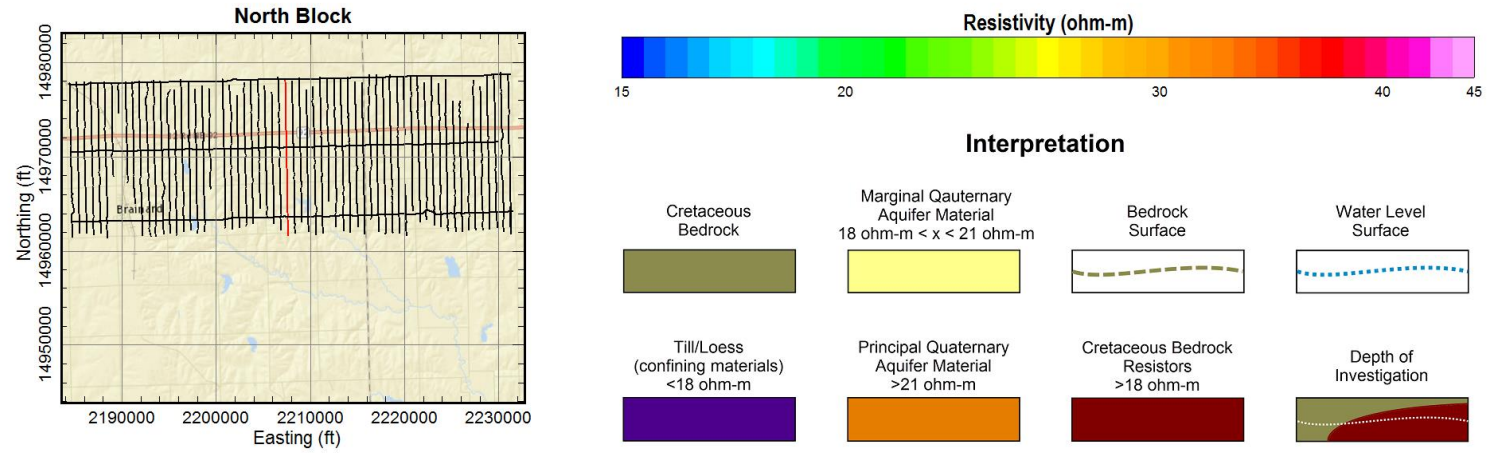

North Block Line L303001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

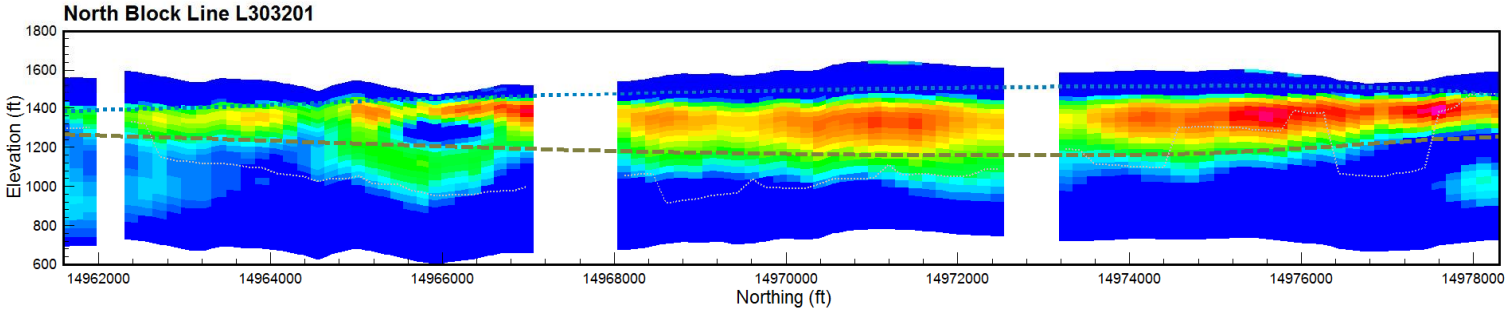

Line L303001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

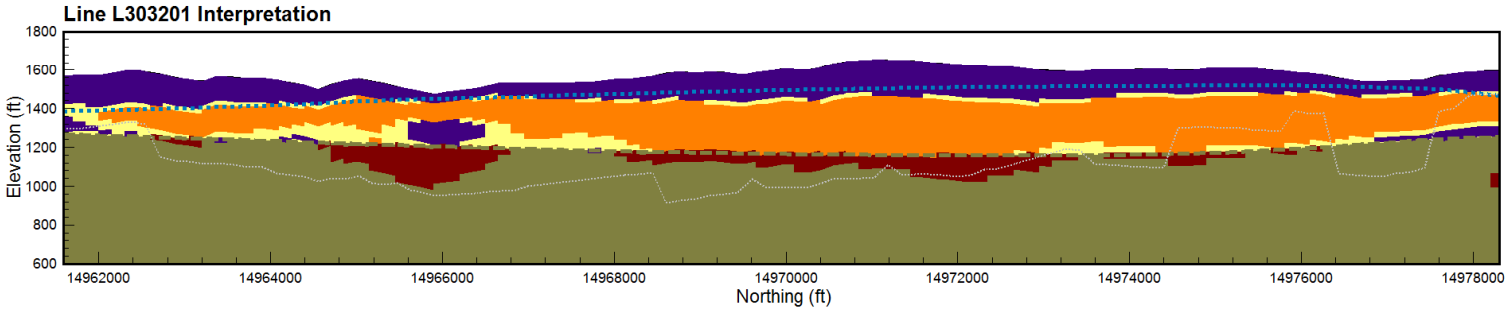

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

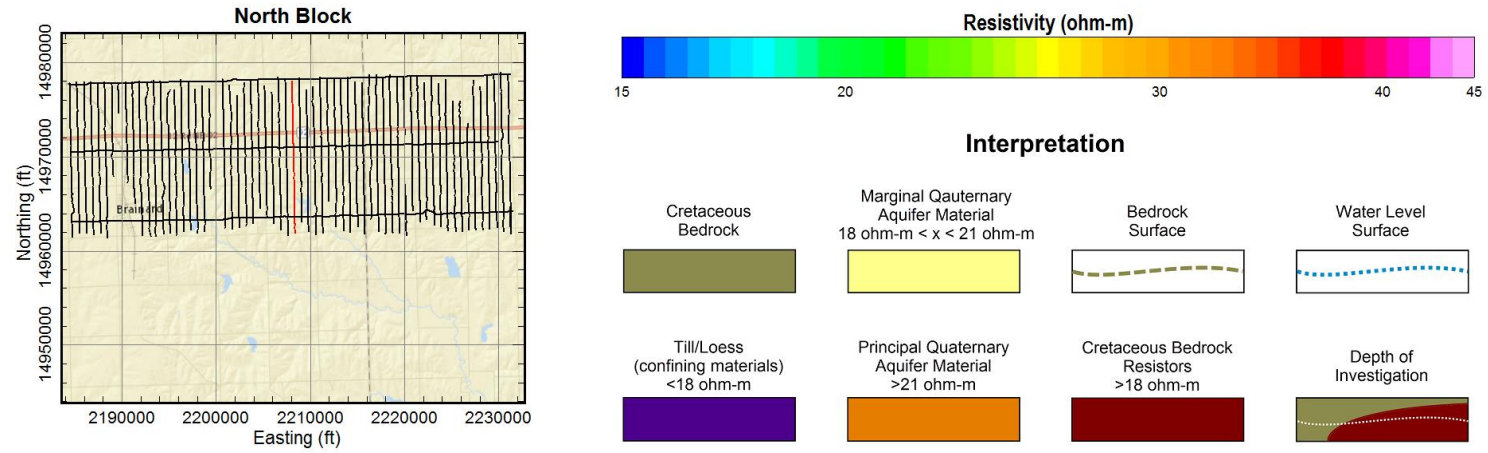

North Block Line L303101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

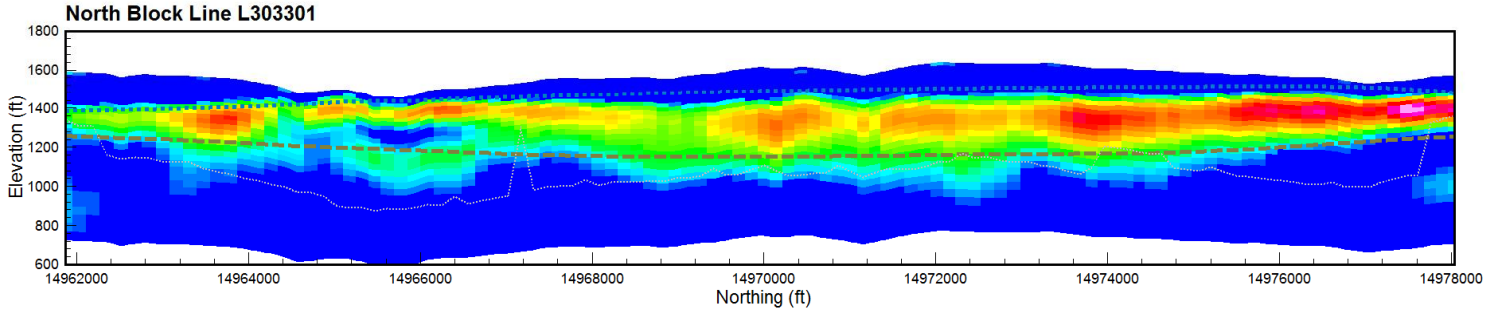

Line L303101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

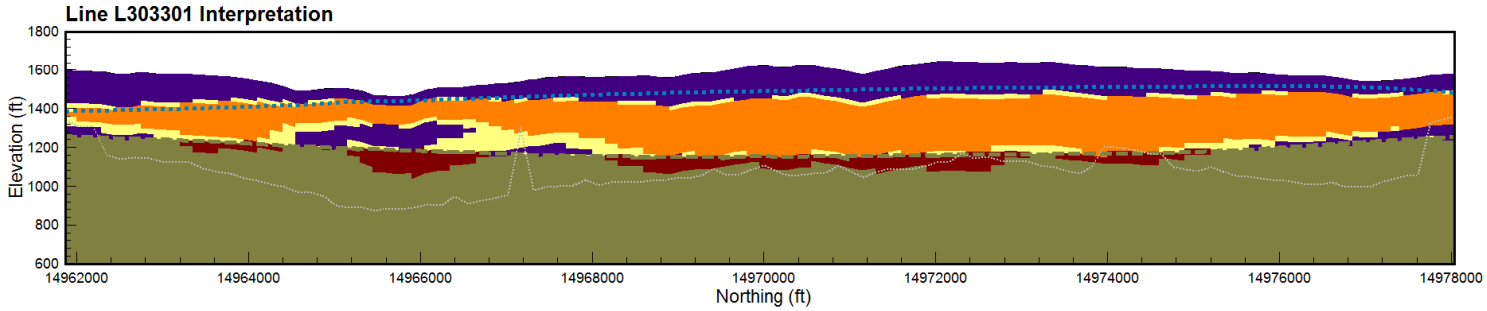

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

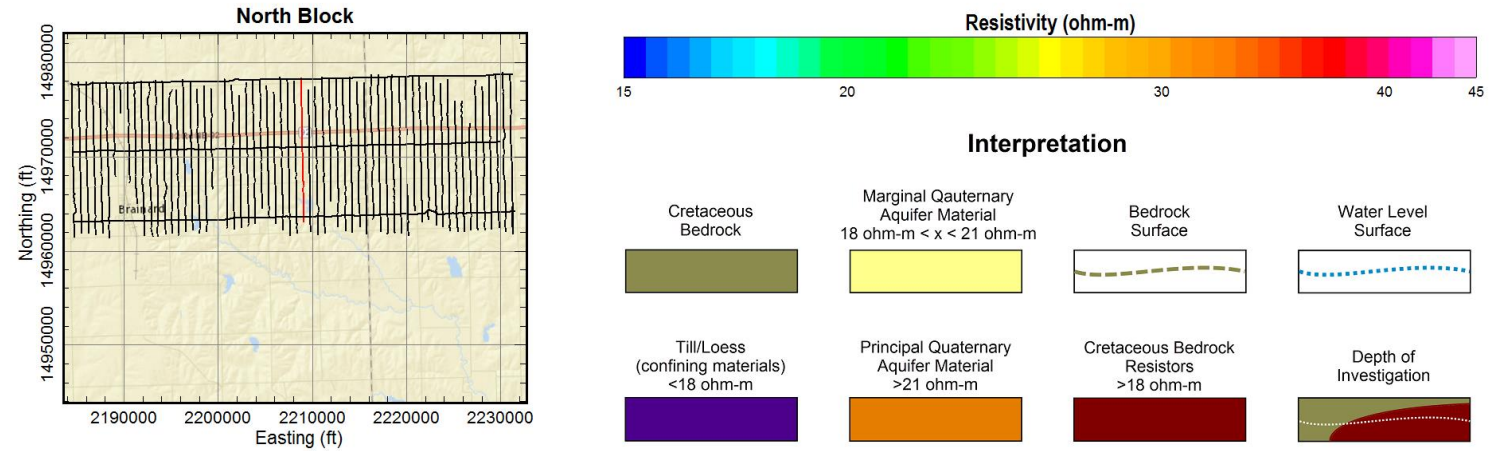

North Block Line L303201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

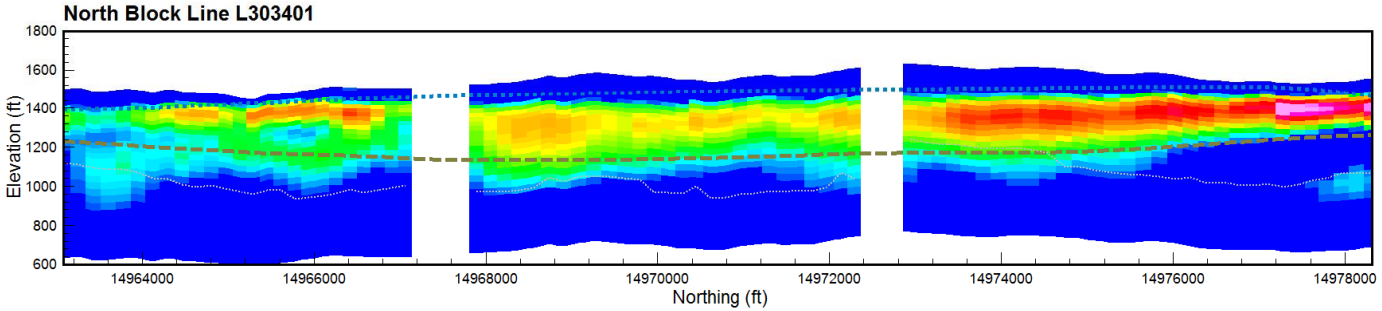

Line L303201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

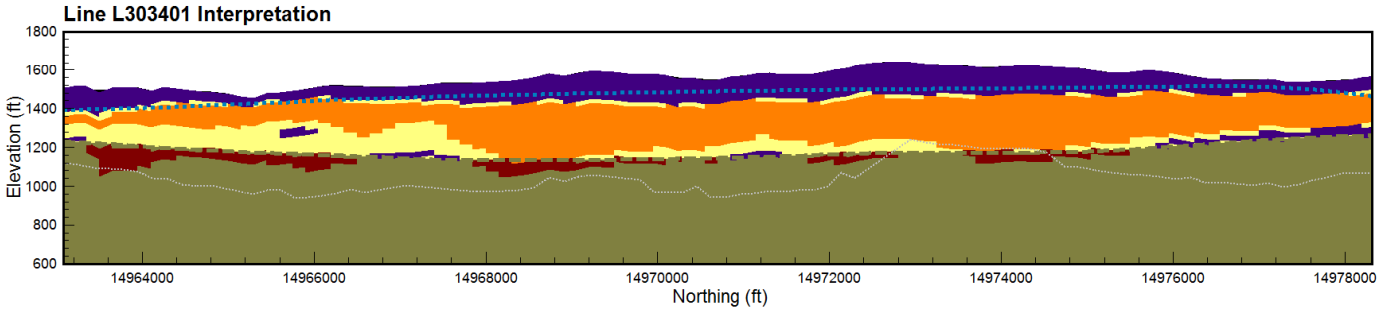

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

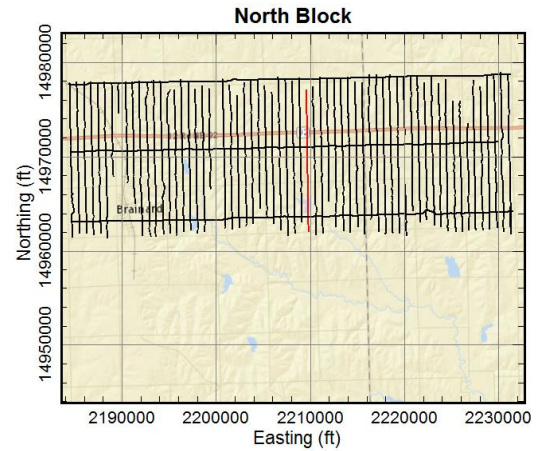

North Block Line L303301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

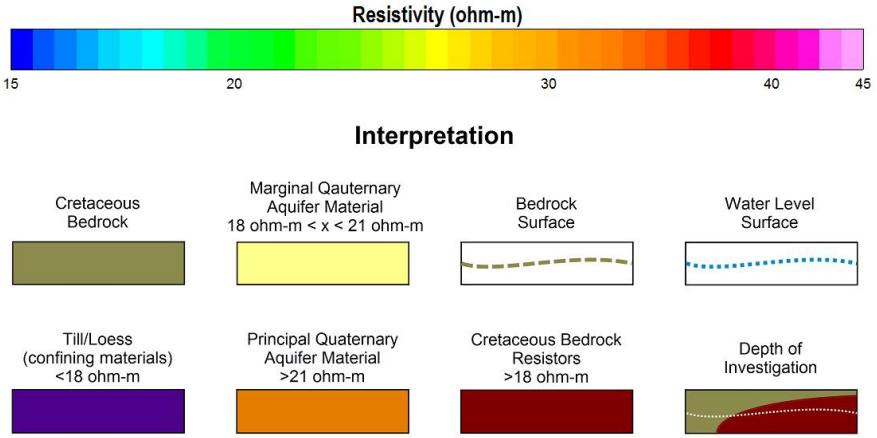

Line L303301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

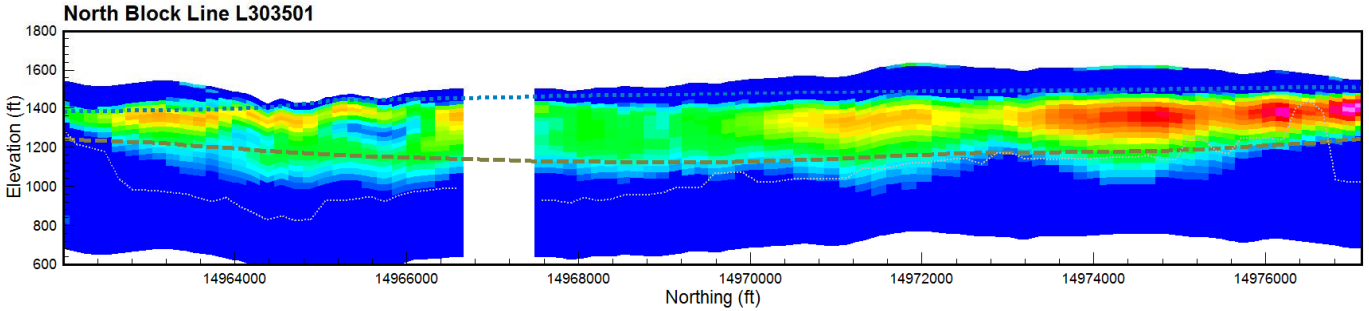

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

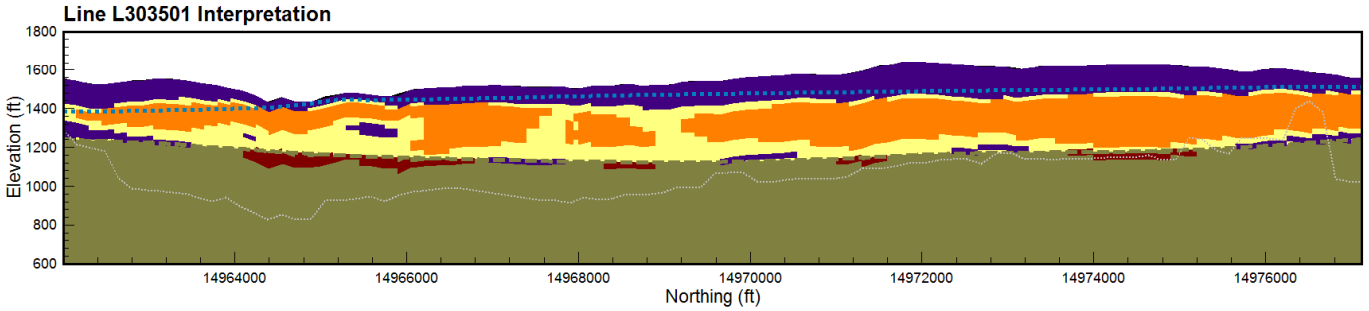

North Block Line L303401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

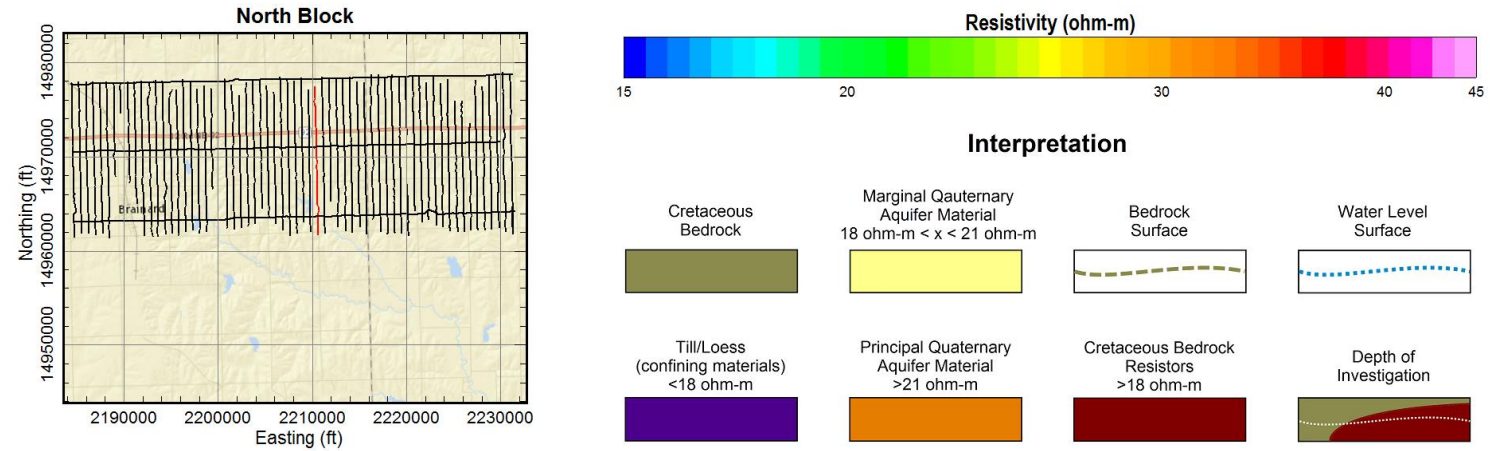

Line L303401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

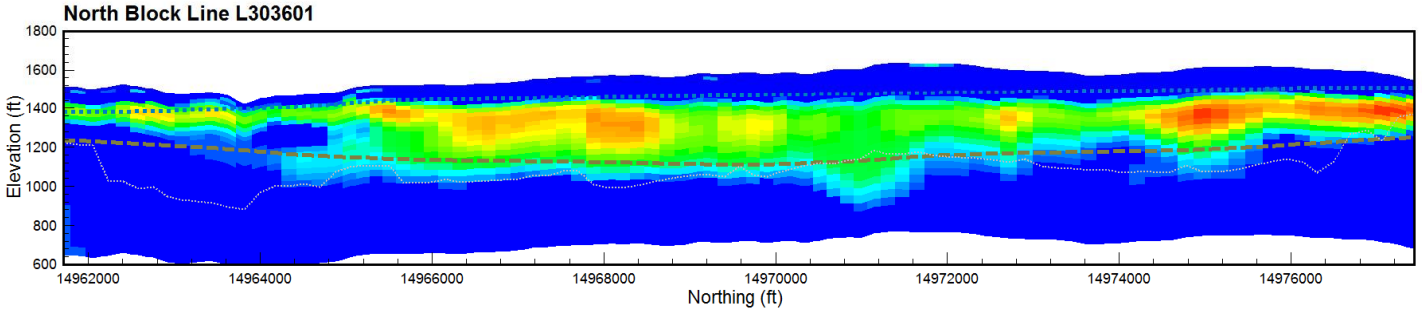

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

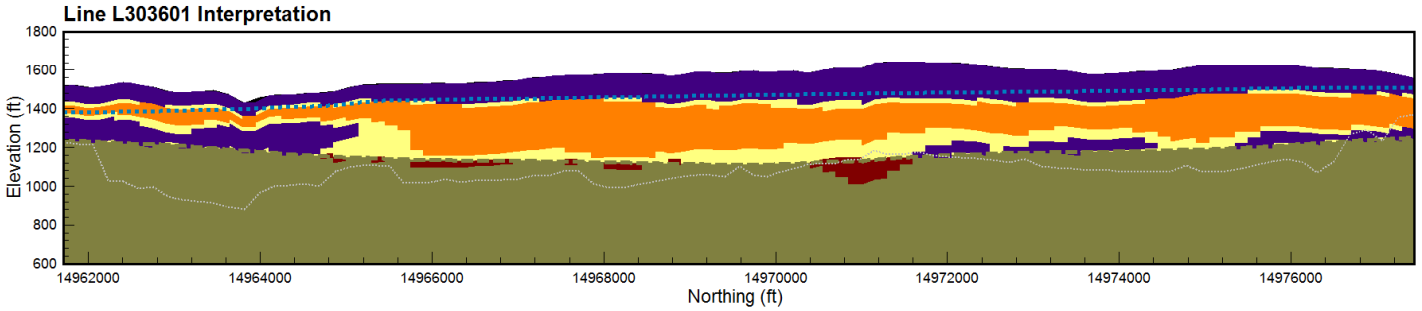

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

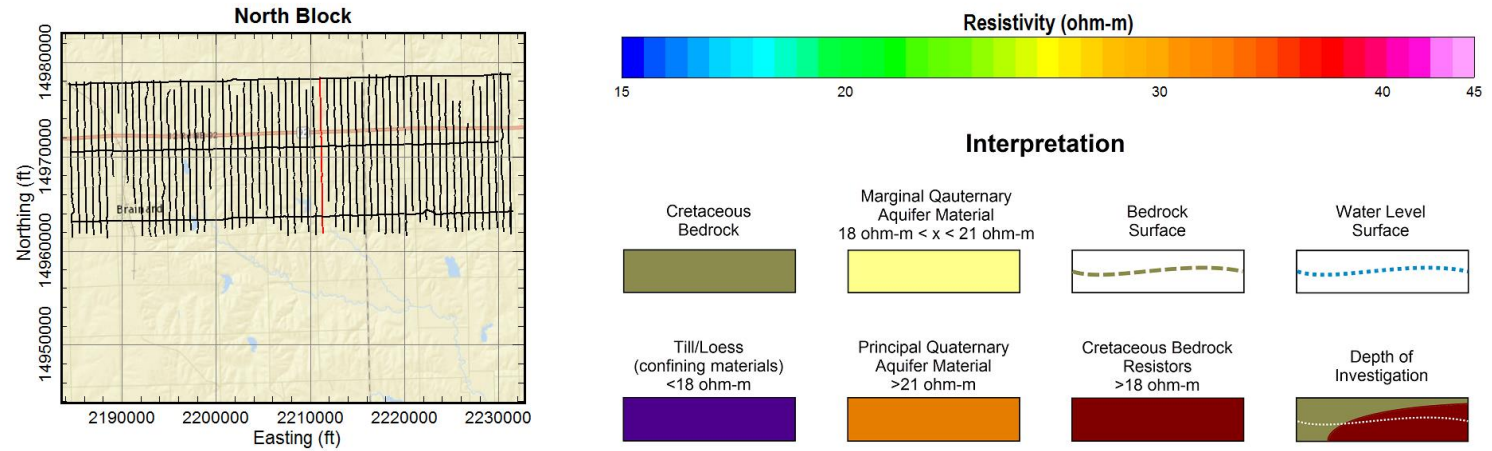

North Block Line L303501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

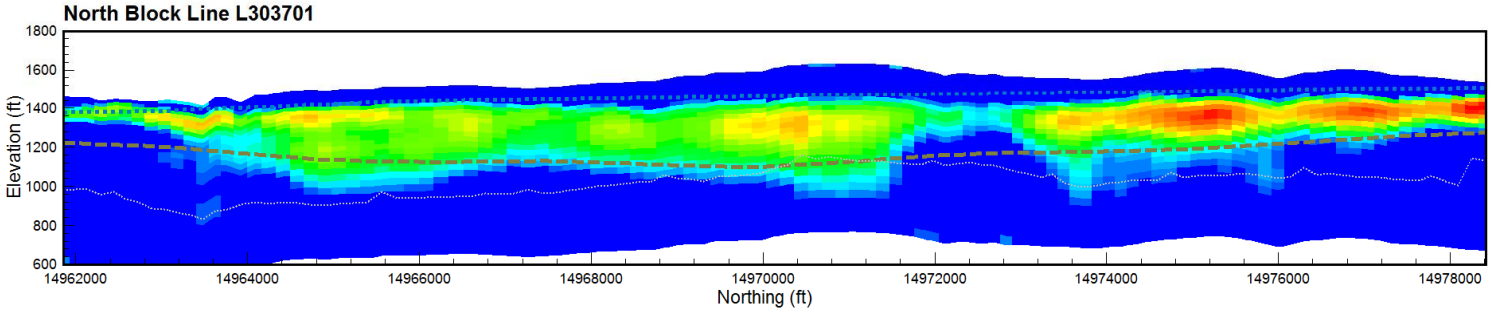

Line L303501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

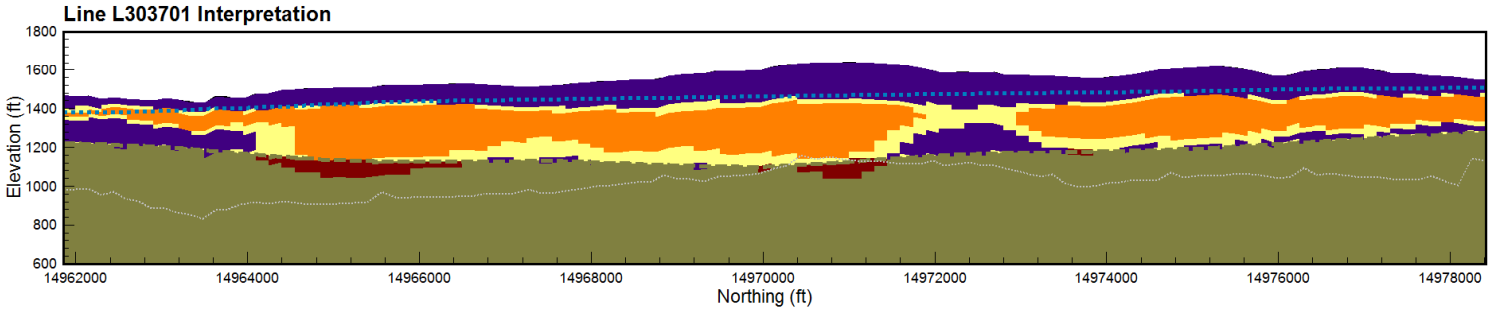

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

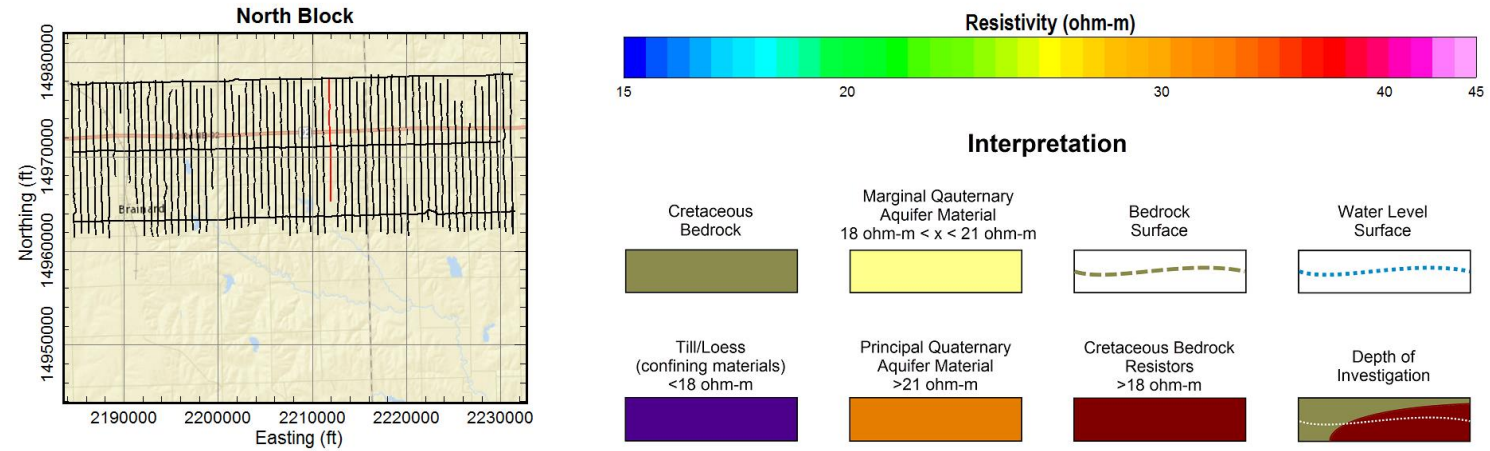

North Block Line L303601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

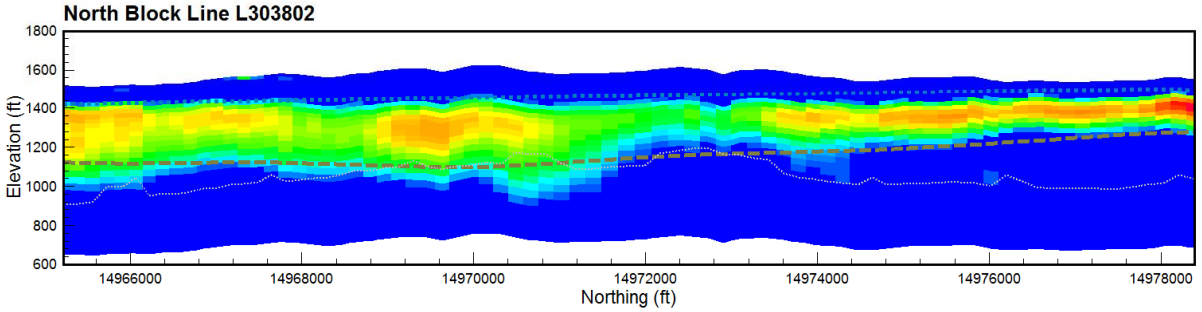

Line L303601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

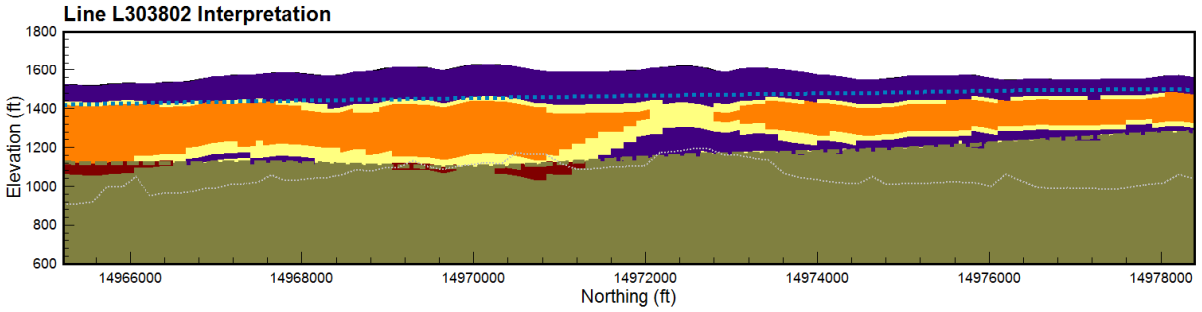

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

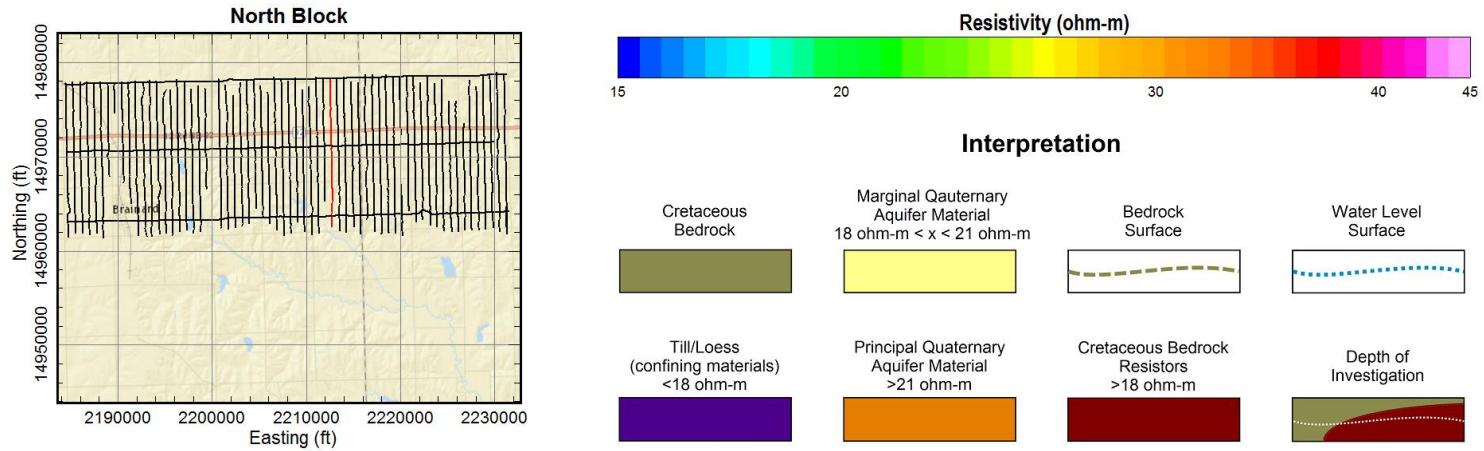

North Block Line L303701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

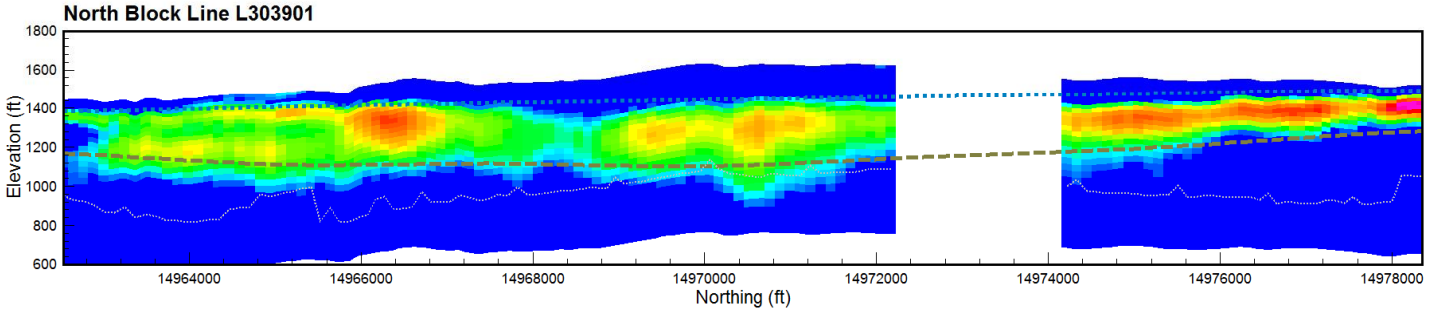

Line L303701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

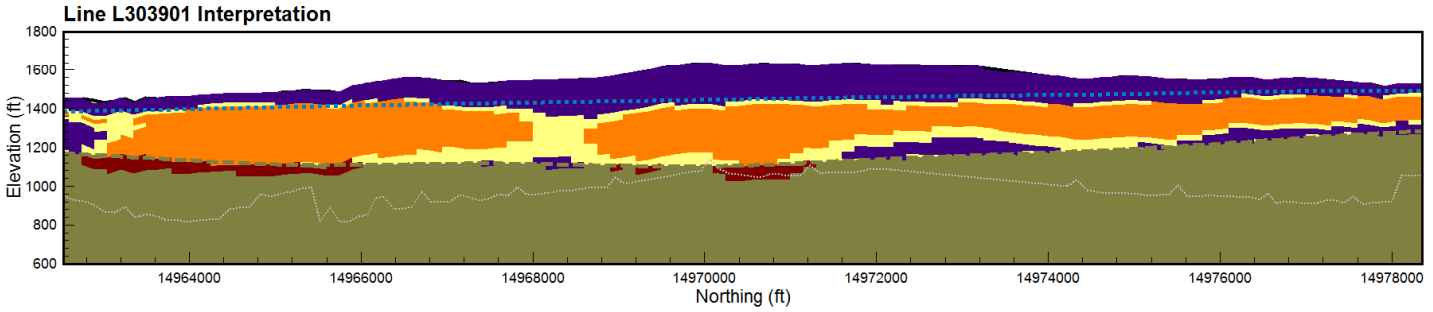

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

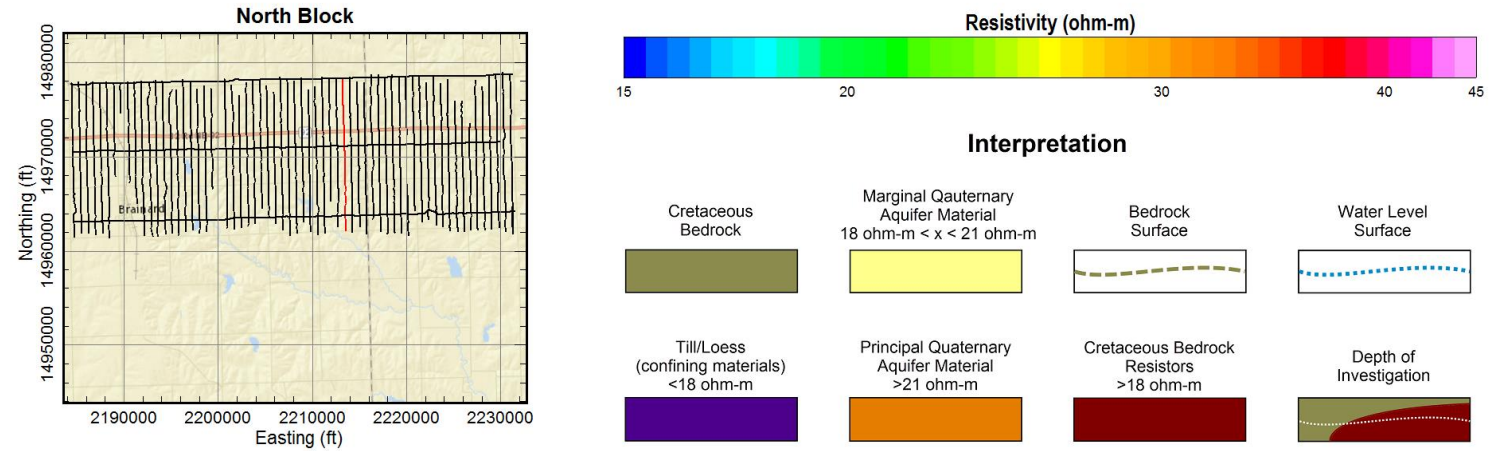

North Block Line L303802
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

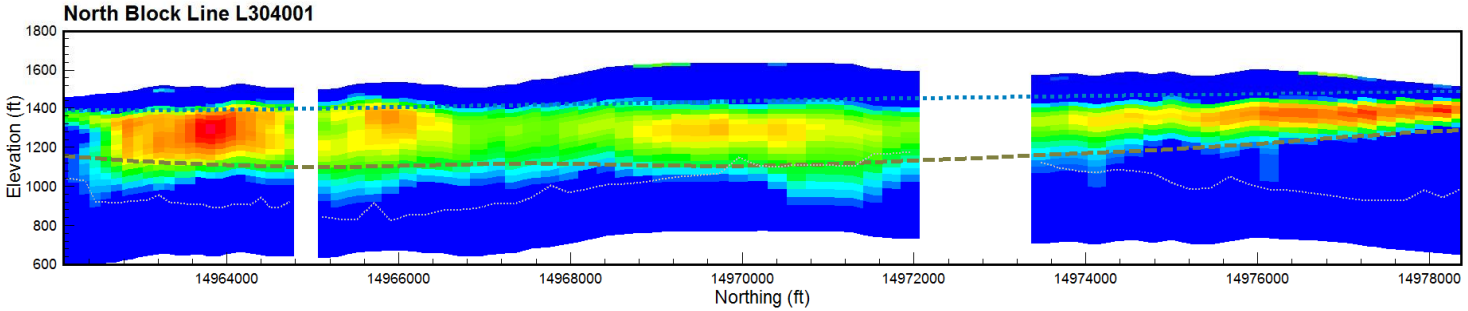

Line L303802 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

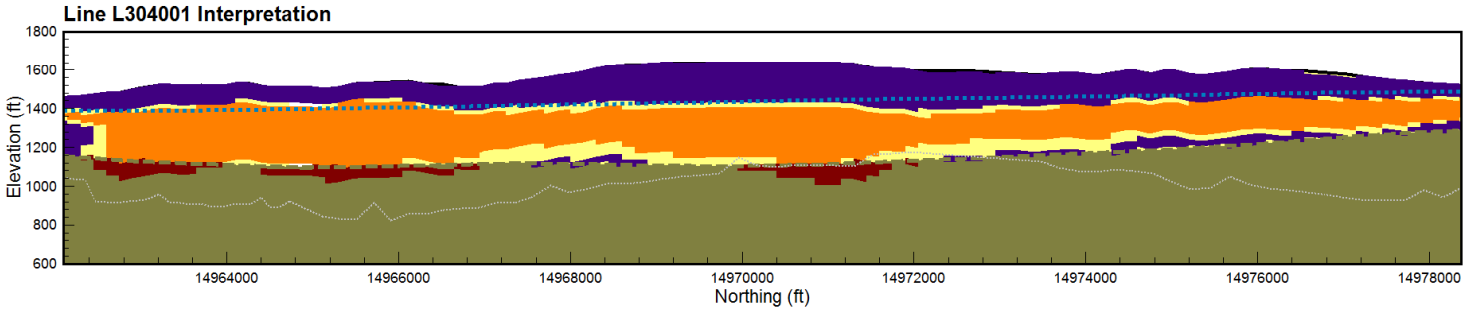

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

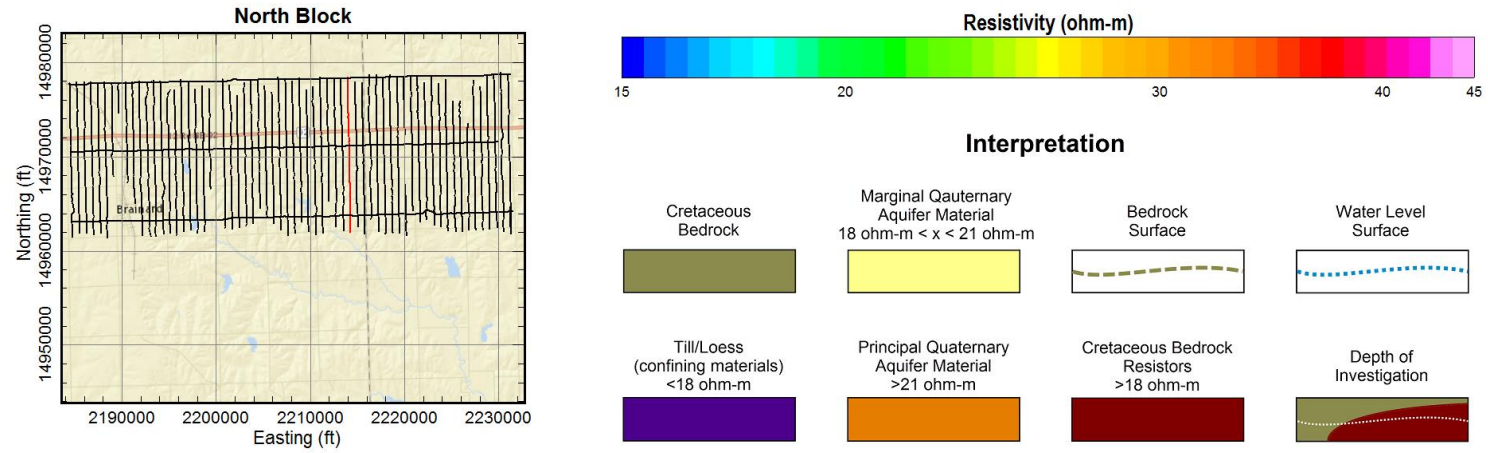

North Block Line L303901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

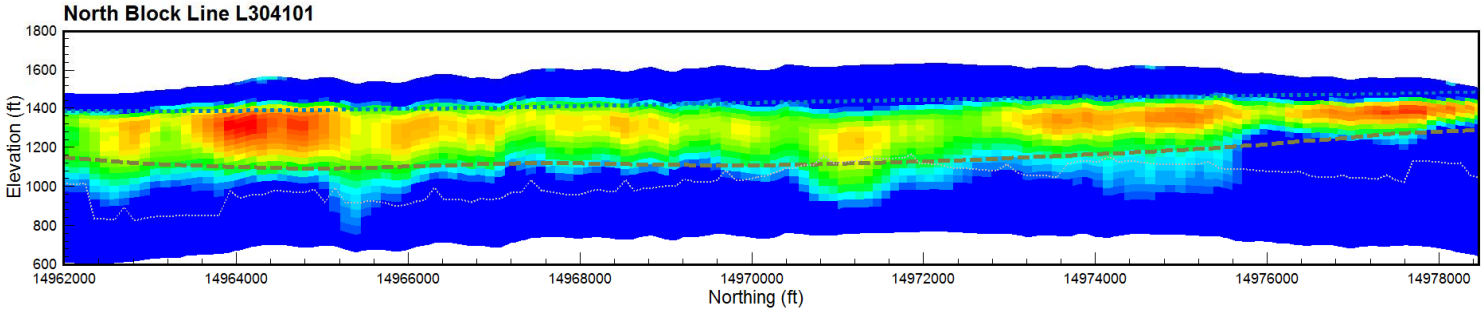

Line L303901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

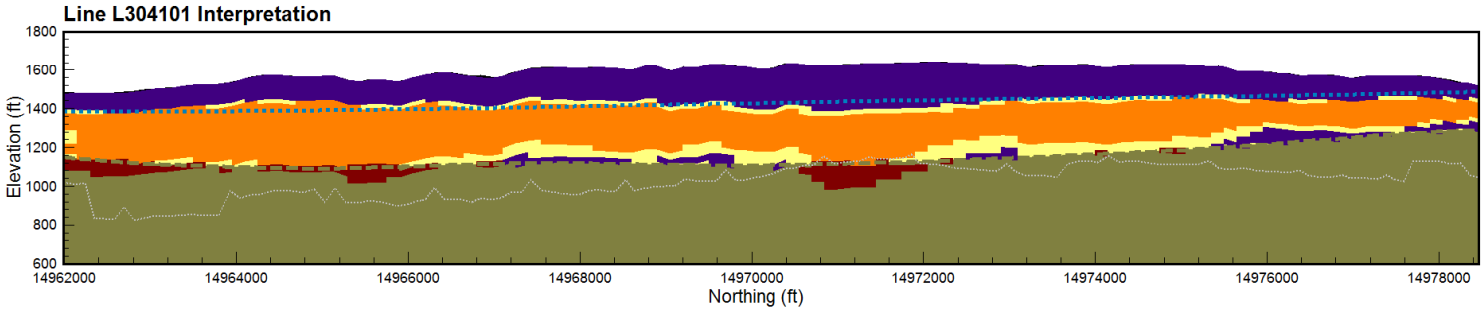

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

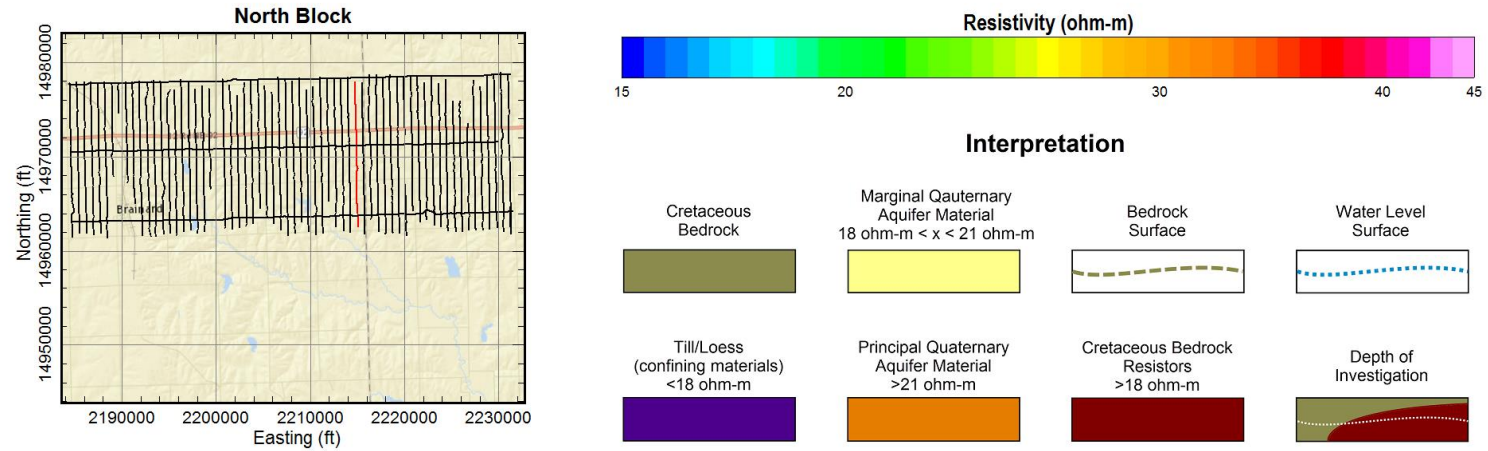

North Block Line L304001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

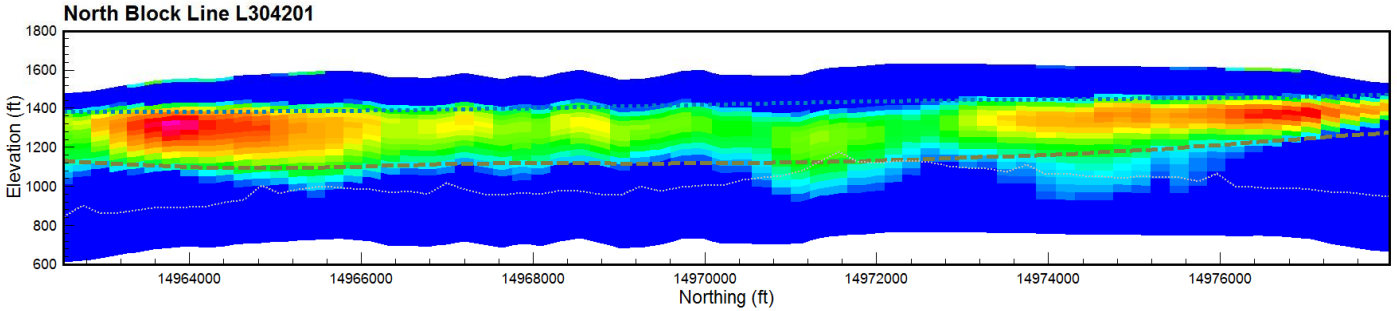

Line L304001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

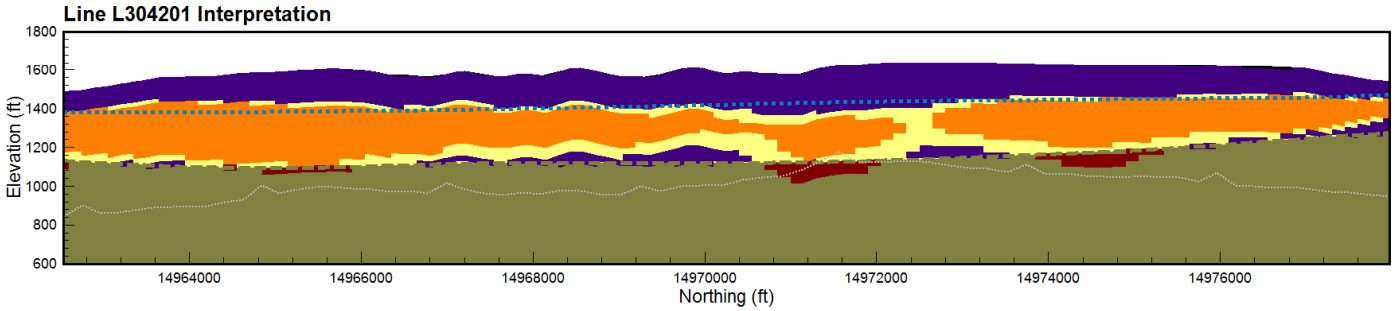

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

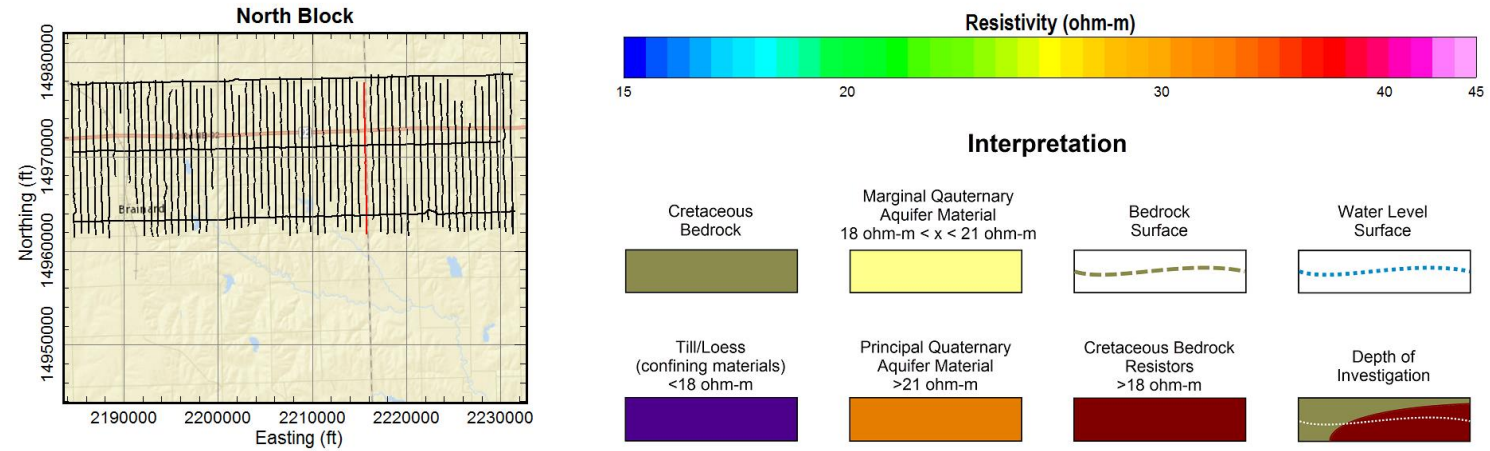

North Block Line L304101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

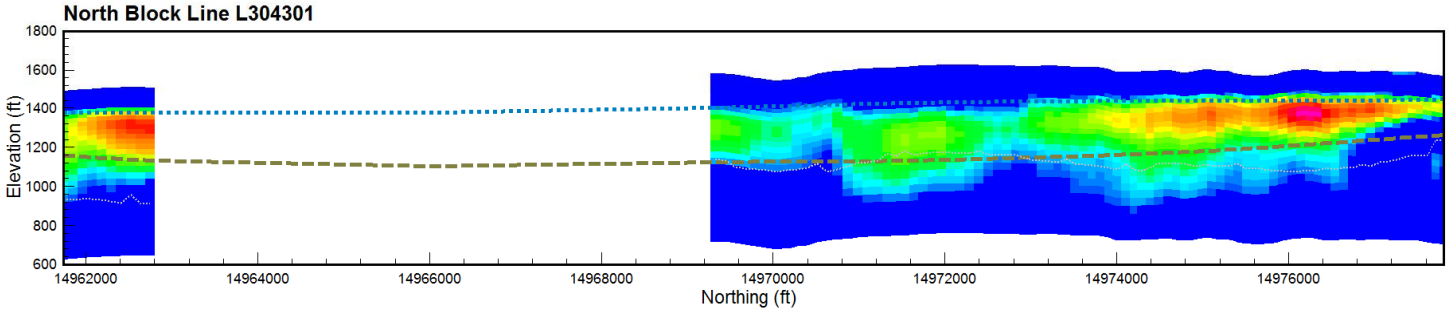

Line L304101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

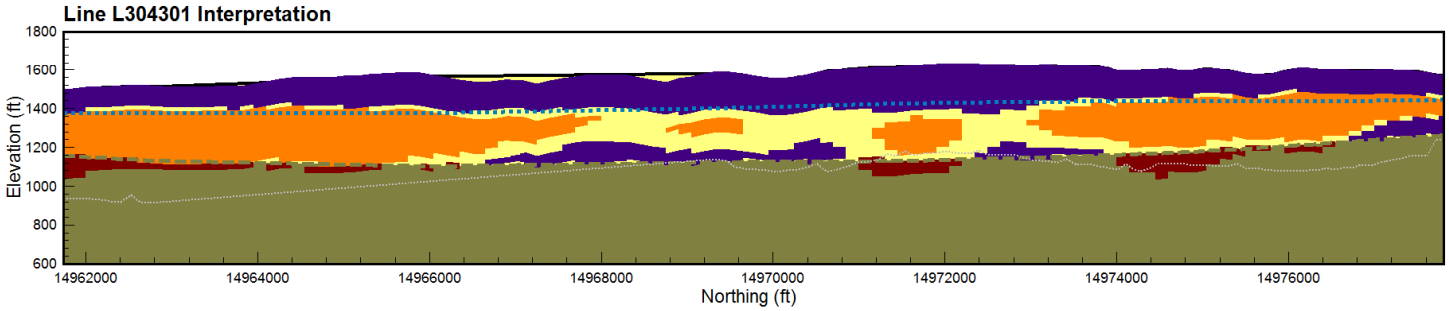

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

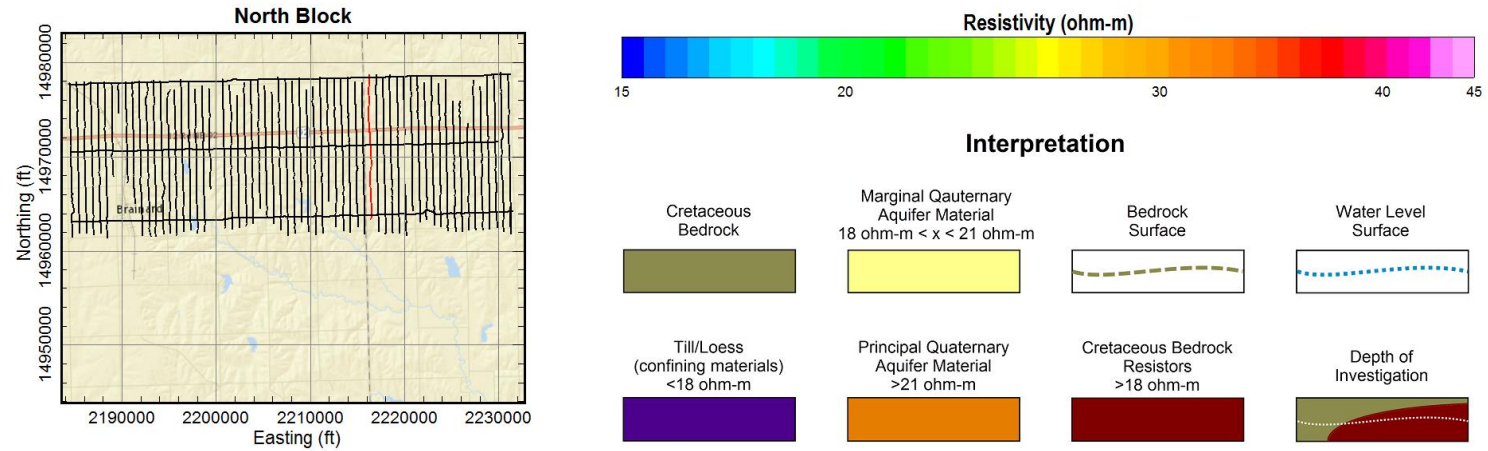

North Block Line L304201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

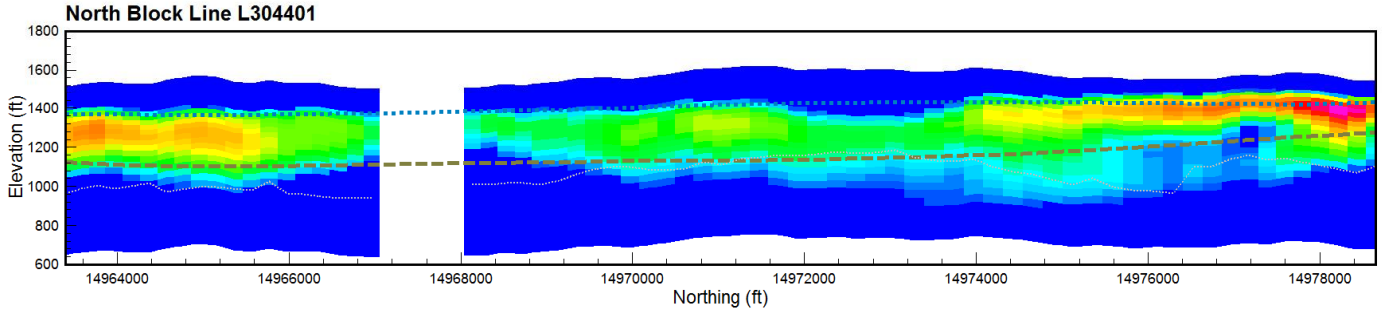

Line L304201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

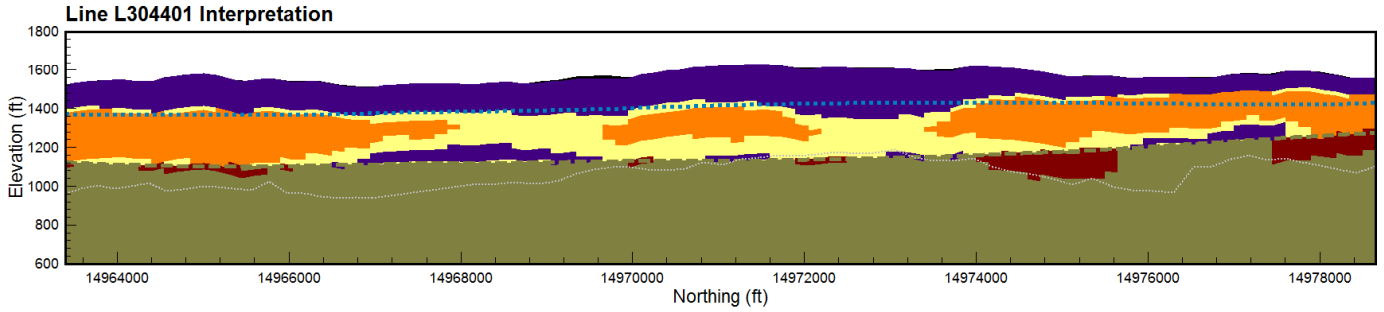

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

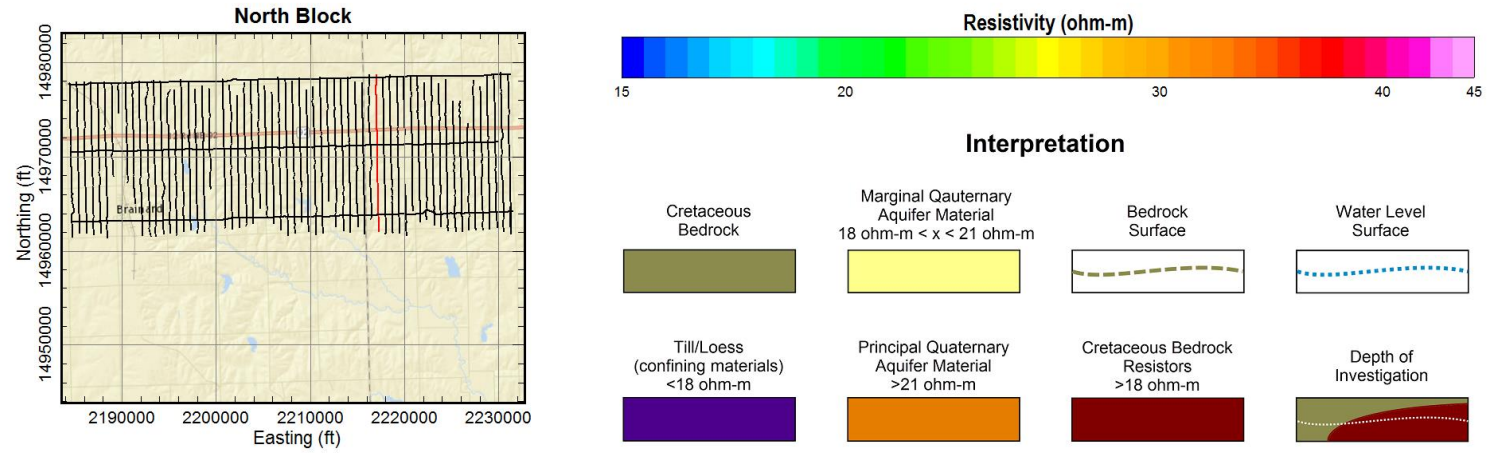

North Block Line L304301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

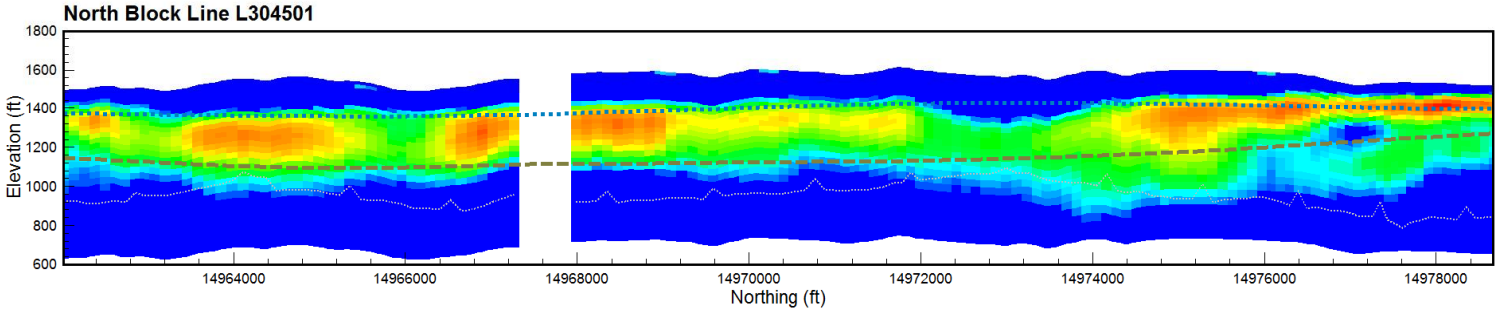

Line L304301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

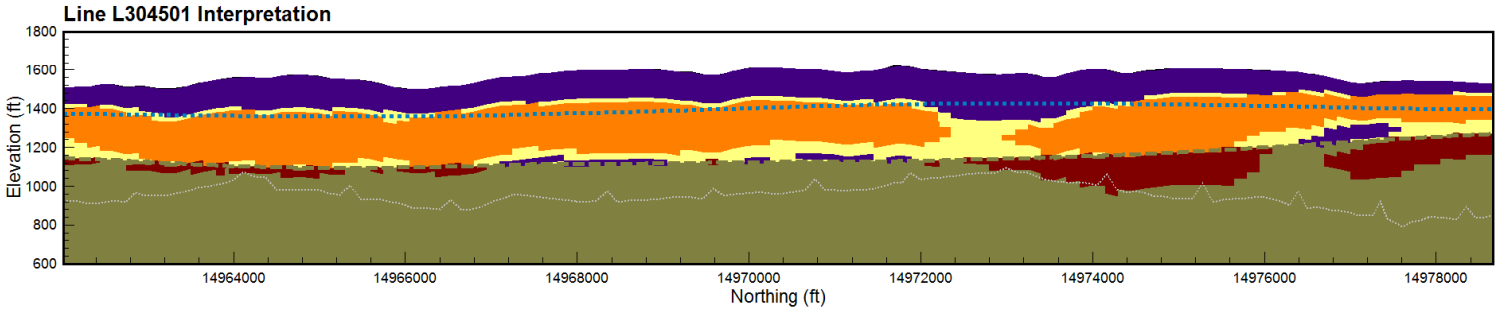

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

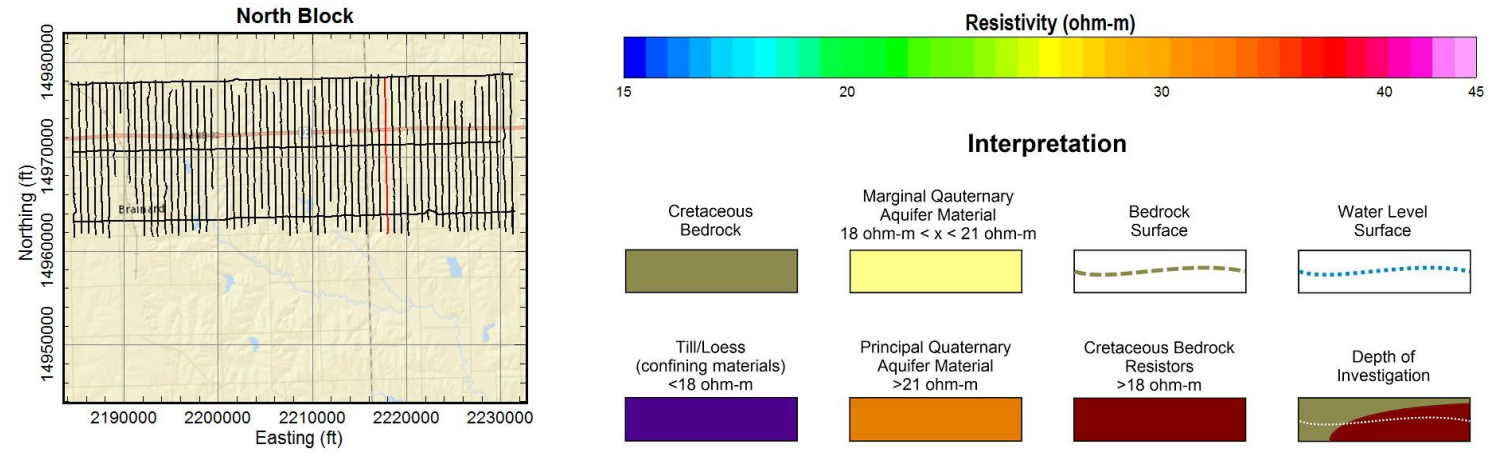

North Block Line L304401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

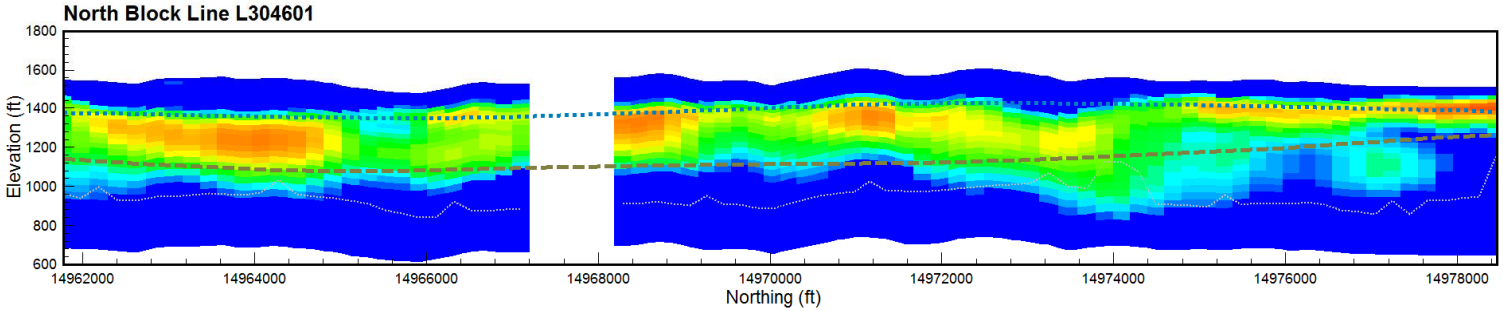

Line L304401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

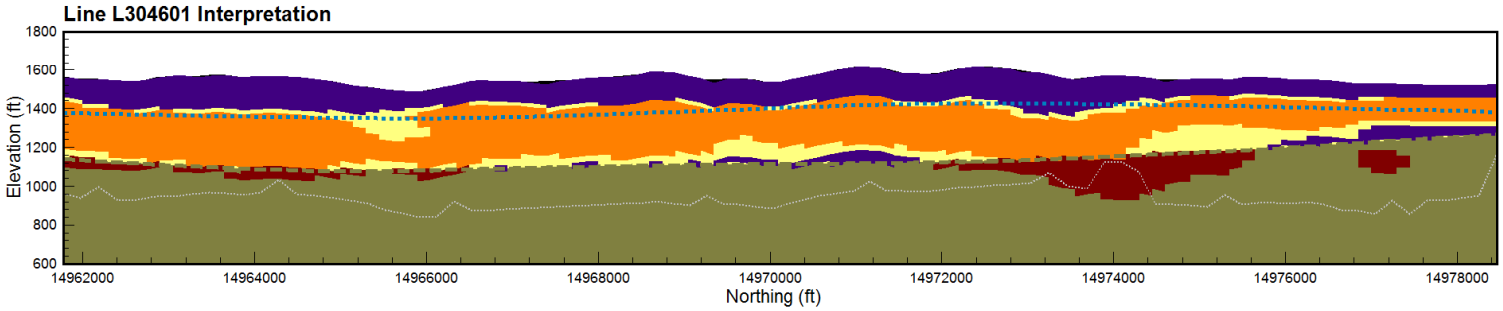

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

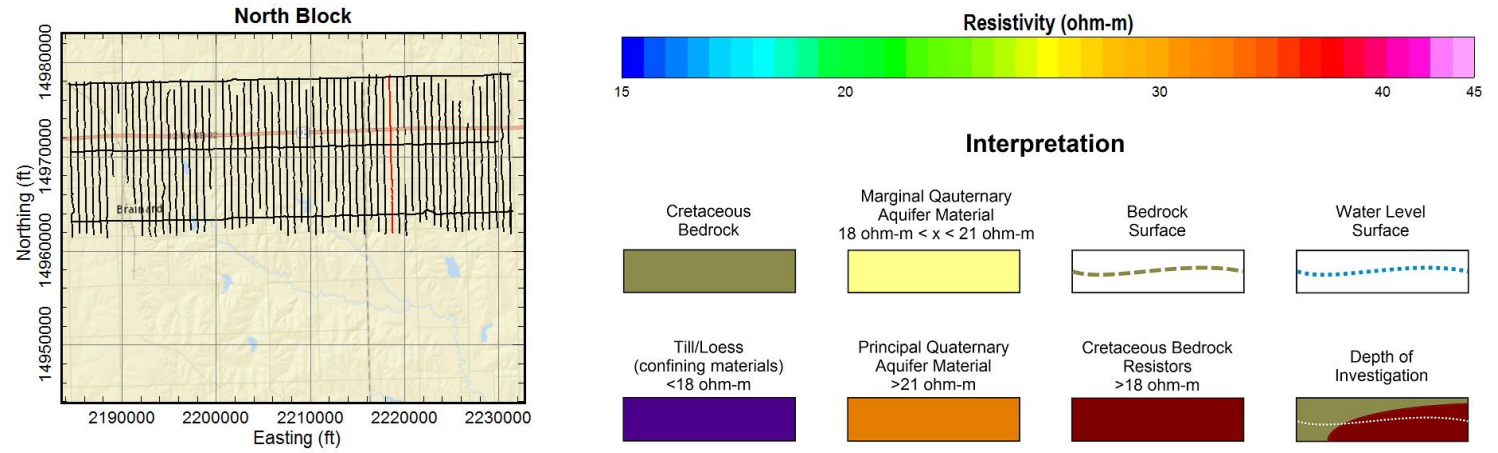

North Block Line L304501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

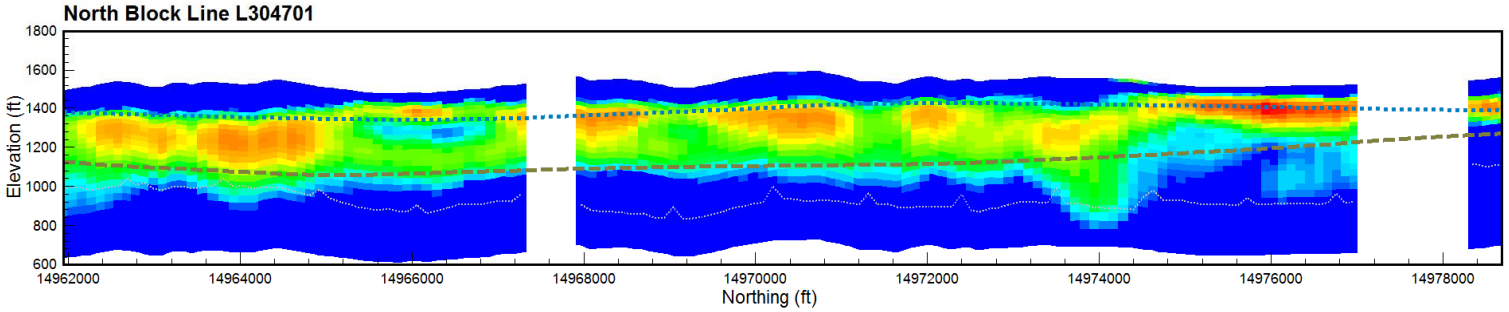

Line L304501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

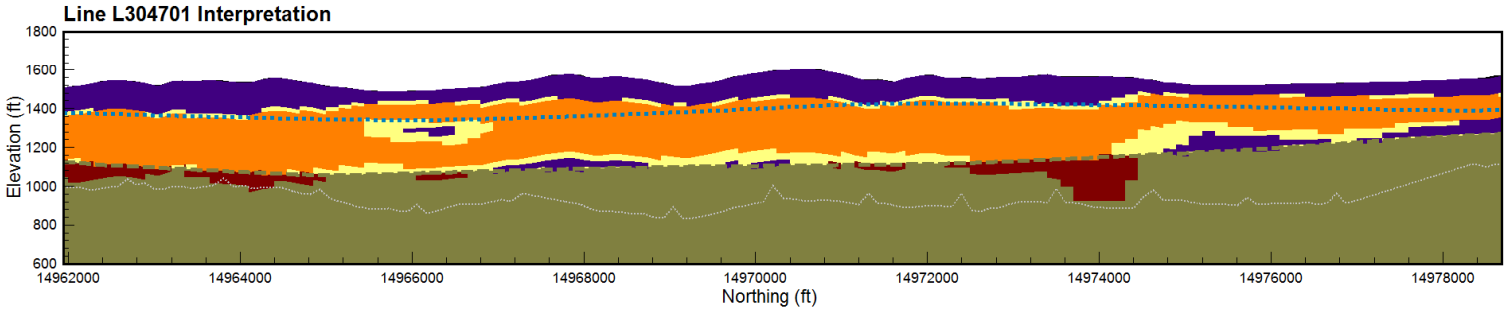

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

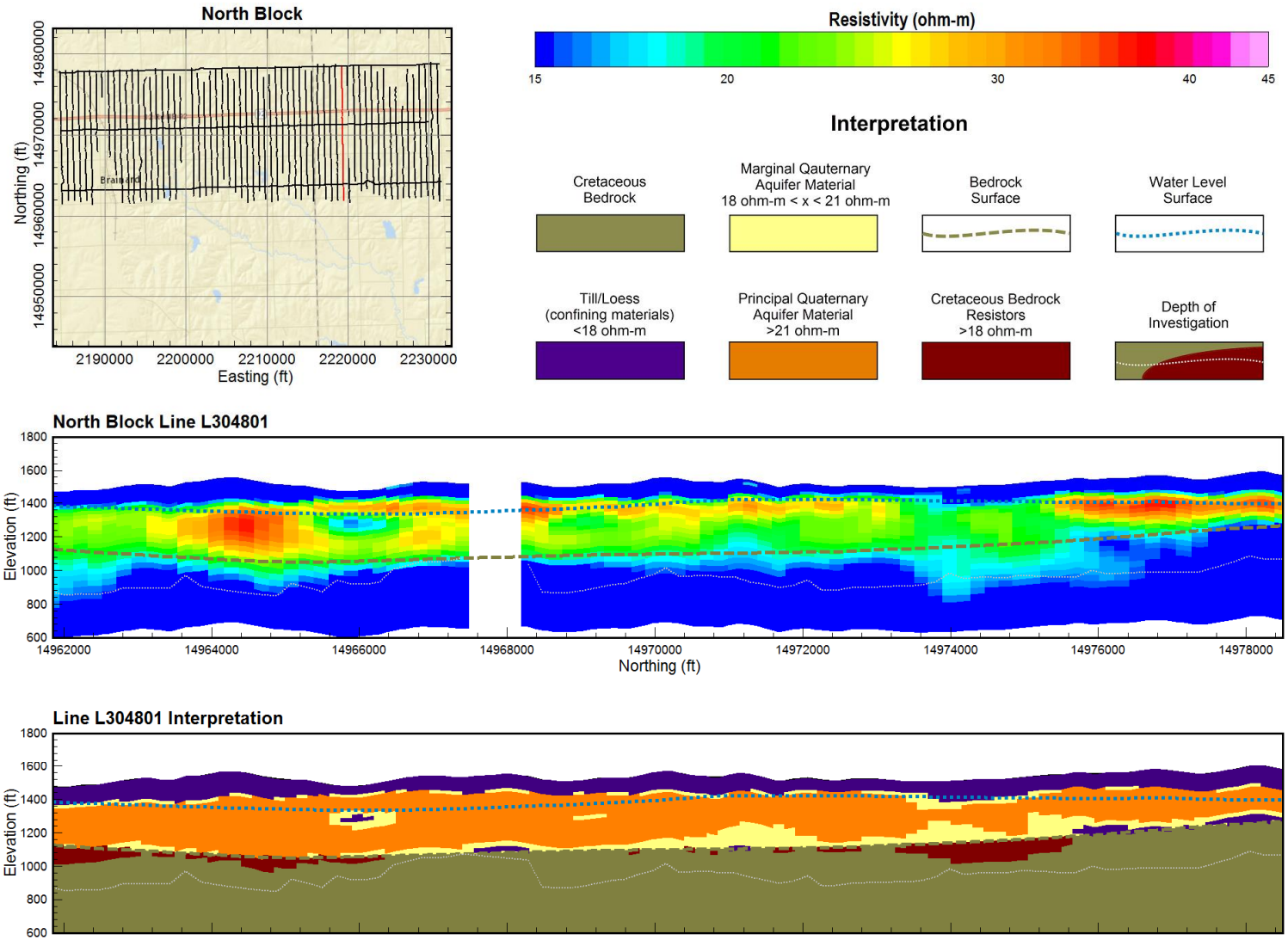

North Block Line L304601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

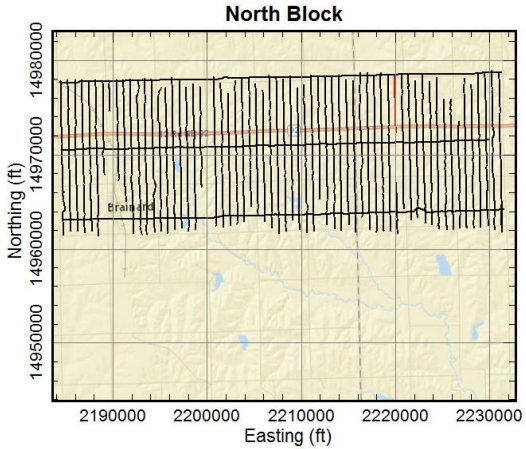

Line L304601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

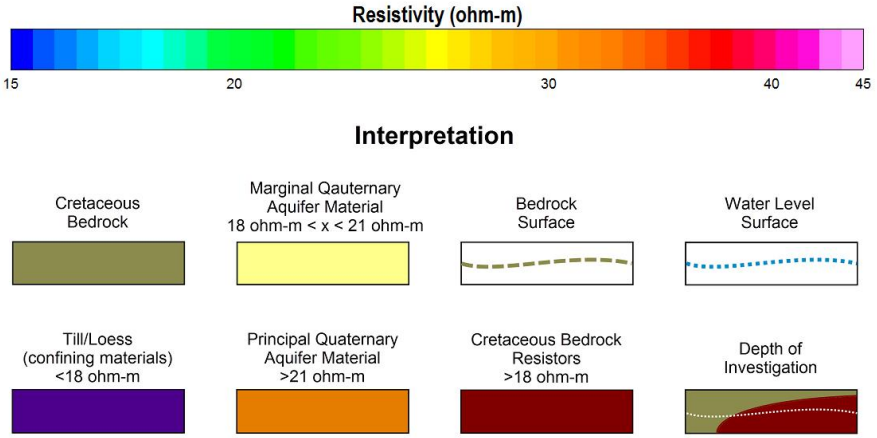

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

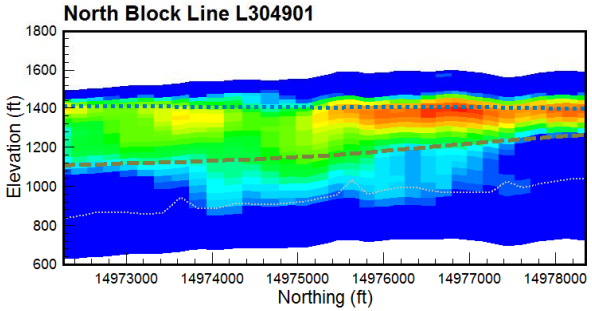

North Block Line L304701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

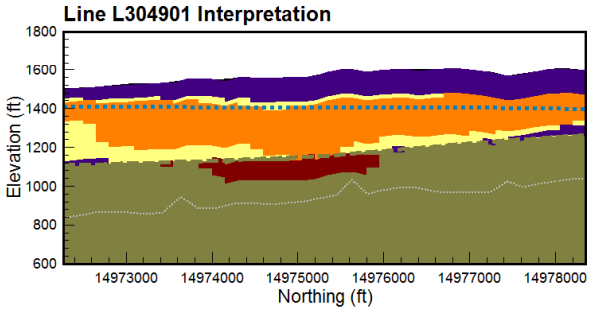

Line L304701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

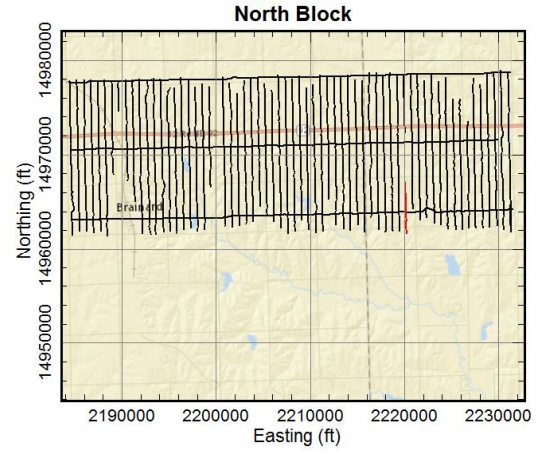

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation
North Block Line L304801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L304801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

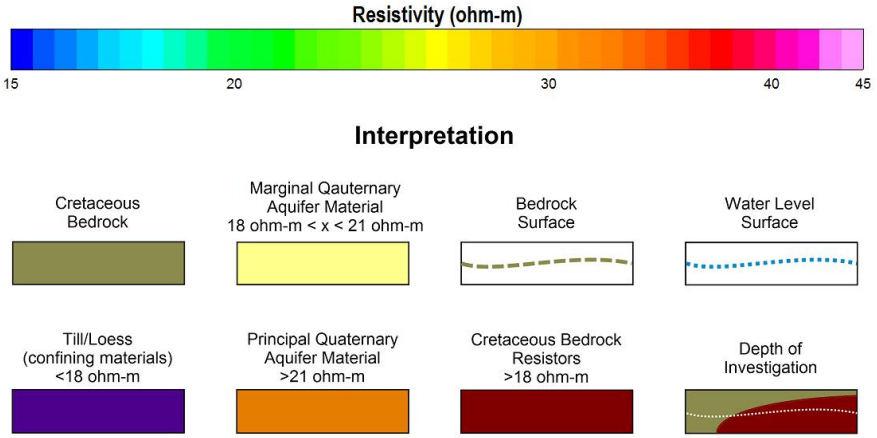

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

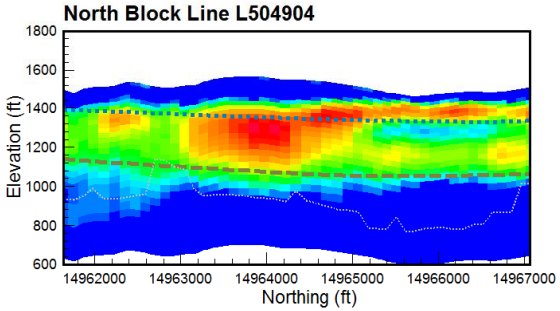

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

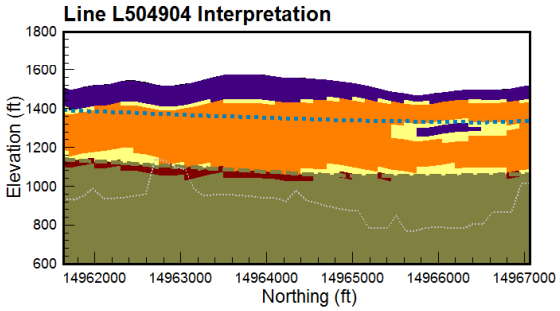

North Block Line L304901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14973000
14974000
14975000
14976000
14977000
14978000
Northing (ft)

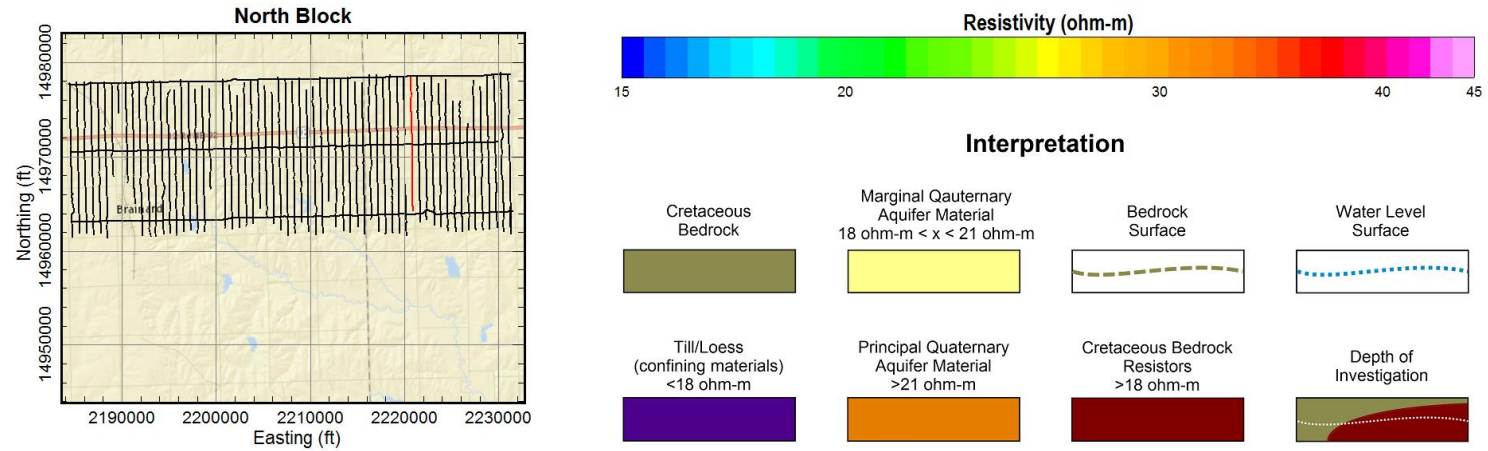

Line L304901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14973000
14974000
14975000
14976000
14977000
14978000
Northing (ft)

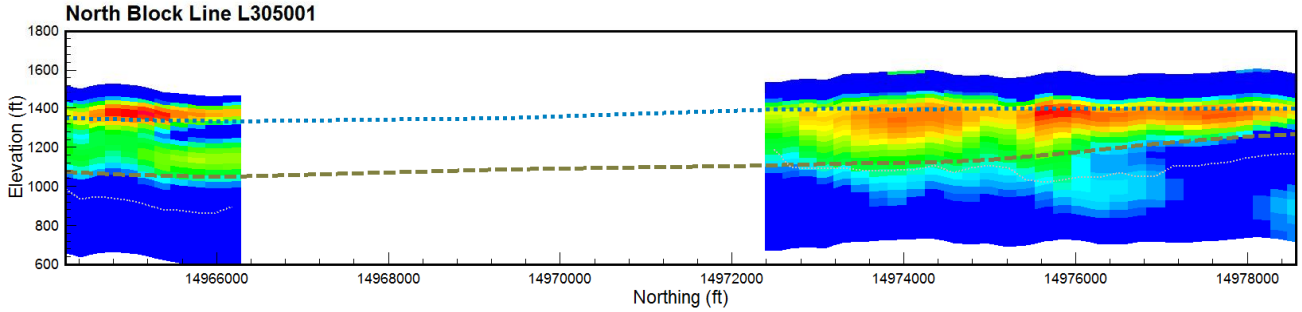

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

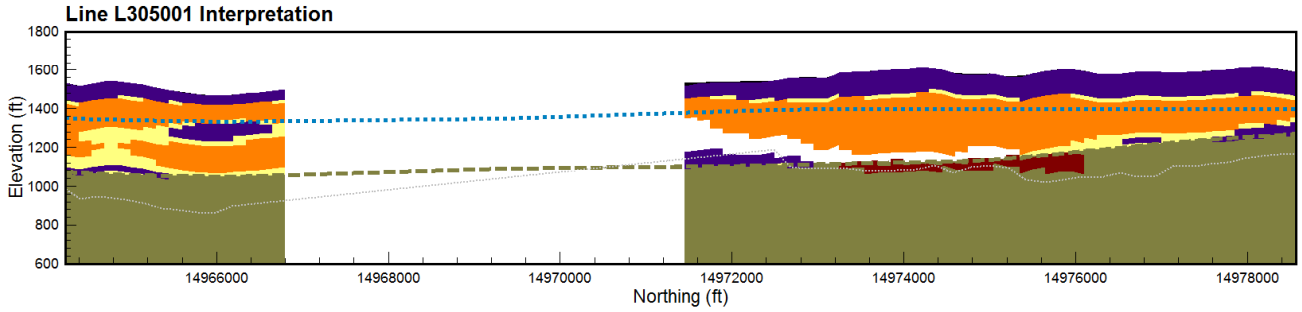

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

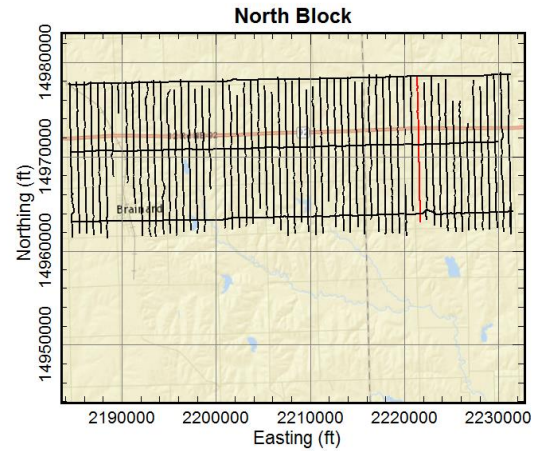

North Block Line L504904
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14963000
14964000
14965000
14966000
14967000
Northing (ft)

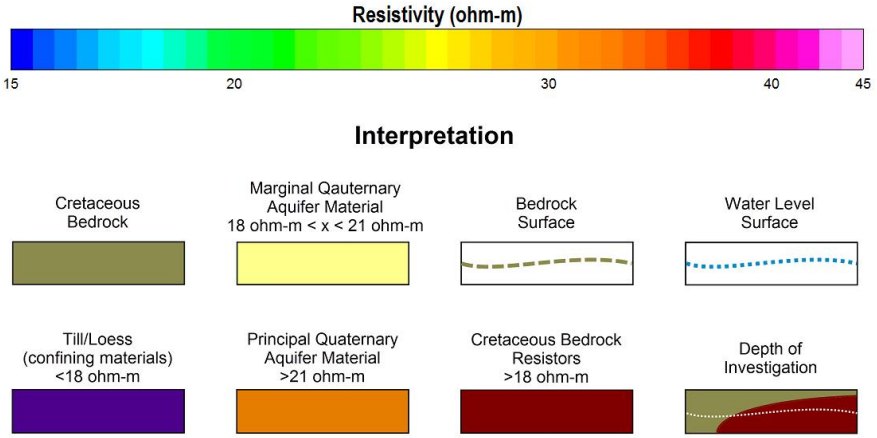

Line L504904 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14963000
14964000
14965000
14966000
14967000
Northing (ft)

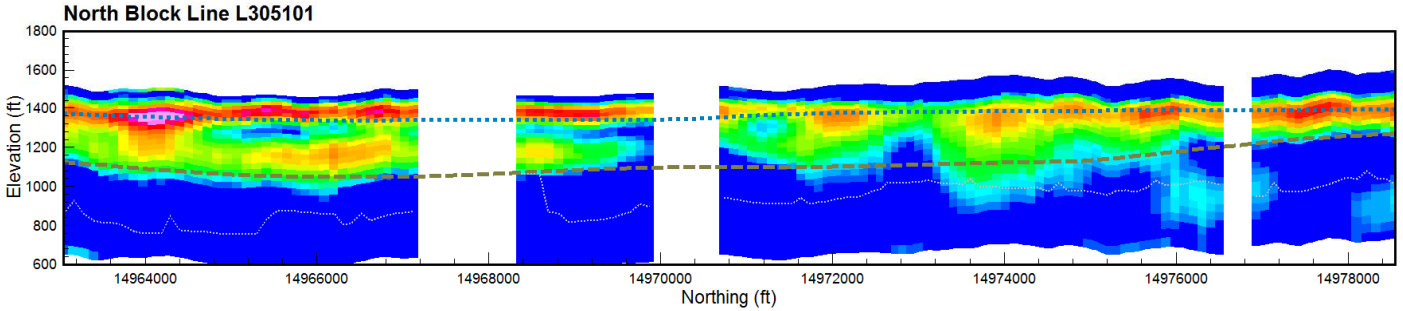

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

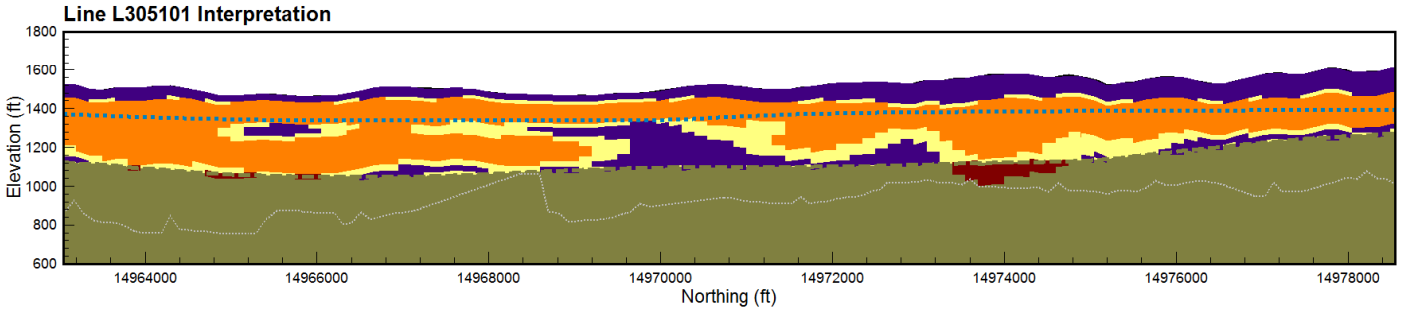

North Block Line L305001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

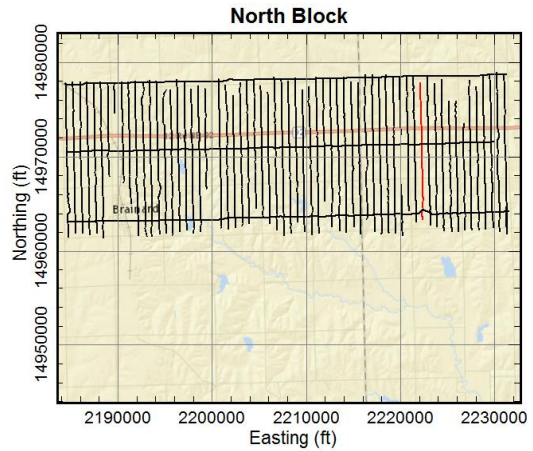

Line L305001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

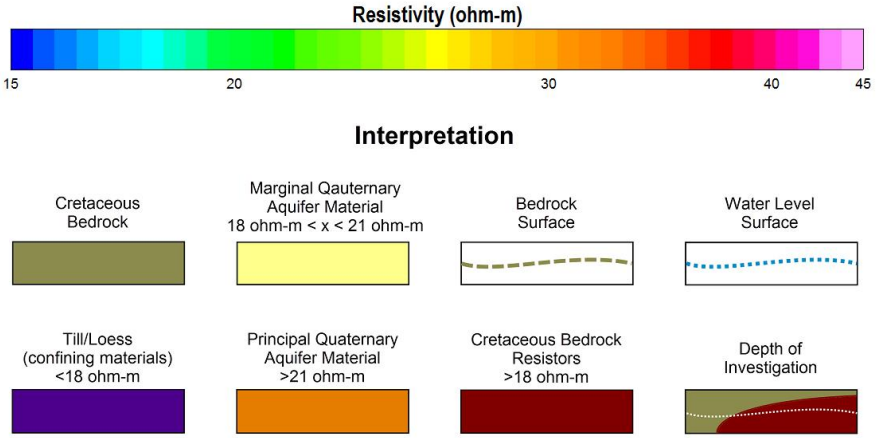

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

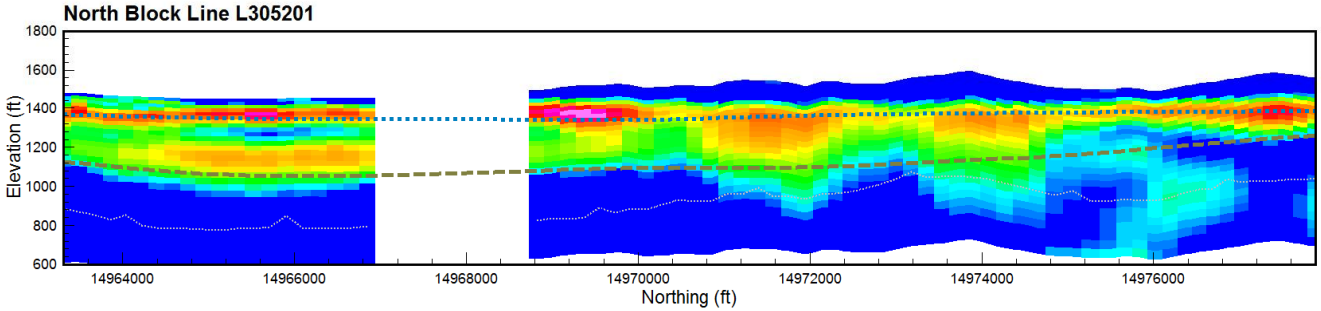

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

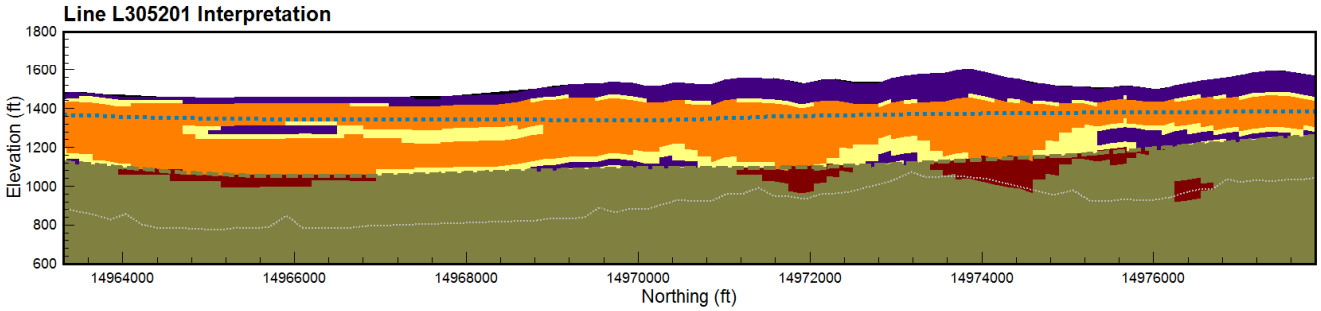

North Block Line L305101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

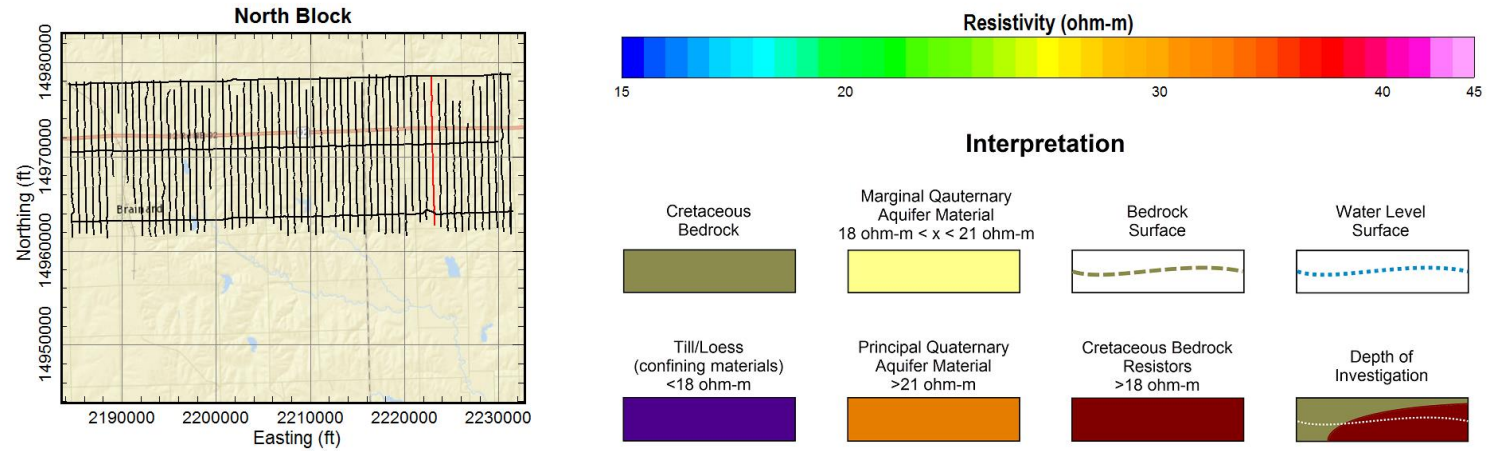

Line L305101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

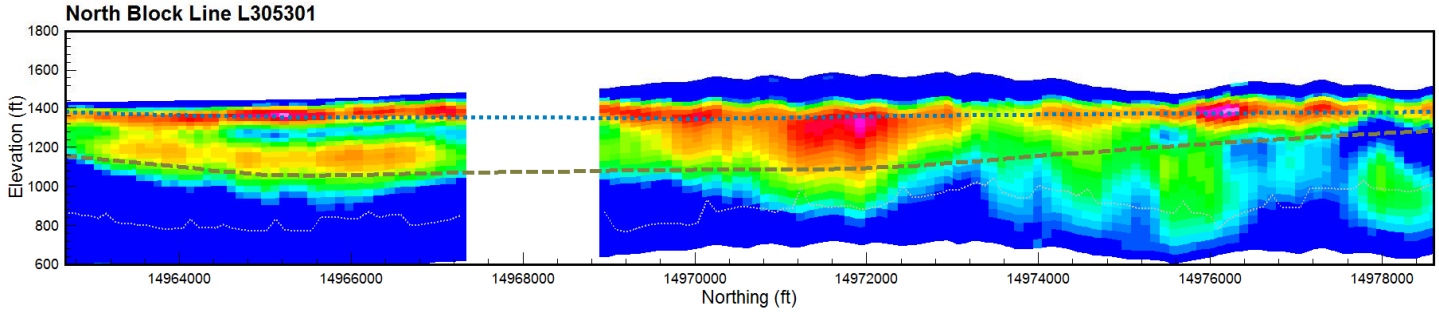

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

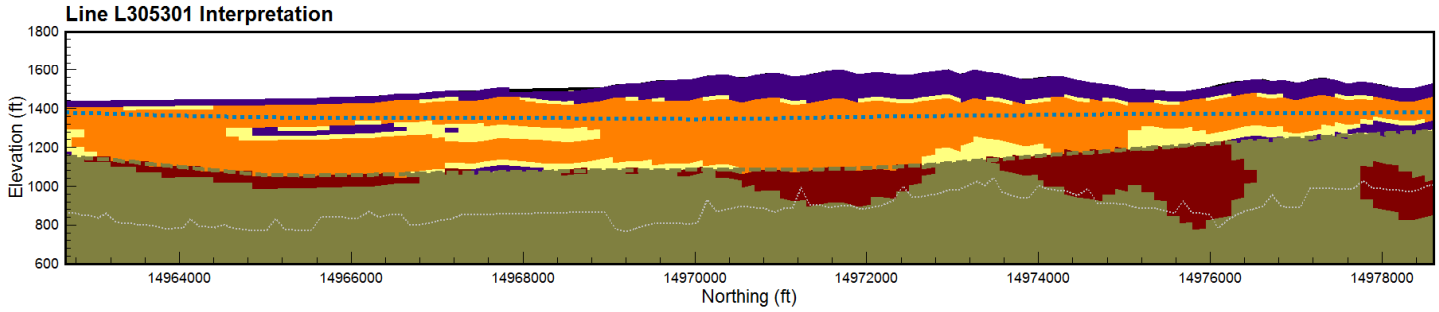

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

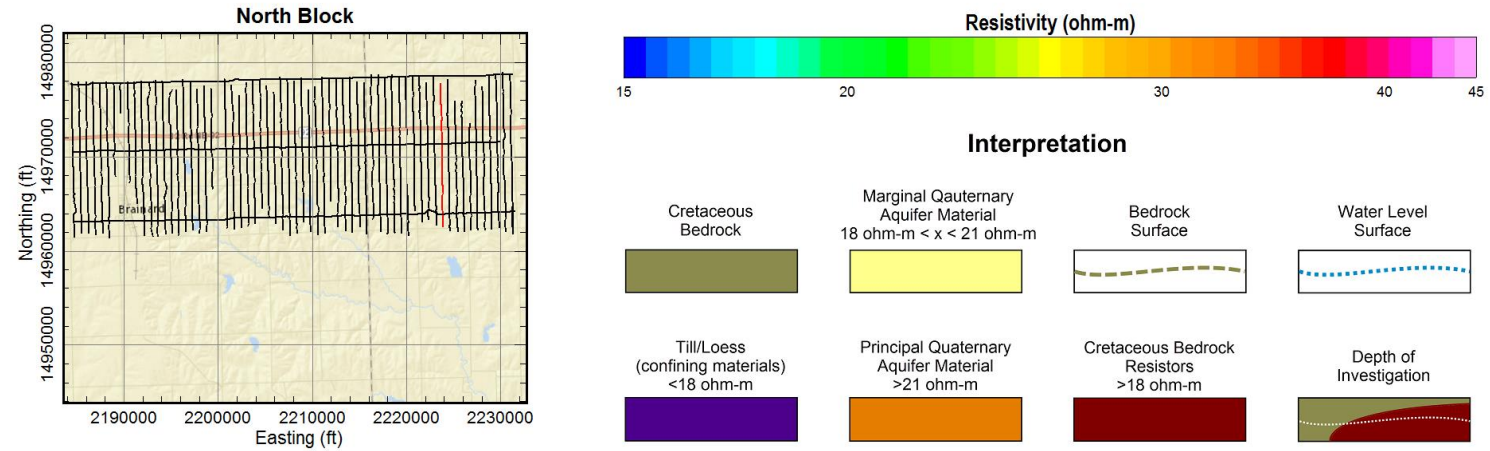

North Block Line L305201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

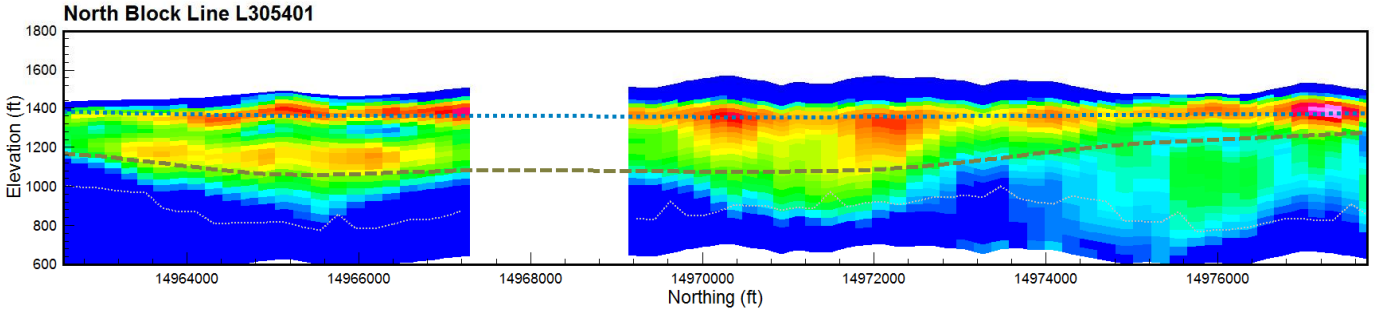

Line L305201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

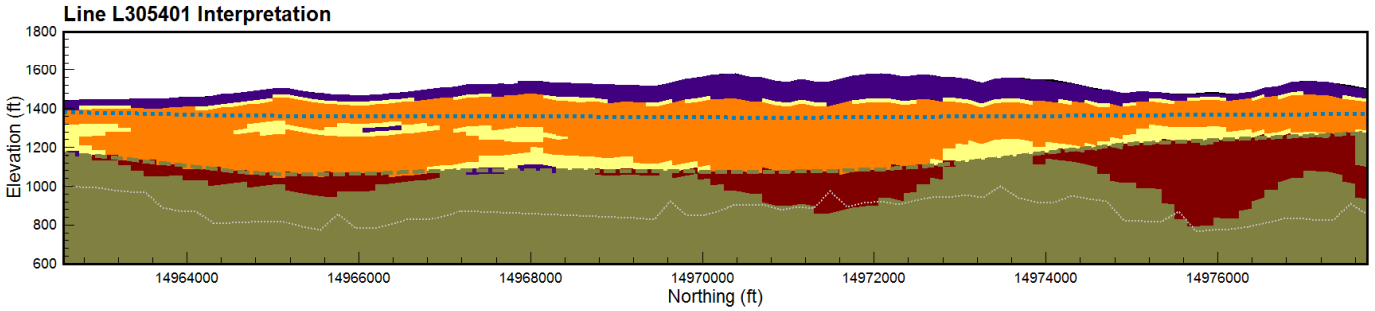

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

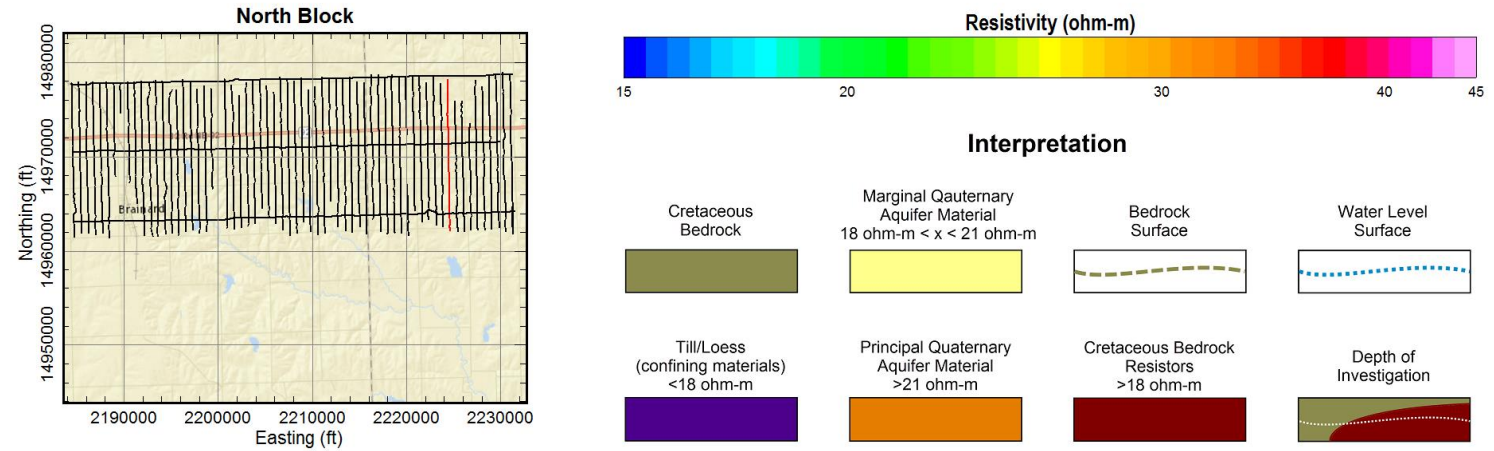

North Block Line L305301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

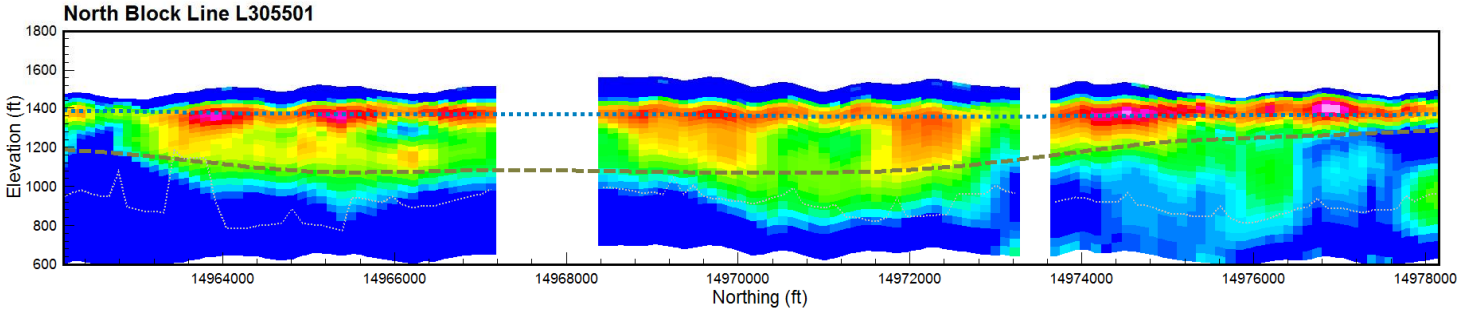

Line L305301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

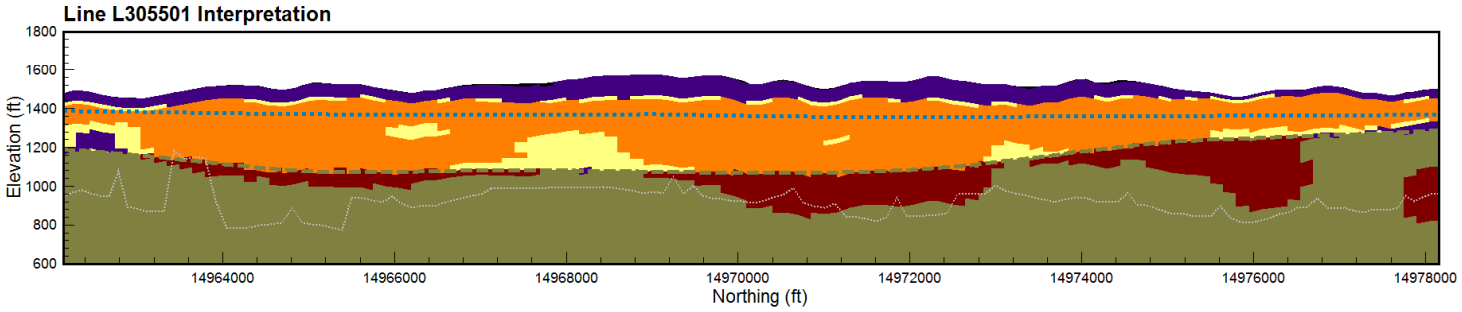

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

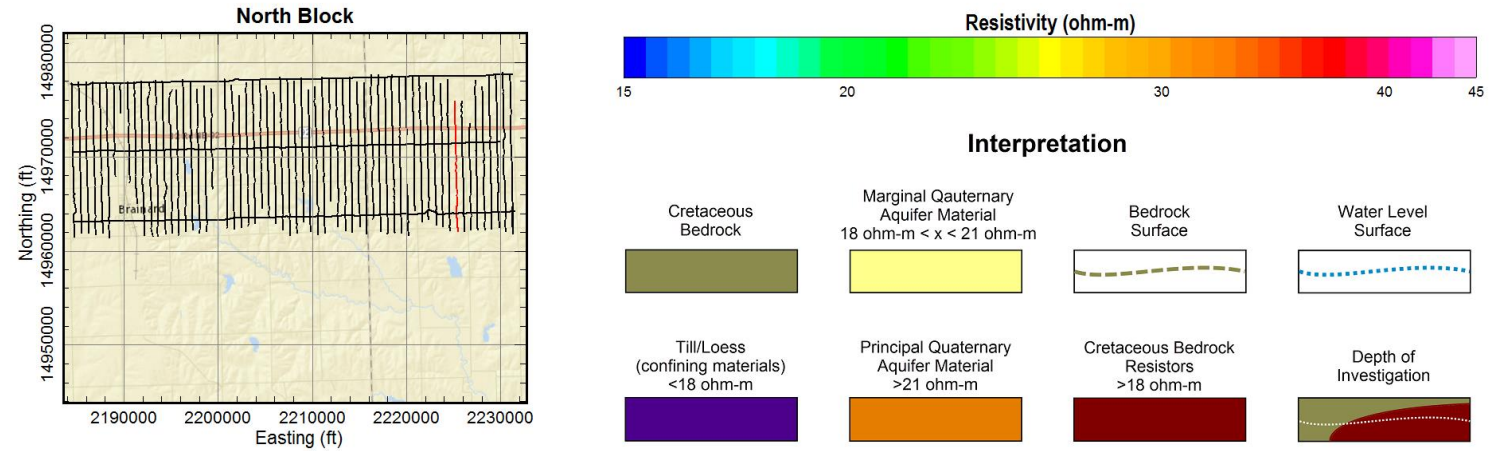

North Block Line L305401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

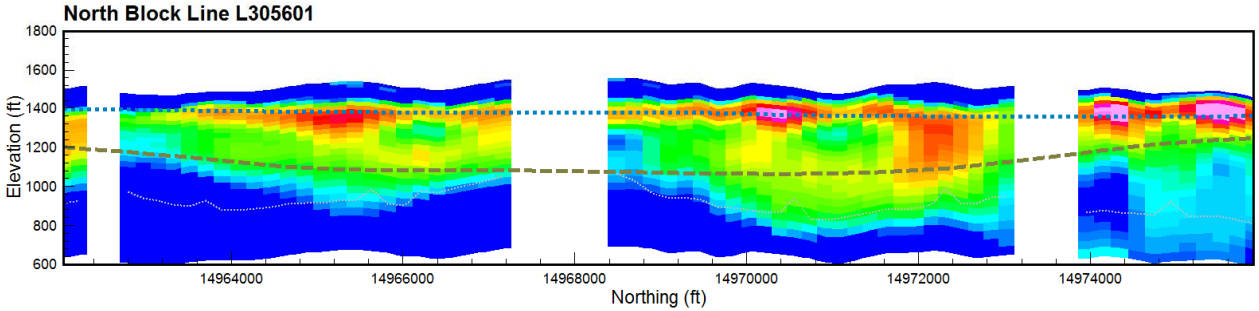

Line L305401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

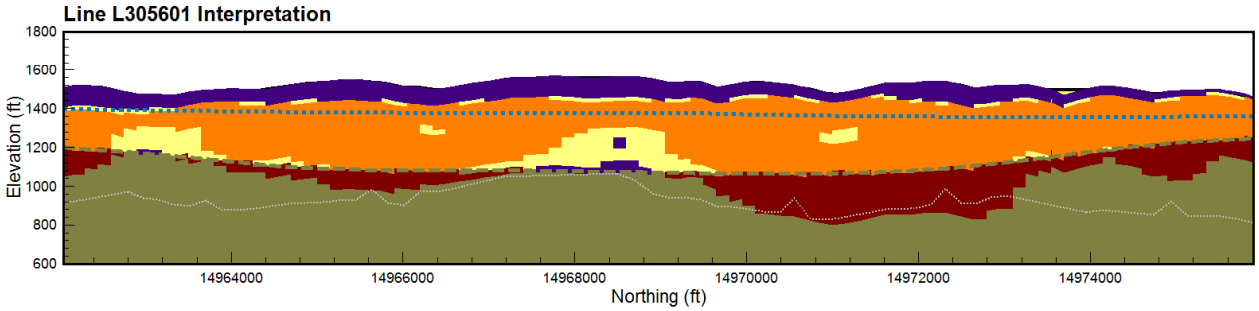

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

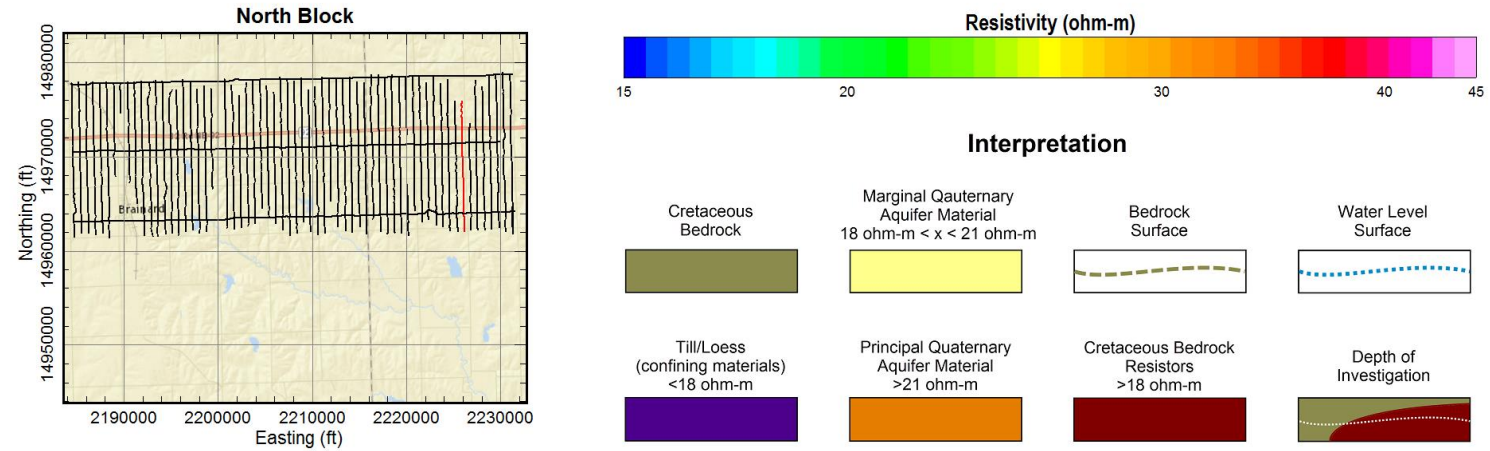

North Block Line L305501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

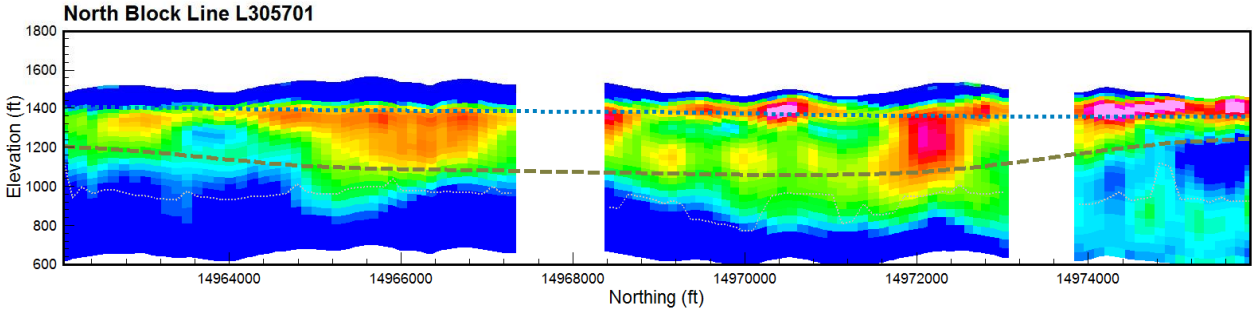

Line L305501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

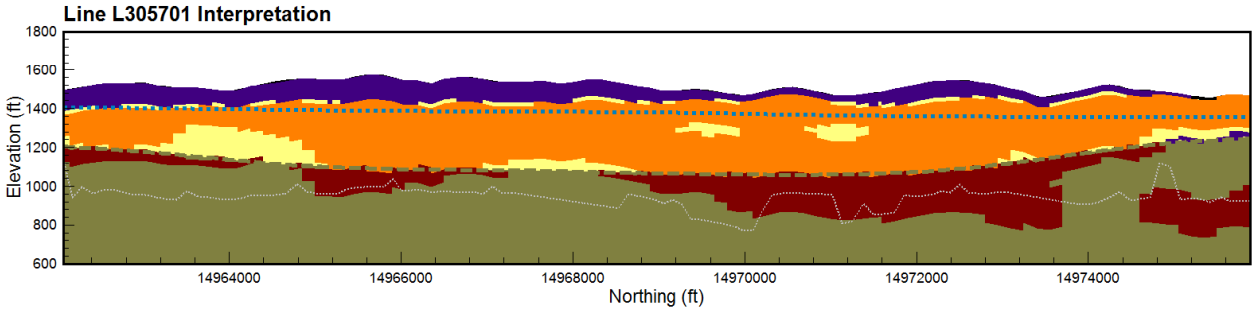

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

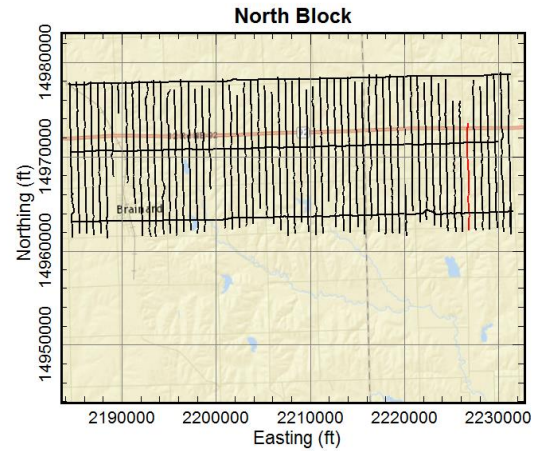

North Block Line L305601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
Northing (ft)

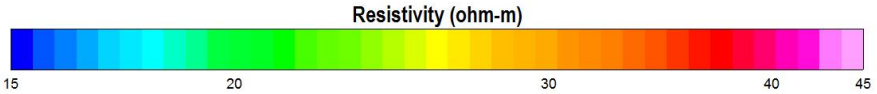

Line L305601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
Northing (ft)

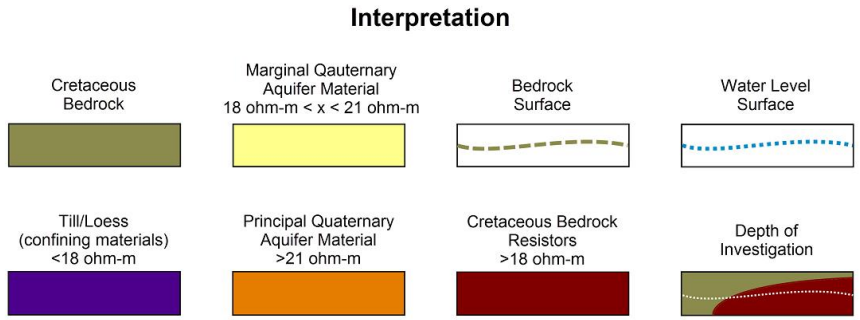

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

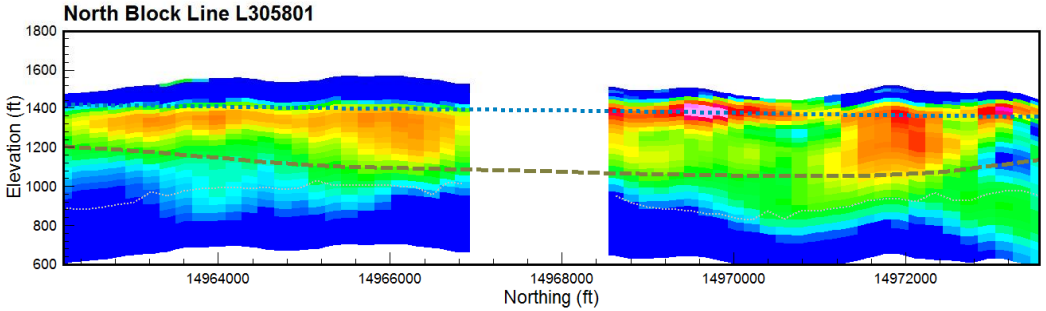

North Block Line L305701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
Northing (ft)

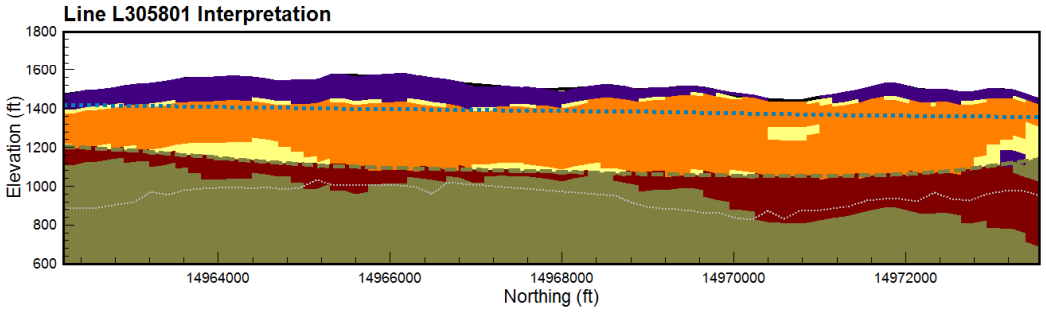

Line L305701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
Northing (ft)

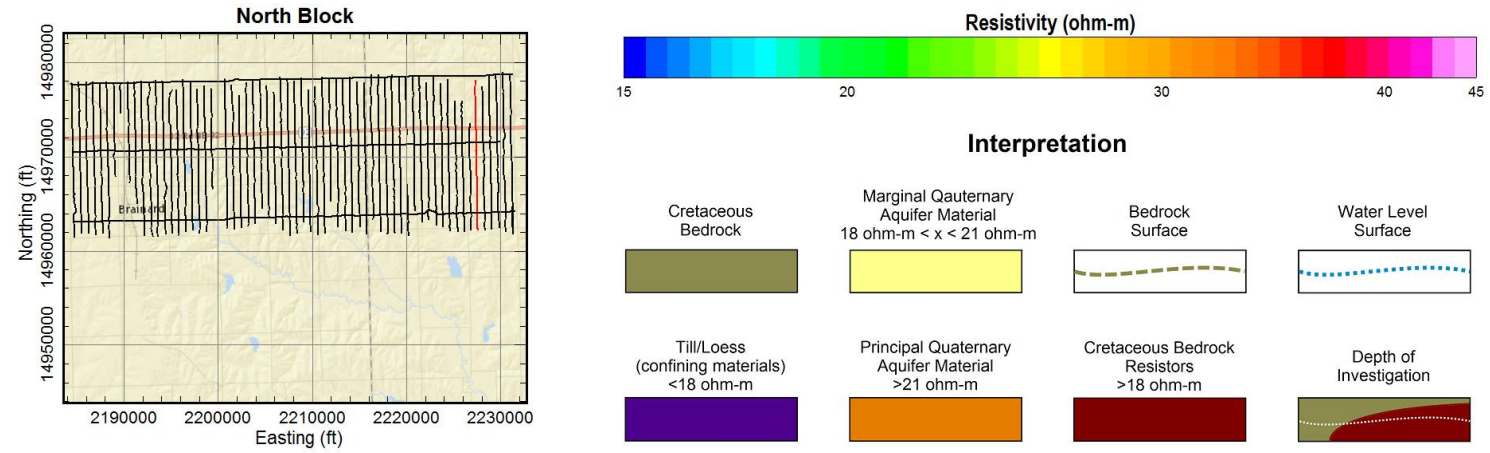

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

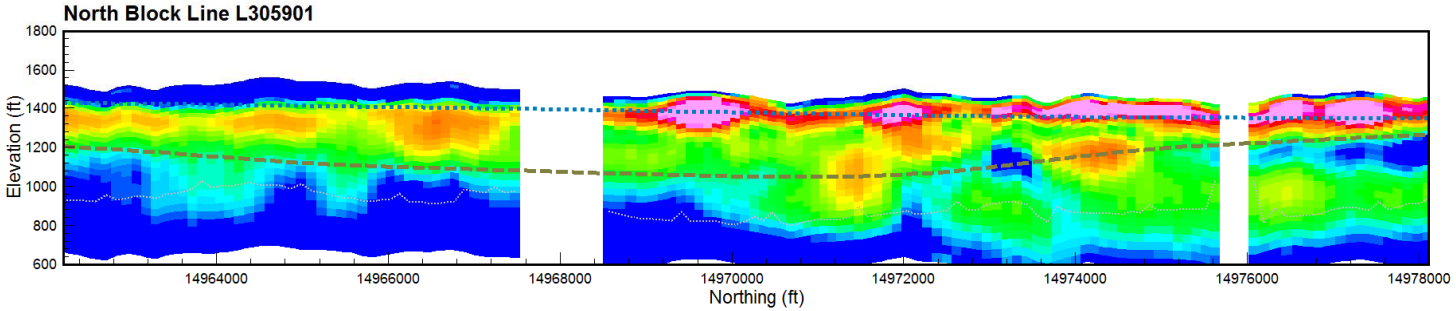

Resistivity (ohm-m)
15
20
30
40
45

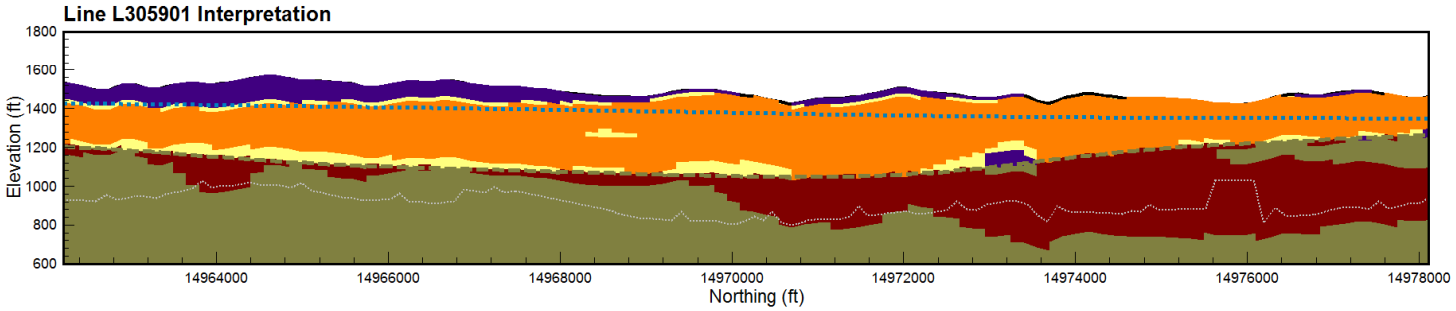

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

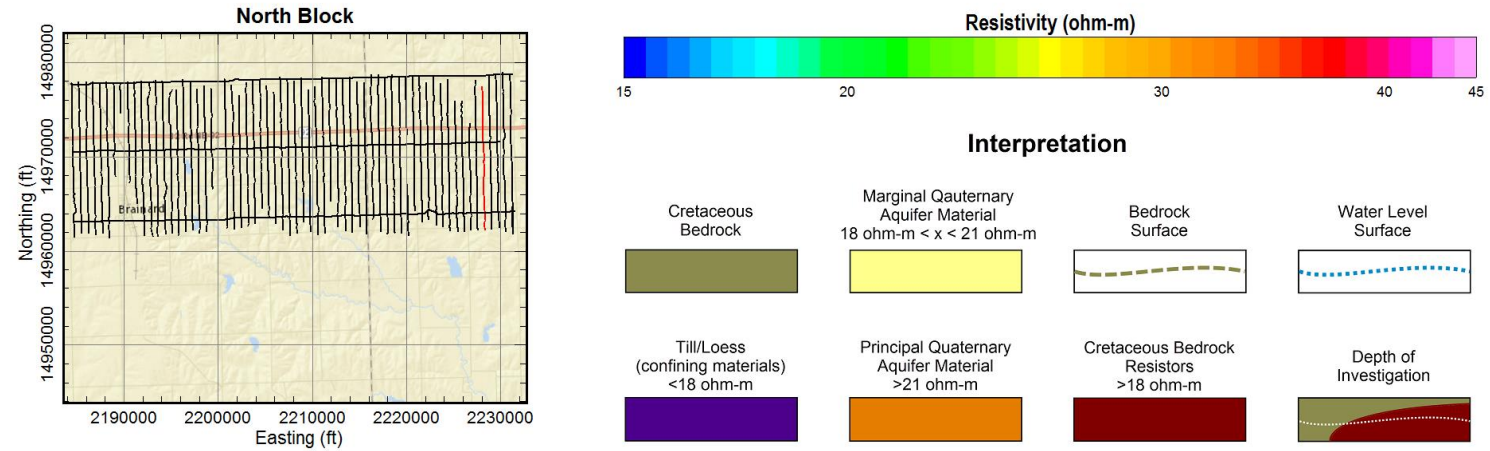

North Block Line L305801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
Northing (ft)

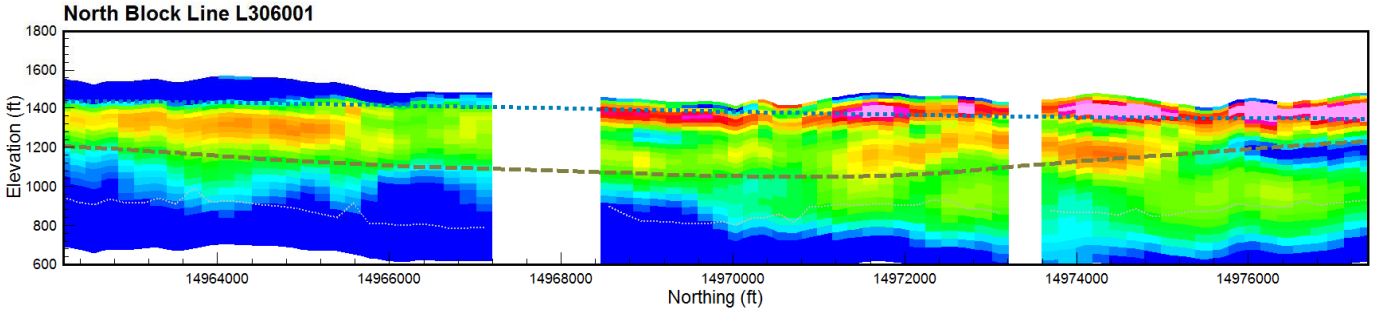

Line L305801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
Northing (ft)

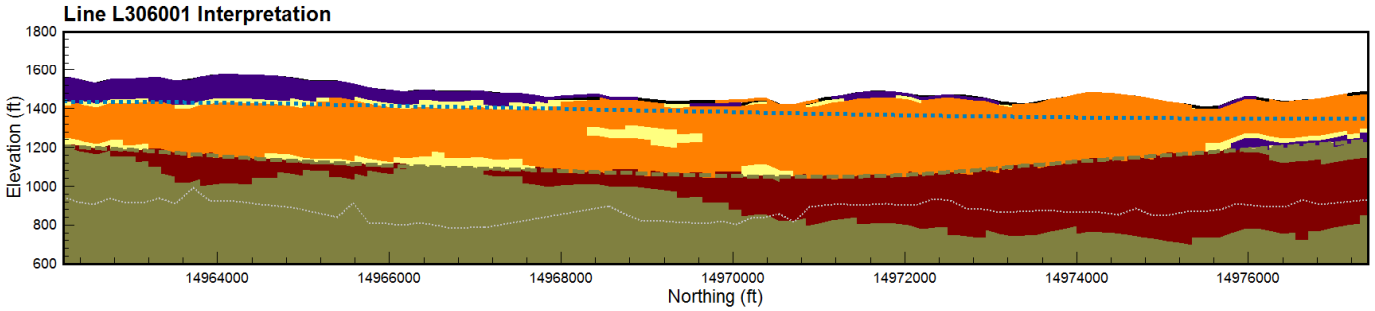

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

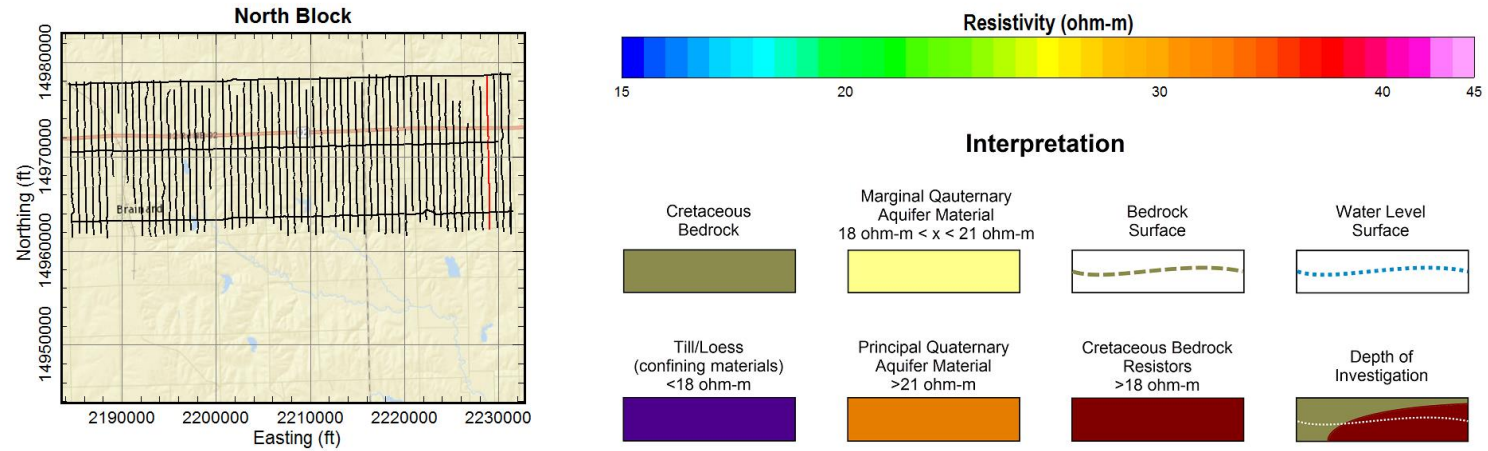

North Block Line L305901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

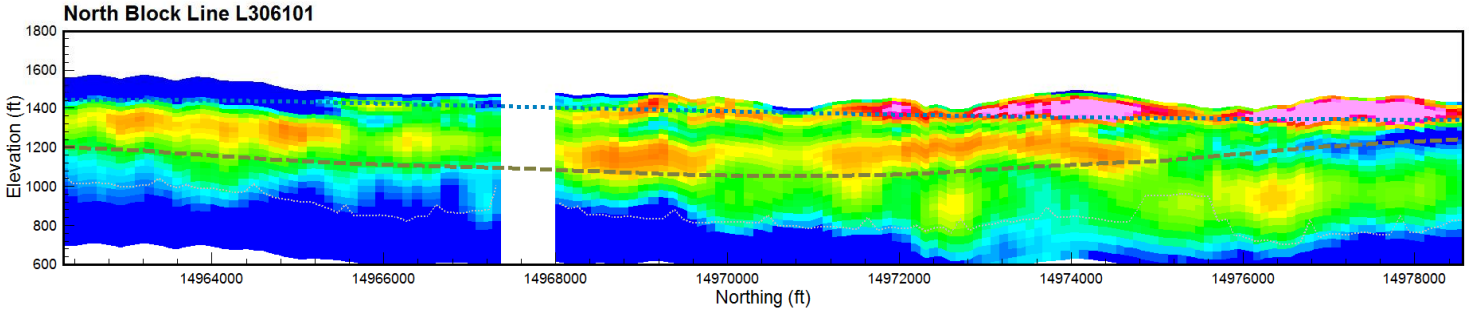

Line L305901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

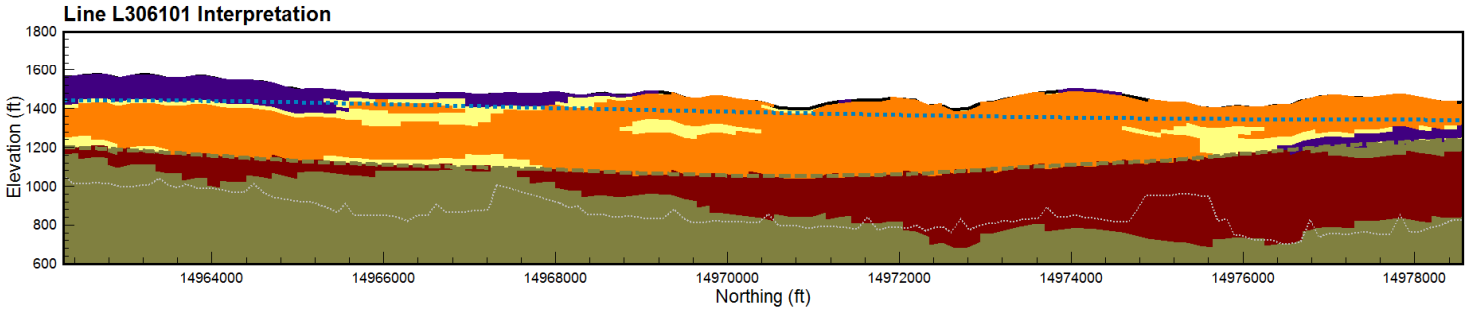

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

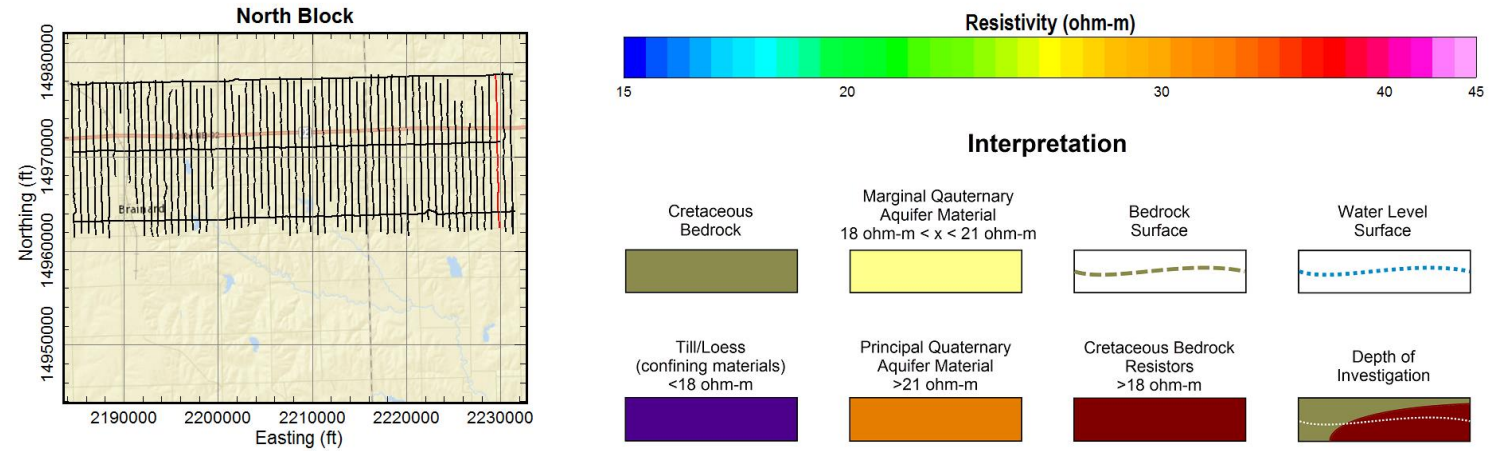

North Block Line L306001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

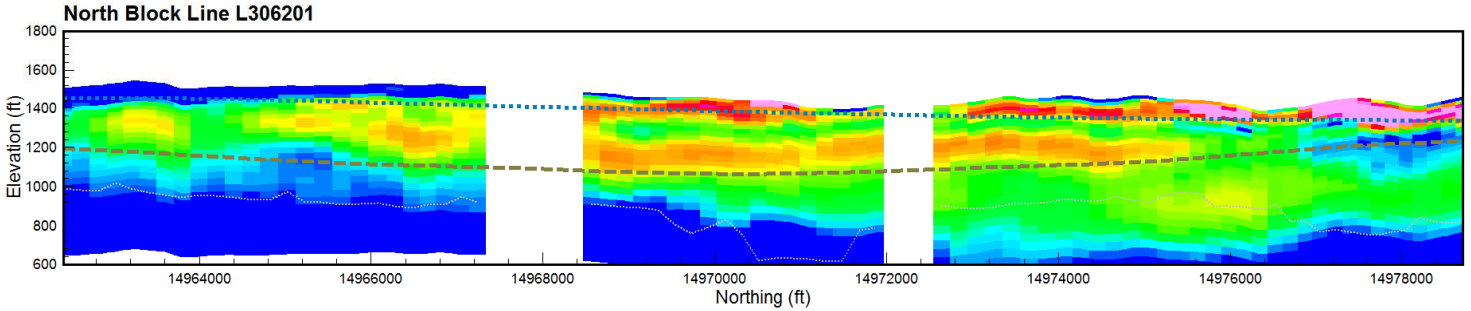

Line L306001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
Northing (ft)

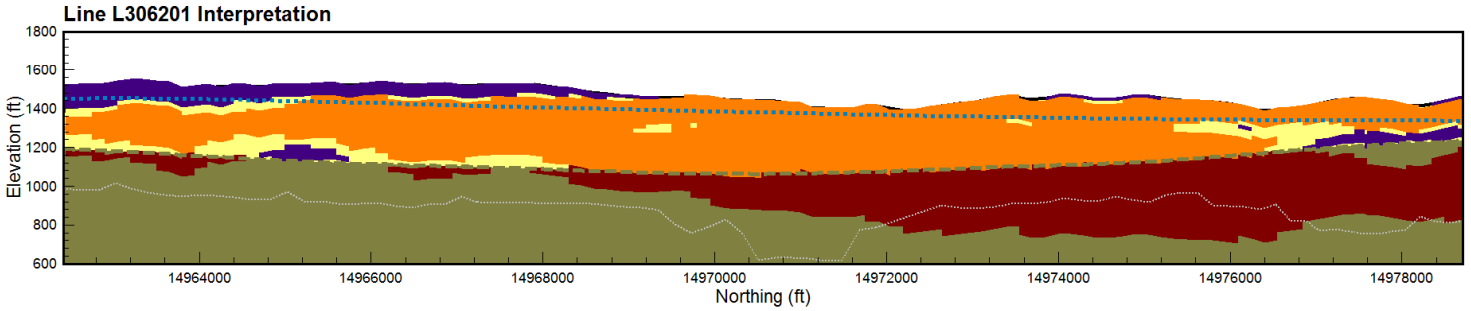

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

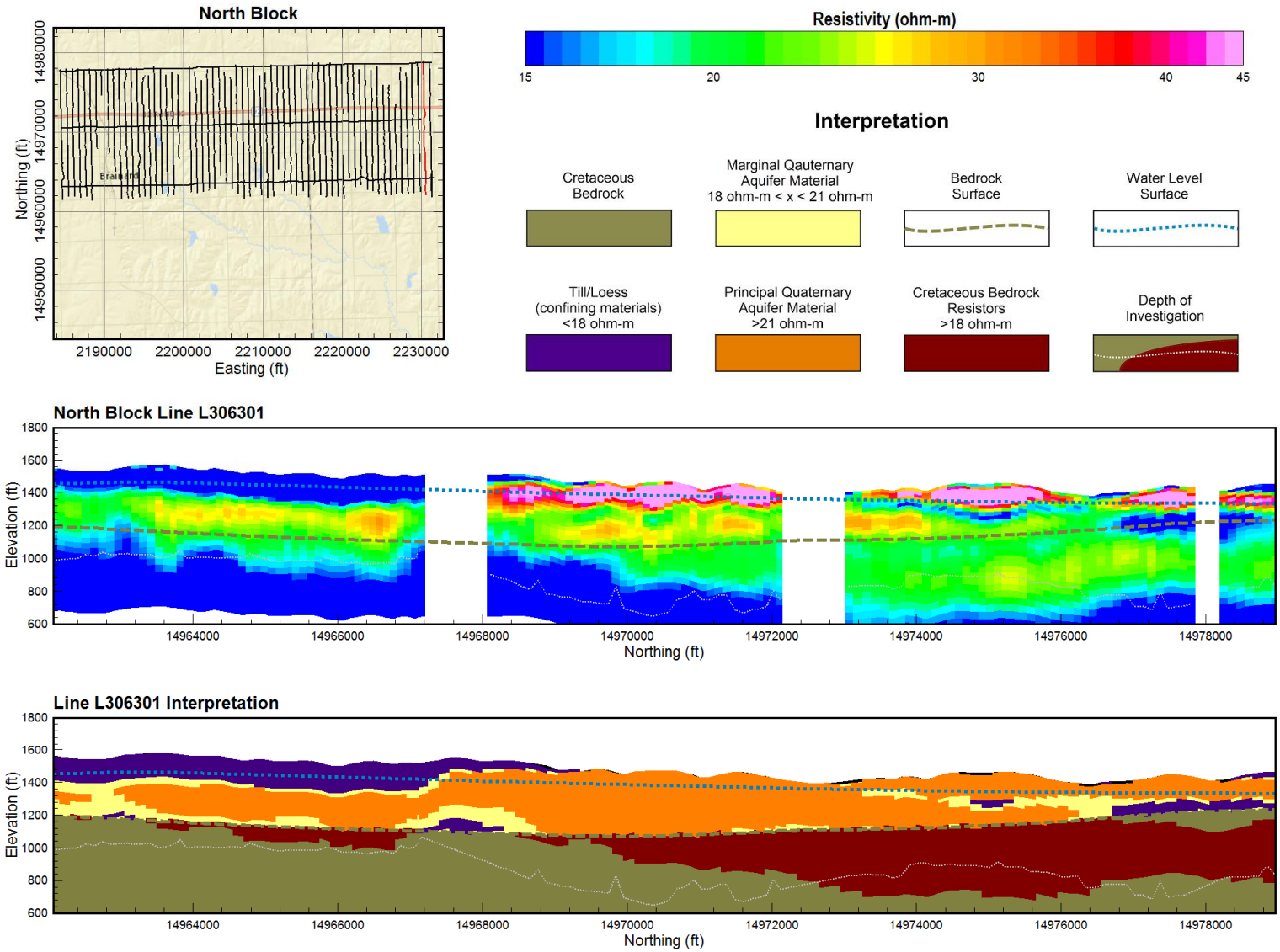

North Block Line L306101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

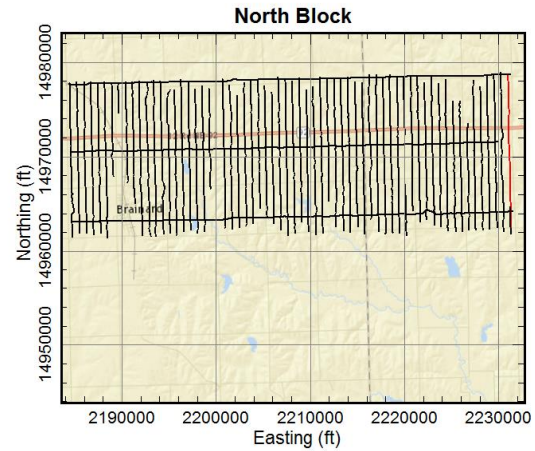

Line L306101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

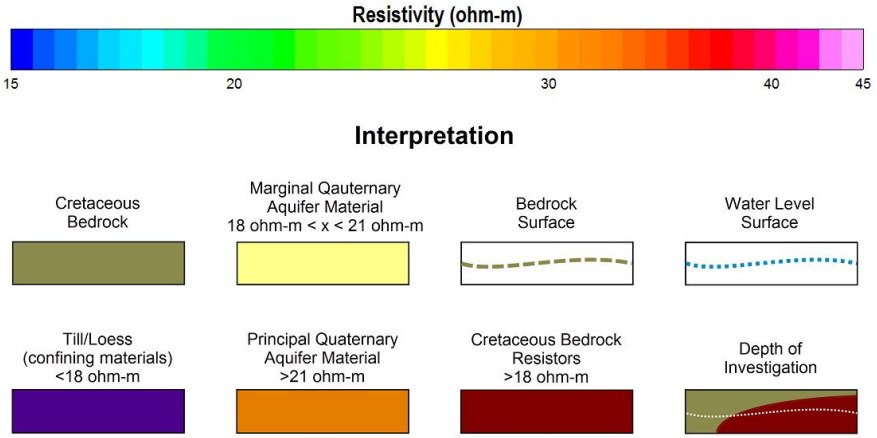

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

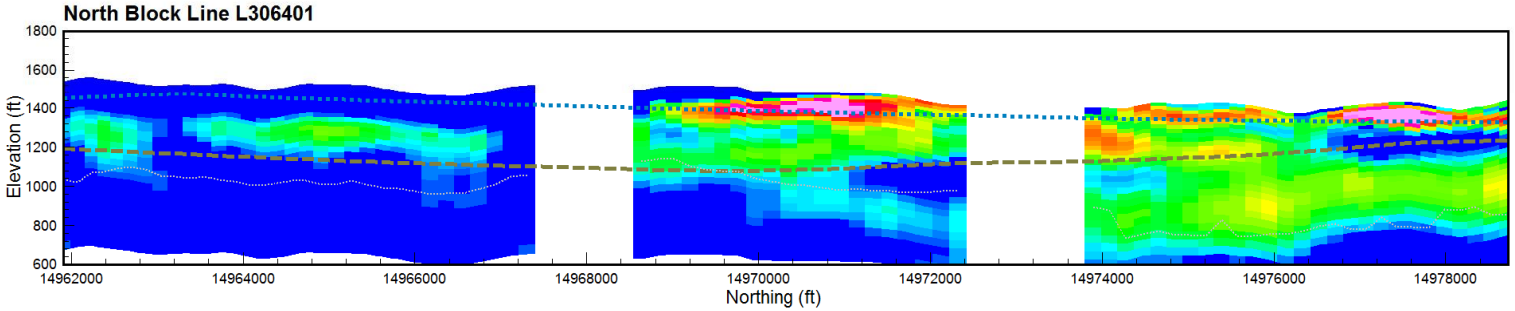

North Block Line L306201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

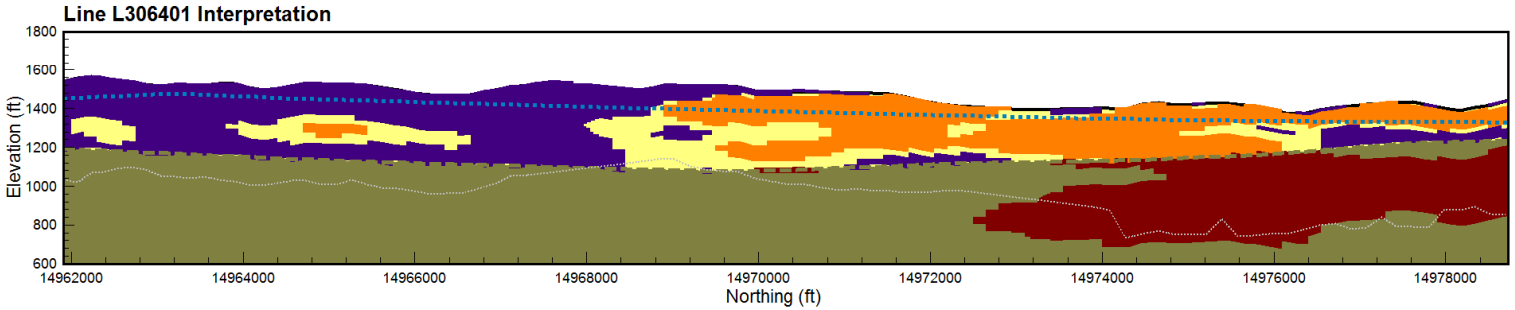

Line L306201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

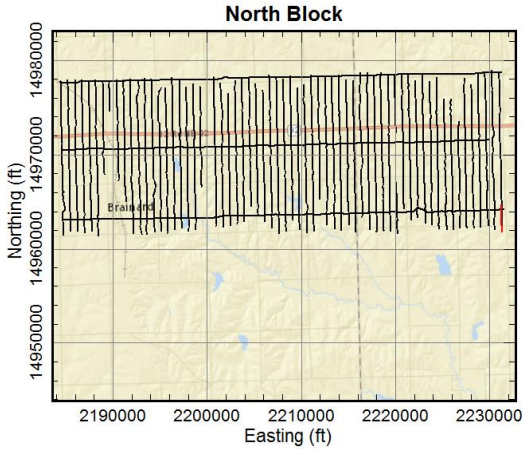

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation
North Block Line L306301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)
Line L306301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

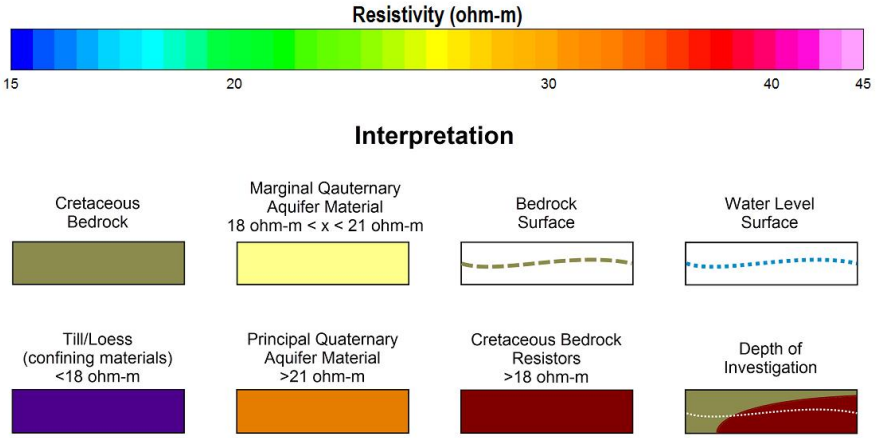

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)

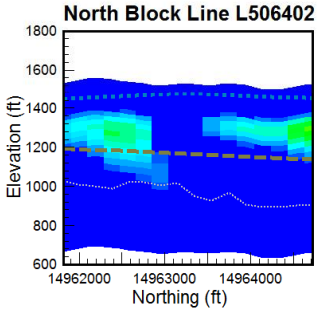

Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

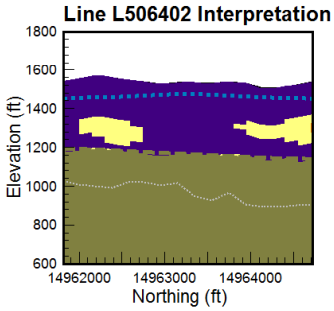

North Block Line L306401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)


Line L306401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14964000
14966000
14968000
14970000
14972000
14974000
14976000
14978000
Northing (ft)

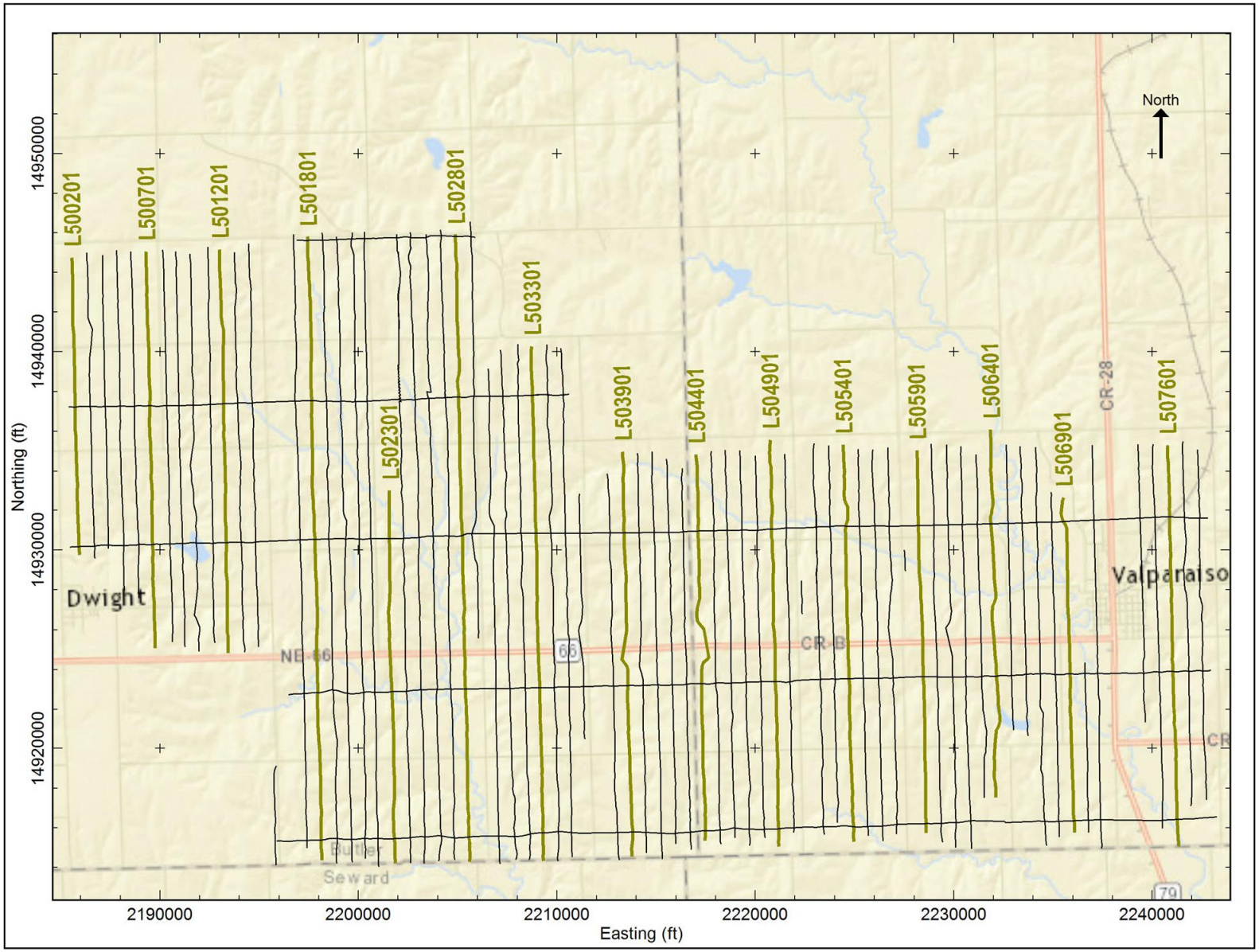

North Block
Northing (ft)
14980000
14970000
14960000
14950000
2190000
2200000
2210000
2220000
2230000
Easting (ft)


Resistivity (ohm-m)
15
20
30
40
45
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 21 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >21 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation


North Block Line L506402
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14963000
14964000
Northing (ft)

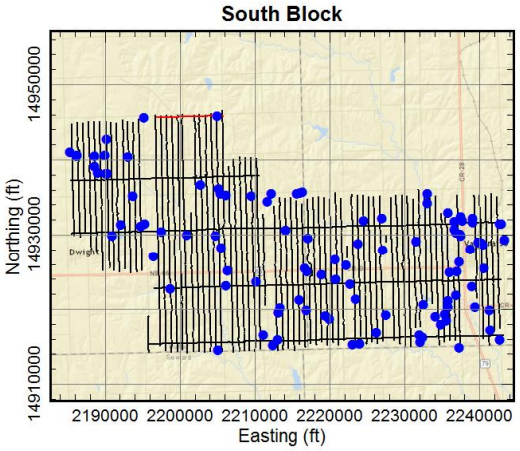

Line L506402 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14962000
14963000
14964000
Northing (ft)

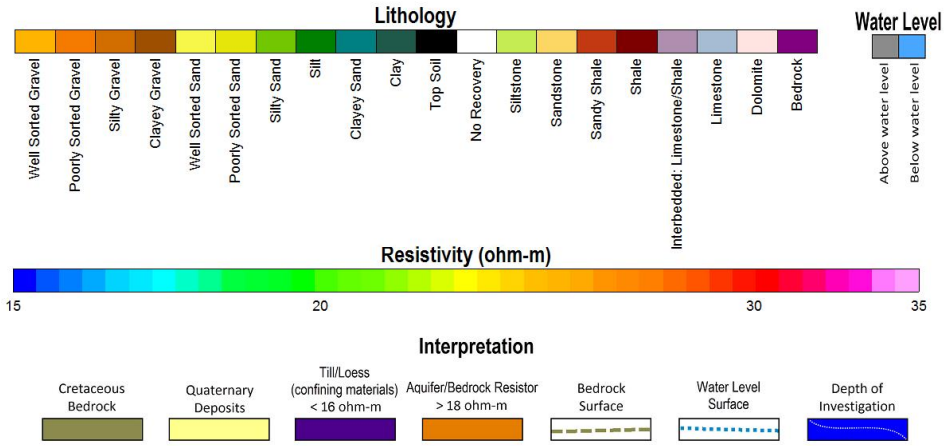
South Flight Block Profiles
Reference Map

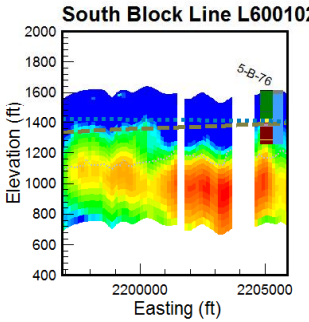

North
L500201
L500701
L501201
L501801
L502801
L503301
L502301
L503901
L504401
L504901
L505401
L505901
L506401
L506901
L507601
CR-28
Dwight
Valparaiso
NE-66
66
CR-B
Butler
Seward
79
14950000
14940000
14930000
14920000
Northing (ft)
2190000
2200000
2210000
2220000
2230000
2240000
Easting (ft)

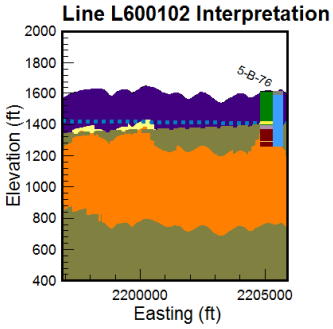
South Flight Block Profiles

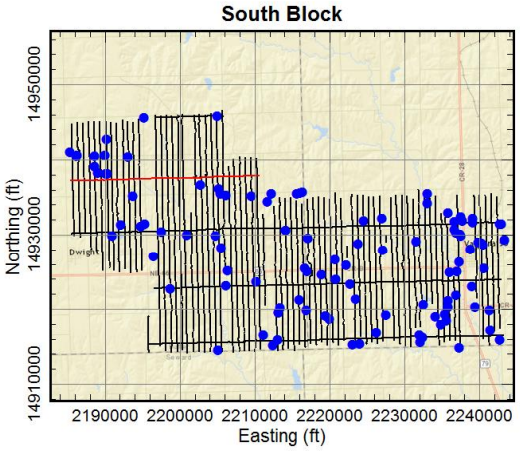
Quaternary Interpretations with Boreholes and NDNR Water Levels

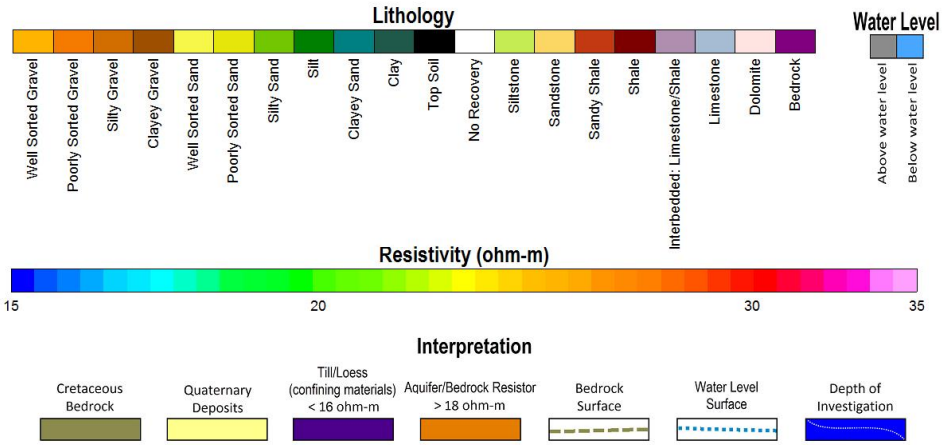

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

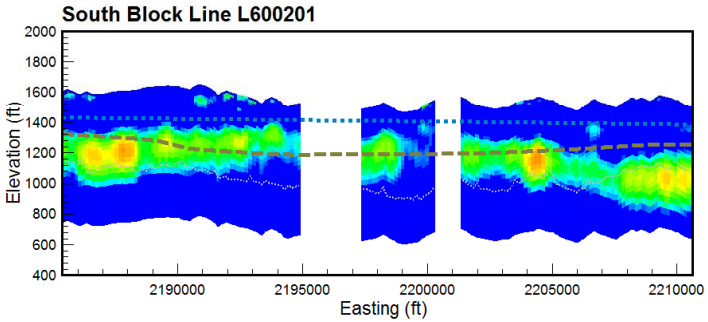

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

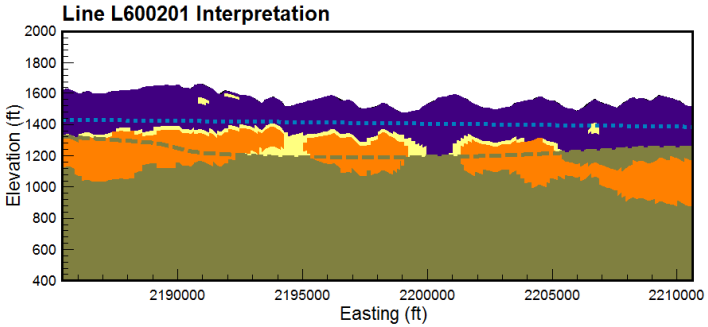

South Block Line L600102
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
5-B-76
2200000
2205000
Easting (ft)

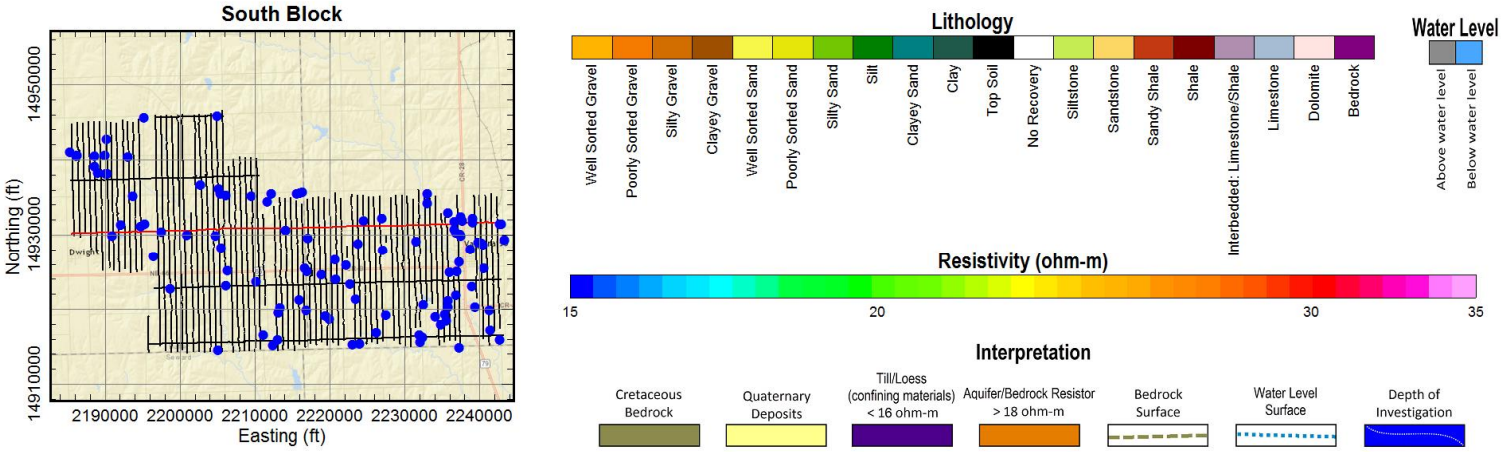

Line L600102 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
5-B-76
2200000
2205000
Easting (ft)

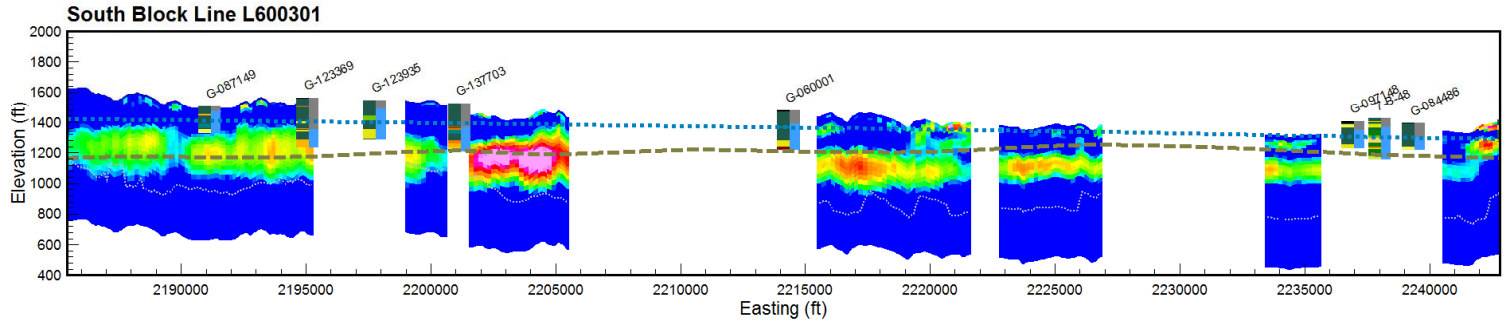

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

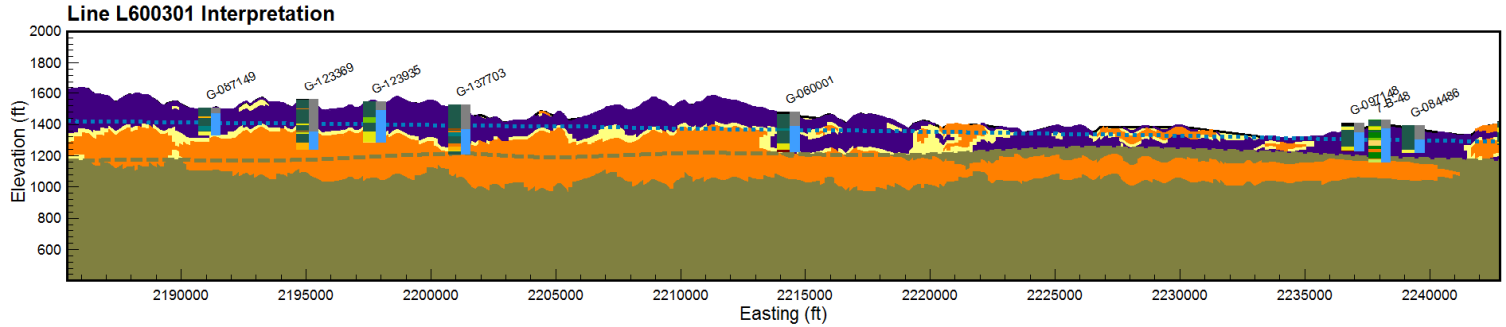

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

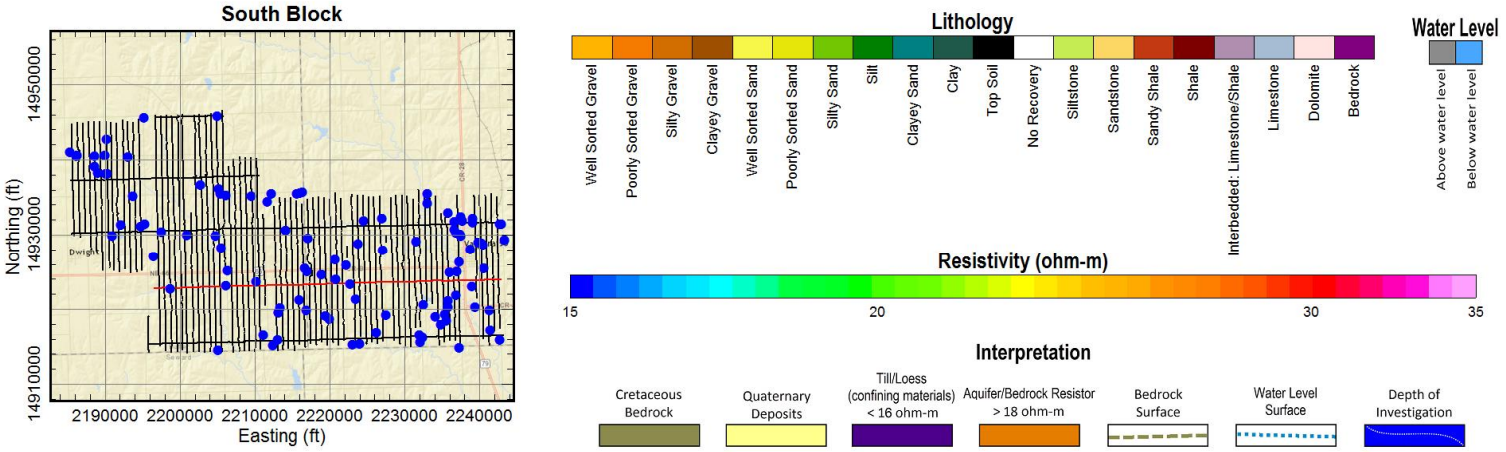

South Block Line L600201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
2190000 2195000 2200000 2205000 2210000
Easting (ft)

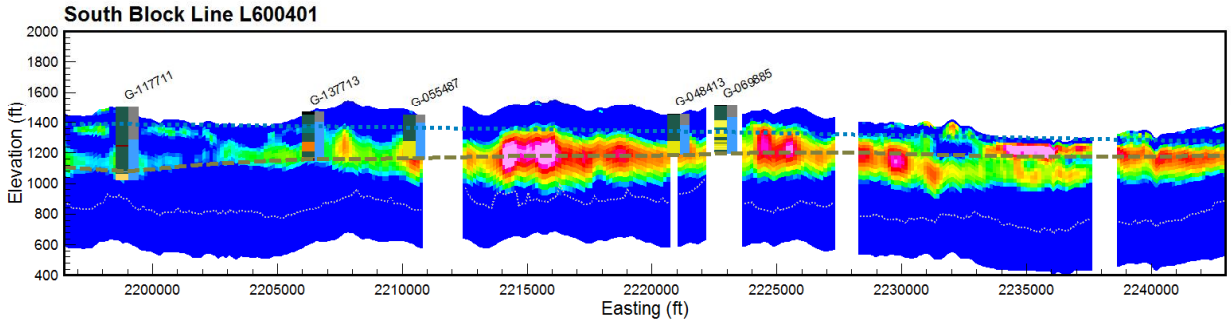

Line L600201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
2190000 2195000 2200000 2205000 2210000
Easting (ft)

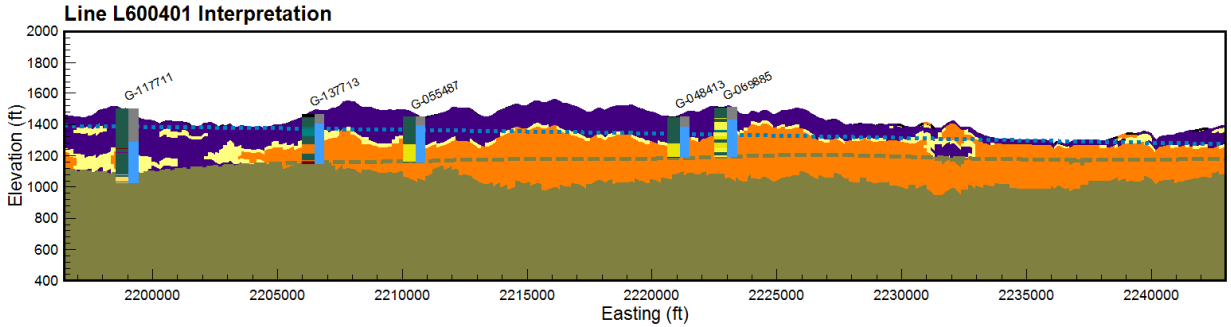

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

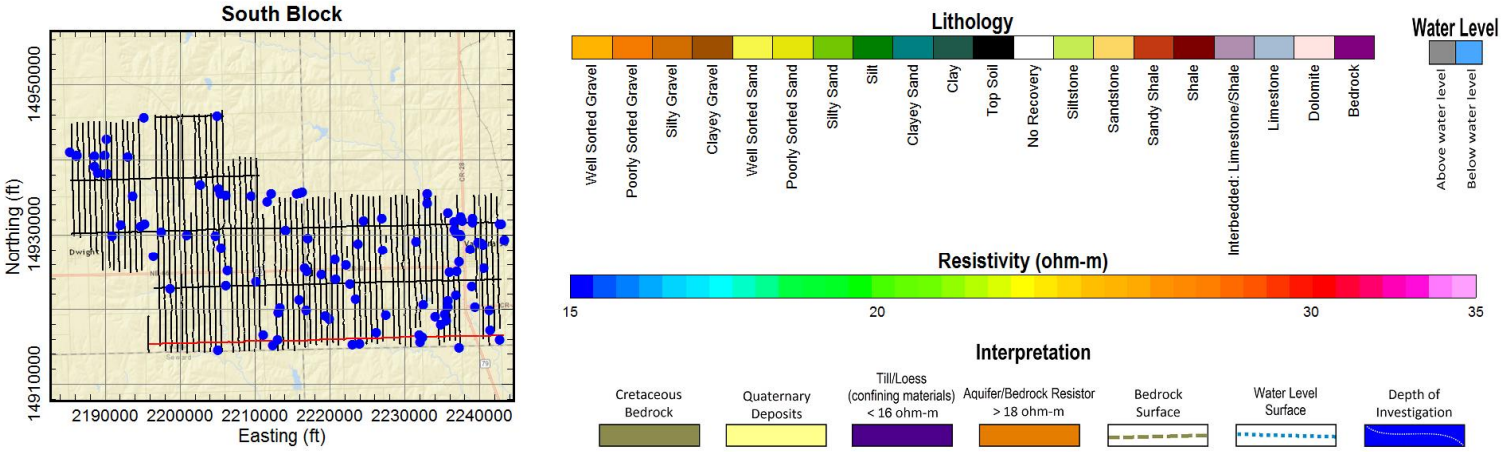

South Block Line L600301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-087149
G-123369
G-123935
G-137703
G-060001
G-097148
G-084486
2190000 2195000 2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

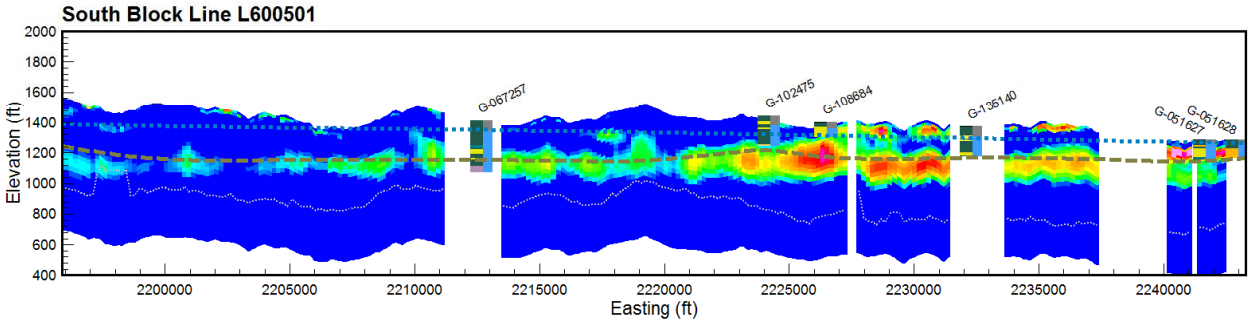

Line L600301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-087149
G-123369
G-123935
G-137703
G-060001
G-097148
G-084486
2190000 2195000 2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

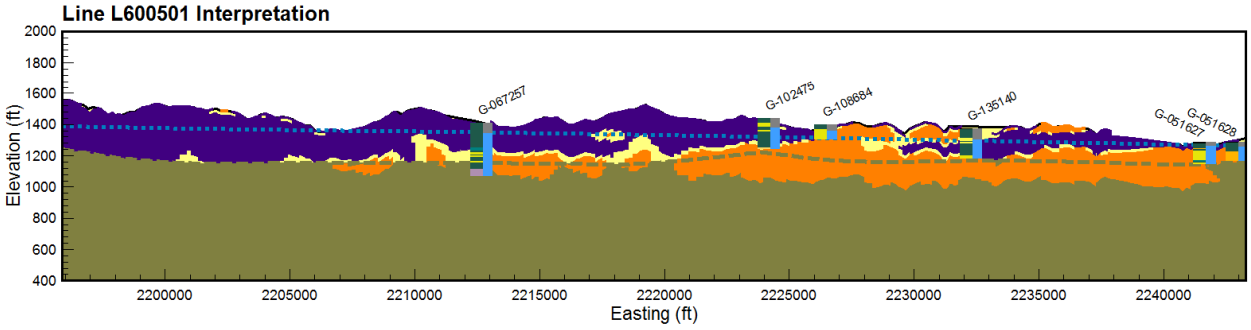

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

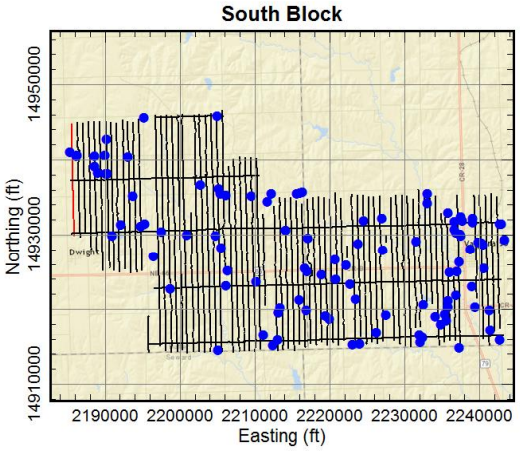

South Block Line L600401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117711
G-137713
G-055487
G-048413
G-069685
2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

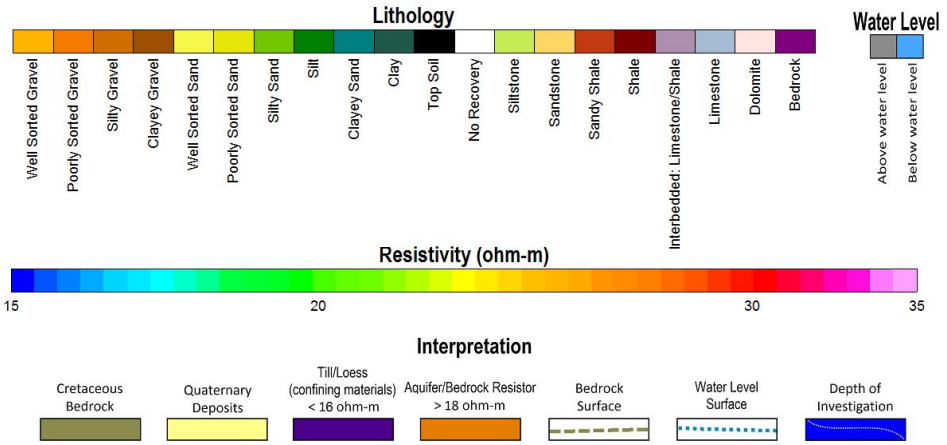

Line L600401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117711
G-137713
G-055487
G-048413
G-069685
2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

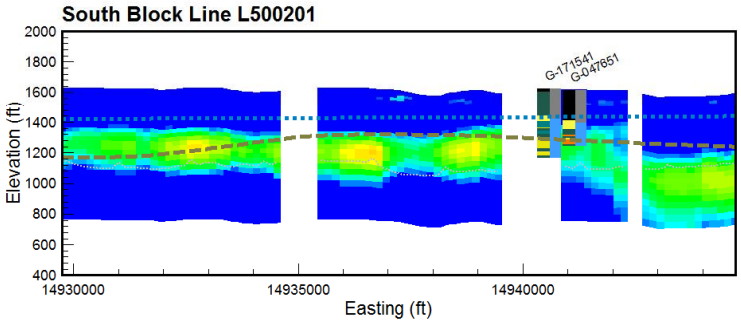

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

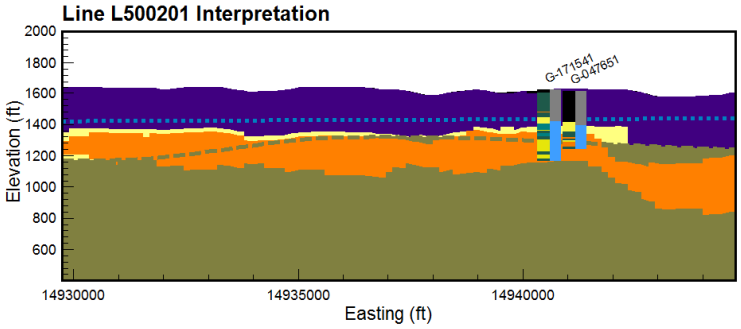

South Block Line L600501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-067257
G-102475
G-108684
G-135140
G-051627
G-051628
2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

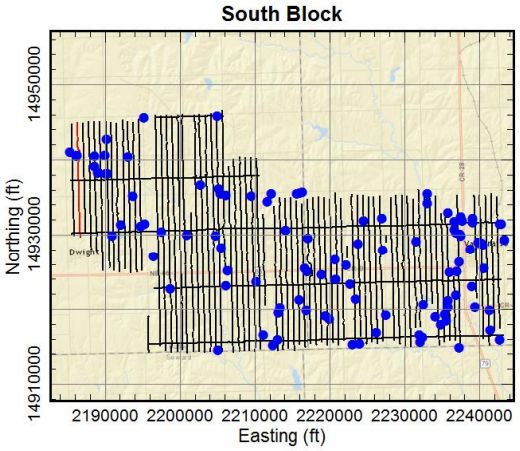

Line L600501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-067257
G-102475
G-108684
G-135140
G-051627
G-051628
2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

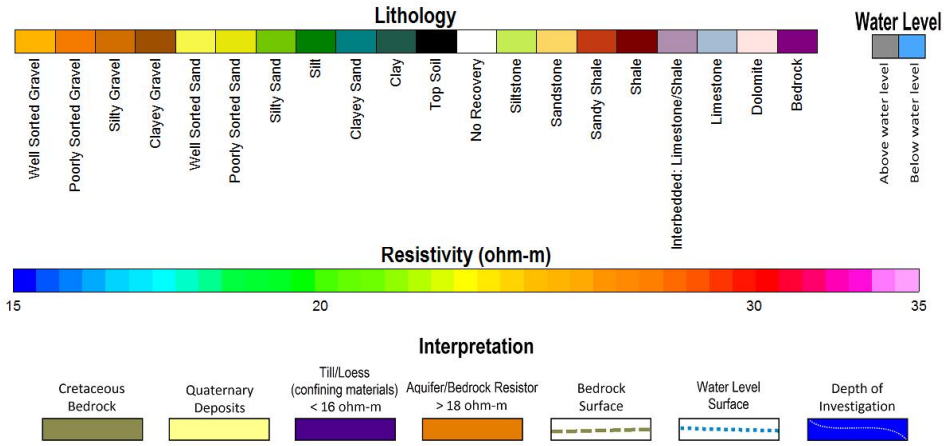

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

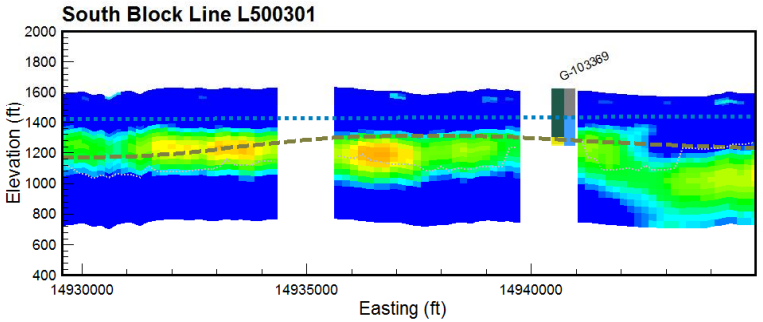

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

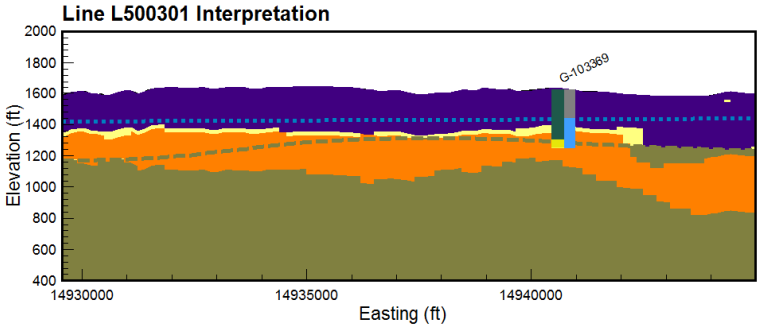

South Block Line L500201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-171541
G-047651
14930000
14935000
14940000
Easting (ft)

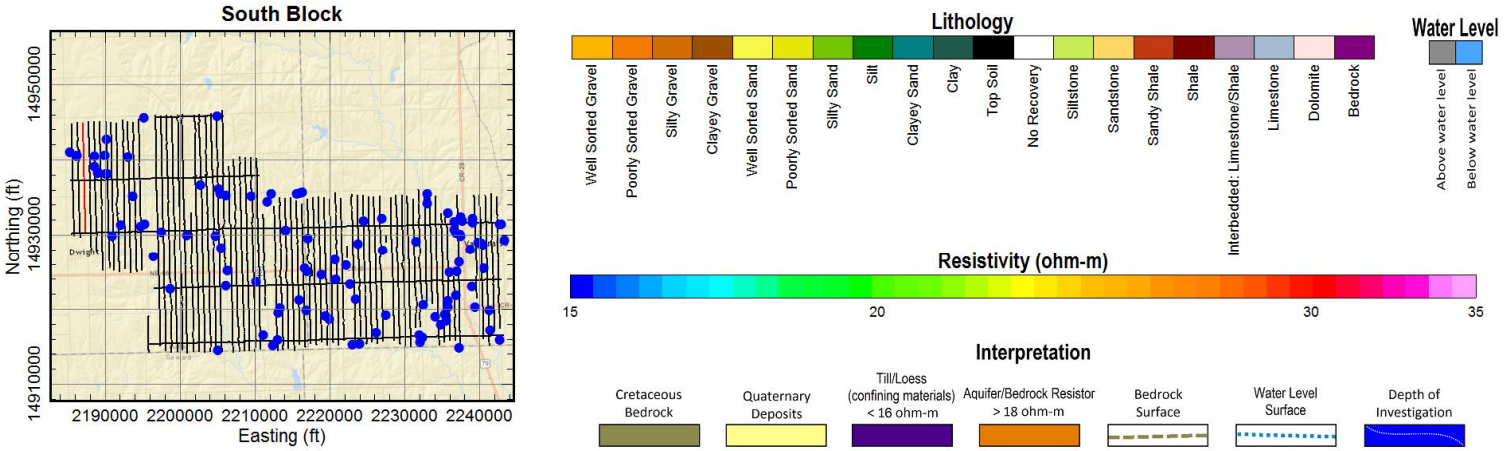

Line L500201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-171541
G-047651
14930000
14935000
14940000
Easting (ft)

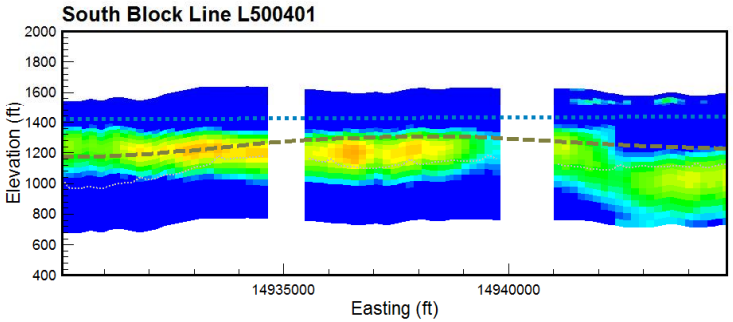

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

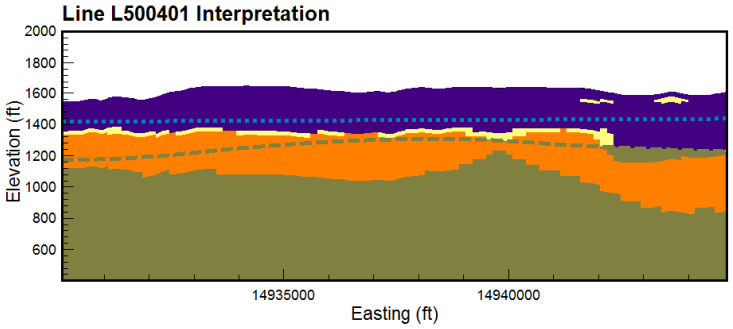

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

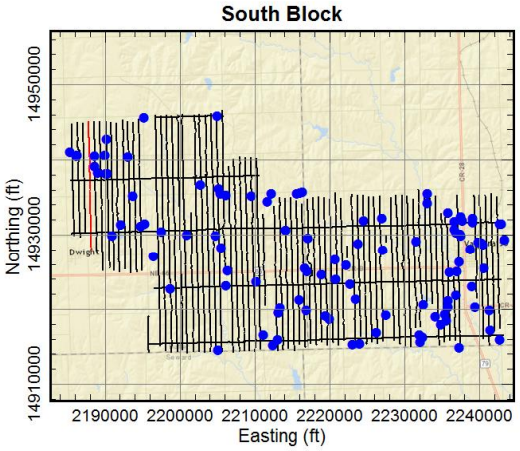

South Block Line L500301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-103369
14930000
14935000
14940000
Easting (ft)

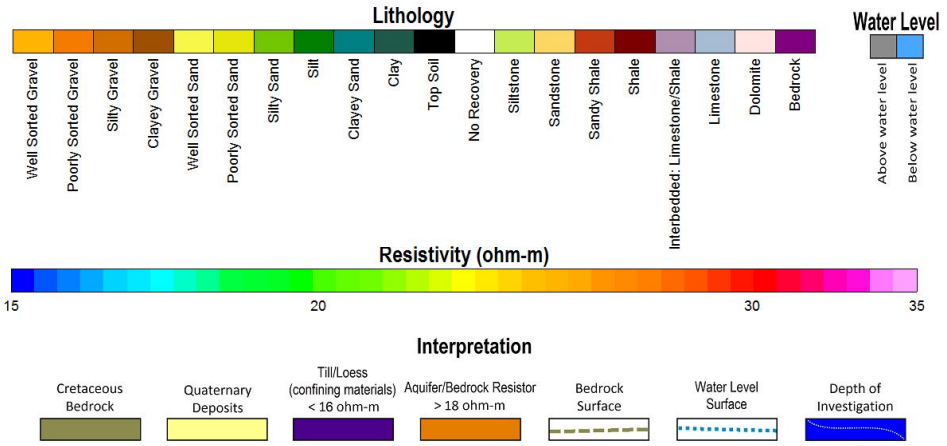

Line L500301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-103369
14930000
14935000
14940000
Easting (ft)

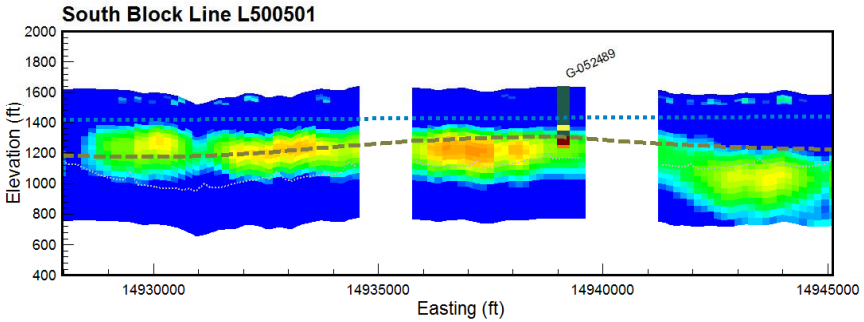

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

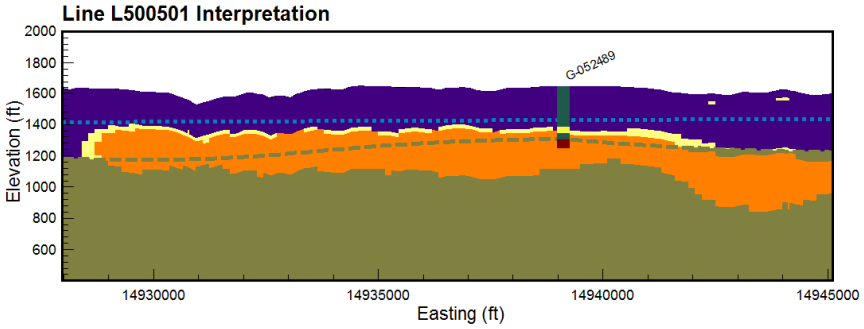

South Block Line L500401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14935000
14940000
Easting (ft)

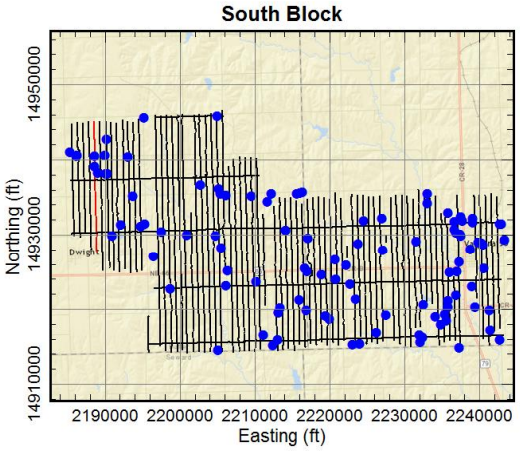

Line L500401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14935000
14940000
Easting (ft)

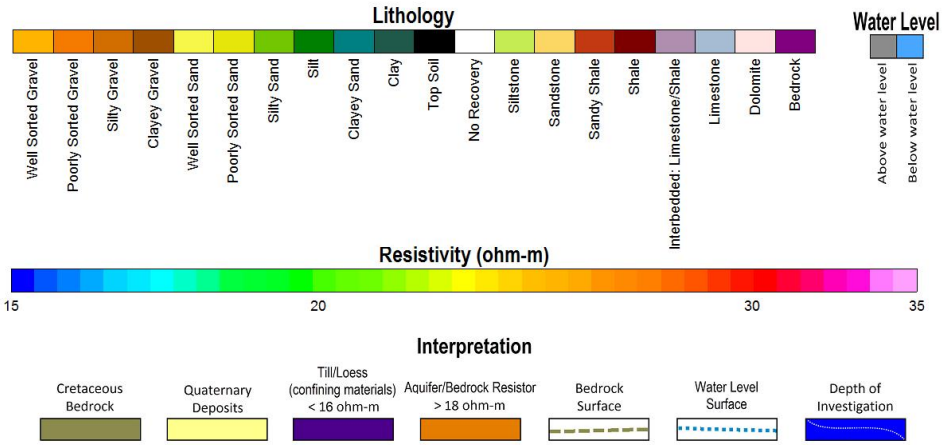

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

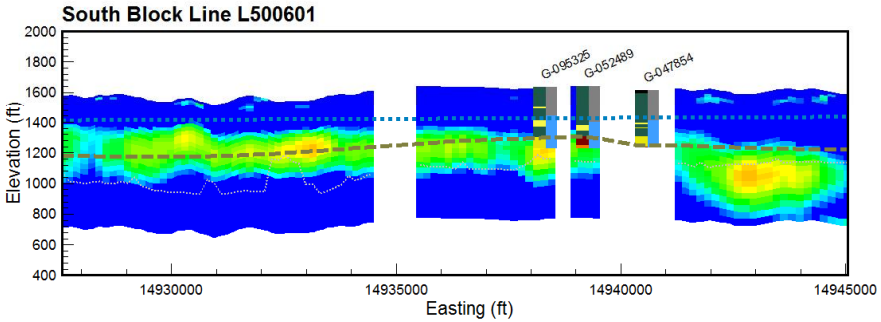

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

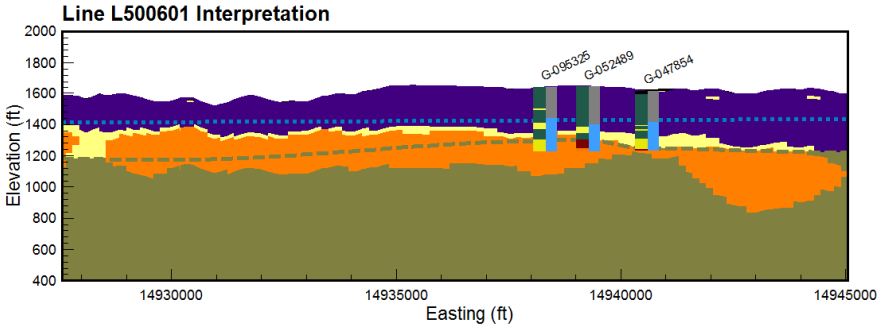

South Block Line L500501
G-052489
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14930000
14935000
14940000
14945000
Easting (ft)

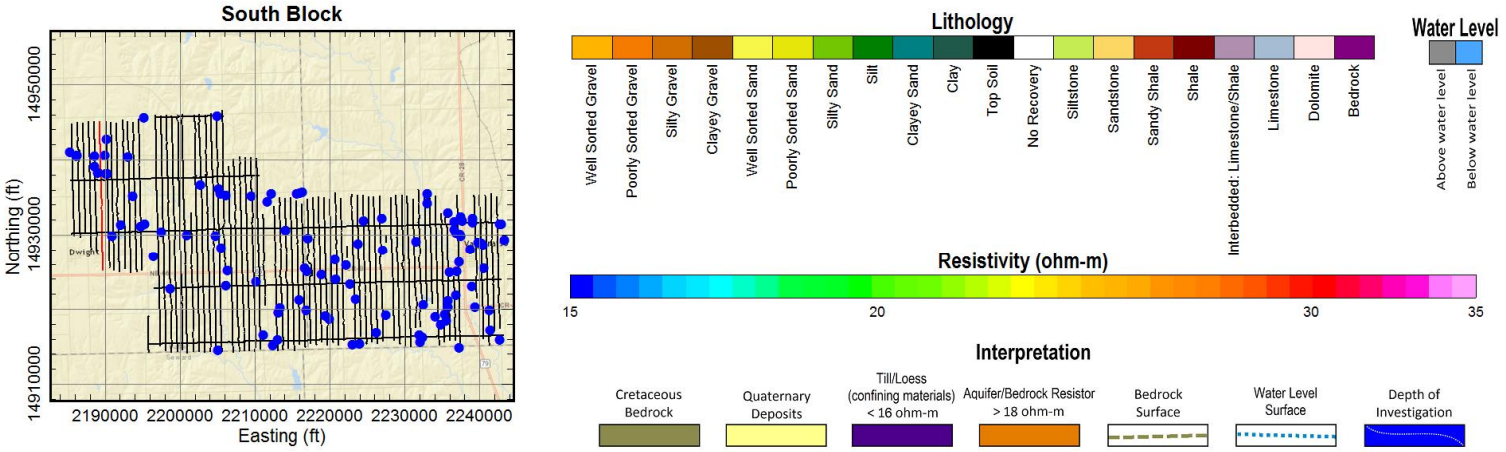

Line L500501 Interpretation
G-052489
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Easting (ft)

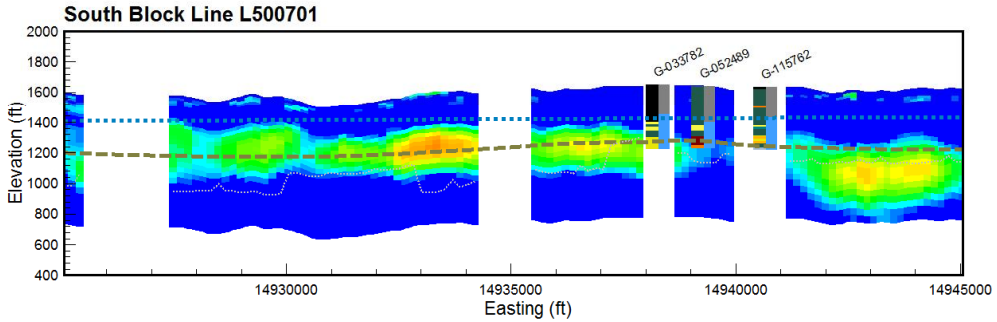

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

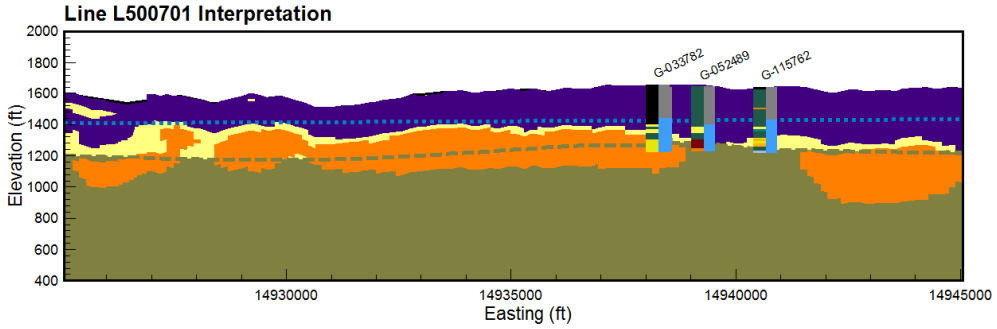

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

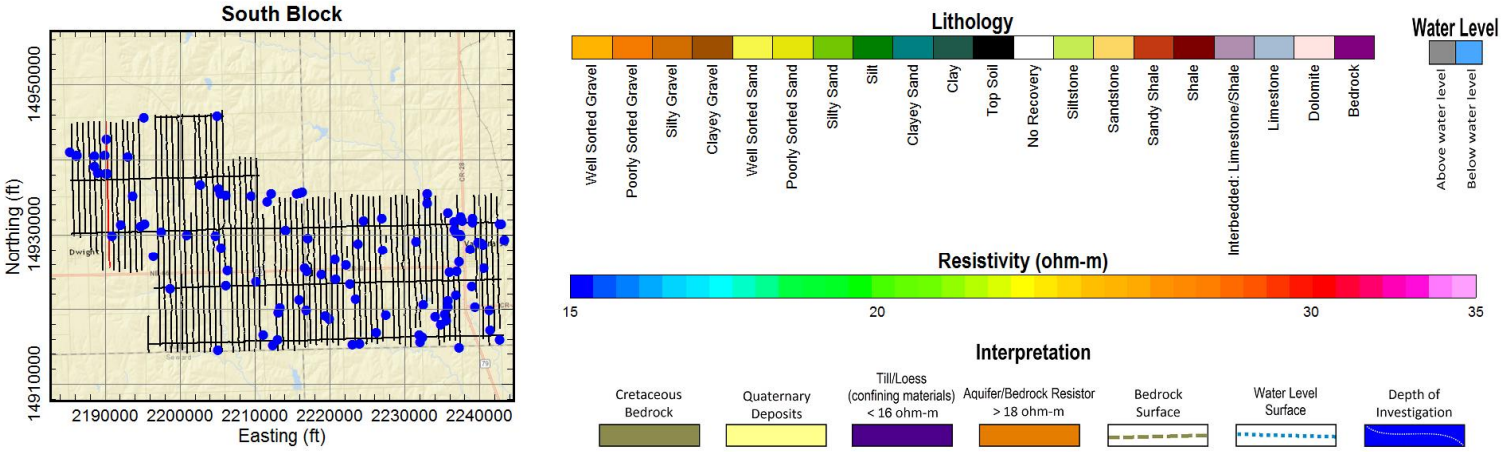

South Block Line L500601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-095325
G-052489
G-047854
14930000
14935000
14940000
14945000
Easting (ft)

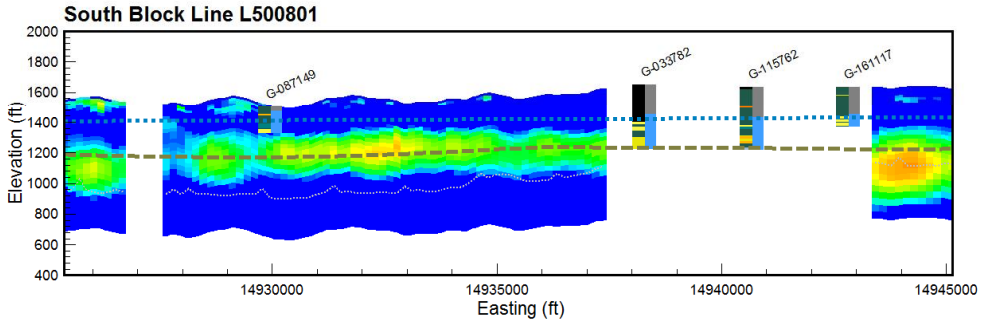

Line L500601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-095325
G-052489
G-047854
14930000
14935000
14940000
14945000
Easting (ft)

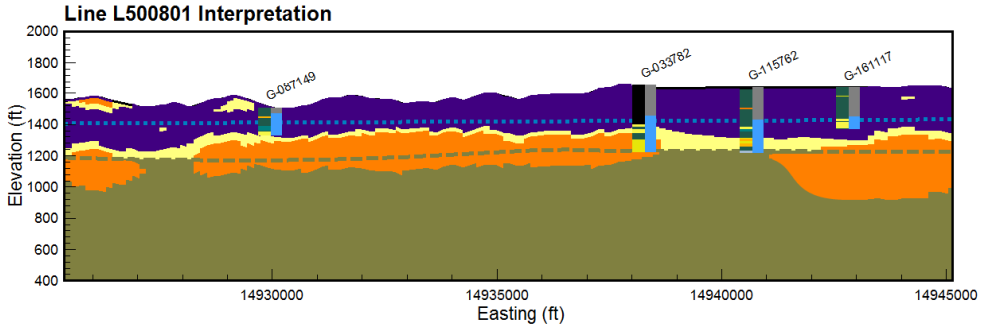

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

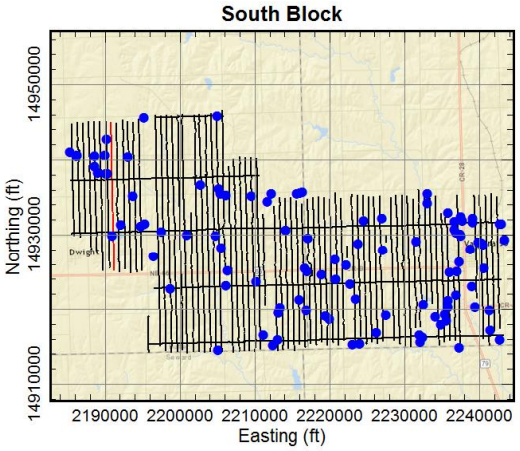

South Block Line L500701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-033782
G-052489
G-115762
14930000
14935000
14940000
14945000
Easting (ft)

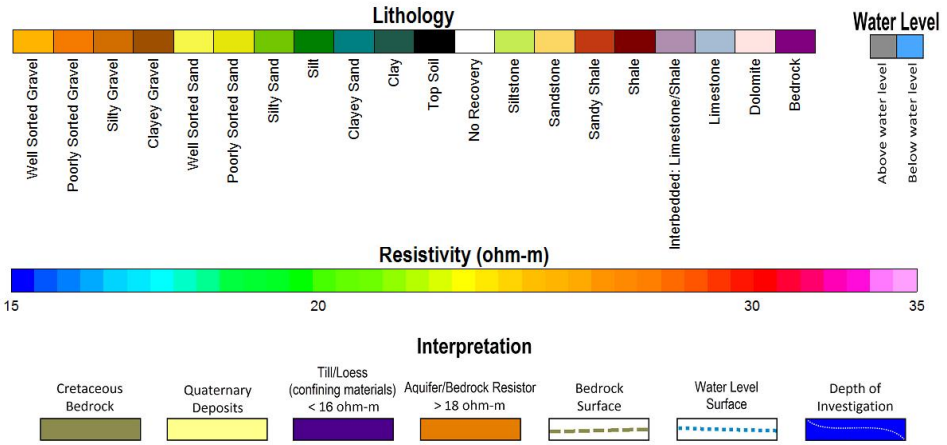

Line L500701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-033782
G-052489
G-115762
14930000
14935000
14940000
14945000
Easting (ft)

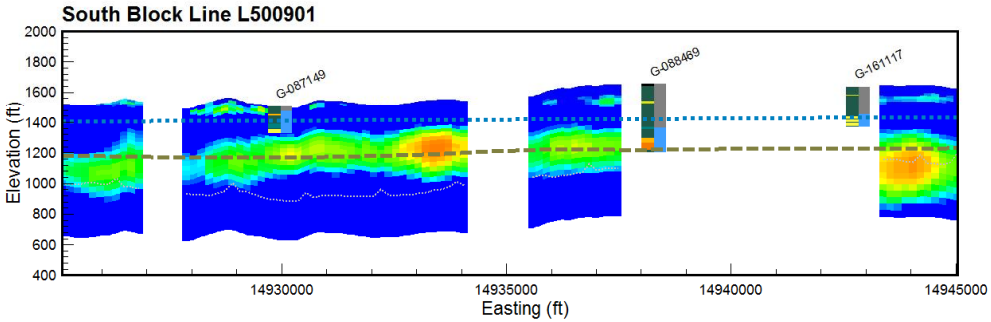

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

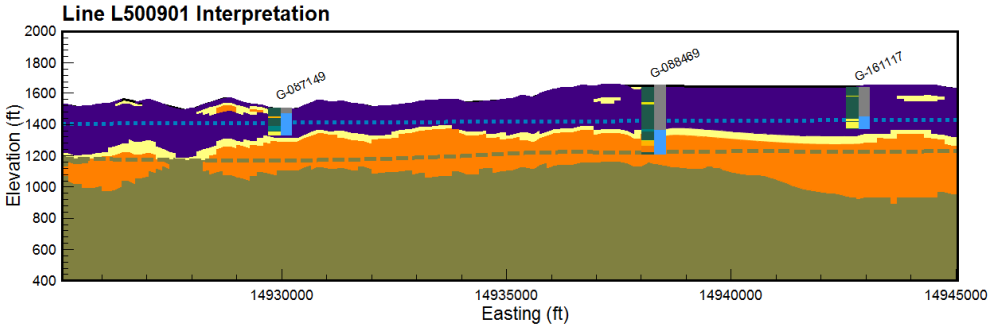

South Block Line L500801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-087149
G-033782
G-115762
G-161117
14930000
14935000
14940000
14945000
Easting (ft)

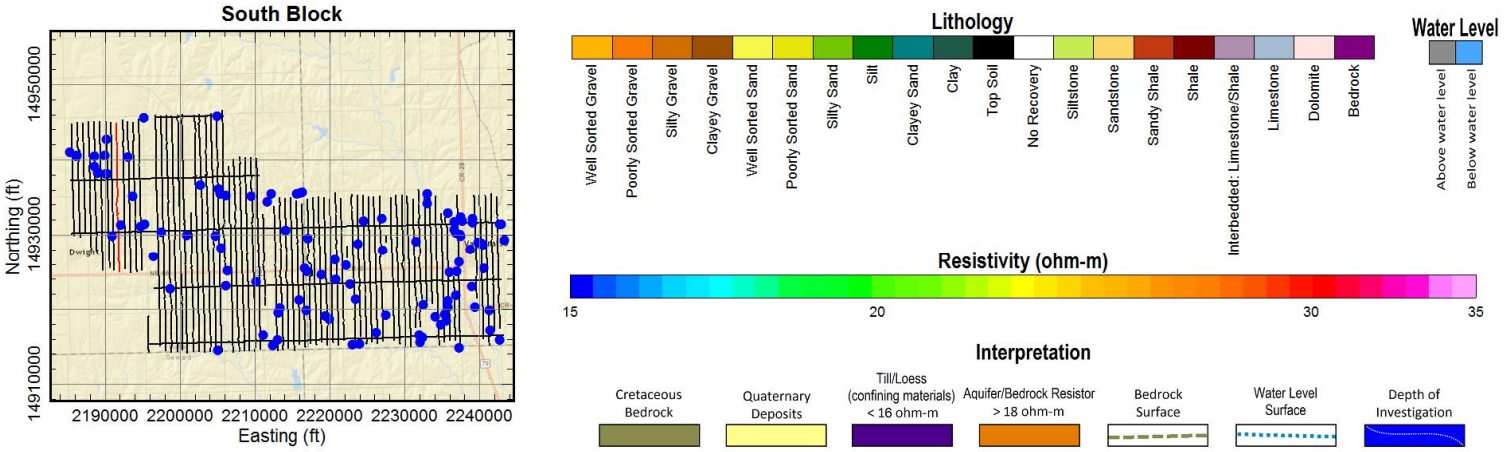

Line L500801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-087149
G-033782
G-115762
G-161117
14930000
14935000
14940000
14945000
Easting (ft)

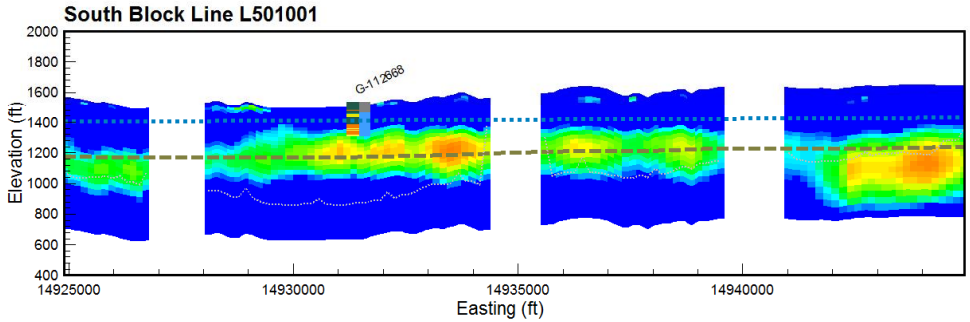

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

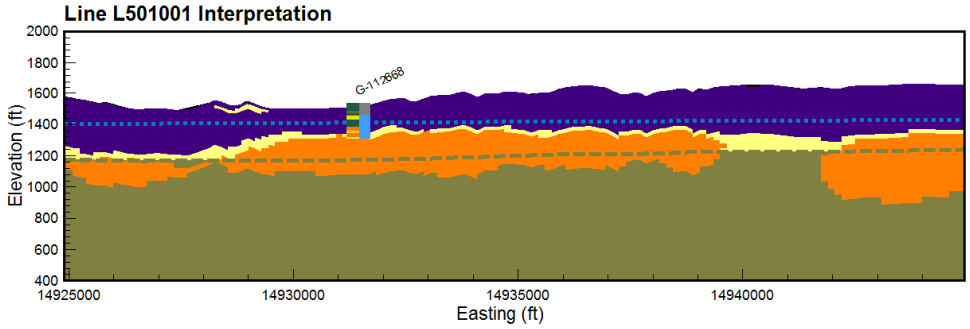

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

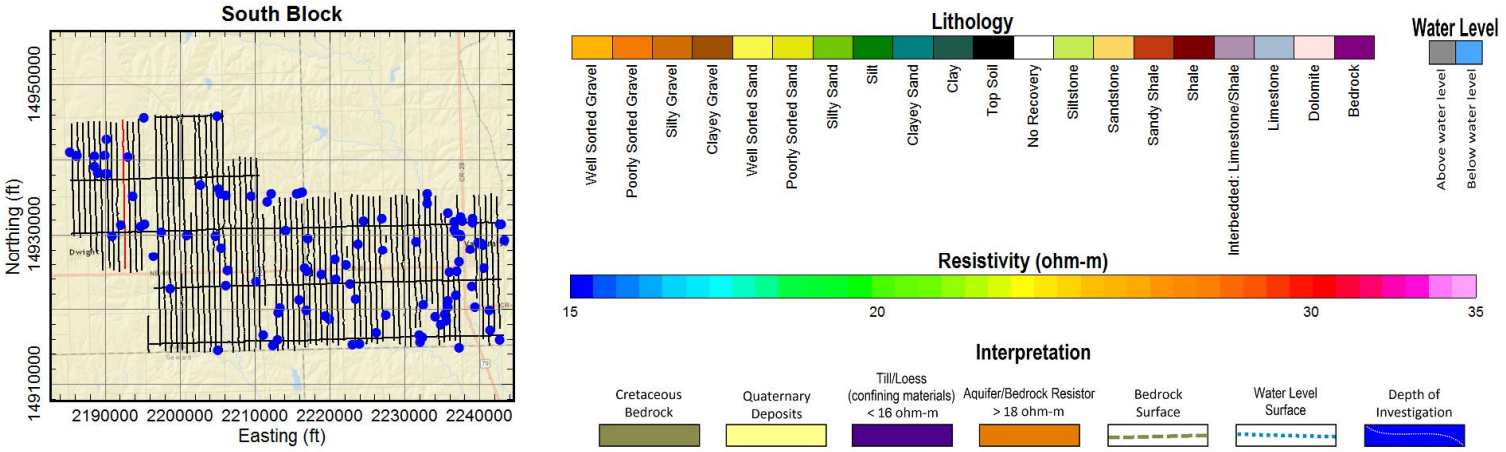

South Block Line L500901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-087149
G-088469
G-161117
14930000
14935000
14940000
14945000
Easting (ft)

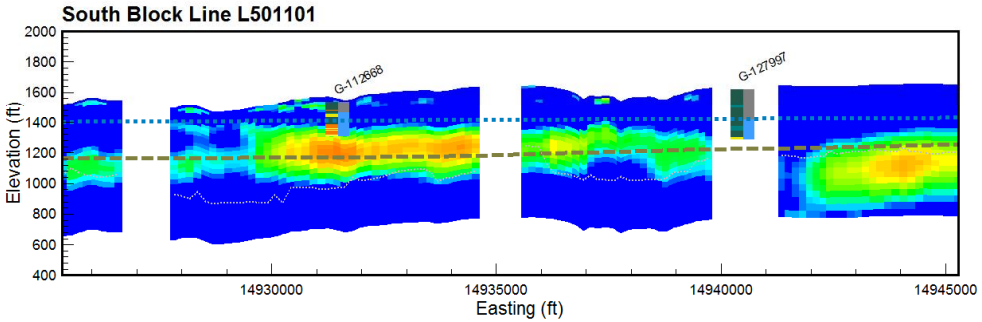

Line L500901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-087149
G-088469
G-161117
14930000
14935000
14940000
14945000
Easting (ft)

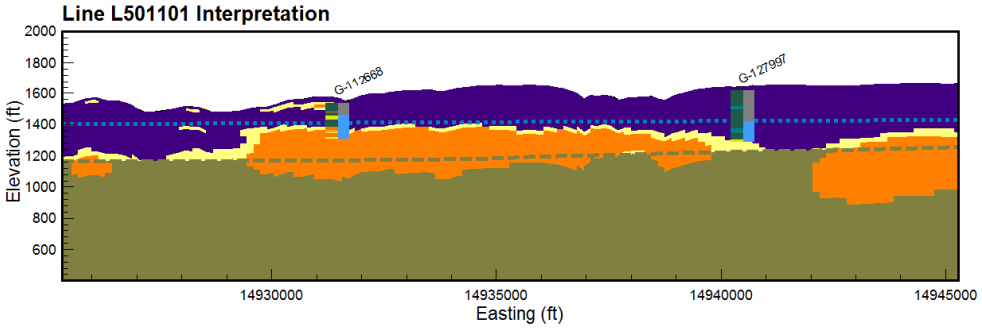

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

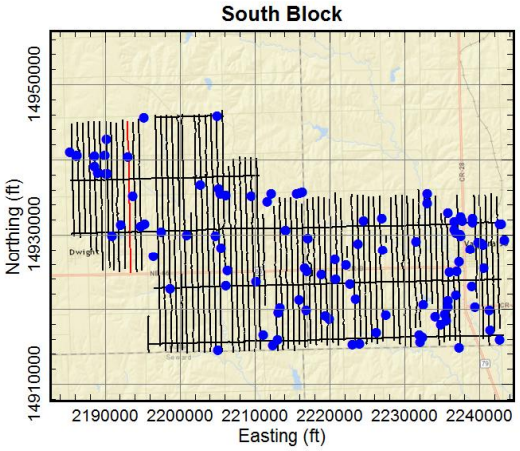

South Block Line L501001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112668
14925000
14930000
14935000
14940000
Easting (ft)

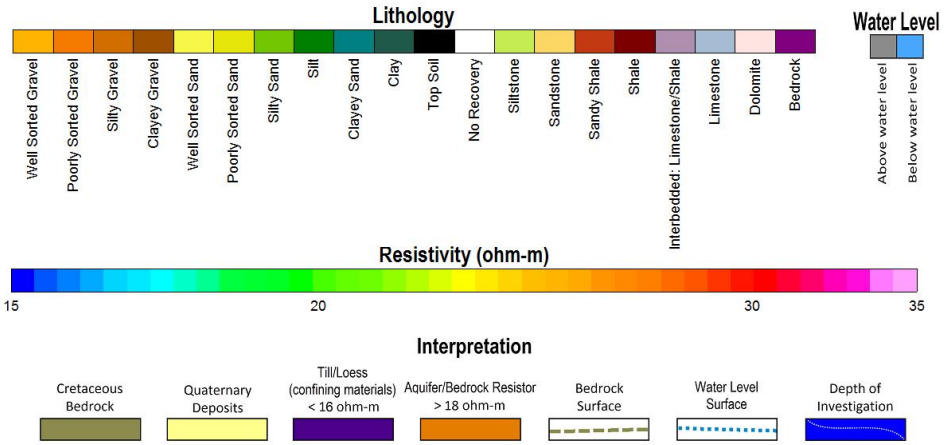

Line L501001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112668
14925000
14930000
14935000
14940000
Easting (ft)

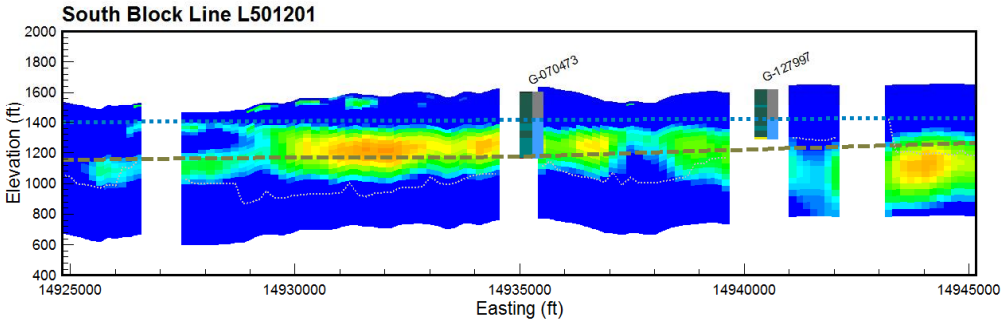

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

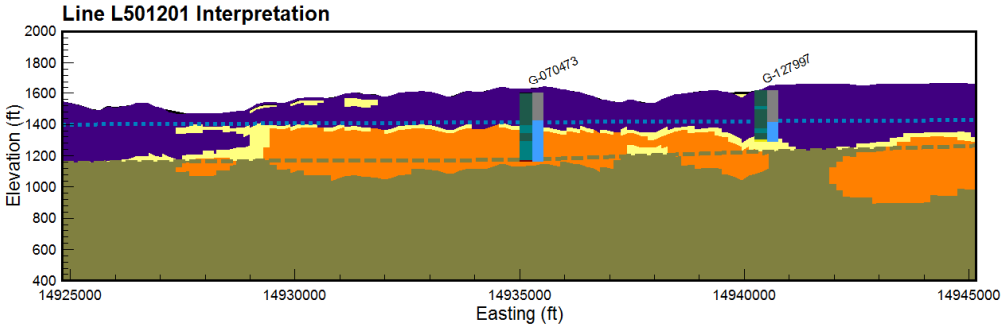

South Block Line L501101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112668
G-127997
14930000
14935000
14940000
14945000
Easting (ft)

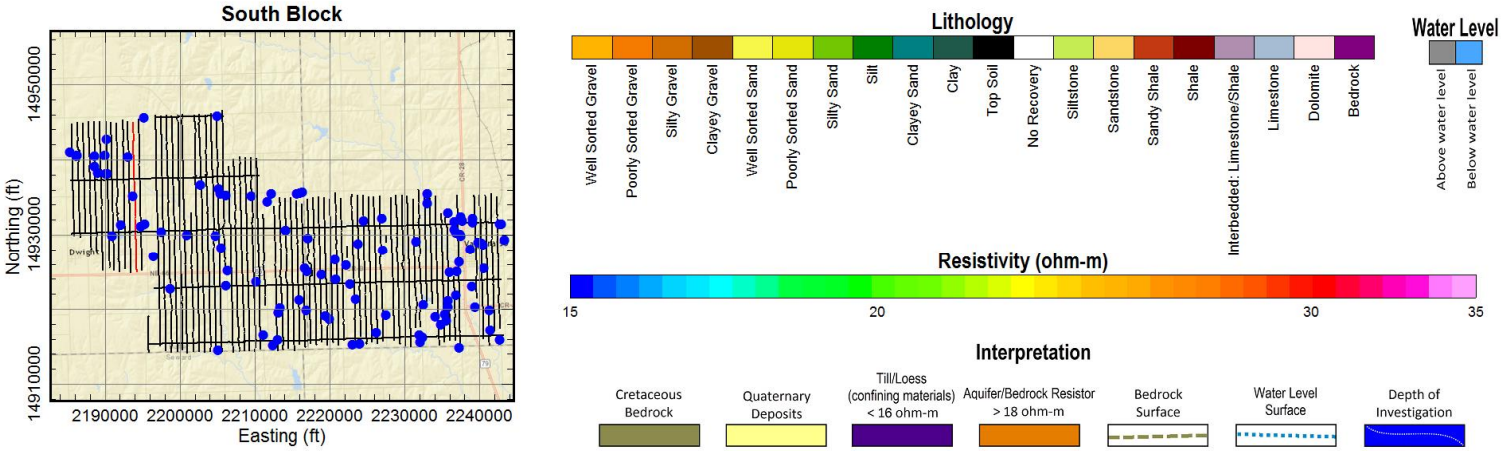

Line L501101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-112668
G-127997
14930000
14935000
14940000
14945000
Easting (ft)

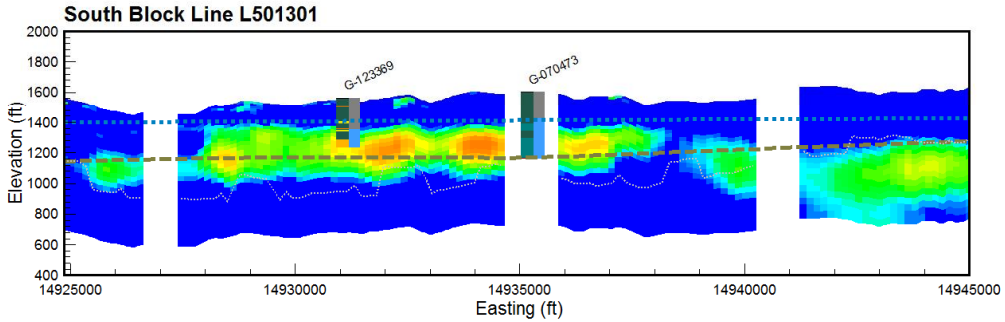

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

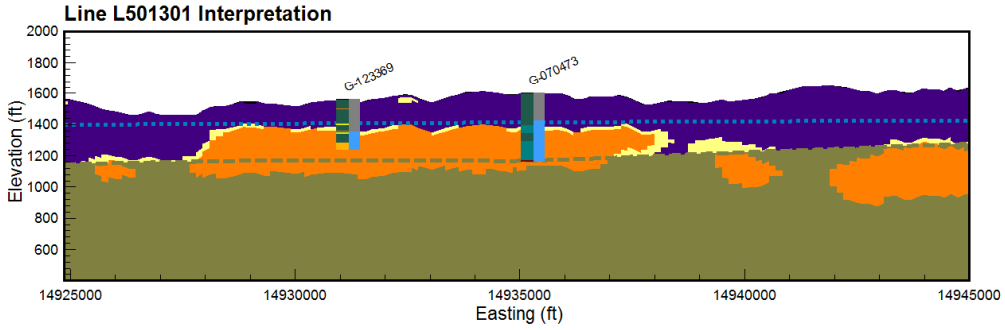

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

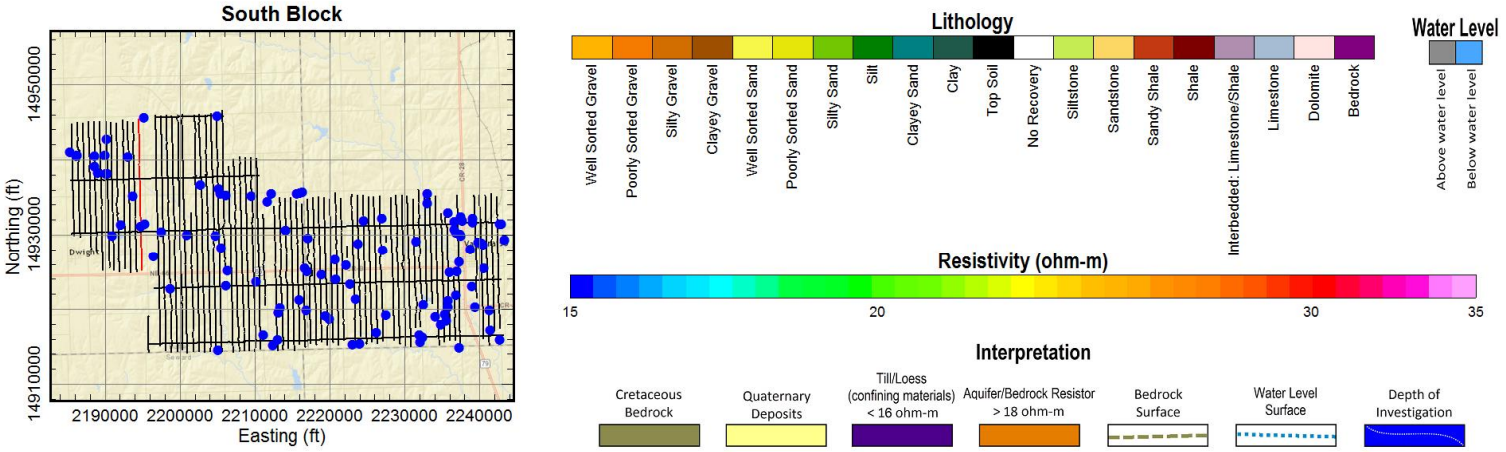

South Block Line L501201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-070473
G-127997
14925000
14930000
14935000
14940000
14945000
Easting (ft)

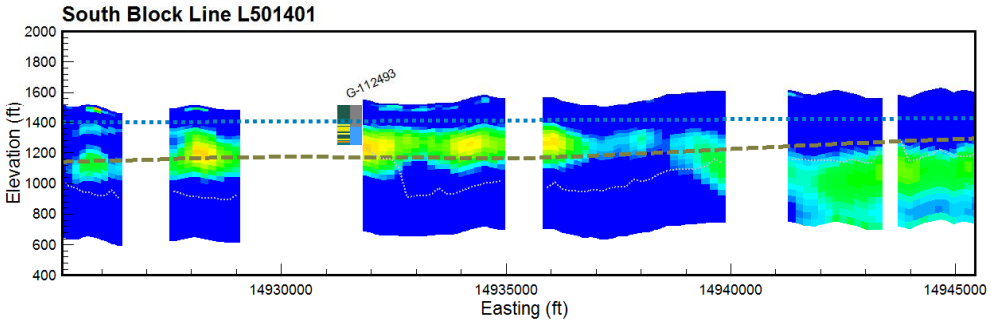

Line L501201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-070473
G-127997
14925000
14930000
14935000
14940000
14945000
Easting (ft)

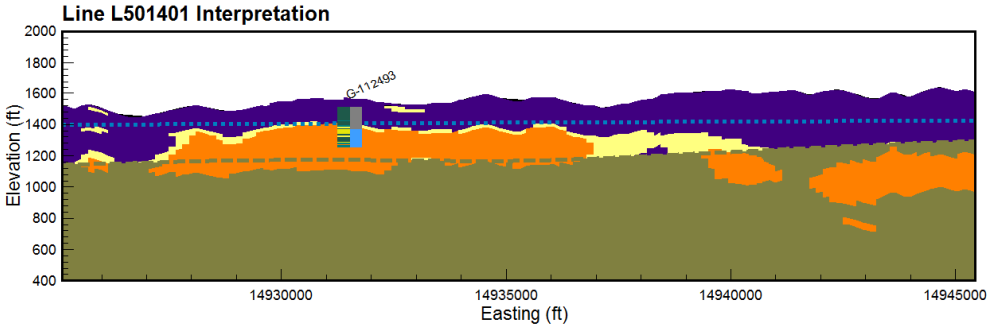

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

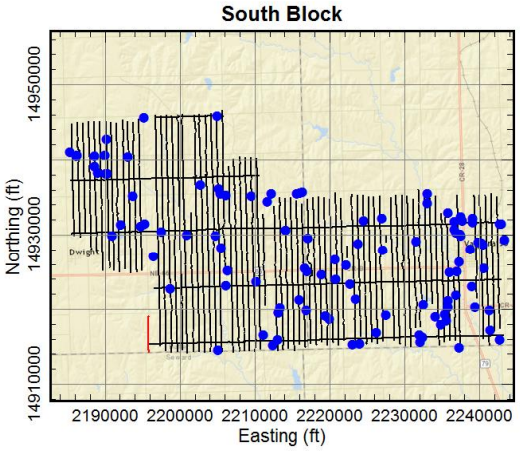

South Block Line L501301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-123369
G-070473
14925000
14930000
14935000
14940000
14945000
Easting (ft)

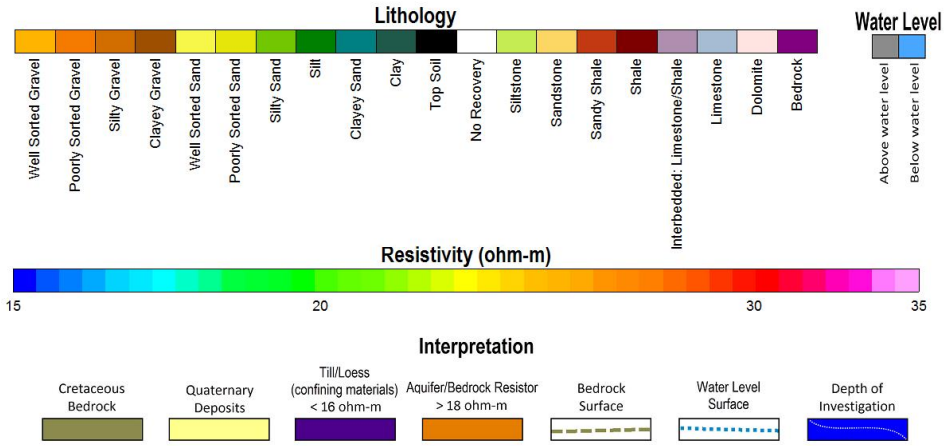

Line L501301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-123369
G-070473
14925000
14930000
14935000
14940000
14945000
Easting (ft)

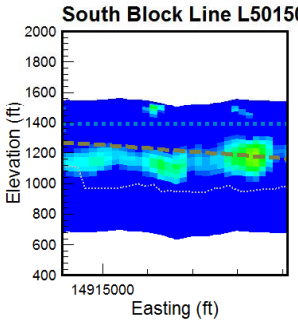

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

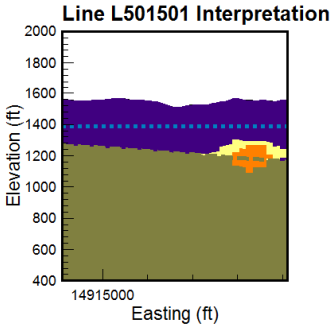

South Block Line L501401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112493
14930000
14935000
14940000
14945000
Easting (ft)

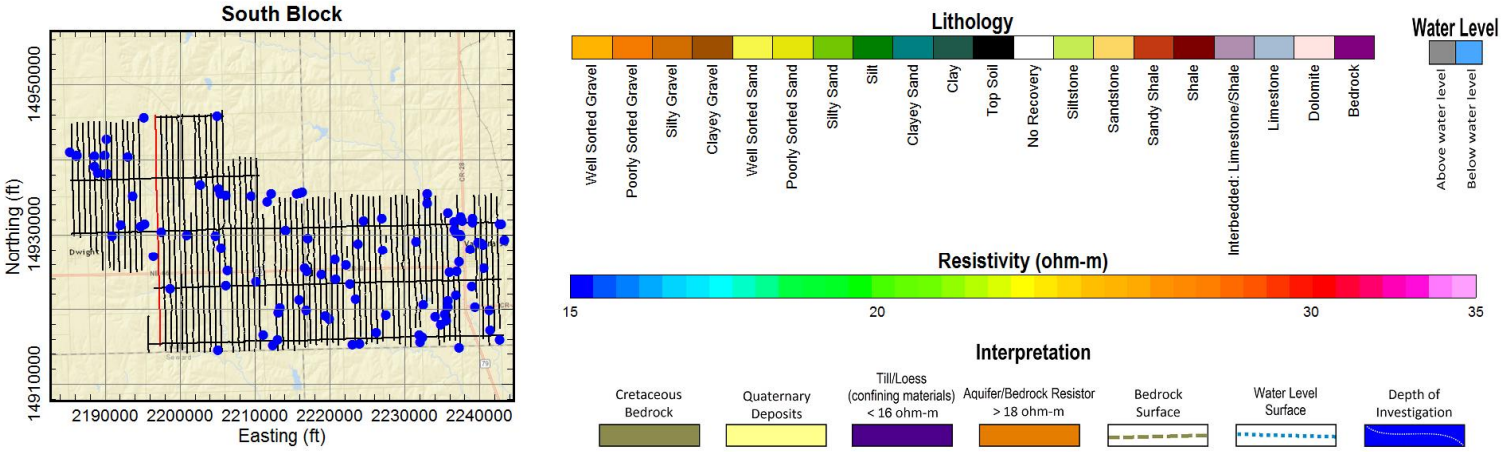

Line L501401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112493
14930000
14935000
14940000
14945000
Easting (ft)

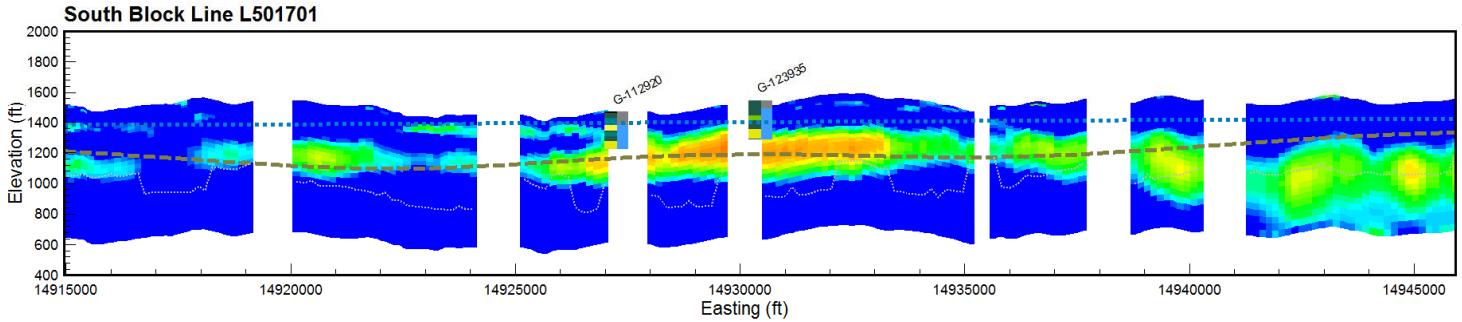

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

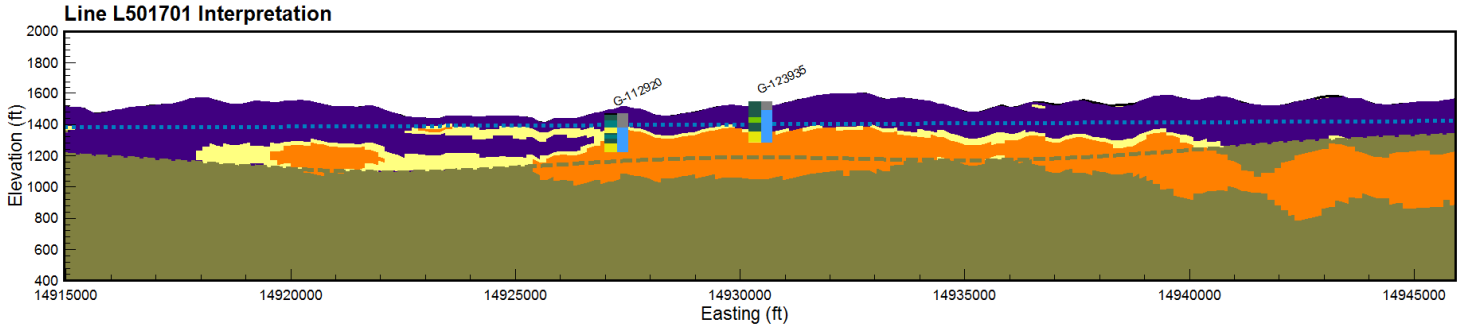

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

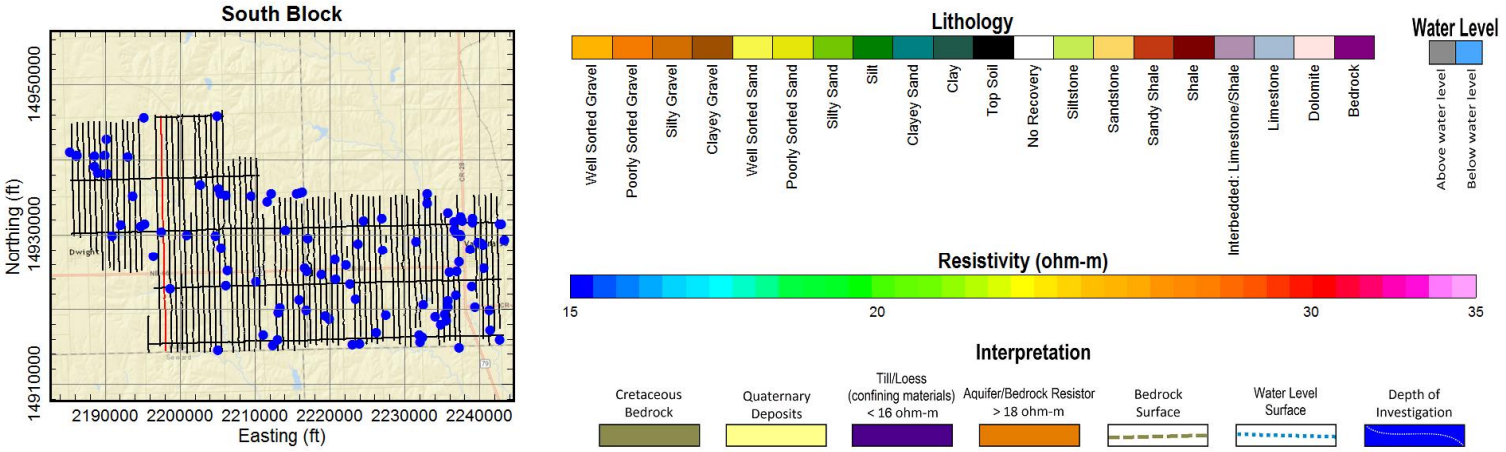

South Block Line L501501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000
Easting (ft)

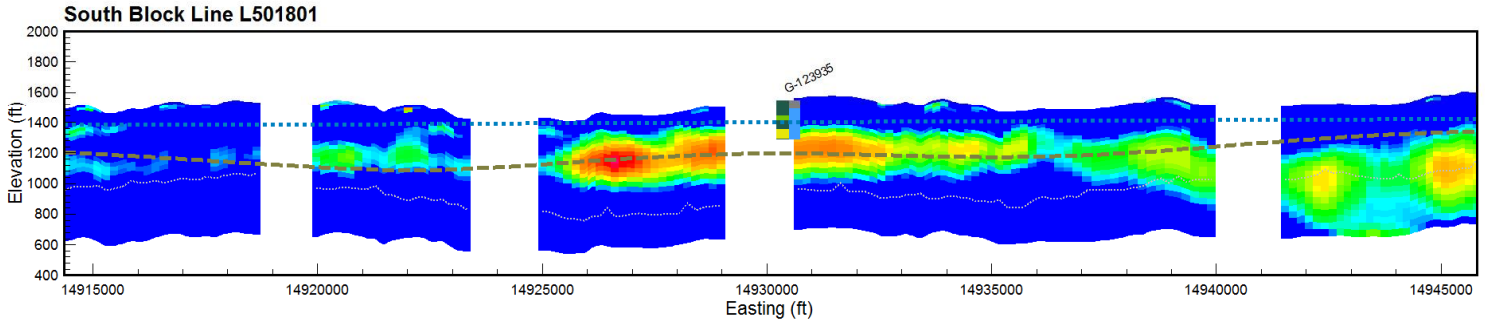

Line L501501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000
Easting (ft)

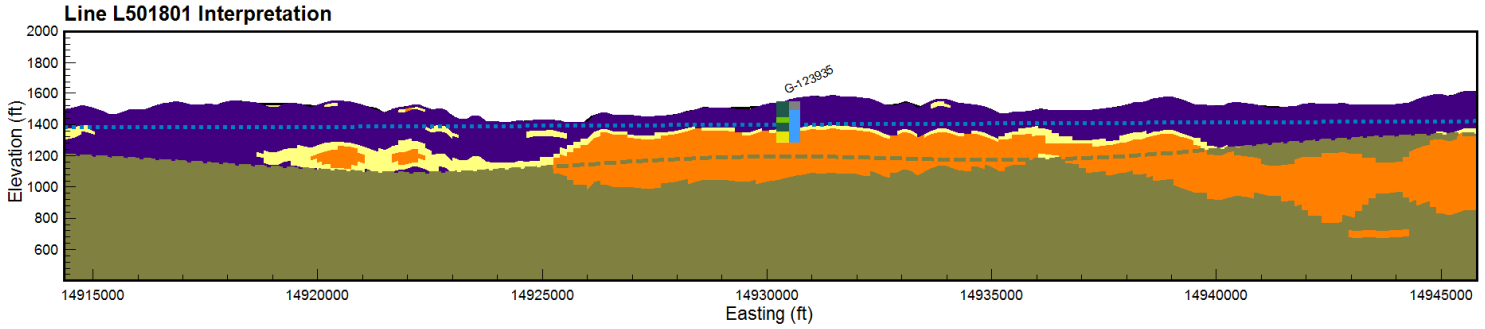

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

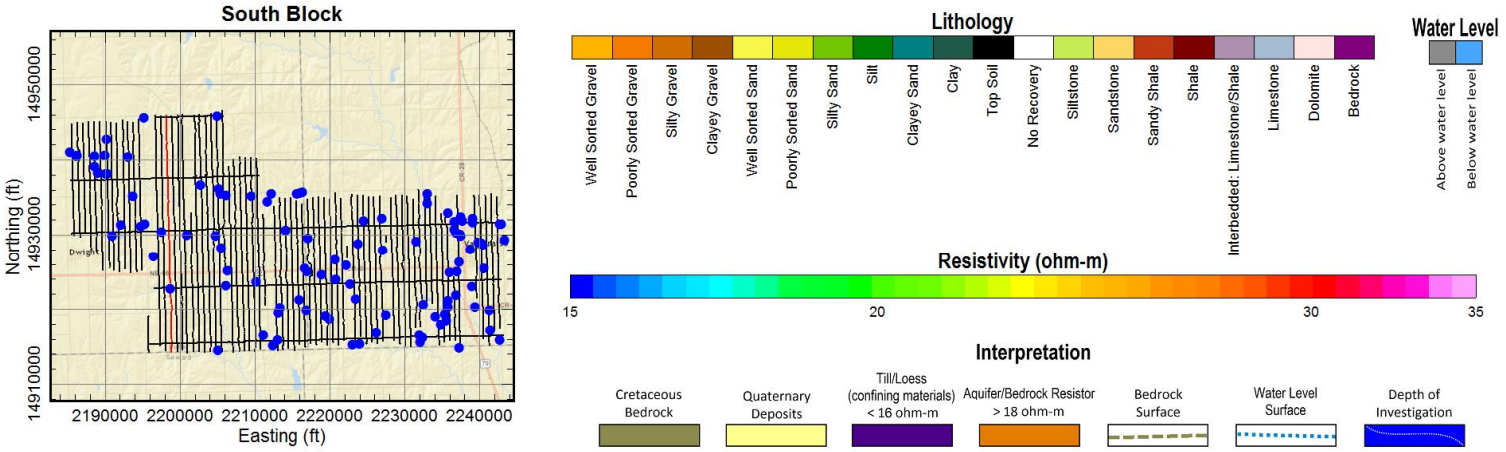

South Block Line L501701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112920
G-123935
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Easting (ft)

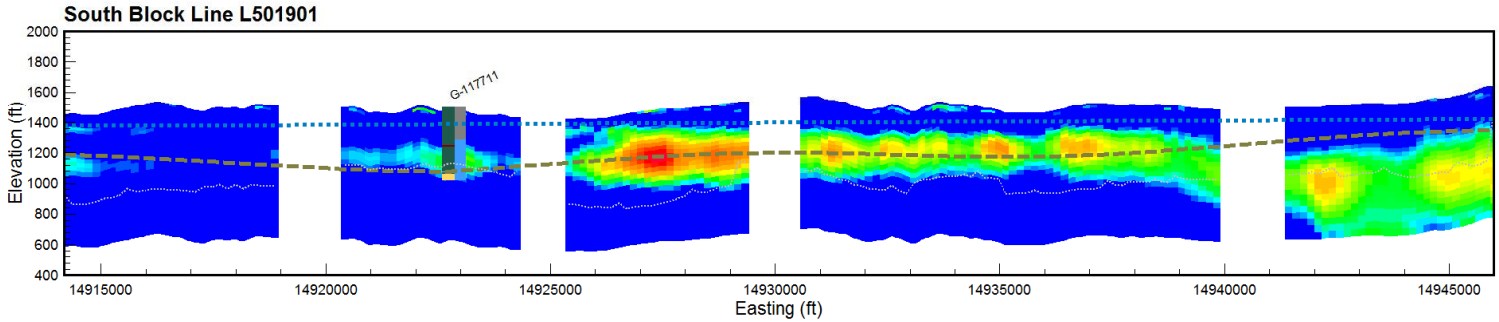

Line L501701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112920
G-123935
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Easting (ft)

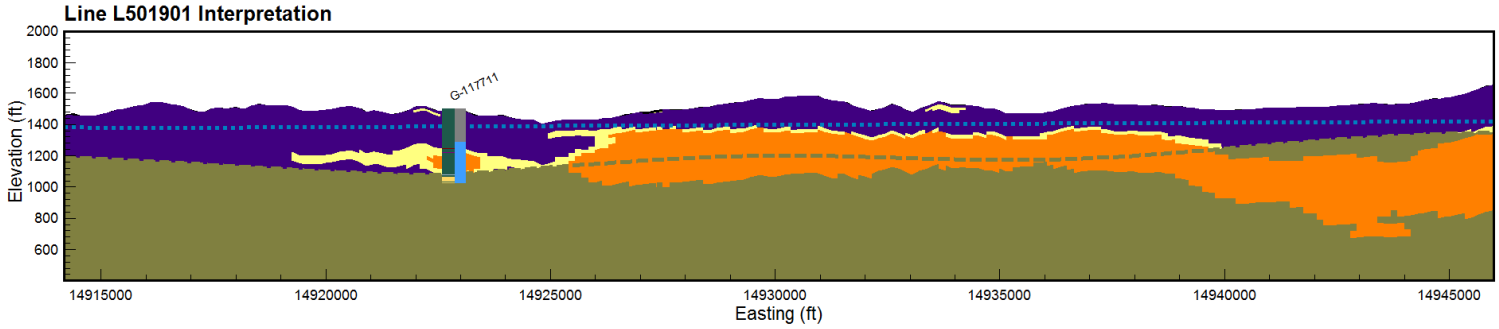

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

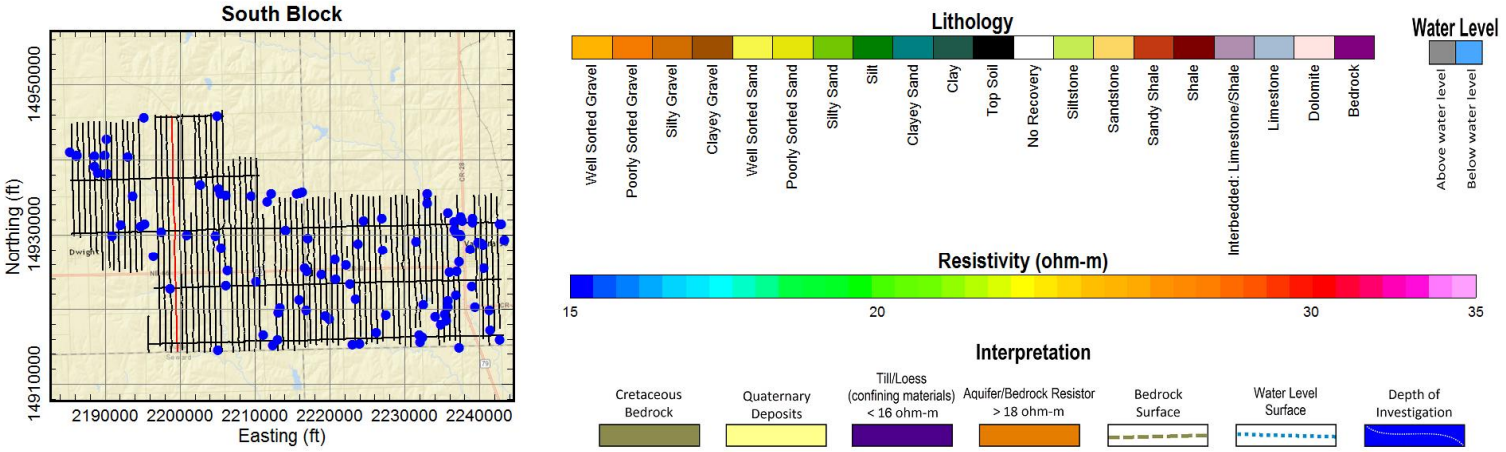

South Block Line L501801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-123935
14915000
14920000
14925000
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14935000
14940000
14945000
Easting (ft)

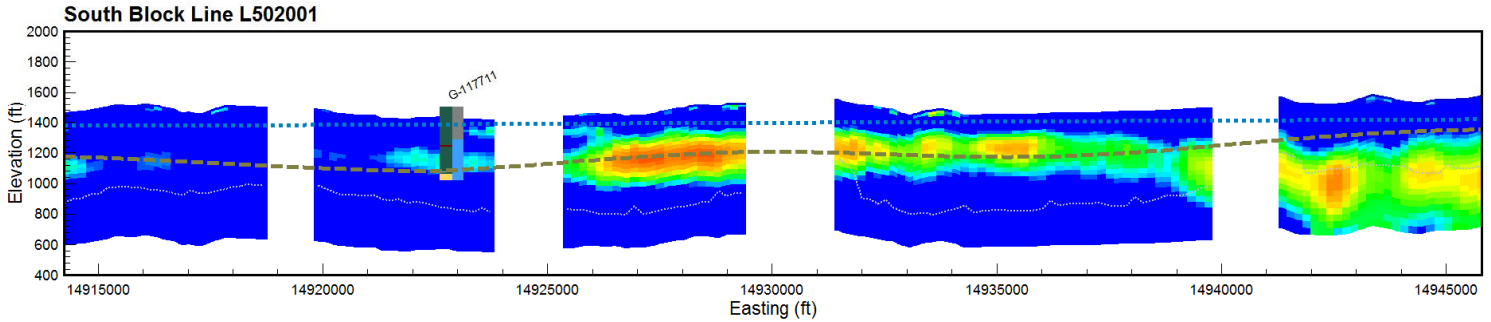

Line L501801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-123935
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

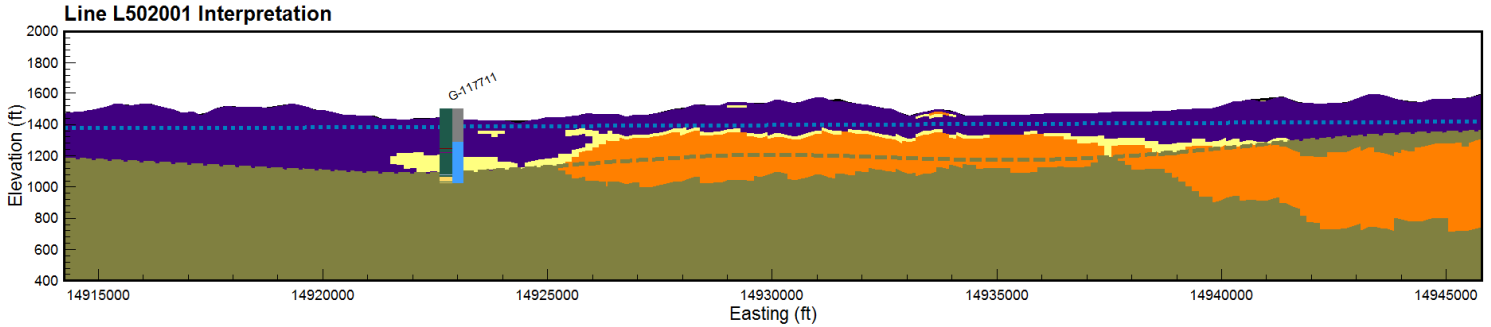

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

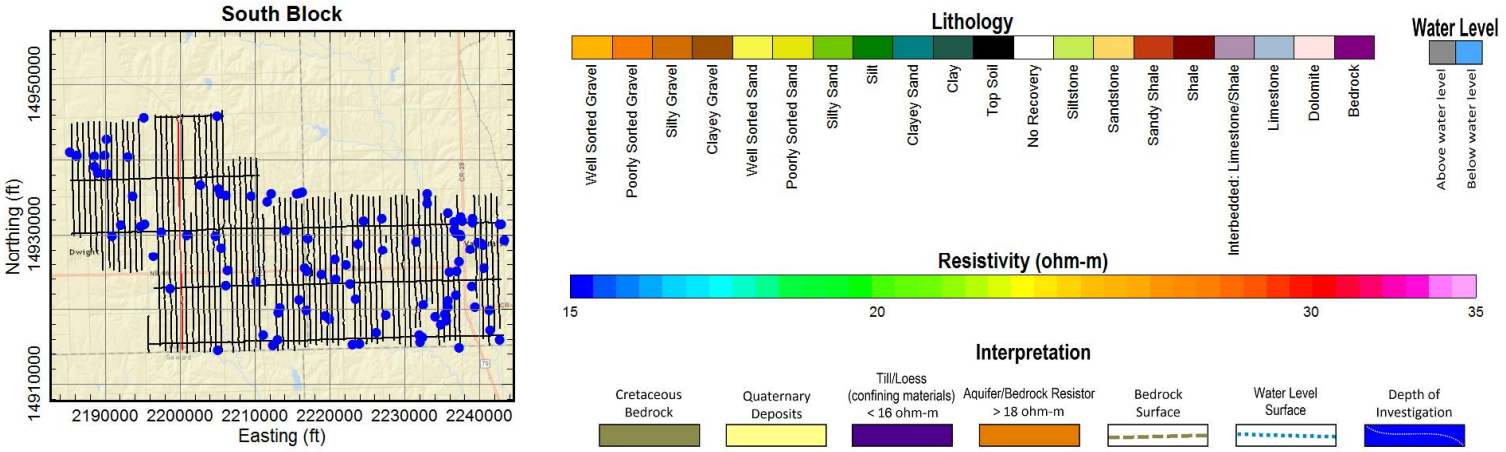

South Block Line L501901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117711
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

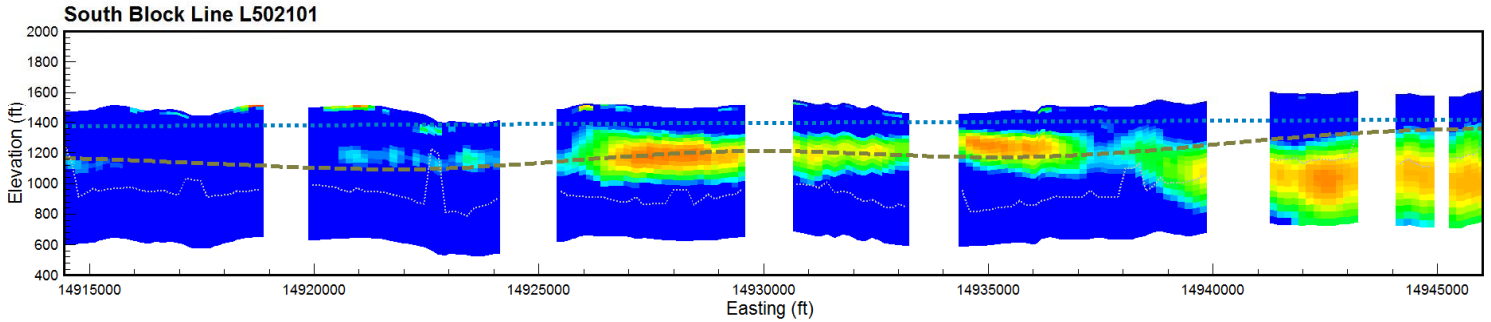

Line L501901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-117711
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

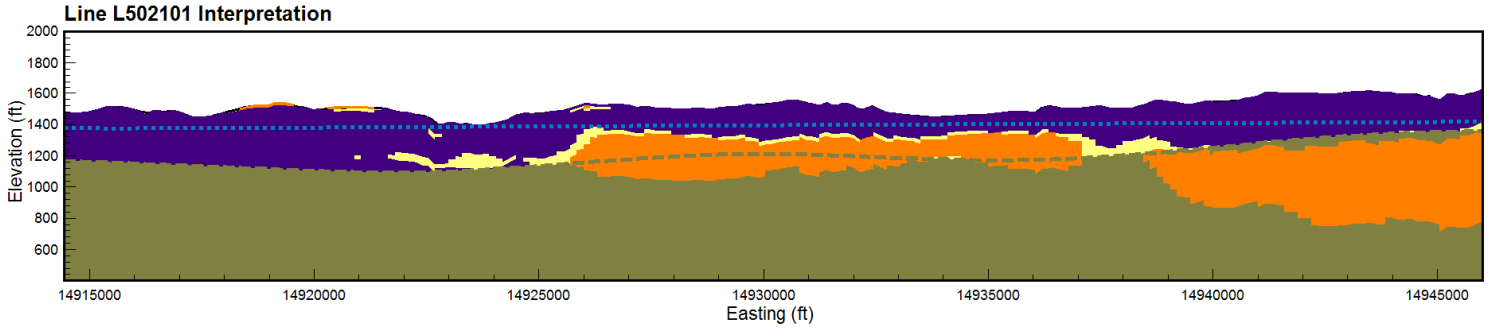

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

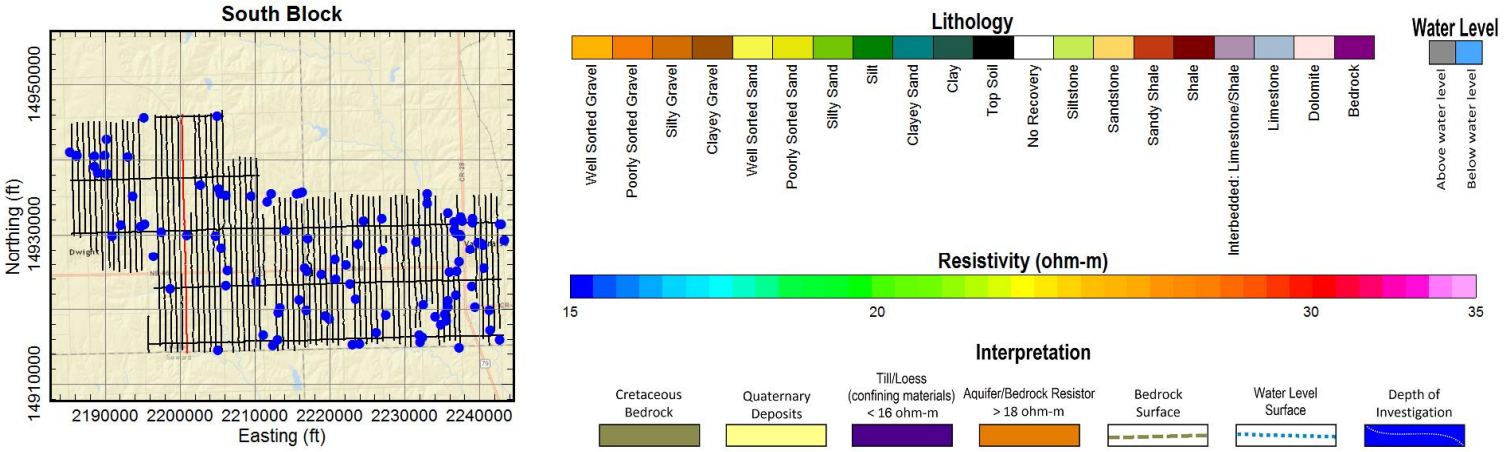

South Block Line L502001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117711
14915000
14920000
14925000
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14940000
14945000
Easting (ft)

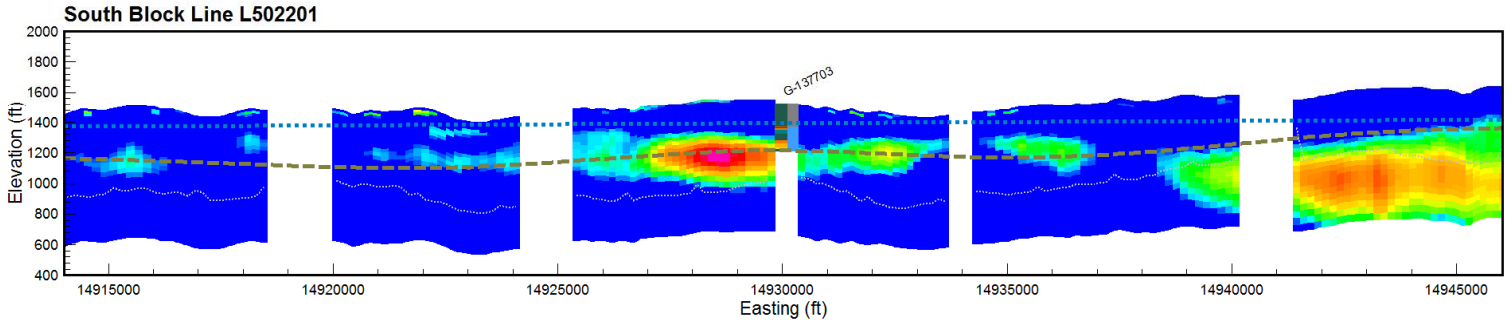

Line L502001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117711
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

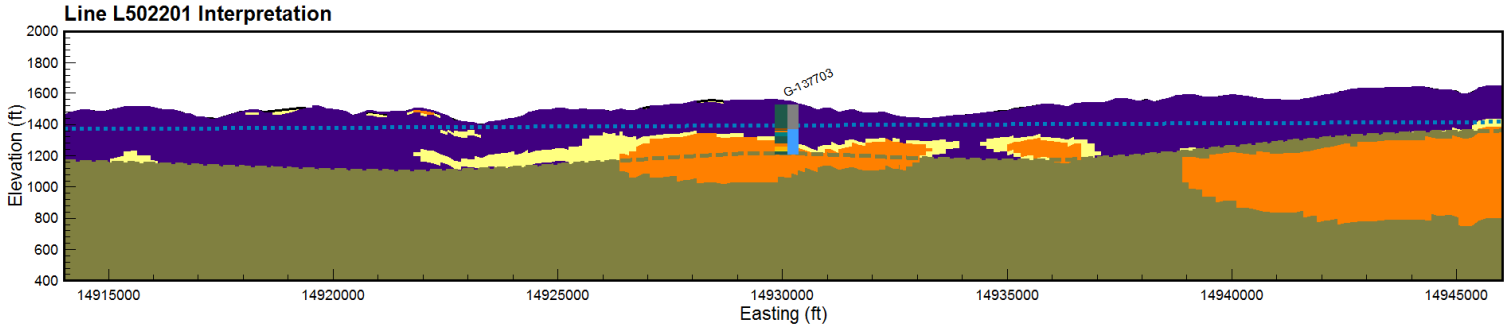

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

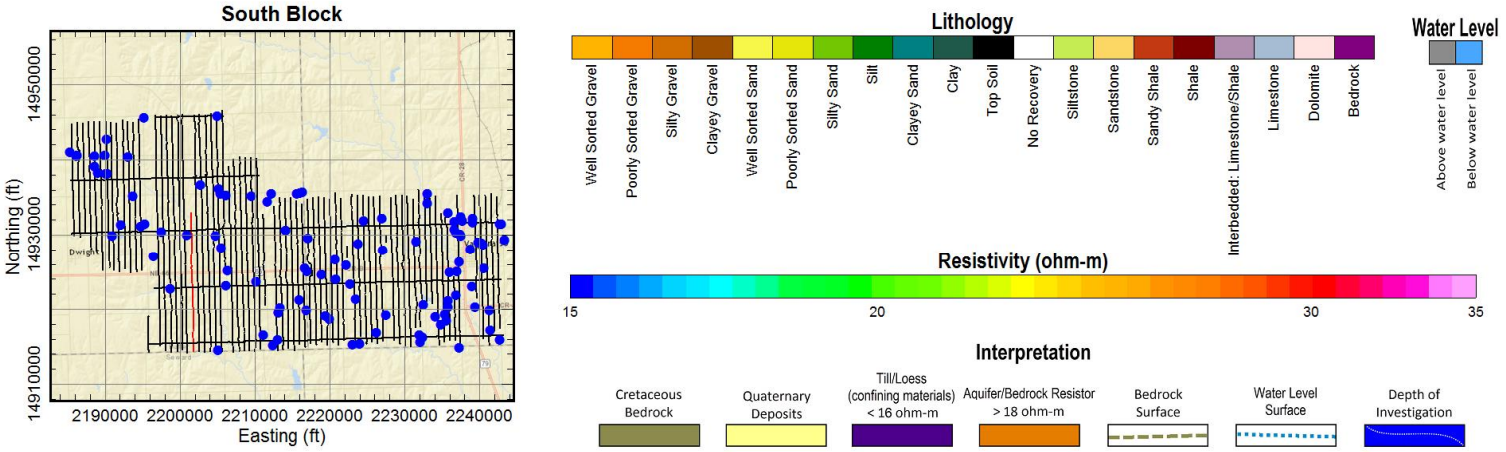

South Block Line L502101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Easting (ft)

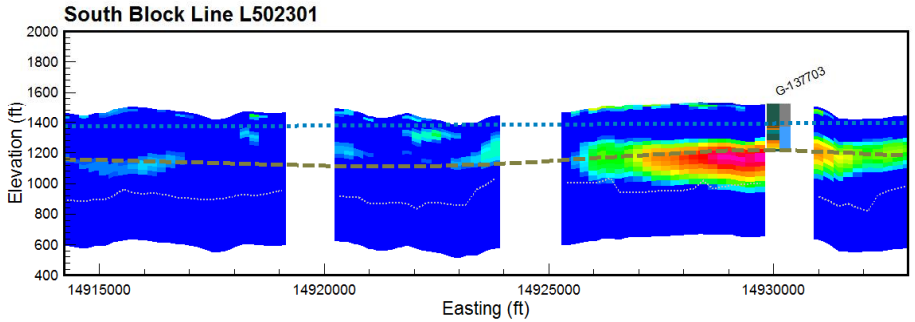

Line L502101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Easting (ft)

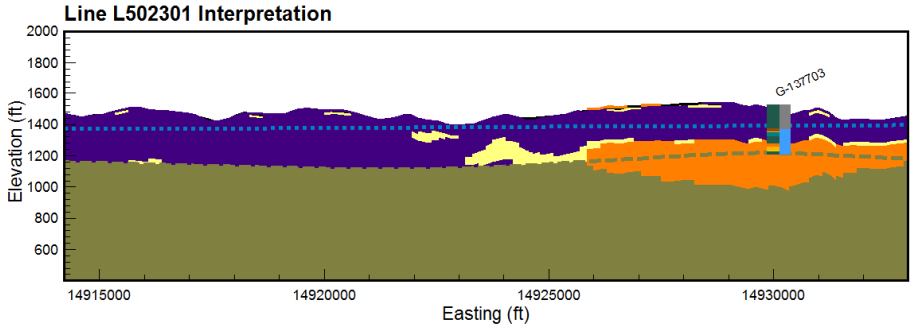

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

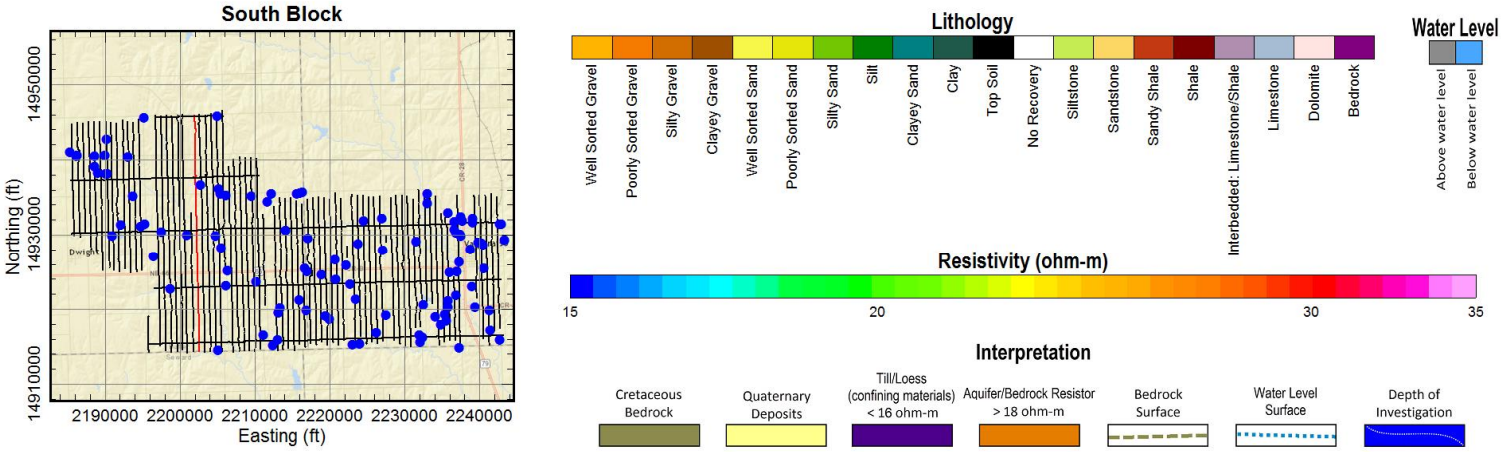

South Block Line L502201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-137703
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

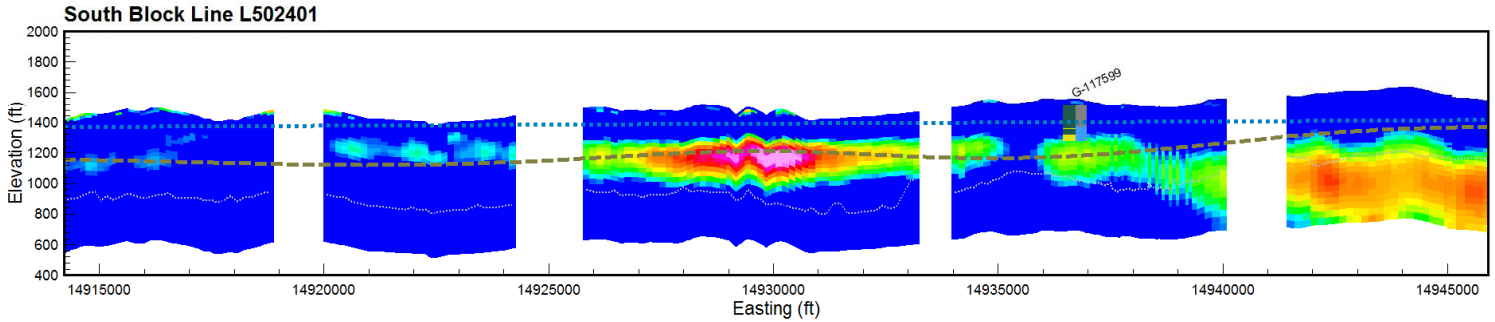

Line L502201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-137703
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

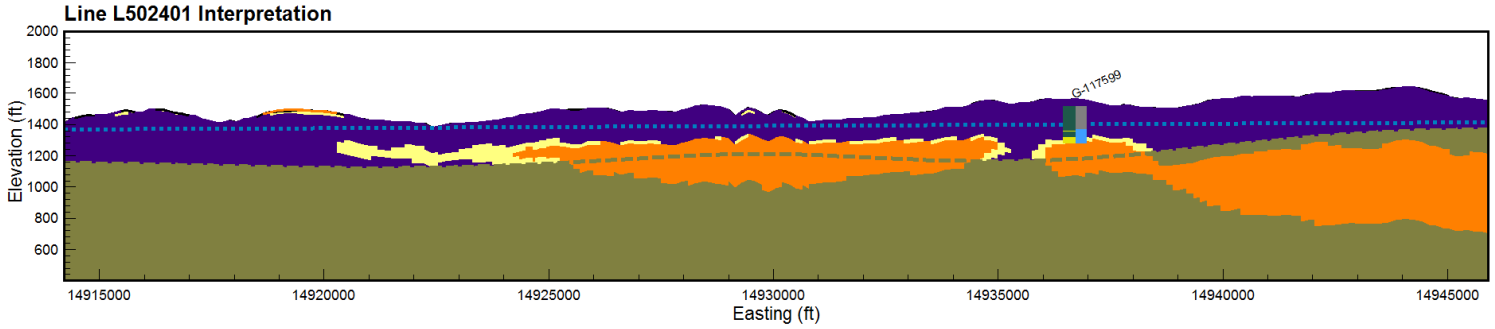

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

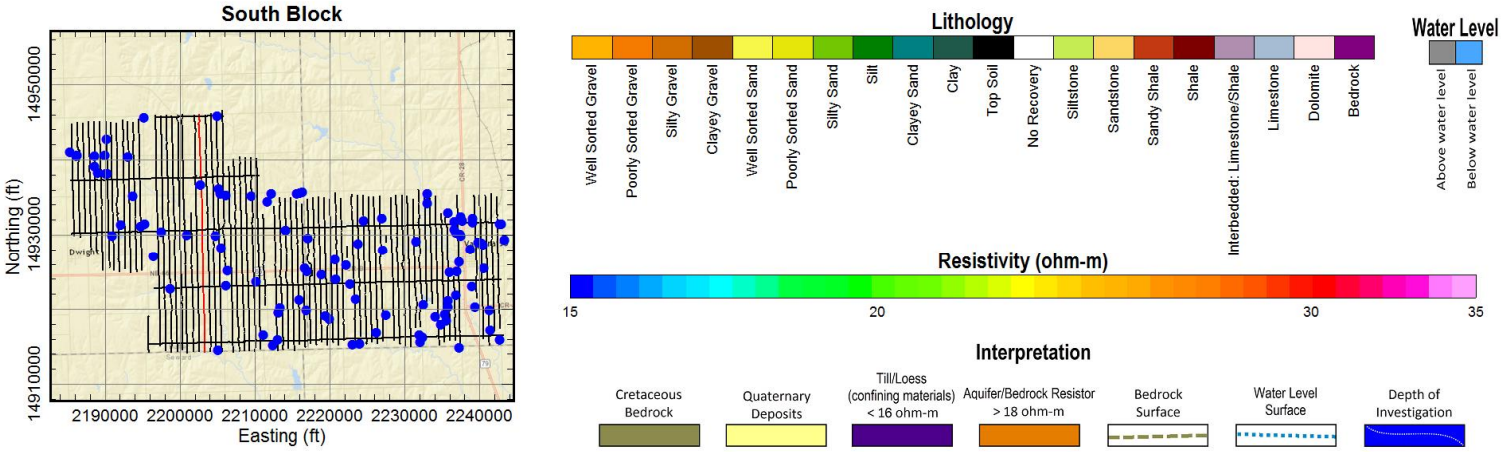

South Block Line L502301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-137703
14915000
14920000
14925000
14930000
Easting (ft)

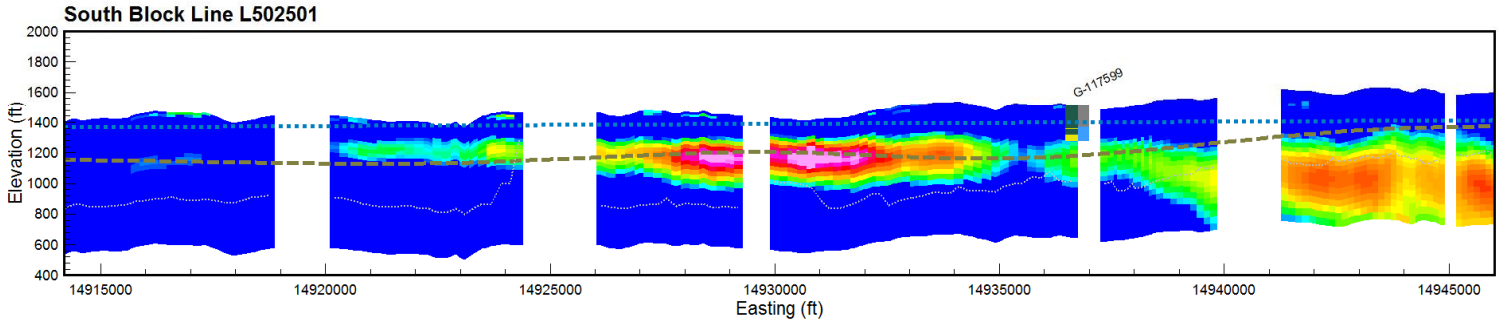

Line L502301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-137703
14915000
14920000
14925000
14930000
Easting (ft)

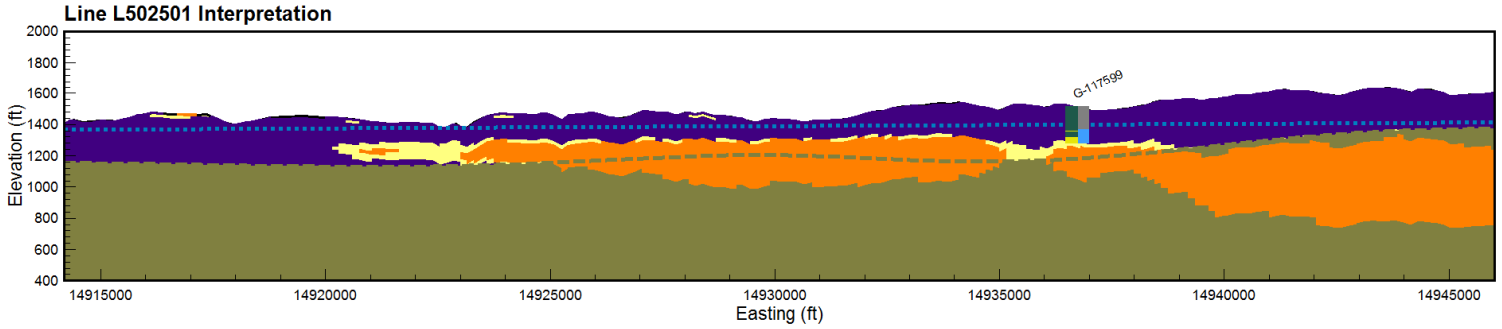

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

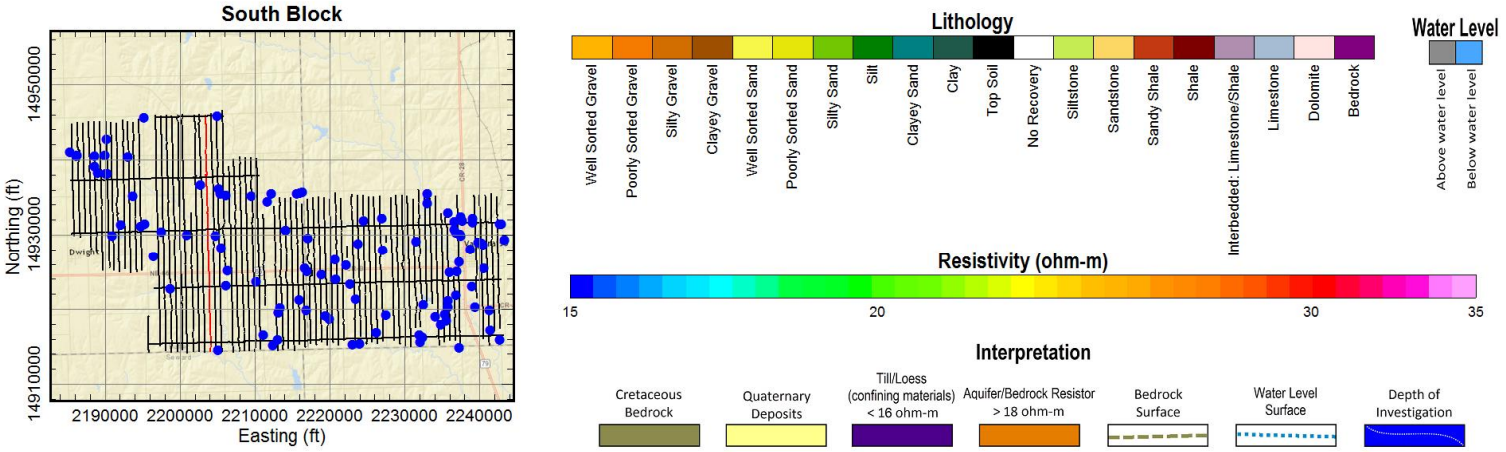

South Block Line L502401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117599
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

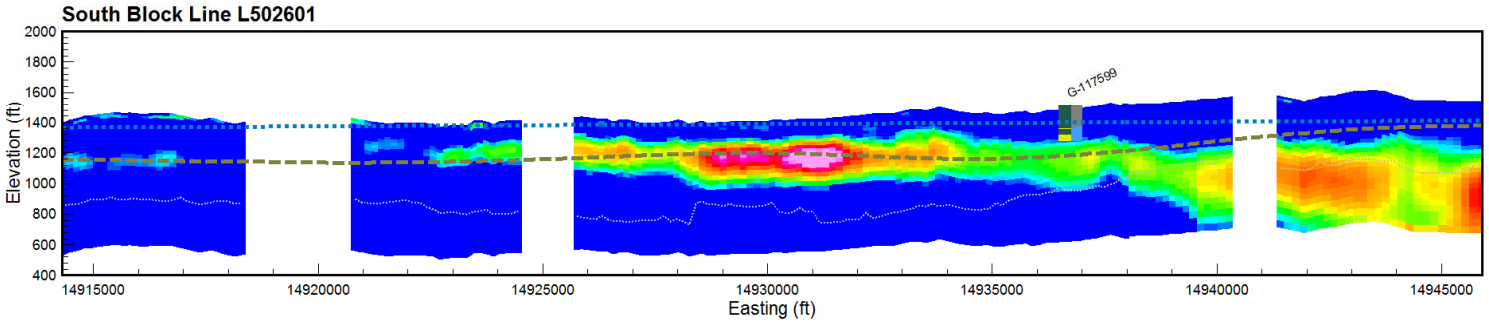

Line L502401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-117599
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

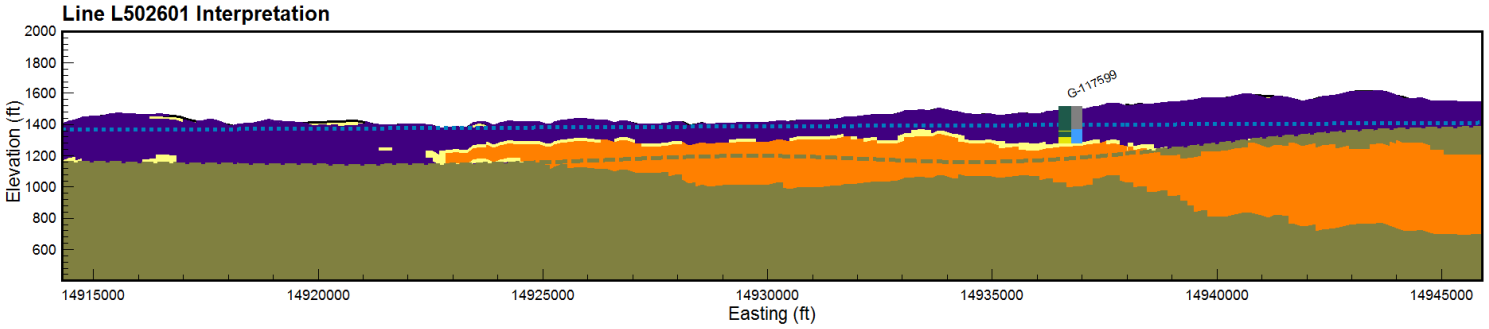

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

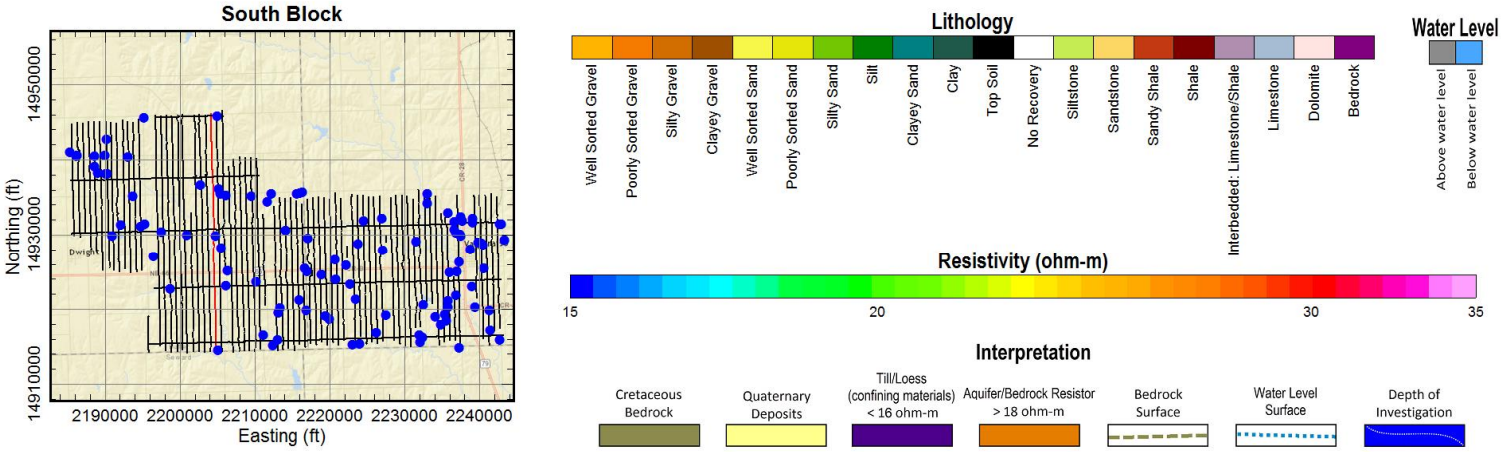

South Block Line L502501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117599
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

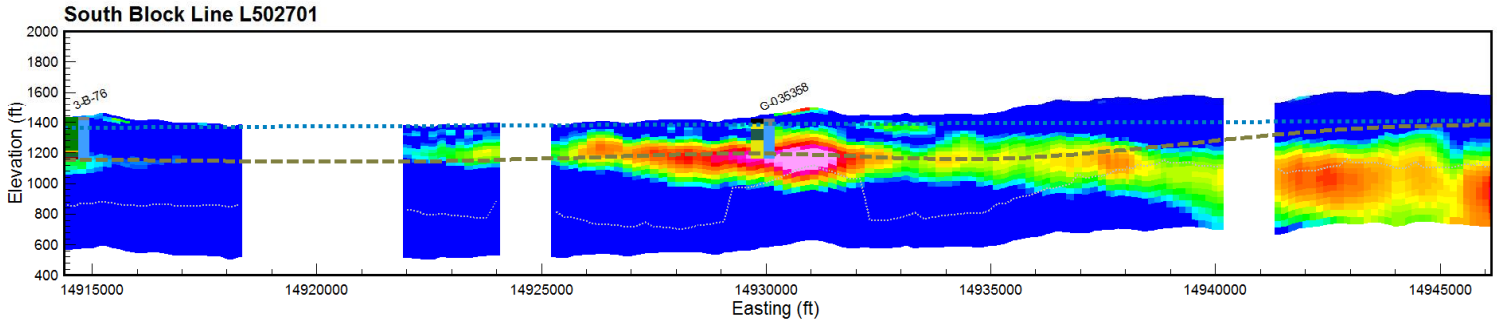

Line L502501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117599
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

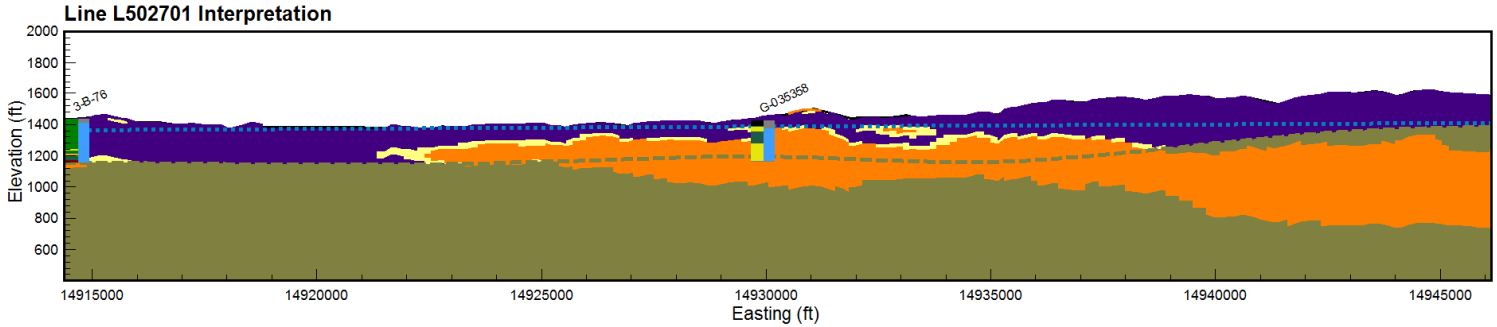

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

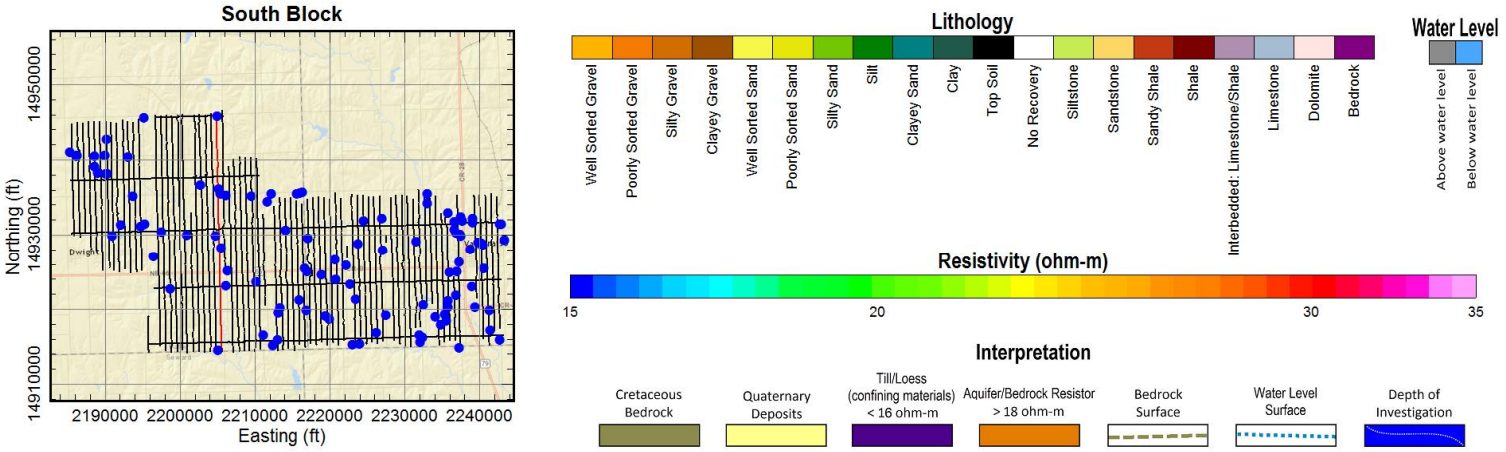

South Block Line L502601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-117599
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

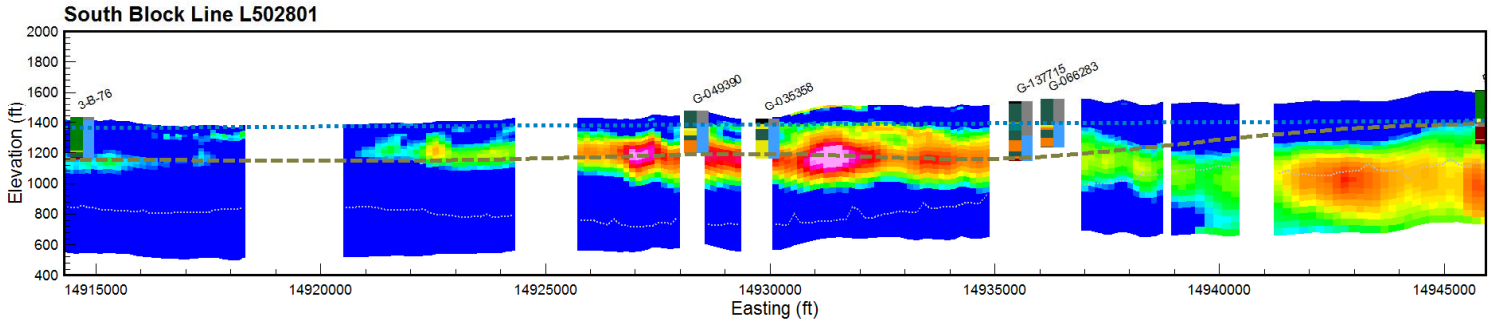

Line L502601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-117599
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

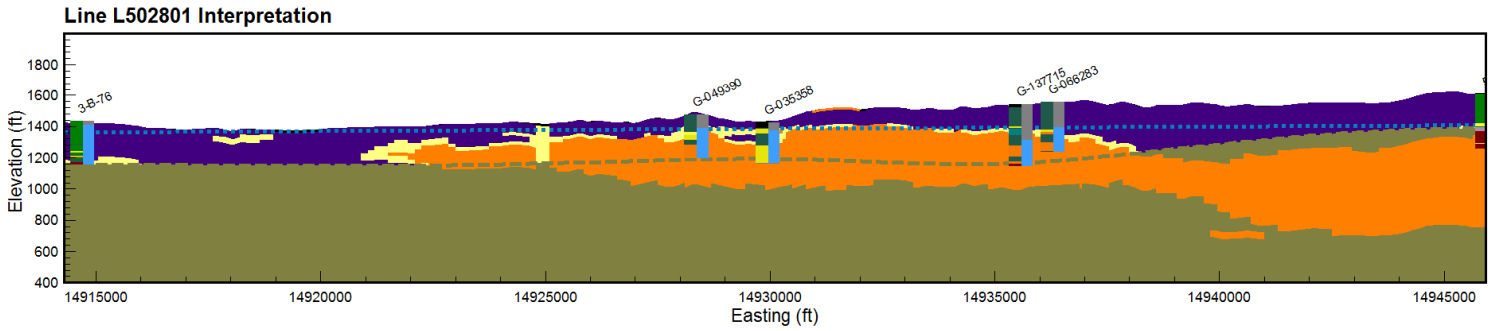

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

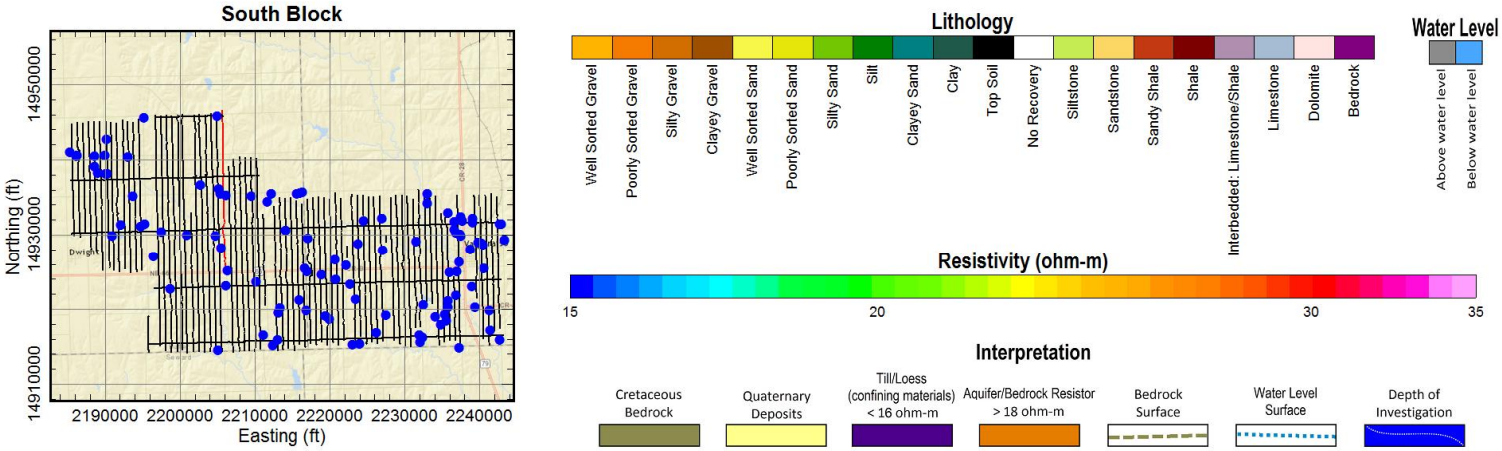

South Block Line L502701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
3-B-76
G-035358
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

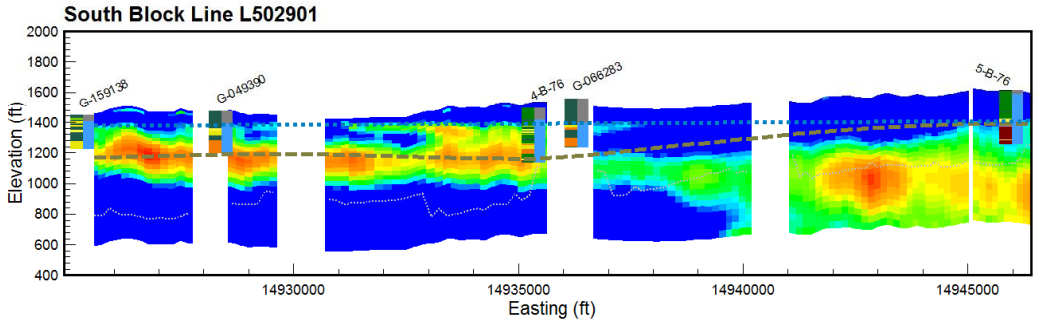

Line L502701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
3-B-76
G-035358
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Easting (ft)

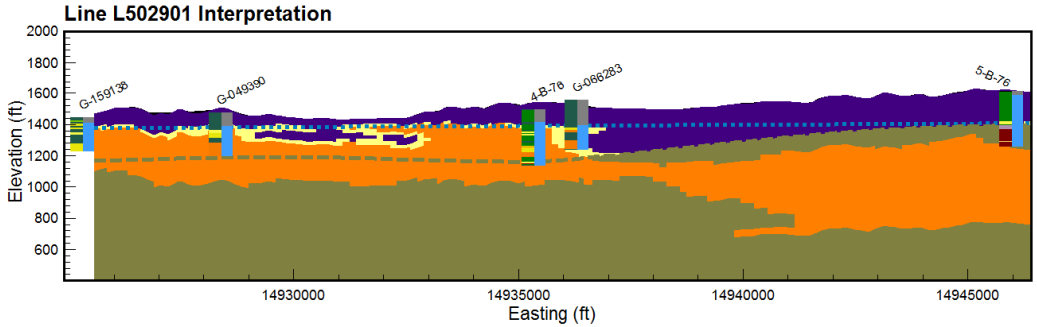

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

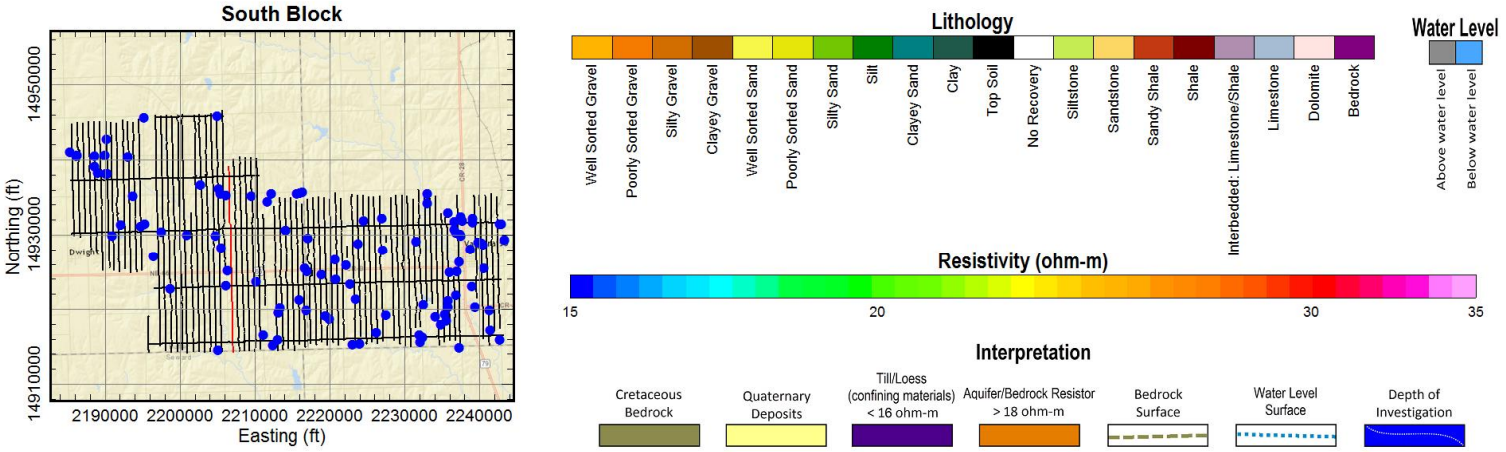

South Block Line L502801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
3-B-76
G-049390
G-035358
G-137715
G-066283
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Easting (ft)

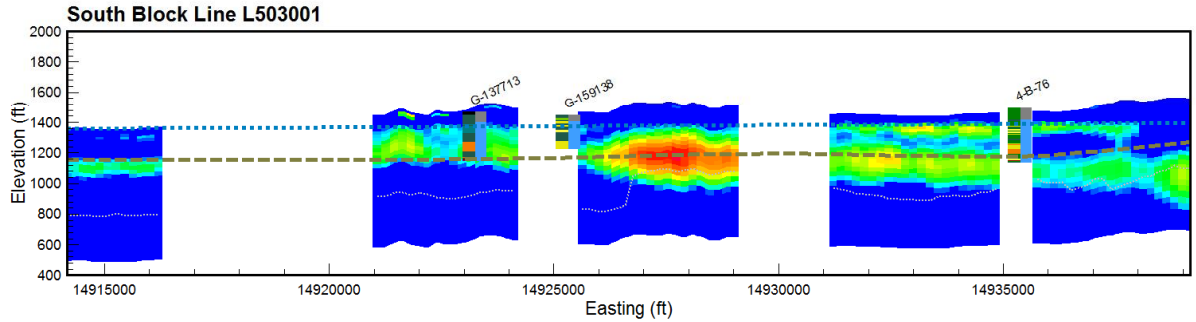

Line L502801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
3-B-76
G-049390
G-035358
G-137715
G-066283
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Easting (ft)

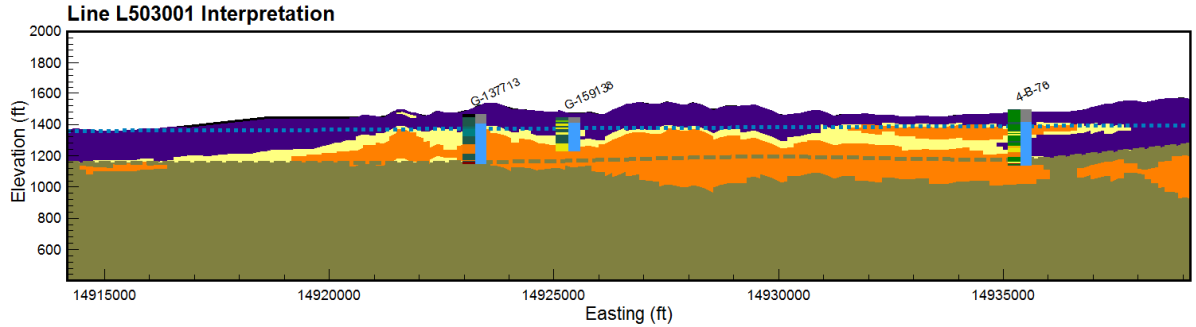

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

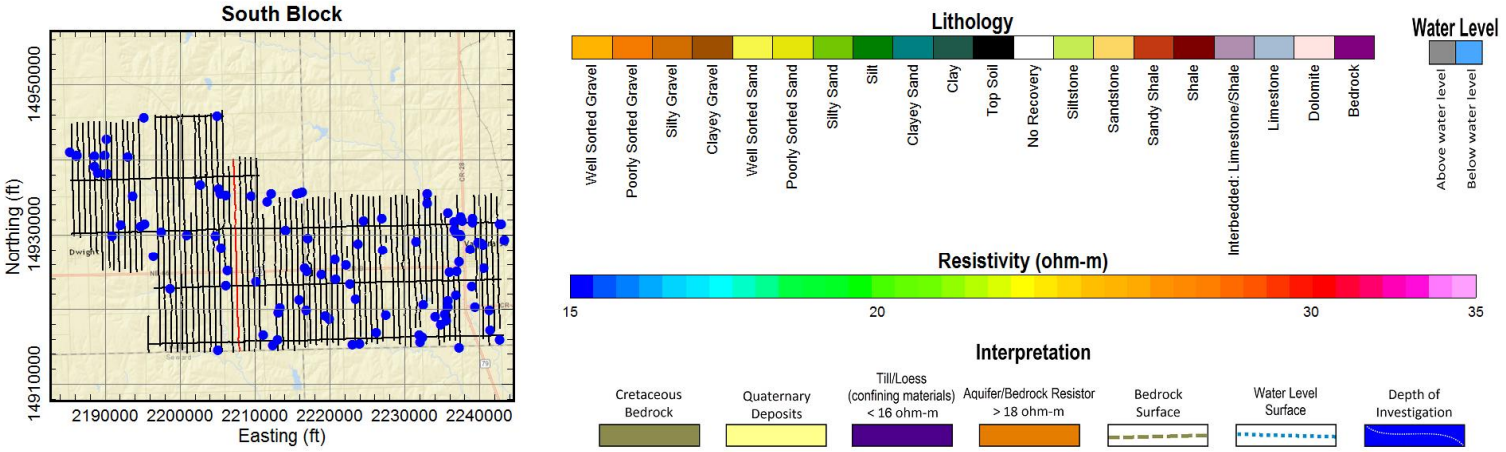

South Block Line L502901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-159138
G-049390
4-B-76
G-066283
5-B-76
14930000
14935000
14940000
14945000
Easting (ft)

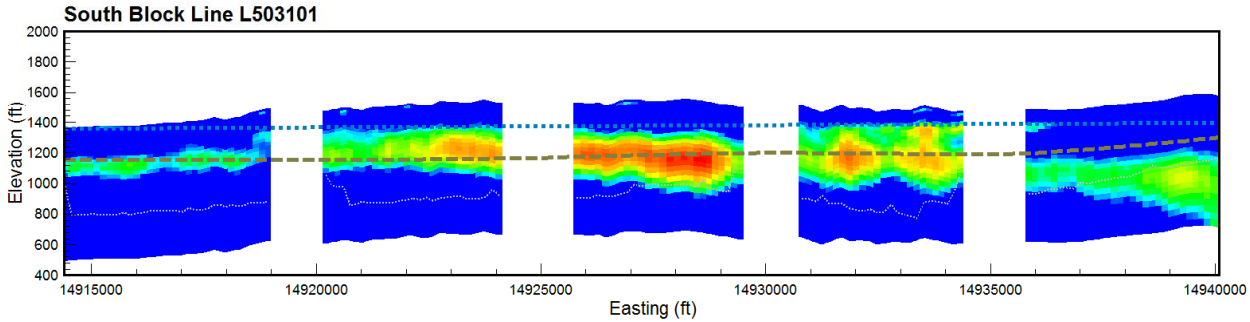

Line L502901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-159138
G-049390
4-B-76
G-066283
5-B-76
14930000
14935000
14940000
14945000
Easting (ft)

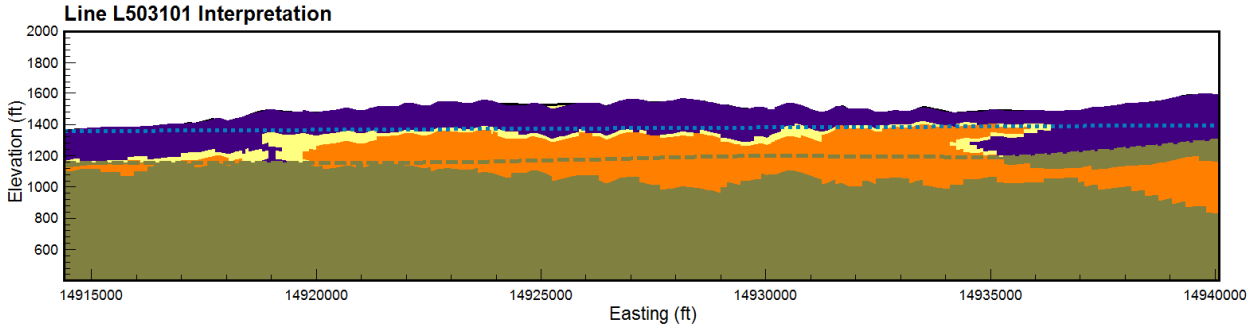

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

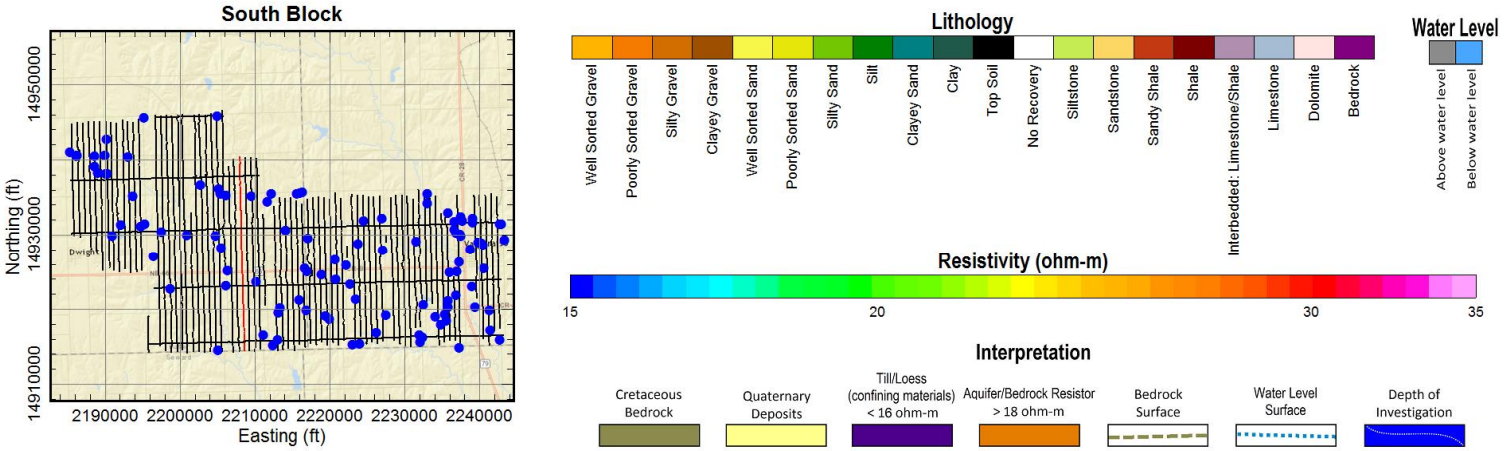

South Block Line L503001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-137713
G-159138
4-B-76
14915000
14920000
14925000
14930000
14935000
Easting (ft)

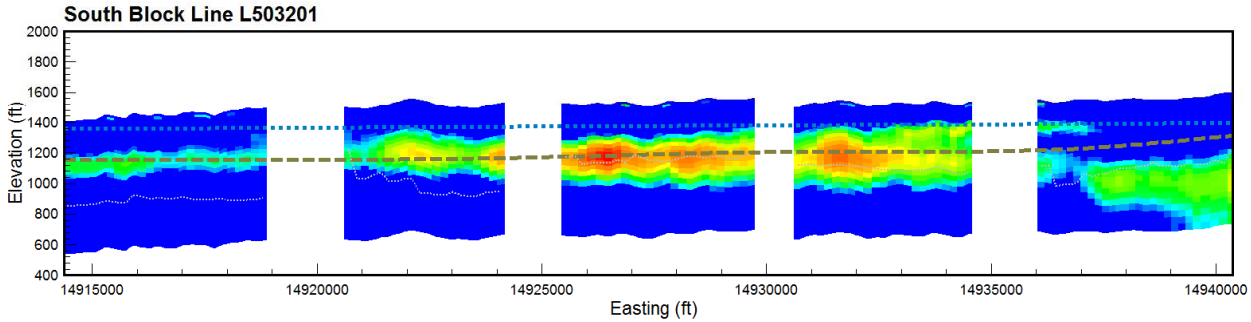

Line L503001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-137713
G-159138
4-B-76
14915000
14920000
14925000
14930000
14935000
Easting (ft)

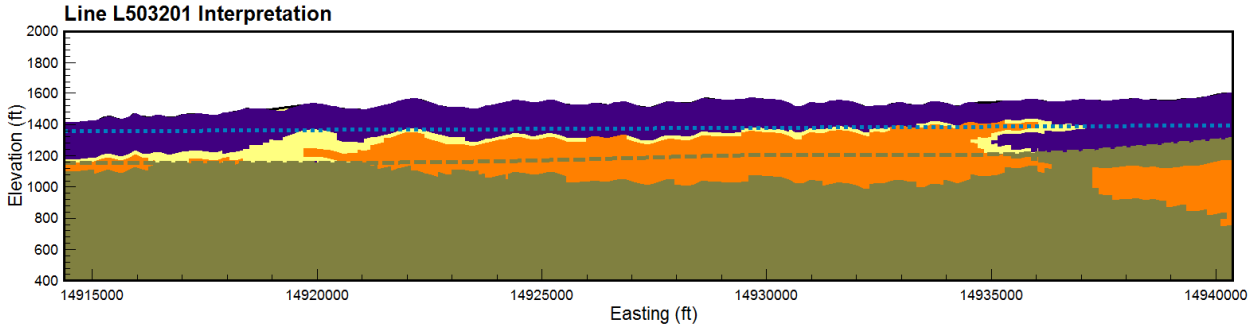

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

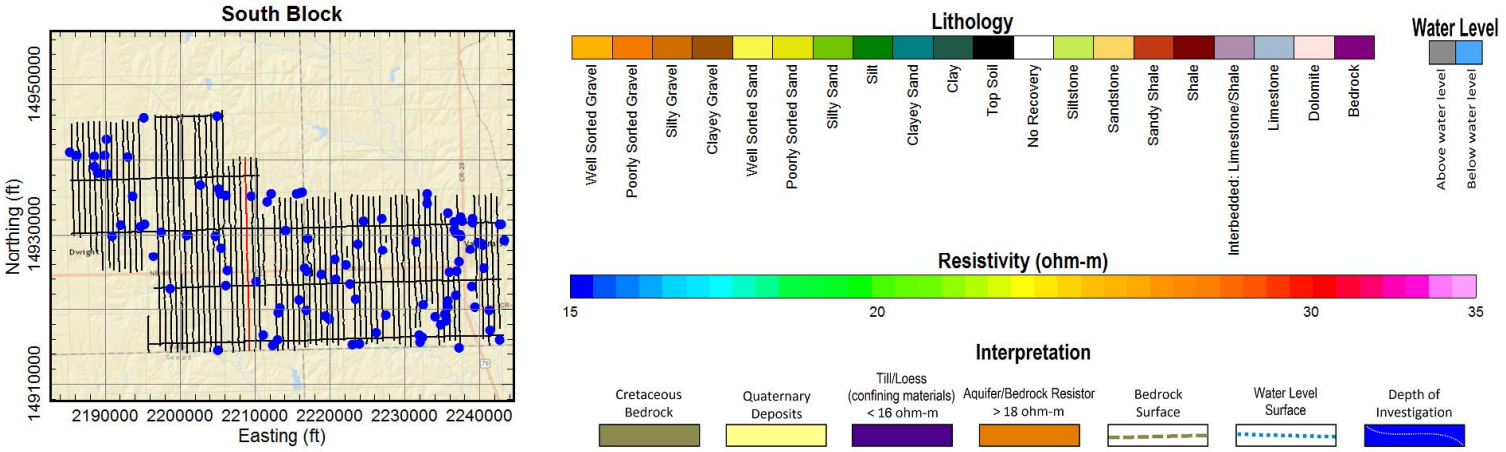

South Block Line L503101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000 14920000 14925000 14930000 14935000 14940000
Easting (ft)

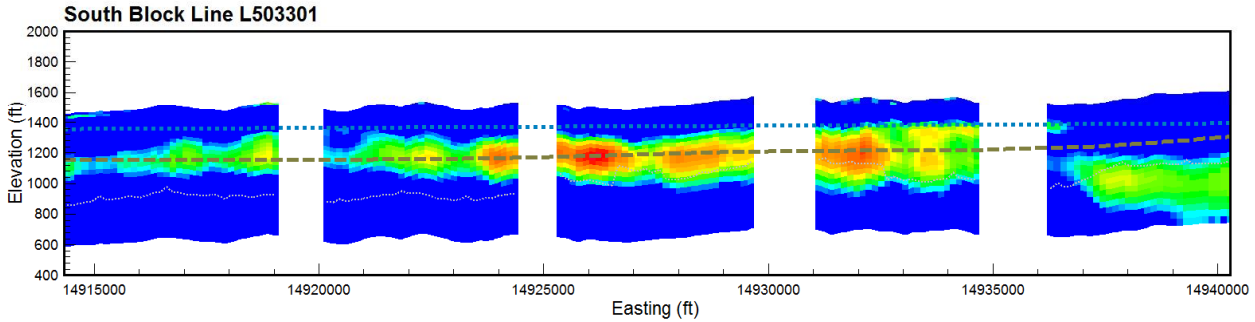

Line L503101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000
Easting (ft)

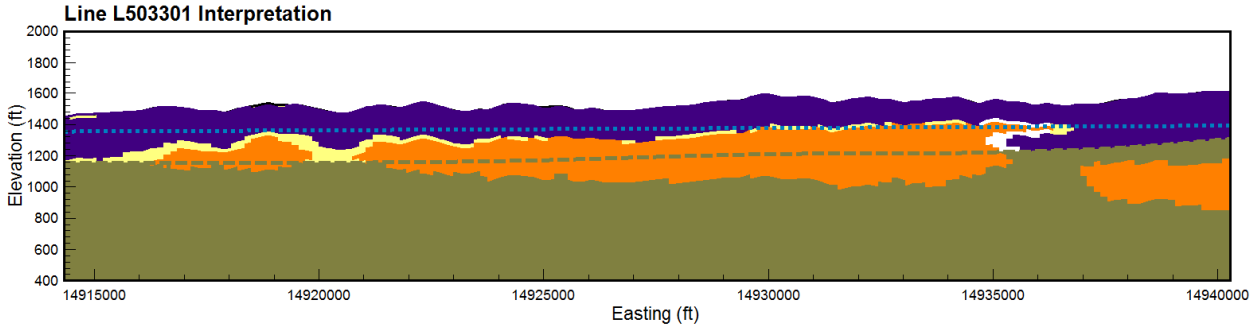

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

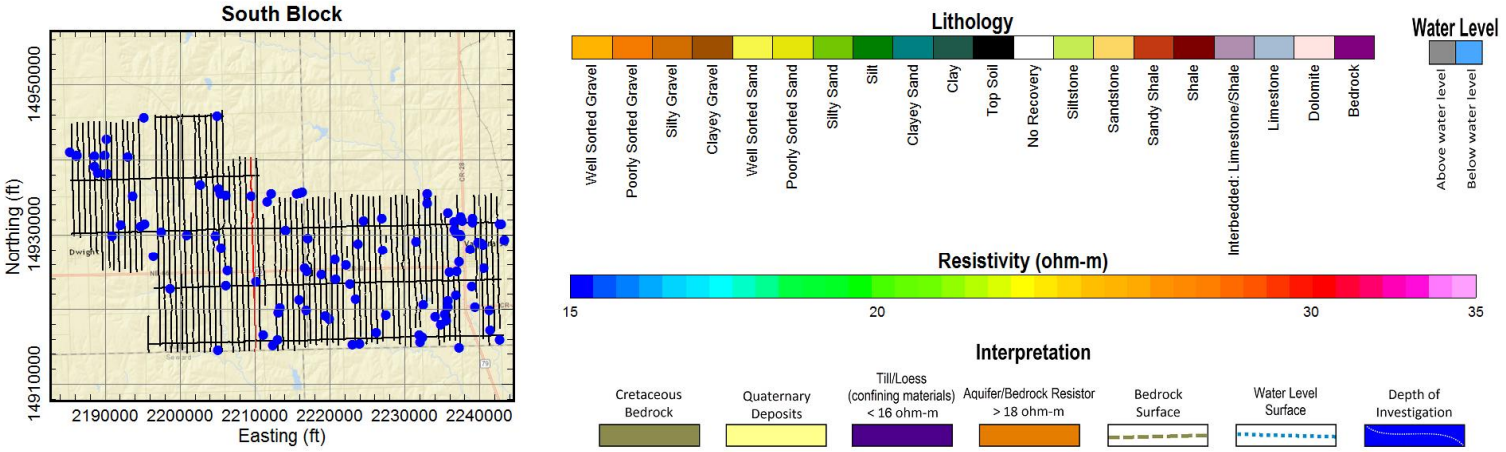

South Block Line L503201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000
14920000
14925000
14930000
14935000
14940000
Easting (ft)

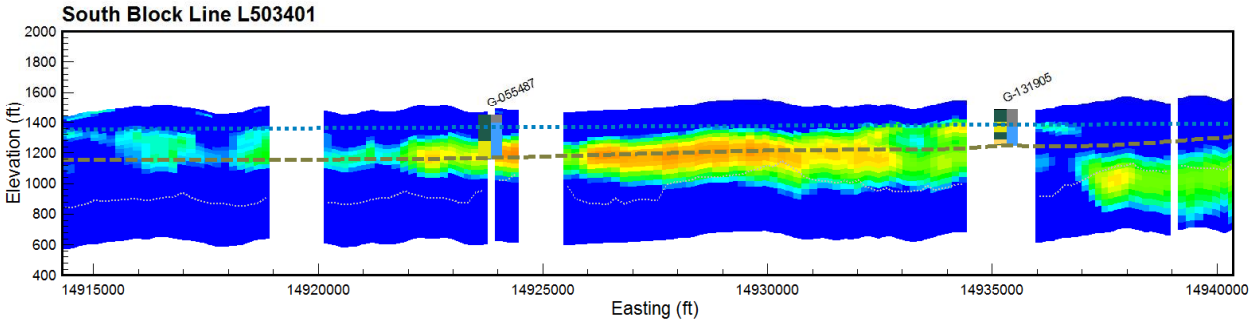

Line L503201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000
14920000
14925000
14930000
14935000
14940000
Easting (ft)

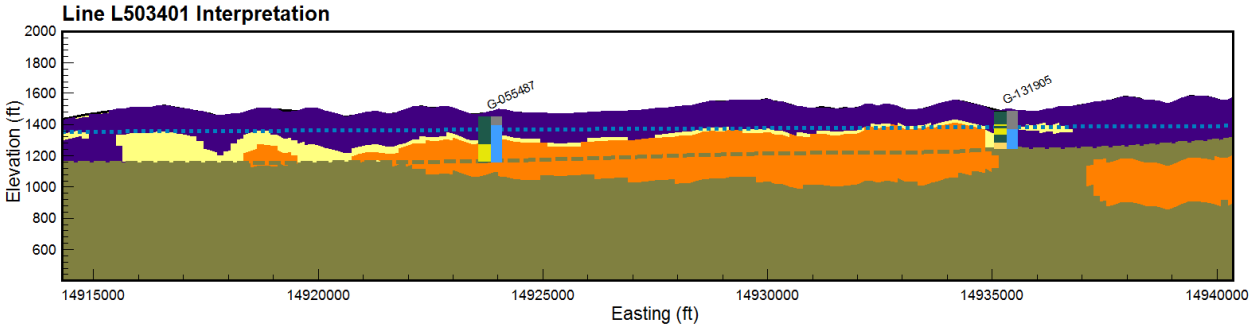

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

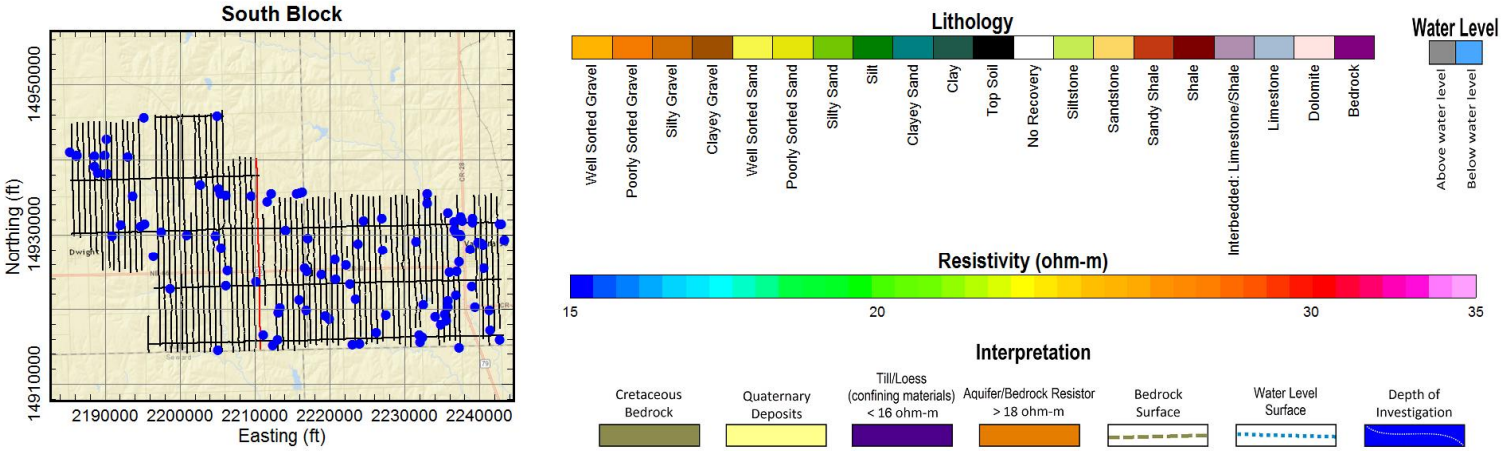

South Block Line L503301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000
14920000
14925000
14930000
14935000
14940000
Easting (ft)

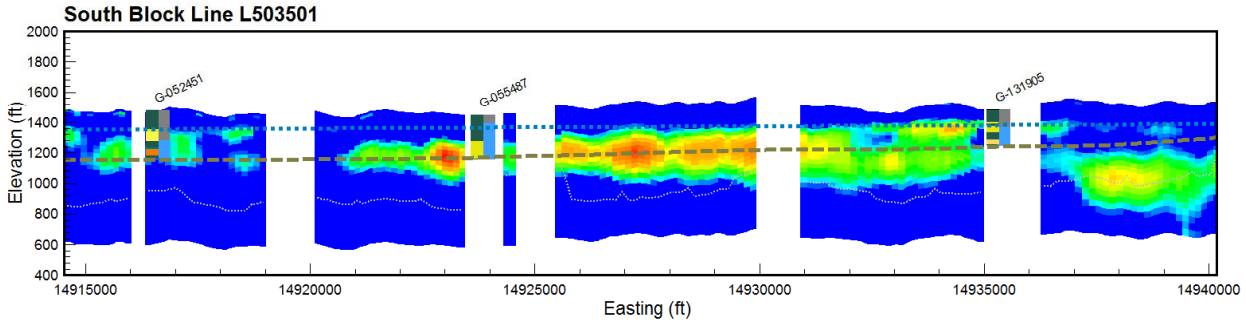

Line L503301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000
14920000
14925000
14930000
14935000
14940000
Easting (ft)

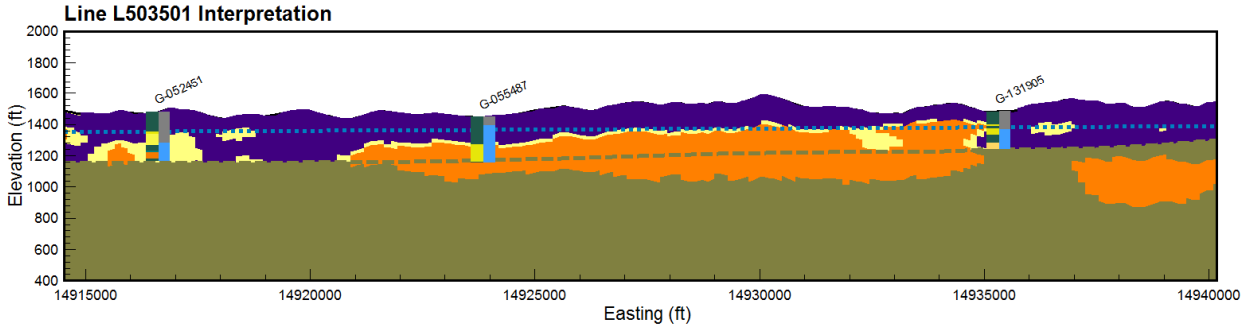

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

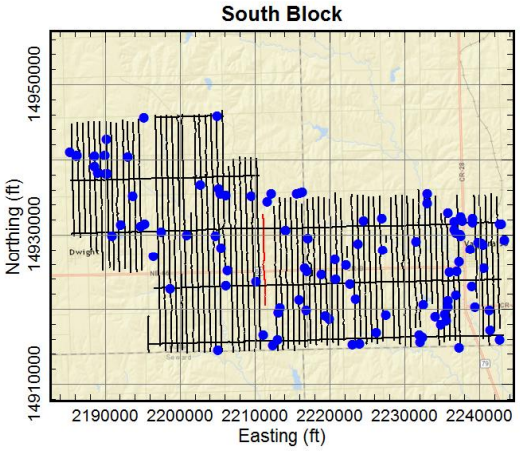

South Block Line L503401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-055487
G-131905
14915000
14920000
14925000
14930000
14935000
14940000
Easting (ft)

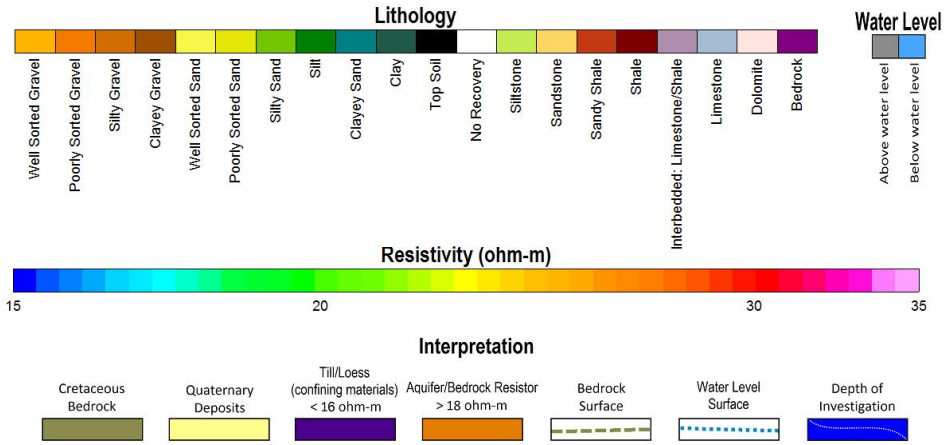

Line L503401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-055487
G-131905
14915000
14920000
14925000
14930000
14935000
14940000
Easting (ft)

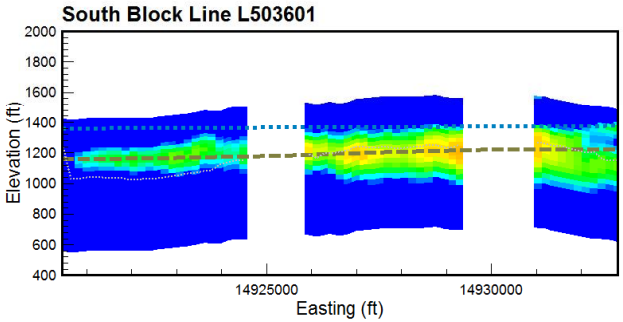

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

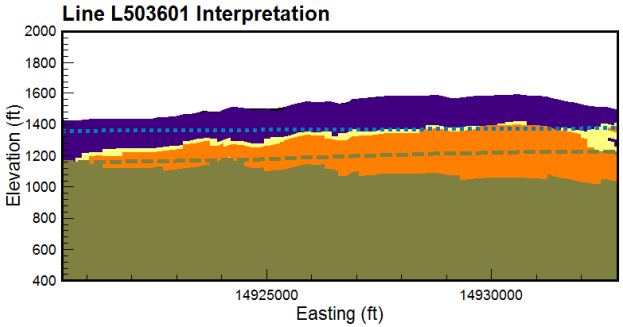

South Block Line L503501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-052451
G-055487
G-131905
14915000 14920000 14925000 14930000 14935000 14940000
Easting (ft)

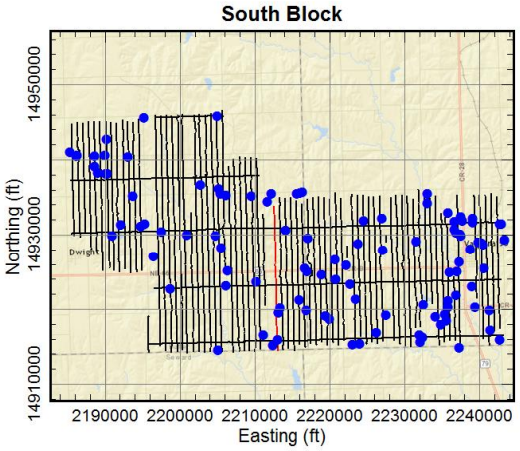

Line L503501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-052451
G-055487
G-131905
14915000 14920000 14925000 14930000 14935000 14940000
Easting (ft)

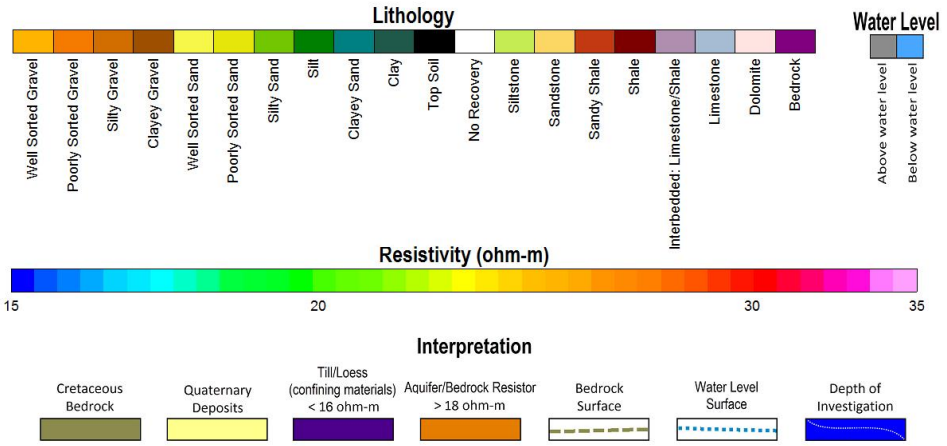

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

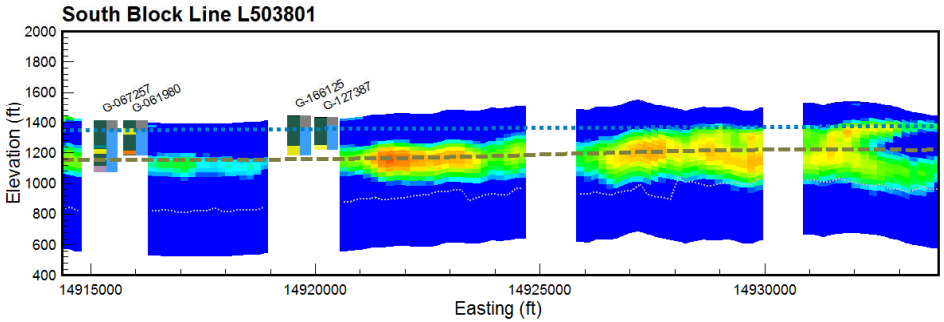

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

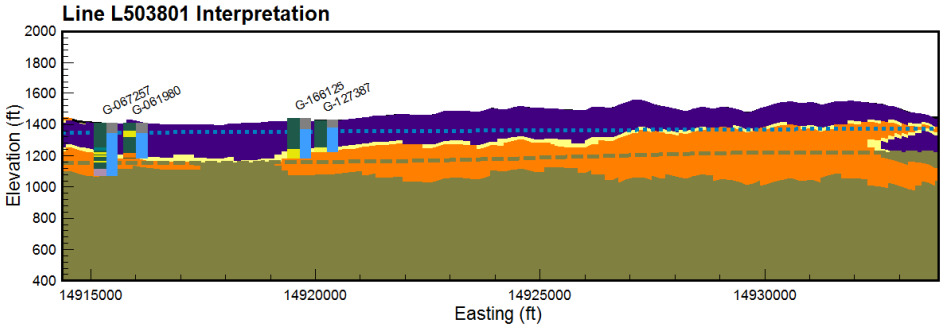

South Block Line L503601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14925000
14930000
Easting (ft)

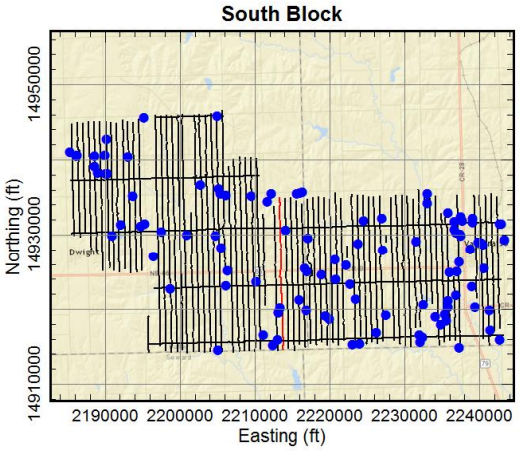

Line L503601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14925000
14930000
Easting (ft)

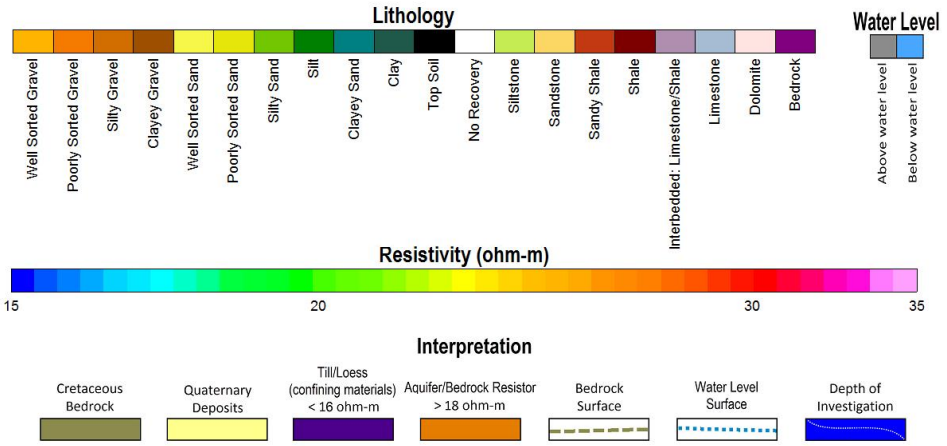

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

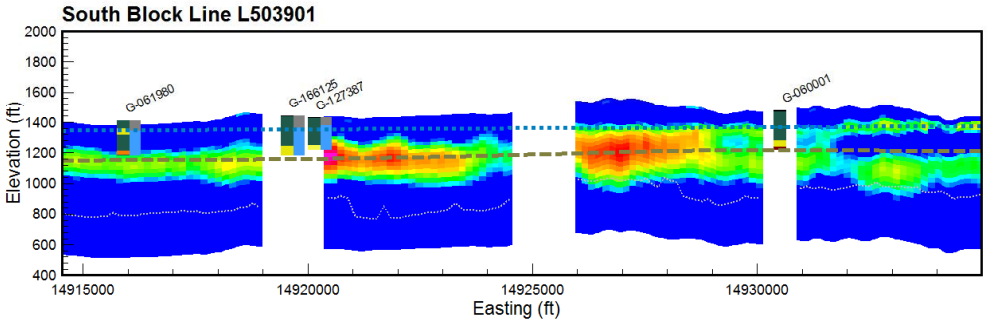

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

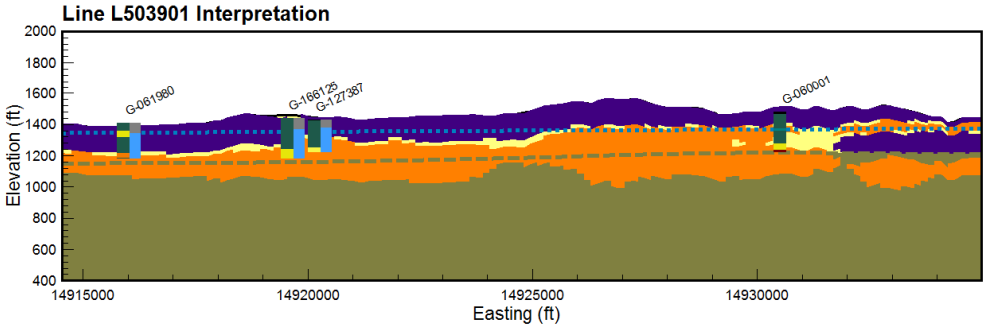

South Block Line L503801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-067257
G-061980
G-166125
G-127387
14915000
14920000
14925000
14930000
Easting (ft)

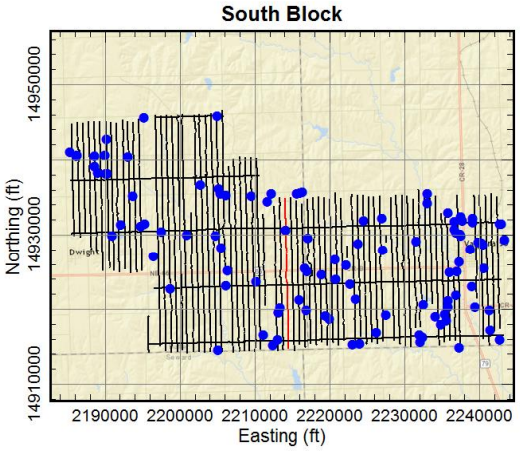

Line L503801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-067257
G-061980
G-166125
G-127387
14915000
14920000
14925000
14930000
Easting (ft)

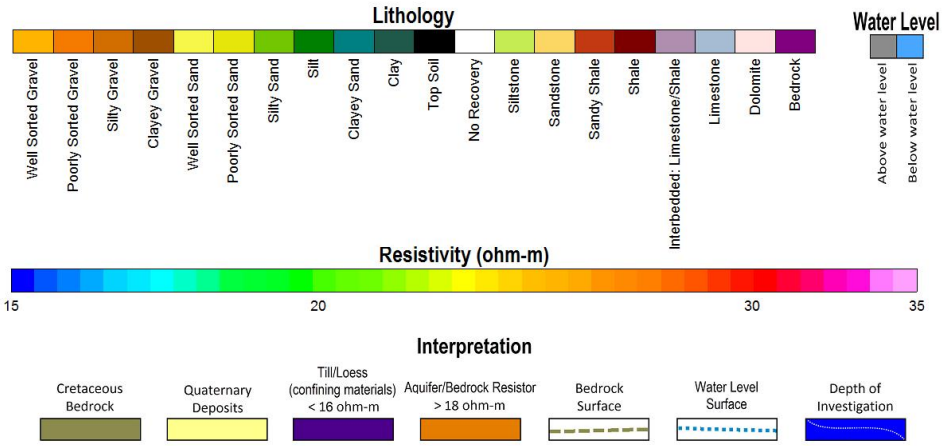

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

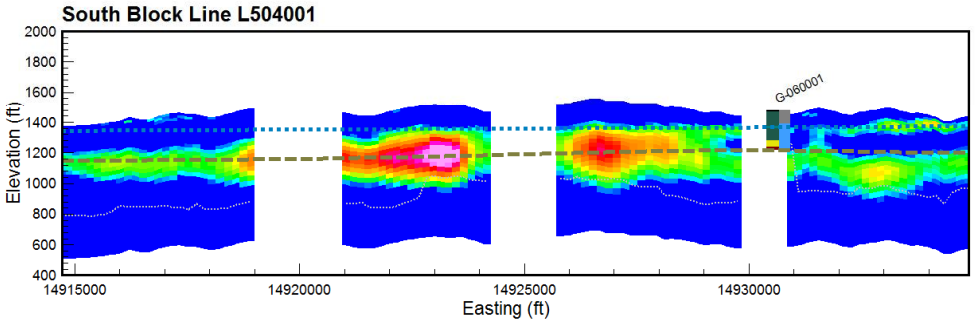

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

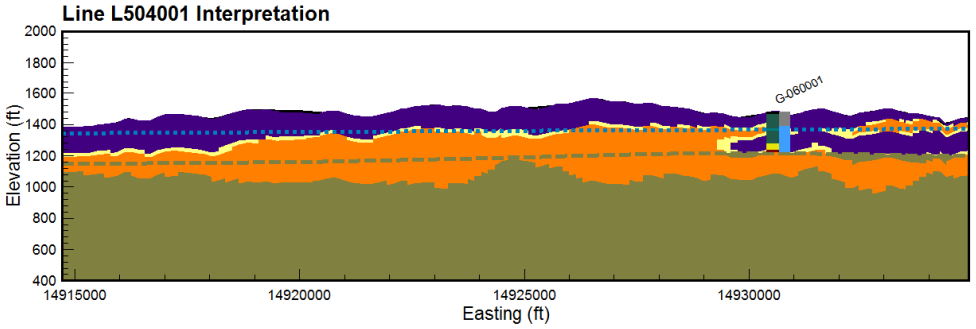

South Block Line L503901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-061980
G-166125
G-127387
G-060001
14915000
14920000
14925000
14930000
Easting (ft)

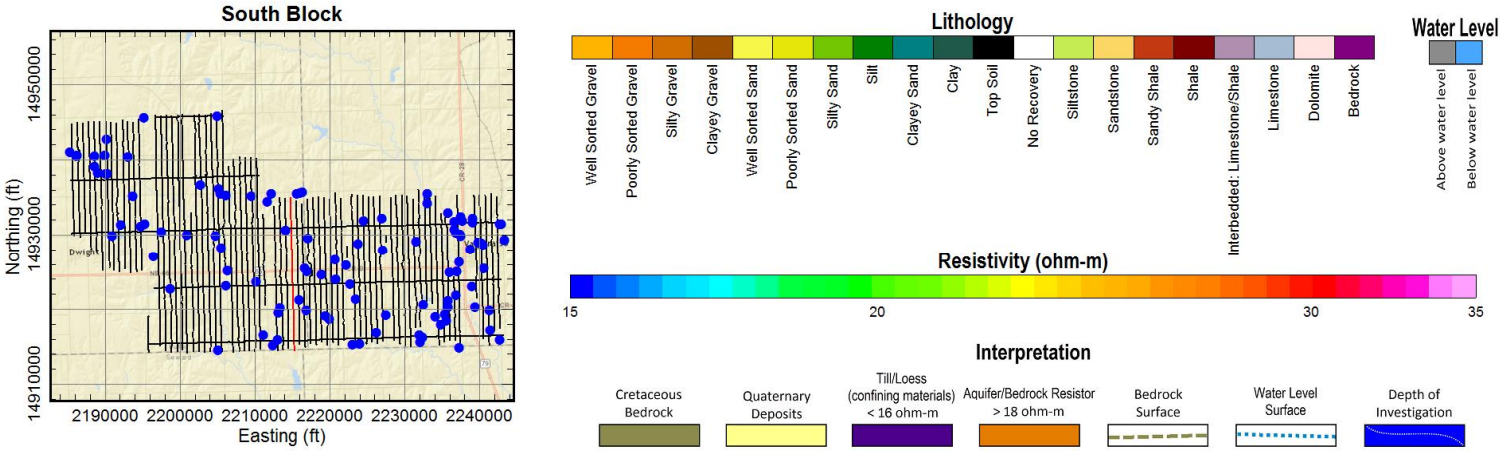

Line L503901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-061980
G-166125
G-127387
G-060001
14915000
14920000
14925000
14930000
Easting (ft)

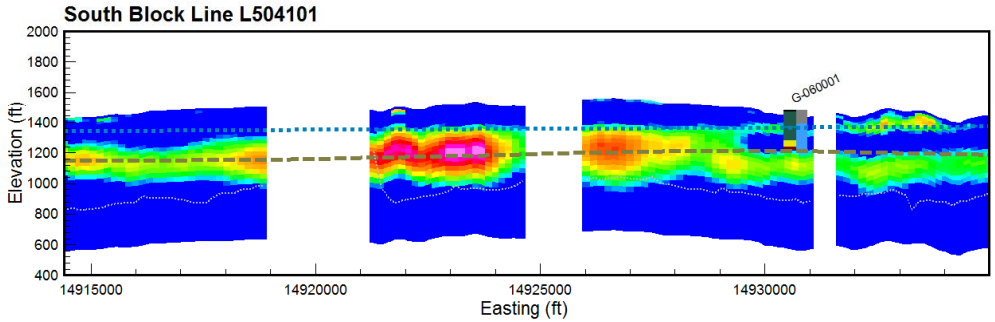

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

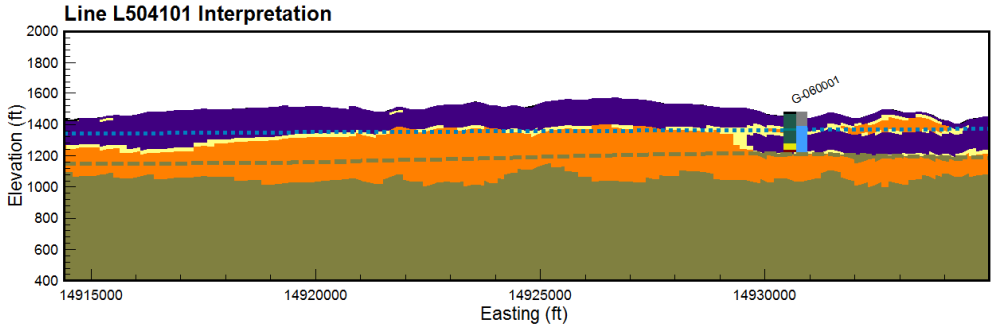

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

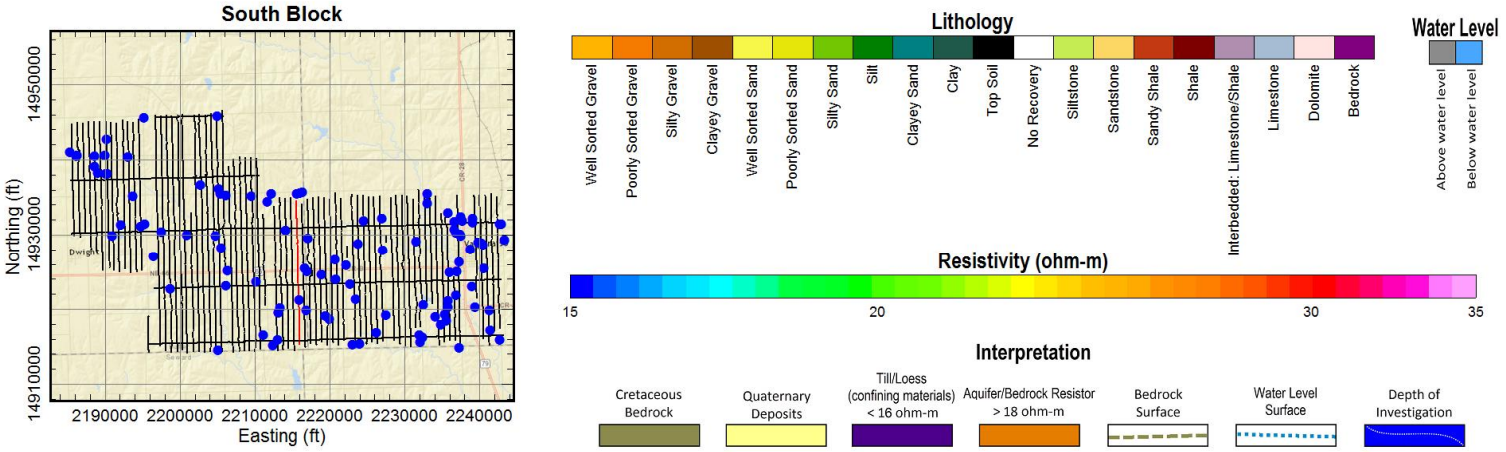

South Block Line L504001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-060001
14915000
14920000
14925000
14930000
Easting (ft)

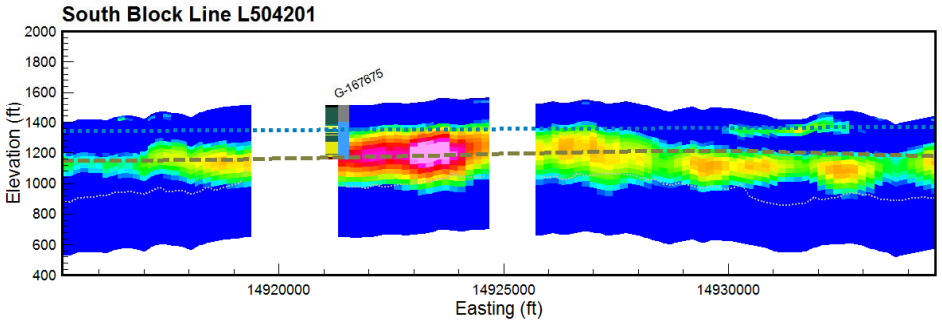

Line L504001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-060001
14915000
14920000
14925000
14930000
Easting (ft)

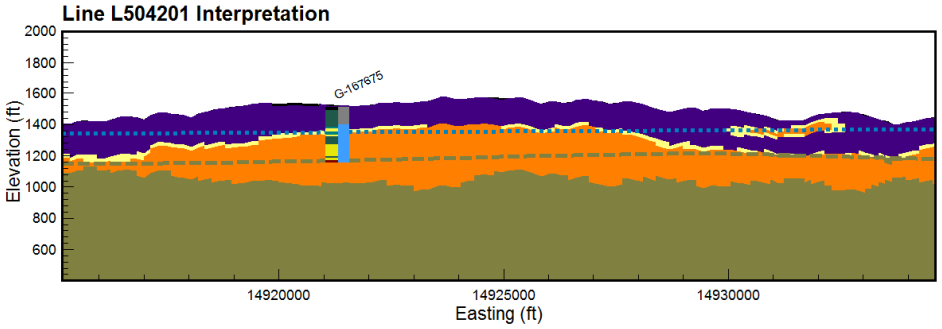

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

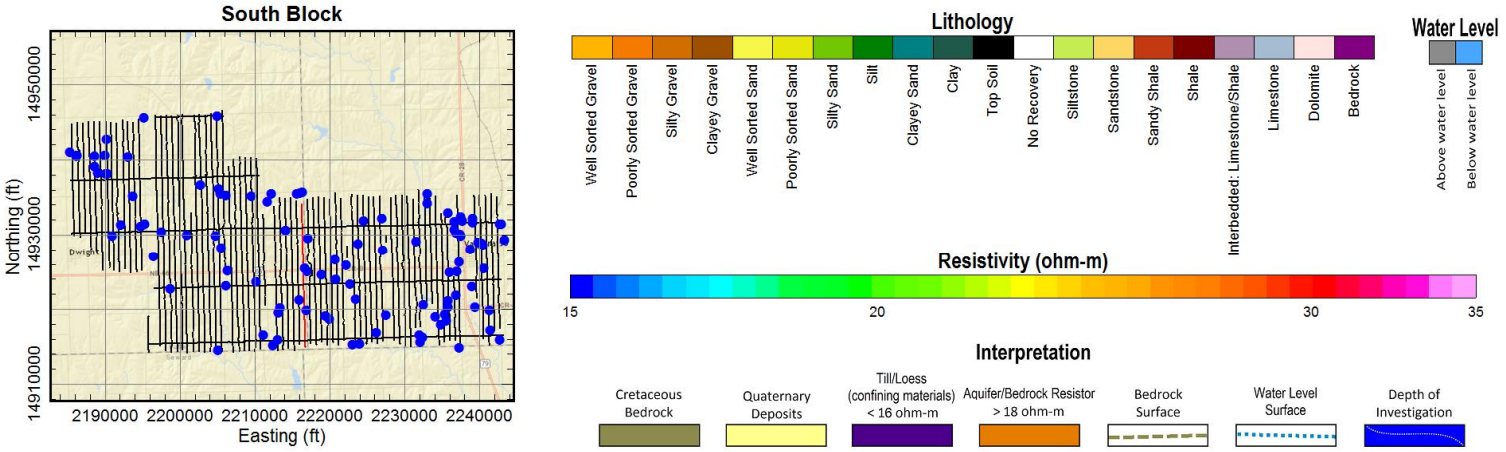

South Block Line L504101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-060001
14915000
14920000
14925000
14930000
Easting (ft)

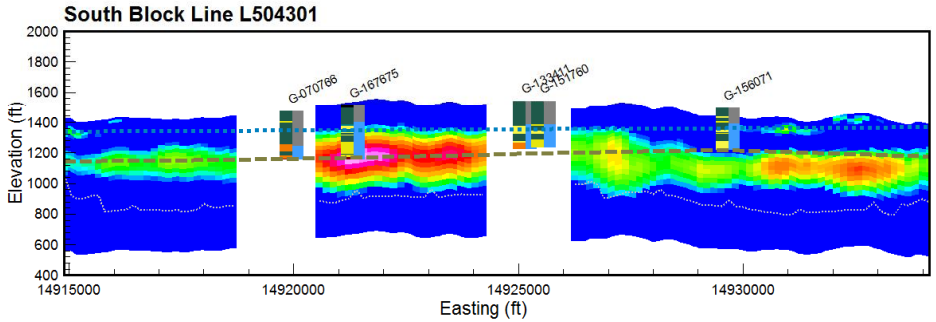

Line L504101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-060001
14915000
14920000
14925000
14930000
Easting (ft)

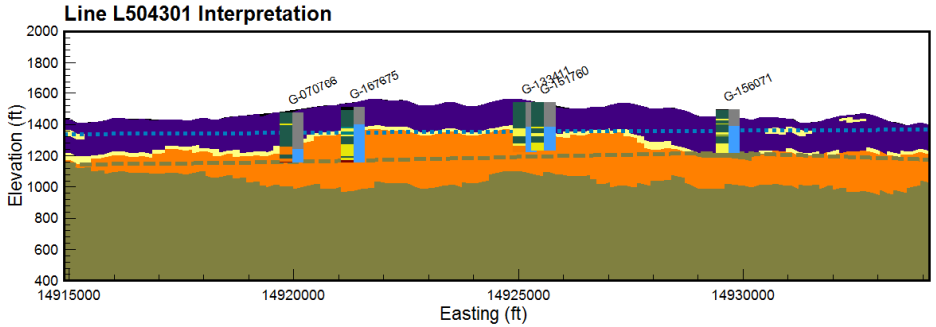

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

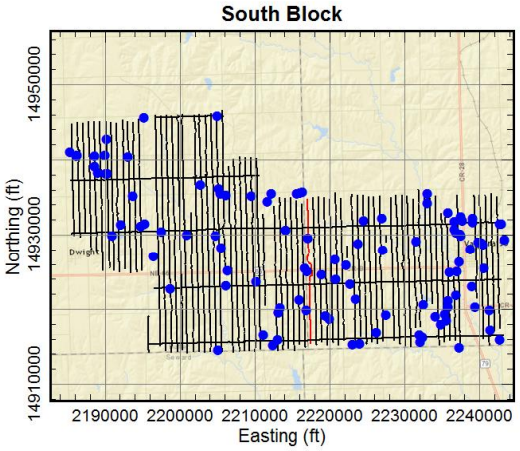

South Block Line L504201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-167675
14920000
14925000
14930000
Easting (ft)

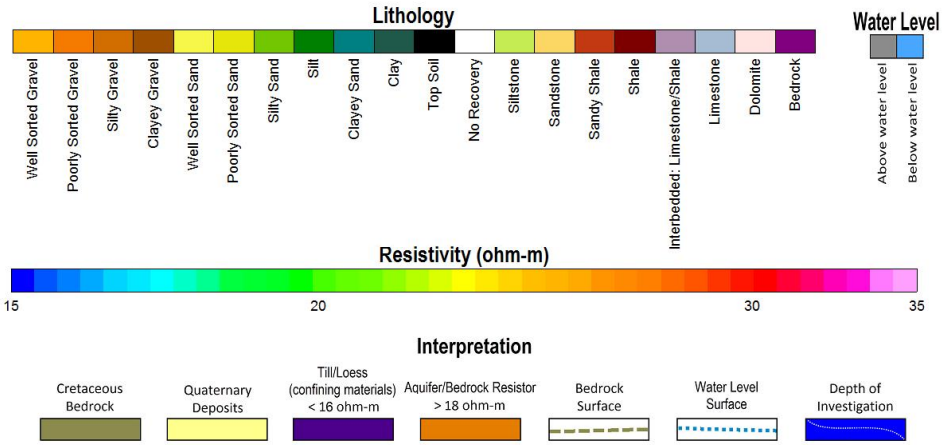

Line L504201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-167675
14920000
14925000
14930000
Easting (ft)

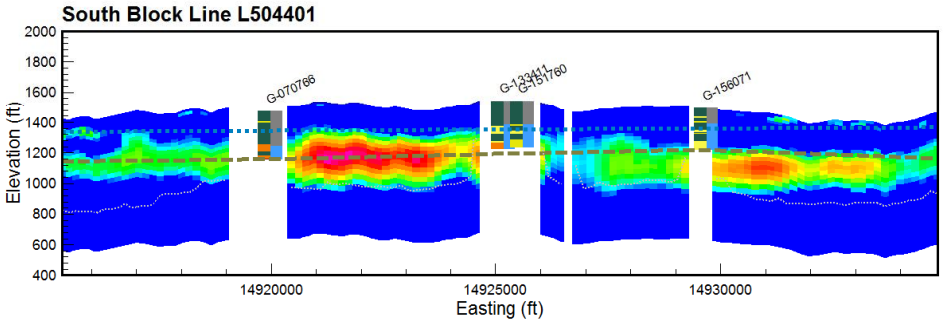

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

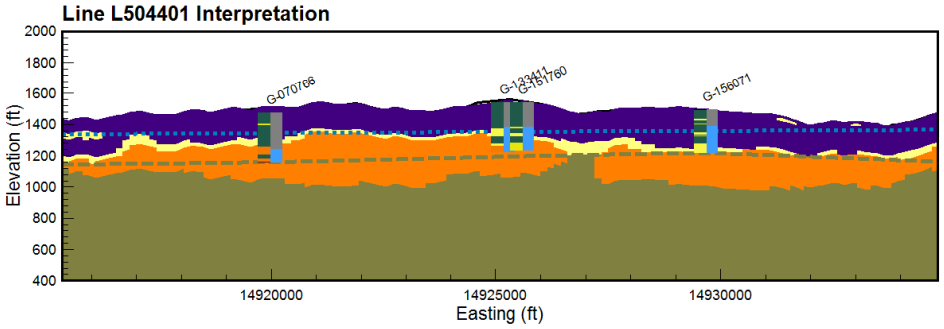

South Block Line L504301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-070786
G-167675
G-133441
G-151760
G-156071
14915000
14920000
14925000
14930000
Easting (ft)

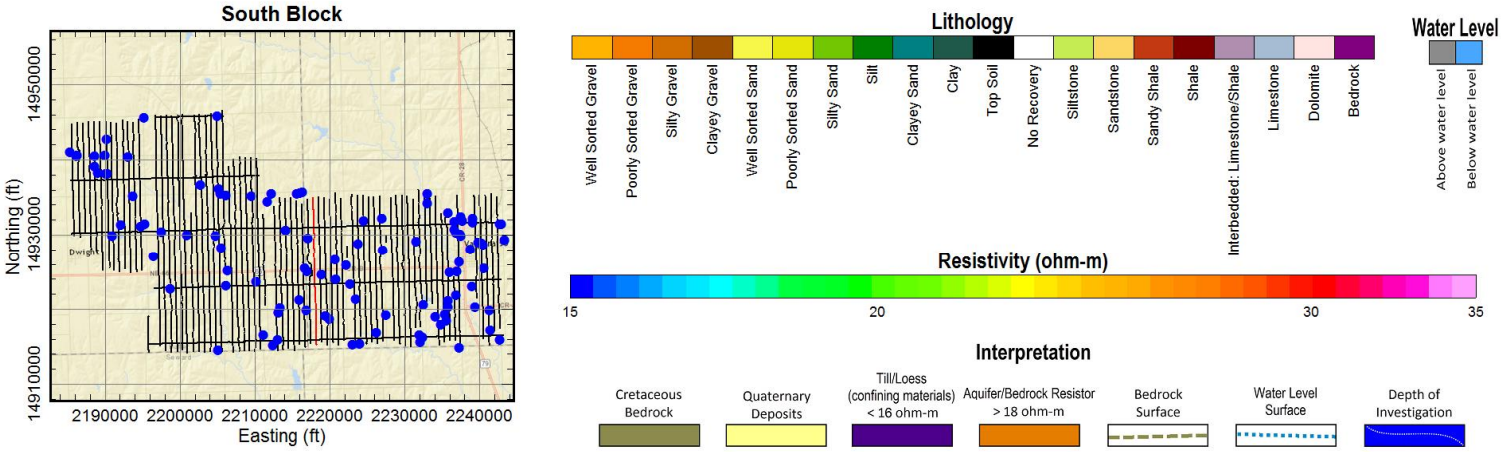

Line L504301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-070786
G-167675
G-133441
G-151760
G-156071
14915000
14920000
14925000
14930000
Easting (ft)

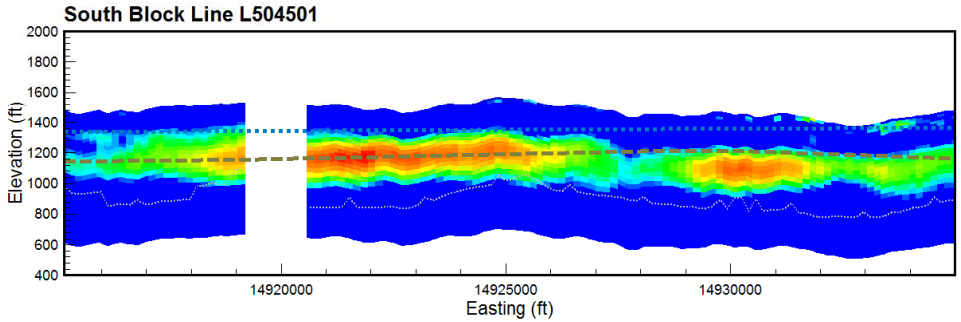

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

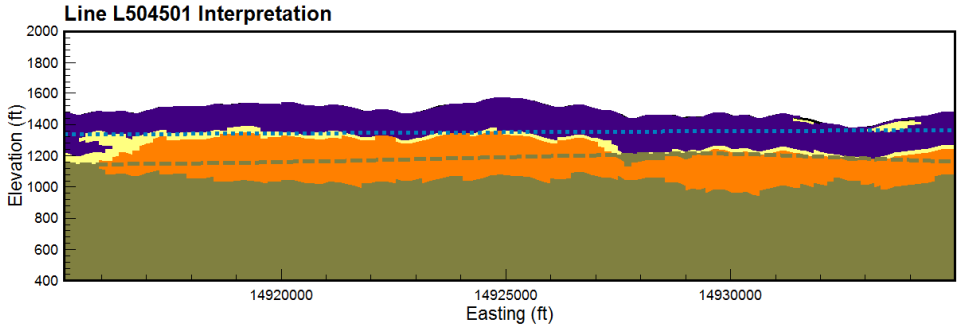

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

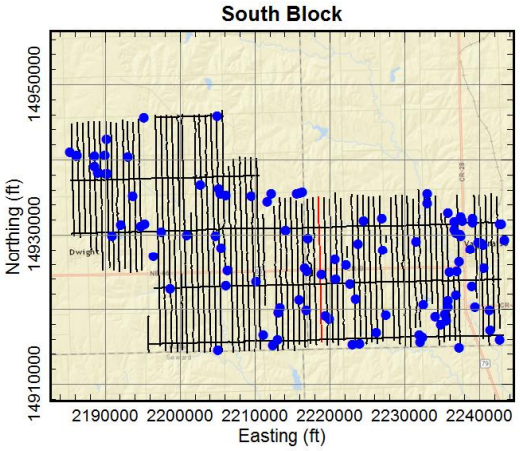

South Block Line L504401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-070766
G-133411
G-151760
G-156071
14920000
14925000
14930000
Easting (ft)

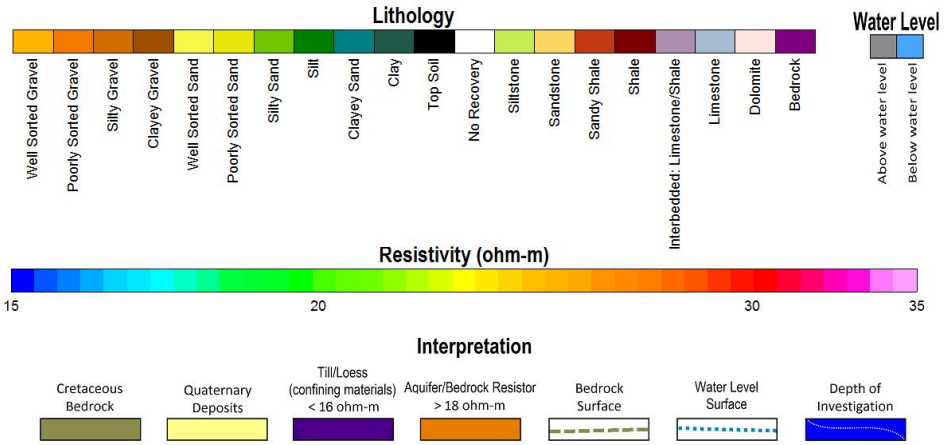

Line L504401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-070766
G-133411
G-151760
G-156071
14920000
14925000
14930000
Easting (ft)

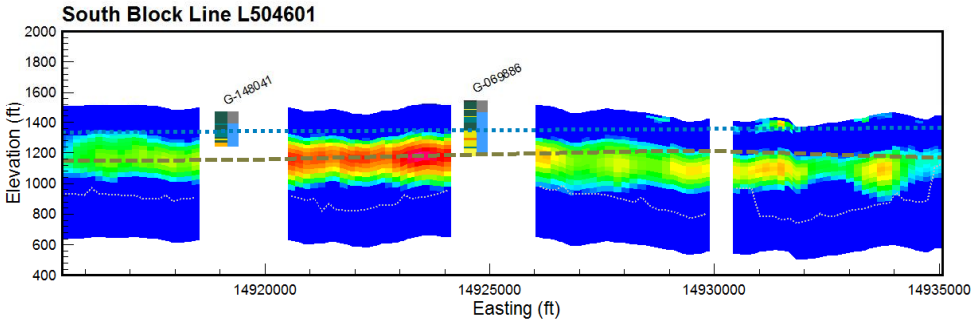

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

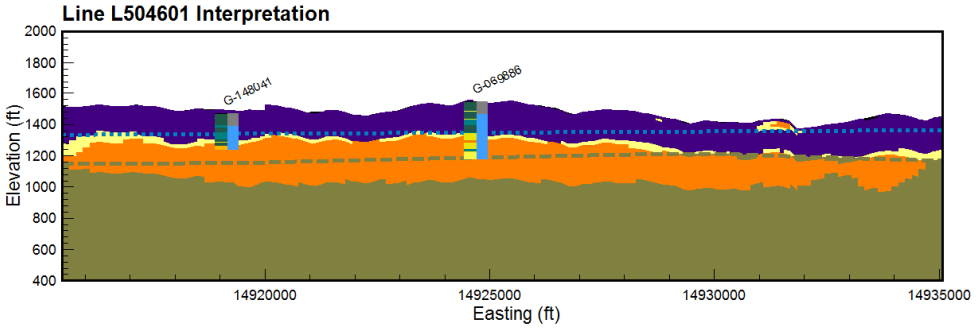

South Block Line L504501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14920000
14925000
14930000
Easting (ft)

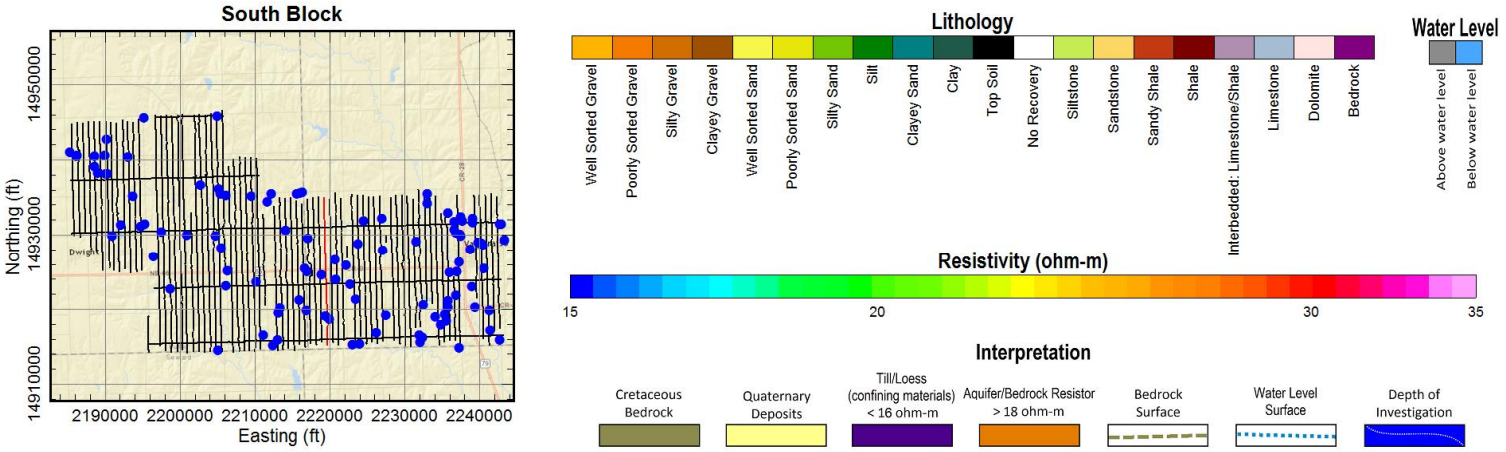

Line L504501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14920000
14925000
14930000
Easting (ft)

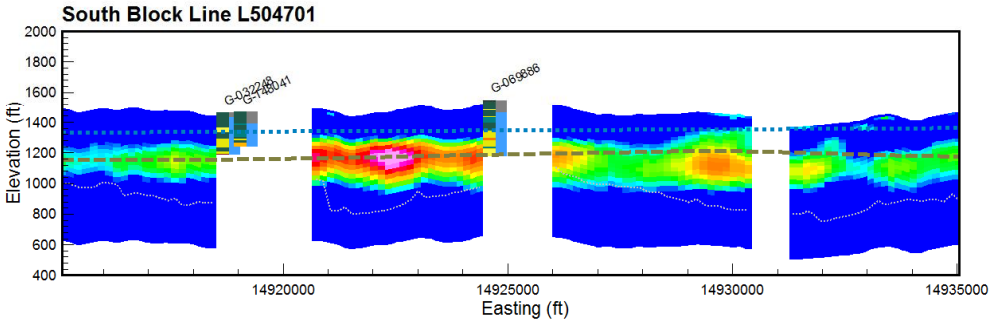

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

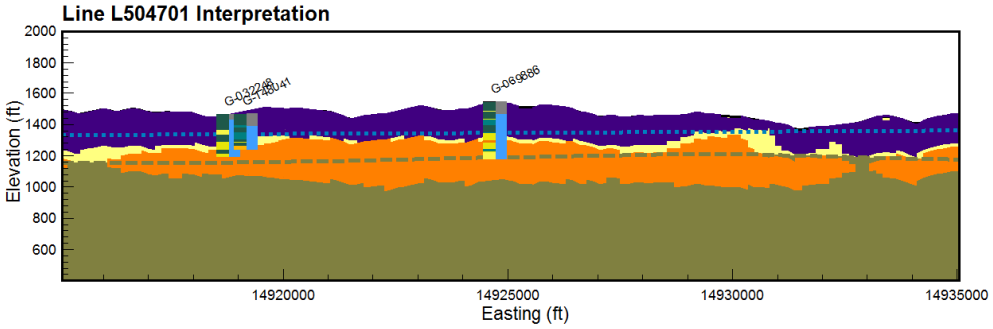

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

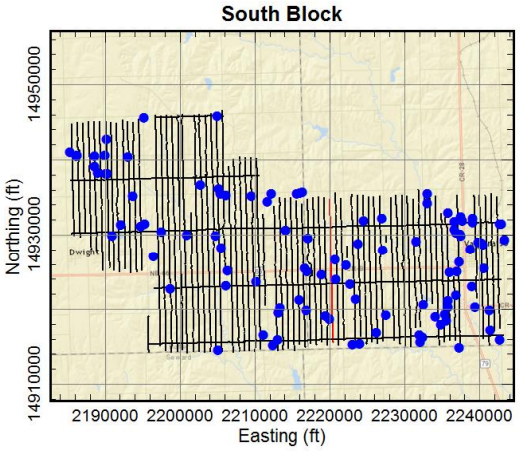

South Block Line L504601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-148041
G-069686
14920000
14925000
14930000
14935000
Easting (ft)

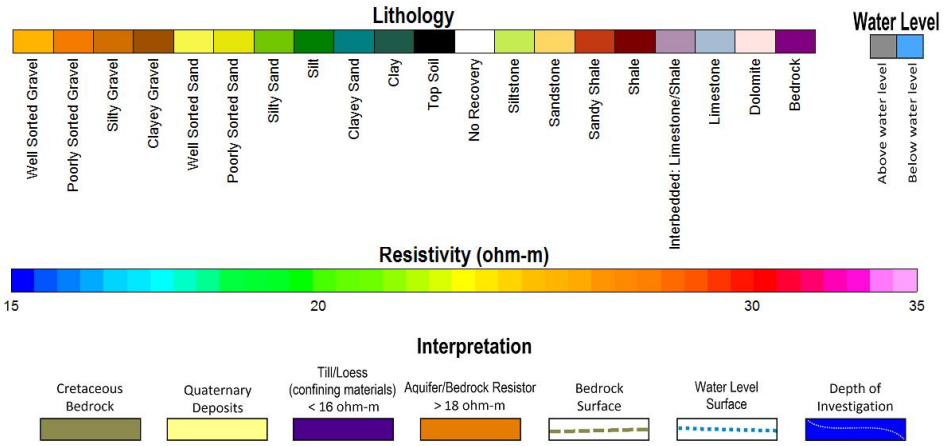

Line L504601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-148041
G-069686
14920000
14925000
14930000
14935000
Easting (ft)

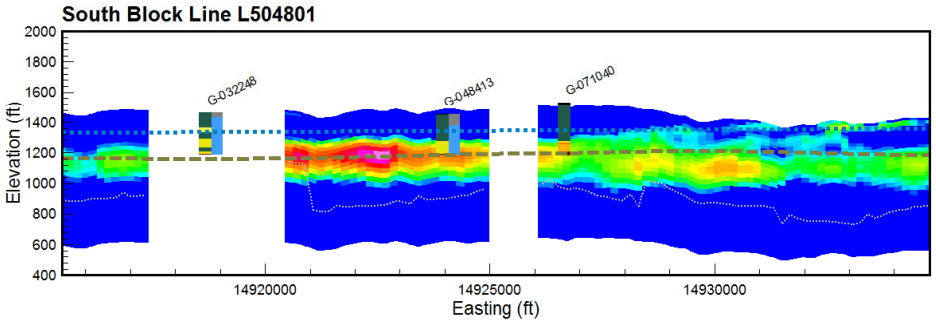

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

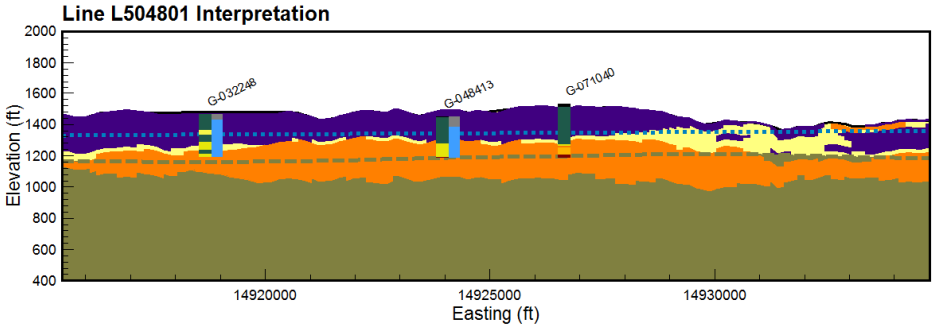

South Block Line L504701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-032248
G-066886
14920000
14925000
14930000
14935000
Easting (ft)

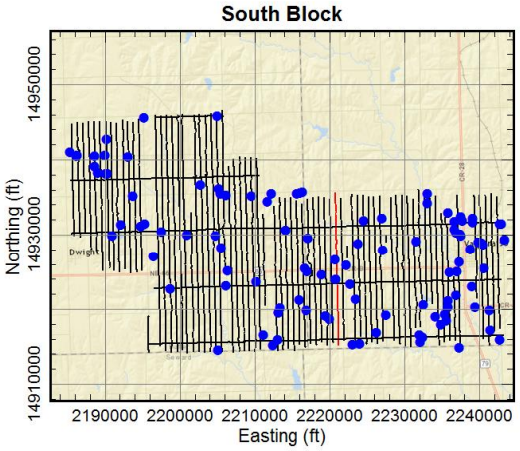

Line L504701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-032248
G-066886
14920000
14925000
14930000
14935000
Easting (ft)

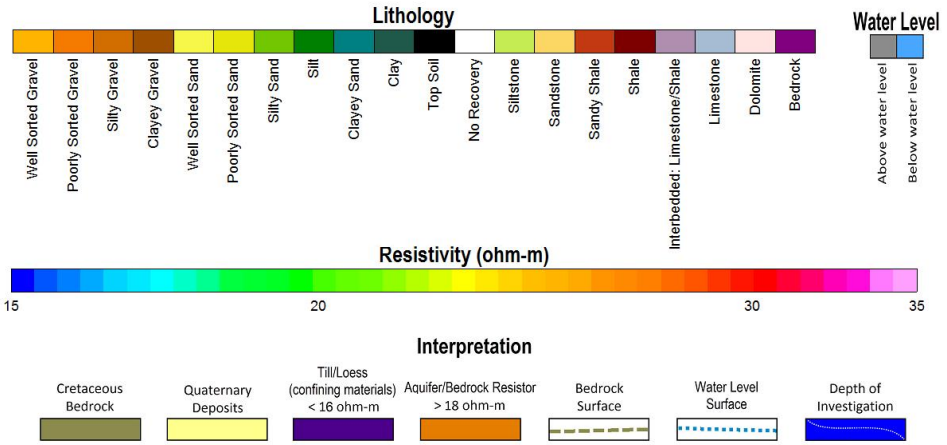

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

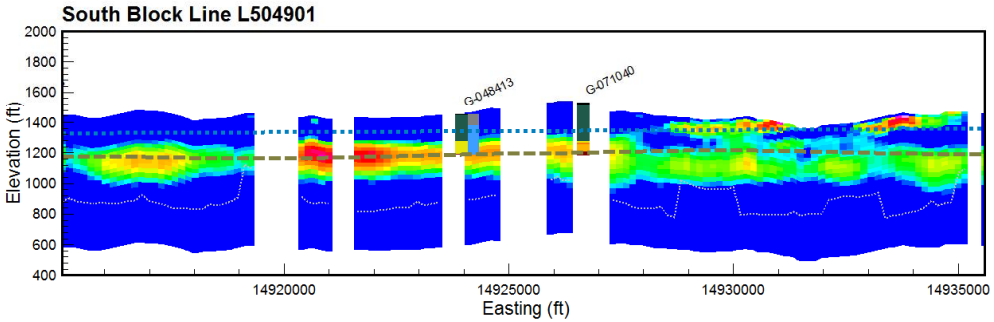

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

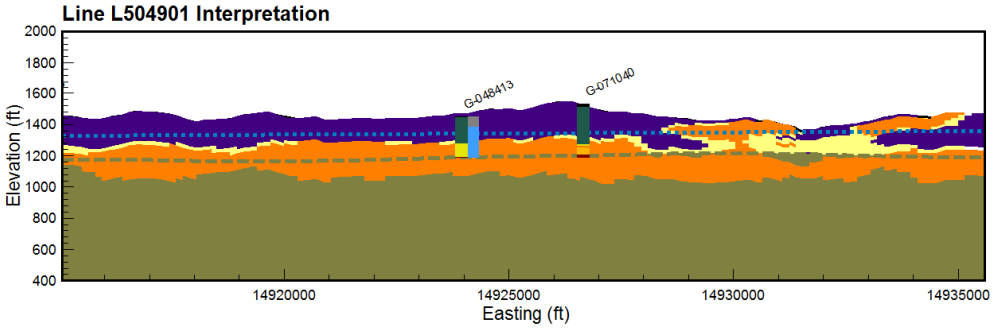

South Block Line L504801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-032248
G-048413
G-071040
14920000
14925000
14930000
Easting (ft)

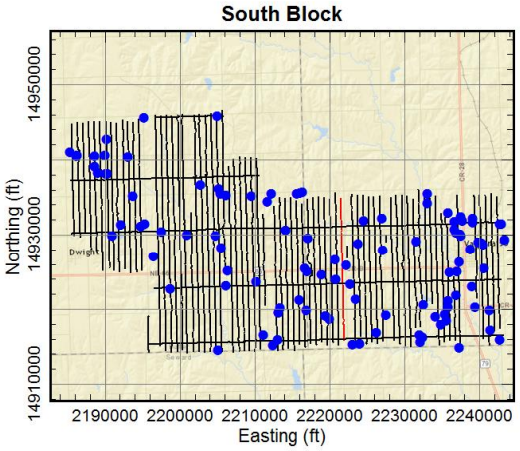

Line L504801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-032248
G-048413
G-071040
14920000
14925000
14930000
Easting (ft)

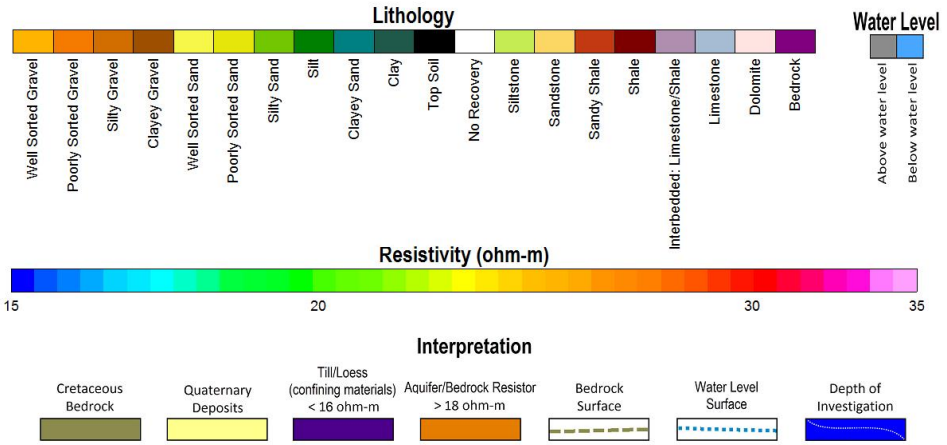

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

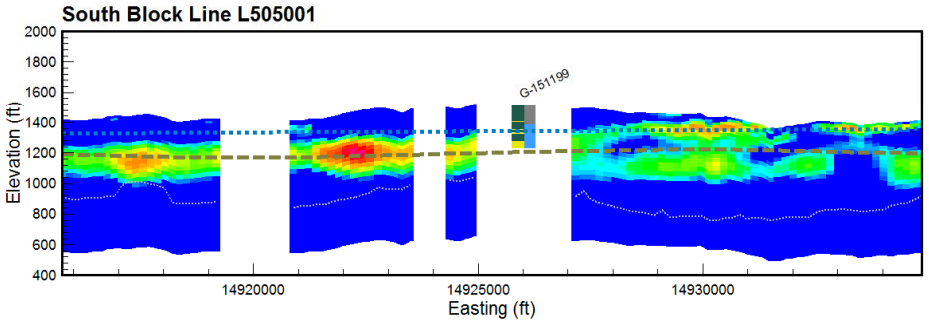

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

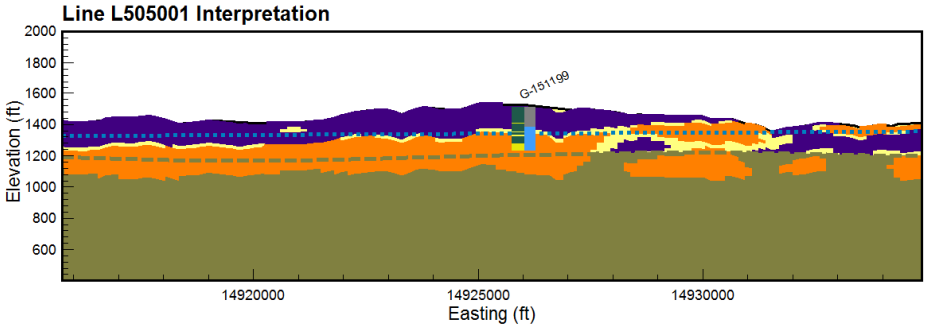

South Block Line L504901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-048413
G-071040
14920000
14925000
14930000
14935000
Easting (ft)

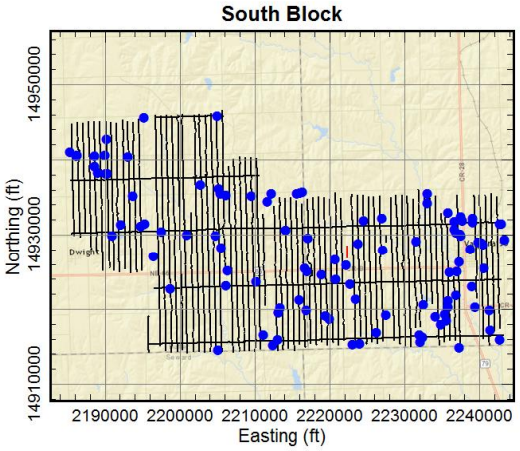

Line L504901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-048413
G-071040
14920000
14925000
14930000
14935000
Easting (ft)

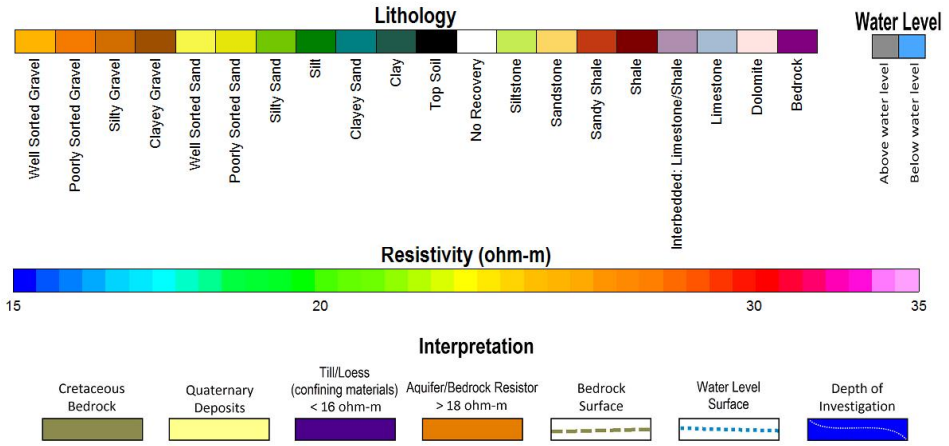

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

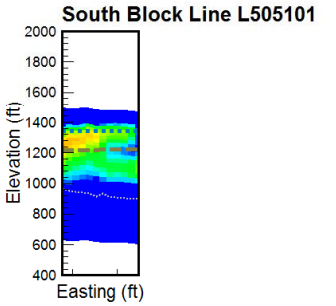

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

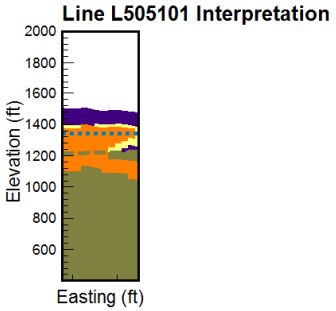

South Block Line L505001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-151199
14920000
14925000
14930000
Easting (ft)

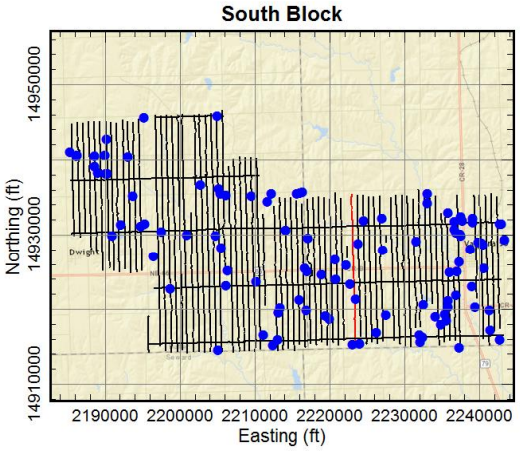

Line L505001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-151199
14920000
14925000
14930000
Easting (ft)

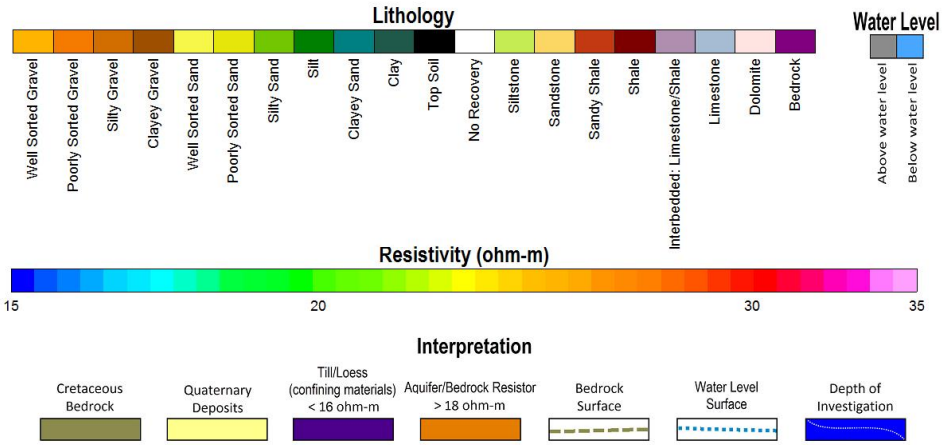

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

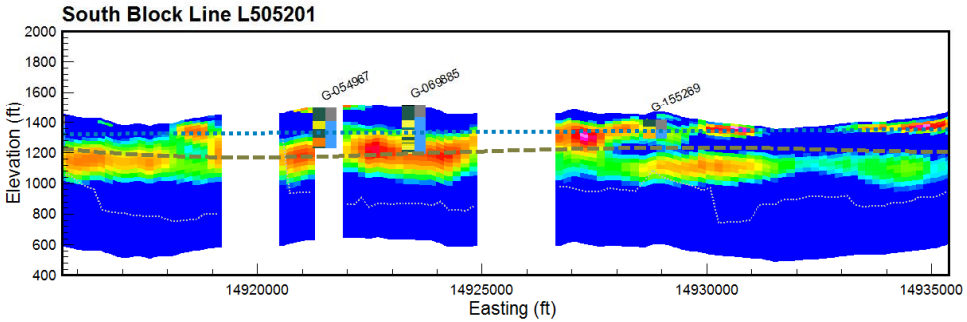

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

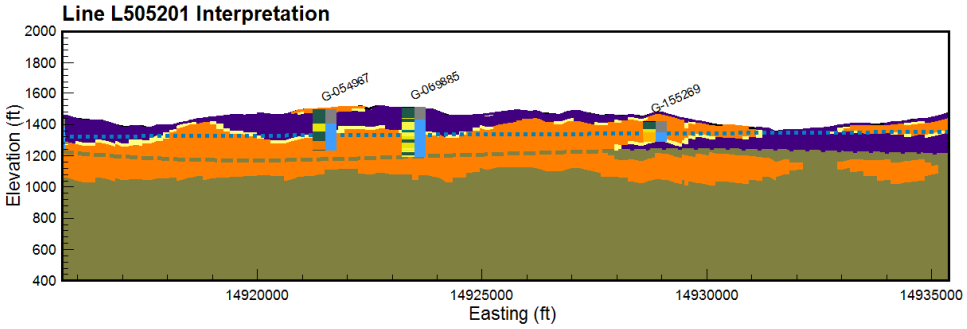

South Block Line L505101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
Easting (ft)

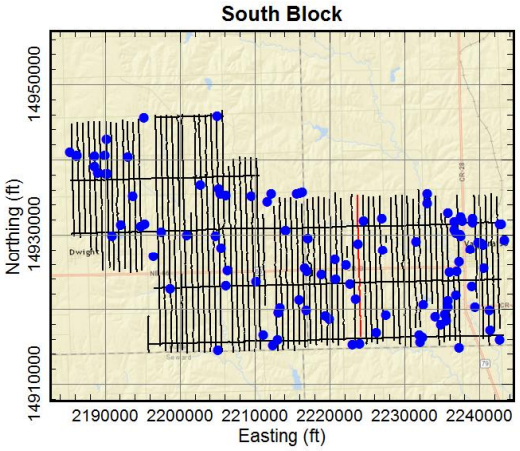

Line L505101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
Easting (ft)

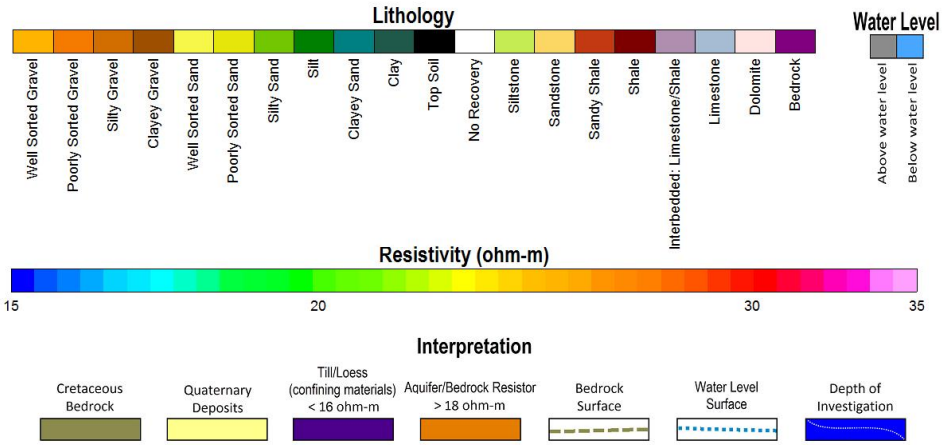

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

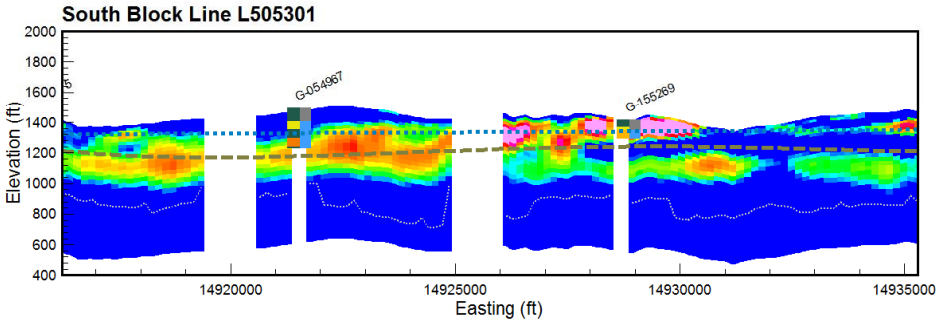

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

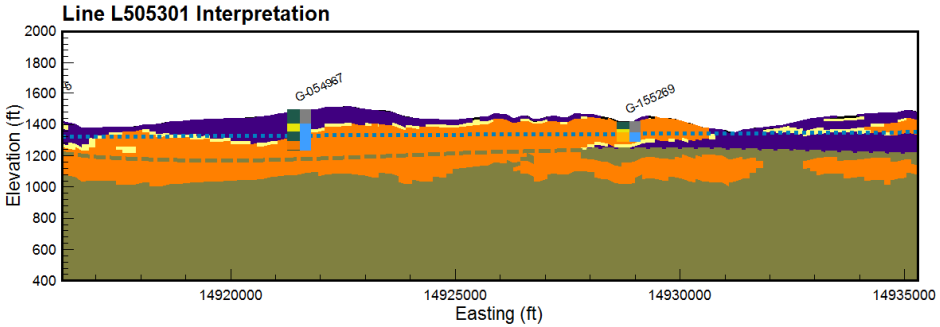

South Block Line L505201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-054967
G-069885
G-155269
14920000
14925000
14930000
14935000
Easting (ft)

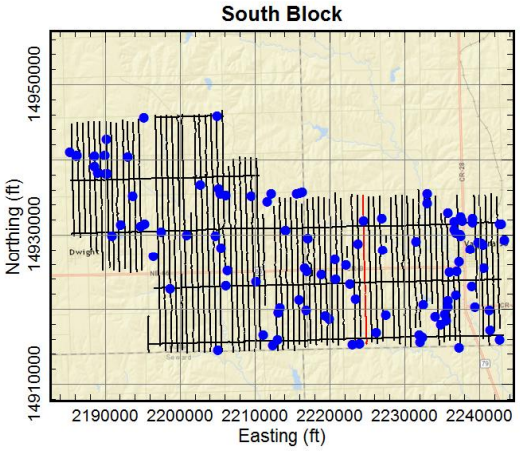

Line L505201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-054967
G-069885
G-155269
14920000
14925000
14930000
14935000
Easting (ft)

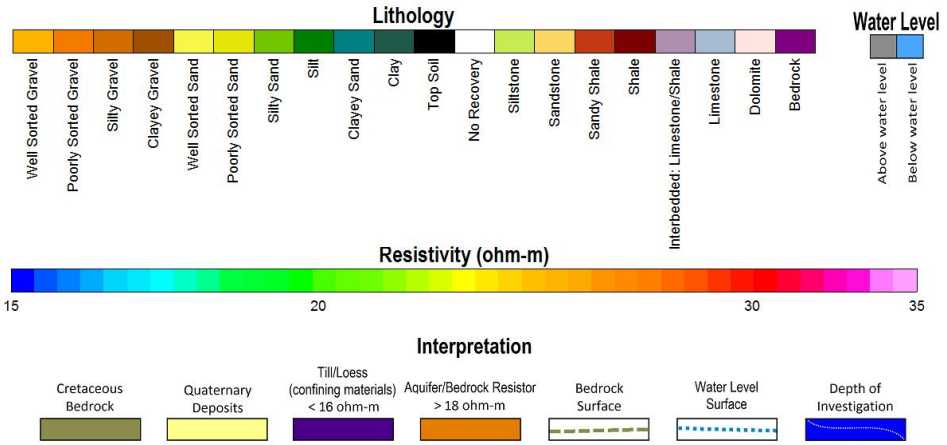

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

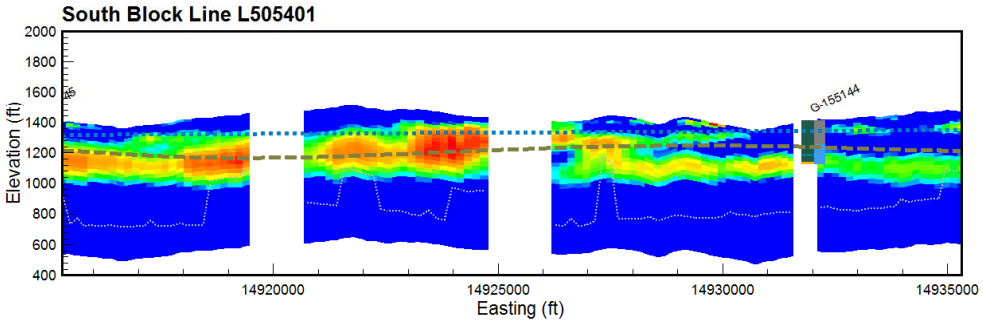

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

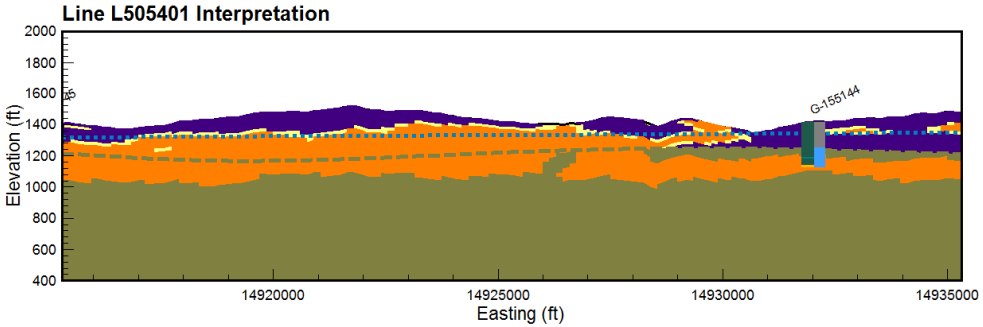

South Block Line L505301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-054967
G-155269
14920000
14925000
14930000
14935000
Easting (ft)

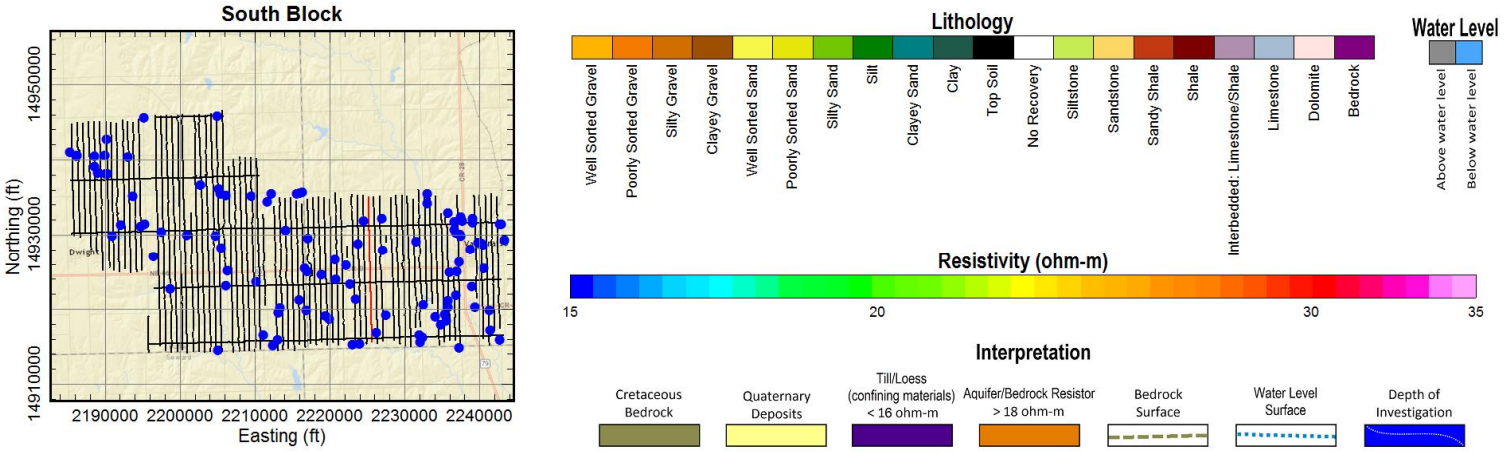

Line L505301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-054967
G-155269
14920000
14925000
14930000
14935000
Easting (ft)

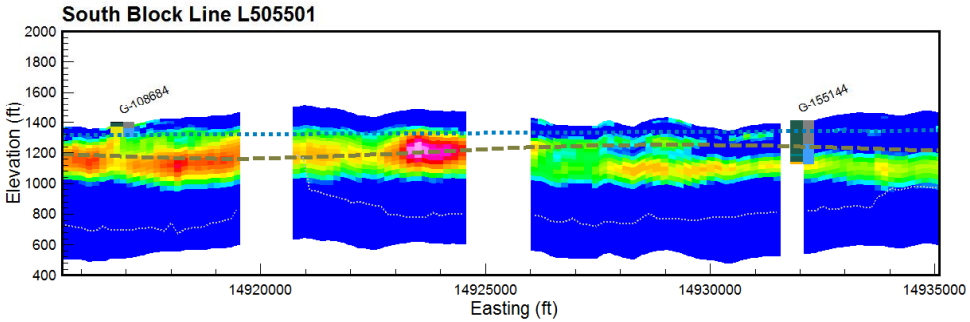

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

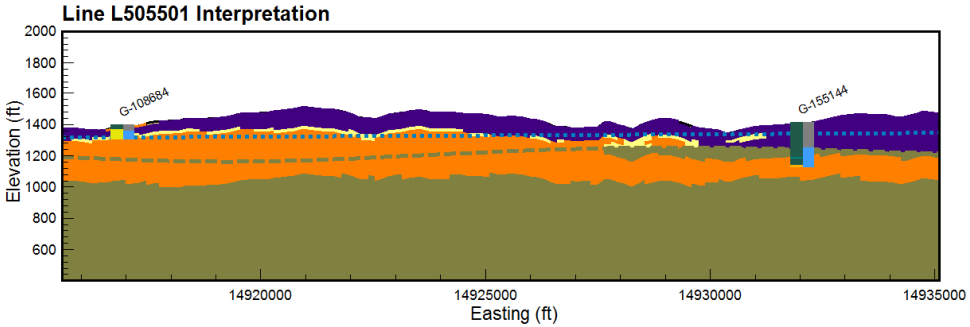

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

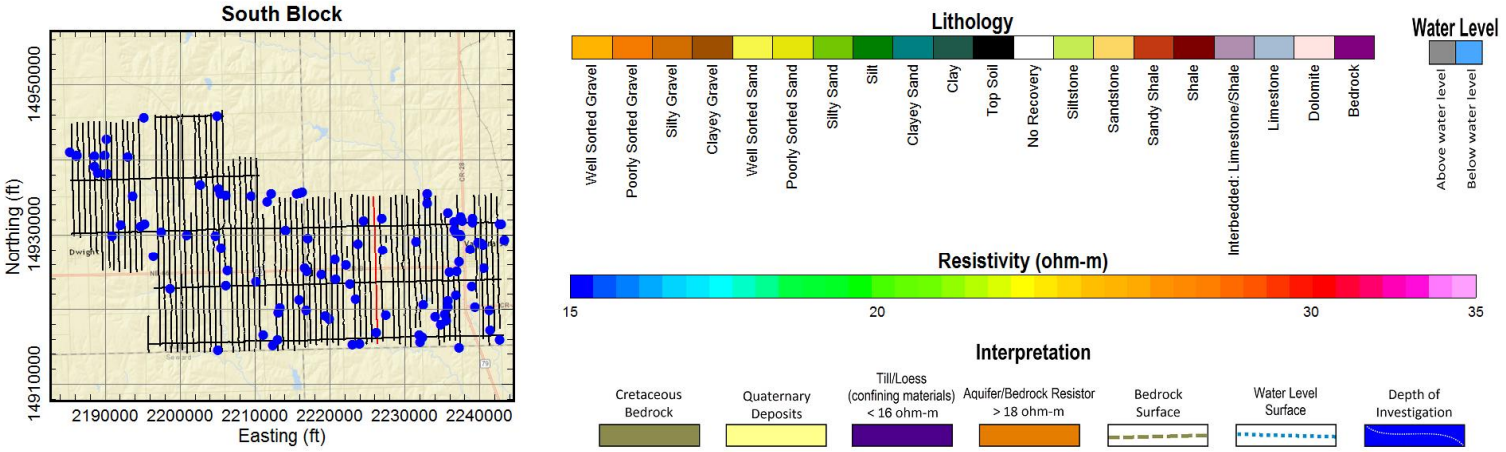

South Block Line L505401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-155144
14920000
14925000
14930000
14935000
Easting (ft)

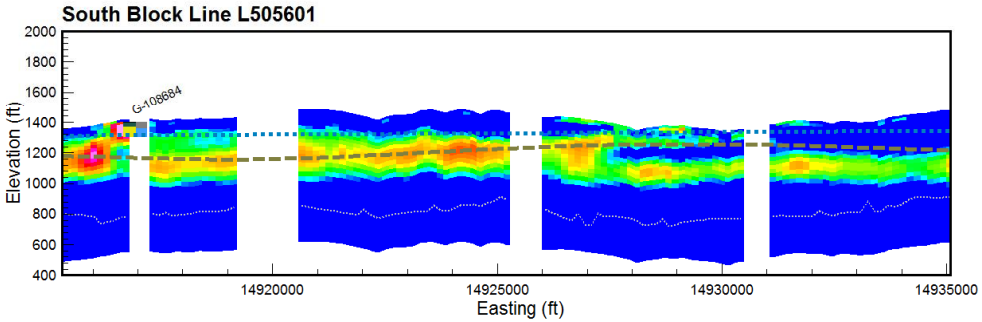

Line L505401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-155144
14920000
14925000
14930000
14935000
Easting (ft)

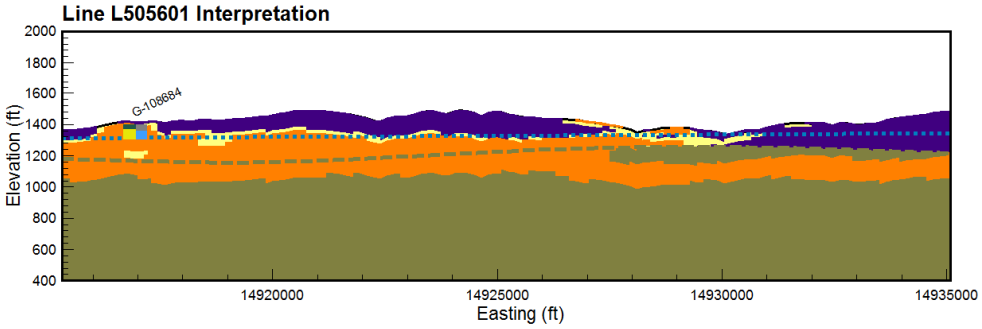

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

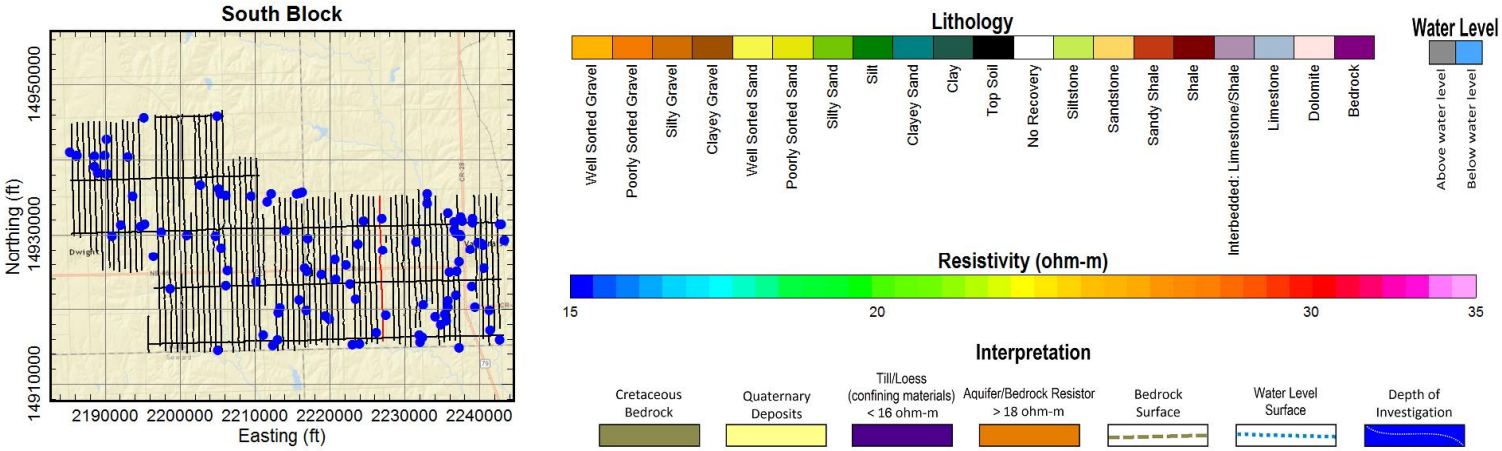

South Block Line L505501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-108684
G-155144
14920000
14925000
14930000
14935000
Easting (ft)

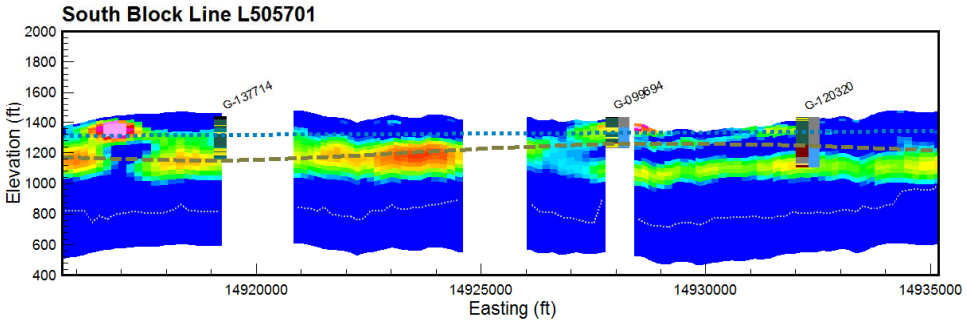

Line L505501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-108684
G-155144
14920000
14925000
14930000
14935000
Easting (ft)

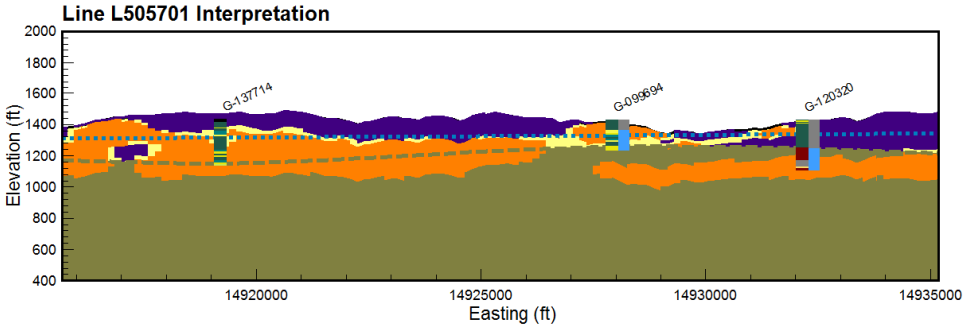

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

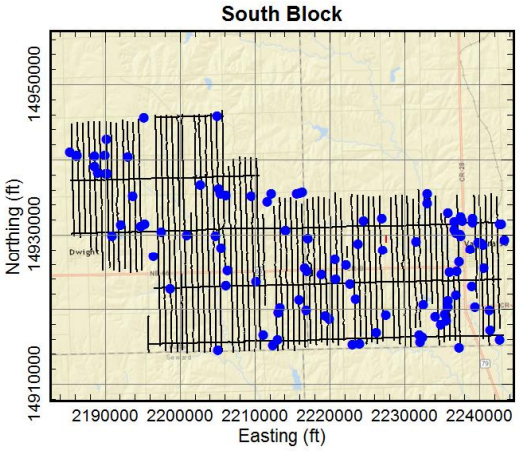

South Block Line L505601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-108684
14920000
14925000
14930000
14935000
Easting (ft)

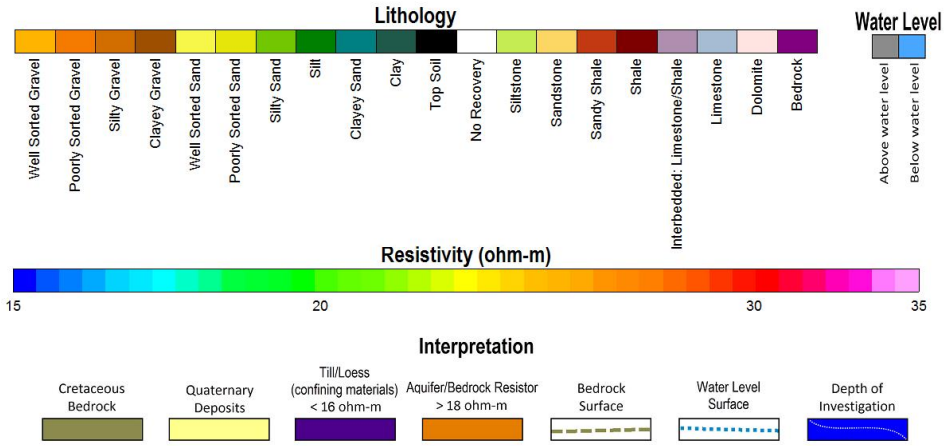

Line L505601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-108684
14920000
14925000
14930000
14935000
Easting (ft)

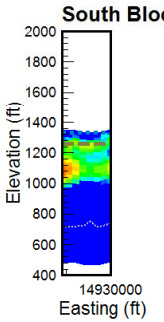

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

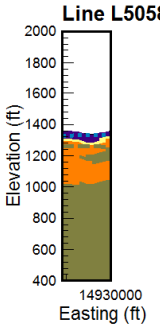

South Block Line L505701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-137714
G-099694
G-120320
14920000
14925000
14930000
14935000
Easting (ft)

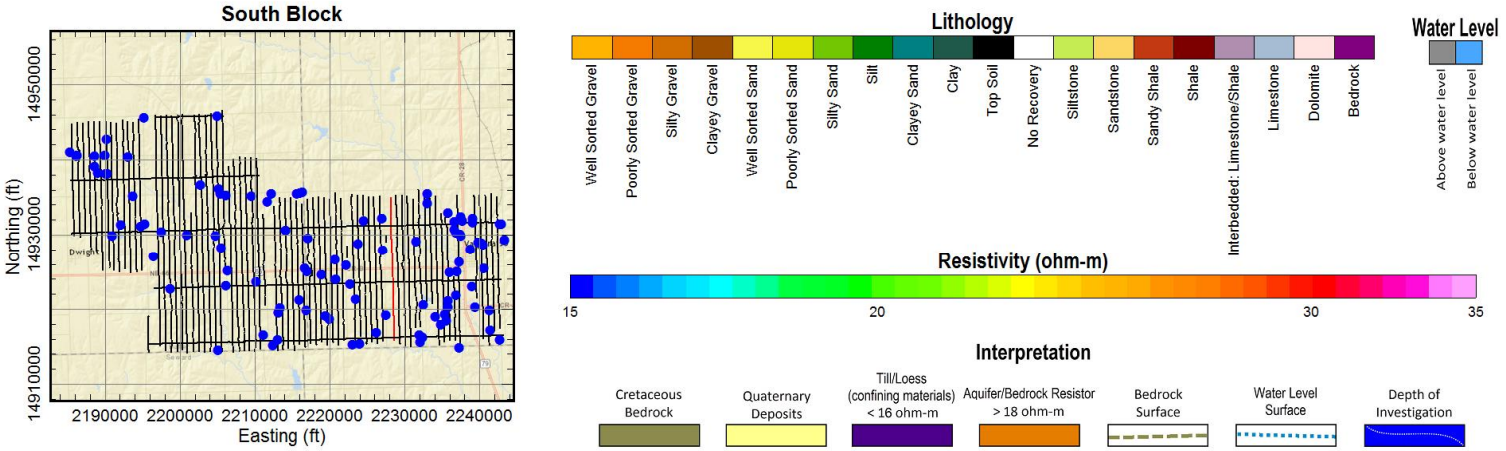

Line L505701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-137714
G-099694
G-120320
14920000
14925000
14930000
14935000
Easting (ft)

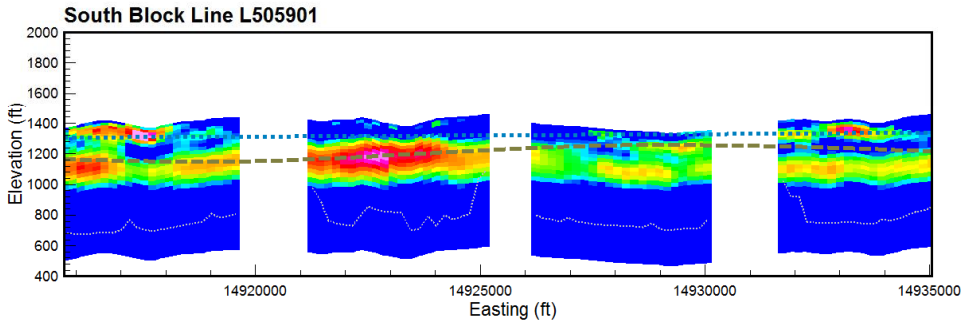

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

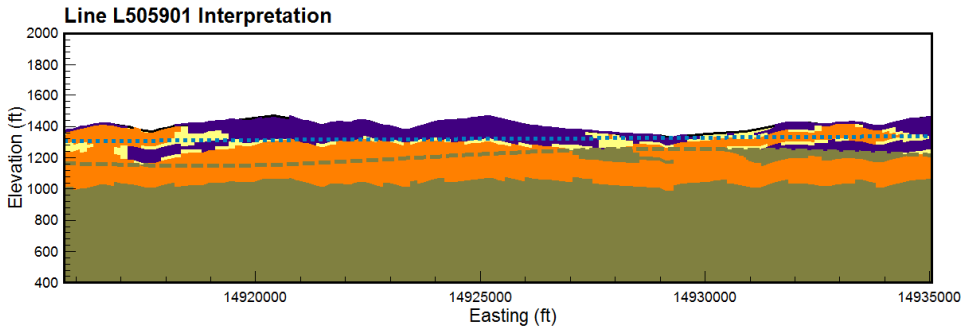

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

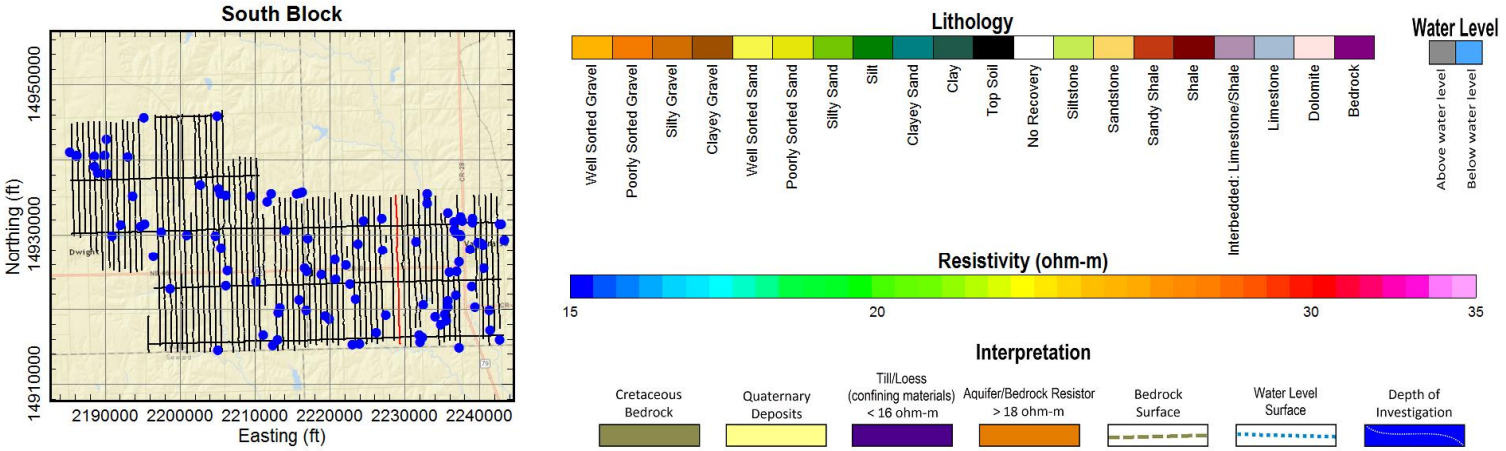

South Block Line L505801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14930000
Easting (ft)

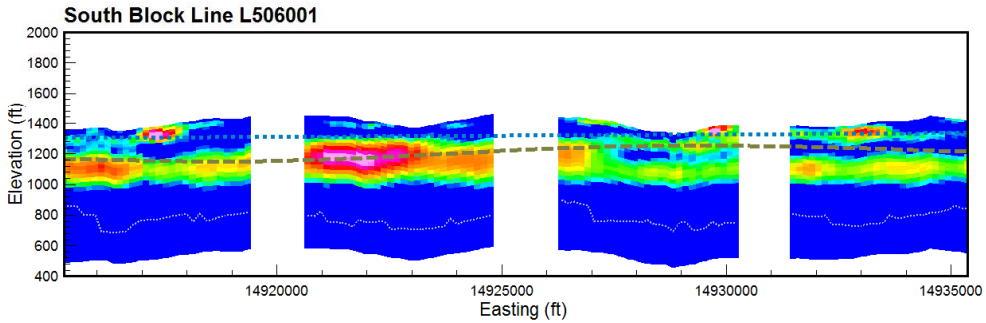

Line L505801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14930000
Easting (ft)

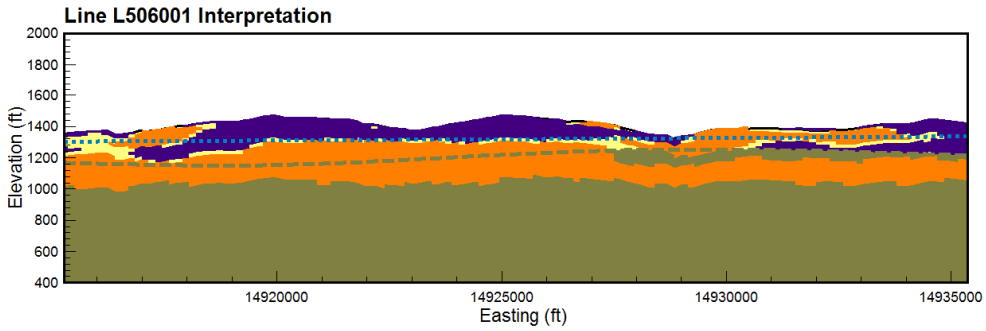

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

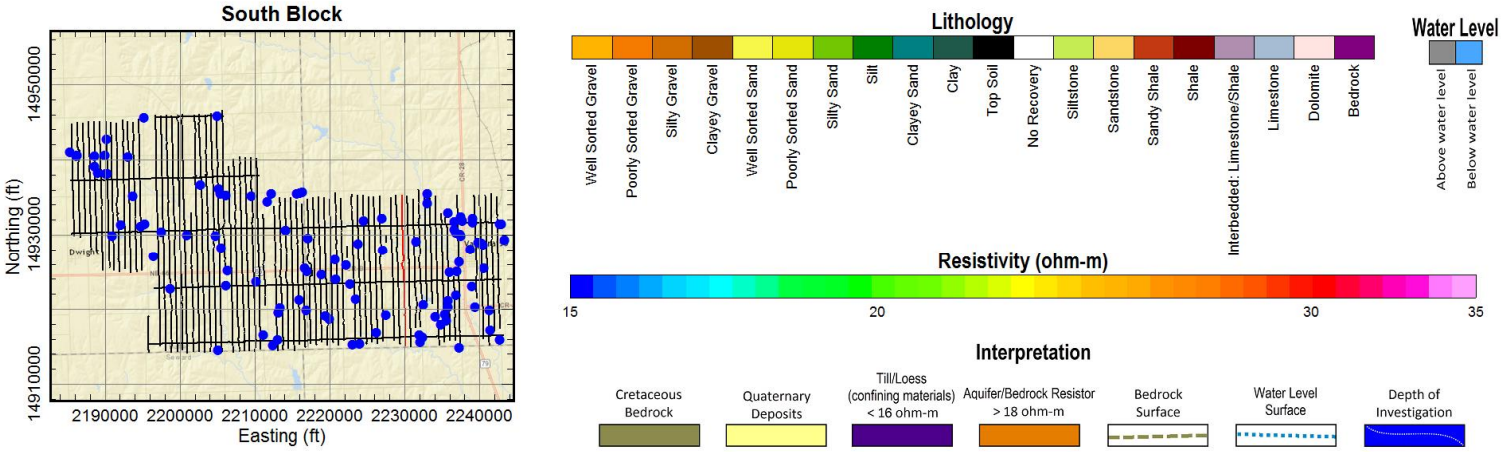

South Block Line L505901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14920000
14925000
14930000
14935000
Easting (ft)

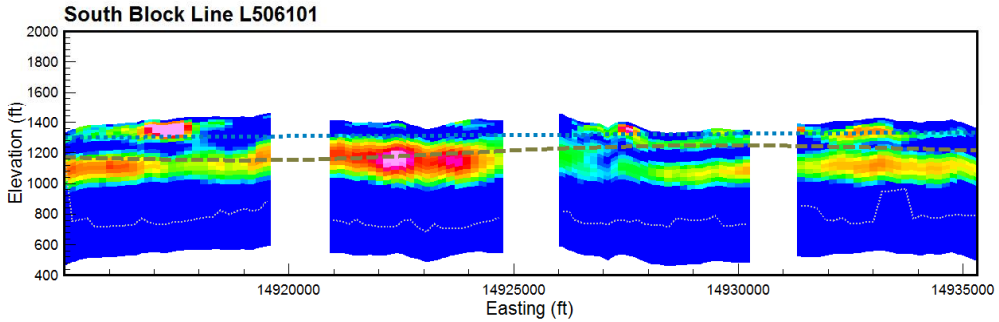

Line L505901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14920000
14925000
14930000
14935000
Easting (ft)

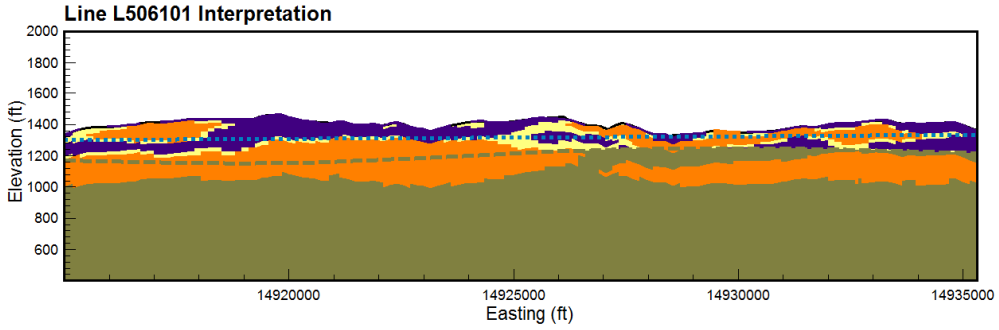

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

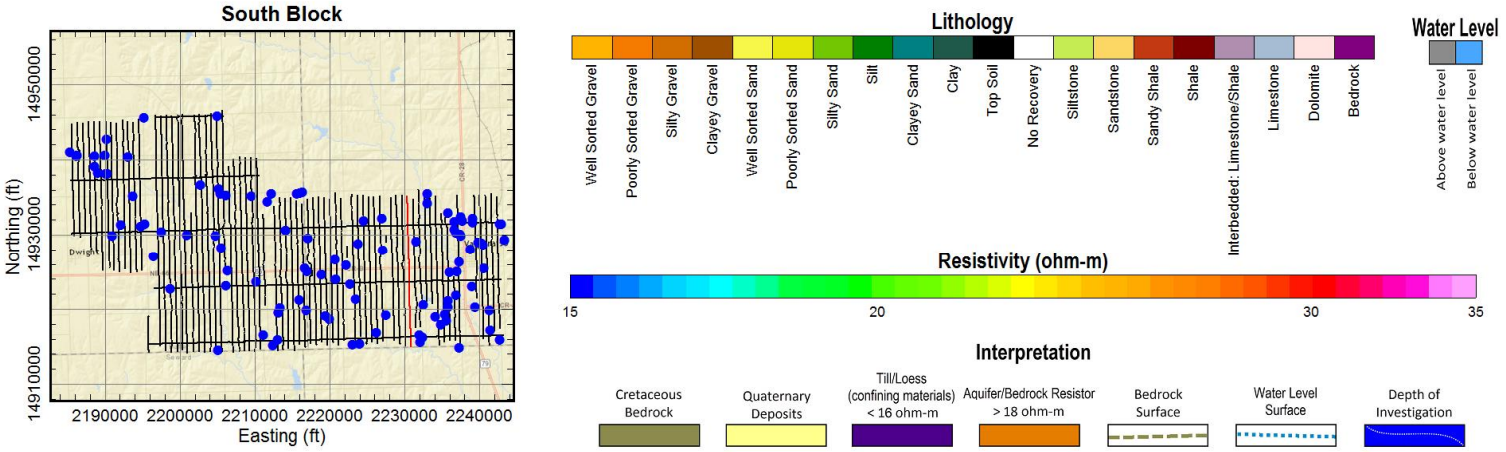

South Block Line L506001
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14920000
14925000
14930000
14935000
Easting (ft)

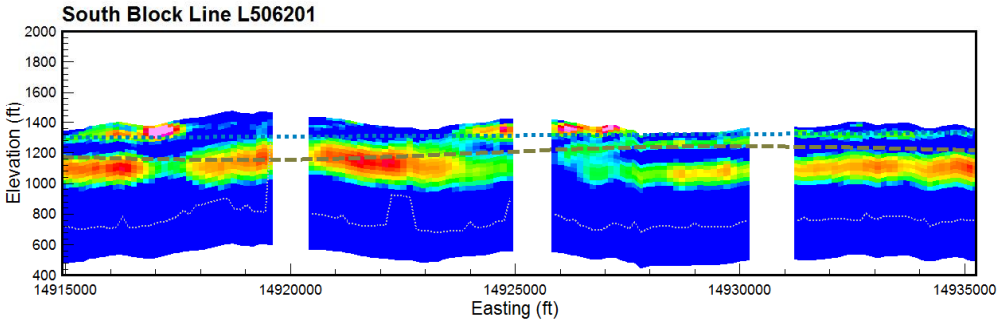

Line L506001 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14920000
14925000
14930000
14935000
Easting (ft)

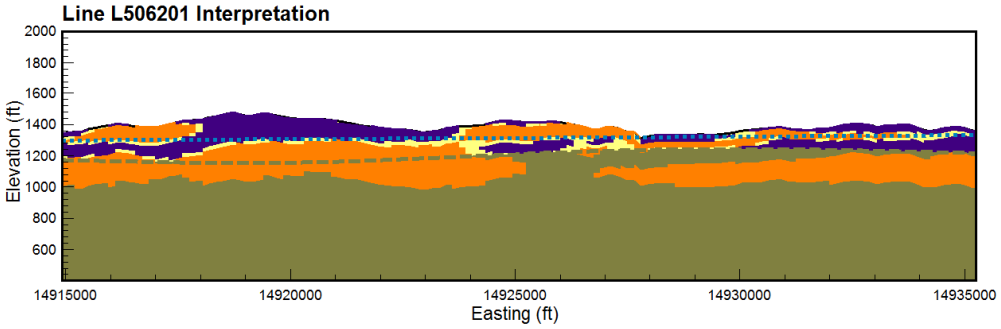

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

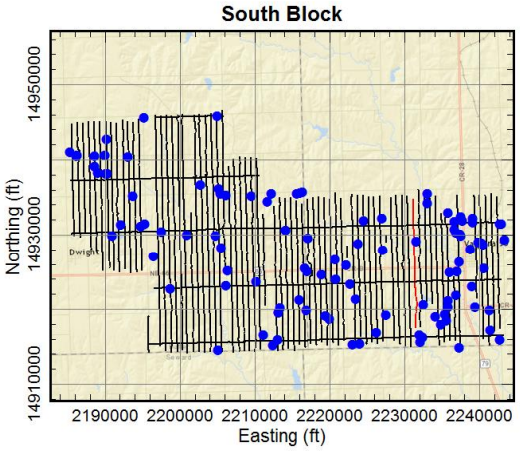

South Block Line L506101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14920000
14925000
14930000
14935000
Easting (ft)

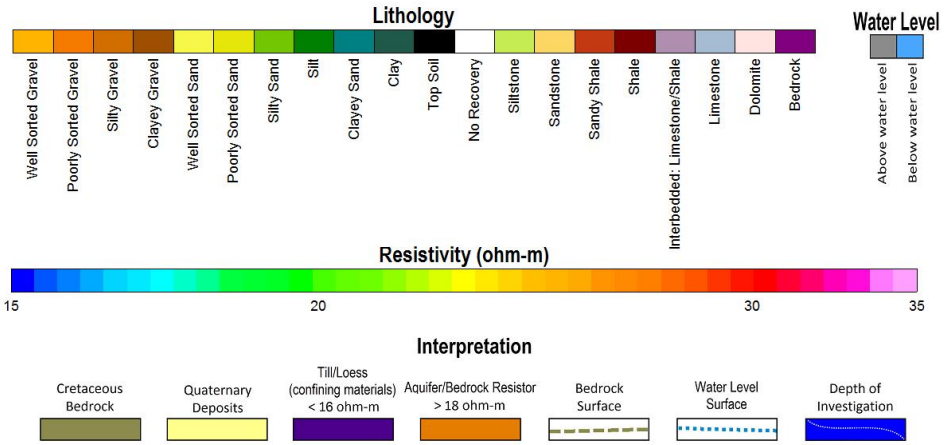

Line L506101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Easting (ft)

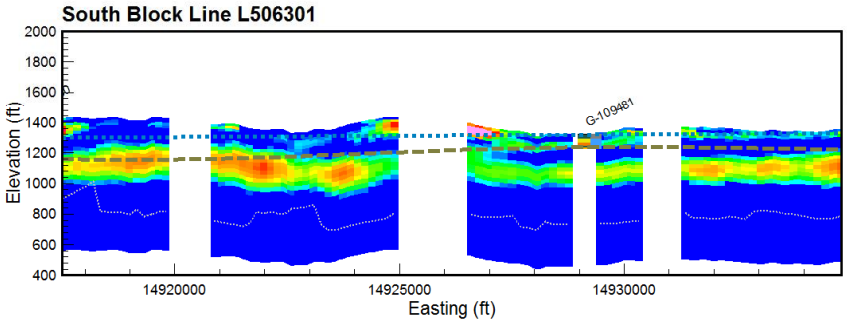

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

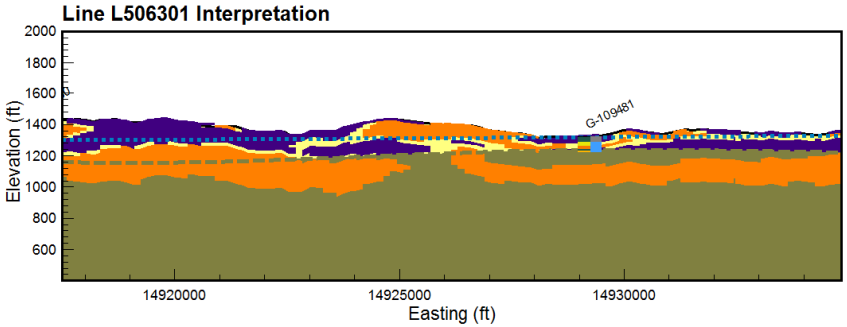

South Block Line L506201
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
14915000
14920000
14925000
14930000
14935000
Easting (ft)

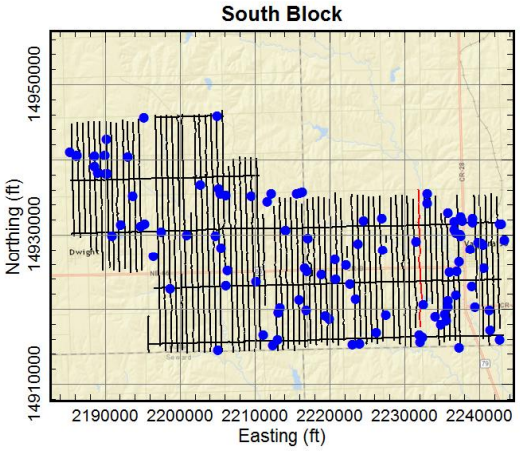

Line L506201 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
Easting (ft)

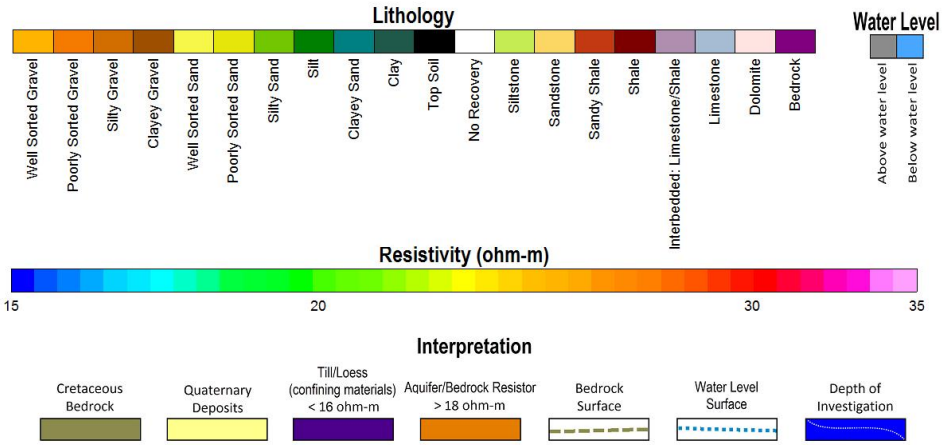

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

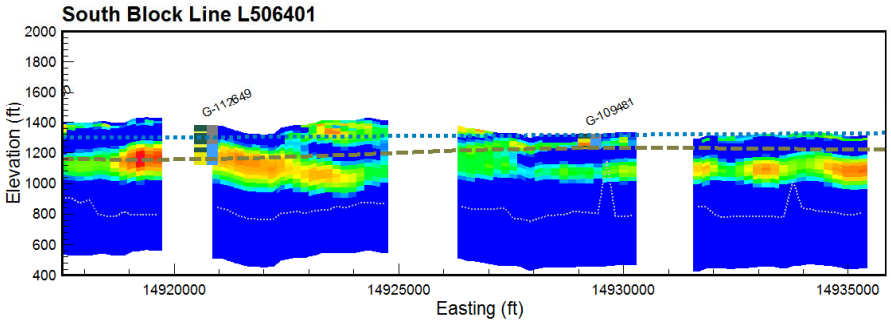

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

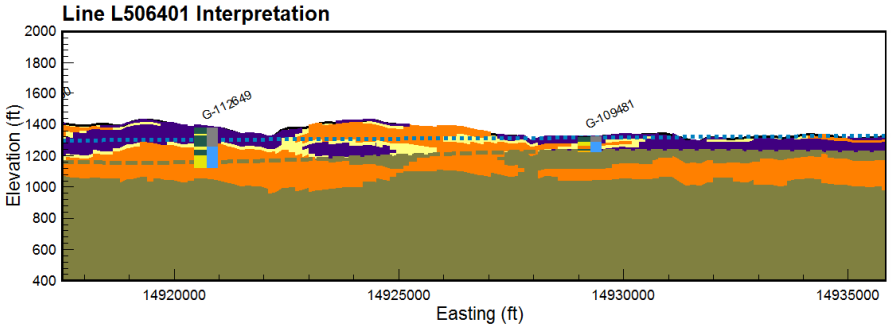

South Block Line L506301
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-109481
14920000
14925000
14930000
Easting (ft)

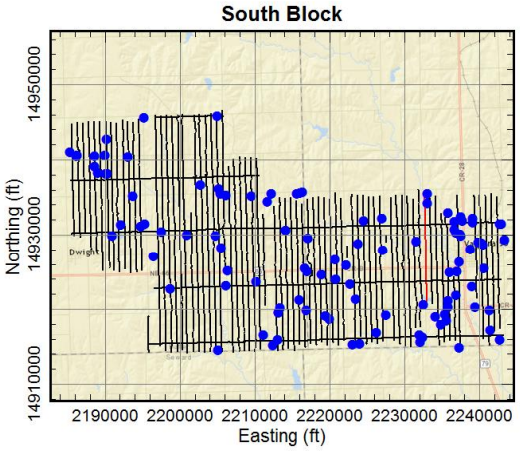

Line L506301 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-109481
14920000
14925000
14930000
Easting (ft)

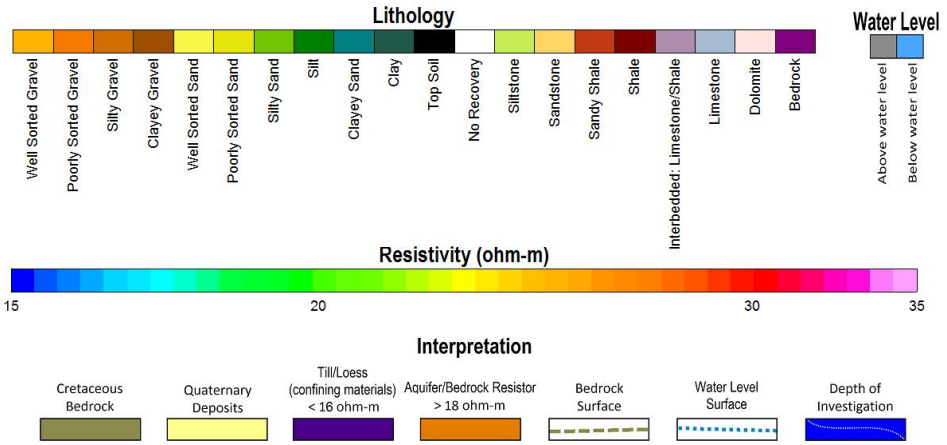

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

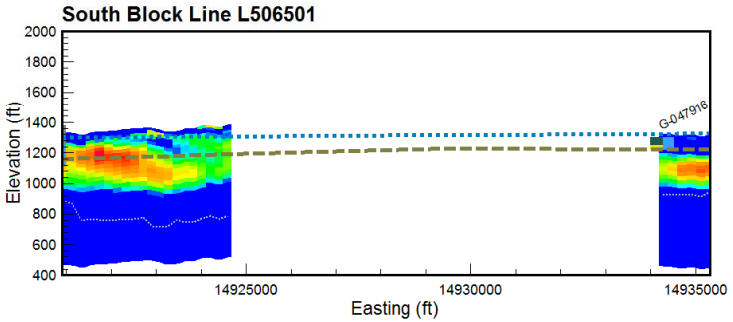

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

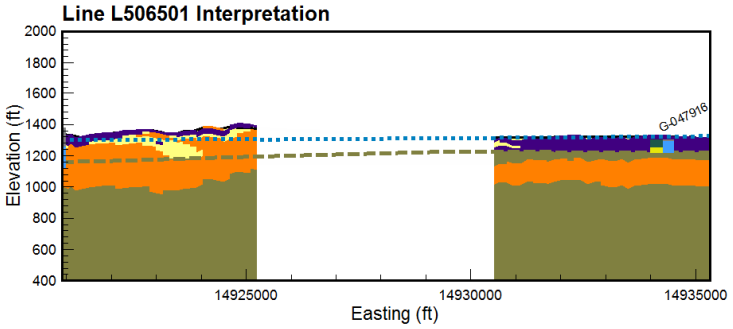

South Block Line L506401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112649
G-109481
14920000
14925000
14930000
14935000
Easting (ft)

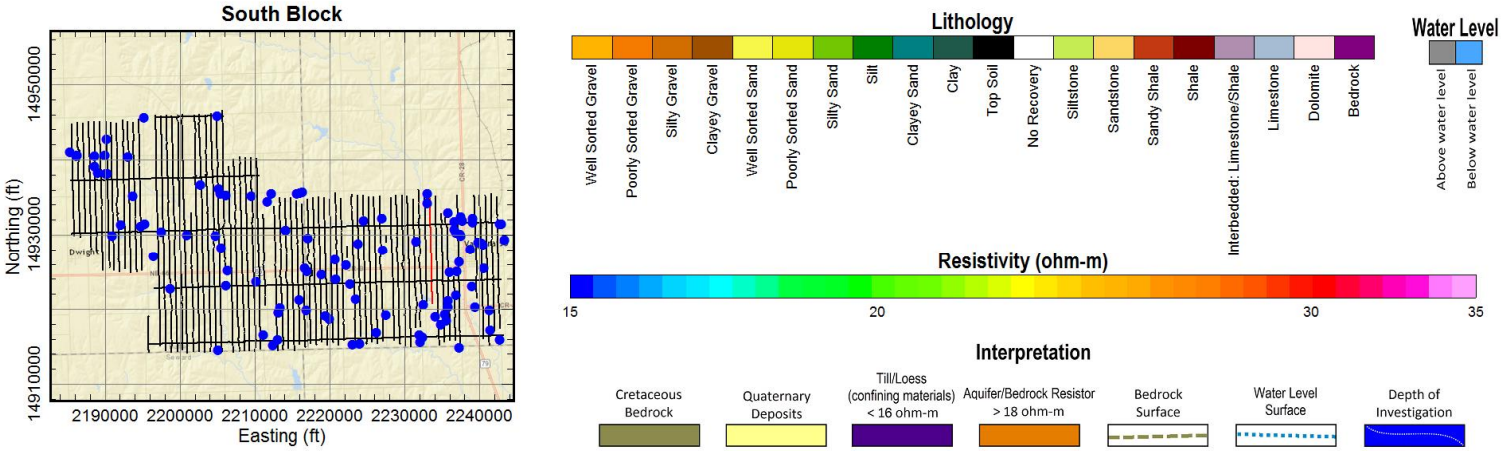

Line L506401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-112649
G-109481
14920000
14925000
14930000
14935000
Easting (ft)

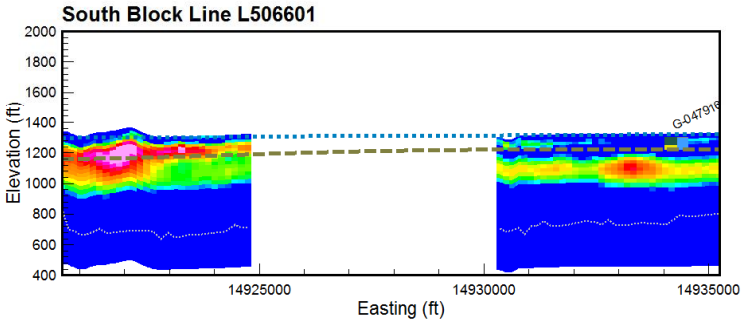

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

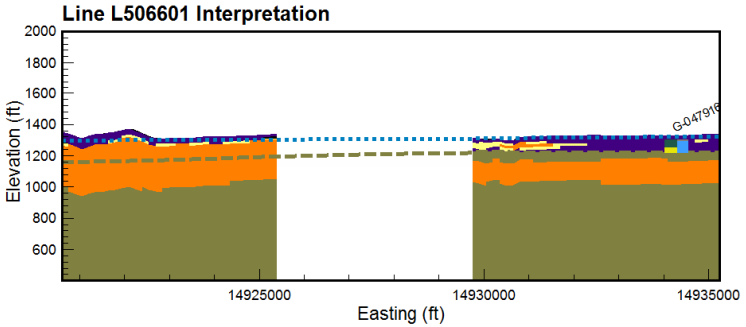

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

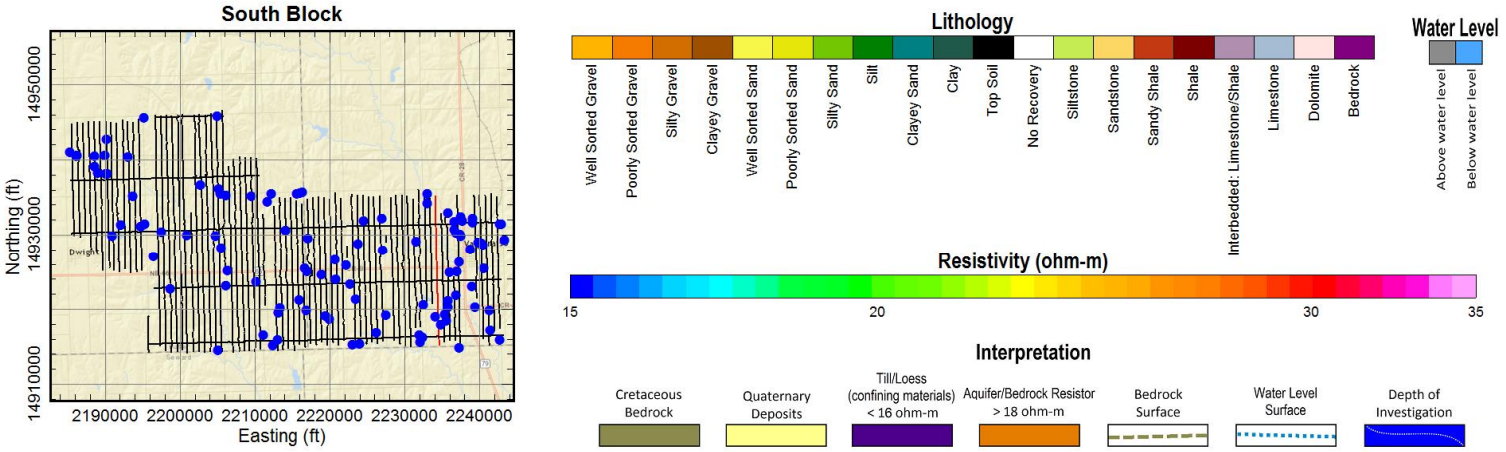

South Block Line L506501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-047916
14925000
14930000
14935000
Easting (ft)

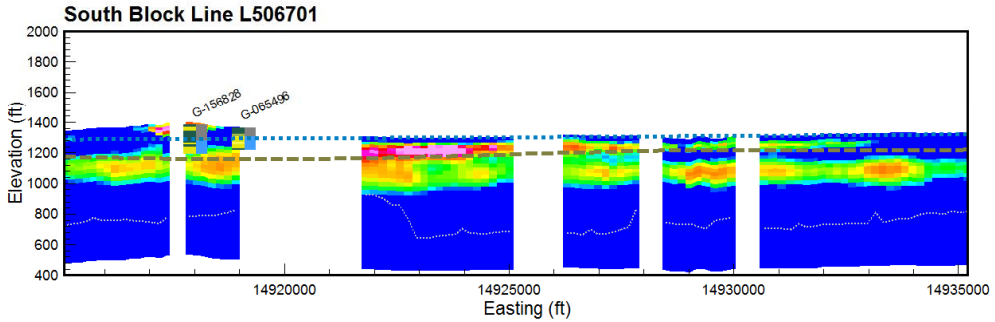

Line L506501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-047916
14925000
14930000
14935000
Easting (ft)

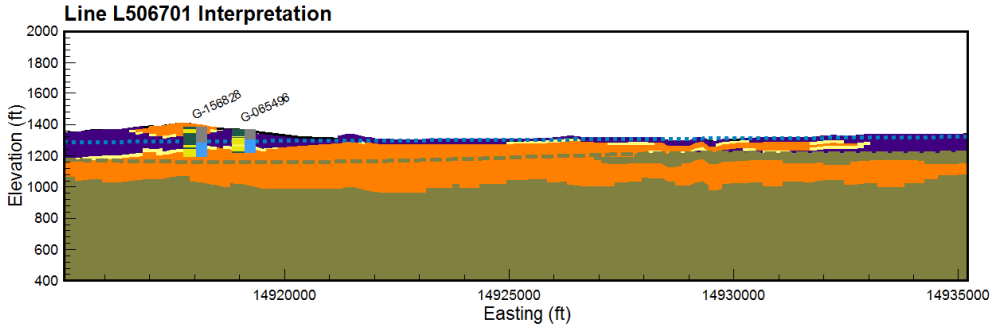

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

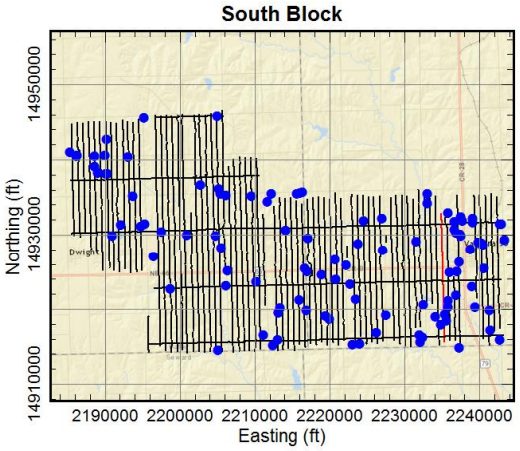

South Block Line L506601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-047916
14925000
14930000
14935000
Easting (ft)

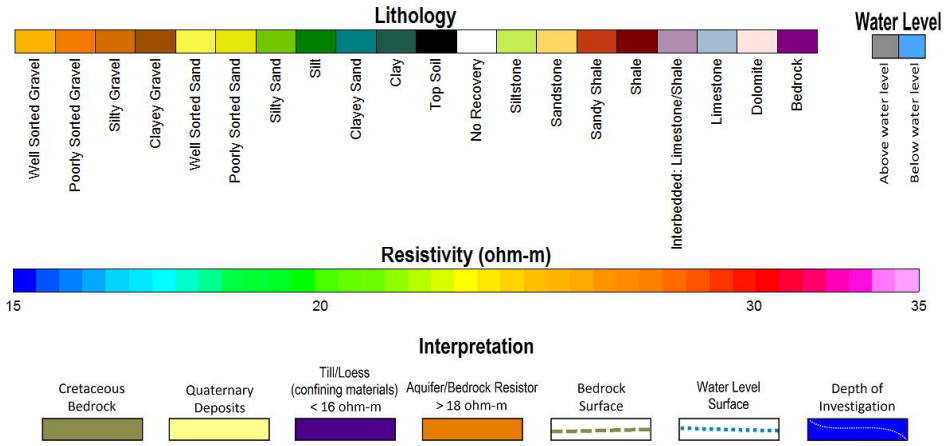

Line L506601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-047916
14925000
14930000
14935000
Easting (ft)

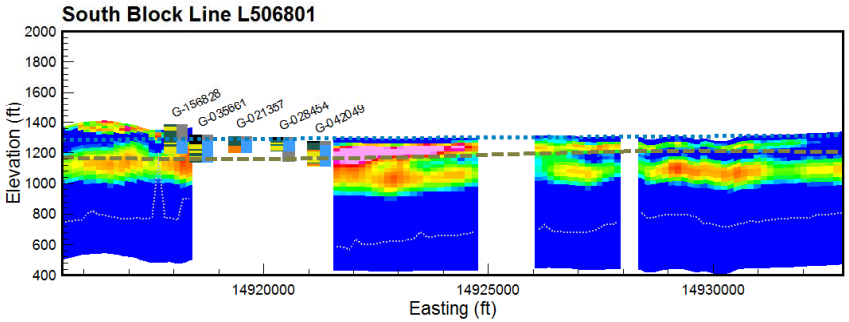

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

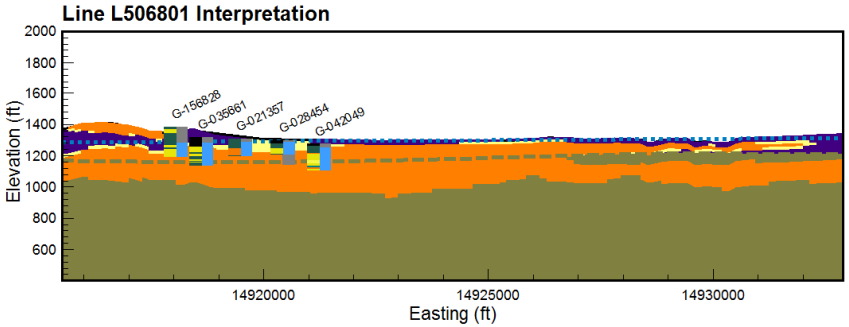

South Block Line L506701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-156828
G-065496
14920000
14925000
14930000
14935000
Easting (ft)

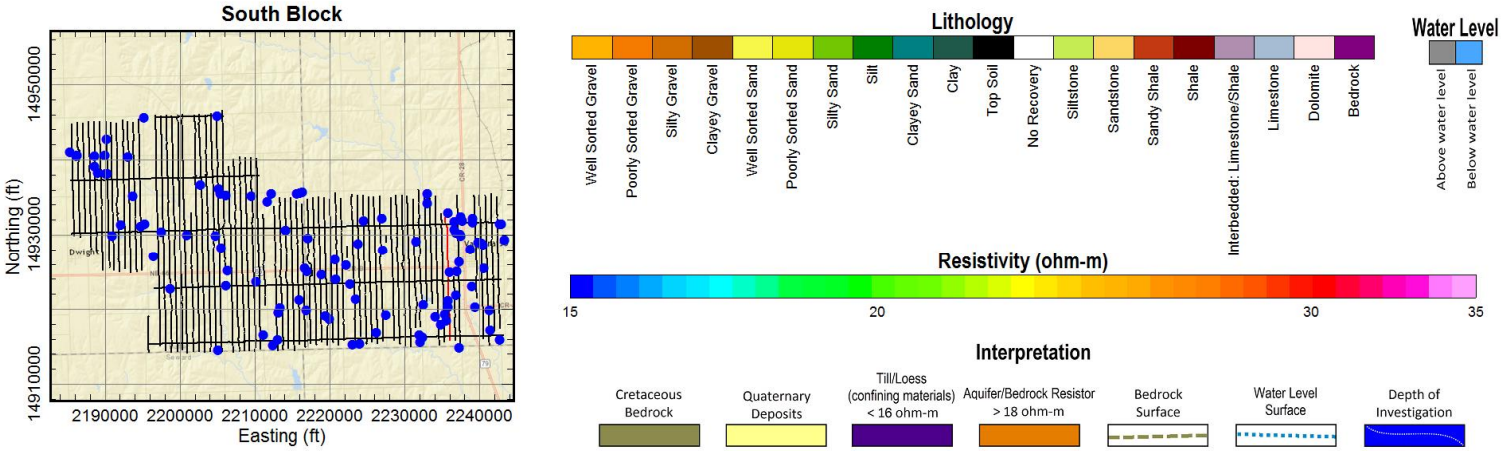

Line L506701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-156828
G-065496
14920000
14925000
14930000
14935000
Easting (ft)

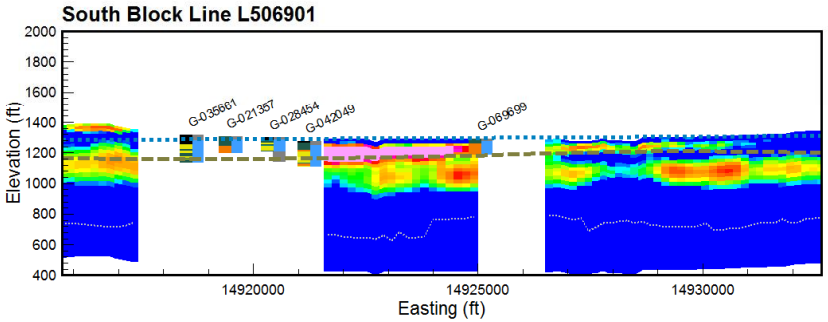

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

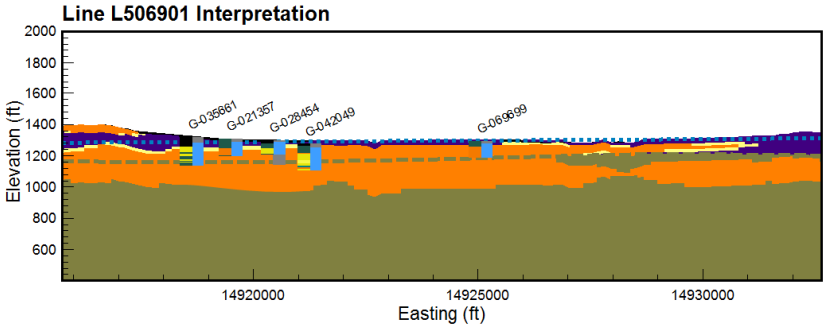

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

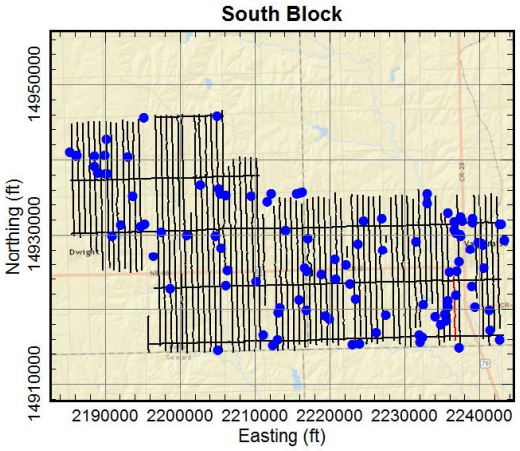

South Block Line L506801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-156828
G-035661
G-021357
G-028454
G-042049
14920000
14925000
14930000
Easting (ft)

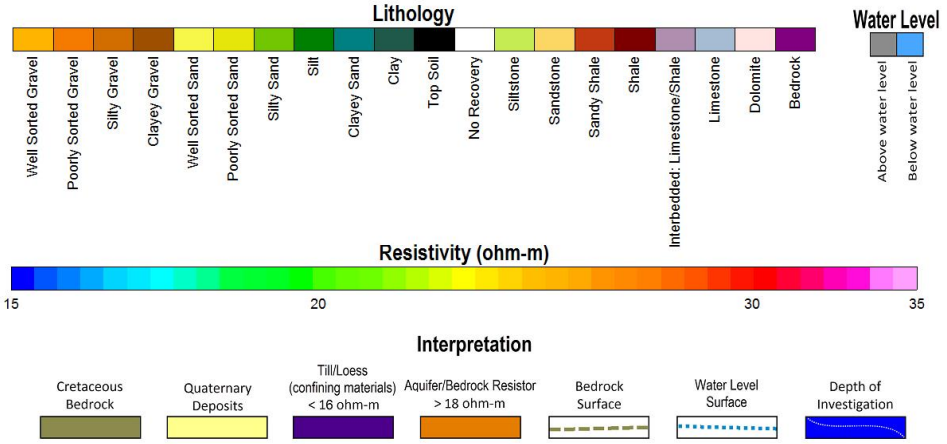

Line L506801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-156828
G-035661
G-021357
G-028454
G-042049
14920000
14925000
14930000
Easting (ft)

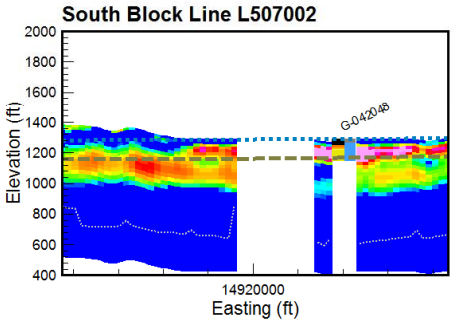

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

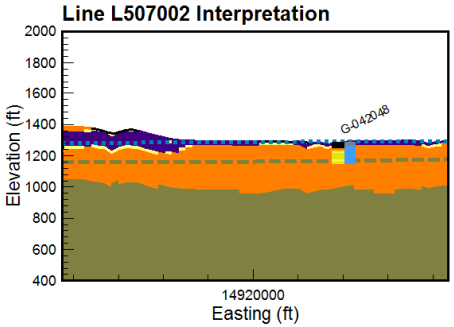

South Block Line L506901
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-035661
G-021357
G-028454
G-042049
G-069699
14920000
14925000
14930000
Easting (ft)

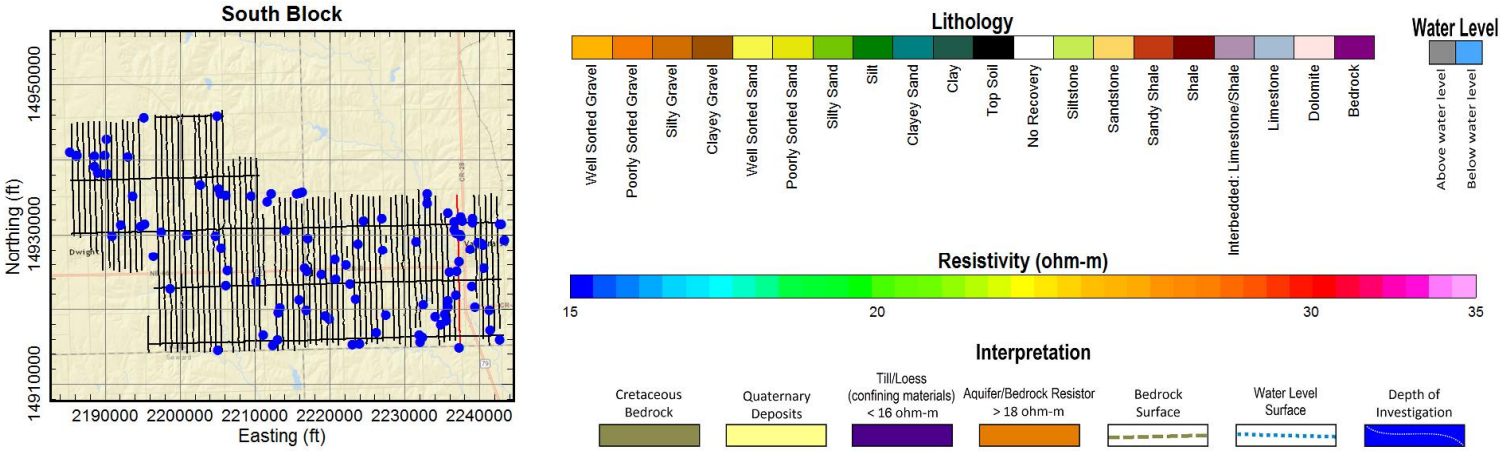

Line L506901 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
G-035661
G-021357
G-028454
G-042049
G-069699
14920000
14925000
14930000
Easting (ft)

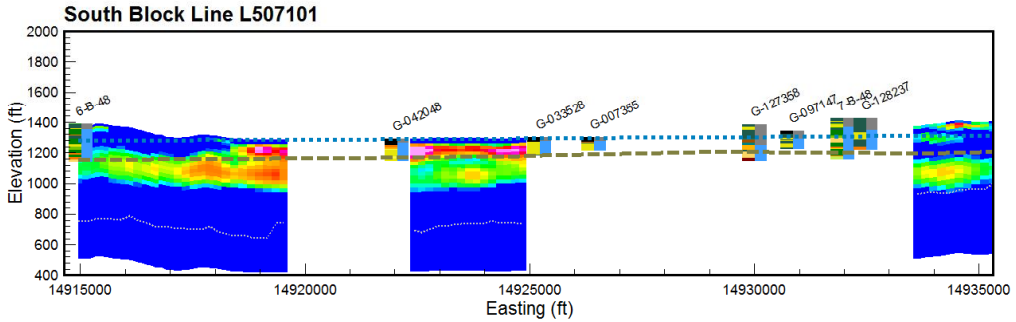

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

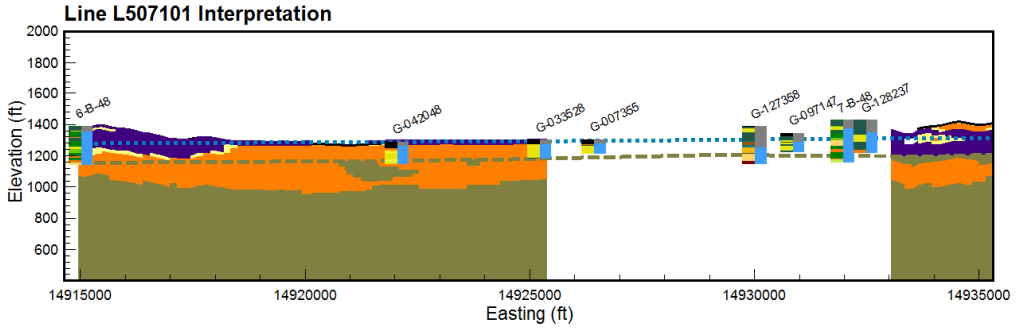

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

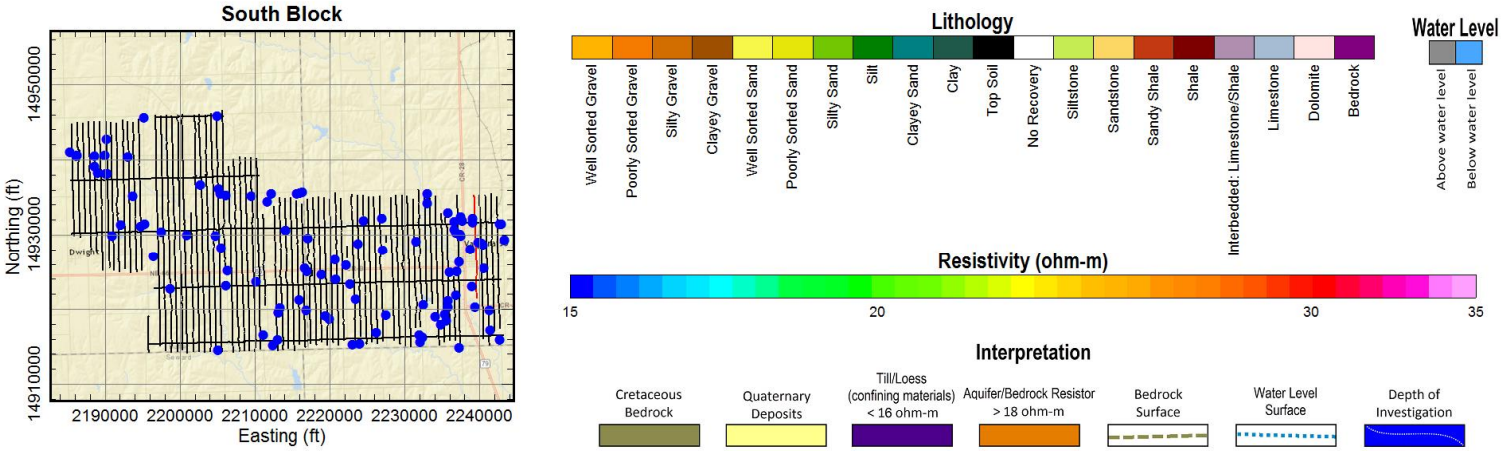

South Block Line L507002
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-042048
14920000
Easting (ft)

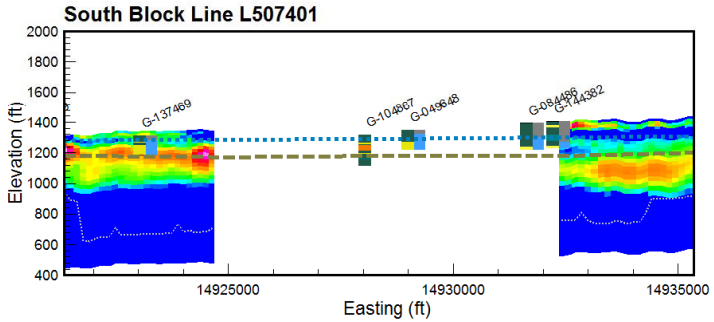

Line L507002 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-042048
14920000
Easting (ft)

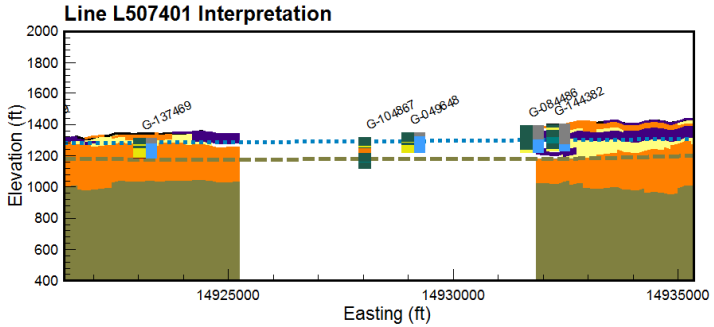

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

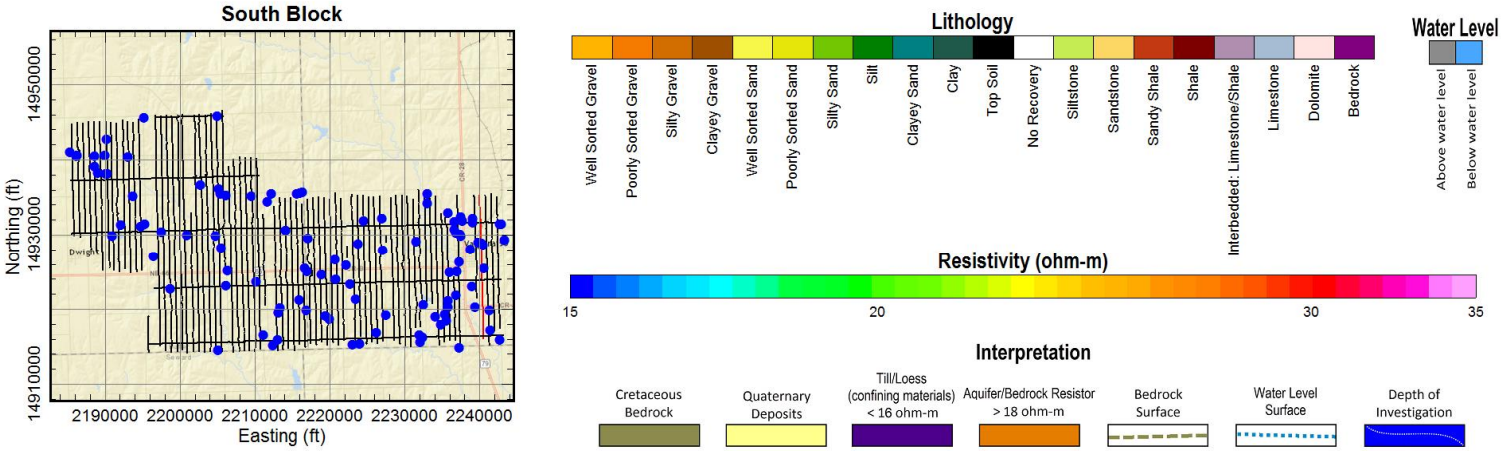

South Block Line L507101
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
6-B-48
G-0420048
G-0335528
G-007355
G-127358
G-0971471
7-B-48
G-1282237
14915000
14920000
14925000
14930000
14935000
Easting (ft)

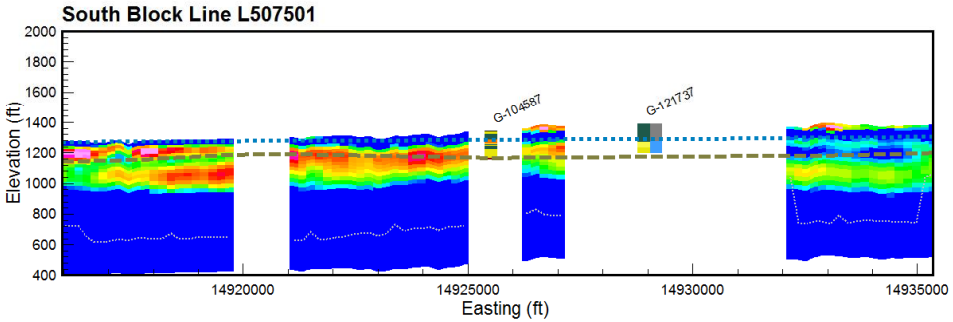

Line L507101 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
6-B-48
G-0420048
G-0335528
G-007355
G-127358
G-0971471
7-B-48
G-1282237
14915000
14920000
14925000
14930000
14935000
Easting (ft)

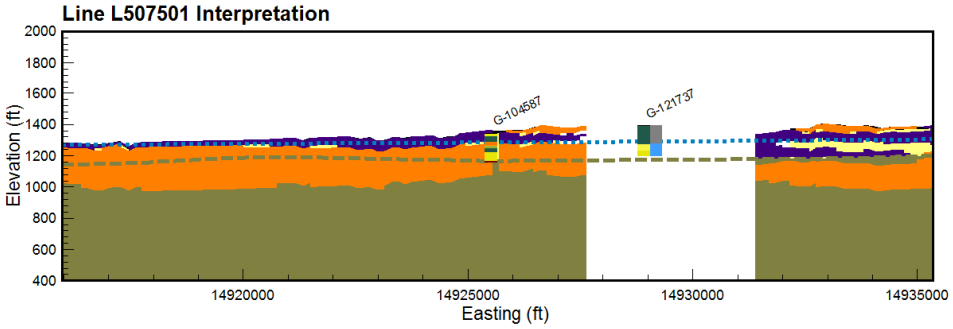

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

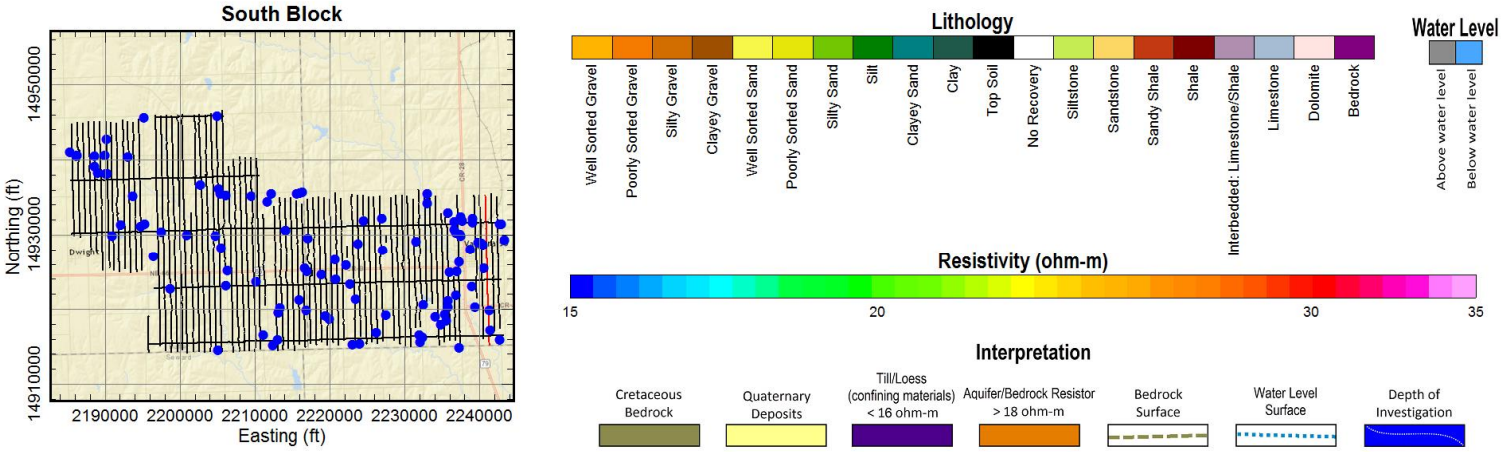

South Block Line L507401
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-137469
G-104867
G-049648
G-084486
G-144382
14925000
14930000
14935000
Easting (ft)

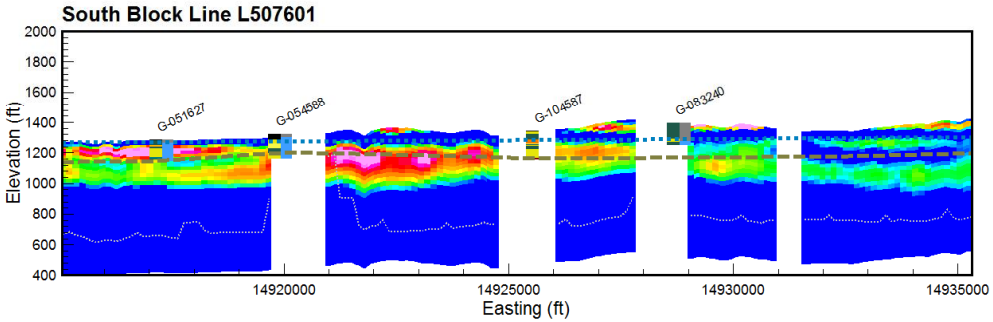

Line L507401 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-137469
G-104867
G-049648
G-084486
G-144382
14925000
14930000
14935000
Easting (ft)

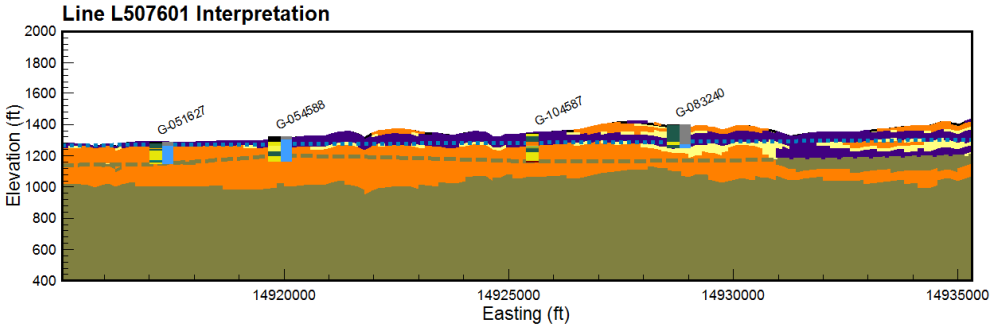

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

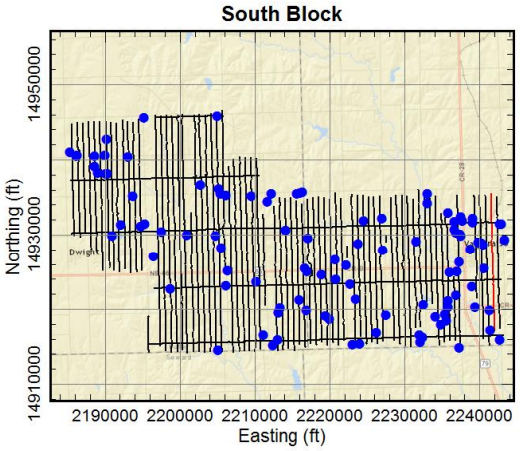

South Block Line L507501
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-104587
G-121737
14920000
14925000
14930000
14935000
Easting (ft)

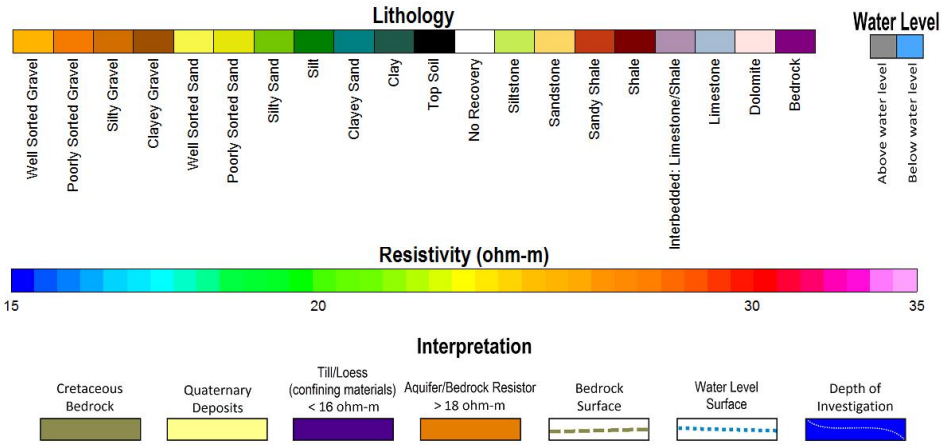

Line L507501 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-104587
G-121737
14920000
14925000
14930000
14935000
Easting (ft)

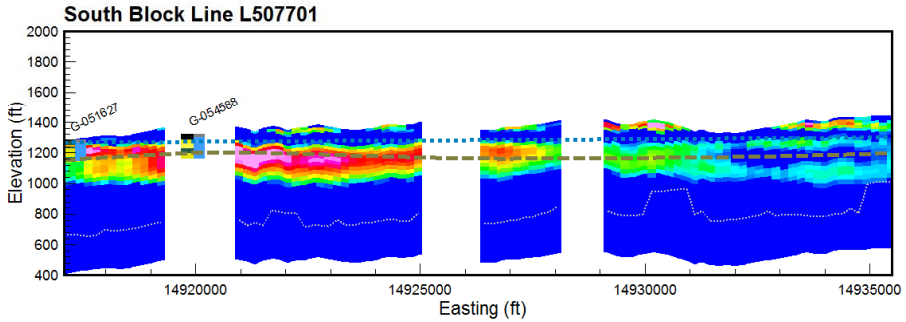

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

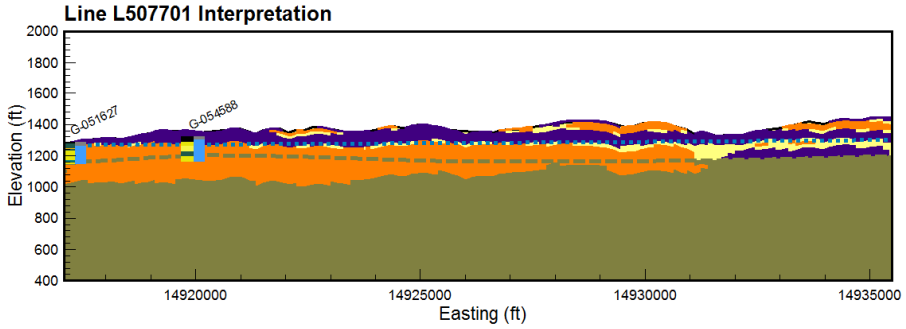

South Block Line L507601
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-051627
G-054588
G-104587
G-083240
14920000
14925000
14930000
14935000
Easting (ft)

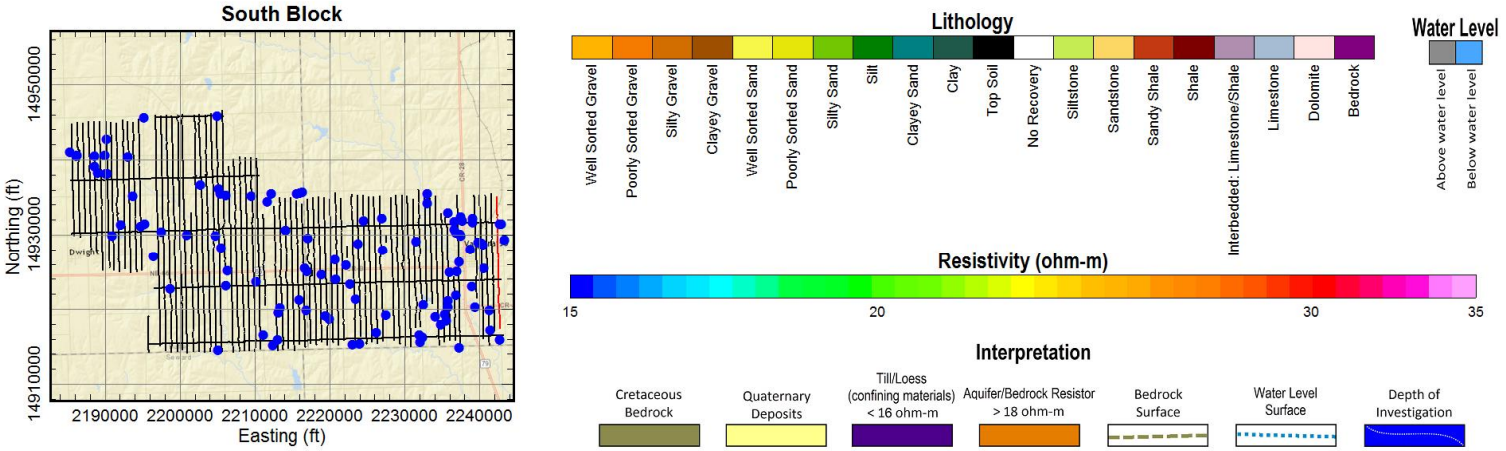

Line L507601 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-051627
G-054588
G-104587
G-083240
14920000
14925000
14930000
14935000
Easting (ft)

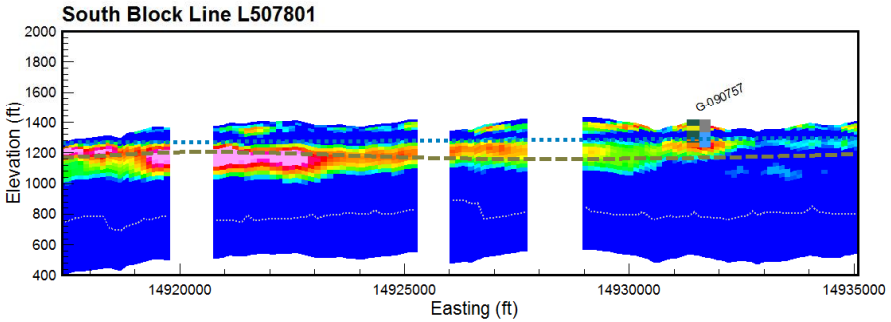

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

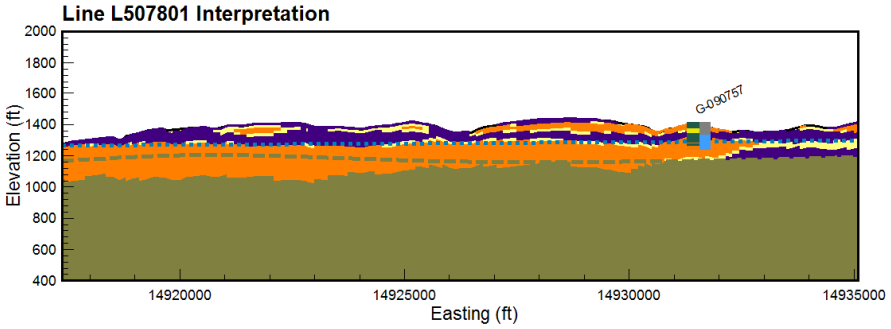

Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation


South Block Line L507701
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-051627
G-054588
14920000
14925000
14930000
14935000
Easting (ft)

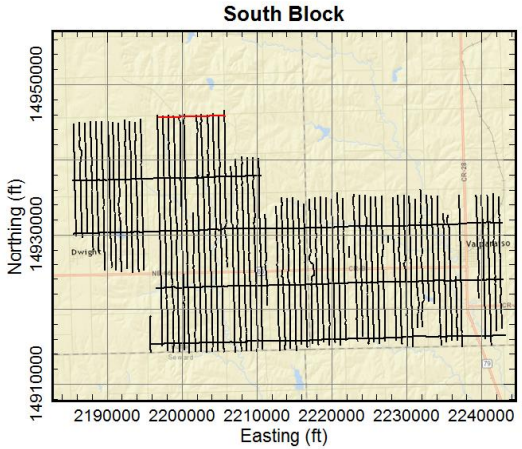

Line L507701 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-051627
G-054588
14920000
14925000
14930000
14935000
Easting (ft)

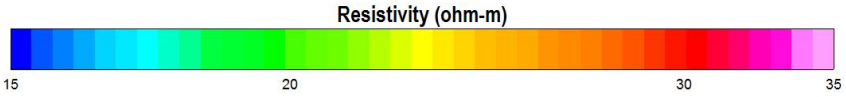

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 16 ohm-m
Aquifer/Bedrock Resistor > 18 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

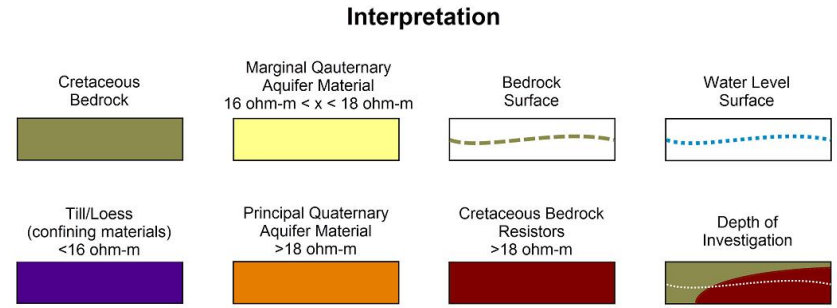

South Block Line L507801
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-090757
14920000
14925000
14930000
14935000
Easting (ft)

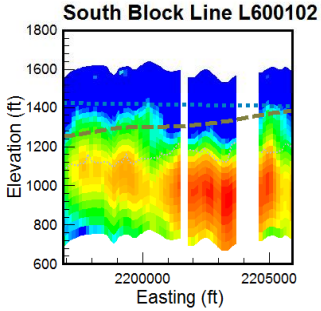

Line L507801 Interpretation
Elevation (ft)
2000
1800
1600
1400
1200
1000
800
600
400
G-090757
14920000
14925000
14930000
14935000
Easting (ft)

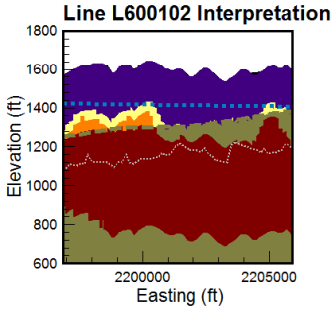
South Flight Block Profiles
Bedrock Interpretations

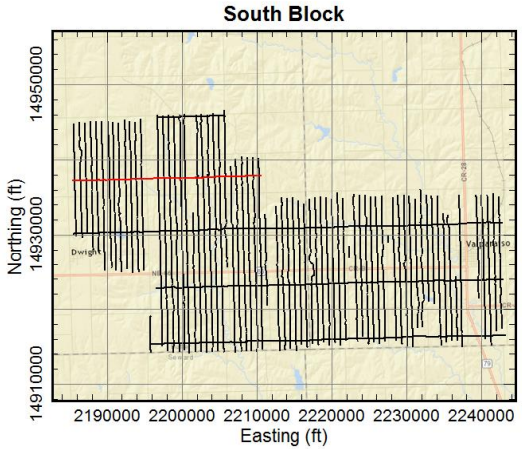

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

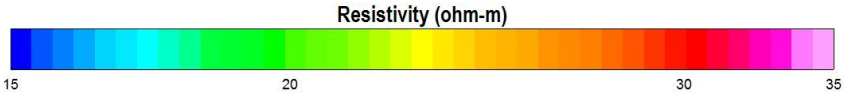

Resistivity (ohm-m)
15
20
30
35

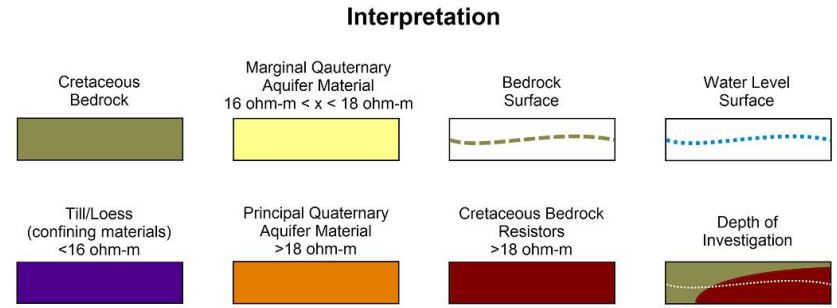

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

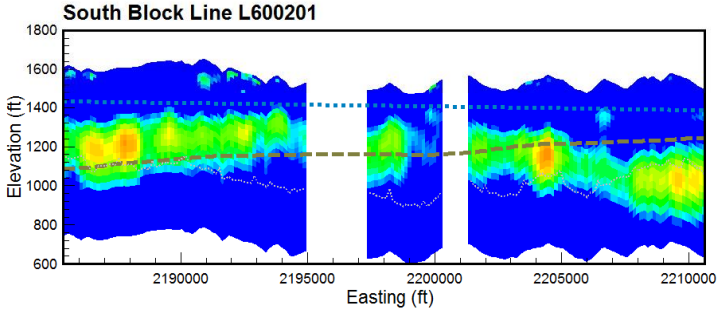

South Block Line L600102
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2200000
2205000
Easting (ft)

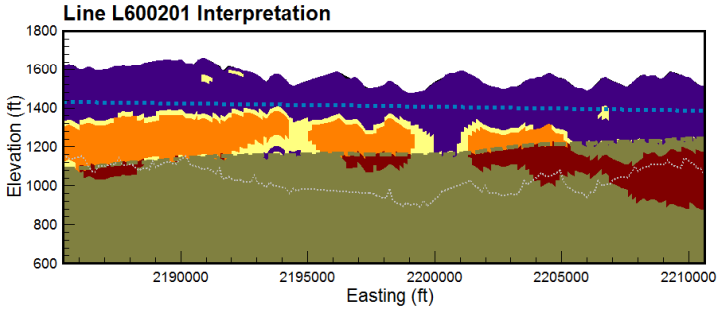

Line L600102 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2200000
2205000
Easting (ft)

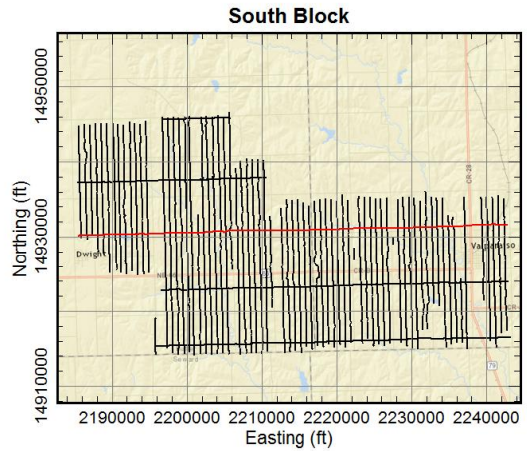

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

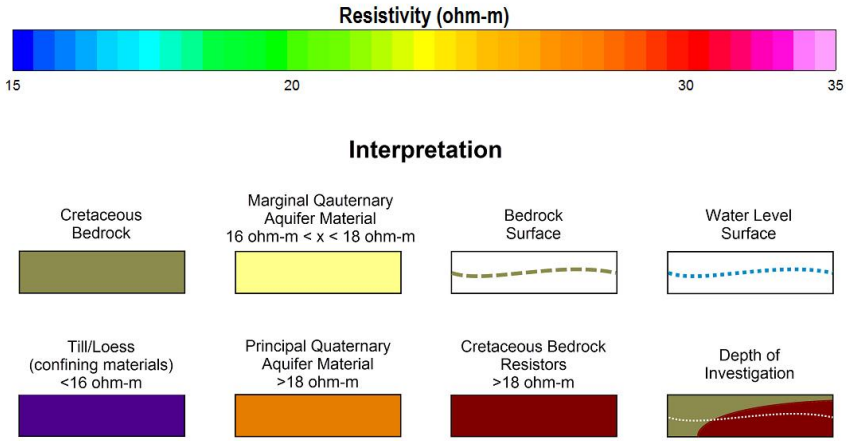

Resistivity (ohm-m)
15
20
30
35

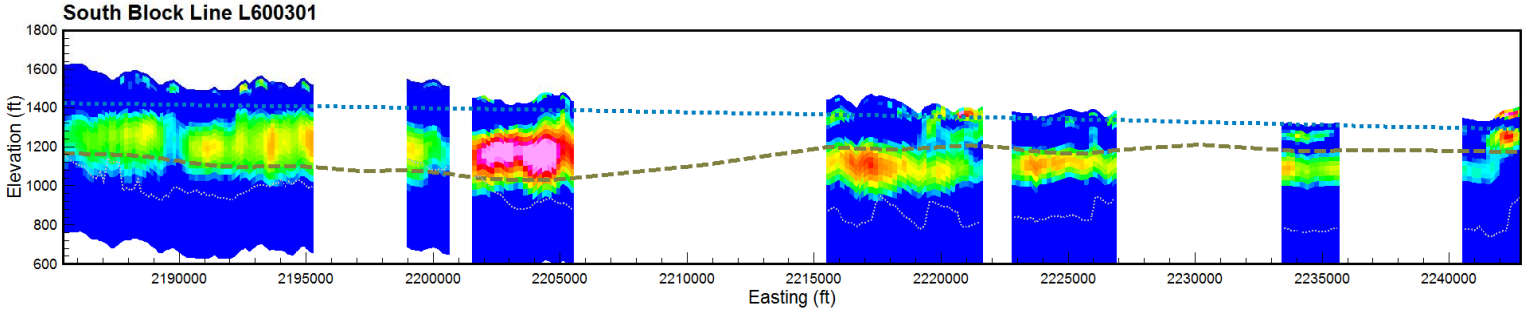

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

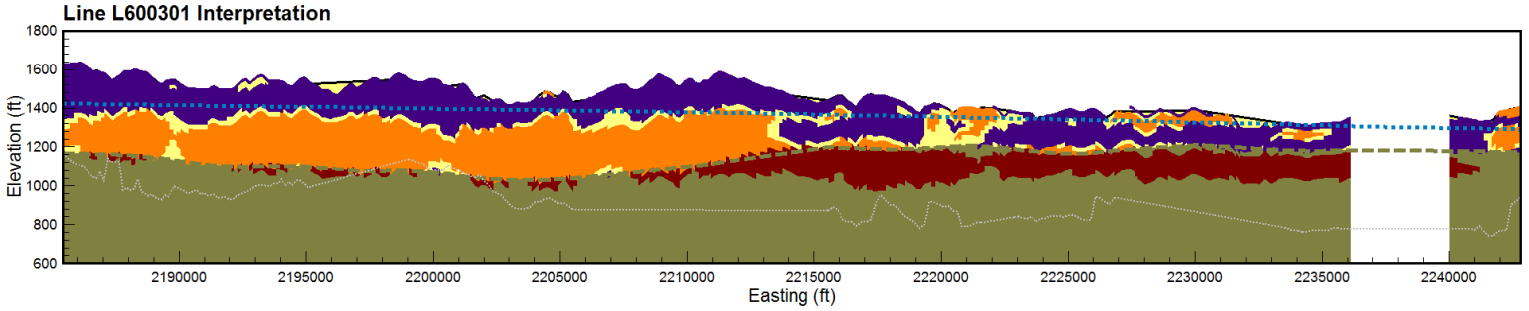

South Block Line L600201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2190000 2195000 2200000 2205000 2210000
Easting (ft)

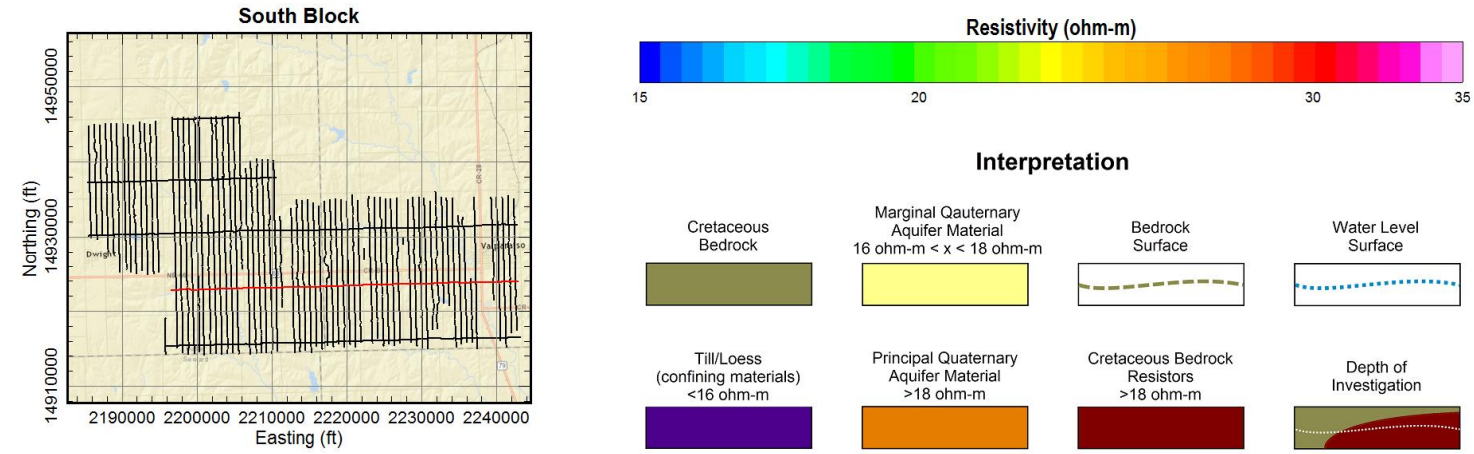

Line L600201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2190000 2195000 2200000 2205000 2210000
Easting (ft)

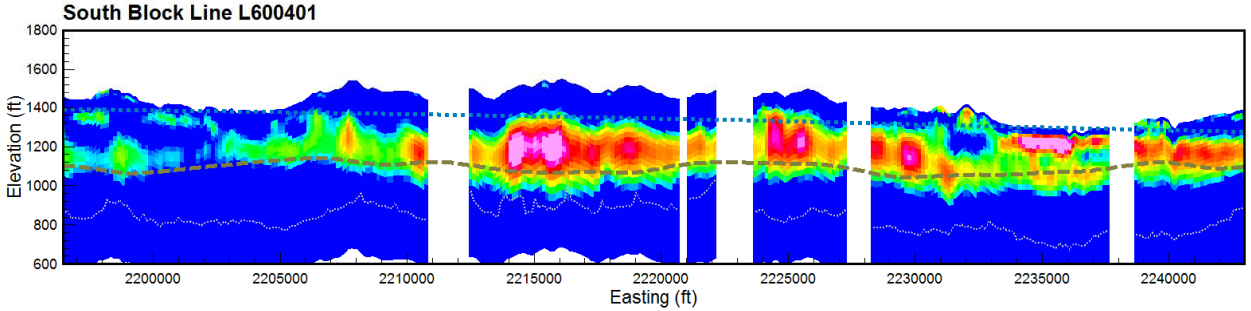

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

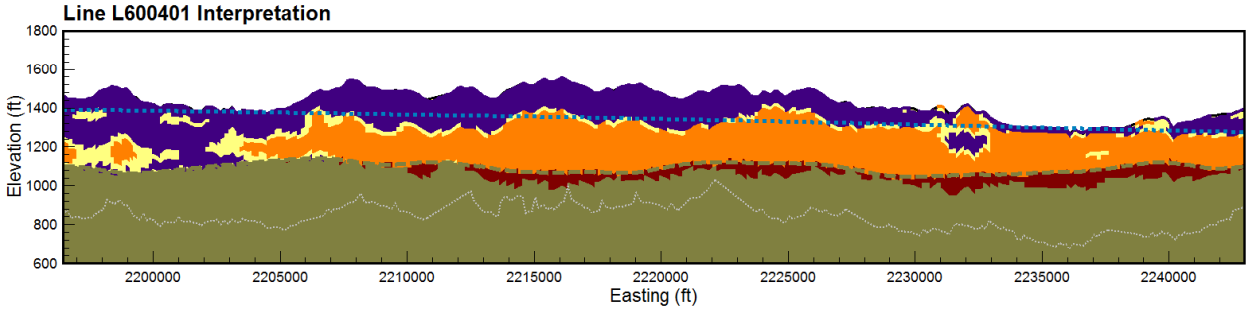

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

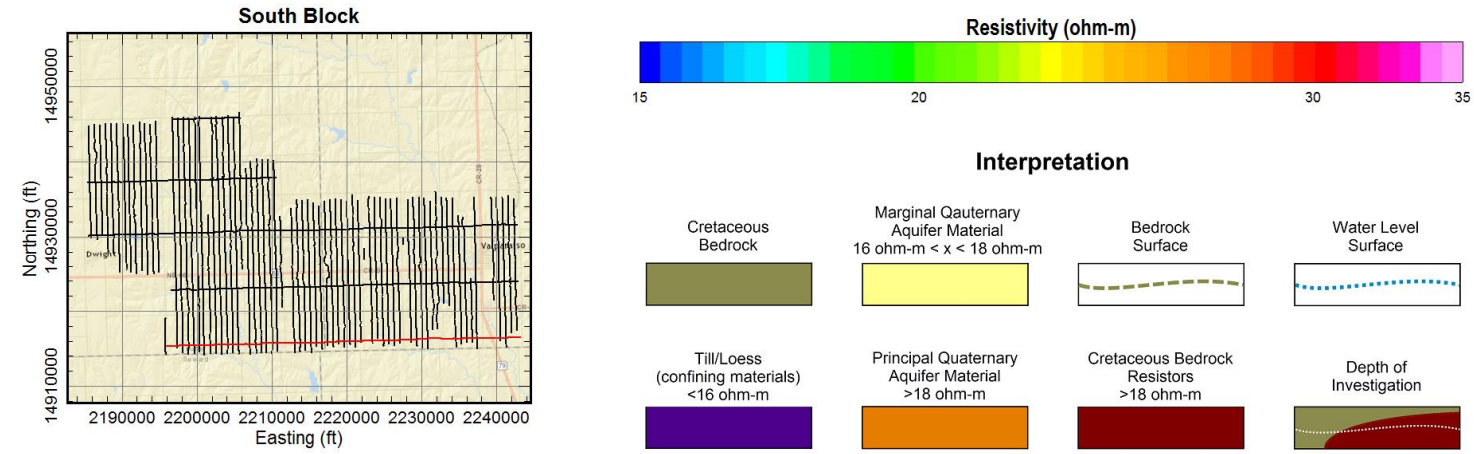

South Block Line L600301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2190000 2195000 2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

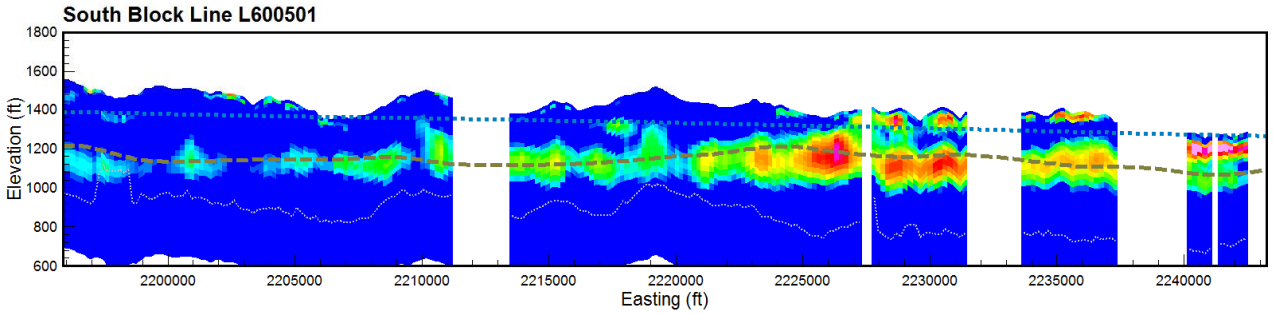

Line L600301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2190000 2195000 2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

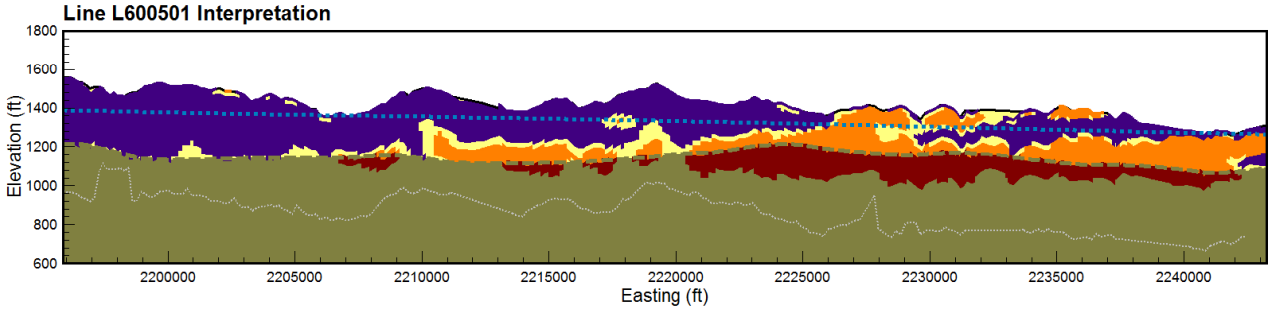

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

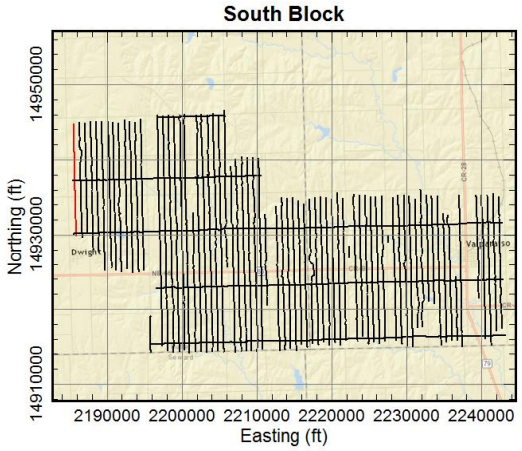

South Block Line L600401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

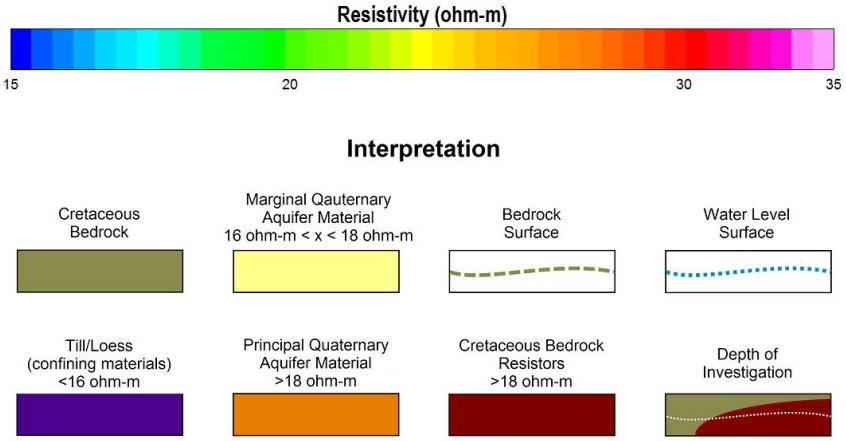

Line L600401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

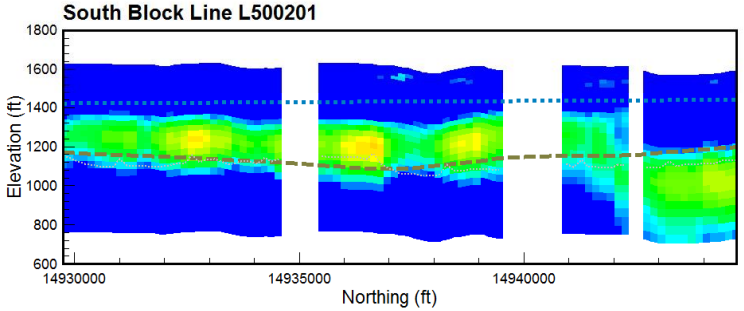

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

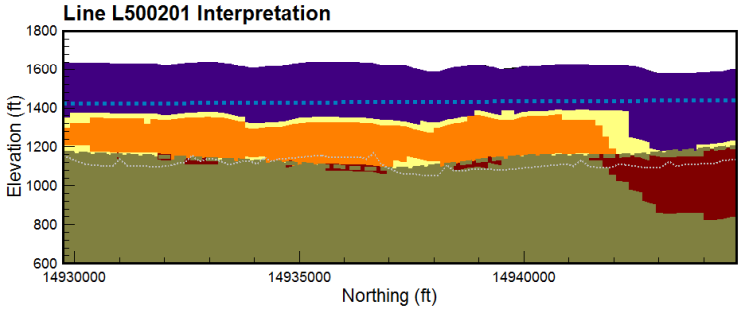

South Block Line L600501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

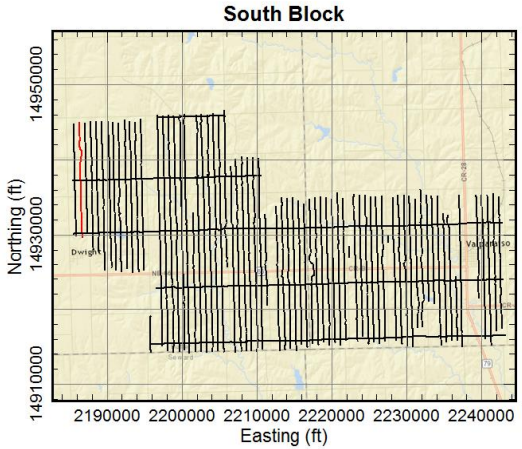

Line L600501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
2200000 2205000 2210000 2215000 2220000 2225000 2230000 2235000 2240000
Easting (ft)

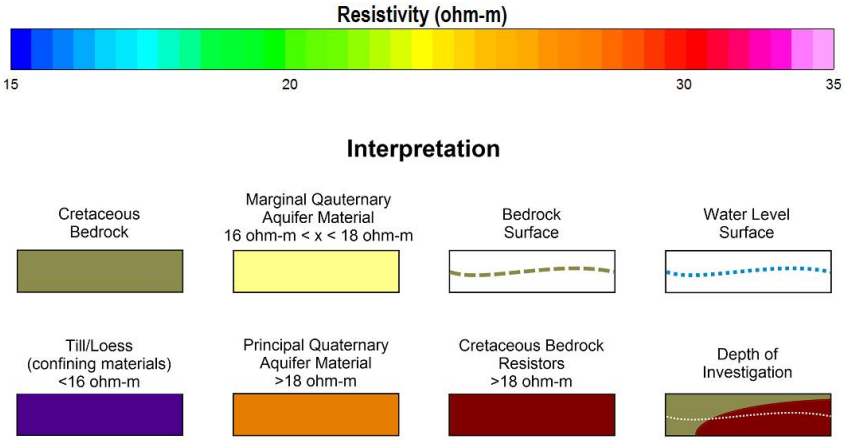

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

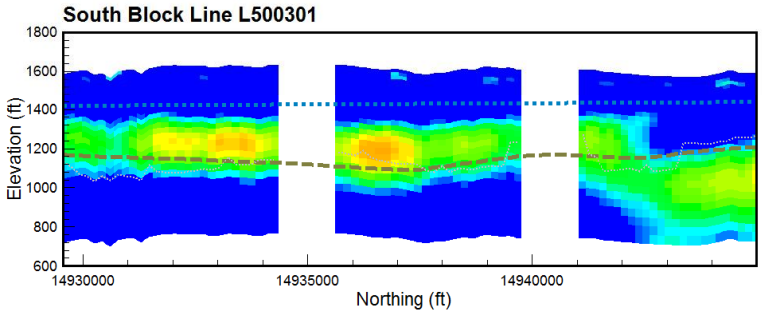

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

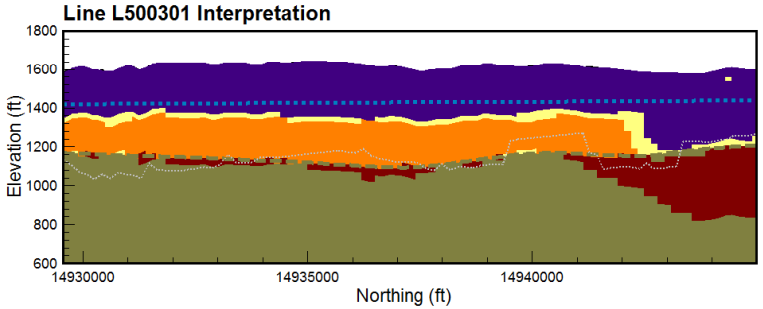

South Block Line L500201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
Northing (ft)

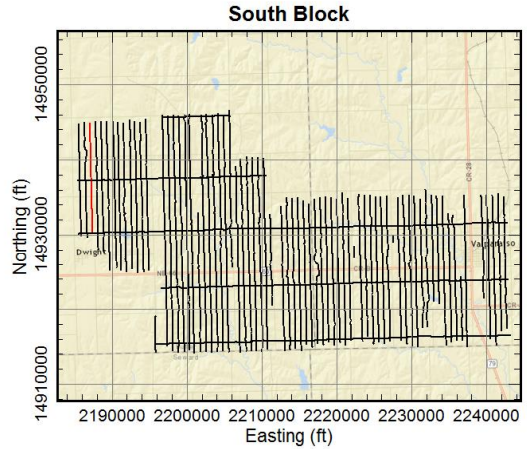

Line L500201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
Northing (ft)

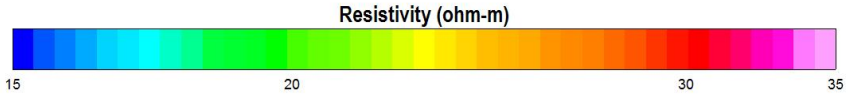

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

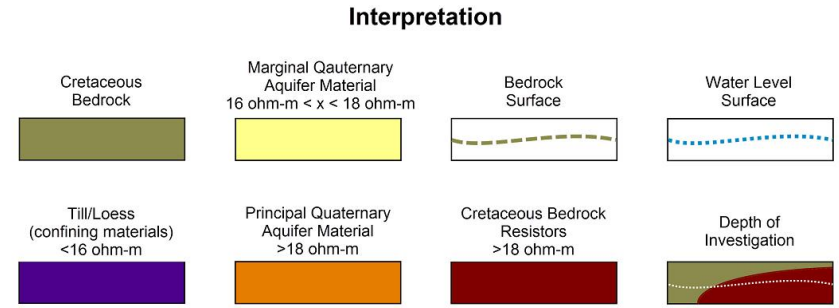

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

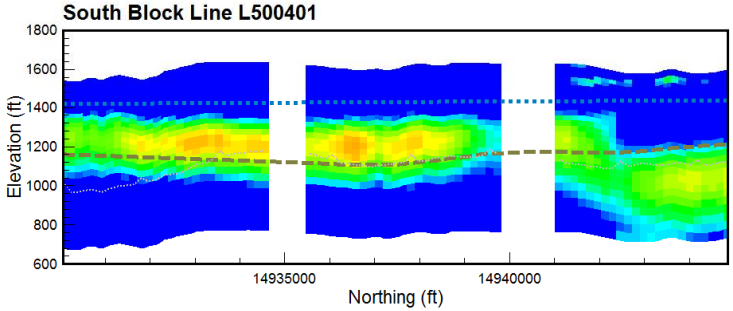

South Block Line L500301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
Northing (ft)

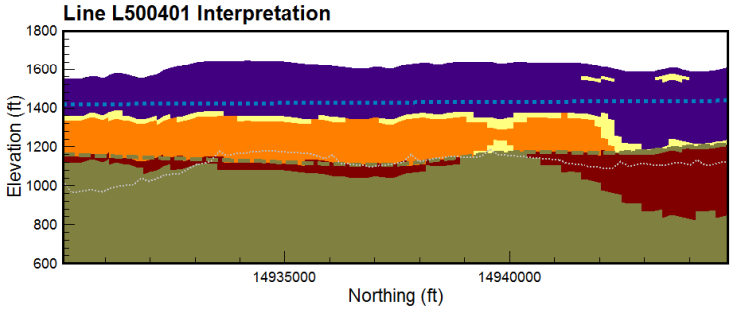

Line L500301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
Northing (ft)

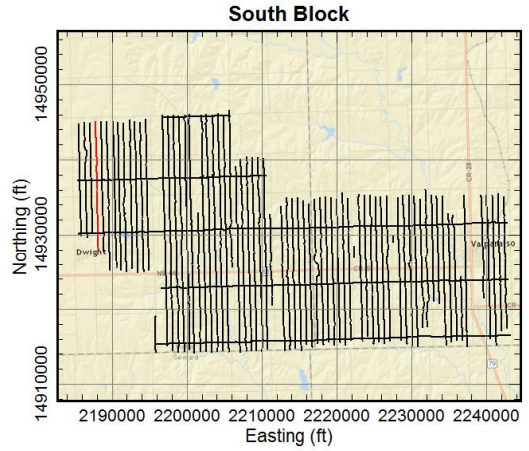

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

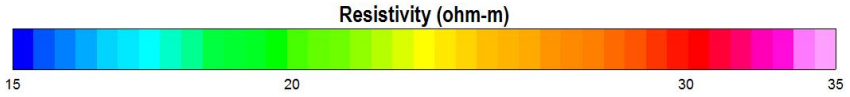

Resistivity (ohm-m)
15
20
30
35

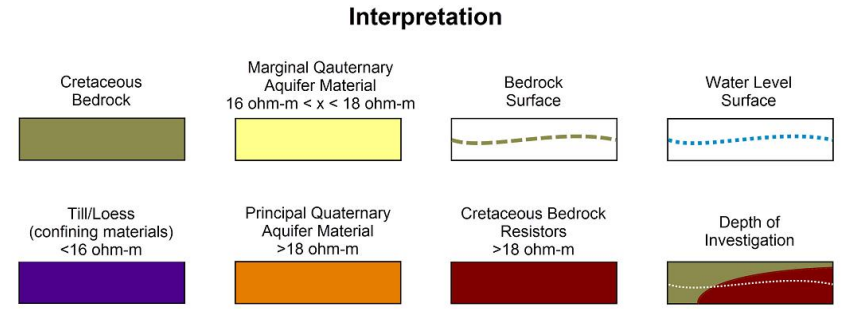

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

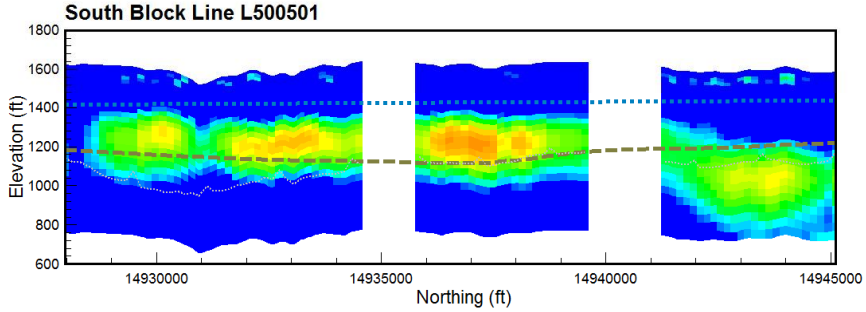

South Block Line L500401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14935000
14940000
Northing (ft)

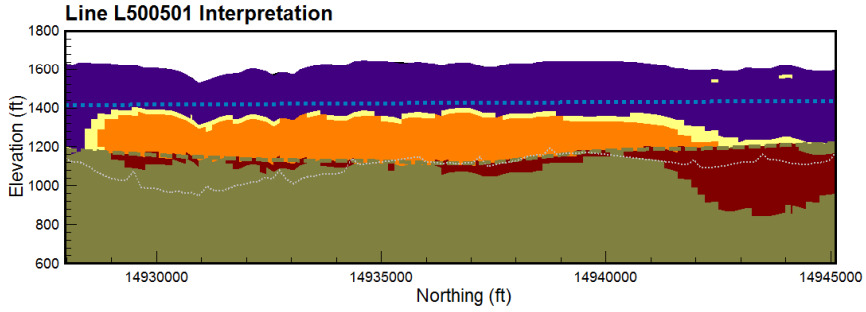

Line L500401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14935000
14940000
Northing (ft)

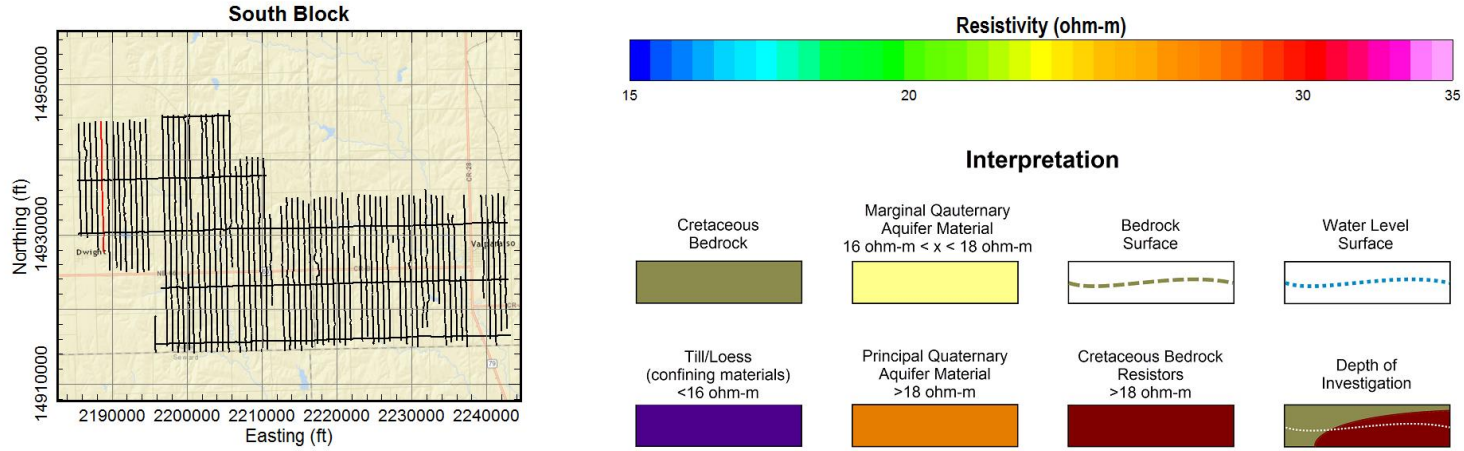

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

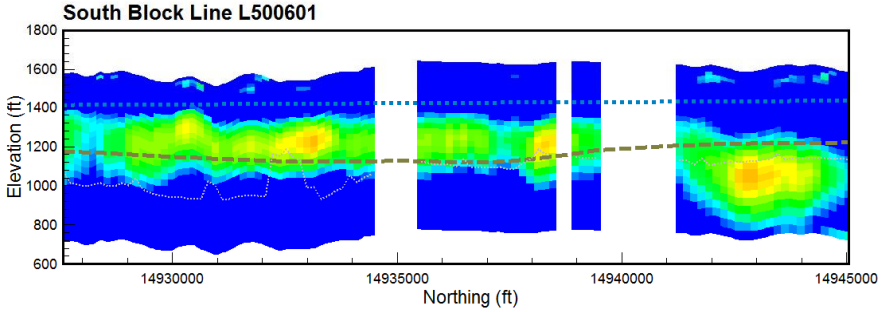

Resistivity (ohm-m)
15
20
30
35

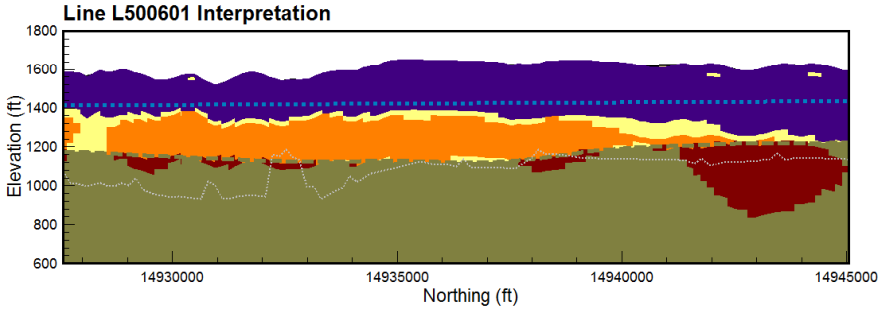

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

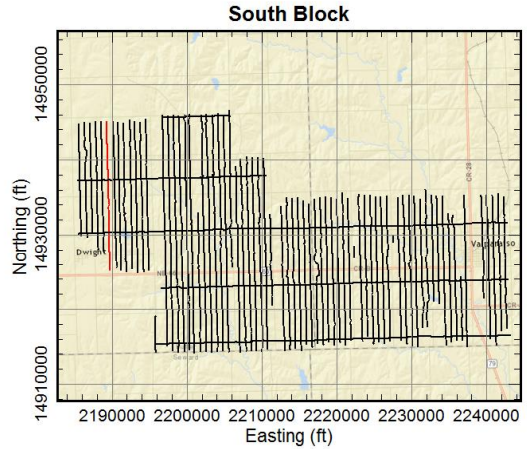

South Block Line L500501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

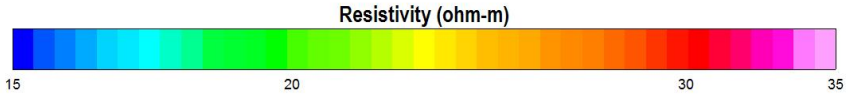

Line L500501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

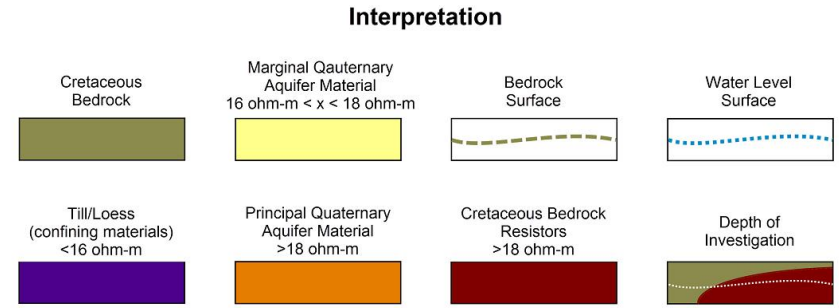

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

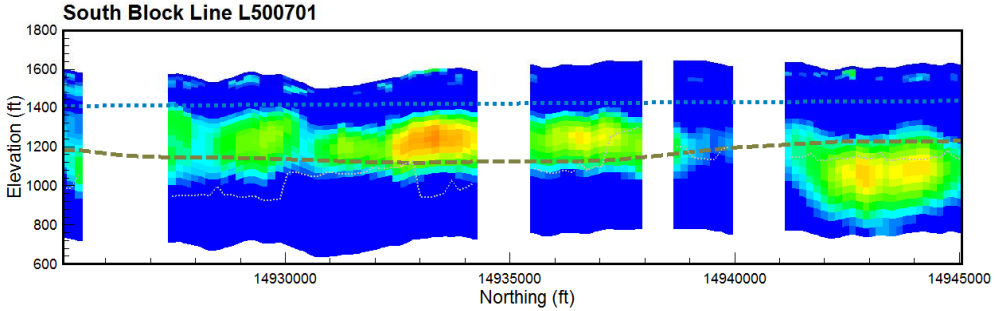

South Block Line L500601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

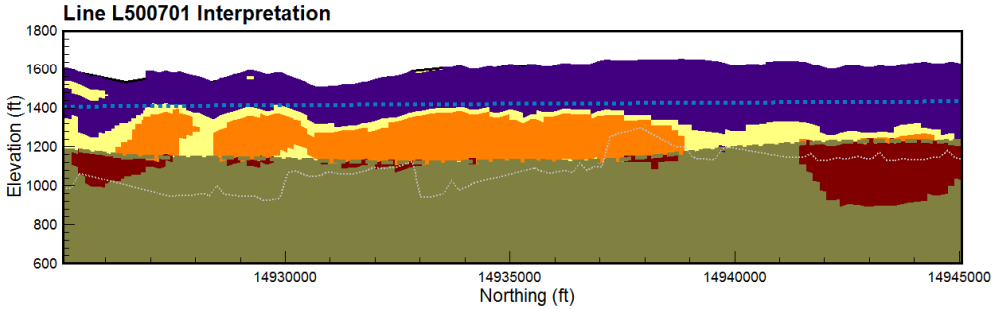

Line L500601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

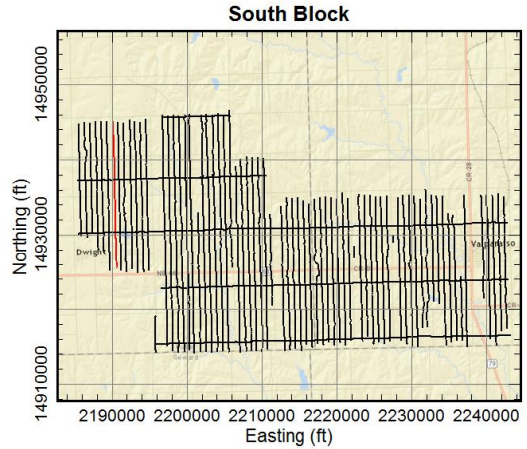

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

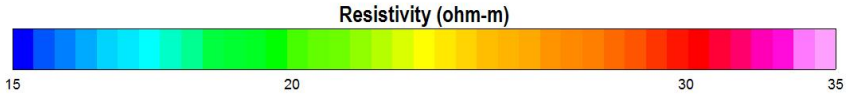

Resistivity (ohm-m)
15
20
30
35

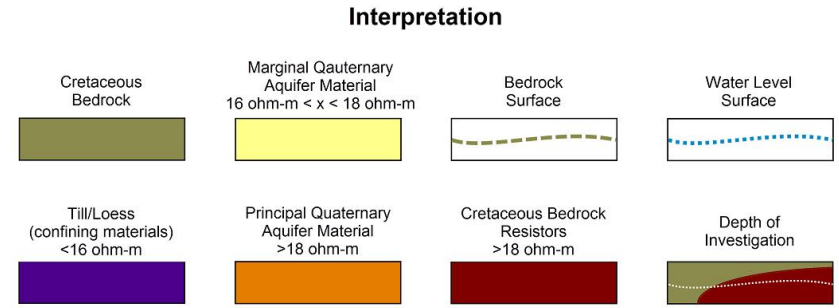

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

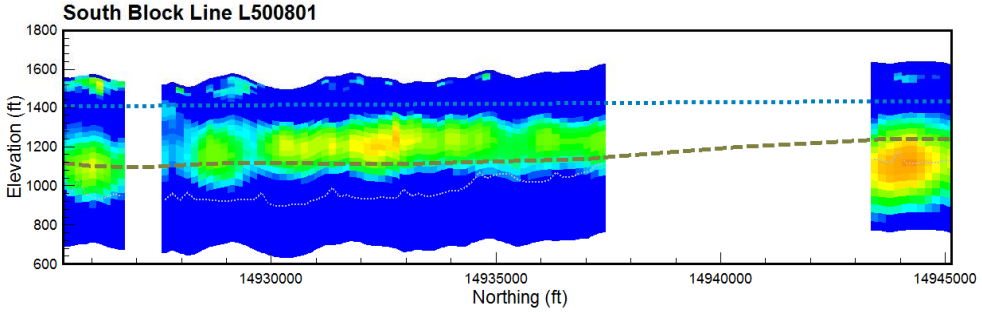

South Block Line L500701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

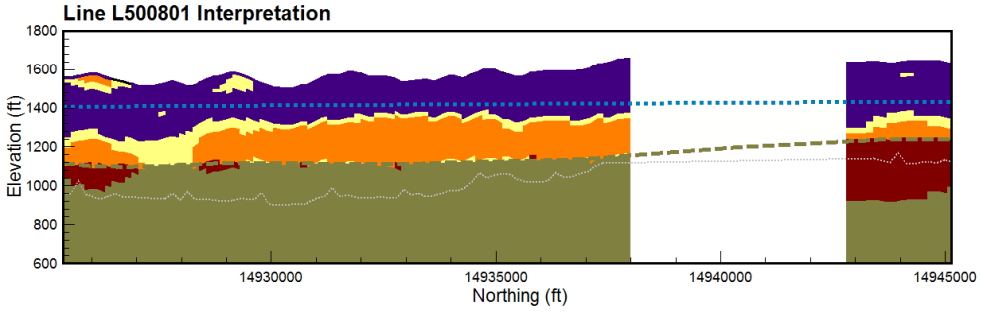

Line L500701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

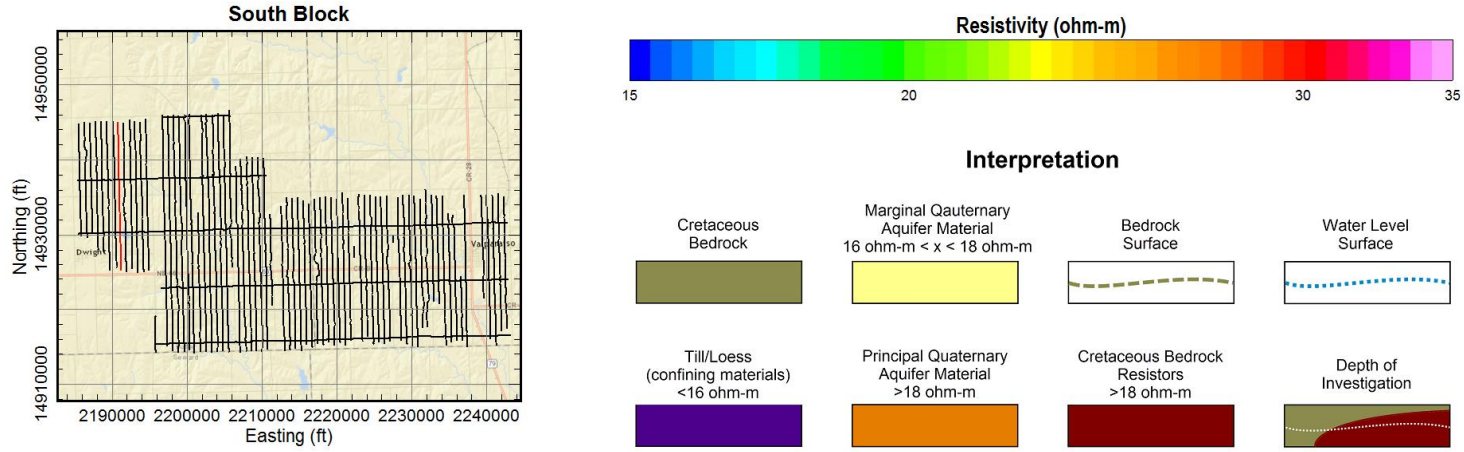

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

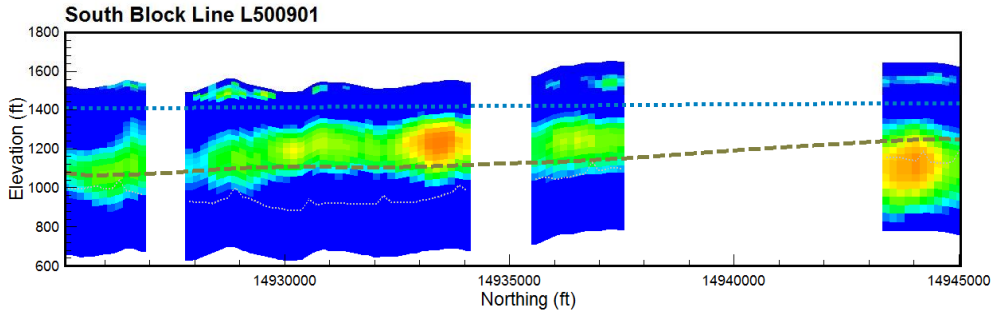

Resistivity (ohm-m)
15
20
30
35

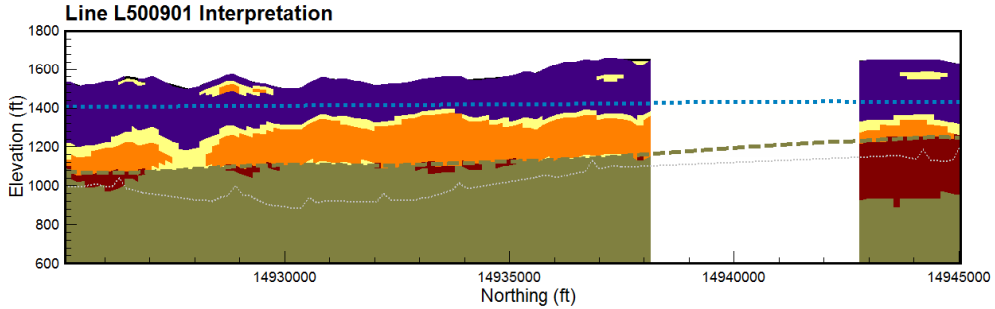

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

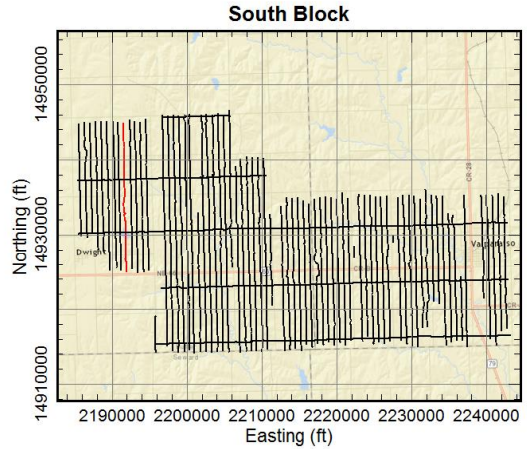

South Block Line L500801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

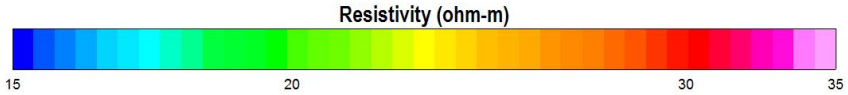

Line L500801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

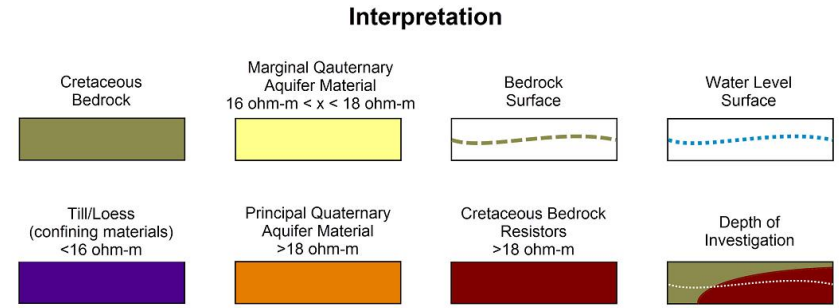

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

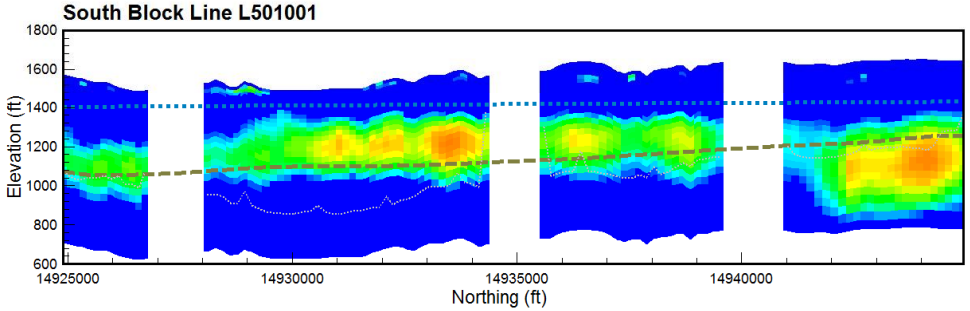

South Block Line L500901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

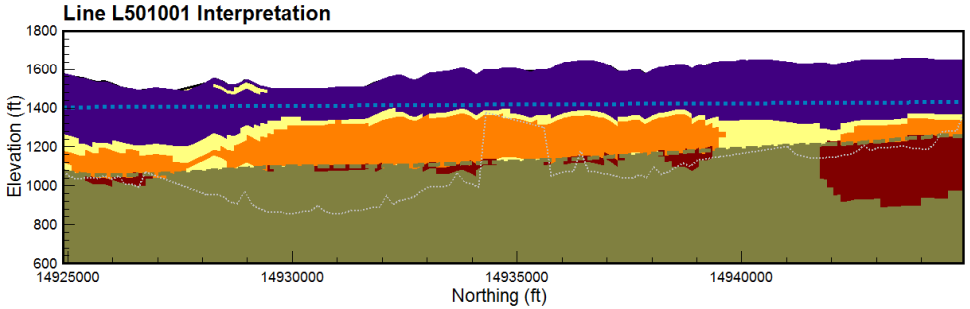

Line L500901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

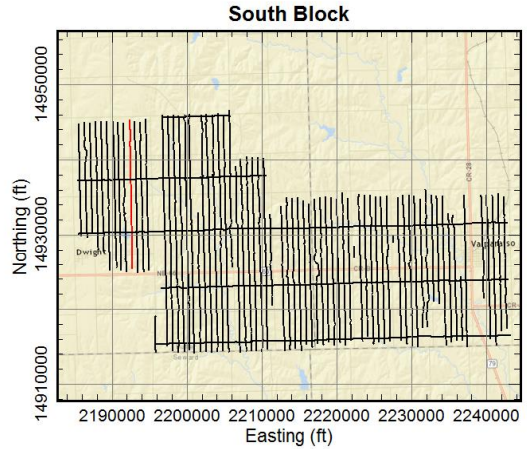

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

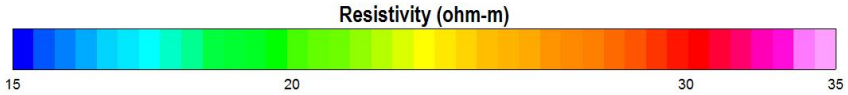

Resistivity (ohm-m)
15
20
30
35

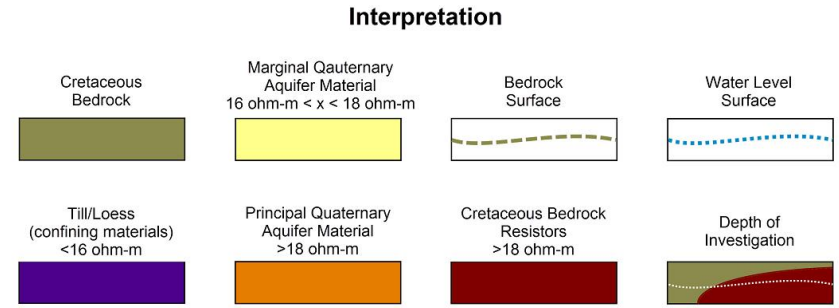

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

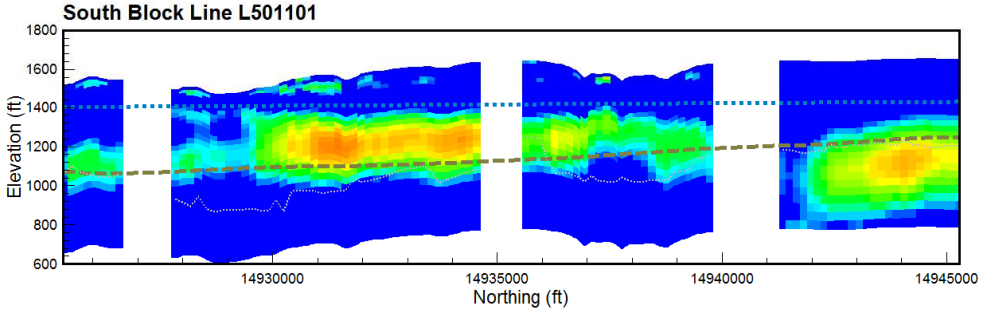

South Block Line L501001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
14940000
Northing (ft)

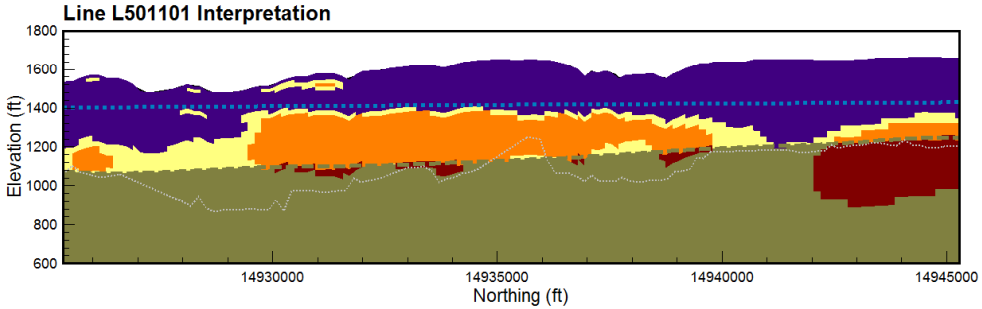

Line L501001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
14940000
Northing (ft)

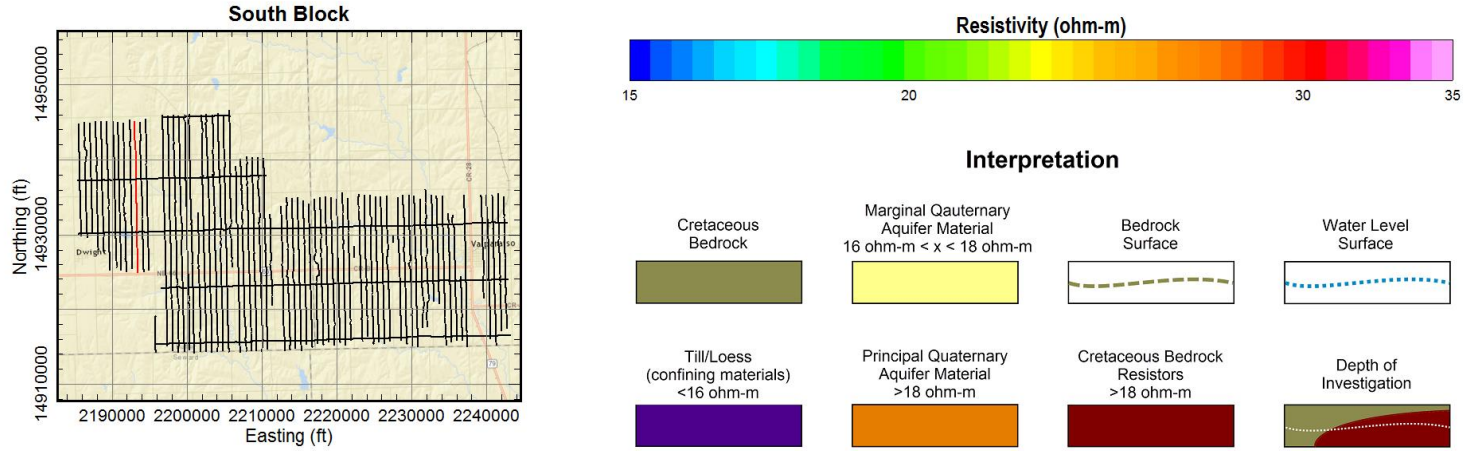

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

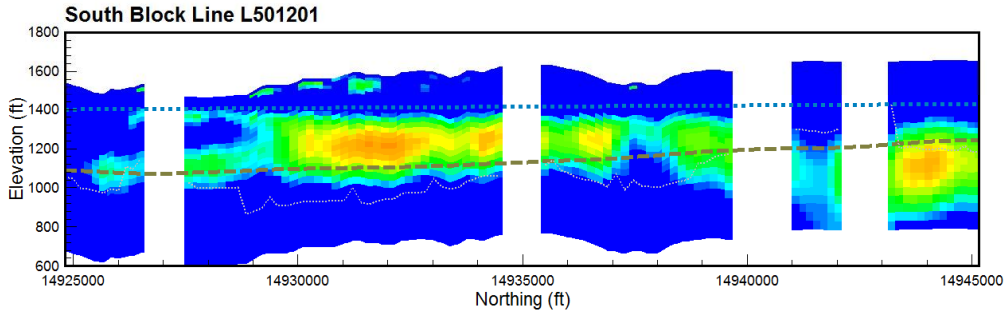

Resistivity (ohm-m)
15
20
30
35

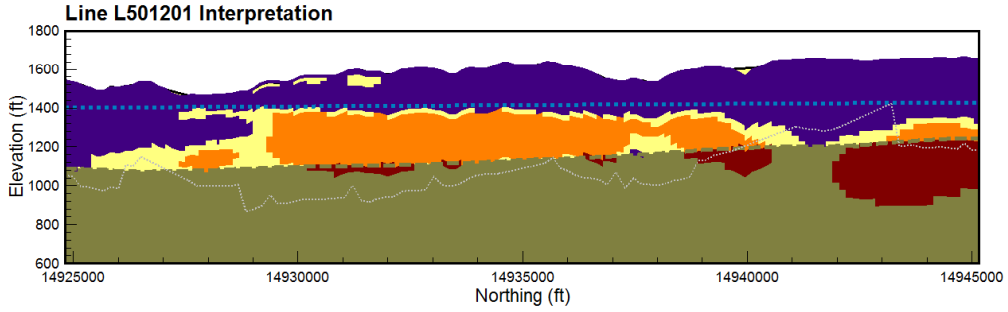

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

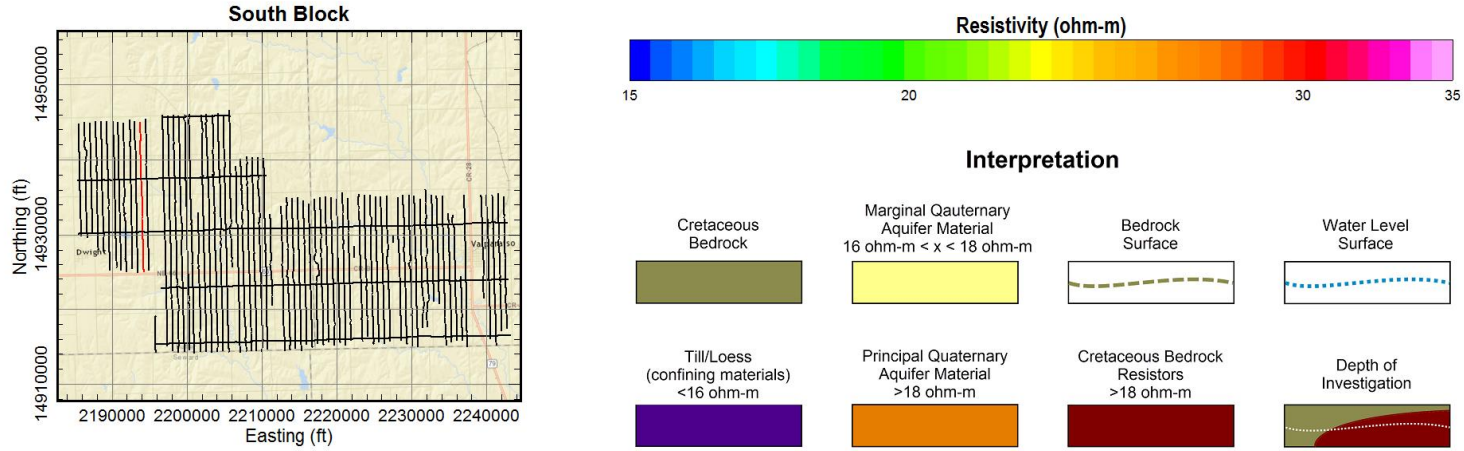

South Block Line L501101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

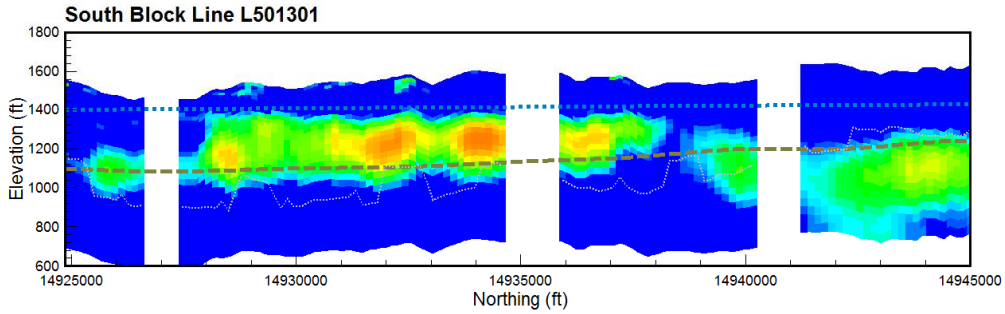

Line L501101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

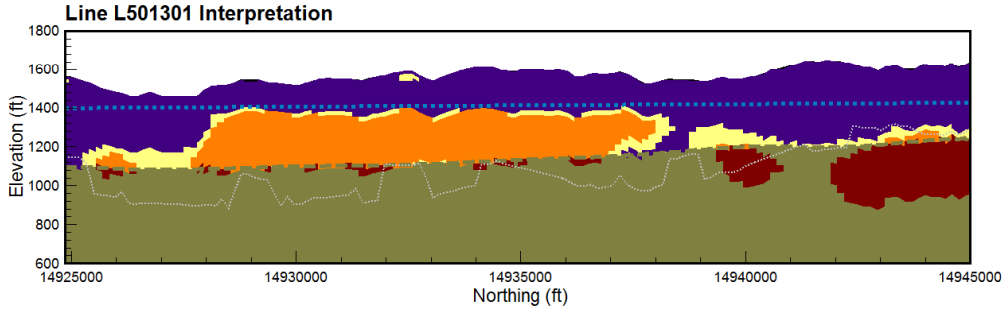

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

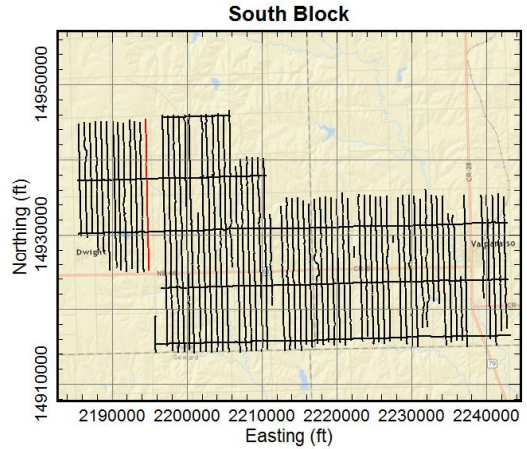

South Block Line L501201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
14940000
14945000
Northing (ft)

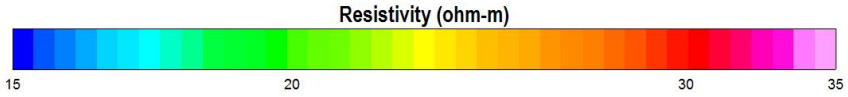

Line L501201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
14940000
14945000
Northing (ft)

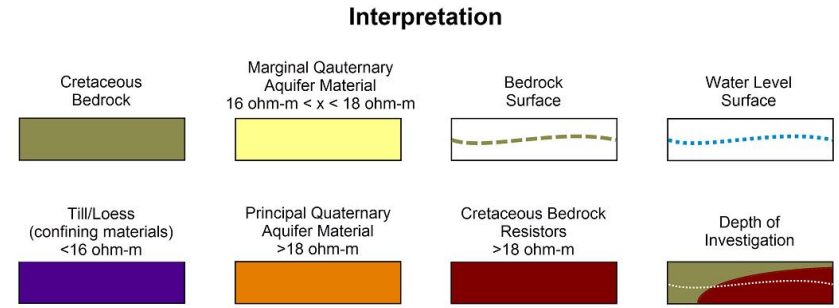

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

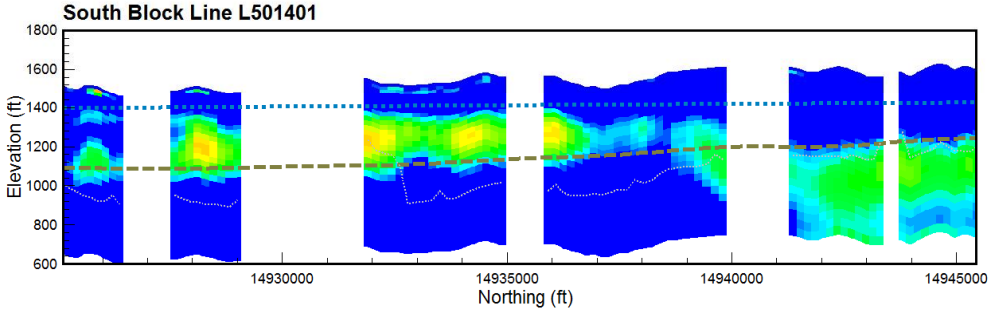

South Block Line L501301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
14940000
14945000
Northing (ft)

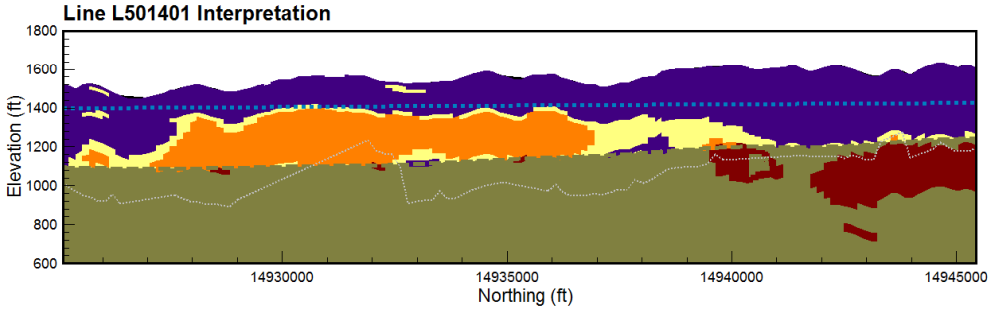

Line L501301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
14940000
14945000
Northing (ft)

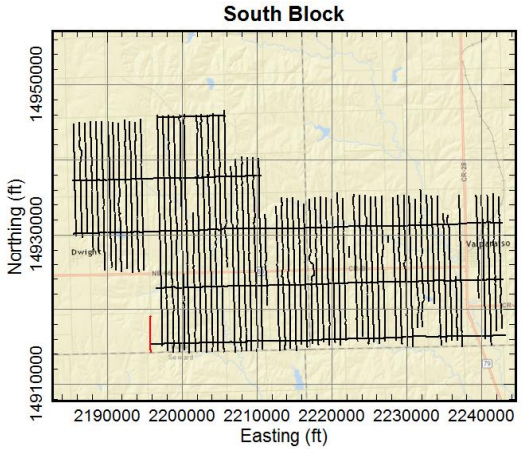

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

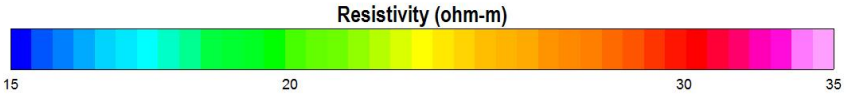

Resistivity (ohm-m)
15
20
30
35

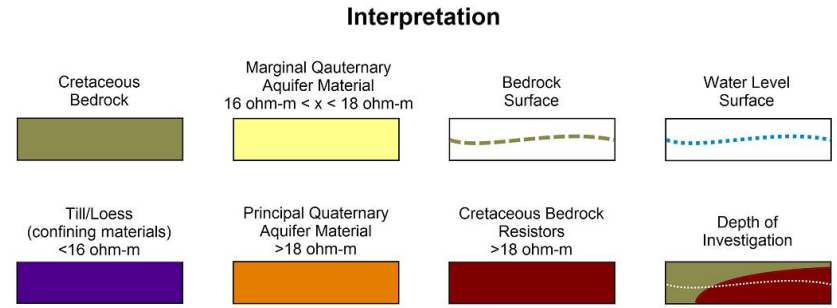

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

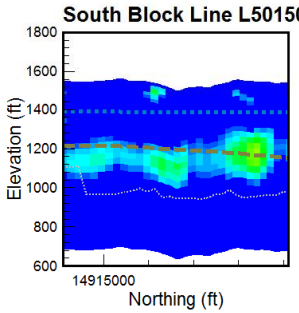

South Block Line L501401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

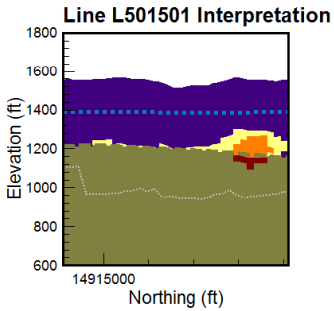

Line L501401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

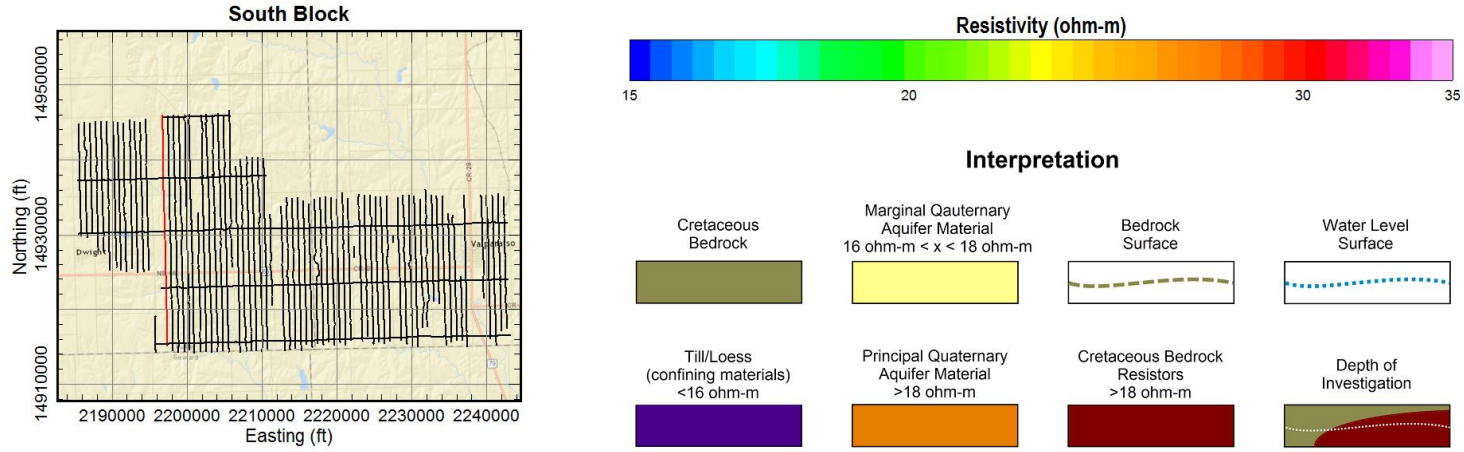

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

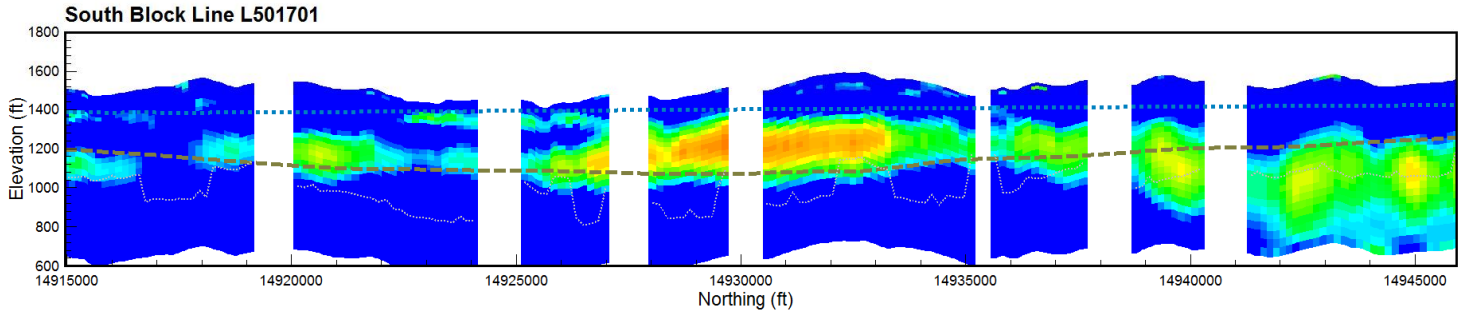

Resistivity (ohm-m)
15
20
30
35

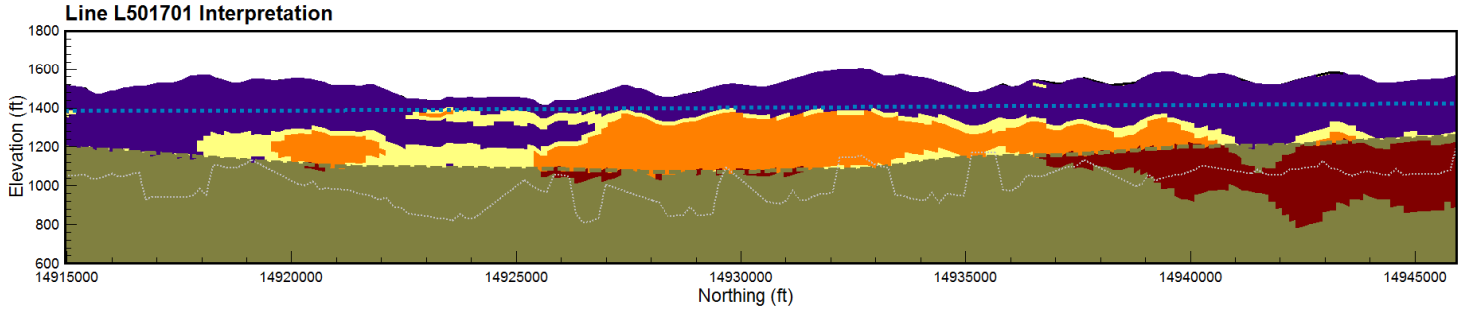

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

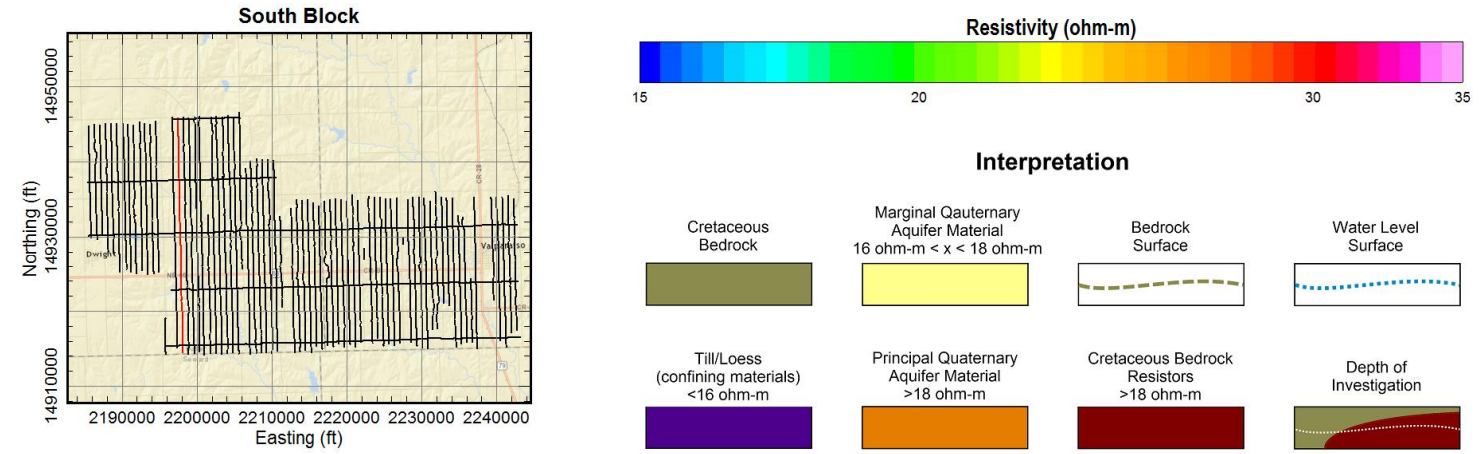

South Block Line L501501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
Northing (ft)

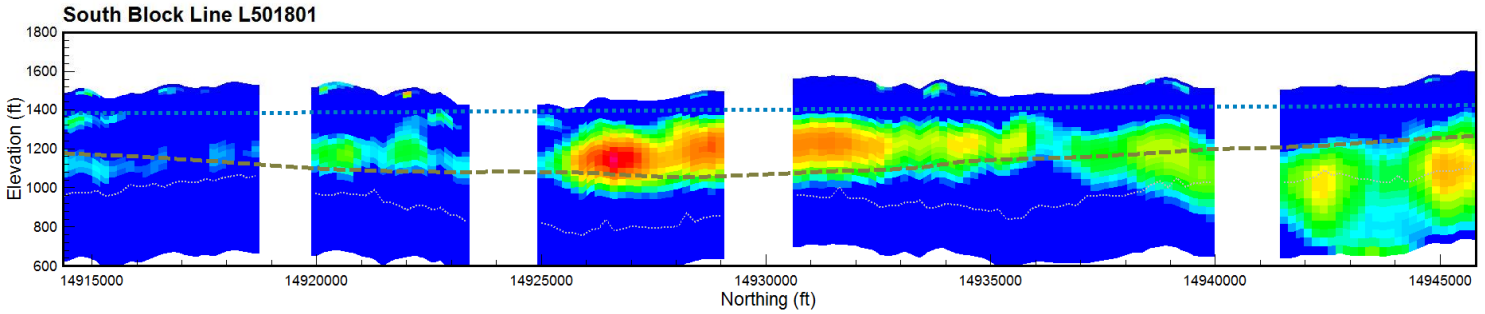

Line L501501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
Northing (ft)

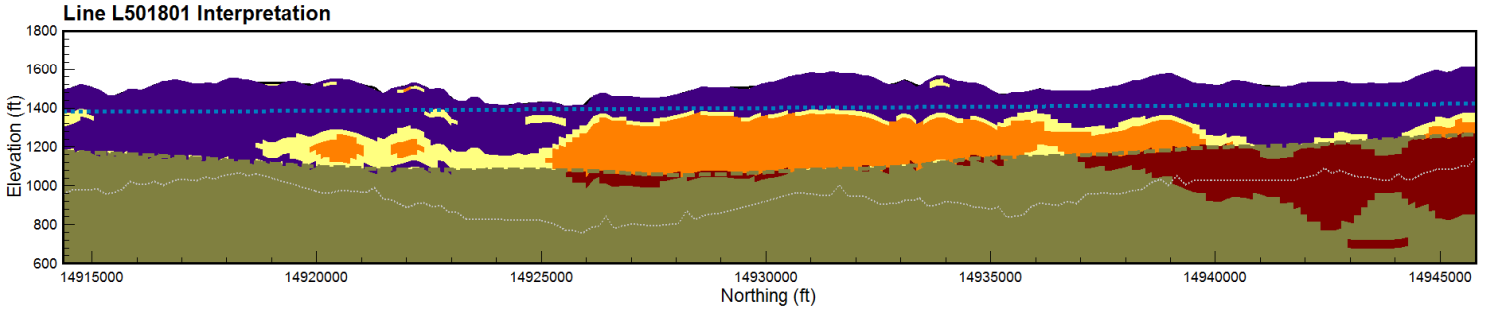

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

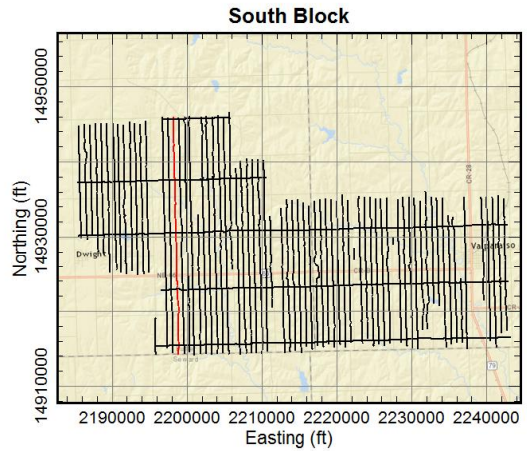

South Block Line L501701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

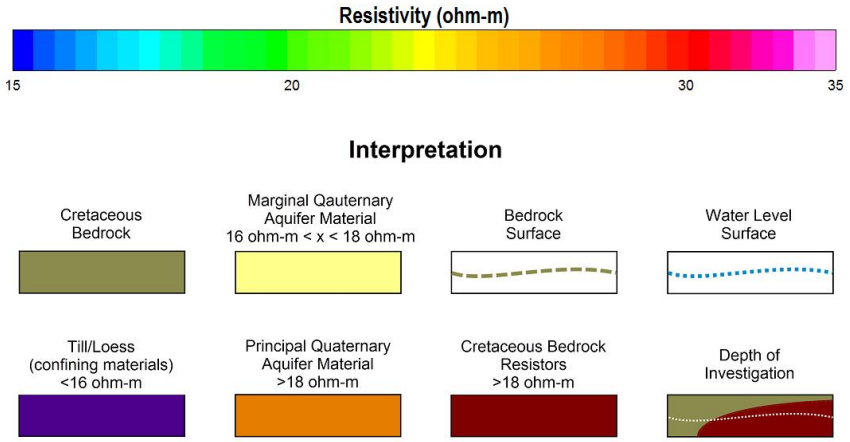

Line L501701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

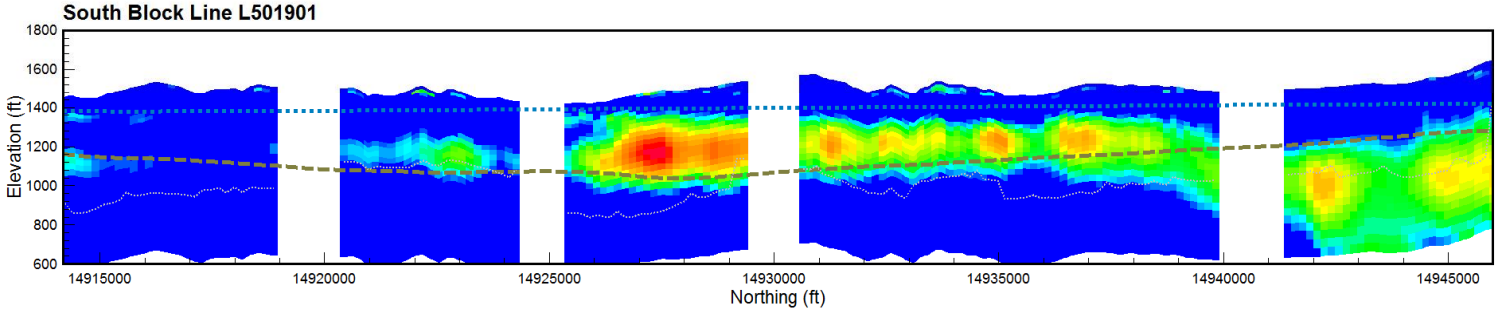

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

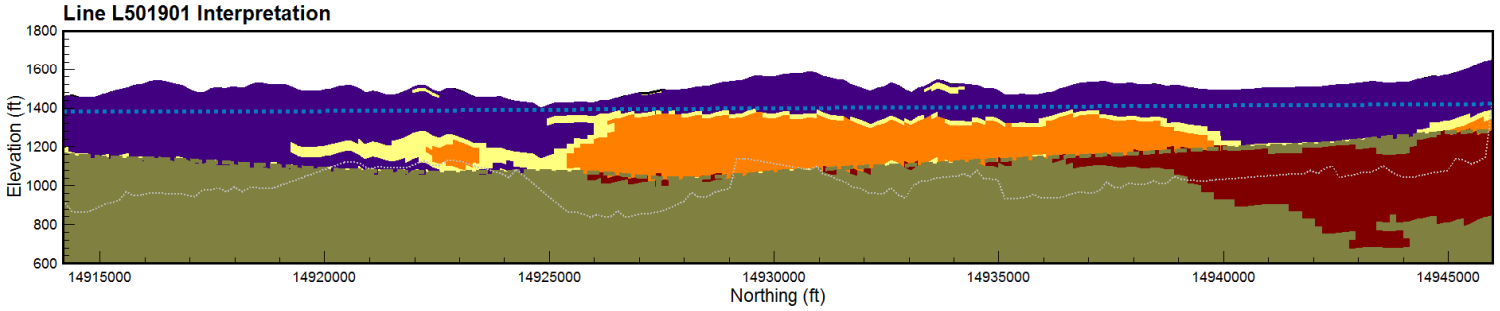

South Block Line L501801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

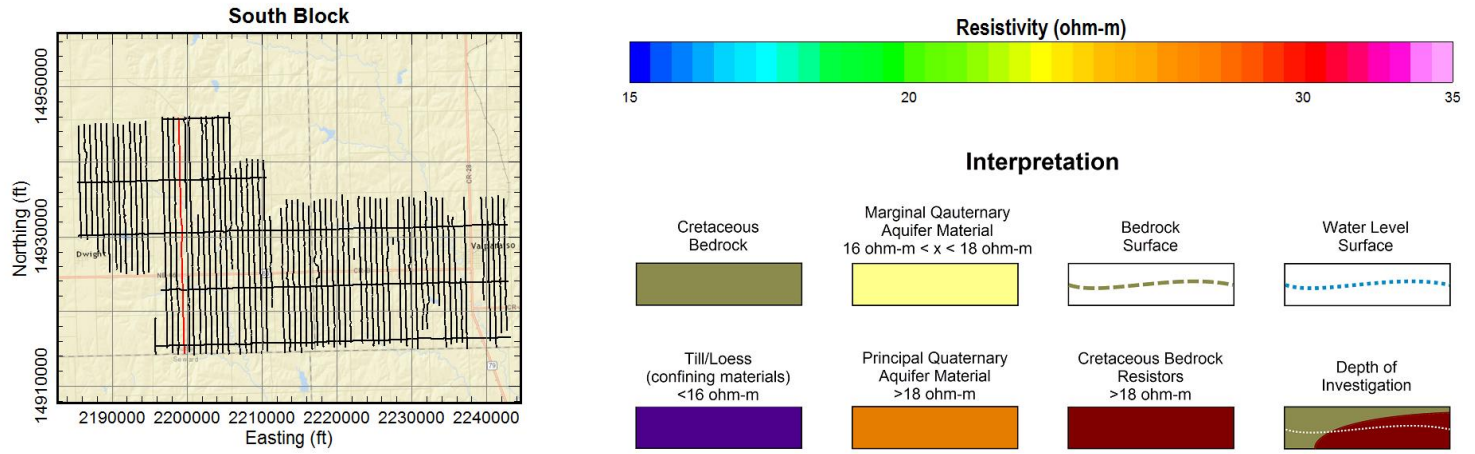

Line L501801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

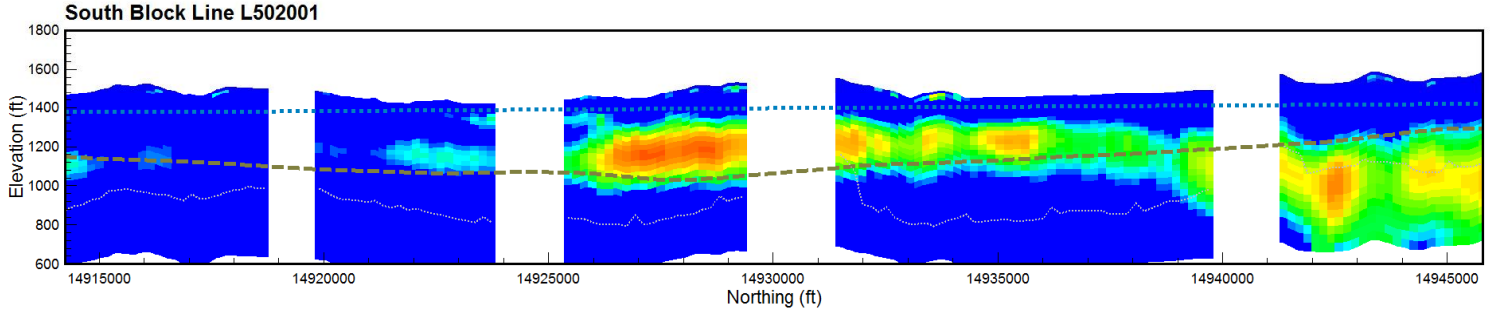

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

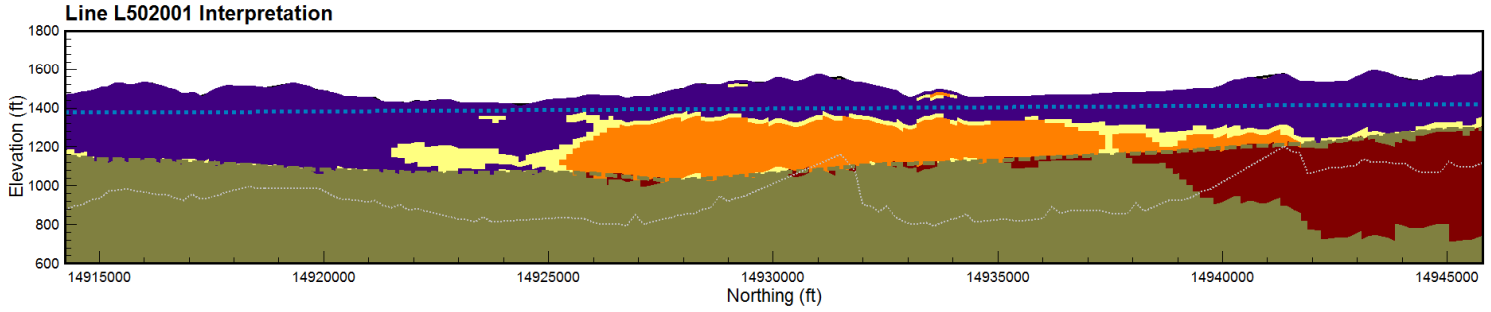

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

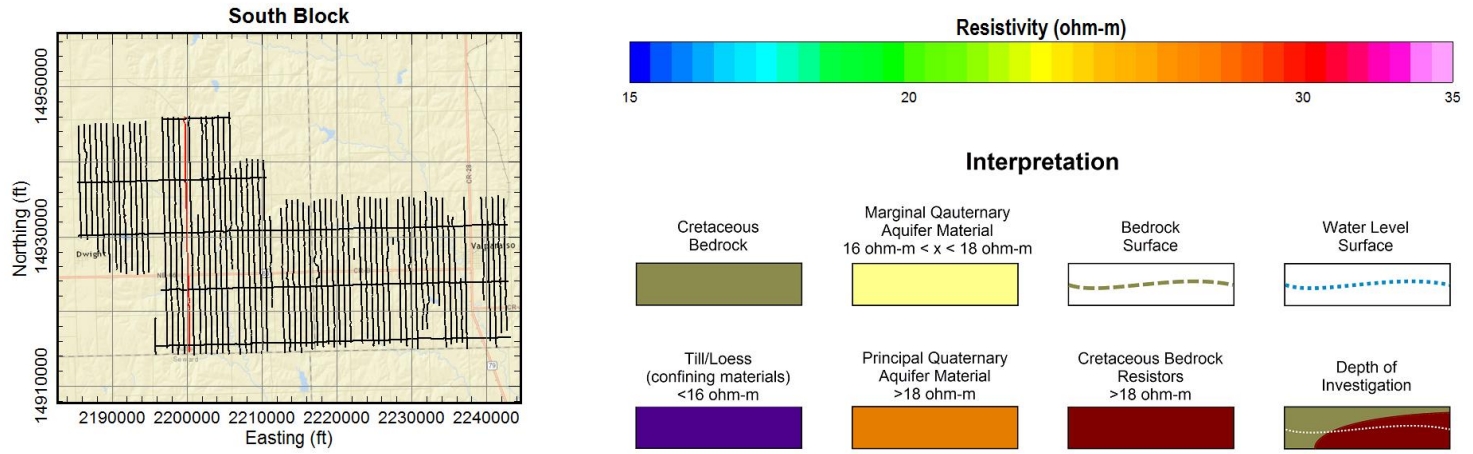

South Block Line L501901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

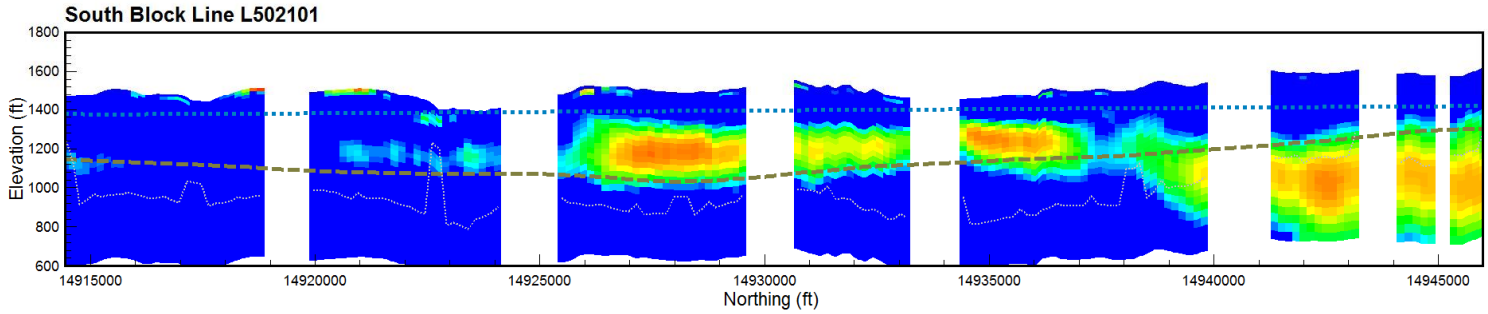

Line L501901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

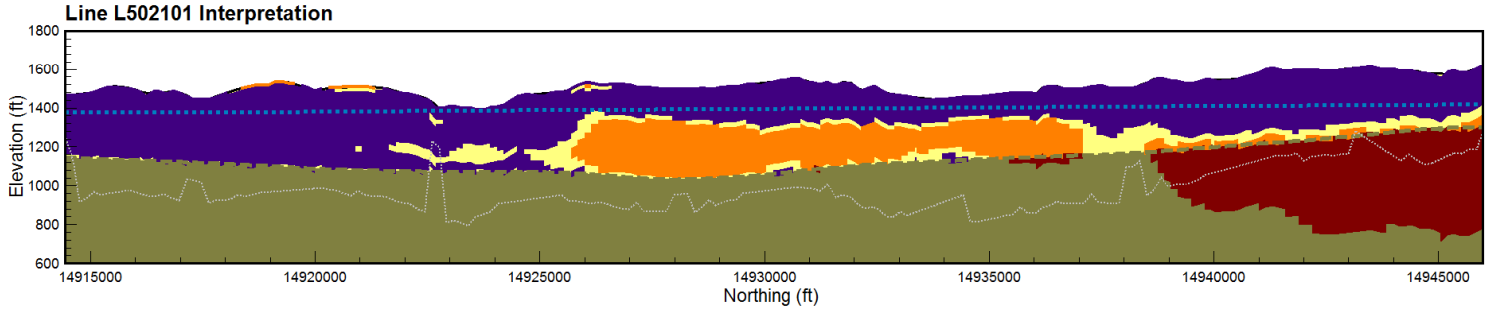

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

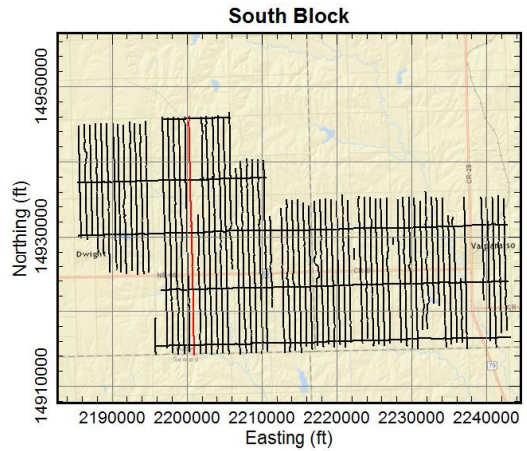

South Block Line L502001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Northing (ft)

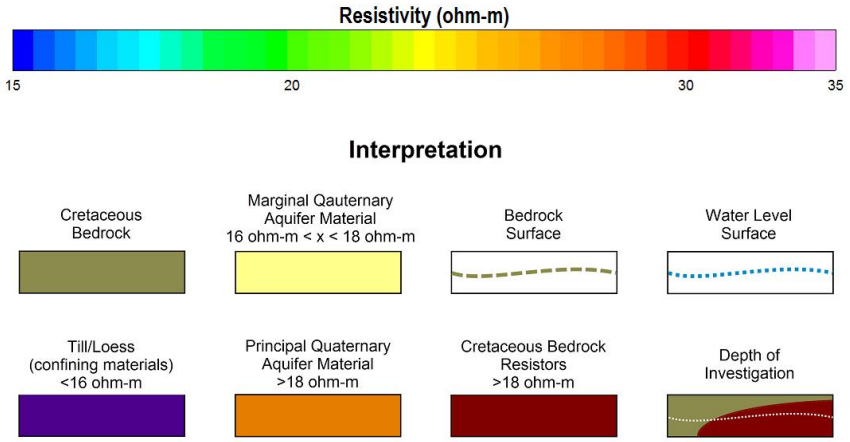

Line L502001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Northing (ft)

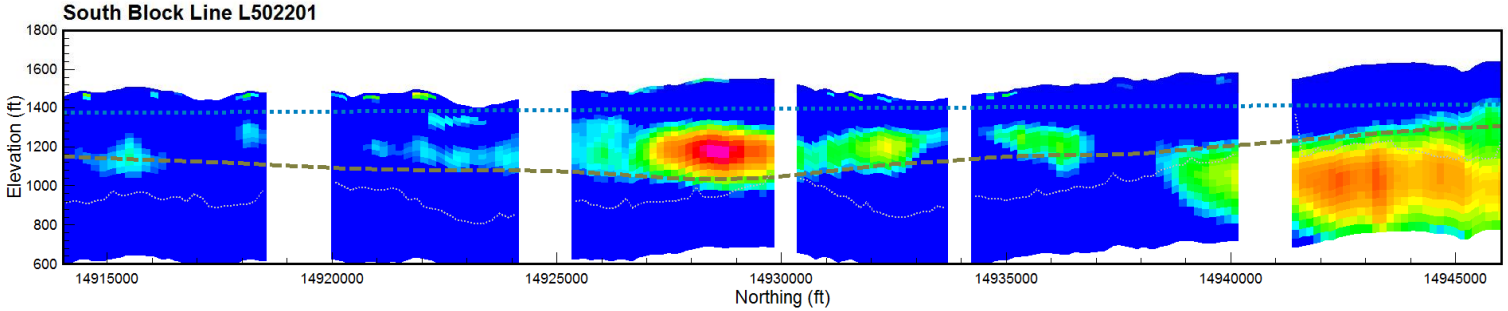

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

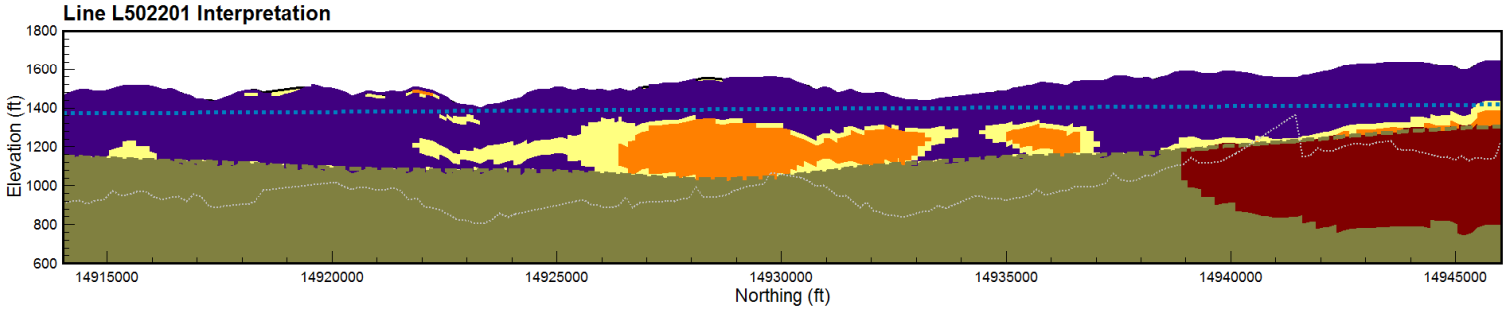

South Block Line L502101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

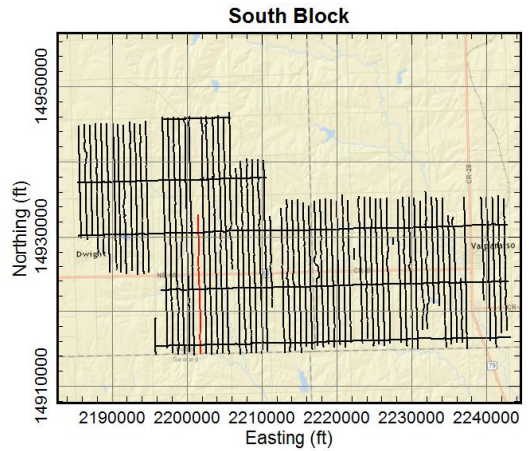

Line L502101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

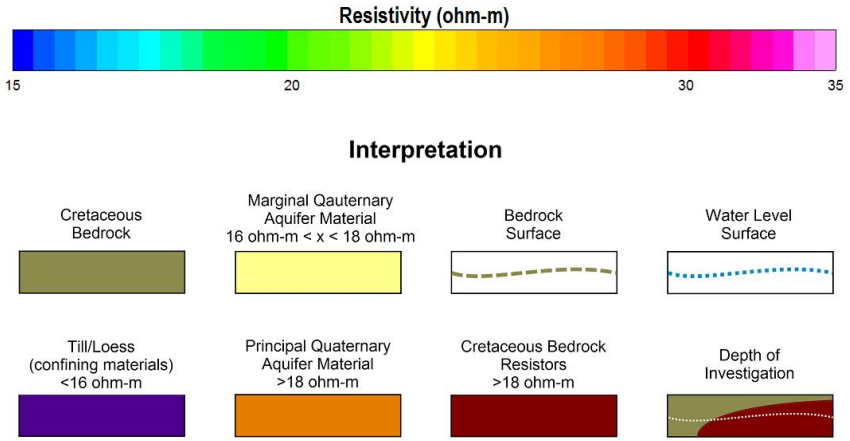

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

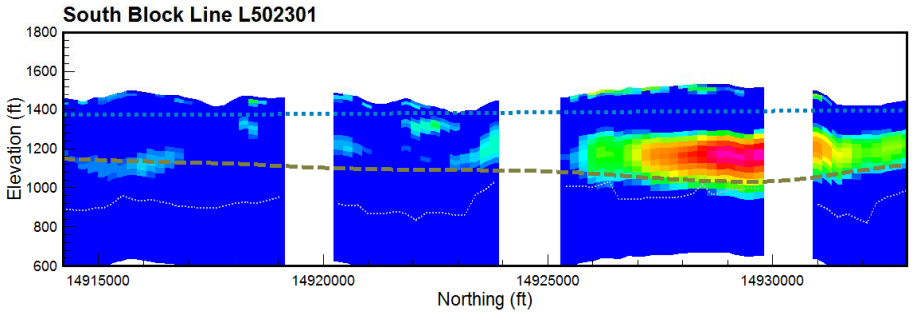

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

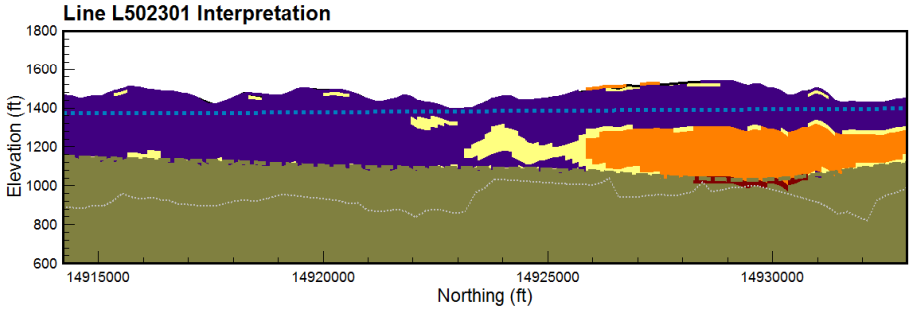

South Block Line L502201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Northing (ft)

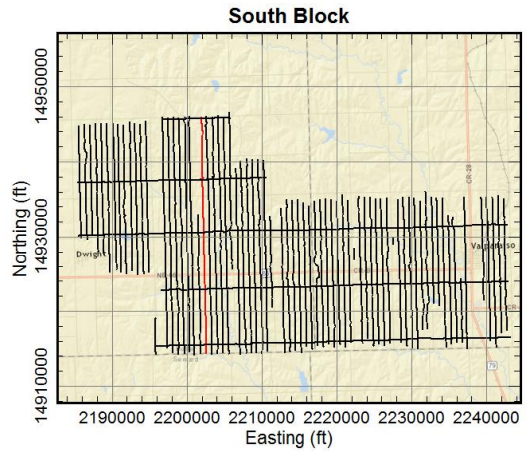

Line L502201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
14945000
Northing (ft)

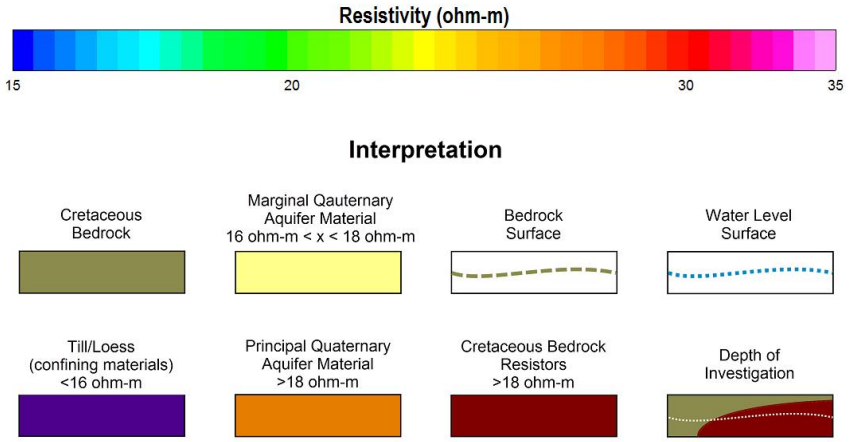

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

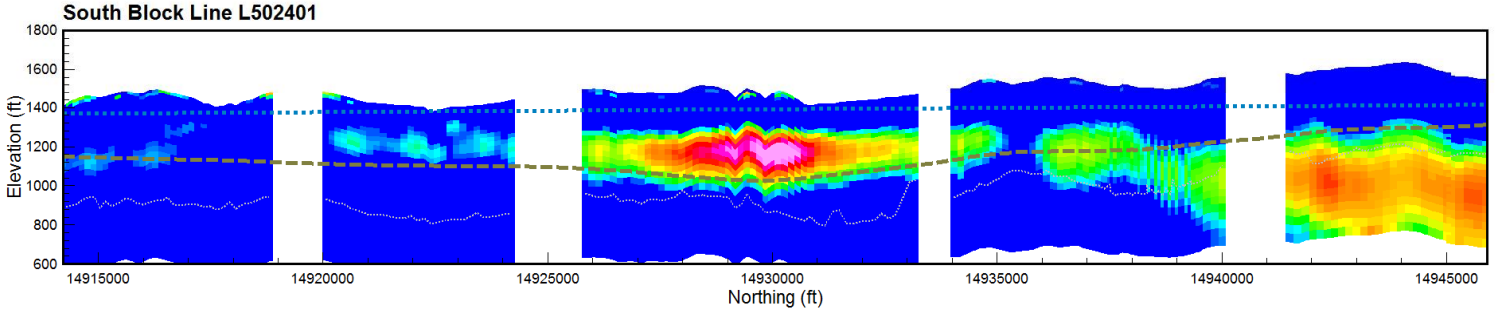

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

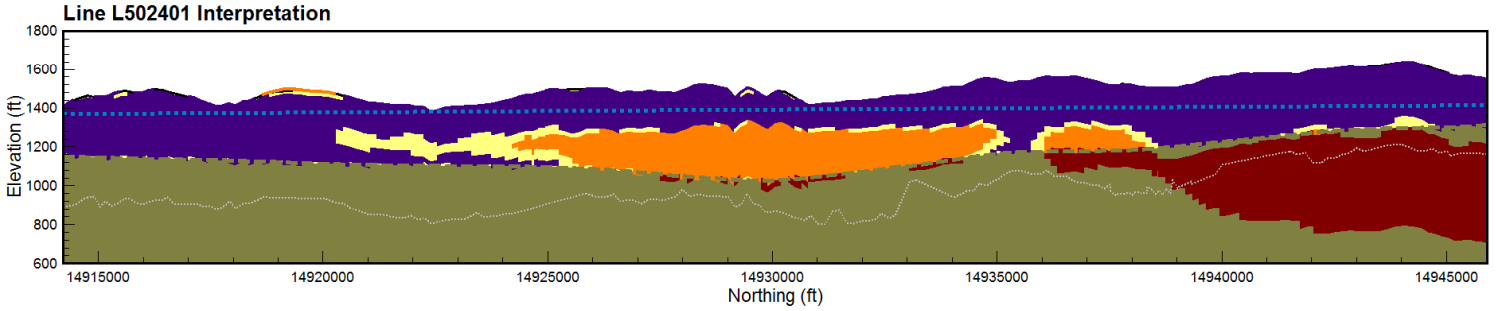

South Block Line L502301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

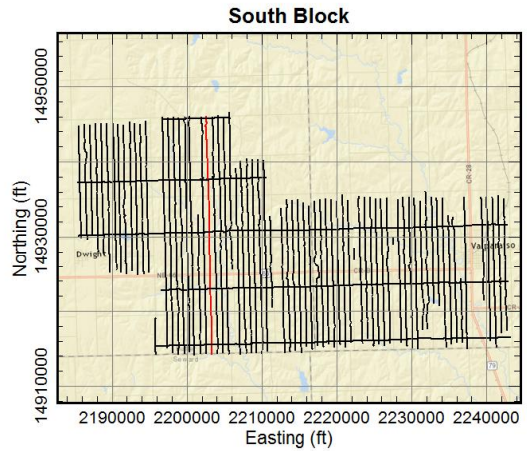

Line L502301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

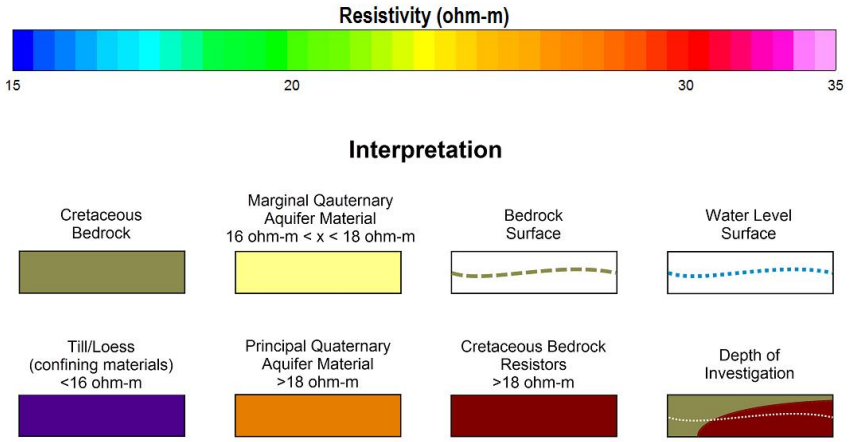

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

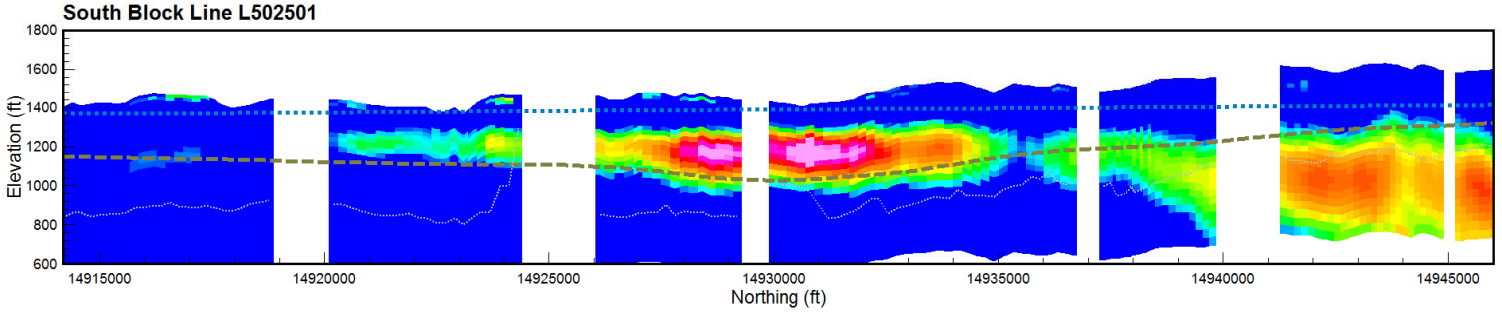

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

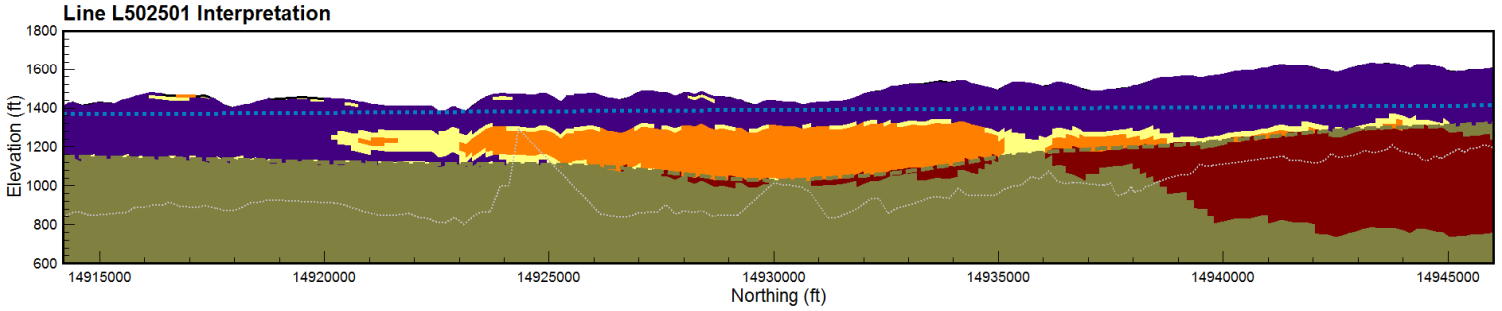

South Block Line L502401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

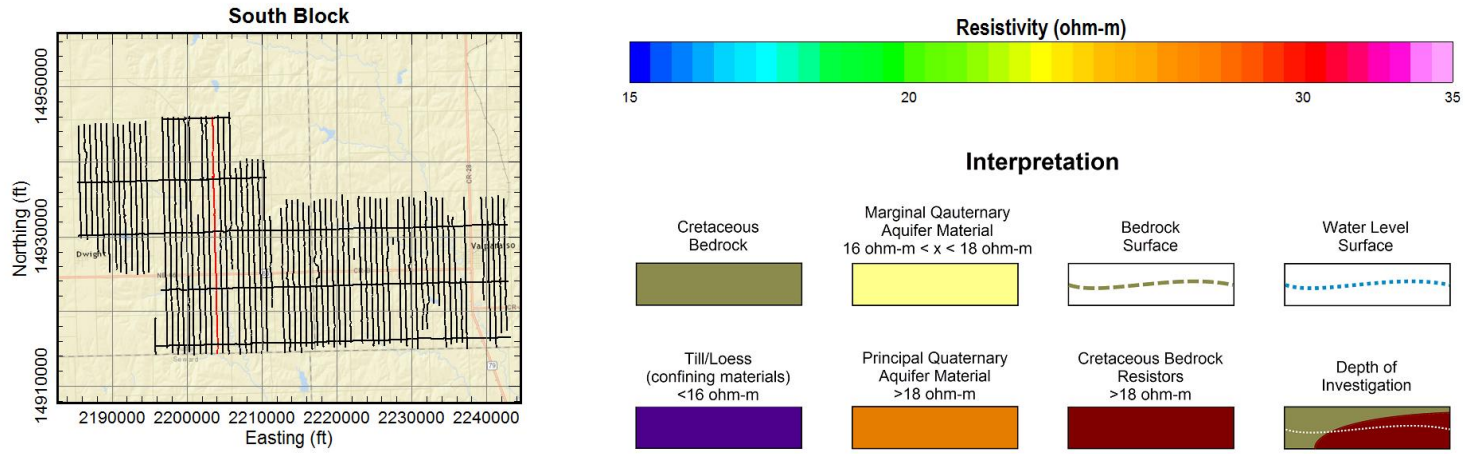

Line L502401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

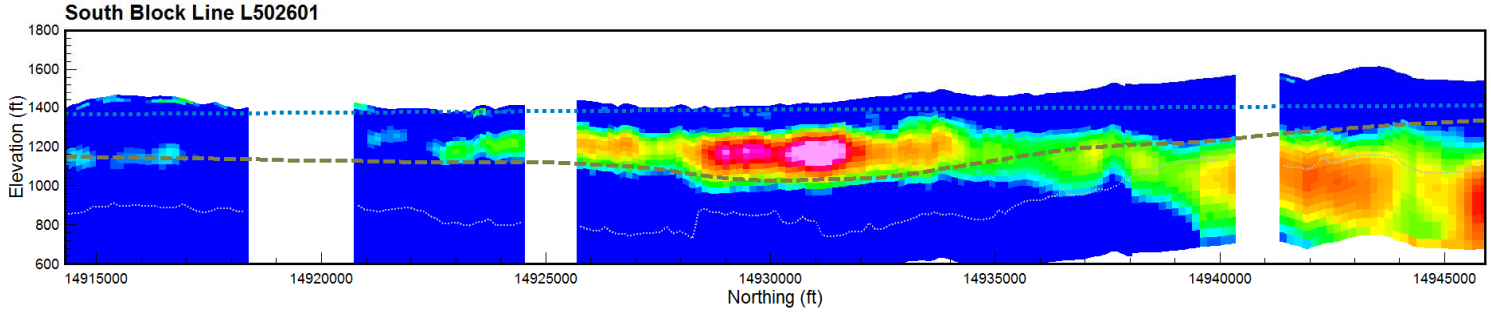

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

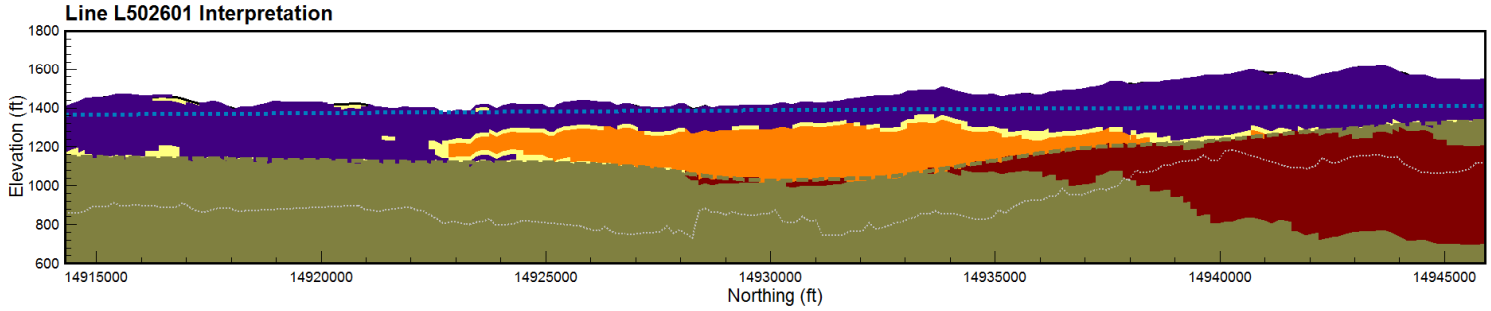

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

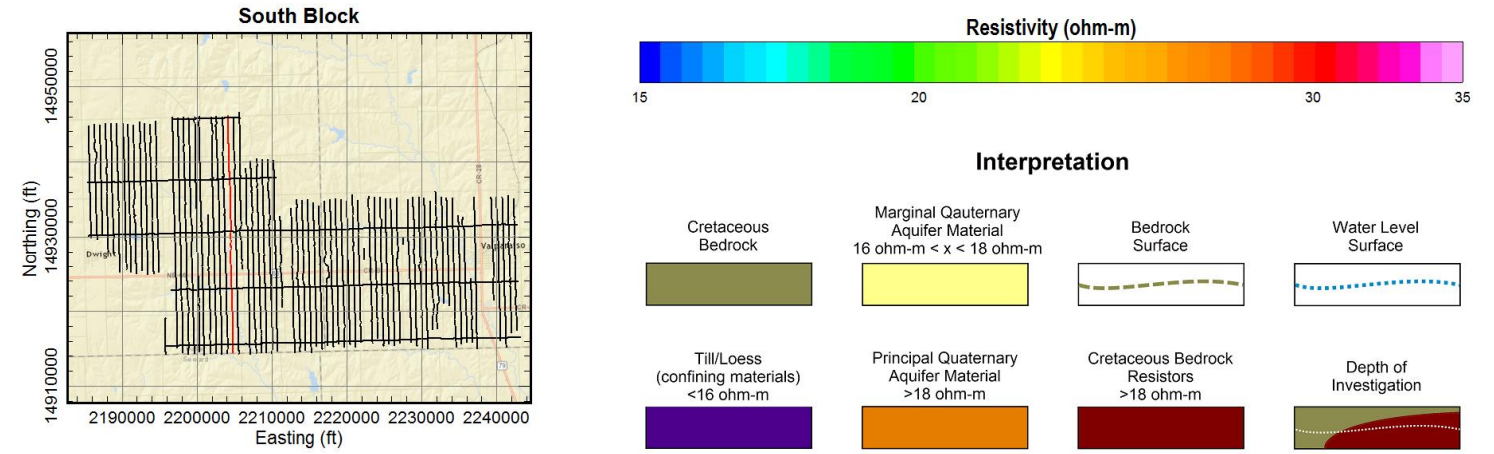

South Block Line L502501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

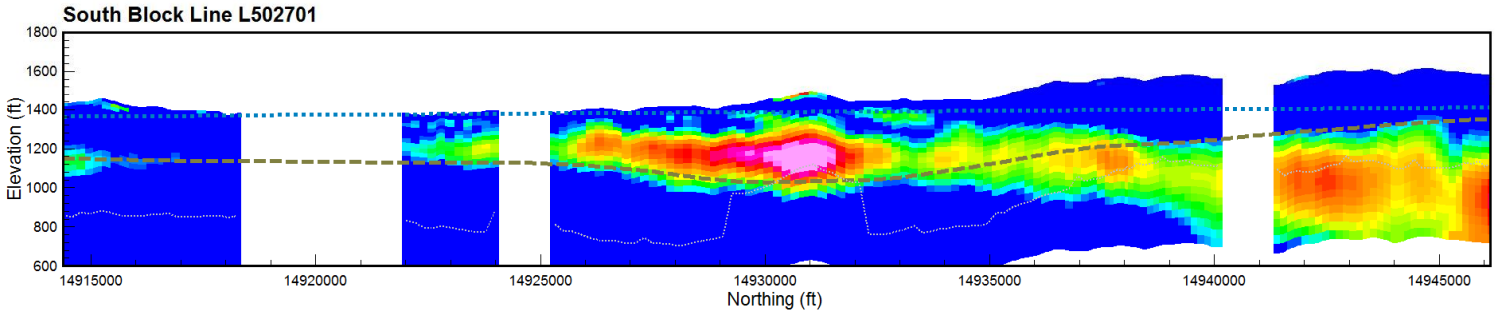

Line L502501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

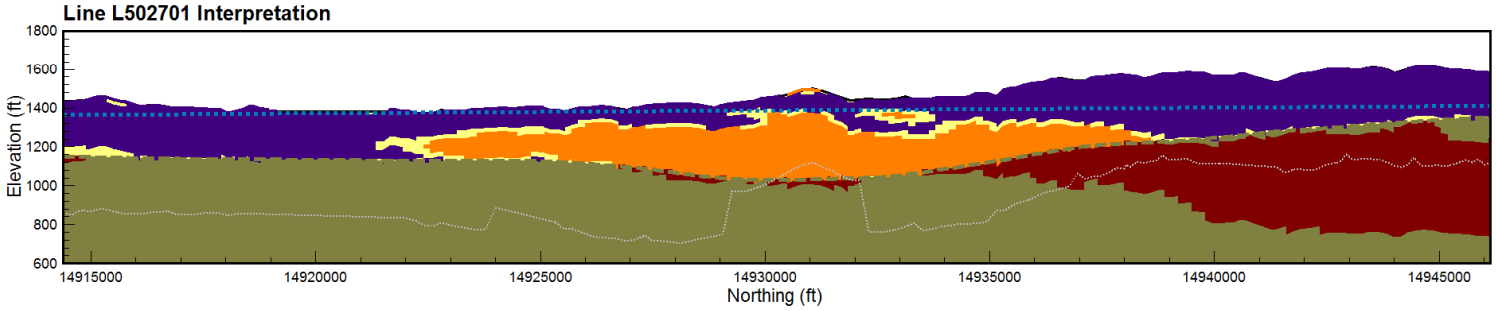

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

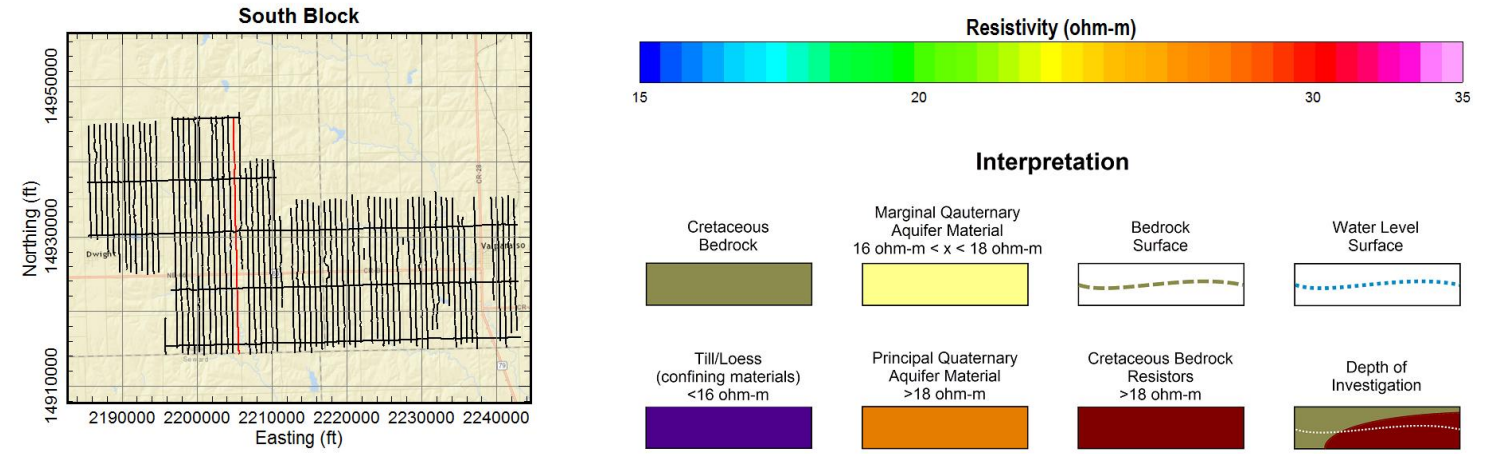

South Block Line L502601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

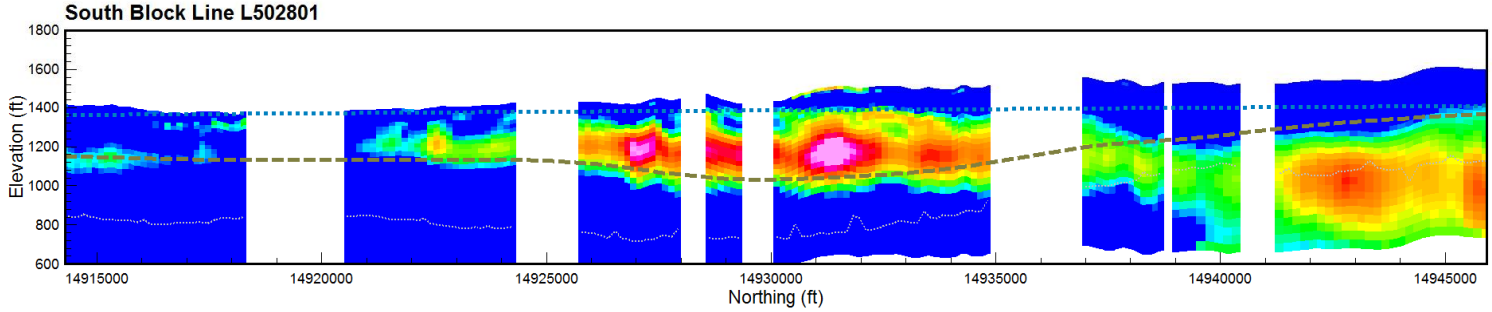

Line L502601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

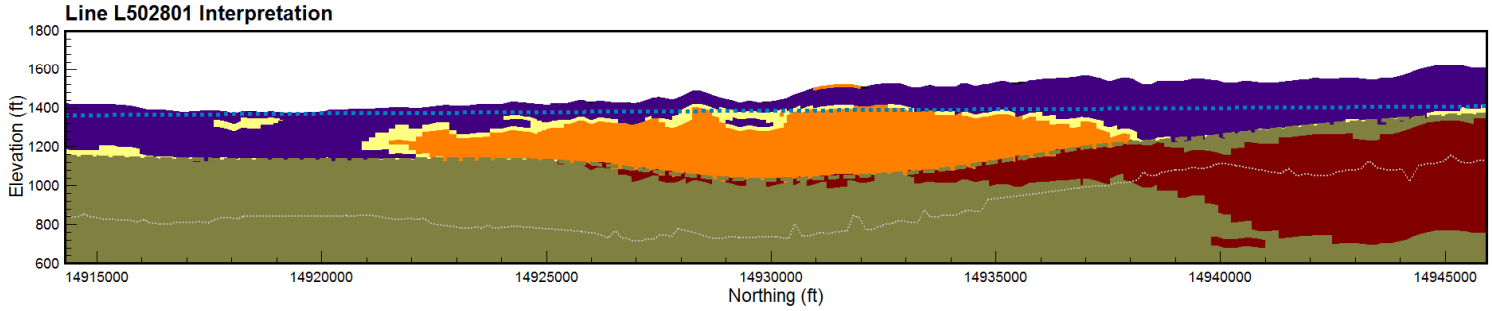

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

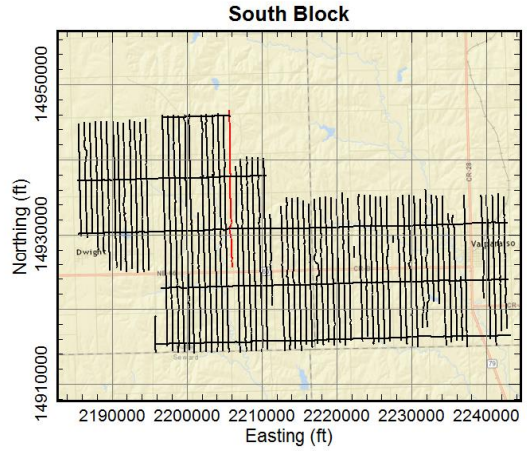

South Block Line L502701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

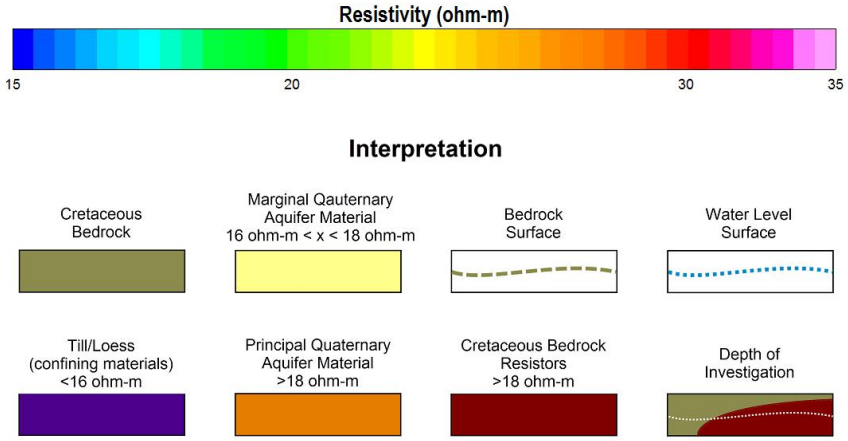

Line L502701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

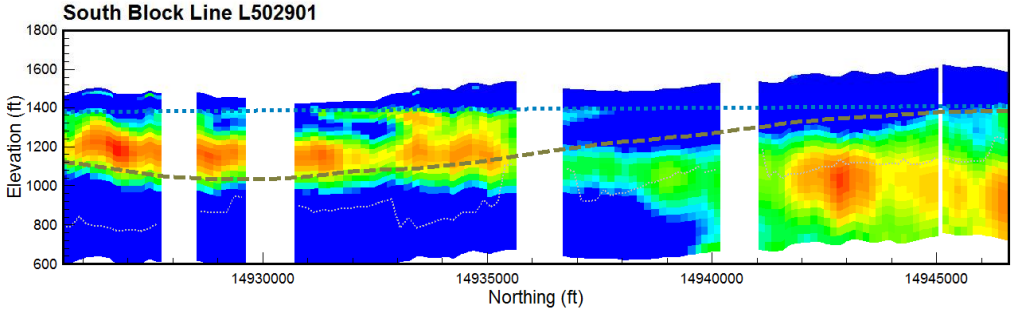

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

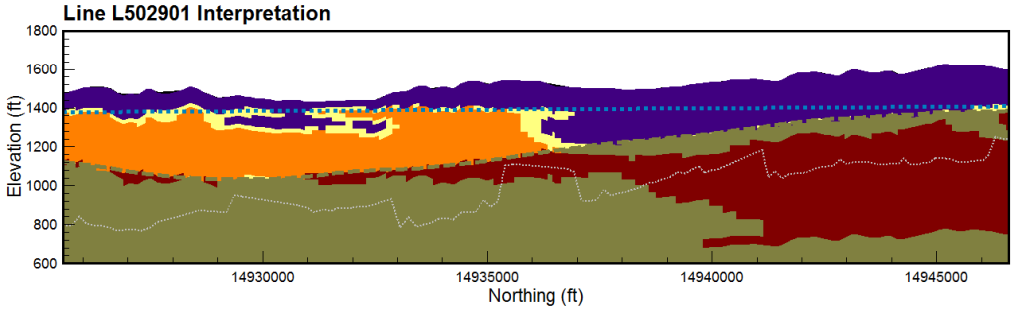

South Block Line L502801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

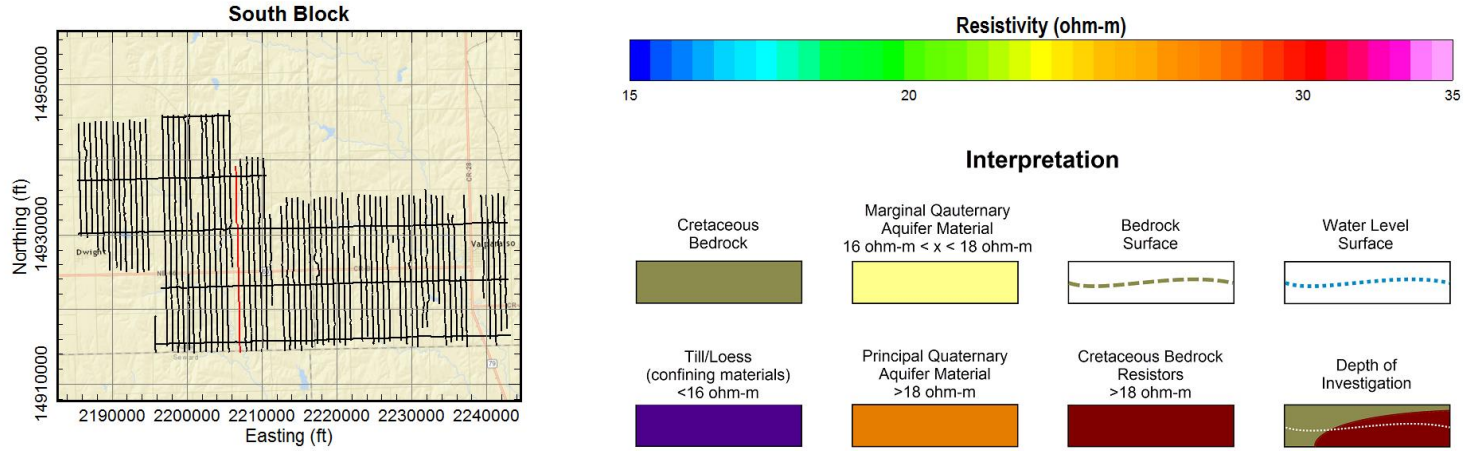

Line L502801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000 14920000 14925000 14930000 14935000 14940000 14945000
Northing (ft)

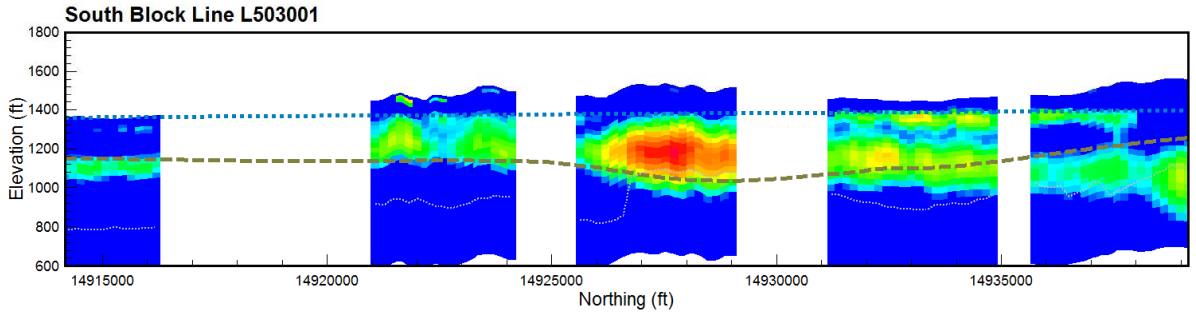

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

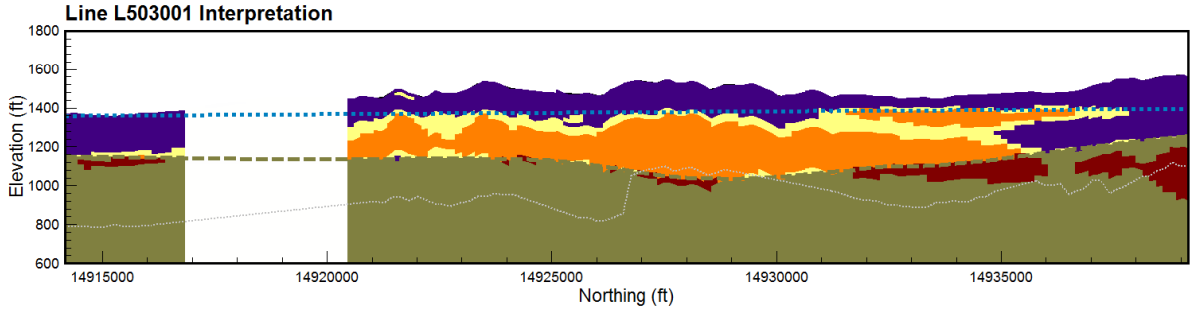

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

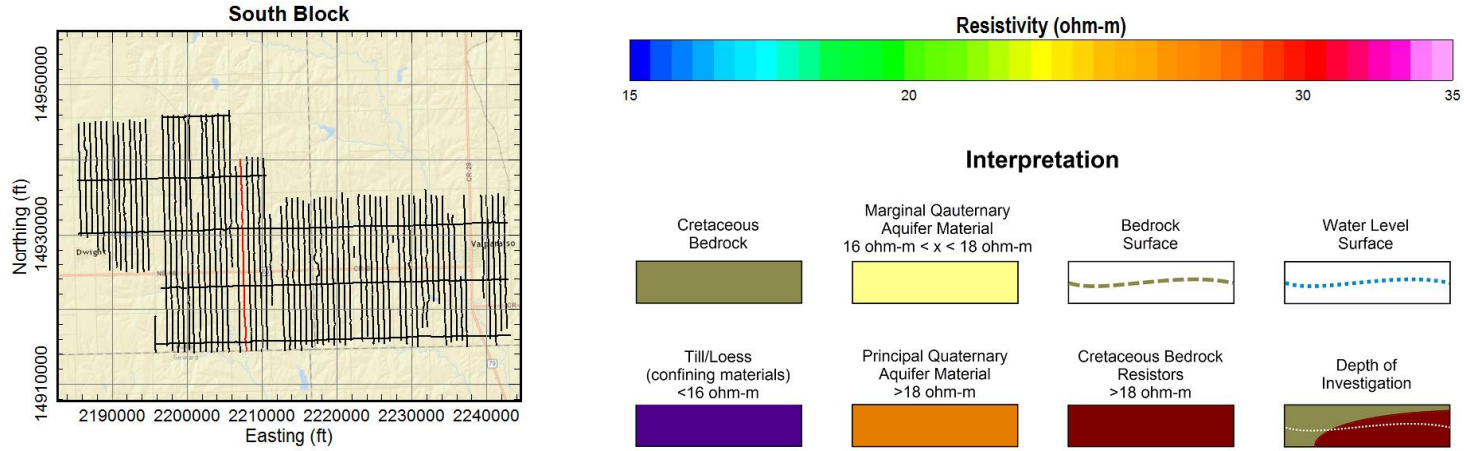

South Block Line L502901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

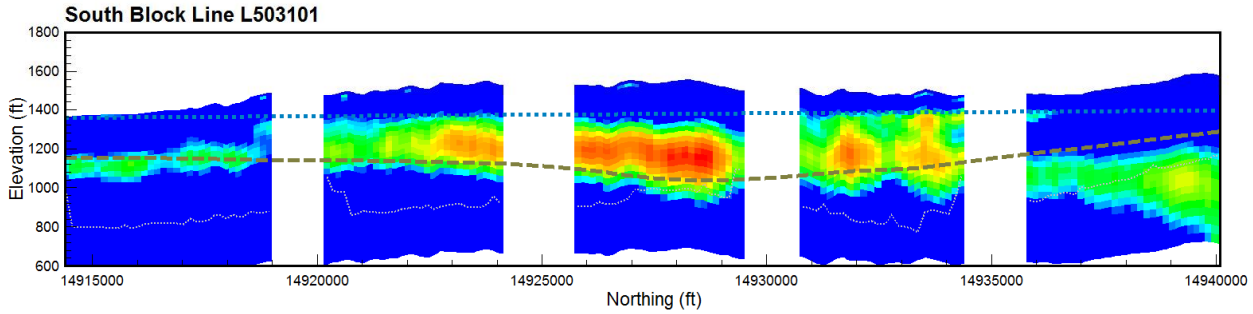

Line L502901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
14935000
14940000
14945000
Northing (ft)

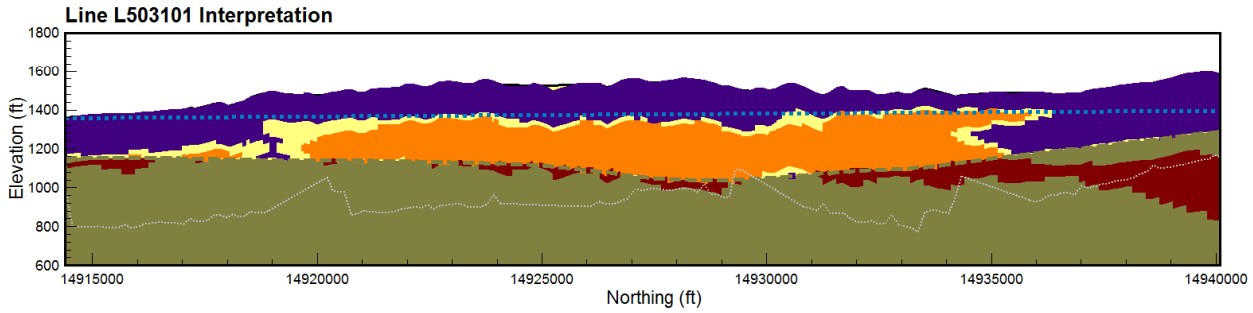

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

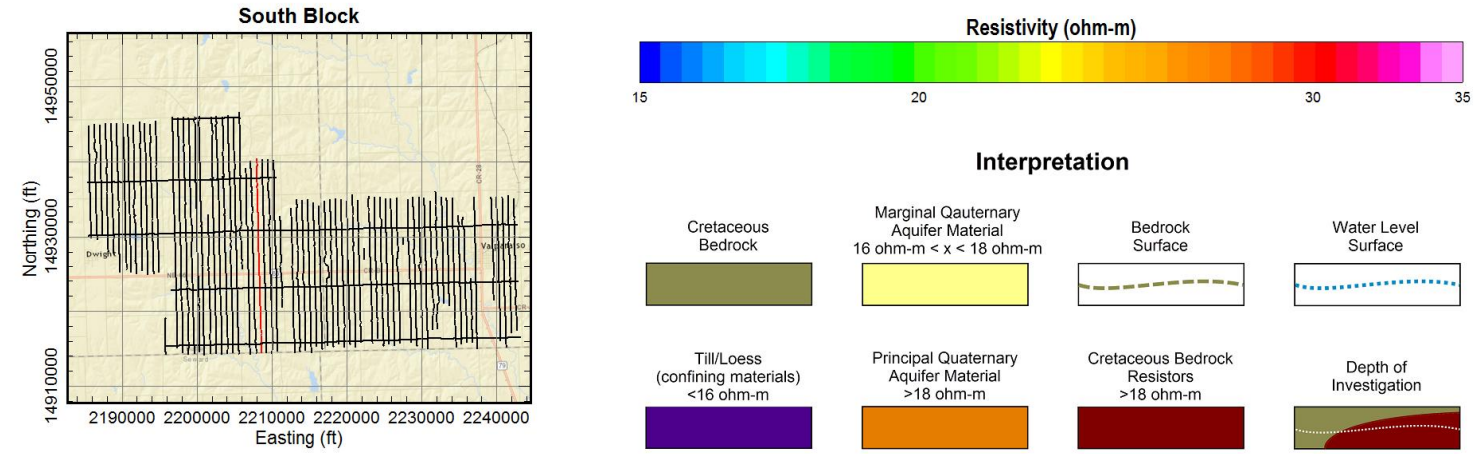

South Block Line L503001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
Northing (ft)

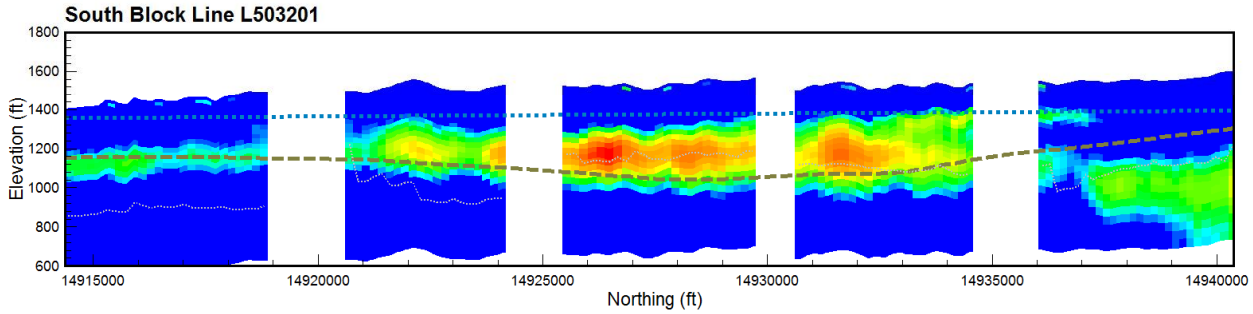

Line L503001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
Northing (ft)

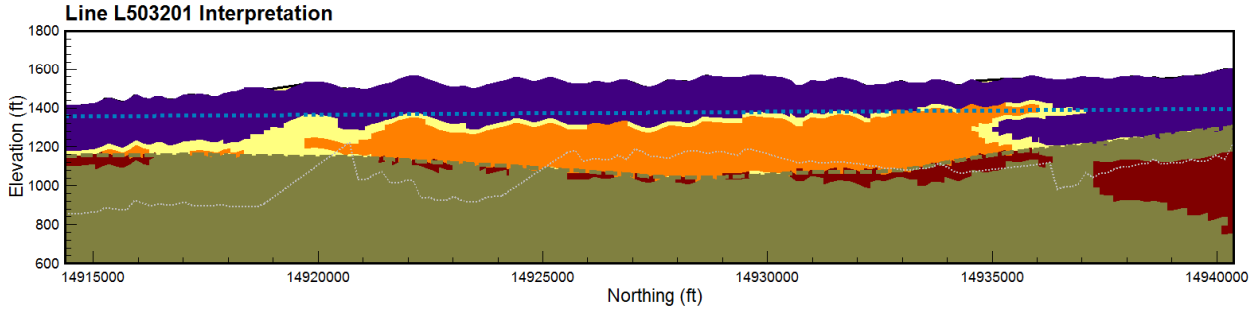

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

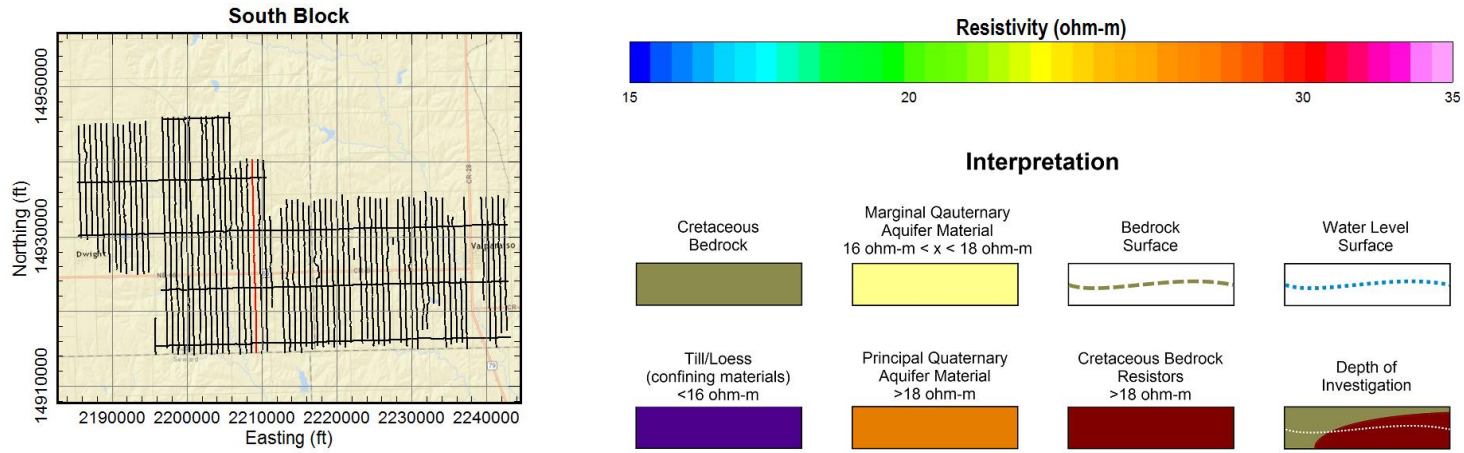

South Block Line L503101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

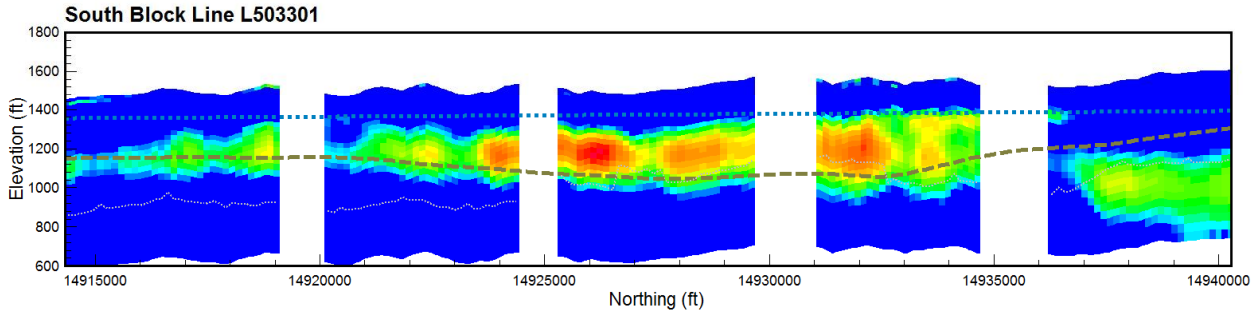

Line L503101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

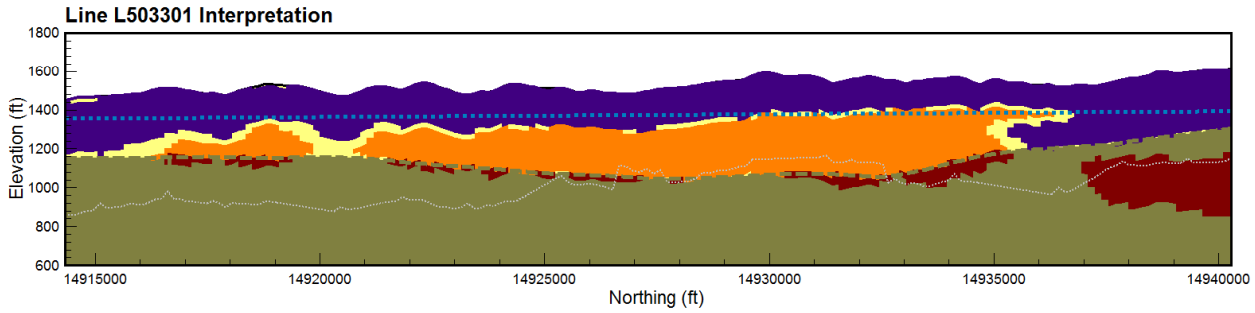

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

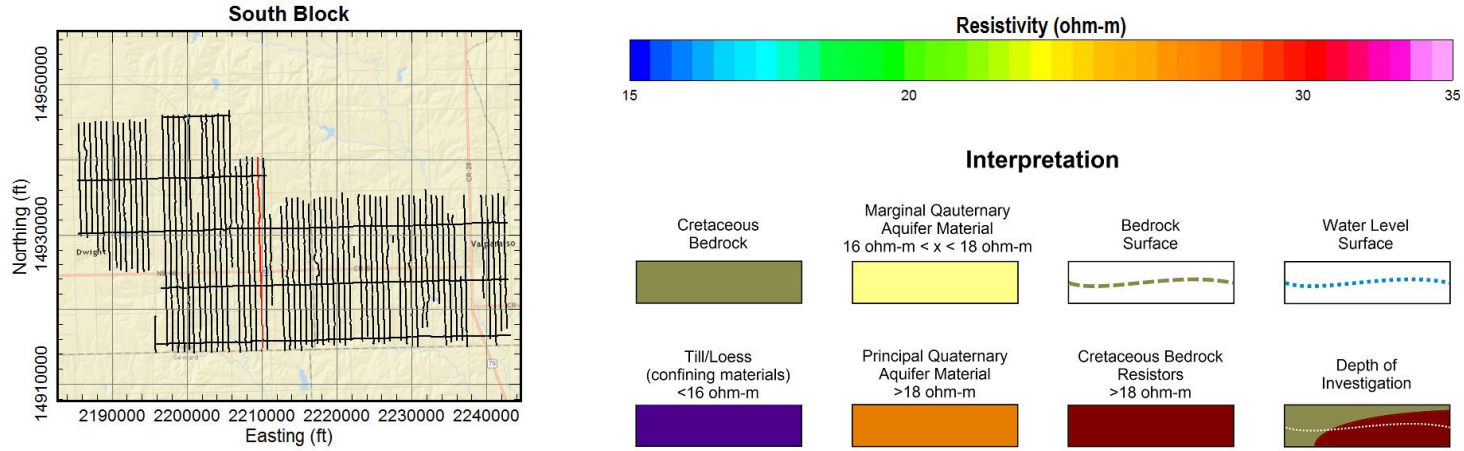

South Block Line L503201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

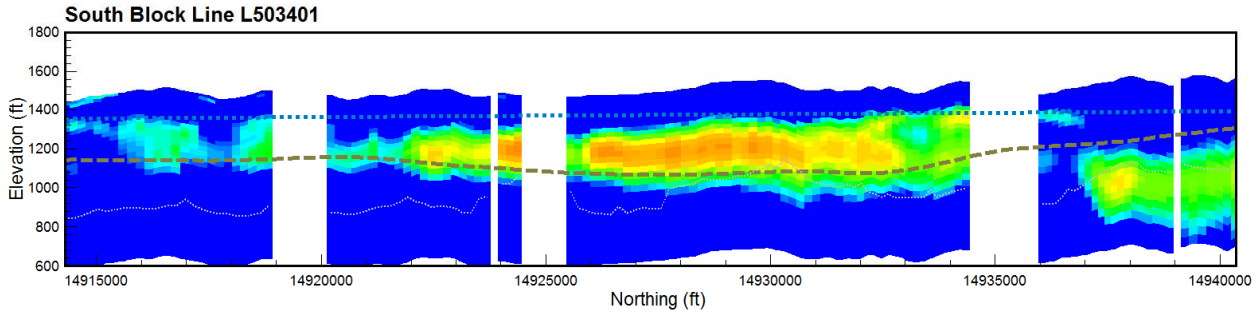

Line L503201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

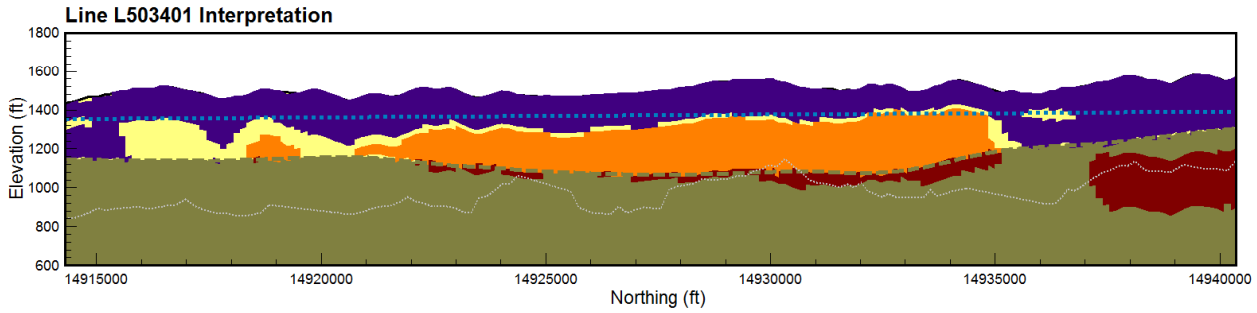

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

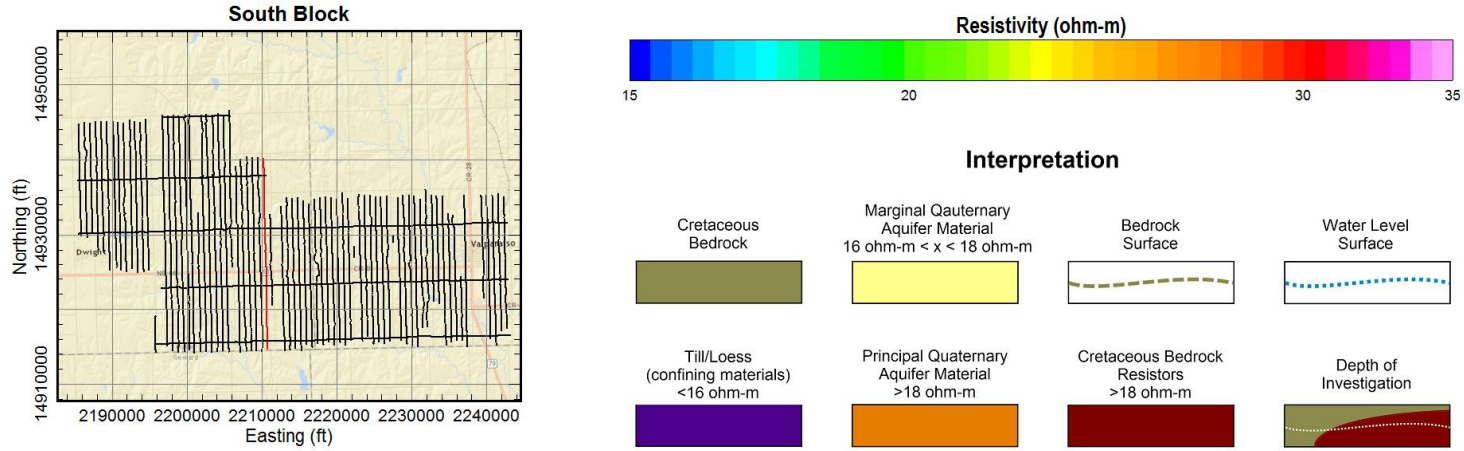

South Block Line L503301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

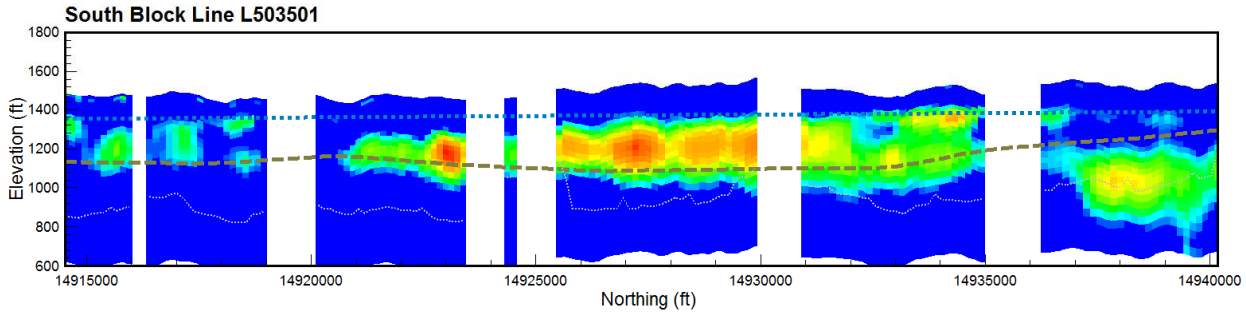

Line L503301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

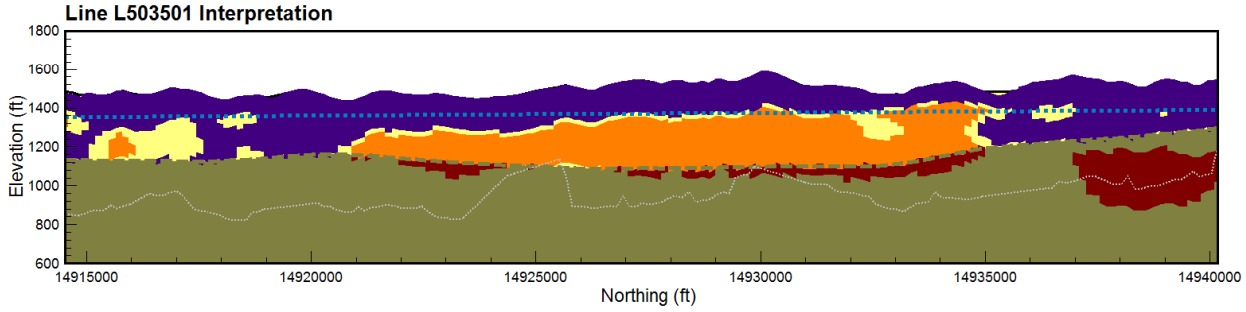

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

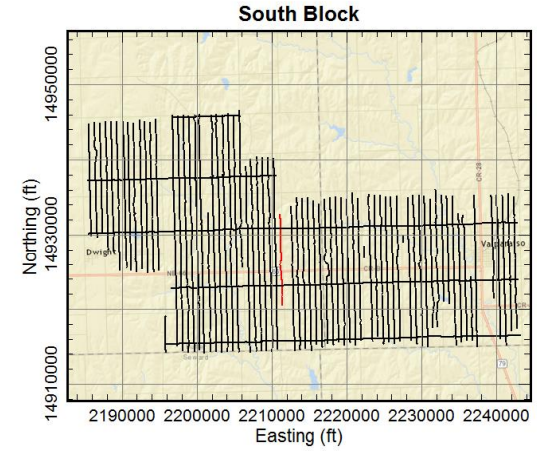

South Block Line L503401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

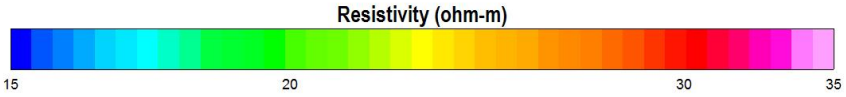

Line L503401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

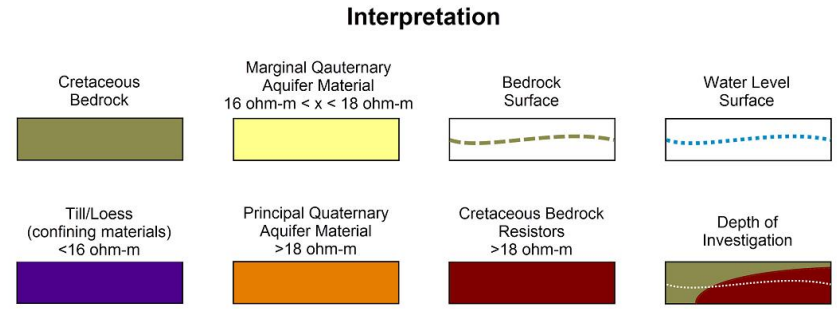

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

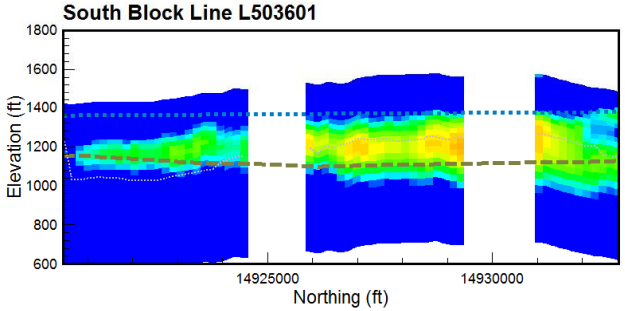

South Block Line L503501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

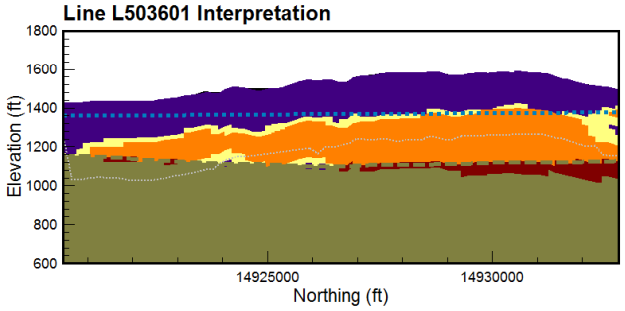

Line L503501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
14940000
Northing (ft)

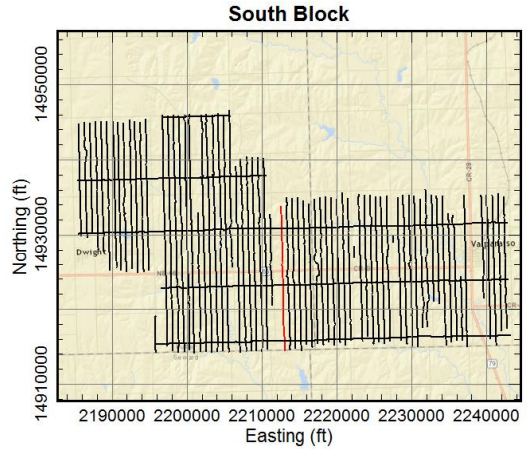

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

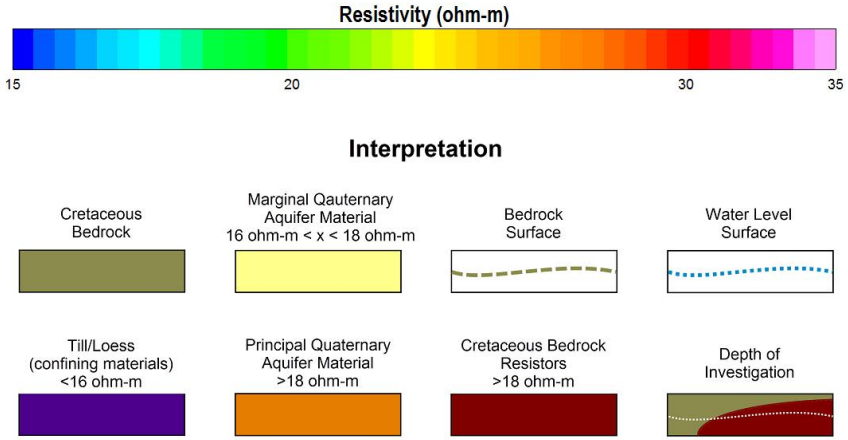

Resistivity (ohm-m)
15
20
30
35

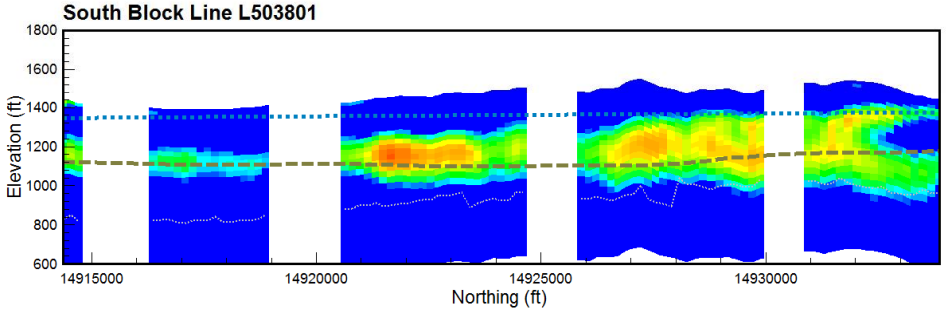

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

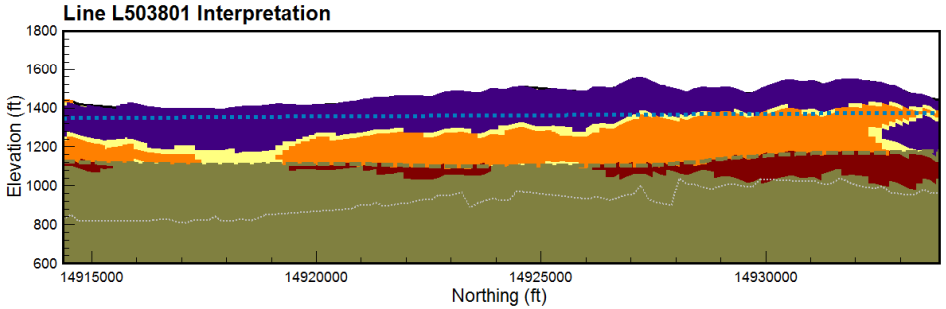

South Block Line L503601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
Northing (ft)

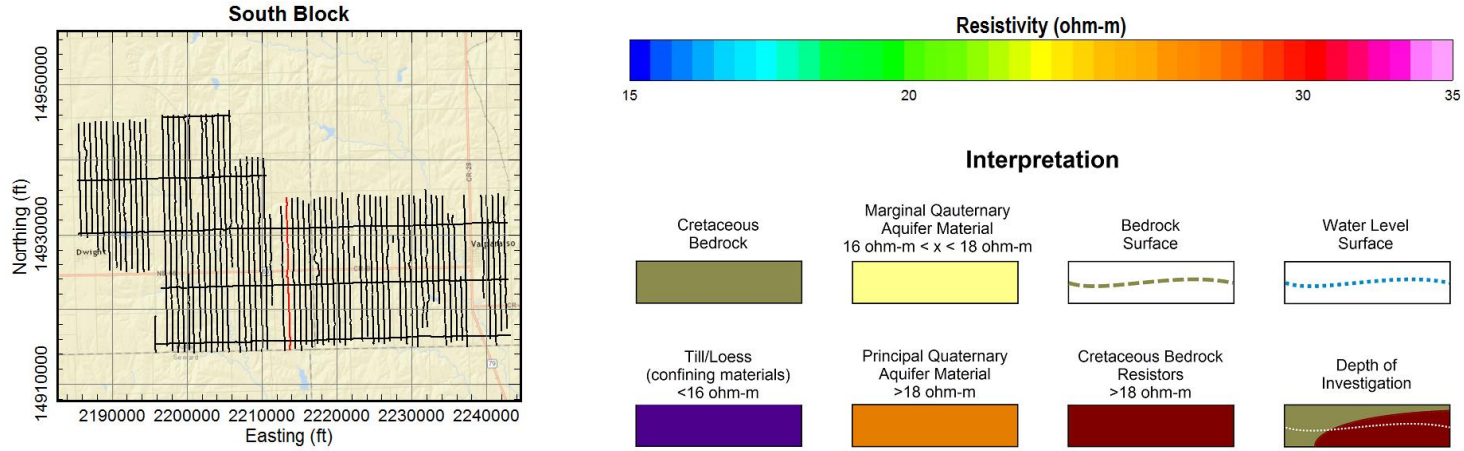

Line L503601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
Northing (ft)

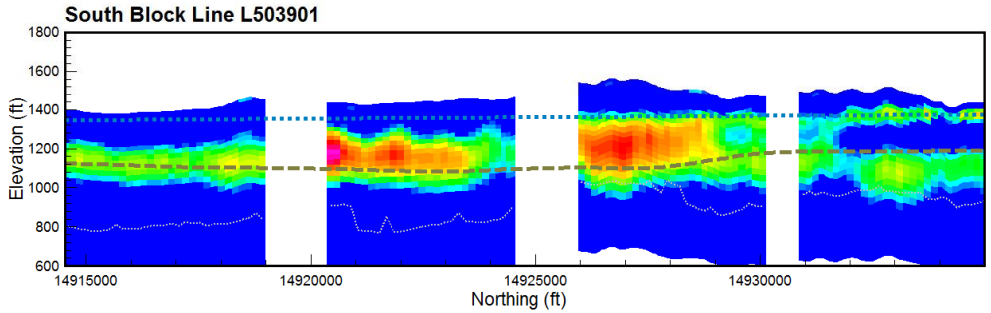

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

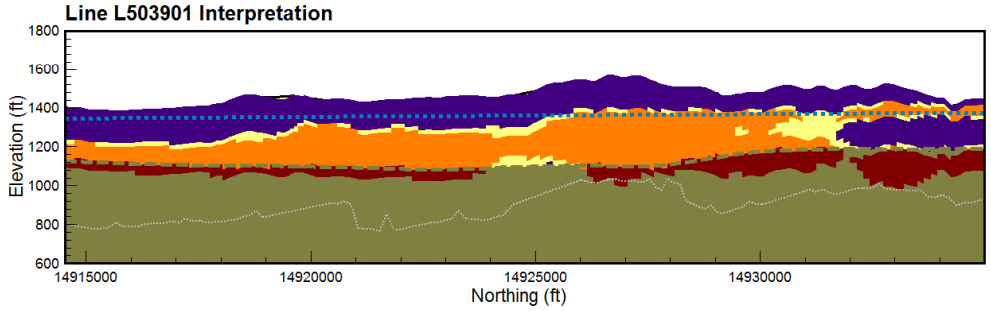

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

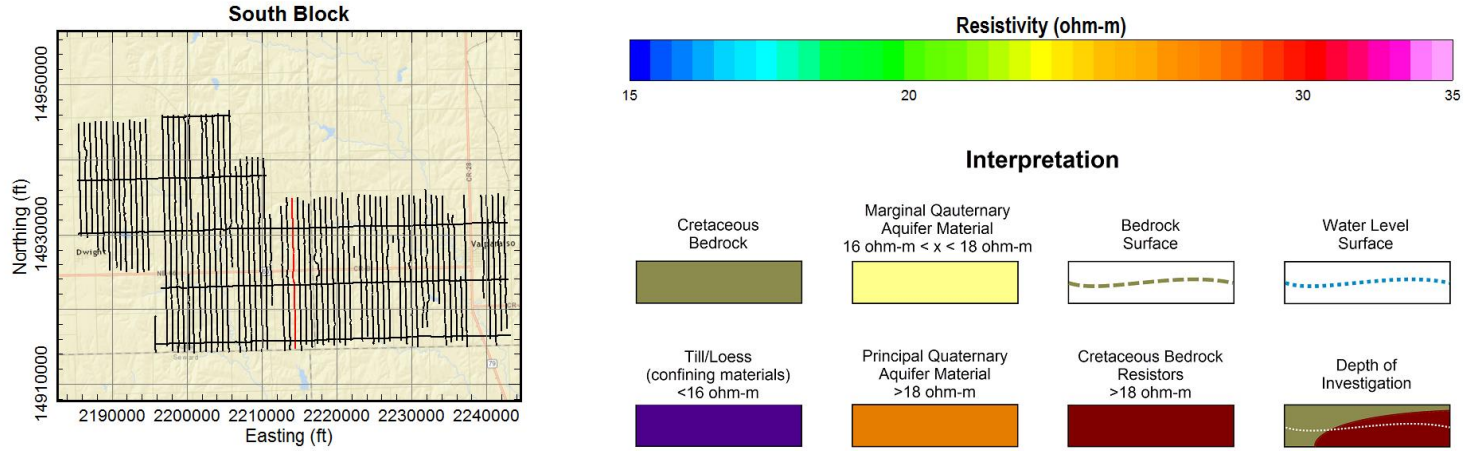

South Block Line L503801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

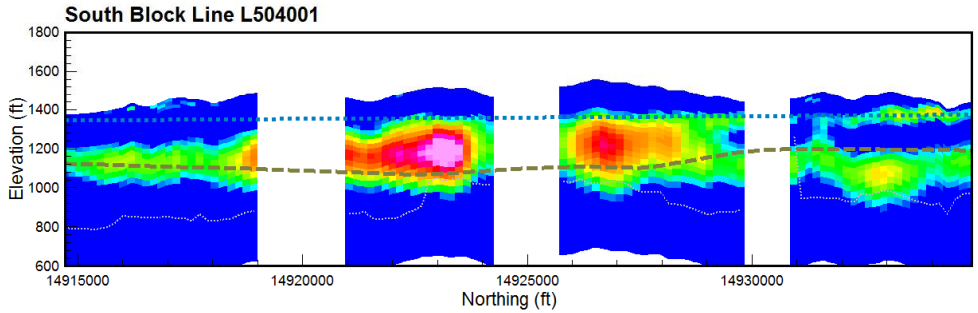

Line L503801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

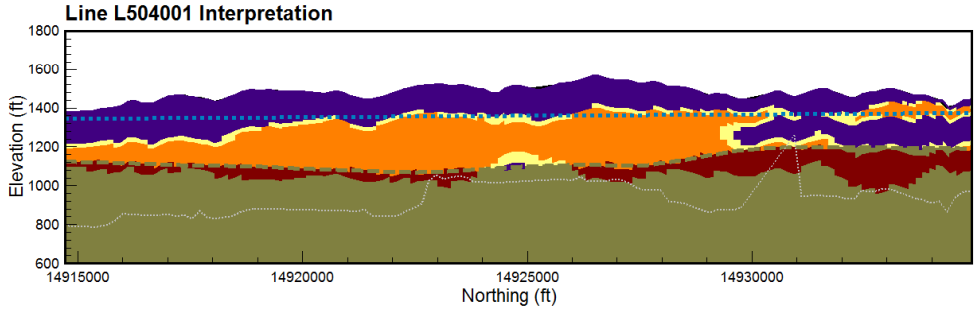

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

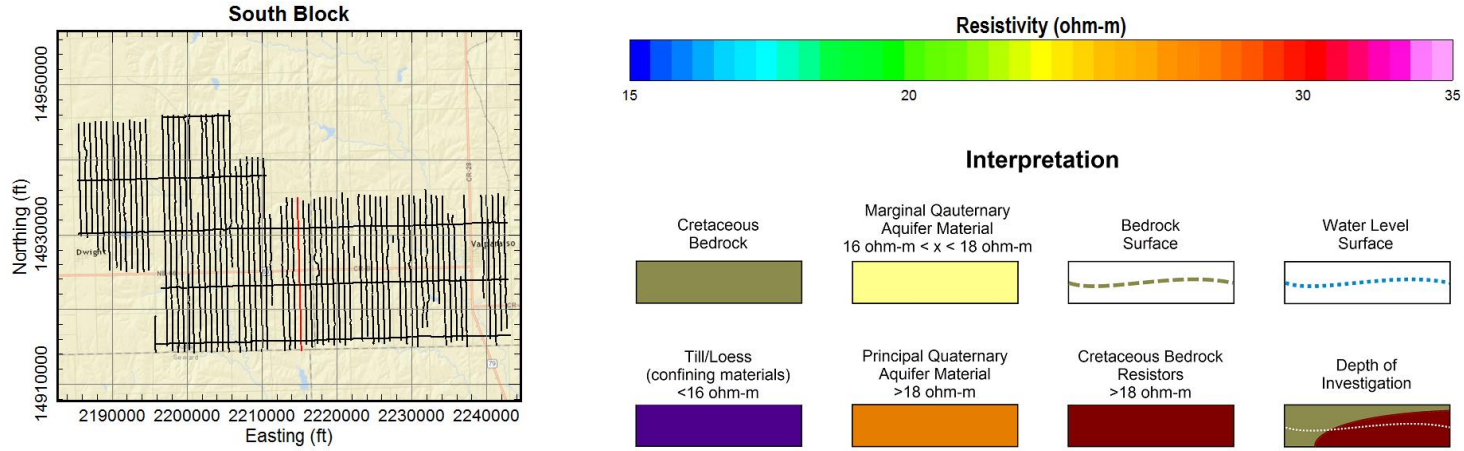

South Block Line L503901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

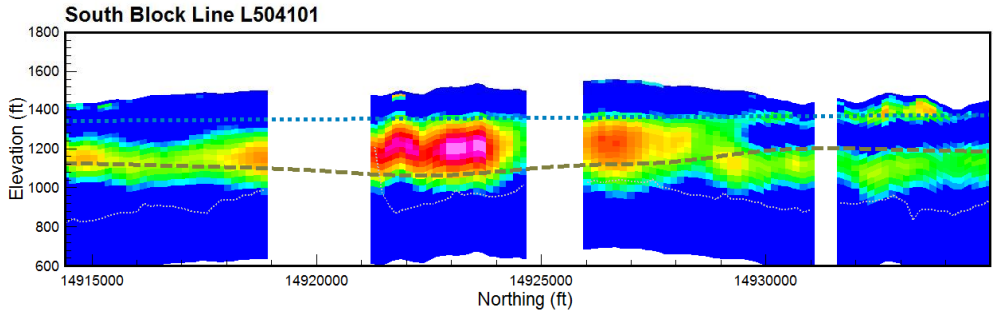

Line L503901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

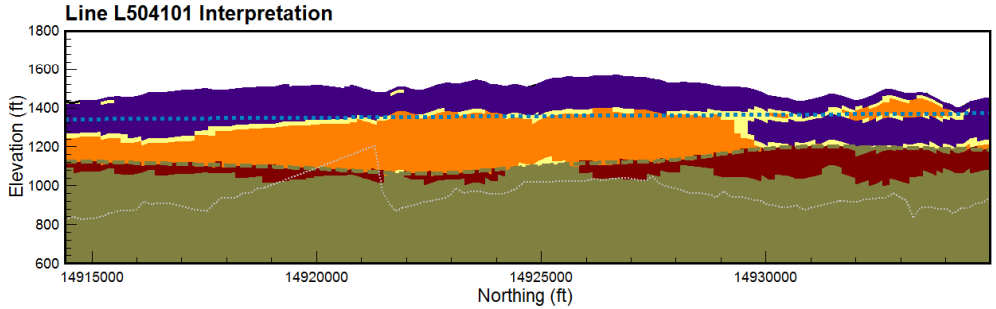

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

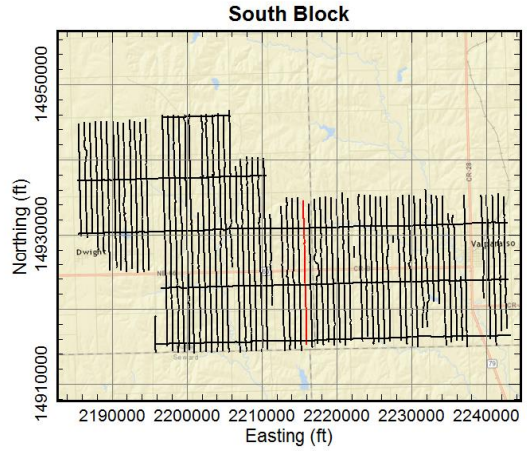

South Block Line L504001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

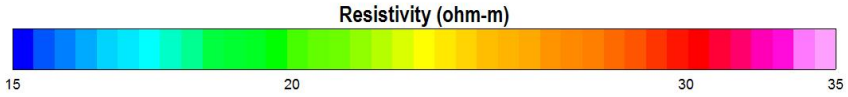

Line L504001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

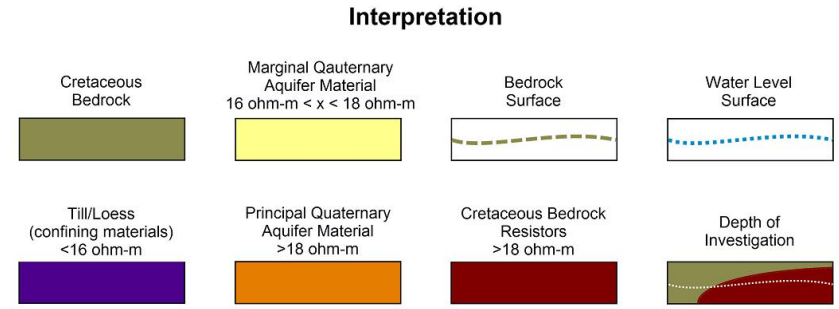

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

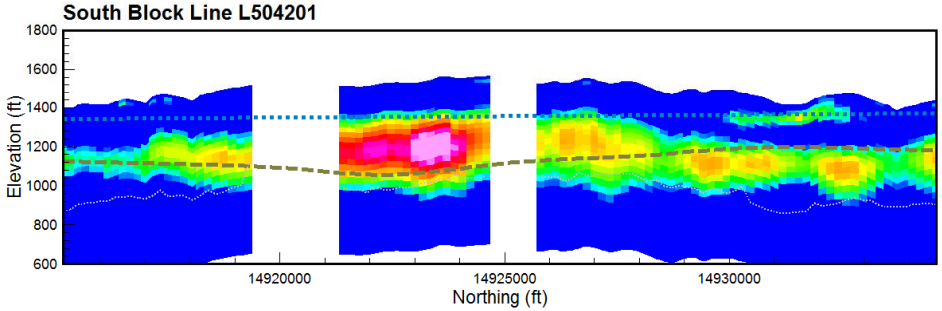

South Block Line L504101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

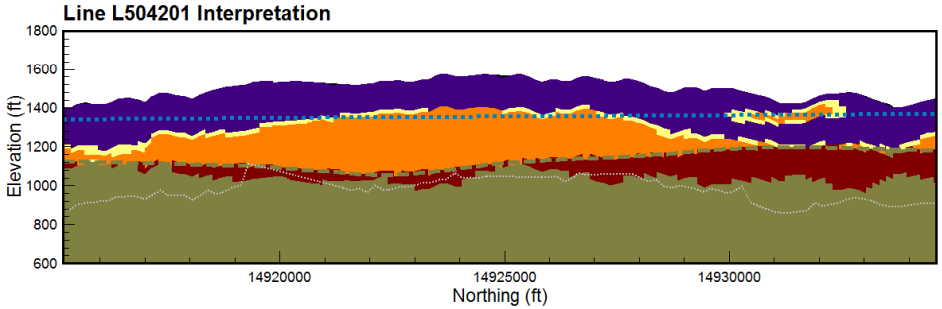

Line L504101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

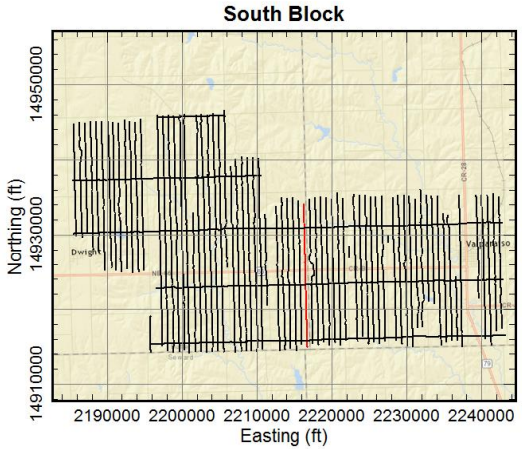

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

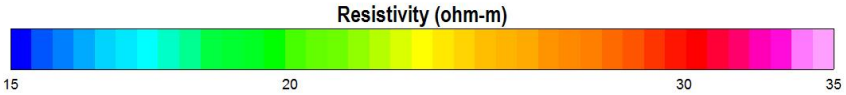

Resistivity (ohm-m)
15
20
30
35

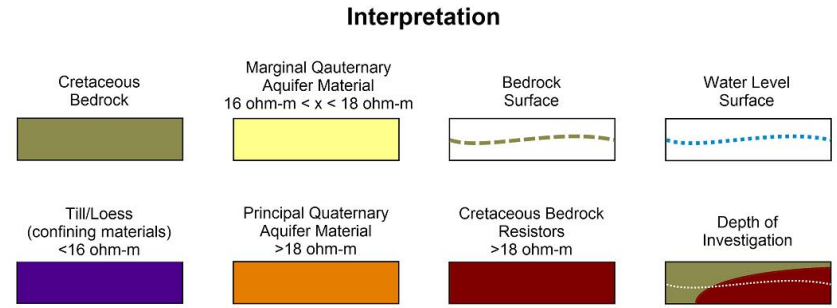

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

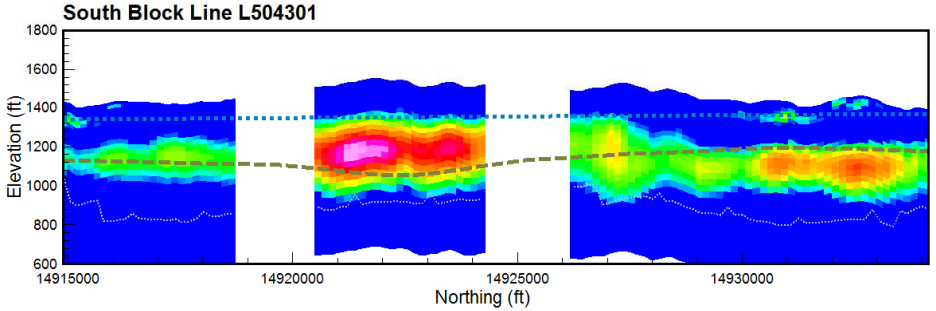

South Block Line L504201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

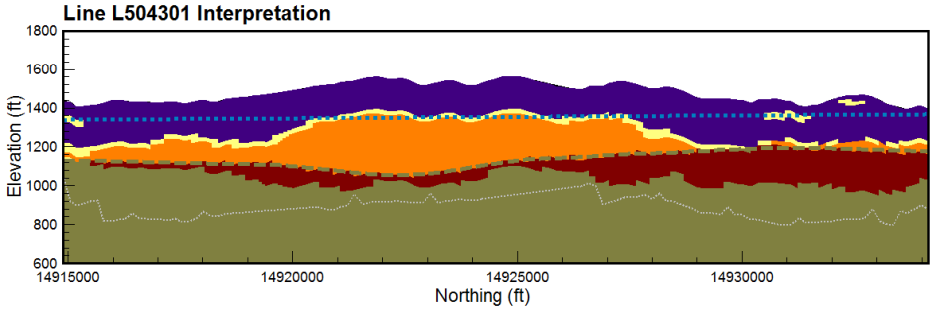

Line L504201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

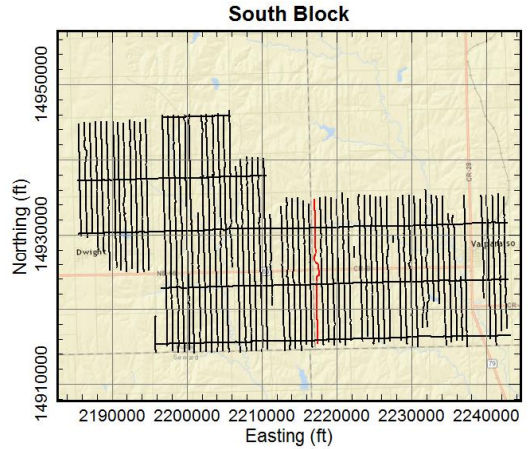

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

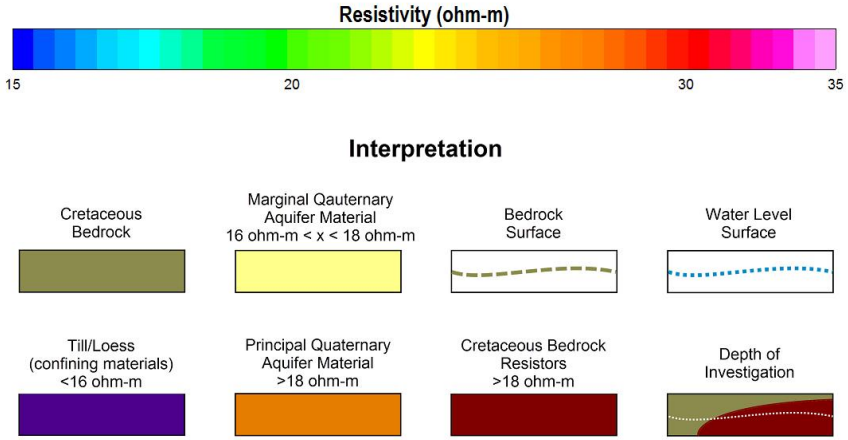

Resistivity (ohm-m)
15
20
30
35

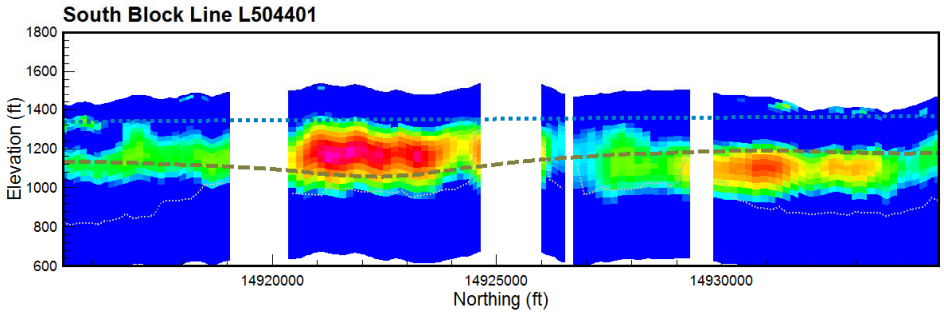

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

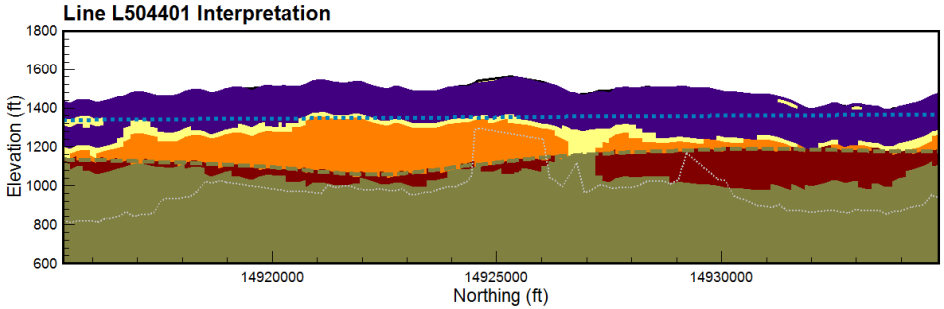

South Block Line L504301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

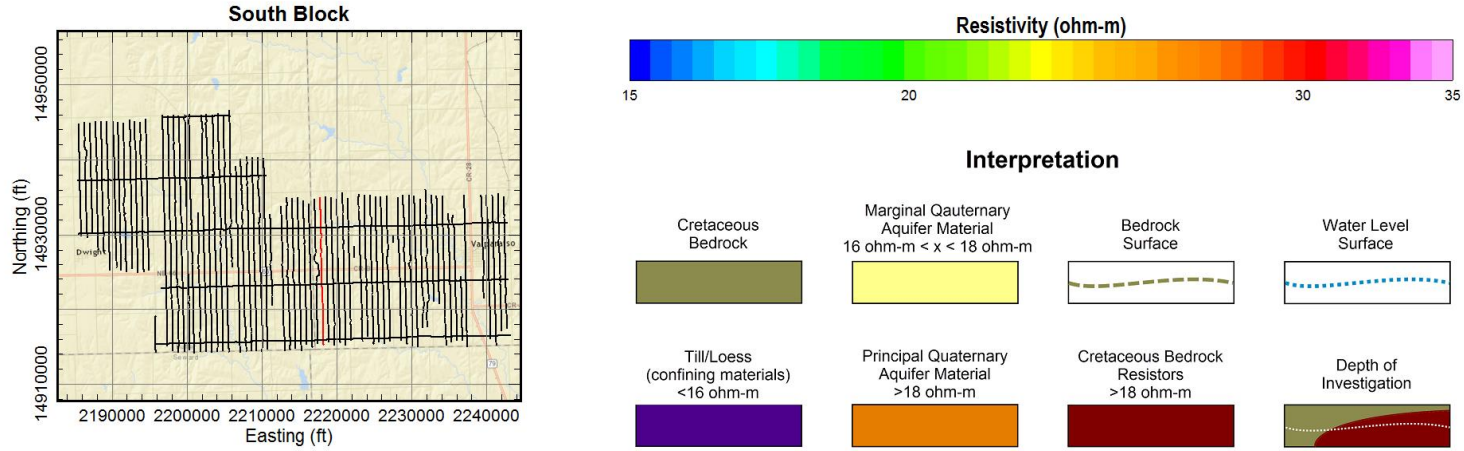

Line L504301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
Northing (ft)

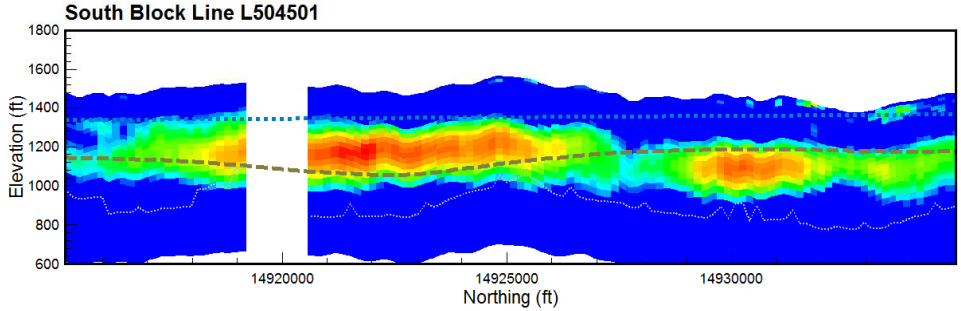

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

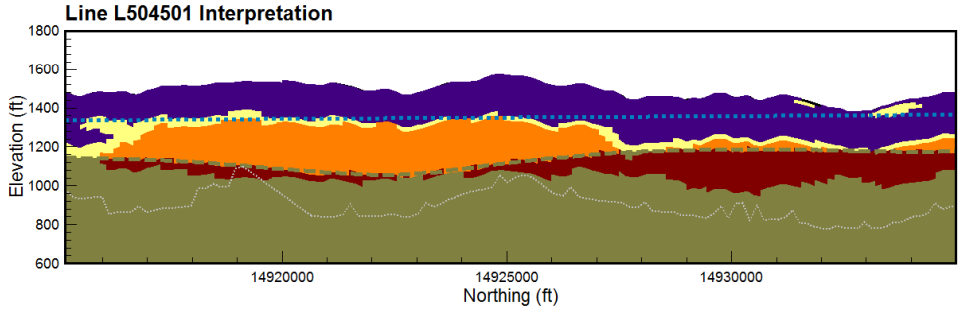

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

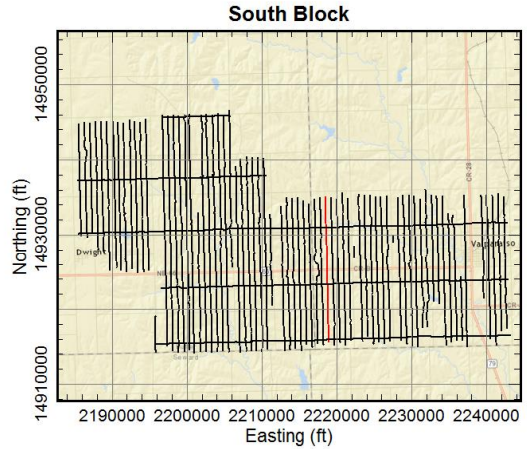

South Block Line L504401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

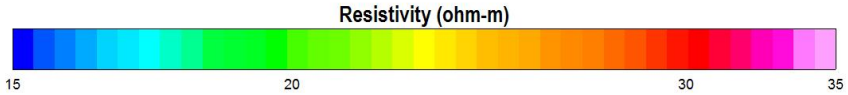

Line L504401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

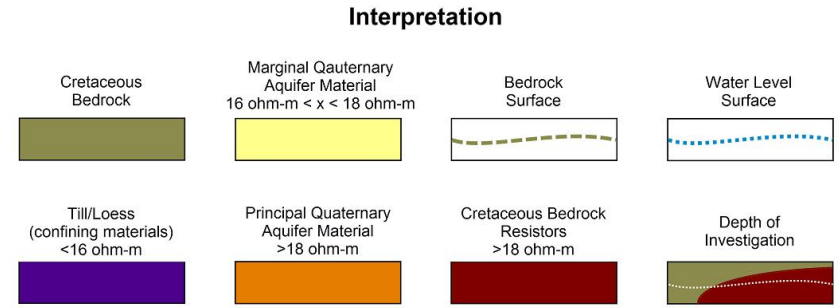

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

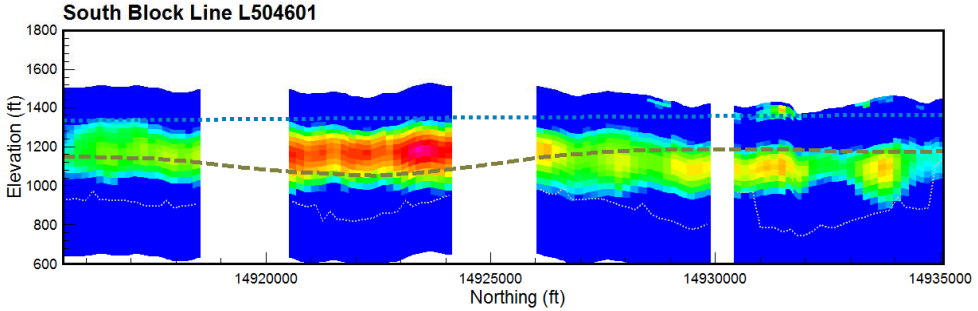

South Block Line L504501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

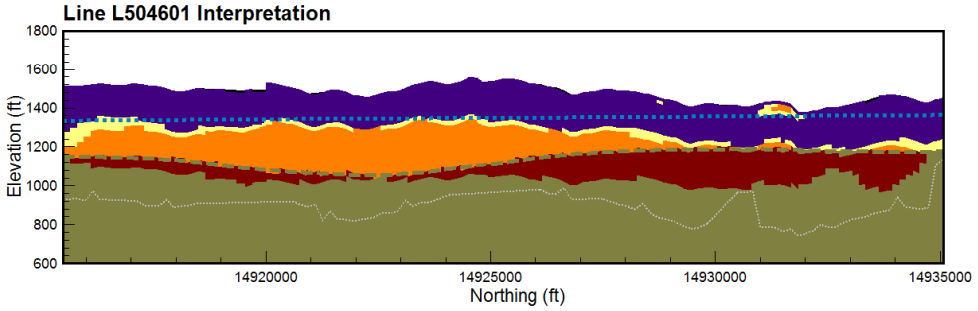

Line L504501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

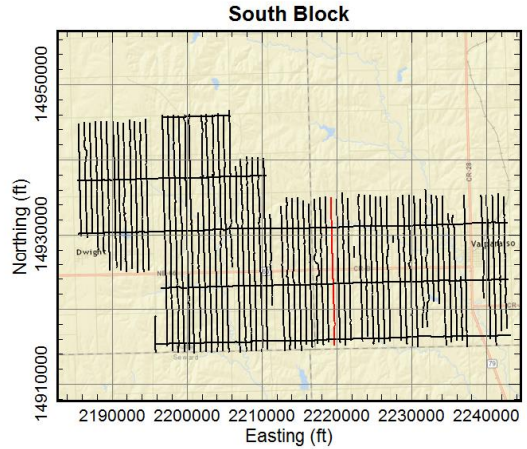

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

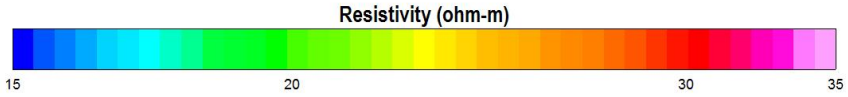

Resistivity (ohm-m)
15
20
30
35

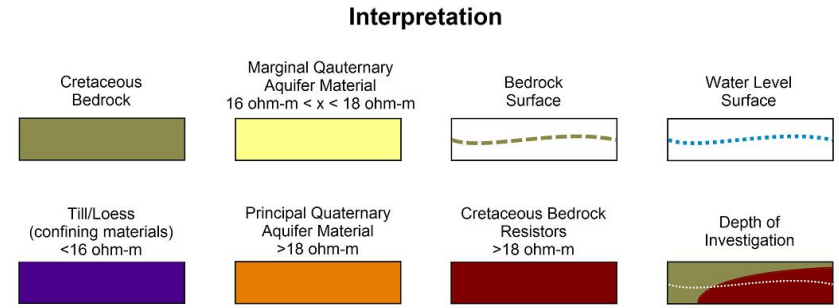

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

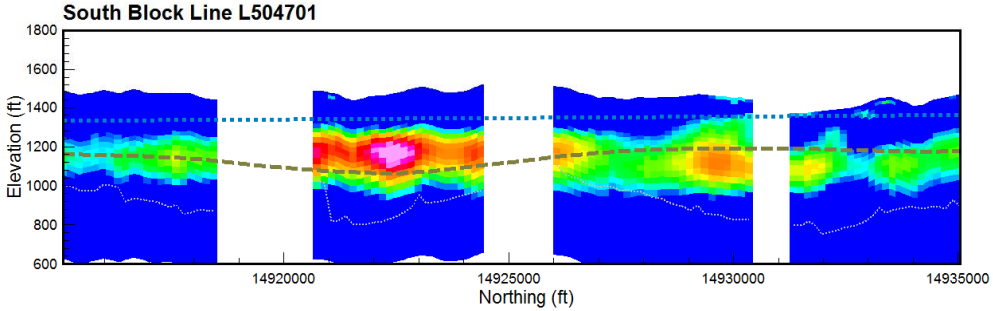

South Block Line L504601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

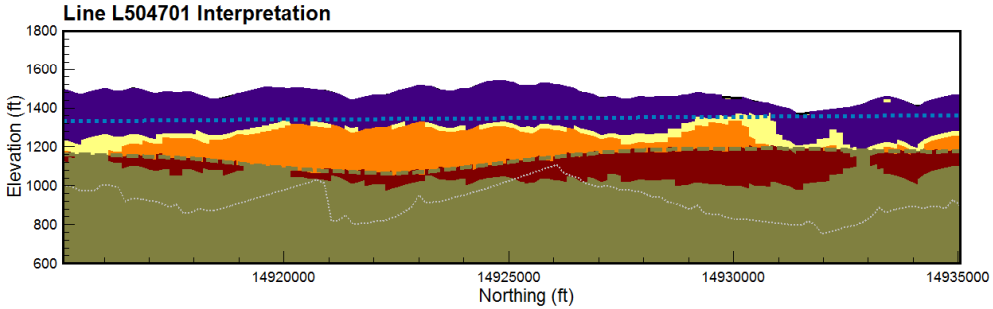

Line L504601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

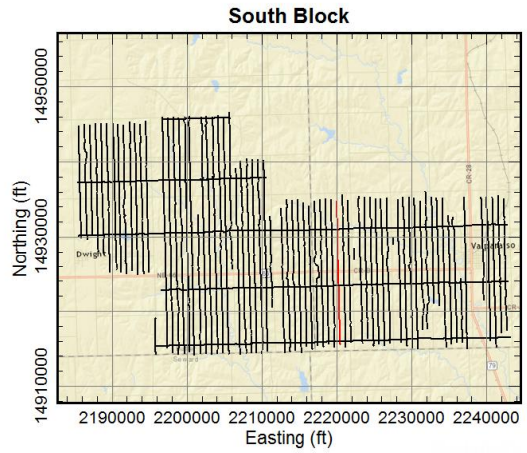

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

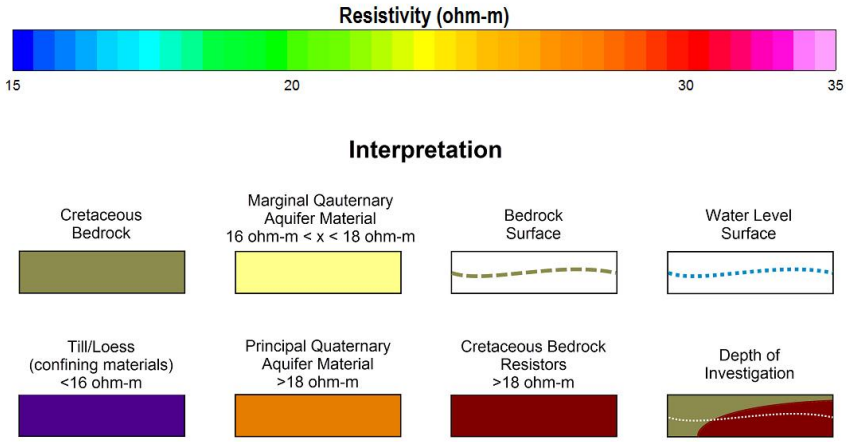

Resistivity (ohm-m)
15
20
30
35

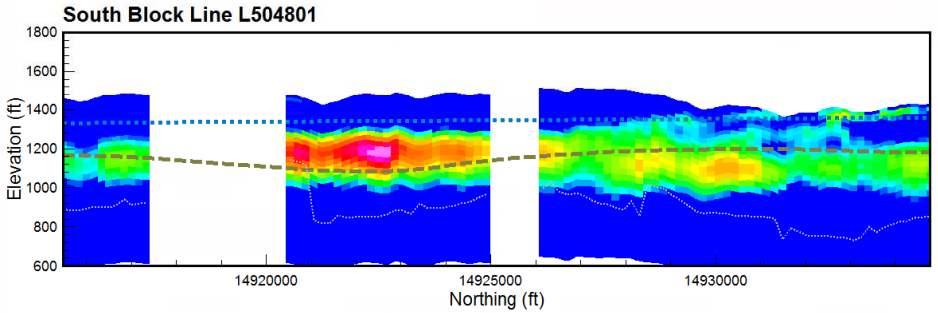

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

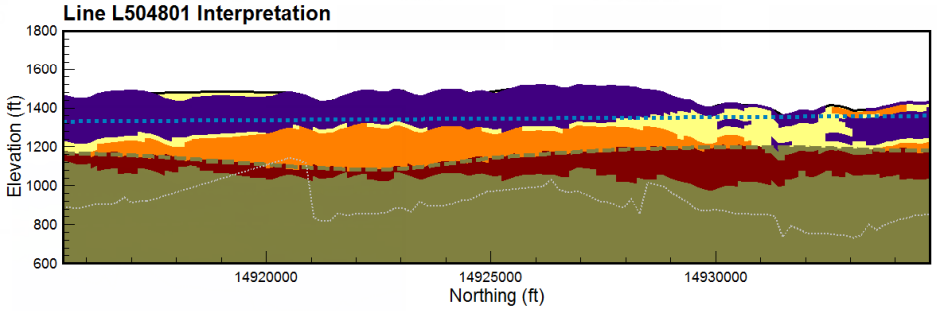

South Block Line L504701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

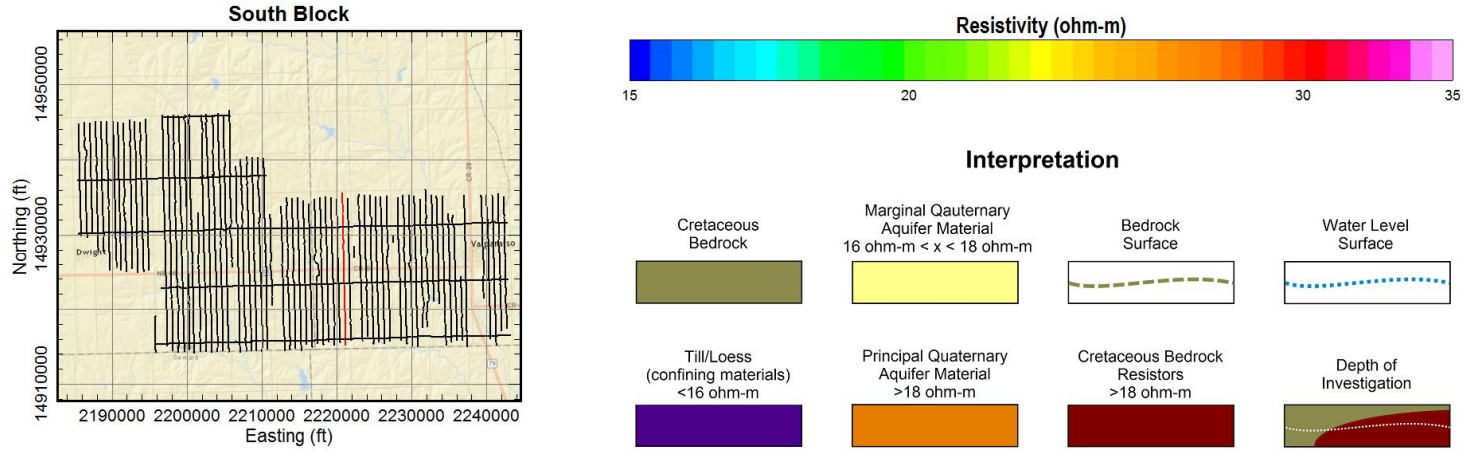

Line L504701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

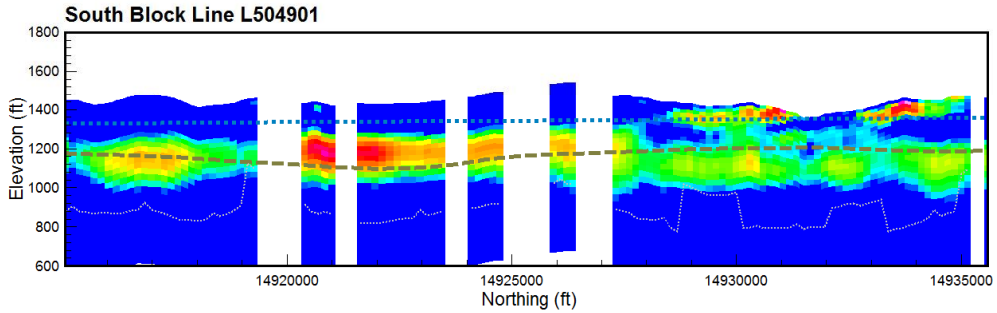

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

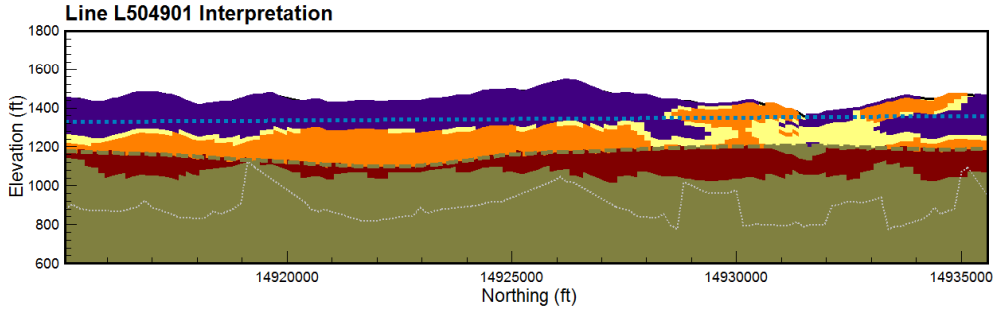

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

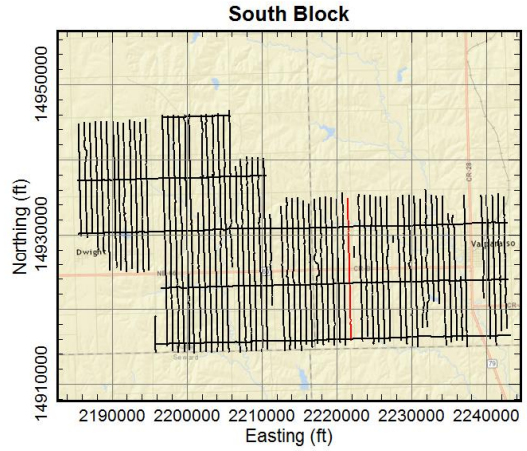

South Block Line L504801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

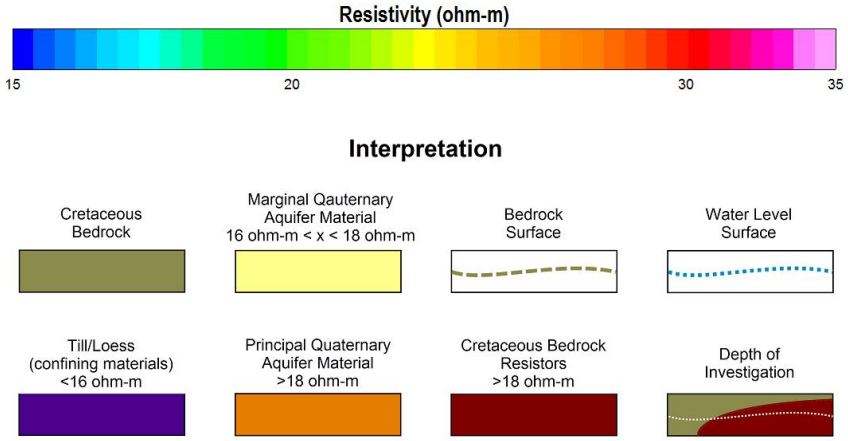

Line L504801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

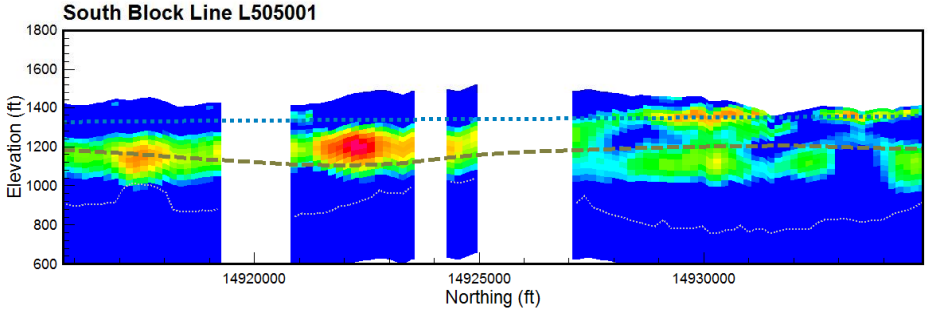

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

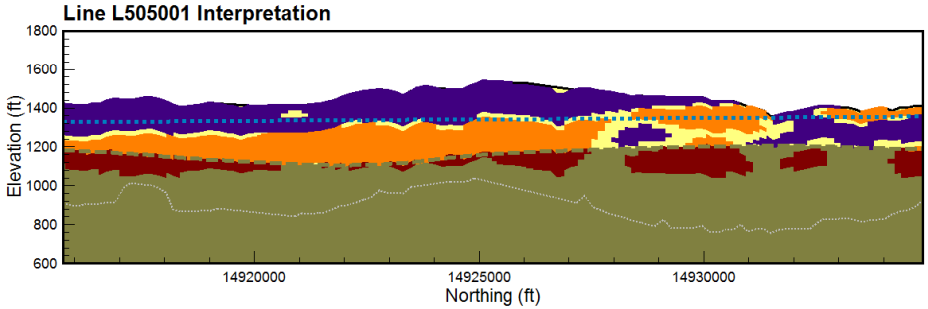

South Block Line L504901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

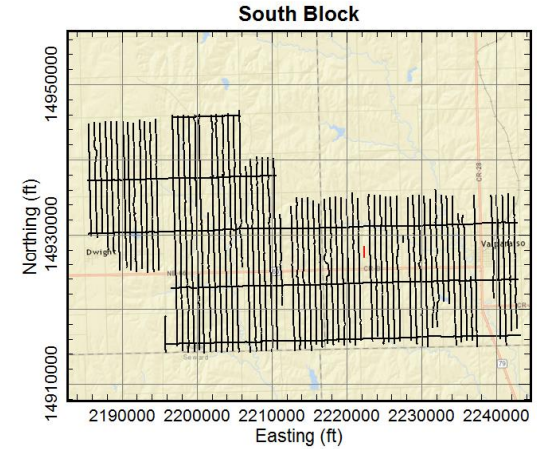

Line L504901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

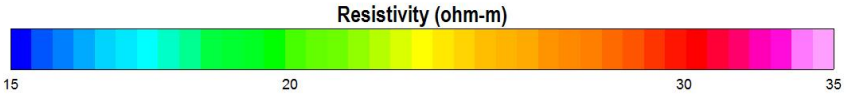

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

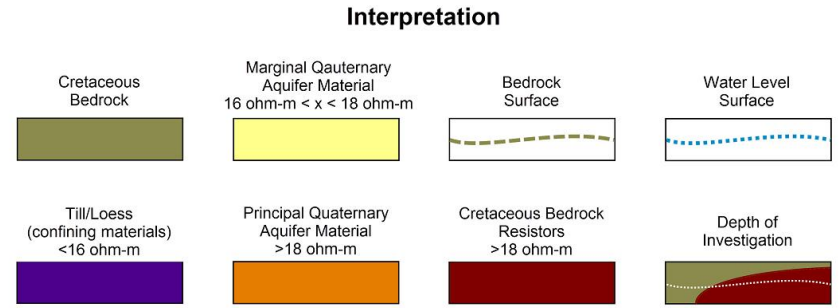

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

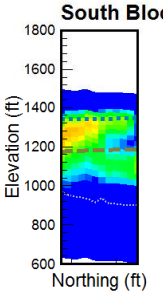

South Block Line L505001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

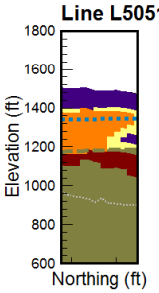

Line L505001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

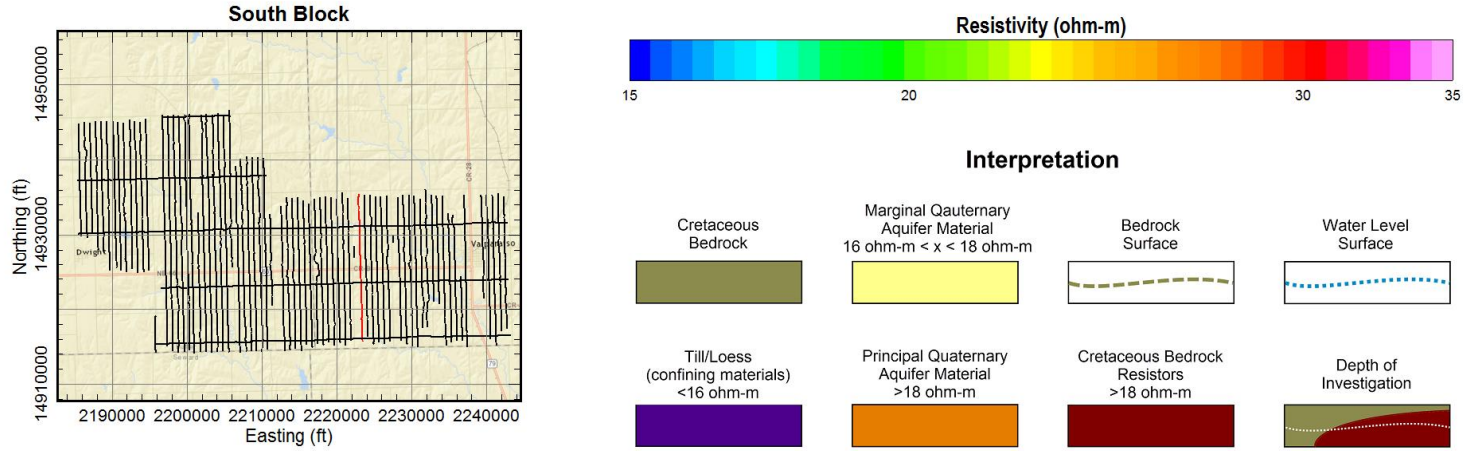

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

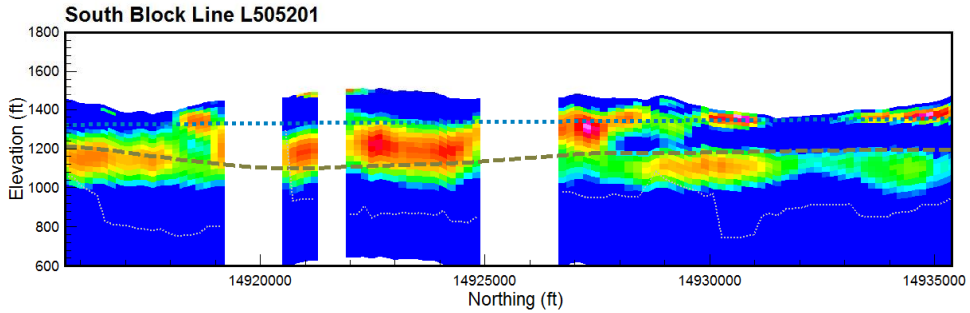

Resistivity (ohm-m)
15
20
30
35

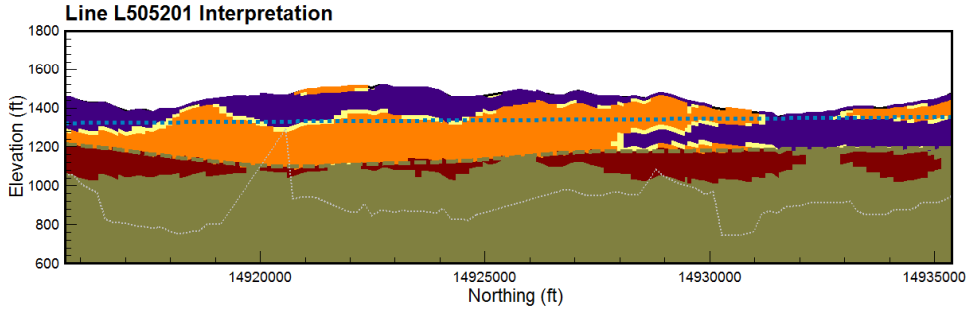

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

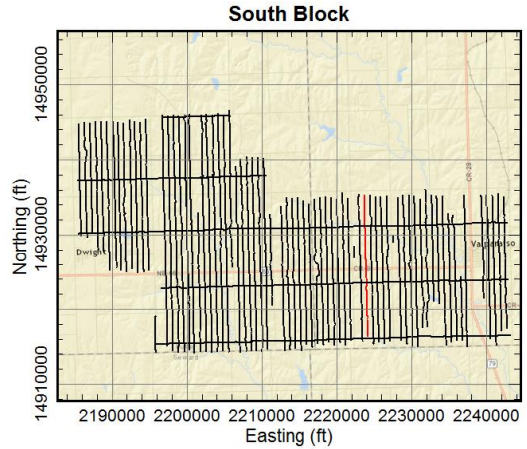

South Block Line L505101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
Northing (ft)

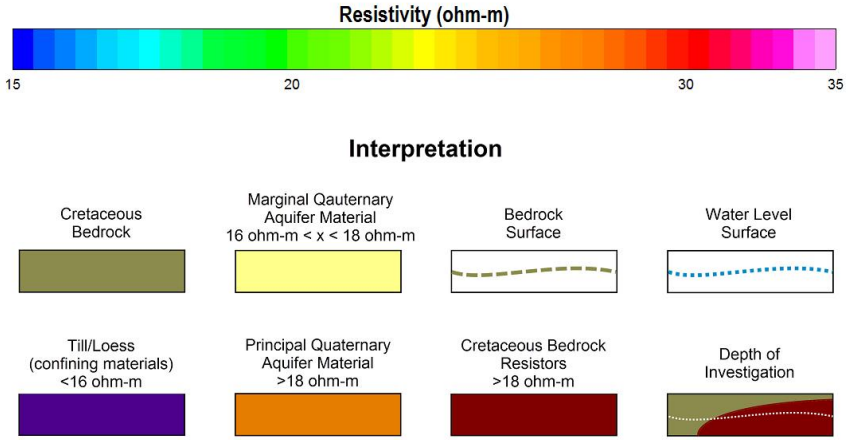

Line L505101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
Northing (ft)

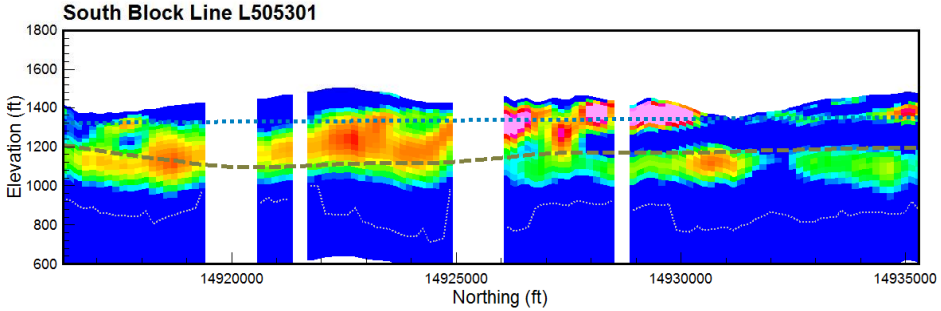

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

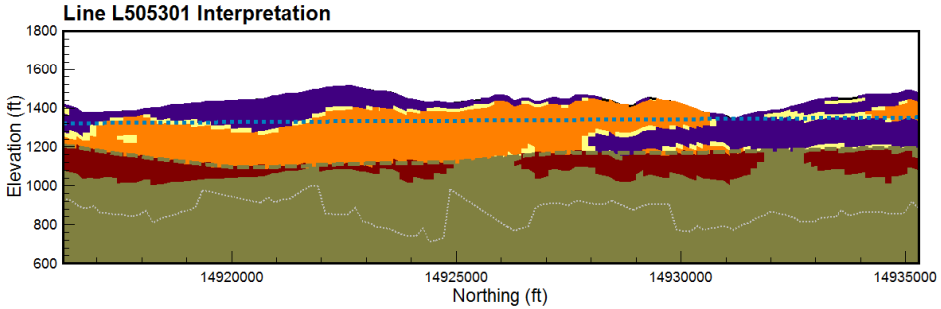

South Block Line L505201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

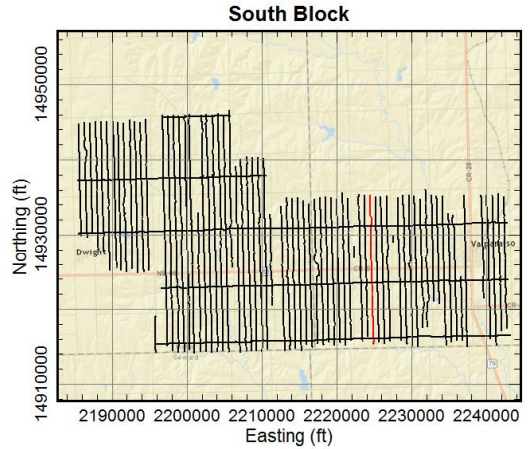

Line L505201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

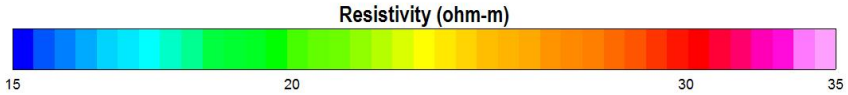

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

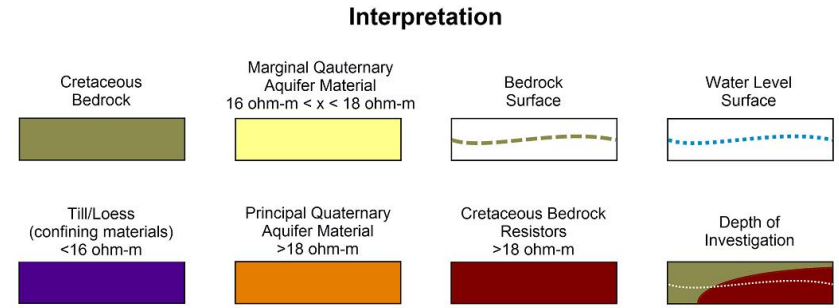

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

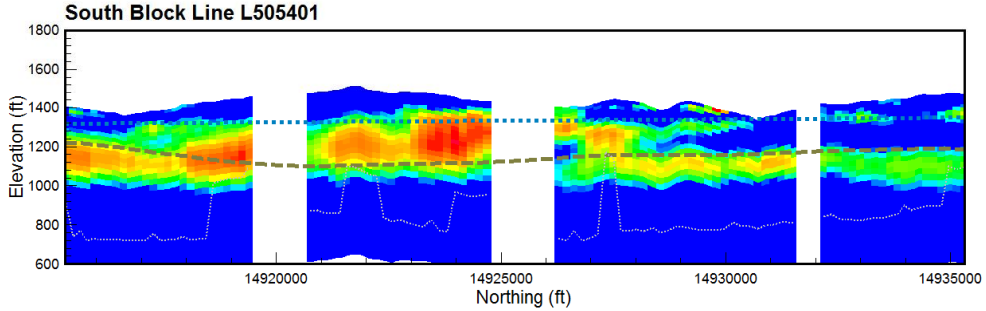

South Block Line L505301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

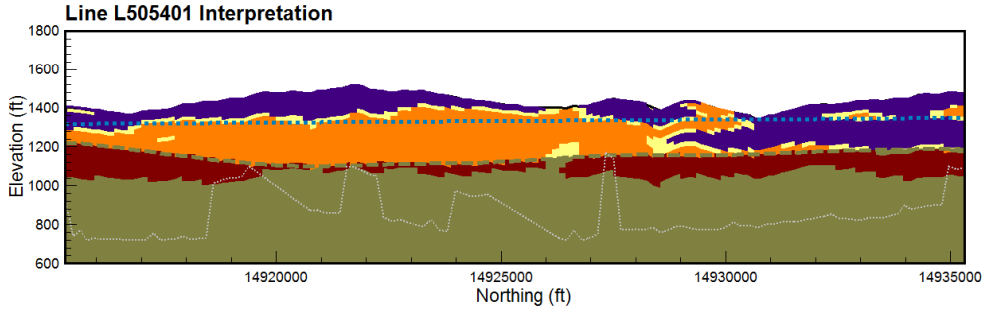

Line L505301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

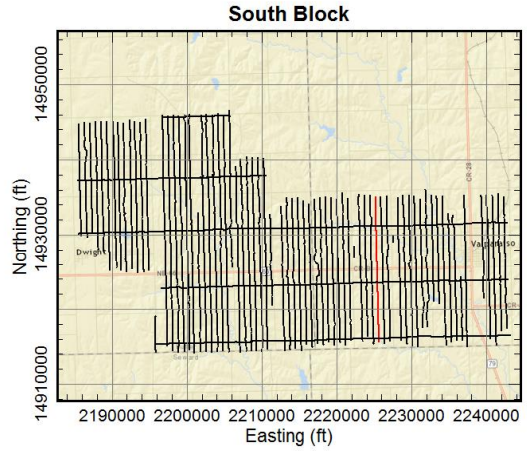

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

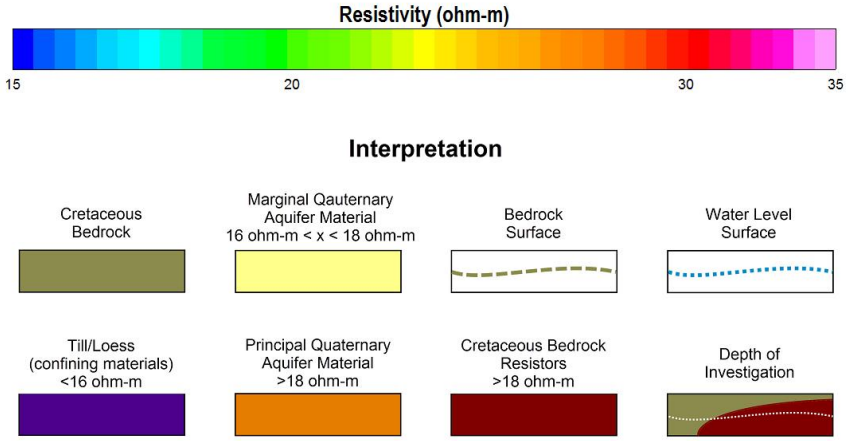

Resistivity (ohm-m)
15
20
30
35

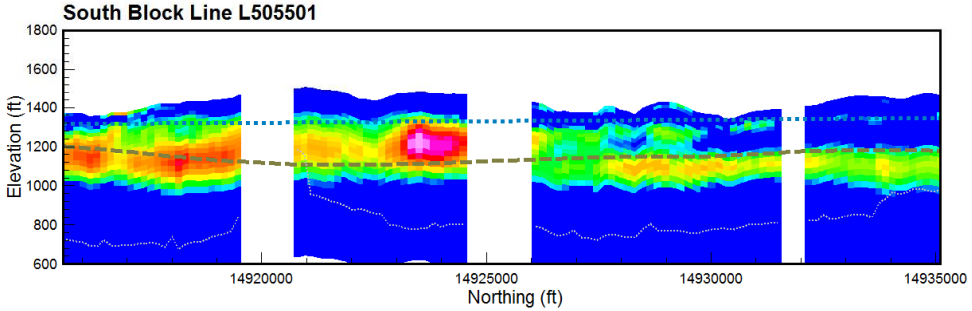

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

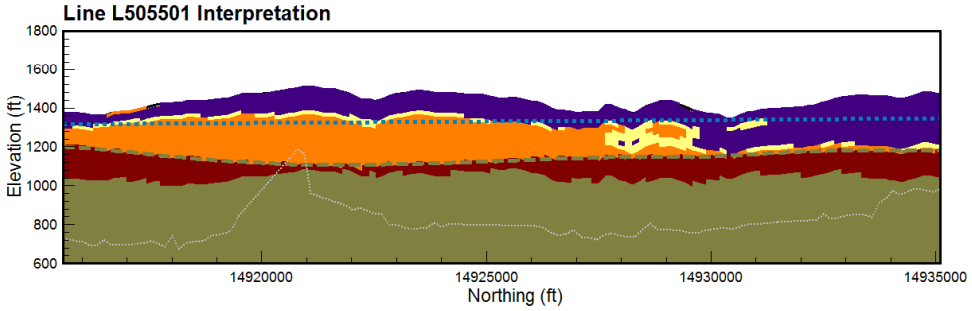

South Block Line L505401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

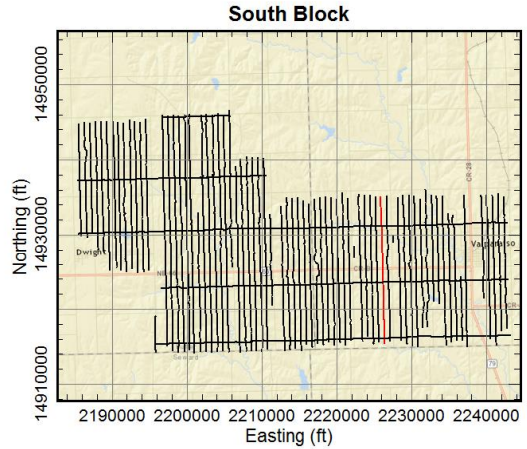

Line L505401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

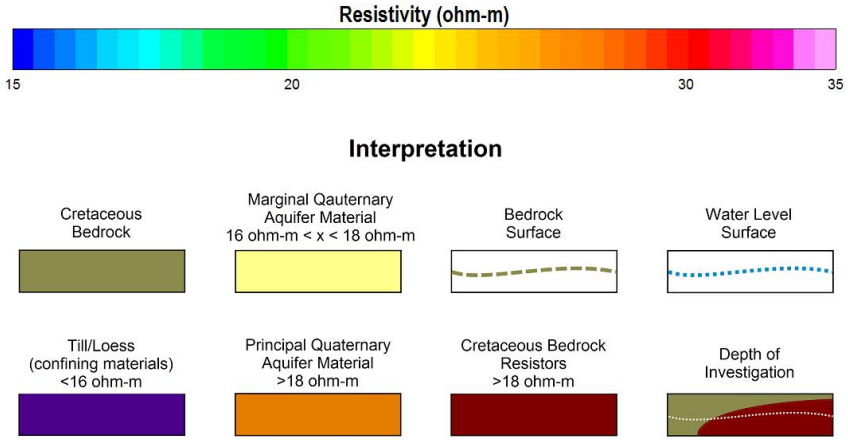

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

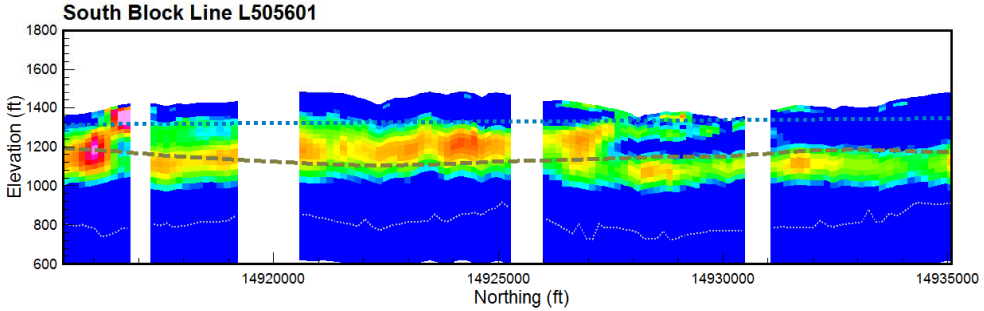

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

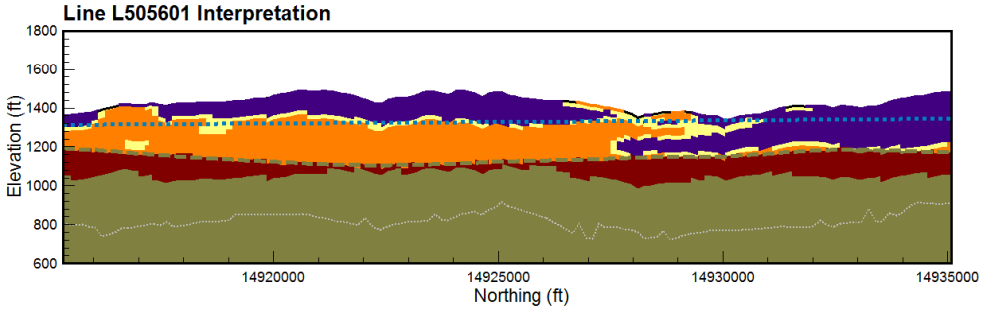

South Block Line L505501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

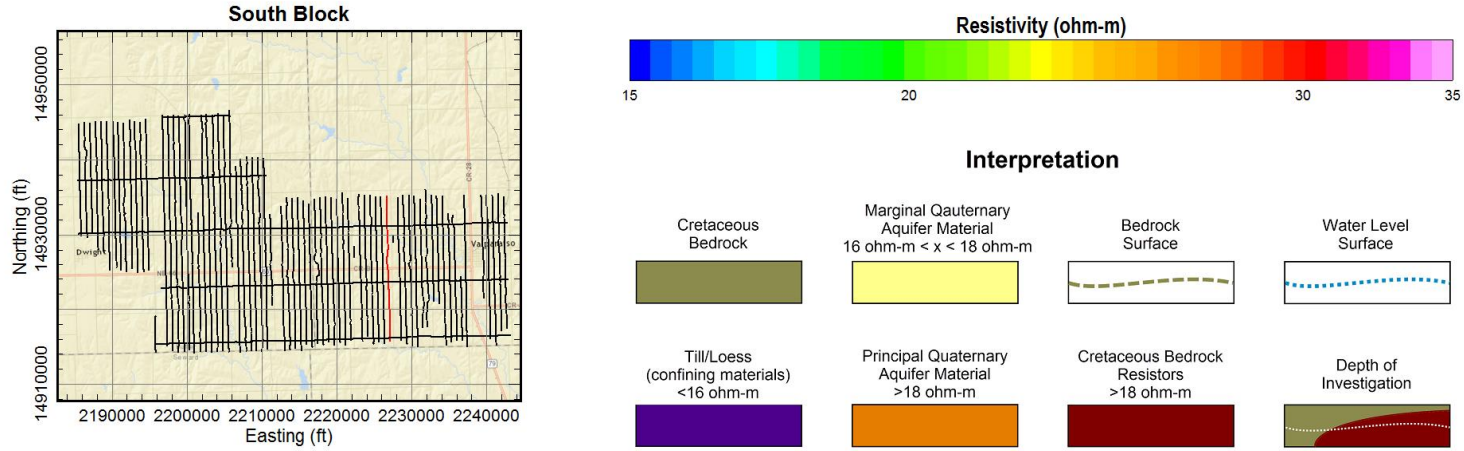

Line L505501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

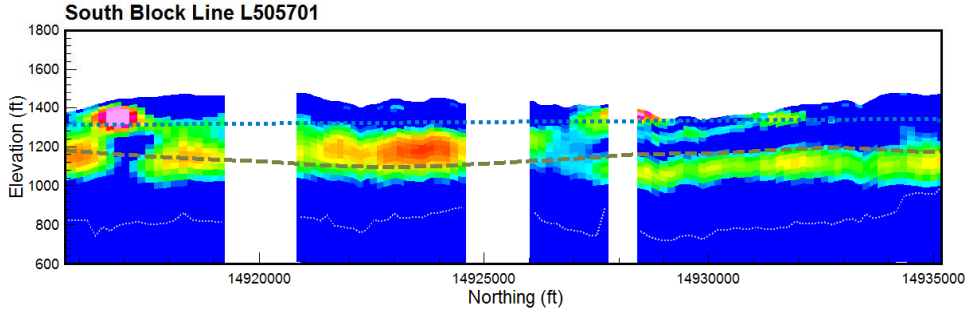

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

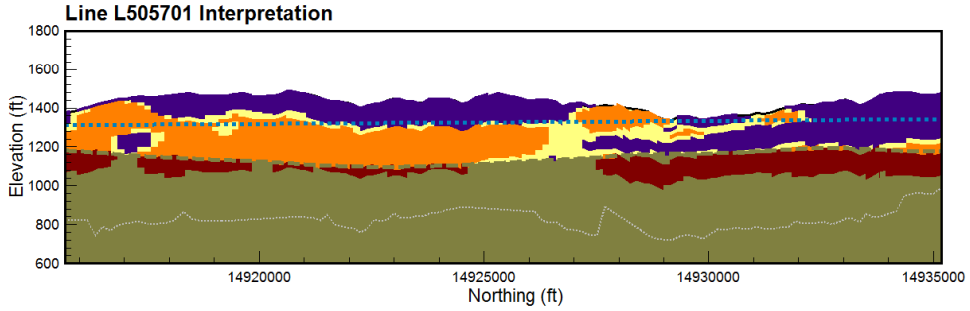

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

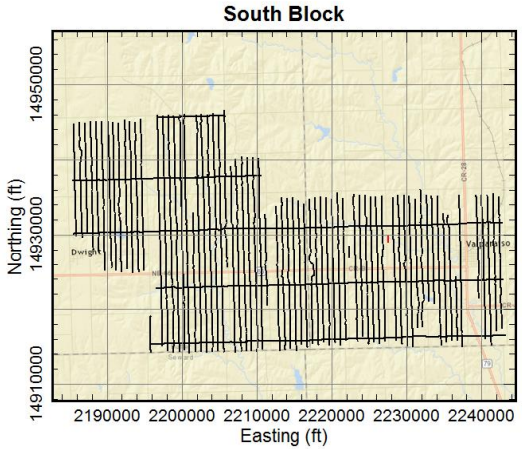

South Block Line L505601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

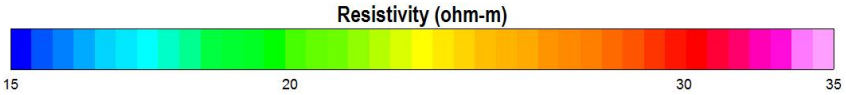

Line L505601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

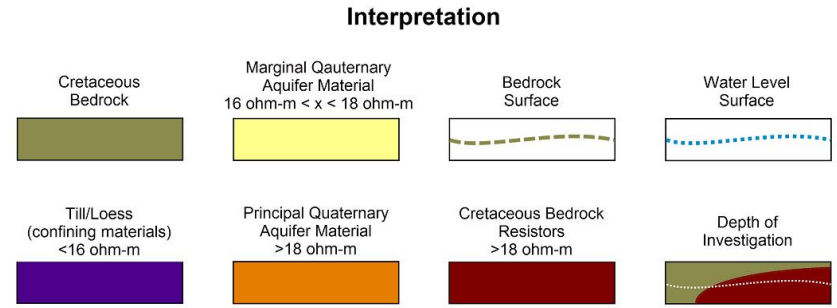

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

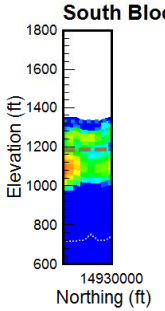

South Block Line L505701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

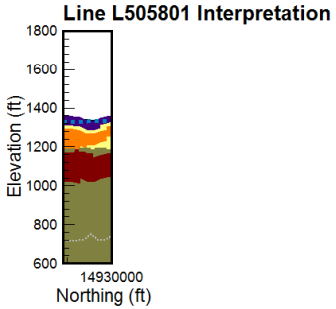

Line L505701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

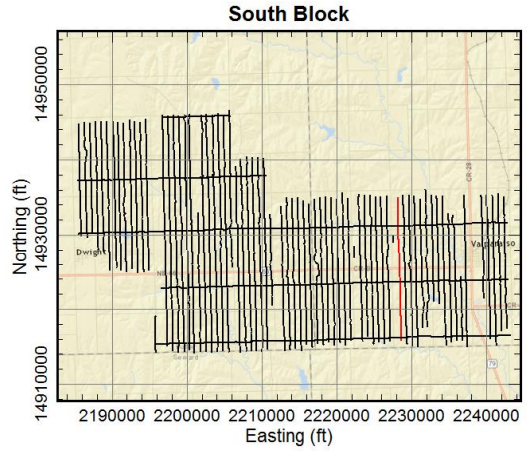

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

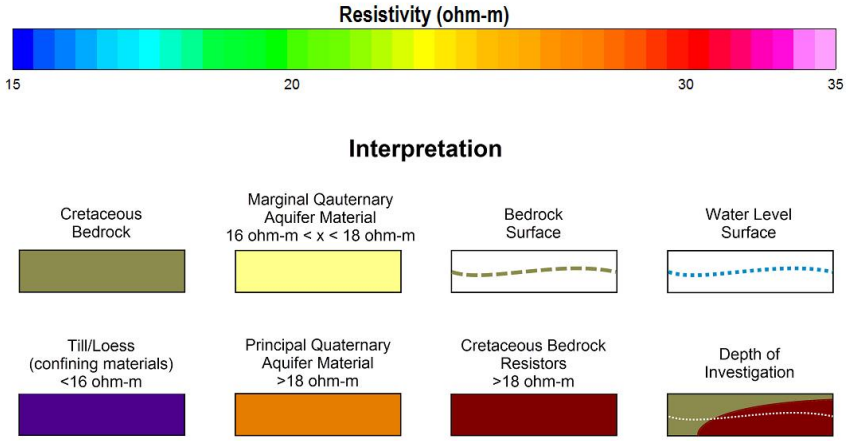

Resistivity (ohm-m)
15
20
30
35

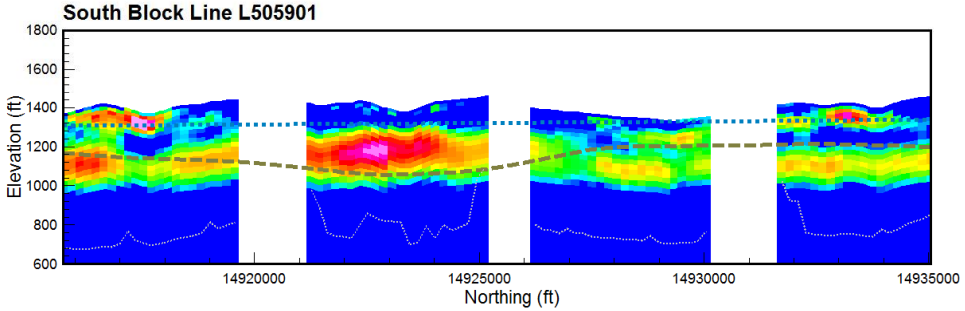

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

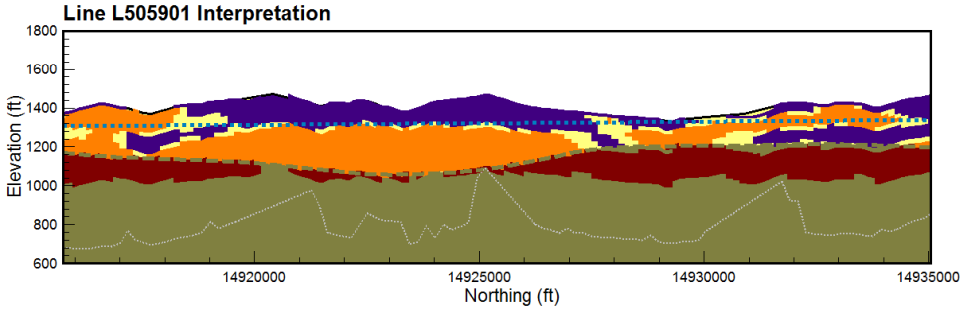

South Block Line L505801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
Northing (ft)

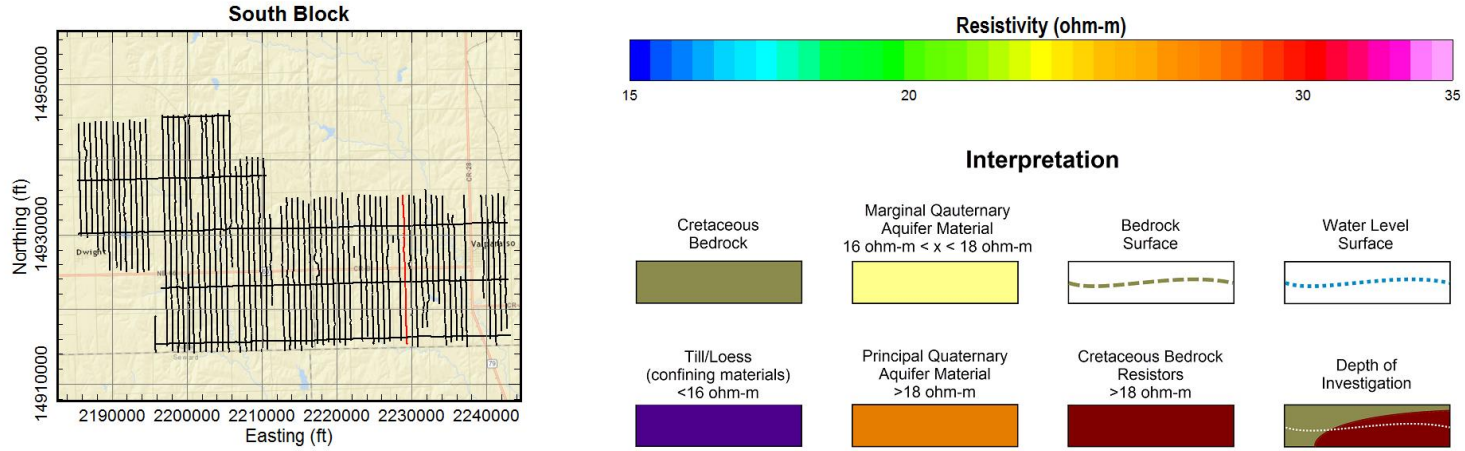

Line L505801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14930000
Northing (ft)

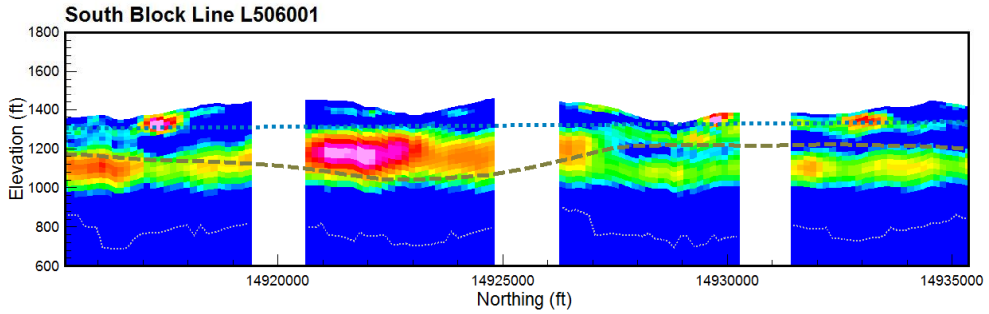

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

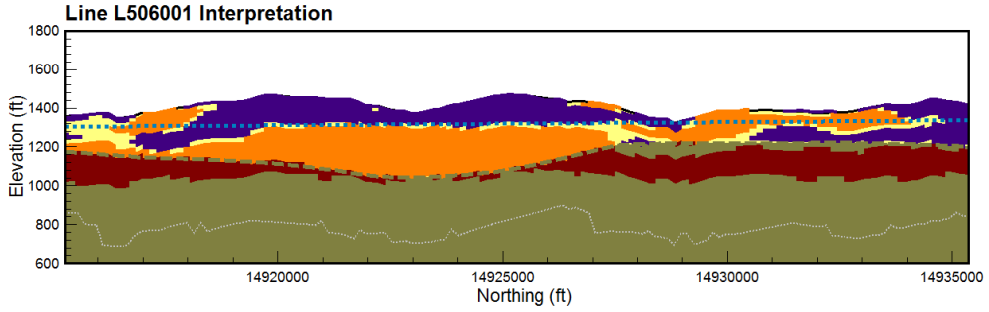

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

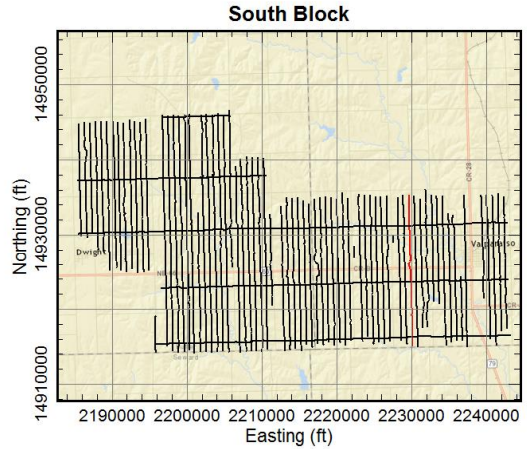

South Block Line L505901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

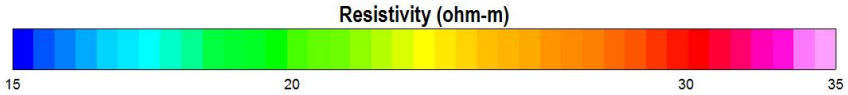

Line L505901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

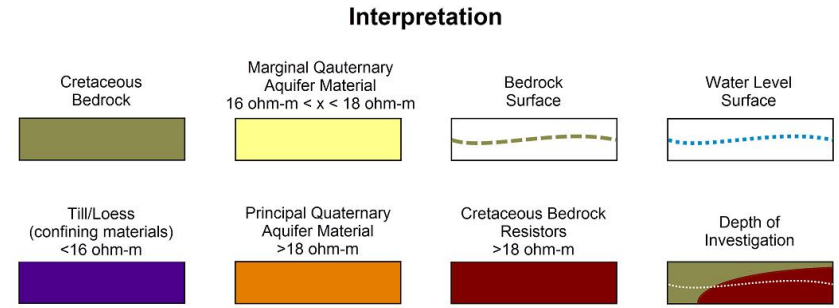

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

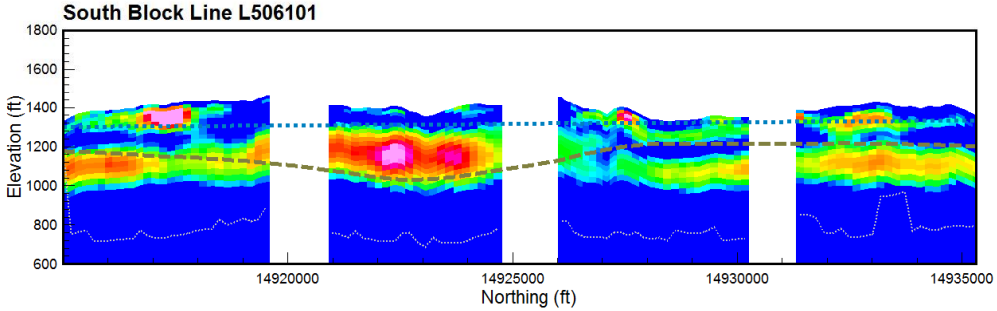

South Block Line L506001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

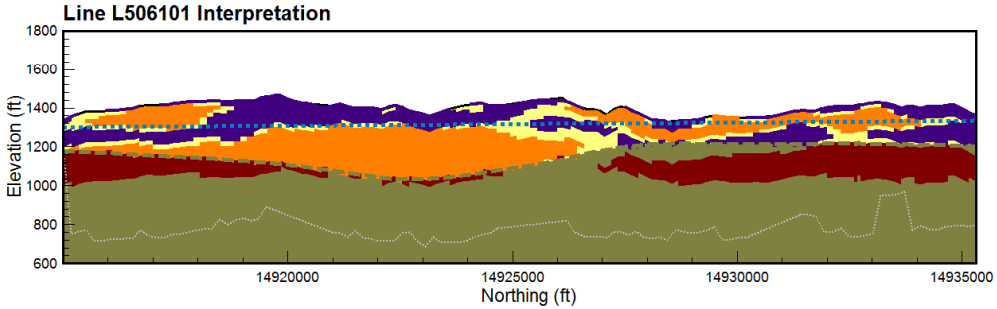

Line L506001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

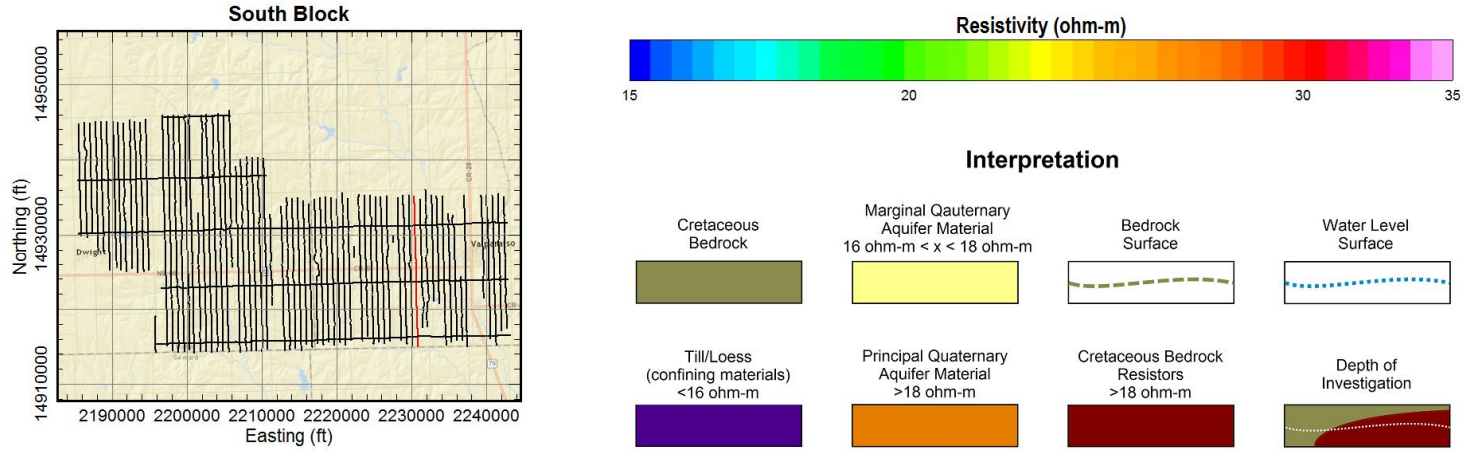

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

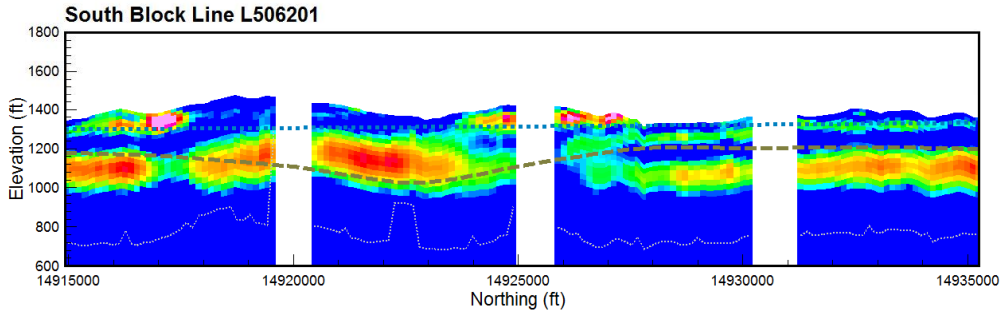

Resistivity (ohm-m)
15
20
30
35

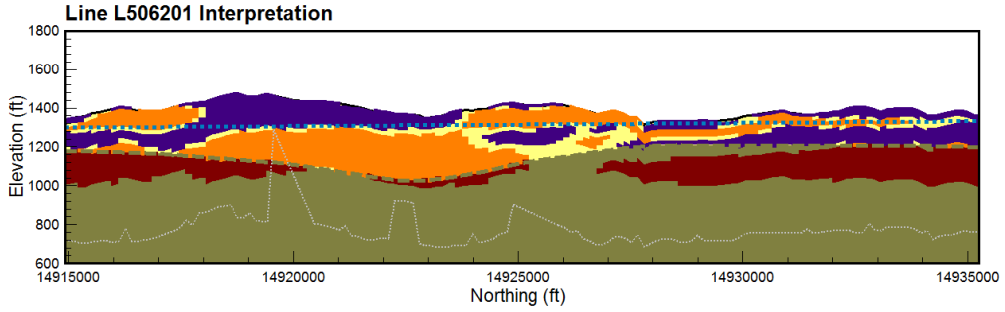

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

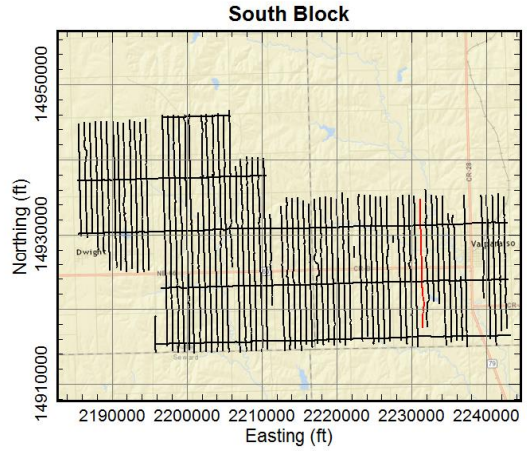

South Block Line L506101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

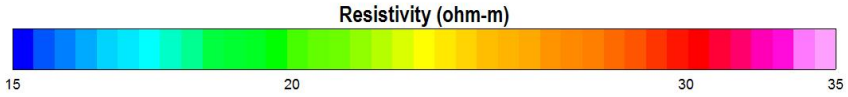

Line L506101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

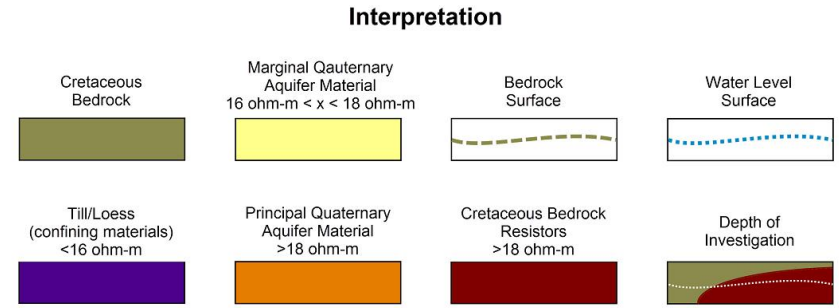

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

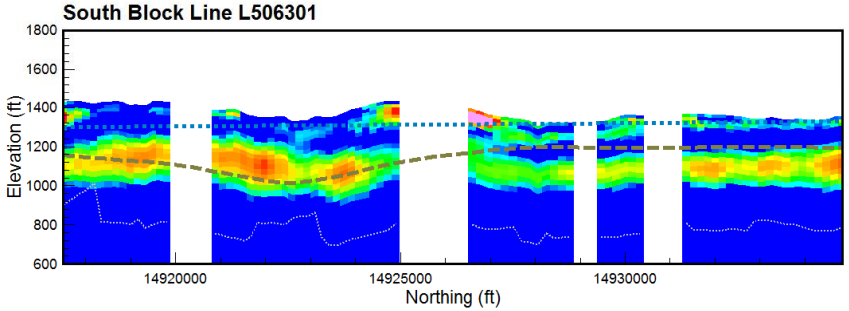

South Block Line L506201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
Northing (ft)

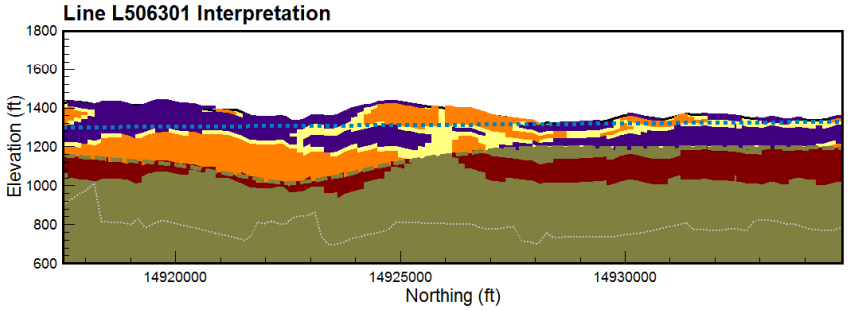

Line L506201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
Northing (ft)

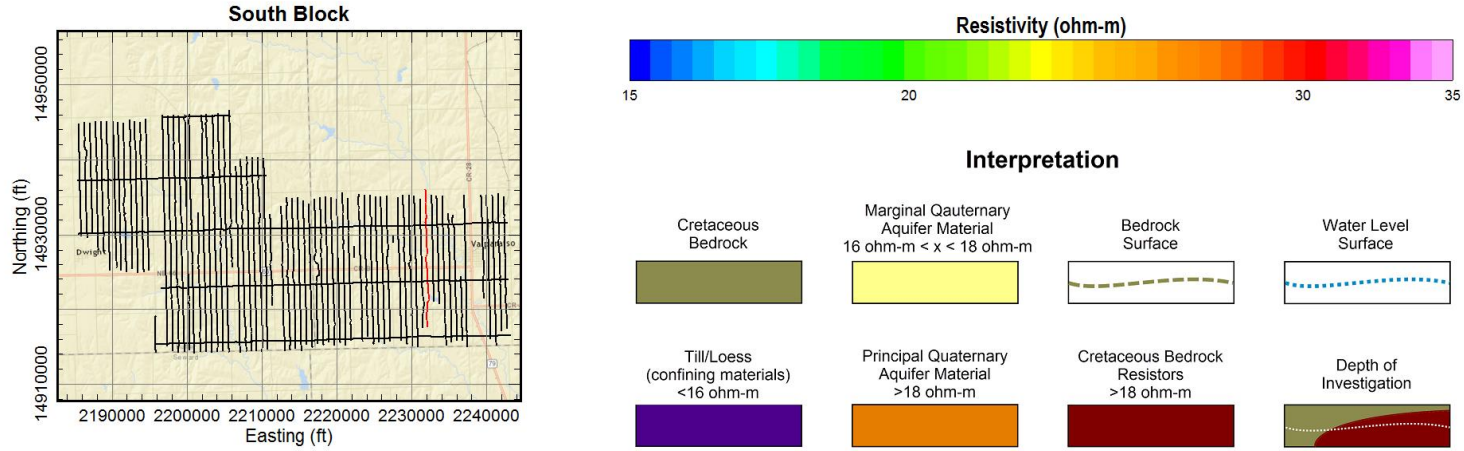

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

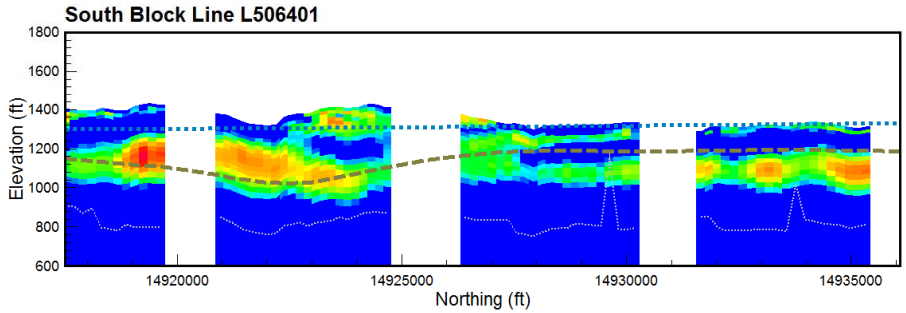

Resistivity (ohm-m)
15
20
30
35

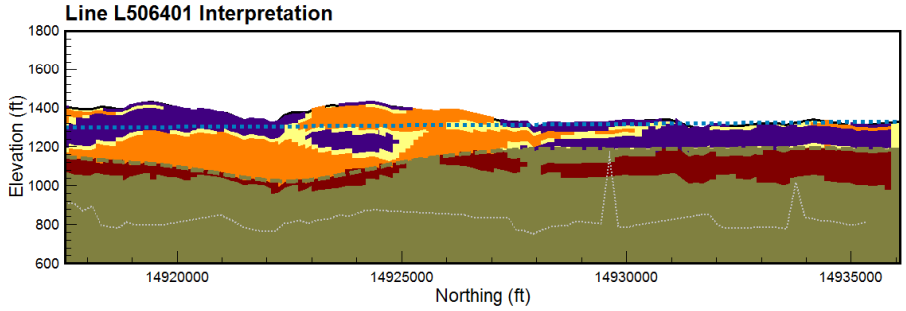

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

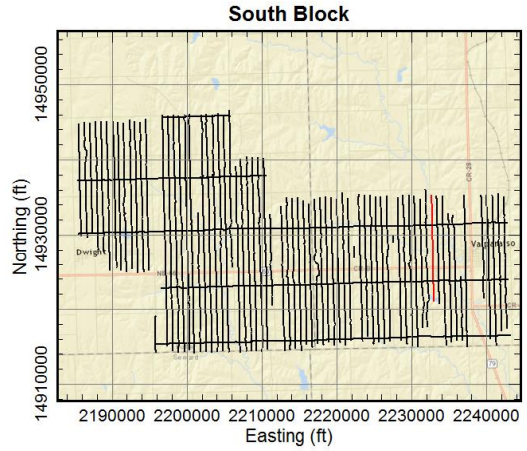

South Block Line L506301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

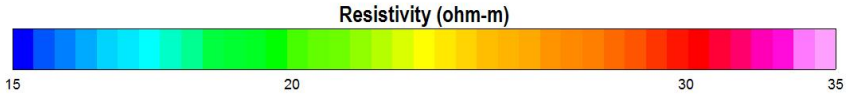

Line L506301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

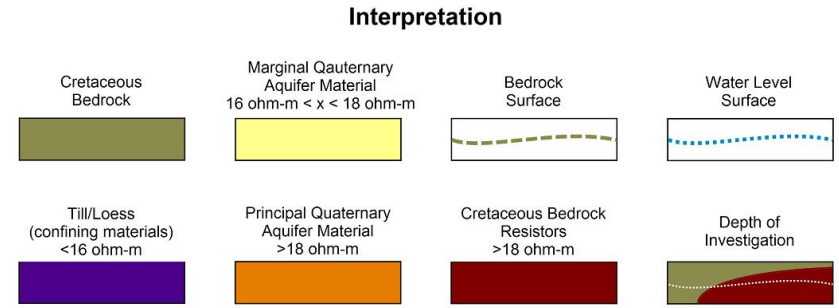

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

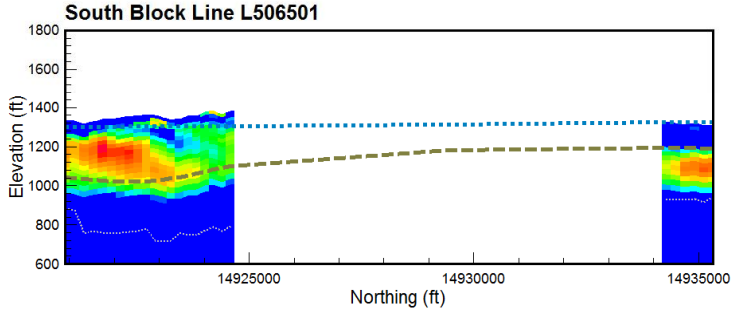

South Block Line L506401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

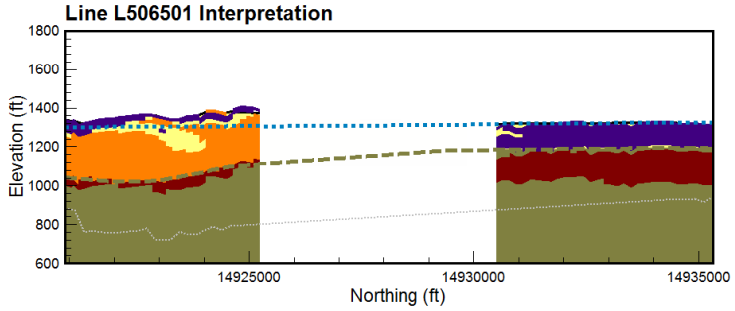

Line L506401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

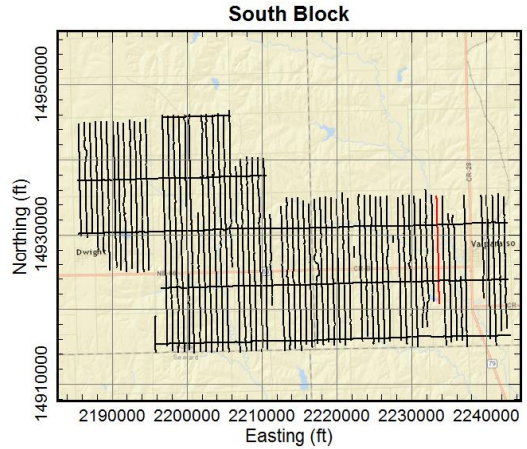

South Block
14950000
14930000
14910000
Northing (ft)
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

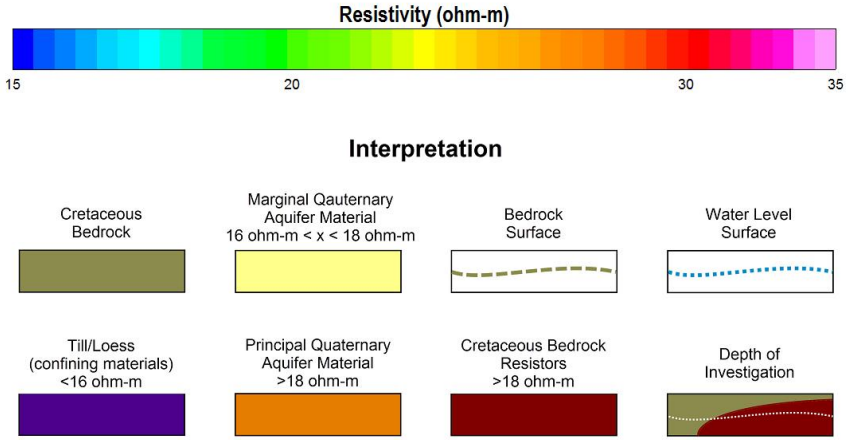

Resistivity (ohm-m)
15
20
30
35

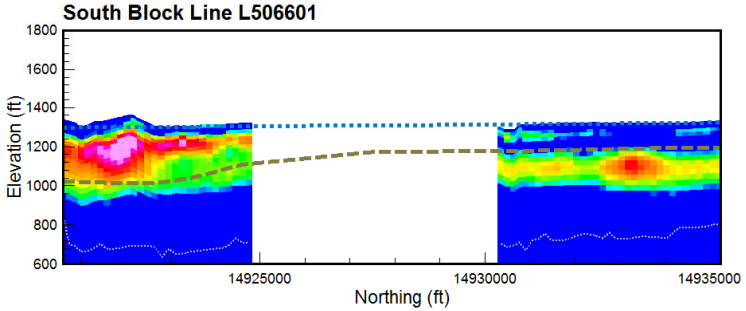

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

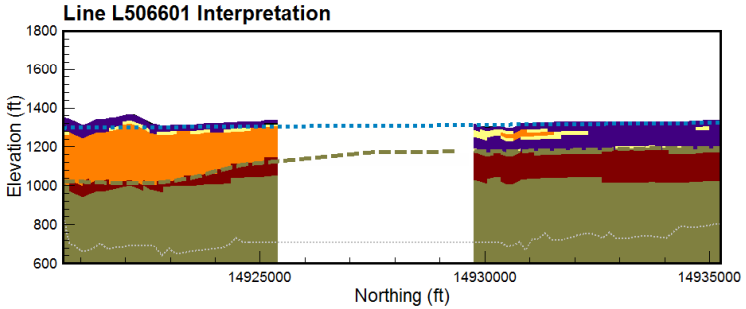

South Block Line L506501
1800
1600
1400
1200
1000
800
600
Elevation (ft)
14925000
14930000
14935000
Northing (ft)

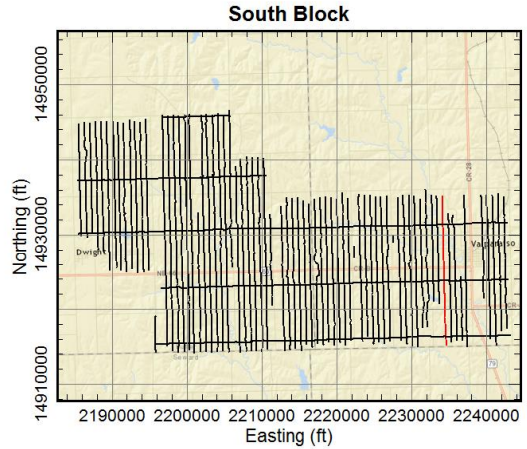

Line L506501 Interpretation
1800
1600
1400
1200
1000
800
600
Elevation (ft)
14925000
14930000
14935000
Northing (ft)

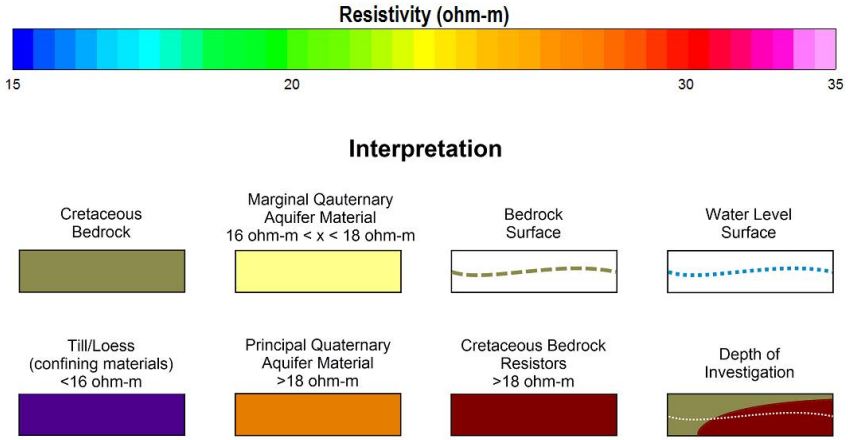

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

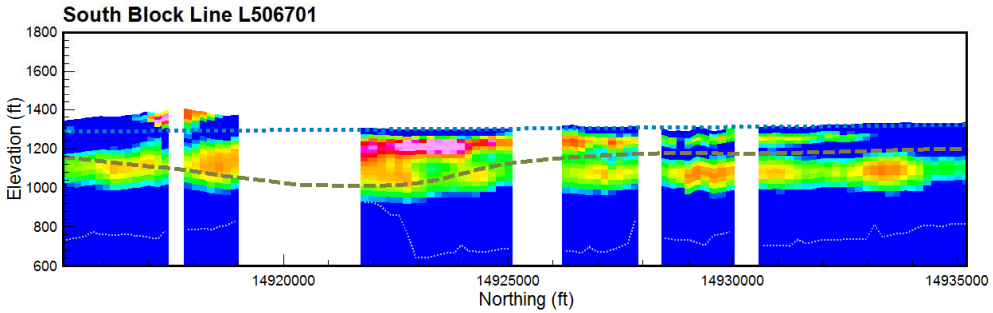

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

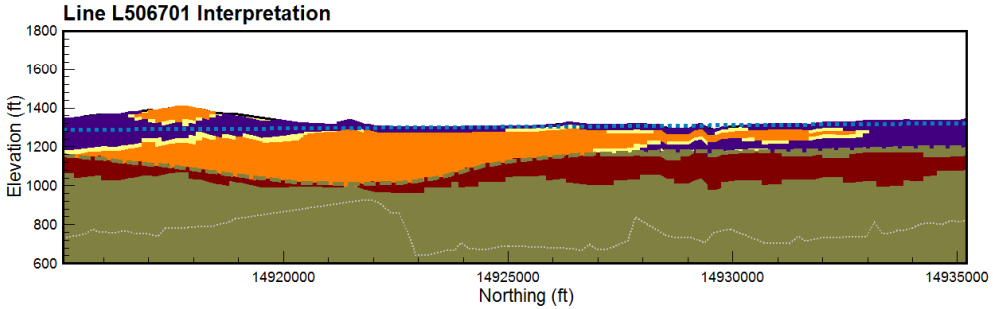

South Block Line L506601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
Northing (ft)

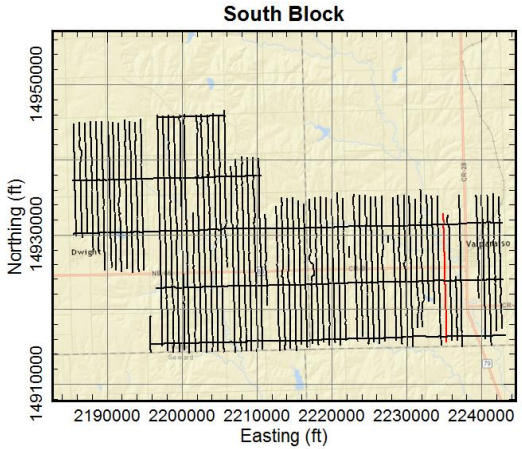

Line L506601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
Northing (ft)

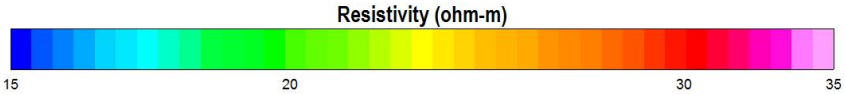

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

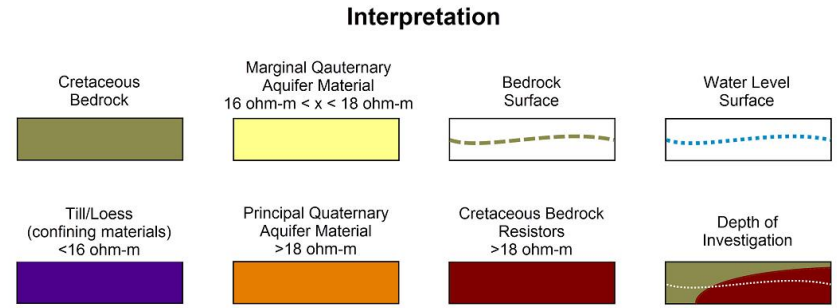

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

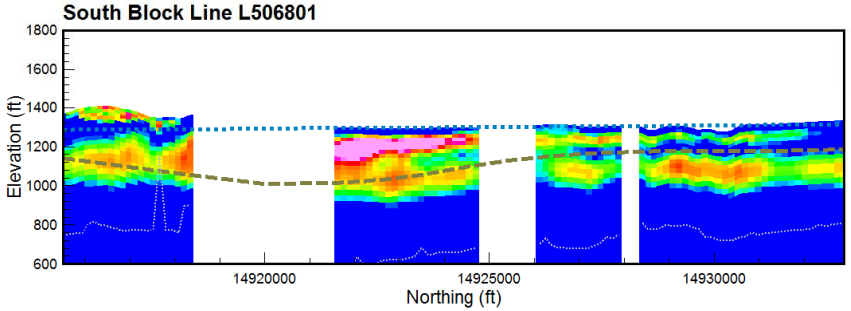

South Block Line L506701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

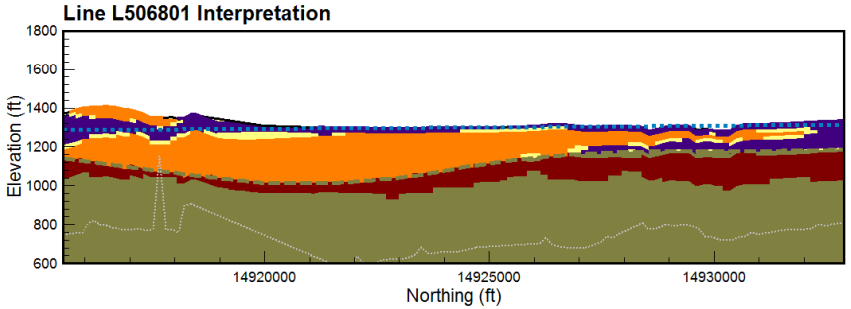

Line L506701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

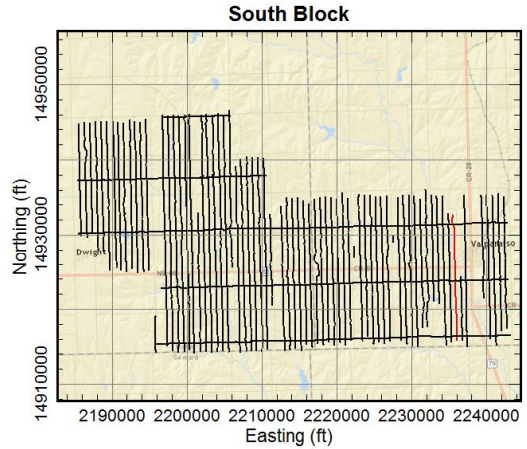

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

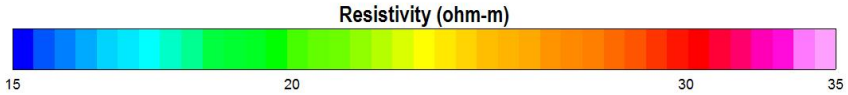

Resistivity (ohm-m)
15
20
30
35

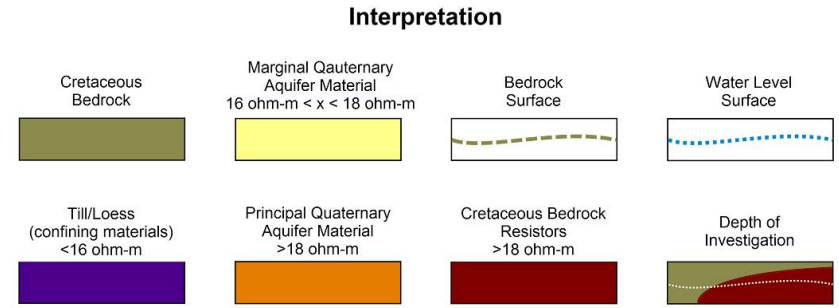

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

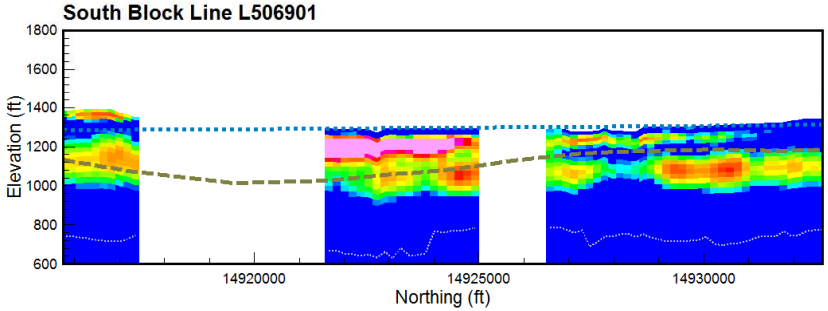

South Block Line L506801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

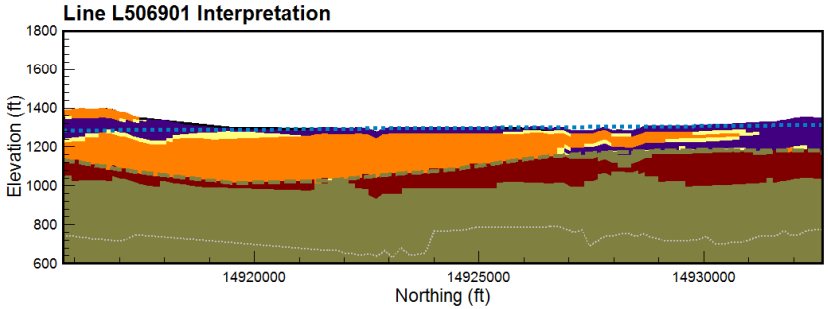

Line L506801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

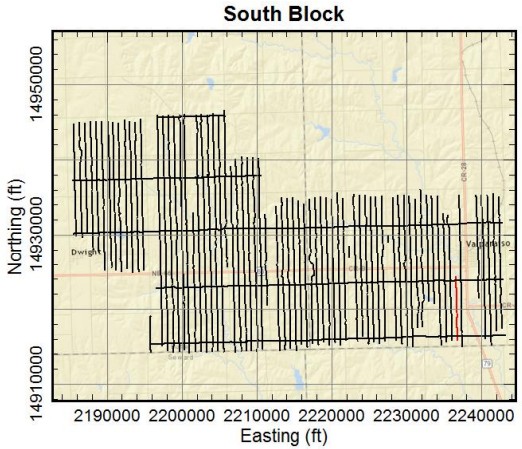

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

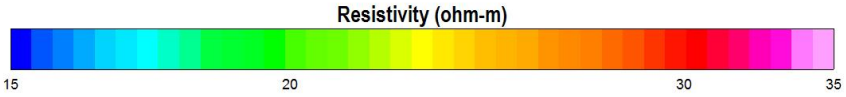

Resistivity (ohm-m)
15
20
30
35

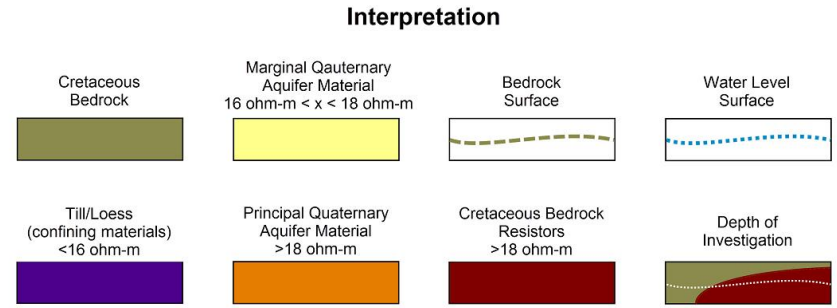

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

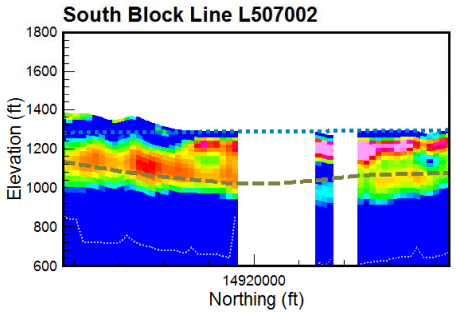

South Block Line L506901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

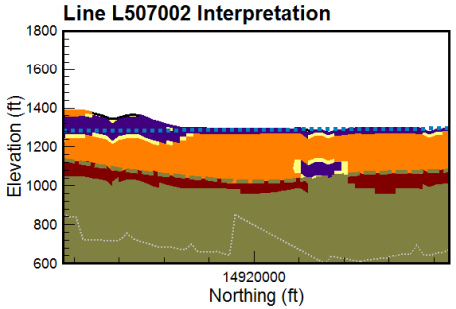

Line L506901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
Northing (ft)

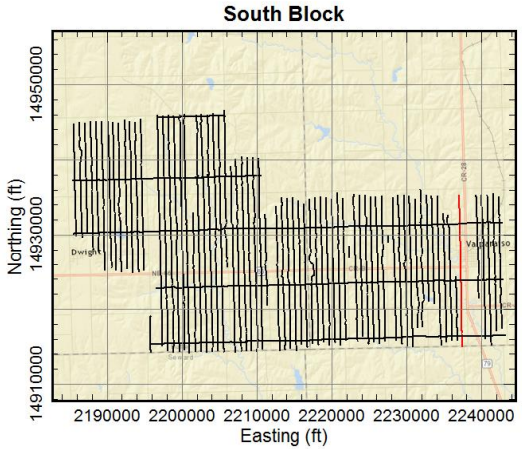

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

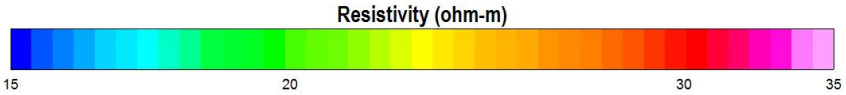

Resistivity (ohm-m)
15
20
30
35

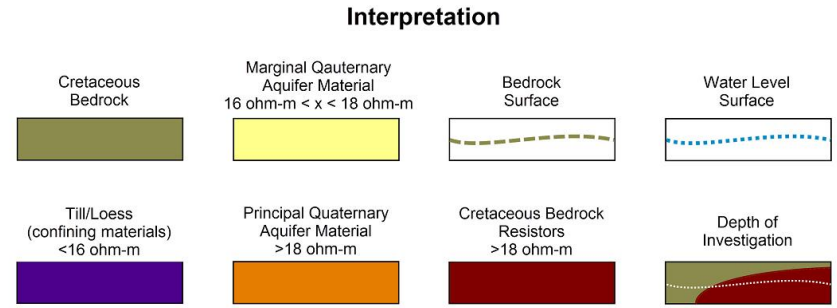

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

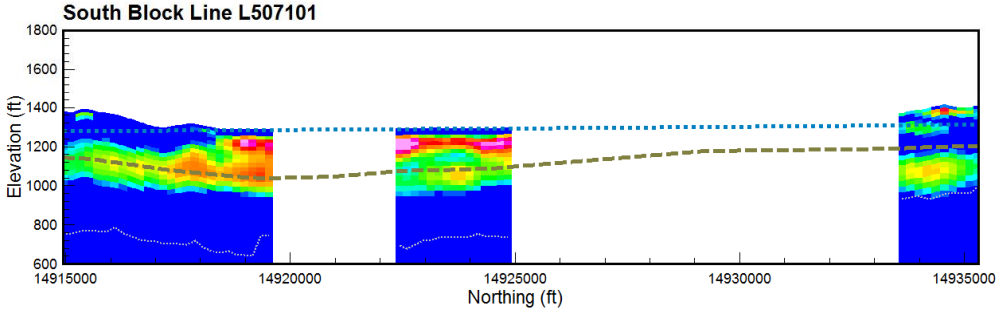

South Block Line L507002
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
Northing (ft)

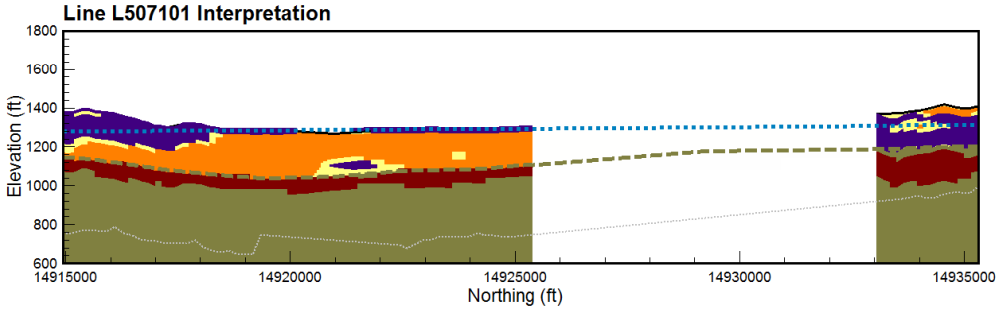

Line L507002 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
Northing (ft)

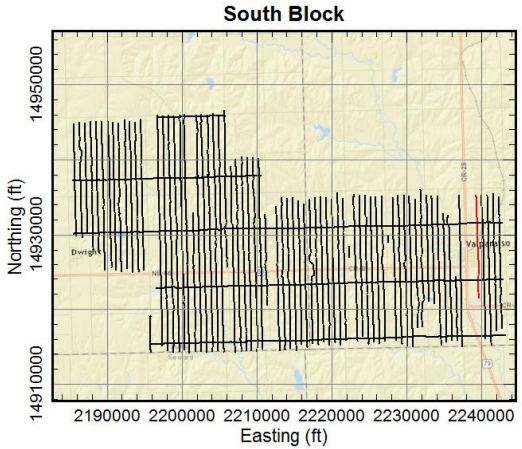

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

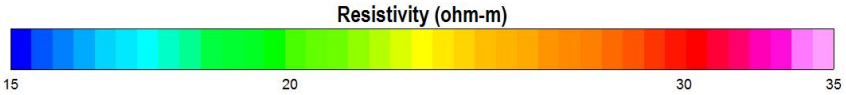

Resistivity (ohm-m)
15
20
30
35

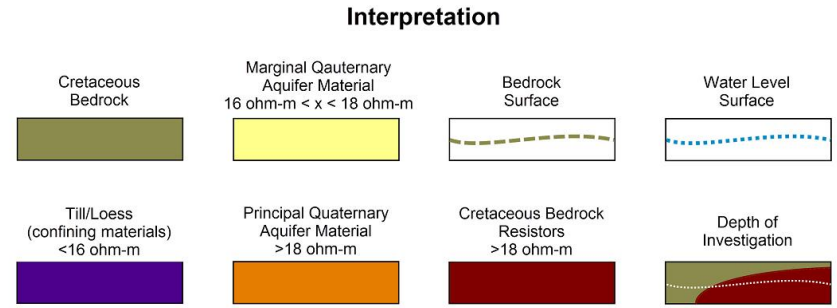

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

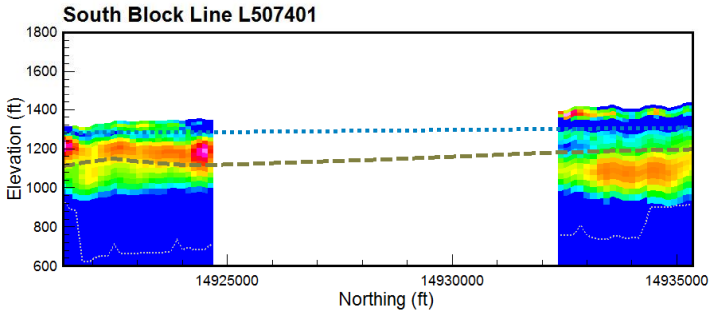

South Block Line L507101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
Northing (ft)

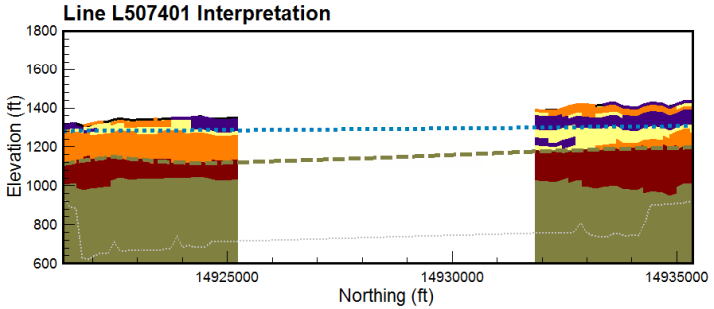

Line L507101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14915000
14920000
14925000
14930000
14935000
Northing (ft)

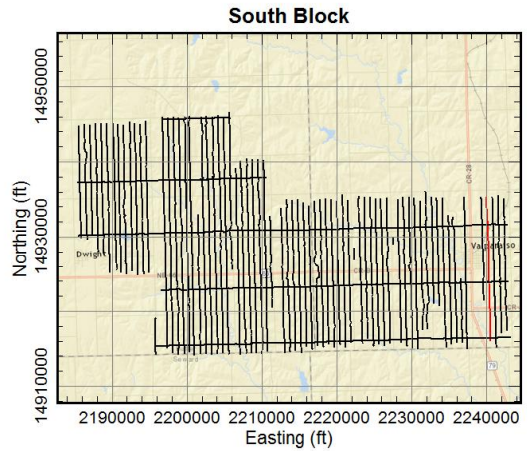

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

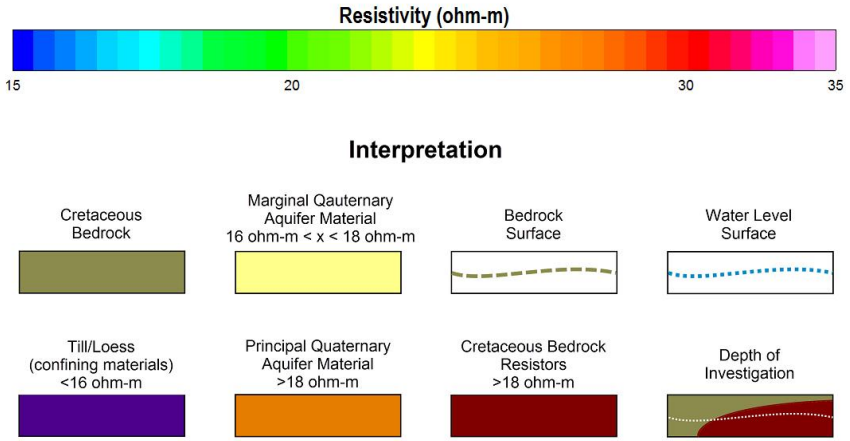

Resistivity (ohm-m)
15
20
30
35

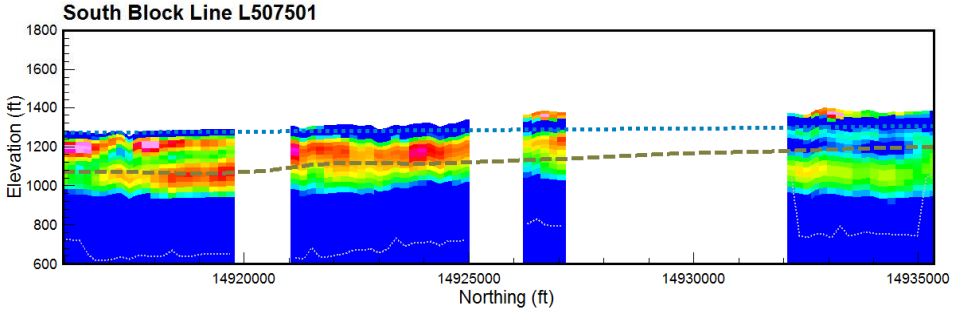

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

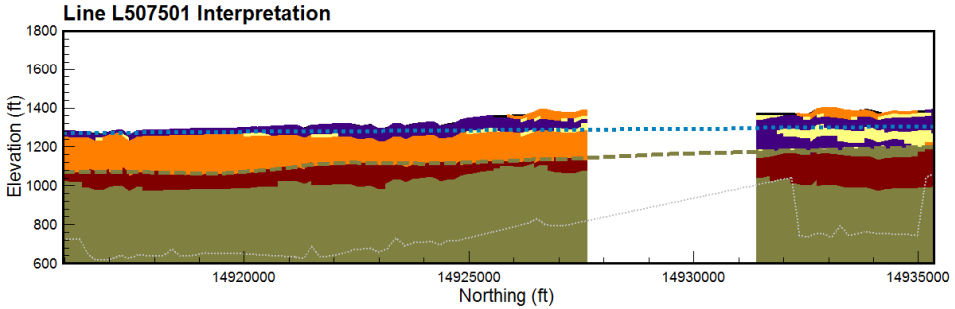

South Block Line L507401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
Northing (ft)

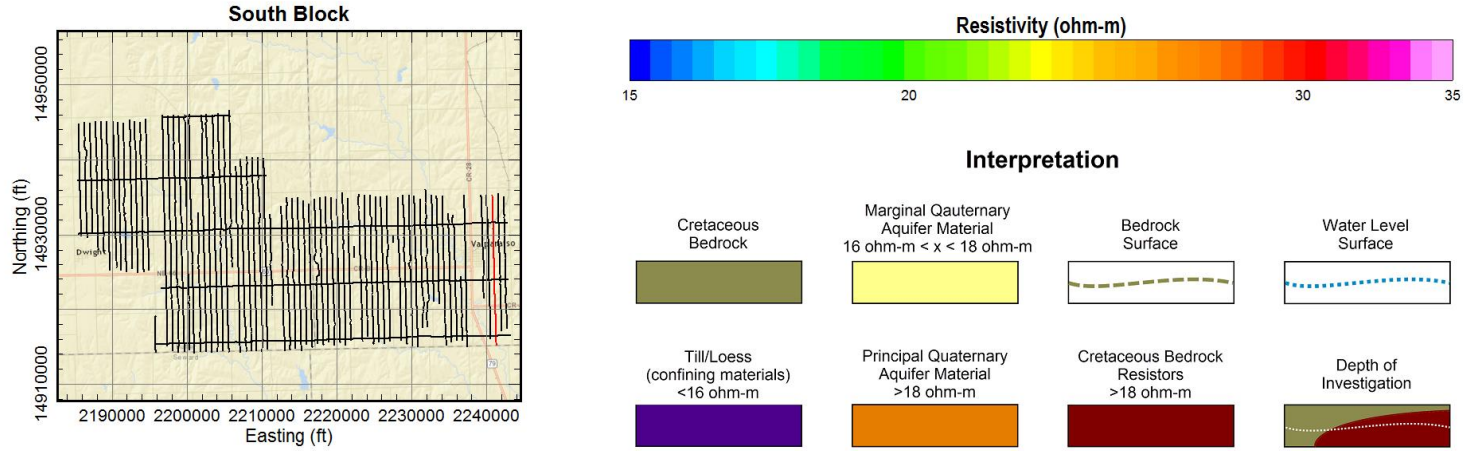

Line L507401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14925000
14930000
14935000
Northing (ft)

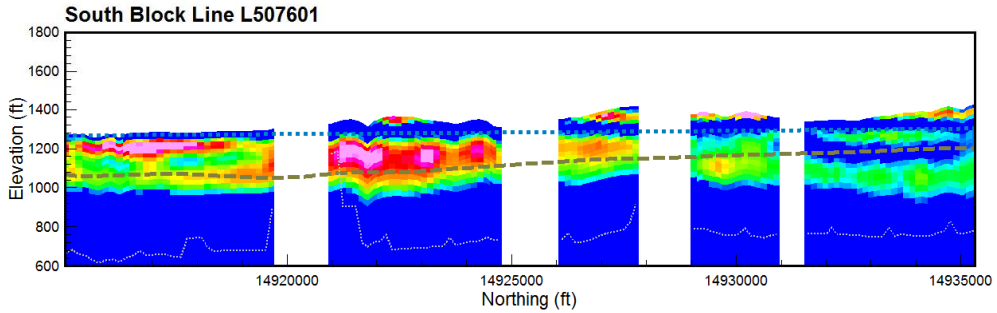

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

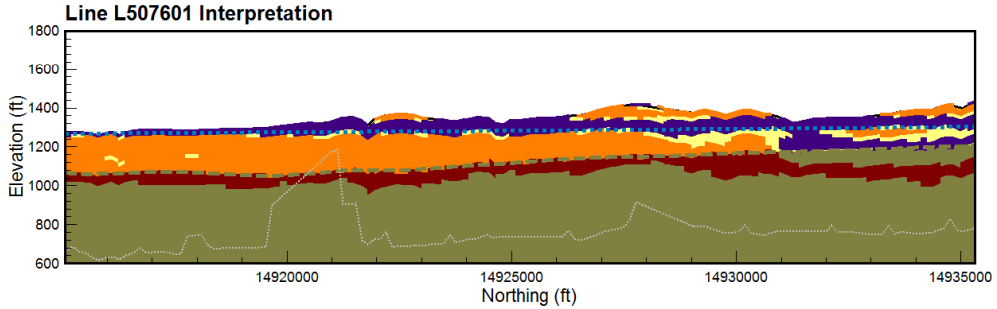

Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

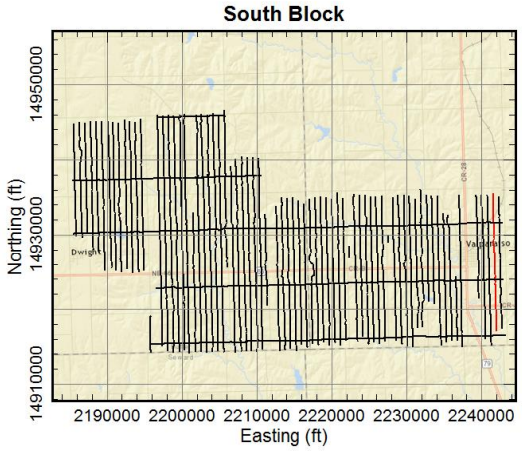

South Block Line L507501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

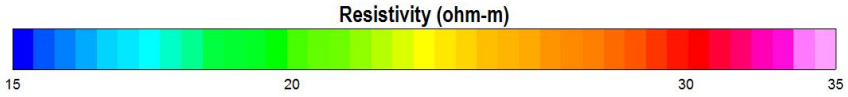

Line L507501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

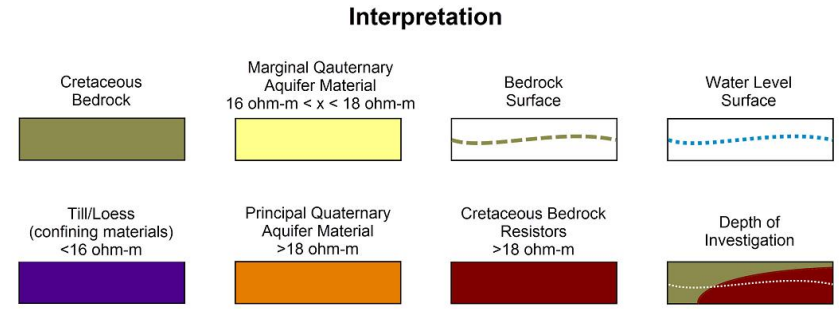

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)
Resistivity (ohm-m)
15
20
30
35
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

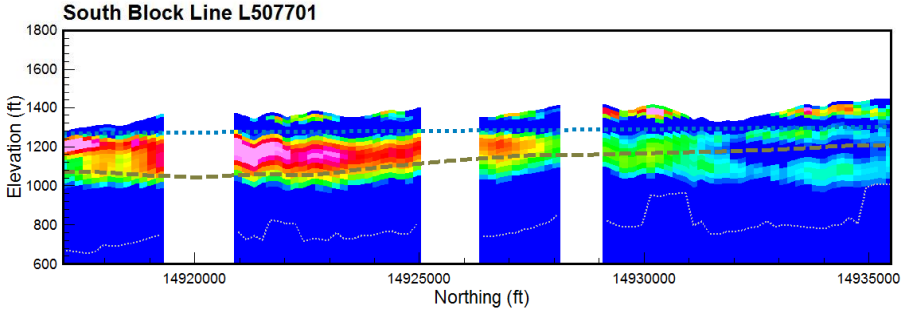

South Block Line L507601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

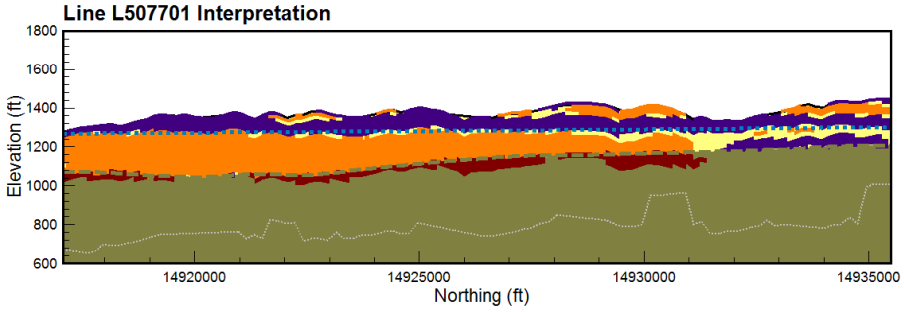

Line L507601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

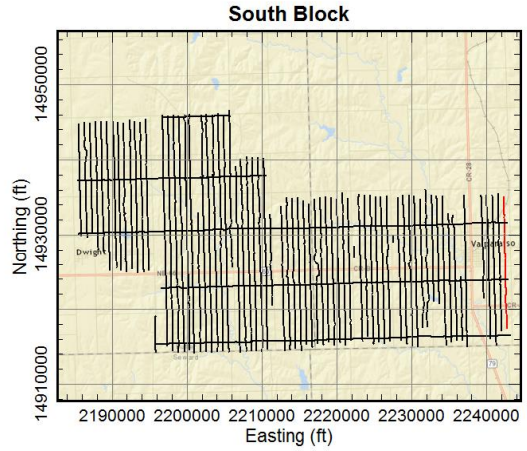

South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

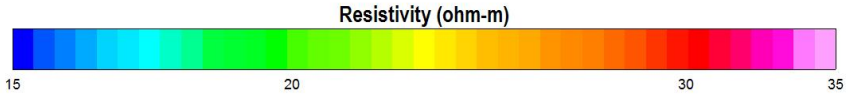

Resistivity (ohm-m)
15
20
30
35

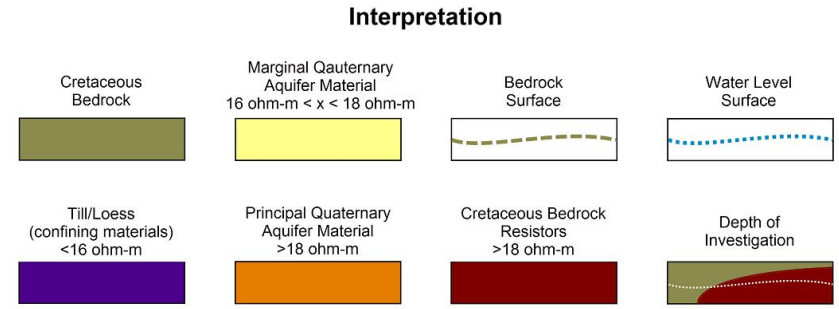

Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

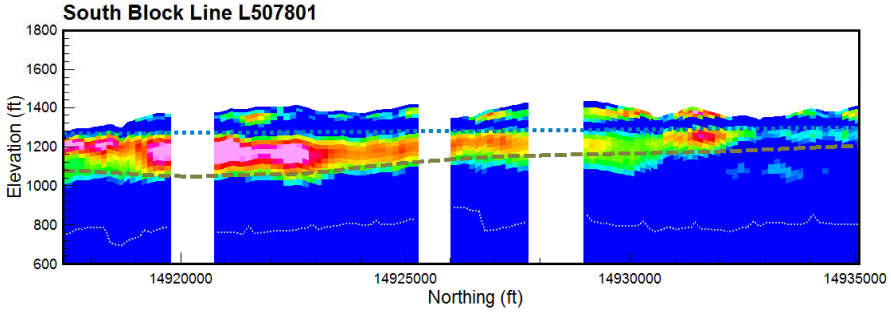

South Block Line L507701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

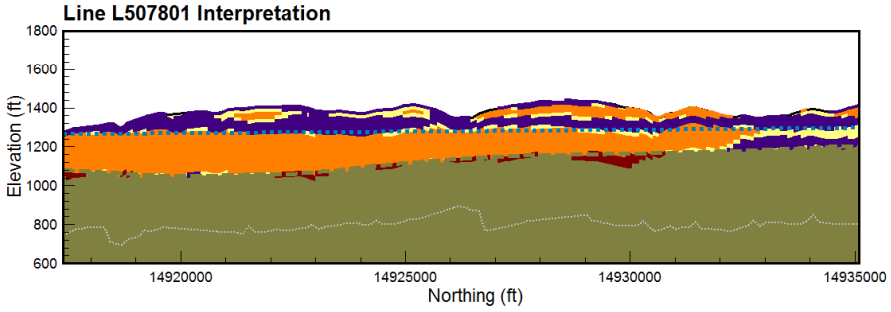

Line L507701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)


South Block
Northing (ft)
14950000
14930000
14910000
2190000 2200000 2210000 2220000 2230000 2240000
Easting (ft)

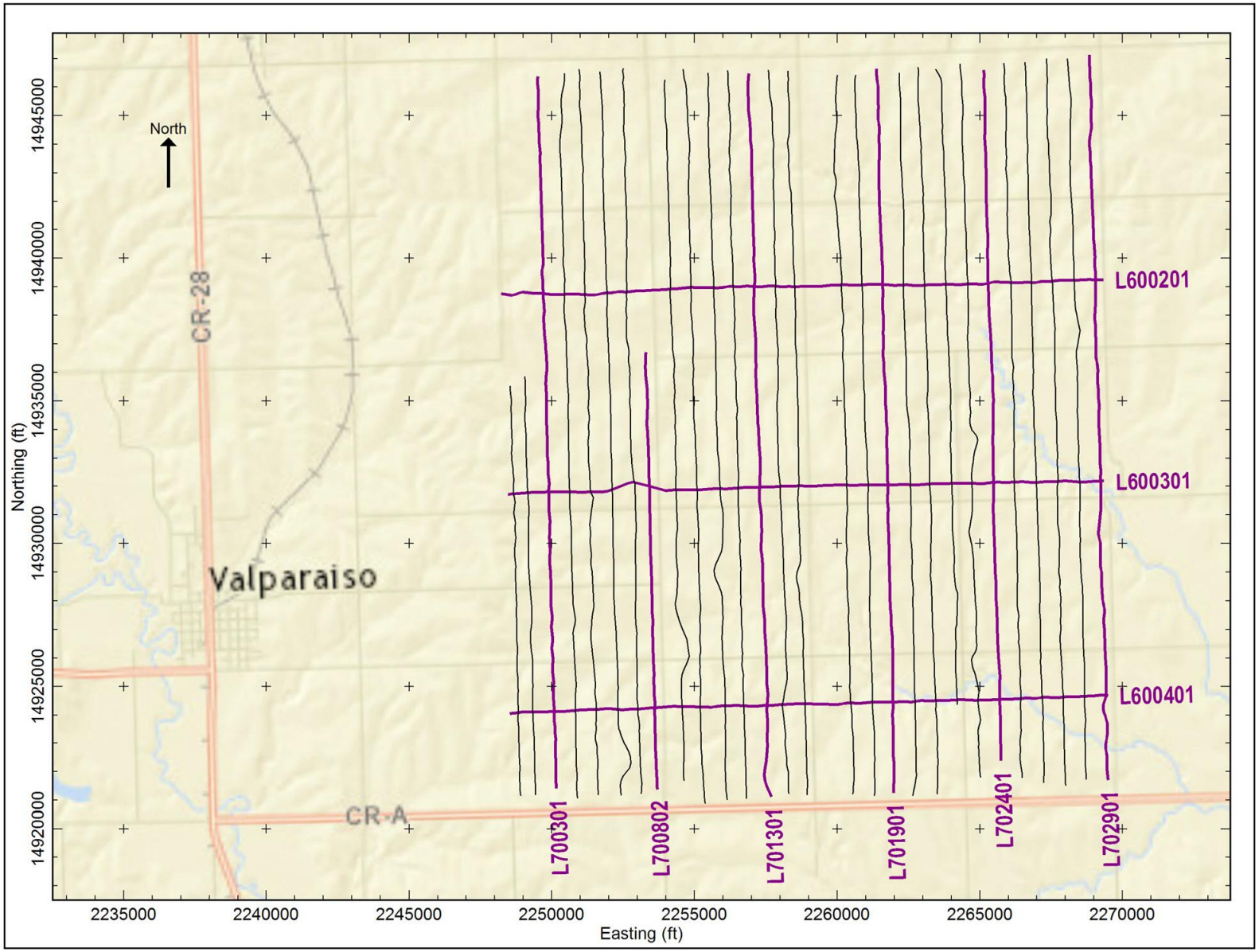

Resistivity (ohm-m)
15
20
30
35


Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
16 ohm-m < x < 18 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <16 ohm-m
Principal Quaternary Aquifer Material >18 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation


South Block Line L507801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

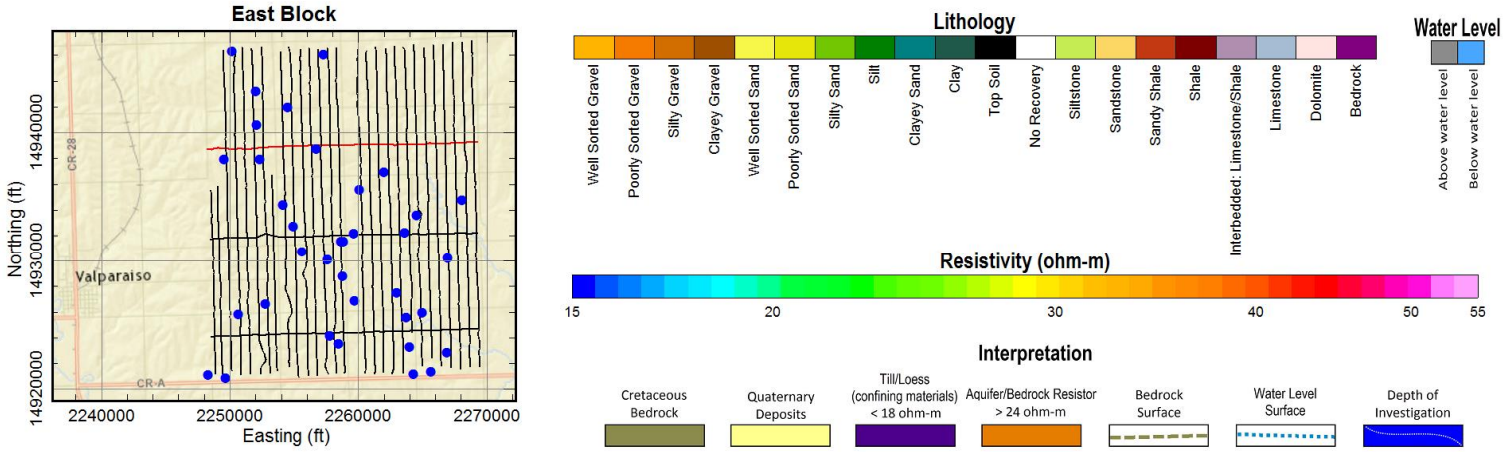

Line L507801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
14920000
14925000
14930000
14935000
Northing (ft)

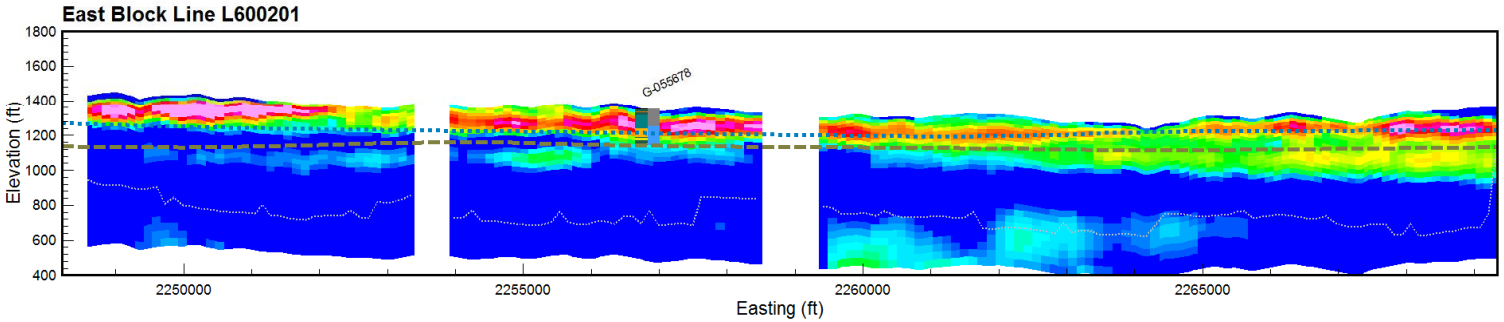
East Flight Block Profiles
Reference Map

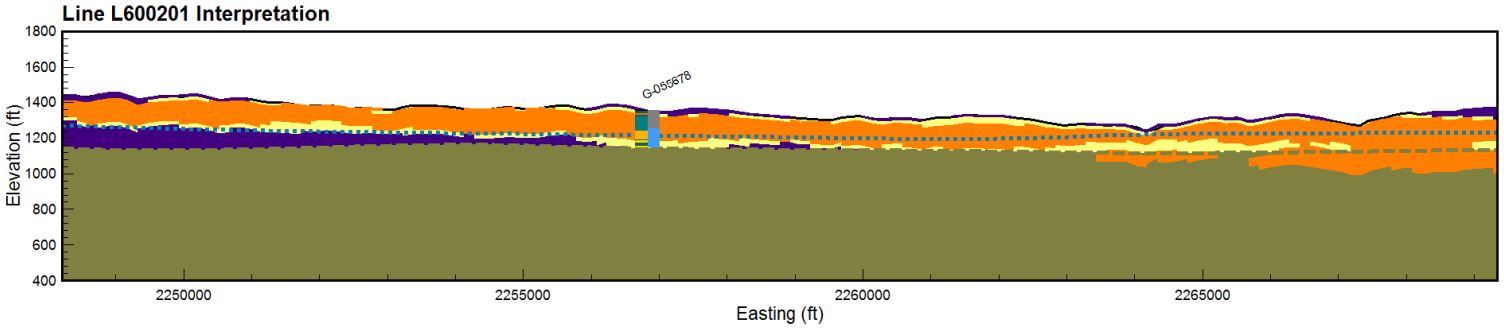

North
CR-28
Valparaiso
CR-A
L600201
L600301
L600401
L700301
L700802
L701301
L701901
L702401
L702901
Northing (ft)
14945000
14940000
14935000
14930000
14925000
14920000
Easting (ft)
2235000
2240000
2245000
2250000
2255000
2260000
2265000
2270000

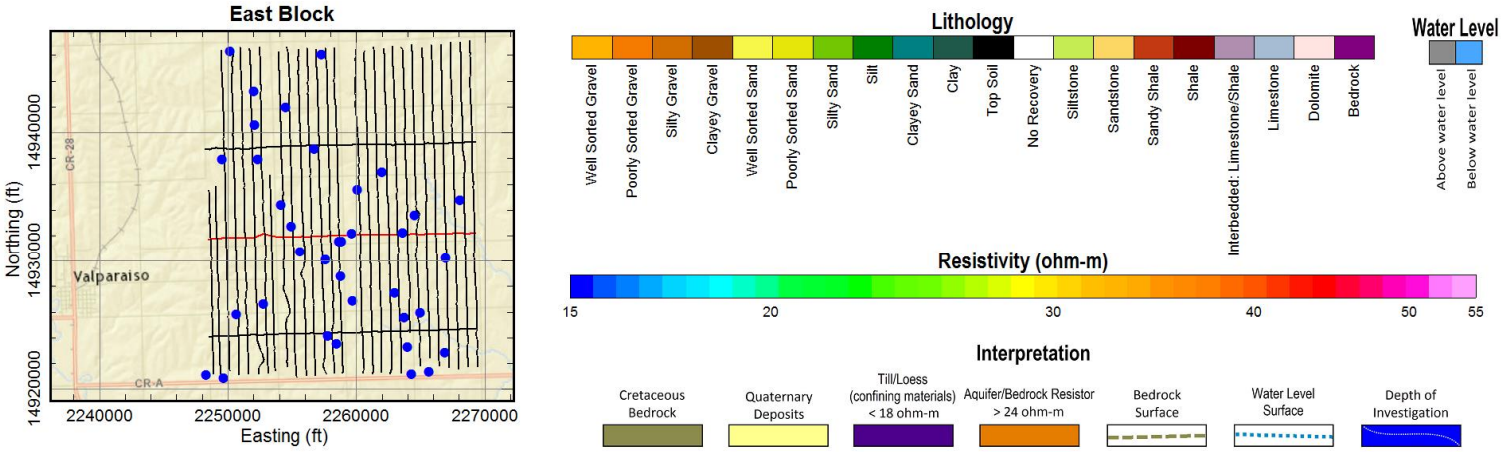
East Flight Block Profiles

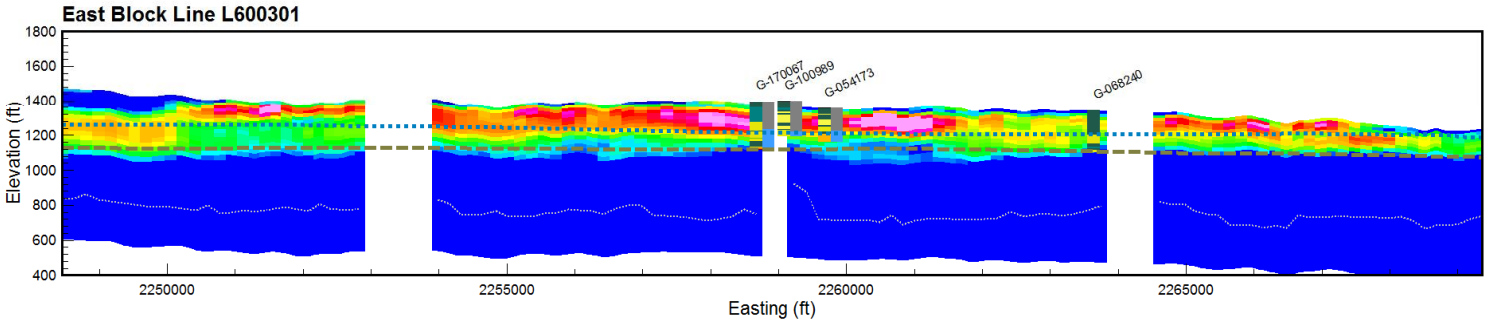
Quaternary Interpretations with Boreholes and NDNR Water Levels

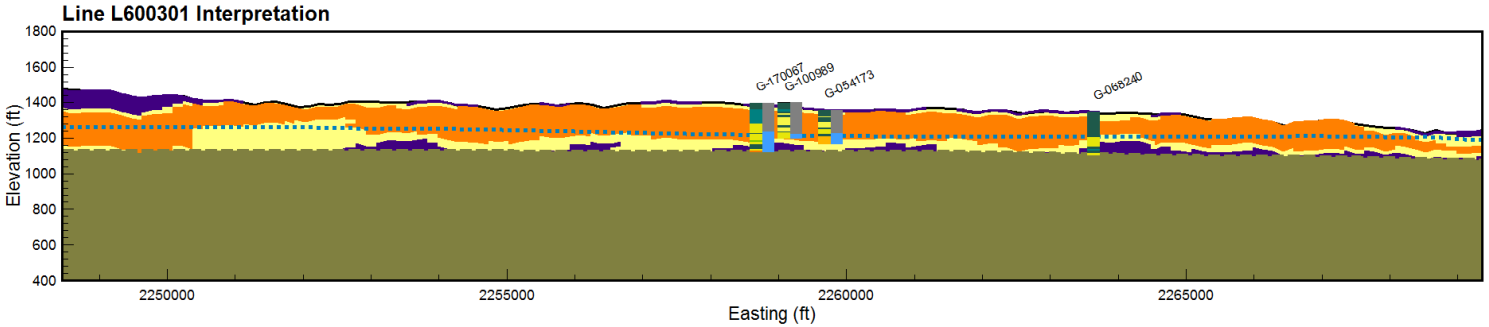

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

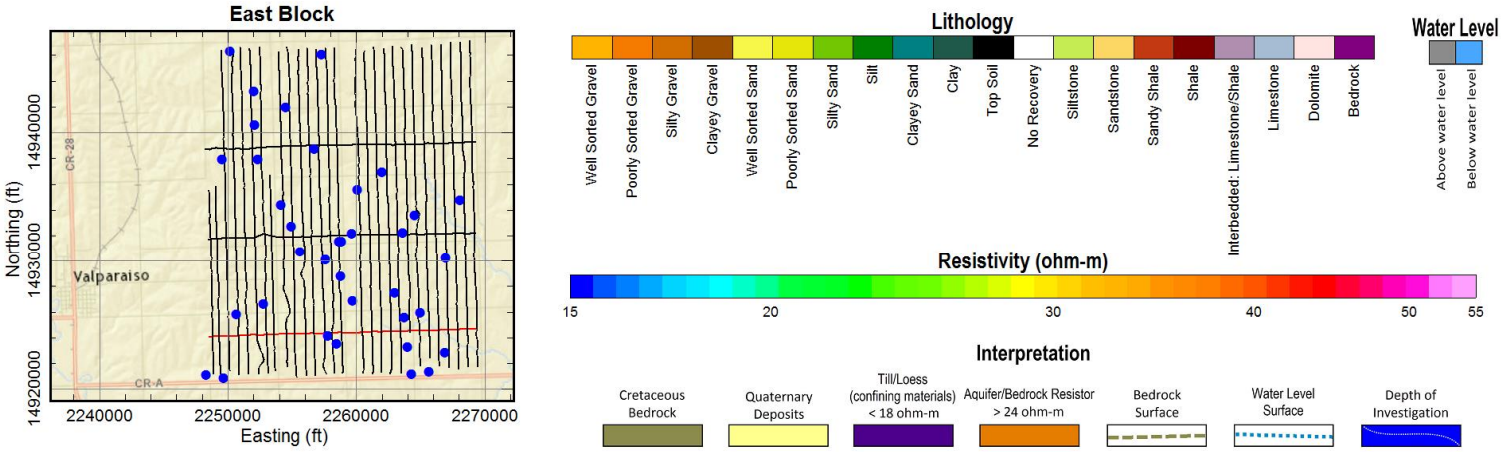

East Block Line L600201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-055678
2250000
2255000
2260000
2265000
Easting (ft)

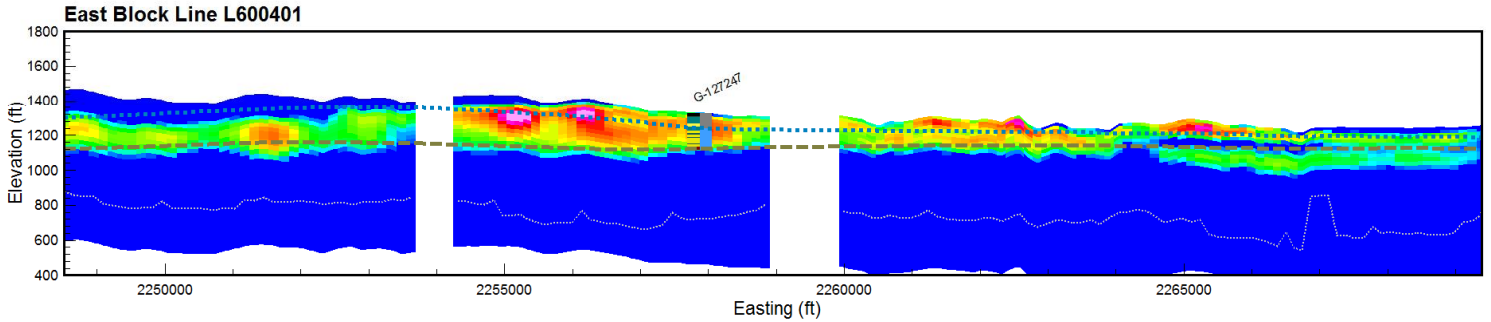

Line L600201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-055678
2250000
2255000
2260000
2265000
Easting (ft)

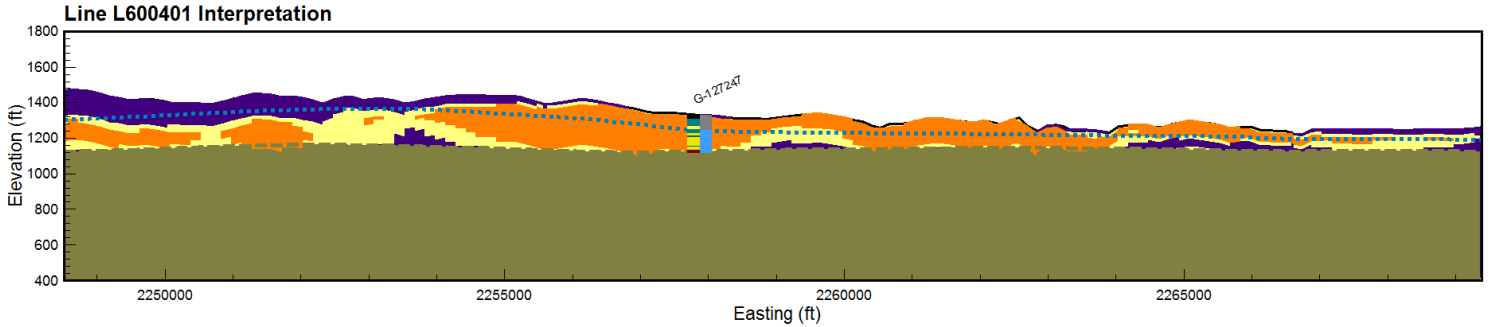

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

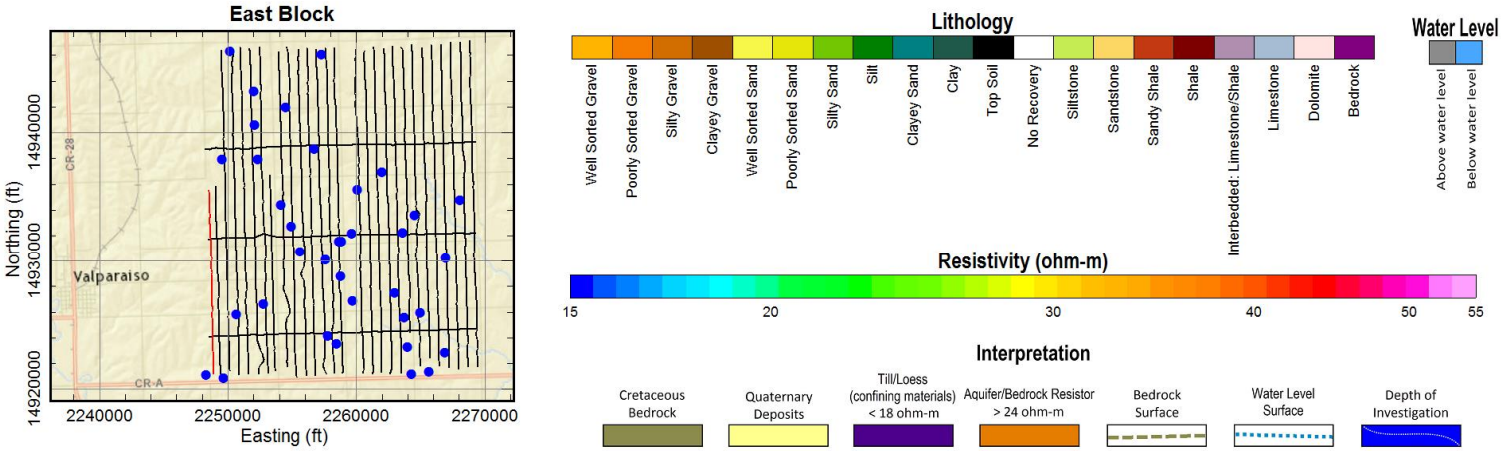

East Block Line L600301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-170067
G-100989
G-054173
G-068240
2250000
2255000
2260000
2265000
Easting (ft)

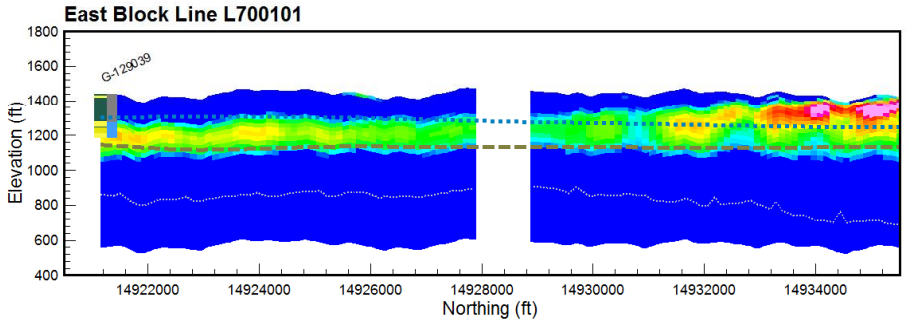

Line L600301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-170067
G-100989
G-054173
G-068240
2250000
2255000
2260000
2265000
Easting (ft)

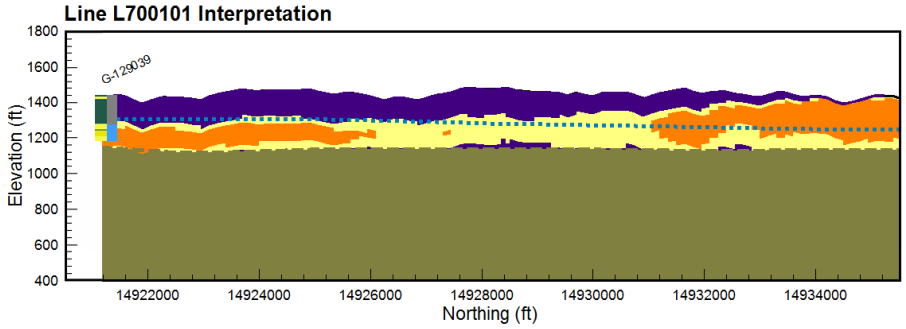

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

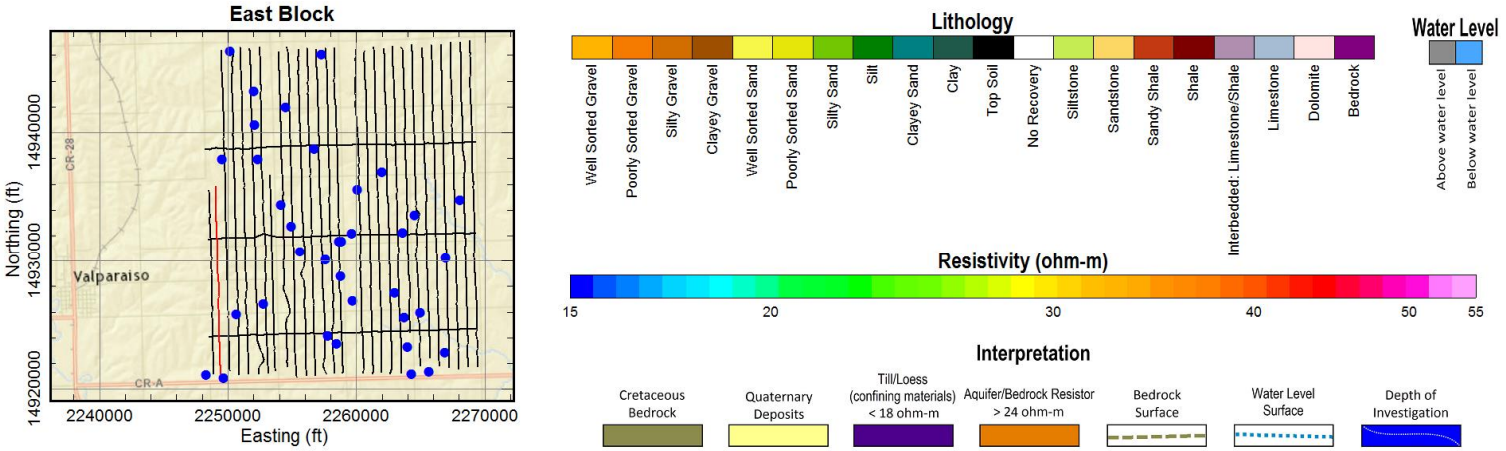

East Block Line L600401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-12T247
2250000
2255000
2260000
2265000
Easting (ft)

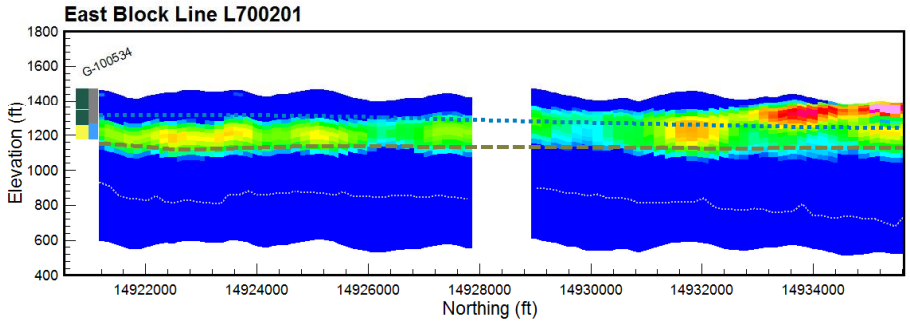

Line L600401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-12T247
2250000
2255000
2260000
2265000
Easting (ft)

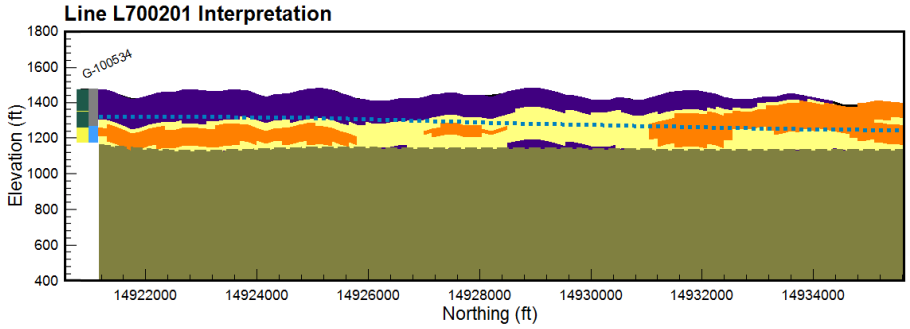

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

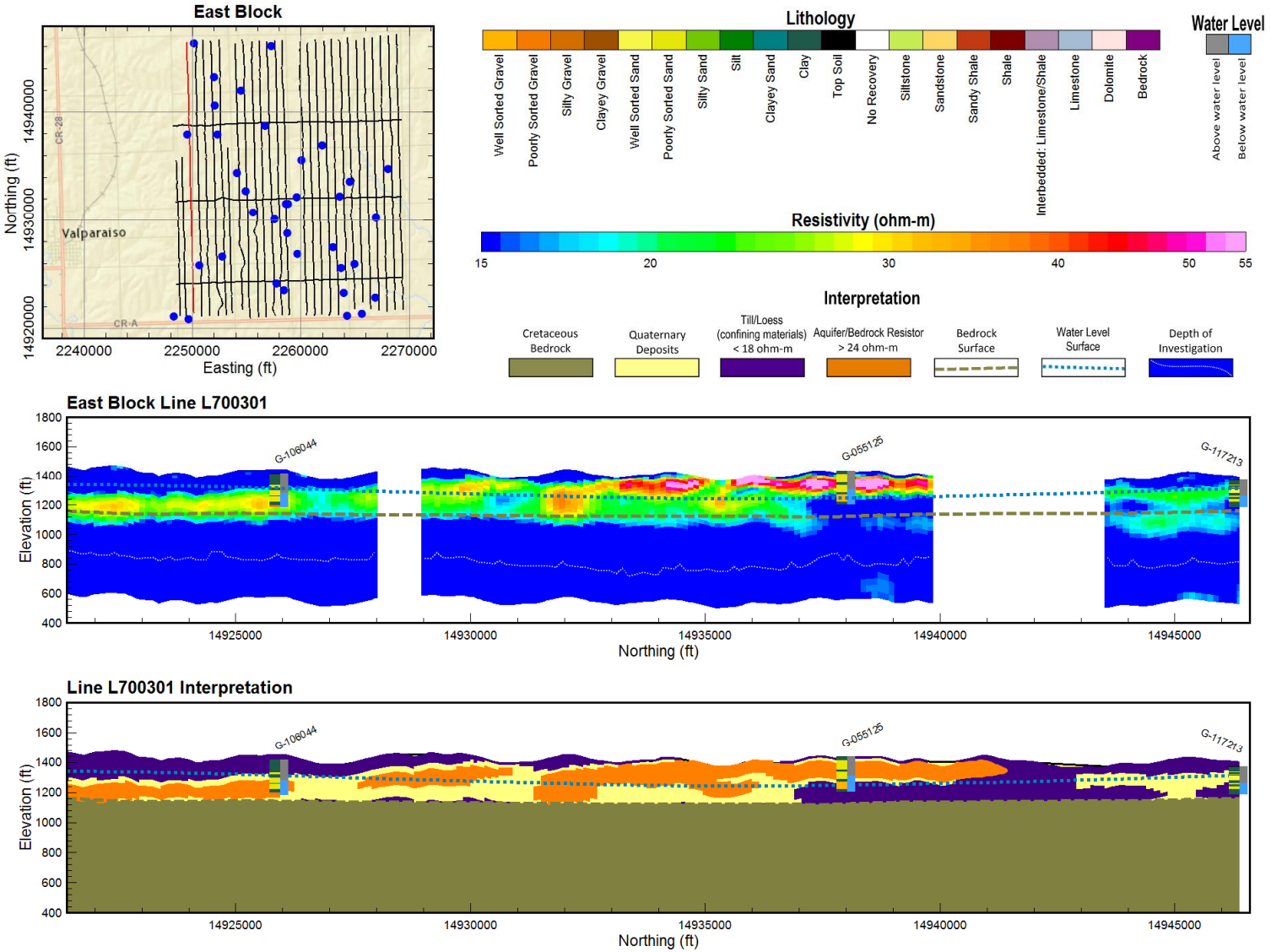

East Block Line L700101
G-129039
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
Northing (ft)

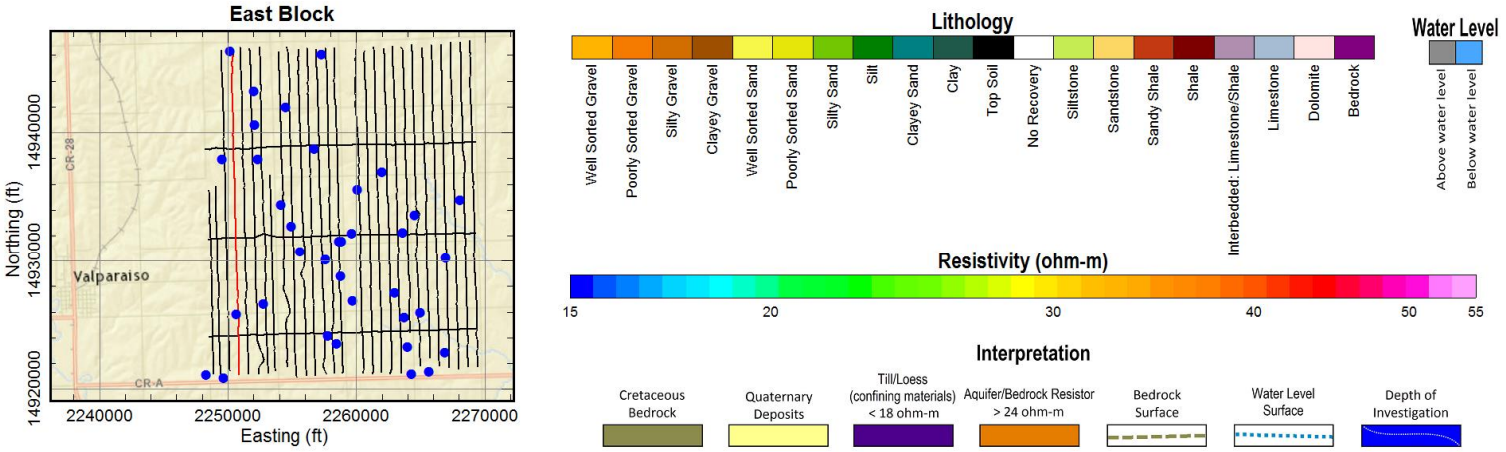

Line L700101 Interpretation
G-129039
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
Northing (ft)

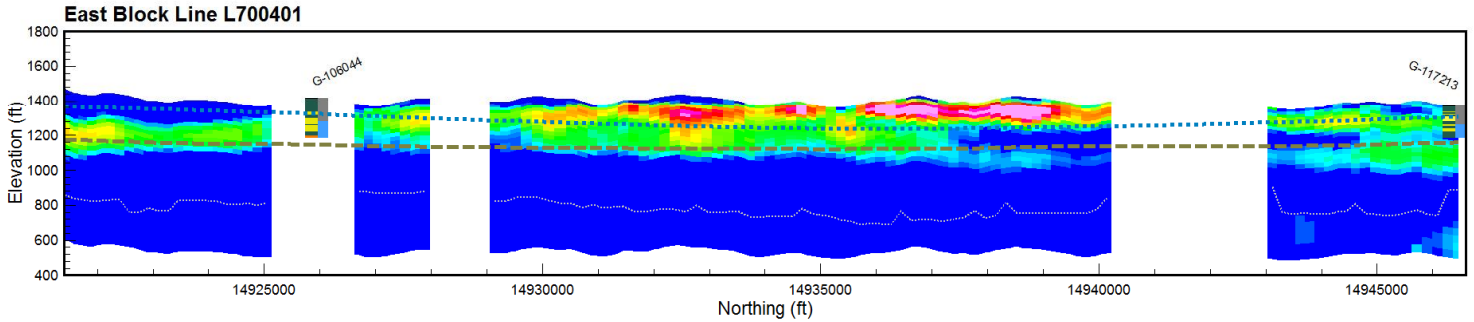

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

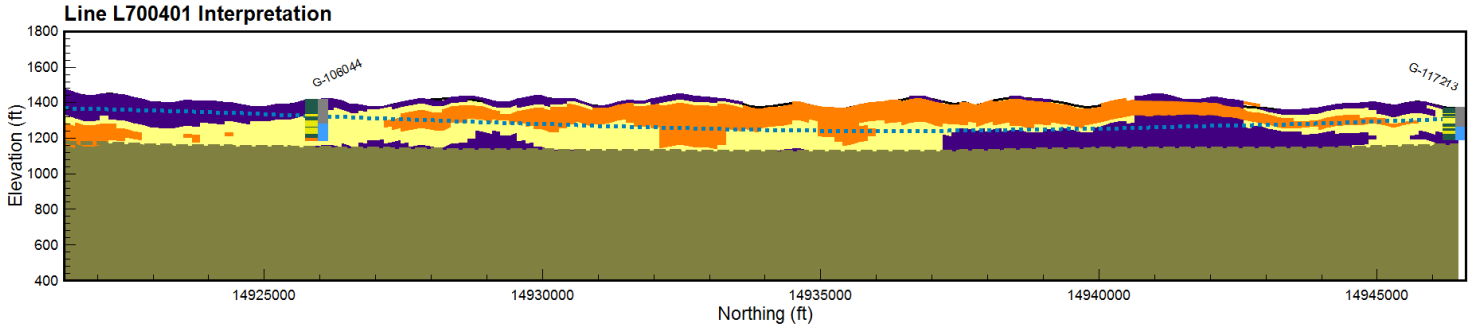

East Block Line L700201
G-100534
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
Northing (ft)

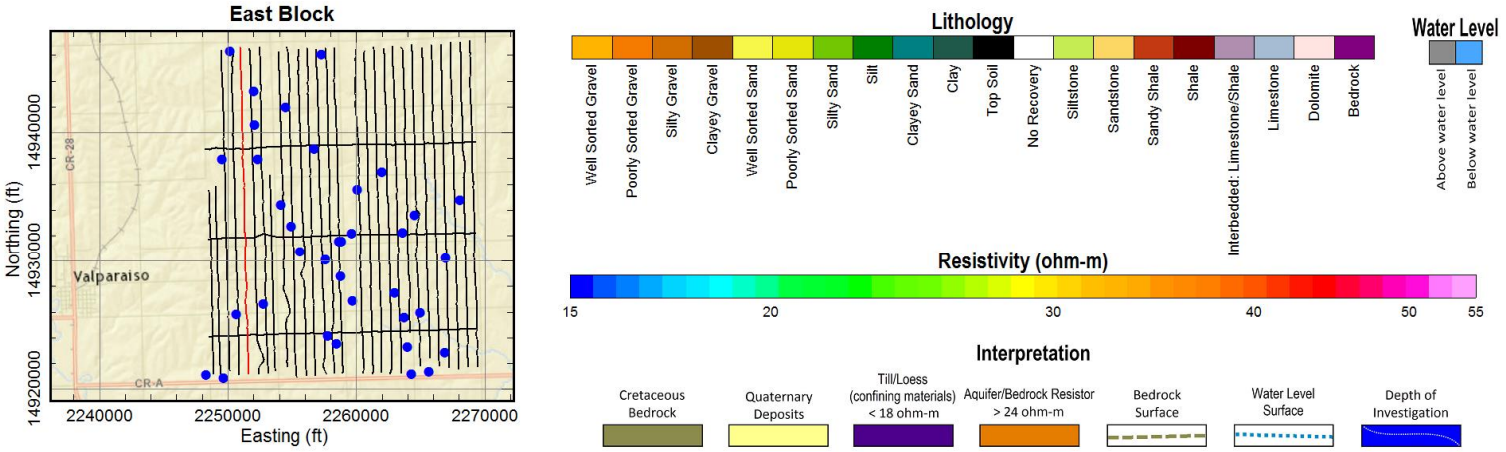

Line L700201 Interpretation
G-100534
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
Northing (ft)

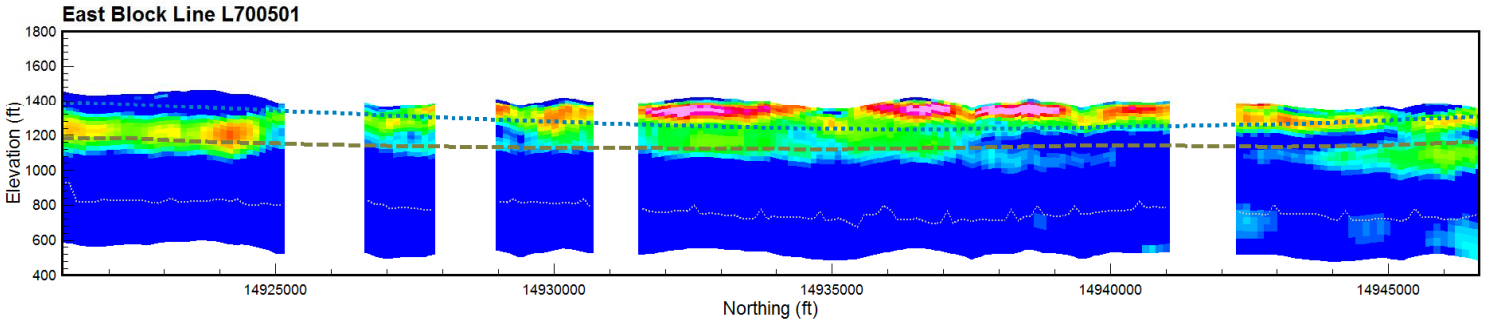

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation
East Block Line L700301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-106044
G-055125
G-117213
14925000
14930000
14935000
14940000
14945000
Northing (ft)
Line L700301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-106044
G-055125
G-117213
14925000
14930000
14935000
14940000
14945000
Northing (ft)

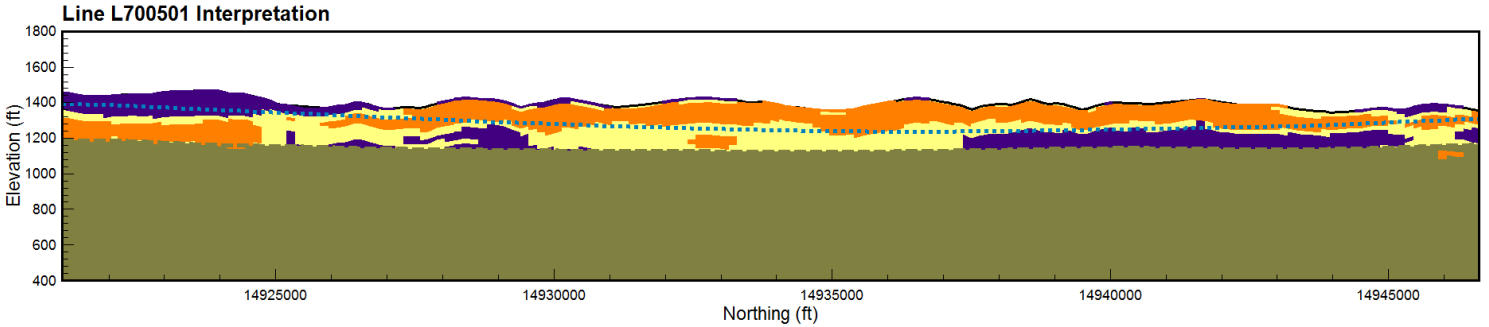

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

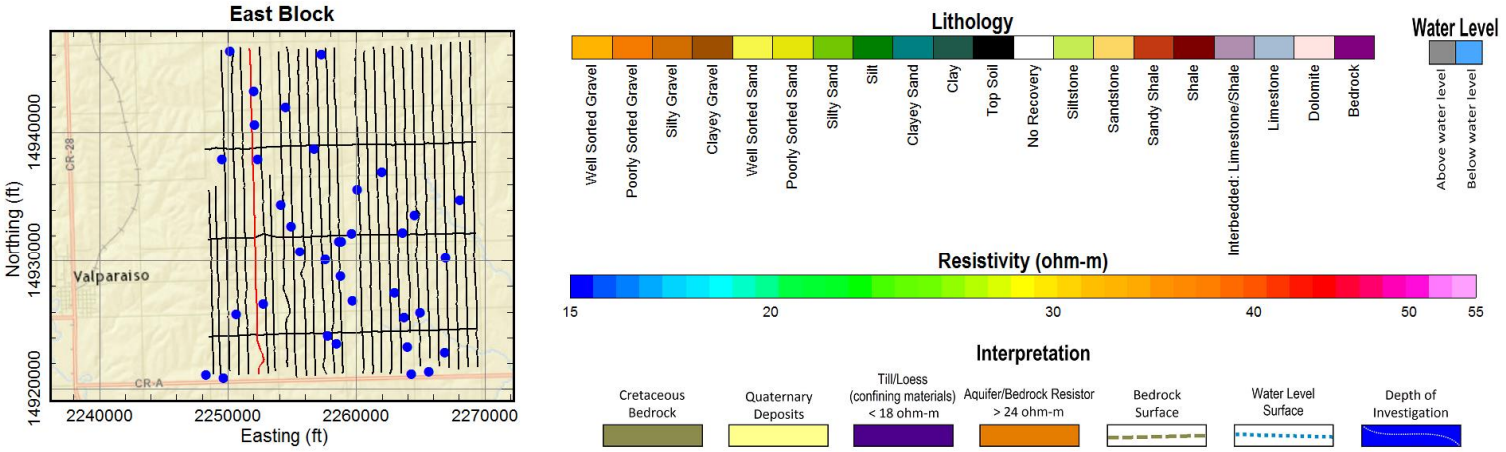

East Block Line L700401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-106044
G-117213
14925000
14930000
14935000
14940000
14945000
Northing (ft)

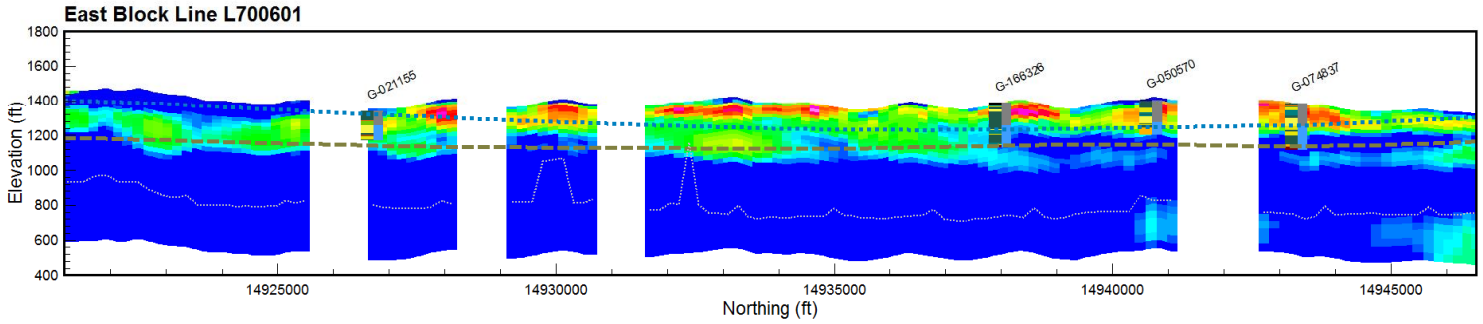

Line L700401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-106044
G-117213
14925000
14930000
14935000
14940000
14945000
Northing (ft)

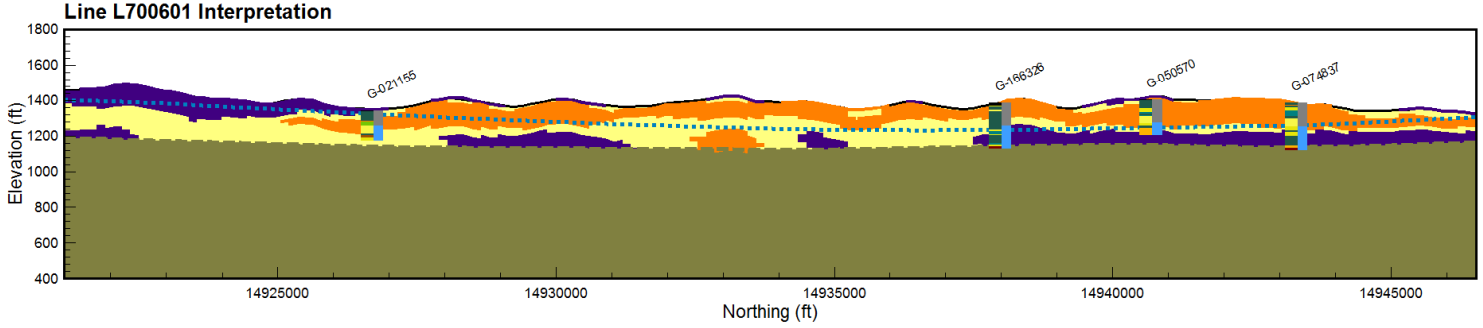

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

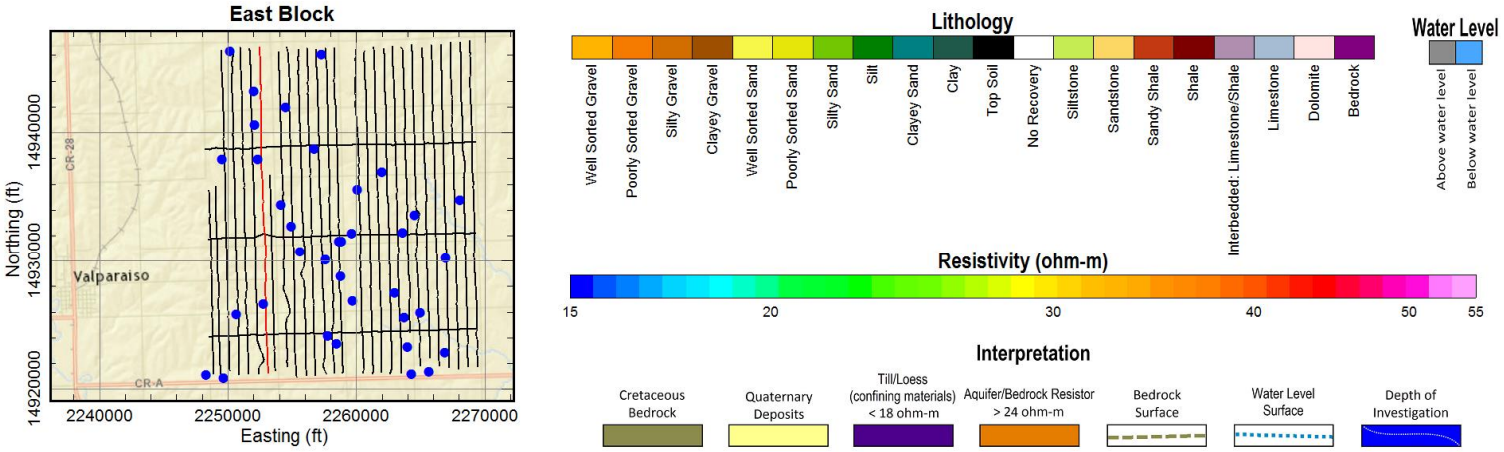

East Block Line L700501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

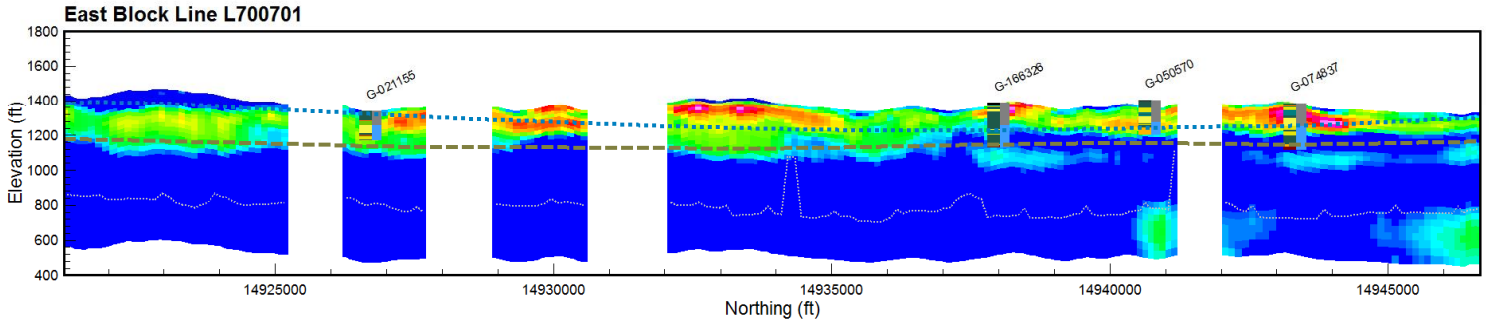

Line L700501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

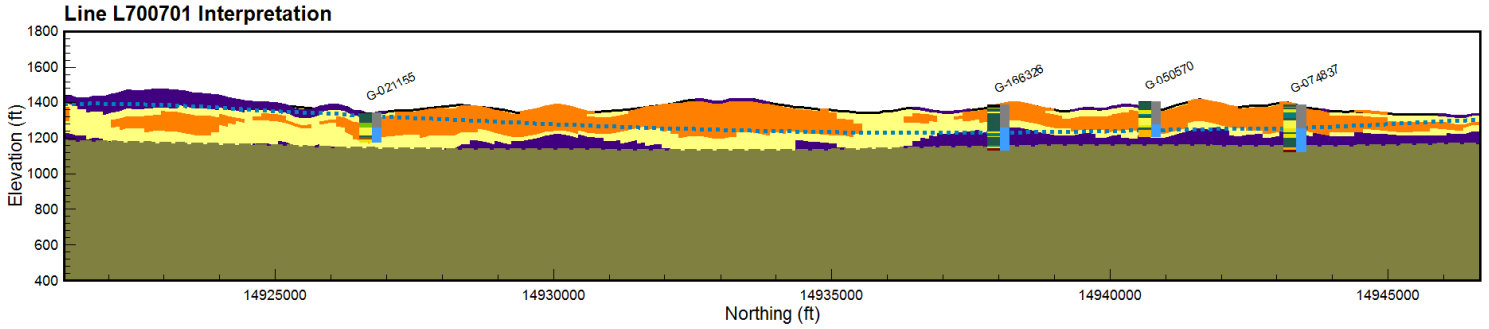

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

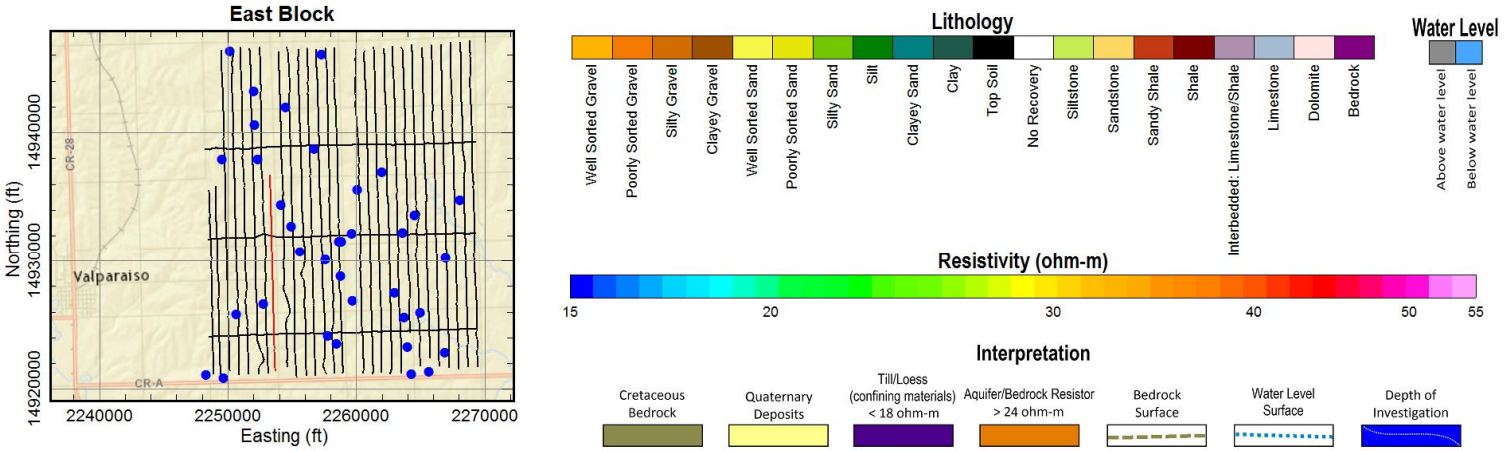

East Block Line L700601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-021155
G-166326
G-050570
G-074837
14925000
14930000
14935000
14940000
14945000
Northing (ft)

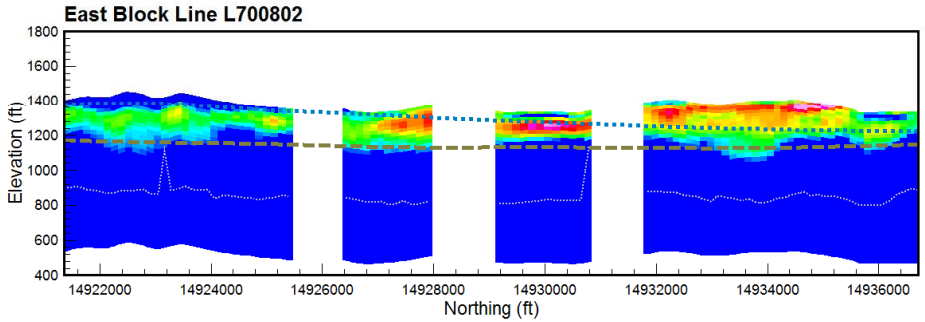

Line L700601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-021155
G-166326
G-050570
G-074837
14925000
14930000
14935000
14940000
14945000
Northing (ft)

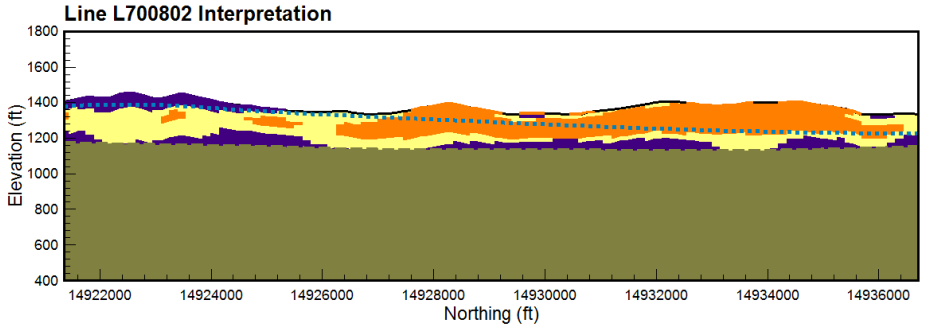

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

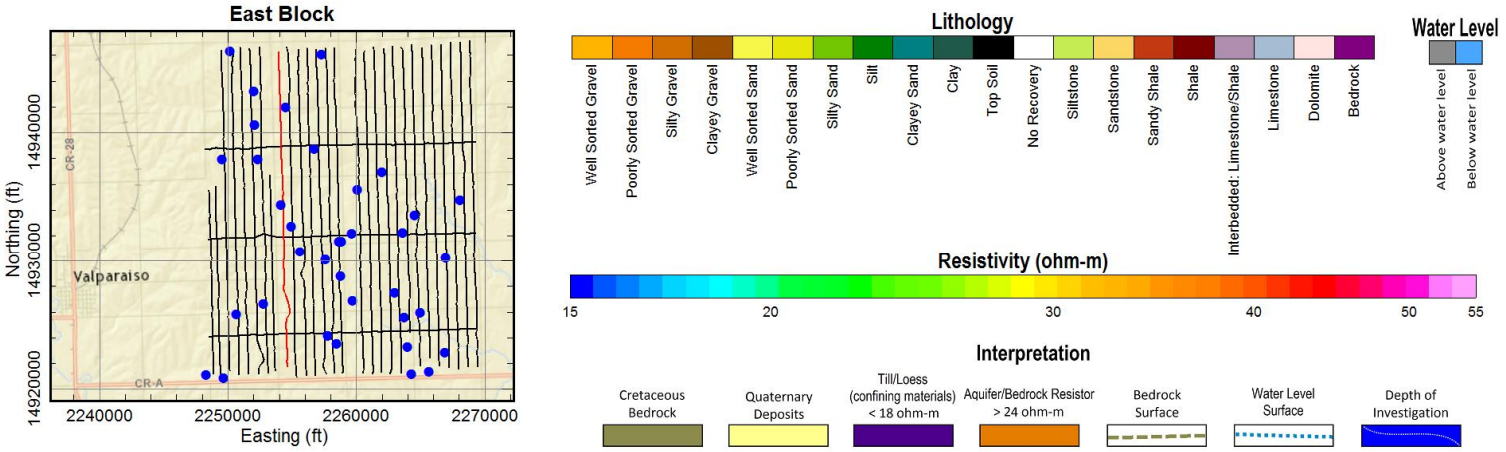

East Block Line L700701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-021155
G-166326
G-050570
G-074837
14925000
14930000
14935000
14940000
14945000
Northing (ft)

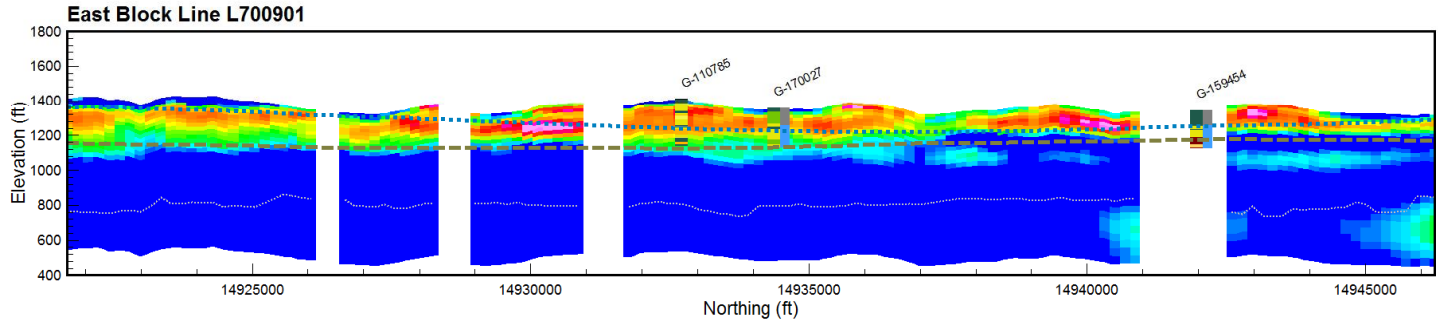

Line L700701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-021155
G-166326
G-050570
G-074837
14925000
14930000
14935000
14940000
14945000
Northing (ft)

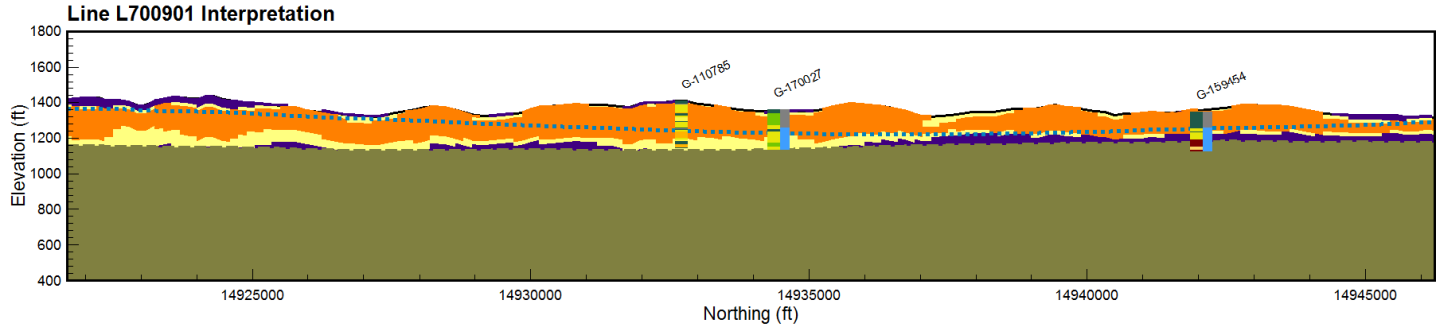

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

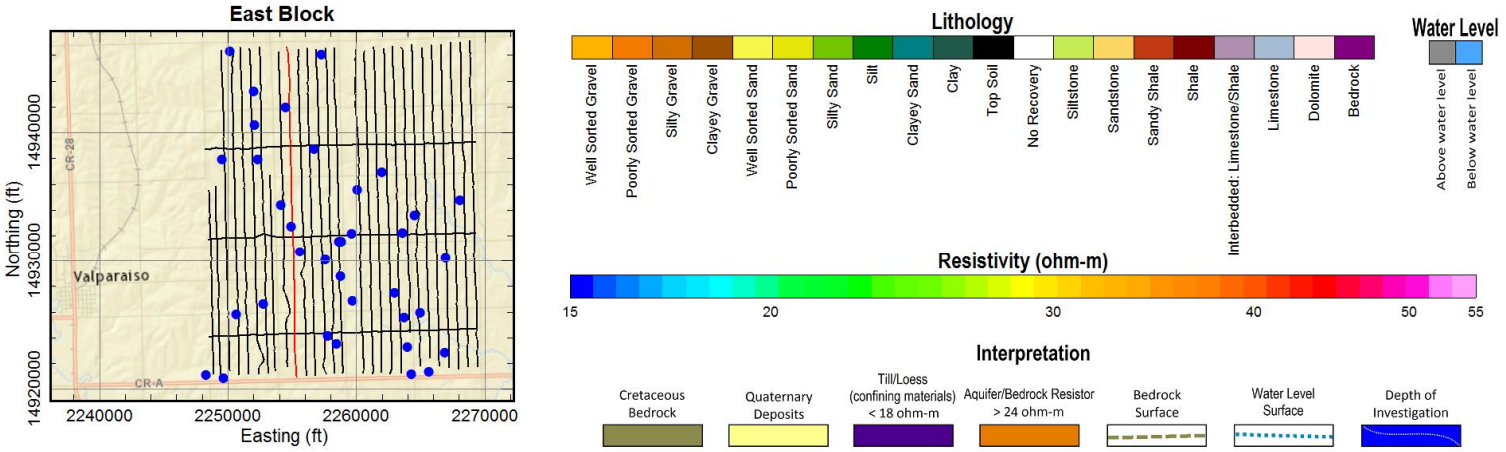

East Block Line L700802
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
14936000
Northing (ft)

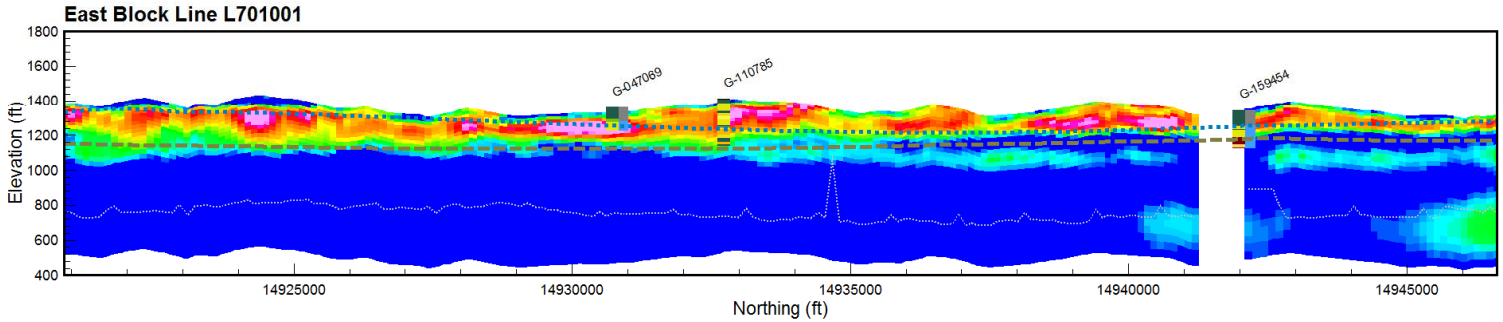

Line L700802 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
14936000
Northing (ft)

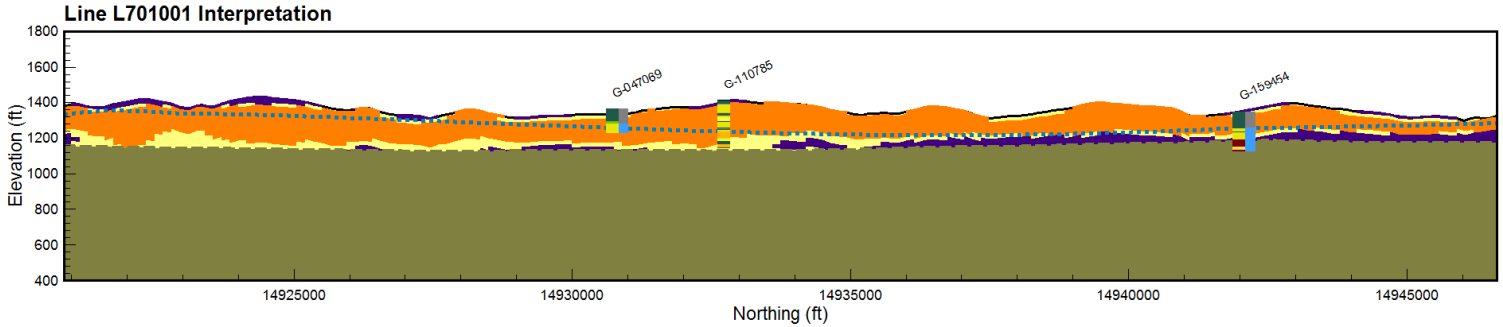

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

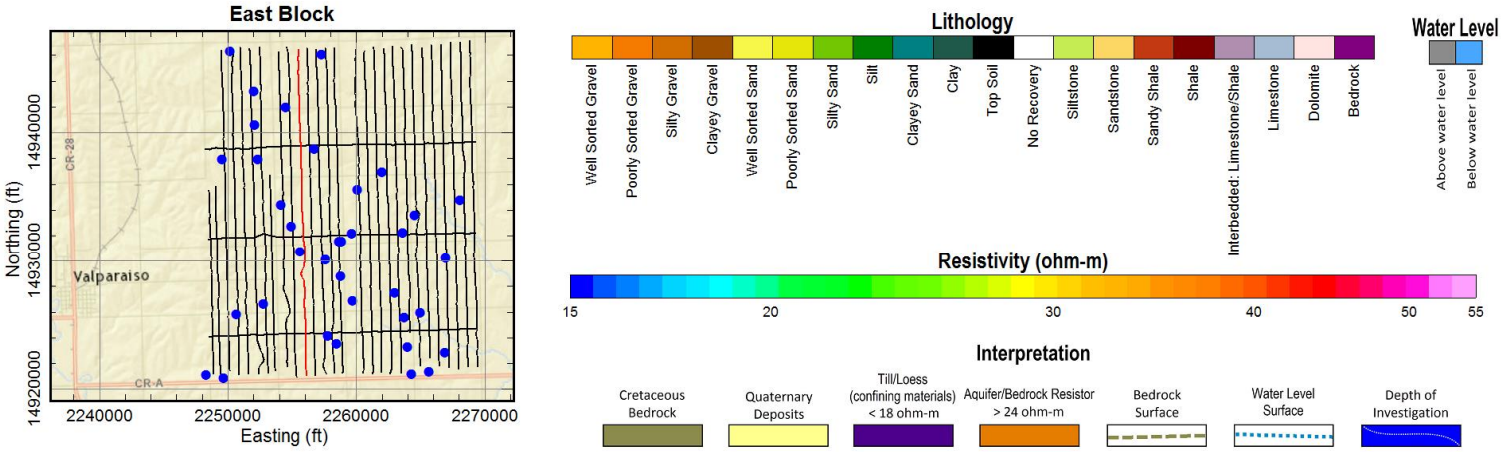

East Block Line L700901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-110785
G-170027
G-159454
14925000
14930000
14935000
14940000
14945000
Northing (ft)

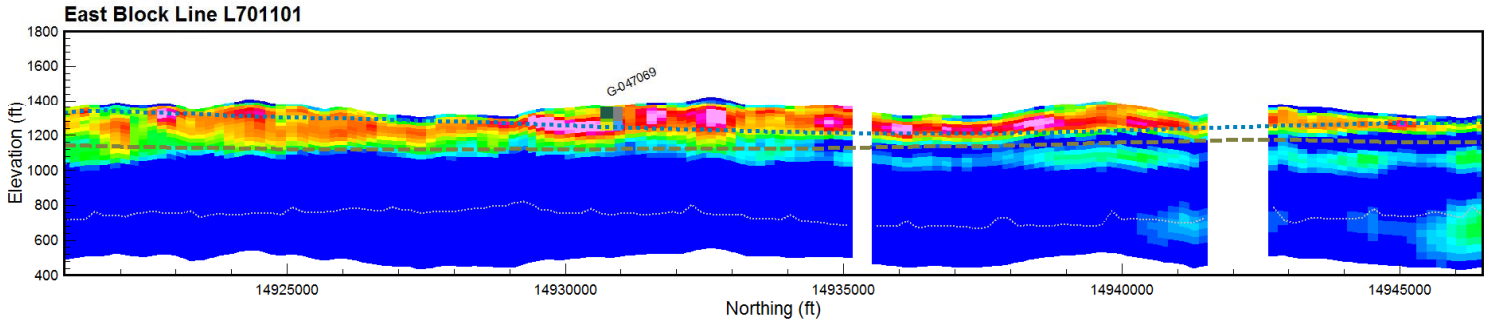

Line L700901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-110785
G-170027
G-159454
14925000
14930000
14935000
14940000
14945000
Northing (ft)

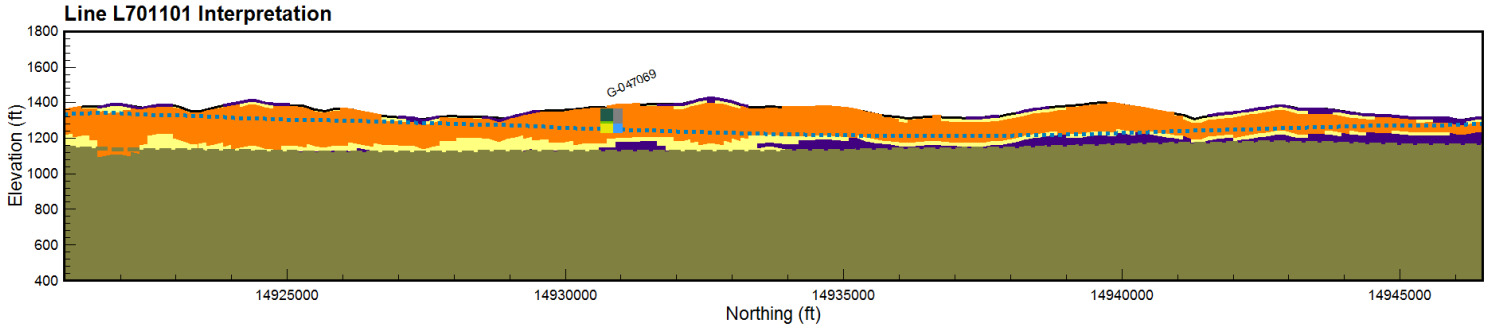

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

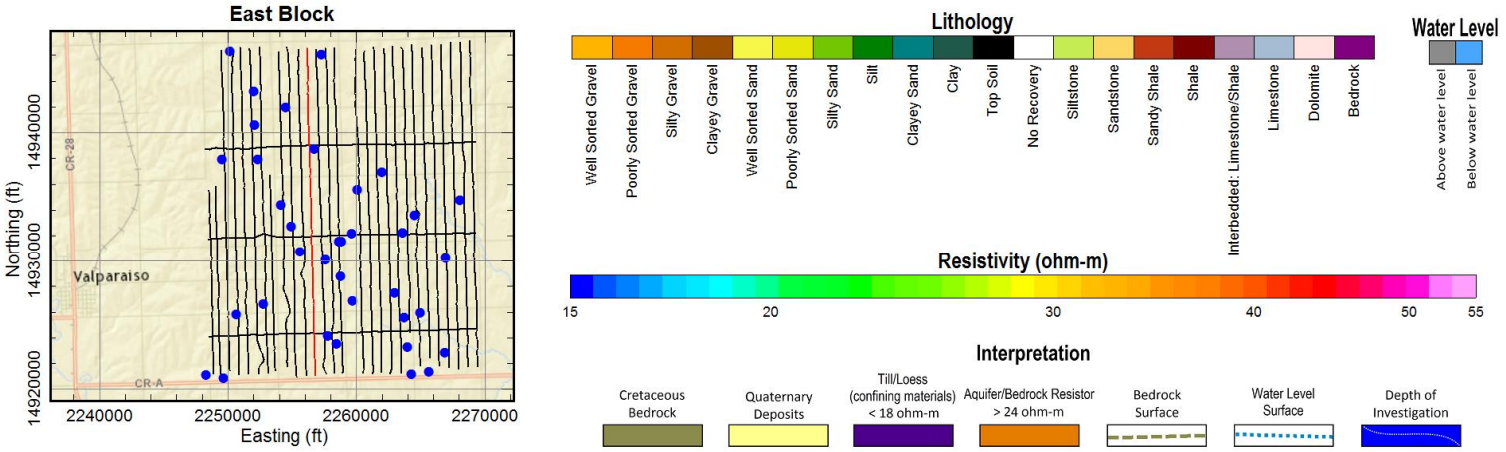

East Block Line L701001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-047069
G-110785
G-159454
14925000
14930000
14935000
14940000
14945000
Northing (ft)

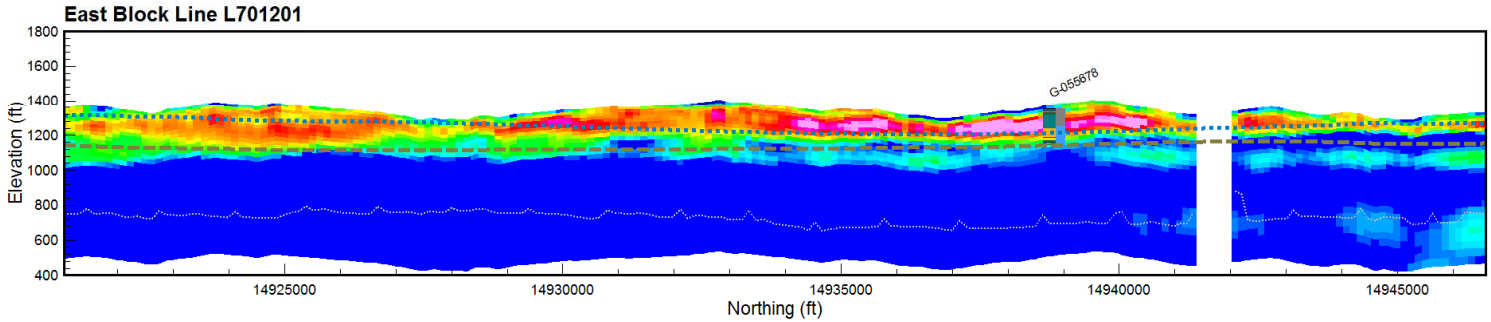

Line L701001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-047069
G-110785
G-159454
14925000
14930000
14935000
14940000
14945000
Northing (ft)

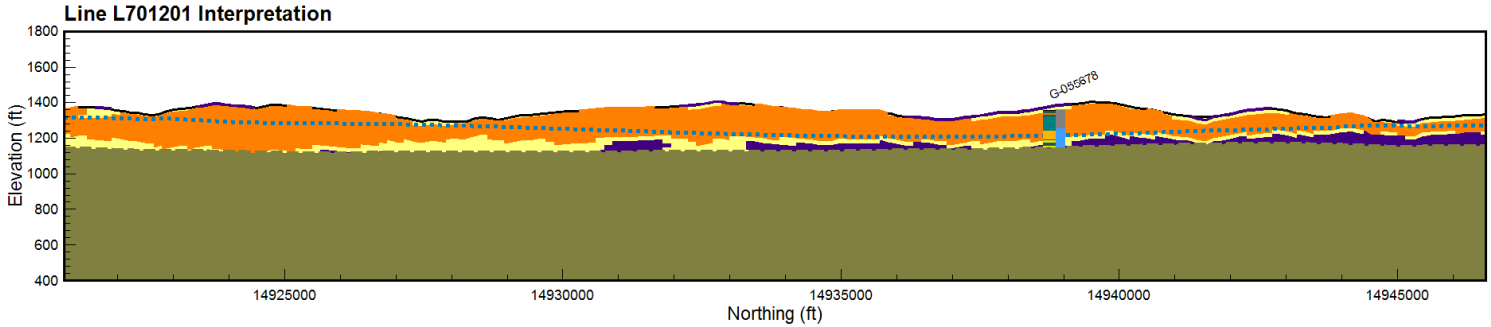

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

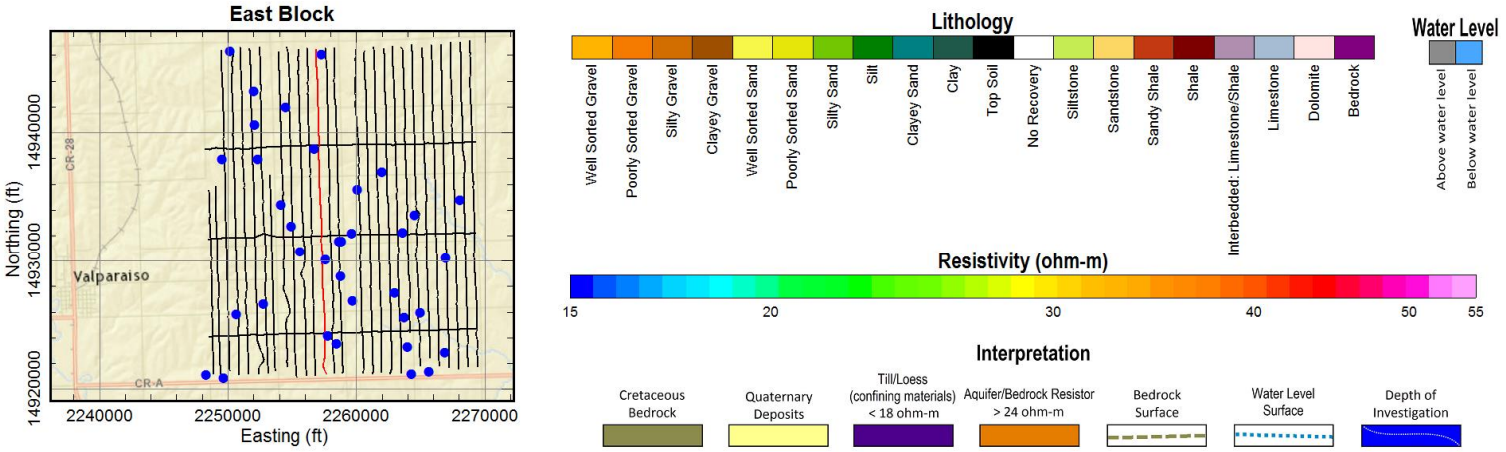

East Block Line L701101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-047069
14925000
14930000
14935000
14940000
14945000
Northing (ft)

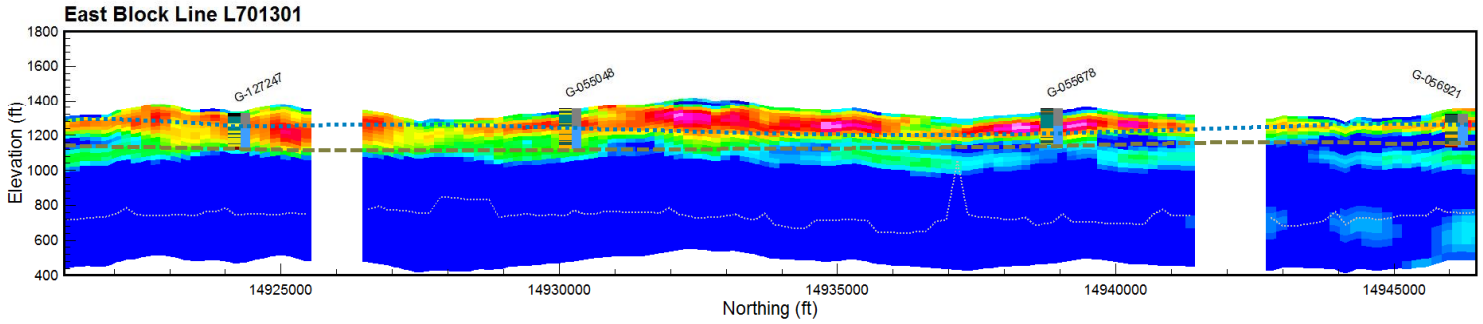

Line L701101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-047069
14925000
14930000
14935000
14940000
14945000
Northing (ft)

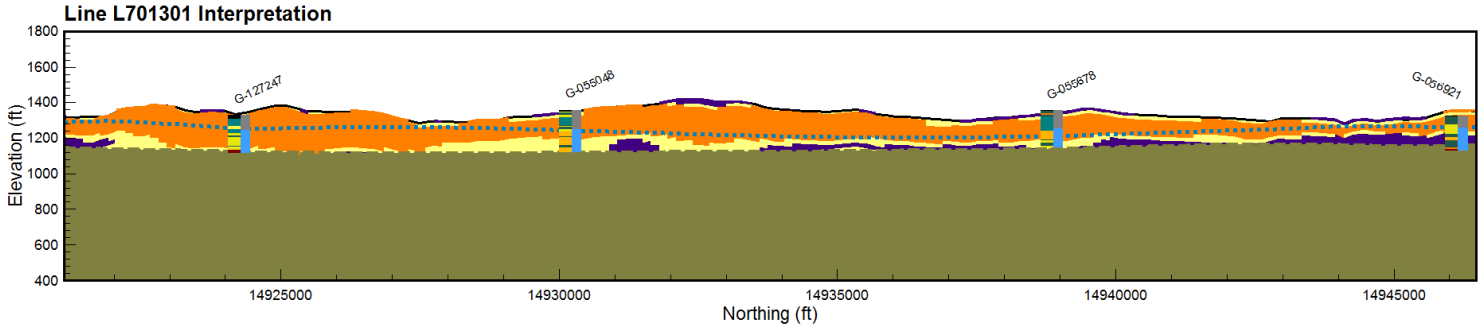

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

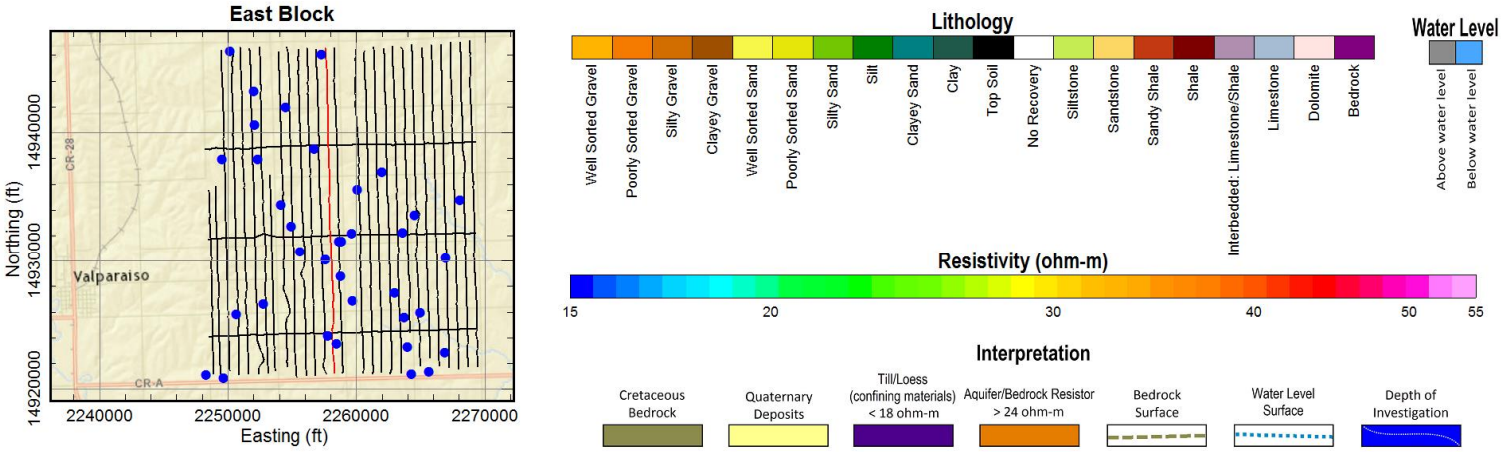

East Block Line L701201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-055678
14925000
14930000
14935000
14940000
14945000
Northing (ft)

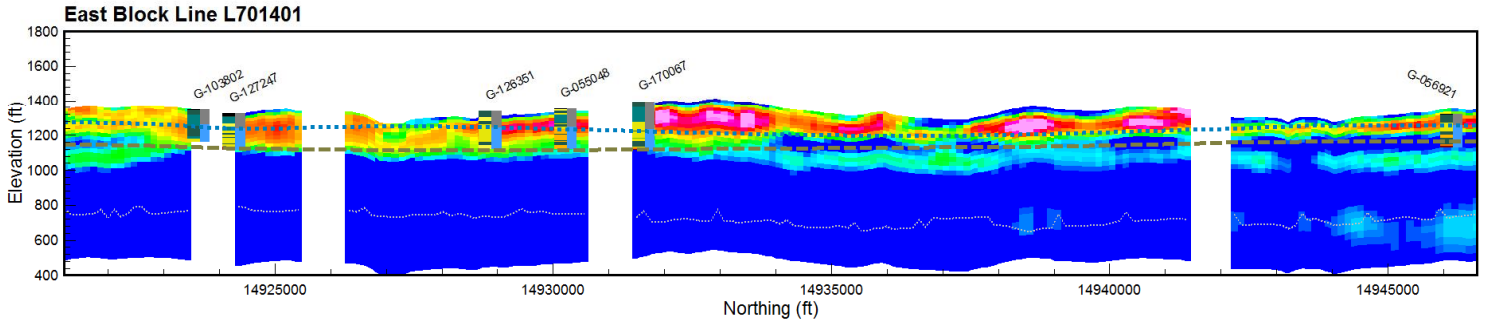

Line L701201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-055678
14925000
14930000
14935000
14940000
14945000
Northing (ft)

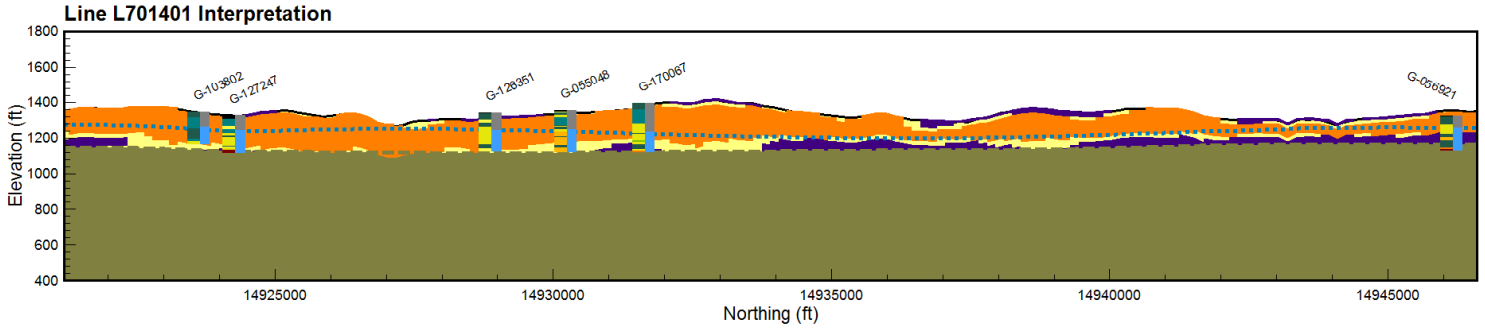

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

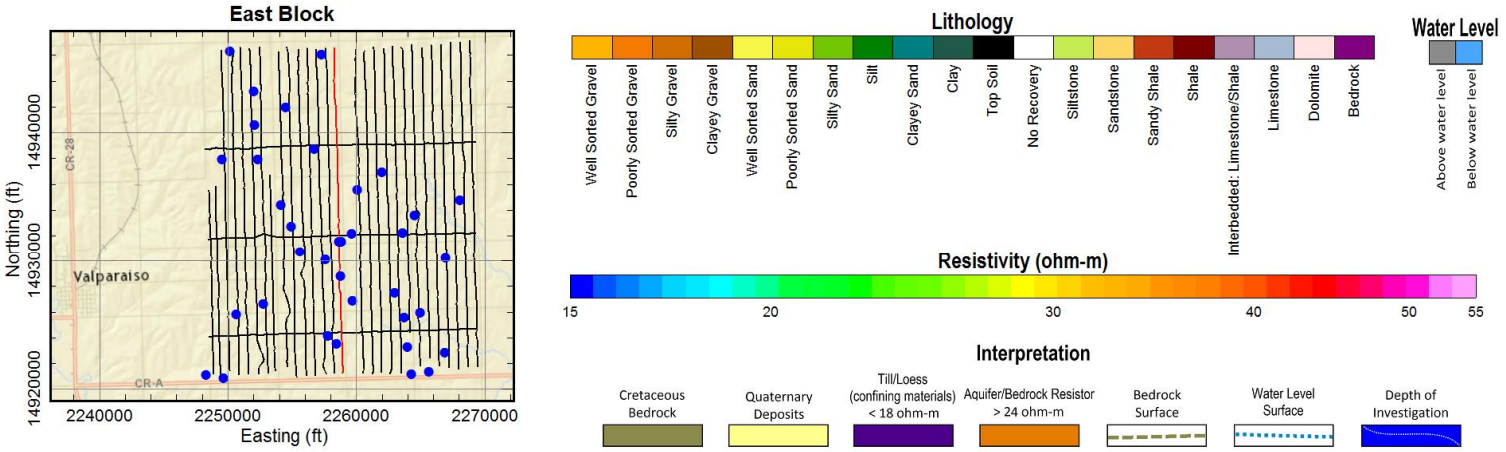

East Block Line L701301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-127247
G-055048
G-055678
G-056921
14925000
14930000
14935000
14940000
14945000
Northing (ft)

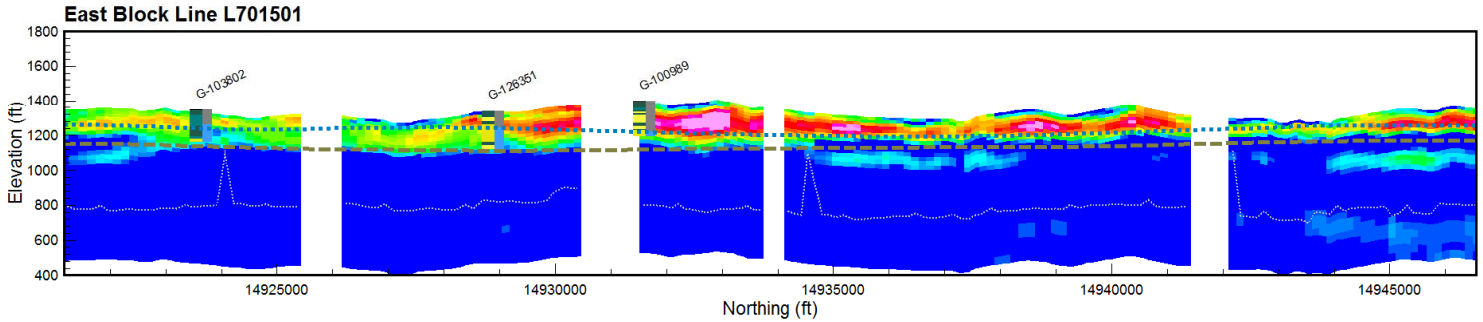

Line L701301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-127247
G-055048
G-055678
G-056921
14925000
14930000
14935000
14940000
14945000
Northing (ft)

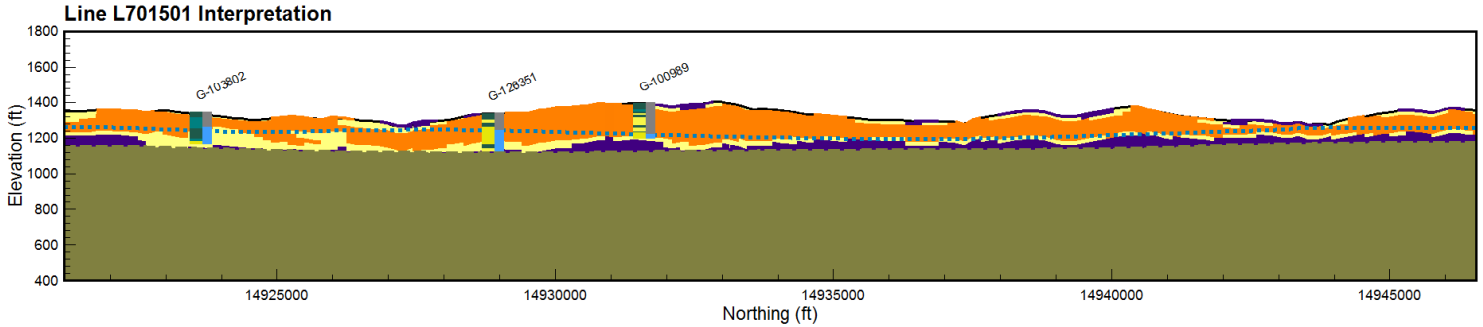

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

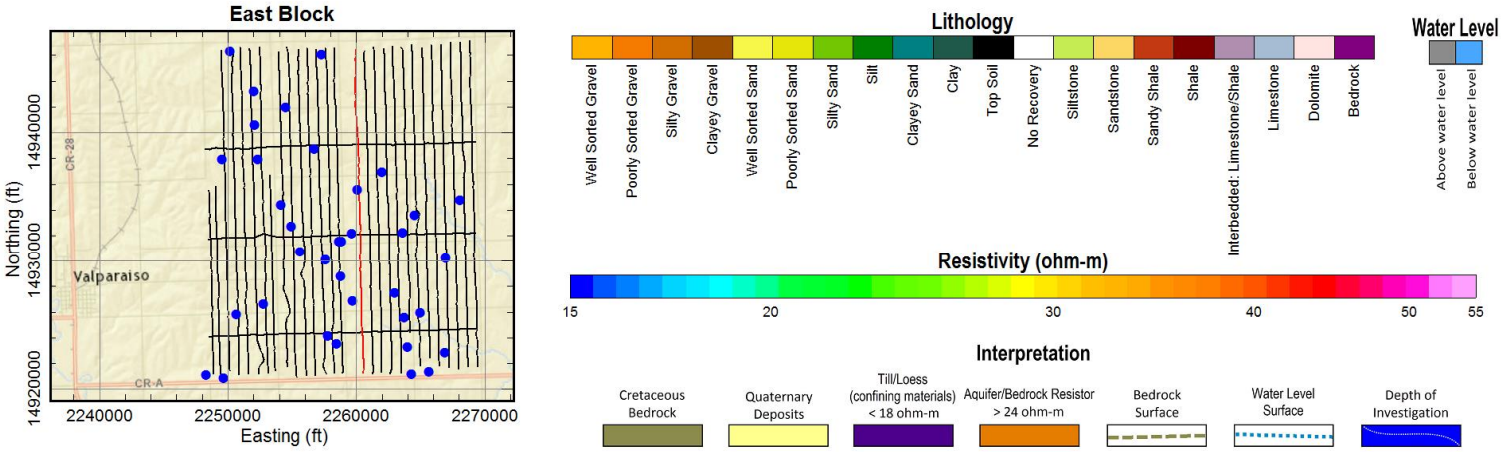

East Block Line L701401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-103802
G-127247
G-126351
G-055048
G-170067
G-056921
14925000
14930000
14935000
14940000
14945000
Northing (ft)

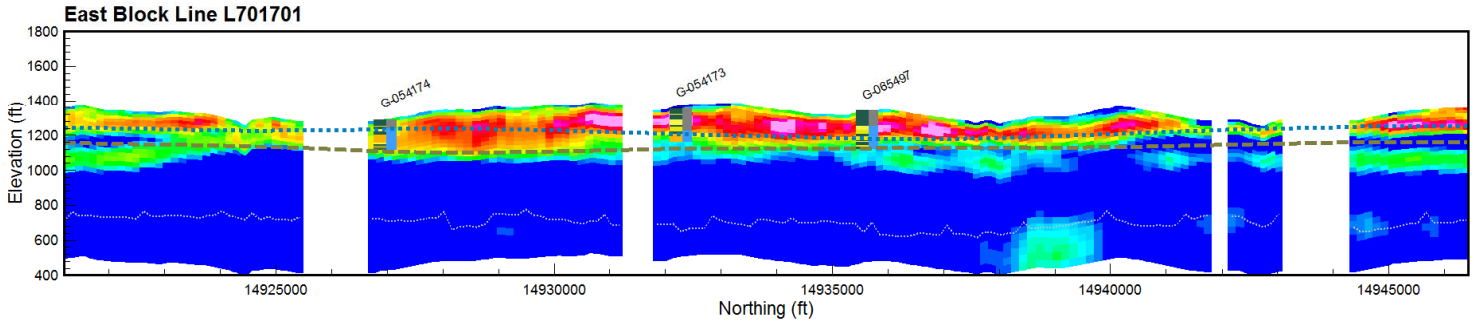

Line L701401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-103802
G-127247
G-126351
G-055048
G-170067
G-056921
14925000
14930000
14935000
14940000
14945000
Northing (ft)

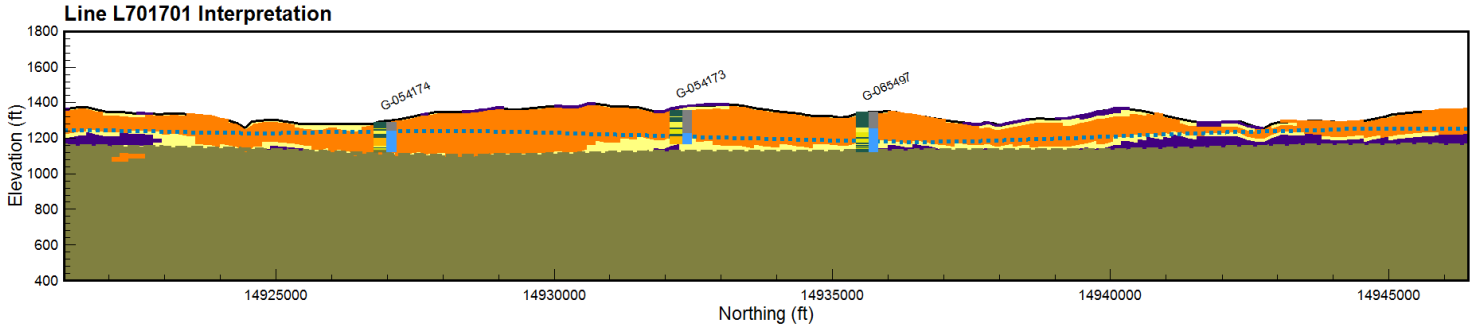

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

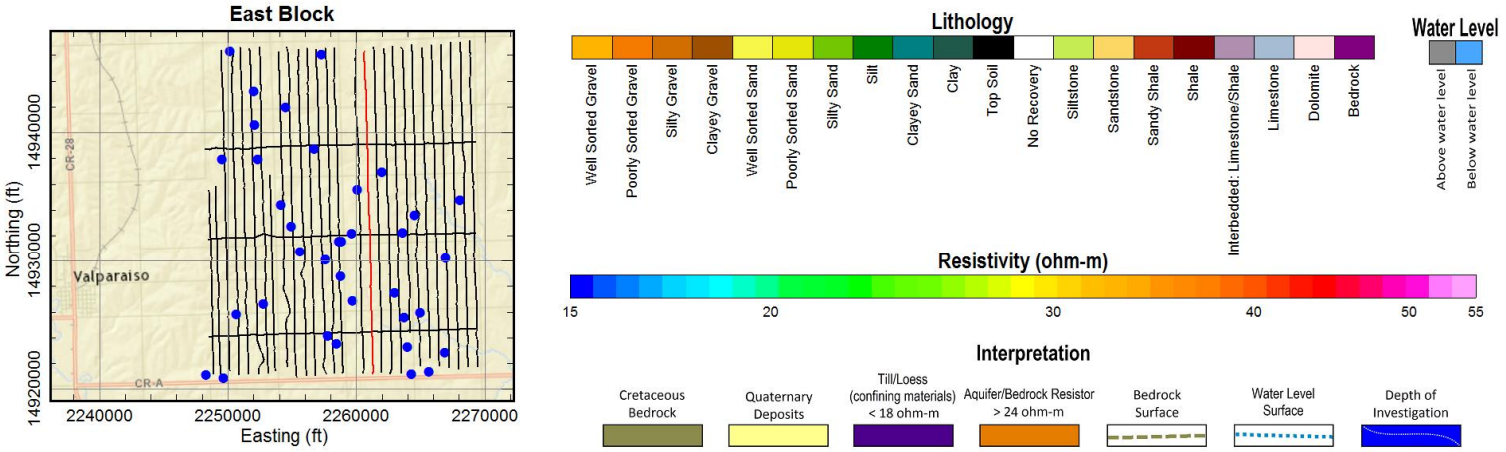

East Block Line L701501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-103802
G-126351
G-100989
14925000
14930000
14935000
14940000
14945000
Northing (ft)

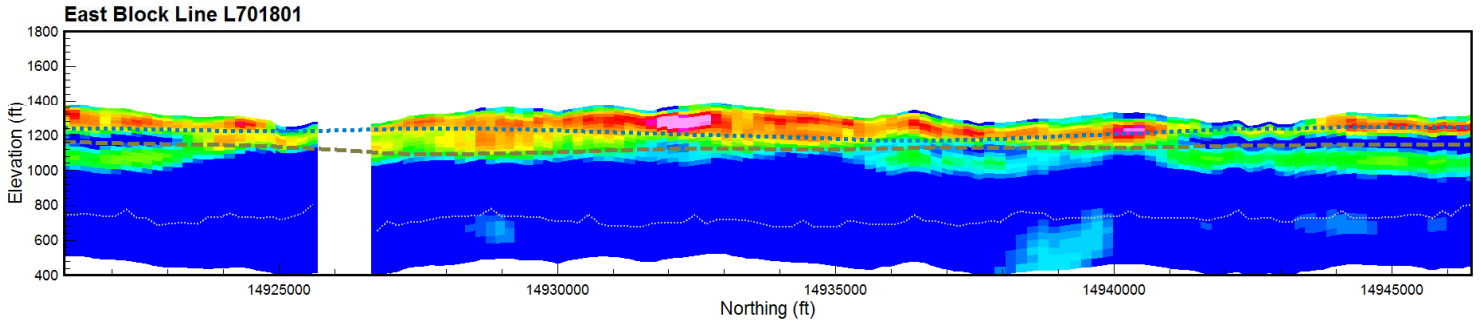

Line L701501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-103802
G-126351
G-100989
14925000
14930000
14935000
14940000
14945000
Northing (ft)

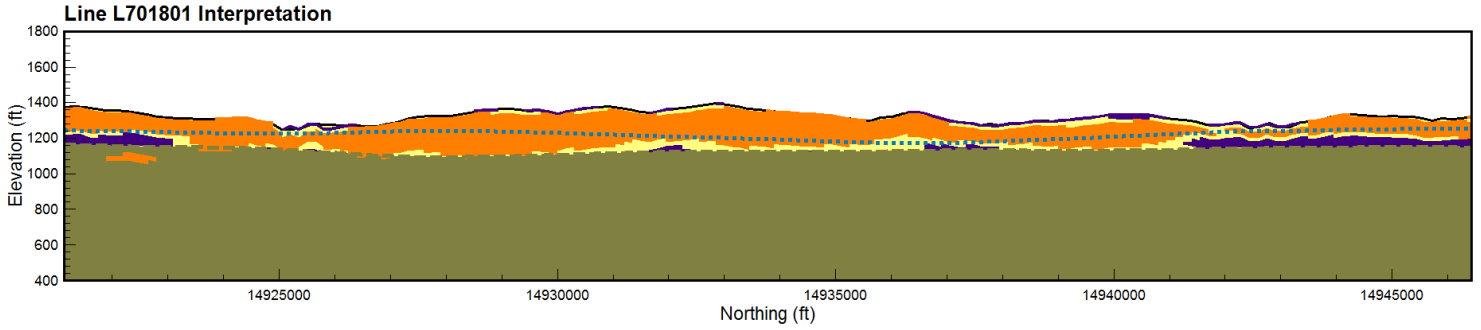

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

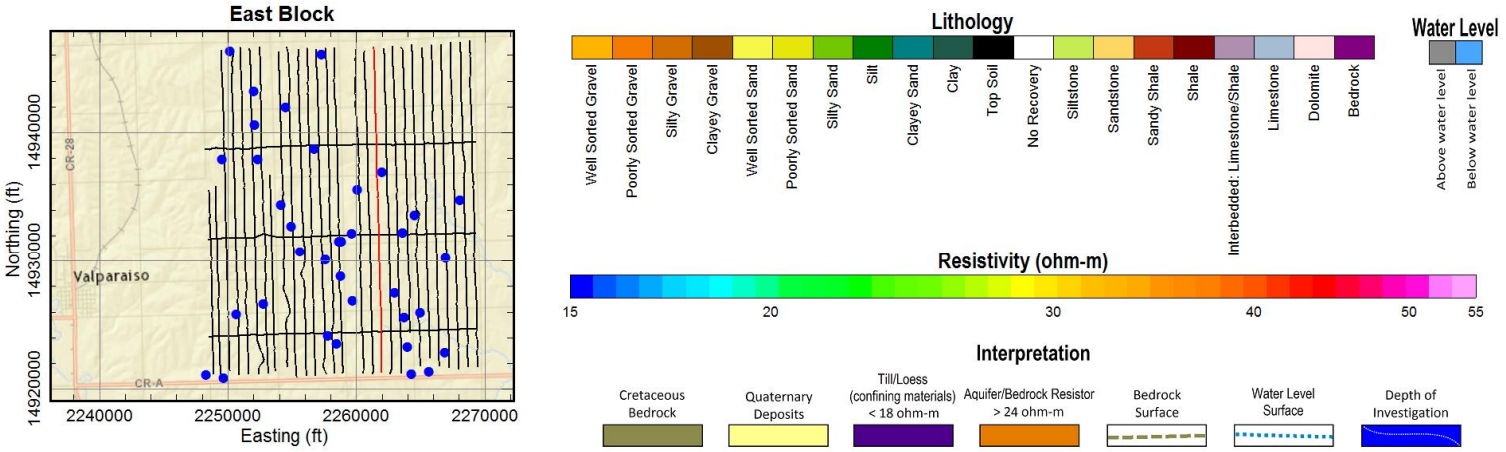

East Block Line L701701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-054174
G-054173
G-065497
14925000
14930000
14935000
14940000
14945000
Northing (ft)

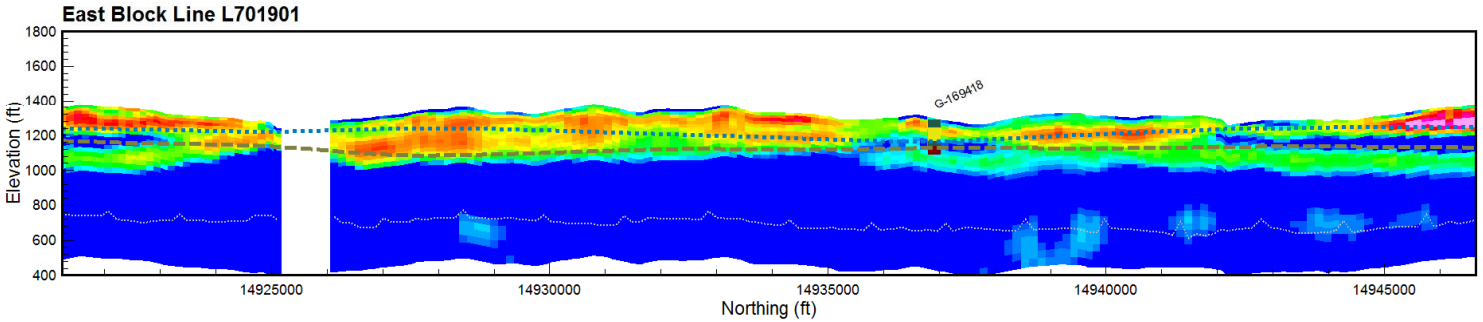

Line L701701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-054174
G-054173
G-065497
14925000
14930000
14935000
14940000
14945000
Northing (ft)

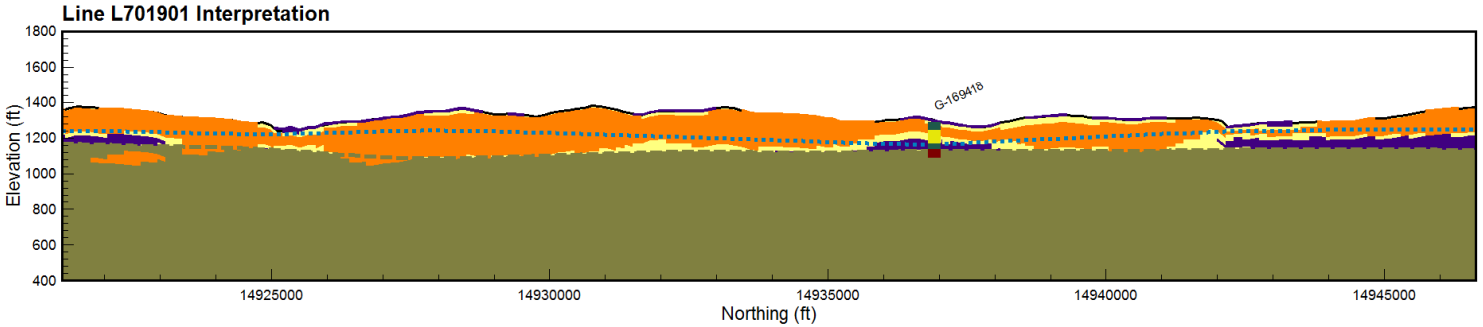

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

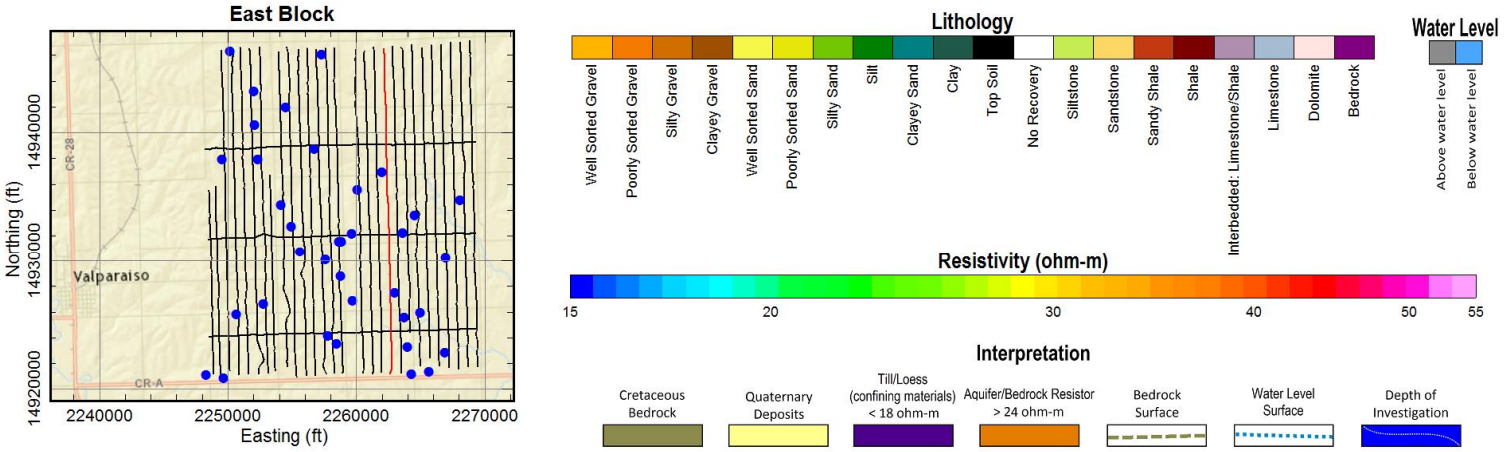

East Block Line L701801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

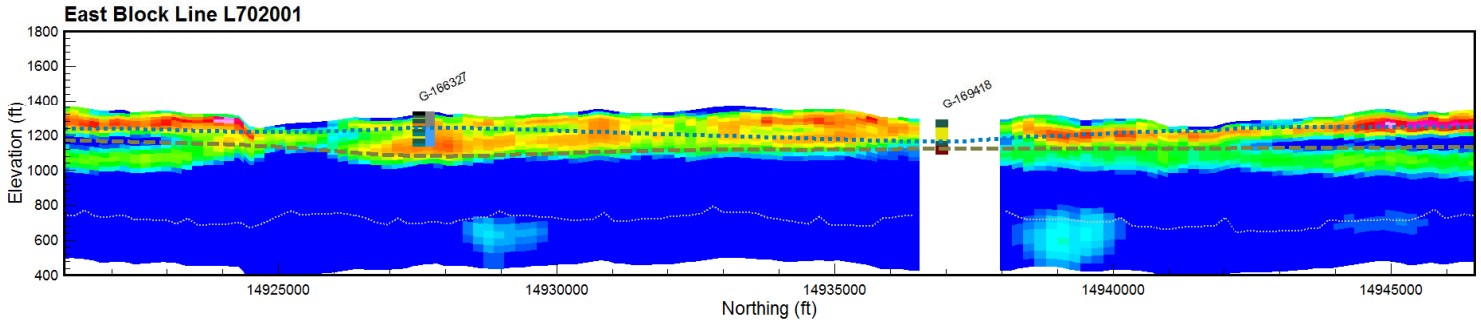

Line L701801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

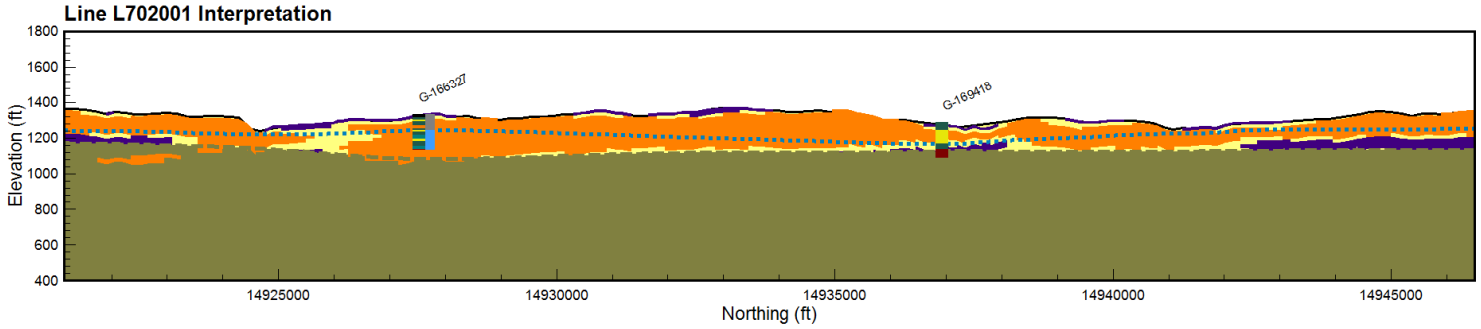

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

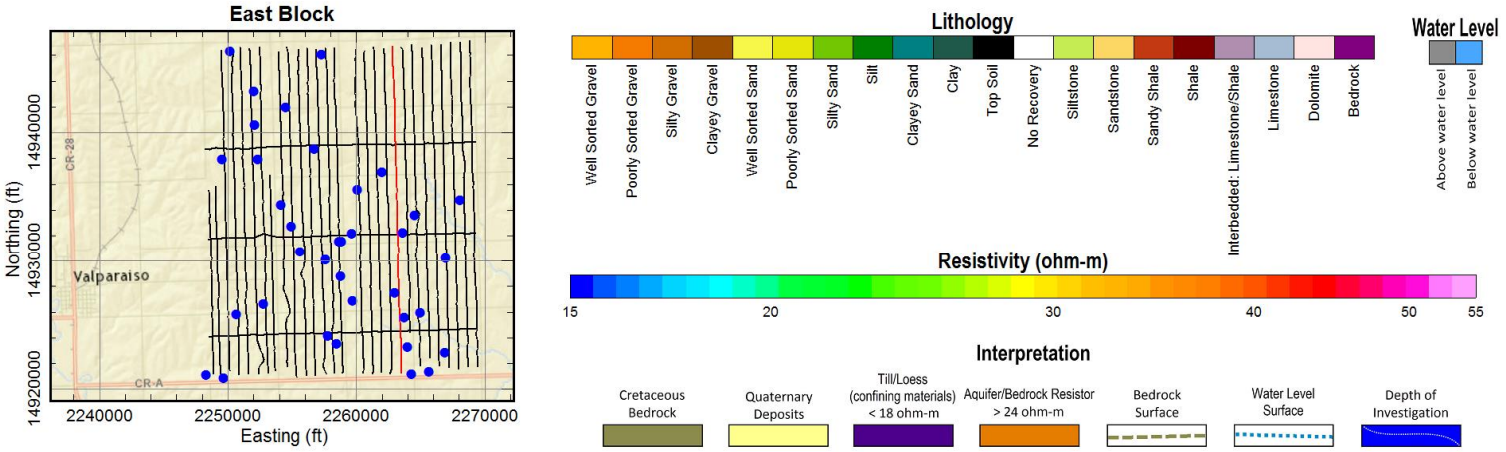

East Block Line L701901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-169418
14925000
14930000
14935000
14940000
14945000
Northing (ft)

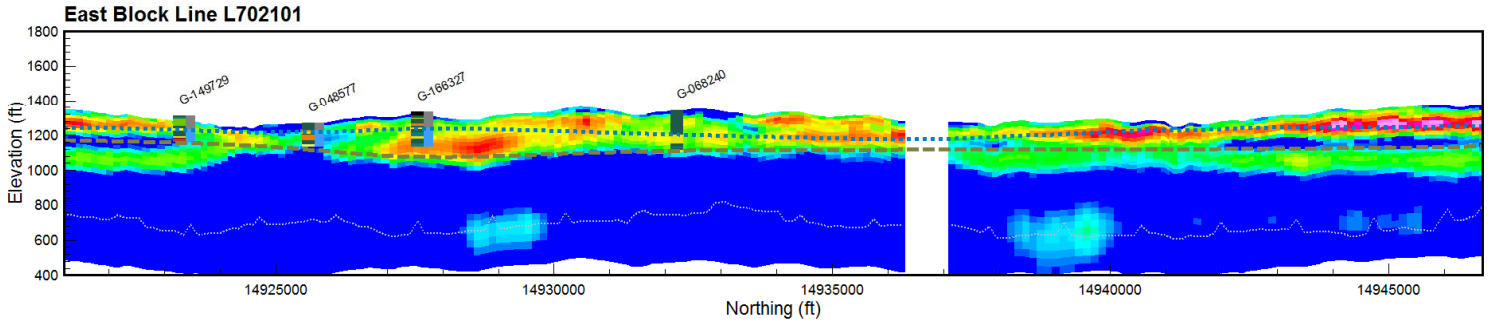

Line L701901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-169418
14925000
14930000
14935000
14940000
14945000
Northing (ft)

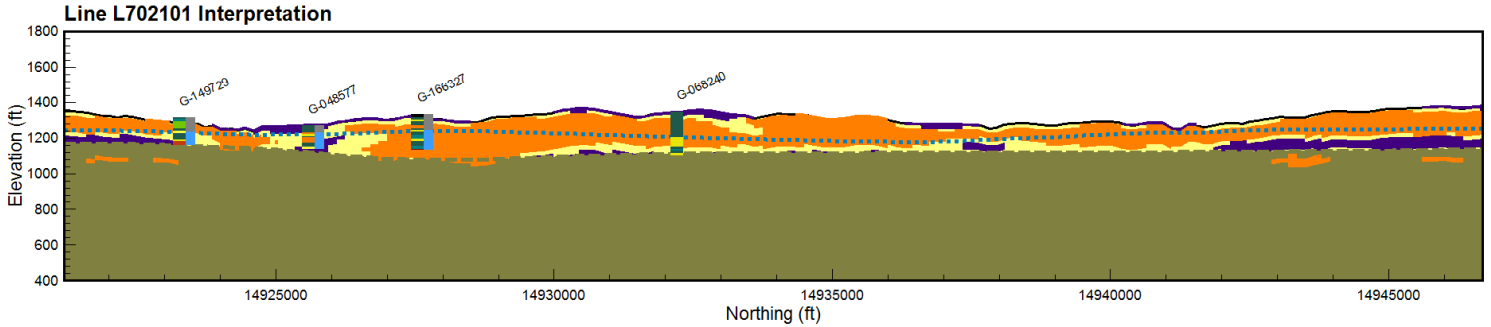

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

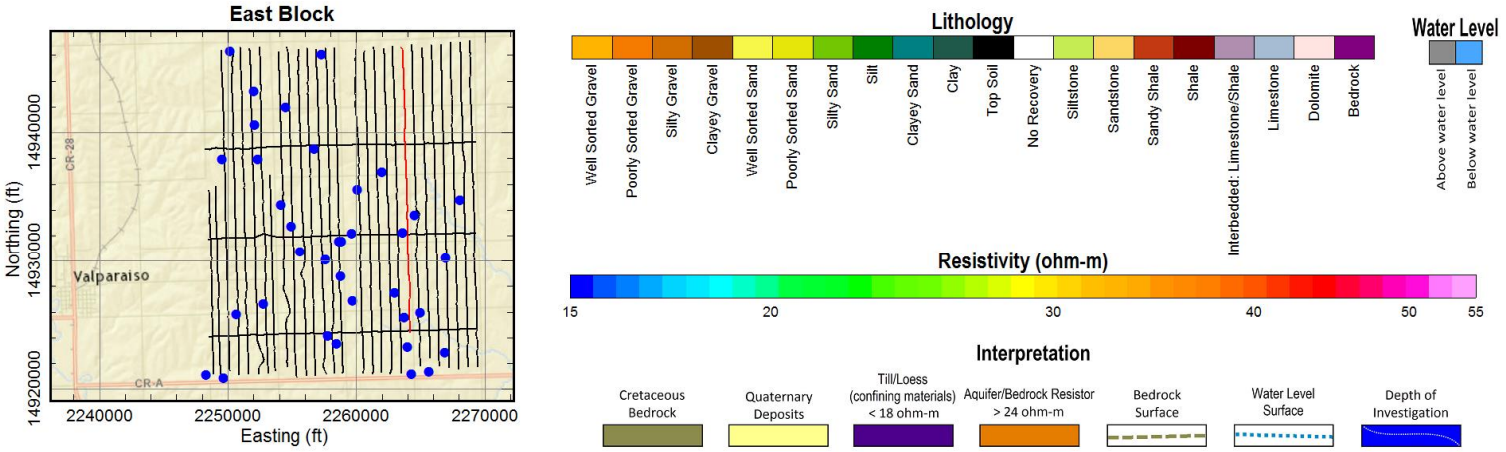

East Block Line L702001
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-166327
G-169418
14925000
14930000
14935000
14940000
14945000
Northing (ft)

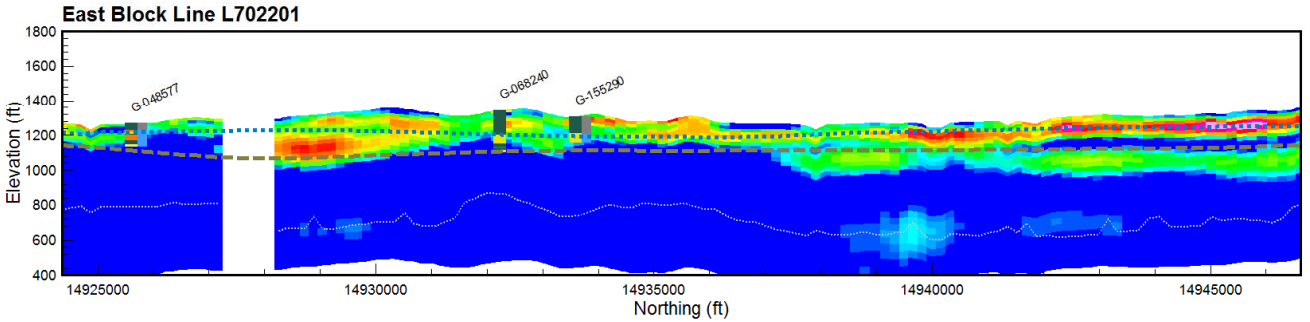

Line L702001 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-166327
G-169418
14925000
14930000
14935000
14940000
14945000
Northing (ft)

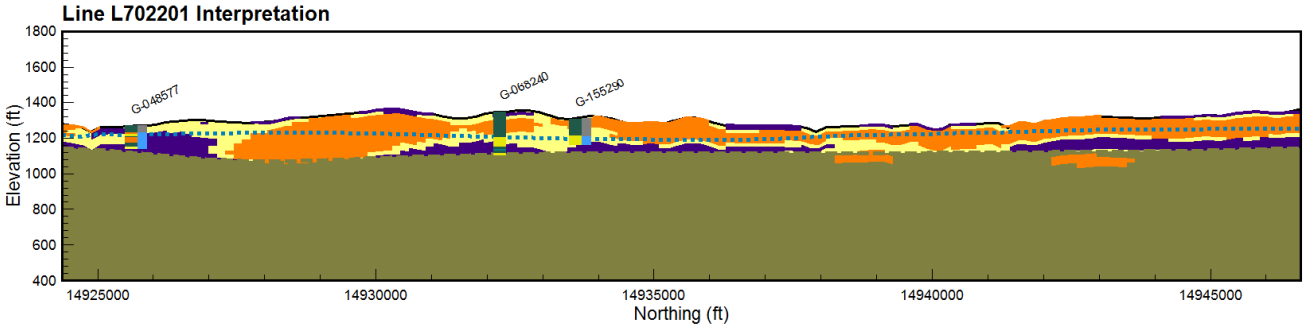

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

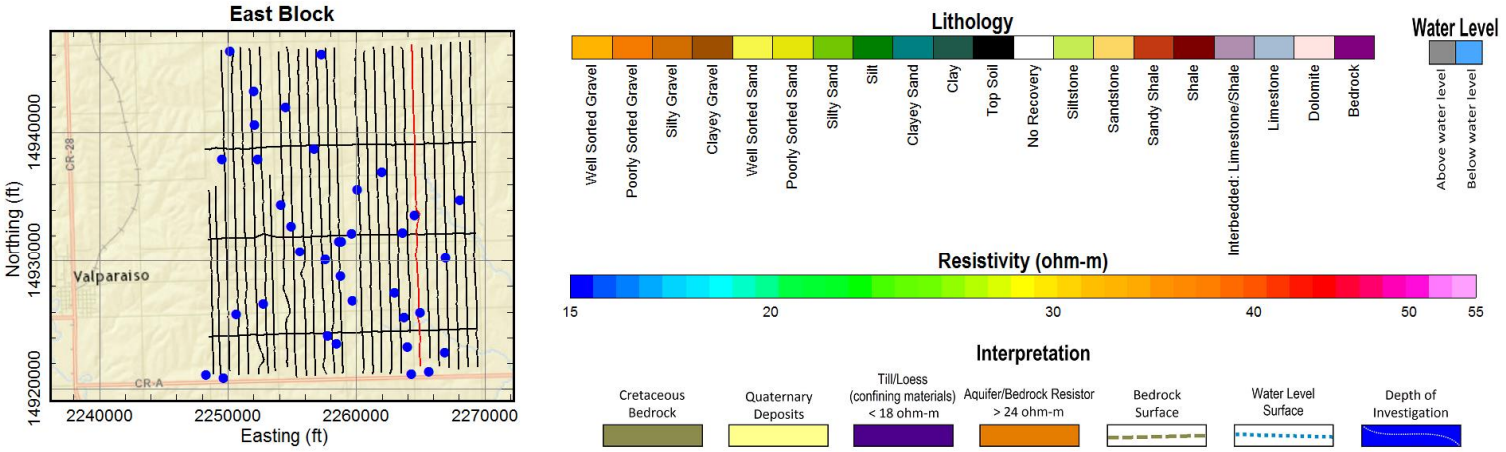

East Block Line L702101
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-149729
G-048577
G-166327
G-068240
14925000
14930000
14935000
14940000
14945000
Northing (ft)

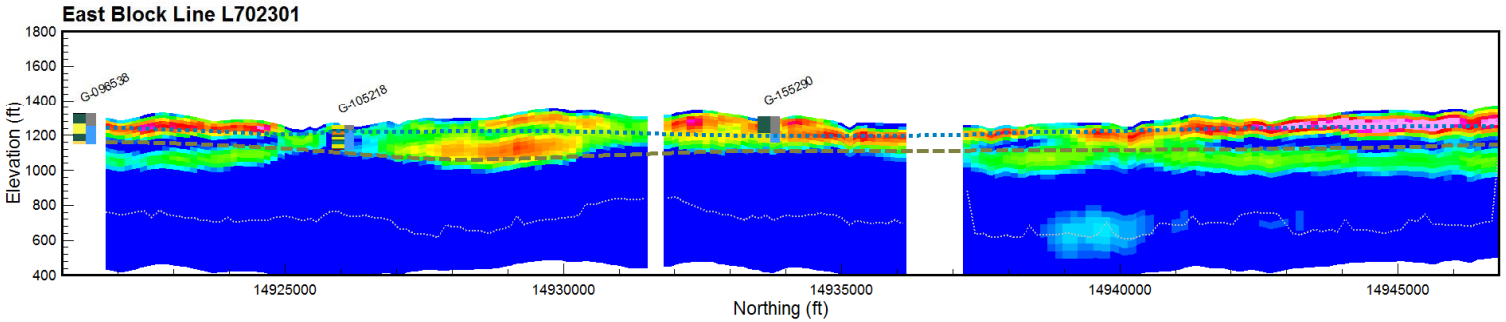

Line L702101 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-149729
G-048577
G-166327
G-068240
14925000
14930000
14935000
14940000
14945000
Northing (ft)

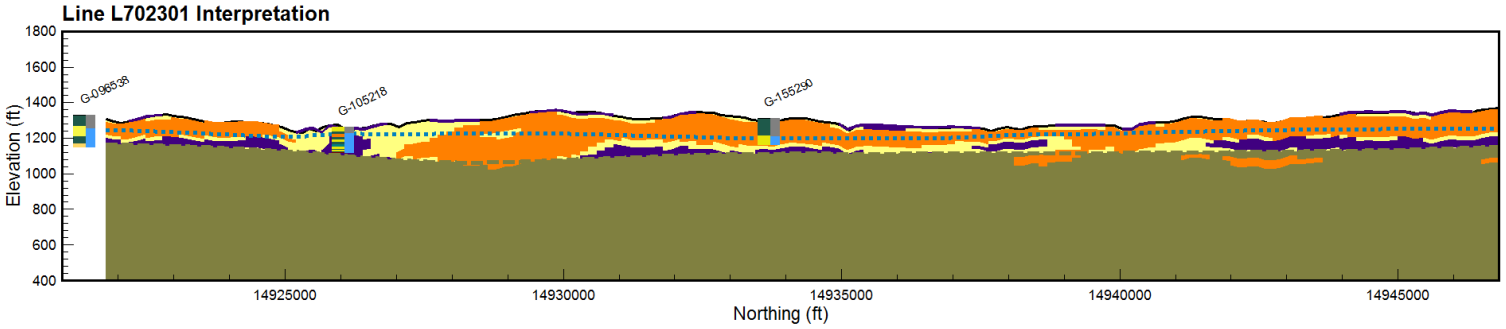

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

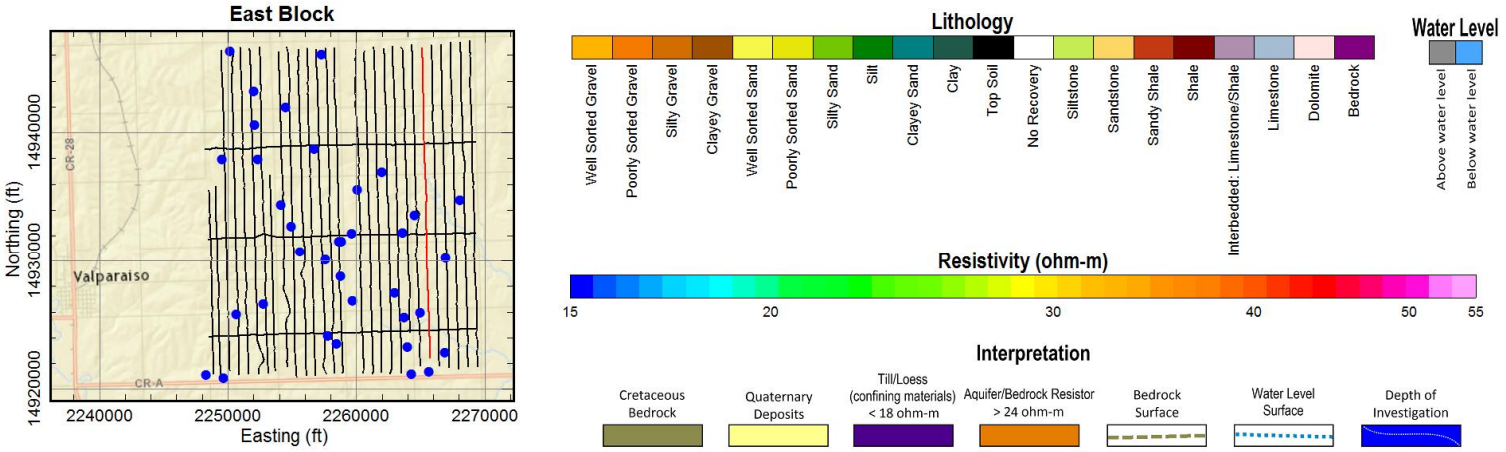

East Block Line L702201
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-048577
G-068240
G-155290
14925000
14930000
14935000
14940000
14945000
Northing (ft)

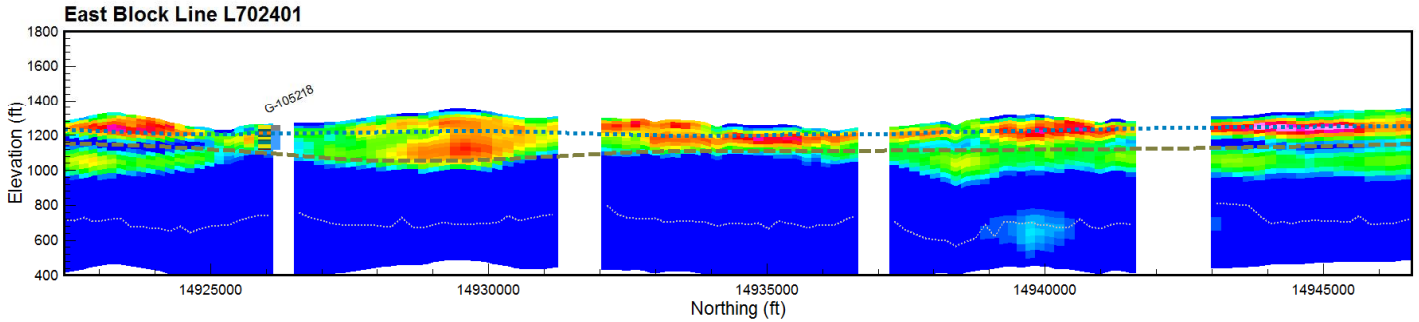

Line L702201 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-048577
G-068240
G-155290
14925000
14930000
14935000
14940000
14945000
Northing (ft)

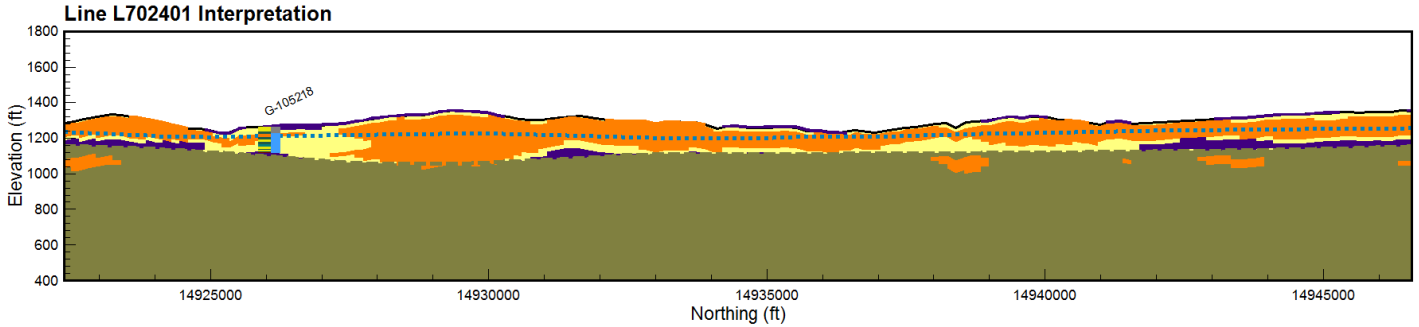

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

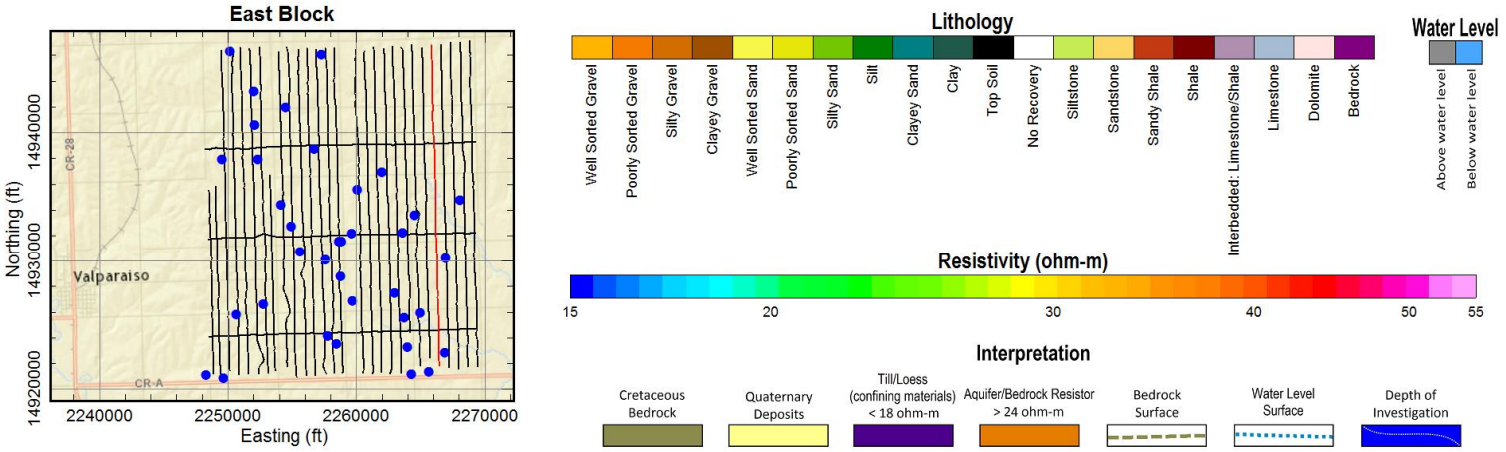

East Block Line L702301
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-096536
G-105218
G-155290
14925000
14930000
14935000
14940000
14945000
Northing (ft)

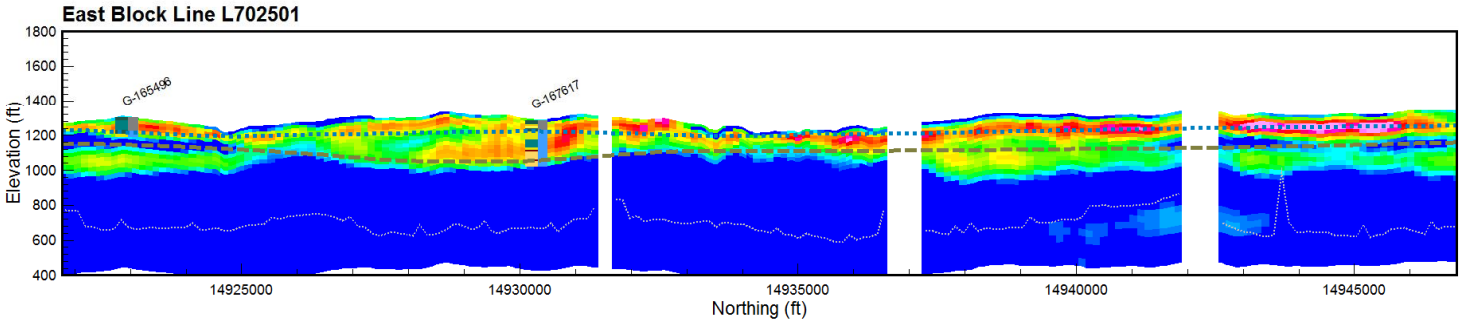

Line L702301 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-096536
G-105218
G-155290
14925000
14930000
14935000
14940000
14945000
Northing (ft)

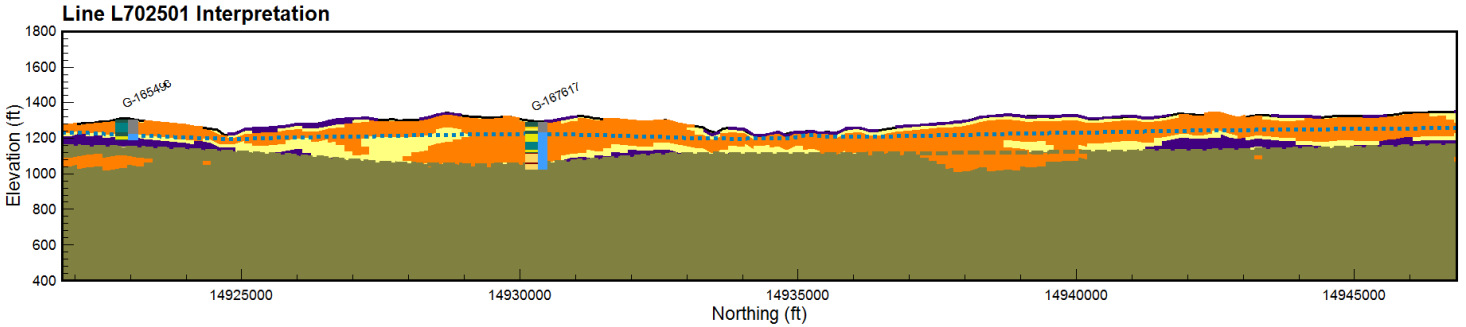

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

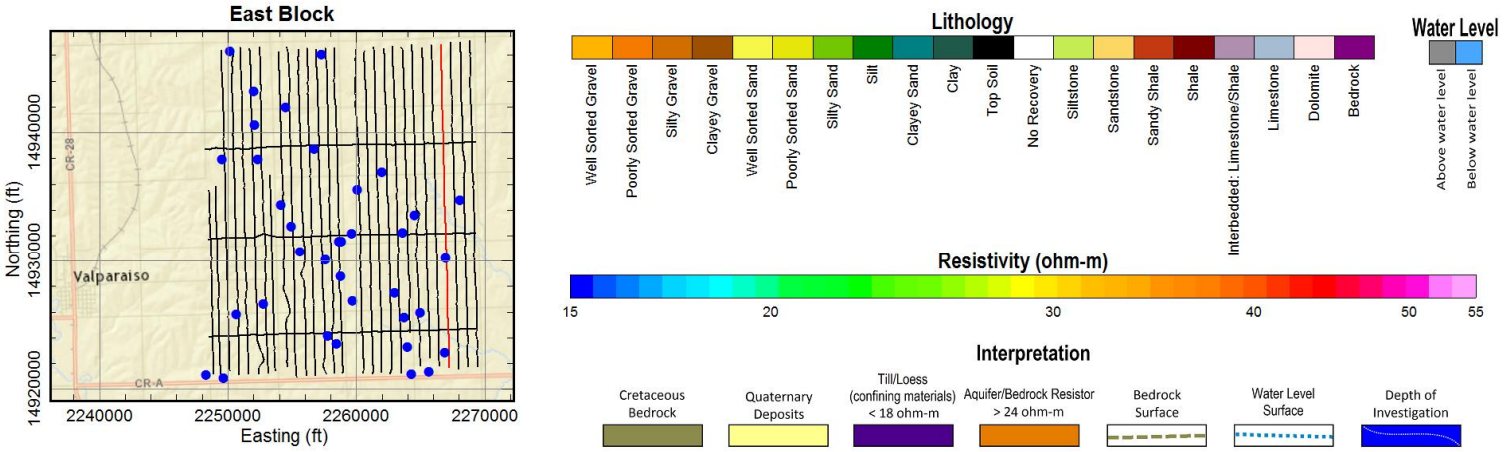

East Block Line L702401
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-105218
14925000
14930000
14935000
14940000
14945000
Northing (ft)

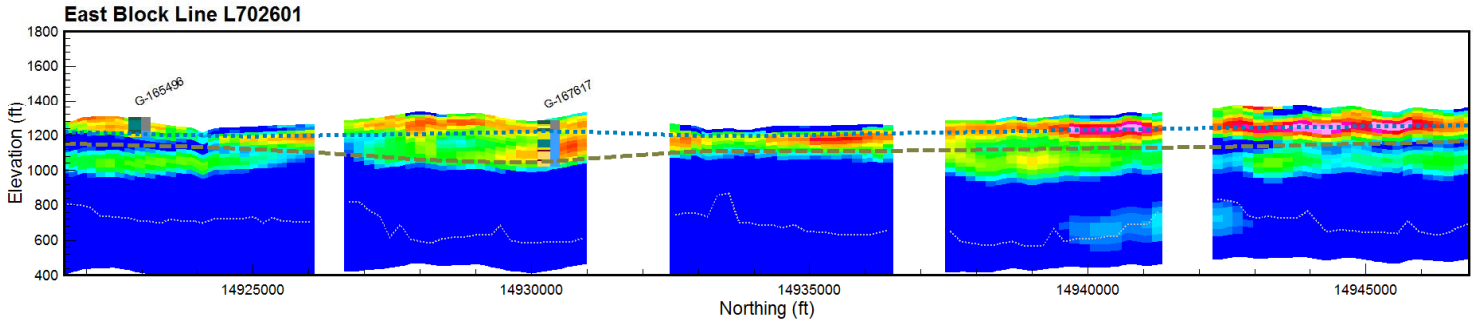

Line L702401 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-105218
14925000
14930000
14935000
14940000
14945000
Northing (ft)

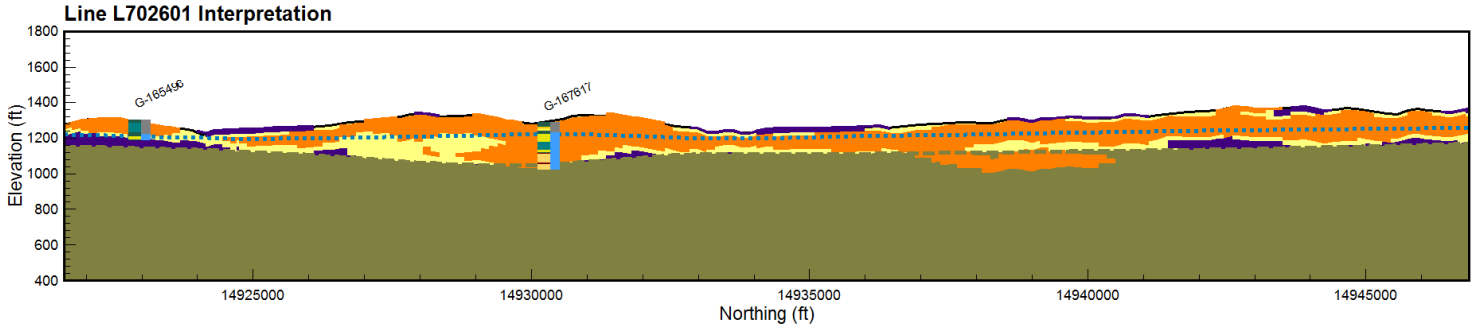

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

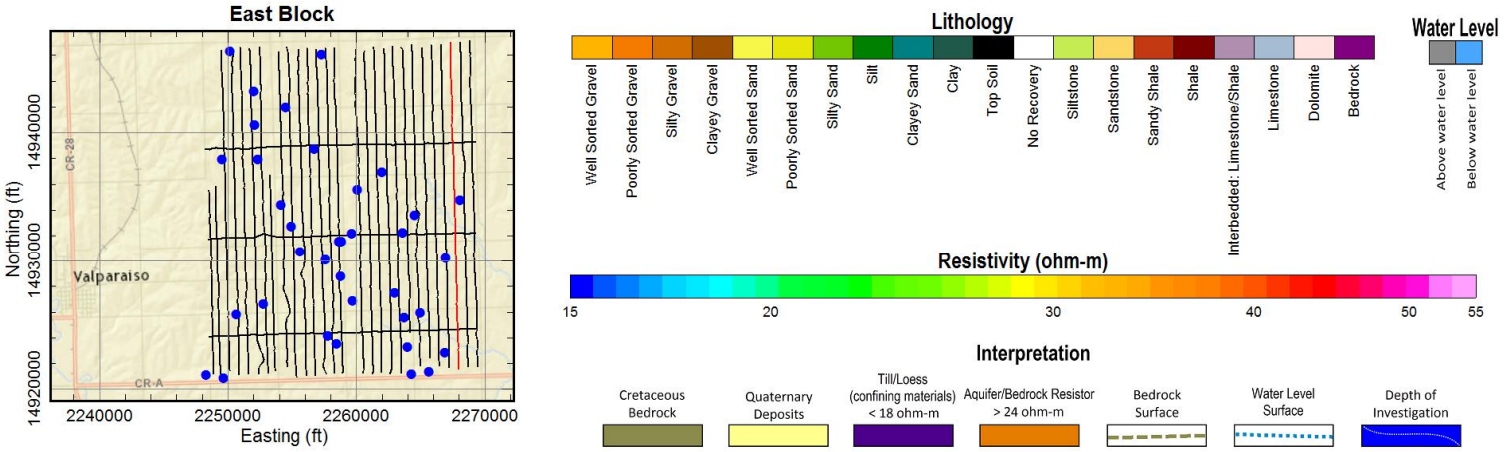

East Block Line L702501
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-165496
G-167617
14925000
14930000
14935000
14940000
14945000
Northing (ft)

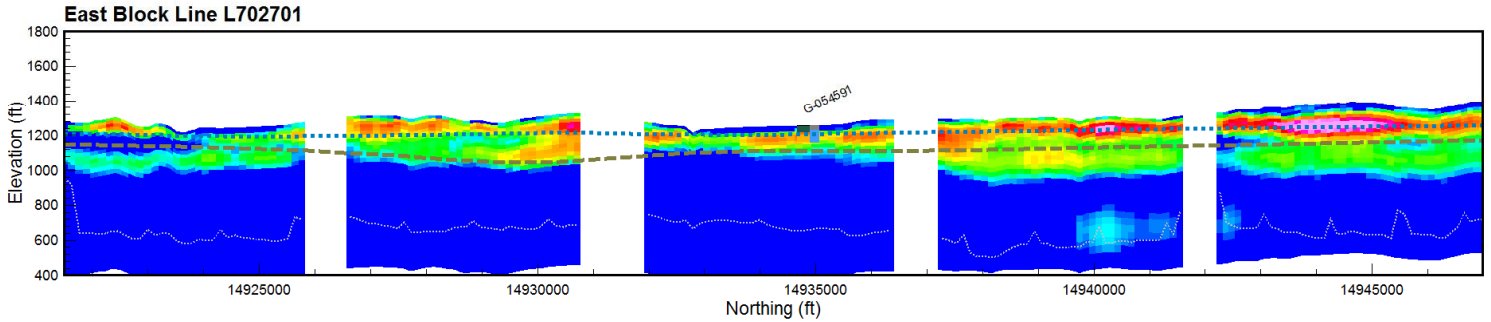

Line L702501 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-165496
G-167617
14925000
14930000
14935000
14940000
14945000
Northing (ft)

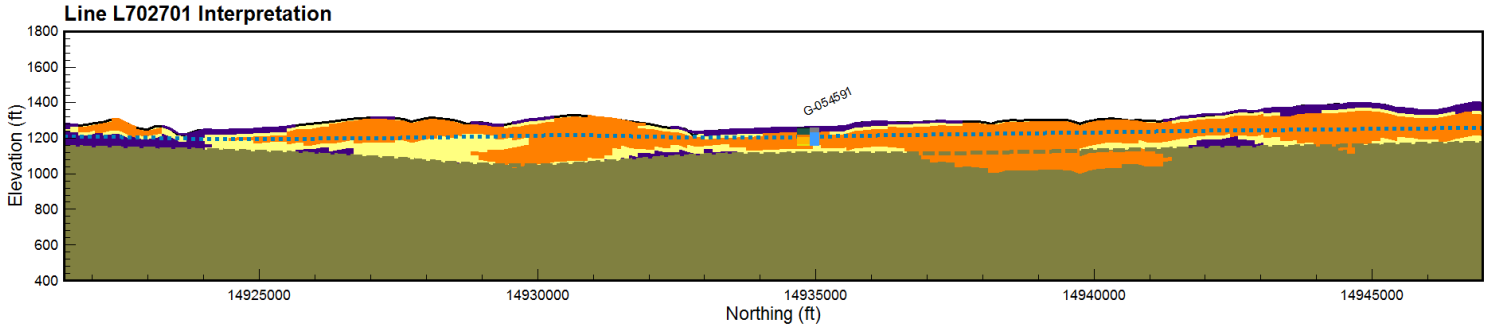

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

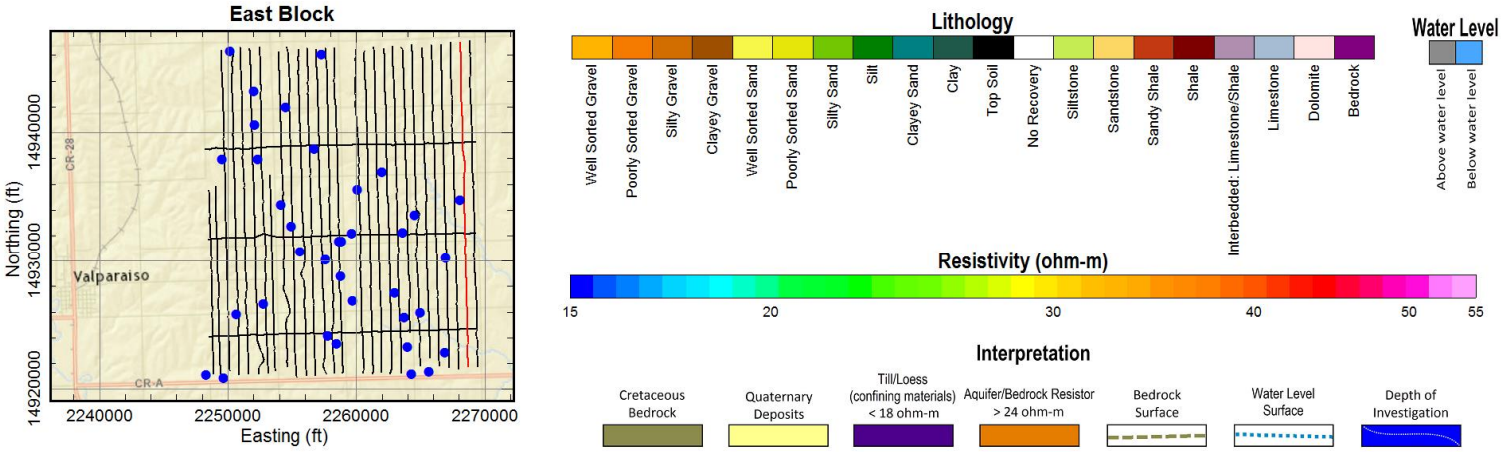

East Block Line L702601
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-165496
G-167617
14925000
14930000
14935000
14940000
14945000
Northing (ft)

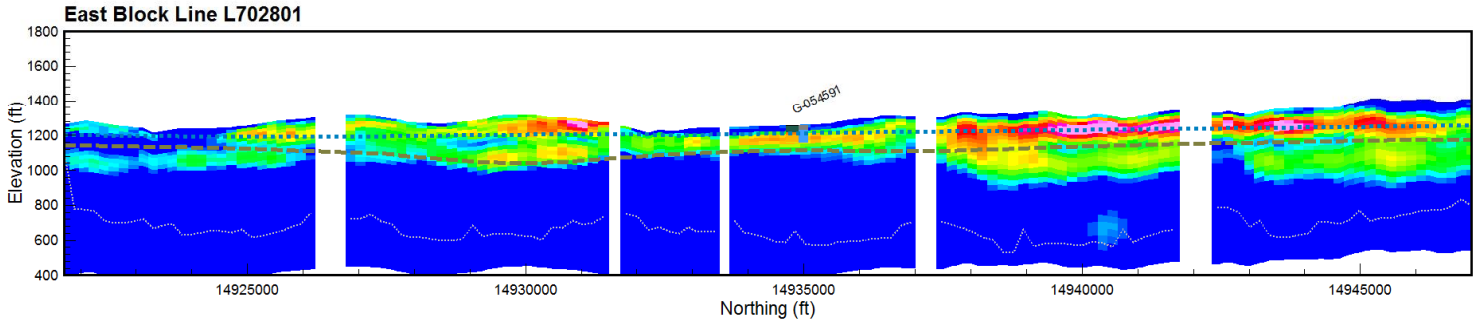

Line L702601 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-165496
G-167617
14925000
14930000
14935000
14940000
14945000
Northing (ft)

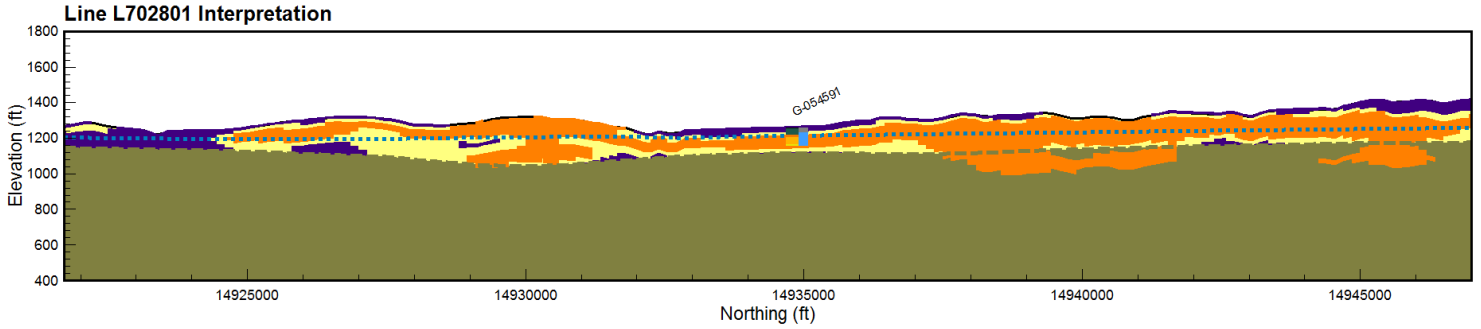

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

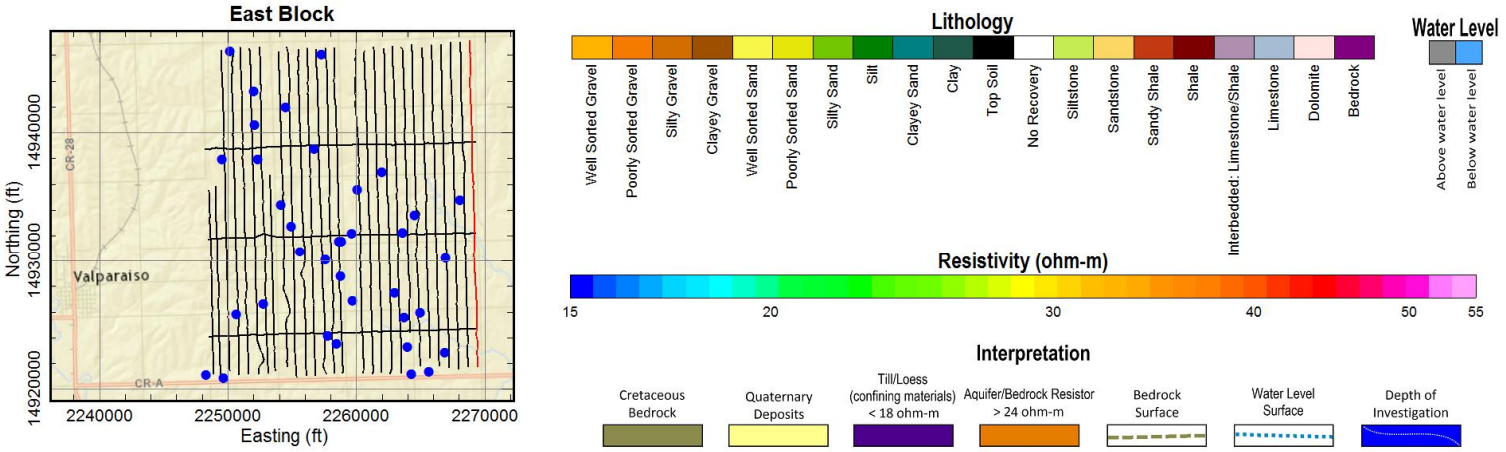

East Block Line L702701
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-054591
14925000
14930000
14935000
14940000
14945000
Northing (ft)

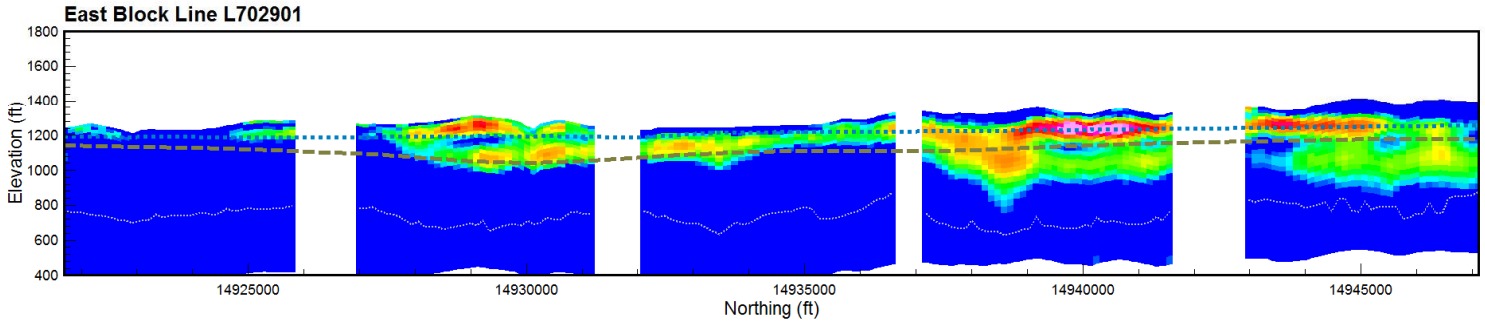

Line L702701 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-054591
14925000
14930000
14935000
14940000
14945000
Northing (ft)

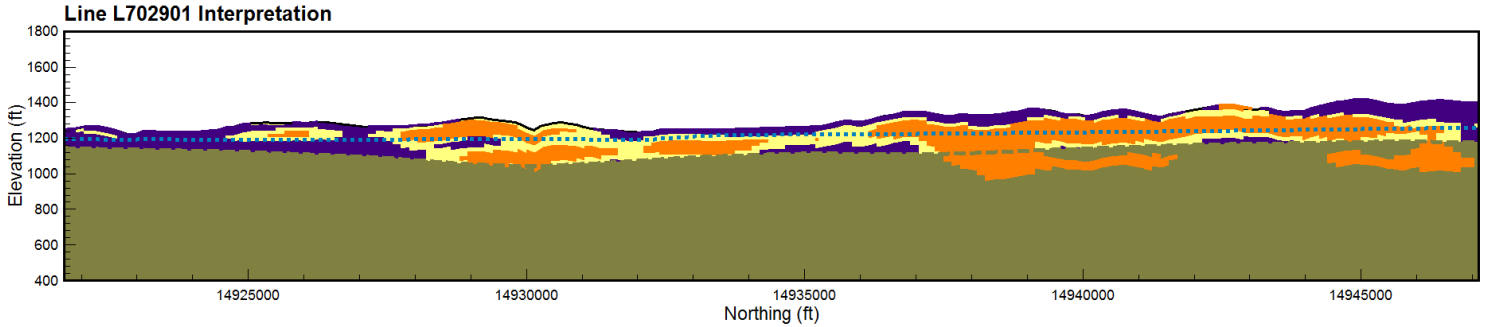

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation


East Block Line L702801
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-054591
14925000
14930000
14935000
14940000
14945000
Northing (ft)

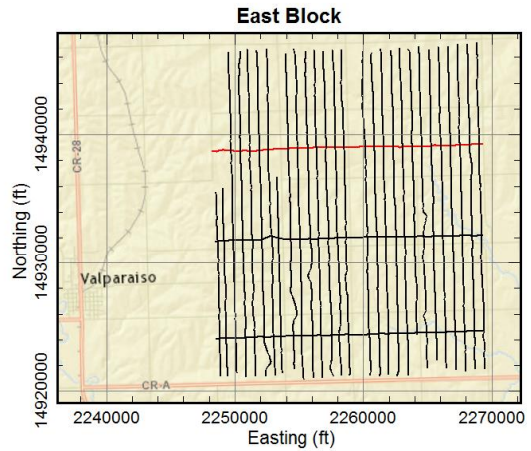

Line L702801 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
G-054591
14925000
14930000
14935000
14940000
14945000
Northing (ft)

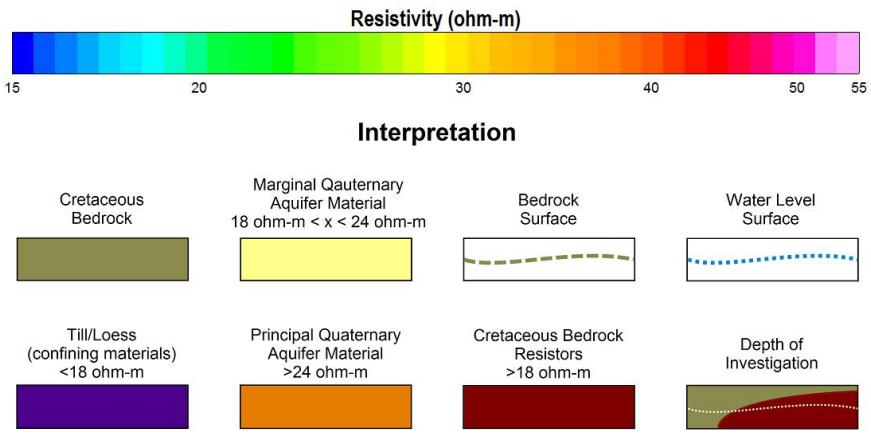

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Lithology
Well Sorted Gravel
Poorly Sorted Gravel
Silty Gravel
Clayey Gravel
Well Sorted Sand
Poorly Sorted Sand
Silty Sand
Silt
Clayey Sand
Clay
Top Soil
No Recovery
Siltstone
Sandstone
Sandy Shale
Shale
Interbedded: Limestone/Shale
Limestone
Dolomite
Bedrock
Water Level
Above water level
Below water level
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Quaternary Deposits
Till/Loess (confining materials) < 18 ohm-m
Aquifer/Bedrock Resistor > 24 ohm-m
Bedrock Surface
Water Level Surface
Depth of Investigation

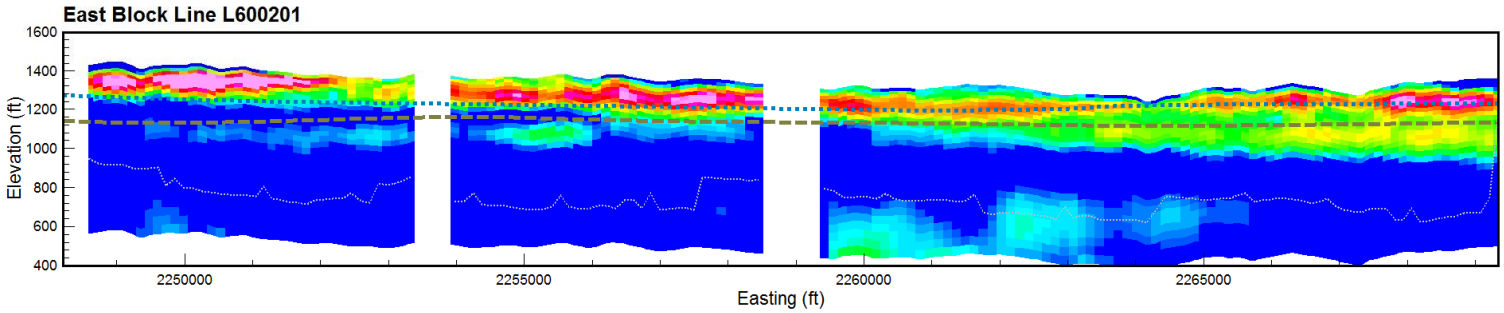

East Block Line L702901
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

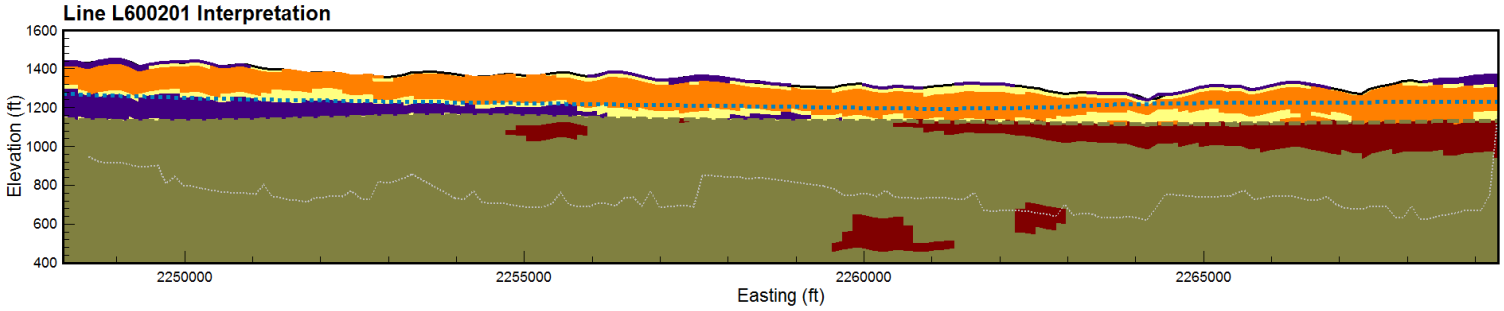

Line L702901 Interpretation
Elevation (ft)
1800
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

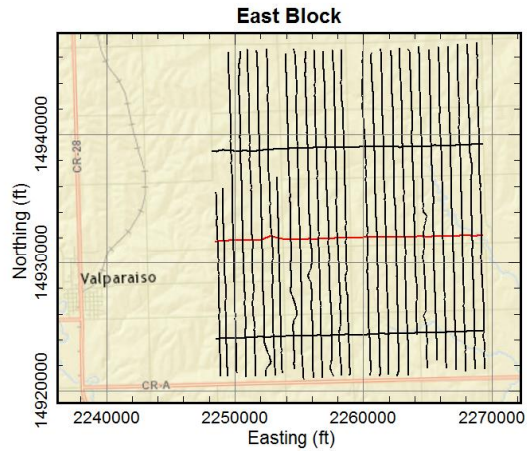
East Flight Block Profiles
Bedrock Interpretations

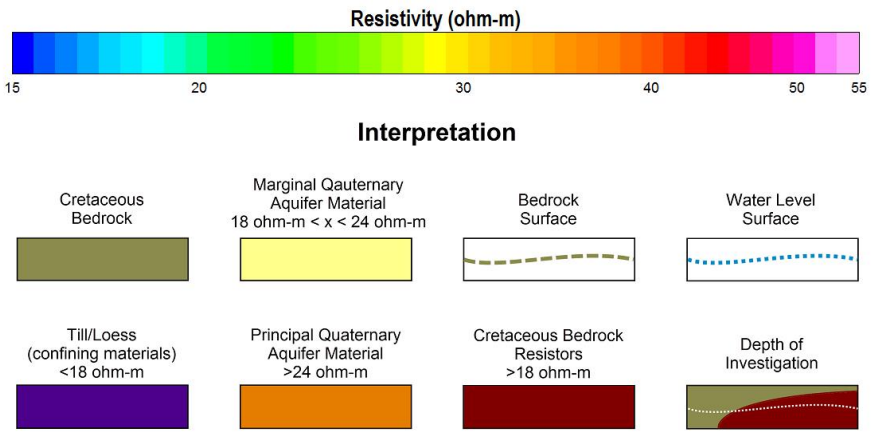

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

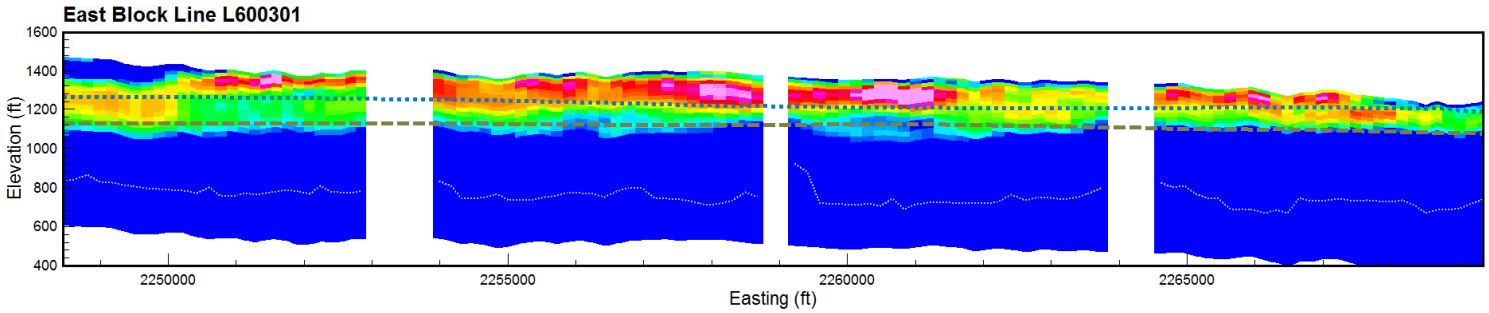

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

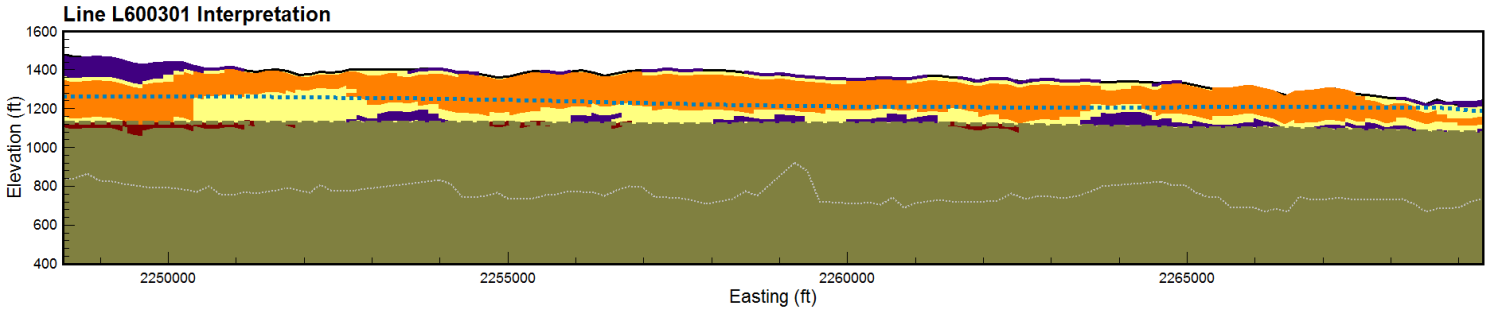

East Block Line L600201
Elevation (ft)
1600
1400
1200
1000
800
600
400
2250000
2255000
2260000
2265000
Easting (ft)

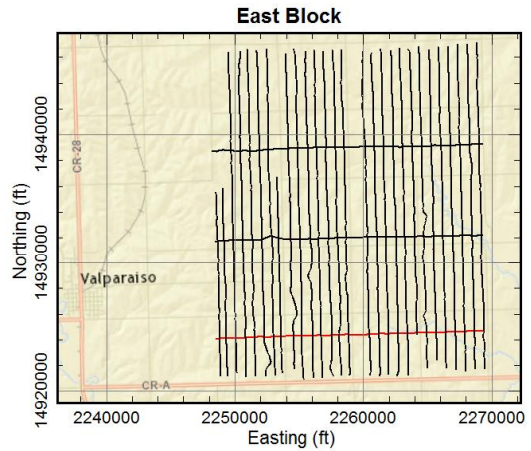

Line L600201 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
2250000
2255000
2260000
2265000
Easting (ft)

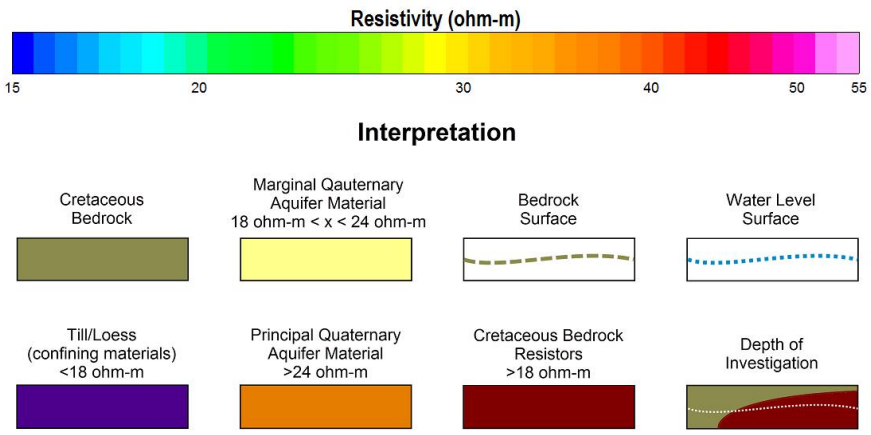

East Block
Northing (ft)
14940000
14930000
14920000
2240000
2250000
2260000
2270000
Easting (ft)
Valparaiso
CR-28
CR-A

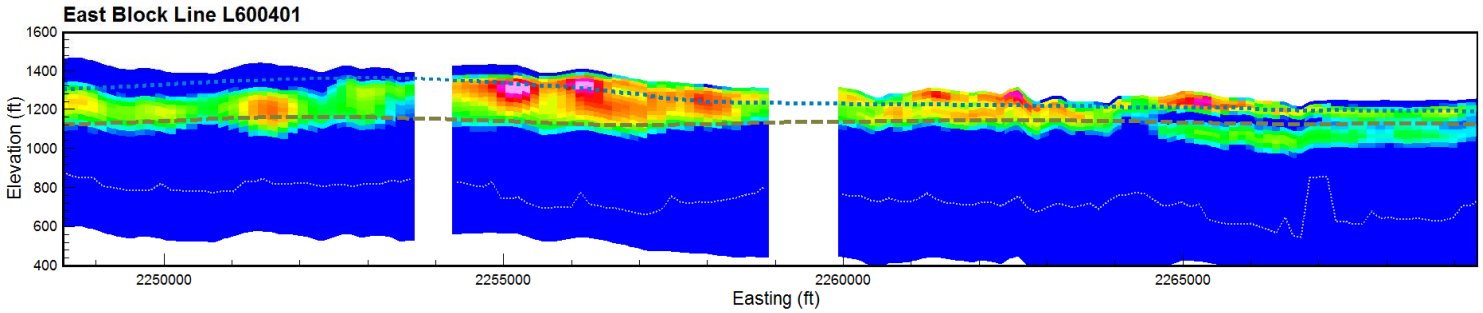

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

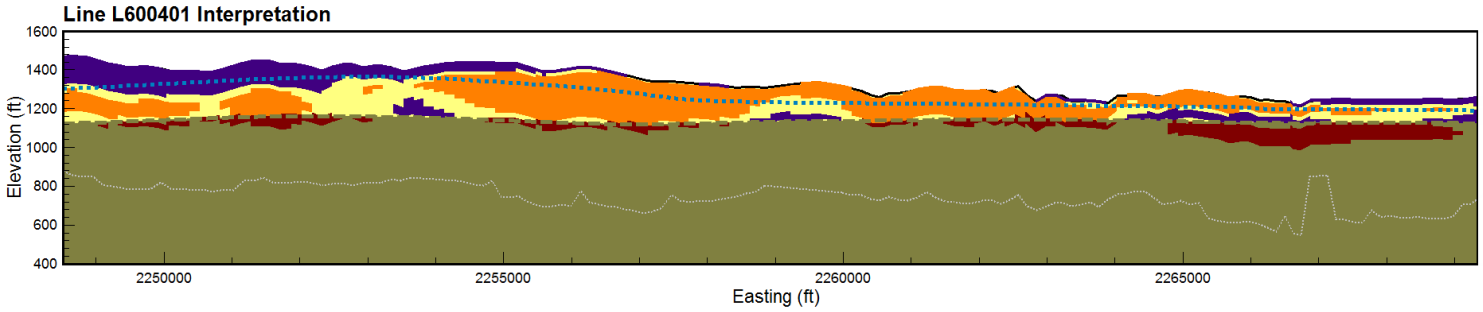

East Block Line L600301
Elevation (ft)
1600
1400
1200
1000
800
600
400
2250000
2255000
2260000
2265000
Easting (ft)

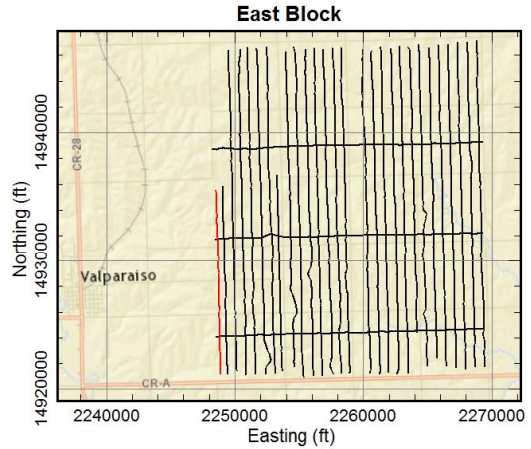

Line L600301 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
2250000
2255000
2260000
2265000
Easting (ft)

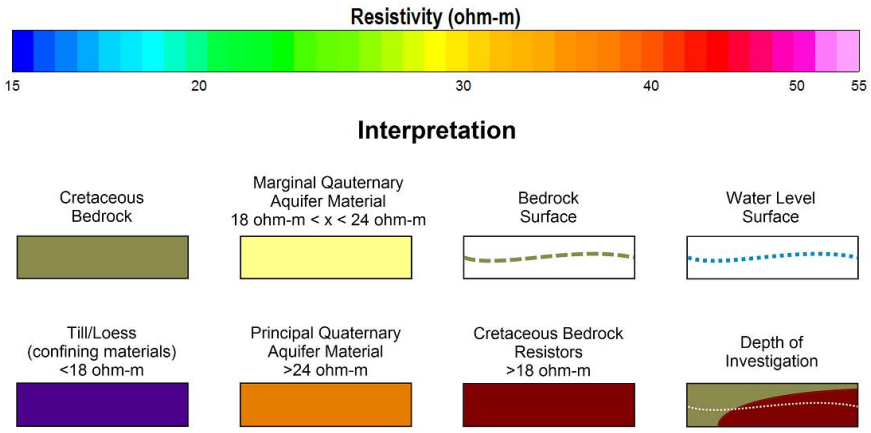

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

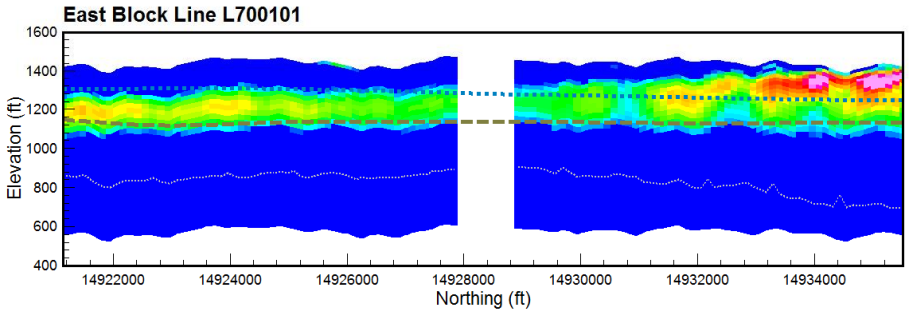

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

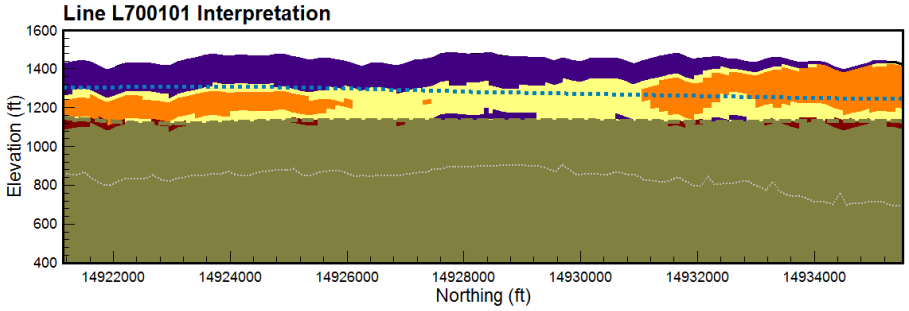

East Block Line L600401
Elevation (ft)
1600
1400
1200
1000
800
600
400
2250000
2255000
2260000
2265000
Easting (ft)

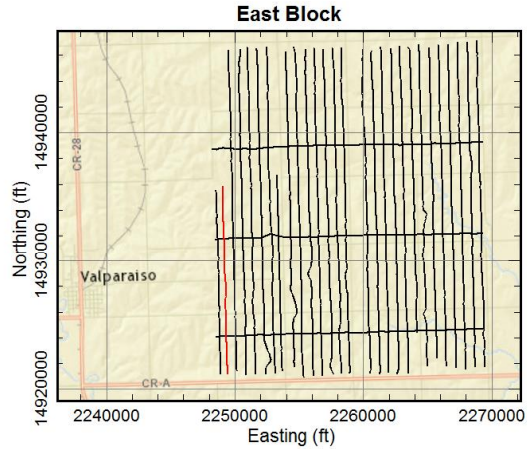

Line L600401 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
2250000
2255000
2260000
2265000
Easting (ft)

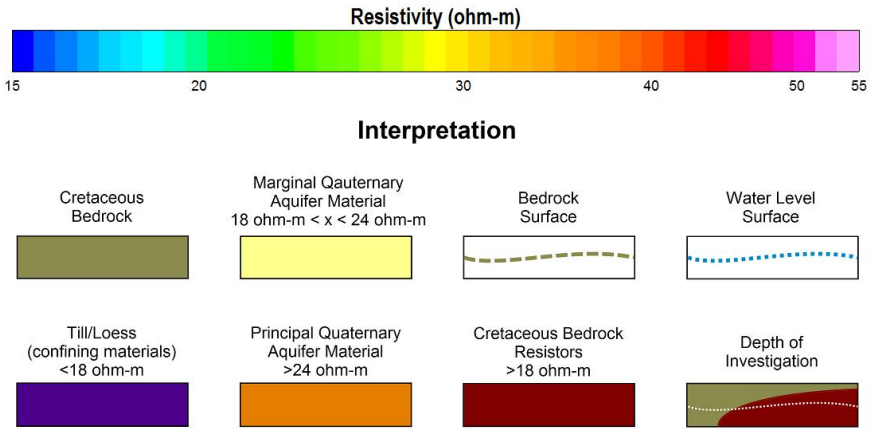

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

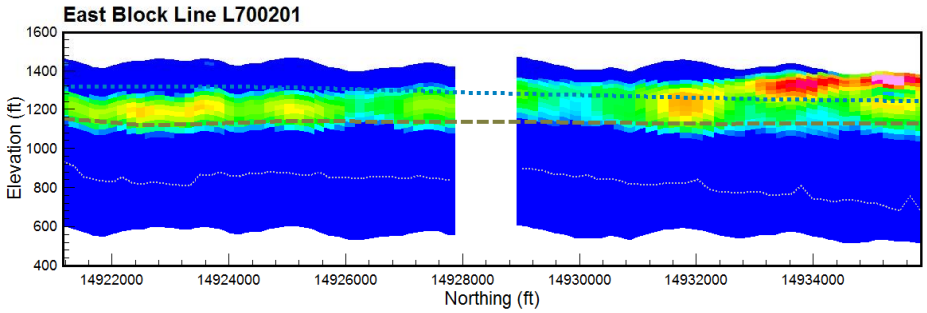

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

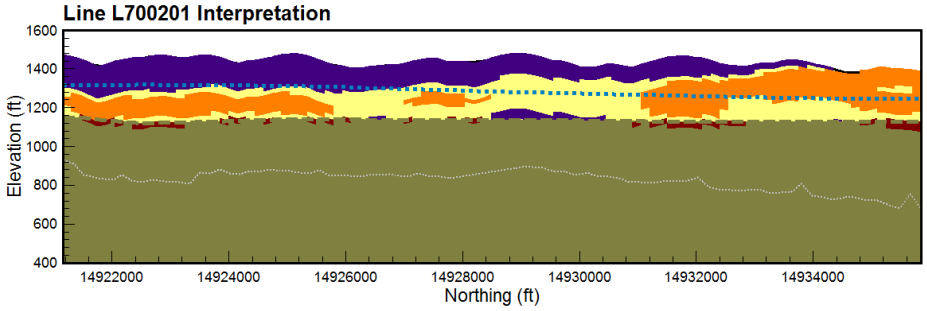

East Block Line L700101
Elevation (ft)
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
Northing (ft)

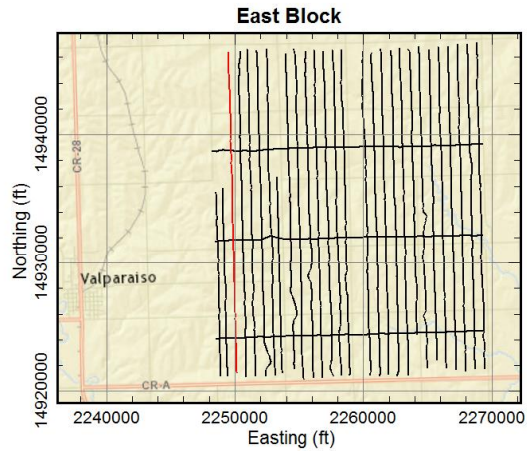

Line L700101 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
Northing (ft)

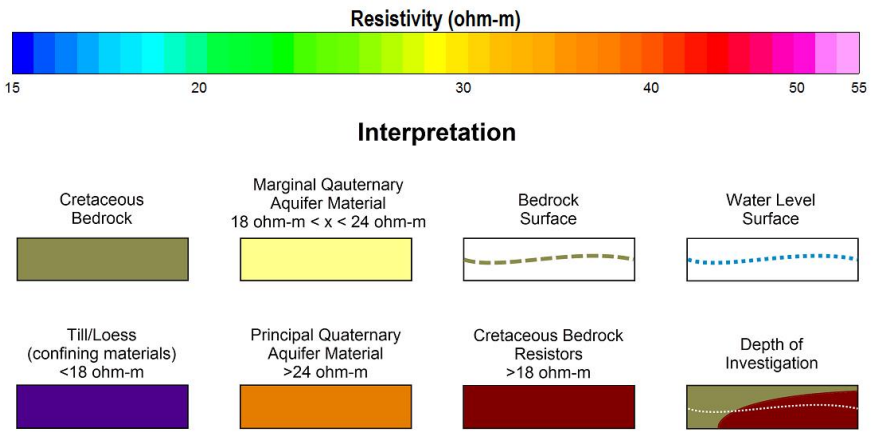

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

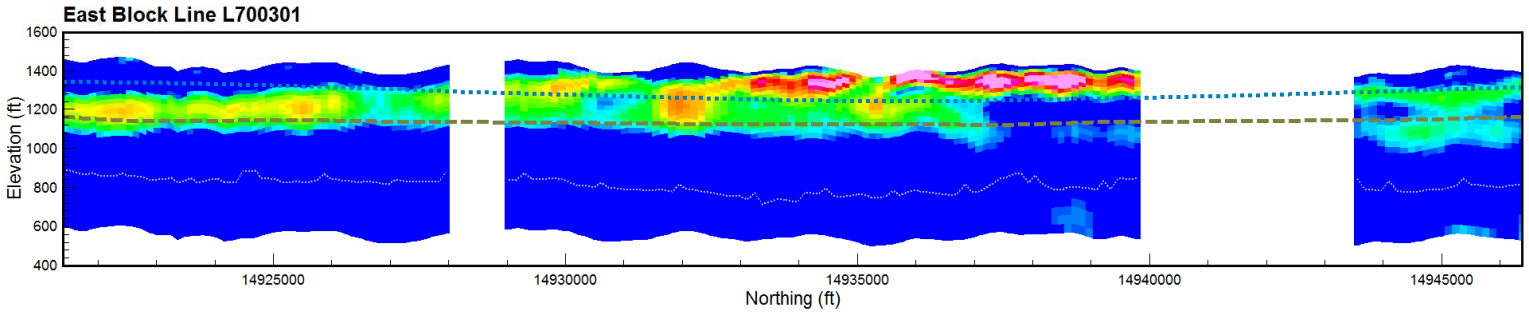

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

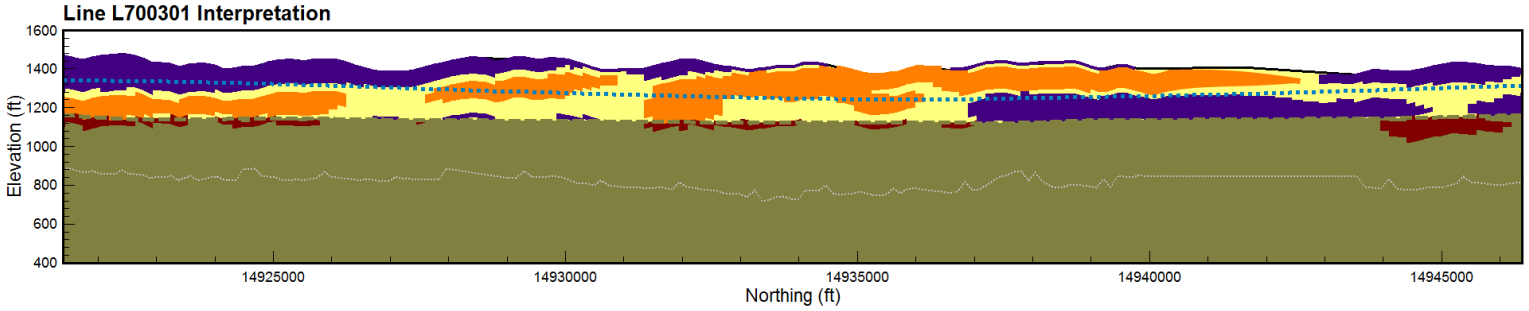

East Block Line L700201
Elevation (ft)
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
Northing (ft)

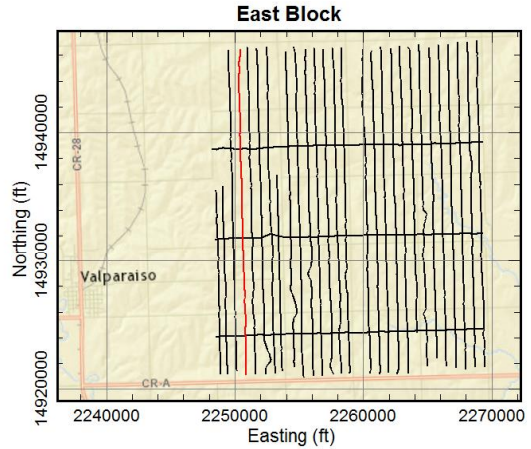

Line L700201 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
Northing (ft)

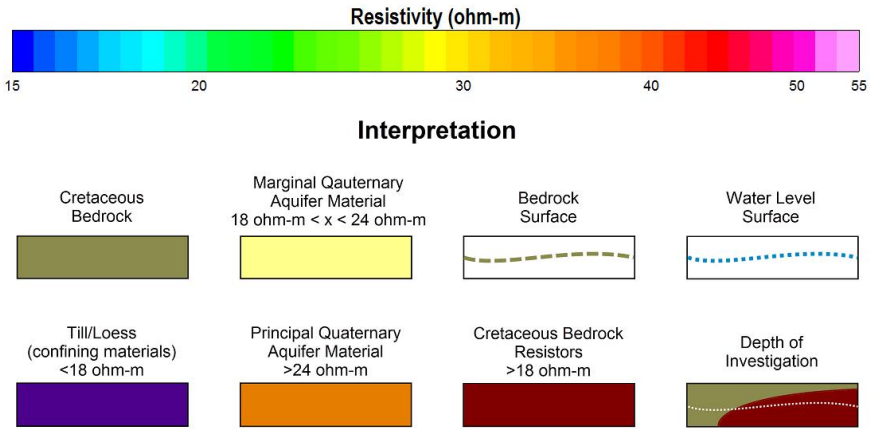

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

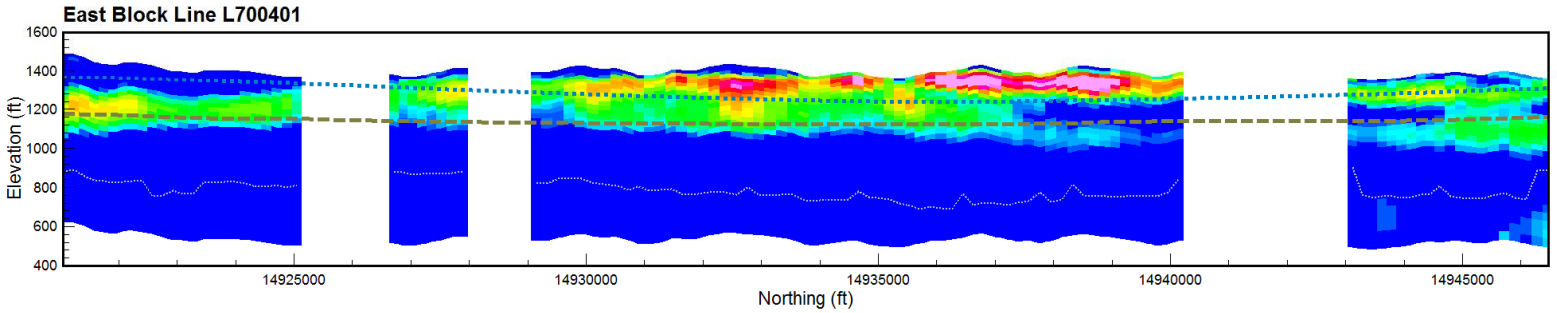

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

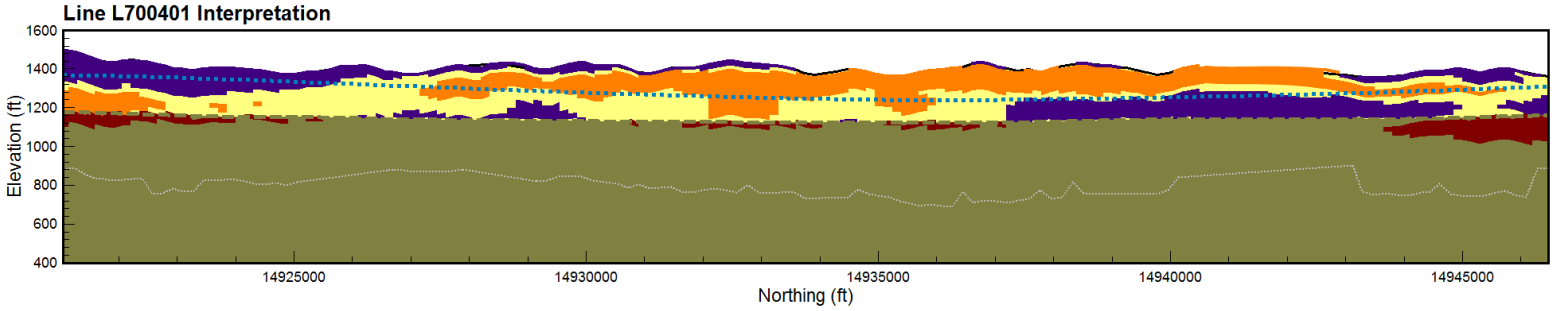

East Block Line L700301
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

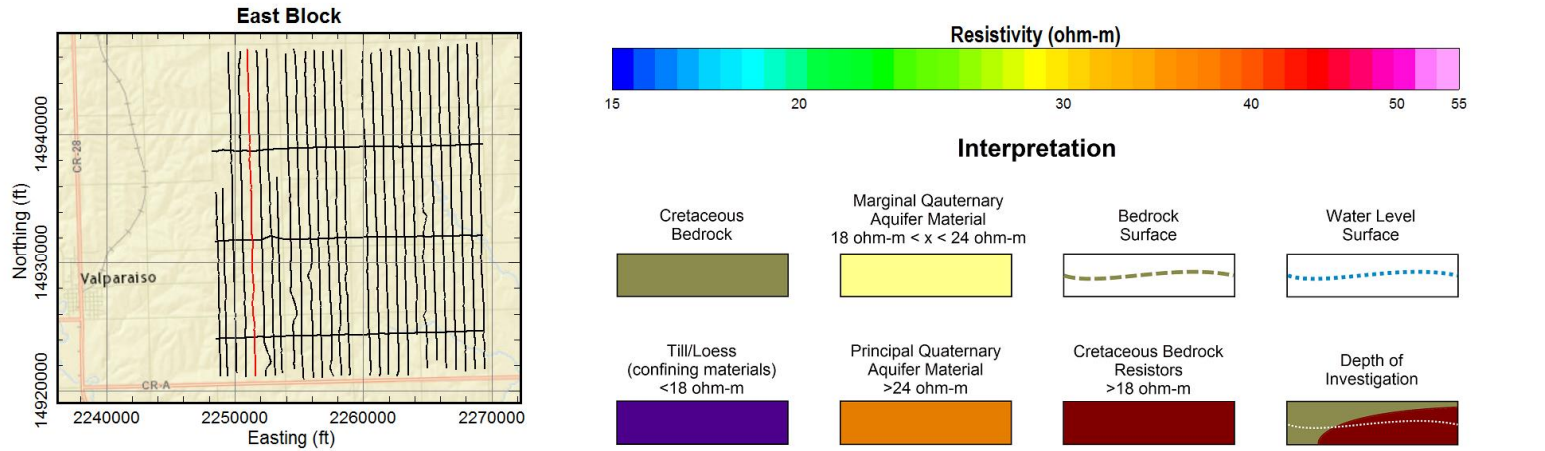

Line L700301 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

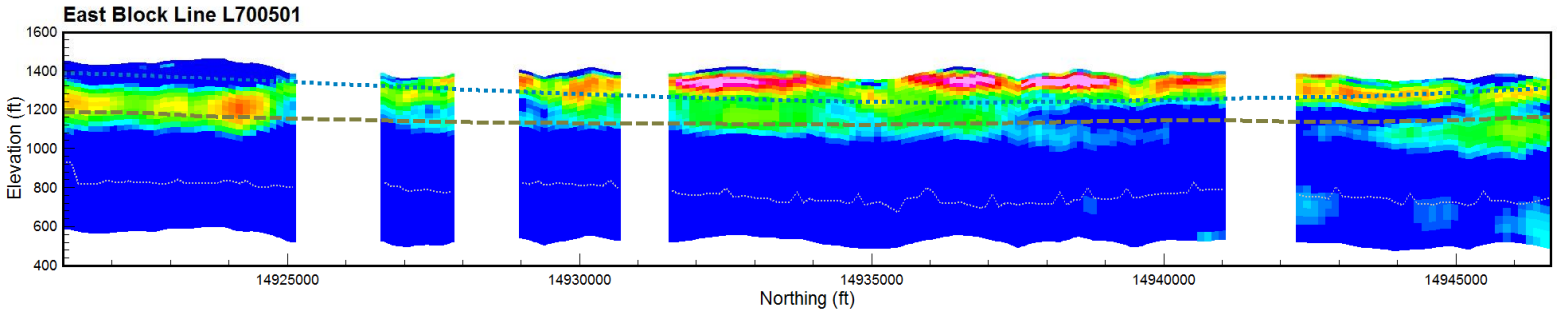

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

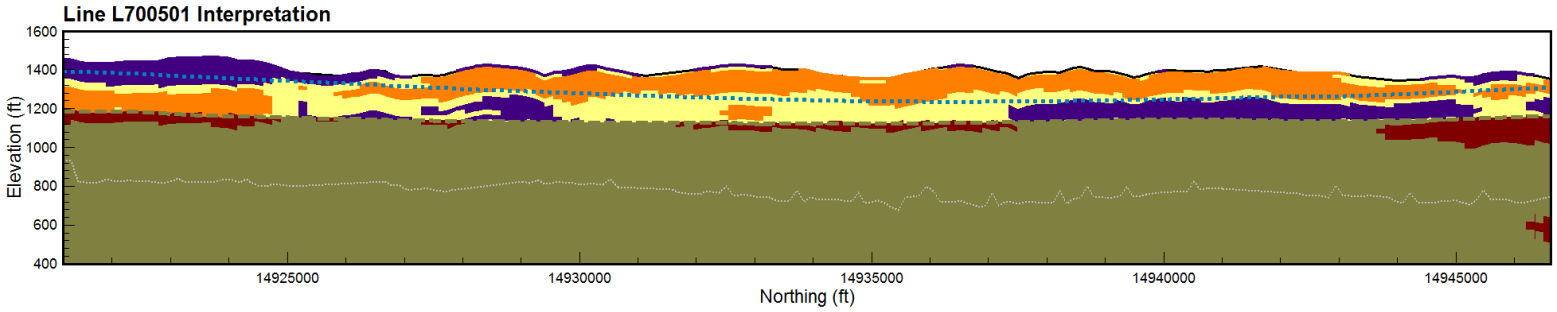

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

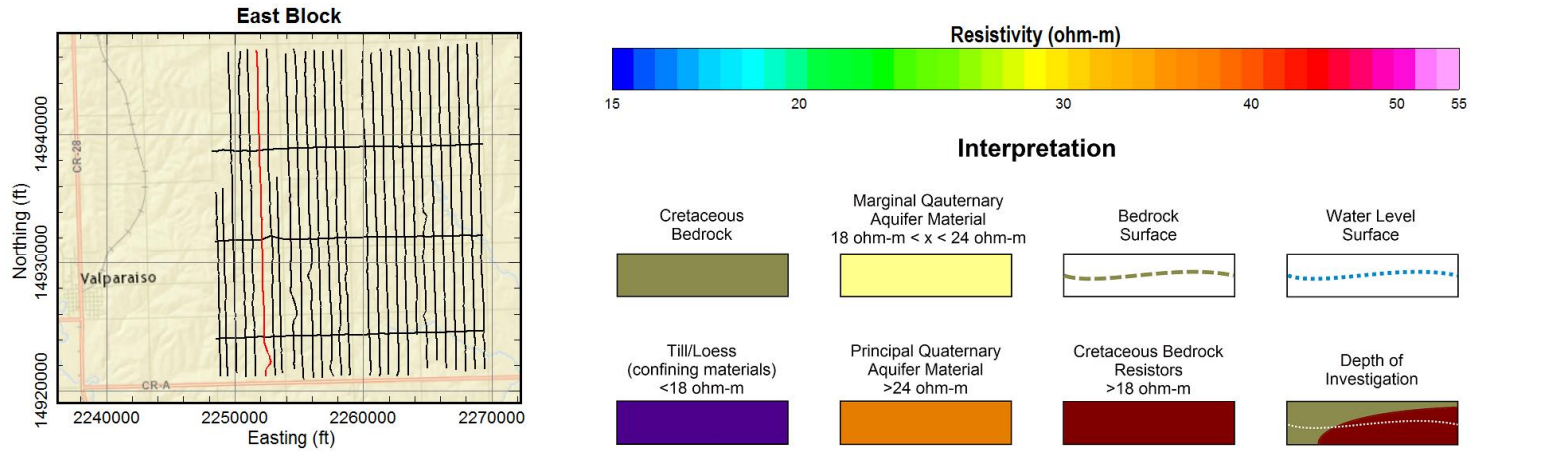

East Block Line L700401
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

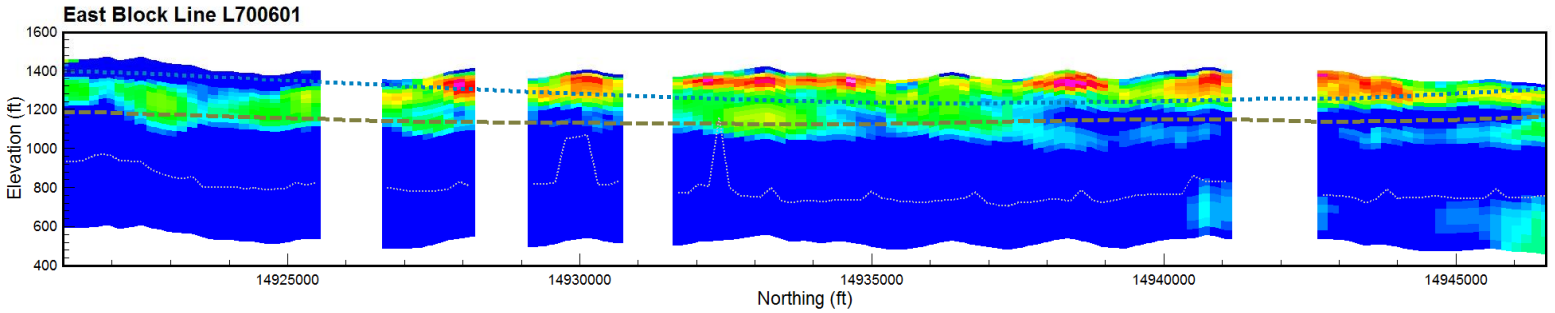

Line L700401 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

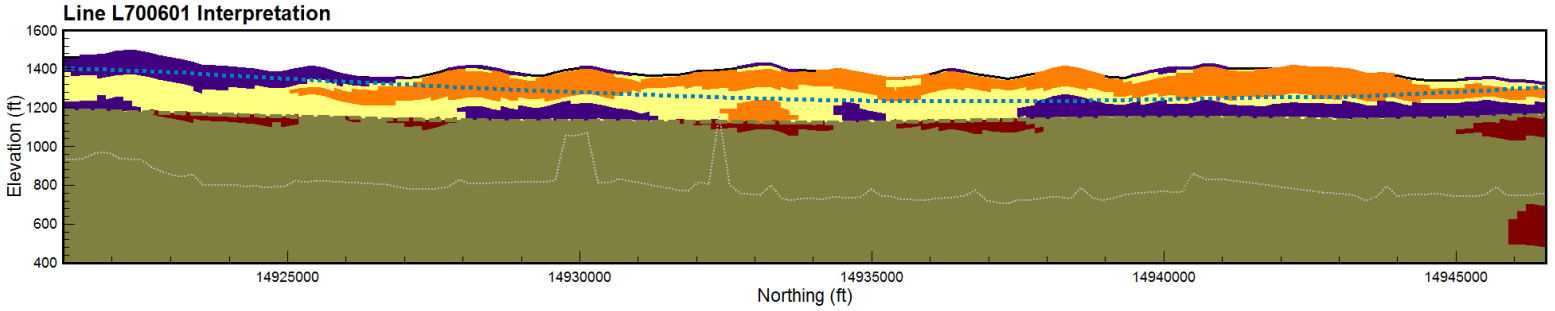

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

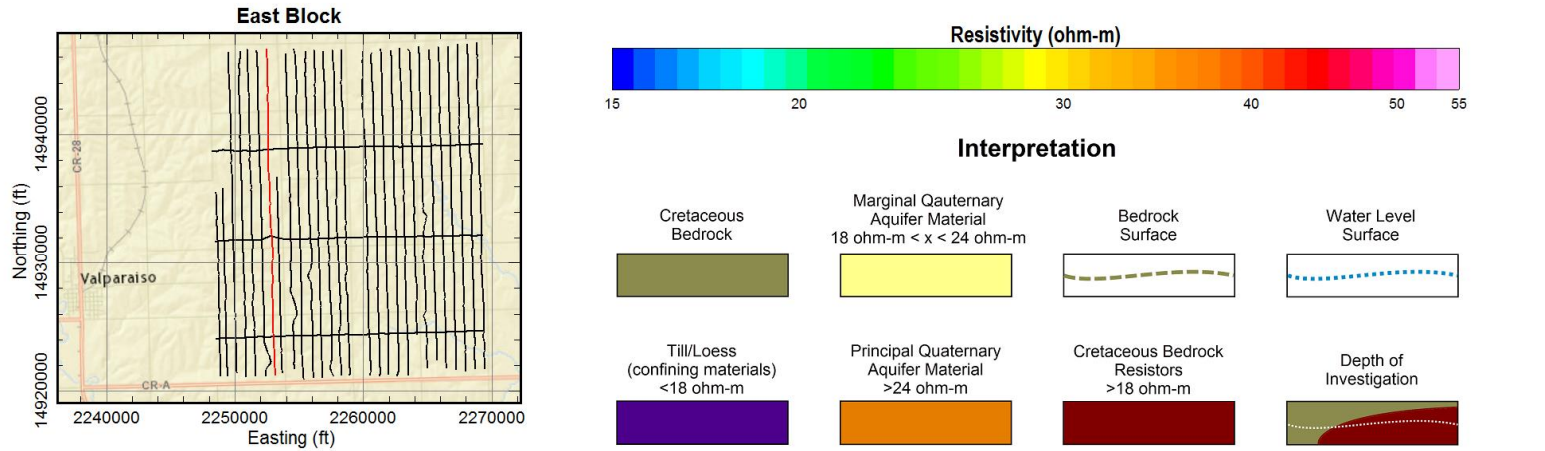

East Block Line L700501
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

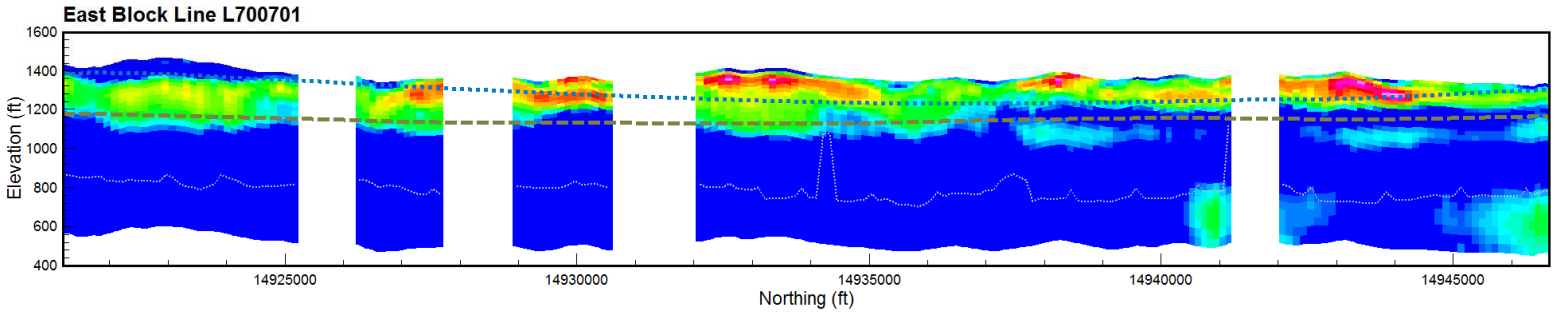

Line L700501 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

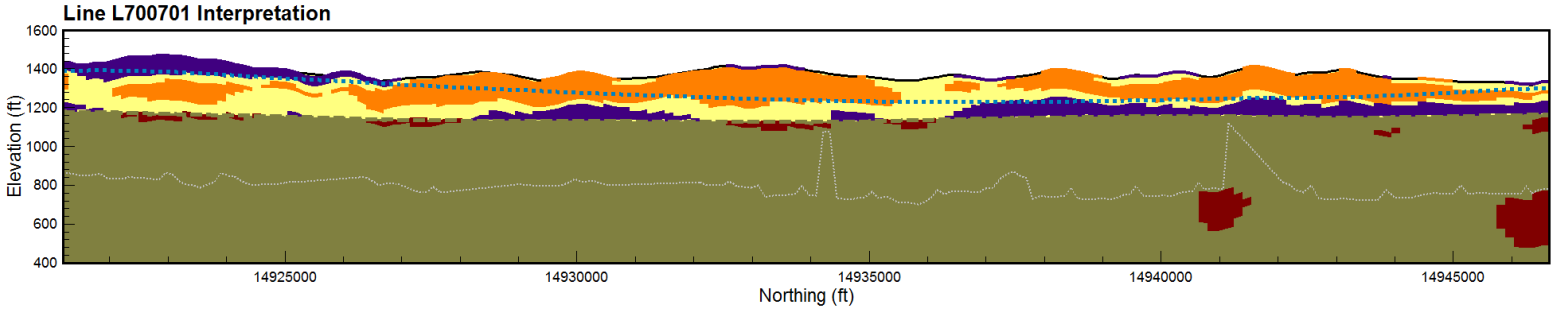

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

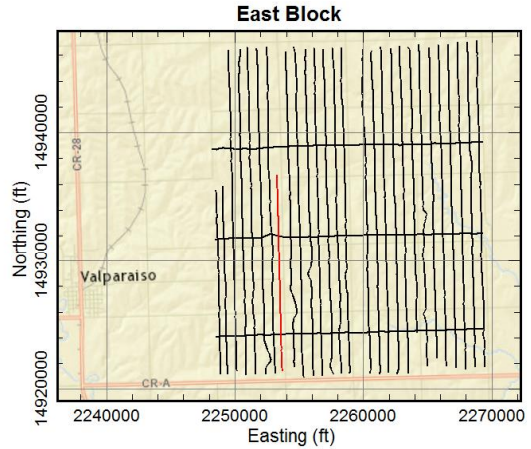

East Block Line L700601
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

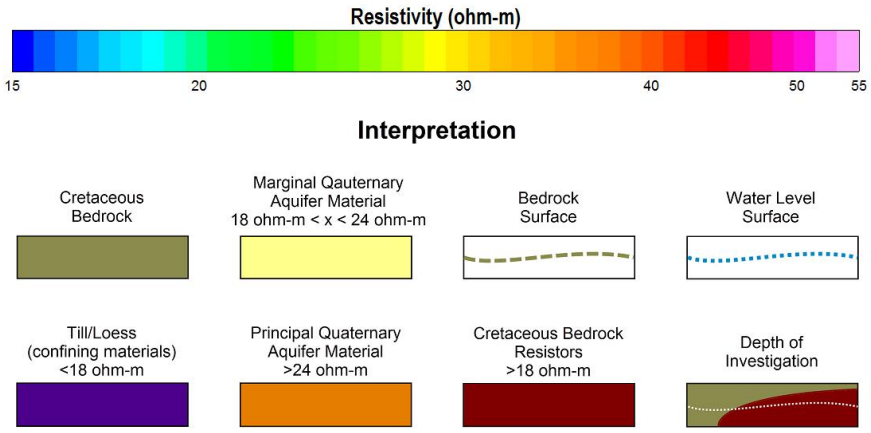

Line L700601 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

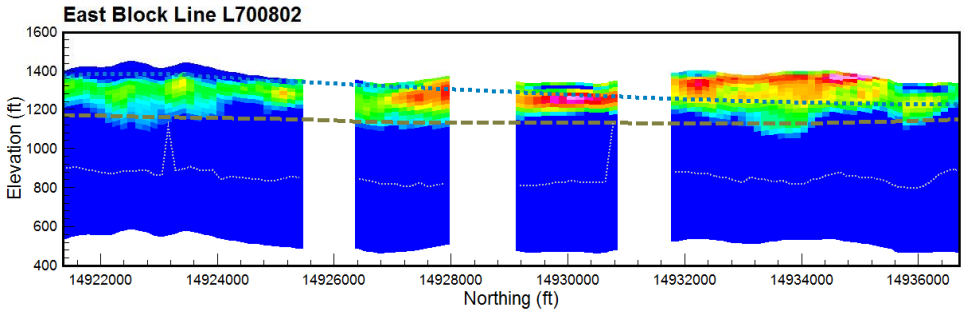

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

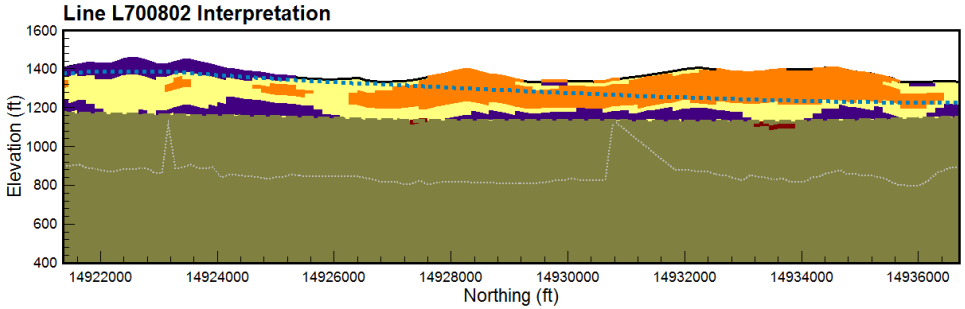

East Block Line L700701
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

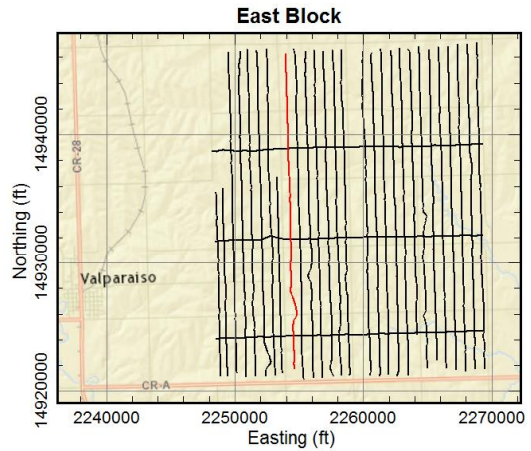

Line L700701 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

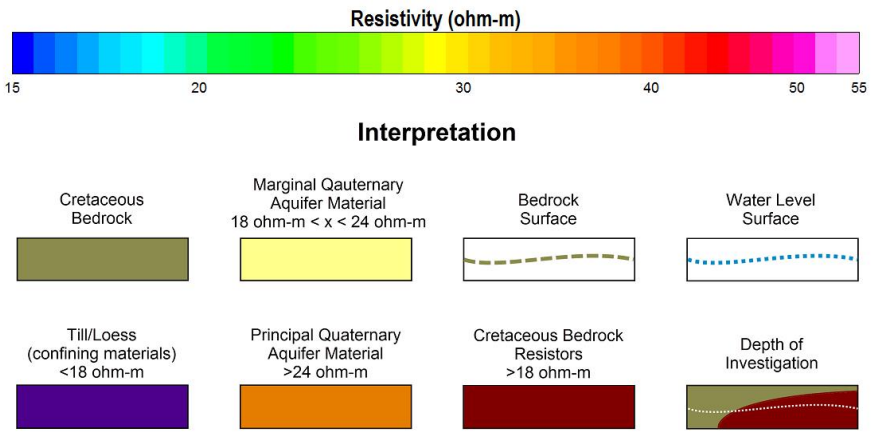

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

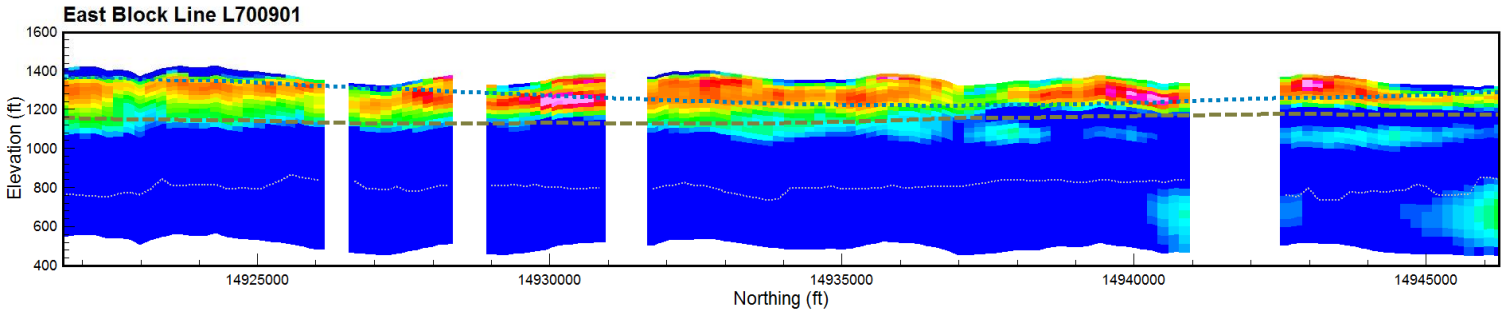

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

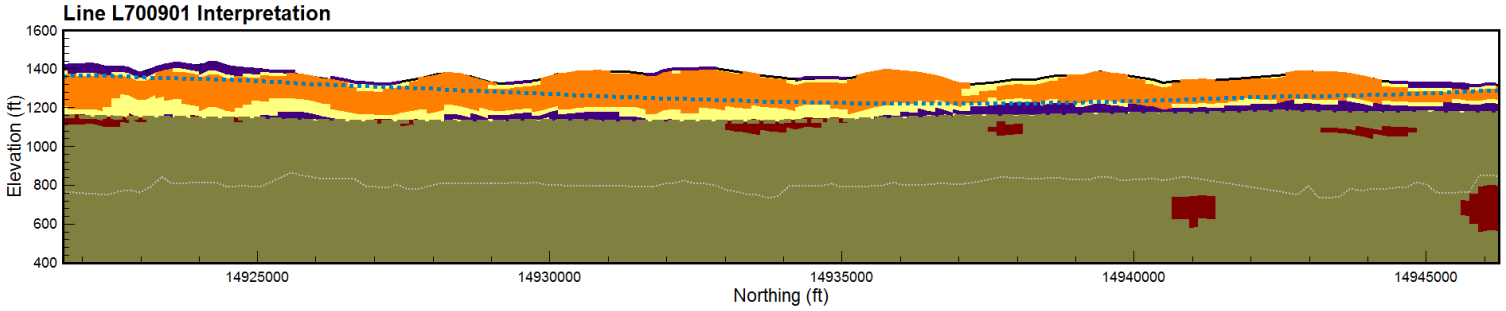

East Block Line L700802
Elevation (ft)
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
14936000
Northing (ft)

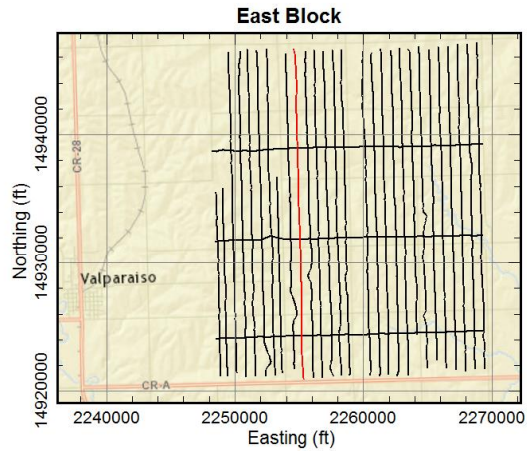

Line L700802 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14922000
14924000
14926000
14928000
14930000
14932000
14934000
14936000
Northing (ft)

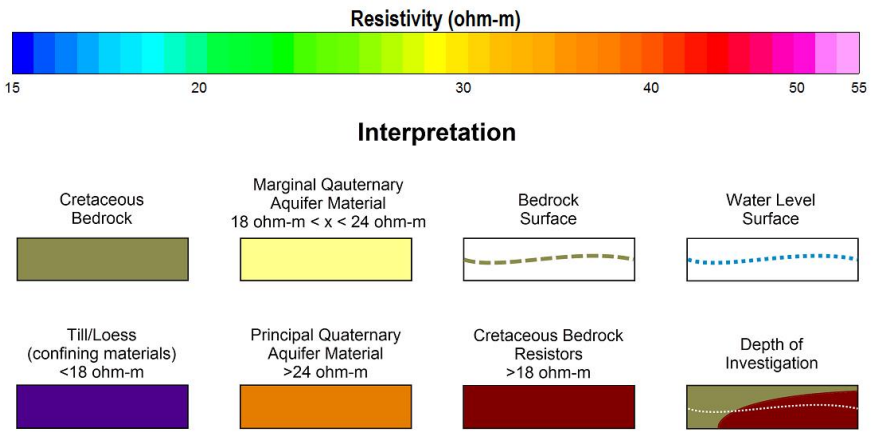

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

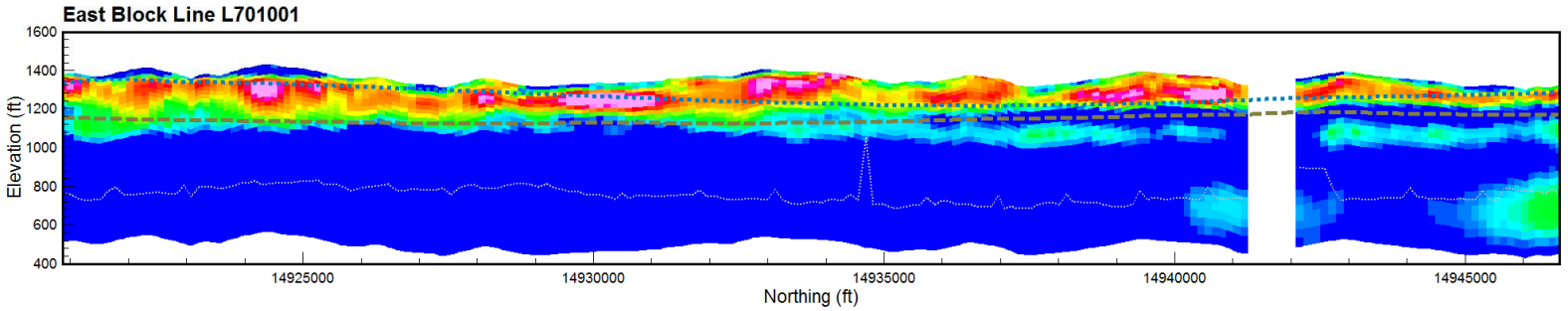

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

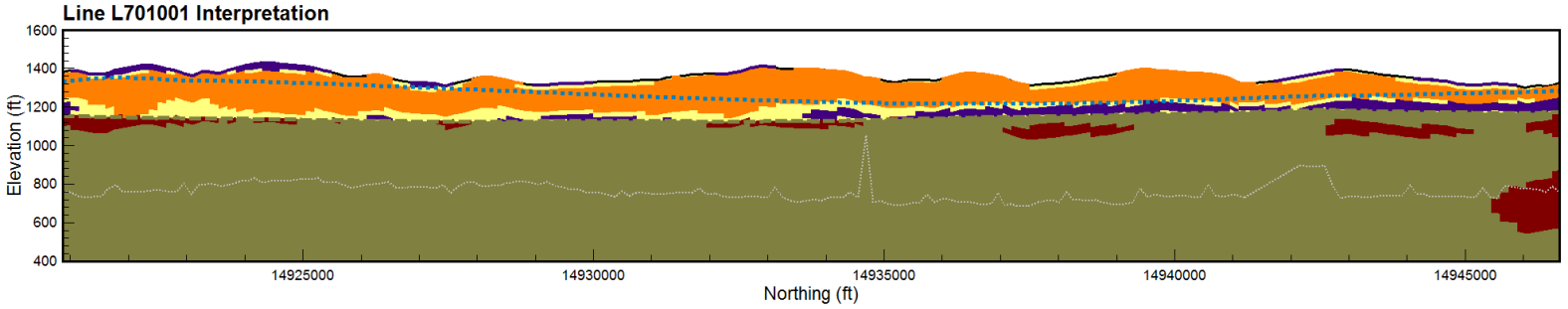

East Block Line L700901
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

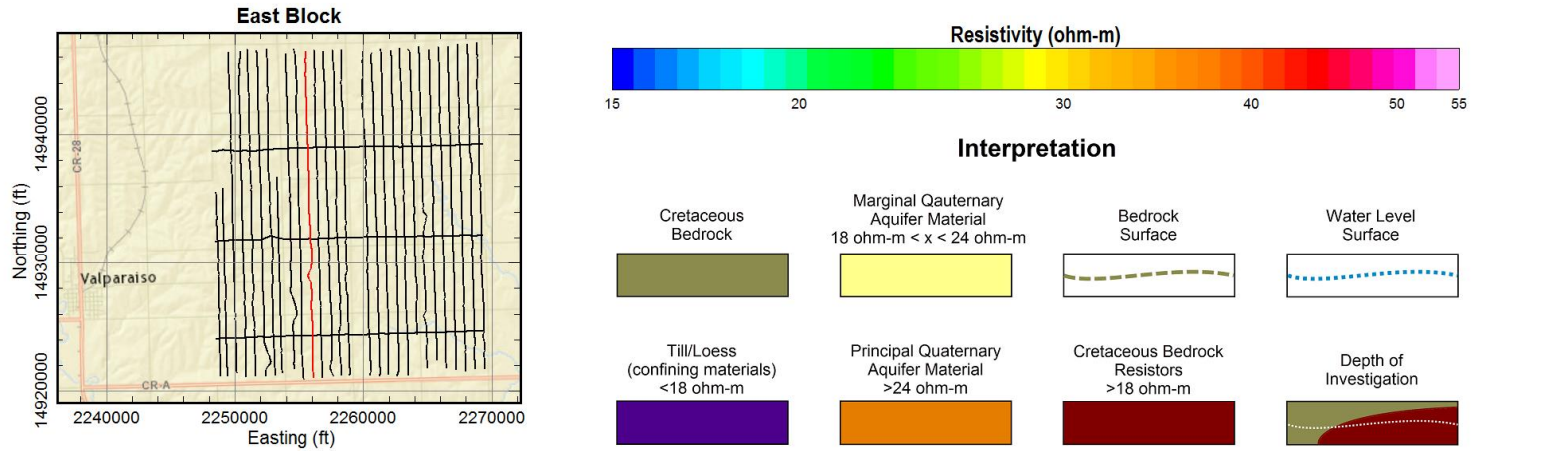

Line L700901 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

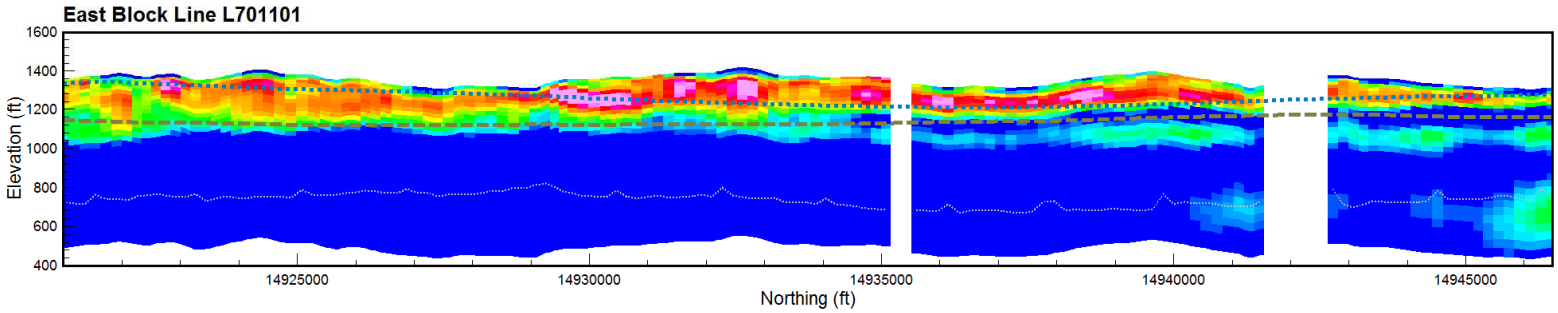

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

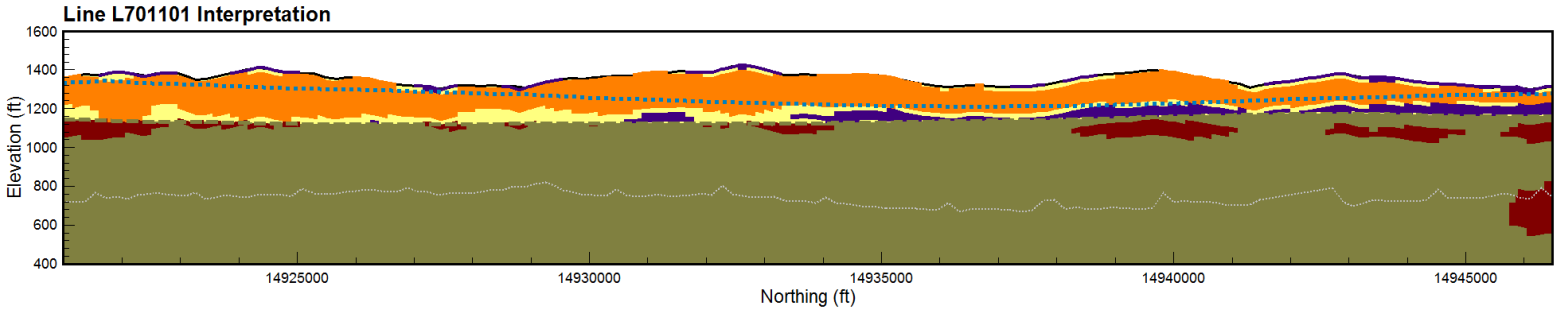

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

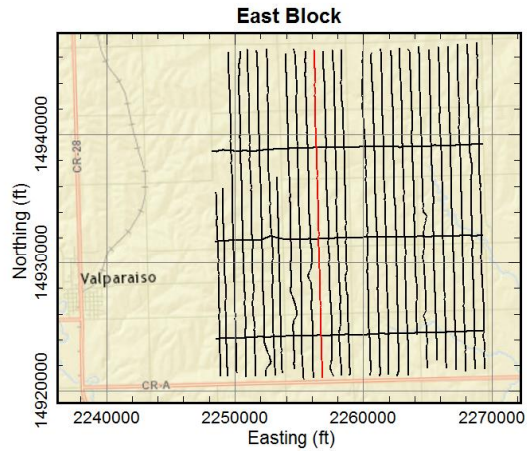

East Block Line L701001
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

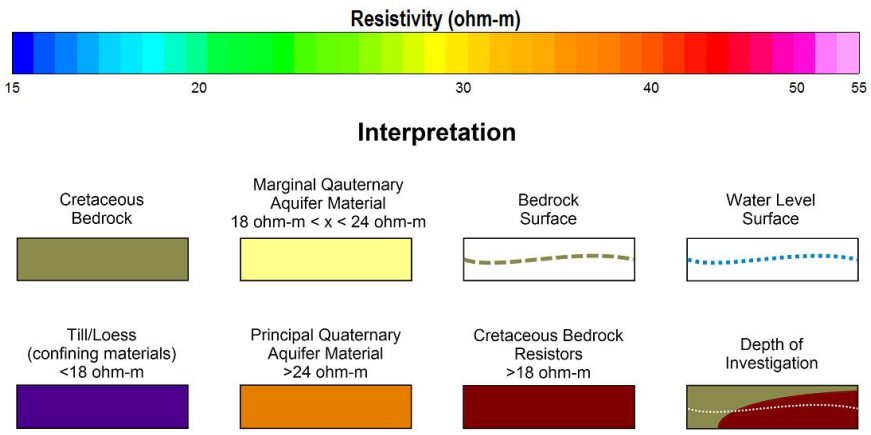

Line L701001 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

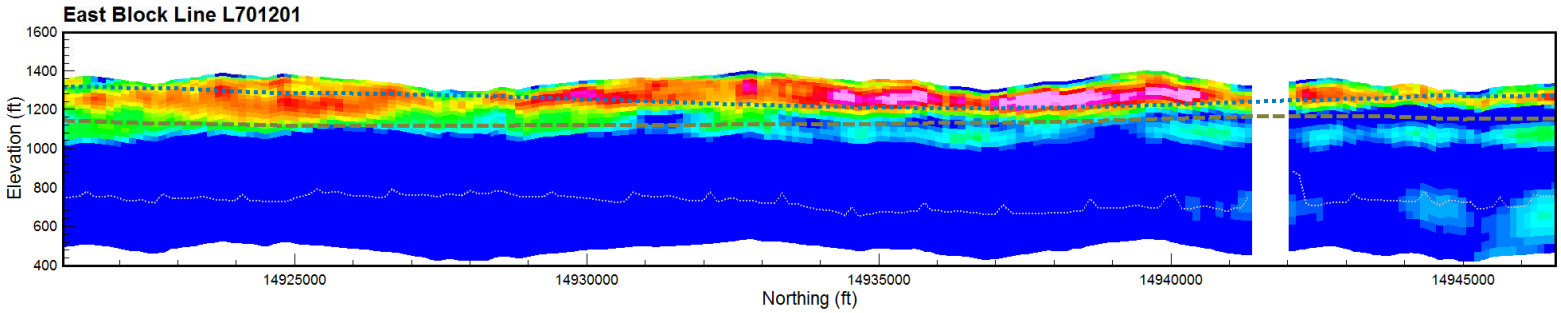

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

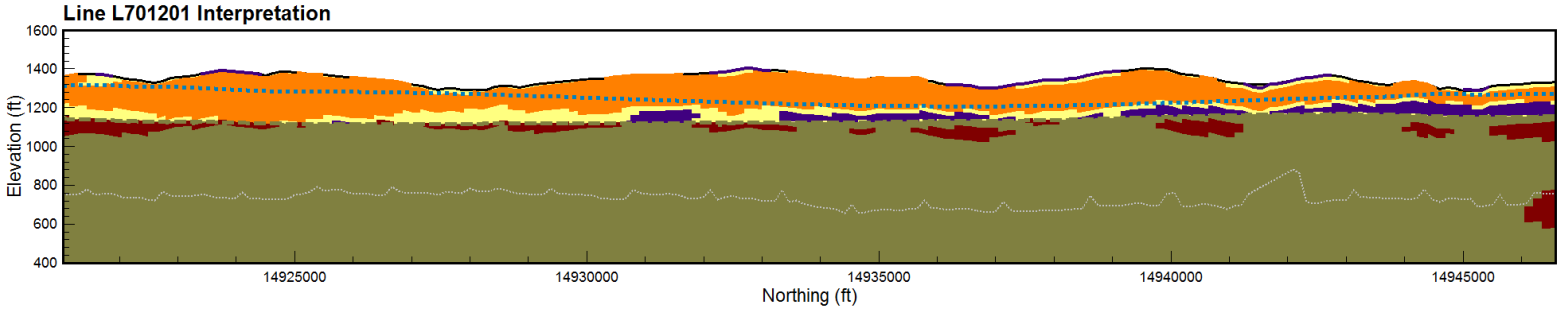

East Block Line L701101
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

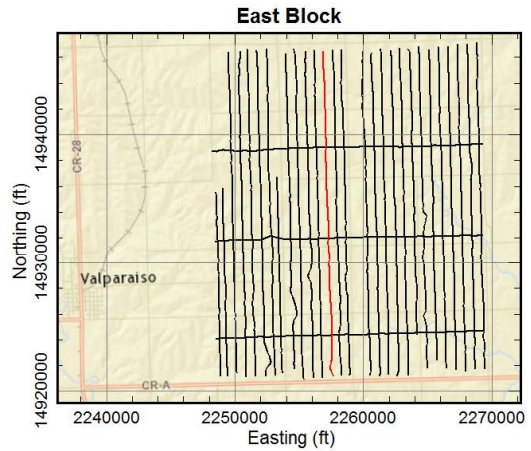

Line L701101 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

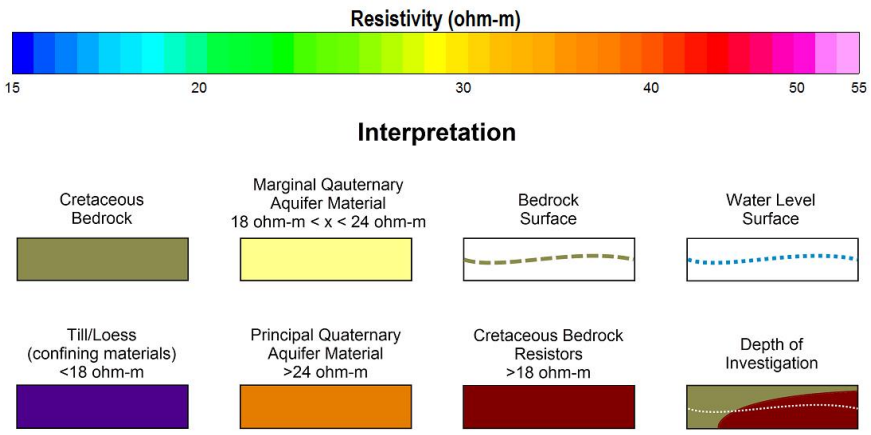

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

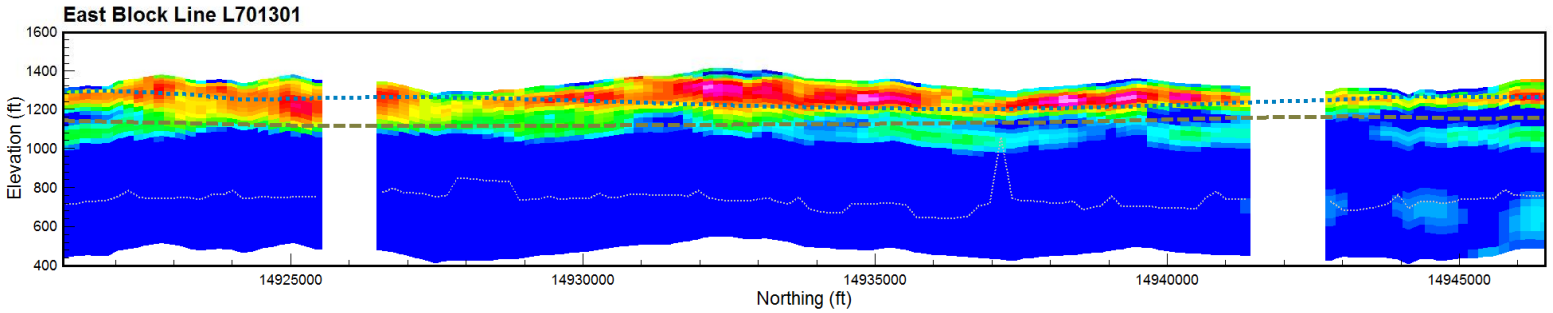

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

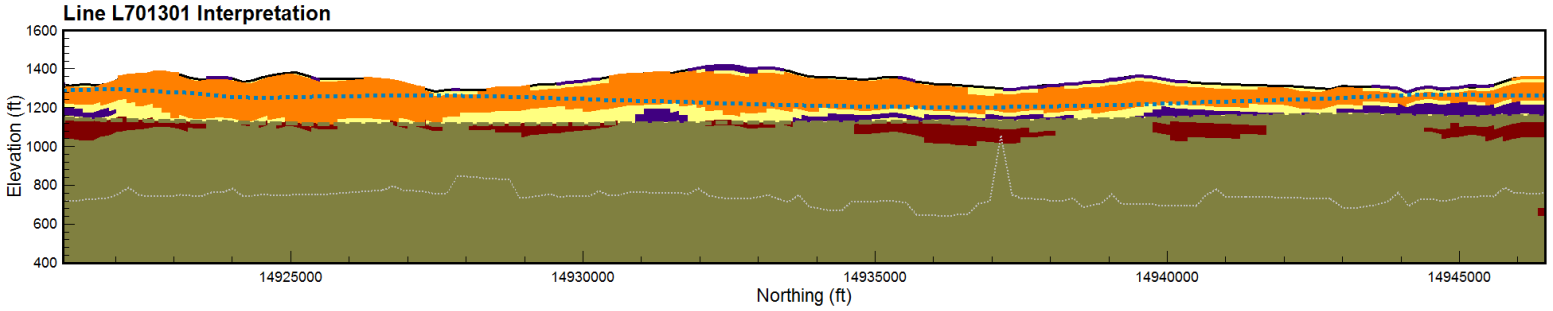

East Block Line L701201
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

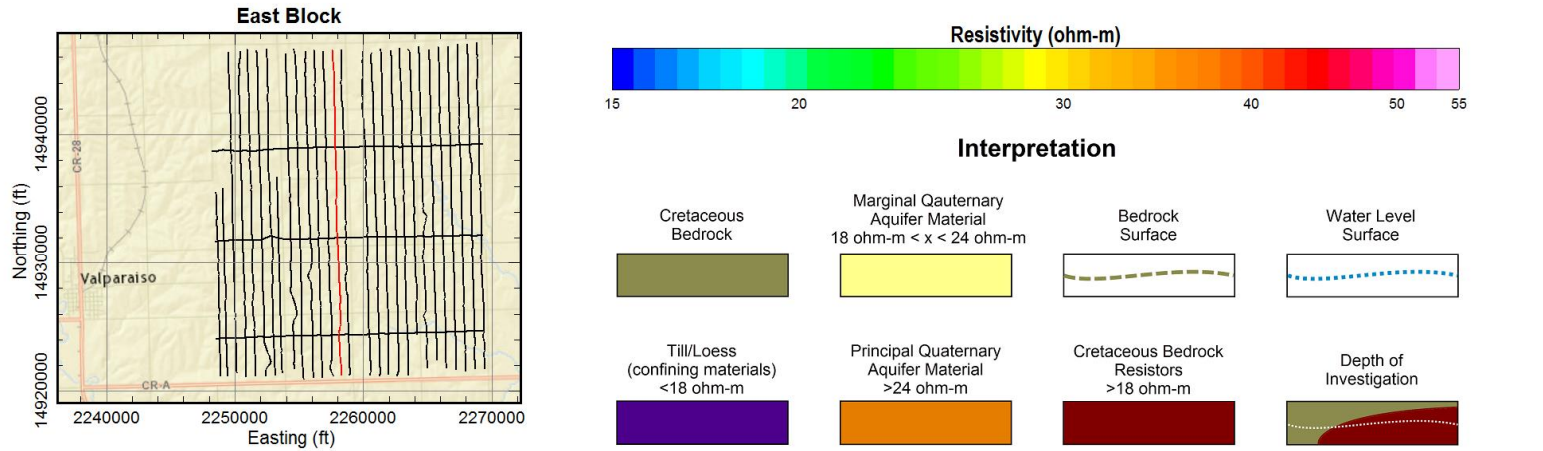

Line L701201 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

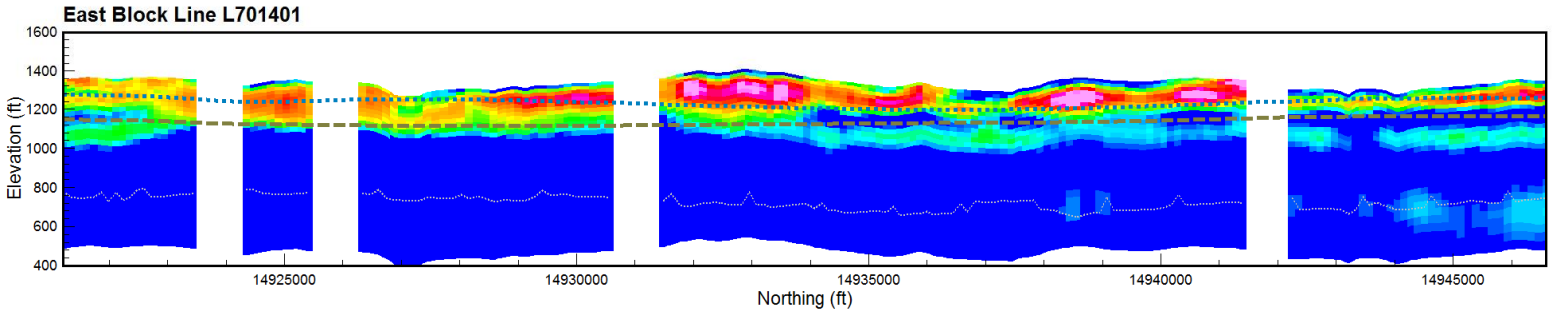

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

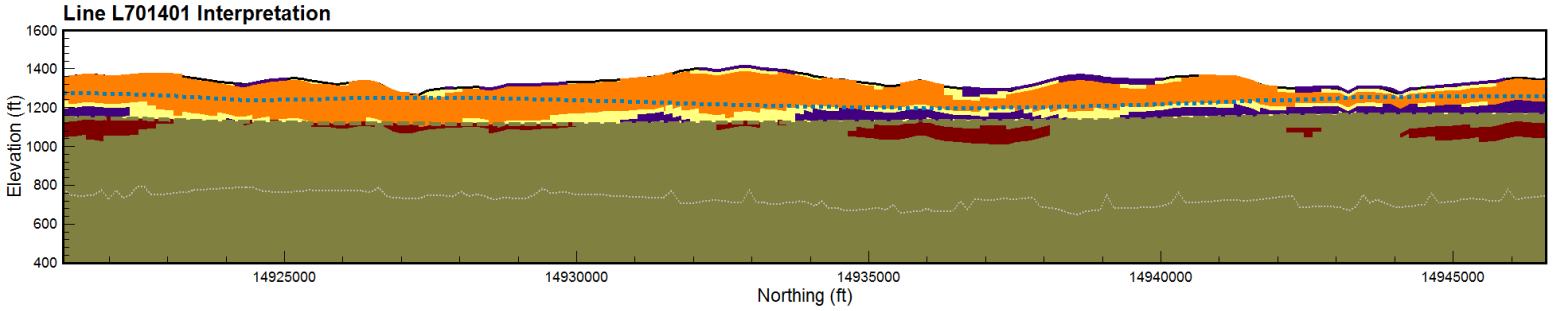

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material
18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

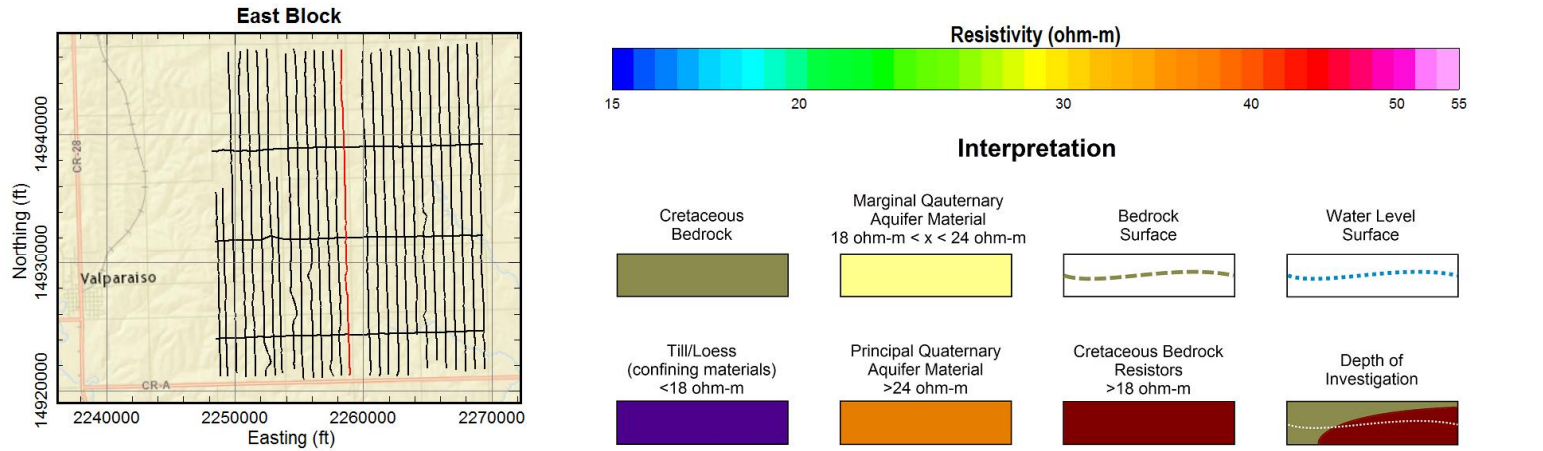

East Block Line L701301
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

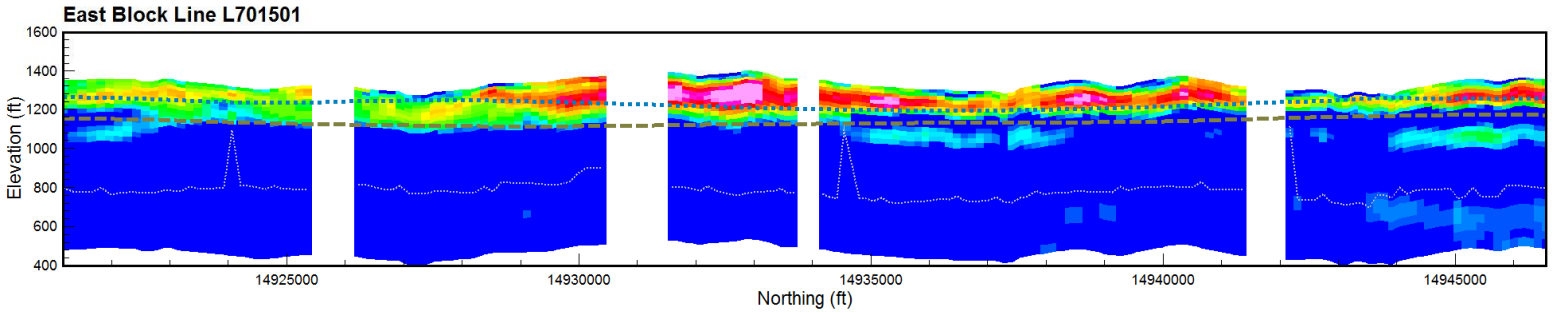

Line L701301 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

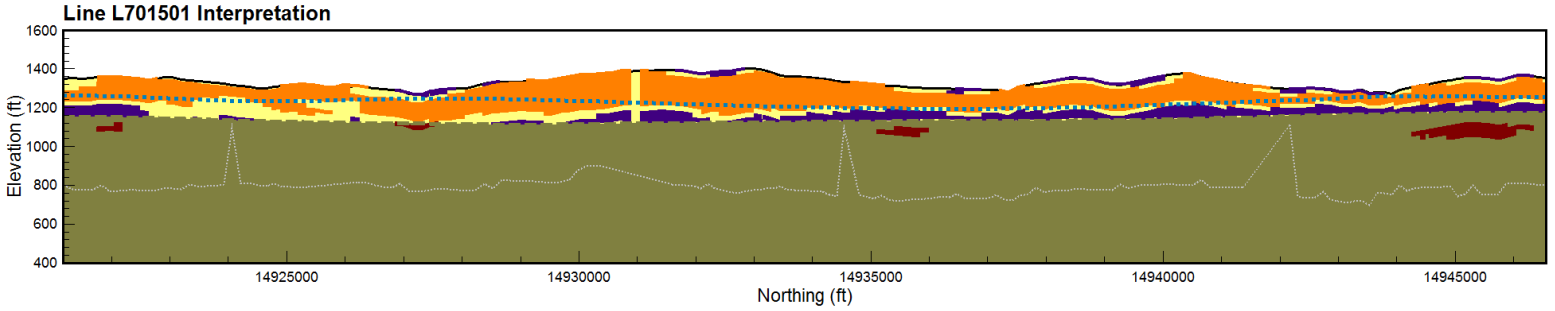

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

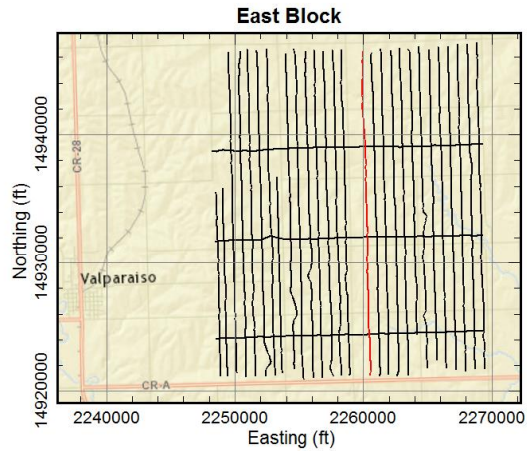

East Block Line L701401
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

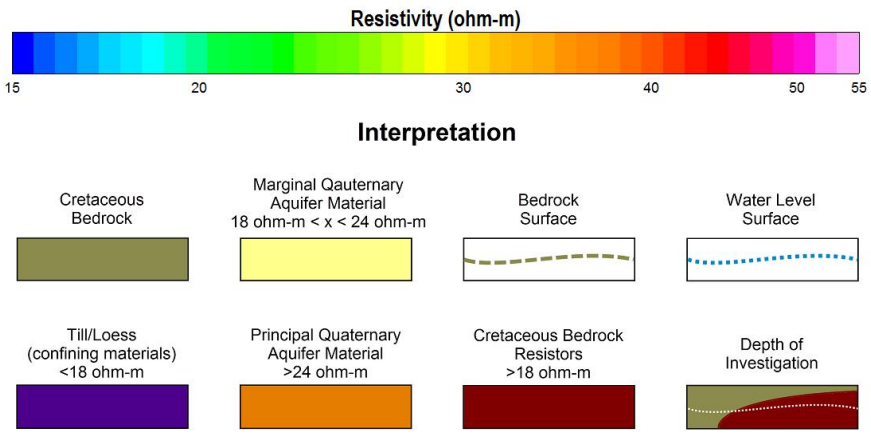

Line L701401 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

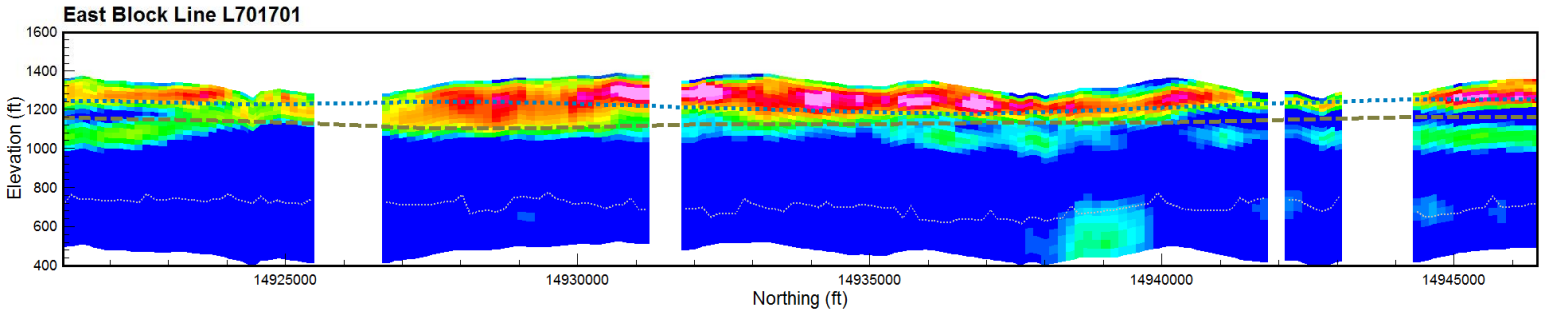

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

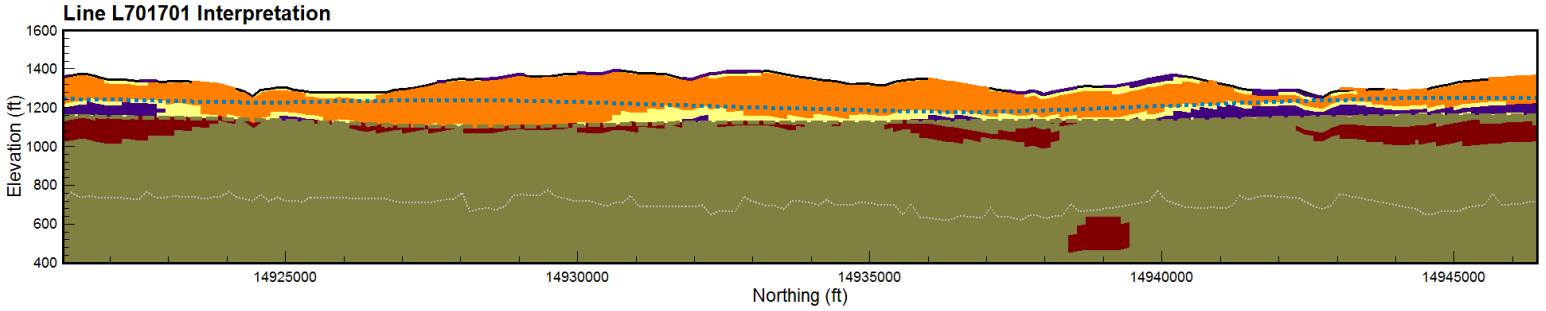

East Block Line L701501
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

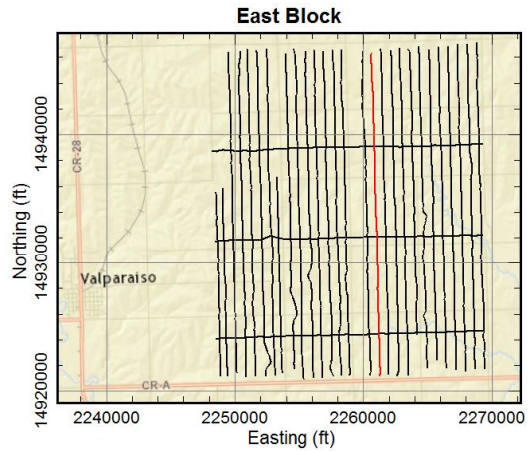

Line L701501 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

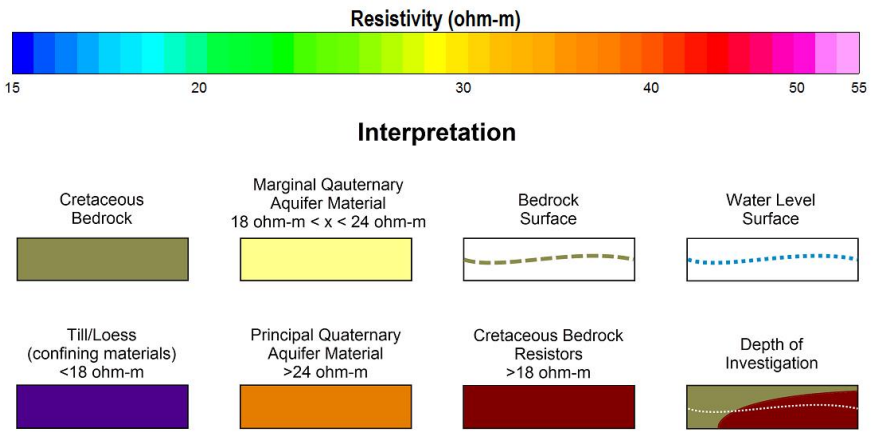

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

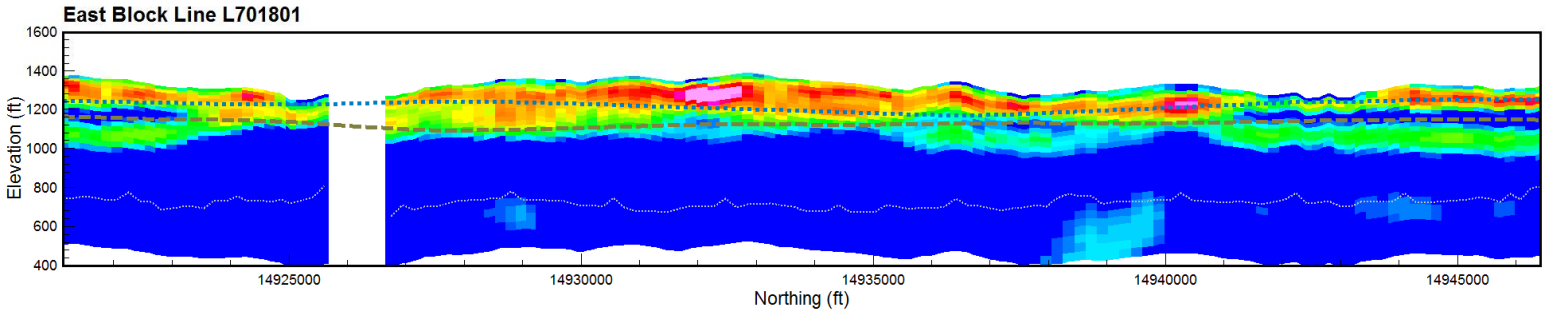

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

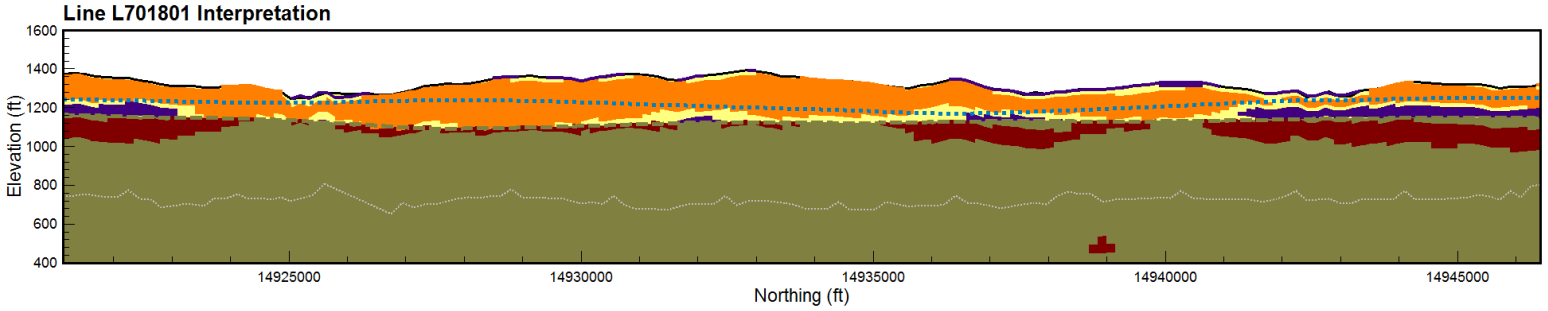

East Block Line L701701
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

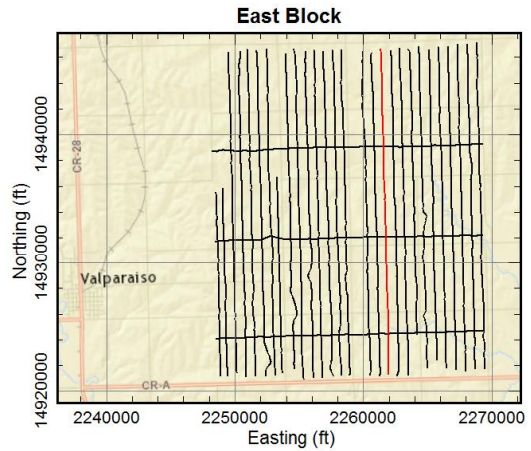

Line L701701 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

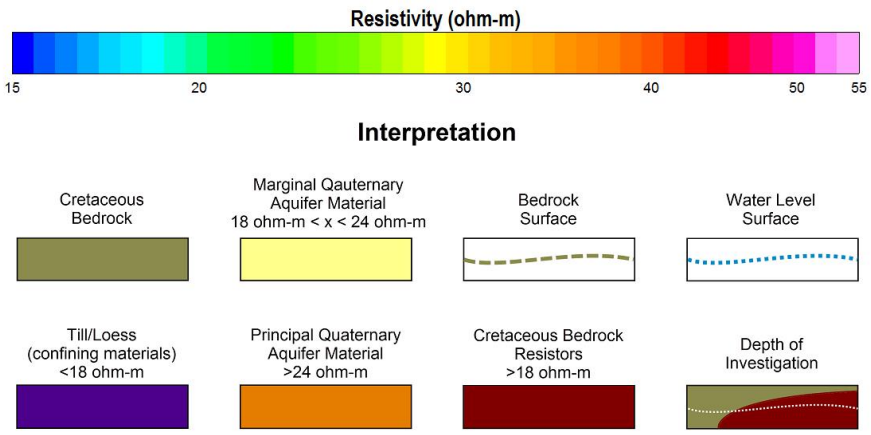

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

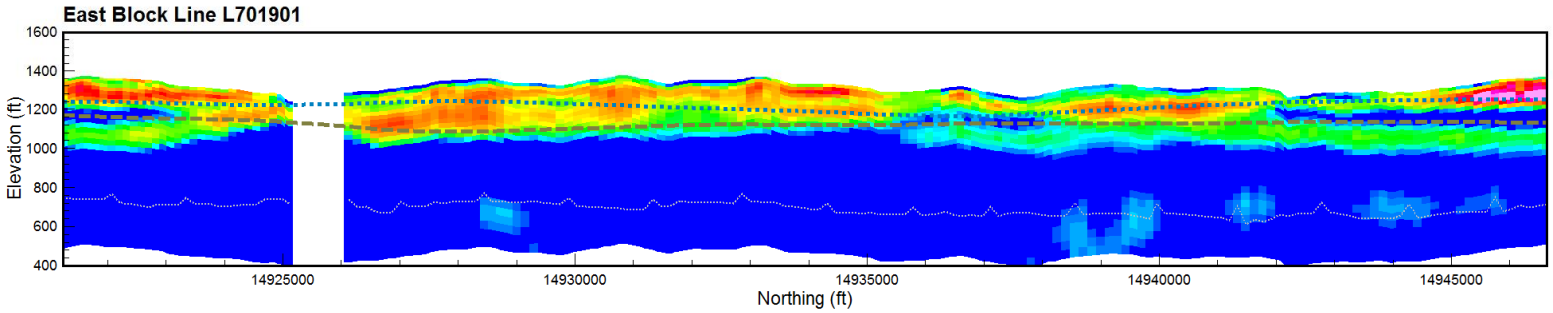

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

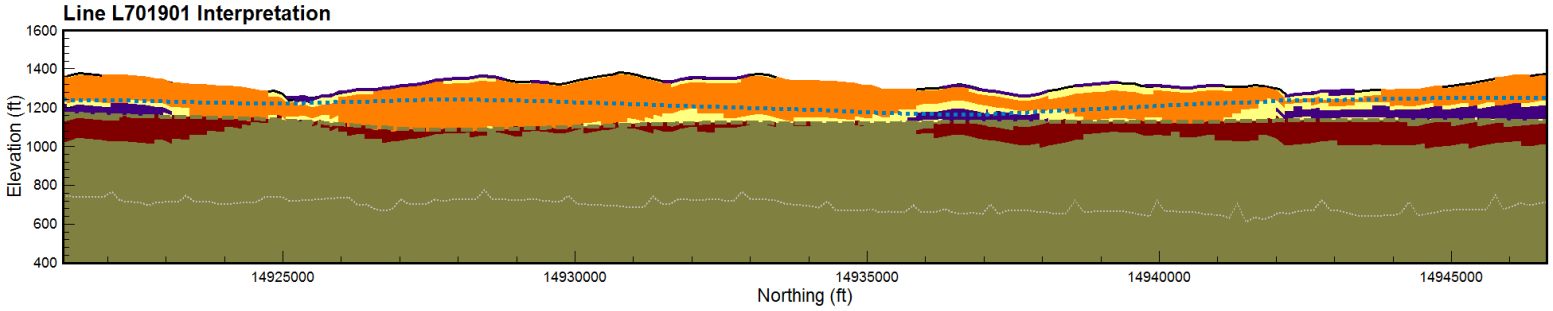

East Block Line L701801
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

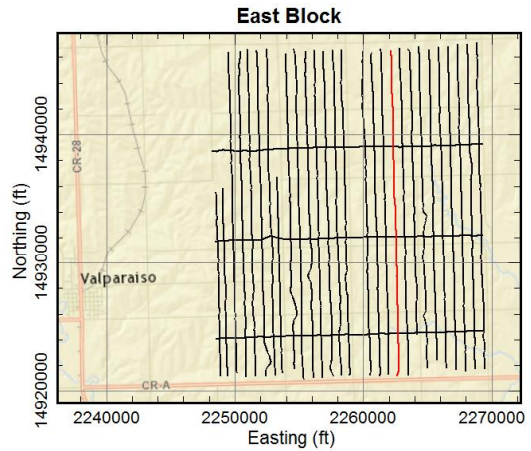

Line L701801 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

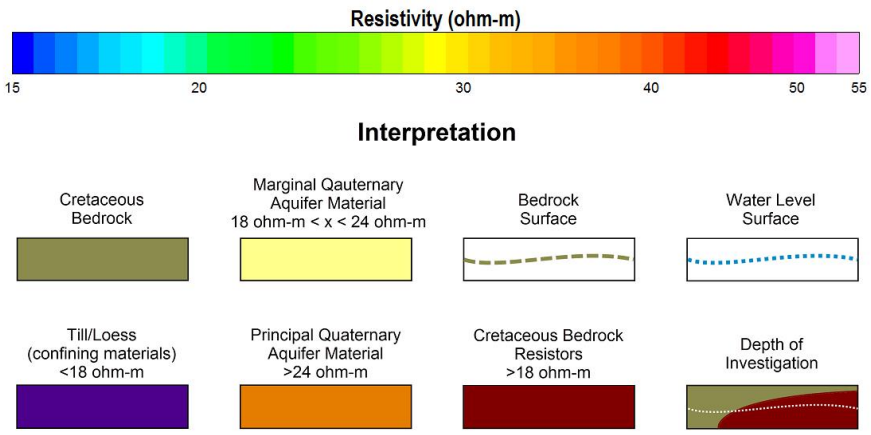

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

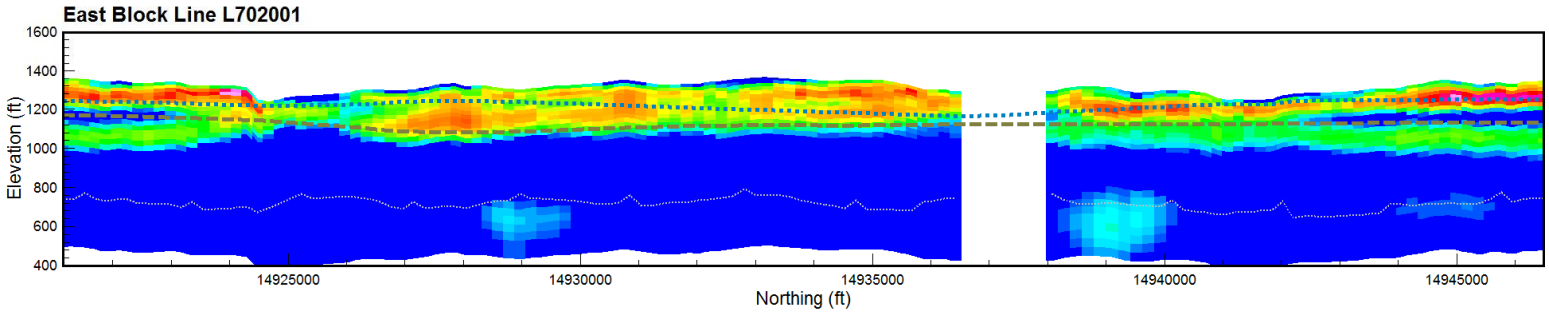

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

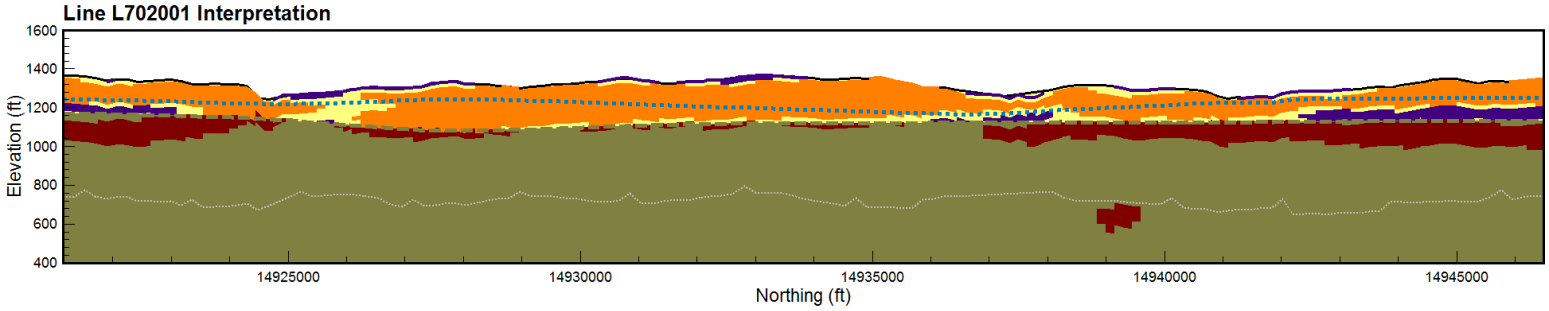

East Block Line L701901
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

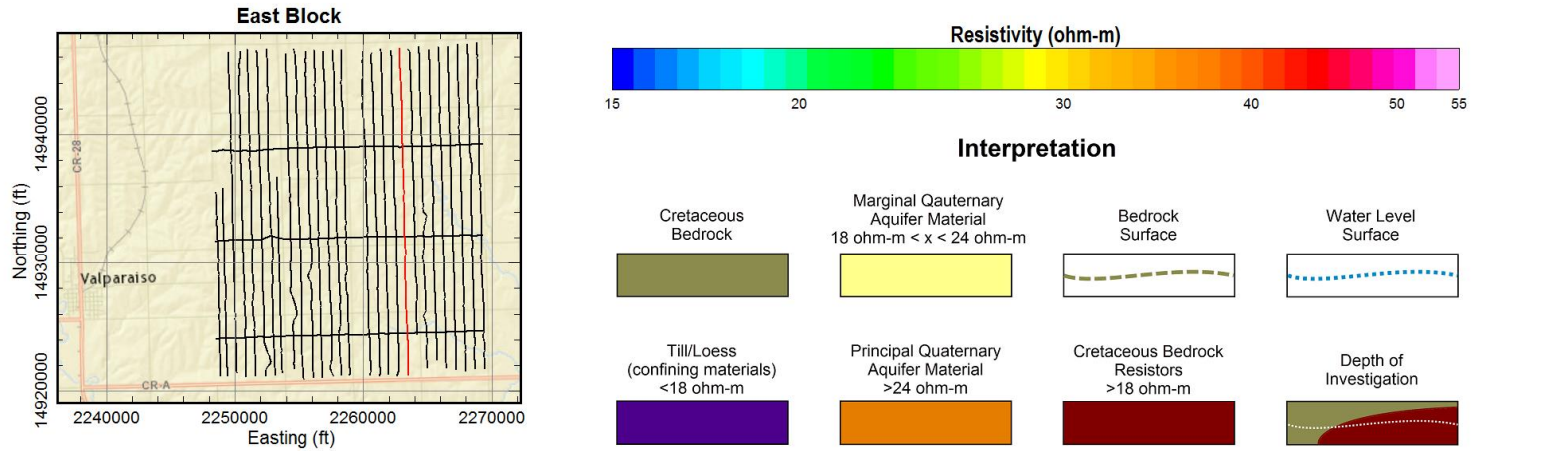

Line L701901 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

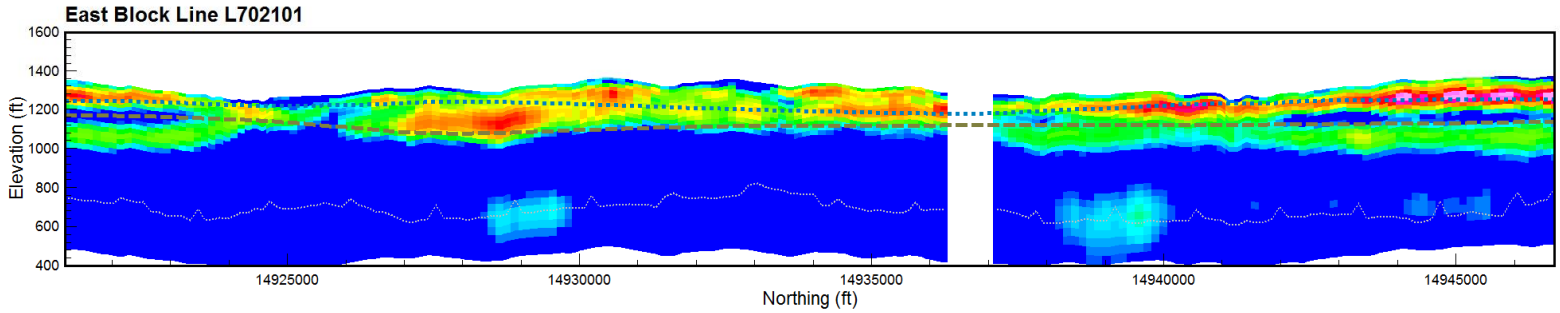

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

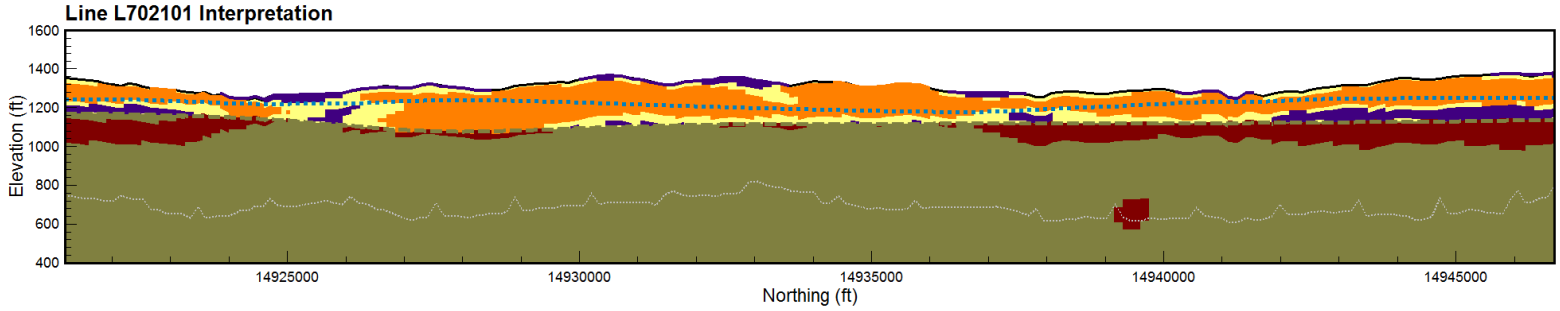

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

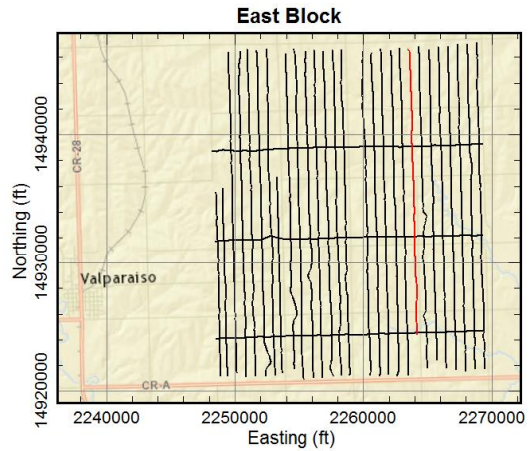

East Block Line L702001
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

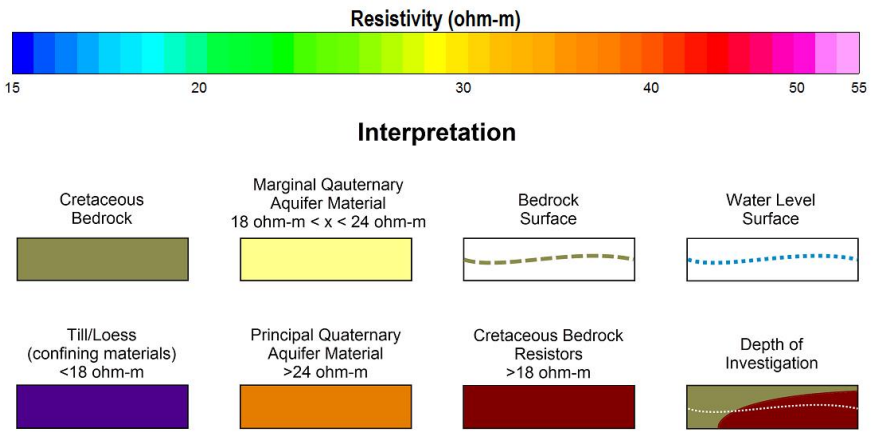

Line L702001 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

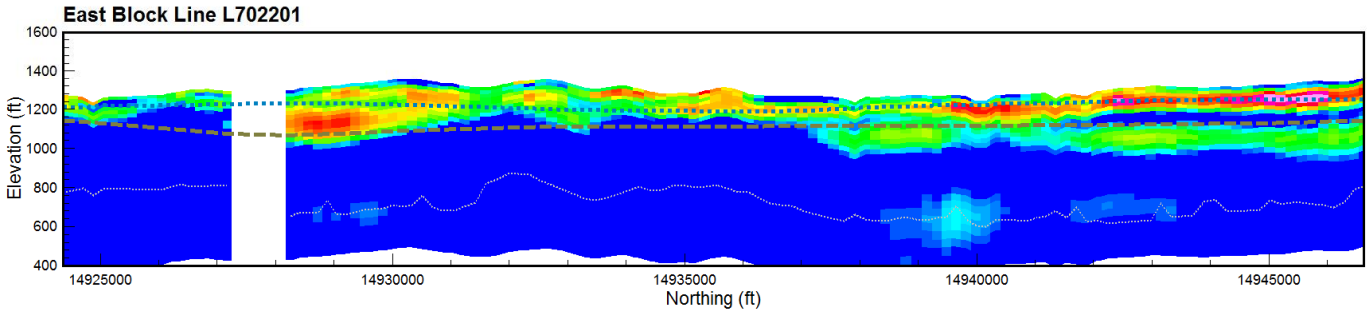

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)
Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

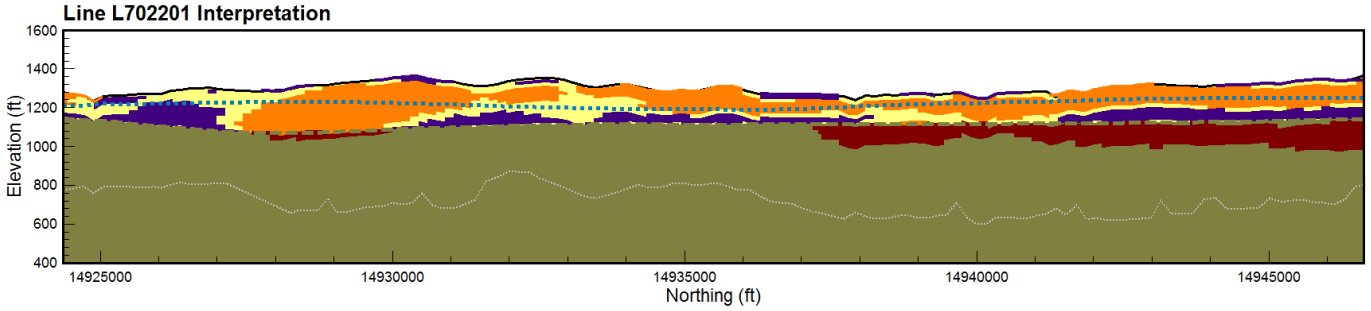

East Block Line L702101
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

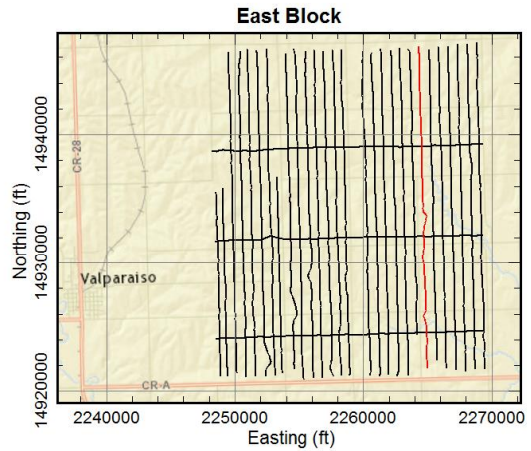

Line L702101 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

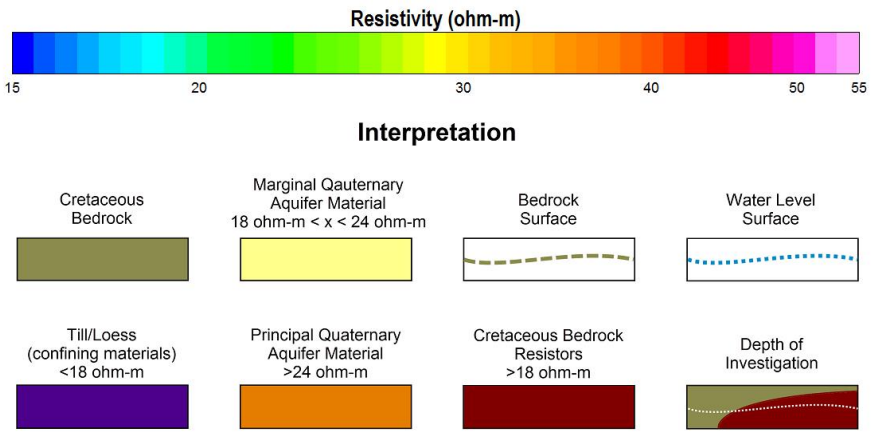

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

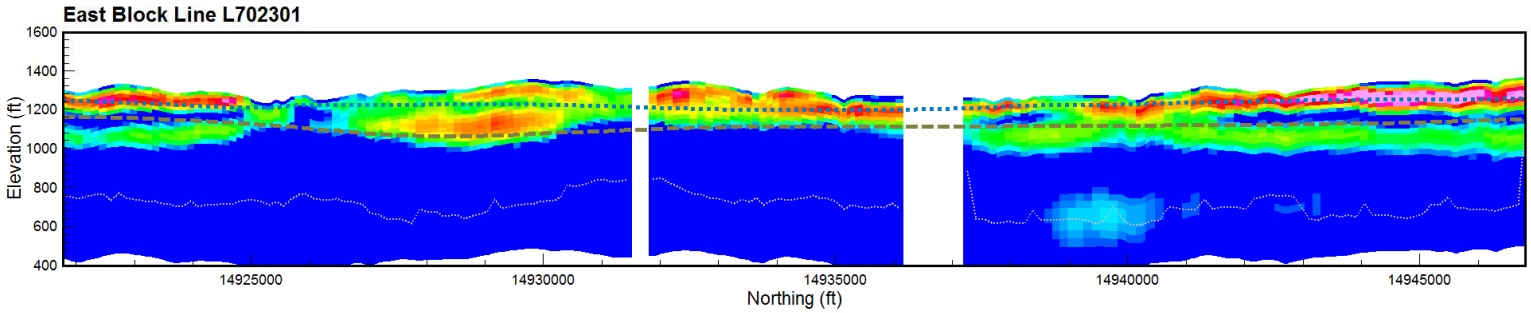

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

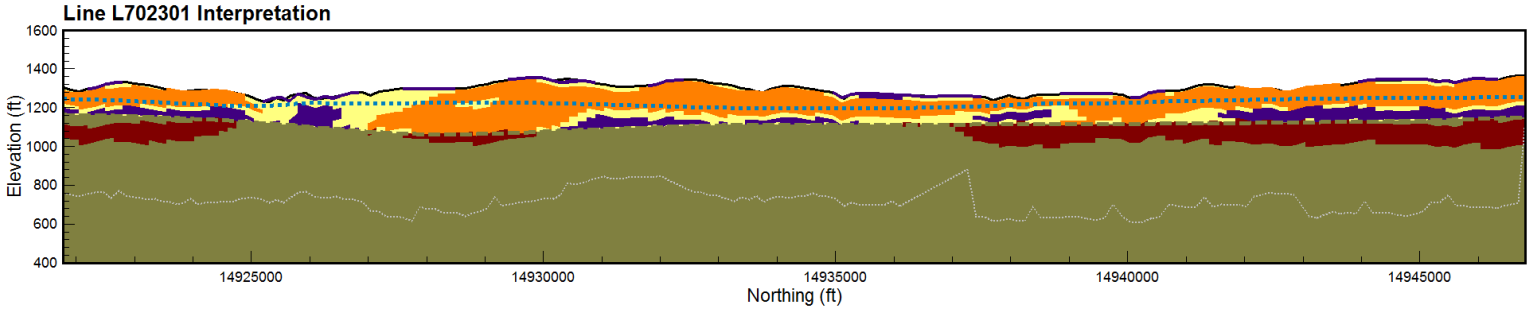

East Block Line L702201
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

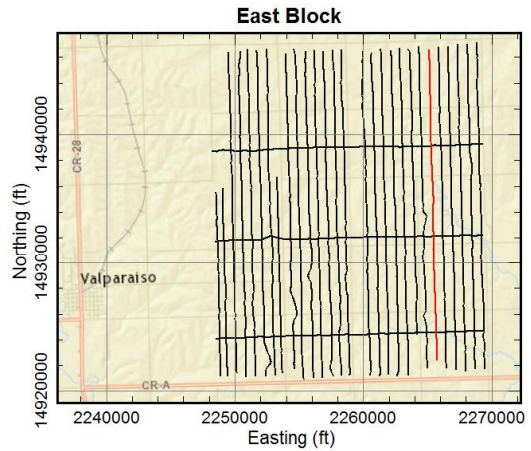

Line L702201 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

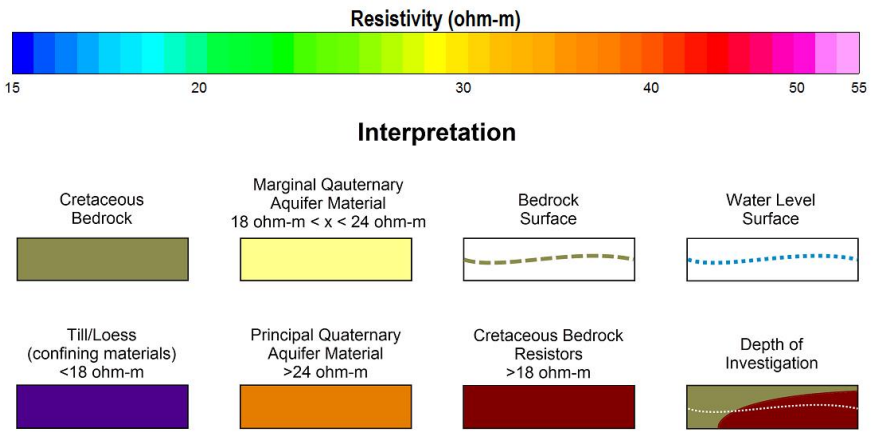

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

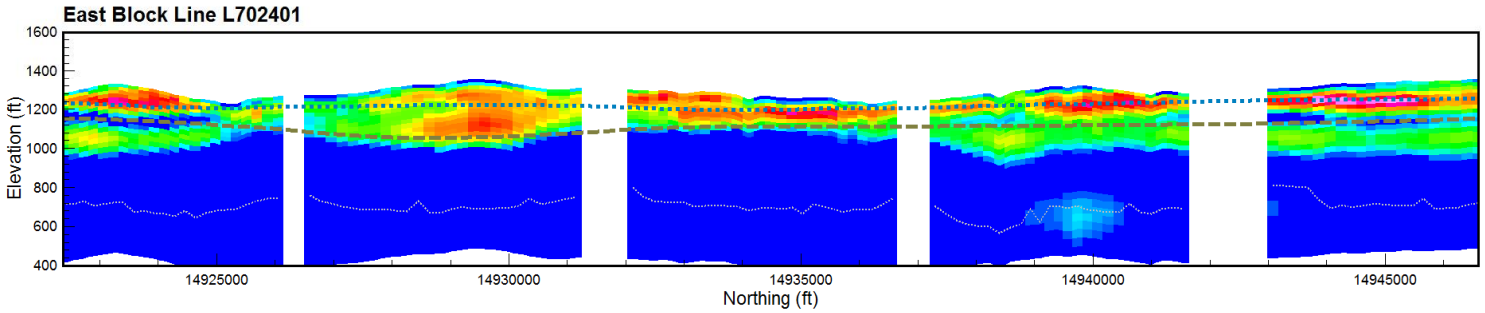

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

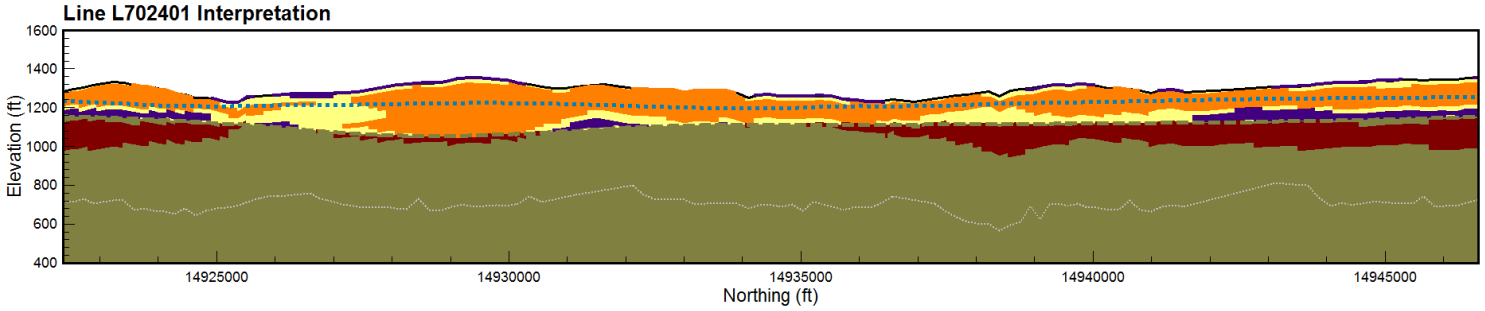

East Block Line L702301
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

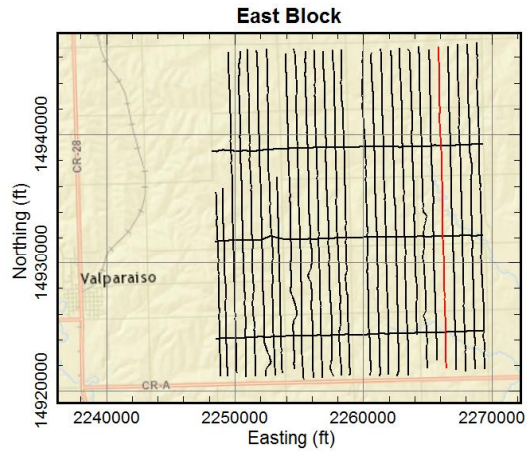

Line L702301 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

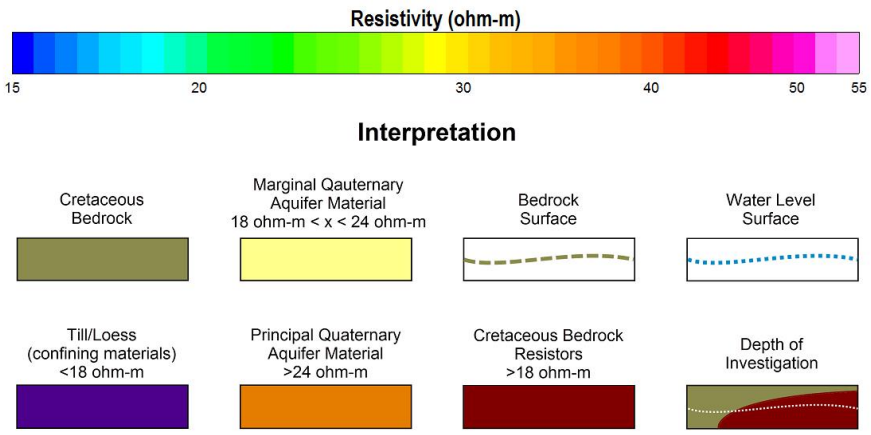

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

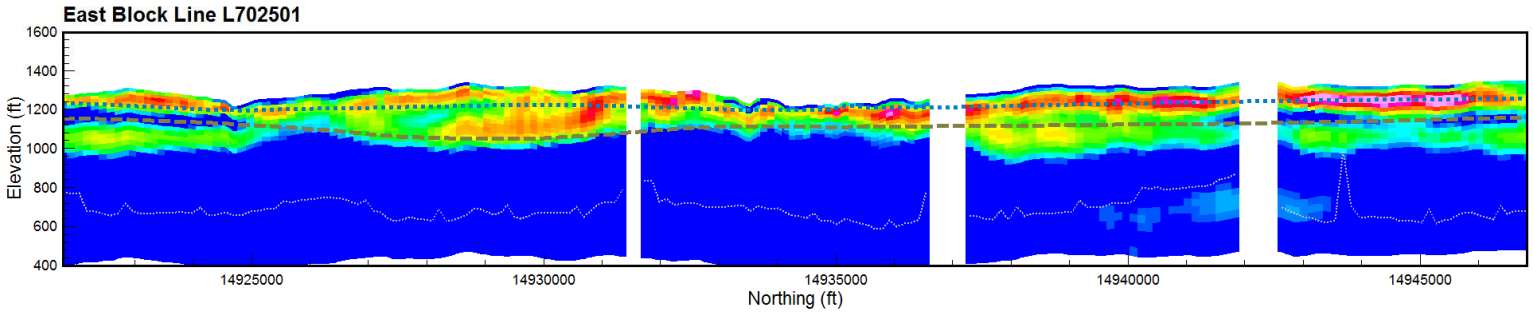

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

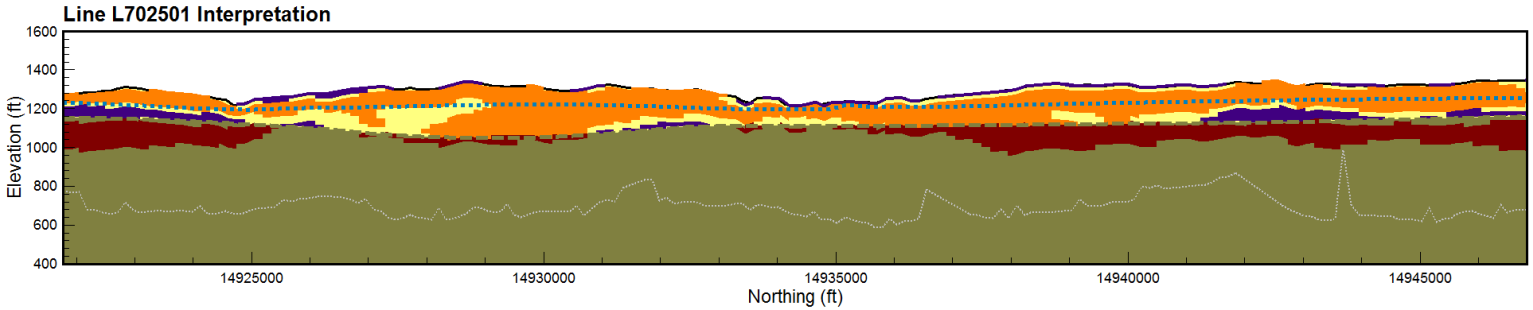

East Block Line L702401
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

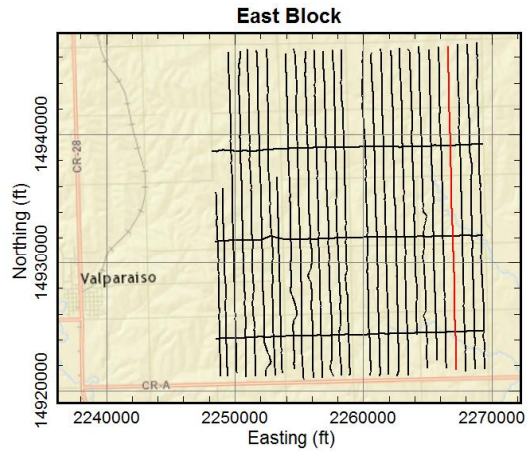

Line L702401 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

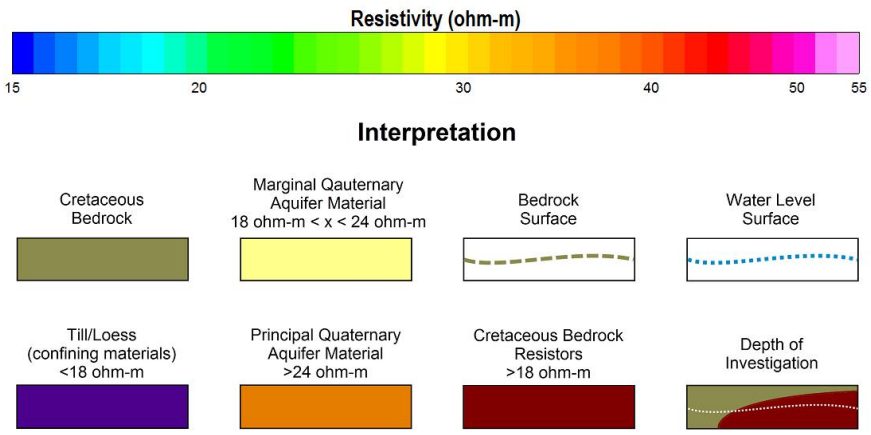

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

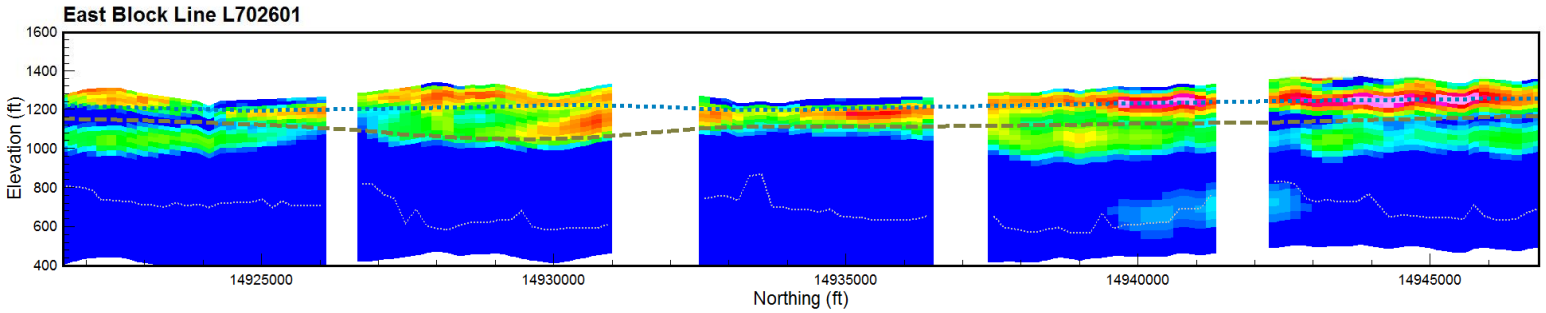

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

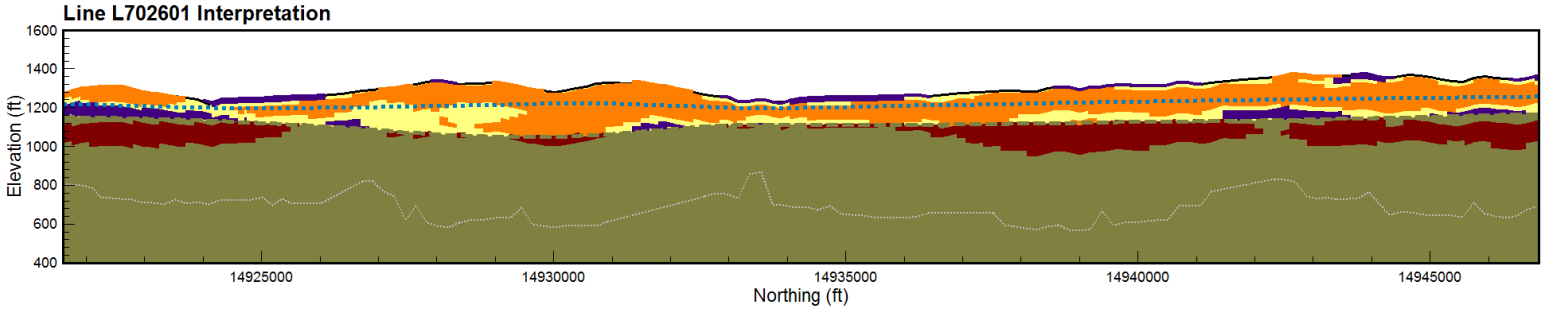

East Block Line L702501
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

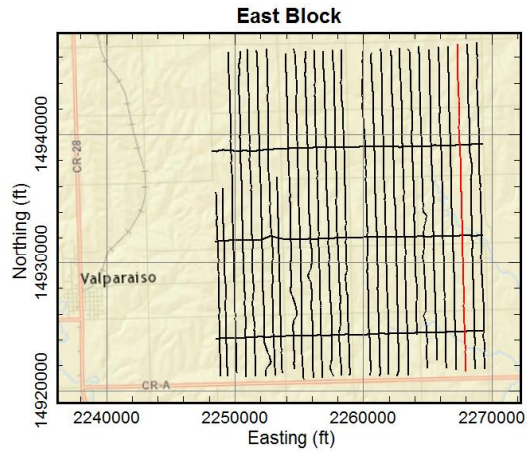

Line L702501 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

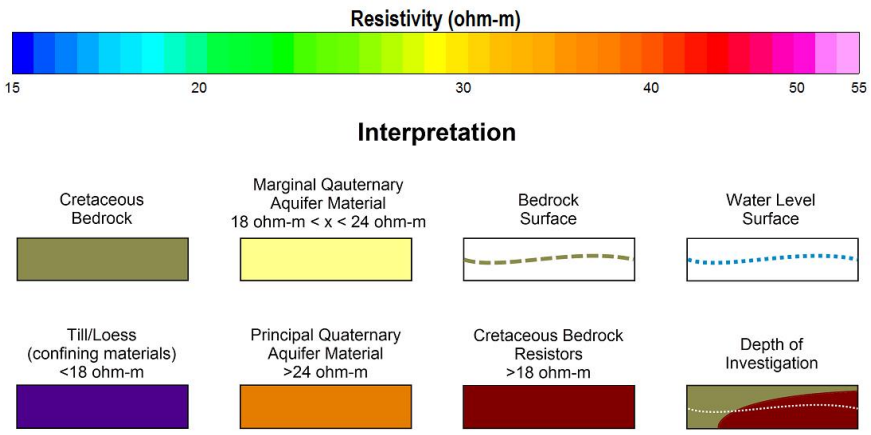

East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

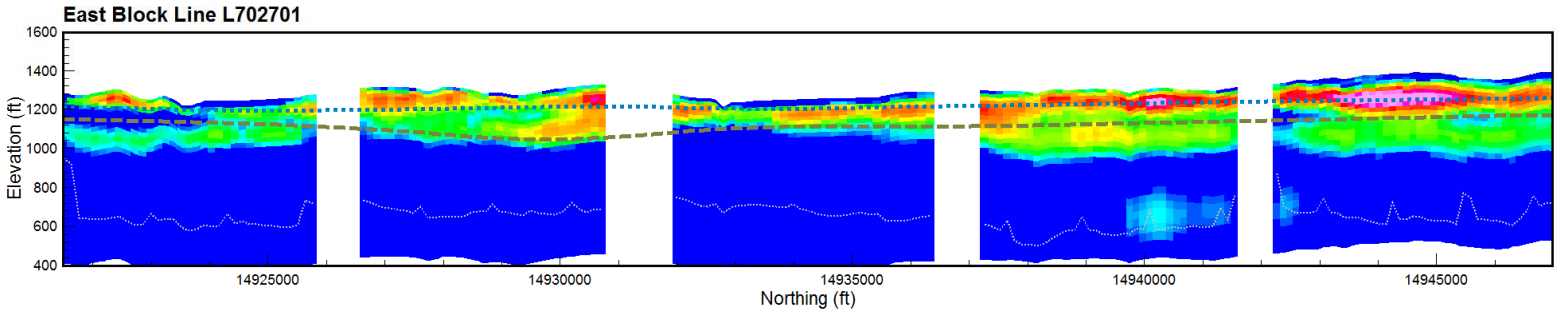

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

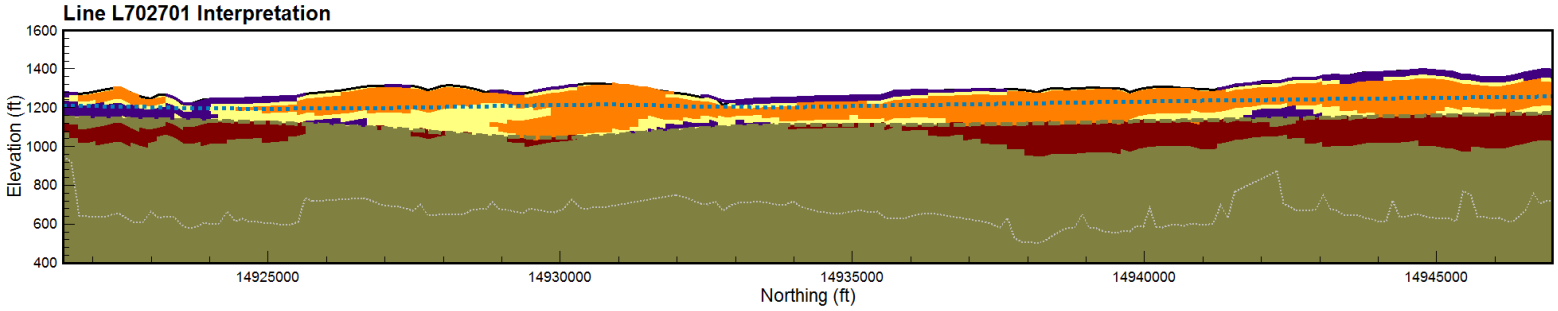

East Block Line L702601
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

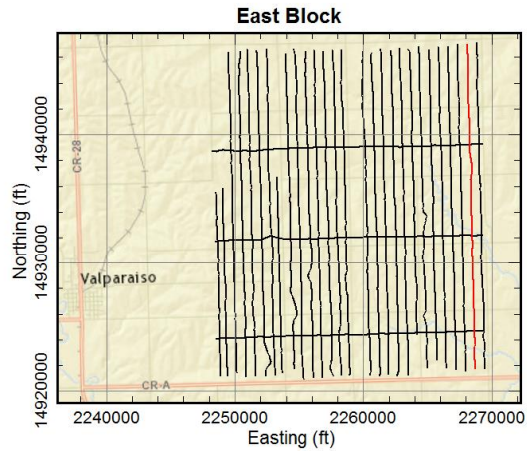

Line L702601 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

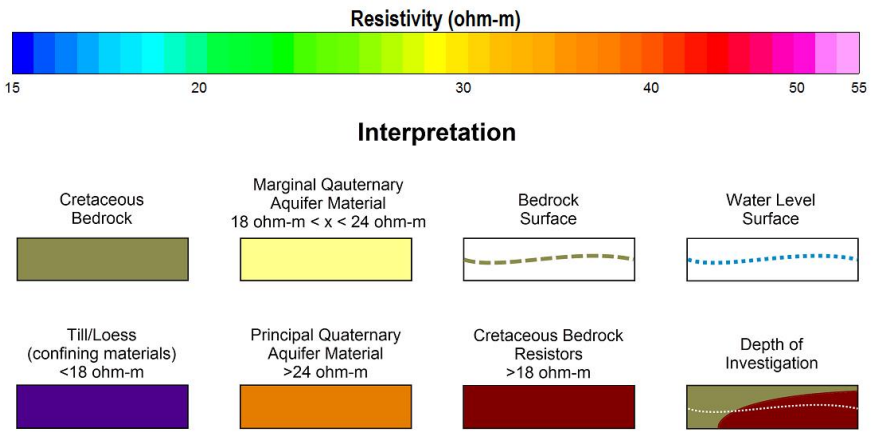

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

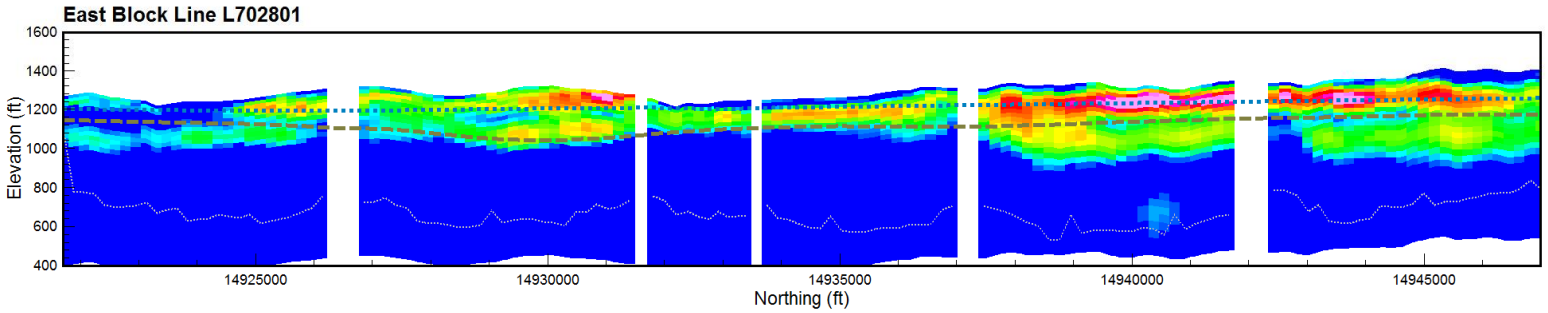

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

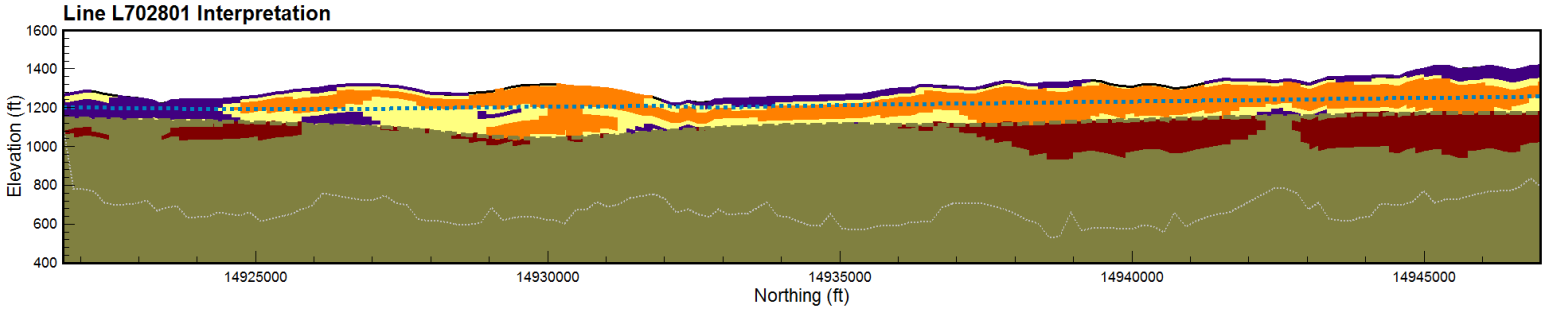

East Block Line L702701
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

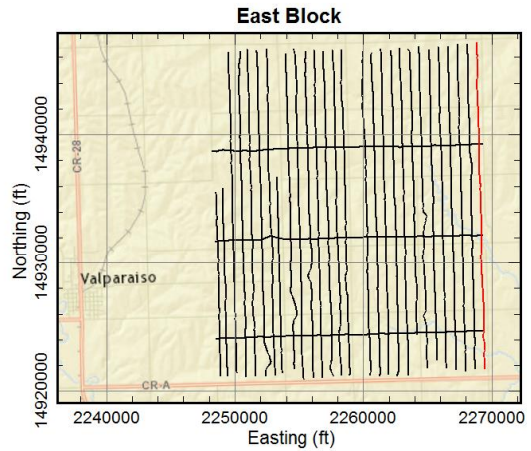

Line L702701 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)

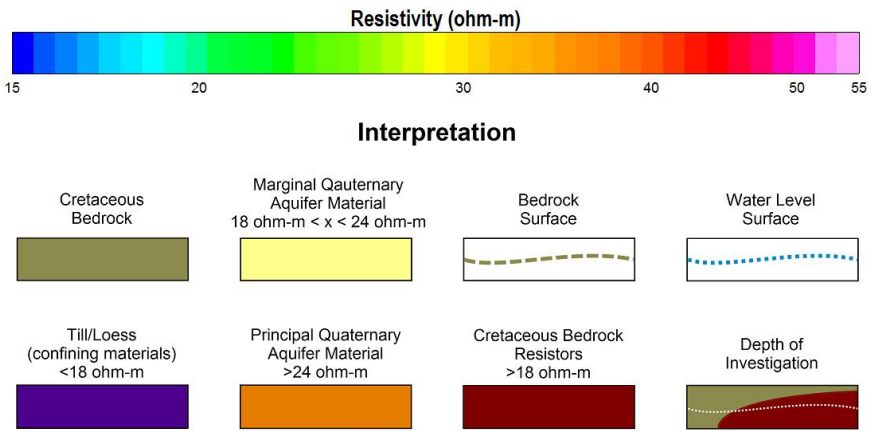

East Block
Northing (ft)
14940000
14930000
14920000
Valparaiso
CR-28
CR-A
2240000
2250000
2260000
2270000
Easting (ft)

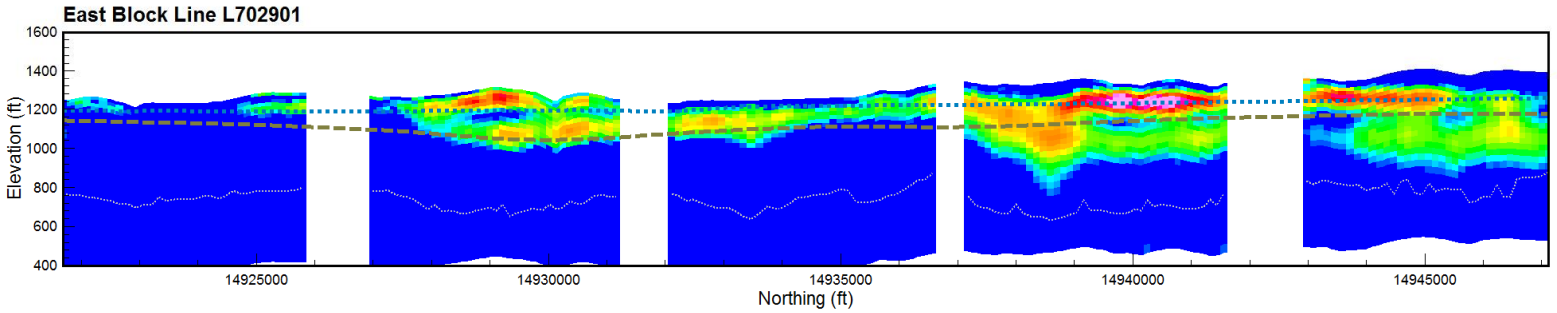

Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation

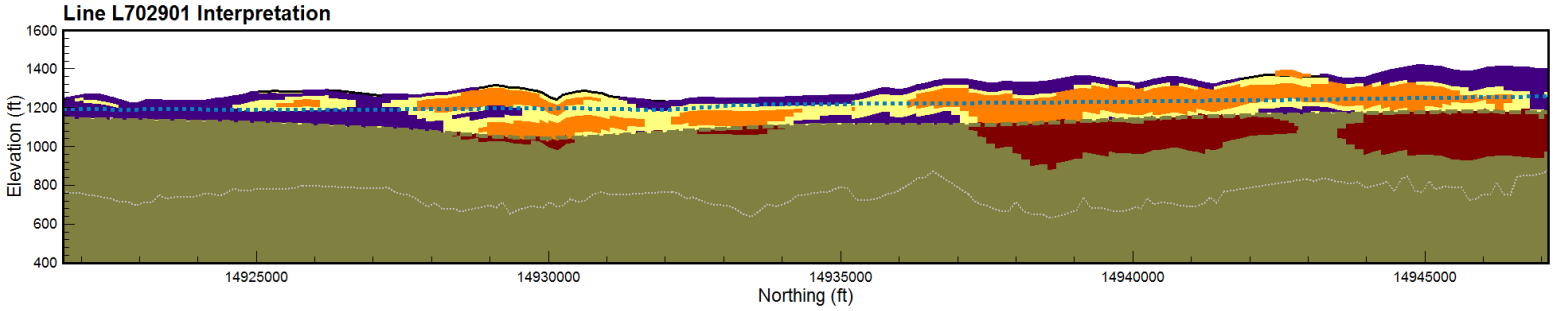

East Block Line L702801
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)


Line L702801 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)


East Block
Northing (ft)
14940000
14930000
14920000
CR-28
Valparaiso
CR-A
2240000
2250000
2260000
2270000
Easting (ft)


Resistivity (ohm-m)
15
20
30
40
50
55
Interpretation
Cretaceous Bedrock
Marginal Qauternary Aquifer Material 18 ohm-m < x < 24 ohm-m
Bedrock Surface
Water Level Surface
Till/Loess (confining materials) <18 ohm-m
Principal Quaternary Aquifer Material >24 ohm-m
Cretaceous Bedrock Resistors >18 ohm-m
Depth of Investigation


East Block Line L702901
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)


Line L702901 Interpretation
Elevation (ft)
1600
1400
1200
1000
800
600
400
14925000
14930000
14935000
14940000
14945000
Northing (ft)