The topographic data base was derived from ND State Water Commission Data Portal. Background shading is derived from NASA SRTM (Shuttle Radar Topography Mission) data. Inset data derived from Geocommunities 1:250,000 Canadian National Topographic database (www.geocomm.com). Scale 1:10,000,000.

SURVEY SPECIFICATIONS:
- Survey Date: October 4th - October 22nd, 2016
- Survey Base: Jamestown, North Dakota
- Aircraft: Aerospatiale A-star 350 B3 C-FVTM
- Survey Line Spacing: 400 metres
- Survey Line Direction: N 90° E / N 270° E
- Tie Line Spacing: 5000 Meters
- Tie Line Direction: N 0° E / N 180° E
- Average Aircraft Terrain Clearance: 70 meters
- EM Transmitter Loop: Towed at an average terrain clearance of 31 meters below the helicopter
- 2 Magnetic Sensors: Towed at an average terrain clearance of 21 meters below the helicopter

INSTRUMENTS:
- Geotech Time Domain Electromagnetic System (VTEM) Concentric Rx/Tx Geometry
  - X-Coil Diameter 0.32m
  - Z-Coil Diameter 1.2m
  - Transmitter Loop: Diameter 26 Meters
  - Dipole Moment: 365,276 nIA
  - Transmitter Wave Form: Trapezoid, Pulse Width 7.17 ms, Base Frequency 30Hz
- Geometrics High Sensitivity Caesium 2 Magnetic Sensors
  - Mag Resolution: 0.02 nT at 10 samples/sec

MAP PROJECTION:
- Datum: WGS84
- Projection: Universal Transverse Mercator
- Central Meridian: 99°W (Zone 14N)
- Central Scale Factor: 0.9996
- False Easting/Northing: 500,000m/0m
- Major Axis: 6378137
- Inverse Flattening: 298.25722

Resistivity
- Ohm-m

Courtenay
- Dazey
- Wimbledon
- Leal
- Rogers
- Sanborn
- Pierre
- Minneapolis
- Bismarck
- Fargo
- Jamestown

North Dakota State Water Commission

Geotech VTEM System
Depth Slice 40 metres
Flown and processed by Geotech Ltd.
245 Industrial Parkway North,
Aurora, Ontario, Canada L4G 4C4
www.geotech.ca
January 2017

Resistivity
The topographic data base was derived from ND State Water Commission Data Portal. Background shading is derived from NASA SRTM (Shuttle Radar Topography Mission) data. Inset data derived from Geocommunities 1:250,000 Canadian National Topographic database (www.geocomm.com).

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Survey Base: Jamestown, North Dakota
Aircraft: Aerospatiale A-star 350 B3 C-FVTM
Survey Line Spacing: 400 metres
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INSTRUMENTS
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Concentric Rx/Tx Geometry
X-Coil Diameter 0.32m
Z-Coil Diameter 1.2m
Transmitter Loop: Diameter 26 Meters
Dipole Moment: 365,276 nIA
Transmitter Wave Form: Trapezoid, Pulse Width 7.17 ms, Base Frequency 30Hz

Geometrics High Sensitivity Caesium 2 Magnetic Sensors
Mag Resolution: 0.02 nT at 10 samples/sec

MAP PROJECTION
Datum: WGS84
Projection: Universal Transverse Mercator
Central Meridian: 99°W (Zone 14N)
Central Scale Factor: 0.9996
False Easting/Northing: 500,000m/0m
Major Axis: 6378137
Inverse Flattening: 298.25722

Geotech Project # GL 160238
January 2017
Resistivity
Ohm-m
Courtenay
Dazey
Wimbledon
Leal
Rogers
Sanborn

Geotech VTEM System
Depth Slice 50 metres
Flown and processed by Geotech Ltd.
245 Industrial Parkway North,
Aurora, Ontario, Canada L4G 4C4
www.geotech.ca
The topographic data base was derived from ND State Water Commission Data Portal. Background shading is derived from NASA SRTM (Shuttle Radar Topography Mission) data. Inset data derived from Geocommunities 1:250,000 Canadian National Topographic database (www.geocomm.com)(http://mapservice.swc.nd.gov).

SURVEY SPECIFICATIONS:
- Survey Date: October 4th - October 22nd, 2016
- Survey Base: Jamestown, North Dakota
- Aircraft: Aerospatiale A-star 350 B3 C-FVTM
- Survey Line Spacing: 400 metres
- Survey Line Direction: N 90° E / N 270° E
- Tie Line Spacing: 5000 Meters
- Tie Line Direction: N 0° E / N 180° E
- Average Aircraft Terrain Clearance: 70 meters
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INSTRUMENTS
- Geotech Time Domain Electromagnetic System (VTEM)
- Concentric Rx/Tx Geometry
- X-Coil Diameter 0.32m
- Z-Coil Diameter 1.2m
- Transmitter Loop: Diameter 26 Meters
- Dipole Moment: 365,276 nIA
- Transmitter Wave Form: Trapezoid, Pulse Width 7.17 ms, Base Frequency 30Hz
- Geometrics High Sensitivity Caesium 2 Magnetic Sensors
- Mag Resolution: 0.02 nT at 10 samples/sec

MAP PROJECTION
- Datum: WGS84
- Projection: Universal Transverse Mercator
- Central Meridian: 99°W (Zone 14N)
- Central Scale Factor: 0.9996
- False Easting/Northing: 500,000m/0m
- Major Axis: 6378137
- Inverse Flattening: 298.25722

Resistivity
- Ohm-m
- Courtenay
- Dazey
- Wimbledon
- Leal
- Rogers
- Sanborn
- 

Geotech Project # GL 160238

January 2017

Flown and processed by Geotech Ltd.
245 Industrial Parkway North,
Aurora, Ontario, Canada L4G 4C4
www.geotech.ca
Geotech Project # GL 160238

The topographic data base was derived from ND State Water Commission Data Portal

Background shading is derived from NASA SRTM (Shuttle Radar Topography Mission) data

Inset data derived from Geocommunities 1:250,000 Canadian National Topographic database (www.geocomm.com)

Scale 1:10,000,000

Survey Specifications:

Survey Date: October 4th - October 22nd, 2016
Survey Base: Jamestown, North Dakota
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Instruments

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Transmitter Wave Form: Trapezoid, Pulse Width 7.17 ms, Base Frequency 30Hz

Geometrics High Sensitivity Caesium 2 Magnetic Sensors
Mag Resolution: 0.02 nT at 10 samples/sec

Map Projection

Datum: WGS84
Projection: Universal Transverse Mercator
Central Meridian: 99°W (Zone 14N)
Central Scale Factor: 0.9996
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Resistivity

Ohm-m

Courtenay
Dazey
Wimbledon
Leal
Rogers
Sanborn
ake

January 2017

Resistivity

TOPOGRAPHIC LEGEND:

Roads
Railways
Streams / Rivers
Contours
Lakes / Ponds
City Bounderies

Geotech VTEM System
Depth Slice 70 metres
Flown and processed by Geotech Ltd.
245 Industrial Parkway North,
Aurora, Ontario, Canada L4G 4C4
www.geotech.ca

North Dakota State Water Commission
Spiritwood-JT
Jamestown, North Dakota
Geotech VTEM System
Depth Slice 70 metres
Flown and processed by Geotech Ltd.
245 Industrial Parkway North,
Aurora, Ontario, Canada L4G 4C4
www.geotech.ca

January 2017
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Projection: Universal Transverse Mercator
Central Meridian: 99°W (Zone 14N)
Central Scale Factor: 0.9996
False Easting/Northing: 500,000m/0m
Major Axis: 6378137
Inverse Flattening: 298.25722

TOPOGRAPHIC LEGEND:
Roads
Railways
Streams / Rivers
Contours
Lakes / Ponds
City Boundaries
The topographic data base was derived from ND State Water Commission Data Portal. Background shading is derived from NASA SRTM (Shuttle Radar Topography Mission) data. Inset data derived from Geocommunities 1:250,000 Canadian National Topographic database (www.geocomm.com). Scale 1:10,000,000.

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MAP PROJECTION
- Datum: WGS84
- Projection: Universal Transverse Mercator
- Central Meridian: 99°W (Zone 14N)
- Central Scale Factor: 0.9996
- False Easting/Northing: 500,000m/0m
- Major Axis: 6378137
- Inverse Flattening: 298.25722

North Dakota State Water Commission
Spiritwood-JT
Jamestown, North Dakota
Geotech VTEM System
Depth Slice 90 metres
Flown and processed by Geotech Ltd.
245 Industrial Parkway North,
Aurora, Ontario, Canada L4G 4C4
www.geotech.ca
January 2017

TOPOGRAPHIC LEGEND:
- Roads
- Railways
- Streams / Rivers
- Contours
- Lakes / Ponds
- City Bounderies

Resistivity
Ohm-m
Courtenay
Dazey
Wimbledon
Leal
Rogers
Sanborn

44° 45’
46° 50’
46° 55’
47° 00’
47° 05’
47° 10’
47° 15’

-98° 30’
-98° 25’
-98° 20’
-98° 15’
-98° 10’

5175000N
5180000N
5185000N
5190000N
5195000N
5200000N
5205000N
5210000N
5215000N
5220000N
5225000N
5230000N
5235000N

535000E
540000E
545000E
550000E
555000E
560000E

Bismarck
Fargo
Jamestown

44°
46°
48°
50°

-105°
-102°
-99°
-96°
-93°

Minnesota
North Dakota
South Dakota
Project Site
Canada
SURVEY SPECIFICATIONS:
Survey Date: October 4th - October 22nd, 2016
Survey Base: Jamestown, North Dakota
Aircraft: Aerospatiale A-star 350 B3 C-FVTM
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**Resistivity**

- **Ohm-m**

**TOPOGRAPHIC LEGEND:**

- Roads
- Railways
- Streams / Rivers
- Contours
- Lakes / Ponds
- City Boundaries

**Geotech Project # GL 160238**

Flown and processed by Geotech Ltd. 245 Industrial Parkway North, Aurora, Ontario, Canada L4G 4C4 www.geotech.ca

**January 2017**

**North Dakota State Water Commission**

Spiritwood-JT Jamestown, North Dakota

Geotech VTEM System

Depth Slice 110 metres

Resistivity Ohm-m

Courtenay Dazey Wimbledon Leal Rogers Sanborn Lake