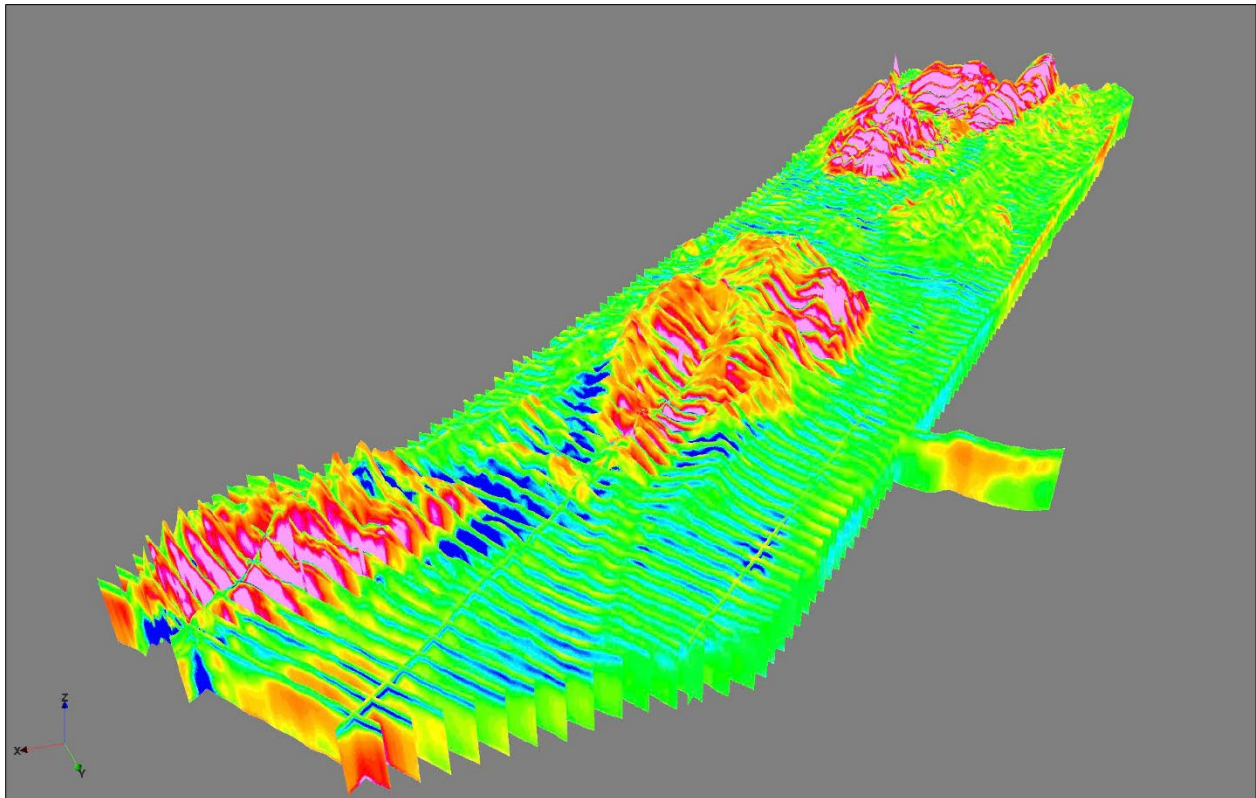


CANDLE HILLS AIRBORNE ELECTROMAGNETIC SURVEY, KUSKOKWIM REGION, ALASKA

Petersen, E.I., Fusso, L.A., Geotech Ltd., and Aqua Geo Frameworks LLC

Geophysical Report 2026-3



3D Fence diagram of inverted subsurface resistivity values resulting from the Candle Hills EM survey. Perspective view from the northeast.

2026
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS



STATE OF ALASKA

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Suggested citation:

Petersen, E.I., Fusso, L.A., Geotech Ltd., and Aqua Geo Frameworks LLC, 2026, Candle Hills airborne electromagnetic survey, Kuskokwim region, Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2026-3, 9 p. <https://doi.org/10.14509/31963>



CANDLE HILLS AIRBORNE ELECTROMAGNETIC SURVEY, KUSKOKWIM REGION, ALASKA

Petersen, E.I.¹, Fusso, L.A.¹, Geotech Ltd.², and Aqua Geo Frameworks LLC³

INTRODUCTION

The Candle Hills airborne electromagnetic survey covers a portion of the McGrath and Iditarod quadrangles, southwest of McGrath, across part of the Kuskokwim Mountains in western interior Alaska (fig. 1). The McGrath and Iditarod quadrangles are prime exploration targets because they lie within historically productive mining districts and contain geologic structures and rock units known to host gold and other metallic mineral deposits (Bundtzen and Miller, 1996; Bundtzen and others, 2004; Miller and others, 2005). The survey was conducted to characterize subsurface electrical resistivity variations and to support geologic mapping and mineral resource evaluation. These data provide a framework for identifying concealed lithologic contacts, structural features, and alteration zones that may indicate areas of elevated mineral potential.

Time-domain electromagnetic data were acquired using the helicopter-mounted VTEM Terrain system on August 5-12, 2025, by Geotech Ltd. A total of 1060 line-kilometers were flown over a single survey block measuring 369.5 square kilometers. The block was flown with northwest–southeast line orientation and a nominal spacing of 400 meters, along with northeast-southwest oriented tie lines with a nominal spacing of 4000 meters. Mean ground clearance was 44 meters, with a mean survey speed of 86 km/hr.

Geotech Ltd. provided initial resistivity models, produced via simple inversion using a technique termed Resistivity Depth Imaging (RDI). These models are referred to in the provided data files as “geotech_rdi.” Aqua Geo Frameworks then produced a spatially constrained inversion model (referred to in the data files as “agf_sci”), which incorporates both along-track and cross-track constraints. The Aqua Geo Frameworks model is recommended for end-users as it resolves finer-scale structures, including faults. We also provide a 3D voxel dataset registered to elevation rather than raw depth for the agf_sci model.

These data are provided as a Geophysical Report under an open end-user license and are available on the DGGs website, <https://doi.org/10.14509/31963>. This survey was flown under the same contract/in conjunction with the Granite Mountain airborne electromagnetic survey (Petersen and others, 2026, <https://doi.org/10.14509/31964>).

¹Alaska Division of Geological & Geophysical Surveys, 3354 College Road, Fairbanks, AK 99709

²Geotech Ltd., 270 Industrial Parkway South, Aurora, Ontario, Canada, L4G 3T9

³Aqua Geo Frameworks LLC, 10848 Ridge Road, Fort Laramie, WY 82212

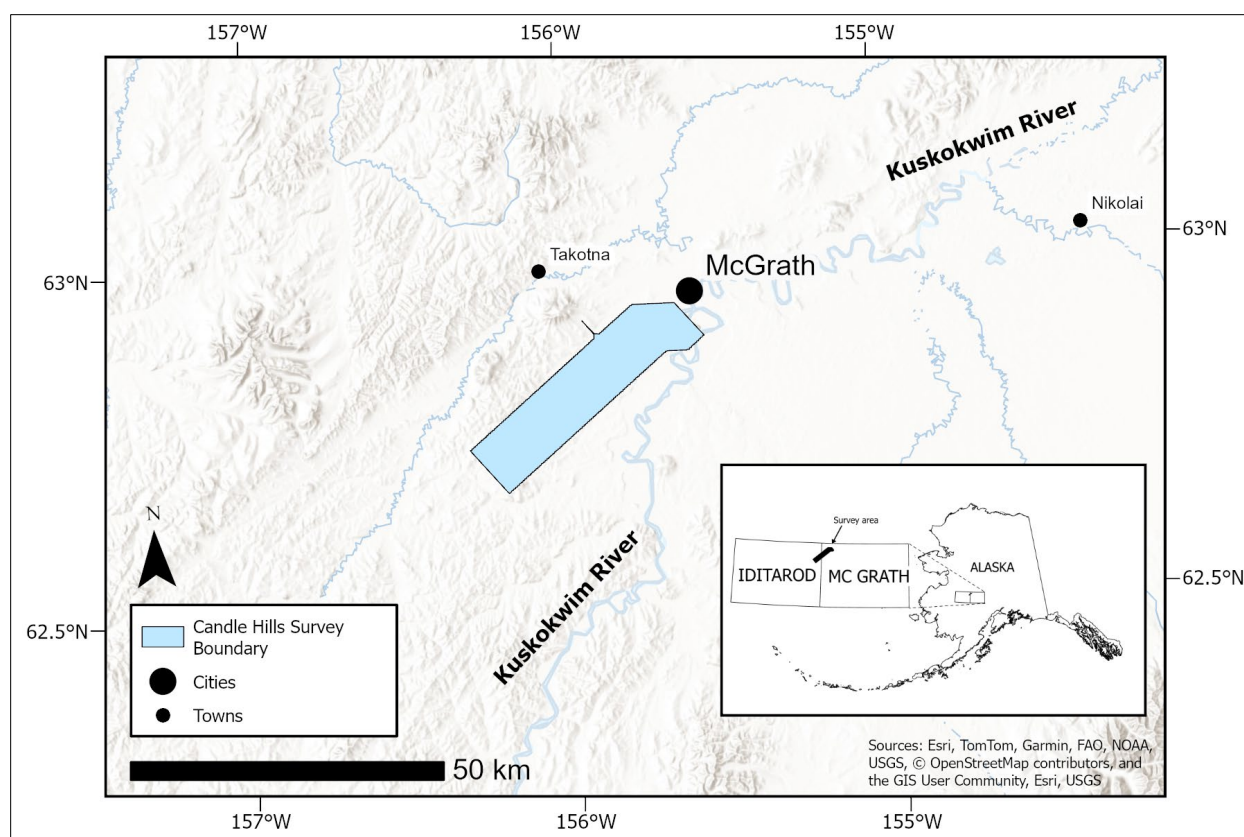


Figure 1: Regional map of survey area. **(Inset)** Survey location within Alaska, with relevant 1:250,000-scale quadrangles labeled.

DELIVERABLES

This document provides an overview of the survey and includes text and figures of selected primary and derivative products. Table 1 lists available data packages. Table 2 lists full-scale maps available for download. Please consult the metadata, project report, and digital data packages for more information and data.

Table 1. Data available for download

Data Package	Description
ascii_data	ASCII format line data, other ASCII data
databases_geosoft	Geosoft format database of final line data, other Geosoft format databases
documents	Project report, calibration reports
grids_geosoft	Oasis montaj Geosoft GRD format gridded data
grids_tif	Geographically registered data value rasters of gridded data, GeoTiff format
maps_pdf_format	Printable and geographically registered maps in PDF format.
models_resistivity	Models of subsurface resistivity inverted from measured EM response. agf_sci is the recommended model for end-users.
vector_data	Line path and survey boundary in Esri shapefile (shp) format

Table 2. Full-scale printable maps are available in Portable Document Format (*.pdf) with a resolution of 300 dpi. See Appendix A for previews of these maps in reduced-resolution page-sized format. The page-sized format is intended for reference and search purposes only.

Map Title	File Name
Flight path	sheet01_candle_hills_flightpath.pdf
Resistivity	
Modeled Resistivity, Voxel Layer at 240 m Above Sea Level	sheet02_candle_hills_agf_sci_resistivity_voxel_240m_elev.pdf
Modeled Resistivity, Voxel Layer at 100 m Above Sea Level	sheet03_candle_hills_agf_sci_resistivity_voxel_100m_elev.pdf
Modeled Resistivity, Voxel Layer at 0 m Above Sea Level	sheet04_candle_hills_agf_sci_resistivity_voxel_0m_elev.pdf
Modeled Resistivity, Voxel Layer at 80 m Below Sea Level	sheet05_candle_hills_agf_sci_resistivity_voxel_-80m_elev.pdf

ACKNOWLEDGMENTS

This work was supported by State of Alaska capital improvement project funds. Doyon, Limited funded survey lines acquired over their land holdings.

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- Bundtzen, T.K., and Miller, M.L., 1996, Precious metals associated with Late Cretaceous-early Tertiary igneous rocks of southwestern Alaska: Alaska Division of Geological & Geophysical Surveys Public Data File 96-15, 85 p. <https://doi.org/10.14509/1739>
- Bundtzen, T.K., Miller, M.L., and Hawley, C.C., 2004, Alaska resource data file, Iditarod Quadrangle, Alaska: U.S. Geological Survey Open-File Report 2004-1311, 373 p.
- Miller, M.L., Bundtzen, T.K., and Gray, J.E., 2005, Mineral resource assessment of the Iditarod Quadrangle, west-central Alaska: U.S. Geological Survey Miscellaneous Field Studies Map 2219-B, 1 sheet, scale 1:250,000.
- Petersen, E.I., Fusso, L.A., Geotech Ltd., and Aqua Geo Frameworks LLC, 2026, Granite Mountain airborne electromagnetic survey, Kuskokwim Region, Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2026-4. <https://doi.org/10.14509/31964>

<https://doi.org/10.14509/31963>

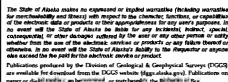


Figure 1. $J_{\text{eff}}^{\text{H}}$, $J_{\text{eff}}^{\text{H}}$, $J_{\text{eff}}^{\text{H}}$, $J_{\text{eff}}^{\text{H}}$, and $J_{\text{eff}}^{\text{H}}$ (molecules L^{-1})

Flight paths, survey line number labeled

Note: All survey line numbers are shown, with the exception of individual test lines (labeled, Line 1320). Line numbers are displayed to the north of labeled lines. Labels are situated at the northeast end of NE-SW oriented lines and the south end of NW-SE oriented lines.

This work was supported by the State of Alaska capital improvement project funds. Doyon, Limited funded survey lines acquired over their landholdings.

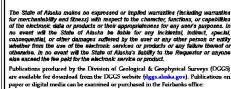
Basemap streams and waterbodies from:
National Hydrography Dataset, U.S. Geological Survey
Reston, Virginia, 2002-2016

Basemap hillshades and contours from:
U.S. Geological Survey, EROS Data Center, 2013,
Digital elevation - Interferometric Synthetic Aperture
Radar (IfSAR) - Alaska

Projection:
Universal Transverse Mercator Zone 4N

Datum:
NAD83

Cartography by:
E.J. Petersen and A.E. Macpherson (2025)

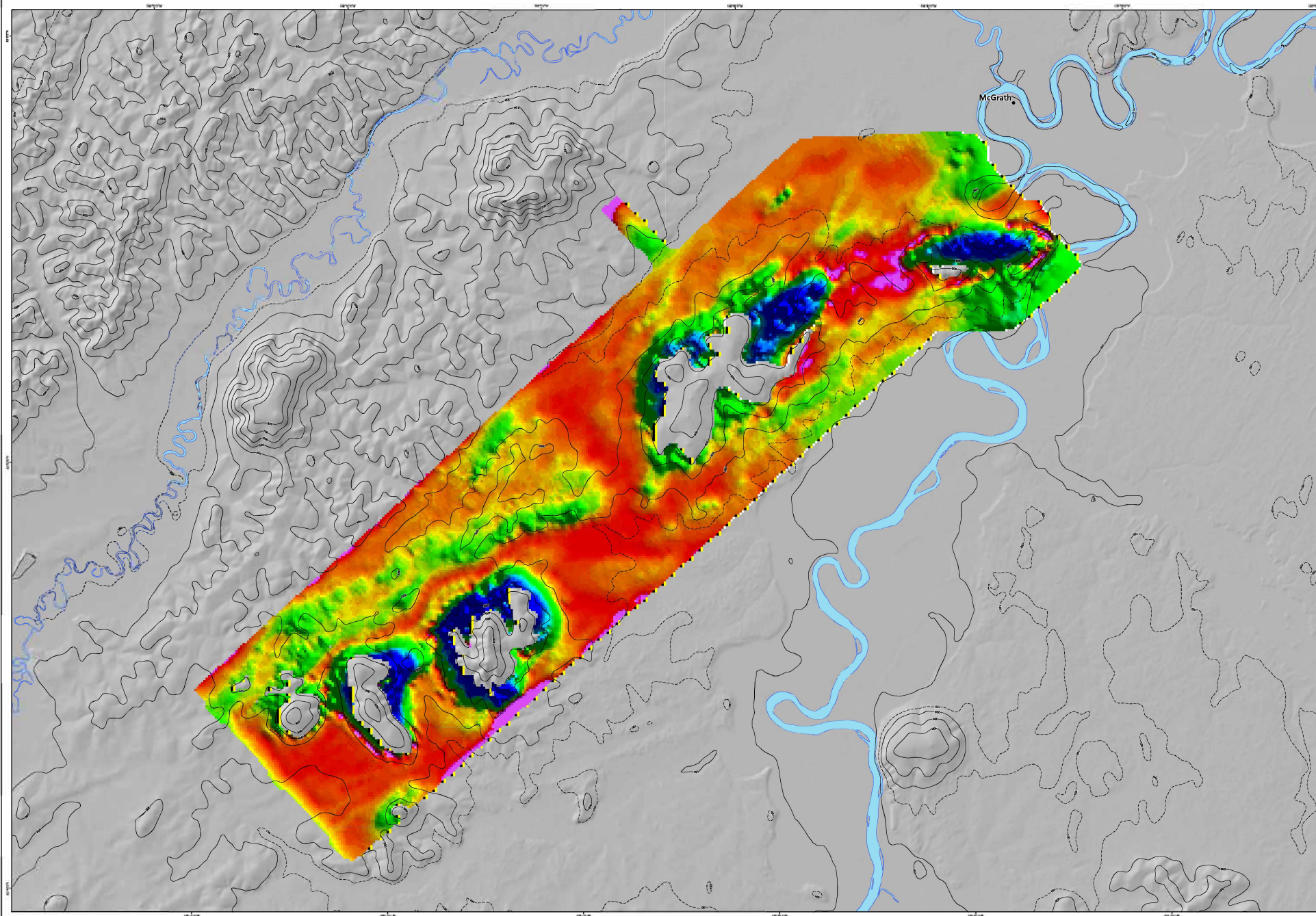


Polimeni E.J.¹, Fazio, L.A.¹, Geotech Ltd.², and Aquas Geo Frameworks LLC³



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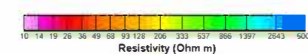


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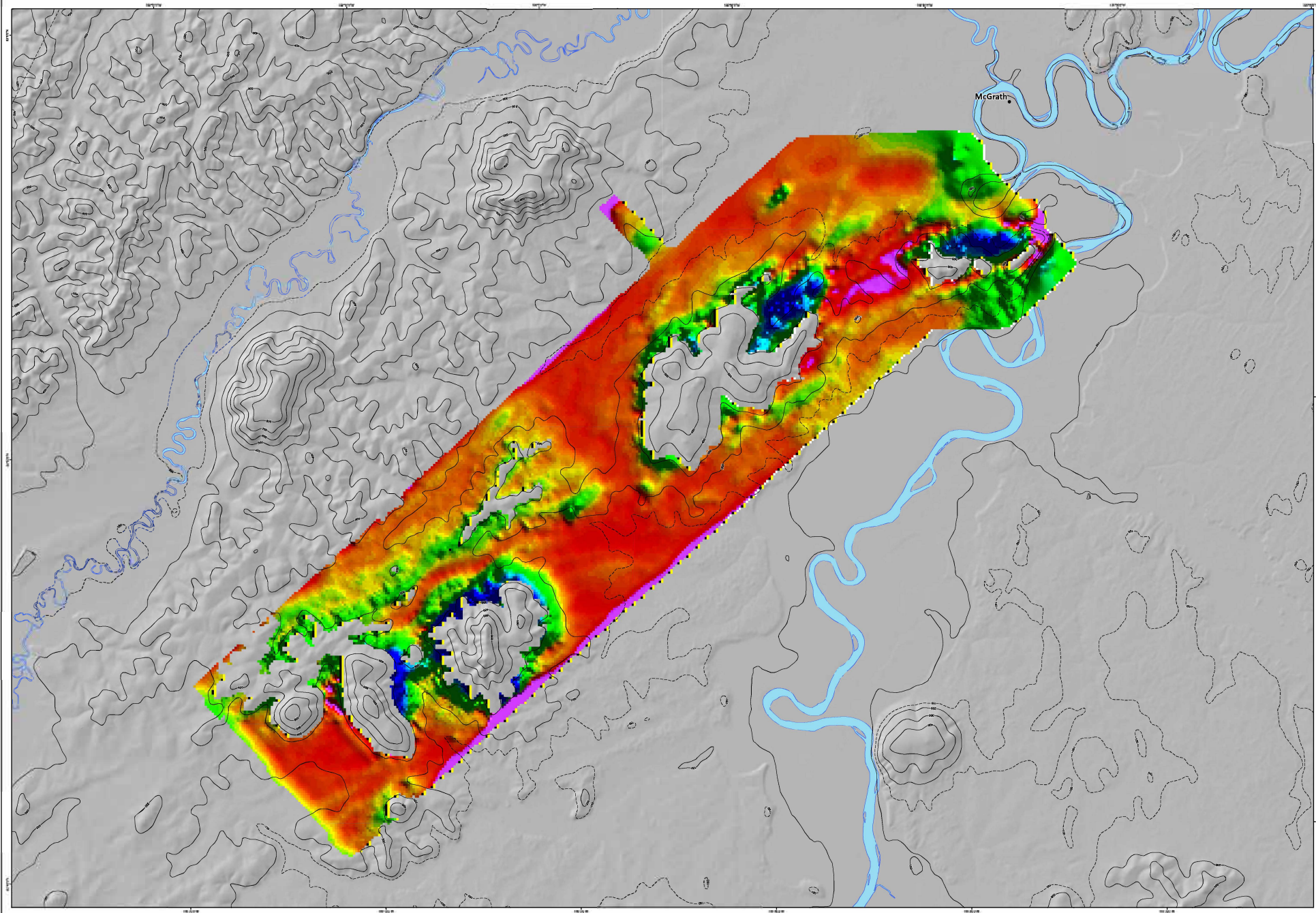
Modeled Resistivity, Voxel Layer at 0 m Above Sea Level
Candle Hills airborne electromagnetic survey, Kuskokwim Region, Alaska

by
Petersen, J.C., [et al.], [et al.], [et al.], and Aqua Geo Frameworks, LLC



Base map streams and waterbodies from:
National Hydrography Dataset, U.S. Geological Survey
Reston, Virginia, 2003-2016
Base map hillshade and contours from:
U.S. Geological Survey, ERCS Data Center, 2013
Digital elevation - Interferometric Synthetic Aperture
Radar (IFSAR) - Alaska
Projection:
Universal Transverse Mercator Zone 4N
Datum:
NAD83
Cartography by:
C.L. Petersen and A.E. Macpherson (2026)

This work was supported by the State of Alaska capital improvement project funds. Dayon, Limited funded survey lines acquired over their land holdings.

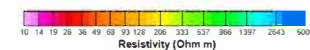


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**Modeled Resistivity, Voxel Layer at 80 m Below Sea Level
Candle Hills airborne electromagnetic survey, Kuskokwim Region, Alaska**

by
Petersen, J.C., [et al.], [et al.], [et al.], and Aqua Geo Frameworks LLC



Base map streams and waterbodies from:
National Hydrography Dataset, U.S. Geological Survey
Reston, Virginia, 2003-2016
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