

MAGGIE CREEK PROPERTY GRAVITY SURVEY – 2020 GIS DATABASE



Gravity Interpretation and Geology over Gray Shade Topography



James L. Wright M.Sc. April 30, 2020

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INTRODUCTION

A gravity survey was completed over a portion of the Maggie Creek property by McGee Geophysical Services based in Reno, Nevada for U. S. Gold Corp. The survey spanned April 21 - 26, 2020. Objective is to delineate structures, lithologies and alteration related to possible gold mineralization on the property. Another primary goal is place the property's structural position relative to the Gold Quarry gold deposit.

Survey procedure, data processing and an interpretation along with target area identification are developed in the report. In addition to the gravity survey, district scale topography and geology are included to provide supporting data for the gravity interpretation. Results are provided in digital formats for the GIS products. The digital products include raw data, intermediate processed products, and final products in the form of MAPINFO, ARCGIS and Google Earth KMZ files. The GIS files include image, contour and postings for the various data sets and derived products. All digital products are located on a DVD in a sleeve at the rear of the report. A README file on the DVD explains the file / folder organization.

Figure 1 shows the property location relative to counties, roads, towns and topography in north central Nevada.



FIGURE 1: Maggie Creek Property Location

SURVEY PROCEDURE

The 2020 gravity data set is composed of 800 unique stations, which were merged with eight USGS regional stations. Figure 2 presents a station posting. Data were acquired on a 100 m staggered square grid. Also, 500 - 1000 m spaced stations were gathered on surrounding public roads to provide valuable larger scale data. This regional data, along with the USGS data, are critical to placing the property relative to structures associated with the Gold Quarry deposit. Coordinate system used is WGS 84 / UTM ZONE 11N.



FIGURE 2: Maggie Creek Gravity Station Posting

Relative gravity measurements were made with LaCoste & Romberg Model-G gravity meters. Topographic surveying was performed with Trimble Real-Time Kinematic (RTK) and Fast-Static GPS. The gravity survey is tied to the US Department of Defense gravity base in Elko (DoD reference number 3899-2).

All gravity stations were surveyed using the Real-Time Kinematic (RTK) GPS method or, where it was not possible to receive GPS base information via radio modem, the Fast-Static method was used. A GPS base stations, designated MC1 and 609, were used on the project. The coordinates and elevation of these base station location were determined by making simultaneous GPS occupations in the Fast Static mode with Continuously Operating Reference Stations (CORS). The topographic surveying was performed simultaneously with gravity data acquisition. All gravity data processing was performed with the Xcelleration Gravity module of Oasis montaj (Version 7.0). The gravity data were processed to Complete Bouguer Gravity over a range of densities from 2.00 g/cc through 3.00 g/cc at steps of 0.05 g/cc using standard procedures and formulas.

Terrain Corrections were calculated to a distance of 167 km for each gravity station. Various procedures were used for three radii around each station: 0-10m, 10-2000m, and 2-167 km. These include the triangle method, combination of a prism and a sectional ring method, and sectional ring method for the three zones respectively.

Repeat statistics for the Maggie Creek gravity survey follow.

Total number of stations:	800
Number of repeated stations:	42
% stations repeated:	5.3%
Total number of readings:	885
Number of repeat readings:	85
% readings repeated:	9.6%
Maximum repeat error:	0.036 mGal
Mean repeat error:	0.009 mGal
RMS error:	0.014 mGaL

The mean of the absolute value of the loop closure errors is 0.02 mGal. Additional logistical details are available in the Appendix.

DATA PROCESSING

Data provided by MaGee Geophysical Services LLC includes the gravity data corrected to the complete Bouguer anomaly (CBA) stage for a number of densities. Determination of the most suitable Bouguer density is required for removal of topographic effects in the data. The most appropriate density for processing is that which minimizes the correlation of CBA gravity with terrain. Figure 3 shows what is termed a density profile over topography. Figure 4 presents complete Bouguer gravity (CBA) data for densities ranging from 2.00 g/cc to 3.00 g/cc along the profile, which crosses rough terrain in the central part of the survey. Below the CBA profiles is the corresponding topography. A dashed line connects a prominent, sharp topographic high with the CBA gravity profile. The CBA gravity variations are produced by incorrect densities used for processing and change polarity depending upon if a valley or hill is being traversed. An examination of the CBA profiles reveals a density of approximately 2.45 g/cc exhibits the least correlation of gravity, on **average**, with the sharp hill.

In addition to the GIS products, the CBA data are imported into the VOXLER 3D data environment and Google Earth to facilitate integration with other data sets such as drilling and underground development. Figures 5 and 6 show examples of each.



FIGURE 3: Density Profile Location over Topography



FIGURE 4: Density Profile CBA and Topographic Profile (Sections Look Northwest)



FIGURE 5: VOXLER 3D CBA Data Posting



FIGURE 6: Google Earth CBA Horizontal Gradient

The 2.45 g/cc data were gridded with a Kriging algorithm using a spacing of 25 m, which is 25% of the detail grid station spacing. This product is termed the CBA or GRAV. The CBA data were processed with a proprietary procedure to produce a smoothed regional grid (GRAV_UC), which subtracted from the CBA grid yields a residual (GRAV_RES) grid. Finally, the total horizontal (GRAV_HG) and first vertical derivatives (GRAV_VD) were computed from the CBA. All five grids were mask to the data limits and imaged / contoured for import into MAPINFO, ARCGIS and Google Earth. The images and contours were imported as separate files. Color bars, measurement units and contour intervals for the five products are embedded directly in the corresponding GIS images.

In addition to the detail grid property scale products, the entire dataset including the road reconnaissance and USGS data were processed using a 100 m grid for the CBA gravity. Images and contours for this regional (REG) gravity product were also incorporated in the GIS and Google Earth data sets. Coverage for this product is sufficient to establish the gravity connection between Gold Quarry and the property.

INTERPRETATION

The interpretation first addresses the detailed gravity coverage over the property, then places this into a larger scale encompassing the Gold Quarry and Mike deposits. Geologic control used for the detailed coverage is that of Evans and Cress (1972), which includes their formation labels.



FIGURE 7: Basic CBA Gravity @ 2.45 g/cc, Property over Gray Shade Topography



FIGURE 8: Residual (Upper) and Horizontal Gradient (Lower) of CBA Gravity

The basic survey result, complete Bouguer anomaly (CBA) of gravity, is presented in Figure 7 over the topography. In gross aspect the gravity is dominated by a gravity high dropping to the northeast with an arm protruding to the northwest. This gravity surface in general reflects denser carbonates of the lower plate plunging beneath thickening upper plate rocks. Prominent lows to the northwest and southeast of the coverage are produced by low density basin fill covering Paleozoic rocks. The highest gravity occurs on the extreme southwest corner of the survey, where readings extend well down the slope into Maggie Creek canyon. The high density Hanson Creek dolomite (**SOh**) is relatively close at this point and produces the unusual high readings.

Finer detail in the CBA is extracted by secondary products such as the residual and total horizontal gradient of gravity as presented in Figure 8. Interpreted structures, based primarily on the horizontal gradient, are indicated with either dashed lines or thrust symbols and placed over the two data products along with labels. Structures, which juxtapose rocks of differing densities, are indicated in the horizontal gradient as ridges and in the residual fall along gradients. The interpreted structures are classified as either high angle or thrusts with barbs along the upper plate side. Thrusts produce weak horizontal gradient highs due to the relatively gradual density transition as compared to the high angle faults. A dot is placed on the high angle faults, where possible, to indicate down-side movement.

Two of the high angle structures are labeled. These include the Good Hope Parallel, depicted in magenta, and Soap Creek structures. The significance of these is discussed in the regional review. Basin fill to the southeast overlies a complex array of structures.



FIGURE 9: Interpretation over Geology of Evans and Cress (1972)

The geology of Evans and Cress (1972) is partially colored and overlain with the interpretation in Figure 9. Two areas are added to the interpretation in the figure. These are areas of interpreted dolomitic alteration (**Dol_Alt**), which correlate with prominent gravity highs along the Good Hope Parallel Structure (see Figures 8 and 10). Additional detail of the colored geology is provided by Figure 10 with inclusion of the residual gravity beneath the colored geology and interpretation. Limestone in the upper plate (**Ovl**) tends to correlate with local gravity highs in the residual. This is particularly evident in the northwest extended arm of higher gravity noted previously. The areas of dolomitic alteration are located at structural complexity along the Good Hope Parallel.



FIGURE 10: Geology, Interpretation over Residual Gravity

The larger scale geologic and gravity setting is presented in Figure 11, where the entire gravity data set is employed, as well as the geology of Thompson et. al. (2002). The Good Hope, Soap Creek and Gold Quarry faults are highlighted in the figure. These three structures control gold deposit in the south area of the Carlin Trend. Structural intersections play important roles at Gold Quarry and Mike, while other deposits such as Tusc are scattered along the Good Hope fault. **Major structures on the property parallel to the Good Hope fault with northeast trending structural intersections** deserve detailed exploration scrutiny. The extended gravity coverage confirms the continued plunge of the lower plate northeast past the property.



FIGURE 11: Regional CBA Gravity, Interpretation over Geology of Thompson et. al. (2002) Figure I-3

CONCLUSIONS AND RECOMMENDATIONS

The gravity survey delineates the northeast plunging plate boundary from Schroeder Mountain. A number of thrust and normal faults are delineated, including one which parallels the Good Hope fault. A series of normal faults, which appear to be extension of the Soap Creek Fault, intersect this structure on the northwest end. A direct analogy to the Mike deposit is indicated. On the southeast end, a possible extension of the Gold Quarry Fault intersects the structure as well with interpreted proximal dolomitic alteration. A direct analogy to the Gold Quarry deposit is indicated.

Economic mineralization is not outcropping, thus requiring exploration at depth. Once integration with geologic and geochemical data is completed, consideration should be given to conducting a CSAMT survey over areas of merit to delineate lithologies, structures and alteration prior to drill testing.

REFERENCES

Evans, J. G., and Cress, L. S., 1972, Geologic map of the Schroeder Mountain Quadrangle, Nevada: United States Geologic Survey Map MF-324.

Thompson, T. B., Teal, L., and Meeuwig, R. O., 2002, Gold deposits of the Carlin Trend: Nevada Bureau of Mines and Geology, Bulletin 111.

APPENDIX

GRAVITY SURVEY

over the

MAGGIE CREEK PROSPECT

EUREKA AND ELKO COUNTIES, NEVADA

for

US GOLD CORP.

APRIL 2020

SUBMITTED BY

Magee Geophysical Services LLC 465 Leventina Canyon Road Reno, Nevada 89523 USA TEL 775-742-8037 FAX 775-345-1715 Email: <u>chris_magee@gravityandmag.com</u> Website: <u>www.gravityandmag.com</u>

INTRODUCTION

Gravity data were acquired over the Maggie Creek prospect in Eureka and Elko Counties, Nevada for US Gold Corp. The gravity survey was conducted between April 21 and April 26, 2020. A total of 800 new gravity stations were acquired and merged with eight public domain USGS gravity stations. Field operations were based out of Elko, Nevada.

Relative gravity measurements were made with LaCoste & Romberg Model-G gravity meters. Topographic surveying was performed with Trimble Real-Time Kinematic (RTK) and Fast-Static (FS) GPS.

Gravity data were processed to complete Bouguer gravity (CBG) and forwarded to consulting geophysicist Jim Wright of J L Wright Geophysics for further processing and interpretation.

DATA ACQUISITION

Survey Personnel

Data acquisition and surveying were performed by Brian Page, Jack Magee, Kristina Kennedy, Matt Basile and Lukas Magee. Brian Page and Christopher Magee supervised all operations and completed final data processing.

Gravity Meters

LaCoste & Romberg Model-G gravity meters, serial numbers G-018, G-392, G-406, G-603 and G735 were used on the survey. Model-G gravity meters measure relative gravity changes with a resolution of 0.01 mGal. The manufacturer's calibration tables used to convert gravity meter counter units to milliGals are included with the delivered data.

Modified calibration tables were used for meters G-018, G-392 and G-603 to correct interval scale factors used to convert gravity meter dial readings to milligals. The modifications were determined based on a 12-station gravity calibration loop in northern Nevada, covering a range of 274.60 mGal, and completed in August 2016. Both the original manufacturer's calibration tables and modified tables used to convert gravity meter counter units to milligals are included with the delivered data.

Gravity Base

The gravity survey is tied to a single IGSN-71 gravity network base at the Elko Regional Airport (DoD reference number 3899-2). Information on this base is listed below.

Base	Absolute Gravity	Latitude (WGS84)	Longitude (WGS84) Elevation(NAVD88)
ELKO	979740.16	40.82778	-115.77972	1547.90

GPS Equipment

All gravity stations were surveyed using the Real-Time Kinematic (RTK) GPS method or, where it was not possible to receive GPS base information via radio modem, the Fast-Static method was used. The following GPS equipment was used on the project:

Trimble SPS880/R8/5700 receivers Trimble Model TSC2/TSC3 controllers Trimble TrimMark III base radio Trimble Zephyr GPS antennas Trimble Business Center (version 5.2) was used for GPS data processing.

Geodetic Survey Control

Two GPS base stations, designated *MC1* and 609 were used on this project. The coordinates and elevation of GPS base station *MC1* were determined by making simultaneous GPS occupations in the Fast Static mode with continuously operating reference stations (CORS). GPS data for the station was submitted to the National Geodetic Survey (NGS) OPUS service which is an automated system that uses the three closest CORS stations to determine coordinates and elevations for unknown stations. Station 609 was determined by collecting simultaneous GPS data and adjusting raw coordinates to the *MC1* OPUS solution. The coordinates and elevations of stations *MC1* and 609 are listed below.

Station	WGS-84 Latitude	WGS-84 Longitude	WGS-84 Ellipsoid Ht.
MC1	N 40° 48' 01.82430"	W 116° 11' 27.54953"	1532.395 m
	WGS84 UTM Northing	WGS84 UTM Easting	Elevation (NAVD88)
	4516926.638 m	568244.386 m	1551.349 m
609	WGS-84 Latitude	WGS-84 Longitude	WGS-84 Ellipsoid Ht.
	N 40° 43' 24.72814"	W 116° 04' 51.27331"	1480.143 m
	WGS84 UTM Northing	WGS84 UTM Easting	Elevation (NAVD88)
	4508473.807 m	577619.518 m	1499.149 m

Topographic Surveying of Gravity Stations

All topographic surveying was performed simultaneously with gravity data acquisition. The gravity stations were surveyed in WGS84 UTM Zone 11 North coordinates in meters and the GEOID12A geoid model was used to calculate North American Vertical Datum of 1988 (NAVD88) elevations from ellipsoid heights. The coordinate system parameters used on this survey are summarized below.

<u>Datum</u>	
Datum Name	WGS84
Ellipsoid	World Geodetic System 1984
Semi-Major Axis	6378137.000 m
Inverse Flattening	298.257223563
Transformation	None

Universal Transverse Mercator
UTM 11 North
00° 00' 00.00000" N
117° 00' 00.00000" W
0.9996
0
500000 m
GEOID12A (CONUS)

Gravity Stations

A total of 800 new gravity stations were acquired and merged with eight USGS public domain stations. Stations were reached on foot or by ATV and 4x4 trucks were used for access.

DATA PROCESSING

Overview

New field data including station identifier, local time, gravity reading, measured slope, and operator remarks were recorded in the field in notebooks and on survey controllers. Recorded data were then entered into a notebook computer or transferred digitally in the form of Geosoft RAW gravity text files. Survey coordinates were also transferred digitally.

All gravity data processing was performed with the *Gravity and Terrain Correction* module of Geosoft Oasis montaj (version 9.1). Gravity data were processed to complete Bouguer anomaly (CBA) over a range of densities from 2.00 g/cc through 3.00 g/cc at steps of 0.05 g/cc using standard procedures and formulas.

Terrain Corrections

Terrain corrections were calculated to a distance of 167 km for each gravity station. The terrain correction for the distance of zero to 10 meters around each station was calculated using a sloped triangle method with the average slopes measured in the field. The terrain correction for the distance of 10 meters to 2000 meters around each station was calculated using a combination of a prism method and a sectional ring method with digital terrain from a 10-meter USGS digital elevation model (DEM). The terrain correction for the distance of 2 to 167 kilometers around each station was calculated using the sectional ring method and digital terrain from SRTM and/or 90-meter DEMs.

Data Processing Parameters

The following parameters were used to reduce the gravity data:

GMT Offset	Gravity Formula	Gravity Datum
-7 hours	1967	IGSN-71

Gravity Repeats and Loop Closures

800
42
5.3%
885
85
9.6%
0.036 mGal
0.009 mGal
0.014 mGaL

The mean of the absolute value of the loop closure errors is 0.02 mGal.

DATA FILES

Raw Data Files

The raw data files are named with the gravity meter serial number, date, and operators initials. The format is *gnnn_mmm_dd_2020_iii.txt* where *gnnn* is the serial number of the gravity meter, *mmm* is the month, *dd* is the date on which the gravity loop was acquired, and *iii* are the operator's initials. The raw data files and Geosoft database file (.gdb) for each day's data are included with the delivered data.

Final Gravity XYZ File

The final GDB file with all principle facts for the Maggie Creek gravity survey is named *MaggieCreek_Master_Final_Apr2020.gdb* with a corresponding CSV file named *MaggieCreek_Master_Final_Apr2020.csv*. The data columns in the file include headers identifying the value of each column.

Grid and Terrain Files

The file names for the grid files used to create the images in this report and to calculate the terrain corrections are as follows and are included with the delivered data.

Complete Bouguer gravity grid MaggieCreek_CBA255 _Final_Apr2020.grd Local terrain files MaggieCr_10mDEM_WGS84z11_NED.grd Regional terrain files MaggieCr_90mDEM_WGS84z11_SRTM.grd Regional terrain correction output file MaggieCr_167km_TC100.grd

Geosoft Database Files

All of the additional Geosoft database (.gdb) files associated with the data processing are also included with the delivered data, these are:

Final coordinate and elevation listing

MaggieCreek_Locations_WGS84z11_NAVD88.gdb Master gravity database MaggieCreek_Master_Final_Apr2020.gdb Gravity base station database ELKO_GRAV_BASE.gdb

GPS Data Files

The raw and processed GPS data are included with the delivered data as Trimble Business Center projects and are included in files organized by meter and operator.