# ASSESSMENT REPORT

**Spectral Analysis and Ground Truthing**
**Of the**
## Dude and Tak Claim Group

TEXADA ISLAND, British Columbia

For
**Tenures: 407667;501996; 522543; 501940; 517074; 517185; 517129; 517178; 517284; 517153; 522450; 517026**
Of the Nanaimo Mining District

Prepared For:
NORTHSTAR MINING LTD.
FMC# 143663

**Event #**
**4186940**

Located on Map sheet
92F.059

Longitude: 49º37'56"
Latitude: -124º18'37"
UTM 10N
405364
5498299

**Associated Minfile #s:**
092F 059 (MAY); 092F 200 (CISCO); 092F 276 (MAY)
092F 327 (ANGEL); 092F 504 (LONG B); 092F 505 (DAVE'S); 092F 506 (FRISKY)

**Associated ARIS** (Assessment Report) file **numbers**:
7559; 9264; 10065; 13747; 14916; 16013; 17301; 17685; 18671

Date: Dec 10 2007
By
Auracle Geospatial Science Inc.

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**EXECUTIVE SUMMARY**

Auracle Geospatial Science Inc. was asked by NORTHSTAR MINING LTD. to carry out a Spectral Analysis and location verification program on its several of its mineral tenures on Texada Island British Columbia. These are primarily Copper Molybdenum Gold prospects staked for their base metal and precious metal potential. In the preceding year spectral analysis was undertaken by the author on these tenures, together with an ongoing program of geoscience data compilation and image fusion.

Geologically this area is widely underlain by Upper Triassic Karmutsen Formation Basaltic Volcanic rocks and narrow lenses of Limestone with intrusions of quartz diorite to granodiorite. Exploration work this year was carried out as a part of the Dude and Tak Group Project on this tenure which is the largest contiguous tenure group within the project area. This is an area of coastal rainforest and steep terrain. This area is an excellent candidate for higher resolution airborne or ground grid Hyperspectral data collection, which has the potential to more clearly define these complex mineral occurrences. Of note is the lack of data regarding gold mineralization in the work conducted by Falconbridge in the 1970s and a noticeable lack of sample retention in drill core characterized as intersecting fracture zones. B. Bowen P. Eng.'s statement: "Falconbridge's drilling program represents an incomplete test of the porphyr potential of the Dude prospect" seems to remain unanswered.

Auracle Geospatial Science Inc.
D

## INTRODUCTION

In May of 2006 an area of prospective Copper Molybdenum Gold porphyr terrain was acquired by Northstar Mining Ltd. on the East Coast of Texada Island. Exploration in this area has been carried out since the mid 1970s by Falconbridge Nickel, Cariboo Gold, Rhyolite Resources Ltd., Carolin Mines Limited and Pathfinder Resources. Programs of Prospecting, Soil Geochemistry, Geophysics, and limited drilling have been conducted at various locations. With the acquisitions by Northstar of a more complete ground package, currently elevated base and precious metal prices, a decision was made to apply satellite spectral analysis to locate possible zones of alteration which may provide a basis for more intensive ground exploration.

## LOCATION AND ACCESS (Figure 2)

The Northstar Dude and Tak claim groups are located 31 to 37 km south of the Town of Venanda on the east coast of Texada Island west by a government operated Ferry of the City of Powell River British Columbia. Crossing time from Powell River to Blubber Bay on the Northern end of Texada is approximately 25 minutes. Access to the site is along a secondary road from a smaller community of Gilles Bay. There is an airport approximately 20km north of the claim group at Gilles bay with daily scheduled flights to Vancouver and Qualicum Beach. There is a good network of roads accessing and crossing the claim group area including public roads and old and new logging roads. An improved BC Hydro Access road provides general access. This is an area of possible high winter snowfall and winter travel should be avoided. Four wheel drive transportation is recommended year round. A main electrical transmission line crosses the claim group presenting a relatively vegetation clear window. Texada Island enjoys an industrial economic base, featuring three operating limestone quarries.

## PHYSIOGRAPHY

The topography of the area is rugged and mountainous. The mineral tenures cover and lie to the east of Mount Grant with steep slopes with moderately to deeply incised river valleys. Elevations range from sea level in the north east to about 700 meters in the highlands to the west.

This a coastal rainforest with dense vegetation consisting of replanted to larger Douglas fir, Hemlock, Balsam conifers, Alder deciduous trees, and thick salal underbrush. This location features a maritime environment with moderate to high rainfall.

## MINERAL CLAIM STATUS

This exploration report encompasses 67 mineral claim cells out of the total 105 mineral cell claims held by Northstar in three separate claim blocks (tenures). All of the 67 cells are contiguous. Separate groups consisting of 15 cells (mineral tenure #502019) and 23 cells (mineral tenures: 516336 and 516341) are located south and east of this group. A list of claims is included in the Confirmation Cover to this document and a claim map is inserted as Figure 2.

**PREVIOUS WORK (Extracts from Minfile and ARIS)**

Mineral exploration work carried out on these several properties is reported in the British Columbia Ministry of Energy Mines and Petroleum Resources Minfiles numbered: 092F 059 (MAY); 092F 200 (CISCO); 092F 276 (MAY); 092F 327 (ANGEL); 092F 504 (LONG B); 092F 505 (DAVE'S); 092F 506 (FRISKY) and in the same ministry's exploration assessment reports file (ARIS) numbered: 7559; 9264; 10065; 13747; 14916; 16013; 17301; 17685; 18671.

Texada Island enjoys a lengthy and persistent mining history. In the 1900's copper gold skarns were mined at Venanda. A magnetite replacement deposit 3 km north of Gilles Bay was mined by Texada Mines Ltd. from 1952 to 1977. Three limestone quarries are currently in operation on Texada.

The Dude and Tak mineral prospects were discovered as anomalous copper and molybdenum mineralization by local prospectors in 1969. The area was staked and subsequently optioned to Falconbridge Nickel Mines Ltd. Falconbridge conducted soil Geochemistry, ground geophysics, geological mapping and limited diamond drilling. Low grade copper was intersected and the option that they held was terminated in 1970.

A minor program of short hole drilling (11m maximum) was conducted by F. Brennan in the late 1970s without substantial success.

Northstar Mining staked the claim area and acquired additional cell claims from 2000 to present. Northstar's prospector Bob Duker assisted B. Bowen P. Eng. in an intensive geological mapping program in 2001. This study also performed a compilation of the existing data.

**REGIONAL GEOLOGY** (Figure 3)

The Northstar Mining Ltd. Dude and Tak Claim Group lie within a region of Texada Island underlain by the basaltic volcanic rocks of the Upper Triassic Karmutsen formation which have been variously described as porphyritic and narrow limestone lenses. Of interest are Diorite/Granodiorite intrusions. Metallic mineralization has been described as related to these intrusives. Chlorite, kaolinite, epidote, hematite and potassic alteration are reported to commonly occur near intrusive contacts.

**EXPLORATION WORK 2007**

Spectral Analysis was conducted using ASTER L1A data granule: AST_L1A_00308012004192432_20080108111854_2010 which was selected for suitability to multispectral image analysis for mineral classification based on the date of collection, time of day, presence of cloud within target area, and availability of coherent multi band data. This granule is cloud free (0%) low aerosol image covering all but the northern tip of Texada Island. L1A images are unprocessed data requiring georegistration, and other pre-processing for this application. TRIM vector data was acquired for mapping and combined with the BC geological survey's 10N UTM dataset.

FIELD WORK

This work location was visited by the author in the company of Bob Duker (Northstar's prospector) and Daryl Clark to examine vegetation and rock outcrop for applicability of Satellite borne spectral data analysis. A second day visit occurred with Bob Duker in September 2007

EQUIPMENT and SOFTWARE

These data were processed using Clark University's IDRISI ANDES and CARTOLINX raster GIS, ESRI and ENVI raster analysis applications.

PROCESSING and ANALYSIS

Data was imported as raw reflectance data and visually checked for completeness and consistency before a series of pre-processing steps were taken. Pre-processing included georeferencing of the image data to create positional reference. Georeferencing consisted of resampling and rubber sheeting the data using a standard convolution method, and reprojecting the resulting data. A region of interest (dark oceanic water) depicting a flat spectral field was used as a basis for a Flat Field Atmospheric Correction. The atmospherically corrected images were processed using a minimum noise fraction (MNF) transform to identify and reduce noise. Six MNF bands were generated and from these a level of spectral coherence was achieved, that is that data was extracted that represented the significant spectral information contained within and the insignificant data was eliminated. The MNF data was classified using a variety of statistical methods including mixture tuned matching, spectral angel comparison, and pixel unmixing to generate classification images of pixels which most likely represent the spectral end members of specific minerals. The Spectral end members were compared with those collected in 15 spectral libraries including those of the US Geological Survey, Johns Hopkins University, Jet Propulsion Laboratory, and several other industry standard libraries.

**RESULTS**

The Initial Minimum Noise Fraction multiband Data produced adequate spectral coherence for subsequent analysis (See 2009B3resFFHG_mnf.jpeg). This image is projected together with overlain tenure corners (blue crosses) to identify the target area to the viewer. A classification image depicting high spectral correlation or low infeasibility is projected as an overlay to the greyscale background Match filter to Hematite/Datolite image. In this image (2009B3FFHGhemROI.jpeg) areas of dark gray indicate a presence

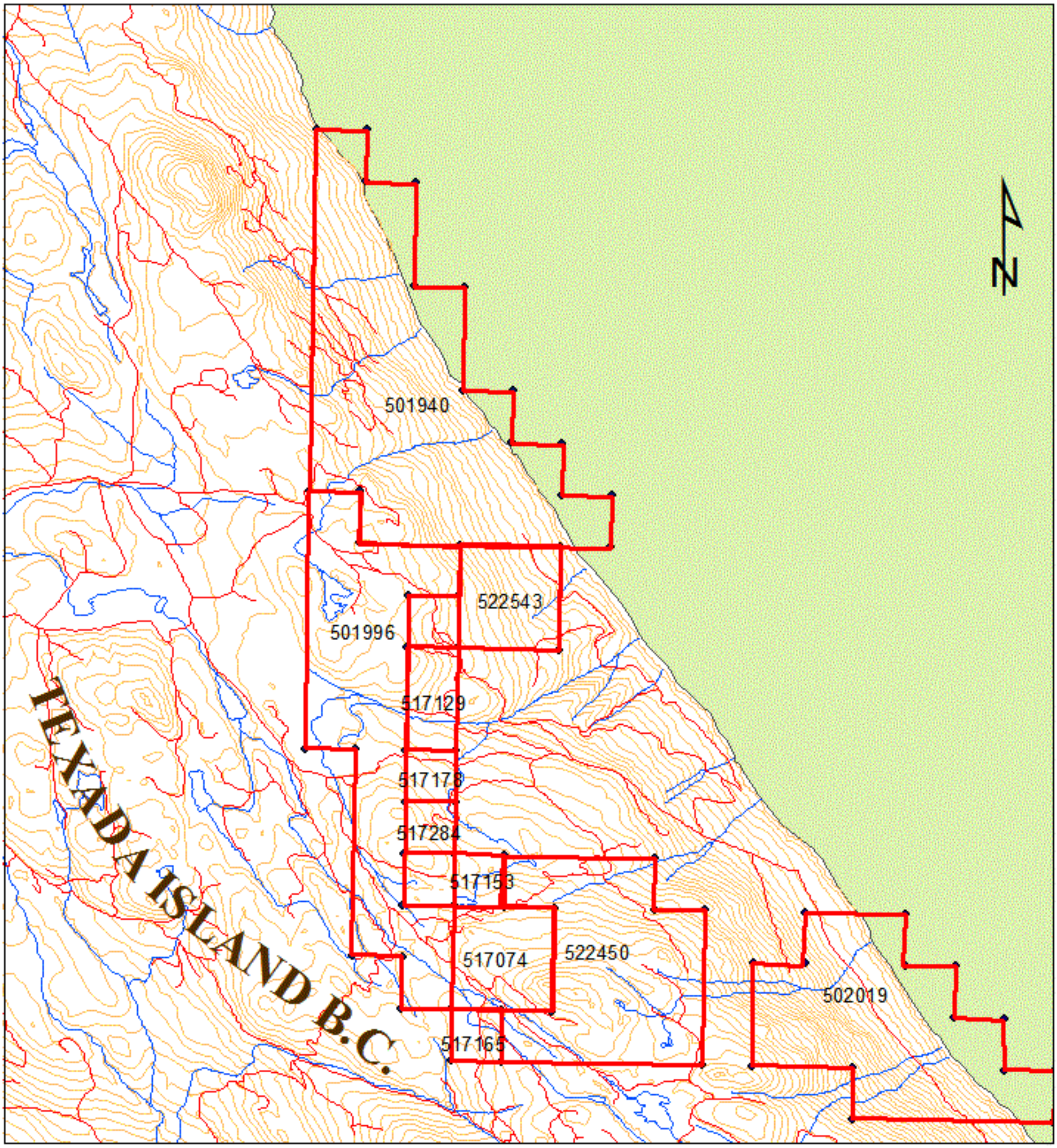
(or lack of infeasibility) of Hematite spectral correlation, the Chartreuse depicting presence of Talc/Magnetite, Dark red the presence of Ferroaxinite, yellow the presence of Natrolite.
The data clearly demonstrates that there are spectral signals which may be identified to produce regional exploration targets. The area north of the electrical transmission line correlates well with the strong signal of hematite in the right of way cut area. These areas would benefit by higher resolution spectral examination.

**CONCLUSIONS**

This is an area of considerable potential which is supported by this work and analyses.
The area, while quite rugged is amenable to further work and seems to be in a region of possible future development. This area seems to be underexplored at present. Spectral analysis has identified areas of interest that should receive more intensive ground based follow up.

**STATEMENT OF WORK**

The Spectral Analysis Exploration Work was carried out by Auracle Geospatial Science Inc. between November 2007 and December 2007. Site work occurred in August of 2007 this work forms part of a basis for planned ongoing work.
The work of this analysis was separately focussed on the three tenure groups as discrete entities for the purposes of Reporting
While the actual cost of the work exceeds the amount (please see appendix I) applied to this assessment report, it agrees with the budget allowed to complete the work and is reduced from an aggregate total of $12962.00 to an applied total of $9785.47 for this tenure group only.
Filing fees amount to $779.19.




1,200 600 0 1,200 Meters

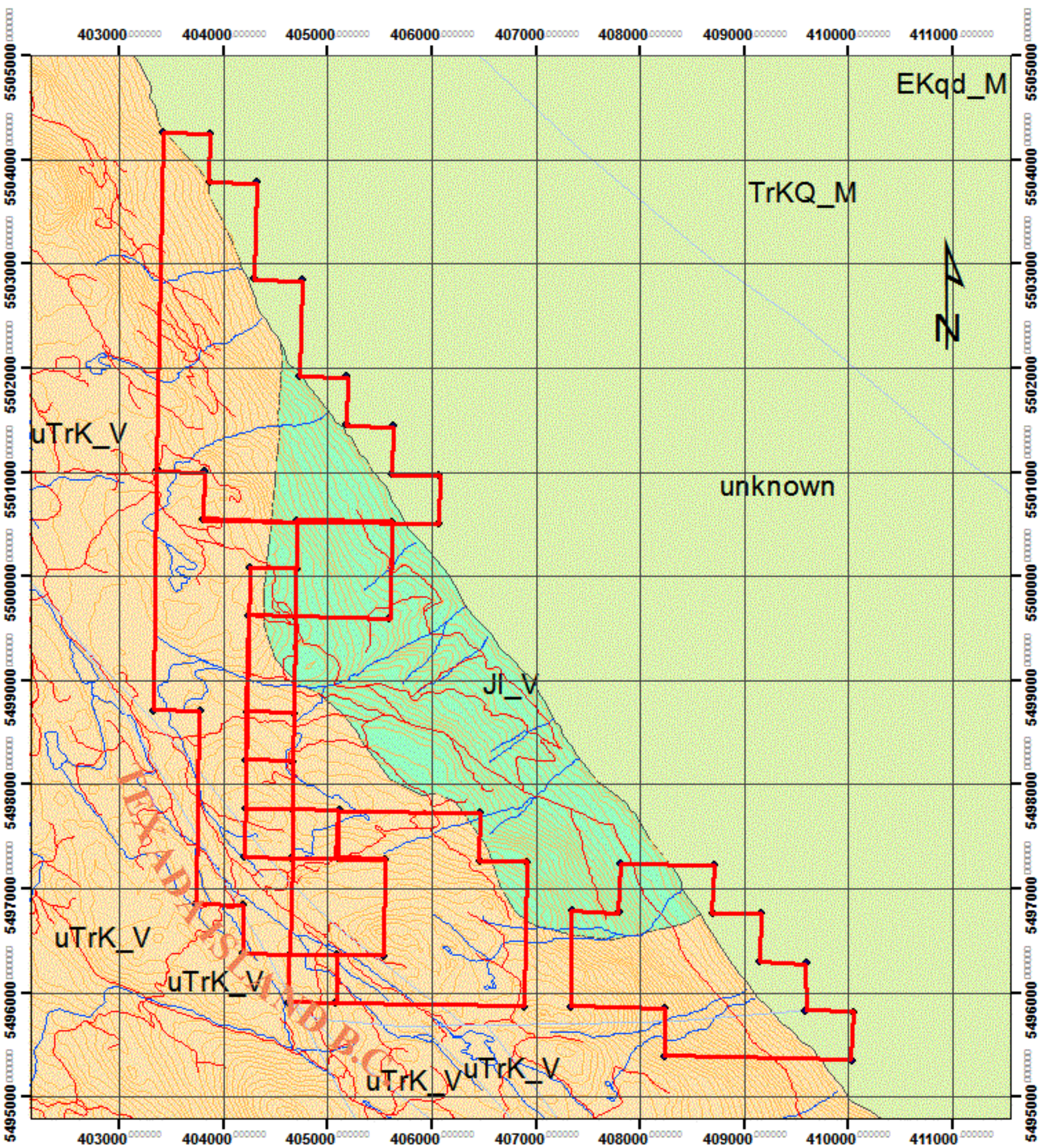
1:50,000

TENURE NUMBERS LOCATIONS AND ACCESS

LEGEND

- 407667groupcorners
- 502019corners
- tcstl
- troad
- trivr
- tlake
- tctrl
- NM10_ocean_utm

# NORTHSTAR MINING LTD.
# TEXADA ISLAND
# DUDE and TAK GROUP

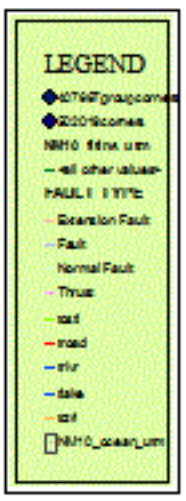


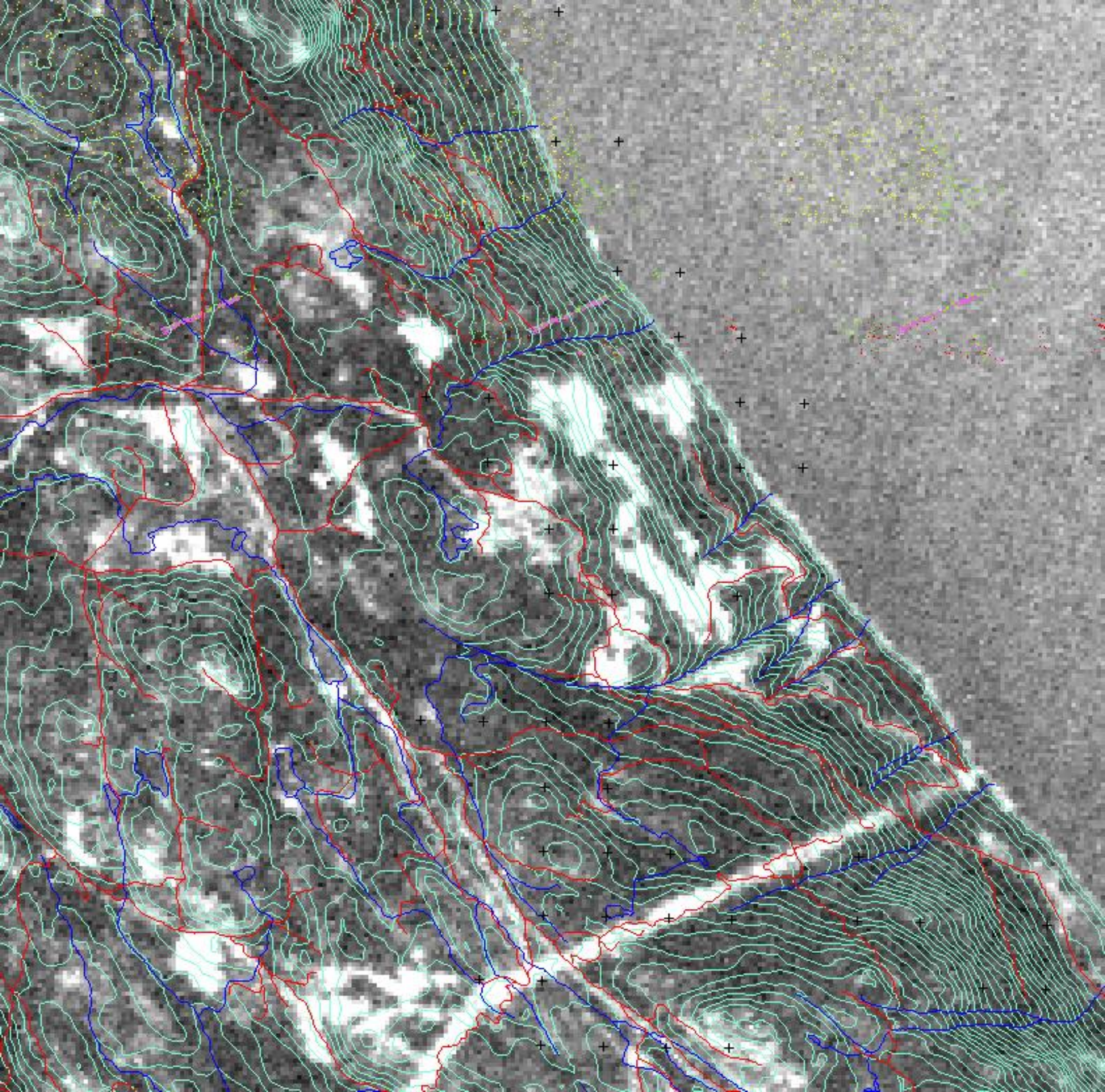

1,000 500 0 1,000 Meters

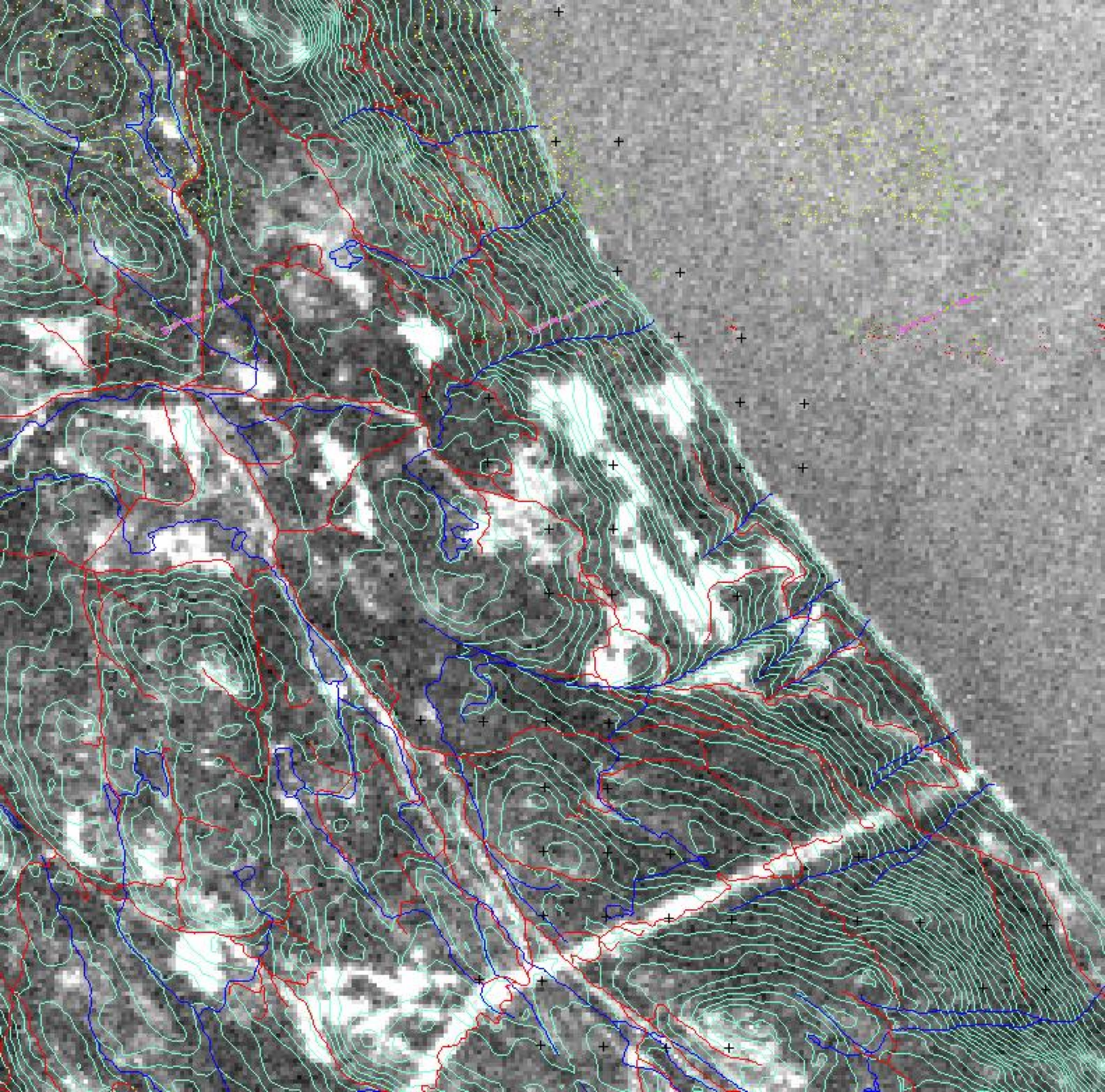
1:50,000

GEOLOGY and TOPOGRAPHY

# NORTHSTAR MINING LTD.
# TEXADA ISLAND
# DUDE and TAK GROUP







**SW BC**

DUDE and TAK Group Project

2007 Work Budget

Project Area: ***Northstar Mining Texada***

| Cost Categories | | Type | Descriptio | Units | Rate | number | Qty | extended |
|---|---|---|---|---|---|---|---|---|
| Personnel | | | | | | | | |
| | Project Manager | | | $/Day(8hr.) | $550.00 | 2 | 1 | $1,100.00 |
| | QP | | | $/Day(8hr.) | $650.00 | 1 | 0 | $0.00 |
| | Field Assistants | | | $/Day(8hr.) | $350.00 | 2 | 1 | $700.00 |
| | Other | | | $/Day(8hr.) | | | | |
| Travel | | | | | | | | |
| | Lodging | R and Board | | $/Day/Perso | $100.00 | 1 | 0 | $0.00 |
| | Lodging Short Stay | R and Board | QP | $/Day/Perso | $100.00 | 1 | 0 | $0.00 |
| | Meals | | travel | $/Day/Perso | $30.00 | 1 | 2 | $60.00 |
| | Vehicle | | | $/Kilometre | $0.42 | 1 | 0 | $0.00 |
| | Fuel | Unimog | | | | | 0 | $0.00 |
| | Fares | Ferry | | | $88.00 | 2 | 0 | $0.00 |
| | | Ferry Passenger | | | $8.80 | 2 | 0 | $0.00 |
| | | Airfare | | | $98.00 | 1 | 4 | $392.00 |
| Misc Costs | | | | | | | | |
| | Materials | | | | | | | |
| | Supplies | | | | | | | |
| | Misc. | | | | | | | |
| Communications | | | | | | | | |
| | Satellite | | | $/Week | $30.00 | 1 | 0 | $0.00 |
| | Sat Phone | | | $/month | $275.00 | 1 | 0 | $0.00 |
| | Radio | | | $/Week | | | | |
| Field Equipment Rental | | | | | | | | |
| | Vehicle | | | $/Day | $100.00 | 1 | 2 | $200.00 |
| | Generator | | | $/Week | $250.00 | 1 | 0 | $0.00 |
| | Dryer heater | | | $/Month | $98.00 | 1 | 0 | $0.00 |
| | ATV | | | $/Day | $100.00 | 2 | 0 | $0.00 |
| | Aircraft | J Ranger | | $/Hour | | | | |
| | | Mob & Demo | fuel inc | $/Minute | $18.89 | 150 | 0 | $0.00 |
| | | Daily | fuel inc | $/Minute | $378.00 | 4 | 0 | $0.00 |
| | | L Ranger | | | | | | |
| Tech Equipment Rental | | | | | | | | |
| | Computer | | | $/Day | $25.00 | 1 | 0 | $0.00 |
| | CDGPS | | | $/Day | $30.00 | 1 | 0 | $0.00 |
| | Gamma Ray Spectrometer | | | $/Week | $500.00 | 1 | 0 | $0.00 |
| | SWIR Spectrometer | | | $/Week | $850.00 | 2 | 0 | $0.00 |
| Sampling equipment Rental | | | | | | | | |
| | Soil Probe | | portable | $/Week | $1,550.00 | 1 | 0 | $0.00 |
| | Tips | | wet cutting | $each | $144.19 | 1 | 0 | $0.00 |
| | Core Tubes | 36" | clr vinyl | $ per set of 1 | $26.75 | 2 | 0 | $0.00 |
| SampleAnalysis | | | | | | | | |
| | Preprocessing | | | | | | | $650.00 |
| | Processing time | | | | | 2 | 1 | $2,400.00 |
| | Spectral Analyses | | | | | | | $5,500.00 |
| | Sample prep | | | | $5.00 | 1 | 0 | $0.00 |
| | Drying | | onsite | $/week | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample Bags | | | $each | $0.30 | 15 | 0 | $0.00 |
| | Chemical analysis | | Uassay | $perSample | $20.50 | 15 | 0 | $0.00 |
| Fuel | | | | | | | | |
| | ATV | | | $/Day | $10.00 | 2 | 0 | $0.00 |
| | Probe | | | $/Day | $20.00 | 1 | 0 | $0.00 |
| | Heater | | dryer | $Day | $10.00 | 1 | 0 | $0.00 |
| | Shipping | | | | | | | $0.00 |
| Data Acquisition | | | | | | | | |
| | TRIM | | | | $220.00 | 6 | 1 | $1,320.00 |
| | Satellite/air data | | | | | | | $400.00 |
| Mapping and Reporting | | | | | | | | |
| | Mapping | | | | | | | |
| | QP report | | | cost | | | 0 | $0.00 |
| | Priniting and copying | | | | | | | $35.00 |
| Licences and Permits | | | | | | | | |
| | Exploration Permit | | | | | | | $0.00 |
| | Bond | | | | | | | $0.00 |
| | WCB | inc | | | | | | $0.00 |
| | Insurances | Equipment | | | | | | $120.00 |
| | | Liability | | | | | | $85.00 |
| | ATV | in rental | | | | | | |
| Office and Admin | | | | | | | | $12,962.00 |
| | | | | | | | Total | $12,962.00 |

## Statement of Qualification

**I, David J. McLelland,** do hereby certify that:

1. I am a Principal in:
Auracle Geospatial Science Inc,
*325* Dorset Road Qualicum Beach,
British Columbia, Canada V9K 1H5

2. I am a post graduate student of Earth and Environmental Science and have completed the postgraduate certificate in applied and theoretical GI Science at Simon Fraser University, and completed the academic component of the MSc. program requirement.

*3. I* have completed the B.C.I.T. B.C.Y.C.M. Mineral Exploration program, and Completed the B.C.I.T.1 B.C.Y.C.M. Advanced field School.

4. I am the Project Manager and I am responsible for the collection and management of data and execution of analysis.

*5.* This report was prepared on behalf of Auracle Geospatial Science who has been engaged by NORTHSTAR MINING LTD. to complete a work program on these properties.

6. I have no material or financial interest in the subject properties or the companies that own them.

7. This report has been prepared in accordance with generally accepted Scientific Principles and is based upon the best information available at the time of preparation. I am not aware of any material fact or material change with respect to the subject Matter of the report that is not reflected in the report.

Date: Dec 1 2007
Qualicum Beach, British Columbia

_____
David McLelland