TMAC Resources Inc.

MADRID ADVANCED EXPLORATION PROGRAM
Environmental Baseline Conditions

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MADRID ADVANCED EXPLORATION PROGRAM

ENVIRONMENTAL BASELINE CONDITIONS

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ENVIRONMENTAL BASELINE CONDITIONS

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Glossary and Abbreviations

Glossary and Abbreviations

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

Active layer	The relatively thin layer of soil/overburden above continuous permafrost that thaws during the summer months.
ANFO	Ammonium Nitrate and Fuel Oil
asl	Above sea level
BHP	BHP Minerals Canada Ltd. (BHP Billiton)
BMP	Best Management Practice
CCD	Counter current decantation
DFO	Department of Fisheries and Oceans (Fisheries and Oceans Canada)
ESC	Erosion and Sediment Control
FOB	Fine ore bin
Freshet	In channels, the relatively high annual peak water discharge period resulting from spring/summer meltwater runoff of the winter snowpack.
HBML	Hope Bay Mining Ltd.
Hydrograph	A graphical plot of water discharge versus time
ICU	Intensive cyanidation unit
m	Metres
NAD83	North American Datum 1983, based on the spheroid (GRS80)
NIRB	Nunavut Impact Review Board
NPC	Nunavut Planning Commission
NWB	Nunavut Water Board
PMF	Probable Maximum Flood
RSA	Regional Study Area
Runoff	The part of precipitation that appears in surface streams and is a measure of hydrologic response of a watershed, commonly presented as a depth of water over an entire watershed in mm.
TIA	Tailings Impoundment Area
TMAC	TMAC Resources Inc.
TSS	Total Suspended Solids
Unit Yield	A ratio of water discharges normalized to the drainage area for a basin.

UTM	Universal Transverse Mercator
Watershed	The entire geographical area drained by a river and its tributaries; an area characterized by all runoff being conveyed to the same outlet.
WKRLUP	West Kitikmeot Regional Land Use Plan
ZOI	Zone of Influence

1. Environmental and Social Setting

1. Environmental and Social Setting

1.1 BASELINE STUDIES

Baseline environmental studies have been conducted in the Hope Bay Belt (includes the Madrid Advanced Exploration Project, "the Project" region) since 1993, and are still ongoing today (Figures 1.1-1 and 1.1-2).

The following components have been included in historical baseline studies in the Hope Bay Belt:

- Climate and meteorology;
- Air quality;
- Noise and vibrations;
- Hydrology;
- Hydrogeology;
- Bathymetry;
- Fish and fish habitat (marine and freshwater);
- Aquatics (includes marine and freshwater surface water quality, sediment quality, and aquatic biology);
- Ecosystem mapping, vegetation, and overburden;
- Wildlife, including Caribou, Muskox, wolves, Arctic Fox, Wolverine, Grizzly Bear, birds, waterfowl, raptors, seabirds, dens, small mammals, and marine mammals;
- Heritage Resources (archaeology);
- Public consultation;
- Traditional Knowledge;
- Socio-economics; and
- Land and resource use.

Table 1.1-1 provides a list of baseline reports that contain information most relevant to the Madrid Advanced Exploration Project Type B Water Licence Application. Environmental baseline studies have been conducted within the Hope Bay Belt for several years as part of ongoing exploration activities, planning and design, environmental assessment and authorization compliance. The list included in Table 1.1-1 should not be considered an exhaustive list; rather, it provides the sources containing the majority of collected data. Data continues to be collected on an ongoing basis through various baseline and compliance studies occurring in the Hope Bay Belt region.

The following sections provide high-level summaries of the existing environmental conditions within the Hope Bay Belt, with a particular focus on the Madrid Area where appropriate.

Figure 1.1-1

Hope Bay Belt
Regional Location

Figure 1.1-2

Madrid Advanced Exploration Program

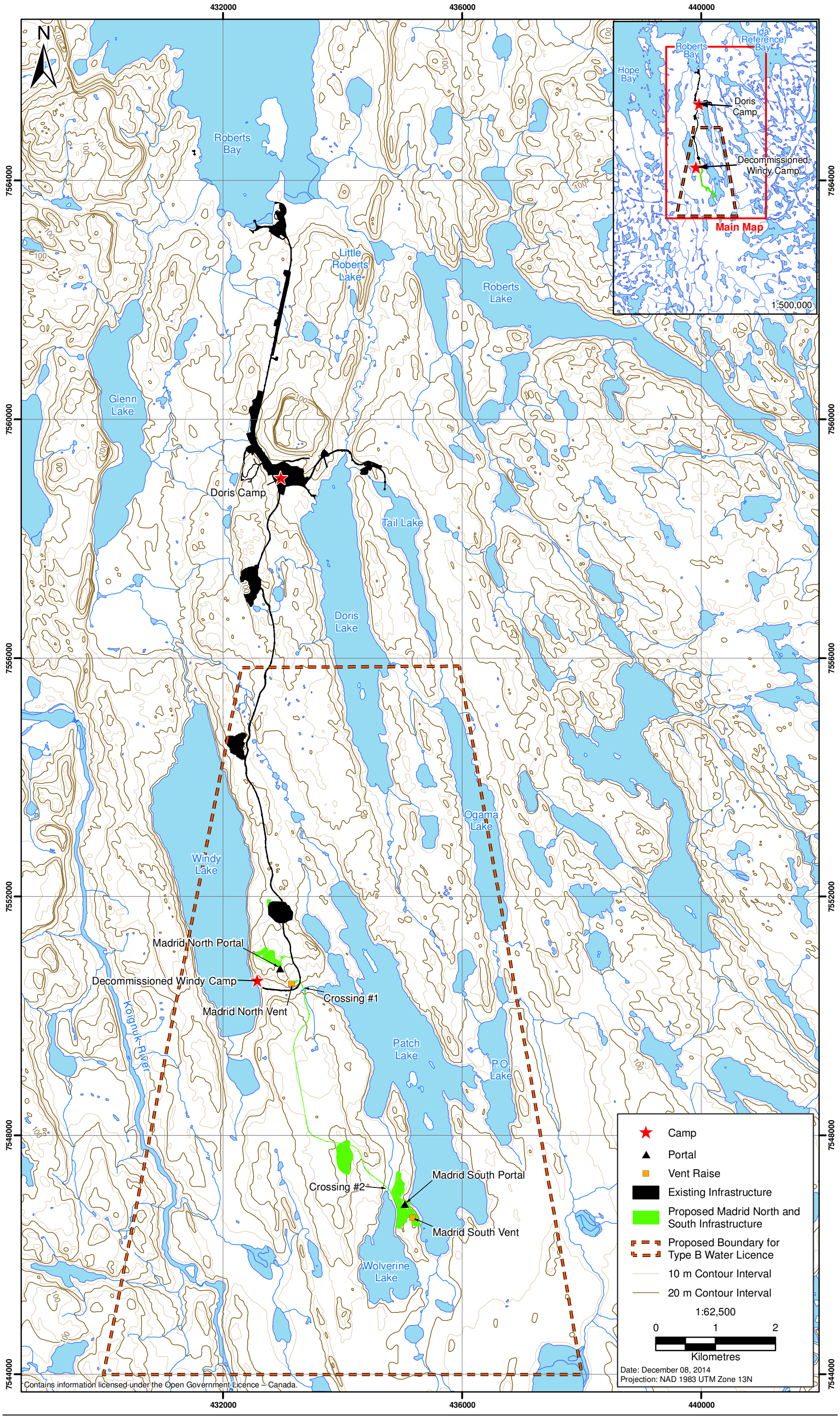


Table 1.1-1. Baseline Studies Relevant to the Madrid Advanced Exploration Project Type B Water Licence Application (as of June 30, 2014)

Topic	Sources
Climate and Meteorology	1993-2002 Data Compilation Report for Meteorology and Hydrology (Rescan 2002) 2009 Meteorology Baseline Report, Hope Bay Belt Project (Rescan 2009a) Hope Bay Belt Project 2011 Meteorology Baseline Report (Rescan 2012e)
Air Quality	Report on Air Quality and Noise Assessment of the Miramar Doris North Project (Golder 2003c) Supporting Document B3 - Doris North Project - Air Quality Assessment Methods (Golder 2005f) Air Quality Monitoring Summary: Doris North 2009 (Golder 2009a) Hope Bay Belt Project 2010 Air Quality Baseline Report (Rescan 2011e)
Noise and Vibrations	Noise Baseline Report (Rescan 2007) Doris North Gold Mine Project Noise Abatement Plan (Rescan 2010c) Hope Bay Belt Project 2010 Noise Baseline Report (Rescan 2011h)
Hydrology	BHP Minerals Canada Ltd - Doris Lake 1995 Environmental Study (Klohn-Crippen Consultants Ltd. 1995) 1993-2002 Data Compilation Report for Meteorology and Hydrology (Rescan 2002) 2006-2008 data: *2008 Hydrology Baseline Update* (Golder 2009c) 2009-2013 data: 2009 Hydrology Baseline Report (Rescan 2009b), 2010 Hydrology Baseline Report (Rescan 2011i), 2011 Hydrology Baseline Report (Rescan 2012d)
Soils, Terrain and Ecology (including Wetlands)	BHP World Minerals Hope Bay Belt Project: Environmental baseline studies and appendices 1996 (Rescan 1997c) BHP World Minerals Hope Bay Belt Project: 1996 Environmental Data Report (Rescan 1997a) BHP World Minerals Hope Bay Belt Project: 1997 Environmental Data Report (Rescan 1997b) Terrestrial Ecosystems and Bioterrain of the Hope Bay Belt, Northwest Territories, Canada (Westroad Resource Consultants 1998) Vegetation classification of the West Kitikmeot/Slave Study Region (RWED 2000) 2000 Supplemental Environmental Baseline Data Report Hope Bay Belt Project (Rescan 2001) Summary of Vegetation Baseline Studies Report, 2003 (Burt 2003) Hope Bay Belt Project: 2010 Ecosystems and Vegetation Baseline Report (Rescan 2011f) Hope Bay Belt Project: 2010 Terrain and Soils Baseline Report (Rescan 2011j) Doris North Project “No Net Loss” Plan Final Report (Golder 2007a) Preliminary Regional Ecological Land Classification (Golder 2009d)
Fish and Fish Habitat (Marine and Freshwater)	BHP Minerals Canada Ltd - Doris Lake 1995 Environmental Study (Klohn-Crippen Consultants Ltd. 1995) 2000 Supplemental Environmental Baseline Data Report Hope Bay Belt Project (Rescan 2001) Aquatic Baseline Studies Doris Hinge Project Data Compilation Report 1995-2000 (RL&L Environmental Services Ltd./Golder Associates Ltd. 2002a) Doris North Project Aquatic Studies 2002 (RL&L Environmental Services Ltd./Golder Associates Ltd. 2002b) Doris North Aquatic Studies 2003 (Golder 2003a) Doris North Aquatic Studies 2004 (Golder 2005d) Doris North Aquatic Studies 2005 (Golder 2006b) Doris North Aquatic Studies 2006 (Golder 2007b) Doris North Project Aquatic Studies 2007 (Golder 2008b) Doris North Aquatic Studies 2008 (Golder 2009b) Boston and Madrid Project Areas 2006-2007 Aquatic Studies (Golder 2008a) 2008 Hope Bay Project: Baseline Review and Gap Analysis Report (Rescan 2008)

(continued)

Table 1.1-1. Baseline Studies Relevant to the Madrid Advanced Exploration Project Type B Water Licence Application (as of June 30, 2014; continued)

Topic	Sources
Fish and Fish Habitat (Marine and Freshwater) *(cont'd)*	2009 Freshwater Fish and Fish Habitat Baseline Report, Hope Bay Belt Project (Rescan 2010b) Doris North Gold Mine Project: Aquatic Effects Monitoring Plan (Rescan 2010e) 2010 Freshwater Fish and Fish Habitat Baseline Report, Hope Bay Belt Project (Rescan 2011a) Bathymetric Surveys Hope Bay Project (Golder 2006a)
Aquatics (including Surface Water Quality)	BHP Minerals Canada Ltd - Doris Lake 1995 Environmental Study (Klohn-Crippen Consultants Ltd. 1995) Aquatic Baseline Studies Doris Hinge Project Data Compilation Report 1995-2000 (RL&L Environmental Services Ltd./Golder Associates Ltd. 2002a) Doris North Project Aquatic Studies 2002 (RL&L Environmental Services Ltd./Golder Associates Ltd. 2002b) Doris North Aquatic Studies 2003 (Golder 2003a) Doris North Aquatic Studies 2004 (Golder 2005d) Doris North Aquatic Studies 2005 (Golder 2006b) Doris North Aquatic Studies 2006 (Golder 2007b) Doris North Project Aquatic Studies 2007 (Golder 2008b) Doris North Aquatic Studies 2008 (Golder 2009b) Boston and Madrid Project Areas 2006-2007 Aquatic Studies (Golder 2008a) 2008 Hope Bay Project: Baseline Review and Gap Analysis Report (Rescan 2008) 2009 Freshwater Baseline Report, Hope Bay Belt Project (Rescan 2010a) Hope Bay Belt Project: 2010 Freshwater Baseline Report (Rescan 2011g)
Wildlife	BHP Minerals Canada Ltd - Doris Lake 1995 Environmental Study (Klohn-Crippen Consultants Ltd. 1995) BHP World Minerals Hope Bay Belt Project: Environmental baseline studies and appendices 1996 (Rescan 1997c) BHP World Minerals Hope Bay Belt Project: Environmental baseline studies and appendices 1997 (Rescan 1998) Hope Bay Belt Project - 1998 Environmental Data Report (Rescan 1999); Abundance and Distribution of Caribou in Hope Bay Study Area: 1996-2000 (Hubert and Associates Ltd. 2002a) Data Report Wildlife Studies May-August 2001 - Hope Bay Joint Venture Gold Project (Hubert and Associates Ltd. 2002c) Data Report Wildlife Studies Jun-July 2002 - Hope Bay Joint Venture Gold Project (Hubert and Associates Ltd. 2002b) Terrestrial Wildlife of Hope Bay, Nunavut: an integration and overview of data collected from 1994-2002 (Hubert and Associates Ltd. 2002d) Data Report - Wildlife Studies Jun-July 2003 - Hope Bay Nunavut (Hubert and Associates Ltd. 2003) Data Report - Wildlife Studies Jun-August 2004 - Hope Bay Nunavut (Hubert and Associates Ltd. 2004) Data Report Wildlife Studies May-August 2000 – Hope Bay Joint Venture Gold Project (Hubert and Associates Ltd. 2001) Report on Wildlife Mitigation and Monitoring (Golder 2006c) Program for the Doris North Gold Mine Project Miramar Doris North Project Wildlife Studies: Annual Report 2005 (Golder 2005e); Doris North Gold Mine Project: Wildlife Baseline Data Synthesis 2005 (Golder 2005a) Doris North Gold Mine Project: Wildlife Habitat Suitability Models 2005 (Golder 2005c) Doris North Gold Mine Project: Wildlife Cumulative Effects Assessment 2005 (Golder 2005b)

(continued)

Table 1.1-1. Baseline Studies Relevant to the Madrid Advanced Exploration Project Type B Water Licence Application (as of June 30, 2014; completed)

Topic	Sources
Heritage Resources	BHP Minerals Canada Ltd. – Doris Lake 1995 Environmental Study (Klohn-Crippen Consultants Ltd. 1995)
	BHP World Minerals – Hope Bay Belt Project - Environmental Baseline Studies Report & Appendices (Rescan 1997c)
	Archaeological Investigations - Hope Bay Joint Venture 2000 (Points West Heritage Consulting Ltd. and Rescan 2000)
	Archaeological Investigations - Hope Bay Joint Venture 1995-2000 (Points West Heritage Consulting Ltd. and Rescan 2002)
	Doris North (Hope Bay) Project, Nunavut, Archaeological Investigations in 2003 (Points West Heritage Consulting Ltd. and Rescan 2003a)
	Doris North (Hope Bay) Heritage Resource Protection Plan 2003 (Points West Heritage Consulting Ltd. and Rescan 2003b)
	Hope Bay Project Summary Report Archaeological Field Work (Points West Heritage Consulting Ltd. 2004)
Socio-economics and Land and Resource Use	BHP World Minerals – Hope Bay Belt Project – Environmental Baseline Studies Report & Appendices 1996 (Rescan 1997c)
	Supporting Document E2 – Socio-Economic Baseline Studies of the Kitikmeot Communities, Nunavut and Yellowknife Northwest Territories (Hornal and Associates Ltd. 2003b)
	A Socio-Economic Impact Assessment of the Proposed Doris North Project in the Kitikmeot Region Nunavut (Hornal and Associates Ltd. 2003a)
	Human and Ecological Risk Assessment for the Environmental Impact Statement for the Proposed Doris North Project (Golder 2005g)

2. Physical Environment

2. Physical Environment

2.1 REGIONAL SETTING

The Hope Bay Belt (Figure 1.1-1) is located within the Queen Maud Gulf Lowlands, which covers the east-central portion of the West Kitikmeot region. The area lies within the Slave Geological Province, which is underlain by granite and related gneisses, as well as by sedimentary and volcanic rocks (more than 2.5 billion years old (WKRLUP 2005). The topography of the area ranges from undulating plains near the coast to massive Archean-age rocks rising to 300 m above sea level in the south (WKRLUP 2005). The coastal areas are mantled by postglacial silts and clays, exposed bedrock, cryosol soils, and marine deposits. Permafrost is continuous and deep (up to 500 m) with low ice content (WKRLUP 2005).

The northern portion of the Hope Bay Belt consists of several watersheds that drain into Roberts Bay near mine infrastructure and the Koignuk River that drains into Hope Bay west of mining activities. Watersheds in the southern portion of the belt flow into the upper Koignuk River. The entire Hope Bay Belt area lies within the Bathurst Inlet-Burnside Watershed.

Climate in the region can be described as a subarctic desert with limited rainfall. Prevailing winds are from the northwest. Most precipitation falls as rain during the summer, and a mean of 10 cm of snow per month falls during the winter (WKRLUP 2005). The region is characterized by long dark winters and short bright summers. The ground is covered in snow from October to June most years. Lakes are ice-covered from approximately October to June most years, with ice thickness reaching depths of 2.0 m.

A number of protected areas exist within the West Kitikmeot region (Figure 2.1-1); however, no sites overlap with the Madrid South or Madrid North Projects or the overall Hope Bay Belt area. The largest is the Queen Maud Gulf Migratory Bird Sanctuary (approximately 30 km east of the Hope Bay Belt area), which is a wetland of international importance and a legislated conservation area that supports nesting grounds for nearly the entire global population of Ross' Geese (NPC 2004). Designated conservation zones are also found near Hood River in the Wilberforce Falls area, and the Huikitak River watershed east of the Bathurst Inlet area. These zones are of cultural importance for local Inuit and serve as a destination for eco-tourists (NPC 2004).

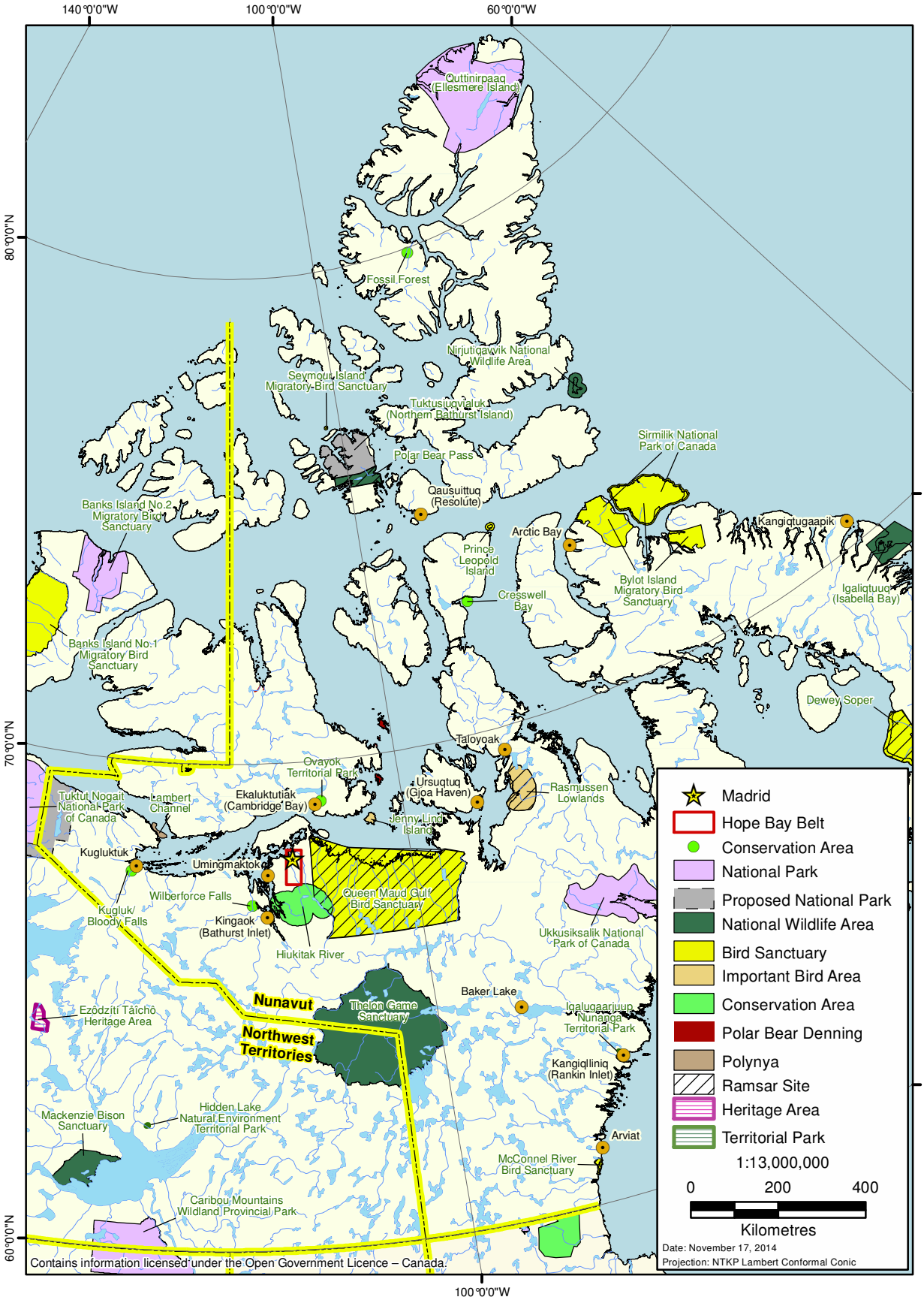
2.2 CLIMATE CONDITIONS AND FUTURE CLIMATE TRENDS

Meteorological baseline studies have been conducted in the northern (Doris station) and southern (Boston station) part of the Hope Bay Belt area since 1993 and have involved a variety of automated and manual methods (Rescan 2002). The Doris meteorological station (30 m asl) contains the most relevant and complete set of data for use (2004 to present[1]) in characterizing the current climate of the Madrid Area (Rescan 2009a, 2010d, 2011c, 2012a; ERM Rescan 2014a).

[1] The Doris meteorological station has been collecting data from 2004 to present. However, the station was upgraded from a 3 m tower to a 10 m tower on August 13, 2009, which may affect the correlation between data pre- and post-2009.

Figure 2.1-1

Parks and Conservation Areas of the Madrid Advanced Exploration Program Region



The annual mean temperature for the Doris station between 2004 and 2013 was -11.2°C, with average minimum and maximum daily temperatures of -12.4°C and -9.9°C respectively and an average relative humidity of 78.5% (Rescan 2009a, 2010d, 2011c, 2012a; ERM Rescan 2014a). Monthly mean air temperatures generally remain above freezing only from June through August or September, with monthly mean temperatures generally ranging between 3°C and 15°C, with July the warmest month of the year. The remainder of the year sees mean temperatures in the minuses, with temperatures generally ranging between -20 and -30°C from December through March, the coldest months of the year (Rescan 2009a, 2010d, 2011c, 2012a).

Normal annual precipitation at Cambridge Bay, the closest regional Environment Canada meteorological station to the Project area, is 139 mm (EC-MSC 2004). Approximately 50% of the annual precipitation occurs as snow, while the remainder occurs as rainfall. This compares relatively well to available rainfall and snow-water-equivalent (SWE) data measured in the Project area. The average total annual rainfall at the Doris station between 2004 and 2013 was 82 mm. Mean SWE values for various terrain types across the Project area was approximately 70 mm based on sampling from 2004 to 2008. This suggests that total mean annual precipitation in the Project area may range from 100 to 150 mm. Based on data from micro-meteorological stations at Doris Lake during the 2009 to 2012 open-water seasons, annual evaporation was calculated to be approximately 150 mm (ranging between 120 mm and 175 mm annually).

Solar radiation in the Arctic is high during the summer and almost zero during the winter. The annual average number of bright sunshine hours (from 2010 to 2012), where average global solar radiation is greater than 120 W/m^2, was 2,324 (EC-MSC 2004). For comparison, the average number of hours of bright sunshine in Cambridge Bay for 1971 to 2000 was 1,720.

In general, wind in the Hope Bay Belt region typically blows from the northwest quadrant year round. The average annual wind speed at the Doris station is 19.1 km/h, with average annual maximum wind gust speeds of 70.8km/h, with a maximum recorded wind speed of 104 km/h.

For future climate trends, literature suggests that mean annual temperature may increase in Canada's north by approximately 2.0°C for the climate normal period for the years 2010 to 2030 and by approximately 6.0% for the climate normal period for the years 2070 to 2100 (Lemmen et al. 2008). Over the same time periods, projections suggest that total annual precipitation could increase from 5 to 8% and 15 to 30%, respectively. The projected increase in mean annual air temperatures would lead to effects on the regional cryosphere. This would likely include alterations to sea, river, and lake ice regimes and winter snow pack, especially during shoulder seasons of spring and fall, as well as permafrost conditions.

2.3 TOPOGRAPHY AND SURFICIAL MATERIAL

The topography of the northern Hope Bay Belt area is typical of coastal lowlands in the Arctic, characterized by low and moderate relief with some high relief features (e.g., Doris Mesa, which is a diabase dike). Numerous lakes and ponds occur in low relief areas and glacial landforms (ridges and eskers) and rock outcroppings (diabase sills and dikes) occur on moderate relief areas. Elevations in the northern portion of the belt range from sea level at Roberts Bay to 158 m asl at the summit of Doris Mesa (Rescan 2011j). Watersheds are generally long and narrow, predominantly orientated along the north-south axis (Plate 2.3-1). The Hope Bay Belt region has been subjected to multiple glaciations during the Quaternary period. During each glaciation, the area was overridden by the northwestern section of the Laurentide Ice Sheet. Evidence of only the most recent glaciation (Late Wisconsinan) is preserved in the present day landscape. Bedrock striations, orientation of eskers, grooves, and drumlins indicate that the predominant glacial ice movement was north-northwest (EBA 1996).

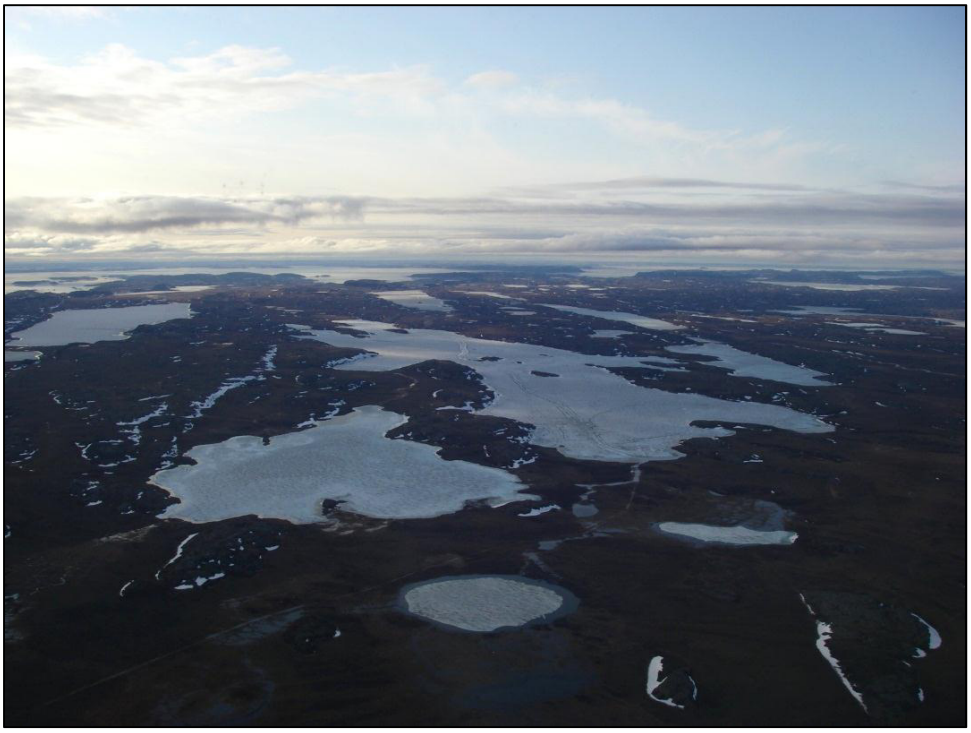


Plate 2.3-1. Oblique aerial view of the Madrid Area. View is to the north. The majority of lakes are elongated and oriented along a north-south axis. Wolverine and Patch lakes are in the foreground of the photograph. Windy Lake is visible on the far left of the photograph. June 7, 2010.

The belt area became ice-free about 8,800 years ago as the ice sheet melted back toward the southeast, leaving a blanket of basal till (morainal deposits (Dyke and Prest 1986). During the period of glacial recession, sea level was approximately 200 m higher and the project area was entirely submerged under ocean water. Marine sediments were deposited over most of the landscape.

Isostatic rebound after de-glaciation resulted in emergent landforms, and during this process ocean waves and currents washed the landscape. Easily eroded materials, including marine sediments, till, and glacio-fluvial sands and gravels, were redistributed by waves, currents, and sea ice. Areas exposed to high energy washing, generally high relief areas, have had marine deposits either completely washed away exposing the underlying moraine and or bedrock, or have had larger, coarser marine sediments (predominantly sands and gravels) deposited as isolated beaches (Rescan 1997c). Washing has also resulted in the accumulation of finer textured marine (glaciomarine) deposits in valley bottoms. At times, these glaciomarine deposits are complexed or are mixed with the finer fractions of morainal deposits that have also been washed down-slope. Since emergence, the natural effects of slope processes, frost action and permafrost have transformed the landscape to its present day shape (EBA 1996).

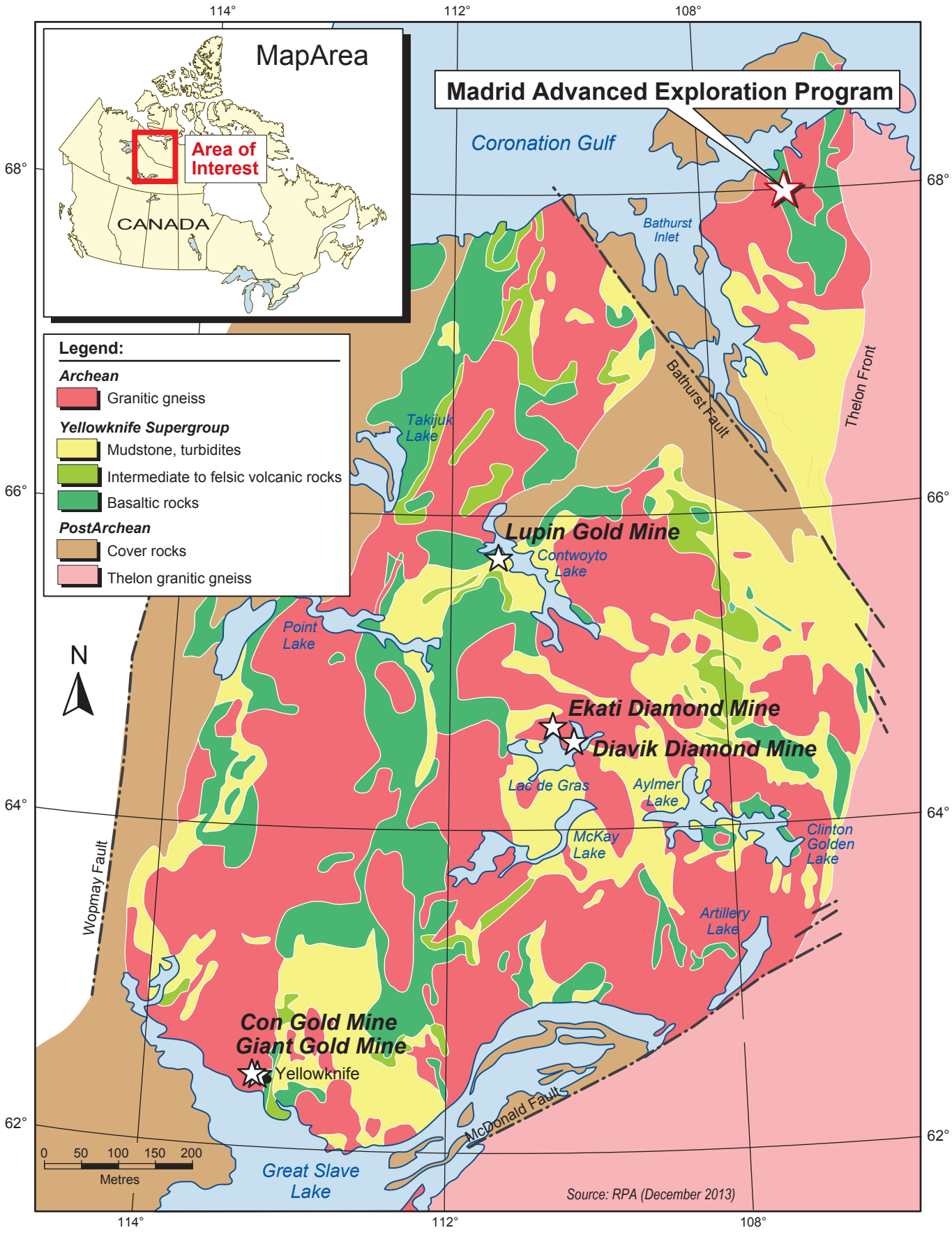
2.4 GEOLOGY AND MINERALOGY

2.4.1 Regional Geology

The Madrid Advanced Exploration Program is located within the Hope Bay Volcanic Belt which is part of a massive structural-geological complex called the Slave Structural Province. The Hope Bay Volcanic Belt lies in the northeast portion of the province (Figure 2.4-1; TMAC 2013).

Figure 2.4-1

Regional Geology of the Hope Bay Belt



U-Pb geochronology brackets volcanism in the Slave Structural Province to between 2715 and 2610 Ma. In general, the pan-Slave deformation event took place between 2.7 Ga and 2.6 Ga and resulted in regional compression, plutonism, and late extension (TMAC 2013).

The Bathurst Block, which covers approximately 16,000 km^2 in the northeast portion of the Slave Structural Province, is isolated from the rest of the province by the Proterozoic cover of the Kilohigok Basin. The Hope Bay Volcanic Belt, within the northern portion of the Bathurst Block, extends over 80 km in a north-south direction and is between 7 km and 20 km wide. The belt is dominated by mafic volcanic rocks with felsic volcanic and volcanoclastic rocks, with subordinate ultramafic bodies and meta-sedimentary rocks. Existing U-Pb geochronology of the belt indicates that felsic volcanism spanned a period of at least 53 Ma. The metamorphic grade in the interior of the belt is lower greenschist with amphibolite grade near the belt margins (TMAC 2013).

2.4.2 Local Geology

The Madrid deposit area is host to the Naartok, Rand, and Suluk gold resources while the Madrid trend hosts the Rand Spur, Marianas, Patch 7, and Patch 14 zones. The rocks within this corridor are predominantly a north-south striking package of mafic volcanic rocks, comprising a sequence of Fe-Ti tholeiitics, Mg tholeiitics, komatiitic basaltics, synvolcanic to late gabbroic and ultramafic rocks. Gold mineralization in this corridor is most commonly associated with the high Fe-Ti tholeiites and is structurally controlled by a large-scale zone of deformation referred to as the Madrid Deformation Zone. The Madrid Deformation Zone trends north-south along Patch Lake and at its northern end sharply changes orientation to an east-west trend across to Windy Lake (TMAC 2013). The geology of the Madrid Area is illustrated in Figure 2.4-2a with accompanying figure legend in Figure 2.4-2b.

Ductile strain is largely represented in the Madrid Area by the main corridor of the Madrid Deformation Zone and its splays, as well as within local zones of moderate to high strain (outside of the Madrid Deformation Zone). Intensity of the ductile strain increases towards the Madrid Deformation Zone where mafic volcanic rocks begin to exhibit pervasive intense foliation and locally exhibit mylonitic textures. Splays off of the Madrid Deformation Zone preferentially develop along volcanic-sediment horizon, possibly related to the large competency contrast between massive flows and argillite-volcanoclastic layers. It is clear that the Madrid Deformation Zone is not a single planar structure, but a complicated anastomosing feature with several splays and local pinch-and-swell textures (TMAC 2013).

Apparent discontinuities in alteration, mineralization, and lithological units generally define a set of northwest trending steep structures in the Naartok area and a structure partially the contact of the Naartok east mineralized horizon (TMAC 2013).

The general stratigraphy of the northern Madrid Area (Naartok West to Suluk) is composed of three major volcanic packages: the Wolverine Group (C-type rocks), the Patch Group (A-type rocks), and C-type tholeiitic andesite. Stratigraphy at Naartok West includes a moderately to steeply westerly dipping package of intercalated C-type and A-type basalts and interflow sedimentary rocks. At Naartok East, the stratigraphy comprises a moderately westerly dipping package of intercalated C-type and A-type basalts and interflow sedimentary rocks. The Suluk stratigraphy is similar to the other areas of Madrid (TMAC 2013).

The Wolverine volcanic suite is separated into north and south components by the Madrid Deformation Zone. The rocks of the Wolverine Group south of the Madrid Deformation Zone comprise a series of distinctive C-type pillowed flows which are in the gradational contact with intercalated aphanitic to massive to amygdaloidal basaltic flows that also represent normal tholeiitic rocks. They demonstrate weak to moderate strain and have a predominantly chlorite-calcite alteration assemblage.