Prepared for:

TMAC RESOURCES

MADRID ADVANCED EXPLORATION PROGRAM

Type B Water Licence Application Supplemental Information Report

December 2014

ERM

Delivering sustainable solutions in a more competitive world

TMAC Resources Inc.

MADRID ADVANCED EXPLORATION PROGRAM

Type B Water Licence Application Supplemental Information Report

December 2014

Project #0194097-0007

Citation:
ERM Rescan. 2014. *Madrid Advanced Exploration Program: Type B Water Licence Application Supplemental Information Report*. Prepared for TMAC Resources Inc. by ERM Consultants Canada Ltd.: Vancouver, British Columbia.

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MADRID ADVANCED EXPLORATION PROGRAM

Type B Water Licence Application Supplemental Information Report

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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
BHP	BHP Minerals Canada Ltd. (BHP Billiton)
CCME	Canadian Council of Ministers of the Environment
Contact Water	The part of precipitation that comes in contact with the Madrid Advanced Exploration Program activities and infrastructure. Contact water is collected and directed to the Pollution Control Ponds for re-use, or transport to Doris North Project TIA for disposal.
Culverts	Within the Hope Bay Belt, these are constructed drains or tunnels under roads or infrastructure to allow the passage of water to maintain fish/fish habitat and/or prevent ponding of water. Culverts within the Belt are typically corrugated steel pipe that may have a bottom section removed (arched culvert) or are intact (closed culvert) over the pipe length.
Deep groundwater	The deep groundwater regime is laterally continuous and found in bedrock below the permafrost at approximately 300 m below ground surface (m-bgs) depth. Because of the thick, low permeability permafrost; there is generally little to no hydraulic connection between the shallow and deep groundwater flow regimes.
DFO	Department of Fisheries and Oceans (Fisheries and Oceans Canada)
ELC	Ecosystem Land Classification
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.
ISQG	Interim Sediment Quality Guidelines
ITK	Inuit Traditional Knowledge
IQ	Inuit Qaujimajatuqangit
MMER	Metal Mine Effluent Regulations
NAD83	North American Datum 1983, based on the spheroid (GRS80)
NIRB	Nunavut Impact Review Board
NCLA	Nunavut Land Claims Agreement

DNLUP	Draft Nunavut Land Use Plan
NPC	Nunavut Planning Commission
NWB	Nunavut Water Board
NWNSRT Act	*Nunavut Waters and Nunavut Surface Rights Tribunal Act*
Runoff	The part of precipitation that appears at surface and is a measure of hydrologic response of a watershed, commonly presented as a depth of water over an entire watershed in mm.
Salinity	Salinity is the total of all non-carbonate salts dissolved in water, usually expressed in parts per thousand (1 ppt = 1,000 mg/L) and is a measure of the *total* salt concentration. Even though there are smaller quantities of other ions in seawater (e.g., K, Mg, or SO_4), sodium (Na) and chloride (Cl) ions represent about 91% of all seawater ions. The salinity level in seawater is fairly constant, at about 35 ppt (35,000 mg/L), while brackish estuaries may have salinity levels between 1 and 10 ppt. Salinity can be determined from chloride concentration using the formula: $$salinity\ (ppt) = 0.0018066 \times 5\ Cl–\ (mg/L)$$
Shallow groundwater	The shallow groundwater regime consists of the active layer above the permanent permafrost. This is an ephemeral system that in winter time is primarily frozen and is only active in the summer months.
SIG or SIG MM2	Mining and Milling Supplemental Information Guidelines for Advanced Exploration
Talik	A layer of year-round unfrozen ground that lies in permafrost areas. In regions of continuous permafrost, taliks often occur underneath shallow thermokarst lakes and rivers, where the deep water does not freeze in winter, and thus the soil underneath will not freeze either. Sometimes closed, open and through talik are distinguished. These terms refer to whether the talik is completely surrounded by permafrost, is open to the top (e.g., a thermokarst lake), or open to both top and unfrozen layers beneath the permafrost, respectively.
the Project	Madrid Advanced Exploration Program
TIA	Tailings Impoundment Area
TMAC	TMAC Resources Inc.
TSS	Total Suspended Solids
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 (unapproved)

1. INTRODUCTION

The objective of this document is to provide supplemental information on the Madrid Advanced Exploration Program (the Project) to support the Madrid Advanced Exploration Program Type B Water Licence Application submitted to the NWB in accordance with the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRT Act) and *Nunavut Waters Regulations*.

1.1 DOCUMENT OUTLINE

The Nunavut Water Board (NWB) *Mining and Milling Supplemental Information Guidelines for Advanced Exploration* (SIG MM2) has been used to develop the information provided within this report is presented in Appendix 2.

A concordance table as per the requirements of the SIG MM2 is provided in Appendix 2. This document also follows the NWB's *Guide 4: Completing and Submitting a Water Licence Application for a New Licence.*

This document is structured to provide easy cross-reference with the SIG with the format following:

- Preamble: General Water Licence Application;
- Section 1: Introduction;
- Section 2: Minimum Application Requirements;
- Section 3: General Water Licence Application;
- Section 4: Detailed Description of the Undertakings;
- Section 5: Baseline Environmental Conditions;
- Section 6: Water Use and Water Management;
- Section 7: Waste Disposal and Management;
- Section 8: Monitoring;
- Section 9: Reclamation and Closure;
- Section 10: Environmental Effects; and
- Section 11: Public Consultation.

Should the Nunavut Impact Review Board (NIRB) determine that a screening pursuant to the Nunavut Land Claim Agreement (NLCA) is required, this document also includes the information required by NIRB Part 1 Form Project Proposal Information Requirements as well as the NIRB Part 2 Form PSIR Requirements (Appendix 10).

2. MINIMUM APPLICATION REQUIREMENTS

Section 2 of this Technical Report addresses Section 2.0 – "Minimum Application Requirements (Application Checklist)" of the **Nunavut Water Board information Requirements for a Type B General Water Licence Application**.

2.1 GENERAL WATER LICENCE APPLICATION

The application form for a Type B Water Licence is presented as a preamble to this document.

2.1.1 Scope of the Type B Water Licence

This Licence will authorize TMAC to use water and deposit waste in support of an advanced exploration program for the Madrid area.

The Project includes all bulk sample infrastructure and exploration activities at the Madrid area. The exploration plan for the Project is an estimated 10 years and includes diamond drilling on surface and underground, bulk sampling through underground mining methods, field mapping, airborne/ ground/downhole geophysics and associated air and road access and associated transportation of goods, supplies and mined material, and support infrastructure such as access portals, ramps, waste and ore stockpiles, water and waste management structures.

The Madrid area is located at the general geographical coordinates shown in Table 2.1-1 and Figure 3.5-2.

Table 2.1-1. Geographic Coordinates of Madrid Advanced Exploration Program

	Latitude / Longitude		UTM	
NE	68° 06' 34" N	106° 32' 22" W	7555864	435954
NW	68° 08' 07" N	106° 37' 44" W	7555840	432309
SE	68° 00' 13" N	106° 29' 00" W	7544000	438000
SW	68° 00' 07" N	106° 40' 29" W	7544000	430000

Under this Madrid Advanced Exploration Program Type B water licence, TMAC will be allowed to undertake construction, operations, and closure including reclamation, of exploration drilling and bulk sampling. The activities and facilities under the scope of this Type B Water Licence will include the following:

- water supply for domestic uses and industrial purposes including water uses such as diamond drilling underground and surface, construction and maintenance of roads, emergency and temporary camp, water crossings, diversions and storage;
- site drainage, surface water management, and underground water management for Madrid North and Madrid South and surficial drilling as warranted;

- oily water treatment facilities for wastewater and oily storm water treatment for maintenance facilities and fuel storage berms at Madrid North and Madrid South;
- contact water collected in Pollution Control Ponds, will be discharged to the tundra at a distance greater than, or equal to, 31m from local waterways;
- temporary storage and management of hazardous materials at Madrid North and Madrid South;
- fuel tanks, dispensing storage facilities and associated containment areas or berms for the Bulk Fuel Storage Facilities and day tanks at Madrid North and Madrid South;
- containment for fuel storage and hazardous materials (if any) at Madrid North and Madrid South;
- containment areas for temporary storage of hazardous/nonhazardous waste (waste transfer areas) and new product storage for drums and totes at Madrid North and Madrid South;
- waste sorting facilities and temporary storage facilities for hazardous wastes at Madrid North and Madrid South;
- waste rock storage areas for permanent storage of mine waste and waste rock pile runoff management at Madrid North and Madrid South;
- ore stockpile for temporary storage and runoff management at Madrid North and Madrid South;
- minor watercourse crossings, culverts and associated erosion control;
- diversions, alteration of flow or storage by means of dykes or dams at Madrid North and Madrid South;
- regular inspection and maintenance of all watercourse crossings and associated infrastructure;
- construction and ongoing maintenance of all-weather roads within Madrid North and Madrid South areas;
- ongoing advanced exploration diamond drilling subsurface and on surface;
- ongoing activities in support of engineering and scientific studies for the Madrid area;
- ongoing maintenance to project infrastructure; and
- construction and operation of winter ice roads.

While the Project is a stand-alone project from the Doris North Project, in order to limit footprint and to enhance Belt-wide effienciency, the Project will utilize some of the existing Doris North Project infrastructure and systems as follows. Test milling and processing of ore will be undertaken at the Doris North Project mill. Portable toilets and/or Pacto units with waste will be transported to Doris North Project camp for inclusion in its sewage treatment plant. Any contact water not meeting discharge criteria will be transported for disposal in Doris North Project – Tailings Impoundment Area (TIA). Hydrocarbon contaminated snow and soil/overburden will be transported to Doris North Project camp for treatment and/or backhaul offsite for appropriate treatment/disposal. Explosives will be managed at the existing Doris North Project storage facility. Wastes will be

disposed of as appropriate at the Doris North Project waste management facilities. Hazardous wastes will be transferred to designated areas at Doris North Project and disposed of offsite in accordance with currently approved waste management plans.

2.2 INFORMATION REQUIRED TO SATISFY THE REQUIREMENTS OF THE SIG

The information required to satisfy the requirement of the Supplemental Information Guideline (SIG) is presented the following Sections and Appendices to this Volume.

The Madrid Advanced Exploration Program is an advanced stage of exploration to establish feasibility of the Project. The design information for the Project is preliminary at this stage. Issued for construction drawings will be submitted to the NWB at least sixty (60) prior to commencement of construction of facilities. Once construction is completed, Construction Summary Reports including as-built drawings will be submitted to the Board within ninety (90) of start-up of the facility. Issued for construction documents and construction summary report will be stamped by a Professional Engineer licenced to practice in Nunavut.

2.3 EXECUTIVE SUMMARY

2.3.1 Executive Summary (English)

TMAC Resources Inc. (TMAC) is proposing to undertake an advanced exploration program within the Madrid area of the Hope Bay Greenstone Belt (the Hope Bay Belt) in the Kitikmeot Region Nunavut. The Madrid area is located approximately 130 km southwest of Cambridge Bay.

Over the past twenty years, the Hope Bay Belt has undergone considerable exploration and development activities by TMAC and previous operators. The Hope Bay Belt has significant existing infrastructure including air strips, roads, fuel storage, a port facility, power plants, administration, geology and lab buildings, and underground development at the Doris and Boston areas.

The Doris North Project (Doris) is known as Phase 1 of the Hope Bay Belt development with gold production planned from an underground mine located near Doris Lake. Doris North is currently fully permitted and partially constructed. TMAC is requesting authorizations for the Madrid Advanced Exploration Program to allow additional work to: further define the Madrid North and South mineral resources; understand deposit variability; support mine planning; and to validate economic feasibility.

The proposed Madrid Advanced Exploration Program includes extracting approximately 50,000 tonne bulk ore samples from each of the Madrid North and Madrid South using underground mining methods that will be trucked to the Doris North Mill for processing. The 10 year Advanced Exploration Program will also include infrastructure and support activities such as diesel power generation, waste rock and ore storage areas, surface and groundwater management, explosives use and storage, quarry activities, all-weather and winter roads, and underground and surface diamond drilling. Camp facilities at Doris North will be used to accommodate the approximately 70 personnel required for the Madrid Advanced Exploration Program. Solid, hazardous and non-hazardous waste

generated as part of the Madrid Advanced Exploration Program will be transported to Doris North for inclusion in its existing management facilities.

Freshwater for the program will be sourced primarily from Patch and Windy Lakes and used for industrial (mainly surface and subsurface drilling) and domestic uses with a daily peak rate of 295 m^3/day. Use of existing infrastructure and access corridors associated with Doris North, and underground mining methods at Madrid, minimizes the affected footprint. The potential for environmental effects from the Madrid Advanced Exploration Program to the physical, biological and traditional resources can be mitigated through incorporation of design considerations and accepted management practices.

2.3.2 Executive Summary (Inuktitut)

To be provided once available.

2.3.3 Havaamik Naetomik Okaohik

TMAC-kon (TMAC) havaakagumayun nalvakheokhimaklotik Madrid-mi Kapihiliktumi Oyagaktaakhanik Nunagiyaoyumi (Kapihiliktuk) Kitikmeoni, Nunavumi. Madrid nuna kanitoani 130 kilamitamik ugahiknikaktok hivugaata oalikheani Ikaloktuteam.

Atukhimayoni 20-ni ukeon, Kapihiliktumi Oyagaktakvikhak nalvakheokveokhaaktok havakveohimalikhonilo TMAC-kunin hivoanilo oyagakheoktinin. Kapihiliktuk pikaktok agiyonik taya napaktikhimayoni ilalo milviknik, apkotinik, okhokyoakakviknik, tulaktakvikhamik, alguyaktutinun ignikotinik, titigakviknik, nunalikiven ilitokhaevelo iglukpaknik, nunan iloanilo oyagaktakviknik Doris-mi Boston-milo.

Doris-mi kaoyimayaoyok Havaak 1-mi Kapihiliktumi Oyagaktakvikhami kulmik nunan iloanun hitileoklotik oyagaktakvikhaan haneani Doris Tatim. Doris Oyagaktakvik taya havakveoginageaniktok ilagalo hanayaohimalikhoni. TMAC-kon tukhiktun agitutinik Madrid-mi Nalvakheogeamikni ila havaligeamikni: naonaeteageagani Madrid-mi Tunungani Hivogaanilo oyagaktaakhanik; tukihealogin oyagaktaakhan kanoginigin; ikayoktoklogo oyagaktakvikhak opalogaeyageagani; nalunaegeaganilo manikhakheogutaoteaknikhaa.

Atoktaoyomayok Madrid-mi Nalvaakheokveokhaaktok Havaak ilakaktok ahivaeyaagani 50-taosan tansnik ukumaetilaagani oyagaktaanik ilitokhagakhanik atuni Madrid Tununganin, Madrid Hivugaanilo nunan iloanun hitileoklotik oyagaktakneaktun akhalutikulo akyaktaolotik Doris-mi Oyakikivikmun hikuptiktaoyaagani. Kulini ukeoni Nalvaakheokveokhaakvikhak Havaak ilakakneaktok pikotinik ikayutiniklo havaanik ila alguyaktutinun ignikotinik, ikagunik oyakanik ileogaevikhak, kaagani nunan iloanilo imavaloen monaginiginik, kagaktitaotinik atoknigin tutkumavelo, oyagaktakvikmi havaan, ukeogaalok apkotikhan, nuna iloanilo kaaganilo hitiyonik kigutikaktonik ikutakveoyun. Iglukpakakvikmi pikotin Doris-mi hiniktakveoneaktun 70-nin inuknin havageakaktonin Madrid-mi Nalvaakheokveokhaaktukhami. Hitiyun, aneagutaolaktulo aneaknaetulu ikagun Madrid-mi Nalvaakheokveokhaaktukhami akyaktaoneaktun Doris-mun ilaleotiyagani taya monagivoeyoni pikotini.

Imiktaakhan havakvikmi piyaovakneakun Patch-min Windy-milo Tatinin atoktaolotiklo havaami (ila nunami iloanilo ikutaktonin) inuknilo atoktaoyukhak uplotoagaagan 295 m^3/uplotoagaagan. Atoknigin taya iglukpaen apkotilo Doris-mi, nunam iloanilo oyagaktaotin Madrid-mi, mikhiyotaoyun aktokniginik oyagaktakveom. Avataoyomik aktoknigilaakta Madrid-mi Nalvaakheokveokhaaktomin nunamik, naoteaniklo taemanilo ihoakotinik ihoakhilaaktun atokniginin ihomagiyaoteaktonin monagiyotinilo pitkuheoyonin.

2.3.4 Résumé analytique

TMAC Resources Inc. (TMAC) propose d'entreprendre un programme d'exploration approfondie de la zone Madrid de la ceinture de roches vertes de Hope Bay (la ceinture de Hope Bay ou Hope Bay) dans la région de Kitikmeot au Nunavut. La zone Madrid est située à environ 130 km au sud-ouest de Cambridge Bay.

De nombreuses activités d'exploration et de développement dans la ceinture de Hope Bay ont été entreprises par TMAC et d'anciens operateurs depuis les vingt dernières années. La ceinture de Hope Bay dispose d'une infrastructure existante significative y compris des pistes d'atterrissage, des routes, du stockage de carburant, une installation portuaire, des centrales électriques, des bâtiments abritant l'administration, la géologie et les laboratoires, et des aménagements souterrains dans les zones Doris et Boston.

Le projet Doris North (Doris North), reconnu sous la phase 1 du développement de la ceinture Hope Bay, consistera en une production d'or effectuée à partir d'une mine souterraine située près du lac Doris. Doris North est actuellement complètement autorisé et est partiellement construit. TMAC demande l'autorisation pour le programme d'exploration approfondie de la zone Madrid pour effectuer des travaux supplémentaire afin de mieux définir les ressources minérales de Madrid North et de Madrid South, comprendre la variabilité du dépôt, soutenir la planification minière et valider la faisabilité économique.

Le programme d'exploration approfondie proposé de la zone Madrid comprend l'extraction d'échantillons de minerai en vrac d'environ 50 000 tonnes provenant de chacune des zones Madrid North et Madrid South, employant des méthodes d'extraction souterraines. Le minerai sera ensuite acheminé par camion pour traitement à l'usine de Doris North. Le programme d'exploration approfondie, d'une durée de 10 ans, comprendra également des activités reliées à l'infrastructure et au soutien, comme la production d'électricité à partir de diesel, les zones de stockage de stériles et du minerai, la gestion des eaux souterraines et de surface, le stockage et l'utilisation d'explosifs, les activités de carrière, les routes quatre saisons et d'hiver, et les forages au diamant souterrain et de surface. Les installations de camp de Doris North seront utilisées pour accueillir les quelque 70 personnes requises pour le programme d'exploration approfondie de la zone Madrid. Les déchets solides, dangereux et non dangereux générés dans le cadre de ce programme d'exploration seront acheminés vers les installations de gestion existantes de Doris North.

L'eau douce nécessaire pour le programme proviendra principalement des lacs Patch et Windy et sera utilisée pour des fins industrielles (surtout forages de surface et souterrain) et pour usage domestique à un taux de pointe quotidien de 295 m^3/jour. L'utilisation de l'infrastructure et les voies d'accès existants à Doris North, et les méthodes d'exploitation minière souterraine à Madrid, minimise

l'empreinte concernée. Le potentiel pour des effets environnementaux sur les ressources biologiques, physiques et traditionnelles associées au programme d'exploration approfondie pourra être atténué en intégrant les considérations de conception avec les pratiques de gestion reconnues.

2.4 APPLICATION FEE

The associated $30 application fee is submitted to the NWB with this application.

2.5 WATER USE FEE

The water use fee of $30 for this application is submitted with the application fee and the balance will be submitted with the issuance of the water licence.

2.6 SIG CONCORDANCE

The Madrid Advanced Exploration Program SIG has been used to develop the information provided within this report and is presented in Appendix 2.

2.7 STUDIES

Section 2 of the SIG concordance table includes listing all studies completed for the water licence application. To date, studies have been completed within the Hope Bay Belt to determine environmental baseline conditions, develop project activities and components, identify water use and the predicted environmental effects and proposed mitigation measures. The reference lists within this Supplemental Information Report, within Appendix 4 (Project Description) and within Appendix 5 (Environmental Baseline Report) provide a list of studies completed to date used to develop the Madrid Advanced Exploration Program.

3. GENERAL WATER LICENCE APPLICATION

Section 3 of this Technical Report addresses Section 3.0 – "General Water Licence Application" as presented in: Nunavut Water Board information Requirements for a Type B Water Licence Application.

3.1 APPLICATION FORM

The application form for the Madrid Advanced Exploration Program – Exploration Type B Water Licence is presented in the preamble of this technical report.

3.2 APPLICANT INFORMATION

TMAC Resources Inc. is a privately held, Canadian-based mineral exploration and development company. Led by an experienced management team, the vision and sole focus of the company is the responsible and economically sustainable exploration, development and mining of the Hope Bay Greenstone Belt as Canada's next major gold mining camp.

TMAC considers development of the Hope Bay Belt to be an opportunity to further develop the positive working relationship that has been established with the Inuit, Nunavut, and Canada by managing risk and sharing the economic and social benefits with stakeholders through a responsible approach to exploration, mining, and gold production.

The Project's official mailing address is:

TMAC Resources Inc.
95 Wellington Street West
Suite 1010, P.O. Box 44
Toronto, Ontario, M5J 2N7

3.3 APPLICANT REPRESENTATIVE AND INFORMATION

3.3.1 Representative Authorization Letter

The contact person for the Project is:

M. John Roberts
Vice President, Environmental Affairs
TMAC Resources Inc.
95 Wellington Street West
Suite 1010, P.O. Box 44
Toronto, Ontario, M5J 2N7

Phone: 416-628-0126
Fax: 416-644-9337
e-mail: john.roberts@tmacresources.com

3.3.2 List of Officers of the Company and Evidence of Registration

The list of Officers of the Company is attached in Appendix 3.

3.3.3 Financial Statement

TMAC's most recent financial statement is presented in Appendix 3.

3.4 TERM OF THE MADRID EXPLORATION PROJECT WATER LICENCE

TMAC requests that the term of the licence be 10 years. This includes preparation and construction activities over a period of 2 to 3 years, operation for 2 to 3 years, closure 1 to 2 years, and post closure of 2 years. If additional time is needed to accommodate further post closure monitoring, the water licence will be renewed and amended at that time. The requested issuance would be Q3 2015 so procurement can occur in Q3 2015 and work start Q4 2015-Q1 2016. The bulk sample program at Madrid North and Madrid South is currently planned to be completed sequentially with initial work completed at Madrid North. Surficial exploration diamond drilling will occur throughout the 10 year Project life.

3.5 OVERVIEW

3.5.1 Project Background

TMAC Resources Inc. (TMAC) is proposing to undertake an advanced exploration program, including a bulk sample, at the Madrid area (Madrid North and Madrid South), located within the Hope Bay Greenstone Belt (the Hope Bay Belt), an 80 by 20 kilometre Property located along the south shore of Melville Sound in Nunavut (Figure 3.5-1). The Madrid area of the belt is located approximately 130 km southwest of Cambridge Bay, Nunavut and 720 km northeast of Yellowknife, Northwest Territories. The nearest communities are Umingmaktok (70 km to the southwest of the Property), Cambridge Bay, and Kingaok (Bathurst Inlet; 150 km to the southwest of the Property).

The Hope Bay Belt is a north-south trending greenstone belt, with economically viable zones of gold mineralization that can be divided into three areas: Doris, Madrid, and Boston. Over the past twenty years, the belt has undergone considerable exploration and development activities by TMAC and previous operators. As a result, the Hope Bay Property has significant infrastructure including air strips, roads, fuel storage, a port facility, power plants, administration, geology, and lab buildings, and underground development at the Doris and Boston areas. The main area of infrastructure development is the Doris North Project, partially constructed in 2010 and 2011 (NIRB 2013). The Doris North Project has not processed any ore or created any tailings, as it has yet to enter the production mining stage of operations (NIRB 2013). The existing Doris North Project infrastructure is located approximately 14 and 9 km to the north of the proposed Madrid South and Madrid North bulk sample areas respectively (Figure 3.5-2). The footprints of the proposed Madrid North and Madrid South bulk sample areas are included in Figure 4.2-1, Figure 4.3-1, and Appendix 4.

Figure 3.5-1

Hope Bay Belt
Regional Location

TMAC is currently progressing with phased approvals of the Hope Bay Belt, with the expansion of the Doris North Project Phase 1 and the potential development of the Madrid and/or Boston areas (Phase 2). The approval to proceed with the Madrid Advanced Exploration Program is sought as a related but distinct Project.

Previous underground developments at Doris (2010-2011) and Boston (1996-1997) provided critical access to various parts of the mineralization in order to collect bulk samples used to evaluate the character and metallurgical nature of the ore. Underground development and bulk sampling is a necessary step in the advanced exploration process to determine the economic viability of the mineralization. Madrid area is the only district in the Hope Bay Belt without the benefit of a bulk sample program.

The intent of TMAC's proposed Madrid Advanced Exploration Program is to extract bulk samples from the potentially high-grade underground mineral resources, and test the samples at the Doris North Project Mill (Figure 3.5-2). This will allow adequate resource definition and confirmation of mill processing approaches for the Madrid mineral resources, which are required to validate the economic feasibility of the deposit and determine how to incorporate the Madrid area into the mine plan for the Phase 2 Hope Bay Belt development. Access to the underground is needed to better understand the formation of the deposit itself, to explore from underground, to test mining methods, and assess mineral recovery methods. This information will inform feasibility and engineering decisions and assist with strategic planning for the area. This underground work is supported with continued diamond drilling on surface to improve definition of resources and reserves and support ongoing exploration activities.

3.6 SITE HISTORY

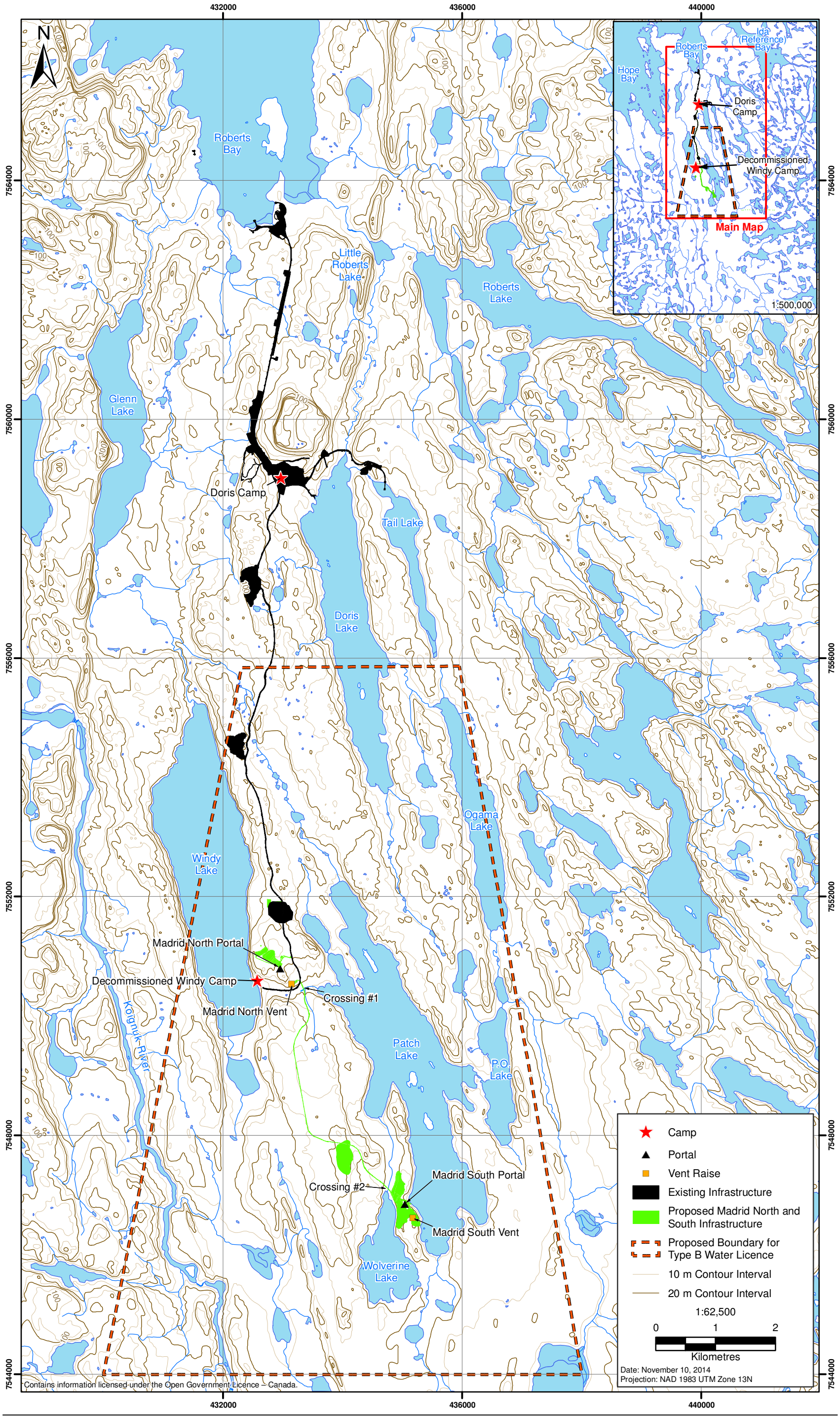
The Hope Bay Belt was first outlined in 1962 by J.A. Fraser of the Geological Survey of Canada during a reconnaissance mapping program. From the mid-1960s to the late 1980s, a variety of small-scale exploration and mining activities were conducted in the belt by Roberts Mining Company, Radiore Uranium Mines, Hope Bay Mines Ltd., Perry Nickel Mines, Noranda Exploration, and Abermin Corporation.

BHP Billiton (BHP) commenced an initial review of the area in 1988, staking claims over the belt in 1991-1992. Between 1991 and 1998, BHP's activities included prospecting, geological reconnaissance and geological mapping, geochemical till sampling, mineralogical studies, and airborne and ground geophysical surveys. BHP also undertook core drilling comprising 1,261 drill holes (approximately 120,000 m), metallurgical testwork, decline construction and an underground bulk sampling program at Boston, and mineral resource estimation and mining studies. Baseline environmental studies were also completed. BHP's work identified the Boston deposit in 1992, the Madrid deposit in 1994, and the Doris deposit in 1995.

In December 1999, the Hope Bay Belt was purchased from BHP by the Hope Bay Joint Venture, which was a 50:50 joint venture between Cambiex Exploration Inc. and Miramar Hope Bay Ltd. (a wholly owned subsidiary of Miramar Mining Corporation). All claims were registered in the name of Cambiex Exploration Inc., which changed its name to Hope Bay Gold Corporation Inc. in 2001. In May 2002, Hope Bay Gold Corporation Inc. merged with Miramar Mining Corporation.

Figure 3.5-2

Madrid Advanced Exploration Program



From 2000-2007, Miramar Hope Bay Ltd. conducted geophysical surveys, till sampling, mapping, and prospecting. Drilling (surface, underground, geotechnical, condemnation) totaled approximately 382,000 m in 2,215 holes. Miramar's work also included metallurgical studies, resource/reserve estimates, and engineering to support the completion of a feasibility study in 2003 for the Doris deposit as well as environmental baseline studies to support the completion of an environmental impact statement for the Doris North Project in 2006.

In late 2007, Newmont Mining B.C. Ltd., an indirect wholly-owned subsidiary of Newmont Mining Corporation, purchased Miramar Hope Bay Ltd. and formed Hope Bay Mining Ltd. (HBML), which became the registered owner of all the Hope Bay Belt tenure. From 2007-2012, HBML conducted core drilling, including exploration, infill, and geotechnical holes, geological mapping, surface sampling, resampling of selected existing drill core, metallurgical test work, mineral resource estimation, collection of whole-rock geochemical data, preliminary metal leaching and waste rock characterization studies, collection of environmental and social base line data, development of a site-wide, probabilistic water balance model, groundwater monitoring programs, and preliminary mining and engineering studies.

In 2010 and 2011, activity at the Doris North Project was focused on completing infrastructure necessary for the development of the mine including the construction of a number of facilities and structures at Roberts Bay area, Doris North Project Camp and some Tail Lake facilities (NIRB 2013). Construction of the North Dam of the Tail Lake Tailings Impoundment Area (TIA) began in January 2011 and was complete in April 2012.

In late 2012, HBML placed the Hope Bay Belt into care and maintenance, and the project was seasonally closed during the winter of 2012/2013. TMAC acquired the Hope Bay Belt from Newmont in March 2013. The acquisition included exploration and mineral rights over the Hope Bay Belt, including the Doris North Project and its permits, licences, and authorizations for development received by previous owners. TMAC re-opened the Doris North Project camp in March 2013. Exploration and environmental monitoring and compliance have been the primary focus of TMAC's efforts in 2013 and 2014.

3.7 RELATIONSHIP OF PHASE 1 AND PHASE 2 HOPE BAY BELT AND MADRID ADVANCED EXPLORATION PROGRAM

The following overview of the phased approach to the potential long-term belt-wide development of the Hope Bay Belt is intended to provide context for the proposed Madrid Advanced Exploration Program.

TMAC views the Doris North Project (Nunavut Impact Review Board (NIRB) Project Certificate No. 003, NWB Type A Licence 2AM-DOH1323) as Phase 1 of a belt-wide development, with limited gold production from one stand-alone underground mine located near Doris Lake (Figure 3.5-2). Originally, Miramar Hope Bay anticipated a 2 year mine life for the Doris North Project; however, ongoing exploration by HBML and more recently TMAC suggests there are sufficient resources and tailings storage capacity to allow 2 to 4 years of additional mine life. TMAC has submitted an amendment request to the NWB to extend the mine life. While envisioned as a key phase in the Belt-wide development, the Doris North Project is designed to operate as a stand-alone operation.

A project proposal for Phase 2 of the Hope Bay Belt, which is intended to cover the reasonable and foreseeable proposed incremental development of the Belt, has been submitted and NIRB EIS Guidelines (NIRB Dec 2012) have been issued. Phase 2 could include the development of the Madrid and/or Boston areas if found to be economically viable. The development would include infrastructure and waste management facilities to support underground mining and processing of ore both districts.

Phase 2 would also include expansion of the existing infrastructure associated with the Doris North Project that would be required to support a Belt-wide production approach. In addition to mining and potential milling facilities for each district, new infrastructure could include tailings and waste rock storage facilities. The Project also anticipates access roads and small support camps off the main north/south transportation corridor to facilitate ongoing exploration activities along the length of the Belt. These alternatives will be investigated in further detail in the upcoming EIS for the Phase 2 Hope Bay Belt Proposal.

TMAC is submitting this licence application to extract bulk samples and to expand exploration drilling of the Madrid deposit. Access to the underground is needed to better understand the formation of the deposit itself, to explore from underground, to test mining methods, and assess mineral recovery methods.

Bulk samples will be extracted from two portals. (Madrid North and Madrid South) which are currently planned to be completed sequentially with initial work completed at Madrid North. This approach means that the same equipment and personnel can be used at both areas and the experience with collecting the bulk sample at Madrid North will help plan and implement the mining to extract the bulk sample at Madrid South. Although the infrastructure and activities presented will be a stand-alone program, Phase 2 development will be planned, as much as possible, to incorporate use of similar footprint and equipment.

4. PROJECT DESCRIPTION

The Madrid Advanced Exploration Program will be staged from two different areas within the Madrid District identified as Madrid South and Madrid North. Madrid South will advance the knowledge base of two sub-deposits (Patch 14 and Wolverine) and Madrid North will advance the knowledge base of two additional sub-deposits (Naartok and Suluk).

The advanced exploration at each site will consist of four components – diamond drilling, underground development within the ore zones, test stoping, and bulk sampling of ore – with the following objectives:

- Diamond drilling – Additional diamond drilling from the surface across the Madrid area will be complemented by closely spaced infill diamond drilling from underground platforms, with the combined objective of increasing deposit knowledge and upgrading resource classification to facilitate detailed Phase 2 mine design, conversion to reserve, and economic assessment.
- Underground development in ore – Underground development conducted along the strike of the ore body, on two or more levels. This will advance the geological understanding of controls on mineralization, provide validation of the current geological models, and establish both geological and grade continuity within the ore zones. The deposits are relatively short strike length, steeply dipping ore zones and are approximately 5 km apart. This spatial distribution does not support accessing both areas with one underground development and is the reason that two bulk sample portal access locations are proposed.
- Test stoping – Test stopes will provide sufficient sample to allow a grade/tonnage reconciliation to be completed against the current resource estimate, assessment of geotechnical parameters, and confirmation of recovery and dilution factors assumed in the reserve conversion. Test stoping will also provide confirmation of the mining methods selected.
- Bulk sampling of ore – Processing of ore sample of sufficient size to assess milling and processing performance. This will be beneficial in providing confirmation of crushing and grinding criteria used to set throughput capabilities and operating criteria such as power usage, reagent usage, and water usage. Bulk sampling will also provide metal recovery estimates that would be more representative of an ore body than core samples or chip samples, thus allowing development of overall economics of the bulk sample based on the recovery of metal. The bulk sample will also allow development of operating techniques to maximize recovery and throughput of the ore body in general.

A portal will be established at each site, along with associated surface infrastructure, underground development in waste, vent raises, and sill development in ore within the ore bodies, and test stoping. At Madrid North, approximately 4,200 m of underground development is expected to occur in waste and 1,000 m in ore. At Madrid South, approximately 3,500 m of underground development is expected to occur in waste and 1,000 m in ore. The proposed underground activities at each site are expected to take approximately 1.5 years to complete once the portal has been established for a total of 3 years of underground mining to extract the bulk sample. Over each 1.5 year period on

average approximately 100 tonnes per day (tpd) of material will be mined. TMAC currently plans to undertake the work at Madrid South and Madrid North sequentially as distinct projects starting with Madrid North and followed by Madrid South.

The existing all-weather road from the Doris North Project to Windy Lake passes in close proximity to the proposed portal site for Madrid North. An approximate 4.7 km extension to this road is proposed for access to the Madrid South portal.

Surface ore and waste storage pads will be required at each site as follows:

- Madrid North – to support approximately 275,000-300,000 tonnes of waste material generated from the underground development, approximately 25,000-30,000 tonnes of ore produced from sill development, and 25,000-30,000 tonnes of ore produced from test stopes.
- Madrid South – to support approximately 225,000-250,000 tonnes of waste material generated from the underground development, approximately 25,000-30,000 tonnes of ore produced from sill development, and 25,000-30,000 tonnes of ore produced from test stopes.

The ore will be processed at the approved Doris North Project processing facility (Figure 3.5-2). Ore grade sample material will be temporarily stored at the bulk sample site and will be trucked approximately 9 km north from Madrid North to the Doris North Project, and approximately 14 km from Madrid South, for processing. Ore from each site may be processed as stand-alone batch material and/or as blended material with ore from the Doris North Project.

TMAC will mine and stockpile the entire bulk sample from Madrid North and Madrid South on their respective designated ore stockpile. When ready, ore will be hauled to Doris North Project using available Haul Trucks with approximately 40 round-trips per day. The time period to complete the transport of material from Madrid to the Doris North Project mill processing facilities will be completed in the shortest possible time period; however, it will be dependent on operational needs, environmental factors, economic and safety considerations.

4.1 EXISTING INFRASTRUCTURE

The proximity of the Madrid area to the Doris North Project provides the opportunity to take advantage of existing infrastructure that will reduce costs, minimize the footprint and minimize the time required to complete the Madrid Advanced Exploration Program. The permitted infrastructure and facilities at Doris North Project have sufficient capacity to support the proposed Project. Infrastructure associated with the Doris North Project includes port facilities, an airstrip, a camp, waste treatment facilities, milling and processing facilities, tailings impoundment facilities, and existing access roads.

4.1.1 Transport

4.1.1.1 Roads

An all-weather access road currently exists from the Doris North Project (camp and mining facilities) approximately 9 km south to the former regional exploration camp at Windy Lake. This camp site is

currently being reclaimed by TMAC as described in the Windy Camp and Patch Lake Facility Updated Closure Plan (SRK 2014e). In addition to this access road, there are approximately 15 km of all-weather roads within the Doris North Project connecting the port, camp and mining facilities.

4.1.1.2 Airstrip

The existing all-weather airstrip located between Roberts Bay and Doris North Project camp will be used to support the advanced exploration program. The airstrip is approximately 900 m long and is capable of landing various aircraft including the DC3 and Dash 7. Approvals are in place to extend this airstrip to 1,400 m; sufficient length to service Bombardier Q400 aircraft. The airstrip is constructed with run-of-quarry rock topped with a crush layer for durability.

A certified and Transport Canada registered ice airstrip is constructed on Doris Lake each year. This ice strip is normally operational from February to mid-April when ice thicknesses and surface conditions permit larger aircraft operations direct to the Hope Bay Belt.

4.1.1.3 Shipping

Roberts Bay is located approximately 5 km from Doris North Project camp and is the main port entry point to the Belt. The port provides a cargo offloading jetty, a diesel fuel offloading facility, and a fuel storage facility. Fuel storage at Roberts Bay includes available storage capacity for 15 M litres of diesel fuel in steel tanks within secondary, lined containment.

In order to provide for the economic supply of material and equipment into the Hope Bay Belt, an annual sealift is required. This sealift generally occurs in the ice-free period of August-September, when ships and barges can access the site.

4.1.2 Processing Plant

Bulk sample ore will be transported from Madrid North and Madrid South to the Doris North Project mill for test processing. The Doris North Project mill is an approved but yet to be constructed facility under the Type "A" Water Licence 2AM-DOH1323. It uses a conventional milling process consisting of crushing, grinding, gravity and flotation concentration, cyanide leach of the concentrate, gold recovery, and on-site refining. Once constructed, the mill will have the permitted capacity to process ore from the bulk samples at an average rate of 800 tonnes per day. Ore from each site may be processed as stand-alone batch material and/or as blended material with ore from the Doris North Project. If processed in bulk, each bulk sample represents the equivalent of 75 days of processing by the mill at 800 tonnes per day.

In 2013, TMAC submitted an application to the Nunavut Water Board (NWB) to amend the current Type "A" Water Licence, 2AM-DOH1323. Amongst other changes, this application contemplates the expansion of the mill from an initial average ore processing rate of 800 tonnes per day to an average of 1,800 tonnes per day over time. The Madrid North Advanced Exploration Program is not reliant on expansion of the mill; however, if approved and constructed, the length of time needed to process the bulk samples may be reduced.

4.1.3 Tailings Containment Areas

The tailings impoundment area (TIA) associated with the Doris North Project has been partially constructed. In 2012, a retention dam (North Dam) was constructed at the north end of the existing approximately 4.5 km long lake. This dam provides for the storage and controlled release of effluent from the impoundment area. There are plans to construct a dam at the south end of Tail Lake (South Dam) to increase the capacity of the impoundment area to meet the needs for the Doris North Project. Once fully constructed, the TIA will have the capacity to process the ore from the currently permitted Doris North Project mine and process the bulk sample ore from the Madrid Advanced Exploration Program. Tail Lake has been added to Schedule 2 of the Metal Mining Effluent Regulations and is fully permitted for use as a tailings impoundment area. Discharge from the TIA must meet the water quality criteria for the Doris North Project Type "A" Water Licence 2AM-DOH1323.

As part of the amendment application submitted in 2013, TMAC is proposing to revise its tailings water management strategy. The revised strategy will have a single discharge from the TIA to the marine environment in Roberts Bay directly instead of being discharged to Doris Creek which discharges to Roberts Bay. The change in the water management strategy will reduce the potential for environmental effects from highly saline groundwater expected when mining in the talik zones of the Doris North Project or in deep areas below the permafrost. The Madrid Advanced Exploration Program is not reliant on changes to the proposed tailings management strategy described above as the proposed tailings volume contribution from Madrid Advanced Exploration activities would be covered by the current Type A water licence. If the amendment to the Type A is approved and implemented, the risks for potential environmental effects may be further mitigated.

4.1.4 Camp Site

The Madrid Advanced Exploration Program will utilize available capacity at the existing permanent camp facilities at the Doris North Project and/or the planned camp at Windy Lake permitted under Type "B" Water Licence 2BE-HOP122. Combined, these camps have the capacity to house 360 workers.

Activities associated with the Madrid Advanced Exploration Program will be scheduled such that additional camp space will not be required during the construction, operations, or closure stages. It is expected that the Madrid Advanced Exploration Program will require a peak work force of up to 70 workers during construction of the roads, portal, and infrastructure, bulk sampling and exploration drilling and as few as 3 to 4 during closure.

4.1.5 Other

Fuel storage is available at Doris North Project at both the camp and mining infrastructure. Approximately 22.5 M litres of storage capacity is available for diesel fuel in variable volumes and storage facilities. Existing infrastructure is also in place to manage sewage, non-hazardous waste, and hazardous waste for the Doris North Project; this infrastructure will be used to support the proposed Madrid Advanced Exploration Program. No changes to existing Doris North Project infrastructure are required as a result of the advanced exploration program; however, some of the existing management plans will need to be updated to encompass the addition of the Madrid area.

4.2 MADRID NORTH ADVANCED EXPLORATION PROGRAM – PROJECT DESCRIPTION

The Madrid North area has been explored since the mid-1990s with activities including prospecting, surficial mapping and sampling, geophysical surveys (downhole, surficial and airborne) and diamond drilling. To support this exploration, various activities and infrastructure have been incorporated into the program including exploration camps (e.g., Windy Camp), quarry activities, drummed fuel storage and caches, helicopter access, ice airstrips, and all-weather and winter roads. Much of this existing infrastructure is part of ongoing remediation and reclamation efforts by TMAC.

The following text outlines the proposed infrastructure to be established at Madrid North as part of the Project. Preliminary engineering drawings are included in Appendix 4 and Figure 4.2-1. Completed investigations show that the location of the proposed infrastructure avoids known archaeological sites. Should sites be encountered during construction, mitigation measures are available that would be implemented for site recovery. All new infrastructure has been sited more than 31 m away from adjacent waterbodies.

4.2.1 Transport

4.2.1.1 Roads

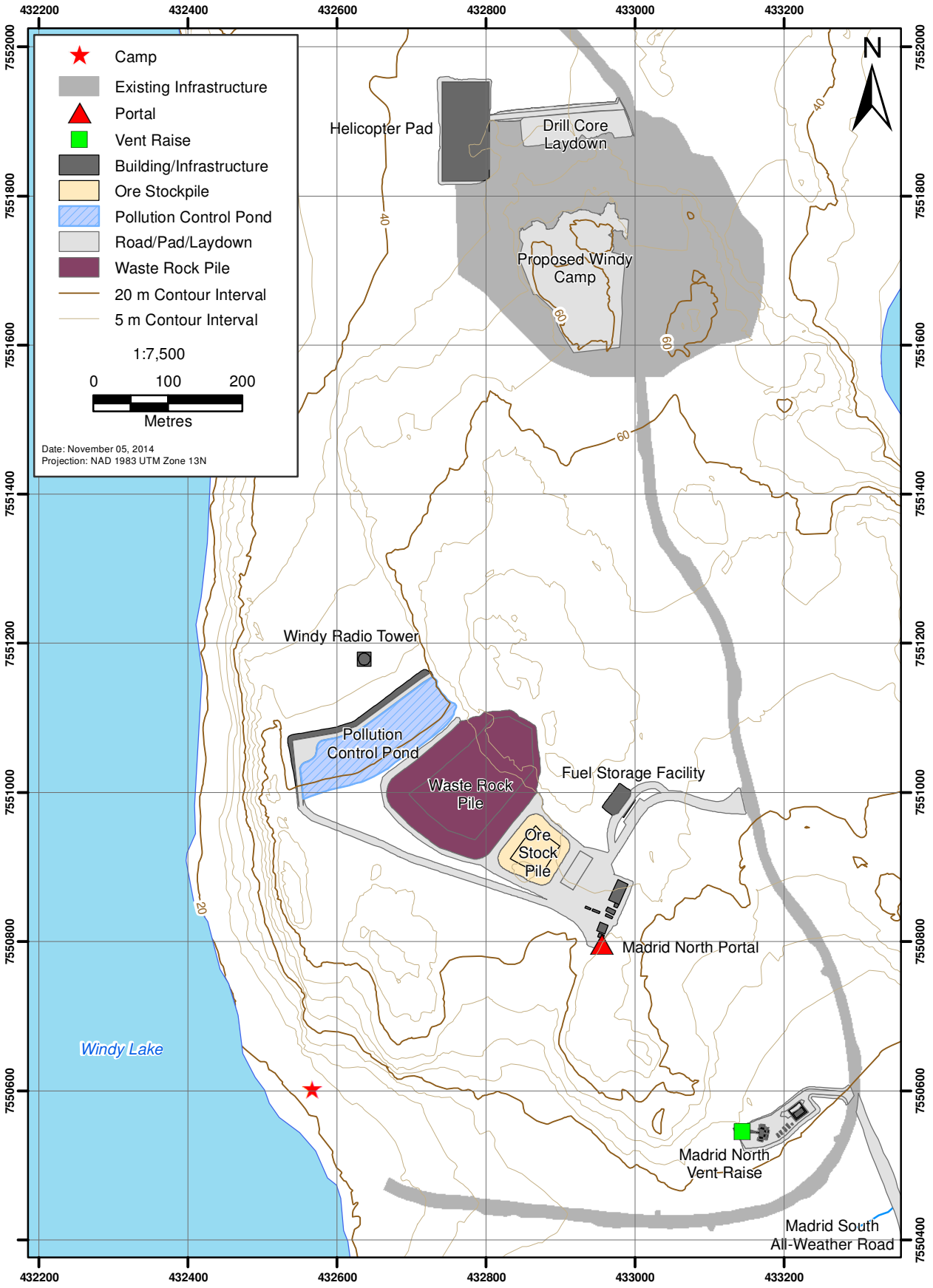
Madrid North is located about 9 km south of the Doris North Project camp, along the Doris North Project-Windy All-weather Road. An all-weather access road will turn off the Doris North Project-Windy Road at kilometre 8+600 and head west up to the Portal and Infrastructure Pad as well as waste rock and ore stockpiles. At kilometre 9+000 a second turn off, on the west side of the Doris North Project-Wind All-weather Road, will lead to the Vent Raise Pad. Prior to its construction TMAC may construct a winter road to access the area.

There are two road alignments at the Madrid North portal. The Portal Access Road alignment is the 225 m long by 9.5 m wide haul road which extends from the Doris North Project-Windy All-weather Road west to the Portal and Infrastructure Pad. The second road alignment is the 460 m long by 6 m wide access road which extends from the Portal and Infrastructure Pad to the Pollution Control Pond berm. It will be used only for light vehicle traffic use. A culvert is to be installed in the Doris North Project-Windy All-weather Road at the Portal Access Road to aid in surface water drainage.

The Vent Raise Access Road alignment is the 130 m long by 9.5 m wide. A culvert is to be installed in the Doris North Project-Windy All-weather Road at the Vent Raise Access Road to aid in surface water drainage.

Preliminary engineering drawings are included as Appendix 4-C. The roads will be constructed in accordance to SRK's Technical Specifications Earthworks and Geotechnical Engineering (SRK 2011c).

Figure 4.2-1
Proposed Site Layout for Madrid North
Advanced Exploration Program



4.2.2 Bulk Sample Stockpile

The Ore Stockpile pad is designed to accommodate approximately 50,000 to 55,000 tonnes of ore within a base area of 5,560 m^2. The ore stockpile will be constructed with an overall slope of 2.5 Horizontal to 1 Vertical (2.5H:1V). The ore stockpile will be placed on a pad consisting of a minimum of 1m thick Run of Quarry (ROQ), and/or mine operations waste rock, material placed over the original ground. This pad will maintain underlying permafrost conditions.

4.2.3 Waste Rock Storage and Disposal

The Waste Rock Stockpile pad is designed to accommodate at approximately 285,000 tonnes of waste rock within a base area of 21,530 m^2. The waste rock stockpile will be constructed with an overall slope of 2.5H:1V. The waste rock stockpile will be placed on a pad constructed of a minimum of 1m thick ROQ material placed over the original ground.

4.2.4 Laydown Areas

The Madrid North laydown area is located on the Portal Upper Pad. The pad (includes those for waste rock and ore storage) will be a minimum of 1 m thick ROQ for permafrost protection and to allow for adequate seepage drainage and will be in accordance to SRK's Technical Specifications (SRK 2011c). No excavation is allowed, except in designated rock quarries. All pads will be graded at 0.5% towards Pollution Control Ponds in order to control runoff and sedimentation.

The Portal Pad provides a base for the Shop, Laydown Area, Office trailers, Brine Mixing Facility, and the storage of calcium chloride. The Vent Raise Pad provides a base for the vent raise, air heating facility and fuel containment. Placement of the facilities is shown in Figure 4.2-1.

4.2.5 Borrow Pits and Rock Quarries

The completion of the Madrid Advanced Exploration Program will require quarry material from five quarries. Three of these quarries (Quarries A, B, and D) are located along the Doris North Project-Windy All-Weather Road and are currently permitted, approved quarries. Two new quarries (Quarries G and H) will also be required. Quarry G is located along the proposed access road to Madrid South and Quarry H is located at the Madrid South bulk sample site.

The existing quarries (A, B, and D) and new quarries (G and H) combined will supply ROQ material needed for the construction of the road network and infrastructure pads needed for the Project. The management and monitoring of these quarries will be done so in accordance with Hope Bay Belt, Quarry Management and Monitoring Plan (Appendix 8-C).

4.2.6 Underground and Aboveground Equipment

Tables 4.2-1 and 4.2-2 summarize the dedicated equipment expected for the Project. This equipment list is preliminary and may be refined as the Project advances. Personnel will be bussed from Doris North Project camp to Madrid North using the existing busses at Doris North Project.

Table 4.2-1. Underground Equipment List for Madrid Advanced Exploration Program

Item	Model	Qty	Description
Jumbo drill	Sandvik DD321	2	2 boom jumbo drills used for development rounds
Roof bolter	McLean MEM928	2	Scissor deck bolter used for installing ground support
LHD scoop	Sandvik LH514	2	6 m^3 capacity bucket underground loader for excavating ore and waste
LHD scoop	Sandvik LH307	1	3 m^3 capacity bucket underground loader for excavating ore and waste in narrow drifts and stopes
Haul truck	Sandvik TH540	2	40 tonne capacity underground haul truck for moving ore and waste to surface
Alimak	ABI-5A Single Drive	1	Rail raise climber for developing vertical ventilation raises
Grader	Miller M86	1	Underground grader for maintaining ramps
Boom truck	McLean BT-3	1	Underground truck for transporting supplies
Shifter truck	Miller Toyota Landcruiser	4	Underground light truck for transporting supervisors and support and technical services personnel
LH drill	Sandvik DL331-5	1	Longhole drill for wide stopes
LH drill	Boart Stopemate	1	Longhold drill for narrow stopes
Loader	Cat 930 Loader	1	Loader for stockpile surface stockpile maintenance and underground services

Table 4.2-2. Surface Equipment List for Madrid Advanced Exploration Program

Item	Model	Qty	Description
Blasting drill	Sandvik Ranger DX800	1	Drill for quarry operations
Haul trucks	Caterpillar 725	1	25 tonne capacity for moving quarry material to construction site and hauling ore to Doris North Project
Haul trucks	Caterpillar 740	2	40 tonne capacity for moving quarry material to construction site and hauling ore to Doris North Project
Loader	Caterpillar 988	1	Loading material onto the haul trucks and crusher
Excavator	Caterpillar 325	1	For construction and maintenance of infrastructure at the pad, portal, and road
Bulldozer	Caterpillar D6		For construction and maintenance of infrastructure at the pad, portal, and road
Explosives truck	To be specified	1	To transport explosive from the Doris North Project facility for delivery to the quarry
Crusher	Clemro	1	To size quarry material to appropriate size for use in construction and maintenance of infrastructure
Pickup trucks	Ford F350	2	Personnel transportation
Diamond drills	To be specified	6	To extract core samples on underlying geologic material for logging and sampling

4.2.7 Water Management

Windy Lake is in the Madrid North area and has been used as water supply for surficial exploration diamond drilling in the area and for an exploration camp (currently being decommissioned). Windy Lake currently provides domestic water for the Doris North Project.

There will be no camp facilities at Madrid North; however, potable water will be needed for domestic use in the office and emergency/medical facilities. Water use is principally industrial use to support mining the bulk sample. Water is needed to prepare brine for drilling in the underground workings. Surficial diamond drilling will also require water to prepare drilling mud. Water will also be required for the construction of seasonal winter roads and dust management

The goal of the water management system for Madrid North will be to use intercepted contact water in preference to lake water for make-up water and to maximize the mine water reuse within the underground workings. Runoff from the Waste Rock/Ore Pad and the Portal and Infrastructure Pad will be collected in the Pollution Control Pond and transferred by truck or pumped to the 50,000 L tank. Make-up water for the BMF will be drawn from this tank. Make-up water should only be needed when water already used from drilling can no longer be recycled. Make-up water will only be drawn from Windy Lake when it cannot be drawn from the Pollution Control Pond. Engineering drawings for Madrid North pads and access are provided in Appendix 4-A and include plans and details regarding the water access point and water storage tank, Pollution Control Pond location, and berm specifications. Excess water collected in the Pollution Control Pond will be discharged to the tundra (if compliant with established discharge criteria) or transported to TIA for disposal.

There will be a single Pollution Control Pond at Madrid North located down gradient of the portal, ore and waste stockpile pads. The Pond will act as a sedimentation basin and will be lined with a geomembrane. The Pond will be contained by a 6-m wide berm designed to allow for light vehicle access around the Pond for regular inspection; to assist in accommodating any required maintenance; and to allow for a vacuum truck to remove any retained water. Conceptual level engineering drawings are included in Appendix 4-A. The surface area of the Pollution Control Pond is up to 13,900 m^2 with a maximum depth of 2.8 m.

The Pollution Control Pond will have the capacity to contain flow from the overall drainage area plus 25% of the annual snow coverage combined with a 100-year, 24-hour storm event or an approximate 15,100 m^3 in total.

The run-off water captured by this Pond will be used within the Brine Mixing Facility or discharged at an approved location.

Further details are included in Appendix 4-A, including the conceptual level engineering drawings of the Pollution Control Ponds, and the sizes and quantities of rip rap.

Water management plans for operations and closure or temporary closure, are presented separately below and in Appendix 8.

4.2.8 Water Management during Operations

The sources of water during operations are runoff from the Portal Pad, waste rock and ore stockpiles and water drawn from Windy Lake. During operations, the underground bulk sampling water demand will be supplied from three sources listed in priority as follows:

1. Reused contact water collected in underground settling sumps;
2. Contact water from waste rock and ore stockpiles, collected and stored in the Pollution Control Ponds; and
3. Freshwater from Windy Lake.

Water will initially be drawn from Windy Lake to make brine for drilling. Brine used underground will be reused to maximum extent possible by settling solids in sumps underground. Some of the drilling brine will be lost in waste rock and ore, and make-up water will be required.

Contact water runoff from the portal pad, and waste rock and ore stockpiles will be collected in the Pollution Control Pond.

Water will be trucked or pumped from the Pollution Control Ponds and stored in a 50,000 L tank, as needed. Water will be pumped from this tank through the BMF. This additional brine will be used for underground drilling as needed.

The total brine/water usage per day for development will be approximately 23 m^3. If the Pollution Control Ponds and underground settling sumps cannot meet the demand for brine, make-up water will be obtained from Windy Lake. Freshwater will be extracted from Windy Lake at a location along the eastern shoreline using a water truck with a mounted mechanical pump and hose. The intake end of the hose will be screened in accordance with guidelines for pump intakes published by DFO (1995).

4.2.8.1 Excess Water Management

Any excess water from the underground workings will be pumped to the surface to the Pollution Control Pond. Water from the Pollution Control Pond that meets criteria (Section 7) will be discharged to the tundra. If these criteria cannot be met, water in the Pollution Control Pond will be trucked to the Doris North Project and discharged to the existing Doris North Tailings Impoundment Area (TIA).

4.2.9 Closure and Temporary Closure

In the case of temporary mine shut down, or permanent closure, water management will be adjusted such that:

- Runoff from the portal pad, waste rock dumps and ore stockpiles will be collected in the Pollution Control Ponds for settling, and if meets discharge criteria will be discharged to the environment, or if noncompliant, excess contact water will be transported to the TIA for disposal.

- Any remaining waste rock or ore remaining on the stockpiles will either be transported to Doris North Project or covered in place with a HDPE liner to eliminate contact, or some combination of both management approaches.

4.2.10 Chemicals and Hazardous Materials

4.2.10.1 Explosives Use and Storage

Regulations governing the storage and mixing of explosives require that powder and detonators are stored in independent magazines and that all storage magazines, bulk ammonium nitrate and the mixing plant be separated by minimum distances based on the amounts being stored (NRCan 1995).

Explosives used in the Madrid Advanced Exploration Program will be sourced from the Doris North Project Explosives Mixing and Storage Facility, as approved under water licence 2AM-DOH1323. This facility has not yet been constructed. Until this facility is available, pre-packaged explosives will be used and transported, handled and stored in temporary storage facilities located at Madrid North that meet NRCan regulations and related territorial regulations.

Explosives required for the bulk sample and for quarry operations will be transported to the site daily. Once the underground project has advanced to the appropriate depth an underground Type 4 magazine will be constructed and used to store explosives transported from the Doris North Project Explosives Facility necessary for the completion of the underground development and production. Estimates of explosive use are 1.40 kg ANFO per BCM (banked cubic metre) for quarry rock and 75 kg per metre of underground drilling or 3 kg per BCM.

4.2.10.2 Chemical Transport, Handling, and Storage

The bulk sample will require the use of two chemicals: a flocculent for the suppression of sediment in the Pollution Control Pond and salt (calcium chloride ($CaCl_2$) or sodium chloride ($NaCl_2$)) to be used in the diamond drilling necessary for blasting. These chemicals will be transported to Madrid North via trucks in bulk for temporary storage in their designated areas. The flocculent will be stored in the Madrid North Laydown Area as shown in Figure 4.2-1. A salt storage area for calcium chloride or sodium chloride will be located adjacent to the BMF.

4.2.10.3 Fuel Handling and Storage

Fuel will be delivered to the Doris North Project fuel storage facilities as part of the annual sealift resupply and will include fuel for the Madrid Advanced Exploration Project. There will be two locations where fuel will be stored at Madrid North. A 75,000 L double-walled tank will be located at the Fuel Transfer Station on the Infrastructure Pad and a 60,000 L double-walled fuel storage tank will be located at the Fuel Storage Facility on the Vent Raise Pad. The Fuel Transfer Station is 40 m from Windy Lake and the fuel storage tank facility at the vent raise is 150 m from Patch Lake. These are the nearest waterbodies to the fuel facilities.

The double-walled fuel storage tank at each location will be placed into a lined containment facility (This HDPE lined containment will be designed to accommodate 110% of the tank volumes plus 10%

of the fuel transport truck as well as 25% of annual snow cover combined with a 1-in-100 year 24-h storm event). In the case of the Fuel Transfer Station (75,000 L) and the Vent Raise Fuel Storage tank (60,000 L) the bermed containments will hold up to 135,000 L and 110,000 L respectively. In addition, each of these containment areas will be equipped with a fuel transfer apron. A sump will be installed in one corner of the containment to allow for collection and removal of runoff and snow melt that accumulates inside the containment. This discharge will be collected and if below effluent criteria proposed in Table 7.6-1 it will be discharged to the tundra; if above these limits, the contact water will be transported and disposed in the Pollution Control Pond.

The fuel transfer stations will be designed to the following codes and guidelines:

- NFPA 30 – Flammable and Combustible Liquids Code 2008 Edition;
- Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products - Canadian Council of Ministers of the Environment; and
- Canada Gazette Part 1, Vol 141, No. 14 April 7, 2007.

The facilities will be staffed and monitored continuously during fuel transfer events and inspected at least once daily at other times to ensure that any potential releases to the containment are identified and mitigated prior to any adverse impact to the environment.

Any uncontrolled discharge or spill of regulated materials will be managed according to the Spill Contingency Plan (TMAC 2014) and according to all applicable regulatory requirements in order to mitigate possible impacts.

4.2.11 Waste Management

4.2.11.1 Waste Water (Grey Water, Sewage, and Other)

To optimize site footprint, no standalone waste water treatment facilities will be established at Madrid North. All grey water and sewage will be transported to Doris North Project to be processed within licensed facilities operating according to the approved Wastewater Treatment Management Plan (SRK 2014c). In general, the wastes will be collected by a sewage effluent vacuum truck and dispensed to a lift station in the Doris North Project Camp wastewater treatment system for processing through the bio-membrane plant. Treated effluent is monitored for quality and volume and discharged in accordance with the requirements of Doris North Project Water Licence 2AM-DOH1323. If "Pacto"- type portable toilet facilities are used, these wastes will be returned to Doris North Project for incineration. The management of contact water from the waste rock dump, ore stockpile and portal pad and underground workings is described in Sections 4.2.7, 4.2.8, and 4.2.9.

4.2.11.2 Solid Waste

To optimize site footprint, no standalone solid waste management facilities will be established at Madrid North. All combustible, non-hazardous waste will be transported to the Doris North Project facilities to be incinerated according to the approved Incinerator Management Plan (HBML 2012c). Only food waste and domestic waste approved for inclusion in the incinerator waste stream is

burned. Recycling and established waste sorting within work areas will divert non-burnable solid waste from the incinerator. All non-combustible, non-hazardous waste and recyclables will be stored in suitable containers and disposed in or transferred to approved on-site or offsite facilities.

4.2.11.3 Hazardous Waste

All hazardous waste will be transported to Doris North Project to be managed according to the approved Hazardous Waste Management Plan (HBML 2012).

Any soil, overburden, and/or snow contaminated with light hydrocarbons (diesel or gas) at the Madrid Advanced Exploration Program will be transferred to the Doris North Project Landfarm Facility for treatment. This multi-cell, multi-treatment stage approved facility is operated in accordance with the Doris North Project Landfarm Management Plan (SRK 2014a). Heavy petroleum (motor oil and grease) contaminated soil, overburden and snow will be excavated and placed in suitable containers to be shipped to the Doris North Project waste management facility staging area at Roberts Bay and shipped off-site for final disposal.

4.3 MADRID SOUTH ADVANCED EXPLORATION PROGRAM – PROJECT DESCRIPTION

The Madrid South area has been explored since the early 1990s with activities including prospecting, surficial mapping and sampling, geophysical surveys (downhole, surficial and airborne) and diamond drilling. To support this historic exploration, various activities and infrastructure have been incorporated into the program including exploration camps (e.g., historic Wolverine Camp), drummed fuel storage and caches, helicopter access, ice airstrips and winter roads.

The following text outlines the proposed infrastructure to be established at Madrid South as part of the Project. Preliminary engineering drawings are included in Appendix 4-B and Figure 4.3-1. Completed investigations show that the location of the proposed infrastructure avoids known archaeological sites. Should sites be encountered during construction, mitigation measures are available that would be implemented for site recovery. All new infrastructure has been sited more than 31 m away from adjacent waterbodies.

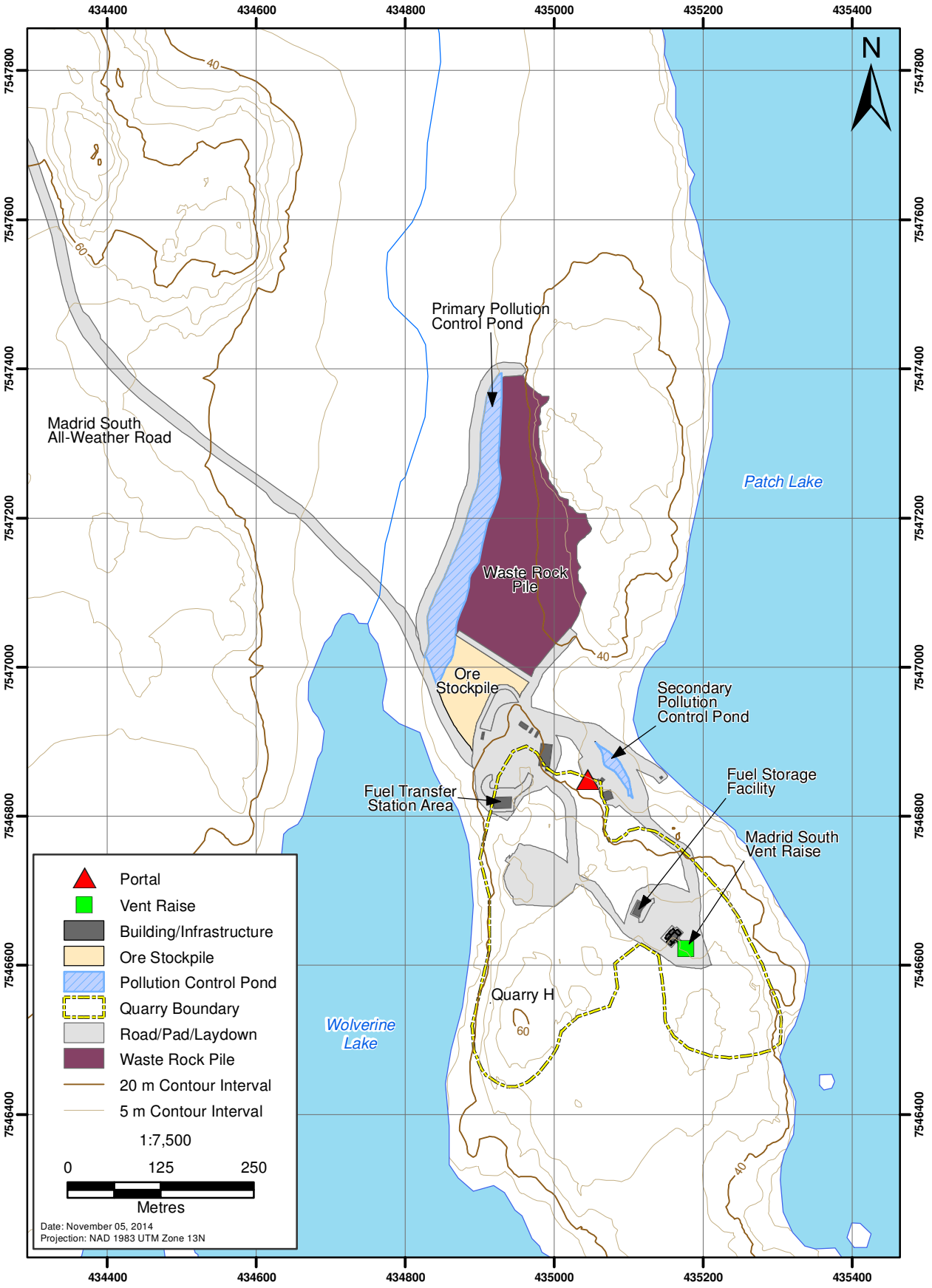
4.3.1 Transport

4.3.1.1 Access Road

Currently there is no permanent access to Madrid South and therefore TMAC proposes to construct a 4.7 km long all-weather road which will branch off from the southernmost end of the existing Doris North Project-Windy All-weather Road (Appendix 4-C). Prior to its construction TMAC may construct a winter road to access the area.

The all-weather road will allow dual lane traffic for vehicles travelling more frequently, such as trucks and crew busses, while allowing single lane traffic for occasional oversize vehicles. Strategically placed road turnouts provide safe use by oversized vehicles (single lane use). To allow water flow, water crossings will be via installation of closed culverts.

Figure 4.3-1
Proposed Site Layout for Madrid South
Advanced Exploration Program



The route extends south from the existing Doris North Project-Windy All-weather road crossing the topographic low (requiring a culvert stream crossing) between Patch and Windy Lakes. After about 0.6 km, the route turns southwest and runs uphill for about 0.6 km onto high well-drained ground. The route continues due south for about 1.5 km before turning south-east heading downhill for about 1.7 km towards the second topographic low (requiring a second culvert stream crossing) between Patch Lake and Wolverine Lakes. Madrid South is reached 0.3 km further.

Animal crossings will be constructed along the all-weather road alignment if required. It is proposed that the actual location of these crossings be determined by Elders after construction of the road has been completed.

4.3.1.2 Madrid South Roads

There are two road alignments to be constructed within the Madrid South footprint. The first road alignment is approximately 500 m long and is a combined haul road and vent raise access road on the east side of the site. The second road alignment is approximately 250 m long and is an infrastructure access road which extends from the Infrastructure Pad past the Laydown Pad to the Vent Raise Pad along the southwest side of the site.

The haul road connecting the Infrastructure Pad to the Madrid South portal is 16 m wide to allow for two-way traffic, of larger vehicles, to and from the waste rock and ore stockpiles. The Vent Raise Access Road section and the Infrastructure Access Road will only carry light vehicle traffic and have therefore been designed with a final road crest width of 8 m.

4.3.2 Bulk Sample (Ore) Stockpile

The Ore Stockpile pad is designed to accommodate approximately 50,000 to 55,000 tonnes of ore within a base area of 12,200 m^2. The ore stockpile will be constructed with an overall slope of 2.5H:1V. The ore stockpile will be placed on an underlying pad consisting of a minimum of 1m thick Run of Quarry (ROQ) material and/or mine waste material placed over the original ground. This pad maintains the underlying permafrost conditions and is graded toward the Primary Pollution Control Pond to control runoff

4.3.3 Waste Rock Management

The Waste Rock Pile pad is designed to accommodate approximately 225,000 tonnes of waste rock. The waste rock pile pad has a base area of 31,230 $m^2$and will be constructed of a minimum of 1 m thick ROQ placed over the original ground to maintain the underlying permafrost conditions. This pad is graded toward the Primary Pollution Control Pond to control runoff. The waste rock pile will be constructed on the pad with an overall slope of 2.5H:1V.

All waste rock placed on the pad will be managed in accordance with the Madrid South Waste Rock Management Plan (Appendix 8-B).

4.3.4 Laydown Area and Infrastructure Pads

The Madrid South laydown area and infrastructure pads include: the Infrastructure Pad; the Portal Pad; Upper Portal Pad, and the Vent Raise Pad. All pads will be a minimum of 1 m thick ROQ for permafrost protection and to allow for adequate seepage drainage and will be constructed in accordance with SRK's Technical Specifications, Earthworks and Geotechnical Engineering (SRK 2011c). No cut is allowed, except in designated rock quarries. All pads will be graded at 0.5% towards the Pollution Control Ponds in order to control runoff and sedimentation.

The Infrastructure Pad provides a base for the Shop, Fuel Transfer Station, Laydown Area, and Office trailers. The Vent Raise Pad provides a base for the vent raise, air heating facility and fuel storage. The Upper Portal Pad provides a base for the water storage tank. The Madrid South Portal Pad provides a base for the brine mixing facility and the storage of calcium chloride ($CaCl_2$). The Brine Mixing Facility will be moved underground once the main ramp is sufficiently sized to allow safe underground mining operations and mixing facility operations. Placement of the facilities, when on surface, is shown in Figure 4.3-1.

4.3.5 Borrow Pits and Rock Quarries

The completion of the Madrid Advanced Exploration Program will require quarry material from five quarries. Three of these quarries (Quarries A, B, and D) are located along the Doris North Project-Windy All-weather Road and are currently permitted, approved quarries. Two new quarries (Quarries G and H) will also be required. Quarry G is located along the proposed access road to Madrid South and Quarry H, is located at the Madrid South bulk sample site.

The existing quarries (A, B, and D) and new quarries (G and H) combined will supply the Run of Quarry (ROQ) material needed for the construction of the road network and infrastructure pads needed for the Project. The management and monitoring of these quarries will be done in accordance with Hope Bay Belt, Quarry Management and Monitoring Plan – Revision 02 (Appendix 8-C).

4.3.6 Underground and Aboveground Equipment

The same equipment that will be used at Madrid North will be used at Madrid South (see Table 4.2-1 and Table 4.2-2).

4.3.7 Water Management

Madrid South is an undeveloped site with no current water use. No changes to the waterbodies or water courses are required for the project. Historically, the waterbodies in Madrid South area have been used to supply water for diamond drills.

There are no camp facilities at Madrid South; however, water will be needed for domestic use in the office and emergency/medical facilities. Industrial water use will be required for mining the bulk sample and for construction and maintenance of winter roads as needed. Specifically, water is needed to prepare brine for drilling in the underground workings, for surficial diamond drilling, in the preparation of drilling mud and for access road dust suppression.

The goal of the water management system for the Madrid Advanced Exploration Program will be to collect and reuse as much contact water as possible in preference to using lake water. Some freshwater will be required initially and for make-up water during the mining of the bulk sample, and freshwater is used seasonally for ice road construction and dust suppression. Water management plans also maximize the mine water reuse within the underground workings. Runoff from the waste rock and ore stockpiles and the Portal Pad will be collected in Pollution Control Ponds and transferred by truck or pumped to the 50,000 L water storage tank. Water for the Brine Mixing Facility (BMF) will be drawn from this tank. Make-up water for underground drilling should only be needed when water already used for drilling can no longer be recycled. Make-up water will only be drawn from Patch Lake when it cannot be drawn from the Pollution Control Ponds. Engineering drawings for the Madrid South pads and access in Appendix 4-B include details regarding intake location and water storage tank, Pollution Control Pond locations, and berm specifications. Excess water collected in the Pollution Control Ponds will be discharged to the tundra (if compliant with established discharge criteria), or if non-compliant will be transported to the TIA for disposal.

There are two Pollution Control Ponds at Madrid South. The Ponds will be lined with a geomembrane and will act as sedimentation basins, facilitating the settling of suspended solids. The run-off water captured by these Ponds will be used within the BMF or removed for disposal to the TIA.

The primary Pollution Control Pond will be constructed downstream of the waste rock and ore stockpiles and will be contained by an 8-m wide berm which will double as a roadway and allow for access around the Pond and to the waste rock storage location. The surface area of the primary Pollution Control Pond is 12,300 m^2 and has the capacity to contain flow from the overall drainage area plus 25% of annual snow coverage combined with a 100-year, 24-hour storm event or approximately 15,000 m^3 in total.

The secondary Pollution Control Pond is located next to Madrid South portal and the BMF. This Pond will be contained by a 6-m wide berm. This berm has been designed to allow for light vehicle access around the Pond for regular inspection and to assist in accommodating any required maintenance. The secondary Pollution Control Pond has the capacity to contain flow from the overall drainage area plus 25% of the annual snow coverage or an approximate total of 900 m^3. However, it is expected that this Pond will always be operated in a manner as to allow for pumping to commence as soon as the containment volume is large enough for one continuous hour of pumping.

Water management plans for operations and closure or temporary closure, are presented separately below and in Appendix 8.

4.3.8 Water Management during Operations

Water management during operations at Madrid South will be similar to water management at Madrid North with freshwater supply provided by Patch Lake. See Section 4.2.8 for details.

4.3.9 Closure and Temporary Closure

Closure at Madrid South will be similar to closure at Madrid North. See Section 4.2.9 for details.

4.3.10 Chemicals and Hazardous Materials

Management of chemicals and hazardous materials at Madrid South will be similar to management at Madrid North. See Section 4.2.10 for details.

4.3.11 Waste Management

Waste management at Madrid South will be similar to management at Madrid North. See Section 4.2.11 for details.

4.4 EXPLORATION ACTIVITIES

Although the Madrid Area is moving into more advanced exploration activities, surficial exploration will continue as well. Geologic and geophysical mapping, diamond drilling, and sampling provide statistically robust estimates of the extent and quality of the deposit and the improved geologic knowledge of the area. The surface drilling at Madrid North and South, in combination with underground drilling and the bulk sample program, will collectively provide information that will support an upgrade to the mineral resource estimated to a higher classification. Surface exploration will continue in the Madrid area over the next several years.

All surface exploration activities will occur in consultation with the project archaeologist, and exploration personnel will be trained in archaeological site recognition and reporting. Locations of drill infrastructure or other activities will be > 31 m from waterbodies and be visually pre-surveyed for the presence of nests and dens. The drill inspection and monitoring program will be implemented to ensure impacts from exploration are minimized. A program of progressive reclamation will be undertaken for all surface drilling. Immediately upon completion of drilling, all casings and other materials will be removed, and disturbed areas will be returned to natural land conditions to the extent practicable.

4.4.1 Diamond Drilling

The diamond core drilling uses a core barrel and bit with a hollow diamond drill bit to collect a continuous sample of rock. These samples will be transported to Doris North Project camp for processing in the core logging and sampling facilities. The associated water use and waste management with core logging and sampling completed as part of the Project will be conducted in the same manner as currently permitted under 2BE-HOP1222 and 2AM-DOH1323. Management of exploration diamond drilling will be incorporated into the current exploration management plans.

Diesel fuel will be stored in small double-walled fuel tanks at each drill site. Quantities will vary, but should not exceed ~1,500 L at a time, and will have spill containment protection.

Chemicals used during drilling activities include calcium chloride (salt) used to prevent freezing of the water in the hole, Visco which is used as a lubricant in the hole, linseed soap for cleaning of drill string components, and heavy grease to prevent seizure of drill rods to each other. Salt will be stored in appropriate containment, while the other materials are stored within the drillers' sea-cans located on site. Small quantities of each material are also located with each drill.

4.4.2 Water Use

In Arctic permafrost drilling conditions, diamond drilling requires a drilling fluid that uses water that is either heated and/or saline to maintain the sample and drill efficiency. To maintain a properly conditioned drill hole, drilling fluids are added to drill water and injected down the hole. Additives, such as polymers, assist in lubrication, wall cake suspension, and other functions needed for different drilling conditions. Flocculent agents are used to assist in removing drill cuttings from the drill water supply in the event that recirculation and containment of fluids/spoils are required. Calcium chloride ($CaCl_2$) is used to lower the freezing point of drill fluids to allow them to remain in liquid form while drilling in freezing subsurface conditions.

Water supply for the individual drill sites will be provided by any nearby lake that has a surface area of at least 15,000 m^2 in surface areas and, if drawing water from under ice, complies with DFO "Water Withdrawal Under Ice" guidelines. Intake screens will also incorporate DFO best management practices for the protection of fish. For many drill locations, Patch and Windy Lakes will serve as the source of water. Water is metered and recorded daily as consumed by each drill, or tracked by delivered truckload to temporary water supply tanks when drills are located adjacent to the road system.

4.4.3 Waste Management

Water from the drill will be recycled to minimize the quantity of freshwater used, and allowed to freeze in the hole upon completion of the drilling. Experience in this region indicates that freezing of the hole takes place in a timeframe ranging from hours to days. Excess brine generated during the drilling process will be removed from the drill site and deposited onto waste rock piles, into Pollution Control Ponds, or discharged to the TIA.

Drill cuttings are pumped to a cuttings management containment system that allows the cuttings to settle and separate from the drill water. The clarified water is re-circulated through the system. If "brine free", cuttings sludge may be deposited in a natural depression in the vicinity of the drillhole, or transported by helicopter to a central cuttings management area where direct flow into a waterbody is not possible and no additional impacts are created. If the cuttings are contaminated with brine, they are transported to a separate contaminated cuttings management facility where runoff is captured for treatment or transfer to an appropriate wastewater disposal facility (e.g., Doris North Project TIA).

4.4.4 Airborne, Surficial, and Downhole Geophysics

Geophysical methods are used to describe the magnetic and gravity properties of the geologic material. No water is used and no wastewater is produced and this activity is included to provide a comprehensive list of activities that may occur as part of exploration activities.

4.4.5 Prospecting, Trenching, Mapping, and Sampling

Prospecting and mapping typically involve surficial investigations to systematically identify the underlying geologic material and mineralization. This program also involves the collection of

samples collected by hammer from outcrops or from shallow depths using mechanical methods such as channel saws and portable/back-pack diamond drills. Water needed for the mechanical methods would be provided by local nearby lakes.

Trenching involves the use of heavier equipment to excavate the underlying material to access areas to sample. No trenching is planned at this time in the Madrid Area; however, if needed to improve geologic understanding or inform ongoing feasibility studies, an amendment will be requested.

5. ENVIRONMENTAL AND SOCIAL SETTING

5.1 BASELINE STUDIES

Baseline environmental studies covering multiple years of data collection have been conducted in the Hope Bay Belt (comprising the Madrid Advanced Exploration Program, "the Project" region) since 1993, and are still ongoing today (Figure 3.5-1). Various components describing both the physical and biological environment have been studied in and around the Project area, in addition to various socioeconomic-related studies. A comprehensive list of all baseline data relevant to the Madrid Advanced Exploration Program Type B Water Licence Application is provided in Appendix 5. A summary of this available information is described in the sections below.

5.2 PHYSICAL ENVIRONMENT

The Hope Bay Belt property (Figure 3.5-1) is located within the Queen Maud Gulf Lowlands, in the east-central portion of the West Kitikmeot region of Nunavut, approximately 685 km northeast of Yellowknife. A number of protected areas exist within the West Kitikmeot Region; however, no sites overlap with the Project area.

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 area is seismically stable, lying in Canada's lowest category for seismic hazard (NBC 2011). The topography of the area is typical of coastal lowlands in the Arctic, characterized by low and moderate relief with some high relief features. Watersheds are generally long and narrow, predominantly orientated along the north-south axis. The Belt area became ice-free from the most recent glaciation about 8,800 years ago as the Laurentide Ice Sheet melted back towards the southeast, leaving a blanket of basal till (morainal deposits). During this glacial recession, sea level was higher and 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, resulting in areas with exposed moraine and/or bedrock.

Permafrost is continuous and deep (up to 500 m) with low ice content across the entire Project area (WKRLUP 2005). The active layer is generally less than 1 m thick in morainal sediments, but is expected to vary considerably with surficial geology and may be as much as 5 m deep in coarse sediments such as glaciofluvials. Taliks (unfrozen ground in otherwise continuous permafrost) are expected to be present beneath current and pre-existing surface water features.

The Madrid area within the Hope Bay Volcanic Belt comprises a north-south striking package of mafic volcanic rocks, with gold mineralization in the corridor being most commonly associated with the Fe-Ti tholeiites, and is structurally controlled by a large-scale zone of deformation (Madrid Deformation Zone) trending north-south along Patch Lake and at its northern end sharply changes orientation to an east-west trend across Windy Lake (TMAC 2013). Four zones comprise the gold mineralization with the Madrid trend.

Geochemical variability according to lithology and/or sample location was assessed in 2010 for additional quarry locations proposed in this application (Quarries G and H) by sampling numerous drillholes at selected locations (SRK 2014d). Results obtained through this characterization program revealed that material from both quarries have a low potential for ARD generation and low sulphur content. Materials are thus considered suitable for construction-related purposes (i.e., road and other infrastructure associated with the Project).

Climate in the region can be described as a subarctic desert with limited rainfall. The region is characterized by long dark winters and short bright summers. Meteorological baseline studies, involving a variety of automated and manual methods, have been conducted in the Madrid area since 1993 through the use of the Doris North Project meteorological station. 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 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.

Groundwater is generally controlled by topography, the distribution of hydraulic conductivity, and permafrost extents in the Project area. Flowing groundwater only exists within the permafrost where salinity depresses its freezing temperature, and is present in pore spaces in the active layer (during summer only), in taliks, beneath the permafrost, and in cryopegs. It is anticipated that the Madrid South underground activities will intercept groundwater when operating in areas of taliks. Groundwater in the Project area has been identified as saline, with a salinity (total dissolved solids) content similar to seawater (Roscoe Postle Associates Inc. 2013).

Rivers in the Project area have stream flow typical of the Arctic nival regime (Church 1974). The long and severe Arctic winter, and brief time when air temperatures are above freezing, limit surface water activity to a short period. Surface water flow typically begins in late May or early June, and rapidly rises to peak annual flow by early to mid-June. Snow that accumulated over the long winter is usually the dominant contributor of water to stream flow on an annual basis. Shortly after air temperature rises above freezing, the snow melts rapidly.

After the snowmelt-fed freshet, stream flow steadily decreases to a summertime minimum, which typically occurs in August. Due to the presence of permafrost, there is limited groundwater supply to smaller streams; however, there may be interaction between groundwater systems and larger rivers and/or lakes through taliks. Although snowmelt is typically responsible for the majority of runoff in most years, this may not be the case in exceptionally rainy seasons. In October, air temperature normally dips below freezing, precipitation begins to fall as snow, and stream flow ceases for the winter except in rivers with very large watersheds. Based on the results of hydrometric monitoring in the Project area, all monitored streams freeze solid in the winter with the exception of the Koignuk River, which retains under-ice liquid water in isolated pools separated by frozen sections of the river (Rescan 2009b, 2011d). However, no under-ice flow has been measured in the Koignuk River.

The northern portion of the Hope Bay Belt (Doris and Madrid areas) consists of two main watersheds: Windy-Glenn (48 km^2) and Doris-Roberts (194 km^2). The Project area extends into two watersheds: Windy Glenn (48 km^2) in Madrid North and Doris-Roberts (194 km^2) in Madrid South. Numerous hydrometric stations have been installed and operated throughout the Hope Bay Belt since the mid-1990s, allowing for multiple data years for many of the major lake drainage outlets

within Madrid areas. Automated monitoring began in 1996 and continues, to various levels, to the present. Streams in the Madrid area generally have low gradients and low bank slopes. Lakes may drain through channelized, permanent outlet streams or undefined, dispersed, and ephemeral drainages. In defined channels, substrate is generally composed of sand, gravel, and cobbles.

Bathymetric information, collected between 1993 and 2007, is available for numerous waterbodies located in the Project area, as are physical limnology characteristics, collected during the ice-covered and or the open-water season, from 1995 to 1998, 2007, 2009, and 2010. Profiles of dissolved oxygen concentrations and temperatures are typical of ice-covered Arctic lakes over both winter and open-water seasons. Ice cover is approximately 2 m thick and water temperatures are coldest just below the ice. Dissolved oxygen concentrations were highest near the water-ice interface, averaging 13.0 mg/L, and gradually decline with depth. Bottom waters in some lakes (e.g., Ogama and Wolverine lakes) were nearly anoxic (≤ 1 mg/L dissolved oxygen). In open-water season the lakes in the area mix fully at least two times per year resulting in well mixed or weakly stratified lakes. Dissolved oxygen concentrations are generally saturated to super-saturated, and remained relatively constant throughout the water column (Rescab 2010a, 2011d). Water clarity is variable amongst lakes, and can likely be attributed to relatively high phytoplankton biomass or the re-suspension of fine sediments along the shoreline resulting from wave action and strong winds common to the area.

Based on available baseline data the Madrid area freshwater is neutral to slightly alkaline, and contain variable concentrations of nutrients and metals; some seasonal water trends are apparent. Madrid area lakes have typically low nutrient concentrations, particularly during summer months, and are characterized as being ultra-oligotrophic to mesotrophic. Mean metal concentrations in Madrid area lakes are generally below CCME (Canadian Council of Ministers of the Environment) guidelines, except for a few lakes that are naturally elevated in aluminum, chromium, copper, and iron (Rescan 2010a). Lake sediments also exhibit some naturally elevated metal concentrations that exceed CCME Interim Sediment Quality Guidelines (ISQG), including arsenic, chromium, and copper; these metals concentrations were often higher than CCME ISQGs.

Multiple stream water quality baseline studies were conducted in the Madrid in 1996, 1997, and 2006 to 2009. Streams tend to be neutral to slightly basic, and have variable turbidity levels. Maximum concentrations of some nutrients (total phosphorus and ammonia) and metals (chromium and nickel) tend to occur during freshet. Stream sediments, containing lower metal concentrations than lake sediments, were also naturally high in chromium.

5.3 BIOLOGICAL ENVIRONMENT

5.3.1 Terrestrial Ecosystems

Over the years, various data describing existing biological environmental conditions have been collected within the Madrid area.

A number of baseline vegetation studies have been conducted in the Hope Bay Belt area from 1996 to 2011 (Rescan 1997a, 1997b, 2010c; Golder 2009). A preliminary regional Ecosystem Land Classification (ELC) system developed by Golder (2009) was used to classify vegetation in the Madrid area in 2010 (Rescan 2010c). The Project area, located north of the tree line, falls in the Queen Maud Gulf Lowland Ecoregion, a tundra, high shrub zone. Identified wetlands surveyed in the Hope Bay belt are

generally either fens or bogs, with lowland polygon fends being the most common. Vegetation tends to be part of either warm (e.g., tall dwarf birch, willow and alder) or wet community sites (sphagnum moss and sedge tussocks). Eleven dominant vegetation communities have been identified through the use of the ELC system in the Madrid area, with *Eriophorum* Tussock meadow being the most common (Rescan 2010c). Through various field studies conducted, no species of conservation concern were identified during the baseline field surveys for the Madrid area. On a regional basis, however, three species (all bryophytes) considered vulnerable or at risk and an "introduced" species, the common dandelion, have been identified within the Hope Bay Belt.

Large terrestrial vertebrate studies involving caribou, muskoxen, grizzly bears in the Madrid area have been conducted at a regional scale since 1996. Various other wildlife surveys have been conducted in the region since the 1970s including bird terrestrial breeding surveys, aerial surveys (e.g., raptors, waterbirds), as well as ground nesting surveys for seabirds. Various data is also available through Inuit Traditional Knowledge (ITK) from a variety of sources including Thorpe et al. (2002) and Keith et al. (2005).

Two ungulate species have been identified including the Barren Ground Caribou (a species of Special Concern) from two distinct herds and Muskoxen. Caribou are a keystone species in the Arctic, both biological and culturally (COSEWIC 2007, 2014). Ahiak caribou historically utilized some portions of the regional area for calving and post-calving during the late 1990s; however, recent collar data suggests that the calving range has moved east and out of the area. Surveys were sporadically conducted over the years; however, 2011 was the last year of aerial surveys due to the inability of detecting a zone of influence from low observed counts or presence-absence data. Muskoxen have also been observed throughout the region through targeted or incidental observations; however, numbers between years and seasons are highly variable, with the last of aerial observations being completed in 2011.

Five carnivore species exist within the Madrid region including Grizzly Bear (*Ursus arctos horribilis*), Wolverine (*Gulo gulo*), Wolf (*Canis lupus*), Arctic Fox (*Vulpes lagopus*), and Red Fox (*Vulpes vulpes*). Grizzly bears are a species of Special Concern (COSEWIC 2002) and are classified as Sensitive in Nunavut (COSEWIC 2005). Approximately 800 grizzly bears are found in the West Kitikmeot region at low densities (COSEWIC 2002). The coastal region comprising the Madrid area is highly productive for grizzly bears, with DNA hair capture studies identifying densities of approximately 8 to 11 individual grizzly bears for every 1,000 km^2. Wolverine populations in the central Arctic tend to be stable, and their conservation status is dependent on where they are found. Wolverines, classified as Secure in Nunavut but as a species of Special Concern in the western Canadian population, have been observed in the Madrid region during aerial surveys and incidental observations. Low sample sizes and recapture rates have prevented population level analyses from being undertaken. Wolves and foxes, also considered Secure, are found throughout the area. Carnivore den surveys identified one active den out of three wolf dens in 2009.

A number of bird species, including upland breeding birds, waterbirds, and raptors, have been identified in the Hope Bay Belt area through baseline and Wildlife Mitigation and Monitoring Program WMMP studies, as well as incidental sightings. Results from previous baseline and monitoring studies have identified 25 species of upland breeding bird, 28 species of waterbirds, and 9 species of raptors to be present in the RSA (Table 5.3-1).

Table 5.3-1. Incidental Observations of Birds in the Hope Bay Belt Area, 1996 to 2013

Species	Type	Total	Species	Type	Total	Species	Type	Total
Canada Goose	V	>1,522	Long-tailed Duck	V	>100	Savannah Sparrow	V	>75
	N	9		N	>2		N	1
Snow Goose	V	>787	Gadwall	V	10	American Tree Sparrow	V	>32
Greater White-fronted Goose	V	>705	Glaucous Gull	V	>55		N	2
Brant Goose	V	1	Herring Gull	V	>17	White-crowned Sparrow	V	>30
Tundra Swan	V	>200	Common Raven	V	>99	Horned Lark	N	2
	N	1		N	2	Snow Bunting	V	>9
Sandhill Crane	V	>151	Rough-legged Hawk	V	>69	Horned Lark	V	>15
	N	>1		N	1	American Pipit	N	2
Pacific Loon	V	>253	Northern Harrier	V	2	Common Redpoll	V	>15
Common Loon	V	6	Golden Eagle	V	>65	American Pipit	V	>5
	N	1	Bald Eagle	V	3	Hoary Redpoll	V	58
Red-throated Loon	V	>29	Peregrine Falcon	V	>29	Lapland Longspur	V	>42
	N	3	Gyrfalcon	V	7		N	2
Yellow-billed Loon	V	4	Short-eared Owl	V	44	Gray-cheeked Thrush	V	Yes*
King Eider	V	>8	Snowy Owl	V	7	Semipalmated Sandpiper	V	>6
Common Eider	V	5		N	1	American Golden Plover	V	5
Red-breasted Merganser	V	>65	Arctic Tern	V	>9	Least Sandpiper	V	>11
Common Merganser	V	1	Parasitic Jaeger	V	>4	Baird's Sandpiper	V	2
Greater Scaup	V	98	Long-tailed Jaeger	V	>1	Pectoral Sandpiper	V	2
Lesser Scaup	V	9	Willow Ptarmigan	V	>98	Wilson's Snipe	V	12
American Green-winged Teal	V	16	Rock Ptarmigan	V	13	Red-necked Phalarope	V	>9
Northern Pintail	V	>210	Harris' Sparrow	V	1	Semipalmated Plover	V	2

Notes:
V = Visual observation; N = Nest observation
** All sightings noted as "yes" were recorded as being "several."*

Birds in Nunavut are protected under various forms of federal and territorial legislation. All upland breeding birds and waterbirds identified at Hope Bay through baseline and monitoring studies, with the exception of ptarmigan species, are considered "migratory birds" and are protected under the *Migratory Bird Convention Act* (1994). Raptors and Common Raven are not considered migratory birds under the *Migratory Bird Convention Act*. However, all bird species, including raptors, are protected under the Nunavut *Wildlife Act* (2003).

Several species encountered during baseline and monitoring studies in the Hope Bay Belt are of conservation concern at the federal and territorial level. Of the 62 species identified, two are listed under the federal *Species at Risk Act* (SARA; 2002). Peregrine Falcon and Short-eared Owl are listed as species of Special Concern under Schedule 1 of SARA. Several others are listed as Sensitive in Nunavut by the Canadian Endangered Species Conservation Council (CESCC 2010), including American Golden-plover, American Pipit, American Tree Sparrow, Arctic Tern, Common Eider, Glaucous Gull, Golden Eagle, Gyrfalcon, Harris' Sparrow, Hoary Redpoll, King Eider, Least Sandpiper, Long-tailed Duck, Red-necked Phalarope, and Rough-legged Hawk, Semipalmated Sandpiper, Snow Bunting, and White-crowned Sparrow.

5.3.2 Aquatic Ecosystems

Aquatic systems comprise organisms from multiple trophic levels, and include periphyton (algae that grows on the surface of rocks or larger plants), phytoplankton (free-floating autotrophic algae), zooplankton (heterotrophic component of aquatic plankton), benthic macroinvertebrates (greater than 0.5 mm in size, also known as benthos) and fish (highest trophic level). Primary producers (e.g., phytoplankton/periphyton) are useful for examining the "early warning" effects of nutrient and metal pollution; they are sensitive to changes in water quality, have short life-cycles, and serve as the basis to higher trophic levels.

Comprehensive phytoplankton, zooplankton, periphyton, and benthos baseline sampling programs were conducted in the Madrid area in various streams and lakes in 2009; additional baseline data are available for some lakes and streams in 2010, and prior to 2009 (Rescan 2010b, 2011b).

Baseline fish studies were also conducted in the Madrid area in 2009 and 2010 (Rescan 2010b, 2011a). Fish habitat was defined as those environmental components that are required either directly or indirectly by fish to carry out their life processes, including spawning and rearing areas, food production areas, migration routes, and over-wintering areas. Channel and instream habitat characteristics were similar among streams and typical of slow-moving streams flowing through tundra wetlands. Streams in the area were generally ephemeral and offered temporary habitat for fish during the spring and early summer months. Outflow streams from lake sources were relatively larger and permanent (e.g., Patch Outflow). These streams supplied relatively high quality habitat, especially for small-bodied fish species such as Ninespine Stickleback (*Pungitius pungitius*). Juvenile Lake Trout (*Salvelinus namaycush*) and Arctic Char (*Salvelinus alpinus alpinus*) were also observed utilizing these large streams for rearing habitat. Lakes, ranging in surface area from 83.1 ha to 1,062.8 ha (e.g., Windy Lake, Wolverine Lake and Patch Lake), were the predominant form of fish habitat in the Madrid Area and supplied the greatest amount of perennial fish habitat. Ponds (maximum depth is < 3 m) assessed in the Madrid Area were rated as having limited habitat.

5.4 FISHERIES

Lake Trout are important to local Inuit for food and fishing is central to culture, identity and recreation. Arctic Char are considered most valuable for subsistence living by local communities, followed by lake Trout and Lake Whitefish. As supported by information gathered through focus groups, the region around the Hope Bay Belt (including the Madrid Area) is known for fishing; there is still evidence of fishing camps the region (Golder 2003; Miramar 2005).

Extensive fish community and fish habitat studies have been completed in waterbodies around the Madrid Area between 1995 and 2014. Sampled waterbodies in the Doris Watershed include Wolverine, Patch, Imniagut, P.O., Ogama and Doris lakes, whereas Windy Watershed sampled waterbodies include Windy, Nakhoktok, and Glenn lakes; outflows of all aforementioned lakes were also assessed. Seven freshwater fish species have been identified within the Project Area (Table 5.4-1). Tissue metals analyses have been conducted for Lake Trout and Lake Whitefish sampled in Patch, P.O., Doris, and Windy lakes.

Table 5.4-1. Species of Fish Captured in the Madrid Advanced Exploration Program Area

Common Name	Scientific Name	Watershed	Habitat (Lake or Stream)
Lake Trout	*Salvelinus namaycush*	Doris, Windy	Lake^{DW}, Stream^{DW}
Arctic Char	*Salvelinus alpinus*	Windy	Lake, Stream
Lake Whitefish	*Coregonus clupeaformis*	Doris, Windy	Lake^{DW}, Stream^{D}
Lake Cisco	*Coregonus artedi*	Doris, Windy	Lake^{DW}, Stream^{D}
Least Cisco	*Coregonus sardinella*	Doris	Lake
Slimy Sculpin	*Cottus cognatus*	Windy	Lake, Stream
Ninespine Stickleback	*Pungitius pungitius*	Doris, Windy	Lake^{DW}, Stream^{DW}

Note: D = Doris; W = Windy

A road will be constructed between Madrid North and Madrid South. This is an extension of the existing Doris North Project all-weather road and requires two crossings. The most northern crossing (Crossing #1) is located slightly upstream of an inflow to Patch Lake, whereas the more southern crossing (Crossing #2) is situated at the most southerly end of Wolverine Lake and is an inflow to Patch Lake. Only Crossing #2 is fish-bearing (with confirmed ninespine stickleback) and with limited value as fish habitat.

5.5 TRADITIONAL WATER AND LAND USE AREAS

The closest settlements to the Project area are Umingmaktok (~70 km) and Kingaok (~150 km). The communities of Iqaluktuuttiaq (Cambridge Bay; ~130 km) and Kugluktuk (~350 km) are the closest major regional centres. Other communities within the region that are further from the Project, include Gjoa Haven (~445 km), Taloyoak (~550 km) and Kugaaruk (~690 km). The Madrid Area falls within the traditional "Areas of Influence" (as defined by the West Kitikmeot Regional Land Use Plan, WKRLUP) of the communities of Bathurst Inlet, Umingmaktok, and Cambridge Bay. Areas of

Influence encompass broad areas of land and sea that are included in traditional land use patterns by community members (HBML 2011; Rescan 2012c).

The Nunavut Planning Commission (NPC), as established under the Nunavut Land Claim Agreement, is currently developing a Nunavut Land Use Plan (NLUP) for all Nunavut regions that are outside of municipal boundaries. While the plan has not yet been approved and remains in draft form, TMAC has reviewed the Draft Nunavut Land Use Plan in relation to the planned Project and is of the view that it is in conformity with the current draft.

The Inuit of the Kitikmeot have a longstanding relationship of reciprocity and respect with their region's wildlife and environment as a whole, as is manifested within *Inuit Qaujimajatuqangit* (IQ) (Golder 2003). As part of the Environmental Impact Statement (EIS) of the Doris North Project, IQ provided assistance in obtaining baseline data for the Hope Bay Belt, which includes Madrid Area sites (Miramar 2005).

IQ for the Hope Bay Belt area was augmented with results from an IQ Workshop in 2003 that was held in Iqaluktuuttiaq (Golder 2003). Definitions for IQ and an understanding of climate change, air quality, noise, landscape and terrain, hydrology and water quality, aquatic organisms and habitat, vegetation, terrestrial wildlife and habitats, archaeology, cumulative environmental effects and valued ecosystem components were documented (Golder 2003). Through the literature review, gap analysis, interviews, and workshop, a variety of IQ was collected that is pertinent to the Hope Bay Belt and Doris North Project. Information collected during historical data collection activities was supplemented by more recent community-based research detailed in the Socio-economic and Land Use Baseline Report completed by Rescan (2012). This consisted of site visits and the completion of interviews with key informants from each study community, a focus group session held with land users from Umingmaktok, and visits to other communities during 2011.

Particular importance has been placed on monitoring water quality to protect fisheries. Lake Trout are important to local Inuit for food, while fishing is central to culture, identity and recreation. Arctic Char are considered most valuable for subsistence living by local communities, followed by lake Trout and Lake Whitefish. As supported by information gathered through focus groups, the region around the Hope Bay Belt (including the Madrid Area) is known for fishing; there is still evidence of fishing camps the region (Golder 2003; Miramar 2005). The region is also known for its important caribou habitat, particularly for calving (i.e., historical grounds for the Bathurst herd**).** Caribou are culturally important and are regarded as indicators of environmental change (Golder 2003). They are hunted for food, clothing, tools and other material, and the act of caribou hunting is central to Inuit identity, culture and subsistence. Inuit have always held respect for wolverines for their tenacious and often unpredictable behaviour. Wolverines have always been hunted, particularly for their fur. IQ indicates that the Wolverine and Grizzly Bear are common in the Hope Bay Belt, due to the abundance of prey animals for scavenging (i.e., caribou, seals) and prey animals, respectively, and the presence of suitable habitat, such as eskers (Golder 2003). Many nesting bird species such as Eagles and Gyrfalcons are found throughout the Hope Bay Belt and Project areas. Important landscape features such as highlands, cliffs and mesas common to the region provide key nesting habitat (Golder 2003). These bird species feed on a variety of prey including Ground Squirrels, Arctic Hare and Canada Geese, and their fluctuations in population size can likely be attributed to changes in prey abundance (Golder 2003).

Very little was known about the history and people of the central Arctic mainland until several scientific expeditions visited the region in the early 1900s. The local residents of this central Arctic coastline at the time of the early studies were identified as Copper Eskimo (or Inuit) due to their use of copper. According to historic sources, from December to May, Copper Inuit people congregated at the coastline to conduct breathing-hole sealing. Local residents reported numerous archaeological and traditional sites in the general region to the Nunavut Planning Commission Transition Team (NPCTT), stating that the Aimaokatalok Lake area was extensively used for caribou hunting in the early 1900s or earlier (NPCTT 1996 as cited in HBML 2011). During the 2003 workshop, an informant indicated that archaeological sites (e.g., sealing, hunting and fishing camps, food caches burial sites and hunting blinds) could likely be found along any good-sized river system, main caribou migration routes and on islands (Golder 2003).

6. WATER USE

Licensing criteria for the use of waters in Nunavut are set out in the Nunavut Waters Regulations (Waters Regulations) and specifically set out in Schedule 2 of the Waters Regulations. TMAC has reviewed these criteria and identified the following water uses required in order to construct and operate the Project.

6.1 WATER USE

Every effort is made to maximize reuse of water including water once it has come in contact with Project Components and/or Activities. Contact water from surface and underground operations will be collected and used/recycled as much as possible. Initiation and make up water is needed from freshwater sources for industrial uses. Freshwater sources are also needed for domestic supply. A combination of sources is proposed to meet operational needs and minimize environmental footprint. Sources are primarily Patch Lake, Windy Lake, and other area lakes with surface area > 15,000 m^2 (as required) for freshwater. A summary of fresh water uses and volumes is presented in Table 6.1-1.

Table 6.1-1. Summary of Freshwater Use Volumes

Freshwater Use		Daily Rate	Annual Rate
Domestic	Office, medical facilities	Up to 5 m^3/day	
Industrial	Drilling (surface, underground, quarry) Dust Suppression (seasonal) Ice Roads (seasonal) - including berms, ramps, temporary water crossings, and portages	Up to 290 m^3/day	
Total		**Up to 295 m^3/day**	**295 × 365 = 108,000 m^3/year**

Note that water usage will be managed in such a way that cumulative peak daily usage for this Project will not exceed 295 m^3/day from freshwater sources. Therefore TMAC requests a total annual volume approval of 108,000 m^3/year.

Water crossings and surface water diversions will also be required in order to proceed with the planned Project activities; however such water uses are required to be licensed but not restricted by volume pursuant to Schedule 2 of the Waters Regulation. TMAC confirms that Project-related alterations of flow or diversions will be limited to surface runoff management and these activities will not come within the Type A licensing threshold set out in Column 5 of Schedule 2.

6.1.1 Madrid North

The bulk sample program at Madrid North and Madrid South is currently planned to be completed sequentially with initial work completed at Madrid North. During construction of Madrid North, freshwater will be sourced from Windy Lake and managed in such a way that cumulative peak daily usage for this Project will not exceed 295 m^3/day.

Industrial use will have a daily peak rate of 290 m^3/day with uses such as drilling, seasonal dust management, and seasonal construction and maintenance of ice roads. This industrial use during construction will also include quarry operations and ongoing exploration drilling activities with water sourced from lakes near these activities.

Freshwater supply at Madrid North will be pumped using similar facilities as Madrid South. The water will be pumped from the lake into a water truck for transportation to the storage tank.

During operations, the underground water demand will be supplied from three sources listed in priority as follows:

1. Reuse mine water collected in underground settling sumps (this includes drilling wastewater).
2. Contact water from waste rock dumps and ore stockpiles, collected and stored in one of two Pollution Control Ponds.
3. Freshwater from Windy Lake.

Groundwater is not expected to contribute to the underground seepage as the workings are within the continuous permafrost. Water will initially be drawn from Windy Lake to make brine for drilling; however, as operations progress drilling waste water will accumulate in the underground settling sumps and be available for reuse. For this reason, a combination of sources is proposed to meet operational needs and minimize environmental footprint. The industrial use will have a daily peak rate of 290 m^3/day over the operational period and includes ongoing exploration drilling activities sourced from lakes near surficial drilling activities. Water supply installed for the construction phase will be maintained for the operational period of the underground activities. Quarry activities and surficial activities will also maintain the same water supply from local sources.

During closure activities, water use will be limited to industrial uses such as surficial exploration drilling, dust management, and ice road construction and maintenance.

6.1.2 Madrid South

The bulk sample program at Madrid North and Madrid South is currently planned to be completed sequentially with initial work completed at Madrid North followed by Madrid South. Water use will be staged accordingly between Madrid North and Madrid South.

During construction the freshwater source will be Patch Lake and use will be managed in such a way that cumulative peak daily usage for this Project will not exceed 295 m^3/day. Domestic use will have a peak rate of 5 m^3/day for use in the office/first aid facilities. Industrial use will have a daily peak rate of 290 m^3/day with uses including dust management, and ice road construction and maintenance. This industrial use during construction will also include quarry operations and ongoing exploration drilling activities with water sourced from lakes near these activities.

Industrial fresh water supply will not be treated; water will be pumped to a water truck for transportation to a holding tank for use. To the extent possible (contact water) will be collected, treated for suspended solids removal and recycled. Fresh water used for surficial drilling, quarrying activities and winter road construction is not treated prior to use.

During operations, the underground water demand will be supplied from three sources listed in priority similar to the priority noted for Madrid North (Section 6.1.1) with freshwater supply from Patch Lake.

Fresh water will initially be drawn from Patch Lake to make brine for drilling; however, as operations progress drilling waste water will accumulate in the underground settling sumps and be available for reuse. For this reason, a combination of sources is proposed to meet operational needs and minimize environmental footprint. The industrial uses will have a daily peak rate of 290 m^3/day over the operational period.

Domestic water supply system and tanks installed for the construction phase will be maintained for the operational period of the water licence. Quarry activities and surficial activities will also maintain the same water supply from local sources.

During closure activities, water use will be limited to industrial uses such as surficial exploration drilling, dust management, and ice road construction and maintenance (if needed).

6.2 QUARRY AND ROAD OPERATIONS

The quarrying for infrastructure and road (4.7 km) construction activities consist of drilling, blasting, mucking, crushing, haulage to usage locations (e.g., the advancing road limit), end dump and levelling; all activities with the potential for generating dust. The major source of dust generation during the operations of the quarries will be in the vicinity of the crusher while it is operating. Dust will also be generated during use of the road corridor. Dust suppression, where required in the quarry or road, will use water and a record of the volume used for this purpose will be maintained. Water use along the road also includes the water crossings; however, this volume is indeterminate and not included in the anticipated water use allocation request.

Road access into the project sites may be required before the all-weather access roads are constructed, therefore water may be used during winter months for ice road construction. Preparation for winter road/ice road construction involves establishing snow fencing along potential routes to collect snow to form the base of the road. Once snow is accumulated along the route, this snow is then packed down and covered with successive layers of water and/or additional snow and allowed to freeze between applications. Water for this purpose will be obtained from nearby waterbodies authorized for use and extracted in accordance with the DFO protocol for winter water withdrawals. All water volumes used for winter road construction will be tracked and recorded. Additional clean snow may be obtained if needed from the surface of nearby frozen lakes. Once completed, this frozen road surface then protects the underlying ground from vehicle traffic. Routine maintenance is conducted throughout the winter road use season by grading and with further snow/water applications. The ice roads degrade naturally and disappear with warming temperatures in spring.

6.3 WATER QUALITY AND QUANTITY

6.3.1 Surface Water

Based on available baseline data the Madrid area freshwater is neutral to slightly alkaline, and contains variable concentrations of nutrients and metals; some seasonal water trends are apparent.

Madrid area lakes have typically low nutrient concentrations, particularly during summer months, and are characterized as being ultra-oligotrophic to mesotrophic. Mean metal concentrations in Madrid area lakes are generally below CCME (Canadian Council of Ministers of the Environment) guidelines, except for a few lakes that are naturally elevated in aluminum, chromium, copper, and iron (Rescan 2010a). Lake sediments also exhibit some naturally elevated metal concentrations that exceed CCME ISQGs, including arsenic, chromium, and copper (Rescan 2010a).

Multiple stream water quality baseline studies were conducted in the Madrid in 1996, 1997, and 2006 to 2009. Streams tend to be neutral to slightly basic, and have variable turbidity levels. Maximum concentrations of some nutrients (total phosphorus and ammonia) and metals (chromium and nickel) tend to occur during freshet. Stream sediments, containing lower metal concentrations than lake sediments, were also naturally high in chromium.

6.3.2 Groundwater

It is anticipated that the Madrid North underground activities will not intercept groundwater; however, Madrid South underground activities may intercept groundwater. Groundwater quality information is not available for the Madrid Area; however, data within the Hope Bay Belt Project area has indicated groundwater as being saline, with a salinity (total dissolved solids) content of approximately 41,000 mg/L similar to seawater (Roscoe Postle Associates Inc. 2013; see Table 7.3-1).

Estimates of the groundwater inflow when operating in these areas ranges from 16 to 1,073 m^3/day with varying permeability. For the purposes of water management design, variable hydraulic properties of key formations (deep volcanic rock and altered rock) were considered resulting in an estimate of total flow of 500 m^3/day. This estimate of flow is used for water balance calculations.

6.4 SITE WATER MANAGEMENT

Site water management during operations and closure is presented in Figures 6.4-1, 6.4-2, and 6.4-3, and described in Section 8. Similar water management approaches are proposed at both Madrid North and Madrid South and the conceptual water management plans (Section 8) are applicable to both.

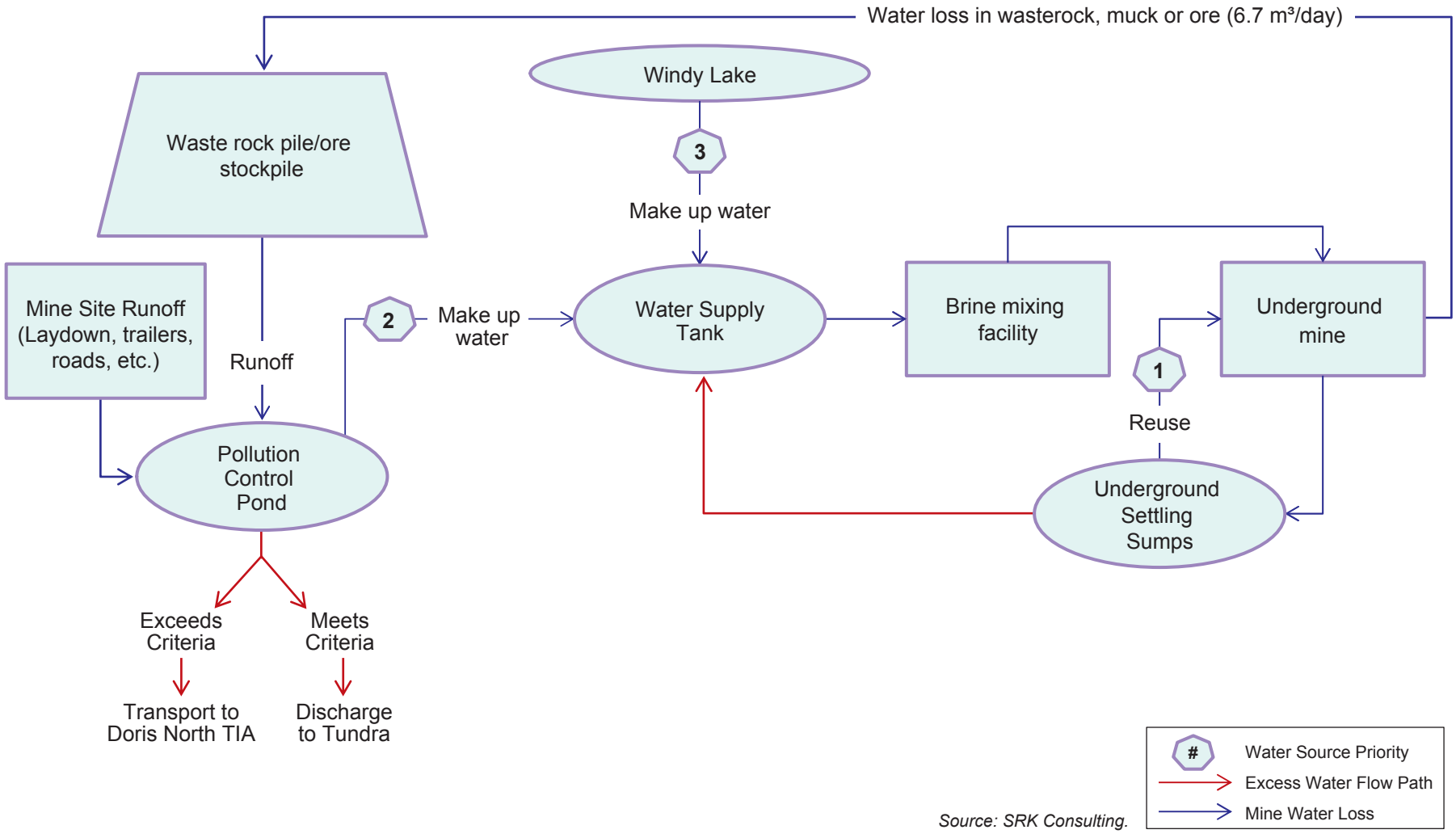
In general, water supply during operations is from surface runoff that has come in contact with Project infrastructure, stockpiles, and underground mine workings, with freshwater make-up drawn from Windy Lake or Patch Lake. The underground mine water demand will be supplied from three sources in the following priority:

1. Reuse mine water collected in underground settling sumps.
2. Contact water from waste rock and ore stockpiles, collected in the Pollution Control Ponds.
3. Freshwater make-up.

Excess water from the underground workings or the Pollution Control Ponds will be managed depending on the water quality. If the excess water meets proposed discharge criteria in Section 7, it will be discharged directly to the tundra to a designated location 31 m away from local waterways and armoured such that erosion and ponding is minimized. If water quality exceeds threshold criteria, water will be trucked to the Doris North Project for disposal in the TIA.

Figure 6.4-1

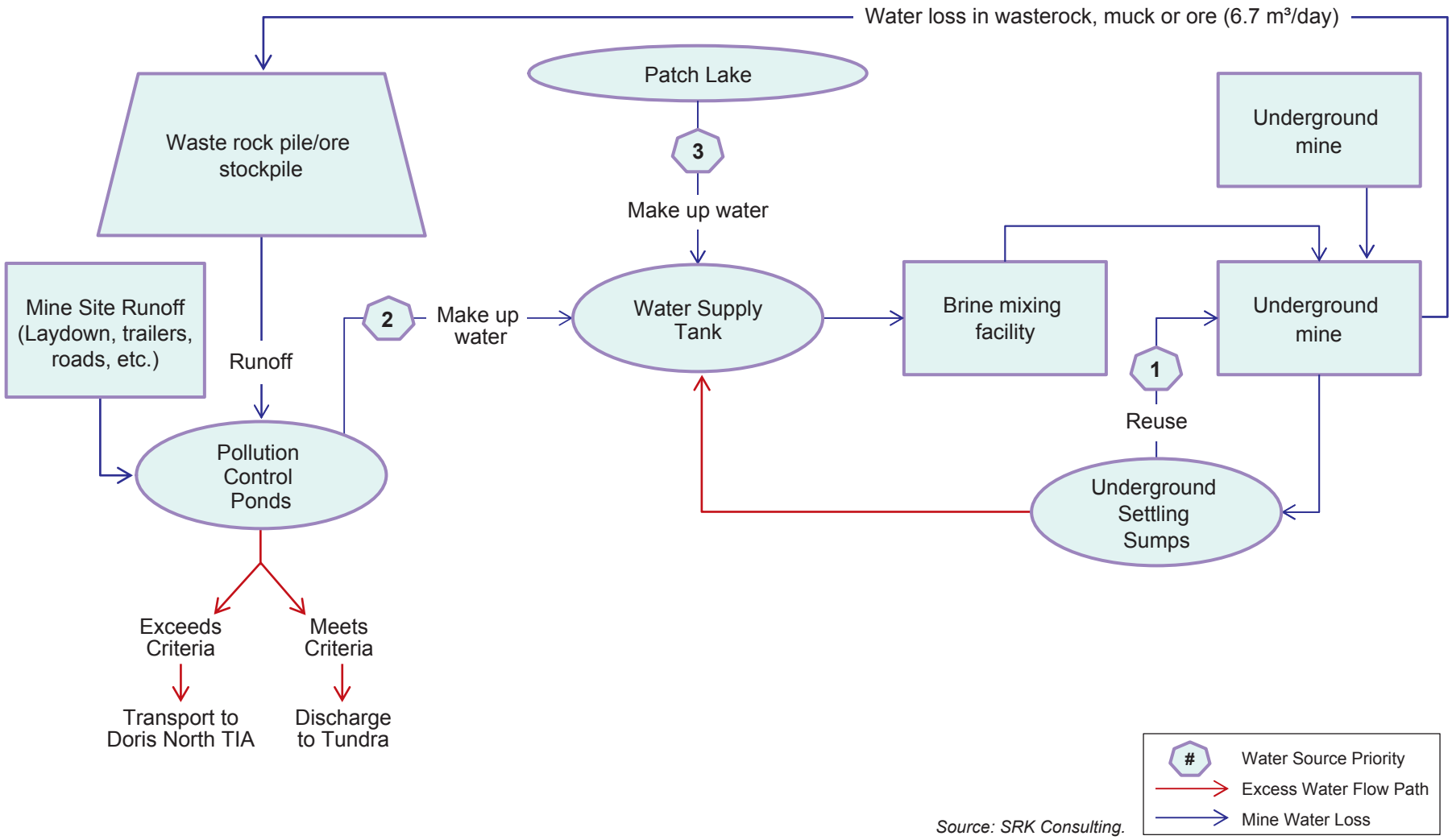
Water Management Schematic for Madrid North - Operations



Source: SRK Consulting.

Figure 6.4-2

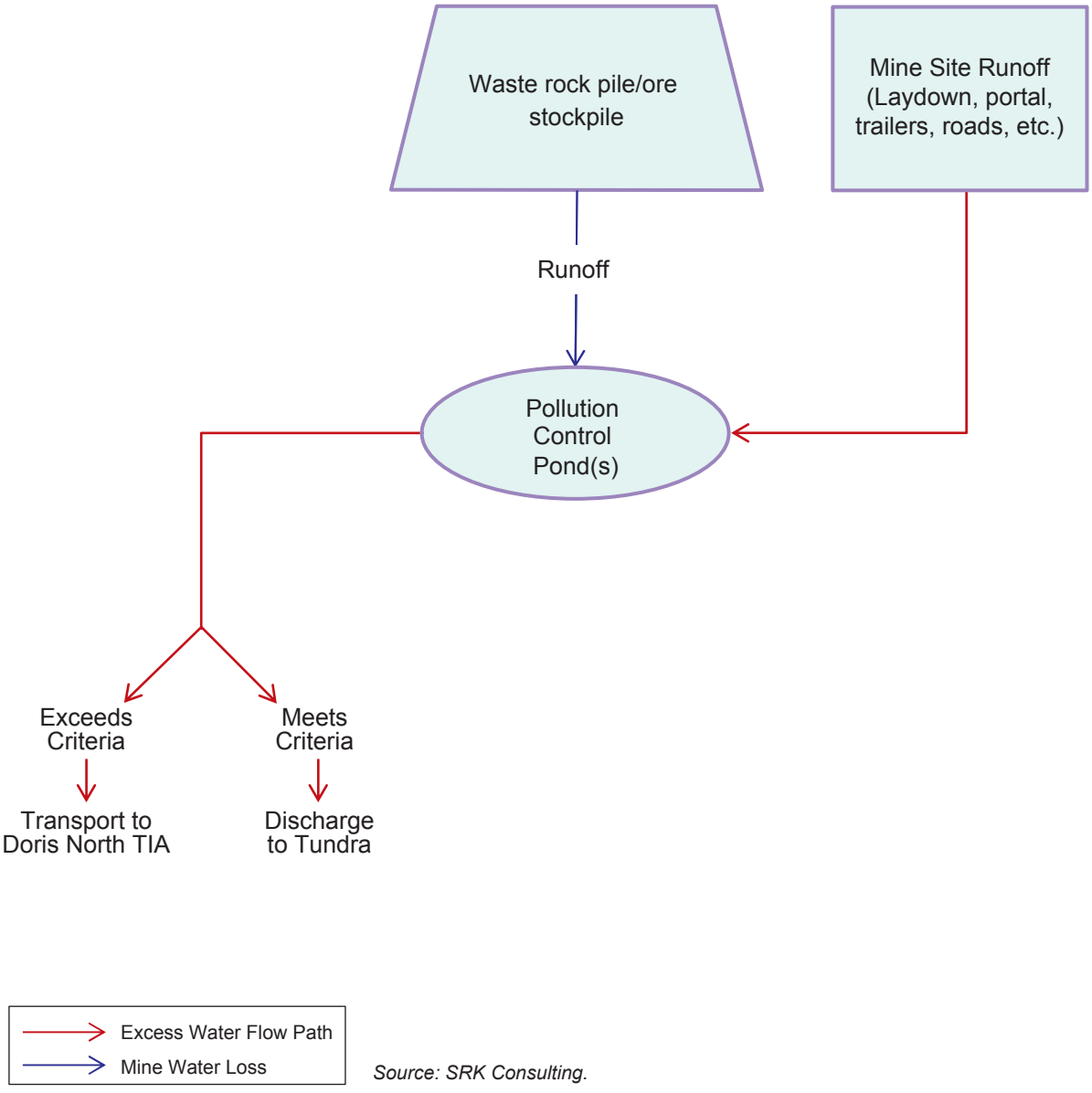
Water Management Schematic for Madrid South - Operations



Source: SRK Consulting.

Figure 6.4-3

Water Management Schematic for Madrid North and Madrid South - Closure and Temporary Closure



Source: SRK Consulting.

6.5 WATER CROSSINGS

The proposed road extension includes two water crossings. The most northern crossing (Crossing #1) is located slightly upstream of an eastward-moving inflow to Patch Lake. The crossing is to occur along the drier and mostly underground portion of the inflow; however, to the west and slightly upstream, the inflow consists of ephemerally-connected ponds. The most downstream (and most eastward) reach situated just upstream of the lake is relatively steep (measured 8% near the mouth). The inflow is considered non-fish bearing; no fish were captured during fishing surveys conducted in 2010 (either through electrofishing along the inflow or minnow traps set in the ponds situated upstream).

The more southern crossing (Crossing #2) is situated at one of the outflows (most southern end) of Wolverine Lake which flows to Patch Lake. The outflow does not have a clearly defined channel, as water seeps through vegetation over a broad area. The site of Crossing #2 thereby consists of a flooded wetland area, reflecting the ephemeral nature of the outflow. Although habitat is generally of poor quality, it is fish-bearing (confirmed Ninespine Stickleback presence); the lake located upstream (Wolverine Lake) contains Least Cisco and Ninespine Stickleback, whereas the downstream lake (Patch) contains multiple fish species. Migration between these two lakes is considered limited and closed culvert installation is proposed.

Closed-bottom culverts will be installed at these two locations since neither crossing location contains fish that are part of a recreational, commercial or Aboriginal fisheries, or that support such a fishery (DFO 1985). Engineering drawings for Madrid North, Madrid South, and all-weather road are provided in Appendices 4-A, 4-B, and 4-C, and include detailed cross-sections and specifications for the water crossings.

6.6 WATER INTAKES

If the Pollution Control Ponds and underground settling sumps cannot meet the demand for brine, make-up water will be pumped from Patch Lake or Windy Lake. Freshwater will be pumped from either Patch Lake or Windy Lake from a location along the shoreline. The intake hose and mechanical pump will be mounted to the water truck used to transport to the storage tank that supplies the BMF. The intake end of the hose will be screened in accordance with guidelines for pump intakes published by DFO (1995).

7. WASTE DISPOSAL

Waste generated at Madrid North and Madrid South will include sewage, greywater, solid waste, waste oil, hazardous waste, scrap metal, contaminated soil and/or water, contact water, fuel storage contact water and diamond drill cuttings.

7.1 WASTE DISPOSAL

Waste generated at Madrid North and Madrid South will be securely stored temporarily on site, and transported to Doris North Project camp for inclusion in its waste management. Exceptions to this are the contact water, drill cuttings and discharge from containment which will be managed and disposed of as described below.

Table 7.1-1 summarizes the type of waste expected, quantity and proposed disposal method to be used to manage waste generated in the Madrid area.

7.2 QUARRY CONTACT WATER MANAGEMENT

The development of each quarry will proceed in a manner that, to the extent possible, all water generated as a result of precipitation or snow melt is retained within the quarry boundaries. Generally this will be accomplished by ensuring that the quarry floors are sloped toward the natural low area of the quarry floor and, if required the creation of a quarry sump to collect the waters and settle out suspended solids.

After significant precipitation events, the quarry area will be inspected and the water level in the quarry sump assessed.

In the event that the quarry sump requires pumping, a sample of the ponded water will be collected, preserved in the appropriate manner, and submitted to an accredited laboratory for the analysis of the parameters listed in Table 7.2-1. These parameters are outlined in Part D Item 18 and Part J Item 6 of Water Licence 2BE-HOP1222 and the quarry effluent quality limits for these aforementioned parameters are listed at Part D Item 18 (Table 7.2-1). Monitoring results will be reported as part of the monthly monitoring reporting.

Additionally, notification will be provided to the Inspector, at least fifteen (15) days prior to the planned pumping. The notification will include the volume proposed for discharge and the discharge location. Following receipt of the laboratory results, water meeting the discharge requirements will be discharged. As the governing permits for Quarry G and H are not presently defined, the discharge requirements are assumed to be the same as those outlined in Table 7.2-1.

Table 7.1-1. Summary of Waste Quantity and Disposal

Type of Waste	Composition	Quantity Generated	Treatment Method	Disposal Method
Sewage	Portable toilet wastes installed as part of a wash truck will be combined with greywater waste	< 10 m^3/d (sewage and grey water)	Collected for transport to the Doris North Project Camp	Disposal as per approved 2AM-DOH1323 wastewater treatment management plan.
Greywater	Grey water from wash trucks will be combined with sewage waste	< 10 m^3/d (sewage and grey water)	Collected for transport to the Doris North Project Camp	Disposal as per approved 2AM-DOH1323 wastewater treatment management plan.
Solid Waste	Mixed non-hazardous waste typically generated at a work site	< 5 m^3/d	Collected for transport to the Doris North Project Camp	Disposal as per approved 2AM-DOH1323 waste management plan.
Waste Oil	Waste oil generated from mining equipment (electrical generators, trucks, drills)	< 1 m^3/d	Collected for transport to the Doris North Project Camp	Disposal as per approved 2AM-DOH1323 waste management plan.
Hazardous Waste, Scrap metal, and Contaminated soil and/or water	Waste generated from drilling activities and accidents	Unknown	Collected for transport to the Doris North Project Camp	Disposal as per approved 2AM-DOH1323 waste management plan and Spill Contingency Plan.
Contact Water	Water that has come in contact with surface infrastructure and underground workings and collected in Pollution Control Pond(s)	Up to 40k m^3/year on average (from Madrid South with groundwater) and up to 6.5k m^3/year (from Madrid North) transported to TIA or reused. Up to 94k m^3/year maximum (Madrid South) and 15k m^3/year (Madrid North) to be reused or transported to TIA.	Discharged to the tundra in area of Pollution Control Pond; any contact water that does not meet discharge criteria, trucked to Doris North Project North for disposal in TIA.	Discharge to designated location at a distance of at least 31 m from the ordinary high water mark of any adjacent waterbody, where direct flow into a waterbody is not possible and no additional impacts are created. At TIA, disposal as per approved 2AM-DOH1323 water management plan.

(continued)

Table 7.1-1. Summary of Waste Quantity and Disposal (completed)

Type of Waste	Composition	Quantity Generated	Treatment Method	Disposal Method
Fuel Storage Contact Water	Water that accumulates in the containment area of the fuel storage areas.	Unknown	Water that does not meet discharge criteria, will either be treated using oil/water separator until criteria met, or trucked to Pollution Collection Pond or to the TIA.	Discharge to designated location at a distance of at least 31 m from the ordinary high water mark of any adjacent waterbody, where direct flow into a waterbody is not possible and no additional impacts are created.
Drill Cuttings	Drill waste, including water, chips, muds and salts ($CaCl_2$) from land-based and on-ice diamond drilling.	Unknown	Cuttings are dewatered, and the separated water or brine is recycled back into the drilling process.	Saline cuttings: removed from the drill site and deposited in a contained location (i.e., designated sump or waste rock pile) where runoff is captured for treatment or disposal to an appropriate facility (i.e., TIA). Non-saline cuttings: disposed in a sump or natural depression proximal to the drill where direct flow into a waterbody is not possible and no additional impacts are created. May be used for reclamation purposes. Excess Brine: removed from the drill site and deposited onto waste rock piles, into Pollution Control Ponds, or discharged to the TIA.

Table 7.2-1. Quarry Effluent Discharge Quality Limits[a]

Parameter	Maximum Average Concentration	Maximum Concentration in Any Grab Sample
pH	6.0 to 9.0	9.0
Electrical Conductivity	500 µS/cm	500 µS/cm
Total Ammonia	2 mg/L	4 mg/L
Total Suspended Solids	15 mg/L	30 mg/L
Oil and Grease	5 mg/L and no visible sheen	10 mg/L and no visible sheen
Total Aluminum	1.0 mg/L	2.0 mg/L
Total Arsenic	0.05 mg/L	0.10 mg/L
Total Copper	0.02 mg/L	0.04 mg/L
Total Iron	0.30 mg/L	0.60 mg/L
Total Lead	0.01 mg/L	0.02 mg/L
Total Nickel	0.05 mg/L	0.10 mg/L
Total Zinc	0.01 mg/L	0.02 mg/L

[a] *From Hope Bay Regional Exploration Program 2BE-HOP1222, Part D for discharges to tundra from the quarries.*

Care will be taken not to disturb settled solids in the bottom of the sump and pumping of the sump will only take place when conditions are suitable. Care will also be taken to discharge water such that it does not enter fish bearing waters and that the pump discharge is positioned in a manner that minimizes erosion and siltation of the area downstream of the discharge.

In the event that the quarry contact water does not meet the discharge criteria, an inquiry of the cause of the noted exceedances will be conducted, appropriate mitigation developed, implemented and a summary report include in the annual report to the NWB. Any non-compliant water that needs to be discharged would be transported to Doris North Project TIA for disposal, or recycled through the Pollution Control Pond water management for use underground.

7.3 UNDERGROUND CONTACT WATER MANAGEMENT

To assist with water management planning, inflow of water into the underground workings was estimated (Appendix 7-A).

The Madrid North underground bulk sample area is within the Naartok deposit and will be within permafrost. As such, groundwater inflows are not expected to occur. The Madrid South underground bulk sample is within the Patch 14 and Wolverine deposits and is expected to intercept the talik zones. There is no specific thermal data available for either the Patch 14 or Wolverine deposits; however, permafrost conditions can be estimated based on thermal data from the Doris and Boston areas of the Hope Bay Belt.

At Madrid South, groundwater is expected to be intercepted when operating in areas of talik. Estimates of the groundwater inflow when operating in these areas ranges from 16 to 1,073 m^3/day with varying permeability. For the purposes of water management design, the hydraulic properties

of key geologic formations vary independently to provide an estimate of total groundwater flow of 500 m^3/day.

There is no groundwater quality data available for Madrid South area, however, groundwater quality for this area can be estimated based on data from Doris and Boston areas. Both areas have saline groundwater at relatively shallow depths in the respective taliks and it is assumed that the water quality would be similar in the Madrid Area. The groundwater collected from the deepest zone at the Doris Central Westbay (Table 7.3-1) can be characterized as follows:

- calcium, sodium, and chloride were the dominant ions;
- the groundwater may be regarded as saline, with a TDS of 41,000 mg/L;
- the majority of total metals had concentrations below detection limits; and
- detected trace metals included cobalt, copper, iron, manganese, molybdenum, nickel, and zinc.

Table 7.3-1. Summary of Groundwater Quality Data for Doris Central Westbay Zone 1

Parameter	Unit	10WBW001-Zone1 (548 m) 6-Apr-2011
pH	pH	7.1
Total Dissolved Solids	mg/L	41,000
Alkalinity (as $CaCO_3$)	mg/L	2.7
Chloride (Cl)	mg/L	19,000
Sulfate (SO_4)	mg/L	940
Bicarbonate (HCO_3)	mg/L	-
Dissolved Metals		
Aluminum (Al)	mg/L	< 0.005
Arsenic (As)	mg/L	< 0.002
Cadmium (Cd)	mg/L	< 0.00005
Calcium (Ca)	mg/L	4,800
Chromium (Cr)	mg/L	< 0.0005
Cobalt (Co)	mg/L	0.000059
Copper (Cu)	mg/L	0.00083
Iron (Fe)	mg/L	0.034
Lead (Pb)	mg/L	< 0.0003
Magnesium (Mg)	mg/L	71
Manganese (Mn)	mg/L	0.73
Mercury (Hg)	mg/L	< 0.00001
Molybdenum (Mo)	mg/L	0.011
Nickel (Ni)	mg/L	0.0016
Potassium (K)	mg/L	39
Selenium (Se)	mg/L	< 0.002
Sodium (Na)	mg/L	7,000
Zinc (Zn)	mg/L	0.16

Based on these conclusions, water management includes the potential interception of underground mine water that is assumed to be saline. During operations, the priority is to reuse mine water collected in underground settling sumps to supply the underground drilling activities. When present, excess water from the underground sumps will be directed to the surface Pollution Control Pond for reuse in the Brine Mixing Facility; release to environment if compliant with discharge criteria; or if noncompliant, transported to Doris North Project TIA for disposal.

7.4 CONTACT WATER MANAGEMENT

The goal of the water management system for the Madrid Advanced Exploration Program will be to recycle intercepted contact water in preference to using lake freshwater for make-up water and to maximize the mine water reuse within the underground workings.

Annual volumes of contact water reporting to the Pollution Control Ponds can be estimated by calculating the contribution from surface runoff and contribution from groundwater inflow to the underground workings (Appendix 7-A). These values for an average year are:

- Madrid North – 21,384 m^3 per year;
- Madrid South – 16,430 m^3 per year (4,655 m^3/y (PCP 1) + 11,775 m^3/y (PCP 2));
- Madrid South (with groundwater) – 134,804 m^3 per year.

In order to maximize mine water reuse, runoff collected in Pollution Control Ponds will be transferred by truck or pumped to the 50,000 L tank to be used as water supply for the Brine Mixing Facility (BMF). Make-up water will only be drawn from the freshwater sources when it cannot be drawn from the Pollution Control Ponds.

Excess contact water in the Pollution Control Ponds that meets discharge criteria (Table 7.4-1) will be discharged to the tundra. Water that does not meet discharge criteria will be trucked to Doris North Project TIA for disposal. Discharge from the TIA must meet the water quality criteria for the Doris North Project Type "A" Water Licence 2AM-DOH1323.

Table 7.4-1. Pollution Control Pond Effluent Discharge Quality Limits

Parameter	Maximum Average Concentration	Maximum Concentration in Any Grab Sample
pH[a]	6.0 to 9.0	9.0
Total Suspended Solids[a]	15 mg/L	30 mg/L
Total Ammonia[a]	2 mg/L	4 mg/L
Oil and Grease[a]	5 mg/L and no visible sheen	10 mg/L and no visible sheen
Chloride[c]	150 mg/L	600 mg/L
Total Aluminum[a]	1.0 mg/L	2.0 mg/L
Total Arsenic[b]	0.5 mg/L	1.00 mg/L
Total Copper[b]	0.30 mg/L	0.60 mg/L

(continued)

Table 7.4-1. Pollution Control Pond Effluent Discharge Quality Limits (completed)

Parameter	Maximum Average Concentration	Maximum Concentration in Any Grab Sample
Total Iron[a]	0.30 mg/L	0.60 mg/L
Total Lead[b]	0.20 mg/L	0.40 mg/L
Total Nickel[b]	0.50 mg/L	1.00 mg/L
Total Zinc[b]	0.50 mg/L	1.00 mg/L

[a] From Doris Mining and Milling Licence 2AM-DOH1323 for discharges to tundra from the Sediment Control Pond (ST-1), Cyanide and Reagent Storage Facility (ST-11), and Landfill (ST-3). Doris PCP (ST-2) does not have tundra discharge criteria – it is discharged into the TIA.
[b] MMER criteria and Boston Advanced Exploration Project Licence 2BB-BOS1217 for discharge of mine water and drainage from decline, waste rock and ore stockpiles to tundra via Containment Pond monitoring station BOS-2.
[c] From Doris Mining and Milling Licence 2AM-DOH1323 for discharges at Doris Outflow Creek (TL-3) and BC Ambient Water Quality Guidelines (http://www.env.gov.bc.ca/wat/wq/BCguidelines/chloride/chloride.html).

7.5 BULK FUEL STORAGE FACILITIES CONTACT WATER MANAGEMENT

Water accumulated in the containment berms for the Fuel Transfer Stations or Fuel Storage Facilities will be sampled for the analysis of oil and grease, benzene, toluene, ethylbenzene and lead. Contact water that meets discharge criteria (Table 7.5-1) will be discharged to the tundra. Water that does not meet discharge criteria will be trucked to either the Madrid Pollution Control Ponds or Doris North Project TIA for disposal. Discharge from the TIA must meet the water quality criteria for the Doris North Project Type "A" Water Licence 2AM-DOH1323.

Table 7.5-1. Madrid Fuel Storage Facility Effluent Discharge Quality Limits[a]

Parameter	Maximum Average Concentration	Maximum Concentration in Any Grab Sample
pH	6.0 to 9.0	9.0
Total Suspended Solids	15 mg/L	30 mg/L
Oil and Grease	5 mg/L and no visible sheen	10 mg/L and no visible sheen
Total Lead	0.01 mg/L	0.02 mg/L
Benzene	0.37 mg/L	-
Toluene	0.002 mg/L	-
Ethylbenzene	0.090 mg/L	-

[a] From Doris Mining and Milling Licence 2AM-DOH1323 for discharges to tundra from Bulk Fuel Storage Facilities ST-5, ST-6A, and ST-6B.

8. MONITORING AND MANAGEMENT PLANS

8.1 MANAGEMENT PLANS

The Madrid Advanced Exploration Program will be conducted in close proximity to existing infrastructure and activities associated with the Doris North Project and the regional exploration program completed across the Hope Bay Belt. The materials and equipment needed to construct and operate the advanced exploration program will use existing transportation infrastructure including the port site at Roberts Bay, the all-weather and ice air strips, and the existing road network. The workforce will stay at the existing camp facilities and solid wastes generated at the Madrid area will be managed at the Doris North Project. The bulk samples extracted from underground development at Madrid North and Madrid South will be processed at the Doris North Project mill and tailings will be managed at the approved tailings impoundment area (TIA). Surface and underground water generated at the two bulk sample sites may also be transported to the TIA for management.

By virtue of utilizing this existing infrastructure, many activities associated with the Madrid Advanced Exploration Program have existing monitoring and management plans in place. These plans have been implemented in accordance with the requirements of the Doris North Project NIRB Project Certificate and the Type "A" Water Licence.

Table 8.1-1 summarizes the plans currently in place for Doris North Project that will be updated in consideration of the Madrid Advanced Exploration Program. The Hope Bay Belt Quarry Management Plan has already been updated and included in this application (Appendix 8-C). The other existing plans require revision in order to capture the scope and/or location of the proposed activities. TMAC proposes to update this plans at least 60 days prior to the execution of any proposed activities associated with the Madrid Advanced Exploration.

In addition to the existing plans that will be updated to incorporate the Madrid area, TMAC has identified stand-alone plans to support this application that are also summarized in Table 8.1-1:

- Madrid North and South Water Management Plan (Appendix 8-A);
- Madrid North and South Waste Rock Management Plans (Appendix 8-B); and
- Closure and Reclamation Plan (Section 9).

Discrete monitoring stations, parameters and frequency of sampling proposed as appropriate by TMAC for monitoring water use and waste disposal under the requested Type "B" water licence are presented in Table 8.1-2. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater* and submitted to an accredited laboratory for analysis.

Table 8.1-1. TMAC Management Plans Applicable to Madrid Advanced Exploration Program

Name	Purpose of the Plan and/or Nature of Change	Submission Date
Existing Management and Monitoring Plans applicable to Madrid Advanced Exploration Program		
Noise Abatement Plan	Describes the mitigation measures to reduce or eliminate the potential effects of noise on wildlife. The existing mitigation measures will apply to the Madrid Advanced Exploration Program and the plan will be updated to include this geographic areas.	60 days prior to the commencement of construction
Air Quality Management Plan	Describes the mitigation measures to reduce or eliminate the potential effects of dust, particulate matter, and emissions. It also includes monitoring of weather data. The existing mitigation measures will apply to the Madrid Advanced Exploration Program and the plan will be updated to include this geographic area.	60 days prior to the commencement of construction
Non-Hazardous Waste Management Plan	Describes the measures taken to dispose of non-hazardous waste including open-burning and transport off-site for disposal to approved landfill facilities. All non-hazardous waste from the Madrid Advanced Exploration Program will be transported to Doris North Project for management in accordance with this plan. This plan will be updated to include the Madrid as a source of wastes to be managed under the plan.	60 days prior to the commencement of construction
Hazardous Waste Management Plan	Describes the measures taken to dispose of hazardous waste; transport off-site for disposal and/or recycling at approved facilities. All hazardous waste from the Madrid Advanced Exploration Program will be transported to Doris North Project for management in accordance with this plan. This plan will be updated to include the Madrid Advanced Exploration Program as a source of wastes to be managed under the plan.	60 days prior to the commencement of construction
Landfarm Management Plan	Describes the management of hydrocarbon contaminated soil and snow at a facility constructed at the Doris North Project. Any contaminated snow and soil generated from the Madrid Advanced Exploration Program will be transported to Doris North Project for management in accordance with this plan. This plan will be updated to include the Madrid Project as a source of wastes to be managed under the plan.	60 days prior to the commencement of construction
Incinerator Management Plan	Describes the measures taken to dispose of food wastes, pressed sewage waste, and paper in an on-site incinerator at Doris North Project. These wastes will be transported from the areas of Madrid Advanced Exploration Program activity to Doris North Project for management in accordance with this plan. This plan will be updated to include the Madrid Project as a source of wastes to be managed under the plan.	60 days prior to the commencement of construction

(continued)

Table 8.1-1. TMAC Management Plans Applicable to Madrid Advanced Exploration Program (continued)

Name	Purpose of the Plan and/or Nature of Change	Submission Date
Existing Management and Monitoring Plans applicable to Madrid Advanced Exploration Program *(cont'd)*		
Wastewater Treatment Management Plan	Describes the management of grey water and sewage generated from camp operations. No changes to this plan are required as a result of personnel residing at either the Doris North Project. Sewage and grey water generated at wash trailers and portable toilets at Madrid North and Madrid South sites will be transported to Doris North Project for management in accordance with this plan. This plan will be updated to include the Madrid Advanced Exploration Program as a source of wastes to be managed under the plan.	60 days prior to the commencement of construction
Interim Water Management Plan for Doris North Project	Describes the management of water generated at Doris North Project including the mine site, diversion berm, Pollution Control Pond and sumps, as well as the Tailings Impoundment Area (TIA). The TIA may receive excess water from Pollution Collection Ponds as part of the management plan for the Madrid Advanced Exploration Program and may receive excess surface and/or groundwater generated at Madrid North or Madrid South that is not otherwise discharged to the local receiving environment. This plan will be updated to include the Madrid Advanced Exploration Program as a source of wastes to be managed under the plan.	60 days prior to the commencement of construction
Aquatic Effects Monitoring Program	Describes the monitoring program designed to determine the short and long-term effects in the aquatic environment resulting from the Doris North Project, to evaluate the accuracy of impact predictions, and to assess the effectiveness of planned impact mitigation measures and to identify additional impact mitigation measures to avert or reduce environmental effects. This plan will be expanded in geographic scope to include the Madrid Area; for example proposed locations Table 8.1-2 may also be used to monitor effects within Patch Lake.	60 days prior to the commencement of construction
Hydrology Monitoring Program	The Hydrology Monitoring Program in the area includes locations within the Doris Watershed, Windy Watershed, Roberts Watershed, and reference watersheds. Hydrometric monitoring has included two locations along Doris Creek, Roberts Lake Outflow Windy Lake and Windy Lake Outflow. The continued monitoring of Windy Outflow and Roberts Outflow can be used to identify any significant water level decreases that could affect fish habitat in Windy Outflow during dry years. A tidal gauge installed in Roberts Bay will also allow continuous monitoring of water levels during bathymetric surveys. This plan will be expanded to include the Madrid Project area.	60 days prior to the commencement of construction
Wildlife Monitoring and Management Program	The spatial extent of the Wildlife Monitoring and Management Program (WMMP) currently in place for the Doris North Project includes the Madrid Area. The existing plan will be updated in consideration of the changes in activity level proposed in this area, including the addition of targeted monitoring of areas of infrastructure for interactions with wildlife.	60 days prior to the commencement of construction

(continued)

Table 8.1-1. TMAC Management Plans Applicable to Madrid Advanced Exploration Program (continued)

Name	Purpose of the Plan and/or Nature of Change	Submission Date
Existing Management and Monitoring Plans applicable to Madrid Advanced Exploration Program *(cont'd)*		
Community Relations Management Plan	The Community Relations Management Plan applies to all area of activity within the Hope Bay Belt and will reviewed on its regular schedule and updated as necessary in consideration of the changes in activity level proposed in the Madrid Area.	Annually
Spill Contingency Plan	Identifies a set of procedures to follow during unanticipated spills. The plan also outlines reporting and record keeping requirements for spills, a list of responsibilities to be followed in conducting spill response activities, information on available resources and potential operational hazards encountered when responding to spills, defined methods to review spill events and initiatives to reduce repeat occurrences, and to complete inspections and inventory of spill kits and on-site hazardous materials. The Plan applies to all area of activity within the Hope Bay Belt and will be reviewed regularly and updated as necessary for the Madrid Advanced Exploration Program.	Annually
Emergency Response Plan	The Emergency Response Plan accompanies the Spill Contingency Plan, and covers other non-spill related emergencies. The Emergency Response Plan outlines the roles and responsibilities of different employees in emergency situations. All relevant external emergency numbers and internal telephone numbers and radio channels are listed. This plan will be reviewed at least once annually and revised as required for the Madrid Project.	Annually
Monitoring and Follow-up Plan (MFP)	The MFP summarizes all of the monitoring undertaken in support of the various management plans and site activities. The MFP is accompanied by a Quality Assurance and Quality Control (QA/QC) Plan that details the procedures that are needed so that the quality of the data collected is appropriate for its purpose. This plan will be updated to include all of the monitoring associated with Madrid Advanced Exploration Program, including the requirements identified in the project proposal and the requirements stipulated in the water licence issued by the NWB.	60 days prior to the commencement of construction
Explosives Management Plan	The Explosives Management Plan provides information on how explosives will be transported, stored and used at the Doris North Project focusing on two goals: safety and environmental stewardship. The Plan applies to all activity within the Hope Bay Belt and will be reviewed and updated as necessary to include the Madrid Advanced Exploration Program.	60 days prior to the commencement of construction
Quarry Management Plan	Describes the objectives and measures to maintain and enhance environmental performance of the quarries while avoiding to the extent practical, remedying, and mitigating any potential adverse environmental effects associated with rock quarrying.	Included with Application (Appendix 8-C)

(continued)

Table 8.1-1. TMAC Management Plans Applicable to Madrid Advanced Exploration Program (completed)

Name	Purpose of the Plan and/or Nature of Change	Submission Date
Project Specific Management and Monitoring Plans – Madrid Advanced Exploration Program		
Surveillance Network Program (SNP)	Identifies the locations where discrete samples will be collected for monitoring and analysis to confirm that the use of water and discharges to the environment meet the requirements of water licence.	The proposed locations for SNP stations are provided in Table 8.1-2
Waste Rock Management Plans	Describes the management practices that will be implemented to mitigate potential environmental effects when managing the waste rock and ore generated at Madrid North and Madrid South during construction, operations, and closure.	Included with Application (Appendix 8-B)
Interim Water Management Plan for Madrid North and Madrid South	Describes the management practices that will be implemented to mitigate potential environmental effects associated with the withdrawal of freshwater from Patch and Windy Lakes and collection and disposal of contact water at Madrid North and Madrid South including groundwater that may accumulate in underground workings.	Included with Application (Appendix 8-A)
Preliminary Closure and Reclamation Plan	Describes the activities undertaken at completion of the Madrid Advanced Exploration Program in order to establish stable chemical and physical conditions, enable the future use the sites following reclamation, and to meet the requirements of Aboriginal, Federal and Territorial governments, landowners, local communities and regulatory authorities. The plan includes an estimate of costs for closure and post-closure monitoring for purposes of planning and the provision of financial security.	Included with Application (Appendix 9)

Table 8.1-2. Proposed SNP Compliance Stations, Parameters, and Frequency of Sampling for Madrid Advanced Exploration Program

Project Component	Proposed Monitoring Station	Parameters	Frequency
Madrid North	Water Storage tank (Windy Lake freshwater via water truck)	Volume (m^3/d)	Daily during use.
	Pollution Control Pond	Volume (m^3/d) and percentage full (m^3)	Volume and percent full: once prior to discharge.
		Proposed discharge criteria (Table 7.4-1) based on 2AMDOH1323 and MMER	Discharge: daily during pumping.
		Erosion at discharge point	Water Quality: once prior to discharge and monthly while discharging.
	Fuel Storage Area – Vent Raise	Proposed discharge criteria (Table 7.5-1) including Benzene, Toluene, Ethylbenzene, Oil and Grease, and pH	Any ponded water prior to discharge. Water not meeting established discharge criteria will be transported to the TIA or Pollution Control Pond.
	Fuel Transfer Station	Proposed discharge criteria (Table 7.5-1) including Benzene, Toluene, Ethylbenzene, Oil and Grease, and pH	Any ponded water prior to discharge. Water not meeting established discharge criteria will be transported to the TIA or Pollution Control Pond.
Madrid South	Water Storage tank (Patch Lake freshwater via water truck)	Volume (m^3/d)	Daily during use.
	Pollution Control Pond – Primary	Volume (m^3/d) and percentage full (m^3)	Volume and percent full: once prior to discharge.
		Proposed discharge criteria (Table 7.4-1) based on 2AMDOH1323 and MMER	Discharge: daily during pumping.
		Erosion at discharge point	Water Quality: once prior to discharge and monthly while discharging.
	Pollution Control Pond – Secondary	Volume (m^3/d) and percentage full (m^3)	Volume and percent full: once prior to discharge.
		Proposed discharge criteria (Table 7.4-1) based on 2AMDOH1323 and MMER	Discharge: daily during pumping.
		Erosion at discharge point	Water Quality: once prior to discharge and monthly while discharging.
	Fuel Storage Area – Vent Raise	Proposed discharge criteria (Table 7.5-1) including Benzene, Toluene, Ethylbenzene, Oil and Grease, and pH	Any ponded water prior to discharge. Water not meeting established discharge criteria will be transported to the TIA or Pollution Control Pond.
	Fuel Transfer Station	Proposed discharge criteria (Table 7.5-1) including Benzene, Toluene, Ethylbenzene, Oil and Grease, and pH	Any ponded water prior to discharge. Water not meeting established discharge criteria will be transported to the TIA or Pollution Control Pond

(continued)

Table 8.1-2. Proposed Monitoring Stations, Parameters, and Frequency of Sampling for Madrid Advanced Exploration Program (completed)

Project Component	Proposed Monitoring Station	Parameters	Frequency
Quarry Areas	Contact Water Sump	Proposed discharge criteria (Table 7.2-1) including TSS, pH, Alkalinity, Conductivity, Reduction Potential (Eh), Total Sulphate, Total Ammonia, Nitrate, Oil and Grease. Total Metals (including Al, As, Cu, Fe, Pb, Ni, and Zn).	Any ponded water prior to discharge. Water not meeting established discharge criteria will be transported to the TIA.
Exploration Drill Locations	Water Use Source	Location Volume (m^3/d)	Recorded at setup. Daily.
	Drill Cutting Sump	Location	Recorded at setup.

8.2 WATER MANAGEMENT PLAN FOR BULK SAMPLING PROGRAM

The Water Management Plans for Madrid North and Madrid South (Appendix 8-A) is intended primarily for TMAC Resources Inc. staff and their contractors to employ best practices throughout all water management activities associated with the operation and closure of the Madrid Advanced Exploration Program, thus ensuring minimal potential environmental impacts.

There are no camp facilities at Madrid Area and therefore potable water is limited to daily usage by the work force in the office and emergency/first aid facilities. All remaining water use will be limited to that needed to support mining the bulk sample. Water is needed to prepare brine for drilling in the underground workings. The goal of the water management system is to use intercepted contact water in preference to lake water for make-up water and to maximize the mine water reuse within the underground workings.

This plan has been written in a manner allowing it to be appended to the Hope Bay Water Management Plan, following regulatory approval to proceed with the Madrid Advanced Exploration Program.

8.3 WASTE ROCK AND ORE MANAGEMENT PLAN

The conceptual Waste Rock Management Plan for Madrid North and South is presented in Appendix 8-B. A comprehensive waste rock management plan will be developed and submitted sixty (60) days prior to the start of bulk sample operations. The framework of the waste rock management will address details such as waste rock and seepage monitoring; water management; management of explosives residue; spill prevention and dust management.

The dominant rock types for Madrid South include mafic metavolcanics and porphyry granitoids, with lesser amounts of intermediate volcanics. This waste material is characterized by low sulphur content with 95% of the samples collected to date containing less than 0.50% total sulphur. Higher levels of Neutralization Potential and Total Inorganic Carbon with median values for all rock types greater than 75 kg $CaCO_3$ eq/t with ferroan dolomite as the most abundant carbonate mineral. All samples from Madrid South were classified as non-potentially acid generating (non-PAG) and the potential for acid rock drainage from Madrid South waste rock is low. Metal leaching under neutral pH conditions, notably arsenic, and to a lesser extent nickel, may be an issue for the relatively small proportion of material that contains somewhat higher amounts of sulphide. However, segregating according to sulphide content is considered impractical due to the relatively low amounts of sulphide present in this material. Therefore, all Madrid South waste rock will be placed in one waste rock stockpile.

The potential for acid rock drainage is also considered low for the waste rock from Madrid North area. The ABA data indicate that the waste rock is primarily classified as non-PAG due to nearly ubiquitously high carbonate content. Sedimentary units with high sulphur content and early gabbro have the potential to be Potentially Acid Generating (PAG); however, volumetrically, both rock types are projected to be relatively minor. In terms of metal leaching, arsenic and nickel leaching from waste rock are potential issues. The data show that occurrence of arsenic and nickel leaching is

not related to a specific rock type, sulphur content or metal assays, but possibly to the occurrence of the trace occurrence of the sulphide mineral gersdorffite ((Fe,Co,Ni)AsS), which requires specialized mineralogical instrumentation to identify. As a result, there is no practical field technique for segregation of waste rock that contains gersdorffite, therefore, all Madrid North waste rock will be placed in one waste rock stockpile.

Madrid North and Madrid South each have a designated Ore Stockpile adjacent to the portal. During operations, ore will be brought from the underground workings to the surface using mobile equipment and stockpiled in the designated Ore Stockpile area. Approximately 50,000 to 55,000 tonnes of ore will be stockpiled at Madrid South and Madrid North with transportation to Doris North Project by one haul campaign near the end of the underground operations. The haul campaign will be scheduled when mobile equipment is available to minimize the time needed to complete the transport.

8.4 QUARRY MANAGEMENT PLAN

The proposed construction and development at Madrid South and Madrid North, including the all-weather road that connects to the existing Doris-Windy Road, would make use of rock from Quarry G and H. The Hope Bay Belt Quarry Management and Monitoring Plan (Appendix 8-C) has been prepared by TMAC to address the management requirements for all current and proposed quarries in the Hope Bay Belt.

9. RECLAMATION AND CLOSURE

9.1 EXPLORATION DRILLING

A program of progressive reclamation will be undertaken for all surface drilling. Immediately upon completion of drilling, all casings and other materials will be removed, and disturbed areas will be returned to conditions to blend with local surroundings.

9.2 MADRID BULK SAMPLE AREAS

A conceptual level plan and associated cost estimate for the reclamation and closure for all facilities associated with the Madrid Advanced Exploration Program is presented in Appendix 9. The basis of the plan and its cost estimate is the existing plan and cost estimate approved by the NWB for the Doris North Project and is in accordance with the Mine Site Reclamation Policy for Nunavut (DIAND 2002) and the Northwest Territories Mine Site Reclamation Guidelines (INAC 2007).

The infrastructure associated with the Madrid Advanced Exploration Program has been designed to facilitate effective closure and reclamation. The overall objectives for each of the areas of infrastructure is to establish stable chemical and physical conditions, enable the future use the sites following reclamation, and to meet the requirements of Aboriginal, Federal and Territorial governments, landowners, local communities and regulatory authorities.

There are four distinct areas of infrastructure associated with the Madrid Advanced Exploration Program. These areas are:

1. Madrid North Portal;
2. Madrid North Vent Raise;
3. Madrid South All-weather Road; and
4. Madrid South Portal and Vent Raise.

Materials from existing and approved rock quarries, Quarries A, B and D as well as two new quarries, Quarries G and H to be developed in association with the Madrid Advanced Exploration Program will be used as the source of the needed cover materials for the closure of these sites. The closure and reclamation Quarries G and H is considered as part of the planning for the Madrid Advanced Exploration Program.

Table 9.2-1 provides a summary of the estimated cost for closure and reclamation of the facilities associated with the Madrid Advanced Exploration Program. The cost estimate has been developed using an NWB approved Microsoft Excel spreadsheet that is consistent with the principles of the RECLAIM 6.1 model. The cost estimate does not account for savings in closure costs that may result from conducting the work at Madrid North and Madrid South sequentially as opposed to at the same time. Savings in cost can be reasonably expected by moving infrastructure from one site to the other and progressively reclaiming the sites.

Table 9.2-1. Estimated Closure Costs for TMAC Madrid Advanced Exploration Program

Area	Estimated Cost (2014 CDN $)
Direct Costs	
Madrid North Bulk Sample Infrastructure	$1,834,000
Madrid All-weather Road	$17,000
Madrid South Bulk Sample Infrastructure	$1,757,000
Additional Direct and Supporting Costs (Off-Site Shipping, Disposal Fees, Water Management)	$817,000
Indirect Costs	*$2,706,000*
Total Closure and Reclamation Cost	**$7,131,000**

TMAC currently has posted reclamation security with Aboriginal Affairs and Northern Development Canada (AANDC), the KIA, and DFO covering existing and approved activities at Hope Bay including the Doris North Project, the Boston Advanced Exploration Project, and the Regional Exploration Program. TMAC proposes to post additional financial security in association with the Madrid Advanced Exploration Program in accordance with the estimate provided in Table 9.2-1.

10. IDENTIFICATION OF POTENTIAL ENVIRONMENTAL EFFECTS AND PROPOSED MITIGATION

10.1 INTRODUCTION

Over the past twenty years, the Hope Bay Belt has undergone considerable exploration and development activities by TMAC and previous operators. As a result, the Hope Bay Property has significant infrastructure including airstrips, roads, fuel storage, a port facility, power plants, administration, geology, and lab buildings, and underground development at the Doris and Boston areas. The main area of infrastructure development is the Doris North Project, which was constructed between 2010 and 2011, though the Doris North Project has not yet processed any ore or created any tailings, as it has never entered the production mining stage of operations (NIRB 2013).

The proximity of the Madrid area to the Doris North Project provides the opportunity to take advantage of existing infrastructure that will reduce costs, minimize the footprint and minimize the time required to complete the Madrid Advanced Exploration Program. The permitted infrastructure and facilities at Doris North Project have sufficient capacity to support the proposed program and have been previously screened and assessed by the Nunavut Impact Review Board (NIRB).

Previous underground developments at Doris (2010-2011) and Boston (1996-1997) provided critical access to various parts of the mineralization in order to collect bulk samples used to evaluate the character and metallurgical nature of the ore. Underground development and bulk sampling is a necessary step in the advanced exploration process to determine the economic viability of the mineralization. Madrid area is the only district in the Hope Bay Belt without the benefit of a bulk sample program.

The Madrid Area has been explored since the early 1990s with activities including prospecting, surficial mapping and sampling, geophysical surveys (downhole, surficial and airborne) and diamond drilling. To support this exploration, various activities and infrastructure were authorized including exploration camps (e.g., Wolverine and Windy Camps), quarry activities, drummed fuel storage and caches, helicopter access, ice airstrips, and all-weather and winter roads.

10.2 PREVIOUS AND CURRENT NIRB SCREENING AND REVIEW

Given the level of exploration and development in the Hope Bay Belt, many of the proposed activities and infrastructure supporting the Madrid Advanced Exploration Program have been previously authorized and screened by NIRB (Table 10.2-1). Exploration and bulk sampling activities at Boston have been screened and determined to be exempt (EX148) from environmental assessment and regional exploration activities across the Hope Bay Belt have also been screened and determined to be exempt from environmental assessment. Advanced exploration and mine development at Doris North Project has been screened and undergone environmental assessment (screening 05MN047 and Project Certificate 003).

Table 10.2-1. Hope Bay Belt Authorizations

Quarry Permits	Commercial Lease
• KTP308Q010 - Quarries A, B, D (exp. Jan 20, 2015) • KTP307Q010 - Quarries 2, 3, 4 (exp. Jan 20, 2015) • IOL Surface tenure – Quarries G, H (application pending)	• KTCL313D001 - Commercial Lease (exp. Sept 13, 2018)
Land Use Licences	**Water Licences**
• KTL303C056 - Hope Bay Land Use (exp. Jan 20, 2015) • KTL306C003 - Boston Land Use Licence (exp. Jan 20, 2015) • KTL306F007 - Winter Road Land Use(exp. Jan 20, 2015) • IOL Surface Tenure for Advanced Exploration – Madrid (application pending)	• 2BB-BOS1217 Boston Advanced Exploration Project (exp. Jul 31, 2017) • 2AM-DOH1323 Doris North Mining and Milling Undertaking (exp. Aug 15, 2023) • 2BE-HOP1222 Hope Bay Regional Exploration Program (exp. Jun 30, 2022)

A project proposal for Phase 2 of the Hope Bay Belt, which is intended to cover the reasonable and foreseeable proposed incremental development of the Belt over the next approximately 10 years, has been submitted and NIRB EIS Guidelines (NIRB Dec 2012) have been issued. Phase 2 may include the development of the Madrid and/or Boston areas, including infrastructure and waste management facilities to support underground and open pit mining and processing in both districts.

TMAC is submitting this application in advance of the upcoming Phase 2 Hope Bay Belt EIS. The Project will provide further definition of Madrid South and North mineral resources, support mine planning, and validate the economic feasibility of the deposit. For this reason, TMAC is seeking approval for the Madrid Advanced Exploration Program Type B water licence prior to completion of the NIRB review of Phase 2. TMAC considers these proposed activities exempt from NIRB screening and treated as an exception to the Phase 2 environmental assessment to allow the issuance of the Type B water licence to support continued exploration and/or bulk sampling program.

As such, TMAC has considered the following sections of Article 12 of the NLCA in relation to this application:

> **12.10.1 - Projects Not to Proceed** No licence or approval that would be required in order to allow a proposed project to proceed shall be issued in respect of a project that is to be screened by NIRB until the screening has been completed and, if a review pursuant to Part 5 or 6 is to be conducted, until after that review has been completed and a NIRB project certificate has been issued by NIRB pursuant to these provisions.
>
> **12.10.2 – Exceptions** Notwithstanding Section 12.10.1, where a project proposal has been referred for review pursuant to Part 5 or 6, approvals or licences for exploration or development activities related to that project may be issued if: **(a)** the activity falls within Schedule 12-1; or **(b)** the activity can, in the judgement of NIRB, proceed without such a review.

TMAC has reviewed Schedule 12-1 of the NLCA and in its view, the Project activity falls wholly within Schedule 12-1 (Types of Project Proposals Exempt from Screening):

1. Land use activities not requiring a permit or authorization from the Government of Canada or Territorial Government.
2. Land use activities requiring only a Class B permit under the Territorial Land Use Regulations (SOR/77-210 4 March 1977).
3. All construction, operation and maintenance of all buildings and services within an established municipality, except for bulk storage of fuel, power generation with nuclear fuels, or hydro power and any industrial activity.
4. All hotels, motels or tourist facilities of 20 beds or less outside the boundaries of a municipality.
5. Water uses that do not require a public hearing under Section 13.7.3.
6. Prospecting, staking or locating a mineral claim unless it requires more than a Class B permit mentioned in item 2.
7. Such other categories of activities and projects as may be agreed upon by NIRB and the appropriate Minister.

TMAC is of the view the Project should be exempt from NIRB screening and proceed directly to the NWB licensing as it falls under Schedule 12-1 item 5 and is exempt from screening. Despite this view, TMAC has included NIRB's Part 1 and Part 2 Forms in Appendix 10 for the purposes of completeness.

10.3 IDENTIFICATION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

Table 10.3-1 identifies the environmental effects associated with the advanced exploration program, quarry activities and associated support throughout the project phases. Identification of the effects is presented as:

- positive (P); or
- negative and mitigable (M); or
- negative and non-mitigable (N); or
- unknown (U).

The methods used to predict effects associated with the Madrid Advanced Exploration Program was guided by the approach used for the Doris North Project Final EIS (Miramar 2005). Valued Ecosystem Components (VECs) for the Doris North Project were selected based on both western scientific data and Inuit *Qaujimajatuqangit*. For screening purposes of the proposed Madrid Advanced Exploration Program, the identification of environmental impacts considered the identified VECs for the Doris North Project and the potential affects due to the quarry and bulk sampling program.

Table 10.3-1. Summary of Potential Effects of the Madrid Advanced Exploration Program

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Air Quality					
Degradation of air quality due to exhaust emissions from vehicles, aircraft and other combustion equipment	M	M	M		Use of well-maintained, fuel efficient equipment and promotion of fuel conservation measures.
Degradation of air quality due to fugitive dust emissions from blasting, quarrying, crushing and screening	M	M			Dust generated will be short term and localized in nature and may settle on nearby overburden/soils, vegetation and surface water. As needed, water will be applied during periods of dry weather.
Degradation of air quality due to fugitive dust emissions from increased use of the existing airstrip and road traffic	M	M	M		Dust generated will be localized in nature and may settle on nearby overburden/soils, vegetation and surface water. As needed, water will be applied during the summer periods of dry.
Greenhouse gas emissions contributing to climate change	M	M	M		Use of well-maintained, fuel efficient equipment and promotion of fuel conservation measures. The equivalent emissions of GHG from the Madrid Advanced Exploration Program during the peak year is approximately 0.002% of Canada's annual emissions. The Hope Bay Project also has a "No-idling" Policy.
Noise					
Changes to background noise conditions due to movement of vehicles, aircraft and other equipment	M	M	M		Equipment fitted with appropriate mufflers and silencers. Use enclosures, berms, acoustic screening and shrouding where stationary sources requiring control are identified. Keeping equipment in a well maintained condition.
Increased noise and vibration due to blasting and exploration drilling	M	M			Use enclosures, berms, acoustic screening and shrouding where stationary sources requiring control are identified. Keeping equipment in a well maintained condition.

(continued)

Table 10.3-1. Summary of Potential Effects of the Madrid Advanced Exploration Program (continued)

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Ground Stability and Permafrost					
Alteration of the active layer	M/N	M/N	M/N	M/N	Effects to permafrost will be mitigated as far as practical by reducing the extent of cut and fill areas; cut and fill will be allowed in designated rock quarries Appropriate thermal insulation will be placed to prevent onset of thermal erosion. Where fill is required, it will be of sufficient thickness and quality such that the active layer is not reduced.
Acceleration of permafrost-related processes such as mass wasting and erosion	M	M	M	M	Minimizing areas of disturbance. Where disturbance occurs, erosion and sediment control measures including compaction, sediment fences, and erosion control blankets will be implemented.
Groundwater					
Changes in groundwater quality due to the interaction between talik groundwater and underground mine water	M	M			Minimize operations within talik zone. Underground water will be collected into sumps and re-used for underground drilling. If excess water accumulates, the collected water will be transported to the Pollution Control Pond on surface.
Changes in groundwater quality due to the interaction between deep groundwater and underground mine water					Mine operations do not extend below the base of the permanently frozen zone.
Degradation of active layer water due to contact with poor quality (contact) water	M	M			Surface water management strategies including diversion/collection systems have been incorporated to reduce the risk of degradation of very shallow groundwater in the active-layer.
Surface Water Quantity					
Surface water drawdown of area lakes as a result of use	M	M			Recycling of intercepted contact water for drilling purposes will reduce the demand for fresh water and lake drawdown. Compliance with DFO Guidelines for under ice water taking.

(continued)

Table 10.3-1. Summary of Potential Effects of the Madrid Advanced Exploration Program (continued)

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Surface Water Quantity *(cont'd)*					
Alteration in surface runoff patterns due to diversions	M	M	M		Minimizing footprint and diversion of surface runoff, minimizes the alteration to runoff patterns. Diverted surface runoff is kept within the existing watershed.
Surface Water Quantity and Sediment Quality					
Changes in surface water quality from disposal of contact water at bulk sample sites		M	M	M	Contact water meeting discharge criteria will be released from the bulk sample pad to the tundra at least 31 m away from the local waterways. If the discharge water does not meet the water quality criteria, it will be transported to the Doris North Project for disposal in TIA.
Changes in water quality from fugitive dust emissions	M	M	M		Appropriate drainage and sediment control structures will be used to prevent sediment laden water from entering surrounding waters. Dust generation will be minimized by road watering or by using other non-toxic, non-wildlife attractant substances to suppress dust.
Changes in surface water quality from runoff from quarry sites	M	M	M	M	Contact water within the quarry boundaries will be collected in a sump. If this contact water meets discharge criteria it will be discharged to the environment. If it does not meet discharge criteria it will be trucked to the Pollution Control Pond for reuse, or trucked to Doris North Project for disposal in TIA. Management plans will outline the storage, handling and use of explosives to minimize excessive residue and nitrogen loading.
Changes in surface water quality from runoff water from roads, pads, and other infrastructure	M	M	M	M	Runoff from the pads will be directed to the Pollution Control Pond and runoff from the roads may be monitored for two years to confirm geochemical stability of the material. Roads and infrastructure pads have been sited to avoid waterbodies and are designed to minimize the risk for erosion and use of silt fencing if and where necessary.
Presence of hydrocarbons owing to fuel spills	M	M	M		The possibility of accidental spills or releases will be eliminated or reduced by implementation of management plans and standard operating procedures. Available spill and emergency response equipment.

(continued)

Table 10.3-1. Summary of Potential Effects of the Madrid Advanced Exploration Program (continued)

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Surface Water Quantity and Sediment Quality *(cont'd)*					
Changes in surface water quality from disposal of treated sewage effluent and/or sludge					The existing camp facilities at Doris North Project will be used and portable, latrine style toilet facilities at Madrid South and Madrid North. Toilet wastes will be returned to the Doris North Project for disposal at existing sewage treatment facilities.
Changes in surface water quality from disposal of underground mine water	M	M	M		Underground contact water will be collected in underground sumps and reused for drilling. Excess water will be pumped to the surface and discharged to the Pollution Control Ponds.
Mobilization of particulate material dust-generating activities	M	M			Dust generation will be minimized by road watering or by using other non-toxic, non-wildlife attractant substances to suppress dust.
Disturbance and suspension of sediments from in-water construction activities	M				Appropriate drainage and sediment control structures will be used to prevent sediment laden water from entering surrounding waters.
Changes in sediment quality from disposal of treated contact water at bulk sample sites	M	M	M	M	Contact water meeting discharge criteria will be released from the bulk sample pad to the tundra at least 31 m away from the local waterways. If it does not meet discharge criteria it will be trucked to the Doris North Project for disposal in TIA.
Presence of hydrocarbons in sediment owing to fuel spills	M	M			The possibility of accidental spills or releases will be eliminated or reduced by implementation of management plans and standard operating procedures.
Changes in sediment quality from disposal of treated sewage effluent and/or sludge					The existing camp facilities at Doris North Project will be used and portable, latrine style toilet facilities at Madrid South and Madrid North. Toilet wastes will be returned to the Doris North Project for disposal at existing sewage treatment facilities.

(continued)

Table 10.3-1. Summary of Potential Effects of the Madrid Advanced Exploration Program (continued)

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Vegetation					
Loss of ecosystems and vegetation to infrastructure development	N	N			Loss of ecosystems and vegetation will be minimized by minimizing Project footprint and utilization of existing infrastructure and access corridors associated with the Doris North Project. The total area that will be converted to roads, pads, and laydown areas amounts to approximately 25 ha across the Madrid area. Current Doris North Project footprint is approximately 70 ha.
Degradation of eco-systems and vegetation through increased dust deposition, chemical spills, alteration of local hydrology, or the introduction of invasive species	M	M	M	M	Implementation of dust mitigation measures and available spill and emergency response measures. Where practical, road construction and maintenance will prevent the ponding of water to maintain local hydrological patterns. The introduction of invasive plant species to newly disturbed areas will be minimized by washing machinery and vehicles thoroughly prior to their use on site.
Degradation of ecosystems and vegetation through discharge to the tundra		M			Erosion will be mitigated through the use of silt curtains and Pollution Control Ponds, as required.
Terrestrial Fauna					
Habitat loss due to infrastructure development	M	M	M	M	Minimizing overall Project footprint and avoiding significant habitat. Avoiding clearing during wildlife sensitive periods or using qualified personnel to conduct pre-clearing surveys if clearing occurs within sensitive wildlife periods.
Changes in movement and behaviour due to sensory disturbance from blasting, human presence, vehicle and aircraft traffic	M	M	M		Equipment fitted with appropriate mufflers and silencers. Use enclosures, berms, acoustic screening and shrouding where stationary sources requiring control are identified. Keeping equipment in a well maintained condition. Blasting restrictions for proximity of sensitive wildlife.

(continued)

Table 10.3-1. Summary of Potential Effects of the Madrid Advanced Exploration Program (continued)

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Terrestrial Fauna *(cont'd)*					
Mortality due to vehicle and aircraft traffic	M	M	M		Vehicle speed limits will be implemented and enforced and vehicles restricted to site roads and quarry footprints. Wildlife has the right of way on the road system, supported by a notification system. Established management procedures for deterring wildlife from active areas.
Mortality or reduced vigor from ingestion of contaminants deposited in food and water sources due to construction activities, vehicle traffic, and drilling activities	M	M	M	M	A waste and wildlife attractant management protocol implemented such that wildlife do not have access to camp wastes, contaminated areas, and attractants.
Aquatic Fauna					
Reduction in habitat or de-oxygenation of water through water withdrawals for operations and dust suppression activities	M	M			Recycling of intercepted contact water for drilling purposes will reduce the demand for fresh water and lake drawdown. Compliance with DFO Guidelines for under ice water taking. Minimizing footprint and diversion of noncontact surface runoff, minimizes the alteration to runoff patterns. Diverted surface runoff is kept within the existing watershed.
Reduction in habitat quality through reduced water or sediment quality associated with the introduction of nutrients or contaminants, including elevated TSS levels through dust-generating and in-water construction activities	M	M			The mitigation measures already described for water and sediment quality will help minimize the potential effects to aquatic organisms, fish, and fish habitat by minimizing changes to water and sediment. Elevated levels of TSS will be mitigated through the use of erosion control, silt curtains and Pollution Control Ponds, as required.

(continued)

Table 10.3-1. Summary of Potential Effects of the Madrid Advanced Exploration Program (completed)

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Aquatic Fauna *(cont'd)*					
Removal or alteration of aquatic habitat for infrastructure, including the construction of culverts	M	M			Minimized accepted techniques for sediment control, riparian care, site isolation, and timing windows. Location of infrastructure to minimize the loss of aquatic systems, with a particular focus on avoiding important fish habitat. Infrastructure is designed with a minimum 31 m setback distance from adjacent waterbodies and the water that comes into contact with these facilities will be intercepted for management prior to release to the environment.
Historical and Traditional Uses					
Disturbance or loss of recorded and unrecorded archaeological sites or significant heritage resources	M	M			The footprint has been surveyed and the recorded archaeological sites are mitigable with recovery in accordance with Territorial legislation and implementation of a "chance find" procedure.
Damage or removal of archaeological material	M	M			The footprint has been surveyed and the recorded archaeological sites are mitigable with recovery in accordance with Territorial legislation and implementation of a "chance find" procedure.
Decrease in access to land for land users	N	N	M	M	Communication will be a major component of mitigation to changes to access to the area. This would inform other land users of activities associated with Project construction and operations, including restricted areas, blasting activities, and wildlife management. Communication will enable land users to adjust their activities accordingly, and stay informed regarding Project development. (TMAC is discussing with KIA measures that generally address any impacts of the project on Inuit.)
Changes to the aesthetic quality of the area	M	M	M	M	TMAC will also consider suggestions made by land users and residents of local communities in the development of mitigation and enhancements, in the interest of ensuring that these measures are meaningful and effective in the local context.

The following discussion focuses on the environmental impacts that are identified as either: negative and mitigable (M) or negative and non-mitigable (N). The potential direct, indirect, and cumulative effects that the proposed Madrid Advanced Exploration Program may have on the biophysical and socio-economic environments during the construction, operations, closure/temporary closure, and post-closure phases are covered. Where potential effects have been identified, mitigation measures are proposed to minimize or eliminate the potential environmental and/or social effects.

10.4 POTENTIAL EFFECTS AND PROPOSED MITIGATION FOR THE PHYSICAL ENVIRONMENT

10.4.1 Air Quality and Noise

Potential Project-related effects on air quality and noise during the construction, operations, closure/temporary closure, and post-closure phases include degradation of air quality, increased Greenhouse Gas emissions, and increased noise and vibration. These impacts are identified as negative and mitigable. Proposed mitigation measures are described in the following.

Air emissions, primarily airborne particulates and oxides of sulphur and nitrogen will be generated as a result of the use of combustion engines including the generation of electricity at each of the bulk sample sites. Mitigation measures will include the use of well-maintained equipment, a "No-idling" policy, and conservation of fuel through the efficient use of vehicles and equipment. Conservation is motivated in part due to the high cost of fuel in the arctic. Through the course of the advanced exploration project, it is estimated that at peak activity levels, up to 5.5 million L per year of diesel fuel may be consumed by on-site equipment. For reference, Doris North Project has a current capacity of 22.5 million L and is licenced for up to 29 million litres of fuel. The equivalent emissions of greenhouse gases from the Madrid Advanced Exploration Program during the first year of construction (peak year) may be in the order of 16,000 tonnes CO_2e which is approximately 0.002% of Canada's annual emissions.

Fugitive dust emissions will be generated through the movement of road vehicles and aircraft. Fugitive emissions are also expected to be generated as a result of quarry development and operations (blasting, loading and unloading of equipment). Dust generated from these activities will be localized in nature and may settle on nearby overburden/soils, vegetation and surface water. Dust emissions will be mitigated in the same manner as currently undertaken with the Doris North Project, where roads are watered during summer periods of dry weather. Whereas the quarries will be a source of fugitive emissions for only a short period of time during project development, the road will be a source of fugitive emissions during construction, operations, and periods of use during closure.

Noise emissions will be concentrated at the two bulk sample sites, the associated vent raises and along the access roads from Doris North Project. Noise and vibration generated underground is not expected to propagate to the surface. Fixed wing aircraft moving personnel and goods to the project will result in noise as will the use of rotary aircraft to support surface drilling activities. However, these activities are short term and temporary. Noise and vibration during construction will be more intense than during operations as quarry rock is produced, roads and site pads are constructed, and

the portals and ramps to access the underground are established. Mitigation measures for noise controls are being considered and include:

- using equipment that is fitted with appropriate mufflers and silencers;
- using enclosures, berms, acoustic screening and shrouding where stationary sources requiring control are identified; and
- keeping equipment in a well maintained condition.

10.4.2 Ground Stability and Permafrost

Potential Project-related effects on ground stability and permafrost during the construction, operations, closure/temporary closure, and post-closure phases include alternation of the active layer and acceleration of permafrost related processes such as mass wasting and erosion. These effects have been identified as negative and mitigable, with the exception of the change to the active layer that is negative and non-mitigable. Proposed mitigation measures are described in the following.

The project will require the establishment of two quarry sites, the construction of an approximately 5 km long access road, and the construction of pad areas to house the equipment and materials to support the advanced exploration program. In total, the project will have an associated physical footprint of approximately 25 ha. For comparison, the Doris North Project has approximately 15 km of all-weather road and a footprint of approximately 209 ha. The total amount of excavated rock and overburden will be limited by optimization of the bulk sample development plan including the utilisation of existing infrastructure and access corridors associated with the Doris North Project.

Disturbances of overburden and overlying tundra vegetation as a result of constructing this footprint may alter the thermal regime, which could induce a shift in the active layer and melting of ground ice, resulting in thaw settlement. Depressions caused by these settlements could form, leading to erosion and ponding of water.

The potential for increased surface erosion during the construction phase will be proactively addressed by minimizing areas of disturbance. In areas where disturbance is unavoidable, mitigation will focus on stabilizing cut and fill areas and implementing erosion and sediment control measures including compaction, sediment fences, and erosion control blankets. All pads will be graded at 0.5% towards the Pollution Control Ponds in order to control runoff and sedimentation.

Effects to permafrost will be mitigated as far as practical by reducing the extent of cut and fill areas. Where cutting occurs, appropriate thermal insulation will be placed to prevent onset of thermal erosion. Where fill is required, it will be of sufficient thickness and quality such that the active layer is not reduced. Specifically, all pads will be a minimum of 1 m thick for permafrost protection and to allow for adequate seepage drainage and will be constructed in accordance with SRK's Technical Specifications, Earthworks and Geotechnical Engineering (SRK 2011c).

10.4.3 Groundwater

Potential Project-related effects on groundwater during the construction, operations, closure/ temporary closure, and post-closure phases includes changes in groundwater quality due to the

interaction between talik groundwater and underground mine water; changes in groundwater quality due to the interaction between deep groundwater and underground mine water; and degradation of active layer water due to contact with poor quality (contact) water. These effects are identified as negative and mitigable. Proposed mitigation measures are described in the following.

In developing its plans for advanced exploration at Madrid South and Madrid North, TMAC has determined that program objectives can be met without working below the basal depth of permafrost (approximately 450 m). This will limit the potential of interaction of the workings and the deep groundwater system. Mining the bulk sample within talik zones beneath Patch Lake at Madrid South may result in groundwater seeping into underground workings. The rate of inflow into mine workings is dependent on the location and extent to which bulk sample mining within these zones occurs. Potential effects to the quality of groundwater are introduced by mining within these unfrozen zones.

Sustained collection of groundwater seeping into the mine will induce a groundwater sink, thereby preventing seepage of contact water into the natural groundwater regime from the underground mine. Water will be collected in sumps and re-used for underground drilling, with excess transported to the Pollution Control Pond on surface.

The underground operations do not pose a risk to the groundwater regime in terms of change to water quantity or quality.

Groundwater in the active-layer could be affected by activities that influence surface water. Active-layer water refers to the water that exists in the thin layer of soil/overburden above the continuous permafrost that thaws during the summer months. Active-layer water interacts with surface water for a short period of time in the summer and is thus susceptible to degradation due to contact with poor quality surface water.

Surface water management strategies including noncontact surface water diversion and contact water collection systems have been incorporated to reduce the risk of degradation of very shallow groundwater in the active-layer.

10.4.4 Hydrology

Potential Project-related effects on hydrology during the construction, operations, closure/temporary closure, and post-closure phases are surface water drawdown of area lakes and streams as a result of use and alteration in surface runoff patterns. These effects are identified as being negative and mitigable with proposed mitigation measures described in the following.

For the purposes of predicting the potential of effects due to the withdrawal of freshwater, the change in water level using a conservative set of assumptions was calculated. The initial assumption is to assume a sustained withdrawal from both Patch and Windy lakes is each 299 m^3/day (Table 10.4-1) each year. This is slightly more than the requested volume of 295 m^3/day. Based on these assumptions:

- Open water season is assumed to be July to October 15 and ice-cover season from October 16 to June 30.

- During ice-covered season it is conservatively estimated that the ice thickness is 2 m throughout the season.

Table 10.4-1. Projected Water Drawdown from Patch Lake and Windy Lake at 299 m³/day

Lake	Days	Total Volume in Lake (000 m³)	10% of Total Lake Volume (000 m³)	Withdrawal of Total Lake Volume at 299 m³/d (%)	Withdrawal of Total Lake Volume at 642 m³/d (%)
Windy Lake					
Open Water	106	59,190	5,919	0.05	0.12
Ice Covered	259	48,741	4,874	0.16	0.35
Patch Lake					
Open Water	106	23,544	2,354	0.13	-
Ice Covered	259	12,722	1,272	0.61	-

At the maximum withdrawal rate of 299 m³/day sustained for a year, there would be less than 1% drawdown of the total lake volume during any season. The greatest % removal would be in Patch Lake during the ice-covered season (0.61% of total lake volume) due to its much lower average depth.

Windy Lake is authorized to be a water source for other water licences in the area; with a peak withdrawal of 299 m³/day at Madrid North the cumulative withdrawal rate including permitted volumes under other licences may peak at 642 m³/day. At this cumulative withdrawal rate sustained for a year, there would be less than 1% drawdown of Windy Lake total lake volume well below the 10% limits outlined by DFO Guidelines.

Drawdown effects on the lake and its respective watershed are further influenced by the loss of surface runoff. Engineered pads at Madrid North and Madrid South are designed to intercept and capture surface water that contacts the area during the period of operations, including the waste rock and ore stockpiles. This water will be used for drilling purposes and will reduce the demand for fresh water from Patch and Windy Lakes. However, this captured water is removed from its watershed (at least temporarily) and as such its loss may lead to potential hydrological impacts.

Based on a preliminary water balance conducted for Madrid South and Madrid North bulk sample sites, the total average annual runoff contributions to Patch Lake and Windy Lake that may be lost from each lake as a result of contacting the project are summarized in Table 10.4-2. These calculations conservatively assume that none of the collected contact water will be returned to the lake as treated effluent. Change to the lake volumes with the loss of the surface runoff due to contact with infrastructure is less than 1% for both Patch and Windy Lakes. Of note, is that a portion of this surface water may return to the watershed as treated discharge depending on the needs of water for drilling and the balance of water on-site at that time reducing the equivalent volume removed.

Lake volumes may be affected by the concurrent withdrawal for water supply plus loss of surface runoff due to contact with project infrastructure. The effect of these cumulative water withdrawals (Table 10.4-2) is negligible and below the 10% criteria identified by DFO.

Table 10.4-2. Anticipated Changes to Patch and Windy Lake Volumes due to Water Withdrawals and Surface Runoff Removal

	Patch Lake (Madrid South)	Windy Lake (Madrid North)
Average annual discharge	0.25 m^3/s (~7.9 Mm^3/year)	0.11 m^3/s (~3.5 Mm^3/year)
Equivalent volume surface runoff removed	9,200 m^3/year	20,049 m^3/year
Change in lake volume (%)	0.1%	0.6%
Equivalent volume removed with water withdrawal (at 299 m^3/day) and surface runoff loss	118, 335 m^3/year (109,135 m^3/y + 9,200 m^3/y)	129,184 m^3/year (234,330 m^3/y + 20,049 m^3/y)
Change in lake volume	1.5%	7.3%

10.4.5 Surface Water Quality and Sediment Quality

Potential Project-related effects on water and sediment quality during the construction, operations, closure/temporary closure, and post-closure phases include the following.

For surface water quality:

- changes in surface water quality from disposal of contact water at bulk sample sites;
- changes in water quality from fugitive dust emissions;
- changes in surface water quality from runoff from quarry sites;
- changes in surface water quality from runoff water from roads, pads, and other infrastructure;
- presence of hydrocarbons from fuel spills;
- changes in surface water quality from disposal of treated sewage effluent and/or sludge;
- changes in surface water quality from disposal of underground mine water.

For sediment quality:

- mobilization of particulate material from dust-generating activities;
- disturbance and suspension of sediments from in-water construction activities;
- changes in sediment quality from disposal of contact water at bulk sample sites;
- presence of hydrocarbons in sediment as a result of fuel spills;
- changes in sediment quality from disposal of treated sewage effluent and/or sludge.

These effects have been identified as being negative and mitigable with proposed mitigation measures are described in the following sections.

10.4.5.1 Surface Water Quality

Contact Water from Bulk Sample Sites

All water that comes into contact with the pad and its infrastructure, including the waste rock and ore stockpiles will be directed to the Pollution Control Ponds to be used as a water supply for

underground drilling. There will be seasonal excesses of contact water over the Project life and this contact water could contain elevated metals (due to possible metal leaching) and/or nitrogen compounds (from explosives residue).

Contact water meeting discharge criteria will be released from the bulk sample site at Madrid North and Madrid South to the tundra. Meeting these criteria in the discharge water will mitigate the effects to the water quality. If the discharge water does not meet the water quality criteria, it will be transported to the Doris North Project for disposal in the TIA. During normal operations, discharges will be to the tundra away from local waterways (including Windy and Patch Lakes for Madrid North and Madrid South respectively) such that the discharge will be > 31 m away from the normal high water mark.

Fugitive Dust Emissions

Dust-generating activities include the quarry operations and associated crushing and screening activities, construction of roads and buildings and the ongoing use of roads and the airstrip. These activities could introduce particulate matter, such as TSS and metals associated with rock, into surrounding surface waters. Appropriate drainage and sediment control structures will be used according to current industry practice during construction to prevent sediment laden water from entering surrounding waters.

During operations, dust generation will be minimized by implementation of a road speed limit, road maintenance (grading), and suppression of dust in the quarry/road with application of water or other approved products.

Run-off from Quarry Sites

The use of ANFO as an explosive can leave nitrogen residues on rock surfaces, which can then run off into surface waters. Improper storage and handling of ANFO can also introduce nitrogen compounds to surface waters. Quarry design and operations will incorporate measures to collect any contact water within the quarry boundaries to facilitate monitoring. If this contact water meets discharge criteria it will be discharged to the environment. If it does not meet discharge criteria it will be trucked to the Pollution Control Pond for reuse or treatment, or trucked to Doris North Project camp for disposal in TIA.

ANFO will be delivered on a daily basis from the Doris North Project facility and delivered directly to the blast hole as needed. No storage is intended at the quarry locations. Runoff water will be diverted around the loading area to prevent contact with potential contaminants. Nitrogenous residues in quarry sump water will be minimized to the extent possible. Current industry management practices will be used for the handling and use of explosives to minimize excessive residue and nitrogen loading. These practices are already in place for the Doris North Project and will be used for the bulk sample project.

Run-Off from Roads and Pads

Run-off water from roads and infrastructure pads has the potential to release poor quality water to down gradient lakes and streams. As a primary means of mitigation, roads and infrastructure pads

will be constructed of quarry materials that have been confirmed to pose low risk for metal leaching and/or potential acid generation and constructed to minimize potential for erosion.

Runoff from the pads will be directed to the Pollution Control Pond (Table 8.1-2). Roads and infrastructure pads have been sited to avoid waterbodies and are designed to minimize the risk for erosion and currently accepted industry construction practices will be employed during construction and operations.

There are two crossings along the road between Madrid North and Madrid South bulk sample sites. Potential for effects at these crossings, including the release of poor quality water and/or sediment during construction and operations will be avoided through the use of erosion control measures and available spill and emergency response equipment.

Fuel Spills

The transportation and handling of hydrocarbons on site during construction and operations could potentially cause the introduction of hydrocarbons to surface waters if there was a spill or if not handled properly.

The possibility of accidental spills or releases will be eliminated or reduced by implementation of current industry management practices, including facilities that incorporate containment, and standard operating procedures.

Treated Sewage and/or Sludge

Workers will utilize the existing camp facilities at Doris North Project or the new permitted camp at Windy Lake. There will be portable, latrine style toilet facilities established at Madrid South and Madrid North. Toilet wastes will be returned to the Doris North Project for disposal at existing sewage treatment facilities. As the existing camp space and associated infrastructure has the capacity for the workers associated with the Madrid Advanced Exploration Program, no new effects are anticipated. Treated sewage will be handled according to the existing Waste Water Treatment Management Plan for Doris North Project (HMBL 2012).

Underground Mine Water

The underground mine water will be managed in underground sumps and reused for drilling so no potential effects to surface water quality are expected. Madrid South is anticipated to intersect groundwater during underground operations. This underground contact water is anticipated to be saline and the underground mine water will be pumped to the surface and discharged to the Pollution Control Ponds.

Management of Surficial Diamond Drill Cuttings

Drilling fluids are a mix of rock cuttings from the drilling and water containing variable levels of drill mud, salt ($CaCl_2$) and drill additives. Drill cuttings management is employed to reduce environmental impact through the release of the drilling fluid, maximize drilling fluid and salt reuse, and increase efficiency in water consumption. Recirculation systems are especially important

to reduce impact to the environment at drill locations as it allows drill cuttings to be filtered out and then reuse the drill water.

Drill cuttings are pumped to a cuttings management containment system that allows the cuttings to settle and separate from the drill water. The clarified water is re-circulated through the system. If "brine free", cuttings sludge may be deposited in a natural depression in the vicinity of the drillhole, or transported by helicopter to a central cuttings management area. If the cuttings are contaminated with brine, they are flown to a separate contaminated cuttings management facility.

10.4.5.2 Sediment Quality

Dust-generating activities include the construction of roads, infrastructure pads and buildings as well as quarry and associated crushing/screening activities. As with surface water quality, sediment quality could be impacted by the deposition of particulate material onto stream or lake sediments.

In-stream construction activities, such as culvert installations could disturb and suspend lake and river sediments, causing their transport downstream or to other locations. During construction and operations, hydrocarbons could be introduced into lake or stream sediments if there was a spill or if not handled properly.

Fuel storage tanks and handling areas will be placed in HDPE lined containment designed to contain any hydrocarbon leakage. In addition, fuel transfer stations will be designed to meet the codes and guidelines. Facilities will also be monitored on a regular basis to identify any potential releases to the containment are identified and mitigated.

Mitigation measures in place to minimize potential effects of surface water quality will also minimize effects on sediment quality. This applies to mitigating the effects of dust deposition from on-land construction, sediment suspension from in-water construction, fuel storage and handling, discharge of complaint water to tundra from treatment plants or containment berms well as treated sewage discharge. See Section 10.4.5.1 for further detail on measures to mitigate surface water and sediment quality.

10.5 POTENTIAL EFFECTS AND PROPOSED MITIGATION FOR THE BIOLOGICAL ENVIRONMENT

10.5.1 Vegetation

Potential Project-related effects on vegetation during the construction, operations, closure/ temporary closure, and post-closure phases include: loss of ecosystems and vegetation to infrastructure development; degradation of ecosystems and vegetation through increased dust deposition, chemical spills, alteration of local hydrology, or the introduction of invasive species; and degradation of ecosystems and vegetation through discharge to the tundra. These effects have been identified as being negative and mitigable, except for the loss of ecosystems and vegetation within the infrastructure footprint. Proposed mitigation measures are described in the following.

Loss of vegetation will occur during the construction phase of the project. Plant cover will be removed and disturbed as infrastructure is built. Loss of ecosystems and vegetation will be minimised through

optimization of the mine development plans including the utilisation of existing infrastructure and access corridors associated with the Doris North Project. The total area that will be converted to roads, pads, and laydown areas amounts to approximately 25 ha across the Madrid area.

During construction and operations, vegetation may be degraded by dust deposition, which can slow plant growth and change the microclimate by altering the amount of snow cover or timing of spring melt. Spills could potentially affect plant cover, with the potential effects varying depending on the material, season, and plant community present. Potential effects of dust deposition or chemical spills on vegetation will be mitigated following the most recent Air Quality Management Plan and the Spill Contingency Plan.

Changes to surface water flows due to the construction of roads and pads and diversion of surface runoff water around infrastructure during the construction, operations, and closure/temporary closure phases and discharge to the tundra during the operations phase could potentially alter the plant communities present by changing overburden moisture. To minimize the potential for changes in moisture, where practical, road design and construction will prevent the ponding of water that may arise from the damming effect of the raised permafrost level in the road bed to maintain local hydrological patterns. Measures may include the installation of closed culverts to allow flow and minimal change to hydrologic system.

Discharge to the tundra could potentially alter local plant communities by changing overburden moisture, increasing erosion, or altering overburden chemistry. The quantity of and rate at which water is expected to be discharged to the tundra is unlikely to increase erosion. Erosion will be mitigated through the use of silt curtains and Pollution Control Ponds, as required. Potential effects of changes in overburden and vegetation chemistry may be realized in the area local to the discharge point.

Increased physical disturbances on site could potentially lead to the introduction of invasive plants. The introduction of invasive plant species to newly disturbed areas will be minimised by washing machinery and vehicles thoroughly prior to their use on site.

10.5.2 Terrestrial Fauna

Six terrestrial fauna or bird VECs were identified during the Doris North Project EIS consultation process (caribou, wolverine, grizzly bear, upland breeding birds, waterfowl, and raptors) and are therefore considered included in identifying the effects for the Madrid Advance Exploration Program application.

Potential Project-related effects on fauna during the construction, operations, closure/temporary closure, and post-closure phases are:

- habitat loss due to infrastructure development;
- changes in movement and behaviour due to sensory disturbance from blasting, human presence, vehicle and aircraft traffic;
- mortality due to vehicle and aircraft traffic; and
- mortality or reduced vigor from ingestion of contaminants deposited in food and water sources due to construction activities, vehicle traffic, and drilling activities.

These effects have been identified as being negative and mitigable. Proposed mitigation measures are described in the following.

Direct effects on local populations of terrestrial fauna and birds may result from habitat loss and/or alteration as a result of site construction, mortality associated with vehicle or aircraft collisions, and reduced vigour or mortality associated with the deposition and subsequent ingestion of contaminants in food and water sources.

Indirect effects on local populations of terrestrial fauna and birds may include changes in the movement and behaviour of terrestrial fauna due to sensory disturbance from blasting, human presence, increased light levels, vehicle and aircraft traffic. Avoidance of habitat due to sensory disturbance can result in functional habitat loss.

Habitat loss will occur due to the development of Project infrastructure and facilities such as ore and waste stockpiles, Pollution Control Ponds, buildings and the additional length of all-weather road. For the VECs with large home ranges (i.e., the caribou, grizzly bear, wolverine, waterfowl, and raptors), the localized habitat loss will be a relatively small area compared to the total area that is typically used within the annual life cycle. For upland breeding birds, localized habitat loss may result in a reduction in the number of breeding territories and productivity for the local breeding populations.

Activities from the Project which could result in changes to movement and behaviour include the following:

- blasting (noise and ground vibrations);
- human presence, increased light levels, and vehicle and aircraft traffic (noise and other sensory disturbance);
- project infrastructure and facilities;
- habitat fragmentation; and
- the additional all-weather road.

The all-weather site road, vehicle and aircraft traffic, quarry and underground blasting activities have the potential to alter terrestrial fauna and bird movements during local life cycle activities and seasonal migrations. Advanced exploration activities may also alter the behaviour (e.g., time spent feeding and resting) which could change the energy balance of individuals.

Mortality of the terrestrial fauna and birds could occur due to wildlife-vehicle and wildlife-aircraft interactions. These could potentially result from vehicle traffic, planes landing and taking off, and helicopter use. Mortality could occur during site clearing activities if sensitive wildlife periods (e.g., upland breeding bird reproduction) are not avoided. Mortality could also occur of nuisance animals if they are attracted to the infrastructure areas due to odours and camp waste.

The terrestrial fauna and birds may ingest chemicals of potential concern from the Project infrastructure area, water in the Pollution Control Ponds or receiving environments, from ingestion of dust on vegetation or soil/overburden, or via bioaccumulation through ingestion of prey species.

Implementation of best management practices are the optimal approach to reducing the risk of human/wildlife interaction due to increased traffic and personnel in the area. Management practices currently being followed for the Doris North Project for the terrestrial fauna and bird VECs will be implemented including:

- avoiding clearing during wildlife sensitive periods or using qualified personnel to conduct pre-clearing surveys if clearing occurs within sensitive wildlife periods, e.g., upland bird breeding period;
- vehicle speed limits will be implemented and enforced, wildlife has the right of way supported by an awareness notification system, and vehicles restricted to site roads and quarry footprints during construction and operations;
- a waste and wildlife attractant management protocol implemented such that wildlife do not have access to camp wastes, contaminated areas, and attractants;
- a policy of no feeding and no intentional attraction of wildlife is already in place for the Hope Bay Belt and is disseminated to all TMAC and contractor employees during employee orientation and enforced through worksite inspections;
- a littering policy will be developed and disseminated to all TMAC and contractor employees during employee orientation, continued throughout the life of the Project, and enforced;
- the Hope Bay Belt has already reduced individual serving disposable packaging and employees and contractors are encouraged to bring re-usable personal food and beverage containers to site; and
- a protocol for human-wildlife interactions including bear safety measures is already in place for the Hope Bay Belt and is disseminated to all employees and contractors as part of orientation and field safety training with lead management responses undertaken by identified supervisors, wildlife biologists and conservation officers.

10.5.3 Aquatic Organisms, Fish, and Fish Habitat

Four fish VECs were identified during the Doris North Project EIS consultation process (i.e., Arctic Char, Lake Trout, Lake Whitefish, and Ninespine Stickleback) and are therefore included in identifying effects of the Madrid Advanced Exploration Program. Potential Project-related effects on aquatic ecosystems, fish, and fish habitat during the construction, operations, closure/temporary closure, and post-closure phases are:

- reduction in habitat or de-oxygenation of water through water withdrawals for operations and dust suppression activities;
- reduction in habitat quality through reduced water or sediment quality associated with the introduction of nutrients or contaminants, including elevated TSS levels through dust-generating and in-water construction activities; and
- removal or alteration of aquatic habitat for infrastructure, including the installation of culvert water crossings.

These effects have been identified as being negative and mitigable. Proposed mitigation measures are described in the following.

To mitigate the potential effects of water drawdown on littoral zone habitat, stream habitat, and oxygen concentrations, large water supply sources (Patch Lake and Windy Lake; Volumes: 23,544,076 m^3 and 59,137,485 m^3) were selected for bulk sample activities at Madrid South and Madrid North. Changes in lake levels are not expected to result in detectable changes in flow characteristics, including water depth, in Windy or Patch outflows. For exploration activities, only waterbodies that meet the current criteria (> 15,000 m^2) and DFO guidelines regarding surface water withdrawals will be used as supply sources.

Project activities that could have potentially negative effects on surface water and sediment quality could also have negative effects on aquatic organisms, fish, and fish habitat in the following ways:

- a reduction in growth, survival, or reproduction (e.g., from sublethal toxicity associated with reduced water quality or food availability or oxygen deprivation due to excessive nutrient enrichment);
- enhancement of growth, survival, or reproduction (e.g., from minor nutrient enrichment);
- changes in species composition resulting from reduced, growth, survival, or reproduction of some organisms (e.g., from sublethal toxicity, lethal toxicity, or oxygen deprivation due to excessive nutrient enrichment);
- reductions in the abundance and density of aquatic organisms resulting from reduced, growth, survival, or reproduction of some organisms; and/or
- reductions in fish health or fish habitat quality (e.g., from sediment suspension and TSS loading or changes in food availability or quality).

The mitigation measures already described for water and sediment quality will help minimize the potential effects to aquatic organisms, fish, and fish habitat by minimizing changes to water and sediment. The effects associated with work in or around water (e.g., sedimentation) will be minimized through adherence to current management practices, standard operating procedures and regulatory guidelines. Elevated levels of TSS will be mitigated through the use of silt curtains and Pollution Control Ponds, as required, and mitigated at point source discharges of contact waters to tundra located > 31 m from any waterbody.

The effects of the removal or alteration of aquatic habitat for infrastructure, including the installation of culverts for road crossings, will be minimised primarily through project design and a range of specific and generally accepted techniques for sediment control, riparian care, site isolation, and timing windows. The location of infrastructure has been selected to minimise the loss of aquatic systems, with a particular focus on avoiding important fish habitat. No aquatic habitat loss is expected to occur as a result of site infrastructure. In addition, Madrid South and Madrid North waste rock piles and ore stockpiles have been designed with a minimum 31 m setback distance from adjacent waterbodies and the water that comes into contact with these facilities will be intercepted for management prior to release to the environment.

The Madrid North and Madrid South bulk sample sites fall within the Windy and Doris Watersheds. A new access road 4.7 km in length extending south from the existing Windy – Doris North Project Camp road is proposed to be built primarily within the Doris Watershed. A section less than 1 km in length would be in the Koignuk Watershed, but on top of a ridge far from any waterbodies; this section of road will not directly or indirectly impact the Koignuk Watershed. To allow water flow, closed culverts will be used for water crossings.

The proposed road corridor includes two water crossings. Crossing #1 (northern crossing) is non-fish bearing (confirmed by electrofishing and minnow trapping surveys) and closed culverts will be installed at this crossing. Crossing #2 (southern crossing) is fish-bearing (confirmed ninespine stickleback presence) and the lake located upstream (i.e., Wolverine Lake) contains Least Cisco and Ninespine Stickleback, whereas the downstream lake contains multiple fish species. Migration between these two lakes is considered limited and closed culvert installation is proposed. The scheduling of instream works will follow the recommended periods of least risk to the key regional fish species (i.e., Arctic Char, Lake Trout, Lake Whitefish, and Ninespine Stickleback).

Thus, the Project is not expected to cause any significant adverse effects on Arctic Char, Lake Trout, Lake Whitefish, and Ninespine Stickleback in the Project area.

10.6 HISTORICAL RESOURCES AND TRADITIONAL USES

Potential Project-related effects on historical resources and traditional use during the construction, operations, closure/temporary closure, and post-closure phases are:

- disturbance or loss of recorded and unrecorded archaeological sites or significant heritage resources;
- damage or removal of archaeological material;
- decrease in access to land for land users; and
- changes to the aesthetic quality of the area.

These effects have been identified as being negative and mitigable, as the footprint has been surveyed and the recorded archaeological sites are avoidable or mitigable with recovery in accordance with Territorial legislation. A "chance find" would also be negative and mitigable with the implementation of a "chance find" procedure.

Communication will be a major component of mitigation to changes to access to the area. This would inform other land users of activities associated with Project construction and operations, including restricted areas, blasting activities, and wildlife management. Communication will enable land users to adjust their activities accordingly, and stay informed regarding Project development. TMAC will also consider suggestions made by land users and residents of local communities in the development of mitigation and enhancements, in the interest of ensuring that these measures are meaningful and effective in the local context. To enhance communication, TMAC's regional office in Cambridge Bay will continue to act as a central local resource regarding the company's activities.

10.7 CUMULATIVE EFFECTS

Cumulative effects can arise from multiple activities that happen concurrently or sequentially and can have a greater combined impact on an environmental component than those of individual activities. The only anticipated interactions will occur between the Madrid Advanced Exploration Program, the existing Doris North Project, and the existing regional exploration program. There are no competitor holdings or lodges, or parks in proximity to the Madrid Advanced Exploration Program.

Activities associated with the Madrid Advanced Exploration Program overlap with activities at Doris North Project, however, they are substantially smaller in scale than the Doris North Project. The effects of the Madrid Advanced Exploration Program are expected to be minimal in combination with Dorth North Project activities due to the lower level of activity (approximately 70 personnel of the possible current level of 360 personnel within the Belt), smaller footprint of approximately 25 ha (of the total 209 ha), and the focused shorter timeframe (1.5 years each) of underground operations at two sites. Initial screening also indicates that the environmental effects are mitigable so there are no residual impacts from the Madrid Advanced Exploration Program.

Monitoring Plans (e.g., spill and fuel management, closure and restoration), visits by Beneficiaries so that they may see footprint and activities for themselves, and a commitment to mitigation measures such as avoidance, monitoring and adaptive management will reduce of the potential for cumulative effects.

10.8 ACCIDENTAL EVENTS AND MALFUNCTIONS

Potential Project-related effects on accidental events or malfunctions during the construction, operations, closure/temporary closure, and post-closure phases are impacts to groundwater, surface water, and aquatic ecosystems from accidental spills of fuel and chemicals and impacts to groundwater, surface water, and aquatic ecosystems from unplanned releases of underground mine water or effluent. These effects are identified as negative and mitigable. Proposed mitigation measures are described in the following.

The possibility of accidental spills or releases will be eliminated or reduced by implementation of best management practices, including containment measures, and standard operating procedures described in Section 8. Contingency plans for accidental spills (Spill Contingency Plan, Emergency Response Plan) and extreme weather conditions are currently in existence for the Doris North Project. The Emergency Response Plan was designed to avoid potential adverse environmental effects of incidents, malfunctions and other unplanned events such as spills, fires, or wildlife encounters. The Environmental Health and Safety Management System (Environmental Protection Plan) will implement measures to avoid or minimize any effects on the biophysical environment (HBML 2012b). These contingency plans will also be implemented for the bulk sample project activities.

10.9 TRANSBOUNDARY EFFECTS

The potential project related transboundary effects include potential environmental effects that could cross the geographical boundaries of Nunavut. Most effects from Madrid South and Madrid

North areas will remain in the localized area around the infrastructure. All of these geographical areas are within Nunavut, including all major watersheds.

10.10 ALTERNATIVES

Alternatives considered for the Madrid Advanced Exploration Program focussed on technical and cost considerations to identify the optimal site layout for each area as well as water balance and water quality within the Doris North Project TIA. A "go/no go" alternative is also considered.

10.10.1 Go / No Go

The reliability of a mine feasibility study is based on the quality of the information describing the proposed ore body. Detailed diamond drilling from surface can provide good general information about the deposit, however, it is prudent in the case of a potential underground mine to confirm the grade, continuity, and consistency of the gold mineralization in the rock prior to making major monetary and time commitments and applying for permits to construct and operate the mine. This can only be accomplished through an underground exploration program and the collection of a bulk sample of the mineralized rock. This is the next logical step in the exploration of the Madrid area and with its completion, the financial and technical risk to the Hope Bay Belt Phase 2 development is further reduced.

10.10.2 Site Layout Alternatives for Madrid South

TMAC considered three surface infrastructure alternatives at Madrid South location:

- Access from Doris North Project Portal. Access to Madrid South would be underground via the Doris North Project, Connector, and Central underground workings. No surface infrastructure would be required. This option was not selected as hauling waste rock and ore from Madrid South to Doris North Project using underground vehicle is not practical.
- Minimal Development. Only Madrid South portal would be constructed and all waste rock and the ore would be hauled to Doris North Project via the Doris-Windy All-weather Road. This option was not selected as hauling waste rock, for disposal, and ore, to be stockpiled, at Doris North Project is not practical.
- Full Development. The entire surface infrastructure required to support underground bulk sampling would be constructed as well as all the waste rock and ore stock would be stored at Madrid South. The ore would then be transported to Doris North Project for processing in the mill. This was selected as the preferred option.

10.10.3 Site Layout Alternatives for Madrid North

TMAC considered three surface infrastructure alternatives for the Waste Rock Stockpile at Madrid North location:

- South Waste Rock Stockpile. The waste rock stockpile would be placed in the gully located to the southwest of the portal. The Pollution Control Pond berm required to capture the contact water would be located on disturbed ground that has experienced permafrost

degradation and would tie into the Doris-Windy All-weather Road. To provide containment capacity the berm would need to be up to 7 m in height. This option was not selected because of the berm height.

- East Waste Rock Stockpile. The waste rock stockpile would be placed in the gully located to the south east of the portal. The Pollution Control Pond berm required to capture the contact water would be located in proximity to the Vent Raise with access from the Doris-Windy All-weather Road. To provide containment capacity the berm would need to be up to 6 m in height. This option was not selected because of the berm height and the proximity to the vent raise.
- North Waste Rock Stockpile. The waste rock stockpile as well as the ore stockpile would be placed in the large open area north of the portal. The Pollution Control Pond berm required to capture the contact water would only need to be 3 m in height. This option also provides suitable grades for access road construction to the Pollution Control Pond. This option was the preferred option.

11. PUBLIC CONSULTATION

11.1 INTRODUCTION

HBML and TMAC undertook a range of consultation and communication activities with local communities, land users, regulators, and resource managers over the past several years, including proposed changes to the Mine described in this document.

Communication and consultation activities included:

- community meetings;
- in-person meetings;
- site tours; and
- distribution of printed information materials (e.g., bulletins, project information sheets).

The remainder of this section focuses on the community meetings, including meeting locations, dates, and attendance, as well as providing a summary of the comments and questions raised. For all community meetings, comments and feedback pertaining to the information presented were documented and, where practicable, responses were provided by HBML or TMAC staff in attendance. Information on other communication and consultation activities is also briefly described below.

11.2 COMMUNITY MEETINGS

11.2.1 November / December 2009

In November and December, HBML conducted a community tour, providing a project update to the public in the Kitikmeot region. Meetings were held in Kugluktuk, Cambridge Bay, Gjoa Haven, Taloyoak and Kugaruk. A special meeting was held in Cambridge Bay with former residents of Umingmaktok and Kingaok. Over 220 attendees were present during these meetings, with the highest turnout being in Taloyoak. During these meetings, the potential of a bulk sample and advanced exploration work at Madrid was first discussed with community members, although no specific comments or questions on this topic were heard.

11.2.2 August 2010

In August 2010, HBML conducted a community tour and proposed amendments planned at that time were presented and discussed in advertised community meetings open to the public. The proposed amendments included the camp expansion and mine life extension. Environmental baseline studies conducted in the Doris North Project were also presented and discussed. Some additional information was provided on the possibility of further advanced exploration at Madrid South in particular including the need for support infrastructure. Community meeting locations included Cambridge Bay, Gjoa Haven, Kugaaruk, Kugluktuk, and Taloyoak, with the overall attendance totalling approximately 121 attendees with the largest attendance being in Gjoa Haven. Community Elders were in attendance at Gjoa Haven, Taloyoak, and Kugaaruk.

During the community meetings, no specific questions were asked regarding the proposed changes to the Madrid North and Madrid South area. Discussion topics included: opportunities for work, employment requirements, scheduling, training, opportunities for youth, possible site visits for local residents, activities in the Windy Lake area, climate change, mine abandonment, helicopter use and wildlife, and potential effects on human health.

11.2.3 June 2011

In order to specifically address the proposed Mine changes, a round of community meetings was held in June 2011. HBML visited five communities: Cambridge Bay, Gjoa Haven, Kugaaruk, Kugluktuk, and Taloyoak. Specific information pertaining to this amendment application was presented. The start of permitting a bulk sampling effort at Madrid South was specifically mentioned, including a timeline to begin work on this project aspect by early 2013.

Table 10.2-1 details the community meeting dates and the estimated number of attendees. The overall attendance totalled 52 individuals, with the largest attendance being in Taloyoak. Meeting attendance was lower than anticipated in Kuglukuk as many residents were away fishing. Elders were present at the meetings in Kugaaruk and Taloyoak.

Table 10.2-1. Public Meeting Dates and Attendance, June 2011

Date	Community	Attendance*
Monday, June 6, 2011	Kugluktuk	5
Tuesday, June 7, 2011	Cambridge Bay	13
Wednesday, June 8, 2011	Kugaaruk	15
Thursday, June 9, 2011	Taloyoak	19
Friday, June 10, 2011	Gjoa Haven	Postponed due to weather

**Attendance numbers estimated from draw prize entries and visual counts.*

Comments and questions pertaining specifically to the proposed mine changes were discussed in Cambridge Bay, Kugaaruk, and Taloyoak.

Comments and questions discussed at the meetings were focused on changes to the Doris North mine rather than the planned bulk sample application and generally pertained to employment opportunities, training, mine production timelines, Inuit benefits, environmental testing, and potential effects on human health and social issues. This feedback will be incorporated into future discussions and considered during on-going Project planning.

11.2.4 April 2013

In March 2013, TMAC acquired the Hope Bay Belt from Newmont Mining Corporation. In the following month, a community consultation tour was conducted throughout the Kitikmeot Region, including face-to-face meetings with Hamlet Councils when possible. Consultation and communications focussed on project history, background information on project acquisition, introductions to the TMAC Executive, and announcing 2013 project care and maintenance and exploration plans as well as general Hope Bay Belt development.

11.2.5 December 2014

In December 2014, TMAC personnel visited the five communities of Kugluktuk, Cambridge Bay, Gjoa Haven, Taloyoak, and Kugaaruk. TMAC brought information on the previous year's activities at Hope Bay, its exploration results for 2014, the environmental performance and future permitting activities. Specifically, the proposed Madrid Advanced Exploration Program was discussed in detail in all venues. Discussions were held with the public in scheduled public meetings, with regulators and municipal leaders. Communications focussed on providing an update to the Doris North Project and Hope Bay Belt development. Comments and questions generally pertained to employment opportunities, and potential effects to the land and local environment. This feedback will be incorporated into future discussions and considered during on-going Project planning.

11.3 OTHER COMMUNICATION AND CONSULTATION ACTIVITIES

A community newsletter was published and distributed in October 2010. The newsletter presented information pertaining to the 2010 sealift, summer field work, and employment information. It was intended that this publication would reach a larger audience, including those who may not be able to attend the community meetings or site visits.

In July 2011, 24 KIA staff were provided a site tour, including Community Liaison Officers. The tour was intended to familiarize KIA staff with the Hope Bay Belt such that accurate information regarding the Project could be provided to Beneficiaries through KIA representatives.

In August 2011, two Cambridge Bay Elders participated in archeological field studies.

12. CONCLUSIONS

TMAC Resources Inc. (TMAC) is proposing to undertake an advanced exploration program at the Madrid area (Madrid South and Madrid North), located within the Hope Bay Greenstone Belt (the Hope Bay Belt) in the Kitikmeot Region, Nunavut. The Madrid area of the belt is located approximately 130 km southwest of Cambridge Bay.

The intent of TMAC's proposed Madrid Advanced Exploration Program (the Program) is to:

- advance mineral resource definition;
- assess the effectiveness of the mining techniques for the Madrid deposits; and
- to validate the milling processes of the Doris mill in treating Madrid Ore.

The results of this Program will help validate economic feasibility of the Madrid area. Core Program activities are surface and subsurface diamond drilling, subsurface development and bulk sampling and associated Program infrastructure including rock quarries, all-weather access roads, portals and vents, waste rock and ore storage areas, and water management ponds.

Many of the proposed activities have occurred within the Hope Bay Belt under other authorizations and the Madrid Advanced Exploration Program is a relatively small sized Program. To minimize the project footprint and potential for impacts, the Madrid Advanced Exploration Program will utilize existing facilities at Doris North Project, including the Doris North Project camp and waste management facilities including the already permitted Tailings Impoundment Area.

The Program requires authorization from the NWB to allow water use and disposal of waste to water and submission of this application is to provide the Board with sufficient information to issue the Type B license to support bulk sampling and surficial exploration activities.

As presented in this application package, potential negative environmental effects to physical, biological and traditional resources can be mitigated through incorporation of design considerations and accepted management practices within the Belt. TMAC is confident that the activities can proceed in a manner that is protective of the sensitive environment in which we operate.

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Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

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Appendix 1

(for Chapter 1, Introduction)

No appendix for this chapter.

Appendix 2

(for Chapter 2, Minimum Requirements)

SIG for Madrid Advanced Exploration Program Type B Water Licence Application

2.0 Minimum Application Requirements (Application Checklist)

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	NWB Concordance Assessment
Minimum Application Requirements	1	General Water Licence Application Form (see the NWB's *Guide 4: Completing and Submitting a Water Licence Application for a New Licence*) or Application for Water Licence Amendment Form, if appropriate (see NWB's *Guide 7: Licensee Requirements Following the Issuance of a Water Licence*).	Y				With cover letter as preamble to Supplemental Information Report: Section 2.1 and Appendix 3	
	2	Information required to satisfy the requirements of the SIG including plans, reports and designs.	Y				Supplemental Information Report: Section 2.2 and Appendix 2	
	3	Executive summary in english.	Y				Supplemental Information Report: Section 2.3.1	
	4	Translated executive summary in appropriate language and dialect.	Y				Supplemental Information Report: Section 2.3.2 to 2.3.4	
	5	Application fee.	Y				Supplemental Information Report: Section 2.4	
	6	Water use fee.	Y				Supplemental Information Report: Section 2.5	
	7	A table indicating concordance of the application and supporting documents to the Guidelines. These generic Guidelines are provided in excel as a tool for applicants to provide the necessary concordance table.	Y				Supplemental Information Report: Section 2.6, 2.7 and Appendix 2	

Notes: Report title: ERM Rescan. 2014. Madrid Advanced Exploration Program: Type B Water Licence Application Supplemental Information Report. Prepared for TMAC Resources Inc. by ERM Consultants Canada Ltd.: Vancouver, British Columbia.
Electoric document: D.1 - 0194097-0007 (Madrid WLA Supplemental Report).pdf

Qualifications:

1 Applications that do not include all of the items listed above will be returned to the applicant as incomplete with a request for the deficient information.
2 If more than one licensable activity or facility is proposed that requires a water licence (eg. multiple water sources, waste deposits, structures, crossings, etc.) the required information must be provided for each activity or facility.
3 Information between all documents that make up the application package must be consistent and must be accurately cross referenced.
4 The application must distinguish between recommendations or options and actual commitments to chosen alternatives.
5 For additional guidance regarding the submission of electronic documentation, see the NWB's *Guide 6: Electronic Documentation: Submissions and Registry* .
6 The applicant, where practical, may combine components of the information requested in the SIG into more concise plans to provide clarity and eliminate duplication. If this practice is considered, then the applicant must clearly outline, through proper referencing and clearly detailed statements, how the NWB should consider the documents that have combined elements of information. Information management is the responsibility of the applicant.
7 The applicant must submit a concise executive summary of the application package. In addition, the Applicant shall submit an executive summary for each separate supporting document, report or study. All executive summaries shall be provided in English, Inuktitut and/or Inuinnaqtun (where applicable).

The applicant must complete the yellow columns of the worksheet(s). Blue columns are for NWB use only.

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Applicant	**1**	Provide the full name of the applicant and contact person including contact information (position, phone number, address, fax number and email address).	Y				General Water License Application block 1 Supplemental Information Report: Section 3.2		
Applicant Representative	**2**	Provide the name and contact information of any party submitting the application on behalf of the applicant (including position, phone number, address, fax number and email address).	Y				General Water License Application block 1 Supplemental Information Report: Section 3.3		
	3	Provide a signed letter authorizing a party to be the applicant's representative in the licensing process.	Y				Supplemental Information Report: Section 3.3.1		
Name of Project	**4**	Provide the name of the project.	Y				General Water License Application block 3 Supplemental Information Report: Section 3.1		
Location of Undertaking	**5**	Provide coordinates of the project extents taking into account the Local Project Area (LPA) and the Regional Project Area (RPA), where applicable.					General Water License Application block 4 Supplemental Information Report:		
	a	Provide location by Latitude and Longitude.	Y				Section 2.1.1 (Table 2.1-1)		
	b	Provide location by UTM coordinates, if available.	Y				Section 2.1.1 (Table 2.1-1)		
	c	Provide the distances to the nearest communities.	Y				Section 5.5		
	6	Indicate whether the drainage basin, in which the project is located, is shared with any other jurisdiction. If applicable, indicate which jurisdiction.	Y				Section 5.2		
Map	**7**	Provide a map at a 1:50,000 scale based on the National Topographic Series indicating the location of the undertaking, watercourses and the location of waste deposits. Additional maps at various scales may be provided if those maps will provide additional information or clarification. All additional maps must indicate the scale, map sheet number, and location of north.	Y				Supplemental Information Report: Section 3.6 (Figure 3.5-2); Section 4.2 (Figure 4.2-1); Section 4.3 (Figure 4.3-1)		
Nature of Interest in the Land	**8**	Provide the nature of the interest in the land associated with the proposed undertaking, including:							
	a	Sub-surface leases from Nunavut Tunngavik Incorporated (NTI) and/or Indian and Northern Affairs Canada (INAC) as well as surface authorizations from INAC for crown land use, a Designated Inuit Organization (DIO) for Inuit Owned Land (IOL) use, or the Government of Nunavut for Commissioner's land use. Provide the permit or licence numbers.	Y				General Water License Application block 6		
	b	The date or expected date of issuance of any authorization and the date of expiry.	Y				General Water License Application block 6		

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	9	Indicate whether the applicant is the name of the entity holding the authorization for the interest in the land and if not, provide the name of the entity holding the authorization.	Y				General Water License Application block 6 Supplemental Information Report: Section 3.6		
NPC Determination	10	Provide written confirmation from the NPC confirming that NPC's requirements under the NLCA regarding land use plan conformity (Article 11 of the NLCA) have been addressed.	NA	An approved Land Use Plan for the Kitikmeot Region is currently not in place					
NIRB Determination	11	Provide written confirmation from the NIRB confirming that NIRB's requirements under the NLCA regarding development impact assessment (Article 12 of the NLCA) have been or are in the process of being addressed. Documentation may include:					General Water License Application block 8 Supplemental Information Report:		
	a	Written confirmation from NIRB that the project proposal does not require screening;	Y				Section 10.2 and Appendix 10A		
	b	NIRB's screening determination;	Y				Section 10.2 and Appendix 10A		
	c	If a review is required, NIRB's recommendation to the Minister regarding the type of review;	Y				Section 10.2 and Appendix 10A		
	d	If a review is required, the Minister's written decision regarding the review of the development proposal;	Y				Section 10.2 and Appendix 10A		
	e	If a review is required, NIRB's project certificate;	Y				Section 10.2 and Appendix 10A		
	12	List of activities requested for exception in accordance with NLCA s. 12.10.2;	Y				Supplemental Information Report: Section 2.1.1		
	13	Indicate whether any Type B water licence application is for an activity to be considered for interim, short term approval in accordance with NLCA s. 13.5.5.	Y				Supplemental Information Report: Section 2.1.1		
Description of Undertaking	14	See section 4 of this SIG for specific requirements.					see SIG section 4		
Other Applicable Supplemental Information Guidelines	15	Indicate whether any other Supplemental Information Guidelines apply to the undertaking including the following:					General Water License Application block 11		
	a	Hydrostatic testing	NA	not applicable to Program					

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	b	Tannery	NA	not applicable to Program					
	c	Tourist / remote camp	NA	not applicable to Program					
	d	Landfarm and on-site storage of hydrocarbon contaminated soil	Y				Supplemental Information Report: Section 2.1.1 and 4.2.11.3		
	e	Onshore oil and gas exploration drilling	NA	not applicable to Program					
	f	Mineral exploration/remote camp	Y				General Water License Application block 11 Supplemental Information Report: Section 4.1.4, 4.2 and 4.3		
	g	Advanced exploration	Y				General Water License Application block 11 Supplemental Information Report: Section 4		
	h	Mine development	NA	not applicable to Program					
	i	Municipal	NA	not applicable to Program					
	j	General Water Works	Y				Supplemental Information Report: Section 4.2.7, 4.3.7 and 6		
	l	Power	NA	not applicable to Program					
Options (Alternatives)	**16**	Provide a brief explanation of the alternative methods or locations that were considered to carry out the project.	Y				Supplemental Information Report: Section 10.10		
Water Use	**17**	See section 6 of this SIG for specific requirements	Y				see SIG section 6		
Water Use: Quality and Quantity	**18**	See section 6 of this SIG for specific requirements	Y				see SIG section 6		
Waste Disposal	**19**	See section 7 of this SIG for specific requirements	Y				see SIG section 7		
Waste Disposal: Quality and Quantity	**20**	See section 7 of this SIG for specific requirements	Y				see SIG section 7		

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Other Authorizations	**21**	Provide a list of any authorizations required in relation to the project in addition to the water licence. For each additional authorization required for the project, provide the name of the authorization, the administering agency, the project activity requiring the authorization, the date or expected date of issuance and the date of expiry. Provide a description of how those authorizations may affect the NWB's water licensing process.	Y				General Water License Application block 16		
	22	Indicate whether an authorization has been obtained or sought from the Department of Fisheries and Oceans for dewatering or using any waterbodies for containment of waste	Y				Supplemental Information Report: Section 6.5		
	23	Provide formal applications to the Navigable Waters Protection Program (NWPP) for any works.	Y				Supplemental Information Report: Section 5.3.2, 5.4 and Appendix 5		
	24	Provide a timetable for filing the appropriate plans and procedures required by government parties.	Y				Supplemental Information Report: Section 8.1 (Table 8.1-1)		
	25	Indicate whether the applicant/ licensee holds any existing water licences. If applicable, provide the licence number and expiry date of any existing water licences.	Y				General Water License Application block 6 Supplemental Information Report: Section 10.2 (Table 10.2-1)		
Predicted Environmental Effect and Proposed mitigation measures	**26**	Identify the potential effect of water use and waste disposal on the following components:	Y				Supplemental Information Report:		
	a	Groundwater and Surface Water including:							
		changes in flow (including seasonal rate of flow)	Y				Section 10.4, 10.5 and Table 10.3-1		
		quantity	Y				Section 10.4.3, 10.4.4, 10.4.5.1 and Table 10.3-1		
		quality	Y				Section 10.4.5.1 and Table 10.3-1		
	b	Land including:							
		geologic structure change	Y				Section 10.4, 10.5 and Table 10.3-1		
		soil contamination	Y				Section 10.5 and Table 10.3-1		
		compaction, settling and erosion	Y				Section 10.5.1 and Table 10.3-1		
		alteration of the permafrost regime	Y				Section 10.4.2 and Table 10.3-1		
		riparian zone loss	Y				Section 10.5.1 and Table 10.3-1		
	c	Vegetation including:							
		species composition and abundance	Y				Section 10.5.1 and Table 10.3-1		
		non-native species introduction	Y				Section 10.5.1 and Table 10.3-1		
		accumulation of toxins and heavy metals (in relation to remediation objectives for closure)	Y				Section 10.5.2 and Table 10.3-1		
	d	Aquatic Ecosystems including:							
		fish	Y				Section 10.5.3 and Table 10.3-1		
		benthic invertebrates	Y				Section 10.5.3 and Table 10.3-1		

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Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
		plankton	Y				Section 10.5.3 and Table 10.3-1		
	27	Identify effects separately for each project phase.	Y				Supplemental Information Report: Section 10.3 (Table 10.3-1)		
	28	Provide a description of the methods used to predict effects.	Y				Supplemental Information Report: Section 10.3 (Table 10.3-1)		
	29	Provide a cumulative effects assessment of the project's water use and waste disposal activities in relation to other activities in the same drainage basin.	Y				Supplemental Information Report: Section 10.7		
	30	Identify effects arising from accidental events or malfunctions.	Y				Supplemental Information Report: Section 10.8		
	31	Provide a description of all proposed mitigation, management and monitoring programs to mitigate adverse impacts.	Y				Supplemental Information Report: Section 10.4, 10.5 and Table 10.3-1		
	32	Provide a description of the measures to be taken to mitigate impacts on historical resources or traditional uses of water and procedures to be followed should artifacts be discovered.	Y				Supplemental Information Report: Sections 5.5, 10.6 and Appendix 10B		
	33	If applicable, provide a description of any potential transboundary effects.	Y				Supplemental Information Report: Section 10.9		
	34	See sections 5, 6, 7, and 8 of this SIG for additional information requirements	Y				See sections 5, 6, 7, and 8 of this SIG for additional information requirements		
Existing and Other User Water Rights	**35**	Provide the names, addresses, and nature of use for any known persons or properties that may be adversely affected by the proposed undertaking, including those that that hold licences for water use in precedent to the application, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders, and holders of other rights of a similar nature.	NA	not applicable to Program					
	36	Provide a description of any potential effects of the project on the persons or properties identified in item 35 of this section.	NA	not applicable to Program					
	37	Provide a description of the measures incorporated into the project design to mitigate effects of the project on the persons or properties identified in item 35 of this section.	NA	not applicable to Program					
	38	Indicate whether compensation has been paid and/or agreement(s) for compensation have been reached with any existing or other users.	NA	not applicable to Program					
Inuit Water Rights	**39**	Provide a description of any potential effects of the project on the quality, quantity, or flow of waters flowing through Inuit Owned Land (IOL).	Y				General Water License Application block 19		
	40	Provide a description of the measures incorporated into the project design to mitigate effects of the project on the quality, quantity, or flow of waters flowing through IOL.	Y				General Water License Application block 19		

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	41	Indicate wheter an agreement to pay compensation for any loss or damage has been reached with one or more Designated Inuit Organization (DIO); or if the parties have been unable to reach an agreement on compensation	Y				General Water License Application block 19		
Consultation	**42**	Provide a summary of any consultation meetings including when the meetings were held, where and with whom.	Y				Supplemental Information Report: Section 11.2 and 11.3		
	43	Provide a summary of the results of consultation meetings including a list of concerns expressed and measures proposed to address concerns.	Y				Supplemental Information Report: Section 11.2 and 11.3		
Security	**44**	Provide a financial security assessment that is prepared in a manner consistent with principals respecting mine site reclamation and implementation found in the *Mine Site Reclamation Policy for Nunavut* , Indian and Northern Affairs Canada, 2002. The financial security assessment must include:					Supplemental Information Report:		
	a	An estimate of the total financial security for final reclamation equal to the total outstanding reclamation liability for land and water combined sufficient to cover the highest liability over the life of the undertaking;	Y				Section 9.2 (Table 9.2-1) and Appendix 9		
	b	The cost of having the necessary reclamation work done by a third-party contractor if the operator defaults;	Y				Section 9.2 (Table 9.2-1) and Appendix 9		
	c	Contingency factors appropriate to the particular work to be undertaken.	Y				Section 9.2 (Table 9.2-1) and Appendix 9		
Abandonment and Restoration	**45**	Provide plans for the abandonment and restoration of the project. Detail the costs to carry out the plan, and a proposal for financial assistance which covers the costs to carry out the plan.	Y				Supplemental Information Report: Section 9 and Appendix 9		
	46	Provide a list and description of any existing abandoned or restored site facilities.	Y				Supplemental Information Report: Section 9 and Appendix 9		
Financial Information	**47**	Provide a statement of financial responsibility.	Y				General Water License Application block 22 Supplemental Information Report: Section 3.3.3 and Appendix 3		
	48	If the applicant is an entity for which audited financial statements are issued, a copy of the most recent audited financial statements must be attached to the statement of financial responsibility.	Y						
	49	Provide the name of the corporation, limited company or other business entity, with a list of the officers of the company and a copy of the Certificate of Incorporation or evidence of registration of the company name.	Y						
Studies and Designs	**50**	Provide a list of studies, reports and plans relevant to the application that have been undertaken to date including:					Supplemental Information Report: Section 4, 5, 6, 7, and 9; Appendix 4, 5, 6, 7 and 9		
	a	Design rational, design requirements, design criteria, design parameters, design standards/analysis/method;	Y						
	b	Design assumptions and the limitations associated with such design assumptions;	Y						
	c	The inclusion of clear, definable engineering qualifiers with all design drawings and reports;	Y						
	d	Site specific data and analysis to support the design and management decisions made;	Y						
	e	Materials that appropriately delineate the particulars of a design or plan.	Y						

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	51	Provide construction methods and procedures regarding how infrastructure will be put in place on-site.	Y				Supplemental Information Report: Section 4.1 to 4.4		
	52	Provide a timetable for submission of preliminary and final-for-construction engineered designs (note: for construction designs are required for NWB approvals).	Y				Supplemental Information Report: Section 2.2		
	53	See sections 5, 6 and 7 of this SIG for additional information requirements	Y				See SIG section 5, 6, and 7		
Proposed Time Schedule	54	Provide the proposed start and completion dates for each phase of development (construction, operation, closure and post closure) and any anticipated periods of seasonal shut down.	Y				General Water License Application block 24 Supplemental Information Report: Section 3.4		
Proposed Term of Licence	55	Provide a proposed term of licence including the expected date of licence issuance and the expected date of licence expiry.	Y				General Water License Application block 24 and 25 Supplemental Information Report: Section 3.4		
Annual Reporting	56	Provide detailed information regarding the content of annual reports and a proposed outline or template of the annual report. The annual report should include the following:							
	a	Water related monitoring results;	Y				General Water License Application block 26		
	b	Comparison of water quality and quantity monitoring data with the water quality and quantity predictions presented in the application;	Y				General Water License Application block 26		
	c	A description of how the conditions in the NIRB project certificate related to the NWB mandate have been implemented;	Y				General Water License Application block 26		
	d	Project changes under adaptive management;	Y				General Water License Application block 26		
	e	Any actions taken in response to direction provided by the Inspector.	Y				General Water License Application block 26		
Renewals and Amendments	57	If the application is for a renewal or amendment of an existing licence provide the water licence number and the date of water licence expiry.	Y				Supplemental Information Report: Section 10.2 (Table 10.2-1)		
	58	If the application is for a renewal or amendment of an existing licence, provide a compliance assessment/status report. This report must document the status of compliance for each condition of the existing water licence taking into consideration inspector dialogues and inspector directions, responses to inspector dialogues and inspector directions, spills that may have occurred, and any reporting requirements. The report must indicate when facilities were inspected by regulatory agencies and list any spills that may have occured including a description, location shown on a map, and the action taken to address the affected area.	NA						

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4.0 Project Description

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Description of Undertaking	**1**	Provide a complete description of the undertaking with detailed site plan(s) of all project infrastructure for the Local Project Area (LPA) and/or the Regional Project Area (RPA), where applicable. Include maps and/or aerial photos with scales that allow the determination of distances between the objects depicted. Differentiate any temporary components from permanent components. Consider the following in providing the description:					Supplemental Information Report:		
	a	Raw water intake;	Y				Section 4.4.2, 6.1.1, 6.1.2 and 6.6		
	b	Water storage and treatment facilities including distribution systems;	Y				Section 4.2.7, 4.2.8, 4.3.7, 4.3.8 and 6.4		
	c	Existing water bodies/courses and any changes to these water bodies/courses that may have or may occur as a result of water use or waste disposal facilities. Provide an outline of the drainage basin and drainage patterns within the RPA;	Y				Section 6.3 to 6.6, 10.4.3 to 10.4.4 and 10.4.5.1		
	d	Location of receiving water bodies and drainage pathways;	Y				Section 5.2		
	e	Transportation access routes and details of water course crossings;	Y				Section 4.1.1, 4.2.1, 4.3.1 and 6.5		
	f	Locations of environmental monitoring sites;	Y				Section 8.1 (Table 8.1-2)		
	g	Traditional water use and land use areas that may be impacted by the project;	Y				Section 10.6		
	h	Sewage treatment facilities;	Y				Section 4.2.11.1, 4.3.11 and 7.1 (Table 7.1-1)		
	i	Wastewater treatment area and discharge outlet locations;	Y				Section 4.2.11.1, 4.3.11, 4.4.3 and 7.1 (Table 7.1-1)		
	j	Solid waste disposal areas and drainage patterns;	Y				Section 4.2.11.1, 4.3.11 and 7.1 (Table 7.1-1)		
	k	Incinerators	Y				Section 4.2.11.2		
	l	Landfarm (see the NWB's SIG for Landfarm and on-site storage of hydrocarbon contaminated soil (I3));	Y				Section 4.2.11.3		
	m	Waste rock piles (PAG and non-PAG);	Y				Section 4.2.3, 4.3.3 and 8.3		
	n	Stockpiles;	Y				Section 4.2.2, 4.3.2 and 8.3		
	o	Mill or processing plant	Y				Section 4.1.2		
	p	Tailings containment areas;	Y				Section 4.1.3		
	q	Laydown areas;	Y				Section 4.2.4 and 4.3.4		
	r	Quarries;	Y				Section 4.2.5, 4.3.5 and 7.2		
	s	Hazardous waste disposal area;	Y				Section 4.2.11.3, 4.3.11 and 7.1 (Table 7.1-1)		
	t	Waste discharge distribution lines;	Y				Section 4.2.11 and 4.3.11		
	u	Fuel and chemical storage;	Y				Section 4.2.10.2, 4.2.10.3 and 4.3.10		
	v	Explosives manufacturing and storage;	Y				Section 4.2.10.1 and 4.3.10		
	w	Abandoned and/or restored facilities;	NA	not applicable to the Project					
	x	Existing on site infrastructure	Y				Section 4.1		
	y	Others:	NA	not applicable to the Program					

4.0 Project Description

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Exploration Activities	**2**	Indicate the status of the exploration activity on the date of application as one of the following					Supplemental Information Report:		
	a	Design	Y				Section 3.5.1		
	b	Under construction	Y				Section 3.5.1		
	c	In operation	Y				Section 3.6 and 3.7		
	d	Suspended	NA	not applicable to the Program					
	e	Care and maintenance	Y				Section 3.6		
	f	Abandoned	NA	not applicable to the Program					
	g	Other:	NA	not applicable to the Program					
	3	If a change in the status of the exploration activity is expected, indicate the nature and anticipated date of such change.	Y				Supplemental Information Report: Section 3.4		
	4	Indicate the type (or proposed type) of exploration operation and provide a description of the method.	Y				Supplemental Information Report:		
	a	Reverse circulation to obtain bulk sample	NA	not applicable to the Program					
	b	Trenching	Y				Section 4.4.5		
	c	Conventional open pit	NA	not applicable to the Program					
	d	Decline	Y				Section 4		
	e	Conventional underground	Y				Section 4		
	f	Strip mining activity	NA	not applicable to the Program					
	g	Other: (describe)	Y				Section 4.4.1 (Diamond Drilling); Section 4.4.4 (Airborne, Surficial and Downhole Geophysics); Section 4.4.5 (Prospecting, Mapping and Sampling)		
	5	Indicate the size (in tonnes) and number of samples that will be obtained. Indicate whether smaller samples are to be collected from different locations to form one large bulk sample and provide the location of each sample.	Y				Supplemental Information Report: Section 4		
	6	Indicate the present (or proposed) average rate of exploratory production from all mineralized sources in tonnes of ore / day.	Y				Supplemental Information Report: Section 4.1.2		
Milling/ Processing Activities	**7**	Provide a copy of the mill or processing plant flow sheet. Indicate the points of addition of the various reagents (chemicals) that will be used.	NA	not applicable to the Program			Supplemental Information Report: Section 4.1.2		
	8	Indicate the capacity of the mill	NA	not applicable to the Program			Supplemental Information Report: Section 4.1.2		
	9	Indicate the proposed rate of milling (tonnes/day)	NA	not applicable to the Program			Supplemental Information Report: Section 4.1.2		
	10	If applicable, indicate whether the (proposed) milling circuit is in whole or in part based on autogenous grinding.	NA	not applicable to the Program			Supplemental Information Report:		
Camp	**11**	Classify the camp as one of following:							

4.0 Project Description

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	a	Mobile (self propelled)	NA	not applicable to the Program					
	b	Temporary	Y				Section 4.1.4		
	c	Seasonally occupied	NA	not applicable to the Program					
	d	Permanent	Y				Section 4.1.4		
	e	Other: (describe)	Y				Section 4.2.7 (Windy Lake exploration camp being decommissioned); Section 4.3 (historic Wolverine Camp)		
	12	Provide the design, maximum and average populations of the camp	Y				Section 4.1.4		
	13	Provide a description of how the location of the camp was selected. Indicate whether assistance from the Regional Inuit Association Land Manager was obtained in selecting the site.	Y				Section 4.1.4 and 5.5		

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5.0 Baseline Information

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Environmental Setting	**1**	Provide a description of the regional and local setting using maps and/or aerial photos with scales that allow the determination of distances between the objects depicted.	Y				Supplemental Information: Section 3.5 (Figure 3.5-1 and 3.5-2)and 5.1 to 5.5		
	2	Provide a brief history of the property development which took place before the present company gained control of the site. Include shafts, adits, mills, waste dumps, chemical storage areas, tailings disposal areas, and effluent discharge locations. Make references to a detailed map.	Y				Supplemental Information: Section 3.6 (Figure 3.5-2, 4.2-1 and 4.3-1) and Appendix 4		
	3	Provide a description of the site conditions, including:					Supplemental Information Report:		
	a	location	Y				Section 5.2, Appendix 5		
	b	topography	Y				Section 5.3.1, Appendix 5		
	c	geologic conditions	Y				Section 5.2, Appendix 5		
	d	hydrologic characteristics	Y				Section 5.2, Appendix 5		
	e	climate conditions and predicted future climate trends	Y				Section 5.2, Appendix 5		
	f	seismicity	Y				Section 5.2, Appendix 5		
	g	permafrost conditions	Y				Section 5.2, Appendix 5		
	4	Provide a description of the regional and local surface water regime and drainage area and outline the drainage basin on an attached map.	Y				Supplemental Information: Section 5.2, Appendix 5 and Figure 3.5-2		
	5	Provide a description of the groundwater regime.	Y				Supplemental Information: Section 5.2, Appendix 5		
	6	Provide baseline data and an evaluation of baseline data describing surface and groundwater quality in the project area (physical, chemical, and biological characteristics).	Y				Supplemental Information: Section 5.2, Appendix 5		
	7	Provide a description of the usual break-up and freeze-up periods.	Y				Supplemental Information: Section 5.2, Appendix 5		
	8	Provide a description of streambed material, streambank material, and streambank vegetation,	Y				Supplemental Information: Section 5.3.2, Appendix 5		
	9	Indicate the slope of the banks of any water course affected by the application	Y				Supplemental Information: Section 5.3.2, Appendix 5		
	10	Provide a decription of the meander pattern for any channel affected by the application	NA	not applicable to the Program					
	11	Provide the following streamflow data in cubic metres per second for each watercourse included in the application:					Supplemental Information: Section 5.2, Appendix 5		
	a	mean annual flow;	Y						
	b	mean summer flow;	Y						
	c	minimum summer flow;	Y						
	d	minimum annual flow;	Y						
	e	mean annual flood;	Y						
	f	maximum summer flood;	Y						
	g	mean summer flood;	Y						
	12	Provide bathymetric information for water bodies affected by the application.	Y				Supplemental Information Report: Section 5.2, Appendix 5		
	13	Provide a description of the ground condition for design and engineering of earthwork infrastructure, including (if applicable, provide test pit/ drill hole logs and laboratory test results):	Y				Supplemental Information Report:		
	a	Waste rock facilities	Y				Appendix 4		

5.0 Baseline Information

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	b	Tailings containment area	NA	not applicable to the Program			Appendix 4		
	c	Landfills	NA	not applicable to the Program			Appendix 4		
	d	Landfarms	NA	not applicable to the Program			Appendix 4		
	e	Fuel and chemical storage facilities	Y				Appendix 4		
	f	Explosives management areas and facilities	Y				Appendix 4		
	g	Roads	Y				Appendix 4		
	h	Quarries or borrow pits	Y				Appendix 4		
	i	Hazardous waste facilities	Y				Appendix 4		
	j	Wastewater treatment facilities	Y				Appendix 4		
	k	Ore stockpiles	Y				Appendix 4		
	l	Overburden piles	Y				Appendix 4		
	14	Provide results of any assessment of the permeability of any faults and taliks beneath water bodies.	Y				Supplemental Information: Section 5.2, 7.3 and Appendix 7A		
	15	Provide a description of the historical uses of the waters affected by the project.	Y				Supplemental Information: Section 5.5, Appendix 5		
	16	Provide a description of any traditional uses of water in the project area.	Y				Supplemental Information: Section 5.5, Appendix 5		
	17	Indicate whether fish, shellfish, or other wildlife are present and harvested in or near discharge areas and, if applicable, indicate the species harvested and the level of harvest.	Y				Supplemental Information: Section 5.4, Appendix 5		
	18	Provide a description of the results of any consultation with Elders regarding the collection of baseline data.	Y				Supplemental Information: Section 4.3.1.1, 11.2, 11.3, Appendix 5		
Geology and Minerology	**19**	Provide a description of the physical nature of the mineralization, including known dimensions and approximate shape	Y				Supplemental Information: Section 5.2, Appendix 5		
	20	Provide a description of the host rock in the general vicinity of the mineralization (from the surface to the mineralized zone)	Y				Supplemental Information: Section 5.2, Appendix 5		
	21	Provide a geological description of the mineralized zone. (If possible, include the percentage of metals)	Y				Supplemental Information: Section 5.2, Appendix 5		
	22	Provide a description of the geochemical tests which have been (or will be) performed on the ore, host rock, and waste rock to determine their relative acid generation and contaminant leaching potential. Outline methods used (or to be used) and provide test results in an attached report (ie. static test, kinetic tests).	Y				Supplemental Information: Section 4, Section 8, Appendix 5 and Appendix 8		
	23	Provide an estimate of the percentage of sulphide in the mineralization including:					Supplemental Information Report:		
	a	Pyrite	Y				Section 5.2, Appendix 5 and Section 8.3, Appendix 8B		
	b	Pyrrhotite	Y				Section 5.2, Appendix 5 and Section 8.3, Appendix 8B		
	c	Pyrite / Pyrrhotite mixture	Y				Section 5.2, Appendix 5 and Section 8.3, Appendix 8B		
	d	Arsenopyrite	Y				Section 5.2, Appendix 5 and Section 8.3, Appendix 8B		

5.0 Baseline Information

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	24	Provide a description of the geochemical tests which have been (or will be) performed on quarrry or borrow material to determine the relative acid generation and contaminant leaching potential. Outline methods used (or to be used) and provide test results in an attached report (ie. static test, kinetic tests).	Y				Supplemental Information Report: Section 8.4, Appendix 8C		
Fisheries	**25**	The applicant is advised to consult with DFO regarding fish and fish habitat related issues and to visit DFO's website at http://www.dfo-mpo.gc.ca/habitat/habitat-eng.htm. Indicate whether the applicant has consulted with DFO and provide the results of any consultation.	Y				Supplemental Information Report: Section 5.1, Appendix 5		
	26	If applicable, provide baseline data and an evaluation of baseline data describing fish and fish habitat in the project area.					Supplemental Information:		
	27	If applicable, provide a fisheries assessment including:							
	a	Detailed area description (including photographic record);	Y				Section 5.3.2, 5.4, Appendix 5		
	b	Description of fish habitat (including river or lake bottom substrates such as silt, sand, or cobble);	Y				Section 5.3.2, 5.4, Appendix 5		
	c	Presence of sensitive habitats (spawning, migration corridors etc.);	Y				Section 5.3.2, Appendix 5		
	d	Description of aquatic and riparian vegetation;	Y				Section 5.3.2, Appendix 5		
	e	Fish community and lifestage present;	Y				Section 5.4 (Table 5.4-1), Appendix 5		
	f	Depth and width of watercourse;	Y				Appendix 5		
	g	Max/min water flows, currents, tides;	Y				Appendix 5		
	h	Turbidity and sediment loads (total suspended solids);	Y				Section 5.3.2, Appendix 5		
	i	Sport, commercial, subsistence fishery present.	Y				Section 5.5, Appendix 5		
Studies	**28**	Provide a list of baseline studies, reports and plans relevant to the application that have been undertaken to date including:					Supplemental Information Report		
	a	Geotechnical studies;	Y				Section 5.2, Appendix 5		
	b	Geochemical studies;	Y				Section 5.2, Appendix 5		
	c	Water quality studies;	Y				Section 5.2, 5.3 and Appendix 5		
	d	Hydrological and hydrogeological studies;	Y				Section 5.2, Appendix 5		
	e	Traditional use studies;	Y				Section 5.5, Appendix 5		
	f	Aquatic studies;	Y				Section 5.3.2, Appendix 5		
	g	Meteorological studies;	Y				Section 5.2, Appendix 5		

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6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Water Use	**1**	Provide a detailed description of all types of water uses including: (See the NWB definition of "use" in the NWB Guide 2: Terminology and Definitions). Categorize water consumption use(s) as either mining/industrial use and/or domestic use.					Supplemental Information Report:		
	a	Obtain water for domestic purposes	Y				Section 6.1 (Table 6.1-1)		
	b	Obtain water for industrial purposes	Y						
		drilling	Y				Section 4.2.7, 4.3.7, 6.1.1		
		mill or processing plant	NA	not applicable to the Program					
		ice road construction	Y				Section 4.2.7, 4.3.7		
		other: (describe)	NA	not applicable to the Program					
	c	To cross a water course	Y				Section 6.5		
	d	To alter the flow of water, or store water	Y				Section 4.2.7, 4.2.8, 4.3.7, 4.3.8, 6.4		
	e	Flood control	NA	not applicable to the Program					
	f	To divert a watercourse	NA	not applicable to the Program					
	g	To modify the bed or bank of a watercourse	NA	not applicable to the Program					
	h	Others:	NA	not applicable to the Program					
Water Use: Quality and Quantity *Water Intake* **Identify uses as either domestic or industrial**	**2**	Provide the name of the primary water source(s) as well as the name of any alternative water source(s).	Y				Supplemental Information Report: Section 6.1 (Table 6.1-1)		
	3	Provide a description of the source(s) of water and the location of the water source(s) as shown on a map.	Y				Supplemental Information Report: Section 3.5.1, Figure 3.5-2 and Section 6.1		
	4	Indicate the type of water source(s) as lake, river, well, or other type.	Y				Supplemental Information Report: Section 6.1		
	5	Provide a description of the quality of the water from the source(s) for each season (summer, fall, winter, spring).	Y				Supplemental Information Report: Section 6.3 and Appendix 5		
	6	Provide the capacity of the water source(s).	Y				Supplemental Information: Section 6, Section 10, (Table 10.4-1)		
	7	Provide the acquisition rate in cubic metres per day and cubic metres per year from each water source.	Y				Supplemental Information: Section 6.1 (Table 6.1-1) and Section 10.4 (Table 10.4-1)		
	8	Provide a description of the water intake method(s) including the intake facility, the operating capacity of the pump used, the details of any screening to exclude fish, and the distance the pump will be placed from the ordinary high water mark of the watercourse.	Y				Supplemental Information: Section 4.2.7, 4.3.7 and Appendix 4, Section 6.6		
	9	Provide a description of the general condition of any existing water intake facility. Rate the condition of the facility as satisfactory or unsatisfactory and explain the rating.	NA	not applicable to the Program					

6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	10	Indicate whether water is drawn from the source(s) intermittently or continuously and if intermittently indicate during what months it is drawn and for what period it is drawn (days/weeks/months).	Y				Supplemental Information: Section 4.2.7, 4.2.8, 4.3.7, 4.3.8, Appendix 6, Appendix 8		
	11	Indicate the amount of water to be returned to the source.	NA	not applicable to the Program					
	12	Provide a description of the methods to ensure water returned to any source is of an acceptable quality.	NA	not applicable to the Program					
	13	Provide a description of any hydrostatic testing programs, including water sources, and treatment/disposal requirements. If applicable, refer to the NWB's SIG for Hydrostatic Testing.	NA	not applicable to the Program					
	14	Indicate the quantities of water required for ice road construction and provide a description of the methods of ice road construction.	Y				Supplemental Information Report: Section 6.2		
	15	Provide a description of any measures to reduce water consumption.	Y				Supplemental Information: Section 8.1, Appendix 8A and Section 10.4.4		
Water Storage	**16**	Provide a description of any water storage facilities including the type (reservoir/pond, storage tank), location, design, and the water storage volume in cubic meters.	Y				Supplemental Information: Sections 4.2.7, 4.2.8, 4.3.7, 4.3.8, Section 8, Appendix 8A		
	17	If the water storage facility is a reservoir, indicate whether the reservoir is lined, the type of liner and when it was or will be installed.	NA	not applicable to the Program					
	18	Indicate whether a storage reservoir is created in a natural channel. If applicable, provide plan and profile drawings of the reservoir including the size of the drainage basin upstream of the reservoir, topographical plan showing the drainage area boundary, number of hectares flooded, surface area of the reservoir at full capacity, storage capacity, and details of shoreline protection.	NA	not applicable to the Program					
	19	Provide a plan showing representative cross sections of the reservoir.	NA	not applicable to the Program					
	20	Provide a description of the general condition of any existing water storage facility and provide an explanation if it is unsatisfactory.	NA	not applicable to the Program					
Water Distribution	**21**	Provide a description of water distribution systems (ie. piped water, trucked).	Y				Supplemental Information: Section 4.2, 4.3, 8.1, 8.2 and Appendix 8A		
	22	Provide a description of the general condition of any existing water distribution system and provide an explanation if it is unsatisfactory.	NA	not applicable to the Program					
Watercourse Crossings	**23**	Provide a description of any watercourse crossings including pipelines, bridges, culverts or roads and its purpose.	Y				Supplemental Information: Section 4.2, 4.3, Appendix 4 and Section 6.5		
	24	Provide a plan of any watercourse crossing showing cross section and elevations	Y				Supplemental Information: Figure 3.5-2, Section 4, Appendix 4 and Section 6.5		
Watercourse Trainings	**25**	Provide a description of any watercourse trainings including channel and bank alterations, culverts, spurs, erosion control, and artificial accretion, and its purpose.	NA	not applicable to the Program					
Flood Control	**26**	Provide a description of any flood control structures and its purpose.	NA	not applicable to the Program					

6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Diversions	**27**	Provide a description of any diversions including ditches and dikes and its purpose.	Y				Supplemental Information: Section 4.2.7, 4.2.8, 4.3.7, 4.3.8 and Appendix 4		
Alterations in flow	**28**	Provide a description of any activities or structures that could alter the flow of a watercourse including dams, spillways, berms, cofferdams, and dikes, and its purpose.	Y				Supplemental Information: Section 4.2.7, 4.2.8, 4.3.7, 4.3.8 and Appendix 4		
	29	Indicate whether the natural storage capacity or water level of any lake or pond will be altered.	Y				Supplemental Information: Section 4.2.7, 4.2.8, 4.3.7, 4.3.8 and Appendix 4		
	30	If the alteration involves a dam, provide a plan showing the length, height, cross section and elevations of the dam and the location and preliminary designs of spillways, canals, sluice pipes, and any other outlet work.	Y				Supplemental Information: Section 3.6, 4.1.3		
Dewatering	**31**	Provide a description of dewatering programs, if planned, including estimated quantities, qualities, dewatering flow rates, methods and schedule of withdrawl, end use or discharge location.	NA	not applicable to the Program					
Identification	**32**	Indicate whether there are any signs identifying past or present water intake, storage, distribution systems and/or waterwork structures presently in the project area.	NA	not applicable to the Program					
Modifications	**33**	Indicate whether any changes are planned for the water intake, storage, distribution systems and/or waterwork structures. If applicable, see item 36 of this section.	NA	not applicable to the Program					
Proposed Water Works	**34**	For each water work component provide the design plans stamped for construction. Design plans shall consider the following:							
	a	Name of the water body(s) affected.	Y				Supplemental Information Report: Section 4, Appendix 4; Section 8, Appendix 8		
	b	Site photos, site map, or air photos of the location.	Y						
	c	Description of the existing condition of the site (see Section 5)	Y						
	d	Indicate whether any structure will be placed in water on a temporary, seasonal or permanent basis and provide a description of when and how the structure will be removed.	Y						
	e	The design flood flow in cubic metres per second and its return period for the type of structure proposed.	Y						
	f	An explanation of the rationale for the selected design flow flood and its return period.	Y						
	g	Design drawings in plan and profile, drawn to scale, including all relevant dimensions.	Y						
	h	Detaills of design parameters including seismic design criteria if applicable.	Y						
	i	In water work timing restriction for fisheries.	Y						
	j	Start and completion dates for construction.	Y						
	k	Construction schedule and sequence taking into account any timing restrictions.	Y						
	l	Construction methods.	Y						
	m	Equipment to be used.	Y						
	n	A description of the source, type, and composition of material used in construction.	Y						
	o	The quantity of material to be either placed into or removed from the watercourse.	Y						
	p	Sedimentation and erosion control measures.	Y						
	q	Construction monitoring plans.	Y						
	r	Construction quality assurance and quality control measures.	Y						

6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	s	Assessment of impacts to fish and fish habitat (see item 43 of this Section).	Y						
	t	Bank stabilization measures (including the size range of material if applicable).	Y						
	u	Operation and maintenance plans including instrumentation, monitoring and inspection requirements.	Y						
	v	Contingency plans.	Y						
	w	Re-vegetation plans	Y						
	x	Proposed post construction monitoring (photos taken of the site before construction, during construction, and after construction; photos should be taken from the same reference point for easy comparison)	Y						
	y	Abandonment and restoration plans (see items 45-46 of Section 3).	Y						
	35	Final plans and drawings for construction must be stamped by a Professional Engineer licensed to practice in Nunavut. (See Section 7 of the NWB's Guide 4: Completing and Submitting a Water Licence Application for more information regarding design drawings).	Y				Supplemental Information Report: Section 4, Appendix 4		
	36	If geotextile is used or a similar material to prevent the transport of sediment into a watercourse, provide the technical specifications for the proposed material as well as the location, extent and placement method for the material.	Y				Geomembrane use: Supplemental Information Report: Section 4.2.7, 4.3.7, Appendix 4		
	37	If rip rap is used or a similar material for erosion protection, provide information regarding the minimum and maximum sizes of the material and the gradation between those limits. Indicate the quantity to be used and its source.	Y				Stockpile: Supplemental Information Report: Section 4.2.2, 4.3.2 Waste Rock: Supplemental Information Report: Section 4.2.3, 4.3.3		
Predicted Environmental Effects and Proposed mitigation measures	**38**	Provide a description of the effects of water usage on the source from which water will be drawn including the potential for drawdown.	Y				Supplemental Information Report: Section 5.2, 10.4.4, 10.5.3		
	39	Provide a description of any expected changes in surface water flow or storage including changes downstream of the project.	Y				Supplemental Information Report: Section 5.2, 10.4.5.1		
	40	If the cross-section of any watercourse is changed, provide a description of the change and its effect on the flow capacity of the channel.	Y				Supplemental Information Report: Section 5.2, 10.4.5.1		
	41	If the course of any channel is changed, provide a description of measures to maintain stream bed and bank stability.	NA	not applicable to the Program					
	42	Provide a description of measures of preventing surface water from coming into contact with waste and measures of managing surface water that does come into contact with waste (surface water management plan).	Y				Supplemental Information Report: Section 8 and 10.4.3		
	43	Provide a description of measures of preventing groundwater from coming into contact with waste and measures of managing groundwater that does come into contact with waste (groundwater management plan).	Y				Supplemental Information Report: Section 7, Appendix 7, Section 8 and Appendix 8		
Fisheries	**44**	If applicable, provide a description of any potential impacts to fish and/or fish habitat. (Indirect effects may include project effects, water quality, or aquatic organisms. Direct effects may include degradation or alteration of fish habitat). The applicant is advised to consult with DFO regarding fish and fish habitat related issues and to visit DFO's website at http://www.dfo-mpo.gc.ca/habitat/habitat-eng.htm.					Supplemental Information Report:		
	a	Potential effects on fish or fish habitat;	Y				Section 10.5.3		
	b	The area in square metres to be impacted;	Y				Section 10.5.3		

6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	c	Measures to avoid sensitive periods and habitat areas (i.e., spawning beds, migration corridors);	Y				Section 10.5.3		
	d	Measures to avoid physical impacts on habitat;	Y				Section 10.5.2		
	e	Measures to maintain flows and fish passage;	Y				Section 10.4.4, 10.5.3		
	f	Measures to avoid sedimentation;	Y				Section 10.4.5.2		
	g	Measures to avoid spills;	Y				Section 10.4.5.1, 10.4.5.2, 10.5.1		
	h	Detailed habitat no-net-loss plan and site restoration plan;	Y				Section 10.5.3, Appendix 5		
Studies	**45**	Provide a list of studies, reports and plans relevant to the application that have been undertaken to date, including:	Y				Supplemental Information Report:		
	a	Options analysis;	Y				Section 4, Appendix 4, Section 10.10		
	b	Water management plan including water balance analysis;	Y				Section 8, Appendix 8		
	c	Fisheries assessment;	Y				Section 10.5.3		
	d	Construction plan and construction schedule for water works;	Y				Section 8, Appendix 8		
	e	Implementation schedule for construction of works.	Y				Section 8, Appendix 8		
	f	Construction quality assurance and quality control plans;	NA	to be completed and submitted to NWB 60 days prior to start of construction					
	g	Operation and maintenance plan;	Y				Section 8, Appendix 8		
	h	Preliminary abandonment and reclamation plans for existing and proposed facilities;	Y				Section 9, Appendix 9		
	i	Final abandonment and reclamation plans for facilities to be closed;	Y				Section 9, Appendix 9		
	j	Monitoring plans (See Section 8).	Y				Section 8, Appendix 8		

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7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Waste Disposal	**1**	Provide a detailed description of all types of waste and all forms of waste disposal including: (see the NWB definition of Waste in the NWB *Guide 2: Terminology and Definitions*)					General Water License Application block 15 Supplemental Information Report:		
	a	Sewage	Y				Section 4.2.11.1, 4.3.11, 7.1 (Table 7.1-1)		
	b	Grey water	Y				Section 4.2.11.1, 4.3.11, 7.1 (Table 7.1-1)		
	c	Solid waste	Y				Section 4.2.11.2, 4.3.11, 7.1 (Table 7.1-1)		
	d	Sludge	Y				Section 4.2.11.1, 4.3.11, 7.1 (Table 7.1-1)		
	e	Hazardous waste including waste oil	Y				Section 4.2.11.1, 4.3.11, 7.1 (Table 7.1-1)		
	f	Contaminated soil, snow, ice and/or water	Y				Section 4.2.11.1, 4.3.11, 7.1 (Table 7.1-1)		
	g	Bulky items/ scap metal	Y				Section 7.1 (Table 7.1-1)		
	h	Mill or processing plant waste	Y				Section 4.2.7, 4.3.7, 7.1 (Table 7.1-1)		
	i	Mine water	Y				Section 4.2.7, 4.3.7, 7.1 (Table 7.1-1)		
	j	Discharge from dewatered areas	Y				Section 4.2.7, 4.3.7, 7.1 (Table 7.1-1)		
	k	Other: (describe)	NA	not applicable to the Program					
Waste Disposal: Quality and Quantity	**2**	For each type of waste, provide the composition, chemical characteristics and quantity generated. Also provide the location, rate, timing, frequency and duration of the deposit.	Y				Supplemental Information Report: Section 7.1 (Table 7.1-1)		
	3	For each type of waste, provide the proposed methods and processes for collecting, storing, treating and discharging the waste. Indicate the capacity of these facilities.	Y				Supplemental Information Report: Section 7.1 (Table 7.1-1)		
	4	Provide a description of any measures to minimize the production of wastes.	Y				Supplemental Information Report: Section 7.1 (Table 7.1-1)		
Identification	**5**	Indicate whether there are signs identifying any past or present wastewater disposal sites, solid waste disposal sites, or any other waste disposal sites presently in the project area.	NA	not applicable to the Program					
Modifications	**6**	Indicate whether any changes are planned for the wastewater, solid waste, or any other waste facilities. If applicable, see item 7 of this Section.	NA	not applicable to the Program					
Proposed waste facilities	**7**	For each proposed waste facility provide design plans. The designs shall consider the following:							
	a	Site photos, site map, or air photos of the site.	Y						
	b	Description of the existing condition of the site (see Section 5).	Y						

7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	c	A description of the types of waste entering the facility (if applicable, provide a description of the source, type, and quantity of the waste);	Y				Supplemental Information Report: Section 4, Appendix 4 and Section 7, Appendix 7, Section 8 and Appendix 8, Section 9 and Appendix 9		
	d	The concentration of waste entering the facility;	Y						
	e	The geochemical characterization of waste entering the facility, where applicable;	Y						
	f	Distance of the facility from watercourses and fish bearing waters.	Y						
	g	All sources of seepage encountered near watercourse and fish bearing waters as well as the volumes (m3/day) and direction of any seepage;	Y						
	h	Existing and proposed drainage modifications.	Y						
	i	Details of retaining structures.	Y						
	j	Level of treatment (primary, secondary or tertiary).	Y						
	k	By products of treatment which may require further treatment, characterization, handling and disposal.	NA	not applicable to the Program					
	l	Capacity and retention time of the facility;	NA	not applicable to the Program					
	m	Identification of final discharge point (last point of control).	Y						
	n	Method and type of discharge (seasonal, annual, continuous) including details of all decant, siphon mechanisms etc.	Y						
	o	Estimated rates for discharge.	Y						
	p	Restrictions on discharge.	Y						
	q	Discharge effluent criteria proposed;	Y						
	r	Receiving water quality objectives.	Y						
	s	Capacity of the receiving environment;	Y						
	t	Details regarding direction and path of wastewater flow from the area or infrastructure.	Y						
	u	Design drawings in plan and profile, drawn to scale, including all relevant dimensions.	Y						
	v	Details of design parameters including seismic design if applicable.	NA	not applicable to the Program					
	w	Start and completion dates for construction.	Y						
	x	Construction schedule and sequence taking into account any timing restrictions.	Y						
	y	Construction methods.	Y						
	z	Equipment to be used.	Y						
	aa	A description of the source, type, and composition of the material to be used in construction.	Y						
	bb	Construction monitoring plans.	Y						
	cc	Construction quality assurance and quality control measures.	Y						
	dd	Operation and maintenance plans.	Y						
	ee	Contingency plans.	Y						
	ff	Abandonment and restoration plans (see items 45-46 of Section 3).	Y						
	8	Final plans and drawings for construction must be stamped by a Professional Engineer licensed to practice in Nunavut. (See Section 7 of the NWB's *Guide 4: Completing and Submitting a Water Licence Application* for more information regarding design drawings).	Y				Supplemental Information Report: Section 4, Appendix 4		
	9	Provide an assessment of alternatives for any proposed tailings containment facility.	NA	not applicable to the Program					
	10	Provide a description of the general condition of any existing waste facilities and provide an explanation if it is unsatisfactory.	NA	not applicable to the Program					
Predicted Environmental Effects and Proposed mitigation measures	**11**	Provide detailed treatment plans for discharges from any tailings containment area, attenuation pond, reclaim pond, sewage disposal area, sumps or dewatered area. Water treatment plans should include estimates of treatment efficiency for each parameter of concern and a description of pH adjustment methods.	Y				Supplemental Information Report: Section 8.1 (Table 8.1-1), Appendix 8		

7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
	12	Clearly outline proposed discharge criteria, how the criteria were developed, standards to be applied, and how these criteria will be used to prevent ecological effects in the receiving environment.	Y				Supplemental Information Report: Section 8.1 (Table 8.1-1), Appendix 8		
	13	If waste is expected to infiltrate into the ground, provide a description of the sub-surface soil compositions and provide information on groundwater elevations for the project area. Also provide the proximity between the proposed waste disposal system and the groundwater elevation.	NA	not applicable to the Program					
	14	Provide detailed contingency plans for the treatment of turbid water during dewatering activities and/or increased suspended solids during any rewatering activities.	Y				Supplemental Information Report: Section 8.1 (Table 8.1-1), Appendix 8		
Operations and Maintenance	**15**	Provide operation and maintenance plans for any tailings containment areas.	Y				Supplemental Information Report: Section 8.1 (Table 8.1-1), Appendix 8		
	16	If the project includes sewage and/or solid waste disposal, provide an Operations and Maintenance Manual in accordance with the "Guidelines for the Preparation of an Operations and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories, 1996".	NA	not applicable to the Program					
Hazardous Materials	**17**	Provide a description of the type and quantities of drill additives, mill reagents, petroleum products, chemicals and/or hazardous materials on site. (MSDS sheets are not required to be submitted as part of the water licence application).	Y				Supplemental Information Report: Section 4.2.10 and 4.2.11; 4.3.10 and 4.3.11; 7.2		
	18	Provide details regarding the handling and storage of hazardous or potentially hazardous materials.	Y				Supplemental Information Report: Section 4.2.10 and 4.2.11; 4.3.10 and 4.3.11; Section 7 (Table 7.2-1)		
Emergency Response and Spill Contingency	**19**	Provide designs for the fuel tank farm facilities including a description of the nearest water bodies. Provide an evaluation of impacts and mitigation measures in case of a fuel spill.	Y				Supplemental Information Report: Section 8.1, 10.4.5.1, 10.4.5.2		
	20	Provide an Emergency Response and Spill Contingency Plan (ERSCP) that includes mechanisms and processes for addressing potential or actual failure of structures, response equipment and material storage, and programs for providing appropriate training to workers. The plan shall address all licensed facilities.	Y				Supplemental Information Report: Section 8.1 (Table 8.1-1)		
	21	Plan(s) shall address phases of the project including construction, operation, and care & maintenance.	Y				Supplemental Information Report: Section 8.1 (Table 8.1-1)		
	22	Provide an explanation of how the applicant will ensure project contractors meet the applicant's due diligence standards with respect to oil and hazardous material spill prevention, preparedness, response, and restoration.	NA	Established contracting procedures incorporate due dilegence to best management practices and regulatory requirements. Site orientation of all employees and constractors will be implemented					

7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Studies	**23**	Provide a list of studies, reports and plans relevant to the application that have been undertaken to date including design and management decisions. Studies, reports and plans may include:					Supplemental Information Report:		
	a	Options analysis;	Y				Section 4, Appendix 4		
	b	Wastewater treatment assessment;	Y				Section 4 and 6		
	c	Geotechnical and geothermal assessment;	Y				Section 4		
	d	Snow drift assessment;	Y				Section 5		
	e	Weather data for purposes of design;	Y				Section 5		
	f	Wastewater management;	Y				Section 7 and 8.1 (Table 8.1-1)		
	g	Solid waste management;	Y				Section 8.1 (Table 8.1-1)		
	h	Contaminated soil and/or water management	Y				Section 8.1 (Table 8.1-1)		
	i	Quarry Management;	Y				Section 8.4 (Table 8.1-1)		
	j	Hazardous waste management;	Y				Section 8.1 (Table 8.1-1)		
	k	Operation and maintenance plan;	Y				Section 8.1 (Table 8.1-1)		
	l	Spill contingency and emergency response plans;	Y				Section 8.1 (Table 8.1-1)		
	m	Construction plan and construction schedule for waste management infrastructure;	Y				Section 4 and Section 8		
	n	Implementation schedule for construction of works;	Y				Section 4 and Section 8		
	o	Preliminary abandonment and reclamation plans for existing and proposed facilities;	Y				Section 9		
	p	Final abandonment and reclamation plans for facilities to be closed;	Y				Section 9		
	q	Monitoring plans (see Section 8);	Y				Section 8		

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8.0 Monitoring

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided (see Notes below)	Insert electronic file name of document where information is provided (See Notes below)	Insert Section of document where information is provided	If information is not available at the time of application, indicate when the information will be made available	NWB Concordance Assessment
Monitoring	1	Provide a Monitoring Plan including a description of the methods, procedures, standards, and schedules proposed. Monitoring may be required for water use; effluent; surface and/or groundwater water quality, quantity, or flow; ground temperature; ground settlement; etc.	Y				Supplemental Information Report: Section 8.1 to 8.5 (Table 8.1-1)		
	2	Indicate who is responsible for sampling including that person's position, contact information and level of training.	Y				Supplemental Information Report: Section 8.1 to 8.5, Appendix 8		
	3	Indicate the name and contact information of the certified laboratory performing the analysis of samples.	Y				Supplemental Information Report: Section 8.1 to 8.5, Appendix 8		
	4	Provide an Inspection Plan including a description of the methods, procedures, standards, and schedules proposed. Inspections may be required for engineered facilities related to the management of water and waste as well as spills.	Y				Supplemental Information Report: Section 8.1 to 8.5, Appendix 8		
	5	Provide a Quality Assurance/ Quality Control (QA/QC) Plan that addresses both field sampling and laboratory analyses.	Y				Supplemental Information Report: Section 8.1 to 8.5 (Table 8.1-1), Appendix 8		
	6	Provide a summary table that details the monitoring plan. The table should include stations numbers, location, parameter(s) and frequency. Provide a map detailing the location of monitoring sites.	Y				Supplemental Information Report: Section 8.1 (Table 8.1-2)		

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Appendix 3

(for Chapter 3, General Water Licence Application)

Proponent information:

- Corporate registration
- List of officers
- Financial details

95 Wellington Street West
Suite 1010
P.O. Box 44
Toronto, Ontario M5J 2N7
416-628-0216

January 10, 2014

Phyllis Beaulieu, Manager of Licensing
Nunavut Water Board
PO Box 119
Gjoa Haven, NU
X0B 1J0

Re: Authorized Representative for TMAC Resources Inc., Hope Bay Belt Licenses, Permits and Applications

Dear Phyllis,

I am pleased to advise you that for authorizations and applications associated with exploration and the development of mining operations and support facilities within the Hope Bay Belt, John Roberts, Vice President Environmental Affairs will serve as the authorized representative for TMAC Resources Inc. (TMAC).

If you have any questions regarding this application please contact me at the coordinates provided below.

Yours truly,

Catharine Farrow
Chief Executive Officer

Phone: 416-628-0126
Fax: 416-644-9337
e-mail : catharine.farrow@tmacresources.com