TREASURY METALS

INCORPORATED

GOLIATH GOLD PROJECT
DRYDEN, ON
ENVIRONMENTAL IMPACT STATEMENT
EXECUTIVE SUMMARY

Treasury Metals Incorporated
130 King Street West, Suite 3680
Toronto, Ontario M5X 1B1
T: (416) 214-4654
F: (416) 599-4959

September 2017

amec foster wheeler

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS (continued)

PAGE

TABLE OF CONTENTS (continued)

PAGE

TABLE OF CONTENTS (continued)

PAGE

LIST OF TABLES

PAGE

LIST OF FIGURES

PAGE

1.0 INTRODUCTION AND PROJECT OVERVIEW

Treasury Metals Incorporated (Treasury Metals) is proposing to develop the Goliath Gold Project (the Project) and associated infrastructure near Dryden, Ontario. Treasury has been exploring the Project site since 2008 and has completed more than 460 diamond drill holes totalling approximately 135,000 metres (m). Beginning in 2008, Treasury Metals commenced extensive environmental, geotechnical, metallurgical, engineering, socio-economic, and logistical studies in order to advance the Project towards commissioning and operation.

Treasury Metals submitted a Project Description to the Canadian Environmental Assessment Agency (the Agency) on November 26, 2012 and on January 18, 2013 received draft guidelines for the preparation of an Environmental Impact Statement (EIS) for an environmental assessment conducted pursuant to the *Canadian Environmental Assessment Act, 2012*. The EIS guidelines were issued as final on February 21, 2013. In April of 2015 the Agency accepted Treasury Metals' EIS as meeting conformity and the EIS was moved into the technical review and public comment period. As part of the Information Request (IR) process the agency has requested a revised EIS. The following document was prepared in accordance with the Agency's request, including the completions of further technical work required as part of the IR responses. Treasury Metals used the EIS guidelines as reference in adopting a precautionary approach to planning and designing the Project. At each stage of planning and development, alternatives were assessed and, where possible, mitigation of potential effects was incorporated into the Project design.

1.1 The Proponent

Treasury Metals Incorporated is the sole Project Proponent and holds a 100% interest in the exploration mining leases that comprise the Project property. Treasury Metals is a TSX-listed (TML) gold exploration and development company, focused on northwestern Ontario mineral properties. Treasury Metals maintains a corporate and management structure in line with similar publically-traded companies. Directors and officers of the company as disclosed annually in regulatory filings and identified on the company website. The head office for Treasury Metals is in Toronto while the majority of Project activities are conducted at the Project site just east of Dryden (Table 1.1-1).

Contacts for the Project are:

Mr. Bob MacDonald,
Vice President, Goliath Gold Project
rmacdonald@treasurymetals.com

Mr. Mark Wheeler,
Director, Projects
mark@treasurymetals.com

Mr. Mac Potter,
Environmental Superintendant
mac@treasurymetals.com

Table 1.1-1: Proponent Contact Information

Corporate Contact Information	Mark Wheeler, Director, Projects Treasury Metals Inc. Toronto Office The Exchange Tower 130 King Street West, Suite 3680 P.O. Box 99 Toronto, Ontario, M5X 1B1, Canada T: (416) 214-4654 F: (416) 599-4959
Project Contact Information	Bob MacDonald, Vice President - Goliath Gold Project Treasury Metals Inc. Project Office P.O. Box 783 Dryden, Ontario, P8N 2Z4, Canada T: (807) 938-6961 F: (807) 938-6499

Treasury Metals is a mineral exploration company incorporated in the province of Ontario, Canada, and is listed on the Toronto Stock Exchange (TSX) under the symbol "TML". Treasury Metals was originally a subsidiary of Laramide Resources Ltd. (Laramide) and became listed as a public company on the TSX as of August 19, 2008. It is focused on the acquisition and development of precious metal assets in Canada, with a focus on gold.

As a public company, a number of regulatory requirements for disclosure controls and corporate governance must be met. The Treasury Metals board of directors ensures adherence to published policies, including:

- Code of Business Conduct and Ethics;
- Corporate Disclosure, Confidentiality and Insider Trading Policy;
- Corporate Governance Policy;
- Drug and Alcohol Policy;
- Health, Safety, Environment, and Sustainability Policy;
- Whistleblower Policy; and
- Workplace Violence and Harassment Policy.

1.1.1 Occupational Health and Safety Plan

Treasury Metals is fully committed to providing and maintaining a safe work environment and to ensure that every effort is taken to convey to all employees and contractors that “nothing we do is worth getting hurt over”. Treasury Metals has developed and implemented a Health and Safety Policy at the Project site with the goal of achieving a zero recordable injury rate (Appendix Z). This policy is the responsibility of the Vice President, Goliath Gold Project. The policy covers all current activities at the Project site and is reviewed and updated regularly to include any additional activities. The policy will be updated as the Project progresses to ensure compliance with all current or future regulatory standards.

1.1.2 Environmental Management Plan

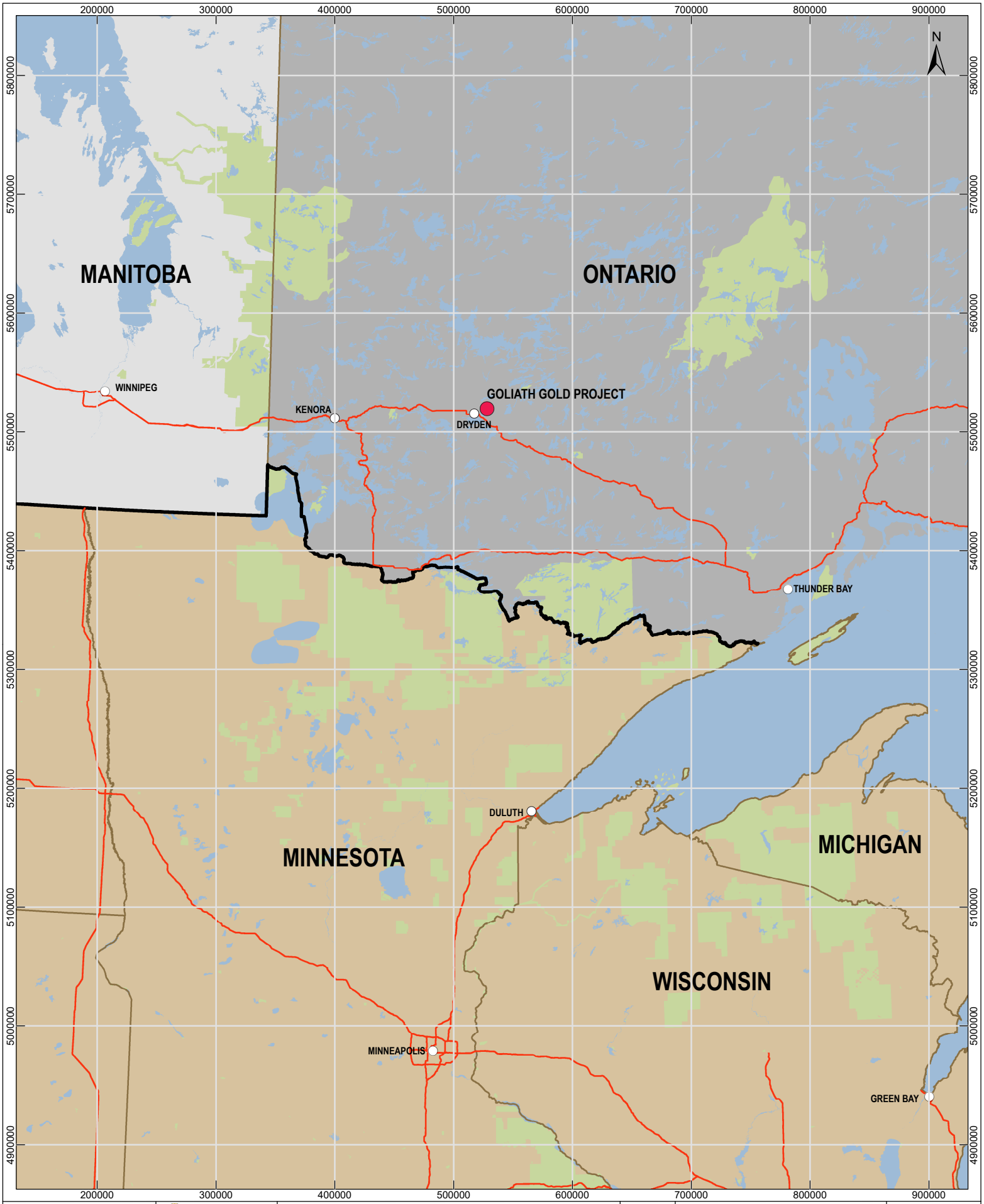
As a corporation, Treasury Metals and all its employees are fully committed to developing the Project in an environmentally responsible manner and incorporating the best environmental practices available into the corporate Environmental Policy. The policy is managed by the Vice President, Goliath Gold Project for the Company. In addition to the policy, Treasury Metals is currently developing an Environmental Management Plan (EMP) for the Project which will incorporate the results of the environmental assessment and permitting processes. Treasury Metals will also develop a series of specific management plans under the framework of the EMP to address specific issues or aspects of the environment. The EMP and the individual management plans to be implemented at the Goliath Gold Project are discussed in Section 12.

1.2 Project Overview

1.2.1 Project Location

The Project is located within with the Kenora Mining Division in northwestern Ontario (Figure 1.2.1-1). The Project site is approximately 4 kilometres (km) northwest of the village of Wabigoon, 20 km east of Dryden and 2 km north of the Trans-Canada Highway 17 and within the Hartman and Zealand townships (Figure 1.2.1-2). Access to the Project property is via existing gravel roads managed through the Local Services Board: Tree Nursery Road and Anderson Road which originates at Highway 17, west of the village of Wabigoon.

The Project is located within the area covered by Treaty 3. Treaty 3 area includes approximately 14,245,000 hectares (ha) in Ontario ranging from the vicinity of Upsala in the east, following the Canada-United States border in the south, and extending past the Ontario-Manitoba border in the west (Figure 1.2.1-3). Treaty 3 includes 28 First Nations communities and a number of villages and towns including Wabigoon, Dryden, Eagle River, Vermillion Bay, Sioux Lookout, Atikokan, Fort Frances, and Kenora. The relative locations of the closest First Nations communities are shown on Figure 1.2.1-4. The Project is also located within an area identified by the Métis Nation of Ontario as the Treaty 3/Lake of the Woods/Lac Seul/Rainy River/Rainy Lake traditional harvesting territories, also named Region 1.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Location of the Goliath Gold Project (Regional Scale)

Figure 1.2.1-1 | REV.01

TREASURY METALS INCORPORATED

DESIGN:	MP	31/07/2017
GIS:	MP	31/07/2017
CHECK:	MW	31/07/2017
REVIEW:	DB	31/07/2017

Canada | United States | Highway/Interstate
Ontario | Population Center | Provincial/State Line | International Boundary

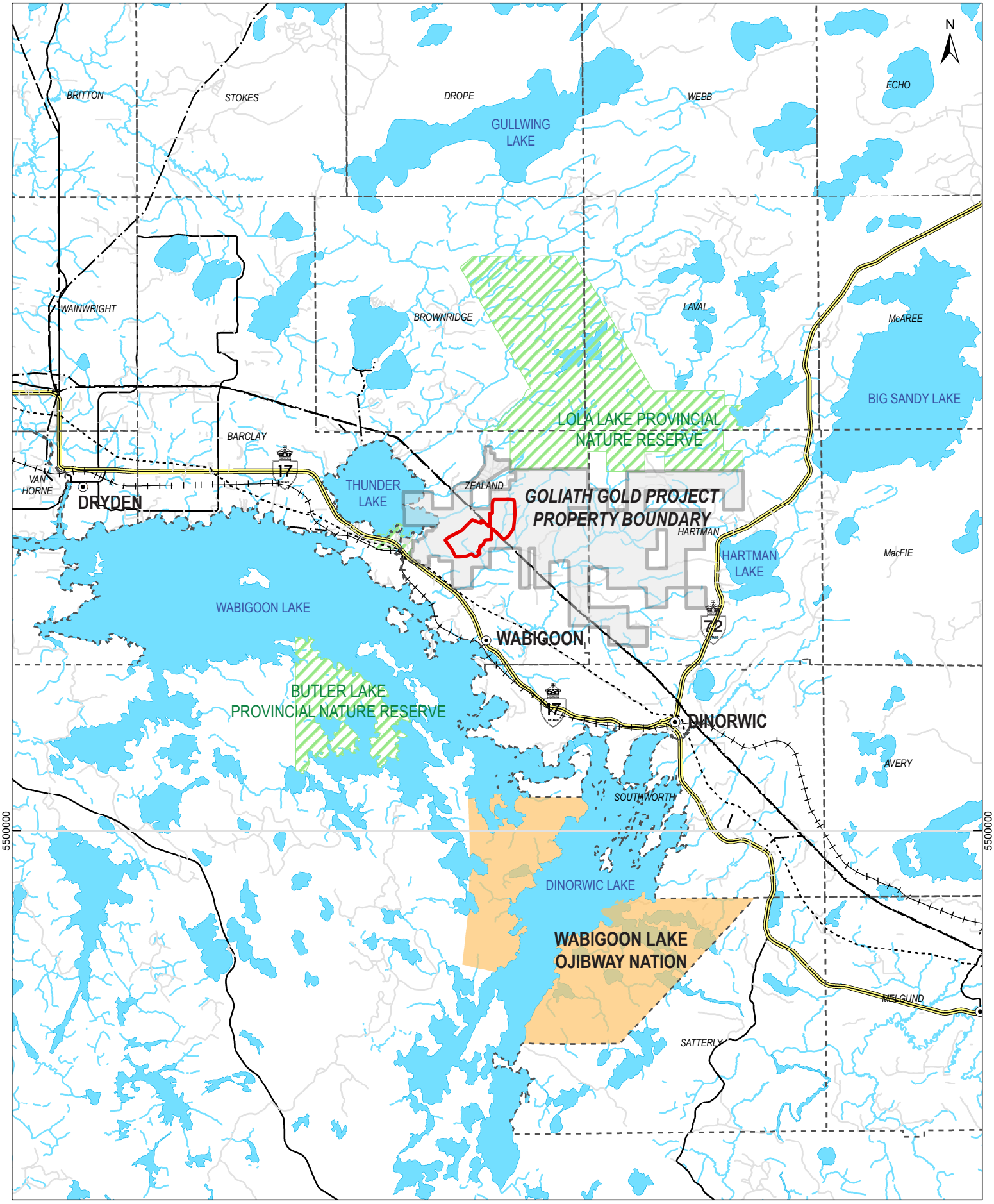
SCALE 1:4,000,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 100 200
Kilometers

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Location of the Goliath Gold Project (Local Scale)

Figure 1.2.1-2 | REV.02

TREASURY METALS INCORPORATED

DESIGN:	MP	17/08/2017
GIS:	MP	17/08/2017
CHECK:	MW	17/08/2017
REVIEW:	MW	17/08/2017

- Operations Area
- Property Boundary
- Townships
- Indigenous Communities
- Provincial Parks
- Populated Area
- Waterbody
- Watercourse
- Railway
- Arterial Roadway
- Expressway / Highway
- Resource / Recreation

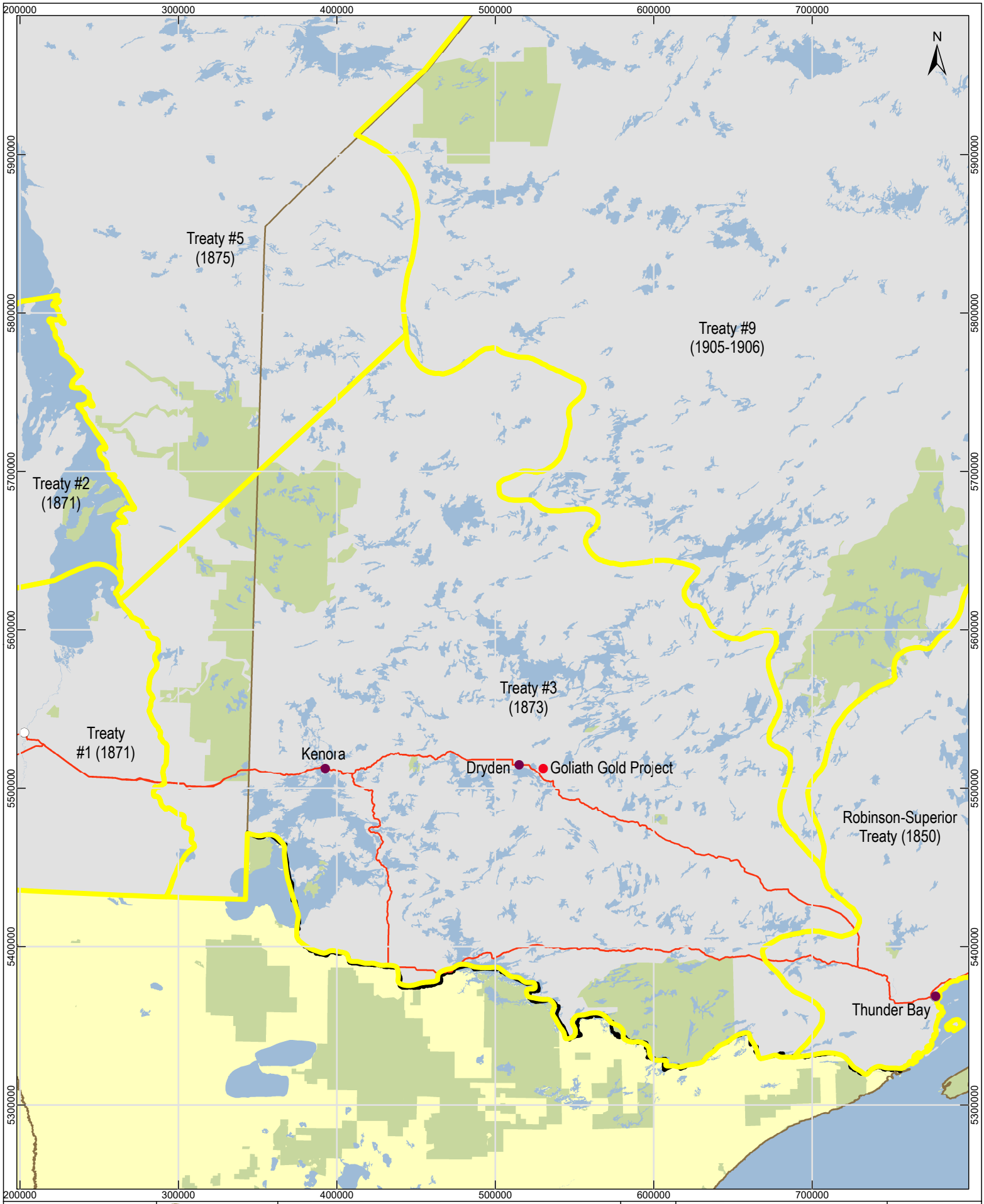
SCALE 1:200,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 1 2 3 4 5 6 7 8 9 10
Kilometers

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Treaty Areas - Regional Scale

Figure 1.2.1-3 | REV.01

TREASURY METALS INCORPORATED

DESIGN:	MP	18/08/2017
GIS:	MP	18/08/2017
CHECK:	MW	18/08/2017
REVIEW:	MW	18/08/2017

Treaty Areas
Canada
United States
Population Center
Highways

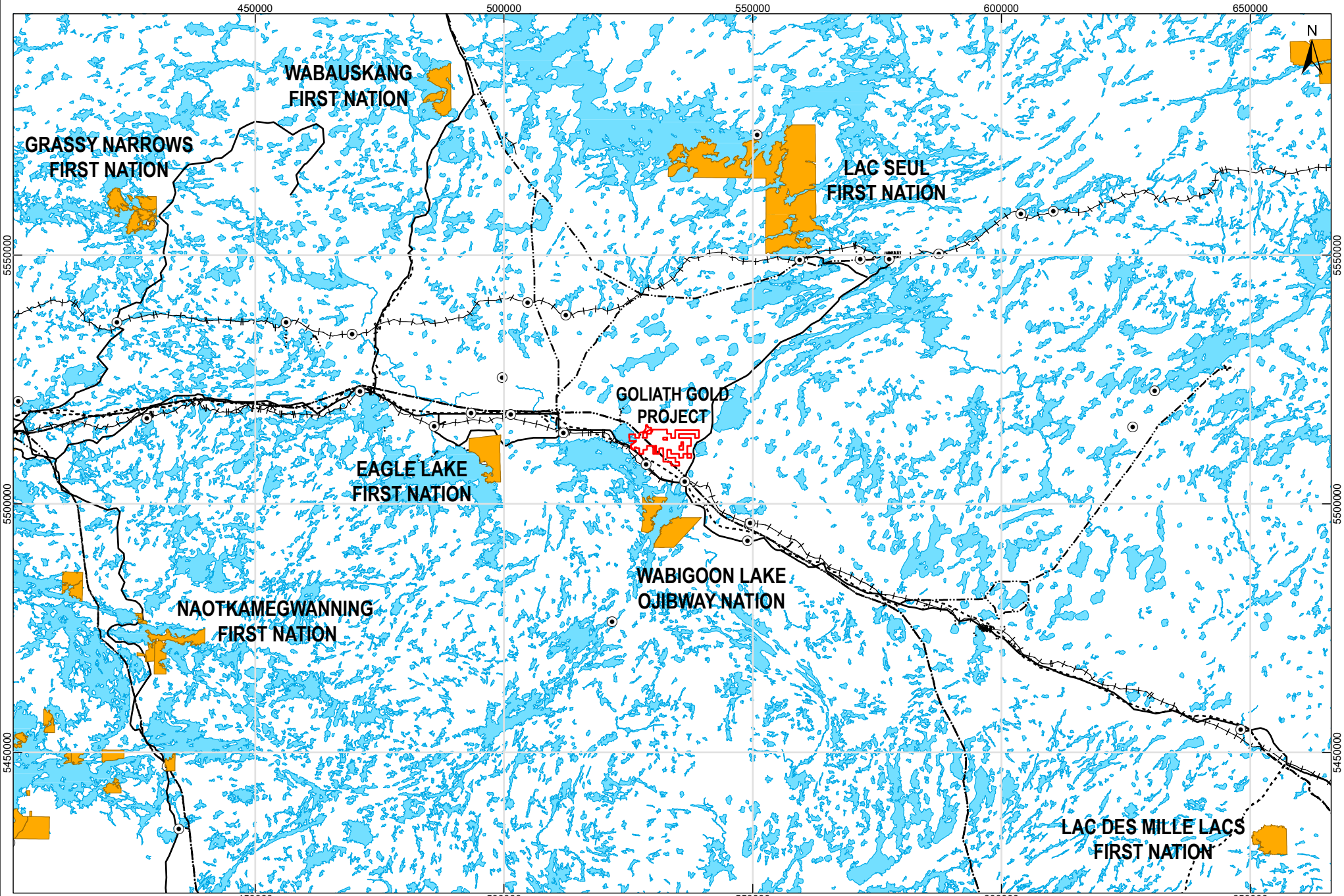
SCALE 1:3,000,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 100
Kilometers

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Indigenous Communities

Figure 1.2.1-4 | REV.02

TREASURY METALS INCORPORATED

DESIGN: MP 18/08/2017
GIS: MP 18/08/2017
CHECK: MW 18/08/2017
REVIEW: MW 18/08/2017

Indigenous Communities
Goliath Property Boundary
Populated Area
Hydro Line
Natural Gas Pipeline
Railway
Highway
Waterbody

SCALE 1:1,000,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 20 40 60
Kilometers

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.

1.2.2 Project History

The Project is an amalgamation of two exploration properties that are now consolidated: the larger Thunder Lake Property purchased from Teck and Corona and the Laramide Property transferred to Treasury Metals from Laramide Resources Limited upon the Treasury Metals' spin-out in 2008. Laramide continues to hold an 8% interest in Treasury Metals. Treasury Metals took ownership in 2008 and has continued exploration drilling through to present day. Treasury Metals has expanded the Project through a combination of staking and acquisition of mining claims, acquisition of strategic properties, and new option agreements.

1.2.3 Land Ownership

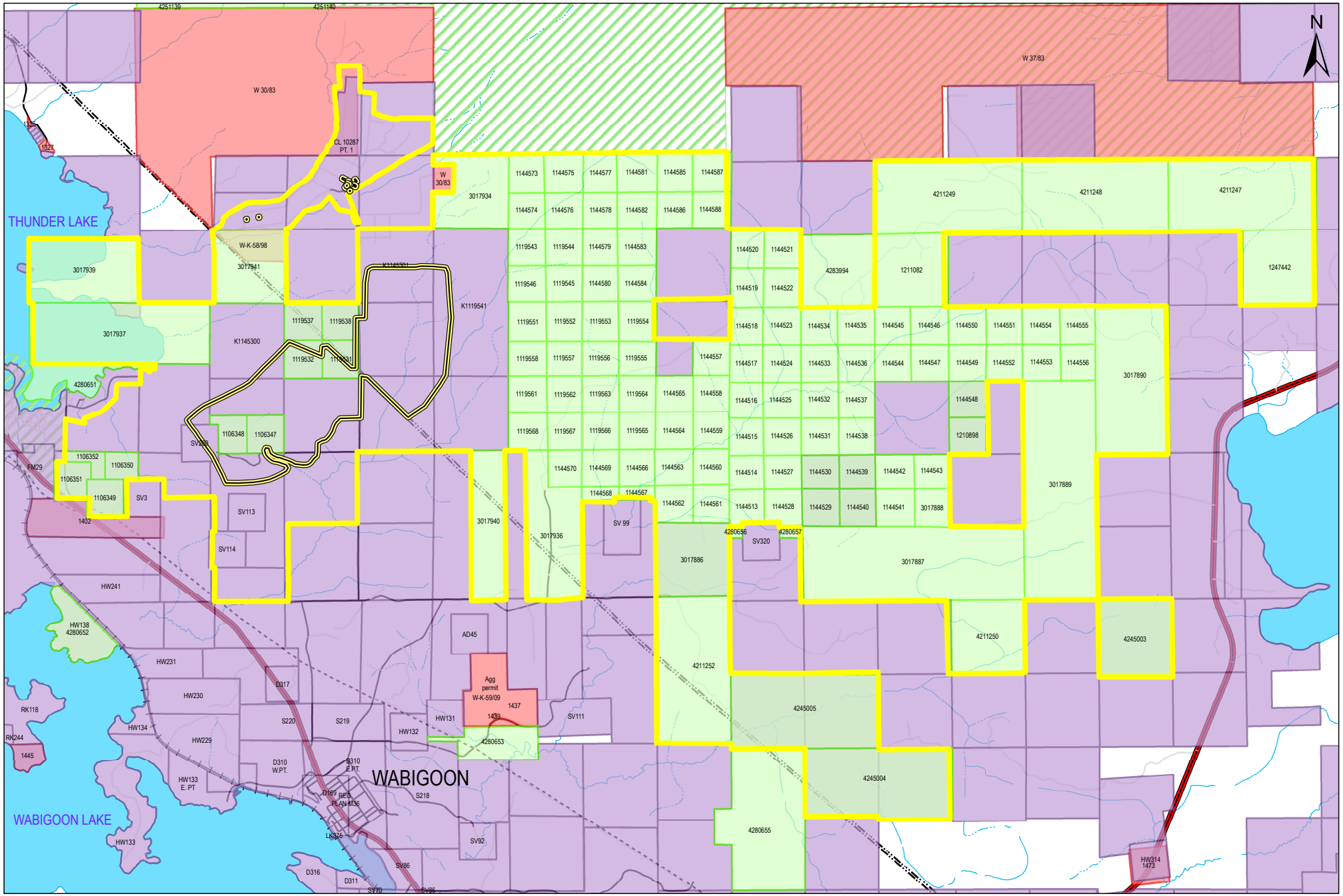
The Project property was formed when the Thunder Lake and Laramide exploration properties were combined under Treasury Metals. The Project is located within the Hartman and Zealand Townships in the Kenora Mining Division. The property has a total area of 4,981 ha and is comprised of 126 unpatented mining claims on 3,808 ha, three mining leases for 261 ha, and 20 patented mining claims on 912 ha (Figure 1.2.3-1). Treasury Metals holds the entire property subject to specific royalties to 13 of the patented land parcels. These specific royalties are generally in the form of a Net Smelter Royalty (NSR), with some of the patented land parcels receiving an advanced royalty.

Treasury Metals also owns the former Ontario Ministry of Natural Resources and Forestry (MNRF) tree nursery property. Treasury Metals currently holds 742 ha or 15% of surface rights within the Property including the MNRF tree nursery property. The private holdings are centered on the infrastructure required for the Project.

1.2.4 Current Land Uses

The Project area exhibits rolling terrain, and is drained principally by Blackwater Creek and its associated minor tributaries. The Project site is located in a low density rural area within the Hartman and Zealand Townships. There is some limited local agriculture focused on cattle, as well as logging activities in the area. Immediate adjacent areas show mainly second growth poplar-dominated forests and wetlands.

Regionally the major city closest to the Project is Thunder Bay (population 108,359), which is located approximately 335 km east-southeast of the site. The closest communities and local populations to the Project are located in Wabigoon (population 430; 4 km northwest of site), and Dryden (population 7,500; 20 km east of site). Of local significance is the population proximal to site located on Thunder Lake Road, East Thunder Lake Road, Tree Nursery Road, and Anderson Road (Figures 1.2.1-1 and 1.2.1-2).



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

TREASURY METALS INCORPORATED

Claims and Dispositions
Goliath Gold Project

Figure 1.2.3--1 | REV.02

DESIGN: MP 18/08/2017
GIS: MP 18/08/2017
CHECK: MW 18/08/2017
REVIEW: MW 18/08/2017

Hydro Line
Natural Gas Pipeline
Railway
Operations Area
Claims
Dispositions
Alienations
Property Boundary
Highway
Local Road
Resource Road

SCALE 1:55,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 1,000 2,000 3,000
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.

1.3 Need for the Project

The purpose of the Project is to extract gold for sale on the open market by mining gold-bearing ore and producing doré product at an onsite gold processing facility. Many in the management and staff at Treasury Metals currently live in the Dryden area and bring a personal interest to returning development and employment to northern Ontario and the regional area. The forest industry has historically been the primary economic influence for the region but in recent years northern Ontario has seen an economic downturn as the forestry industry continues to contract. Dryden and many other northern Ontario communities have seen operational reductions or outright closures of pulp and paper mills, associated facilities, and service industries. These changes have had a direct and negative impact on the socio-economic conditions of many communities across northern Ontario. The Project will bring economic diversity to northern Ontario and provide skilled jobs for the local workforce.

1.4 Project Timeline

Treasury Metals has been developing the Goliath Gold Project since Treasury Metals' inception in 2008. Technical programs have been ongoing for a number of years that include several exploration drill programs, several N.I. 43-101 compliant resource estimates and three Preliminary Economic Assessments that show the Project has economic viability.

A Project Description ("PD") for the Goliath Gold Project was submitted on November 27, 2012 and accepted on November 30, 2012 by the federal government's Canadian Environmental Assessment Agency (the Agency). The Treasury Metals' PD initiated the official permitting and approvals process for mine development. This milestone marked a significant advancement in the development of the Project and officially began the federal government's 365-day legislated period for the completion of the Environmental Assessment ("EA") by the Agency. The 365-day review and approval window includes 45 days the Agency used to determine that an EA for the Goliath Project was required. The Agency used the PD to develop the guidelines for an Environmental Impact Statement ("EIS") that Treasury Metals is required to complete as an integral part of the EA process. These guidelines were received from the Agency on February 21, 2013.

Following the initial submission of the EIS to the Agency in October 2014, the Agency returned with several comments and questions to complete for the document, as a whole, to be accepted for concordance with the requirements of the EIS guidelines. During this year the legislated timeline for completion was officially paused while Treasury Metals made the requested edits. On April 10, 2015, the Agency confirmed that the Treasury Metals Goliath Gold Project EIS conforms to the EIS Guidelines. As a result, the Project moved on to the public comment period and technical reviews conducted by various federal government agencies. The public comment period took place in a 30-day period from April 25 to May 24, 2015, and included Indigenous peoples and general public open house meetings lead by the Agency. Treasury Metals and the consultants who have provided input into the EIS were represented at these meetings to provide technical

content for these sessions. Most meetings occurred in the Dryden, Ontario and Wabigoon, Ontario areas.

On June 30, 2015, as a normal part of the EA process, the Agency returned a series of Information Requests stemming from the public comment period and the Agency's own technical review of the EIS. The Company has compiled replies to these information requests and as part of the process has revised the original version of the EIS into the version presented herein.

Treasury Metals intends to have permitting complete for both the Federal EA and Provincial permitting requirements by 2019. Following the successful completion of mine permits and approvals, the company envisages construction to begin immediately. The construction period is anticipated to take approximately 18–24 months. As planned, Treasury Metals then anticipates mine production to begin in 2021. With an overall mine life of approximately 12 years, this would see the mine operating until the year 2033 with closure and reclamation being complete prior to 2042.

1.5 Regulatory Framework

1.5.1 Canada

The Project is subject to the *Regulations Designating Physical Activities* under the *Canadian Environmental Assessment Act 2012* (CEAA 2012). Specifically, Section 16(c) of the regulations which lists, "*the construction, operation, decommissioning and abandonment of a new… rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 tons/day or more*" is subject to an EA under CEAA 2012.

The Project may also be subject to:

- Section 7(1) of the *Explosives Act* for the on-site storage and or fabrication of explosives;
- Section 35 of the *Fisheries Act*, which prohibits causing serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery; and
- Section 36 of the *Fisheries Act* which prohibits the deposit of a deleterious substance of any type in water frequented by fish. Mine effluent is regulated through the *Metal Mining Effluent Regulations*.

Treasury Metals submitted a project description to the Agency on November 27, 2012 and was notified by the Agency on November 30, 2012 that the project description was accepted, which was posted December 3, 2012 for public comment. On January 17, 2013 the Agency confirmed that an EA by a responsible authority (the Agency) was required for the Project and issued draft EIS guidelines on January 18, 2013 for public comment. Final EIS guidelines were issued by the Agency on February 21, 2013. The Agency advertised the availability funding for public

participation in the Project EA on April 26, 2013 and announced the allocation of the funding on July 12, 2013. Treasury Metals submitted its original EIS document' which was subsequently accepted as meeting conformity in April of 2015. In June 2015, the Agency issued a series of information requests to Treasury Metals (Round 1 information requests). This revised EIS document, along with the responses to the individual information requests given by the Agency represents the next step in the regulatory process..

1.5.2 Ontario

The Project is subject to several Class EAs related to provincial permitting. As the Ontario Government does not require an EA specific to a Mining Project, Treasury Metals will proceed with the specific Class EAs:

- Ministry of Transportation – Class EA for Transportation Facilities;
- Ministry of Natural Resources and Forestry – Class EA for the Removal of Trees;
- Ministry of Natural Resources and Forestry – Class EA for the Burial of an Intake Water Line on Crown Land; and
- Ministry of Natural Resources and Forestry – Class EA as part of the *Lakes and Rivers Improvements Act* for the Construction of the Tailings Dam.

1.5.3 Federal and Provincial Alignment

Although the Federal EA process differs in structure to the Provincial Class EA process, there are various areas of potential overlap. Treasury Metals has engaged with the respective agencies regarding the organization of these overlapping areas and commits to work with these agencies to reduce duplicate work done between Federal and Provincial Agencies.

The majority of the effort to reduce overlap has been and will continue to be in the areas of engaging Indigenous communities and Aboriginal peoples, peoples as well as public engagement.

1.6 Participants in the Environmental Assessment

Participants in the EA process include aboriginal communities, federal, provincial, and municipal governments, project stakeholders, the general public and non-governmental organizations. A listing of the participants in the EA is provided below.

1.6.1 Indigenous Communities

- First Nations:

- Wabigoon Lake Ojibway Nation;
- Eagle Lake First Nation;
- Whitefish Bay First Nation (Naotkamegwanning First Nation);
- Wabauskang First Nation;
- Lac Seul First Nation;
- Grassy Narrows First Nation;
- Lacs des Milles Lacs First Nation; and
- Grand Council Treaty #3.

- Métis Nation of Ontario:
  - Northwest Métis Council;
  - Kenora Métis Council;
  - Sunset Country Métis Council; and
  - Atikokan Métis Council.

- The Aboriginal People of Wabigoon.

1.6.2 Federal Government

The Agency is the responsible authority for the Government of Canada and is responsible for managing the environmental assessment under CEAA 2012 and preparing the EA report for the Project. The Agency is also responsible for engaging and coordinating other federal entities which may have regulatory responsibilities or expert knowledge regarding Project. The Federal bodies engaged by the Agency include:

- Fisheries and Oceans Canada;
- Aboriginal Affairs and Northern Development Canada;
- Natural Resources Canada;
- Environment Canada;

- Health Canada;
- Major Projects Management Office; and
- Transport Canada.

1.6.3 Provincial Government

The Ontario Ministry of Northern Development and Mines (MNDM) is the lead Ministry for the "One Window" approach to the Project review process. MNDM will also lead closure planning and consultation requirements for the Provincial government. The MNRF will lead the Class EA process and work with MNDM to fulfill consultation duties. Further to this, the Ministry of Environment and Climate Change will lead compliance permitting for water management, air quality, and noise approvals. The other Ministries that will participate in the EA and permitting process are:

- Ministry of Northern Development and Mines;
- Ministry of Environment and Climate Change;
- Ministry of Natural Resources and Forestry;
- Ministry of Labor;
- Ministry of Transportation; and
- Ministry of Tourism, Culture and Sport.

1.6.4 Municipal Government

The key municipal government contacts are the Mayor and the Council of Dryden, and the local services board in Wabigoon. They have shown great interest in the Project and have attended multiple meetings. Municipal service providers are also included on the Project stakeholder list through interviews to inform the socio-economic studies and regular updates on the progress of the Project, including the EA.

Consultation has included the following municipal government representatives:

- Village of Wabigoon;
- Town of Dryden;
- Town of Ignace;

- Town of Sioux Lookout;
- Township of Machin;
- Keewatin Patricia District School Board;
- Northwest Catholic District School Board;
- Kenora District Services Board; and
- Dryden Regional Health Center.

1.6.5 Public and Non-governmental Organizations

In general, the public communities of Dryden and Wabigoon have shown great interest in the completion of the EIS and the Project in general. Treasury Metals has made the general public aware of the Project and the EA through advertisements in local newspapers and on radio, community open houses and by making key documents available at the Project office. Public and non-governmental participants in the EA include the following:

- Local residents on Tree Nursery Road, Anderson Road, Highway 17/11, and East Thunder Lake Road;
- The Goliath Mine Stakeholders;
- The Concerned Citizens of Wabigoon;
- Dryden Naturalists;
- Dryden Chamber of Commerce; and
- Dryden Economic Development Corporation.

2.0 ASSESSMENT OF ALTERNATIVES

2.1 Background

A major component of the environmental assessment (EA) process is the evaluation of alternative methods to carry out the Project. These alternatives include both “alternatives to” the Project and “alternative methods” to carry out the Project. This evaluation helps to guide the Project in a responsible manner with the assurance that any reasonable options have been considered. The assessment of alternatives has been prepared in accordance with the *Canadian Environmental Assessment Act* (CEAA, 2012) environmental impact statement (EIS) guidelines.

Alternatives will be carried forward through the assessment if they are likely to fulfill the following objectives:

- Does the alternative provide a reasonably viable solution to the problem?
- Is the technology both proven and has the necessary ability to operate at the Project scale?
- Is the alternative consistent with other Project objectives and/or company policies and procedures?
- Is the alternative consistent with Provincial government policy initiatives?
- Could they affect any sensitive environmental features or other valued components (VCs) when compared to other viable alternatives?
- Is the alternative reasonable to implement in a practical and economical fashion?
- Is the alternative within the scope of the company to implement?
- Is it possible to implement the alternative within the defined study area?
- Are they able to meet the purpose of the *Ontario Environmental Assessment Act*?

2.2 Assessment Methodology

The approach to the assessment of alternatives for the Project EA is to compare and evaluate the overall advantages and disadvantages of each reasonable alternative using a numerical scoring value where possible. Where not possible, an objective non-numerical scoring was used to evaluate each alternative. Comparable methodologies have been followed in similar EAs for other regional mining projects.

The alternatives assessment was accomplished with consideration of any comments received to date from; Indigenous communities, the general public, local stakeholder groups and government reviewers. The objective measures used are features that are significant for the realization of the Project as a whole and offer a relative basis to evaluate the distinct alternatives. The following objective measures were used in the comparison of alternatives:

- Overall cost for the life of the Project;
- Technical feasibility and technical reliability;
- Effects to the environment, including human, physical and biological environments; and
- Potential ability for future closure/reclamation processes.

2.2.1 Overall Cost for the Life of the Project

The overall cost is the total sum of all costs to implement and operate an alternative including initial and sustaining capital expenditures, operating costs and closure/reclamation costs (Table 2.2.1-1).

Table 2.2.1-1: Financial criteria for the alternatives assessment

Criteria	Assessment
Goliath Gold Project Financing	Investor desirability and/or risk
Return on Investment (ROI)	Provides a competitive and acceptable ROI
Financial Risk	Provides a manageable or acceptable financial risk

The performance of these criteria is defined as:

- Preferred: Carries an acceptable financial risk while making a competitive ROI.
- Acceptable: Carries an acceptable financial risk while making an acceptable ROI.
- Unacceptable: Carries an unacceptable financial risk or does not provide an acceptable ROI.

2.2.2 Technical Feasibility and Technical Reliability

Technical feasibility and reliability can be used in conjunction to describe the suitability of a specific alternative (Table 2.2.2-1).

Table 2.2.2-1: Technical feasibility criterion for the alternatives assessment

Criteria	Assessment
Readily Available Technology	Has been successfully implemented in similar mining projects and can be relied upon for sufficient performance over an extended period of time.
	New technologies must be supported by sufficient investigations and technical study to provide confidence in their performance abilities

The performance of these criteria is defined as:

- **Preferred**: Well understood technical capability of alternative with supporting contingency options.
- **Acceptable**: Possible technical capability based on theoretical study. Contingency options must be available as a substitute if the alternative fails to perform as expected.
- **Unacceptable**: No readily available technologies, or technologies that rely solely on unproven studies.

2.2.3 Effects on the Environment

For this assessment the term human environment refers to the potential for negative human environment effects. These include a wide range of land use, socio-economic, cultural and community factors as outlined in the following table. The term physical and biological environment refers to a wide range of factors within water, air, rock, soil and/or overburden and physical plant or animal species. The evaluation criteria for each factor are described in Table 2.2.3-1.

Table 2.2.3-1: Environmental Criteria for the Alternatives Assessment

Criteria	Assessment
Local Residents and Recreational Users	Effect on property values Effect on employment opportunities Effect on local access points Effect on noise levels Effect on water supply for both well water and drinking water Effect on visual disturbance Potential for adverse health effects
Infrastructure	Effect on local access Effect on power supply systems
Public Health and Safety	Attainment of air quality point of impingement standards or scientifically defensible alternatives Effect on drinking water supply Effect on local health services
Local Economy	Effect on local businesses and economic opportunities Effect on access for tourism operators and/or natural resource harvesters
Tourism	Effect on local tourism
Regional Economy	Effect on regional businesses and economic opportunities
Government Services	Effect on local government services and capacities
Resource Management Objectives	Effect on established resource management plans

Table 2.2.3-1: Environmental Criteria for the Alternatives Assessment (continued)

Criteria	Assessment
Built and Cultural Heritage	) Effect on any built heritage resource or cultural heritage features) Alteration that is not sympathetic or is incompatible with the historic fabric and appearance of cultural heritage resources) Isolation of a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship) Direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes) A change in land use) Avoidance of damage to built heritage resources or cultural heritage landscapes, or document cultural resources if damage or relocation cannot be reasonably avoided
Archaeological Resources	) Effect on land disturbances) Avoidance of archaeological sites or mitigation by excavation if avoidance is not possible, as per the standards and guidelines for Consultant Archaeologists
First Nation Reserves and Communities	) Effect on conditions of community on First Nation reserves
Spiritual and ceremonial sites	) Avoidance of damage or disturbance to known spiritual and/or ceremonial sites
Traditional Land use	) Effect on Traditional Land use as caused by the Project
Aboriginal and Treaty Rights	) Effect on Aboriginal and Treaty rights
Effect on Air Quality and Climate	) Maintain air quality point of impingement standards or defensible alternatives) Emission rates of greenhouse gases (GHGs)
Effect on Aquatic Life and Habitat	) Fulfilment of water quality standards and guidelines for protection of aquatic life or ensuring no further degradation of water quality if current conditions do not match Provincial Water Quality Objectives (PWQO)) Management of water level in effected water bodies and streams to maintain aquatic life) Maintenance of fish population) Maintenance of groundwater levels for both flows and quality
Effect on Wetlands	) Fulfilment of water quality standards and guidelines for protection of aquatic life or ensuring no further degradation of water quality if current conditions do not match PWQO) Area, type and quality (functionality) of wetlands that would be displaced or altered) Maintenance of wetland connectivity
Effect on Terrestrial Species and Habitat	) Area, type and quality of terrestrial habitat that would be displaced or altered) Effects of noise disturbance generated by the Project) Maintenance of wildlife movement corridors and plant dispersion) Effect on overall wildlife population
Effect on Species at Risk (SAR)	) Sensitivity level of effected SAR (Endangered, Threatened, Special Concern)) Areal extent, type and quality of SAR that would be displaced or altered) Effects of noise disturbance generated by the Project) Maintenance of wildlife movement corridors and plant dispersion

The performance of these criteria is defined as:

- **Preferred**: Has no effect or manages to minimize adverse effects with no additional mitigation measures and has a positive overall effect.

- **Acceptable**: Has no effect or manages to minimize adverse effects with additional mitigation measures and has a positive overall effect.

- **Unacceptable**: Likely to cause significant adverse effects that cannot be reasonably mitigated.

2.2.4 Potential Ability for Future Closure/Reclamation Processes

The performance of this factor is the ability the alternative to successfully be reclaimed and provide closure (Table 2.2.-1).

Table 2.2.-1: Closure Criteria for the Alternatives Assessment

Criteria	Assessment
Public Safety and Security	Effect on safety and security risks to the community and general public
Environmental Health and Long Term Sustainability	Effect on long-term air quality and the ability to meet point of impingement standards Effect on long-term water quality and the ability to meet water quality guidelines Effect on long-term wildlife habitats including SARs
Land Use	Effect on long-term land uses Effect on long-term visual appearance of Project Site

The performance of these criteria is defined as follows:

- **Preferred**: Causes limited alteration to the Project site which will in turn create a reduced effort in reclamation activities.

- **Acceptable**: Causes alteration to the Project site that will require moderate or large reclamation efforts to meet regulatory requirements.

- **Unacceptable**: Causes alteration to the Project to which reclamation and closure is not technically or reasonably feasible.

2.2.5 Identification of Preferred Alternative

Each alternative has been given a classification to be preferred, acceptable or unacceptable to the aforementioned categories. The overall preferred alternative was then chosen using a holistic approach to how the specific alternative interacted with the Project as a greater whole.

2.2.6 Tailings Storage Facility

Two Project facilities (a tailings storage facility [TSF] and a minewater pond) will overprint waters frequented by fish and are subject to a regulatory amendment of Schedule 2 of the Metal Mining Effluent Regulations (MMER). Assessment of potential alternatives for facilities that overprint

waters frequented by fish is required under Environment and Climate Change Canada's Guidelines for the Assessment of Alternatives for Mine Waste Disposal (Environment Canada 2013), pursuant to a Schedule 2 regulatory amendment. For the Project, this includes an assessment of tailings deposition technology and tailings storage facility locations.

The alternatives assessment of the TSF and minewater pond was completed as a discrete document with differing methodologies to the alternatives assessment in this section due to previous work completed for the aforementioned requirements. This assessment and methodology is detailed in Appendix D-2 to the revised EIS.

A multiple accounts analysis (MAA) has been prepared, which follows the methodology outlined in the Guidelines for the Assessment of Alternatives for Mine Waste Disposal (the Guidelines), prepared by ECCC. This analysis has been used to examine and compare different effects from mine waste storage alternatives, and to provide a decision-making tool, which is transparent and defensible. A sensitivity analysis is provided to allow for different weightings of key MAA components and to evaluate differing values on potential environmental, technical, economic and social impacts.

2.3 Project Alternatives

2.3.1.1 Alternative Means Evaluated

Alternatives for the Project have been carefully considered, bearing in mind that all mining operations pose some unavoidable on-site safety risks, as do other industrial operations. Treasury Metals is aware of these risks and will put a priority on worker health and safety and training programs. Alternatives for the Project have been considered with respect to the following Project components:

- Mining;
- Minewater management;
- Mine rock and overburden management;
- Processing methodology and gold recovery;
- Process effluent treatment;
- Tailing storage facility (TSF);
- Water supply sources;
- Water discharge location;
- Project infrastructure locations;

- Aggregate supply;
- Non-hazardous solid waste management;
- Hazardous solid waste management;
- Domestic sewage management;
- Explosives storage facility
- Power Supply; and
- Mine closure.

2.3.2 Alternatives to the Project

As part of the greater Alternatives Assessment process and in compliance with the CEAA (2012) EIS guidelines, Treasury Metals has assessed three alternatives to the Project. These alternatives to the Project have been identified as:

- Proceed with the Project development, as identified by Treasury Metals;
- Formally delay the Project planning and development until circumstances are more favourable; and
- The "do nothing" alternative (development of the Project is cancelled).

2.4 Summary of Alternatives

A summary of alternatives proposed for the Project is provided within Table 2.4-1.

Table 2.4-1: Summary of Alternatives Assessment

Project Element	Alternative	Assessed in the EA	Rationale
Mining	Open pit mining	Yes	Ore body is near surface which is suited to open pit mining.
	Underground mining	Yes	Orebody is near surface, and at depth indicating that underground mining is feasible.
	Open pit and underground mining	Yes	Orebody is near surface, and at depth indicating that using both open pit and underground mining is feasible. Combination mining is also the most economically viable mining method.
Minewater management	Separate minewater system	Yes	Integrated site water management system will be fully capable of providing capacity for effective minewater treatment, irrespective of whether or not it receives minewater.

Project Element	Alternative	Assessed in the EA	Rationale
	Integrated minewater system	Yes	Development of a separate minewater treatment pond system will add considerable and unnecessary costs to the Goliath project with no tangible technical or performance benefit.
Processing methodology	Gravity and CIL	Yes	The EA considered proven methodology for the recovery of gold. Cyanide and non-cyanide methods were considered.
	Gravity and floatation with off-site concentrate	Yes	
	Gravity, flotation, and ILR	Yes	
Mine rock and overburden management	Place and manage the mine rock and overburden in stockpile adjacent to open pit	Yes	Minimizing mine rock movement is critical to cost performance for the Project, placing mine rock as close to pit as practicable is commonly used standard within the industry. Alternatives to storage include backfill to the pit though sequence development of open pit.
	Establish temporary location for mine rock and overburden and return to pit upon closure	Yes	Moving large amounts of overburden and mine rock would lead to excessive costs, and render the Project uneconomical.
Effluent treatment	Natural cyanide degradation and metals removal	Yes	The use of natural degradation to destroy cyanide presents greater environmental risk.
	In-plant cyanide destruction and metals removal followed by natural degradation	Yes	Natural degradation with cyanide destruction ensures that wildlife, including waterfowl and aquatic life, are protected, that cyanide consumption is minimized, and that contingency is in place to prevent the inadvertent release of cyanide into the environment.
	In-plant cyanide destruction, natural degradation followed by effluent treatment	Yes	Natural degradation with cyanide destruction will ensure minimal environmental impact, and that contingency is in place to prevent the inadvertent release of cyanide.
Tailings storage facility	Conventional slurry tailings	Yes	Clay-lined earthfill dam with a natural clay basin integrated with an internal drain system with a secondary downstream seepage and pump-back system. Minimal cost required as existing roads will assist with construction of pipeline alignments and access to site. No additional open bodies of water will be directly impacted.
	Thickened tailings	Yes	Due to the greater density of the tailings, this alternative is very costly. A lower dam embankment is required than that of slurry tailings, however some diversions of excess water from seasonal runoff will be required. Existing roads will assist in construction, and no additional open bodies of water will be directly impacted.
	Dry stack tailings	Yes	Tailing waste will be stockpiled on surface. Runoff will be collected and routed to a facility for containment and reclaim. Dust and emissions are very likely. Low cost for remediation. No additional open bodies of water will be directly impacted.
	Co-disposal	Yes	Natural clay basin and clay lined dam. Local topography anticipated to reduce embankment

Project Element	Alternative	Assessed in the EA	Rationale
			heights. Underground co-disposal will occur during the underground phase which will decrease the amount of tailings. Low complexity of water containment and reclaim, however closure requires complex reclamation. No additional open bodies of water will be directly impacted.
Water supply	Nearby creeks	Yes	The method and location of meeting fresh waters needs for the Project was considered with the EA.
	Groundwater	Yes	
	Nearby lakes	Yes	
Water discharge	Wabigoon Lake	Yes	Discharge locations were evaluated based on the current water balance anticipated, and the effect on the receiver based upon hydrological characteristics, and quality modelling. Also in conjunction to this economic and social parameters were analyzed.
	Thunder Lake	Yes	
	Hartman Lake	Yes	
	Tree nursery ponds	Yes	
	Blackwater Creek	Yes	
Watercourse realignment	Use of Exisiting Hydro One power supply infrastructure	Yes	Power generation was evaluated based on several factors including capital cost, operating cost, environmental emissions and required footprint.
	Develop alternative means of power generation such as Natural gas, wind or solar	Yes	
Infrastructure and buildings	Power plant facility	Yes	As the Project design phase continues, the optimal locations for these are further reviewed and defined.
	Fuel and energy locations	Yes	
	Temporary storage facilities	Yes	
	Explosive storage facility	Yes	
Aggregate supply	Overburden and mine rock	Yes	Project aggregate needs and sources were identified and assessed within the EA.
	On-site aggregate pit	Yes	
	Commercial off-site aggregate pit	Yes	
Non-hazardous solid waste management	Moving waste to licenced facility off-site	Yes	EA considered alternatives for disposal of non-hazardous solid waste.
Hazardous solid waste management	Moving waste to licenced facility off-site	Yes	EA considered alternatives for disposal of hazardous solid waste.
Domestic sewage management	Sewage treatment plant	Yes	EA considered proven methods of treating domestic sewage waste.
	Septic system	Yes	
	Off-site treatment	Yes	
Open pit closure	Natural flooding	Yes	EA considered proven methods of open pit closure.
	Enhanced flooding	Yes	
	Backfill with mineral waste	Yes	
Mine rock and overburden stockpile closure	Re-use	Yes	EA considered proven methods of mine rock and overburden stockpile closure.
	Stabilize, cover and vegetate	Yes	
	Backfill	Yes	
	Engineered cover	Yes	
Minewater management closure	Leave in place	Yes	EA considered proven methods of minewater infrastructure closure.
	Partial removal	Yes	
	Full removal	Yes	
TSF closure	Permanent flooding	Yes	EA considered proven methods of closure of TSF.
	Capping and reclamation	Yes	
Explosives storage facility	North of tree nursery	Yes	As the Project design phase continues the optimal locations this facility will be reviewed and defined.
	Adjacent to tree nursery road	Yes	
	Disassembly and removal	Yes	

Project Element	Alternative	Assessed in the EA	Rationale
Buildings and equipment closure	Re-use	Yes	EA considered proven alternatives for the closure of buildings and equipment developed and used by the Project.
Infrastructure closure	Decontamination and removal	Yes	EA considered proven alternatives for the closure of infrastructure developed by the Project.
	Leave in place for future use	Yes	
	Reclaim in place	Yes	
Drainage closure	Stabilize and leave in place	Yes	EA considered proven alternatives for the closure of drainage structures developed by the Project.
	Removal	Yes	
Alternatives to the Project	Proceed with the Project	Yes	EA considered alternatives to development of the Project.
	Delay the Project	Yes	
	"Do Nothing"	Yes	

3.0 PROJECT DESCRIPTION

3.1 Introduction

This section provides a description of the proposed Goliath Gold Project (the Project) phases, components, and undertakings.

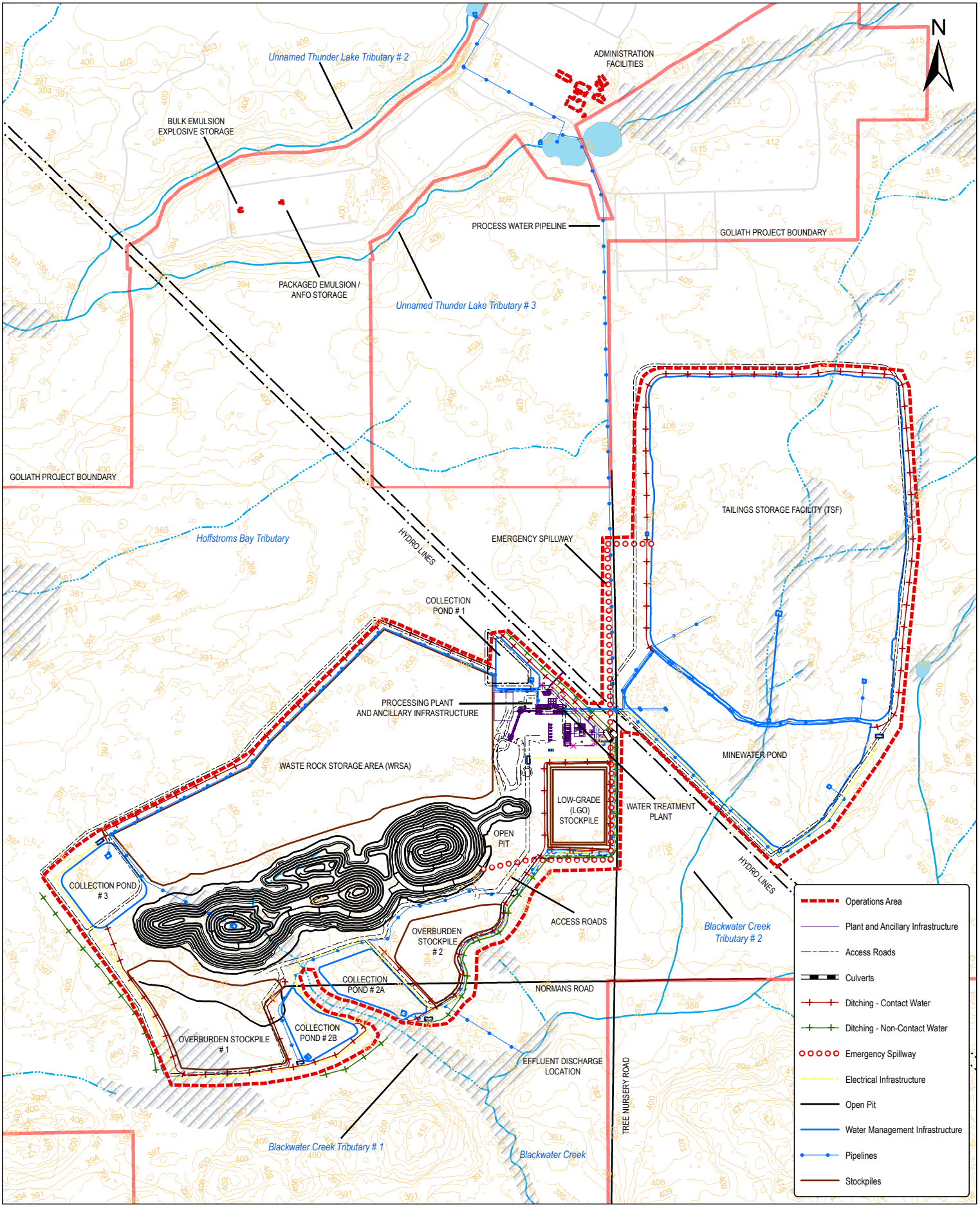
The mine layout places most mine-related facilities in close proximity to the proposed open pit, and to the extent possible, on private lands owned by Treasury Metals. The Operations Area (Figure 3.0-1A) will be surrounded by a perimeter ditch, which will prevent direct discharges to the environment. The overall Project footprint will cover approximately 188 ha during the maximum of extent of operations with the entire footprint on Treasury Metals lands that are either patented or leased (mining rights and surface rights). The site plan shown in Figure 3.0-1A shows the preferred alternatives for Project components. Figure 3.0-1B provides an illustration of the Plant site details, while the layout of the Administration Area is provided in Figure 3.0-1C. At closure, Treasury Metals will reclaim the site in a manner that is illustrated in Figure 3.0-1D.

The Project is designed to:

- Use well known, conventional and environmentally sound mining techniques and technologies used commonly in northern environments;
- Minimize overall footprint;
- Minimize associated potential effects;
- Manage water effectively and efficiently;
- Mitigate or compensate for effects on biological habitat; and
- Accommodate effective planning for final closure and site abandonment, rendering the site suitable for other compatible land uses and functions.

3.1.1 Existing Infrastructure and Facilities

The area surrounding the Project is a mixture of abandoned homesteads, small hobby farms and residential dwellings. Most of the properties associated with the Project have been privately owned since around 1900 and have been acquired by Treasury Metals by means of private purchase agreements. Mineral exploration of the Project site has been carried out since 1990 by various companies and is ongoing. The Ontario Ministry of Natural Resources and Forestry (MNRF) established a tree nursery facility, located north of the mineral deposit, which was sold to Treasury Metals in 2011 and houses the Project office (Figure 3.1-1).



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

General Arranagement
Operations Phase

Figure 3.0-1A | REV.01

TREASURY METALS INCORPORATED

DESIGN:	MP	01/08/2017
GIS:	MP	01/08/2017
CHECK:	MW	01/08/2017
REVIEW:	MW	01/08/2017

- Hydro Line
- Natural Gas Pipeline
- Provincial Parks
- Railway
- Expressway / Highway
- Local Roads
- Resource / Recreation
- Contours (3 meters)
- Intermittent Watercourses
- Permanent Watercourses
- Waterbody
- Wetland

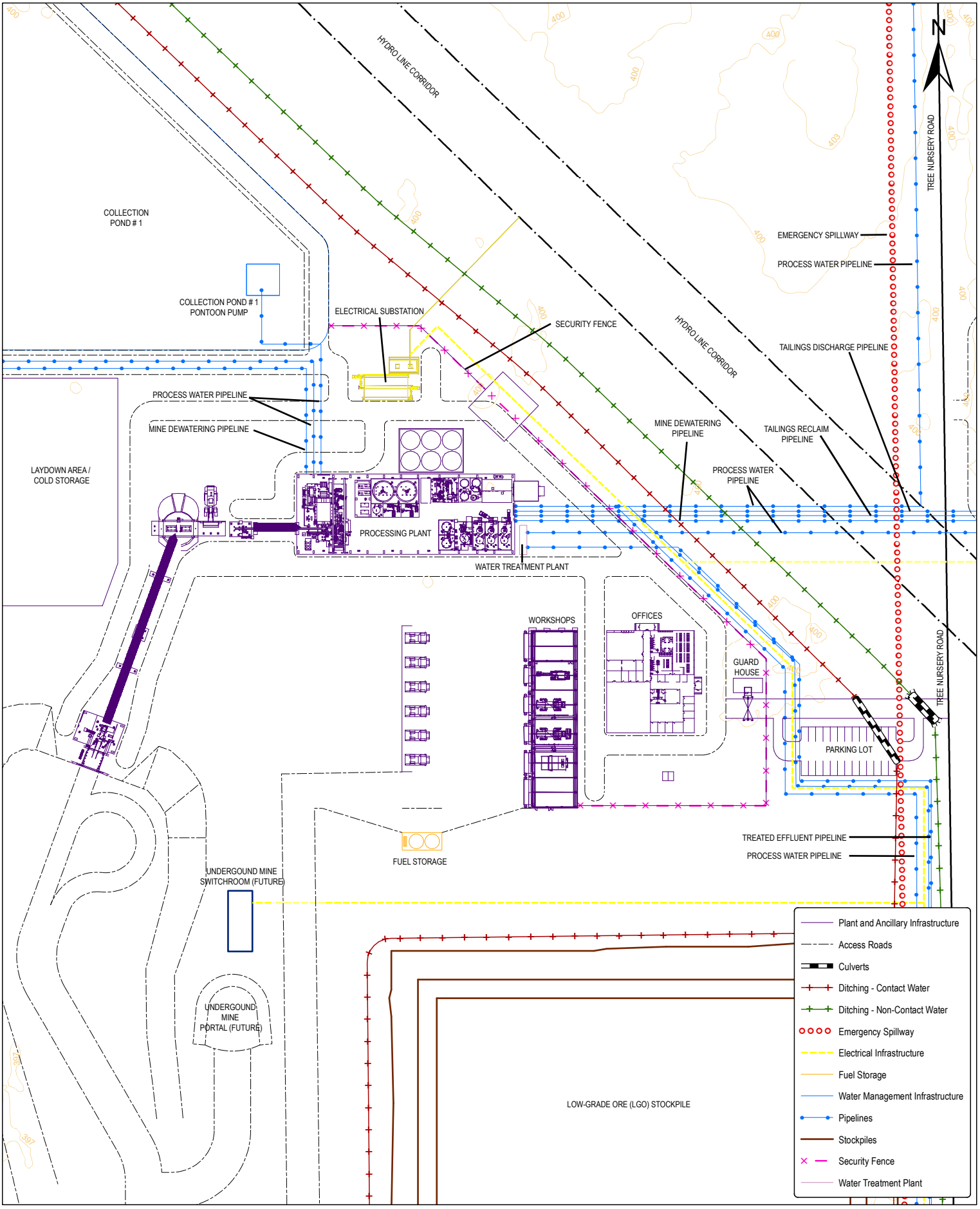
SCALE 1:16,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 250 500 750
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

General Arranagement
Operations Phase (Plant Site Details)

Figure 3.0-1B | REV.01

TREASURY METALS INCORPORATED

DESIGN:	MP	01/08/2017
GIS:	MP	01/08/2017
CHECK:	MW	01/08/2017
REVIEW:	MW	01/08/2017

- Hydro Line
- Natural Gas Pipeline
- Provincial Parks
- Railway
- Expressway / Highway
- Local Roads
- Resource / Recreation
- Contours (3 meters)
- Intermittent Watercourses
- Permanent Watercourses
- Waterbody
- Wetland

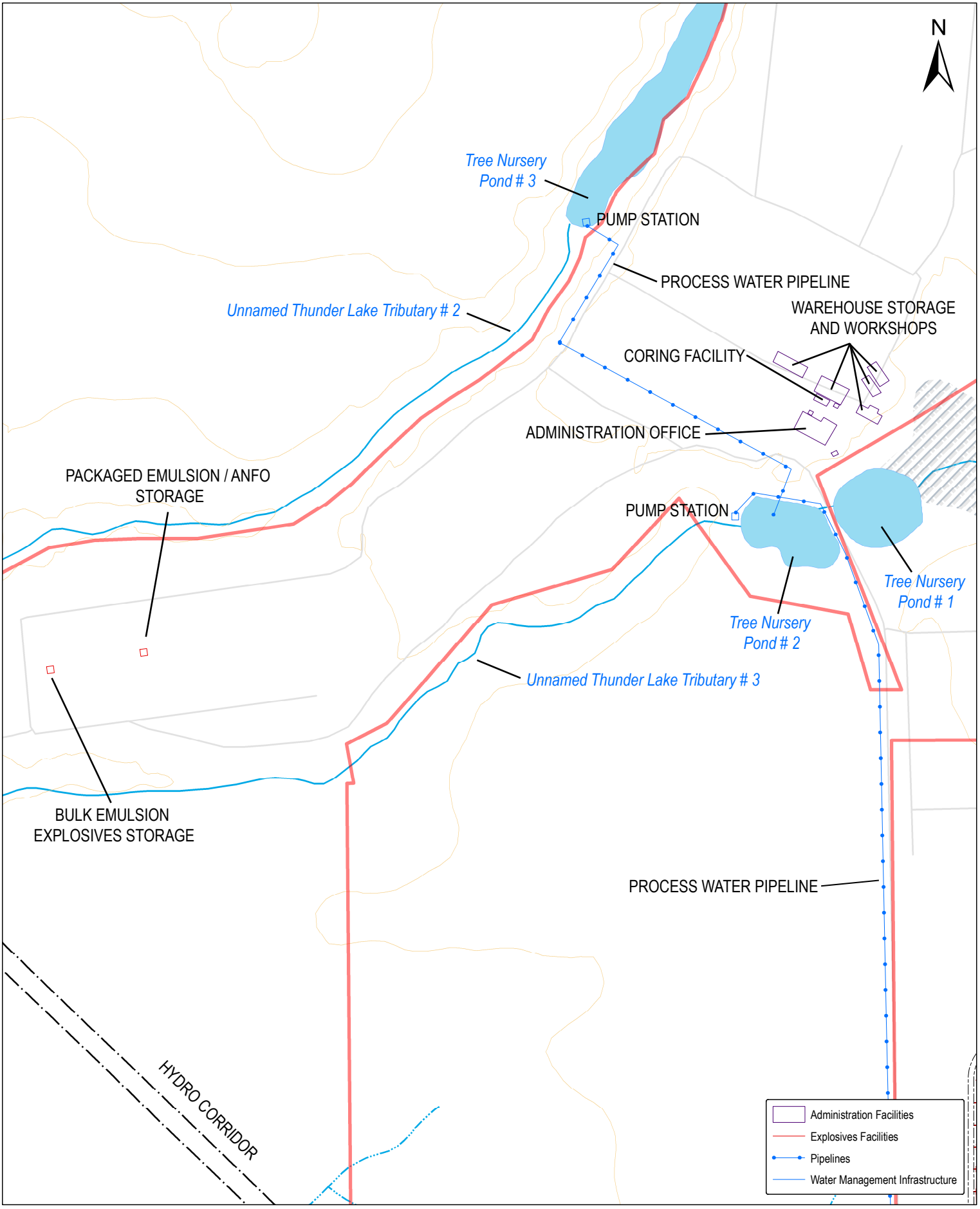
SCALE 1:2,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 100
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

General Arranagement
Operations Phase
(Adminstration Area)

Figure 3.0-1C | REV.01

TREASURY METALS INCORPORATED

DESIGN:	MP	01/08/2017
GIS:	MP	01/08/2017
CHECK:	MW	01/08/2017
REVIEW:	MW	01/08/2017

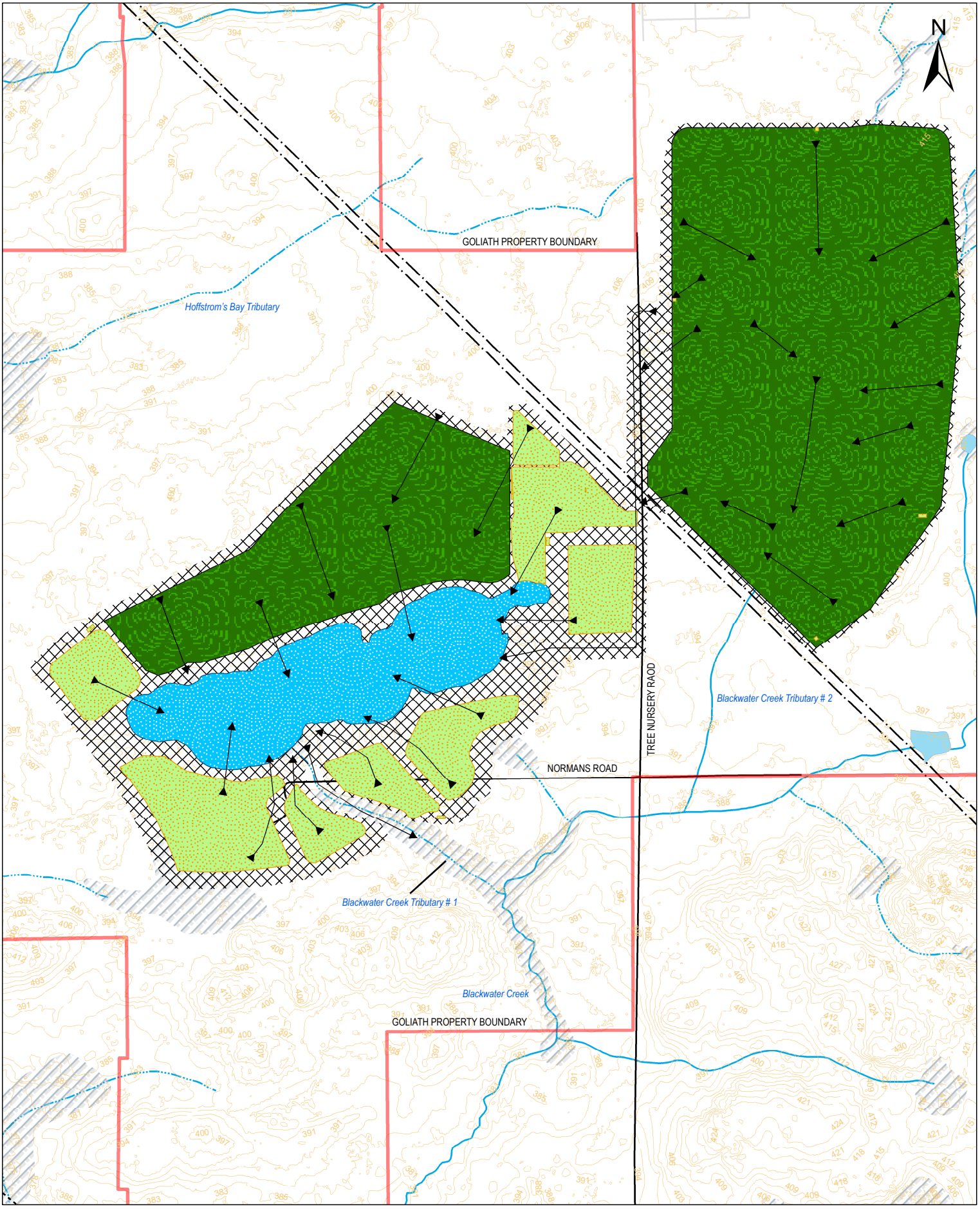
- Hydro Line
- Natural Gas Pipeline
- Provincial Parks
- Railway
- Expressway / Highway
- Local Roads
- Resource / Recreation
- Contours (10 meters)
- Intermittent Watercourses
- Permanent Watercourses
- Waterbody
- Wetland

SCALE 1:7,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 100 200 300
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group
WSP Canada
Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

General Arranagement of Project
Post-Closure Phase

Figure 3.0-1D | REV.01

TREASURY METALS INCORPORATED

DESIGN:	MP	24/08/2017
GIS:	MP	24/08/2017
CHECK:	MW	24/08/2017
REVIEW:	MW	24/08/2017

- Flow Direction
- Semi-Imprevious Membrane
- Returned to Prior State
- Restored Operations Area
- Wetland
- Hydro Line
- Natural Gas Pipeline
- Waterbody
- Intermittent Watercourses
- Permanent Watercourses

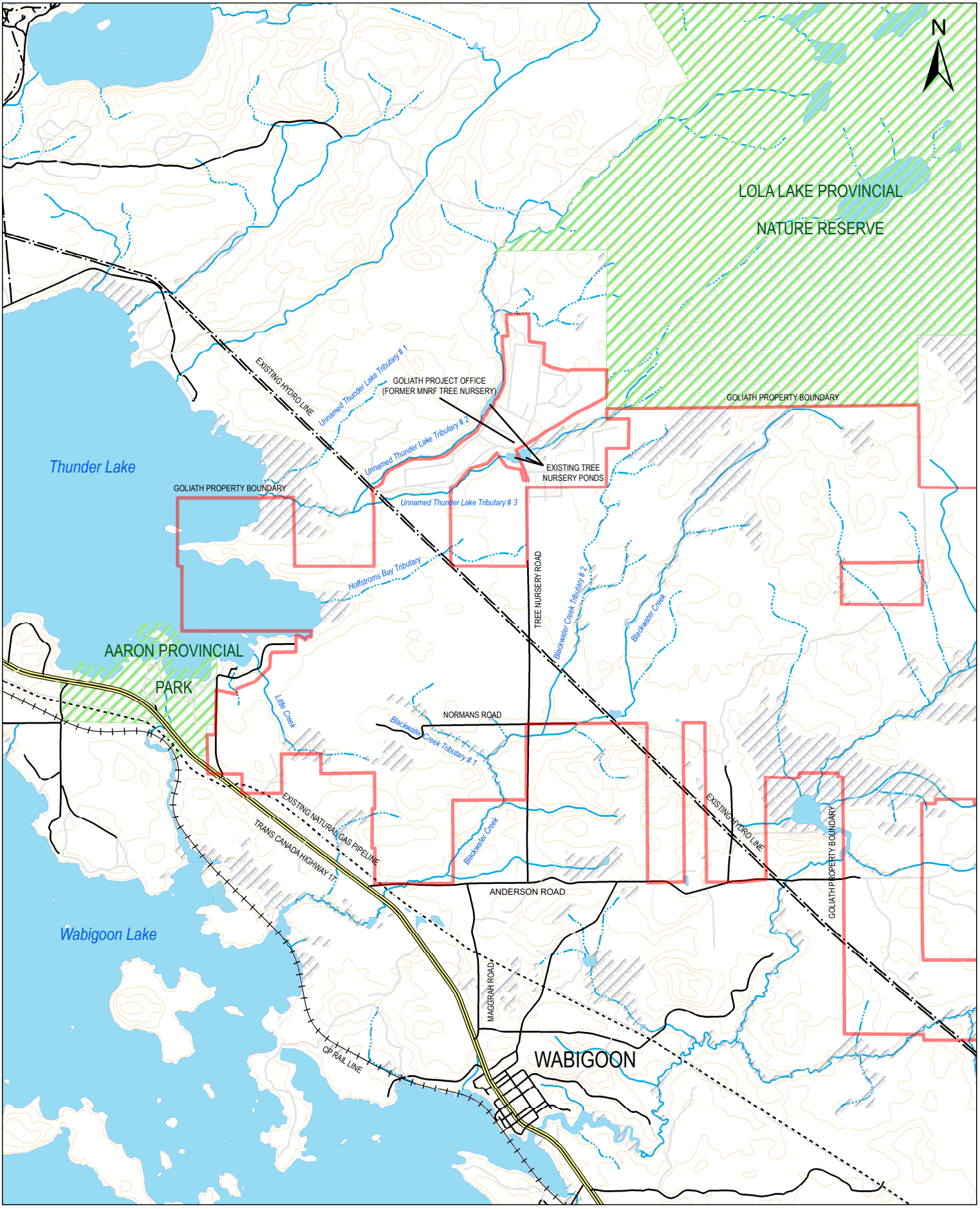
SCALE 1:15,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 250 500 750
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Existing Infrastructure

Figure 3.1-1 | REV.01

TREASURY METALS INCORPORATED

DESIGN:	MP	01/08/2017
GIS:	MP	01/08/2017
CHECK:	MW	01/08/2017
REVIEW:	MW	01/08/2017

- Hydro Line
- Natural Gas Pipeline
- Provincial Parks
- Railway
- Expressway / Highway
- Local Road
- Resource / Recreation
- Contours (10 meters)
- Intermittent Watercourses
- Permanent Watercourses
- Waterbody
- Wetland

SCALE 1:50,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 500 1,000 1,500 2,000
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.

3.1.2 Project Phases and Schedule

The total lifespan of the Project is approximately 18 to 20 years beginning with site preparation and ending with the completion of care and maintenance during post-closure (Table 3.2-1). The estimated duration of each key Project phase is:

- Site Preparation and Construction : 2 years
- Operations Phase: 12 years
- Closure Phase: 3 years
- Post-closure (care and maintenance): 3-6 years

Table 3.2-1: Key Project Components Listed by Phase

Project Phase	Duration	Key Components
Site Preparation and Construction Phase	2 years	Site Preparation • Water management and flood protection infrastructure • Surface drainage diversion structures and water realignment channels/ditches • Access roads for planned infrastructure • Support buildings and infrastructure required for the construction phase
		Construction • Additional site access roads and realignment of existing roads • Construction of the (initial) Tailings Storage Facility • Site drainage works, including pipelines from freshwater/recycled water sources • Construction facilities • Associated building and facilities • 115 kV transmission line including on-site substation
Operations Phase	12 years	• Open pit • Underground development • Process plant • Waste Rock Storage • Overburden Storage • Low-Grade Stockpile • Staged construction to expand TSF capacity
Closure Phase	3 years	• Project site area reclaimed to a naturalized and productive biological state; physically and chemically stable
Post Closure Phase (care and maintenance)	3-6 years	• Filling of the pit lake • Monitoring • Site is without infrastructure

3.2 Refinements to the Project since Filing the Original EIS

Changes have been incorporated to the Project in response to the ongoing engagement process, Information Requests, engineering refinements, measures to ensure compliance with federal and provincial environmental legislation, and evolving environmental best practices that are applicable and feasible for the Project. This Section briefly summarizes the changes to the subject Project components, phases and activities that were described in Section 3 of the original EIS.

3.2.1 Perimeter Ditching

An engineered perimeter runoff and seepage collection ditch will be constructed around the entire Operations Area (refer to Definition of Terms and Acronyms) prior to commencing earthworks for the Project and the collected water will be treated and discharged to Blackwater Creek. This perimeter structure will ensure compliance with the Metal Mining Effluent Regulations and prevent any direct releases of runoff to the environment once the site preparation commences.

3.2.2 Surface and Mine Water Management

The spoils from the perimeter ditch excavation will be windrowed, compacted in successive lifts, and erosion proofed immediately downstream of the ditch to serve as a containment berm. The berm will be designed to exclude non-contact water from the Operations Area. The ditch will provide additional freeboard for the perimeter collection ditches by way of compaction of the underlying overburden. This compaction process will also reduce the flow of ground water through overburden into the Operations Area due to open pit dewatering. This flow reduction will help reduce the zone of influence and potential drawdown of the overburden water table surrounding the pit. Generally, these berms will impound runoff so that flow decants to the open pit during an extreme flood event. However, engineered spillways would be incorporated into the perimeter berm where appropriate to prevent overtopping. These design elements will be integrated into the design basis going forward.

Surface runoff and seepage will be collected in perimeter ponds. Runoff will be retained in these ponds until it is required for use in the process plant. Surplus water in these ponds will be pumped to the effluent treatment system for treatment and discharge to Blackwater Creek. Adequate freeboard will be maintained in these ponds at all times to manage the Environmental Design Storm (EDS). There will be no direct release of runoff from the Operations Area to the environment.

A Minewater Pond (MWP) will be constructed south of the Tailings Storage Facility (TSF). Mine water from the pit and the underground mine workings will be pumped to the MWP. Suspended solids will be settled in this pond and biological oxidation of ammonia will be promoted through the use of in-pond aerators and the placement of media to provide increased surface area for ammonia oxidizing bacteria. Water from the MWP would be used in the underground mine, the Process Plant and for dust suppression within the Operations Area. Water that is used within the Operation Area that does not evaporate will be contained by the perimeter runoff and seepage

collection ditch and subsequently treated within the effluent treatment system and discharged to Blackwater Creek. Surplus water in the MWP will be pumped to the effluent treatment system for treatment and discharge to Blackwater Creek. Adequate freeboard will be maintained in the MWP at all times to manage the EDS.

3.2.3 Stockpiles

The low grade ore stockpile, the coarse ore pile and the fine ore piles are located near to the Plant Site, resulting in a compact site footprint.

The overburden stockpile has been modified to avoid infilling the Blackwater Creek Tributary 1, resulting in two overburden stockpiles located south of the open pit.

The waste rock storage area (WRSA) has been modified to locate it primarily within the Blackwater Creek watershed and minimize the portion that extends into the Thunder Lake watershed. The WRSA will be constructed with an embankment slope that is adequate for long-term physical stability to avoid the need to re-contour the WRSA at closure. As embankments are removed from active fill placement, they will be covered with overburden and vegetated with ground cover species as well as tree species that are consistent with planting prescriptions in the Dryden Forest Management Plan (FMP). Priority will be given to finishing construction of the western perimeter of the WRSA so that this embankment can be prepared and planted to create a green barrier between the mining operations and the residences to the west.

3.2.4 Site Layout and Infrastructure

This section describes the updates to the site layout and infrastructure.

3.2.4.1 Watershed Approach

Treasury Metals has adopted a watershed approach to the site layout. The optimized general arrangement (GA) avoids the Thunder Lake watershed to the extent practical and situates the Project primarily within the sub-watershed of the two westernmost tributaries of Blackwater Creek.

The perimeter runoff and seepage collection ditch will be an engineered feature and will become the new watershed divide between Thunder Lake and Blackwater Creek. This effectively results in the Operations Area being entirely within the Blackwater Creek watershed.

3.2.4.2 Plant Site

Based on the feedback received during the EA process to date, there are impacts and concerns associated with the Plant site location presented in the EIS. Treasury has identified an alternative Plant site location west of Tree Nursery Road. This location is now considered the preferred location for the Plant site for the reasons listed below:

- No removal of fish habitat required and no diversion of Blackwater Creek around the Plant site would be required. This will reduce the impacts to the fish habitat in Blackwater Creek.

- Overburden depth is reduced and projected water table is not as shallow at this new preferred location. This facilitates the effective collection of runoff and seepage from the Plant site. This will reduce the impacts to surface water quality and ground water quality outside of the Operations Area.

- Shallower bedrock and preferable foundation conditions for Plant site infrastructure.

At this time, Treasury Metals continues to advance the federal environmental assessment using the location presented in the EIS as this is regarded as a conservative assessment of the Project effects. Should feedback during the EA and permitting process indicate a preference to re-locate the plant site to the new preferred location, Treasury Metals recognizes there could be the need to update the air and noise modelling required to support the Environmental Compliance Approval (ECA) process that would follow the EA.

3.2.4.3 Pipelines

Pipelines between the TSF and the Plant site containing tailings and reclaim water will be positioned entirely within a lined swale so that potential spillage is contained. Furthermore, potential spillage would be contained by the perimeter runoff and collection system that encircles the Operations Area. Dam crests will be sloped towards the inside of their respective pond to keep spillage within the respective ponds.

3.2.5 Tailings Storage Facility

The floor of the TSF will be low-permeability. Where native soils do not provide a sufficiently thick low-permeability horizon beneath the TSF, the preferred alternative will be to use clay from open pit stripping and from beneath the WRSA where the clay needs to be removed to improve the WRSA foundation conditions. Any of the stripped clay that is not suitable due to its physical properties will be stockpiled with overburden. If the volume of clay is insufficient, a synthetic liner will be used to ensure a low-permeability floor for the TSF. Off-site clay borrow areas would not be developed.

A finger drain will be constructed in the existing creek channel that bisects the TSF. Collected drainage will be conveyed to a pump station at the downstream (south) end of the TSF, and used in the Plant.

The spillway will be positioned on the west side of the TSF so that overflow during an extreme flood event would drain to the open pit where it would be contained.

3.2.6 Water Management

Surface water and mine water will be managed as described in Section 3.2.2.

Grey water (showers) will be pumped to the plant for use in the process.

The only freshwater withdrawals will be from the two existing pumphouse locations at the former Tree Nursery. The maximum withdrawal will be 5% of streamflow, as measured on a real-time basis.

The TSF will be managed as a discrete water pond. The only inputs to the TSF will be process water, direct precipitation and water from the TSF's perimeter seepage collection system. Water from the runoff collection ponds and the MWP will not be consolidated in the TSF as a normal operating practice, but these ponds will be used as sources of process water for the Plant.

As a future optimization, industrial evaporators could be deployed surrounding the TSF to evaporate surplus water from the TSF, thereby reducing the volume that requires treatment and discharge to Blackwater Creek. Evaporators would be enclosed within noise shrouds to contain noise from the fans.

In-pond aerators would be positioned within runoff collection ponds, the MWP and the TSF supernatant pond to minimize ice build-up and promote the oxidation of ammonia. Decreasing the ice cover would increase the volume of water that is available for use in the Plant during winter months.

3.2.7 Watercourse Realignment

As described in Section 2.4, the proposed re-location of the Plant site eliminates the need to realign the subject segment of Blackwater Creek Tributary 2.

3.2.8 Explosives Storage Facility

Minimum permissible distances from Natural Resources Canada have been reviewed and the proposed explosives storage facility will be located on land owned by Treasury Metals, which is removed from any known recreational trails. The facility would be self-contained with zero discharge.

3.2.9 Closure and Decommissioning

Closure strategies have been refined since the submission of the EIS in April 2015 and these are described below.

3.2.9.1 Watershed Approach

Post close out, the necessary segments of the perimeter runoff and seepage collection ditch will remain in place to ensure the Operations Area remains within the Blackwater Creek watershed. The majority of the Operations Area will drain to the open pit post close out. Once the pit is flooded to the spillway elevation, it will decant to the existing tributary of Blackwater Creek.

3.2.9.2 Strategy to Ensure Chemical Stability Post Close Out

For planning purposes, Treasury Metals is preparing to manage waste rock, ore and tailings as Potentially Acid Generating (PAG). Treasury Metals has refined the closure strategy to ensure long-term chemical stability and this is described in the following Sections.

Waste Rock Storage Area

Treasury Metals will further evaluate the geochemical properties of waste rock and the feasibility of a real-time characterization program to segregate non-acid generating (NAG) and PAG waste rock. Confirmed PAG rock would be placed beneath the static water level in the pit and/or underground mine to the extent practical, thereby minimizing the volume of PAG rock in the WRSA. If operational monitoring of the WRSA confirms that it is PAG, a low-permeability dry cover will be constructed over it at closure, in accordance with Section 59 of the Mine Rehabilitation Code of Ontario (O. Regulation 240/00).

Plant Site

The upper portion of the Plant site will be scarified, reclaimed and processed at the end of the mine life. This is anticipated to remove most PAG fines from the Plant site. Any PAG rock that remains at the Plant site would be managed using one of the below alternatives that is deemed most appropriate using empirical data that is gathered at close out.

- Re-location to the open pit and/or underground mine below the static water level;
- Placement on the WRSA prior to installation of the low-permeability dry cover; or
- Placement over the TSF prior to final rehabilitation (Section 2.9.2.3).

Tailings Storage Facility

Treasury Metals will optimize an engineered cover to mitigate chemical instability, in accordance with Section 59 of Schedule 2 of O. Regulation 240/00, using empirical data that is gathered during the life of the Project. For example, empirical data will help guide Treasury Metals choice of whether the best closure option for the TSF will be a dry, low-permeability cover, or a wet cover.

4.0 ACCIDENTS AND MALFUNCTIONS

4.1 Approach

Accidents and malfunctions were identified using a Failure Mode and Effects Analysis (FMEA) methodology. An FMEA is a risk analysis procedure used to identify and characterize accidents and malfunctions (i.e., failure) based on the likelihood of occurring and the severity/magnitude of the failure. Through the FMEA process, a total of 463 failure modes were identified and analyzed, as described in the following sections.

The FMEA process for this Project assessed the likelihood of a potential failure and the consequences of the failure in three main categories:

- Environment;
- Safety and health; and
- Production.

The FMEA process was completed in four general phases:

- Data input;
- Summary of risks and risk matrices;
- Likelihood and severity assessment; and
- Analysis of controls.

A team of experts involved with the Project was assembled and an FMEA workshop was conducted from January 30, 2015 to February 1, 2015. The potential environmental risks were identified, including potential consequences of the occurrence. The likelihood and magnitude of an accident and/or malfunction were also identified. Once the accidents and malfunctions were identified, control measures were established to protect against such occurrences as well as emergency response procedures if accidents or malfunctions failures occur. The FMEA data were gathered and input to a worksheet that uses a structured approach to identify and assess potential risks.

4.1.1 Activities Considered

Potential accidents and malfunctions are organized into categories and each category is further divided into sub-categories or items. The major categories evaluated are:

- General development;

- Mine underground;
- Mine open pit;
- Mine site process;
- Mine site utilities;
- Mine site facilities;
- Mine site tailings;
- Mine site temporary facilities; and
- Off-site infrastructure.

4.1.2 Hazard / Aspect or Threat

The Hazard/Aspect or Threat describes the potential risk or type of failure being evaluated. A failure mode can occur naturally, by an engineering system failure, or operational failure due to inadequate control measures or operator error. For example, the clearing of vegetation (site preparation category) requires heavy equipment and releases from equipment failure are a potential hazard or threat. Since there may be several hazards in one category, the FMEA only includes the most significant or likely hazards that may potentially occur.

4.1.3 Impact Categories

As indicated in Section 4.2, the impact categories are:

- Environment;
- Safety and health; and
- Reputation.

4.1.4 Rank and Risk Level

The rank and risk levels are determined using the likelihood and severity categories for each failure mode. The combination of likelihood and severity for a failure mode assigns a rank ranging from 1 to 25. The greater the likelihood and/or severity, the lower the rank (i.e., smaller ranks represent greater risk). For example, a failure mode that has a high likelihood (i.e., likelihood rating of A - almost certain to occur) and high severity (i.e., severity rating of 5) would be

considered the highest rank (i.e., rank = 1). The risk level is based on ordering the 25 ranks into three risk management categories: low, medium, and high.

4.1.5 Evaluation of Environmental Failure Modes

To evaluate the environmental residual risks, the following steps were taken:

- Filtering from the FMEA worksheet the failure modes exclusive to the environment category;
- Selecting the failure modes in the environment category that had risk rankings (both residual and inherent) of high- or medium-risk levels (i.e., yellow or red on risk matrix); and
- Documenting the rationale behind their rank and subsequent risk level assignment.

The environment impact category has a total of 137 failure modes. 123 of these failure modes are considered low-residual risk and 14 are considered medium-residual risk. There were no high-residual risk environmental failure modes identified during the FMEA (details are provided in Appendix HH.

4.1.5.1 Low Environmental Risks

All of the 123 low residual risk environmental failure modes were considered to have a low severity rating with limited to minor potential environmental effects (i.e., severity rating of 1 or 2). There were no environmental low-residual risk failure modes with a severity of greater than 3. Of the low-residual risk environmental failure modes, two were determined to be “expected” to occur (i.e., likelihood rating B), eight were found to be “likely” to occur (i.e., likelihood rating C), 56 were determined to be “unlikely” to occur (i.e., likelihood rating D), and 57 were found to be “rare” (i.e., likelihood rating E).

4.1.5.2 Medium Environmental Risks

Fourteen of the failure modes are considered medium environmental risks. Of the 14 medium residual risk environmental failure modes, three were considered to have a severity rating of 2 (i.e., minor environmental effects) and the remaining 11 were considered to have a severity rating of 3 (i.e., moderate environmental effects). Of all the medium-risk environmental failure modes, three were determined to be “almost certain” to occur (i.e., likelihood rating A), four were considered to be “unlikely” to occur (i.e., likelihood rating D), and seven were considered to be “rare” (i.e., likelihood rating E).

4.1.5.3 High Environmental Risks

There were no high-residual risk environmental failure modes identified during the FMEA.

4.1.6 Effects of Failure Modes on Environmental Valued Components

The medium risks identified within the environment category were selected for further analysis and categorized into the following three failure modes for further assessment:

- Failure of TSF;
- Spills and releases; and
- Cyanide related accident.

4.2 Natural Hazards

Natural hazards that could potentially affect the Project include extreme flooding, natural fires, earthquakes, tornadoes and climate change. Additional items identified in the EIS Guidelines as potential natural events (e.g., ice jams, geohazards) are not likely to occur due to the topographical characteristics of the Project. All facets of the Project have been designed, and will be constructed and operated with consideration for local environmental conditions and the potential for extreme natural hazards.

The following natural hazards were evaluated:

- Extreme Floods
- Natural Fires
- Earthquakes
- Tornadoes
- Climate Change

4.3 Conclusions

Accidents and malfunctions were identified using an FMEA process. The FMEA is a risk analysis procedure used to identify and characterize accidents and malfunctions based on the likelihood of occurring and the severity/magnitude of the failure. Through the FMEA process, a total of 463 failure modes were identified and analyzed within the environment, safety and health, and reputation impact categories.

Once all risks were identified, Treasury focused on the potential effects of accidents and malfunctions identified in the environment impact category. The environment impact category had

a total of 137 failure modes; 123 of these failure modes are considered low-risk and 14 are considered medium-risk. There were no high-risk failure modes identified during the FMEA process as shown on the risk matrix illustrated in Section 4.2.2 of the revised EIS.

The medium risks identified within the environment category were selected for analysis and were placed into broader failure modes for further assessment. There were three categories of failure modes considered for further environmental assessment: failure of the TSF, releases to land and water, and cyanide releases to land, water, and air. Potential primary environmental effects of the three categories of failure modes were generally to the terrain and soil and surface water. Potential secondary effects were generally determined to be to aquatic resources, groundwater, fish and fish habitat, and wildlife habitat.

As per the EIS guidelines, preventative procedures were identified to minimize impacts to the identified VCs, as well as contingency/emergency response procedures and follow-up monitoring for each failure mode.

Overall, the residual effects of the failure modes on the environment were determined to be not significant if all preventative procedures are adhered to throughout all phases of the Project.

5.0 EXISTING ENVIRONMENT

5.1 Climate

The Project site is located in the west-central portion of the Boreal Shield Ecozone, experiencing a continental climate, generally characterized by short mild summers and long cold winters with relatively low precipitation. The terrain is generally flat and absent of orographic features which can block air masses or produce localized increases in precipitation. Long-term climate statistics for the regional climate stations maintained by Environmental Canada are monitored in Dryden.

Air temperature in the region follows an annual sinusoidal pattern typical of northern continental climates at mid-latitude with minimum average daily temperature occurring in January and maximum average daily temperature occurring in July. Mean daily temperature in July is approximately 19°C with an average daily maximum near 24°C and an average daily minimum near 13°C. Mean daily temperature in January is -18°C with average and daily maximum near -13°C and an average daily minimum near -23°C.

Based on historical observations at Dryden, mean annual precipitation at the Project site is 705 mm, of which, between 20% to 24% falls as snow. Precipitation recorded at Dryden is considered as representative of the local study area (LSA) due to the proximity and the lack of significant elevation differences or geographic features.

5.2 Air Quality, Noise and Light

The Project is located in a rural area of Northern Ontario and is at least 10 km from any existing sources of significant air emissions. Regional air quality data was attained from Ministry of the Environment and Climate Change stations in Thunder Bay. As the stations are located in a more urbanized area compared to the study area, they are likely to capture higher concentrations of the contaminants of concern. The ambient monitoring data collected from these stations are therefore likely to be conservative estimates of the future background conditions experienced in the study area. There are no anthropogenic sources of air emissions located proximal to the development.

The measured ambient sound levels at the Project site were similar to background ambient sound levels characteristic of remote areas (25 dBA to 45 dBA). The existing baseline noise levels are typical of Northwestern Ontario conditions.

Baseline light conditions (as illuminance) was measures at residential locations within about 1 km of the expected processing plant, as well as at representative receptors located on Thunder Lake. The illuminance levels at the receptors are below levels expected in rural residential areas, with the exception of sample sites that were located in proximity to artificial light sources such as exterior home light or street light.

5.3 Geology

The Project area is located within the volcano-plutonic Eagle-Wabigoon-Manitou Greenstone Belt in the Wabigoon Subprovince of the Archaean Superior Province, and is on the north side of the regional Wabigoon fault. This Greenstone Belt consists of a 150 km-wide domain that has an exposed strike extent of 700 km. The full strike length of the Greenstone Belt is unknown since it is overlain by Palaeozoic strata on both ends. The geology on the northern side of the Wabigoon Fault is characterized by generally southward-facing, alternating panels of metavolcanic and metasedimentary rock.

Three major rock groupings are consistently recognized from south to north at the Project site:

- A hanging-wall unit of altered felsic metavolcanic rocks (sericite schist, biotite-muscovite schist) and metasedimentary rocks.
- A central unit of approximately 100 m to 150 m true thickness, which hosts the most significant gold concentrations and consists of intensely deformed and variably altered felsic, fine to medium grained, quartz-feldspar-sericite schist and biotite-quartzfeldspar-sericite schist (BMS) with minor metasedimentary rocks.
- A footwall unit of predominantly metasedimentary rocks with some porphyritic units and minor felsic gneiss and schist.

The gold mineralization is located primarily in the central unit, and is concentrated in a pyritic (phyllic) alteration zone, consisting of the muscovite sericite schist, quartz-eye gneiss and quartz-feldspar gneiss. This area of mineralization appears to extend to a maximum drill-tested depth of 805 m below grade, over a strike length of approximately 2,300 m, with the possibility of this strike length extending to greater than 5,000 m.

5.4 Geochemistry

A preliminary geochemical assessment was completed in 2011 as part of the baseline studies for the site and involved the characterization of 54 drill core samples. An additional 112 drill core samples representing potential mine rock material were selected and characterized in June 2012. The samples included the four dominant mine rock types; Biotite Muscovite Schist (BMS), Biotite Schist (BS), Muscovite Sericite Schist (MSS), and Meta- Sediment (MSED). A sample of the tailings material, produced in metallurgical tests completed by ALS-Kamloops, expected to be produced during the mill process was also characterized in August 2012. The mine rock and tailings samples were assessed as outlined in the prediction guidelines by Price (2009).

Static testing on the mine rock samples and one composite tailings sample consisted of metals analysis, acid base accounting (ABA), and shake flask extraction tests. Kinetic testing, included humidity cell tests (HCT) and field-scale barrel tests with representative samples of the BMS, BS, MSS, MSED rock types as well as one composite tailings sample. Subsequently, loading rates

were calculated for constituents of potential concern (COPC). The metals that exceeded the ten-times the average crustal abundance screening values in mine rock samples included antimony, arsenic, cadmium, cobalt, lead, molybdenum, selenium, silver, and zinc. All four mine rock types were generally classified as PAG with neutralization potential (NP) to acid potential (AP) ratios (NP/AP) that are less than one. However, several samples were shown to be have NP/AP ratios greater than 2 which indicate there may be opportunity for further testing to define subsequent areas of NAG rock within specific areas of the Project area.

Generally for all mine rock HCTs, pH values decreased from approximately 8.0 to 6.0 over the initial 20 weeks, increased slightly between weeks 20 and 50, and then decreased to below 5.0 at termination on week 85. Sulphate concentrations exhibited initially elevated values, which decreased rapidly between approximately weeks 1 to 5. Similarly, several dissolved metals demonstrated initial elevated concentrations followed by substantial decreases over the first 5 to 18 weeks. Some COPCs exhibited increasing concentrations between weeks 60 and 85. Seven of the HCTs were terminated at week 63 after stabilization of COPC concentrations in the leachate and the remaining four at week 85, prior to the establishment of stable conditions.

Duplicate humidity cells were initiated for the tailings composite sample. Measured pH values exhibited steady and consistent declines, from approximately 7.8 to 3.7 over 78 weeks. Sulphate concentrations exhibited initially elevated values, which decreased rapidly over approximately weeks 1 to 10 and increased slightly between week 40 and 78. Similarly, a majority of metal constituents demonstrated initial elevated concentrations followed by substantial decreases over the initial 20 weeks. Higher initial concentrations are related to an initial flush of tailings, while lower values at later times are representative of a relatively constant, natural, rate of release associated with oxidation or other weathering reactions. In addition to arsenic, a majority of the acid soluble trace metal concentrations began to increase at approximately week 20, including cadmium, cobalt, copper, nickel, lead, and zinc. The duplicate tailings HCT was terminated at week 59 and the first tailings HCT at week 78.

The four barrel tests initiated for the BMS, BS, MSS, and MSED mine rock samples had been operating for approximately two years as of this report. The leachate pH values were typically between 4.7 and 6.7 with the exception of values for the MSED field cell which exhibited pH values up to 9.5 in July 2014. Sulphate concentrations in the water collected from the barrels varied between approximately 11 and 90 mg/L. Dissolved arsenic, cadmium, cobalt, lead, nickel, and zinc concentrations were similar among the four mine rock types and appear to be exhibiting a cycling behaviour, with peak values associated with samples collected between March and April. However, dissolved sulphate, cobalt, and nickel concentrations were relatively higher for the BS barrel test, compared to the BMS, MSS, and MSED barrels.

Loading rates were calculated from the available HCT results for the BMS, BS, MSS, and MSED samples. The evaluation of the HCT results for each mine rock type indicated that loading rates for some COPCs were correlated to either sample sulphide content, solids metal contents, or were related to geochemical equilibrium. A good correlation was observed between sulphate loading rates and sulphide content for BMS, BS, and MSS samples. Correlations with either

sulphide or metal contents were observed for the BMS (aluminum, cadmium, lead), BS (iron, lead, uranium, zinc), and MSS (cobalt, iron, lead, nickel, zinc) mine rock samples. Correlations were not determined for MSED as results for only two HCTs were available. Loading rates for tailings HCT results were also calculated. The loading rates from all tests were also scaled to field conditions by accounting for the assumed temperature and particle size differences between the laboratory test conditions and field conditions.

The loading rates from the humidity cells and barrel tests are suitable for incorporation into a water quality model to assess the effects of contact water with pH values above 5 on downstream water quality or to determine what mitigation may be required for contact waters. If acidic conditions evolve, the loading rates may be expected to increase for several COPCs and the effects on contact water will need to be re-evaluated.

The conclusions from this ongoing assessment are as follows:

- The majority of the rock samples, including representative samples from all rock types, that were characterized in this investigation can be classified as potentially acid generating, with specific areas that warrant further follow-up for confirmation of possible NAG status;

- The one tailings sample that was characterized can be classified as potentially acid generating; and

- Mitigation strategies will likely be required to manage mine rock and tailings and to prevent acidic drainage and negative effects on downstream water quality at the site post closure and potentially during operation.

5.5 Surface Water Quality, Hydrology, and Sediment Quality

Surface water quality samples have been collected in or near the Project area beginning November 2010 through 2013. Sites were initially selected to capture pre-development site conditions and, during the planning process, considered the distribution of catchments, creeks, rivers, and other water bodies to characterize the spatial and/or temporal variability in water chemistry. The regional study area includes areas of Blackwater Creek, Hughes Creek, the Thunder Lake sub-catchment and its associated tributaries. Following the 2010-2011 survey, the specific location of sampling sites evolved as additional information about the Project footprint was developed. Nine locations were added and three locations were discontinued during the 2012-2013 sampling program.

Surface water flows at the Project site are limited to creeks which flow ultimately to Wabigoon Lake. The Project area is located in a catchment with an area of approximately 122 km^2 located within the Wabigoon watershed. The average slope within the Project area is approximately 4% and the elevations vary from 370 m to 495 m. Surface water flow at the Project site is currently

monitored by seven hydrological stations distributed throughout the Wabigoon Lake and Thunder Lake sub watersheds.

Sediment analysis on site has indicated good sediment quality, with the majority of parameter concentrations below Provincial Sediment Quality Guidelines and Federal Canadian Environmental Quality Guidelines. Metal parameters were detected at higher concentrations include chromium, copper, iron and magnesium, zinc and nickel. Exceedance in Total Organic Carbon were also seen across the site.

5.6 Hydrogeology and Groundwater Quality

An assessment has been made of the occurrence of private water wells within a 5 km radius of the proposed pit using geographic location data from the Ontario Ministry of the Environment and Climate Change's (MOECC) water well information system (WWIS). A total of 139 wells identified within this area based on the UTMs provided on WWIS with ten being removed from the data set for being identified as outside of the study area. 70% of these wells derive their water from the shallow bedrock.

The closest water wells outside of the company's property are those on Thunder Lake, approximately 1.5 km from the proposed pit. Otherwise, there are no wells within 2 km of the proposed pit and no wells identified to the north or east.

Overburden thickness in the Project area averages approximately 7.5 m thick with thickness rarely exceeding 15 m. The overburden material is comprised of mainly clay with subordinate silt (i.e. clay; silty clay; clay; layered clay and silt). A relatively thin basal sand layer may occur at the bottom of the clay and has an average thickness of 3 m to 4 m.

The Project is located in the Wabigoon Subprovince with rock structure dipping at approximately 70 to 80 degrees to the south-southeast. The Wabigoon Fault is located approximately 2 km to 3 km to the south of the Project.

Hydrogeological data were collected on the property from spring 2012 to early 2014 using methods of:

- Hydraulic conductivity testing using existing boreholes;
- Three additional deep holes drilled to specifically target further test areas;
- Installation of vibrating wire piezometers;
- Eight overburden monitoring wells for water quality and level testing;
- 9 existing exploration holes for water level monitoring; and

- 20 geotechnical boreholes across the Project area.

From a hydrogeological perspective, the surficial deposits can be subdivided into five units:

- Clay – Clay is the dominant overburden deposit at elevations generally below 430 m above sea level (masl), the most common overburden in the Project area and occurs to the south of the Project site and also to the north of the site within the watershed of the Hoffstrom's Bay tributary. The clay is expected to act as an aquatard in the Project area, or in general terms it will act as a confining layer that slows but does not prevent the flow of water to or from an adjacent aquifer.

- Basal Sand – a discontinuous sand layer at the base of the clay that when present is on average 3 m to 4 m thick;

- Bedrock knolls – bedrock exposure or very thin sand. These occur at higher elevations above 395 masl to 400 masl and are scattered throughout the Glaciolacustrine Plain;

- Sand-Clay/Silt-Sand – generally silty sand overlying a largely continuous clay/silt overlying the basal sand; and

- Sand and Gravel – the coarser glacial deposits within the Project area that include the Glaciofluvial Outwash deposits associated with the Hartman Moraine and the Kame deposit south-east of the Project site.

Slug testing of the majority of the groundwater quality wells was conducted by Treasury under direction from AMEC in February 2014. Overall the majority of values obtained appear to be representative of the overburden bedrock contact when silty sand is present.

Groundwater levels in the groundwater quality wells and also a selection of open exploration boreholes were measured in 2013. Water levels measured were consistently within 7 m of ground surface and on average within 3 m of ground surface. Groundwater level fluctuations are typically of the order of 1 m to 2 m. Two of the exploration holes measured were flowing intermittently and two of the 2014 geotechnical holes had water levels at surface after the 2014 freshet.

Overall it appears that groundwater levels are relatively close to surface and approximately follow topography. Groundwater flow from the Project site follows the surface drainage with flow both to the west towards Thunder Lake and to the south towards Wabigoon Lake.

Most of the groundwater flow that occurs around the Projects site is expected to follow the topography with greatest flows along the contact between the upper weathered and fractured bedrock and the basal sand. Rates of groundwater flow are expected to be much lower in the deeper bedrock. The following four hydrostratigraphic units have been identified for the bedrock:

- Shallow Bedrock – this is expected to occur within 10 m of the bedrock surface due to near-surface weathering and fracturing;

- Intermediate Bedrock – this refers to bedrock from approximately 10 metres below grade (mbg) to a depth of around 400 mbg (~ 0 metres above sea level [masl]);

- Deep Bedrock – this refers to bedrock where there are very few fractures (rock quality designation [RQD] > 90%) and very low hydraulic conductivities, which is expected to occur below 400 mbg (~ 0 masl);

- Deformation Zone of the Central Unit – this is a steeply inclined zone that occurs in all three of the above units. It is expected to have half to one order of magnitude higher conductivities in the units not affected by near-surface weathering (i.e. intermediate and deep bedrock).

These aspects of the conceptual hydrogeological model have been used to build a numerical model to estimate groundwater inflows to the mine, its zone of influence, base flow depletion at sensitive creeks and leakage from the tailings management area (TMA) and WRSA to groundwater and the potential location of discharge of this water.

Little Creek and Hoffstrom's Bay Tributary are located on clay overburden and have very limited base flow. Blackwater Creek is also predominantly on clay overburden and similarly has limited base flow. Thunder Lake Tributaries 2 and 3 are situated in a watershed with a higher percentage of granular materials, and base flow from groundwater discharge is expected to be a larger contributor to flows in these watercourses.

5.7 Vegetation

The Project is located within the Ontario Shield Ecozone, the largest ecozone in Ontario. This ecozone is typified by extensive wetlands and boreal forests. Within the ecozone, the Project is situated within the Lake Wabigoon Ecoregion (Ecoregion 4S), within the Lower English River Section of the Boreal Forest Region. This ecoregion is characterized by a range of forest types (mixed forest 25%, sparse forest 24%, and coniferous forest 14%) and open water (24%). Typical tree species include trembling aspen (Populus tremuloides), balsam poplar (Populus balsamifera), spruces (Picea glauca, Picea marina), white birch (Betula papyrifera) and willows (Salix spp.). Biologists detected 270 vascular plant species in the LSA during the course of field survey activities, 25 of which were introduced species commonly associate with disturbed habitats. Most of the remaining species are typical of Ontario's boreal forest. The only plant species at risk observed within the LSA (during all field work activities) was the floating marsh marigold (Caltha natans) observed in the Thunder Creek wetland near the mouth of Thunder Creek.

Wild rice (Zizania palustris) communities were detected at the mouths of Thunder, Blackwater, and Nugget creeks and at Hughes Pond. These communities occupy an estimated area of 12.8 ha within the LSA. Wild rice is a traditional food source for many First Nations.

Landcover in the regional Project area is 61% forest, 20% wetland, 14% water, 5% development land and <1% barren land. Locally land cover is 62% forest, 21 % water, 9% developed land, 8% wetland, and <1% barren land. The diversity of underlying landforms within Ecoregion 4S has resulted in a wide diversity of habitats within the regional area.

5.8 Wildlife

Wildlife surveys conducted between 2011 and 2012 identified species of birds, reptiles and amphibians, mammals and species at risk. The area exhibits a relatively high diversity of avian and mammalian species that reflect the diversity of available habitats. Species observed during surveys in the regional and local study areas are considered to be largely abundant and common to region.

Two terrestrial mammalian SAR were observed within the LSA during field survey efforts: Little Brown Myotis (2011 and 2012) and Northern Myotis (2012). Seven bird SAR were observed within the LSA during the field survey efforts. Bald Eagle, Peregrine Falcon, Black Tern, Common Nighthawk, Barn Swallow, Canada Warbler, Olive-sided Flycatcher. Seven additional bird SAR are potentially present (at least in some years) but have not yet been reported from the LSA: American White Pelican, Bobolink, Eastern Whip-poor-will, Golden Eagle, Least Bittern, Short-eared Owl, and Yellow Rail. Snapping Turtles, Northern Leopard Frog, and Green Frog are known to occur in the Dryden vicinity but were not observed during field survey efforts within the LSA.

5.9 Aquatic Biology

The Project is located within the Lake Wabigoon Ecoregion (Ecoregion 4S) which is within the Lower English River Section of the Boreal Forest Region. It is also within the northern limits of Fisheries Management Zone (FMZ) 5. This zone covers 44,360 km2 from the Manitoba border east to Quetico Provincial Park and the United States border north to the Wabigoon River Watershed.

A total of 10,236 fish were captured at 130 sample sites: 8,265 fish were captured by Klohn Crippen Berger (2012) at 66 sample sites and (DST 2014b) captured a total of 1,971 fish over 68 sites. Thirty-six fish species were identified during a review of historical records while presence of only thirty one fish species, including two identified to the genus level, was confirmed by field sampling. Fish indicated in historical reviews but not confirmed by field surveys include: Cisco, Lake Trout, Lake Whitefish, Longnose Sucker, Muskellunge and Nine-spine Stickleback. Fish captured in field surveys but not included in the historical records include Brassy Minnow. No records of fish SAR were found within the regional study area (RSA) and none were encountered during field surveys.

Benthic invertebrate community samples were collected in October of 2011 and 2012. Samples from 2011 were only collected from areas associated with Blackwater Creek; however, 2012 samples included areas associated with Blackwater Creek as well as Wabigoon Lake, Thunder Bay, and throughout the creek located at either side of a former tree nursery which is located within the Project area.

Results of benthic invertebrate sampling from Blackwater Creek in 2011 indicated a general increase in mean number of taxa and taxa richness from upstream to downstream sites with mean number of taxa ranging from approximately four to 14. Additionally, approximately 61% of the total specimens within all samples consisted of chironomids (family Diptera) which is typical of slow moving streams with silt and clay substrates or where oxygen availability is limiting too many other taxa.

5.10 Archeology and Build Heritage Resources

The Project is located in the DgJc Borden block. A site registration database information request made through the Ministry of Tourism, Culture and Sport resulted in no reported archaeological sites within two kilometres of the Project.

Archaeological sites are most often associated with well-drained, sandy soils. The soils within the Project area are silt and wet clay over bedrock which suggests low archaeological potential. Site inspection of disturbances and access roads with disturbed exposures found no cultural material. The several small areas of elevated topography were observed to have been disturbed by past wood harvesting activities. The Project site therefore does not have topological, surface water, or soil characteristics that would indicate any archaeological potential. This has been confirmed by an on-site Archaeological Assessment completed by a qualified archaeologist.

No built heritage resources have been identified in the Project area. The regional area has a number of historical mine sites due to turn of the century mining activities.

5.11 Visual Aesthetics

The landscape of the Project is typical of northern Ontario. The landscape is characterized by densely populated coniferous and deciduous trees, creeks, and lakes. Identified receptor sites during the winter and summer present a natural setting with views of Thunder Lake, and trees.

5.12 Socio-Economics

The regional study area of the Project includes the following communities within the Kenora and Thunder Bay Districts:

- Thunder Bay;
- Kenora;

- Dryden;
- Wabigoon;
- Ignace;
- Sioux Lookout; and
- Municipality of Machin.

Historically, Northwestern Ontario's economy has been tied to its landscape and the abundant natural resources contained therein, particularly in forestry and mining as well as tourism. Locally, the Domtar pulp mill is the major employer of the area with approximately 330 mill employees and 250 woodland contractors. Due to the reliance upon resource-based industries, local communities have taken proactive measures to strengthen and diversify. This includes the development of strategies that promote continued recreational activities and tourism opportunities, and investment and attractive incentives for new businesses.

Regionally the area is accessible by road, rail and air services. Infrastructure and social services within the local communities provide adequate services for current demands and needs.

6.0 PROJECT EFFECTS AND MITIGATION

As part of the approval process Treasury Metals is undergoing for their Goliath Gold Project, they completed a thorough and comprehensive environmental assessment in accordance with the Project-specific EIS Guidelines prepared by the Canadian Environmental Assessment Agency (the Agency). Treasury Metals submitted an EIS for the Project to the Agency in March of 2015, and April of 2015 the Agency confirmed that Treasury Metals' EIS as met conformity with the requirements of the EIS Guidelines. Following a period of technical review and public comment, the Agency issued a series of requests to Treasury Metals. As part of the information request (IR) process, the Agency requested that Treasury Metals prepare and submit a revised EIS (this document). The revised EIS was prepared in accordance with the Agency's request, and included the completion of further technical work required as part of the IR response process.

This revised EIS lays out the evaluation of potential effects of the Project in a traceable and methodical manner. The effects of the Project were evaluated for the following disciplines:

- Terrain and soils;
- Geology and geochemistry;
- Noise;
- Light;
- Air quality;
- Climate;
- Surface water quality;
- Surface water quantity;
- Groundwater quality;
- Groundwater quantity;
- Wildlife and wildlife Habitat;
- Migratory Birds;
- Fish and fish habitat;
- Wetlands and vegetation;
- Land use;
- Social;
- Economic;
- Human health;
- Heritage resources; and
- Aboriginal peoples.

For each of these disciplines, valued components (VCs) were identified. The Agency describes VCs as "…environmental features that may be affected by a project and that have been identified to be of concern by the proponent, government agencies, Aboriginal peoples or the public." (CEAA, 2015b). From an ecological perspective, a VCs can be an aspect of the physical environment (e.g., air quality or surface water quality), and individual species (e.g., walleye or northern pike), or a range of species that serve as a surrogate for species that interact similarly with the environment (e.g., upland birds). From a socio-economic perspective, VCs could represent an aspect of community well-being, such as housing or employment. The VCs used in the revised EIS are described fully in Section 6.1.3, and are summarized in Table 6.0-1.

Table 6.0-1: Disciplines and VCs used in the Revised EIS Assessment (continued)

Table 6.0-1: Disciplines and VCs used in the Revised EIS Assessment

Discipline or Component	Valued Components (VCs)
Terrain and soils	Natural Landscapes
	Overburden
	Soil chemistry
Geology and geochemistry	Pit lake water quality
Noise	Ambient noise levels
	Noise disturbance to wildlife (including SAR)
	Blasting noise and vibration
	Noise related health effects
Light	Light trespass
Air quality	Air quality
Climate	GHG emissions
	Changes in climate due to the Project
Surface water quality	Surface water quality
Surface water quantity	Surface water quantity
Groundwater quality	Groundwater quality
Groundwater quantity	Groundwater quantity
Wildlife and wildlife Habitat	Wildlife Species at Risk
	Ungulates
	Furbearers
	Upland Birds
	Wetland Birds
	Small mammals
	Reptiles and amphibians
	Invertebrates
Migratory Birds	Upland Birds
	Wetland Birds
Fish and fish habitat	Stream-resident fish population
	Migratory fish populations
	Lake-resident fish populations
	Fish species at risk
Wetlands and vegetation	Wetland extent
	Vegetation communities and species
Land use	Land use planning and policies
	Aggregate operations
	Forestry
	Mineral exploration
	Fishing - recreational and commercial
	Hunting
	Trapping
	Cottagers and outfitters
	Other recreational uses
Social	Population demographics
	Education
	Infrastructure and services
	Housing and property values

Table 6.0-1: Disciplines and VCs used in the Revised EIS Assessment (continued)

Discipline or Component	Valued Components (VCs)
	Public safety
	Transportation and traffic
Economic	Labour force, labour participation and employment
	Income levels
	Cost of living
	Real estate
	Economic development
	Existing businesses
	Government revenues
Human health	Human health
Heritage resources	Archaeological sites
	Historic heritage sites
Aboriginal peoples	Health effects
	Gathering of plant material
	Hunting, trapping, fishing
	Cultural activities
	Socio-economic effects

As set out in the EIS Guidelines, a series of spatial and temporal boundaries were established for evaluating the effects of the Project. Section 6.1.4 provides a description and justification for the spatial boundaries, referred to as study areas, used for each discipline. In most cases, both a local study area (LSA) and regional study area (RSA) were defined. The LSAs selected usually included the areas where the direct effects of the Project were considered to be likely, while the RSA enclosed the larger regional context. In some cases, only a single study area was used for a discipline (e.g., social factors) as the effects were most appropriately addressed on a broader, regional scale. The temporal boundaries were selected to correspond with the following phases of the Project life:

- Site preparation and construction phase;
- Operations phase;
- Closure phase; and
- Post-closure phase.

The methodical steps taken for evaluating the effects of the identified disciplines and VCs included the following:

- **Identify the Likely Effects of the Project on the Environment**: The likely potential effects of the Project on each discipline during each of the four Project phases were identified, along with the possible linkages between the various disciplines and VCs.

- **Predict the Effects of the Project**: Using clearly described approaches, the effects of the Project on the disciplines and VCs. The prediction of effects need to identify and evaluate those measures incorporated in the Project to avoid effects. The results of the effects prediction should cover all Project phases, and indicate whether the Project is predicted to result in adverse effects.

- **Mitigation Measures**: As set out in the EIS Guidelines, mitigation measures need to be identified in those cases where ad verse effects were predicted, In keeping with the EIS Guidelines, such mitigation should be technically and economically feasible.

- **Residual Effects**: Residual adverse effects are those that remain after consideration of the application of technically and economically feasible mitigation measures. The residual effects that remain after mitigation are those that are carried forward for consideration of possible cumulative effects (Section 7) and ultimately for the determination of significance (Section 8).

6.1 Terrain and Soils

The effects of the Project on terrain and soils are described using qualitative and semi-qualitative methods consistent with the nature of the potential effects. With consideration of the effects avoidance and mitigation measures, the following residual adverse effects remain for the terrain and soils VCs:

- **Natural Landscapes**: While smaller features on the site, including the overburden stockpiles and the LGO stockpile would effectively not extend above the treeline, and thus would not be visible beyond the operations low. Although the WRSA will be constructed with relatively shallow 3:1 (horizontal to vertical) side slopes, the WRSA may still be visible from certain areas of Thunder Lake.

- **Overburden**: There would be no residual effects on overburden as the material will be stockpiled during the site preparation and construction phase, and then covered to prevent erosion.

- **Soil Chemistry**: Finally, the soil chemistry will be protected through the implementation of procedures to minimize the potential for equipment leaks and spills at the Project. In the unlikely event leaks or spills occur, procedures to remediate any affected soils will be implemented. There would be no residual effects for soil chemistry.

6.2 Geology and Geochemistry

Although geology and geochemistry would not normally be considered assessment endpoints; they are important for understanding how the Project could affect the environment. The materials handles as part of the Project have been identified as being potentially acid generating (PAG), which could results in acid rock drainage (ARD) and the associated metals leaching (ML) if not

managed properly. Specifically, geology and geochemistry will influence the quality of seepage from the tailings storage facility (TSF) and the waste rock storage area (WRSA), as well as dictating the quality of the water in the pit lake that is allowed to form following closure. Pit lake quality was the VC identified for evaluating the effects of the Project on geology and geochemistry. As the pit lake will not form until after dewatering activities cease, at the end of the operations phase, there would be no residual adverse effects on pit lake quality during the site preparation and construction, operations, and closure phases. In addition, affecting the pit lake water quality, both ARD and ML are important parameters that could influence other components, such as surface water quality. Those effects are evaluated as part of the evaluation of surface water quality effects.

6.3 Noise

Equipment and activities associated with the Project have the potential to produce emissions that will affect the noise levels in the vicinity of the Project. In addition, Treasury Metals plan to use blasting to advance the mining activities in the open pit and underground mine, raising concerns about noise and vibration associated with blasting. The effects assessment for noise considered the following VCs:

- Ambient noise levels;
- Noise disturbance to wildlife (including SAR);
- Blasting noise and vibration; and
- Noise related health effects.

A numerical assessment of noise from the Project was done using the Cadna/A noise model, a commercially available implementation of the ISO 9613 (ISO, 1994b and ISO, 1996) algorithms. Noise emissions were calculates using the expected activity levels, given the size and production rates, and published noise characteristics. Noise predictions were made for a series of residential noise receptors around the Project, including receptors along East Thunder Lake Road and tree Nursery Road. Blasting noise and vibration were calculated using established IEEE procedures. Details of the noise sources and modelling are provide in Appendix H-4 to the revised EIS.

Residual adverse effects were predicted for each of the VCs, and they were advance for determination of significance. Although residual adverse effects were identified for the “noise disturbance to wildlife” VC, the determination of significance of these effects were assessed as a component of the wildlife and wildlife habitat discipline (Section 6.11). In addition, it should be noted that the prediction of residual adverse effects for the noise related health effects VC does not mean the Project noise levels will cause health effects. The predicted residual effects means that the modelling predicted that the Project would result in a change from the baseline conditions for the two indicators used for evaluating that VC (absolute sound pressure [LDN] and percent highly annoyed [%HA]).

6.4 Light

The effects of the Project on light were evaluated using the light trespass VC, and were predicted using a numerical model of the proposed lighting at the processing plant. Light trespass levels during the operations would drop to 0 within the operations area, and were not predicted to affect any of the nearby residences. Generally there will be no illumination required for nighttime operations during the site preparation and construction, or closure phases. If nighttime lighting is required for safety reasons during the during site preparation and construction, or closure phases then shielded portable light directed away from any residences will be used. There will be no sources of light during the post-closure phase.

There were no residual adverse effects predicted for the light trespass VC.

6.5 Air Quality

Equipment and activities associated with the Project have the potential to produce emissions that will affect the air quality in the vicinity of the Project. These effects have been evaluated using a single VC, namely air quality. A series of indicator compounds were selected, based on the expected emissions. Air emissions were calculated using published literature and expected production rates at the mine. Predicted concentrations and deposition rates for the indicator compounds were determined along the property line and at sensitive residential receptor locations around the Project using the AERMOD dispersion model, which is the recommended model for such uses in Ontario. Conservative background concentrations were added to the model predictions to incorporate the contributions from existing activities in the region. Details regarding the model selection and emission calculations are provided in Appendix J-2 to the revised EIS. The modelling predicted there would be residual adverse effects for the air quality VC, which were advanced for the determination of significance. These effects were predicted for the site preparation and construction, operations, and closure phases. There would be no sources of air emissions during the post-closure phase and therefore no residual adverse effects.

6.6 Climate

The equipment to be used for mining at the Project rely on internal combustions engines, will therefore result in greenhouse gas (GHG) emissions. The Project GHG emissions are a potential concern as they could contribute to climate change. Additionally, both the federal and provincial governments have implemented initiatives to manage and mitigate the GHG emissions. The GHG the emission from the proposed Project are expected to be similar to, or smaller than comparable project given the availability of mains electrical power from the Hydro One 115 kV transmission line that runs through the Project, in the vicinity of the proposed plant site. This avoids the need to generate electrical power on site, avoiding addition GHG emissions. The potential effects of the Project on climate, were evaluated using the following VCs:

- Project GHG emissions, and

- Changes in climate due to the Project.

Despite measures to avoid and mitigate effects, the Project will result in GHG emissions, and thus will have a residual adverse effect on the "Project GHG emissions" VC. These emissions will be regulated as part of the Ontario Cap and Trade Program (O.Reg. 144/16). Based on the conservative assessment of expected emissions, the Project is likely to need to report GHG emissions as part of regulation, but would not be considered a large emitter of GHG emissions.

Although the GHG emissions from the Project are large enough to likely need to be reported under the Ontario Cap and Trade Program, the GHG emissions were shown to be too small to have a measurable effect climate. This is consistent with the current federal guidance for incorporating climate impacts in environmental assessments (FPTCCCEA 2003), which states that "…unlike most project-related environmental effects, the contribution of an individual project to climate change cannot be measured." Therefore, there were no residual adverse effects for the "changes in climate due to the Project" VC.

6.7 Surface Water Quality

The effects of the Project on surface water quality was evaluated using a single VC, surface water quality, and a series of indicators compounds selected to capture the range of compounds likely to be associated with the Project. Surface water quality effects were calculated using a numerical model developed to cover all of the watercourses likely to be affected by the Project, and to capture the likely discharges and effects. The model incorporates the refinements to the Project since the filing the original EIS (see Section 3.2). Some of the important factors that contribute to the protection of surface water quality include the following:

- A perimeter runoff and seepage collection ditch will be constructed around the operations area. This system will capture all of the runoff from the developed site area, which will be directed to the water management system for use at the site and in the process.

- There will be no releases to surface water during the site preparation and construction phase.

- During operations, all excess water not required in the process will be treated to concentrations that meet Provincial Water Quality Objectives (PWQO) or Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life, prior to discharging to Blackwater Creek. In the case of mercury, effluent will be treated to meet the background concentrations in Blackwater Creek.

- Dewatering of the open pit and underground mine workings will provide dry working conditions and safe working environment. These dewatering activities will lower the groundwater table around the perimeter of the open pit and mine workings, creating what is referred to as a drawdown zone. Within this drawdown zone, groundwater will migrate

towards the open pit. Therefore, seepage that escapes the seepage collection systems will be captured within the drawdown zone, and ultimately report to the open pit.

- During closure, the site will be graded such that runoff for the operations area will be directed to the open pit during closure. There will be no releases from the Project to surface waters during the closure phase,

- It will take between 6 and 8 years to fill the pit lake, which will extend into the post-closure period. As the pit lake is filling to determine whether batch treatment will be required to meet PWQO prior the release from the pit lake to a tributary of Blackwater Creek. The quality of the water discharged from the pit lake to Blackwater Creek during the post-closure phase will meet PWQO.

No residual adverse effects to surface water quality were identified during the site preparations and construction, and closure phases as there will be no releases to surface waters during those phase. During operations residual adverse effects were predicted for those indicator compounds where the predicted concentrations were higher than the existing conditions. In all cases, the predicted residual effects were still less than the PWQO. Residual adverse effects were also predicted during the post-closure phase, when the groundwater will be transported off site towards adjacent waterbodies. With mitigation in place, including a wet cover over the TSF, All of the predicted residual adverse effects during post-closure would meet the PWQO.

6.8 Surface Water Quantity

There will be a number of aspects of the proposed Project that could affect surface water quantities and flows that have been evaluated using a single VC, namely surface water quantity. The following three indicators have been used for evaluating the effects of the Project on the surface water quantity VC:

- Increase in surface water flows;

- Decrease in surface water flows; and

- Change in lake levels.

The effects of the Project on surface water quantity were predicted using a numerical watershed model developed using information from comparable watersheds in the region, as well as information regarding the local watercourses. As part of the Project refinements since filing the original EIS, Treasury Metals have advanced their engineering, including developing a refined water balance. A key aspect of the refinements to the Project is the construction of a perimeter ditch around the operations area, which will collect all of the runoff within this area for use in the water management system. However, the perimeter ditch will result in the withdrawal of some of the catchment areas for Little Creek and Hoffstrom's Bay Tributary, resulting in residual effects to the flows in these watercourses. During operations, the Project will periodically require fresh water

for use in the process. The current plans have identified the irrigation ponds on Thunder Lake Tributaries 2 and 3 as the preferred sources for this fresh water. Calculations indicate that, with careful management, the Project will be able to meet its fresh water requirements from these watercourses without withdrawing more than 5% of the available flows, even on a dry year.

The refined water balance for the Project uses a combination of runoff collected from the operations area, water from the dewatering of the mine, and water reclaimed from the TSF to meet the needs of the process plant during operations. Calculations on average, wet and dry years show that the available water will be sufficient for the process needs, and that there will often be an excess of water that will be treated to meet PWQO before being discharged into Blackwater Creek, altering the flows downstream. Residual adverse effects were predicted during the operations and post-closure phases were predicted in Little Creek, Hoffstrom's Bay Tributary, Thunder Lake Tributaries 2 and 3, and Blackwater Creek. These effects were advanced for the determination of significance.

6.9 Ground Water Quality

Because the materials to be mined at the Project have been identified as potentially acid generating (PAG), acid rock drainage (ARD) could affect the quality of the seepage from the WRSA and TSF, which could ultimately affect the quality of groundwater. The effects of the Project on groundwater quality were predicted using a hydrogeological model developed for the local hydrogeological conditions using the Modular Finite-Difference Groundwater Flow Model (MODFLOW) modelling platform. This model, which is detailed in Appendix M to the revised EIS, is widely accepted for modelling situations like those at the Project. The modelling the following measures that will mitigate the effects of the Project on groundwater:

- A perimeter runoff and seepage collection ditch will be constructed around what is referred to as the operations area.
- As part of the closure activities, the WRSA will be covered with a low permeability cover to isolate the waste rock and reduce the potential for acidification.
- The PAG waste rock would be placed in the mined out areas of the open pit, to the extent practical, to minimize the volume of PAG material in the waste rock storage area (WRSA).
- At closure, the open pit will be allowed to flood, isolating the exposed mine faces and the waste rock placed underneath a static cover of water to prevent acidification.
- The floor of the tailings storage facility (TSF) will be low-permeability. Where native soils do not provide a sufficiently thick low-permeability horizon beneath the TSF, it will be augmented with suitable clay from open pit stripping. If the volume of clay is insufficient, a synthetic liner will be used to ensure a low-permeability floor for the TSF.

- During operations, a water cover will be maintained over the tailings within the TSF to prevent the onset of acidification.

- At closure, the process water will be withdrawn from the TSF, treated and used to help fill the open pit. The tailings within the TSF will be isolated using either a low permeability dry cover, or a wet cover of non-process water.

- Dewatering of the open pit and underground mine workings will provide dry working conditions and a safe working environment. These dewatering activities will lower the groundwater table around the perimeter of the open pit and mine workings, creating what is referred to as a drawdown zone. Within this drawdown zone, groundwater will migrate towards the open pit. Therefore, seepage that escapes the seepage collection systems will be captured within the drawdown zone caused by dewatering and ultimately report to the open pit during the operations and closure phases.

- The use of a wet cover as a closure option over the TSF is the preferred environmental option. A wet cover prevents acidification of the tailings, which improves the quality of seepage in the long-term. The mitigation also benefits the quality of surface water in the receiving environment.

With consideration of the above, the groundwater modelling determined there would be no residual adverse effects of the Project on groundwater quality. During the site preparation and closure phases there would be no sources that would affect groundwater quality, especially at the private wells in the region. During operations and closure, the measures to contain and capture seepage would contain virtually all of the seepage from the WRSA and TSF. Any seepage that did escape the seepage collection systems would be capture by the drawdown created by the dewatering activities and would be captured in the open pit. Following closure, and the flooding of the open pit, the groundwater will return to near pre-development conditions and seepage from the WSRA and TSF would leave the site. The hydrogeological modelling identifies that this seepage would report to nearby watercourses (it was included in the surface water quality modelling) and would not affect the private wells in the region.

6.10 Ground Water Quantity

In order to safely operate the open pit and underground mine, Treasury Metals will need to conduct dewatering activities to lower the groundwater levels and help keep the mine working free of water. A single VC, groundwater quantity was used for assessing the effects of the Project. The following two indicators were used for describing the predicted effects:

- Decreasing elevations in private water wells; and

- Decreasing contributions to surface flow pattern.

The effects of the Project on groundwater quantity were predicted using the same hydrogeological model developed for evaluating the effects on groundwater quality. Specifically, a model based on the local hydrogeological conditions using the Modular Finite-Difference Groundwater Flow Model (MODFLOW) modelling platform. The hydrogeological model is detailed in Appendix M to the revised EIS.

As there will be no dewatering activities during the site preparation and construction phase there will be no residual adverse effects to groundwater quantity. Once the activities start in the open pit, dewatering activities will start to lower the groundwater levels. The modelling shows that the zone of influence of the dewatering will extend out to private wells in the region and could cause an adverse effect if the drawdown caused by the dewatering activities lowers the groundwater levels to a point where private wells are unable to provide enough water. However, the mitigation for such situations is well known, and Treasury Metals are required to post financial bonds with the regulators to ensure there is money to deepen those private water wells that may be affected. With this mitigation implemented, there would be no residual effects to water elevations in private wells.

The hydrogeological modelling identified a potential effect from dewatering activities on the flows within the catchment for Thunder Lake Tributaries 2 and 3. The hydrogeological investigations identified that the other watercourses within the zone of influence (Little Creek, Hoffstrom's Bay Tributary, Blackwater Creek) are generally underlain with fine grained materials, do not have a proportionately large contribution from groundwater to base flows and would therefore not experience residual adverse effects. The residual effects of decreasing groundwater contributions to the surface flow patterns in Thunder Lake Tributaries 2 and 3 were advanced for the determination of significance.

6.11 Wildlife and Wildlife Habitat

Clearing, construction, mining and activities have the potential to affect wildlife, and the habitat they rely on. The potential effects of the Project on wildlife and wildlife habits were characterized using following VCs:

- Wildlife Species at Risk;
- Ungulates;
- Furbearers;
- Upland birds;
- Wetland birds;

- Small mammals;
- Reptiles and amphibians; and
- Invertebrates.

Suitable indicator species that are known to be present in the region were selected for each of the VCs. The assessment of effects on these VCs considered the measures of direct loss of habitat caused by the Project (e.g., clearing of land), the degradation of habitat as a result of Project activities (e.g., increase noise levels), and potential for mortality (e.g., collisions with Project traffic). The results of the assessment identified residual adverse effects for all of the VCs, which were advanced for the determination of significance.

6.12 Migratory Birds

At the request of the Agency, migratory birds was added as an additional discipline, and the effects described using the uplands birds and wetlands birds VCs that were also used for characterizing he effects on wildlife and wildlife habitat. Residual adverse effects were identified for both of these VCs. Those residual effects were advanced for the determination of significance.

6.13 Fish and Fish Habitat

Project activities during the site preparation and construction phase, operations phase, closure phase and post-closure phase will all have the potential to effect fish and fish habitat. The importance of these potential effects to Aboriginal peoples and other stakeholders was highlighted through the engagement process undertaken by Treasury Metals. For the revised EIS, the effects of the Project were characterized using the following four VC:

- **Stream-resident fish population**: Stream-resident fish populations are species that complete their entire life cycle (spawning, nursery, foraging, overwintering) in the habitats that are present within the local watercourses. In streams such as those affected by the project these are typically small-bodied fishes.
- **Migratory fish populations**: Migratory fish populations are populations that migrate into streams to complete a portion of their life cycle, usually spawning. In some cases the streams also provide nursery habitat.
- **Lake-resident fish populations**: Lake-resident populations are populations that complete their entire life cycle in lakes (e.g., Wabigoon Lake or Thunder Lake).
- **Fish species-at-risk**: Fish species-at-risk are species that have status under the federal *Species at Risk Act* or the *Ontario Endangered Species Act*.

The predicted effects on the VC were described using the following indicators:

- **Habitat loss**: Habitat loss occurs when watercourses or waterbodies are overprinted by the construction of Project elements (e.g., the tailings storage facility, or TSF, will overprint portions of Blackwater Creek Tributary 2).

- **Habitat adversely affected**: When habitat is adversely affected it is considered to be degraded, which can result from factors such as changes in surface water quality, changes in surface water flow, or alteration of the habitat that makes it less suitable (e.g., changes in substrate).

- **Direct mortality**: Direct fish mortality can occur if fish cannot be relocated prior to the loss of habitat or if fish are subjected to lethal pressure changes due to blasting. Mortality could also occur should the surface quality be degraded to a point where fish can no longer survive.

Effects of the Project on fish and fish habitat are predicted based on knowledge of the existing fish habitat and fish communities present and the direct predicted effects of the Project. The predictions of direct effects are primarily qualitative, with quantitative estimates of changes in habitat made where applicable, using GIS. The prediction of effects of the Project on fish and fish habitat also relies on quantitative predictions made for physical disciplines (e.g., surface water quality and surface water). Treasury Metals have incorporated a measures that help avoid or mitigate the potential effects of the Project on fish. Some of these measures include:

- As part of the refinements to the Project since the filing of the EIS (see Section 3.2), the plant site and laydown area have been relocated to west of Tree Nursery Road, eliminating the need to divert the lower reaches of Blackwater Creek Tributary 2.

- As part of the refinements to the Project since the filing of the EIS (see Section 3.2), the overburden stockpile has been modified to avoid infilling the lower reaches of Blackwater Creek Tributary 1.

- Prior to overburden removal, any beaver dams within the Project footprint will be removed and the impoundments will be allowed to draw down. This will reduce the number of fish that will remain in isolated sections of Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2.

- Activities and the construction of Project components that will impact or overprint watercourses (i.e., the perimeter ditch, the effluent diffuser, water intakes) will occur during the fisheries timing window when in-stream work is permitted.

- To the extent possible, fish in the sections of Blackwater Creek Tributary 1 that will be isolated by the construction of the perimeter ditch and overprinted by the removal of overburden from the open pit will be captured and relocated to the same tributaries downstream from the operations area, or to the main branch of Blackwater Creek.

- To the extent possible, fish in the sections of Blackwater Creek Tributary 2 that will be isolated by the construction of the perimeter ditch and overprinted by the construction of the TSF will be captured and relocated to the same tributaries downstream from the operations area, or to the main branch of Blackwater Creek.

- Optimize the layout of the Project to minimize the footprint, and to the extent possible, minimizing the catchment areas diverted from Little Creek and Hoffstrom's Bay Tributary.

- A perimeter ditch around the operations area will prevent the release of runoff.

- The refined water balance for the Project looks to optimize the use of water collected within the operations area for use in the processing of ore. This limits the effects on surface water quantities by minimizing water taking and providing flexibility regarding the volumes discharged from the Project.

- The fresh water needs for the Project will be met by withdrawals from the irrigation ponds on Thunder Lake Tributary 2 and Thunder Lake Tributary 3. The withdrawals will not exceed 5% of the flows in either of the two creeks. Pump intakes will be fitted with fish screens to prevent entrainment.

- Excess water during operations will be treated to meet PWQO prior to being discharged to a single discharge point in Blackwater Creek.

- Treated effluent will be discharged to Blackwater Creek through an engineered structure designed to minimize erosion risks.

- Following operations the dewatering activities will be ceased and the open pit and underground mine will be allowed to fill with water. Treasury Metals will test the water in the open pit as it is filling, and if necessary, batch treatment will be used to ensure that the water to be discharged from the pit lake meets PWQO.

- Once the pit has filled during the post-closure phase, excess water will be allowed to passively discharge through a spillway into the former channel of Blackwater Creek Tributary 1, re-establishing flows in that watercourse.

- As the Project advances, detailed engineering will be completed to ensure that all downstream culverts on Blackwater Creek can support any predicted increases in flows. This would include ensuring that the downstream culverts will continue to provide adequate fish passage.

The following adverse effects were identified for fish and fish habitat:

- Habitat loss is predicted as a result of the overprinting of Blackwater Creek Tributary 2 for the construction of the perimeter ditch and TSF, as well as the overprinting of Blackwater Creek Tributary 1 by the open pit and the construction of the perimeter ditch. The direct habitat losses due to the Project would only affect the "stream-resident fish populations" VC. Habitat loss will not adversely affect the "migratory fish populations", "lake-resident fish populations" or "fish special at risk" VCs.

- The modelling of surface water quality identified residual adverse effects for some indicator compounds on nearby watercourses during the operations and post-closure phases. However, none of the predicted surface water quality adverse effects were above the PWQO. Therefore, there were no adverse effects on fish predicted due to changes in water quality.

- The modelling of surface water quantities identified residual adverse effects on surface water quantities (flows) in Blackwater Creek, Thunder Creek Tributaries 2 and 3, Little Creek and Hoffstrom's Bay Tributary. These changes in flows were identified as adverse effects for the "stream-resident fish populations" and "migratory fish populations" VCs. Habitat degradation due to changes in flows will not adversely affect the "lake-resident fish populations" or "fish special at risk" VCs.

- Treasury Metals will endeavor to relocate the fish that remain within those portions of Blackwater Creek Tributaries 1 and 2, isolated and overprinted by the Project. However, the habitat conditions (soft substrates, dense riparian vegetation) will make effective fish capture difficult, resulting in mortality of fish that are isolated. This adverse effects will only occur for the "stream-resident fish populations". Fish mortality will not adversely affect the "migratory fish populations", "lake-resident fish populations" or "fish special at risk" VCs.

It is expected that the Project will require a Fisheries Act authorization, and Treasury Metals will likely be required to mitigate the losses of fish habitat that it causes as a condition of that authorization. Typically, the offsetting involves the creation of new habitat or the enhancement of existing habitat that is commensurate with the habitat losses. The Fisheries Act authorization, which is issued by DFO, details the offsetting measures to be completed. As a result, the offsetting will fully mitigate the adverse effects associated with habitat loss and degradation. The only residual adverse effect to fish would be the mortality to fish isolated in portions of Blackwater Creek Tributaries 1 and 2 by the overprinting of those watercourses. There will be no residual adverse effects for the "migratory fish populations", "lake-resident fish populations" or "fish species at risk" VCs.

6.14 Wetlands and Vegetation

As part of the site preparation and construction activities, vegetation clearing and the construction of the perimeter ditch will result in the loss of wetland areas overprinted by the Project, and could result in the loss of vegetated areas that contain important plant species. These potential effects are characterized using the following VCs:

- Wetland extent; and
- Vegetation communities and species.

The assessment of wildlife and wildlife habitat effects was based on the loss of vegetated areas, so the vegetation communities VC focuses specifically on those areas of identified botanical importance. To determine the Project effects on the wetlands and vegetation VCs, a geographic information system (GIS) analysis was done using available land use data, validated through the baseline field studies completed for the Project.

Adverse effects were identified for wetland extent associated with the loss of six (6) small wetlands that are overlain by the Project. Within the local study area, these represent a small percentage of the wetlands available. These adverse effects will begin in the site preparation and construction phase, and will continue through the closure phase. These adverse effects are expected to be reversed during post-closure. While some wetland areas lost during the site preparation and construction phase, such as the wetlands overprinted by the TSF will not recover, new wetlands will be generated around the pit lake. Additionally, wetlands affected on Blackwater Creek Tributary 1 are expected to recover once the pit lake fills and flows within the watercourse are re-established. No adverse effects were identified as having Floating Marsh Marigold, the indicator used for this VC.

The effects of the Project on wetlands extent were determined to be residual adverse effects that were advanced for the determination of significance.

6.15 Land Use

Considering the review of the existing information related to land and resource use in the area, review of the Round 1 information requests, and knowledge of similar land and resource assessments, the following VCs were used for determining the effects on land and resource use:

- Land Use Planning and Policies;
- Aggregate Operations;
- Forestry;
- Mineral Exploration;
- Fishing - Recreational and Commercial;
- Hunting;
- Trapping;

- Cottagers and Outfitters; and
- Other Recreational Uses.

A qualitative evaluation of potential effects of the Project identified that there would be adverse effects for all of the land and resource use VCs. These effects were also identified as being residual adverse effects and advanced for the determination of significance.

6.16 Social Factors

Considering the feedback provided in the Round 1 information requests and knowledge of similar resource projects, the following VCs were used for determining the effects on social factors:

- Population demographics
- Education
- Infrastructure and services
- Housing and property values
- Public safety
- Transportation and traffic

A qualitative evaluation of potential effects of the Project identified that there would be positive or adverse effects for all of the social factors VCs. All of these effects are considered to be residual and are advanced for the determination of significance.

6.17 Economic Factors

Considering the feedback provided in the Round 1 information requests and knowledge of similar resource projects, the following VCs were used for determining the effects on economic factors:

- Labour force, labour participation and employment;
- Income levels;
- Cost of living;
- Real estate;
- Economic development;

- Existing businesses; and
- Government revenues.

A quantitative evaluation of the potential economic effects of the Project was completed using an established model, modified to reflect the local conditions in the socio-economic study area. The model used specific details regarding employment, purchasing and capital investments by Treasury Metals to numerically calculate the benefits, and possible hindrances to key economic indicators. The model identified that there would be positive or adverse effects for all of the economic factors VCs. All of these effects are considered to be residual and are advanced for the determination of significance.

6.18 Human Health

Based on the feedback in the Round 1 information requests, it was recognized that human health warranted its own discipline within the revised EIS. Although the original EIS included a fulsome evaluation of the risks to human health from the Project (presented in Appendix W to the EIS), no specific VC were identified, nor were the possible effects and impacts evaluated in a methodical EA process. A single VC was used for assessing the effects of the Project on human health, and included indicators for Aboriginal health and non-Aboriginal health.

As part of the original EIS, the potential health effects of the Project were evaluated using a screening level risk assessment, or SLRA. The results of the health risk assessment were provided as Appendix W to the original EIS. The SLRA has been included as Appendix W to the revised EIS. The SLRA was completed using a numerical screening tool developed by Health Canada. At that time, Health Canada provided the current “Spreadsheet Tool for Human Health Detailed Quantitative Risk Assessment” dated December 12, 2011. The SLRA focussed on the potential effects of the Project on human health as a result of the exposure to compounds generated, and released, as a result of the Project. The SLRA does not explicitly look at other determinants of health, such as social and economic, as these factors are addressed separately in Sections 6.16 and 6.17, respectively.

The results of the numerical risk model was a calculation of the hazard quotients for each of the contaminants of concern identified in the screening process, and for each exposure scenario. The results of the risk modelling are considerably lower than the acceptable risk target hazard quotient (HQ) of 0.2 recommended in the Health Canada. As none of the scenarios approach the acceptable risk target threshold, there are no predicted adverse effects of the Project on human health.

6.19 Heritage Resources

The assessment of heritage resources component focusses on those aspects of the Project regulated under the *Ontario Heritage Act*, and characterized the effects using eh following VCs:

- Archaeological sites; and
- Historic heritage sites.

The prediction of potential effects was done by identifying the presence, or potential for the presence, of heritage resources within the areas to be disturbed by the Project. The determination of the likelihood for archaeological resources to be present within the Project footprint was done in accordance with the requirements of the Ontario Heritage Act, and included the completion of a Stage 1 and Stage 2 archaeological assessment in accordance with the methodologies developed by the Ministry of Tourism, Culture and Sport (MTCS). The findings of the assessments were assessment were documented (provided as Appendix U to the EIS), and reviewed by MTCS have, who expressed satisfaction at the recommendations made.

Based on the findings of the archeological studies completed for the Project (Appendix U to the EIS), it was concluded that the area of the Project "…does not exhibit archaeological potential, therefore it is recommended that the location does not require further archaeological assessment." The archaeological report was submitted to MTCS for review, who expressed satisfaction at the recommendations made. The low archaeological potential evaluated for the Project is also supported the proximity to Thunder Lake and Wabigoon Lake. These areas would have been the preferred locations for settlement, and this settlement would have been related to available food resources (e.g., fish, rice), and access (e.g., canoe routes).

There were no residual adverse effects predicted for the heritage resources component.

6.20 Aboriginal Peoples

Considering the feedback provided in the Round 1 information requests and knowledge of similar resource projects, the following VCs were used for determining the effects on Aboriginal peoples:

- Health effects;
- Gathering of plant material;
- Hunting, trapping, fishing;
- Cultural activities; and
- Socio-economic effects.

A qualitative evaluation of potential effects of the Project identified that there would be adverse or positive effects for all of the Aboriginal peoples VCs. All of these effects are considered to be residual and are advanced for the determination of significance.

6.21 Summary of Predicted Project Effects

A summary of the above steps in the effects assessment process is provided in Table 6.21-1.

Table 6.21-1: Summary of Predicted Effects in Revised EIS

Discipline or Component	Valued Components (VCs)	Indicators	Predicted Effects	Predicted Adverse Effects	Predicted Residual Adverse Effects
Terrain and soils	Natural Landscapes	Uniqueness of surface features from surrounding terrain	Yes	Yes	Yes
	Overburden	Erosion of disturbed overburden	— (1)	—	—
	Soil chemistry	Changes in soil chemistry	—	—	—
Geology and geochemistry	Pit lake water quality	All	Yes	Yes	Yes
Noise	Ambient noise levels	Equivalent noise levels, LEQ	Yes	Yes	Yes
	Noise disturbance to wildlife (including SAR)	Area predicted LEQ above 50 dBA	Yes	Yes	Yes
	Blasting noise and vibration	Peak sound pressure level	Yes	Yes	Yes
		Peak particle velocity	Yes	Yes	Yes
	Noise related health effects	Absolute sound pressure, LDN	Yes	Yes	Yes
		Percent highly annoyed, %HA	Yes	Yes	Yes
Light	Light trespass	Ambient light levels	Yes	† (2)	†
Air quality	Air quality	All	Yes	Yes	Yes
Climate	GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	Yes	Yes	Yes
	Changes in climate due to the Project	All	Yes	†	†
Surface water quality	Surface water quality	Various	Yes	Yes	Yes
Surface water quantity	Surface water quantity	Increase in surface flows	Yes	Yes	Yes
		Decreases in surface flows	Yes	Yes	Yes
		Change in lake levels	Yes	†	†
Groundwater quality	Groundwater quality	All	Yes	†	†
Groundwater quantity	Groundwater quantity	Decreasing elevations in private wells	Yes	Yes	‡ (3)
		Decreasing contributions to surface flow patterns	Yes	Yes	Yes
Wildlife and wildlife Habitat	Wildlife Species at Risk	Common Nighthawk	Yes	Yes	Yes
		Northern Myotis/Little Brown Myotis	Yes	Yes	Yes
		Barn Swallow	Yes	Yes	Yes
	Ungulates	Moose	Yes	Yes	Yes
	Furbearers	American Marten	Yes	Yes	Yes
	Upland Birds	Upland birds	Yes	Yes	Yes
	Wetland Birds	Marsh birds	Yes	Yes	Yes
	Small mammals	Small mammals	Yes	Yes	Yes
	Reptiles and amphibians	Reptiles and amphibians	Yes	Yes	Yes
	Invertebrates	Terrestrial invertebrates	Yes	Yes	Yes
Migratory Birds	Upland Birds	Upland birds	Yes	Yes	Yes
	Wetland Birds	Marsh birds	Yes	Yes	Yes
Fish and fish habitat	Stream-resident fish population	Habitat loss	Yes	Yes	‡
		Habitat alteration or disruption	Yes	Yes	‡
		Potential for mortality	Yes	Yes	Yes

Table 6.21-1: Summary of Predicted Effects in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Predicted Effects	Predicted Adverse Effects	Predicted Residual Adverse Effects
	Migratory fish populations	Habitat loss	Yes	Yes	‡
		Habitat alteration or disruption	Yes	Yes	‡
		Potential for mortality	—	—	—
	Lake-resident fish populations	Habitat loss	—	—	—
		Habitat alteration or disruption	—	—	—
		Potential for mortality	—	—	—
	Fish species at risk	Habitat loss	—	—	—
		Habitat alteration or disruption	—	—	—
		Potential for mortality	—	—	—
Wetlands and vegetation	Wetland extent	Wetland extent	Yes	Yes	Yes
	Vegetation communities and species	Floating Marsh Marigold (Caltha natans)	—	—	—
Land use	Land use planning and policies	Conflict with accepted land uses as stipulated in approved land use plans.	Yes	Yes	Yes
		Overlap with protected areas.	Yes	Yes	Yes
	Aggregate operations	Change in access to aggregate resources.	Yes	Yes	Yes
		Change in demand of aggregate resources extraction.	Yes	Yes	Yes
	Forestry	Change in access to forestry resources for management.	Yes	Yes	Yes
	Mineral exploration	Change in access to mineral claims for exploration and production.	Yes	Yes	Yes
	Fishing - recreational and commercial	Change in access to and abundance of fisheries resources, and therefore, the ability to fish.	Yes	Yes	Yes
	Hunting	Change in access to and abundance of wildlife resources, and therefore, the ability to hunt.	Yes	Yes	Yes
	Trapping	Change in access to and abundance of wildlife resources, and therefore, the ability to trap.	Yes	Yes	Yes
	Cottagers and outfitters	Change in access to cottage and/or outfitter areas.	Yes	Yes	Yes
		Alteration in the enjoyment of properties, their surroundings and their property, or intrinsic values.	Yes	Yes	Yes
	Other recreational uses	Change in access for residents and visitors to public lands for non-consumptive purposes such as all-terrain travel (e.g., motorized recreational vehicles), canoeing, viewing wildlife and landscape, and general physical activities such as walking and hiking.	Yes	Yes	Yes
		Change in access for residents and visitors to pick berries and/or mushrooms or other for consumptive purposes.	Yes	Yes	Yes
Social	Population demographics	Population change	Yes	Yes	Yes
	Education	Capacity of education services	Yes	Yes	Yes
		Education attainment	Yes	Yes	Yes
		Project-specific Training	Yes	Yes	Yes

Table 6.21-1: Summary of Predicted Effects in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Predicted Effects	Predicted Adverse Effects	Predicted Residual Adverse Effects
	Infrastructure and services	Municipal Services	Yes	Yes	Yes
		Community services such as recreation, health and social services	Yes	Yes	Yes
	Housing and property values	Housing availability	Yes	Yes	Yes
		Property values	Yes	Yes	Yes
	Public safety	Crime rate	Yes	Yes	Yes
		Capacity of emergency services	Yes	Yes	Yes
		Requests for emergency services initiated by the Project	Yes	Yes	Yes
	Transportation and traffic	Road network capacity and conditions	Yes	Yes	Yes
Economic	Labour force, labour participation and employment	Labour income	Yes	Yes	Yes
	Income levels	Employment	Yes	Yes	Yes
	Cost of living	Income levels and categories	Yes	Yes	Yes
	Real estate	Current prevailing cost of living	Yes	Yes	Yes
	Economic development	Housing prices and affordability	Yes	Yes	Yes
	Existing businesses	Municipal taxes and contribution to economic development projects	Yes	Yes	Yes
	Government revenues	Local business availability	Yes	Yes	Yes
Human health	Human health	Aboriginal health	Yes	†	†
		Non-Aboriginal health	Yes	†	†
Heritage resources	Archaeological sites	Presence of a site	—	—	—
		Disturbance of a site	—	—	—
	Historic heritage sites	Presence of a site	—	—	—
		Disturbance of a site	—	—	—
Aboriginal peoples	Health effects	Changes in water quality downstream of the Project site	Yes	Yes	Yes
		Changes in quality of harvested plants, animals, or fish	Yes	Yes	Yes
		Changes in health due to noise and vibration	Yes	Yes	Yes
	Gathering of plant material	Removal of locations of traditionally harvested vegetation	Yes	Yes	Yes
		Restricted access to areas of previous traditional plant harvesting	Yes	Yes	Yes
		Change in plant quality	Yes	Yes	Yes
		Diminished on-the-land experience	Yes	Yes	Yes
	Hunting, trapping, fishing	Changes in populations of harvested animals or fish	Yes	Yes	Yes
		Change in access to areas previously used for traditional hunting, trapping, or fishing activities	Yes	Yes	Yes
		Change in amount of habitat	Yes	Yes	Yes
		Change in quality of fish	Yes	Yes	Yes
		Diminished on-the-land experience	Yes	Yes	Yes
	Cultural activities	Removal of cultural sites or restricted access to cultural sites	Yes	Yes	Yes
		Reduction in traditional activities	Yes	Yes	Yes
	Socio-economic effects	Economic effects	Yes	Yes	Yes

Table 6.21-1: Summary of Predicted Effects in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Predicted Effects	Predicted Adverse Effects	Predicted Residual Adverse Effects
		Social effects	Yes	Yes	Yes

Notes:
(1) The "—" symbol denotes where there were no effects predicted as a result of the Project for the VC and indicator
(2) The "†" symbol for where Project effects were predicted, but the effects were not measurable, or below threshold used for determining whether the effects were adverse (i.e., there were no adverse effects)
(3) The "‡" symbol denotes where adverse effects were predicted, but the effects were eliminated or offset by the Project mitigation (i.e., there were no residual adverse effects)

6.22 Summary of Mitigation

A number of mitigation measures will be implemented at the Project to mitigate the potential adverse effects. A list of all these mitigation measures is provided in Table 6.22-1.

Table 6.22-1: Summary of Mitigation Measures

Mitigation Identifier	Mitigation Description
Mit_001	Reduce the overall height of the constructed features to the extent possible.
Mit_002	Construct WRSA and overburden stockpiles with a 3:1 (horizontal to vertical) side slope.
Mit_003	Initiate construction of the WRSA from the western edge
Mit_004	Vegetate the western facing side of the WRSA as soon as possible
Mit_005	Vegetate of the overburden stockpile as soon as possible
Mit_006	Decommission the low-grade ore (LGO) stockpile at the end of operations
Mit_007	Overburden materials (clay, sand or organic material) stripped during the site preparation and construction phase will be placed in the overburden stockpiles located directly to the south of the proposed open pits.
Mit_008	Construct a perimeter ditch and seepage collection system around the operations area to capture and direct all runoff from the site to the water management system.
Mit_009	Equipment will be maintained in good working order and inspected regularly
Mit_010	Re-fueling of equipment will be done in a manner to limit the potential for spills
Mit_011	Fuel will be stored in a lined, contained area.
Mit_012	Fueling vehicles will be parked in a concrete lined area when not in use.
Mit_013	Emulsion will be stored and dispensed in a lined, contained area
Mit_014	Trucks used for the delivery of emulsion will be parked in a concrete lined area when not in use.
Mit_015	Processing plant area will be lined and equipped with runoff and seepage collection
Mit_016	LGO stockpile will be lined and equipped with runoff and seepage collection
Mit_017	Activities on the overburden stockpiles will be minimized and the stockpiles left undisturbed until closure activities are underway.
Mit_018	The WRSA will be covered with a low permeability cover during closure
Mit_019	Waste rock will be evaluated and segregated between PAG and NAG rock, if feasible
Mit_020	The PAG waste rock would be placed in the mined out areas of the open pit, to the extent practical.
Mit_021	A water cover will be maintained over the tailings in the TSF during operations
Mit_022	The open pit will be allowed to flood at closure

Table 6.22-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_023	Tailings within the TSF will be isolated using either a low permeability dry cover, or a wet cover of non-process water. The preferred option for limiting environmental effects is a wet cover.
Mit_024	Batch treatment of the pit lake during filling, as required, to meet PWQO prior to release.
Mit_025	Heavy equipment activity will be conducted between the hours of 07:00 and 22:00, if feasible
Mit_026	Endeavor to schedule noise causing events, such as blasting, to reduce disruption to residents.
Mit_027	Advise nearby residents of significant noise-causing activities, such as blasting.
Mit_028	All internal combustion engines will be fitted with appropriate muffler systems
Mit_029	Implement a modern blasting program that minimizes the blast area, the overall amount of explosives required, and through detonating procedures, minimize the amount of explosives per delay.
Mit_030	Adjust blasting practices if effects of vibration to spawning shoals is identified
Mit_031	Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator bucket to the bed of the truck
Mit_032	The WRSA and overburden stockpile will be situated to act as noise berms
Mit_033	In the event that complaints lead to the identification of specific sources of concern, source-specific abatement such as noise walls, berms, or operational restrictions will be employed, as appropriate.
Mit_034	Activities during the site preparation and construction phase will generally occur during the daytime. If there are times when lighting is required to ensure the safety of the workers, portable lighting will be used in required areas only.
Mit_035	Portable lighting will be directed downward
Mit_036	The higher Lux illumination levels (>80) will be placed within the process plant and mine infrastructure buildings, which contains the process and electrical equipment.
Mit_037	All externally mounted luminaires and their associated lamps will be designed to meet the requirements and recommendations of the Canadian Electrical Code (CEC), and the Building Code of Ontario.
Mit_038	External light fixtures will be installed at a tilt angle of 45º
Mit_039	Cut off angles for external lightings will be designed to minimize the off-site light trespass
Mit_040	Nighttime illumination will not be provided at the tailings storage facility (TSF).
Mit_041	Nighttime illumination will only be provided in the open pit when required. Portable lighting will be used in these situations.
Mit_042	Activities during the closure phase will generally occur during the daytime. If there are times when lighting is required to ensure the safety of the workers, portable lighting will be used in required areas only.
Mit_043	Blasting will likely be restricted to once per day, and only a few days per week.
Mit_044	All internal combustion engines will be properly maintained and all emission control systems (e.g., diesel particulate filters) will be kept in good working order.
Mit_045	Water and chemical suppressants will be used for dust control on the haul roads at the mine site when temperatures are above freezing
Mit_046	Best management practices plan for dust control will be implemented on the site during site preparation and construction, operations and closure.
Mit_047	The Project will utilize the 115 kV transmission line adjacent to the Project
Mit_048	The WRSA will be located immediately to the north of the open pit
Mit_049	Placing the overburden storage area immediately to the south of the open pit to reduce the haul distances.
Mit_050	Project design incorporates a compact footprint.
Mit_051	Perimeter runoff and seepage collection systems will be constructed around the TSF.
Mit_052	The drawdown zone of the dewatering process will capture all seepage that bypasses the seepage collection systems and will report to the open pit.
Mit_053	During operations, excess water not required in the process will be treated to concentrations that meet Provincial Water Quality Objectives (PWQO) or Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life, prior to discharging to Blackwater Creek. In the case of mercury, effluent will be treated to meet the background concentrations in Blackwater Creek.

Table 6.22-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_054	Industry standard erosion and sediment controls, such as sediment traps within ditches, will be implemented during the site preparations and construction phase.
Mit_055	There will be no discharges to surface water during the closure phase.
Mit_056	During closure, the site will be graded such that runoff for the operations area will be directed to the open pit during closure and post-closure phases.
Mit_057	Effectively manage water collected on-site using constructed storage facilities, reducing the need for fresh water withdrawals and discharges of treated water.
Mit_058	An engineered structure, designed to dissipate flows and avoid erosion, will be constructed to discharge effluent during operations into Blackwater Creek.
Mit_059	Fresh water takings from tree nursery irrigation ponds on Thunder Lake Tributaries 2 and 3 will not exceed 5% of the flow entering the ponds
Mit_060	Once the open pit has been filled, excess water from the open pit will be passively released through an engineered spillway into the existing channel of Blackwater Creek Tributary 1.
Mit_061	Effluent from the processing plant will be treated prior to being discharged to the TSF. Effluent directed to the TSF would meet MMER requirements.
Mit_062	The floor of the TSF will be low-permeability using both native soils and suitable clay from open pit stripping. In the event the volume of clay is insufficient, a synthetic liner will be used.
Mit_063	Deepen those wells where the drawdown affects the wells ability to provide the required supply.
Mit_064	Financial assurance will be provided to MNDM to deepen neighbouring residential wells, if required, as part of Project start-up approvals.
Mit_065	Minimized the amount of habitat clearing required for the Project by siting Project infrastructure in previously disturbed areas and optimizing the use of existing roadways.
Mit_066	Develop slope dependent vegetated buffers along rivers creeks and wetlands in conjunction with the MNRF. Buffers should be 120 m, wherever feasible.
Mit_067	Timber clearing will be conducted outside the breeding bird window (May 1 to August 15).
Mit_068	Closure activities should include revegetation with species suitable for the development of habitats capable of supporting a diversity of wildlife species.
Mit_069	Enforcement of speed limits within the Project area
Mit_070	Avoid disturbing areas with suitable bird breeding habitat, where possible.
Mit_071	Wildlife awareness training for all staff will be provided including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence.
Mit_072	Disposal of food waste generated on site will be done in an appropriate manner
Mit_073	Clearing of potential terrestrial reptile and amphibian breeding habitats will be restricted to periods outside the breeding season as directed by MNRF
Mit_074	Develop a wetland clearing strategy with the local MNRF to reduce the effects to overwintering frogs (i.e. draining wetlands to discourage hibernation).
Mit_075	If habitat cannot be avoided, alternate nesting habitat will be provided as a provision of compensatory habitat for species protected under the ESA
Mit_076	Acceptable buffers will be provided around all raptor nests identified throughout all Project phases
Mit_077	Prior to overburden removal, any beaver dams within the Project footprint will be removed and the impoundments will be allowed to draw down.
Mit_078	Activities and the construction of Project components that will impact or overprint watercourses will occur during the fisheries timing window when in-stream work is permitted.
Mit_079	To the extent possible, fish in the sections of Blackwater Creek Tributary 1 that will be isolated by the construction of the perimeter ditch and overprinted by the removal of overburden from the open pit will be captured and relocated to the same tributary downstream from the operations area, or to the main branch of Blackwater Creek.
Mit_080	To the extent possible, fish in the sections of Blackwater Creek Tributary 2 that will be isolated by the construction of the perimeter ditch and overprinted by the construction of the TSF and minewater pond will be

Table 6.22-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
	captured and relocated to the same tributaries downstream from the operations area, or to the main branch of Blackwater Creek.
Mit_081	Pump intakes in the irrigation ponds at the former MNRF tree nursery will be fitted with fish screens to prevent entrainment.
Mit_082	As the Project advances, detailed engineering will be completed to ensure that all downstream culverts can support any predicted increases in flows and maintain current levels of fish passage.
Mit_083	Provide offsetting of fisheries habitat losses as part of the authorization required under the Fisheries Act.
Mit_084	Retention of forested areas wherever feasible.
Mit_085	Identify and protect the locations of any known SAR or provincially significant plant.
Mit_086	Broadcast spraying of herbicides will be avoided
Mit_087	Revegetation of all slopes around the open pit to encourage the development of riparian habitats.
Mit_088	Reclamation of mining footprints to be carried out in accordance with O.Reg. 240/00.
Mit_089	Seeding or hydro-seeding of the reclaimed areas with native seed mix.
Mit_090	Minimize crown land in the Project footprint
Mit_091	Minimize activities on the eastern portion of the Project property.
Mit_092	During the operating life of the Project, the operations area will be fenced and no access will be permitted for security and safety reasons. Access to the former MNRF tree nursery will be controlled. Aboriginal peoples will be able to arrange for accompanied access to these areas with Treasury Metals. Appropriate signage will be placed around areas where access is limited.
Mit_093	Implement a Communications Management Plan to address ongoing engagement with potentially affected stakeholders and Aboriginal groups throughout the life of the Project. The plan should include a framework for a transparent grievance process.
Mit_094	Treasury Metals will undertake a land and resources use baseline to establish a pre-construction baseline of the land and resource users.
Mit_095	Develop a Socio-Economic Management Plan to help ensure commitments are implemented, adverse socio-economic effects are minimized, results are monitored, and effects are adaptively managed.
Mit_096	Collect traditional land use information for the Project area through meetings and traditional land use studies to identify areas of plant gathering, hunting, trapping, fishing, and cultural activities.
Mit_097	Contract security services to help promote a secure and safe worksite environment
Mit_098	Incorporate strategies and actions to aid residents following closure in the Socio-Economic Management Plan.
Mit_099	Treasury Metals will establish and enforce traffic safety protocols, regulatory and cautionary signage, road maintenance and emergency response plans on all Project roads to prevent collisions and accidents.
Mit_100	Ongoing engagement with potentially affected Aboriginal peoples throughout the life of the Project.
Mit_101	Ongoing engagement with potentially affected stakeholders throughout the life of the Project.
Mit_102	Treasury Metals will undertake an update of the socio-economic baseline to establish a pre-construction baseline of the affected communities prior to commencing the Project site preparation and construction
Mit_103	Employment preference will be given to local and regional labour where possible, including Aboriginal and non-Aboriginal communities. This will be dependent upon the skills and workforce being available locally.
Mit_104	Develop training and job transfer policies to support workforce development in the socio-economic study area
Mit_105	Develop training programs for unemployed and under employed residents and non-workers
Mit_106	Treasury Metals will communicate appropriate information (e.g., the timing and communities in which new residents may locate) to the school district(s) to assist with their resource planning process.
Mit_107	Treasury Metals will communicate education requirements needed for employment on the site.
Mit_108	Treasury Metals will work with specific affected homeowners to ensure that their concerns about potential Project-related effects are addressed.
Mit_109	Treasury Metals will work with local and regional governments to minimize the effects of in-migration and out-migration where possible.

Table 6.22-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_110	Treasury will work with public safety services to develop safety and work policy guidelines for mine workers, including a policy of no alcohol or drugs onsite and policies and guidelines to support a respectful work environment.
Mit_111	Incorporate strategies and actions to help local agencies monitor community wellbeing and take corrective actions where appropriate.
Mit_112	Treasury Metals will engage the Local Services Board in Wabigoon to acquire Tree Nursery Road in its entirety from north of Normans Road.
Mit_113	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding the snow plow turn-around for Anderson Rd. and Highway 17.
Mit_114	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding the need for lighting at the Anderson Rd. and Highway 17 intersection.
Mit_115	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding clearing of shrubbery, trees, soil mounds, etc. that could cause a visual obstruction for vehicles using the Anderson Rd. and Highway 17 intersection.
Mit_116	Treasury will maintain, where applicable, a local purchasing policy to purchase goods and services from local suppliers. This policy has the expectation that goods and services will be purchased locally assuming price, delivery and service is competitive with outside suppliers.
Mit_117	Revegetation of the WRSA and TSF will be done using species that are not traditionally used for medicinal purposes, or for consumption, and would deter these types of plants from growing.
Mit_118	Leave a 50 m buffer zone around remaining watercourses within the Project area.
Mit_119	If previously undocumented archaeological resources are discovered, the person discovering the resources will stop alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (l) of the Ontario Heritage Act.
Mit_120	If human remains are discovered, alteration of the site will stop and the person making the discovering will immediately notify the police, or coroner, and the Registrar of cemeteries, at the Ministry of Consumer Services, as required under the Cemeteries Act, R.S.O. 1990 c.C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force).
Mit_121	Restrict activities and development within 300 m of major water sources and within 300 m of historical travel routes, to only those areas where an archeological assessment has been completed.
Mit_122	Do not allow new ground altering activities to occur in areas where an archaeological assessment has not been completed. Once an archaeological assessments has been completed ground altering activities.
Mit_123	At closure, continue training opportunities to help residents to increase their competitiveness and chances to get employment elsewhere

7.0 CUMULATIVE EFFECTS

7.1 Methodology and Scoping

The approach used for assessing the potential cumulative effects of the Project are consistent with the requirements of CEAA 2012, and follow the procedures set out by the Agency in the document entitled “Technical Guidance for Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*, 2012” (CEAA, 2014). Additional information is set out in the operational policy statement entitled “Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*, 2012” (CEAA, 2015). The process for evaluating cumulative effects includes the following five steps:

- Scoping;
- Analysis;
- Mitigation;
- Significance; and
- Follow-up.

The guidance from the Agency states that the assessment of cumulative effects should be done for those valued components (VCs) for which residual environmental effects are predicted. Residual environmental effects are those effects that remain after consideration of technically and economically feasible mitigation. In total, 62 VCs were identified for use in describing the effects of the Project on the environment, 50 of which were identified as having residual adverse effects (see Section 6 for detailed description).

The cumulative effects assessment used both spatial and temporal boundaries for each of the VCs identified as having residual effects. These boundaries were used as the extent of the effects of the applicable VCs for comparison with past, current and future projects in the vicinity of the Goliath Gold Project t assess cumulative effects.

Spatial extents were identified giving considerations on the nature of the VC and the characteristic of the residual Project effects. It should be noted that for a cumulative effect to occur with the effects of the Project, the physical activity does not need to be located within the identified spatial extent. Rather, the effects of the physical activity needs to overlap with the spatial extents identified.

The temporal boundaries used for assessing cumulative effects were selected to be consistent with those used in evaluating the effects of the Project, namely:

- Site preparation and construction phase (2 years);

- Operations (11 to 12 years);
- Closure (3 years); and
- Post-closure (beyond year 17).

7.2 Activities Considered for Assessing Cumulative Effects

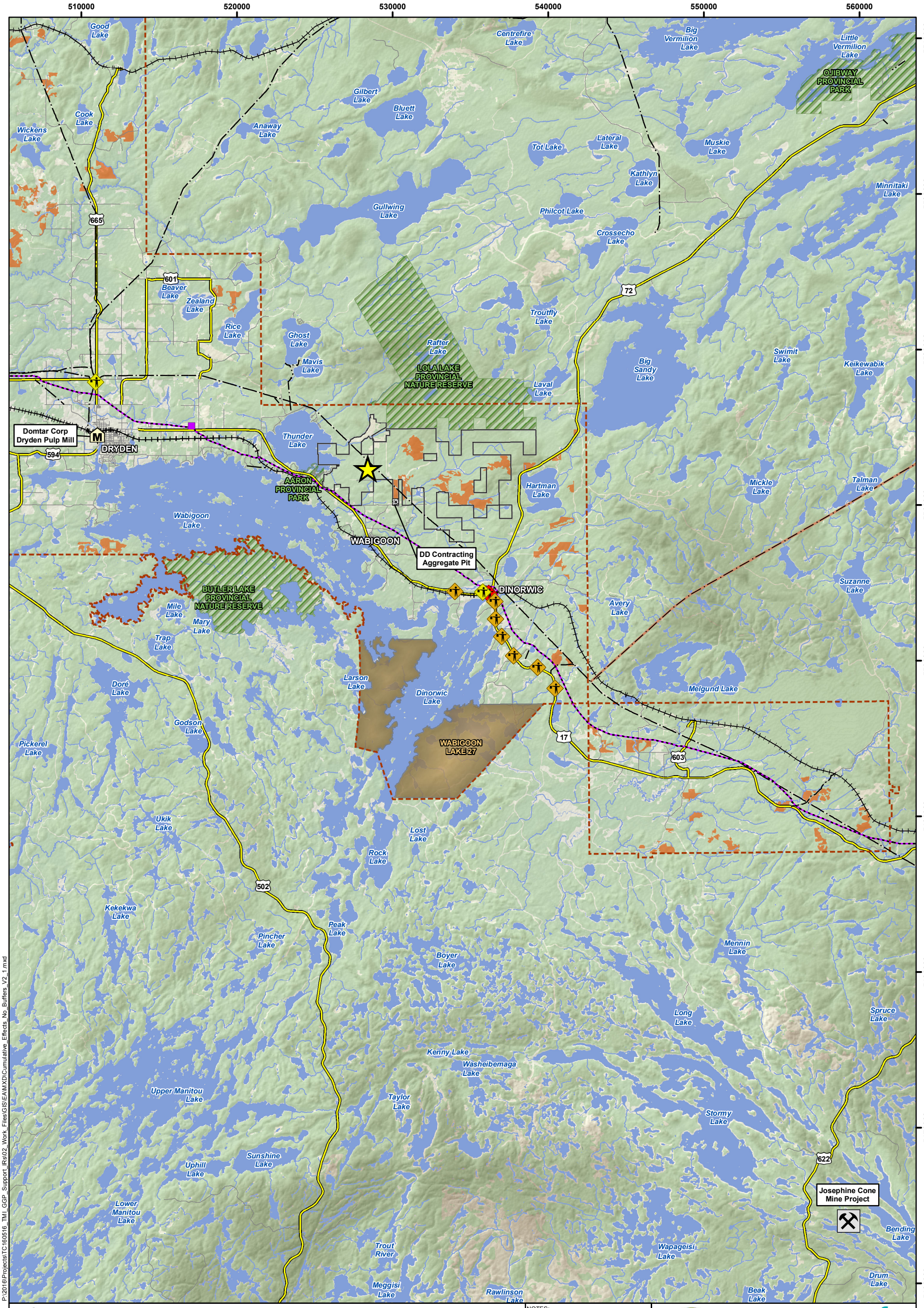
In evaluating the potential effects of the Project, consideration was given to the existing conditions onto which the Project effects would be added. As set out in the operational policy statement (CEAA, 2015) and the technical guidance from the Agency (CEAA, 2014), the use of the present-day conditions is an appropriate means for capturing the cumulative effect from past activities.

The following future activities, shown on Figure 7.2-1 were considered as part of the cumulative effects assessment for the Project. These future Project were specifically identified as part of the Round 1 information requests:

- Treasury Metals Inc. exploration program;
- Highway 17;
- Canadian Pacific rail line;
- forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill;
- proposed 1-5 MW power generation facility;
- Energy East pipeline;
- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- the 230kV transmission line proposed by Wataynikaneyap Power; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon

7.3 Assessment of Cumulative Effects

To determine the potential for cumulative effects associated with the above projects, a series of tables were prepared that explore each of the VCs for which there were predicted residual adverse effects. A final list of the potential cumulative effects for the Project is provided in Table 7.3-1. In total there were 77 potential cumulative effects. However, none of the cumulative effects were identified as altering the predicted magnitudes of the residual effects described in Section 6. Therefore, the potential cumulative effects would not alter the significance of residual effects determine in Section 8.



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LEGEND

- Site Location
- Property Boundary of Claims and Dispositions
- Josephine Cone Mine Project
- Energy East Pipeline Pumping Station
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- Natural Gas Pipeline (Proposed upgraded for Energy East Pipeline)
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Energy East Pipeline route extracted from Energy East Pipeline Project 'Environemental and Socio-economic Assessment', Stantec, 2014.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

0 2.5 5 10 15 20 Kilometres

GOLIATH GOLD PROJECT

Cumulative Effects

PROJECT N°: TC160516 | **FIGURE: 7.2-1**

SCALE: 1:225,000 | DATE: August 2017

Table 7.3-1: Summary of Cumulative Effects Screening

Future Project	Discipline	Do Spatial Extents Overlap?	Do Temporal Boundaries Overlap?	Potential for Cumulative Effects
Treasury Metals exploration program	Terrain and Soils	Yes	Yes	Although these activities will overlap, the effects are not similar. There would be no cumulative effects.
	Noise	Yes	Yes	It is unlikely the relatively limited activities associated with exploration would alter the noise predictions
	Air Quality	Yes	Yes	There is the potential for overlap in space and time. It is expected that the level of activity would be small compared to the Project
	Surface Water Quality	Yes	Yes	These activities are not expected to measurably alter surface water quality.
	Surface Water Quantity	Yes	Yes	These activities are not expected to measurably alter surface water quantities
	Groundwater Quantity	Yes	Yes	These activities are not expected to alter surface groundwater quantities
	Wildlife and Wildlife Habitat	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on wildlife
	Migratory Birds	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on migratory birds
	Fish and Fish Habitat	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on fish
	Wetlands and Vegetation	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on wetland and vegetation
	Land Use	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Social Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Economic Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Aboriginal Peoples	Yes	Yes	These activities are too minor too have measurable cumulative effects
Highway 17	Surface Water Quality	Yes	Yes	These activities are not expected to measurably alter surface water quality.
	Wildlife and Wildlife Habitat	Yes/No	Yes	The effects do not overlap the LSA for most VCs, but are within the RSA used for ungulates. The cumulative effects to individuals are not likely to be measurable
	Land Use	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Social Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Economic Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Aboriginal Peoples	Yes	Yes	These activities are too minor too have measurable cumulative effects
Canadian Pacific Railway	Surface Water Quality	Yes	Yes	These activities are not expected to measurably alter surface water quality.

Table 7.3-1: Summary of Cumulative Effects Screening (continued)

Future Project	Discipline	Do Spatial Extents Overlap?	Do Temporal Boundaries Overlap?	Potential for Cumulative Effects
Canadian Pacific Railway	Wildlife and Wildlife Habitat	Yes/No	Yes	The effects do not overlap the LSA for most VCs, but are within the RSA used for ungulates. The cumulative effects to individuals are not likely to be measurable
	Land Use	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Social Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Economic Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Aboriginal Peoples	Yes	Yes	These activities are too minor too have measurable cumulative effects
Dryden Forest Management Company	Terrain and Soils	Yes	Yes	While the FMA for the company overlaps with the viewscape of the WRSA, the planned harvesting areas (see Figure 7.2.5-1) are located several kilometres to the east of the project. As a result, there would be no cumulative effect on the view of the WRSA from Thunder Lake.
	Noise	Yes	Yes	While there are planned harvesting areas (see Figure 7.2.5-1) located within 5 km of the open pit, the activities would be far enough from the Project they would not alter the maximum predicted noise magnitudes which would occur in close proximity to the operations area.
	Air Quality	Yes	Yes	While there are planned harvesting areas (see Figure 7.2.5-1) located within 10 km of the open pit, the activities would be far enough from the Project they would not alter the maximum predicted air concentrations, which would occur in close proximity to the operations area.
	Surface Water Quality	Yes	Yes	Although there are planned harvesting activities that overlap small portions of the fisheries LSA (see Figure 7.2.5-1), they do not overlap the watercourses potentially affected by the project. Therefore, these activities are not expected to measurably alter surface water quality.
	Surface Water Quantity	Yes	Yes	Although there are planned harvesting activities that overlap small portions of the fisheries LSA (see Figure 7.2.5-1), they do not overlap the watercourses potentially affected by the project. Therefore, these activities are not expected to measurably alter surface water quantities.
	Groundwater Quantity	Yes	Yes	While the closest planned harvesting areas (see Figure 7.2.5-1) will overlap with the zone of influence resulting from the dewatering of the open pit and underground mine, the forestry activities are not expected to measurably alter groundwater quantities.

Table 7.3-1: Summary of Cumulative Effects Screening (continued)

Future Project	Discipline	Do Spatial Extents Overlap?	Do Temporal Boundaries Overlap?	Potential for Cumulative Effects
Dryden Forest Management Company	Wildlife and Wildlife Habitat	Yes	Yes	While the closest planned harvesting activities will overlap small portions of the wildlife LSA (see Figure 7.2.5-1), the affected areas are a small percentage of the available habitat. These activities are not expected to measurable alter the wildlife effects. While harvesting activities will also overlap with the wildlife RSA, any cumulative effects to individuals are not likely to be measurable at this scale.
	Migratory Birds	Yes	Yes	While the closest planned harvesting activities will overlap small portions of the migratory birds LSA (see Figure 7.2.5-1), the affected areas are a small percentage of the available habitat. These activities are not expected to measurable alter the migratory bird effects.
	Fish and Fish Habitat	Yes	Yes	Although this future activity will overlap with the fisheries LSA, the planned harvesting areas (See Figure 7.2.5-1) do not overlap the portions of Blackwater Creek used by the affected stream-based fish populations
	Wetlands and Vegetation	Yes	Yes	While the closest planned harvesting activities will overlap small portions of the wetlands and vegetation LSA (see Figure 7.2.5-1), the planned harvesting does not overlap with any of the wetlands affected by the Project. Additionally, the planned harvest within the LSA represents a small percentage of the available forested land. These activities are not expected to measurable alter the wetlands and vegetation effects.
	Land Use	Yes	Yes	The continuance of activities do not represent a cumulative effect distinct from the exiting conditions
	Social Factors	Yes	Yes	The continuance of activities do not represent a cumulative effect distinct from the exiting conditions
	Economic Factors	Yes	Yes	The continuance of activities do not represent a cumulative effect distinct from the exiting conditions
	Aboriginal Peoples	Yes	Yes	The continuance of activities do not represent a cumulative effect distinct from the exiting conditions

Table 7.3-1: Summary of Cumulative Effects Screening (continued)

Future Project	Discipline	Do Spatial Extents Overlap?	Do Temporal Boundaries Overlap?	Potential for Cumulative Effects
Domtar Dryden Pulp Mill	Air Quality	Yes	Yes	Although the pulp mill is located outside of the 10 km extent for cumulative air quality effects, there is a potential that the effects from Dryden pulp will overlap with those of the Project. It should be noted that the mill will need to comply with their ECA requirements at the property line. The highest air concentrations from the pulp mill will occur near the pulp mill, just as the highest concentration from the Project would occur near the property line of the Project. Therefore the high concentrations from these projects would not affect the same receptor, and thus the cumulative effects will not affect the magnitude of the air quality effects of the Project.
	Wildlife and Wildlife Habitat	Yes/No	Yes	The effects do not overlap the LSA for most VCs, but are within the RSA used for ungulates. The cumulative effects to individuals are not likely to be measurable. The local forestry effects are addressed for the Dryden Forest Management Company.
	Land Use	Yes	Yes	The continuance of activities do not represent a cumulative effect distinct from the exiting conditions
	Social Factors	Yes	Yes	The continuance of activities do not represent a cumulative effect distinct from the exiting conditions
	Economic Factors	Yes	Yes	The continuance of activities do not represent a cumulative effect distinct from the exiting conditions
	Aboriginal Peoples	Yes	Yes	The continuance of activities do not represent a cumulative effect distinct from the exiting conditions
Aggregate pits or quarries;	Terrain and Soils	Yes	Yes	Although these projects overlap, there is a low potential for tall structures at a quarry. Therefore, they would not be visible in the same viewscapes
	Noise	Yes	Yes	There is the potential for overlap in space and time. However, it is expected that the level of activity would not alter the maximum noise predictions. If the aggregate source was sufficiently close to the Project, it is likely that the recovery would be done using Treasury Metals equipment.
	Air Quality	Yes	Yes	There is the potential for overlap in space and time. It is expected that the level of activity would be small compared to the Project
	Surface Water Quality	Yes	Yes	These activities are not expected to measurably alter surface water quality.
	Surface Water Quantity	Yes	Yes	These activities are not expected to measurably alter surface water quantities
	Groundwater Quantity	Yes	Yes	These activities are not expected to alter surface groundwater quantities.

Table 7.3-1: Summary of Cumulative Effects Screening (continued)

Future Project	Discipline	Do Spatial Extents Overlap?	Do Temporal Boundaries Overlap?	Potential for Cumulative Effects
Aggregate pits or quarries;	Wildlife and Wildlife Habitat	Yes	Yes	These activities are not expected to meaningfully alter the magnitude of residual effects on wildlife
	Migratory Birds	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on migratory birds
	Fish and Fish Habitat	Yes	Yes	These activities are not expected to meaningfully alter magnitude the residual effects on fish
	Wetlands and Vegetation	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on wetland and vegetation
	Land Use	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Social Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Economic Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Aboriginal Peoples	Yes	Yes	These activities are too minor too have measurable cumulative effects
Wataynikaneyap Power	Wildlife and Wildlife Habitat	Yes/No	Yes	The effects do not overlap the LSA for most VCs, but are within the RSA used for ungulates. The cumulative effects to individuals is not likely to be measurable
	Land Use	Yes	Yes	This project is not expected to have a measurable cumulative effect
	Social Factors	Yes	Yes	This project is not expected to have a measurable cumulative effect
	Economic Factors	Yes	Yes	This project is not expected to have a measurable cumulative effect
	Aboriginal Peoples	Yes	Yes	This project is not expected to have a measurable cumulative effect
Local infrastructure	Noise	Yes	Yes	There is the potential for overlap in space and time. It is expected that the level of activity would not alter the maximum noise prediction on which the magnitude of effects are established.
	Air Quality	Yes	Yes	There is the potential for overlap in space and time. It is expected that the level of activity would be small compared to the Project
	Surface Water Quality	Yes	Yes	These activities are not expected to measurably alter surface water quality.
	Surface Water Quantity	Yes	Yes	These activities are not expected to measurably alter surface water quantities
	Wildlife and Wildlife Habitat	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on wildlife
	Migratory Birds	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on migratory birds
	Fish and Fish Habitat	Yes	Yes	These activities are not expected to alter magnitude the residual effects on fish

Table 7.3-1: Summary of Cumulative Effects Screening (continued)

Future Project	Discipline	Do Spatial Extents Overlap?	Do Temporal Boundaries Overlap?	Potential for Cumulative Effects
Local infrastructure	Wetlands and Vegetation	Yes	Yes	These activities are not expected to alter the magnitude of residual effects on wetland and vegetation
	Land Use	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Social Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Economic Factors	Yes	Yes	These activities are too minor too have measurable cumulative effects
	Aboriginal Peoples	Yes	Yes	These activities are too minor too have measurable cumulative effects

8.0 DETERMINATION OF SIGNIFICANCE

For each of the residual carried into the cumulative effects assessment (see Table 14.0-2), a determination of significance was completed (Section 8). The significance assessment incorporated consideration of the following measures identified in the EIS Guidelines:

- Magnitude;
- Geographic extent;
- Timing;
- Duration;
- Frequency; and
- Reversibility.

The methods used for assigning the above measures were set out in Section 8.1, and then applied on a discipline by discipline basis (Sections 8.2 through 8.21). The results of the determination of significance for all of the identified residual effects, including consideration of cumulative effects, indicated the following:

- There were no significant residual adverse effects identified for the Project.
- There were five (5) significant residual effects determined as positive. These effects were all for the economic discipline during the operations phase of the Project. The following five (5) VCs were identified with significant positive residual effects:
    - Labour force, labour participation and employment (operations phase);
    - Income level (operations phase);
    - Economic development (operations phase);
    - Existing businesses (operations phase); and
    - Government revenues (operations phase).
- There was one (1) significant residual effect identified as neutral in direction, specifically the real estate VC. Changes in property values were identified as having a significant positive effect from perspective of a seller, and a significant negative effect from the perspective of a buyer, resulting in a neutral direction from a population basis.

A summary of the significance determinations is provided in Table 8.0-1.

Table 8.0-1: Summary of the Determination of Significance in Revised EIS

Discipline	Valued Components (VCs)	Indicators	Site Preparation and Construction	Operations	Closure	Post Closure
Terrain and soils	Natural Landscapes	Uniqueness of surface features from surrounding terrain	—(1)	Not significant	Not significant	Not significant
	Overburden	Erosion of disturbed overburden	‡(2)	‡	‡	—
	Soil chemistry	Changes in soil chemistry	‡	‡	‡	—
Geology and geochemistry	Pit lake water quality	All	—	—	—	Not significant
Noise	Ambient noise levels	Equivalent noise levels, LEQ	Not significant	Not significant	Not significant	—
	Noise disturbance to wildlife (including SAR)	Area predicted LEQ above 50 dBA	(3)	(3)	(3)	—
	Blasting noise and vibration	Peak sound pressure level	Not significant	Not significant	—	—
		Peak particle velocity	Not significant	Not significant	—	—
	Noise related health effects	Absolute sound pressure, LDN	Not significant	Not significant	Not significant	—
		Percent highly annoyed, %HA	Not significant	Not significant	Not significant	—
Light	Light trespass	Ambient light levels	†(4)	‡	†	—
Air quality	Air quality	All	Not significant	Not significant	Not significant	—
Climate	GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	Not significant	Not significant	Not significant	—
	Changes in climate due to the Project	All	†	†	†	—
Surface water quality	Surface water quality	Various	†	Not significant	†	Not significant
Surface water quantity	Surface water quantity	Increase in surface flows	†	Not significant	†	Not significant
		Decreases in surface flows	†	Not significant	†	Not significant
		Change in lake levels	†	‡	†	‡
Groundwater quality	Groundwater quality	All	‡	‡	‡	‡
Groundwater quantity	Groundwater quantity	Decreasing elevations in private wells	—	‡	‡	‡
		Decreasing contributions to surface flow patterns	—	Not significant	Not significant	‡
Wildlife and wildlife Habitat	Wildlife Species at Risk	Common Nighthawk	Not significant	Not significant	Not significant	‡
		Northern Myotis/Little Brown Myotis	Not significant	Not significant	Not significant	‡
		Barn Swallow	Not significant	Not significant	Not significant	‡
	Ungulates	Moose	Not significant	Not significant	Not significant	‡

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline	Valued Components (VCs)	Indicators	Site Preparation and Construction	Operations	Closure	Post Closure
	Furbearers	American Marten	Not significant	Not significant	Not significant	‡
	Upland Birds	Upland birds	Not significant	Not significant	Not significant	‡
	Wetland Birds	Marsh birds	Not significant	Not significant	Not significant	‡
	Small mammals	Small mammals	Not significant	Not significant	Not significant	‡
	Reptiles and amphibians	Reptiles and amphibians	Not significant	Not significant	Not significant	‡
	Invertebrates	Terrestrial invertebrates	Not significant	Not significant	Not significant	‡
Migratory Birds	Upland Birds	Upland birds	Not significant	Not significant	Not significant	‡
	Wetland Birds	Marsh birds	Not significant	Not significant	Not significant	‡
Fish and fish habitat	Stream-resident fish population	Habitat loss	‡	‡	‡	‡
		Habitat alteration or disruption	‡	‡	‡	†
		Potential for mortality	Not significant	†	†	†
	Migratory fish populations	Habitat loss	‡	‡	‡	‡
		Habitat alteration or disruption	‡	†	‡	†
		Potential for mortality	‡	†	†	†
	Lake-resident fish populations	Habitat loss	—	—	—	—
		Habitat alteration or disruption	†	†	†	†
		Potential for mortality	—	—	—	—
	Fish species at risk	Habitat loss	—	—	—	—
		Habitat alteration or disruption	—	—	—	—
		Potential for mortality	—	—	—	—
Wetlands and vegetation	Wetland extent	Wetland extent	Not significant	Not significant	Not significant	Not significant
	Vegetation communities and species	Floating Marsh Marigold (Caltha natans)	Not significant	Not significant	Not significant	Not significant
Land use	Land use planning and policies	Conflict with accepted land uses as stipulated in approved land use plans.	Not significant	Not significant	Not significant	Not significant
		Overlap with protected areas.	Not significant	Not significant	Not significant	Not significant
	Aggregate operations	Change in access to aggregate resources.	Not significant	Not significant	Not significant	Not significant
		Change in demand of aggregate resources extraction.	Not significant	Not significant	Not significant	Not significant
	Forestry	Change in access to forestry resources for management.	Not significant	Not significant	Not significant	Not significant

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline	Valued Components (VCs)	Indicators	Site Preparation and Construction	Operations	Closure	Post Closure
	Mineral exploration	Change in access to mineral claims for exploration and production.	Not significant	Not significant	Not significant	Not significant
	Fishing - recreational and commercial	Change in access to and abundance of fisheries resources, and therefore, the ability to fish.	Not significant	Not significant	Not significant	Not significant
	Hunting	Change in access to and abundance of wildlife resources, and therefore, the ability to hunt.	Not significant	Not significant	Not significant	Not significant
	Trapping	Change in access to and abundance of wildlife resources, and therefore, the ability to trap.	Not significant	Not significant	Not significant	Not significant
	Cottagers and outfitters	Change in access to cottage and/or outfitter areas.	Not significant	Not significant	Not significant	Not significant
		Alteration in the enjoyment of properties, their surroundings and their property, or intrinsic values.	Not significant	Not significant	Not significant	Not significant
	Other recreational uses	Change in access for residents and visitors to public lands for non-consumptive	Not significant	Not significant	Not significant	Not significant
		Change in access for residents and visitors to pick berries and/or mushrooms or other for consumptive purposes.	Not significant	Not significant	Not significant	Not significant
Social	Population demographics	Population change	Not significant	Not significant	Not significant	Not significant
	Education	Capacity of education services	Not significant	Not significant	Not significant	Not significant
		Education attainment	Not significant	Not significant	Not significant	Not significant
		Project-specific Training	Not significant	Not significant	Not significant	Not significant
	Infrastructure and services	Municipal Services	Not significant	Not significant	Not significant	Not significant
		Community services such as recreation, health and social services	Not significant	Not significant	Not significant	Not significant
	Housing and property values	Housing availability	Not significant	Not significant	Not significant	Not significant
		Property values	Not significant	Not significant	Not significant	Not significant
	Public safety	Crime rate	Not significant	Not significant	Not significant	Not significant

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline	Valued Components (VCs)	Indicators	Site Preparation and Construction	Operations	Closure	Post Closure
		Capacity of emergency services	Not significant	Not significant	Not significant	Not significant
		Requests for emergency services initiated by the Project	Not significant	Not significant	Not significant	Not significant
	Transportation and traffic	Road network capacity and conditions	Not significant	Not significant	Not significant	Not significant
Economic	Labour force, labour participation and employment	Labour income	Not significant	Significant (positive)	Not significant	Not significant
	Income levels	Employment	Not significant	Significant (positive)	Not significant	Not significant
	Cost of living	Income levels and categories	Not significant	Not significant	Not significant	Not significant
	Real estate	Current prevailing cost of living	Not significant	Significant (neutral)	Not significant	Not significant
	Economic development	Housing prices and affordability	Not significant	Significant (positive)	Not significant	Not significant
	Existing businesses	Municipal taxes and contribution to economic development projects	Not significant	Significant (positive)	Not significant	Not significant
	Government revenues	Local business availability	Not significant	Significant (positive)	Not significant	Not significant
Human health	Human health	Aboriginal health	†	†	†	†
		Non-Aboriginal health	†	†	†	†
Heritage resources	Archaeological sites	Presence of a site	—	—	—	—
		Disturbance of a site	—	—	—	—
	Historic heritage sites	Presence of a site	—	—	—	—
		Disturbance of a site	—	—	—	—
Aboriginal peoples	Health effects	Changes in water quality downstream of the Project site	Not significant	Not significant	Not significant	Not significant
		Changes in quality of harvested plants, animals, or fish	Not significant	Not significant	Not significant	Not significant
		Changes in health due to noise and vibration	Not significant	Not significant	Not significant	Not significant
	Gathering of plant material	Removal of locations of traditionally harvested vegetation	Not significant	Not significant	Not significant	Not significant

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline	Valued Components (VCs)	Indicators	Site Preparation and Construction	Operations	Closure	Post Closure
		Restricted access to areas of previous traditional plant harvesting	Not significant	Not significant	Not significant	Not significant
		Change in plant quality	Not significant	Not significant	Not significant	Not significant
		Diminished on-the-land experience	Not significant	Not significant	Not significant	Not significant
	Hunting, trapping, fishing	Changes in populations of harvested animals or fish	Not significant	Not significant	Not significant	Not significant
		Change in access to areas previously used for traditional hunting, trapping, or fishing activities	Not significant	Not significant	Not significant	Not significant
		Change in amount of habitat	Not significant	Not significant	Not significant	Not significant
		Change in quality of fish	Not significant	Not significant	Not significant	Not significant
		Diminished on-the-land experience	Not significant	Not significant	Not significant	Not significant
	Cultural activities	Removal of cultural sites or restricted access to cultural sites	Not significant	Not significant	Not significant	Not significant
		Reduction in traditional activities	Not significant	Not significant	Not significant	Not significant
	Socio-economic effects	Economic effects	Not significant	Not significant	Not significant	Not significant
		Social effects	Not significant	Not significant	Not significant	Not significant

Notes:
(1) The "—" symbol denotes where there were no effects potential effects identified for the VC and indicator.
(2) The "‡" symbol denotes where adverse effects were predicted, but the effects were eliminated or offset by the Project mitigation (i.e., there were no residual adverse effects).
(3) For the "Noise disturbance to wildlife (including SAR)" indicator, the significance for the effects of noise on wildlife were incorporated into the effects of the Project on wildlife and wildlife habitat.
(4) The "†" symbol for where Project effects were predicted, but the effects were not measurable, or below threshold used for determining whether the effects were adverse (i.e., there were no adverse effects)

9.0 INDIGENOUS AND PUBLIC ENGAGEMENT

9.1 Interested Parties

Treasury Metals has been in communication with a number of parties both general public and Indigenous communities as they relate to the Project. The communities that are in close proximity to the Project site, and the Indigenous communities as designated by the Crown include:

- General Public; and
  - Residents living on Anderson Road / Tree Nursery Road;
  - Residents living on East Thunder Lake Road / Thunder Lake Road;
  - Residents living proximal to Wabigoon Lake / Thunder Lake;
  - Village of Wabigoon; and
  - City of Dryden.
- Indigenous Communities.
  - Wabigoon Lake Ojibway Nation;
  - Eagle Lake First Nation;
  - Naotkamegwanning (Whitefish Bay) First Nation
  - Lac Seul First Nation;
  - Wabauskang First Nation;
  - Grassy Narrows First Nation;
  - Lac des Mille Lacs First Nation;
  - Métis Nation of Ontario;
  - Aboriginal People of Wabigoon; and
  - Grand Council Treaty 3.

9.1.1 General Public

General public concerns and comments have been received by concerned parties making direct contact with Treasury Metals to state their concern or raise questions about the Project, at public meetings during presentations and question and answer periods, or via concerns presented to government agencies (primarily the CEA Agency) and relayed by the Agency to Treasury Metals.

9.1.1.1 Local Residents

The residents of Anderson Road, Tree Nursery Road, East Thunder Lake Road, Thunder Lake Road, Highway 11/17, those proximal to Wabigoon Lake, and those proximal to Thunder are the parties in closest proximity to the Project. Residents from these locations have interests in the potential effects and impacts to their health, lifestyle, and economic conditions due to the development of the Project.

9.1.1.2 Wabigoon/Dryden

The Project site is situated just to the east of the boundary of the City of Dryden and just to the north of the Community of Wabigoon. Given the proximity of the Project to these communities, they have been identified as interested parties in the Project.

9.1.1.2.1 Village of Wabigoon

The Village of Wabigoon has a long history associated with gold mining. Many Wabigoon area families have historical ties to the Goldrock mining activities. Since the closure of the Gold Rock Mines, Wabigoon's employment and economic base has been tied primarily to forestry and tourism.

9.1.1.2.2 City of Dryden

The City of Dryden also has some early ties to gold mining with mines operating just south of the City of Dryden and Wabigoon Lake in the Larson Bay / Contact Bay area during the early part of the 20th Century. However, the mainstay of Dryden's economy has been the forest industry. Until recently, the mill complex in Dryden included pulp and paper operations, paper converting and a sawmill; along with the associated woodlands operations. Recent closures of the sawmill, followed by the paper machines and converting facility have left the complex with a pulp mill only and significantly reduced employment in the Dryden area. Reduced employment opportunity has resulted in numerous people having to relocate away from the Wabigoon / Dryden area. This, in turn, has adversely affected the retail sector as well as real estate values in the area.

9.1.1.3 Participation of Government Agencies

Treasury Metals has received guidance in the development of the Project from both the Federal and Provincial governments. The primary source of direction from the Government of Canada has

been the CEA Agency. In addition to the EA guidelines for the Project being provided by the Agency, the Agency has provided ongoing direction to Treasury Metals throughout the EIS process. The CEA Agency also coordinates aspects of the EIS process with other Federal agencies and facilitates interaction between Treasury Metals and other Federal agencies as may be required.

On a Provincial level, the MNDM have provided a "one window" approach to the Project on behalf of Ontario. MNDM also facilitates interactions between Treasury Metals and other Provincial ministries as necessary. In order to keep all relevant government agencies abreast of the Project two "Interagency" meetings have occurred.

Interagency Meeting took place on October 25, 2012, March 25, 2014 and September 24, 2014 with participants joining by video link from the MNDM offices in Thunder Bay and the MNRF offices in Dryden. Others who could not participate from these locations joined via teleconference.

9.1.2 Indigenous Communities

Treasury Metals, as part of the revised EIS, has made further efforts to elicit and engage all the Indigenous communities as designated by the Crown. The Indigenous communities have been disaggregated to provide clear and concise documentation surrounding concerns and comments associated with each community. Treasury Metals' efforts to engage and how it has address concerns are fully documented within Section 9 of the revised EIS, and within Appendix DD – Aboriginal Engagement Report.

9.1.2.1 Wabigoon Lake Ojibway Nation

Wabigoon Lake Ojibway Nation is the First Nation in closest proximity to the Goliath Gold Project site. It is located on the shores of Dinorwic Lake approximately 45 km east of Dryden, Ontario and approximately 25 km from the Goliath Gold Project site, via Highway 17 and Wabigoon Lake Ojibway Nation Road. There is unrestricted access between Dinorwic Lake and Wabigoon Lake allowing the residents of Wabigoon Lake Ojibway Nation unrestricted access into Wabigoon Lake for fishing and other traditional Indigenous activities.

Treasury Metals has history of communications with Wabigoon Lake Ojibway Nation beginning in 2008. Contacts have included telephone conversations, emails, letters, and in-person meetings. Topics discussed have included information about the Project, a Memorandum of Understanding, preliminary Impact Benefits Agreement discussions, Traditional Knowledge Study, training, potential impacts and effects of the Project, and potential employment and business opportunities associated with the Project. To date, Treasury Metals has provided a significant amount of documentation to Wabigoon Lake Ojibway Nation regarding Project effects and development. Treasury Metals, as part of this, has offered to discuss funding opportunities to Wabigoon Lake Ojibway Nation for an environmental monitor, and a third party review of the material.

Wabigoon Lake Ojibway Nation received Project information and EIS-related materials, and has received additional material as it relates to the revised EIS and engagement activities to date.

9.1.2.2 Eagle Lake First Nation

Eagle Lake First Nation is located on the northeast shore of Eagle Lake, approximately 25 km west southwest of Dryden. Travelling by road (Highway 17/Highway 594/Highway 502) ELFN is located approximately 50 km from the site of the Project.

Treasury Metals has had ongoing contact with Eagle Lake First Nation since 2009. Treasury Metals has shared information about the company and the Project with Eagle Lake First Nation Chief and Council, resource staff and with community elders. Topics discussed have included information about the Project, Traditional Knowledge Study, training, potential impacts and effects of the Project, and potential employment and business opportunities associated with the Project. Treasury Metals has been in ongoing communications with Eagle Lake First Nation in regards to presenting the revised material supporting the EIS. In conjunction to this Treasury has provided a significant amount of documentation to Eagle Lake First Nation regarding Project effects and development.

9.1.2.3 Whitefish Bay First Nation

Whitefish Bay First Nation is located on the east side of Lake of the Woods close to the community of Sioux Narrows. By road (Highway 17 / Highway 71), Whitefish Bay First Nation is located slightly more than 200 km from the proposed Project site. Treasury Metals is aware that Whitefish Bay First Nation holds commercial fishing licenses on Thunder Lake and Wabigoon Lake.

Treasury Metals has been in contact with Whitefish Bay First Nation since November of 2012. Communication with Whitefish Bay First Nation included sharing Project-related information, meeting scheduling, employment opportunities, business opportunities, and presentation of information regarding impacts and effects due to the Project. Further to this, Treasury Metals attended the Natural Resource Career and Education Fair to support Whitefish Bay First Nation educational opportunities and jobs within natural resource fields. Treasury Metals approached Whitefish Bay First Nation about whether Whitefish Bay First Nation would be interested in a Memorandum of Understanding; Whitefish Bay First Nation agreed to consider it. Treasury Metals has been in ongoing communications with Whitefish Bay First Nation in regards to presenting the revised material supporting the EIS. In conjunction to this Treasury Metals has provided a significant amount of documentation to Whitefish Bay First Nation regarding Project effects and development.

9.1.2.4 Lac Seul First Nation

Lac Seul First Nation lies on the shores of Lac Seul approximately 40 km from the community of Sioux Lookout and over 100 km by road from the Project site. By road (Highway 17/Highway

72/Highway 664), it is approximately 105 km from the community of Frenchman's Head on Lac Seul Reserve to the Project site.

Treasury Metals has been in contact with Lac Seul First Nation since June of 2012. Treasury has participated in Career Fairs at Lac Seul First Nation, most recently in April 2017. Topics have included Career Fair participation, contracting opportunities, and consultation process. Treasury Metals has been in ongoing communications with Lac Seul First Nation in regards to presenting the revised material supporting the EIS. In conjunction to this, Treasury Metals has provided a significant amount of documentation to Lac Seul First Nation regarding Project effects and development.

9.1.2.5 Wabauskang First Nation

Wabauskang First Nation lies on the shores of Wabauskang Lake, approximately 38 km south of Ear Falls, Ontario. By road (Highway 17 - Highway 105), Wabauskang First Nation is located approximately 135 km from the Goliath Gold site. Wabauskang First Nation noted that some Wabauskang First Nation members live in the Wabigoon Dryden area. Further to this, Wabauskang First Nation historically held traditional lands located on the Wabigoon River system, proximal to the community of Quibell.

Although Wabauskang First Nation is located some distance from the Project site, Treasury Metals has been in contact with Wabauskang First Nation with respect to the Project since November of 2012. Topics of the discussion during meetings have included details about the Project, employment opportunities, training, financial opportunities, and impact and effects of the Project. Treasury Metals has been in ongoing communications with Wabauskang First Nation in regards to presenting the revised material supporting the EIS. In conjunction to this, Treasury Metals has provided a significant amount of documentation to Wabauskang First Nation regarding Project effects and development.

9.1.2.6 Grassy Narrows First Nation

Grassy Narrows First Nation is located 80 km to the northeast of Kenora. By road (Highway 17 and Highway 671) Grassy Narrows is approximately 240 km from the Project site. This community is downstream from the Project site. During the 1960's and 1970's, Grassy Narrows First Nation was adversely impacted by mercury contamination of the Wabigoon River that has been attributed to discharges from the pulp and paper mill in Dryden. Engagement with Grassy Narrows First Nation began in 2012. Treasury Metals has provided a significant amount of documentation to Grassy Narrows First Nation regarding Project effects and development.

9.1.2.7 Lac des Mille Lacs First Nation

Lac des Mille Lacs First Nation is comprised of two separate reserve lands located 185 kilometers and 145 kilometers to the southeast of the Project.

Engagement with Lac des Mille Lacs First Nation was initiated in 2017 following a request for information by Lac des Mille Lacs First Nation on April 5, 2016 and the formal listing of engagement needs with Lac des Mille Lacs First Nation on Dec 7, 2016. Lac des Mille Lacs First Nation has expressed concerns regarding the overall environmental impact of the Goliath Gold Project, impacts to economic and cultural pursuits and the practice of traditional activities. Treasury Metals has been in ongoing communications with Lac des Mille Lacs First Nation in regards to presenting the revised material supporting the EIS. In conjunction to this, Treasury Metals has provided a significant amount of documentation to Lac des Mille Lacs First Nation regarding Project effects and development.

9.1.2.8 Métis Nation of Ontario

The members of the Métis Nation of Ontario do not live in a specific community but reside in various locations throughout the region. The closest regional office of the Northwest Métis Council is located in Dryden.

Treasury Metals has been in contact with the Métis Nation of Ontario with respect to the Project since June of 2009. Topics of discussion with Métis Nation of Ontario include meeting scheduling, Memorandum of Understanding, Traditional Knowledge study, consultation scope and budget, employment opportunities, event funding requests, and impact and effects of the Project. The Métis Nation of Ontario in response to these discussions is preparing an updated Memorandum of Understanding document associated with a Traditional Knowledge Study, consultation aspects, and communication protocols. Treasury Metals has been in ongoing communications with the Métis Nation of Ontario in regards to presenting the revised material supporting the EIS and Project development. In conjunction to this, Treasury Metals has provided a significant amount of documentation to the Métis Nation of Ontario regarding Project effects and development.

9.1.2.9 Aboriginal People of Wabigoon

Engagement with the Aboriginal People of Wabigoon began in March 2013. In response to a request from Treasury Metals, the Aboriginal People of Wabigoon provided information about their organization and of the Aboriginal People of Wabigoon in May and June of 2013. Treasury Metals has continued to provide the Aboriginal People of Wabigoon with documentation supporting the development of the Goliath Project. Treasury Metals has been in ongoing communications with the Aboriginal People of Wabigoon in regards to presenting the revised material supporting the EIS and Project development. In conjunction to this, Treasury Metals has provided a significant amount of documentation to the Aboriginal People of Wabigoon regarding Project effects and development.

9.1.2.10 Grand Council Treaty #3

The Grand Council Treaty #3 represents 28 First Nation communities, including those identified for engagement on the Project. Contact between Treasury Metals and Grand Council Treaty #3 began in 2009.

In July 2015, the Agency responded to a letter from Grand Council Treaty #3 that acknowledged a Grand Council Treaty #3 comment that Treaty #3 First Nations could potentially be impacted by the Project. The Agency went on to say that the CEA Agency would continue to consult directly with Treaty #3 First Nations, and if Grand Council Treaty #3 desired to act on behalf of all of the First Nations, formal written communications to that effect would be required from each of the First Nations. Subsequent to the above noted communications, Treasury has included Grand Council Treaty #3 in communications.

Further to this Grand Council Treaty #3 has indicated that a meeting will occur on September 19, 2017 in Dryden, ON to discuss the information presented in the Impact Footprints and Effect Areas Report, in addition to the revised EIS documentation. Treasury Metals is working cooperatively with Grand Council Treaty #3 to support this endeavor to bring all the Indigenous communities to one coordinated meeting to discuss the Projects technical merit as it relates to traditional land use and activities.

9.1.2.11 Other Indigenous Organizations

Treasury Metals has also been in contact with other Indigenous community organizations regarding the Project including:

- Sioux Lookout Area Aboriginal Management Board;
- Dryden Native Friendship Centre;
- Fort William First Nation;
- Seven Generations Education Institute;
- Ontario Coalition of Aboriginal People; and
- Kwayaciiwin Education Resource Centre.

9.2 General Public Engagement

Owing to the proximity of the Project site to residents and the communities of Wabigoon and Dryden, the mine site and vicinity are well known to local residents. The mine site is located within a few kilometers of the Trans-Canada Highway and is accessed by existing gravel roads. Much of the proposed mine site consists of old homesteads and private residences that have been purchased by Treasury. A number of other privately owned properties including vacant land, homes and small hobby farms nearby.

Additionally, many people in the local area are familiar with the site due to the presence of the former tree nursery operated by the Ministry of Natural Resources and Forestry, which is located to the north of the proposed mine site. This tree nursery was operated by the Ontario government

from the early 1960's until the late 1990's and provided employment to many local residents. Following closure of the tree nursery by the MNRF, the facility was sold to a private consortium of tree seedling producers. This consortium operated the facility for a very short period and the tree nursery then sat empty and idle for a number of years prior to its purchase by Treasury Metals in 2010. Treasury Metals is currently using this facility for office and warehousing and anticipates continued use of the facility during construction and operation of the Project.

The local residents and communities of Wabigoon and Dryden have provided significant input towards the Project and the prominent design features associated with the development. The local community has provided support to the Project, noting the potential economic benefit. However, the community has provided input and concerns associated with risks to human health, and the physical and biological environment. These concerns have been brought forward to Treasury Metals within verbal and written communication with those residents located closest to the Project (Anderson Road, Tree Nursery Road, East Thunder Lake Road, Thunder Lake Road etc.) and those communicated to Treasury Metals though meetings and presentation opportunities within the local communities of Wabigoon and Dryden. In addition to concerns brought forward directly to Treasury Metals, comments have been presented to government representatives (CEA Agency) as part of the EIS review process. These comments have been captured within the information request process, and have been responded to in full.

9.2.1 Measures to Address General Public Concerns

General public concerns have been brought forward to Treasury Metals within vocal and written communication with those residents located closest to the Project (Anderson Road, Tree Nursery Road, East Thunder Lake Road, Thunder Lake Road etc.), and those communicated to Treasury Metals through meetings and presentation opportunities within the local communities of Wabigoon and Dryden. In addition to concerns brought forward directly to Treasury Metals, comments have been presented to government representatives (CEA Agency) as part of the EIS review process. These comments have been captured within the information request process, and have been responded to in full.

Details as to how public concerns are to be address is included throughout the EIS as referenced below:

- Impacts to surface water quality;
  - Treasury Metals has committed to discharging to PWQO guidelines which is dictated by the Ministry of Environment and Climate Change as "fishable, swimmable, drinkable";
  - Treasury Metals is committed to working with local water users including the City of Dryden to ensure surface water quality viability; and

- Surface water quality will be monitored as per regulatory needs, preliminary discussion of monitoring in Section 13.8.

- Impacts to groundwater quality to local well users;
  - The monitoring program for groundwater quality was described in the EIS and is designed to confirm if actual drawdown and changes in groundwater quality follow the predicted pattern, and provide sufficient time for corrective action if necessary. The results of the groundwater monitoring program will be reviewed and reported to the MOECC on an annual basis; and
  - Groundwater quality will be monitored as per regulatory needs, preliminary discussion of monitoring in Section 13.10.

- Impacts to groundwater quantity to local well users;
  - Deepen those wells where the drawdown affects the wells ability to provide the required supply;
  - Financial assurance will be provided to MNDM to deepen neighbouring residential wells, if required, as part of Project start-up approvals; and
  - Groundwater quantity will be monitored as per regulatory needs, preliminary discussion of monitoring in Section 13.11.

- Impacts of potential acid rock drainage;
  - Management plans associated with acid rock drainage and the geochemical environment are presented in Section 12.3; and
  - Monitoring components associated with the geochemical condition of the Project and are presented in Section 13.3.

- Impacts to fish and fish habitat including Thunder Lake, Wabigoon Lake, and area streams;
  - The Project will require a *Fisheries Act* authorization and will likely require Treasury Metals to mitigate the losses of fish habitat that it causes as a condition of that authorization. Typically, the offsetting involves the creation of new habitat or the enhancement of existing habitat that is commensurate with the habitat losses. The *Fisheries Act* authorization, which is issued by DFO, details the offsetting measures to be completed and, typically also specifies monitoring to be conducted. DFO uses a letter of credit to provide a financial assurance mechanism in the event that an offsetting plan is not completed; and

- Management plans associated with fish and fish habitat can be referenced in Section 12.10, further to the management plan, monitoring aspects associated with fish and fish habitat can be referenced in Section 13.14.

- Impacts to human health arising from operational risks to water quality, air quality, and noise;

  - As described in Section 6.0, the mitigation measures put in place to avoid effects to geology and geochemistry, air quality, surface water quality and groundwater quality all have a benefit to avoiding adverse effects to human health.

- Impacts to air quality;

  - Blasting will be conducted in a phased manner that optimizes the amount of explosives needed for a given area to be blasted, and that minimizes the area being blasted. Modern blasting methods used in mining are designed to direct the energy from the blasts into the rock. This reduces the amount of blasting agents required to achieve the desired blast objectives, and ultimately reduces the amount of dust generated. The dust generated from modern blasting result primarily from the physical impact of the displaced rock. The proposed blasting at the Project will likely be restricted to once per day, and only a few days during each week;

  - Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator bucket to the bed of the truck (or equivalent bed height as material is loaded into the truck);

  - Ensure that all internal combustion engines are properly maintained and all emission control systems (e.g., diesel particulate filters) are in good working order;

  - Water and chemical suppressants will be used for dust control on the haul roads is used at the mine site, when temperatures are above freezing. The watering program requires dedicated watering equipment, and enough water must be available and applied to off-set evaporation and maintain a wetted road surface. This program would also be supplemented with applications of an approved dust suppressant as required to minimize fugitive dust emissions; and

  - A Best Management Practices Plan for Dust will be implemented as described in Section 12.7, monitoring aspects associated with air quality are described in Section 13.6.

- Impacts from noise;
  - Blasting conducted in phased manner that optimizes the amount of explosives needed for a given area to be blasted, the amount of explosives detonated for a given time delay within the detonating procedure and that minimizes the area being blasted;
  - Where potential effects of vibration to spawning shoals is identified, blasting practices will be adjusted to mitigate the effects;
  - Advise nearby residents of significant noise-causing activities, such as blasting, and endeavour to schedule those events to reduce disruption to residents;
  - Conduct heavy equipment activity between the hours of 07:00 and 22:00, if possible, to reduce the noise effects to neighbouring residents;
  - Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator to the bed of the truck;
  - Ensure that all internal combustion engines are fitted with appropriate muffler systems;
  - Current design will incorporate waste rock storage area and overburden piles as noise berms to Project. In addition to this reclamation efforts will be progressive on waste rock pile though operation leading to additional noise barriers to potential receptors of noise; and
  - Noise management is described in Section 12.6, and monitoring is described in Section 13.4.
- Increased traffic and roadway concerns; and
  - Treasury Metals will establish and enforce traffic safety protocols, regulatory and cautionary signage, road maintenance and emergency response plans on all Project roads to prevent collisions and accidents.
  - Management plans associated with traffic are described in Section 12.15.
- Potential risks to property values in the vicinity of the Project.
  - For the most part, noticeable impacts to properties in the vicinity of the Project and associated impacts to property values are anticipated to be minimal. If anything, the increased employment in the area associated with the Project may result in greater demand for housing and potentially higher real estate values in the Wabigoon/Dryden Area;

- There are a few homes in the immediate vicinity of the proposed mine primarily along Tree Nursery Road which may be more affected by the Project than others. Treasury Metals is committed to working directly with these specific homeowners to ensure that their concerns are addressed; and

- Further to this Treasury Metals is committed to conduct a revised socio-economic study impact of the Goliath Gold Project. This study will evaluate the socio-economic impact of the Project and will reflect the impact to the housing market within the document. This document will be completed prior to construction activities.

9.3 Indigenous Community Engagement

Within the EIS Guidelines, it is stated that "proponent will ensure that it engages with Aboriginal people and groups that may be affected by the Project or that have potential to impact established Aboriginal and Treaty rights and related interests in the project area". The Guidelines also direct the proponent to document public and Indigenous concerns in the EIS and identify and explain, as part of its analysis of the Project, all unresolved questions or concerns of the public or Indigenous communities. The CEA Agency and the MNDM provided direction to Treasury Metals to which specific Indigenous communities that the company was to engage with. Treasury Metals has been in contact with all of the Indigenous communities identified by MNDM and the Agency.

Throughout engagement with the Indigenous communities listed in Section 9.1.2 of the EIS Executive Summary, a number of concerns have been identified by each community that Treasury Metals has strived to address.

9.3.1 Measures to Address Concerns

Details as to how Indigenous concerns are to be address is included throughout the EIS. Further to this specific responses as captured within engagement are presented within Section 9 of the revised EIS and within Appendix DD – Aboriginal Engagement Report. Mitigation and measures to address concerns as noted are referenced below, further aspects of management plans can be referenced in Section 12, monitoring can be referenced in Section 13:

- Impacts to surface water quality;

  - Treasury Metals has committed to discharging to PWQO guidelines which as dictated by the Ministry of Environment and Climate Change as "fishable, swimmable, drinkable";

  - Treasury is committed to working with local water users including the City of Dryden to ensure surface water quality viability; and

  - Surface water quality will be monitored as per regulatory needs, preliminary discussion of monitoring in Section 13.8.

- Impacts to groundwater quality to local well users;
  - The monitoring program for groundwater quality was described in the EIS and is designed to confirm if actual drawdown and changes in groundwater quality follow the predicted pattern, and provide sufficient time for corrective action if necessary. The results of the groundwater monitoring program will be reviewed and reported to the MOECC on an annual basis; and
  - Groundwater quality will be monitored as per regulatory needs, preliminary discussion of monitoring in Section 13.11.
- Impacts to groundwater quantity to local well users;
  - Deepen those wells where the drawdown affects the wells ability to provide the required supply;
  - Financial assurance will be provided to MNDM to deepen neighbouring residential wells, if required, as part of Project start-up approvals; and
  - Groundwater quantity will be monitored as per regulatory needs, preliminary discussion of monitoring in Section 13.12.
- Impacts of potential acid rock drainage;
  - Management plans associated with acid rock drainage and the geochemical environment are presented in Section 12.6; and
  - Monitoring components associated with the geochemical condition of the Project and are presented in Section 13.12.
- Impacts to fish and fish habitat including Thunder Lake, Wabigoon Lake, and area streams;
  - The Project will require a *Fisheries Act* authorization and will likely require Treasury Metals to mitigate the losses of fish habitat that it causes as a condition of that authorization. Typically, the offsetting involves the creation of new habitat or the enhancement of existing habitat that is commensurate with the habitat losses. The *Fisheries Act* authorization, which is issued by DFO, details the offsetting measures to be completed and, typically also specifies monitoring to be conducted. DFO uses a letter of credit to provide a financial assurance mechanism in the event that an offsetting plan is not completed; and

- Management plans associated with fish and fish habitat can be referenced in Section 12.10, further to the management plan, monitoring aspects associated with fish and fish habitat can be referenced in Section 13.13.

- Hydrological impacts;

  - A comprehensive plan will be developed as part of the permitting and approvals process under the MOECC by obtaining an ECA which will include comprehensive details regarding surface water quantity monitoring. The ECA would include details on monitoring flows in Thunder Lake Tributary 2 and 3 where proposed fresh water will be taken to support Project requirements, as required. A Permit to Take Water will also be applied for as part of the approvals process as well for the taking of fresh water.

  - The comprehensive plan outlined in the ECA would including both monitoring upstream of the proposed effluent discharge point in Blackwater Creek as well as monitoring the flow of effluent release as well. The ECA would outline all surface water flow monitoring that will be required to be undertaken during the life of the Project.

  - Management plans associated with hydrology and surface water quantity can be referenced in Section 12.3, further to the management plan, monitoring aspects associated with surface water quantity can be referenced in Section 13.9.

- Impacts to terrestrial wildlife;

  - A program to monitor wildlife and wildlife habitat will be implemented for the Project to ensure that effects to wildlife are properly mitigated throughout the Project life. All wildlife monitoring will be based on standard, acceptable survey protocols. Where appropriate, these protocols will be the same as those used during the baseline data collection efforts, so changes in species populations can be detected.

  - Management plans associated with wildlife can be referenced in Section 12.9, further to the management plan, monitoring aspects associated with fish and fish habitat can be referenced in Section 13.12.

- Impacts to human health arising from operational risks to water quality, air quality, and noise;

  - As described in Section 12.0 and Section 13.0, the mitigation measures put in place to avoid effects to geology and geochemistry, air quality, surface water quality and groundwater quality all have a benefit to avoiding adverse effects to human health.

- Impacts to air quality;

- Blasting will be conducted in a phased manner that optimizes the amount of explosives needed for a given area to be blasted, and that minimizes the area being blasted. Modern blasting methods used in mining are designed to direct the energy from the blasts into the rock. This reduces the amount of blasting agents required to achieve the desired blast objectives, and ultimately reduces the amount of dust generated. The dust generated from modern blasting result primarily from the physical impact of the displaced rock. The proposed blasting at the Project will likely be restricted to once per day, and only a few days during each week;

- Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator bucket to the bed of the truck (or equivalent bed height as material is loaded into the truck);

- Ensure that all internal combustion engines are properly maintained and all emission control systems (e.g., diesel particulate filters) are in good working order;

- Water and chemical suppressants will be used for dust control on the haul roads is used at the mine site, when temperatures are above freezing. The watering program requires dedicated watering equipment, and enough water must be available and applied to off-set evaporation and maintain a wetted road surface. This program would also be supplemented with applications of an approved dust suppressant as required to minimize fugitive dust emissions; and

- A best management plan will be implemented as described in Section 12.7, additional monitoring aspects associated with air quality are described in Section 13.6.

Impacts from noise;

- Blasting conducted in phased manner that optimizes the amount of explosives needed for a given area to be blasted, the amount of explosives detonated for a given time delay within the detonating procedure and that minimizes the area being blasted;

- Where potential effects of vibration to spawning shoals is identified, blasting practices will be adjusted to mitigate the effects;

- Advise nearby residents of significant noise-causing activities, such as blasting, and endeavour to schedule those events to reduce disruption to residents;

- Conduct heavy equipment activity between the hours of 07:00 and 22:00, if possible, to reduce the noise effects to neighbouring residents;

- Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator to the bed of the truck;

- Ensure that all internal combustion engines are fitted with appropriate muffler systems;
- Current design will incorporate waste rock storage area and overburden piles as noise berms to Project. In addition to this reclamation efforts will be progressive on waste rock pile though operation leading to additional noise barriers to potential receptors of noise; and
- Noise management is described in Section 12.6, and monitoring is described in Section 13.4.

- Increased traffic and access concerns;
  - Treasury Metals will establish and enforce traffic safety protocols, regulatory and cautionary signage, road maintenance and emergency response plans on all Project roads to prevent collisions and accidents.
  - Management plans associated with Traffic are described in Section 12.15.

- Potential risks to property values in the vicinity of the Project;
  - For the most part, noticeable impacts to properties in the vicinity of the Project and associated impacts to property values are anticipated to be minimal. If anything, the increased employment in the area associated with the Project may result in greater demand for housing and potentially higher real estate values in the Wabigoon/Dryden Area;
  - There are a few homes in the immediate vicinity of the proposed mine primarily along Tree Nursery road which may be more affected by the Project than others. Treasury is committed to working directly with these specific homeowners to ensure that their concerns are addressed; and
  - Further to this Treasury Metals is committed to conduct a revised socio-economic study impact of the Goliath Gold Project. This study will evaluate the socio-economic impact of the Project and will reflect the impact to the housing market within the document. This document will be completed prior to construction activities.

- Treaty and Indigenous rights;
  - Treasury Metals is not in position to discuss Treaty and Indigenous rights with communities and leadership;
  - The Crown has legal duty to consult Indigenous peoples on potential impacts from federal decisions on their rights, as defined in Section 35 of the *Constitution Act*, 1982 (Section 35 rights); and

- Within the EIS Guidelines, the proponent is encouraged to conduct consultation on baseline conditions, effects assessment (including current uses of land), mitigation and residual effects of the project, as well as incorporate community and traditional knowledge obtained during engagement activities.

  - Treasury is in the best position to:

  - Share information about the Project;
  - Consider ways to adjust plans to avoid or minimize potential impacts identified by the community.

- Engagement and consultation record;

  - As demonstrated in the Aboriginal Engagement Report, Treasury Metals has provided Project-related information and has made staff available to meet with Indigenous communities over a number of years. Indigenous communities were not always able or prepared to engage with Treasury Metals.

  - Treasury Metals is committed to continue to engage with the Indigenous communities identified by the federal and provincial governments. Treasury Metals will continue to provide Project-related information as it becomes available.

- Cultural resources;

  - Avoidance measures and mitigation measures will be put in place, as part of the Archaeological and Cultural Heritage Resource Management Plan (Section 12.11) to respond to archaeological and cultural resources that may be encountered in the execution of the Project.

  - These would include the following:

    - If previously undocumented archaeological resources be discovered, the person discovering the resources must stop alteration of the site immediately of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (I) of the *Ontario Heritage Act*.
    - If human remains are discovered, alteration of the site must stop and the person making the discovering must immediately notify the police, or coroner, and the Registrar of cemeteries, at the Ministry of Consumer Services, as required under the *Cemeteries Act*, R.S.O. 1990 c.C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (when proclaimed in force).

  - Further to this no Indigenous community has identified that cultural or heritage activities take place in the Project area, however, Project specific traditional knowledge

studies have not been completed. Treasury Metals is committed to continue to engage with Indigenous communities to gather Project-specific traditional knowledge and land use information.

- Cyanide use;
  - Cyanide use and the management of cyanide in an operational capacity are captured within Section 3.6.1, Section 3.6.5, and Section 3.6.6.
  - Cyanide management is described in Section 12.5.
- Waste disposal;
  - Waste disposal in an operational capacity are captured within Section 3.10;
  - Hazardous material management is described in Section 12.17, and the waste management plan is described in Section 12.2.
- Tailings management and design;
  - Tailings storage facility design is captured within Section 3.7.
  - The objective of the tailings storage facility is to ensure protection of the environment during operations and in the long-term (after closure), and to achieve effective reclamation at mine closure.
  - Further to this the overall tailings management plan is described in Section 12.4, with dam safety aspects described in Section 12.14.
- Accidents and malfunctions;
  - Accidents and malfunction including tailings storage failure are capture in Section 4.0 of the EIS.
- Closure and reclamation;
  - Closure aspects are discussed in Section 3.14, and 3.16.9.
  - Closure of the Project will be governed by the *Ontario Mining Act* (the Act) and its associated regulations and codes. The Act requires that a detailed closure plan be filed for any mining project before the project is initiated. Financial assurance is required before any substantive development takes place to ensure that funds are in place to carry out the closure plan.

- Training and employment;
  - Treasury is committed to develop and implement employment practices that give preference to local and regional labour where possible, including Indigenous communities.
  - Treasury will promote the participation of local residents in the economic activities of the Project, multiple skill category/level training including on the job training will be provided.
- Economic impacts;
  - Treasury Metals will work with potentially affected stakeholders and Aboriginal peoples to develop a socio-economic monitoring and management plan designed to address potential Project-related socio-economic effects, including optimization of benefits, identified through the environmental assessment process and/or at later stages of the Project.
  - Management plans associated with socio-economic impacts can be referenced in Section 12.2, further to the management plan; monitoring aspects associated with economic factors can be referenced in Section 13.17.
- Mercury use;
  - Mercury is not an active component within Goliath operational needs, although it is present within the geochemical makeup of the host rock of the deposit.
  - Further to this Treasury Metals has committed to discharging to PWQO guidelines which as dictated by the Ministry of Environment and Climate Change as “fishable, swimmable, drinkable”. Surface water quality will be monitored as per regulatory needs, preliminary discussion of monitoring can be sourced Section 13.8.
- Impacts to traditional land use activities and resources;
  - No Indigenous community has identified that traditional land use activities take place in the Project area, however, Project specific traditional knowledge studies have not been completed. Treasury Metals is committed to continue to engage with Indigenous communities to gather Project-specific traditional knowledge and land use information.
  - Due to lack of information Treasury has been conservative in nature and incorporated a number of avoidance and mitigation features as part of the design of the Project.
- Socio-economic impacts;

- Treasury Metals will work with potentially affected stakeholders and Aboriginal peoples to develop a socio-economic monitoring and management plan designed to address potential Project-related socio-economic effects, including optimization of benefits, identified through the environmental assessment process and/or at later stages of the Project.

- Management plans associated with socio-economic impacts can be referenced in Section 12.2, further to the management plan, monitoring aspects associated with social factors can be referenced in Section 13.17, and economic factors can be referenced in Section 13.17.

- Cumulative effects; and

  - Cumulative effects as currently modelled for designated valued components are presented within Section 7.0. Further to this the description of Project effects are assessed in Section 6.0.

- Monitoring.

  - Monitoring aspects for the Project are described within Section 13.0 of the EIS. Treasury Metals is committed to operating within the regulatory parameters as defined by the Crown, and supporting monitoring required.

9.4 Outstanding Indigenous and General Public Concerns

Treasury has attempted to provide answers to questions relating to the development of the Goliath Mine, potential impact arising from the mine development, and measures contemplated to avoid or minimize those impacts. In some cases, because environmental baseline studies were still underway or because engineering and design work had not been completed, it has not always been possible to provide definitive answers to questions and concerns presented. Following the submission of the revised EIS, Treasury will endeavor to provide more comprehensive responses directly to concerned parties.

A complete listing of all contacts made by Treasury relating to Public participation is included in Appendix V. The Aboriginal Engagement Report is included as Appendix DD to the revised EIS. Further outstanding concerns specifically relating to Indigenous engagement are noted within Appendix DD.

10.0 SUMMARY OF COMMITMENTS

As part of the ongoing assessment process for the Goliath Gold Project, Treasury Metals has developed a series of key commitments that will be reported on in accordance with the Federal EIS guidelines (Table 10.0-1). To facilitate the review of the EIS and the tracking of delivery on these commitments during the life of the Project, each commitment has been given a unique reference number. These reference numbers have been inserted into the text of the EIS where applicable. As the assessment process continues to advance, Treasury Metals understands that additional commitments may be identified and requested within the EA process, and through engagement with Federal and Provincial governments, Indigenous communities, and public stakeholders.

It should be noted that Treasury Metals do not take the commitments made lightly. For this reason, commitments have been limited to specific measurable items that are relevant, and will stand up over the life of the Project. Once commitments are made, they cannot be easily withdrawn or adapted to reflect changing conditions. Therefore, specific mitigation measures incorporated into the assessment of Project effects have not been identified individually as commitments to ensure the flexibility of incorporating new and evolving technologies into the Project. To help track the mitigation measures relied on in the EIS, each of the mitigation measures identified in the EIS have been assigned a unique identifier, which are referenced throughout the EIS when mitigation measures are listed. A full listing of all individual mitigation measures is provided in Table 6.23-1. These mitigation measures are listed separate from the commitments in Table 10.0-1 as the mitigation measures establish a level of control to be achieved while affording flexibility to adapt to the conditions encountered as the Project advances, as well as adapting to allow the adoption of new technologies and standards as they become available. This allows for an adaptive Project that constantly can embrace the concept of continuous improvement. A complete list of the commitments for the Project is provided in Table 10.0-1 below.

Table 10.0-1: Commitments for the Project

Commitment Identifier	Commitment
Cmt_001	Treasury will continue to document all comments, issues, or concerns raised by stakeholder groups. All input Treasury receives will be duly considered and acted upon according to the nature of the input received.
Cmt_002	Treasury will follow CEAA protocols in distributing the EIS document for review, including posting for Notice of Public Information Events for Project updates to stakeholder groups.
Cmt_003	Treasury will maintain a local hiring policy, including First Nation communities. The application of this policy is dependent upon the skills and workforce being available locally.
Cmt_004	Treasury will maintain, where applicable, a local purchasing policy to purchase goods and services from local suppliers. This policy has the expectation that goods and services will be purchased locally assuming price, delivery and service is competitive with outside suppliers.
Cmt_005	Treasury will maintain an active safety program aimed at protecting worker safety ensured by meeting applicable occupational health and safety legislation standards, as well as utilizing other best practices. Employee involvement will be a cornerstone of the safety plans, policies and programs.
Cmt_006	All workers and visitors will receive an orientation and safety training prior to conducting work on site. This will include a health and safety overview.
Cmt_007	All health and safety policies and procedures will be reviewed annually.

Table 10.0-1: Commitments for the Project (continued)

Commitment Identifier	Commitment
Cmt_008	Emergency response procedures will be established. All incidents will be reported as per the applicable standards set with the health and safety policies and procedures.
Cmt_009	All vehicles will maintain an emergency kit including communication equipment, first aid kit, and a fire extinguisher where appropriate.
Cmt_010	All chemicals used at the site will have a Material Safety Data Sheet (MSDS) for safe use, relevant regulatory and safety requirements in place and PPE available for use at all times.
Cmt_011	All buildings will meet fire protection requirements and codes. Fire drills will occur on a regularly scheduled basis. All new workers, contractors and visitors will receive a safety orientation which will include a fire response training
Cmt_012	Treasury will continue to engage with Aboriginal communities and groups through the life of the project.
Cmt_013	Ditching and drainage will be designed to collect and manage runoff from site, and will be established around stockpiles. All collection ponds will be integrated with the site water management plan.
Cmt_014	All chemicals on site will be stored according to government regulations and industry best practices. Spill protection systems will be designed according to industry best practices.
Cmt_015	All chemical spills within the processing plant, or chemical storage areas will be controlled through provision of secondary containment as appropriate. Spills of potentially hazardous materials during transport, or from on-site material storage and handling facilities will be managed. Measure will be taken to prevent and clean up any hydrocarbon spills (and other spills) at source to ensure such materials do not enter the surrounding natural environment where practical.
Cmt_016	In the event of a spill, it will be reported according to Ministry of Environment and Climate Change (MOECC) protocols.
Cmt_017	Best management practices for dust control will be implemented. A plan will be prepared to identify all potential sources of dusts, outline mitigation methods to employ, and detail all records and inspections required by regulatory officials. Treasury will monitor air emissions through implementation of current industry standards to meet regulatory requirements (Ontario Reg. 419/05, AAQC, MOECC).
Cmt_018	Treasury will design the operation to meet noise emission regulatory requirements (NPC-103, MOECC)
Cmt_019	Treasury will consult local stakeholders throughout Project life to ensure the Company is aware of general or specific concerns the public may have. A formal public complaint logging and feedback system will be implemented when plant construction commences. This system will be in place for the life of the mine.
Cmt_020	Dangerous wildlife awareness will be part of the site's safety program. Safety training will be provided to workers to raise awareness and to assist in protecting them from injury. Food waste will be managed in a manner that limits contact/attraction of potentially dangerous wildlife.
Cmt_021	Road-killed animals or any other carcasses found on-site will be removed in a timely and legal manner to limit the attraction of wildlife.
Cmt_022	Tailings Storage Facility (TSF) will be constructed to meet all regulatory requirements and industry best practices standards as described within the Provincial Lake and Rivers Improvement Act. TSF will be designed and constructed to withstand the probable maximum flood and maximum credible earthquake. A remedial action plan will be developed as part of the emergency management plan, and environmental management plan with appropriate government agencies, in the event of a dam breach.
Cmt_023	Groundwater monitoring wells will be installed across Project site (as described in Section 13 and Appendix M).
Cmt_024	Environmental monitoring will be conducted in accordance with standard practice and regulatory requirements, including any site –specific environmental approvals (Water Resources Act (Section 34, Section 53), PWQG, ODWS, NPC-103, and NPC-119).
Cmt_025	A blasting schedule and plan will be developed to notify the public when blasting will occur and to describe all blasting activities on site. This plan will be developed though consultation with local stakeholders and regulatory officials.

Table 10.0-1: Commitments for the Project (continued)

Commitment Identifier	Commitment
Cmt_026	All personnel who handle explosive will be checked to ensure they have the required certified training. All un-authorized or non-essential personnel will be restricted from access to blasting sites, and storage facilities.
Cmt_027	Operational procedures for all unit operations and jobs will be implemented to ensure worker safety and prevent operational upsets and equipment failure due to improper use, Accountability systems will be in place to deal with procedural violations. All operational procedures will be reviewed annually.
Cmt_028	All operational and maintenance procedures will be reviewed annually and revised if required to reflect changes that may have occurred.
Cmt_029	A "progressive change management" system will be implemented to ensure that any material changes to operations, maintenance or engineering go through a formal review process to ensure that the possibility of injury, environmental incidents, equipment damage and production interruptions are minimized to the greatest extent possible.
Cmt_030	A list of environmental management plan commitments made during the environmental assessment process will be maintained indicating: ▪ The nature of the commitment; ▪ To whom (e.g., public, agency) the commitment was made, if specific; ▪ Whether the commitment is addressed or linked to a regulatory instrument such as regulation or environmental approval; ▪ Any applicable timeline associated if any; ▪ Status of the commitment; and) Additional actions required to fulfill the commitment.
Cmt_031	Environmental aspects and potential impacts of the project will be managed within an environmental management plan (EMP) which integrates environmental performance with overall project management.
Cmt_032	Implementation and maintenance of the EMP will be driven by Treasury commitment to environmental compliance and regulatory needs. Workers will be educated on Treasury's commitment to environmental excellence and environmental policies.
Cmt_033	EMP will be reviewed annually using an precautionary and progressive approach considering changing circumstances which could affect the suitability of monitoring and effectiveness of the goals of the EMP.
Cmt_034	All water discharged to the environment will meet the listed parameters for PWQO. Where there is no PWQO for a parameter, the commitment will be to meet the CCME value. For mercury, the commitment will be to meet background concentrations. Detailed parameters will be determined through engagement with appropriate Provincial and Federal regulatory bodies.
Cmt_035	All final effluent and air discharge points will have control structures to immediately cease discharge if and when necessary.
Cmt_036	All effluent and air discharge points will be sampled and results reported to the appropriate authorities in accordance with environmental permit requirements.
Cmt_037	Progressive reclamation of mine waste rock area will be undertaken, where practical, once maximum height has been reached.
Cmt_038	The site will be reclaimed and the land restored to a naturalized state per the mine closure plan approved by the Ministry of Northern Development and Mines

11.0 BENEFITS TO CANADIANS

The effects assessment of the Project, provided in Section 6, used the methodical approach consistent with the EIS Guidelines to determine the residual effects of the Project. The residual effects remaining, after avoidance and mitigation measure are in place, can be further categorized into positive or negative effects. Those effects identified as being positive are considered benefits to Canadians. The positive effects identified in Section 6 were all related to the human environment.

Public comments and input regarding the Project, received through engagement and consultation activities, highlighted concerns regarding significant local and regional declines in employment and population. Employment has largely decreased due to downsizing and permanent closures of paper machines and sawmilling capacity in the forestry industry (Appendix CC). The Project will have a positive effect on the local economy. Employment opportunities arising from the Project may also allow skilled trade workers who left the City of Dryden after downsizing of the Weyerhaeuser/Domtar pulp and paper facilities to return to the region and find employment at the Project. Job opportunities created at the Project will provide an opportunity for youth to stay in the region, and attract new working age migrants. The overall effect of the Project will be felt most within commuting distance from the site (estimated 100 km).

Treasury Metals is committed to hiring locally [Cmt_003] and purchasing locally [Cmt_004] as set out in Section 10. To date, Treasury Metals has demonstrated their willingness to follow-through with these commitments through the makeup of its local workforce and its purchasing records. Training, work experience and additional skills gained through involvement in the Project are expected to result in abilities that are transferrable to other economic sectors including forestry and manufacturing. Many of the skills developed while working at the Project will be transferrable to other mining operations and industries, should people either choose to move or be compelled to move post-closure. The skill building associated with the Project will thereby allow the region's economic base to take advantage of other future employment and business opportunities well beyond the life of the Project. Additionally, the Project may help to encourage other mineral development projects in the region, and potentially set Dryden up as a support service and supply hub for other similar regional exploration and mining projects.

A summary of the identified benefits to Canadians is provided in Table 11.0-1 below.

Table 11.0-1: Benefits to Canadians

Discipline	VCs	Benefit to Canadians
Land Use	Cottagers and Outfitters	Outfitters may experience an increase in clientele related to the need for accommodations, which could be viewed as a positive economic effect to the outfitter.
Aboriginal Peoples	Socio-economic Effects	During the construction and operations phases of the Project, there will be a demand for trained workers and training

Table 11.0-1: Benefits to Canadians (continued)

Discipline	VCs	Benefit to Canadians
		opportunities will be available locally and regionally.
	Socio-economic Effects	The demand for employees, goods and services will increase in the study area during the construction and operations phases.
Economic Factors	Labour Force, Labour Participation and Employment	Site preparation and construction and operations will create a demand for workers, and increase employment and labour income in the Project area.
	Income Levels	During site preparation and construction and operations, employment from the Project will increase the labour income in the Project area.
	Real Estate	During the site preparation and construction and operations phases, workers moving into the Project area may cause an increase in the demand for housing, and therefore affect real estate prices.
	Economic Development	During site preparation and construction and operations, employment and purchasing from the Project will increase government tax revenues, which could be used for local development.
	Existing Businesses	During site preparation and construction and operations, the Project will increase the Project area demand for goods and services from local businesses. This could be direct purchasing by Treasury Metals, or by the Project employees.
	Government Revenues	During site preparation and construction and operations, there will be an increase in government revenues through the payment of Project-related business and employment taxes.
Social	Education	Treasury Metals will provide opportunity for training and education opportunities for unemployed and under-employed residents and non-resident workers. It is anticipated that any increase in training would be able to be accommodated within existing education and training facilities.
	Housing and Property Values	There is potential for a noticeable increase in property values with increased income levels.

12.0 ENVIRONMENTAL MANAGEMENT PLANS

Environmental Management Plans (EMP) act as a tool to manage adverse environmental effects through well-defined measures and controls that are integral components of environmental stewardship. Treasury Metals has developed a conceptual EMP framework that effectively encompasses all environmental aspects of the Project and incorporates each phase of development. This conceptual framework consists of 21 individual management plans that will help to ensure that the Project activities proceed as planned, and that procedures are in place if unforeseen events occur. The EMP framework will provide authentication of Treasury Metals' ongoing environmental commitments and provide performance results to Indigenous peoples and stakeholders. The EMP framework has been designed around the central principles stated within the Company's core environmental policy: demonstrate

- Manage our operations to minimize or eliminate impacts on the environment through use of best management practices and appropriate application of technology;
- Adopt and promote policies specific to protecting the environment;
- Implement measures to ensure the efficient use of resources, energy and materials to minimize environmental impacts through all phases of the operation;
- Ensure compliance with all environmental legislation and regulations;
- Set objectives and put processes in place to continually improve our environmental performance; and
- Curtail operation if necessary to prevent or resolve environmental non-compliance conditions.

In preparing the individual EMPs, pertinent legislation and regulations will be used in developing policies and procedures. The EMPs will be finalized through discussions and input from government agencies, Indigenous peoples and stakeholders. The following lists of 21 EMPs were considered significant environmental aspects of the Project and will be developed as the permitting and approval process for the Project is advanced:

- Project Environmental Management Plan;
- Waste Management Plan;
- Water Management Plan;
- Tailings Management Plan;
- Cyanide Management Plan;

- Noise Management Plan;
- Best Management Practices Plan for Dust;
- Greenhouse Gas Management Plan;
- Wildlife Management Plan;
- Fish Management Plan;
- Archaeological and Cultural Heritage Resource Management Plan;
- Socio-Economic Management Plan;
- Emergency and Spill Response Management Plan;
- Dam Safety Management Plan;
- Transportation and Access Management Plan;
- Mine Rock Management Plan;
- Hazardous Materials Management Plan;
- Fuel Handling and Storage Management Plan;
- Explosives Management Plan;
- Health and Safety Management Plan; and
- Communications Management Plan.

A description of each of the 21 EMPs is provided in Section 12 of the revised EIS, along with anticipated timing of implementation and the application of each plan. However, as the Project advances and becomes more refined, this list of individual EMPs is subject to refinement to ensure that changes to the Project have been addressed through the EMP framework.

13.0 ENVIRONMENTAL MONITORING PROGRAM

13.1 Introduction

As part of the EA process, Treasury Metals has detailed a number of proposed monitoring programs divisible by discipline as per the CEA Agency request. The monitoring programs outlined below are indicative of those that monitor for environmental effects of the Project. It should be noted that monitoring programs that do not lend themselves to fit into an environmental discipline outlined throughout this EIS, will be created at a later date through permit applications. These monitoring programs could include a dam monitoring program, a health and safety monitoring program, and a traffic monitoring program.

The EA monitoring programs are designed to be adaptive to account for any environmental effects that were not expected, new information that becomes available, or mitigation measures that are found to not to be effective. Therefore, the monitoring programs are subject to changes as the Project is further developed, and as input is received from government agencies, Aboriginal groups, and stakeholders. This inclusive process will allow for all parties involved to have input into the final environmental monitoring program.

Additionally, a number of monitoring programs will be developed in pursuit of environmental approvals and permits, but will be developed at a later date. These specific regulatory monitoring programs require direct input from applicable government agencies, which is historically completed following the approval of the EIS. The monitoring programs provided in Section 12 of the revised EIS take into consideration input from the Round 1 information requests made by government agencies, Aboriginal peoples and stakeholders, to incorporate concerns made throughout Project engagement.

13.2 Summary

A summary of the proposed monitoring EA monitoring program is provided in Table 13.2-1. These monitoring programs have been developed to verify the effects assessment of the EIS and confirm the effectiveness of the avoidance and mitigation measures proposed. It should be noted that Treasury Metals is aware that regulatory monitoring may be required by government agencies upon EA approval (i.e. ECA monitoring); however, these monitoring programs have not yet been developed and are not included in the summary table.

Table 13.2-1: Summary of the EA Monitoring Programs

Discipline	Parameter	Monitoring Method	Project Phases	Location
Terrain and Soils	WRSA Height	Visual from Thunder Lake	Operations Closure	Select locations on Thunder Lake
Terrain and Soils	WRSA Elevation	Survey the elevation of the WRSA	Operations Closure	WRSA

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
Geology and Geochemistry	Metals (dissolved) In-situ field parameters Major ions (anions and cations)	Water sample will be taken from a safe location as the pit is filling with water.	Post-Closure	Open pit / pit lake
Noise and Vibration (Ambient Noise)	A-weighted equivalent noise levels (L_{eq} in dBA)	24-hour monitoring intervals	Site preparation and construction Operations Closure	Selected sensitive receptors (receptors along east Thunder Lake Road and along Tree Nursery Road)
Noise and Vibration (Wildlife Noise)	A-weighted equvalent noise levels (L_{eq} in dBA)	A series of 1-hour measurements at varying distance	Site preparation and construction Operations Closure	Varying locations around and outside the operations area
Noise and Vibration (Blasting)	Peak sound Pressure (dBA) Peak particle velocity (cm/s)	Measurements taken during blasting events in pit 1	Operations (when open pit mining activities are in pit 1 and relatively close to the surface)	Selected sensitive receptors along east Thunder Lake Road
Light	Configuration of artificial lighting	To be conducted when new artificial lighting is installed at the Project site	Site-preparation and construction Operations Closure	Within the operations area
Air Quality (continuous)	24-hour TSP Annual TSP 24-hour PM_{10} 24-hour $PM_{2.5}$ 1-hour NO_2 24-hour NO_2	Continuous air sampler will be used that is capable of measuring the require parameters	Site preparation and construction Operations Closure	At the security gate south of the Project
Air Quality (passive)	1-hour NO_2 1-hour SO_2	Passive sampling	Site preparation and construction Operations Closure	West of the Project on Thunder Lake Road and east of the Project on Normans Road
Climate (meteorological)	Precipitation Wind speed / direction Temperature Evaporation	Continuous monitoring at a meteorological station	Site preparation and construction Operations Closure	Undetermined
Climate	GHG emissions (t/year)	Annual calculation based on fuel and gas consumption	Site preparation and construction Operations Closure	Operations area
Surface Water Quality	Metals (dissolved) Cyanide Major ions (anions and cations)	Surface water samples will be taken using industry approved methods	Site preparation and construction Operations Closure Post-closure	Watercourse that have the potential to have surface water quality effects from the Project (see Figure 13.8.2-1)

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
	In-situ field parameters			
Surface Water Quality	Discharge (m/s) Channel geomorphology	Flow measurements will be taken using industry approved methods	Site preparation and construction Operations Closure Post-closure	Blackwater Creek Thunder Lake Tributaries 2 and 3 Little Creek and Hoffstrom's Bay Tributary
Groundwater Quality	Metals (dissolved) Cyanide Major ions (anions and cations) In-situ field parameters	Samples will be taken following water level measurements four time a year	Site preparation and construction Operations Closure Post-closure	The monitoring wells described in Section 13.10
Groundwater Quantity	Groundwater elevation	Manual water level measurements on a monthly basis Pressure transducers for once a day measurements with barometric loggers for barometric effects correction	Site preparation and construction Operations Closure Post-closure	The monitoring wells described in Section 13.10
Wildlife and Wildlife Habitat	# of ha of direct habitat loss or disturbed	Assess the amount of habitat that has been overprinted as a result of the Project	Site preparation and construction Operations Closure	Operations area
Wildlife and Wildlife Habitat	Wildlife mortality	Make a log of anytime wildlife is struck by equipment on site	Site preparation and construction Operations Closure	Operations area
Wildlife and Wildlife Habitat	SAR species habitat compensation and utilization	Assess whether the SAR habitat compensation area is being used by SAR species	Site preparation and construction Operations Closure Post-closure	Operations area
Fish and Fish Habitat	Fish species composition	Assess the fish species composition	Site preparation and construction Operations Closure Post-closure	Blackwater Creek Thunder Lake Tributaries 2 and 3 Little Creek and Hoffstrom's Bay Tributary
Fish and Fish Habitat	Fish species composition	Assess the fish species composition in the habitat offset location	Operations (once the offset habitat is completed until the DFO determines it is adequate)	Fish habitat offset location

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
Fish and Fish Habitat	Sub-lethal toxicity / Acute toxicity test	Use industry standard methods for testing	Site preparation and construction Operations Closure	Water from end of pipe effluent
Wetlands	Wetland extent	Mapping of wetland extent in 5-year intervals	Site preparation and construction Operations Closure	Wetlands within the drawdown zone
Wetlands	Water level monitoring	Water level collected using water level loggers and barometric pressure loggers	Site preparation and construction Operations Closure Post-closure	Wetlands within the drawdown zone
Vegetation	Monitor dust deposition on plant surfaces		Site preparation and construction Operations Closure	Varying locations around the Project site
Vegetation	Wetland flora composition	Conduct wetland flora species surveys every 5 years	Site preparation and construction Operations Closure	Wetlands within the drawdown zone
Social	In-migration / outmigration of employees	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	Local hiring	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	Training	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	House availability	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	Real estate values	TBD upon consultation with	TBD upon consultation with Indigenous	TBD upon consultation with

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
		Indigenous communities, government agencies and stakeholders	communities, government agencies and stakeholders	Indigenous communities, government agencies and stakeholders
Social	Crime	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	Emergency services	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	Traffic accidents	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Economic	Employment	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Economic	Business and contracting opportunities	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Economic	Training courses	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Economic	Worker profile	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Economic	Economic commitments	TBD upon consultation with	TBD upon consultation with Indigenous	TBD upon consultation with

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
		Indigenous communities, government agencies and stakeholders	communities, government agencies and stakeholders	Indigenous communities, government agencies and stakeholders
Aboriginal	Aboriginal employment during operations	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Aboriginal	Aboriginal employment during closure	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Aboriginal	Aboriginal employment following closure	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders

14.0 CONCLUSIONS

As part of the approval process Treasury Metals is undergoing for their Goliath Gold Project, they completed a thorough and comprehensive environmental assessment in accordance with the Project-specific EIS Guidelines prepared by the Canadian Environmental Assessment Agency (the Agency). Treasury Metals submitted an EIS for the Project to the Agency in March of 2015, and April of 2015 the Agency confirmed that Treasury Metals' EIS as met conformity with the requirements of the EIS Guidelines. Following a period of technical review and public comment, the Agency issued a series of requests to Treasury Metals. As part of the information request (IR) process, the Agency requested that Treasury Metals prepare and submit a revised EIS (this document). The revised EIS was prepared in accordance with the Agency's request, and included the completion of further technical work required as part of the IR response process.

This revised EIS lays out the evaluation of potential effects of the Project in a traceable and methodical manner. The effects of the Project were evaluated for the following disciplines:

- Terrain and soils;
- Geology and geochemistry;
- Noise;
- Light;
- Air quality;
- Climate;
- Surface water quality;
- Surface water quantity;
- Groundwater quality;
- Groundwater quantity;
- Wildlife and wildlife Habitat;
- Migratory Birds;
- Fish and fish habitat;
- Wetlands and vegetation;
- Land use;
- Social;
- Economic;
- Human health;
- Heritage resources; and
- Aboriginal peoples.

For each of these disciplines, valued components were identified. These VCs were described from both ecological and socio-economic perspective. The VC used in the revised EIS are described fully in Section 6.1.3 of the revised EIS, and are summarized in Table 6.0-1.

The methodical steps taken for evaluating the effects on the identified disciplines and VCs included the following:

- **Identify the Likely Effects of the Project on the Environment**: The likely potential effects of the Project on each discipline during each of the four Project phases were identified, along with the possible linkages between the various disciplines and VCs.

- **Predict the Effects of the Project**: Using clearly described approaches, the effects of the Project on the disciplines and VCs. The prediction of effects need to identify and evaluate those measures incorporated in the Project to avoid effects. The results of the effects prediction should cover all Project phases, and indicate whether the Project is predicted to result in adverse effects.

- **Mitigation Measures**: As set out in the EIS Guidelines, mitigation measures need to be identified in those cases where ad verse effects were predicted, In keeping with the EIS Guidelines, such mitigation should be technically and economically feasible.

- **Residual Effects**: Residual adverse effects are those that remain after consideration of the application technically and economically feasible mitigation measures. The residual effects that remain after mitigation are those that are carried forward for consideration of possible cumulative effects (Section 7) and ultimately for the determination of significance (Section 8).

The findings of the effects assessment is provided in Section 6, and summarized in Table 6.0-1.

For each of the identified residual effects (see Table 6.0-1), the EIS Guidelines require that the assessment consider the potential for there to be cumulative effects. The cumulative effects assessment, presented in Section 7, followed the process set out by the Agency in the document entitled “Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012” (CEAA, 2014). The assessment of cumulative effects also relied on Agency’s operational policy statement entitled “Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012” (CEAA, 2015). The future Projects included in the assessment of possible cumulative effects (see Figure 7.2-1) was expanded from those considered in the original EIS to include Projects identified by the Agency as part of Round 1 information request process. The results of the cumulative effects assessments, which are summarized within Table 7.3-1, concluded that while potential cumulative effects were identified for some VCs, those potential cumulative effects were small and would not alter the magnitude of the predicted residual effects associated with the Project, nor would they alter the determination of significance.

For each of the identified residual effects (see Table 6.0-1) that were carried into the cumulative effects assessment (see Table 7.3-1), a determination of significance was completed (Section 8). The significance assessment incorporated consideration of the following measures identified in the EIS Guidelines:

- Magnitude;

- Geographic extent;
- Timing;
- Duration;
- Frequency; and
- Reversibility.

The methods used for assigning the above measures were set out in Section 8.1 pf the revised EIS, and then applied on a discipline by discipline basis (Sections 8.2 through 8.21 of the revised EIS). The results of the determination of significance for all of the identified residual effects, including consideration of cumulative effects, indicated the following:

- There were no significant residual adverse effects identified for the Project.
- There were five (5) significant residual effects determined as positive. These effects were all for the economic discipline during the operations phase of the Project. The following five (5) VCs were identified with significant positive residual effects:
    - Labour force, labour participation and employment (operations phase);
    - Income level (operations phase);
    - Economic development (operations phase);
    - Existing businesses (operations phase); and
    - Government revenues (operations phase).
- There was one (1) significant residual effect identified as neutral in direction, specifically the real estate VC. Changes in property values were identified as having a significant positive effect from perspective of a seller, and a significant negative effect from the perspective of a buyer, resulting in a neutral direction from a population basis.

A summary of the significance determinations is provided in Table 8.0-1.