



**FIRST MINING
GOLD**



APPENDIX H

SOUND & VIBRATION TECHNICAL SUPPORT DOCUMENT

- H-1 Baseline Sound & Vibration (Leaves Off)
- H-2 Baseline Sound & Vibration (Leaves On)
- H-3 Baseline Sound Noise Assessment Report
- H-4 Blasting Assessment Report**



Blasting Assessment Report

Springpole Gold Project
First Mining Gold Corp.

ONS2104

Prepared by:
WSP Canada Inc.

October 2024



Blasting Assessment Report Springpole Gold Project

Red Lake District, Northwest Ontario
Project #ONS2104

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EXECUTIVE SUMMARY

First Mining Gold Corp. (FMG) proposes to develop, operate and eventually decommission / close an open pit gold and silver mine and ore process plant with supporting facilities known as the Springpole Gold Project (Project). The Project is located in a remote area of northwestern Ontario, approximately 110 kilometres (km) northeast of the Municipality of Red Lake and 145 km north of the Municipality of Sioux

An environmental assessment (EA) pursuant to the Canadian Environmental Assessment Act, 2012 (SC 2012, c. 19, s. 52) and the Ontario Environmental Assessment Act (RSO 1990, c. E.18) is required to be completed for the Project. This report is one of a series of Technical Support Documents prepared by WSP Canada Inc. (WSP) on behalf of FMG to describe the predicted environmental effects of the Project.

This Blasting Assessment Report has been prepared to assess the potential effects of the construction, operation, and decommissioning and closure phases of the Project on noise and vibration from the use of explosives in mining operations. To evaluate the potential for effects, the predictive overpressure and vibration model has been prepared to:

- Predict noise and vibration level from the open pit operations for the Project, based on site investigations conducted during 2021, publicly available data and experience from similar mines.
- Assess the predicted level in accordance with the following guidelines:
 - The ground borne vibration and air-overpressure guideline limits contained within the Ontario Ontario Ministry of the Environment, Conservation and Parks (MECP) *Model Municipal Noise Control By-law for Blasting in Mines and Quarries* (NPC-119) (MECP, 1982).
 - The air-overpressure limits contained in the Health Canada (HC) *Guidance for Evaluating Human Health Impacts in Environmental Assessment: NOISE* (Health Canada Noise Guideline) (Health Canada, 2017).
 - The ground borne vibration limit contained within the Canadian Department of Fisheries and Oceans (DFO) *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright & Hopky, 1998). The water overpressure limit for northern waters as suggested by the DFO in *Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002* (Cott & Hanna, 2005).

Predictive air-overpressure, water-overpressure and ground-borne vibration models were used to establish the upper limit for explosive loading per delay. The allowable explosive loading in kilograms (kg) per delay was calculated based on the receptor setback data to meet the applicable air-overpressure, water-overpressure, and ground-borne vibration criteria.

The blasting impact calculations were completed using conservative assumptions to model the predictable worst-case scenario in all cases. Air-overpressure and ground-borne vibration emissions were assessed for two identified receptors (Site 13 and Site 18) that are located over 2 km away from the boundary of the proposed open pit area. In addition, water-overpressure and ground-borne vibration emissions were assessed for three points (SL-A, SL-B, and SL-C) along the adjacent shorelines which are at the closest distances to the boundary of the open pit. The impact assessment results are summarized in the table below which presents the allowable explosive loading in kg per delay to meet the MECP, HC and DFO criteria and comments received on the draft EIS/EA.

Based on proposed explosive loading, blasting operations will be performed in compliance with the current blasting guidelines published by the MECP and HC.

The results of this study indicate that the proposed explosive loads may result in exceedances of the DFO limits at the shoreline adjacent Source Point A; however, these potential exceedances will be mitigated with measures to be developed in a blast management plan and any remaining residual effects to fish habitat will be addressed in the Fish Habitat Compensation and Offsetting Plan.

Prior to construction, a detailed blasting plan will be developed for the Project to determine the maximum allowable explosive loading at various locations within the Project development area to maintain compliance with NPC-119, Health Canada and DFO limits for vibration at the receptors.

The weekly blast schedule will be posted on the company website, so local Indigenous communities and seasonal cabin owners are aware of the blasting activities in advance.

Blasting Calculations Summary Result

Source Point	Location Relative to Pit	General /Non-Spawning Periods ⁽¹⁾		Spawning Periods ⁽²⁾	
		The Most Stringent Criteria	Allowable Explosive Loading W (kg / delay)	The Most Stringent Criteria	Allowable Explosive Loading W (kg / delay)
A	NW	DFO - Water Overpressure	19.6	DFO - Vibration	5.1
B	SW	DFO - Water Overpressure	3,603	DFO - Vibration	933
C	SE	DFO - Water Overpressure	8,740	DFO - Vibration	2,263

Notes:

- (1) For general/non-spawning periods, the allowable explosive loading is based on the most stringent requirement to meet the following criteria: MECP/HC air-overpressure limit; MECP vibration limit; and DFO water overpressure limit.
- (2) For spawning periods, the allowable explosive loading is based on the most stringent requirement to meet the following criteria: MECP/HC air-overpressure limit; MECP vibration limit; DFO water overpressure limit; and DFO vibration limit.

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Attachment A Blast Impact Table and Calculation Sheets
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LIST OF ABBREVIATIONS

CDF	Co-Disposal Facility
DFO	Fisheries and Ocean Canada
EA	Environmental Assessment
FMG	First Mining Gold Corp.
HC	Health Canada
kg	Kilogram
km	Kilometre
m	Metre
MECP	Ministry of the Environment, Conservation and Parks
NW	Northwest
NPC	Noise Pollution Control
POR	Point of Reception
SE	Southeast
SGP	Springpole Gold Project
SW	Southwest
tpd	Tonnes per day
TSD	Technical Support Documents
WHO	World Health Organization
WSP	WSP Canada Inc.

1.0 INTRODUCTION

First Mining Gold Corp. (FMG) proposes to develop, operate, and eventually decommission / close an open pit gold and silver mine and ore process plant with supporting facilities known as the Springpole Gold Project (the Project). The Project is located in a remote area of northwestern Ontario, approximately 110 kilometres (km) northeast of the Municipality of Red Lake and 145 km north of the Municipality of Sioux -1).

An environmental assessment (EA) pursuant to the *Canadian Environmental Assessment Act, 2012* and the *Ontario Environmental Assessment Act* is required to be completed for the Project. This report is one of a series of Technical Support Documents (TSDs) prepared by WSP Canada Inc. (WSP) on behalf of FMG to describe the predicted environmental effects of the Project.

During the consultation process, Project-specific input from regulatory agencies and Indigenous communities was considered at key milestones of the EA process including baseline studies, alternatives, assessment approach, mitigation and monitoring where appropriate. An overview of the consultation input that was considered during the assessment in relation to this assessment will be summarized in the Environmental Impact Statement / Environmental Assessment (EIS/EA). The updated vibration assessment includes additional simulations, outputs, and discussion based on the additional field data / information collected since the preparation of the draft EIS/EA.

1.1 Blasting Assessment Objectives

This Blasting Assessment Report has been prepared to assess the potential effects of the construction, operation, and decommissioning and closure phases of the Project on noise and vibration from the use of explosives in mining operations. To evaluate the potential effects of blasting, the predictive overpressure and vibration model has been prepared to:

- Predict noise and vibration level from the open pit operations for the Project based site investigations conducted during 2021, publicly available data and experience from similar mines.
- Assess the predicted level in accordance with the following guidelines:
 - The ground borne vibration and air-overpressure guideline limits contained within the Ontario Ontario Ministry of the Environment, Conservation and Parks (MECP) *Model Municipal Noise Control By-law for Blasting in Mines and Quarries* (NPC-119) (MECP, 1982).
 - The air-overpressure limits contained in the Health Canada (HC) *Guidance for Evaluating Human Health Impacts in Environmental Assessment: NOISE* (Health Canada Noise Guideline) (Health Canada, 2017).
 - The ground borne vibration limit contained within the Canadian Department of Fisheries and Oceans (DFO) *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright & Hopky, 1998). The water overpressure limit for northern waters as suggested by the DFO in *Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002* (Cott & Hanna, 2005).

1.2 Project Overview

The Project is proposed to be mined as an open pit. To allow the development and safe operation of the open pit mine, dikes will be established to facilitate controlled dewatering of the mining area. Ore from the open pit will be processed in an onsite process plant at approximately 30,000 tonnes per day (tpd). Tailings resulting from the processing of ore will be stored in a co-disposal facility (CDF).

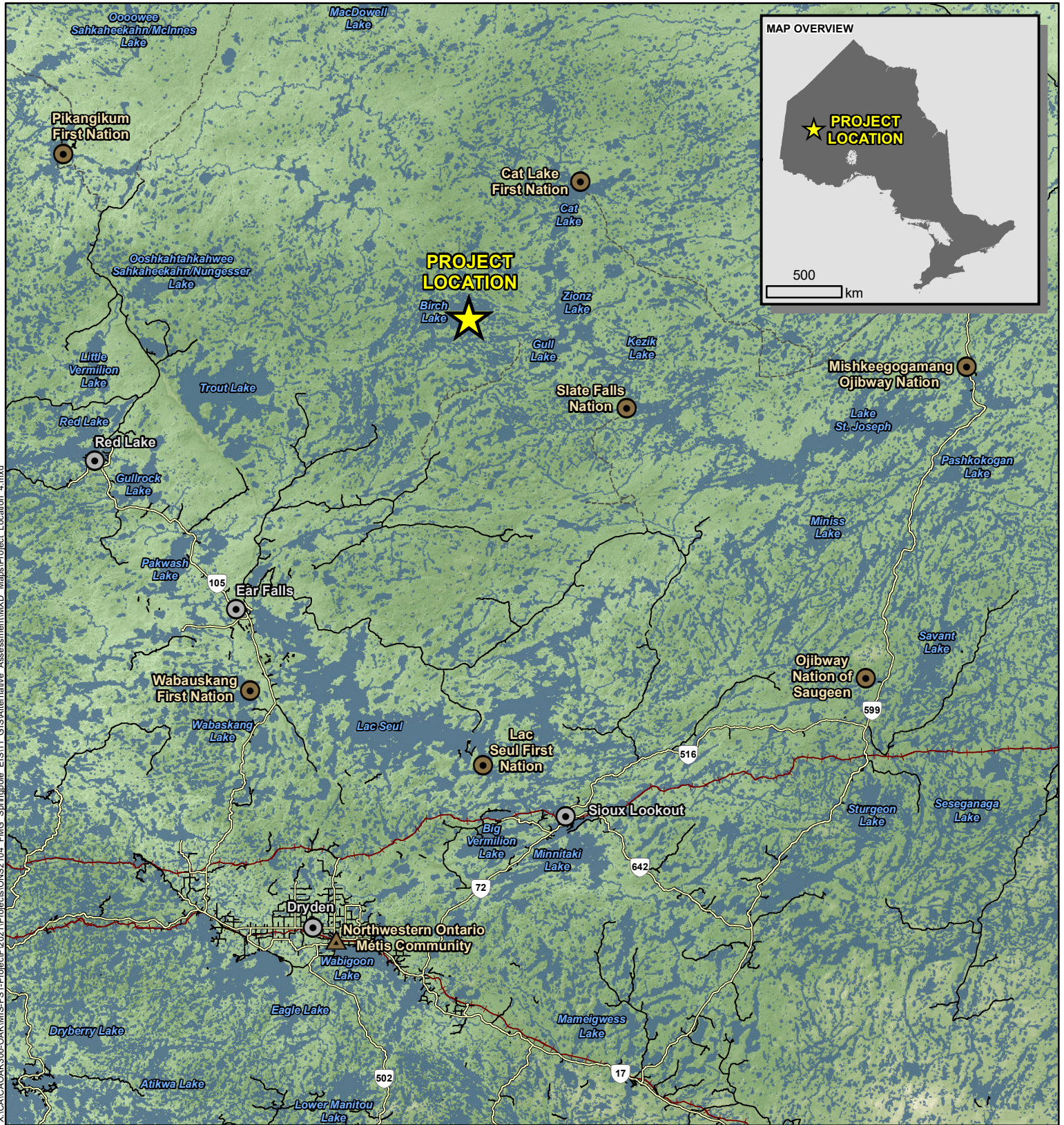
The main components of the Project (Figure 1-2) include:

- Open pit;
- Dikes (west dike and east dike);
- CDF for mine rock and tailings (north cell and south cell);
- Surficial soils stockpile;
- Ore stockpiles;
- Process plant or process plant complex;
- Buildings and supporting infrastructure;
- Water management and treatment facilities;
- Fish habitat development area;
- Accommodations complex;
- Aggregate operation(s);
- Transmission line; and
- Mine access road and co-located airstrip.

The expected duration of Project phases:

- Construction phase (Years -3 to -1: three years in length);
- Operations phase (Years 1 to 10: ten years in length);
- Decommissioning and closure phase (Years 11 to 15: five years in length); and
- Post-closure phase (Years 16+).

After decommissioning and closure of the site will follow a period of environmental monitoring.



X:\CAL\OAK\300-OAK\MIS-FS1-Project\2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\Alternative_Assessment\MXD_Maps\Project_Location_4.mxd

LEGEND

- Project Location
- Railway
- Town
- First Nation Reserve
- Northwestern Ontario Métis Community
- Highway
- Secondary Road
- Resource / Winter Road

NOTES:
 - Topographic information extracted from LIO, MNRF.



SPRINGPOLE GOLD PROJECT

Project Location

Datum: NAD83
 Projection: UTM Zone 18N

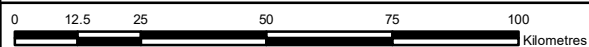


PROJECT N°: ONS2104

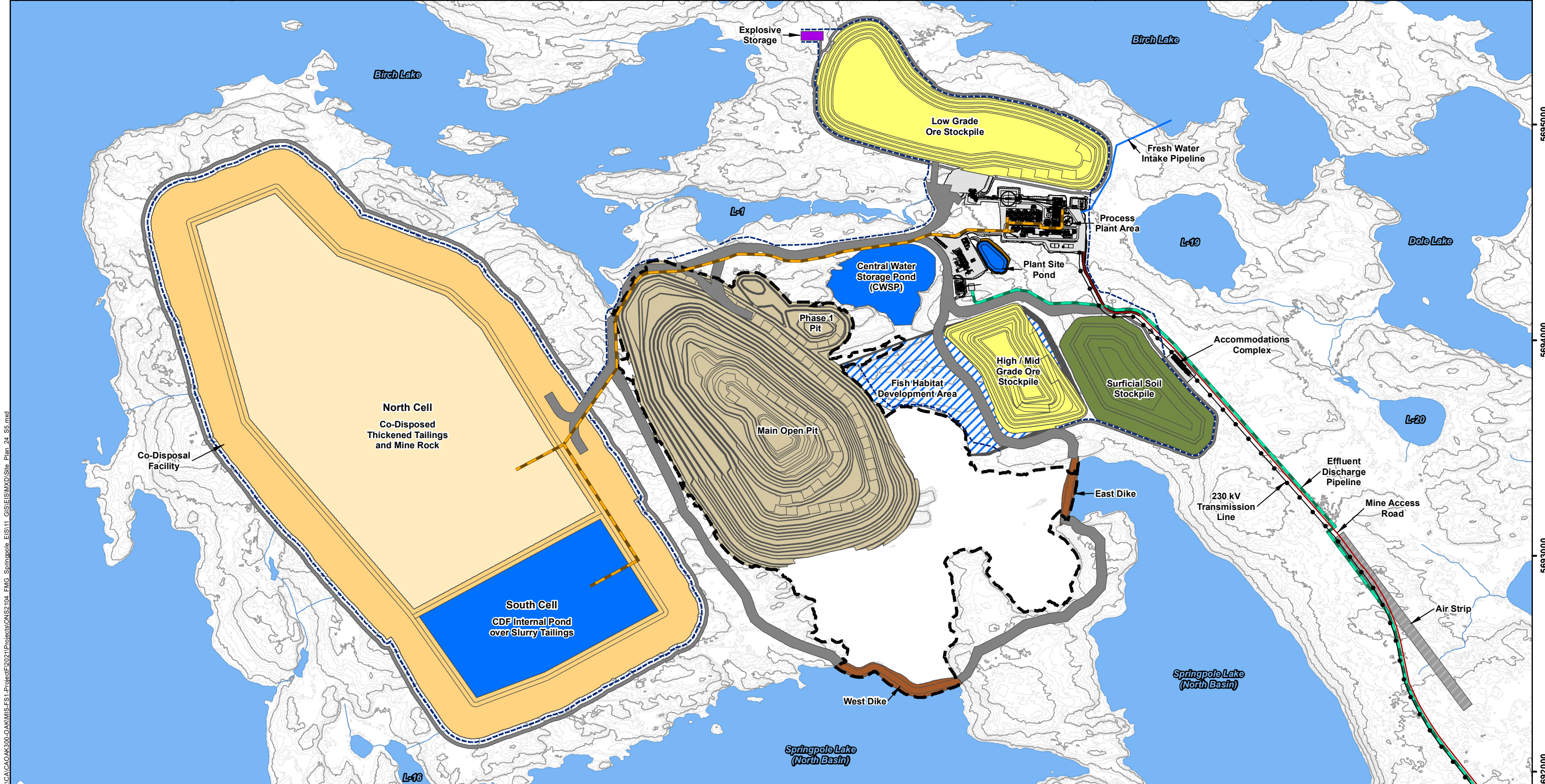
FIGURE: 1-1

SCALE: 1:1,500,000

DATE: September 2024



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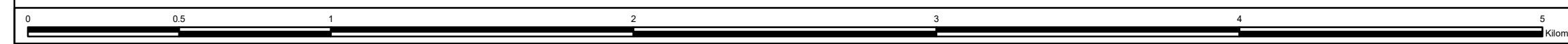
X:\C\CA\OAK300-OAKMIS-FS1-Project\2021\Projects\ONS2104_FMG_Springpole EIS\11 GIS\ES\IMXD\Site Plan_24_S5.mxd

LEGEND

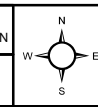
Watercourse	Proposed Mine Features	Process Plant Area	Mine Access Road	Fish Habitat Development Area
Waterbody	Open Pit	Dike	Seepage / Runoff Collection System	
Major Contours (5 m interval)	Open Pit Basin	Pond	230 kV Transmission Line	
Minor Contours (1 m interval)	Ore Stockpile	Haul / Access Road	Fresh Water Intake Pipeline	
	Surficial Soil Stockpile	Explosives Storage	Effluent Discharge Pipeline	
	Co-Disposal Facility	Air Strip	Tailings Pipeline Corridor	
	Co-Disposed Thickened Tailings and Mine Rock			

NOTES:
 - Contours extracted from 2020 LiDAR survey.
 - Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
 - 230 kV transmission line provided by First Mining Gold, April 2024.

SPRINGPOLE GOLD PROJECT	
EIS / EA Site Plan	
PROJECT N°: ONS2104 SCALE: 1:17,000	FIGURE: 1-2 DATE: June 2024



Datum: NAD83
 Projection: UTM Zone 15N



5695000
5694000
5693000
5692000

2.0 APPLICABLE GUIDELINES

The MECP *Model Municipal Noise Control By-law for Blasting in Mines and Quarries* (NPC-119) (MECP, 1982) provides guideline limits for blasting air-borne overpressure and ground-borne vibration. These limits are applicable at sensitive land uses and in particular residential dwellings. The applicable air-borne overpressure and ground-borne vibration limits for blasting from NPC-119 are outlined in Table 2-1.

The NPC-119 is intended to be used to evaluate exceedances of peak threshold limits to prevent structural damage but is not specifically applicable to evaluate the health endpoints considered by Health Canada. The HC *Guidance for Evaluating Human Health Impacts in Environmental Assessment: NOISE* (Health Canada Noise Guideline) (Health Canada, 2017) also provides guideline limits for blasting air-overpressure that are based on the World Health Organization (WHO) recommendations for hearing loss protection. The Health Canada Noise Guideline considers that while hearing loss impacts are not typically considered in the context of a Federal environmental assessment because project-related sound levels rarely reach these high levels at potential receptor locations, noise-induced hearing loss may be a concern when project activities involve impulsive noise emission such as from blasting. As such, Health Canada suggested that the WHO recommendation be followed to avoid hearing loss resulting from impulsive noise exposure and the applicable limits are outlined in Table 2-2 (World Health Organization (WHO), 1999). Annoyance from blasting can depend on the number of blasts executed per day. For multiple blasting events in a single day, Health Canada has adopted the US EPA (1974) criterion for sonic booms and suggests that little or no public annoyance is expected to result if their measured or predicted peak value is below $125-10 \log(N)$ dBZ (zero weighted decibels), where N refers to the number of blasts per day. If the number of blasts per day remains at or less than three (3), a limit of 120 dBL should result in little or no public annoyance (see Table 2-3).

The DFO *Guidelines for the Use of Explosives In or near Canadian Fisheries Waters* (Wright & Hopky, 1998) provides guideline limits for blasting water-overpressure and ground-borne vibration when in proximity to Canadian Fisheries Waters. Subsequent work by DFO (Cott and Hanna 2005) suggested that a more conservative limit for fisheries habitat in waterbodies with substantial ice-cover throughout the year is 50 kPa. DFO has also confirmed, in comments received on the draft EIS/EA, that 50 kPa is a conservative limit for the fisheries habitat on the Project. These limits are applicable at the land-water interface (shoreline). The applicable water-overpressure and vibration limits for blasting from the DFO are outlined in Table 2-4.

Table 2-1: MECP Vibration Limits (NPC-119)

Assessment Type	Assessment Metric	Cautionary Limit ¹	Compliance Limit ²
Air-Overpressure	Peak Pressure Level (L_{peak})		8 dBZ
Vibration	Peak Particle Velocity (PPV)		2.5 mm/s

Source:

MECP 1982

Notes:

- (1) These are cautionary limits below which a routine monitoring is not required.
- (2) The ultimate compliance limit with a routine monitoring is 128 dB for the peak pressure level limit and 12.5 mm/s for the peak particle velocity limit.

Table 2-2: HC Noise Guideline Limits

Assessment Type	Assessment Metric	Limit ¹
Air-Overpressure	Peak Pressure Level (L_{peak})	Z, Adults
		Z, Children

Source:

Health Canada 2017

Notes:

- (a) Limit to avoid hearing loss resulting from impulsive noise exposure.

Table 2-3: HC Noise Annoyance Guideline

Assessment Type	Assessment Metric	Limit ¹
Air-Overpressure	Peak Pressure Level (L_{peak})	20 dBZ

Source:

Health Canada 2017

Notes:

- (a) There should result in little or no public annoyance if the number of blasts per day remains at or less than three (3).

Table 2-4: DFO Blasting near Canadian Fisheries Water Limits

Assessment Type	Assessment Metric	Limit
Water-Overpressure	Peak Pressure Level (P_{peak})	50 kPa
Vibration ¹	Peak Particle Velocity (PPV)	

Source:

Wright and Hopky 1998

Notes:

- (1) The vibration limit applies with a maximum PPV level of 13 mm/s in a spawning bed during the period of egg incubation.

3.0 BLASTING/MINING OPERATION

The Projects operation phase will be carried out over a 10 year period. The open pit will be in operation for approximately 9.5 years.

The use of explosives to support in development will begin at surface level and progress quickly below grade throughout the pit development. Blast patterns vary for feed and waste to assist in mine productivity. Drilling will typically be completed with down the hole hammer drills with a 251 mm diameter bit. Additional drilling capability will be available with smaller 140 mm diameter drills which will supplement the drilling and provide the pre-shear drilling (AGP Mining Consultants Inc., 2021).

The proposed blast design details for the open pit are summarized in Table 3-1. .

Table 3-1: Blast Design Parameters

Parameter	140 mm Blastholes ¹		251 mm Blastholes ¹	
	Ore	Waste	Ore	Waste
Hole Diameter (mm)	140	140	251	251
Bench Height (m)	12.0	12.0	12.0	12.0
Sub-drill (m)	0.8	0.8	1.3	1.3
Depth of Hole (m)	12.8	12.8	13.3	13.3
Pattern Type	Staggered	Staggered	Staggered	Staggered
Burden (m)	4.2	4.0	6.7	6.7
Spacing (m)	4.8	4.6	7.7	7.7
Stemming Length (m)	2.94	2.80	4.69	4.69
Explosive Density (g/cc)	1.25	1.25	1.25	1.25
Explosive Weight (kg/hole) ²	189.7	192.4	532.5	532.5
Powder Factor (kg/t)	0.272	0.303	0.299	0.299
Powder Factor (kg/m ³)	0.784	0.871	0.860	0.860

Notes:

- (1) Based on typical blast designs provided by FMG
- (2) Explosive weight per blasthole

4.0 ASSESSMENT APPROACH

Predictive overpressure and vibration models typically use the weight of explosive as the input variable. The predictive models can be used to establish the upper limit for explosive loading per delay in terms of kilograms (kg) of explosives in consideration of receptor locations, overpressure criteria and ground vibration criteria. This will provide the blasting contractor with generalized guidance which can be utilized to determine the limiting kg/delay explosive loading.

The intensity of ground and air vibration effects from any surface blasting operation are primarily governed by the distance between the receptor and the blast and the maximum weight of explosive detonated per delay period within the blast. The assessment has demonstrated that it is possible to meet all limits at the receptors, however it was identified that where the proposed open pit perimeter is in closer proximity to the receptors (i.e., fish habitat), the estimated explosive loading to meet the DFO limits of 5.1 kg / delay (Table 5-3) may be impractical for operations to attain. Therefore, an explosives load of 190 kg/delay, which was based on typical blast designs, was used to estimate ground vibrations and water overpressures induced by blasts carried out adjacent the proposed open pit perimeter. Based on this explosive charge weight per delay, the ground vibrations and water overpressures have been estimated to result in exceedances of the DFO guideline and therefore, in order to maintain compliance with the the DFO guideline limits, one or more measures may need to be implemented, which may include increasing the a minimum offset distance, decreasing the maximum explosive charge weight per delay or other measures to mitigate effects to fish such as the installation of barriers, timing windows or fish habitat offsetting measures. The information presented in the blasting assessment calculations will be used to design mitigation strategies that will be outlined in a blast management plan.

5.0 ASSESSMENT CALCULATIONS

The blasting assessment calculations were completed using conservative assumptions to model the predictable worst-case scenario in all cases. The MECP guideline (MECP, 1982) limits were used for the assessment of air-borne overpressure and ground-borne vibration. By assessing the air-borne overpressure levels against the MECP guideline limit, the HC limit will be respected as the MECP limit is the same as the MECP air-borne overpressure limit. The DFO guideline (Wright & Hopky, 1998) methods were used for calculation of water-overpressure and ground-borne vibration in proximity to Canadian Fisheries Waters.

A number of Points of Reception (PORs) have been identified and displayed in Figure 5-1. The two nearest PORs, POR01 and POR07, were identified for assessing air-borne overpressure and ground-borne vibration against the MECP limits provided in Table 2-1 and the HC noise annoyance guideline in Table 2-3. Both receptors are located over 6 km from the boundary of the proposed open pit area shown in Figure 5-2.

The three shoreline locations, SL-A, SL-B, and SL-C are the closest land-water interfaces to the boundary of the proposed open pit area and future area for fish habitat development, and were identified for assessing the water-overpressure and ground-borne vibration against the DFO criteria provided in Table 2-4. These shoreline locations are located to the northwest (NW), southwest (SW), and southeast (SE) of the open pit area.

The Blast Assessment Table, provided in Attachment A, shows the maximum explosive loading allowable at the two PORs and the three shoreline locations (see Figure 5-2 for locations) in order to meet the applicable MECP, HC and DFO criteria. The supporting calculations are also provided in Attachment A.

Table 5-1, Table 5-2 and Table 5-3 summarize the results from the Blast Assessment Table for MECP, Health Canada and DFO criteria, respectively, which presents the allowable explosive loading in units of kg/delay. The allowable explosive loading weights were selected based on the most stringent requirement and summarized separately for spawning and general/non-spawning periods in Table 5-4.

Based on proposed blast parameters, blasting operations can be performed at the Project site in compliance with the current blasting guidelines published by the MECP (NPC-119) and HC (2017).

Due to proximity of the open pit area to surrounding waterbody, additional results have been provided in this report in the form of quick reference charts (provided in Attachment B), which show the upper limit for explosive loading in kg per delay in order to meet the applicable criteria for water overpressure and vibration outlined in the DFO guideline. Additional analyses indicate exceedances would likely extend into fish habitat at SL-A as shown in Table 5-5. The setback distances from the proposed pit perimeter that are required to maintain compliance with the DFO Guideline are shown in Figure 5-3. Therefore, these exceedances are mitigated for and incorporated into the Fish Habitat Compensation and Offsetting Plan.

The blast calculations presented in this assessment were completed using conservative assumptions to model the predictable worst-case scenario in all cases. Prior to construction, a detailed blasting plan will be developed for the Project to determine the maximum allowable explosive loading at various locations within the project development area to maintain compliance with NPC-119, Health Canada and DFO limits for vibration at the receptors. The blast management plan will detail the required blasting designs and/or other measures to confirm compliance with limits and mitigate effects to fish habitat. These measures may include in the following:

- Increasing the a minimum offset distance,
- Methods to reduce the maximum explosives weight detonated per delay period (e.g., reduction in blast hole diameter)

- Time in-water and near-water work requiring the use of explosives to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries timing windows.
- Limit blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e., decking).
- Back-fill, or stem, blast holes with sand or gravel to grade to confine the blast.
- Place blasting mats over top of holes to reduce scattering of blast debris around the area.
- Do not use ammonium nitrate based explosives in water due to the production of toxic by-products that may cause serious harm to fish.
- Remove all blasting debris and other associated equipment/products from the blast area.

The weekly blast schedule will be posted on the company website, so local Indigenous communities and seasonal cabin owners are aware of the blasting activities in advance.

Table 5-1: Blast Calculation Summary for MECP Criteria

Source Point	Location Relative to Pit	MECP Receptors		Allowable Explosive Loading W (kg / delay)	
		POR Name	Distance to POR (m)	Air Overpressure ¹	Vibration ²
A	NW	POR01	6,642	26,344	77,526
B	SW	POR07	10,791	111,000	204,632
C	SE	POR07	10,428	102,000	191,096

Notes:

- (1) The allowable explosive loading in kg per delay to meet the water overpressure limit of 120 Dbl.
- (2) The allowable explosive loading in kg per delay to meet the ground vibration limit of 10.0 mm/s.

Table 5-2: Blast Calculation Summary for Health Canada Noise Annoyance Criteria

Source Point	Location Relative to Pit	MECP Receptors		Allowable Explosive Loading W (kg / delay)
		POR Name	Distance to POR (m)	Air Overpressure ¹
A	NW	POR01	6,642	26,344
B	SW	POR07	10,791	111,000
C	SE	POR07	10,428	102,000

Notes:

- (1) The allowable explosive loading in kg per delay to meet the air-borne overpressure limit of 120 dBL.

Table 5-3: Blast Assessment Summary for DFO Criteria

Source Point	Location Relative to Pit	DFO Receptors		Allowable Explosive Loading W (kg / delay)	
		Shoreline Location	Distance to Shorelines (m)	Water Overpressure ¹	Vibration ²
A	NW	SL-A	34	19.6	5.1
B	SW	SL-B	461	3,603	933
C	SE	SL-C	718	8,740	2,263

Notes:

- (1) The allowable explosive loading to meet the water overpressure limit of 50 kPa.
- (2) The allowable explosive loading to meet the ground vibration limit of 13 mm/s.

Table 5-4: Blast Assessment Summary Result

Source Point	Location Relative to Pit	General /Non-Spawning Periods ¹		Spawning Periods ²	
		The Most Stringent Criteria	Allowable Explosive Loading W (kg / delay)	The Most Stringent Criteria	Allowable Explosive Loading W (kg / delay)
A	NW	DFO - Water Overpressure	19.6	DFO - Vibration	5.1
B	SW	DFO - Water Overpressure	3,603	DFO - Vibration	933
C	SE	DFO - Water Overpressure	8,740	DFO - Vibration	2,263

Notes:

- (1) For general/non-spawning periods, the allowable explosive loading is based on the most stringent requirement to meet the following criteria: MECP/HC air-overpressure limit; MECP vibration limit; and DFO water overpressure limit.
- (2) For spawning period of October, the allowable explosive loading is based on the most stringent requirement to meet the following criteria: MECP/HC air-overpressure limit; MECP vibration limit; DFO water overpressure limit; and DFO vibration limit.

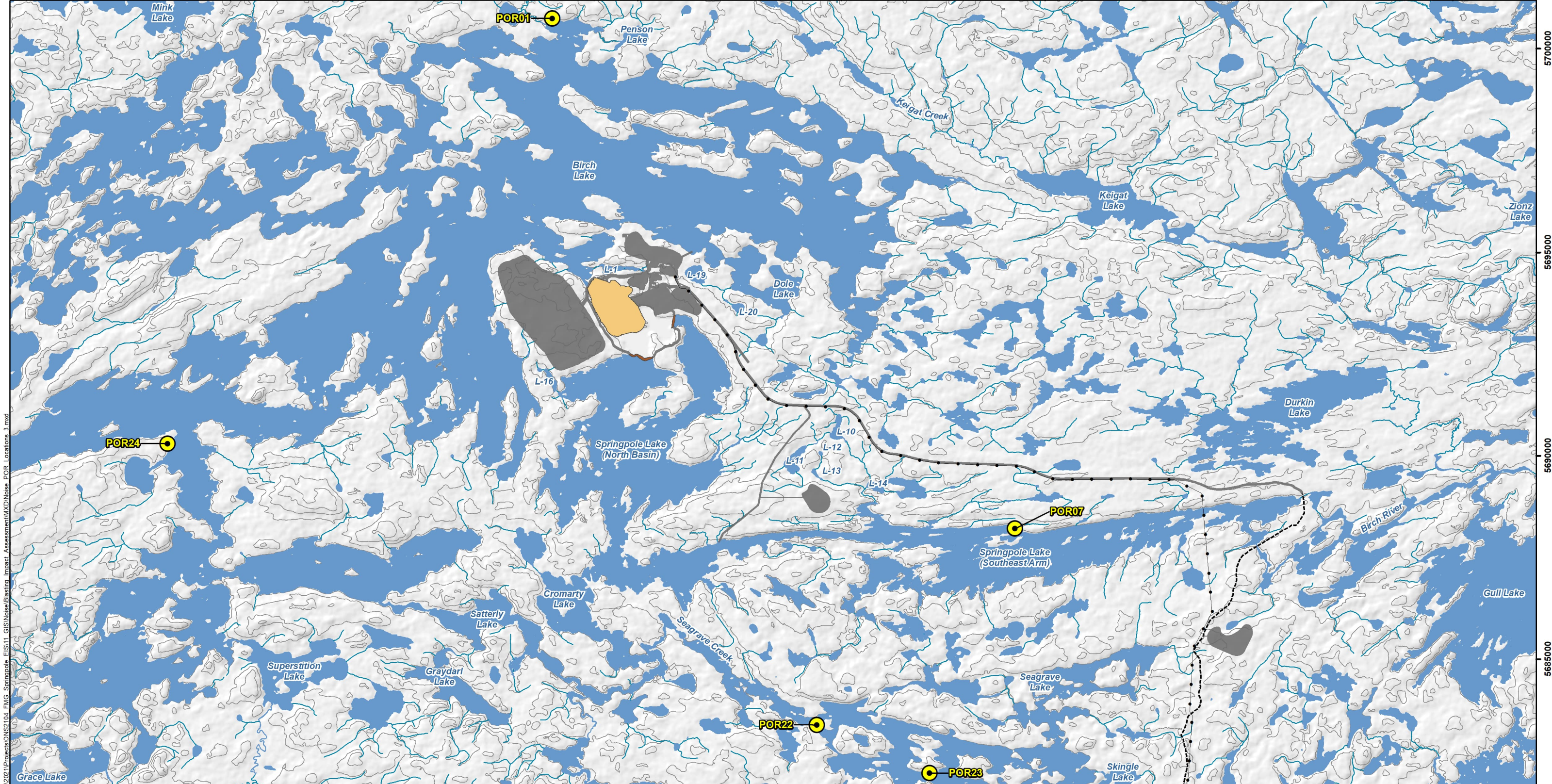
Table 5-5: Estimated Overpressure and Vibration at Shoreline Receptors

Source Point	Location Relative to Pit	DFO Receptors		Maximum Weight (kg) ¹	Water Overpressure (kPa) ²	Vibration (mm/s) ³
		Shoreline Location	Distance to Shorelines (m)			
A	NW	SL-A	34	192	323	238
B	SW	SL-B	461	192	5.0	3.7
C	SE	SL-C	718	192	2.5	1.8

Notes:

- (1) Maximum explosive charge weight per delay of 192 kg for 140 mm diameter holes at the pit perimeters adjacent the shoreline receptors.
- (2) The allowable explosive loading to meet the water overpressure limit of 50 kPa.
- (3) The allowable explosive loading to meet the ground vibration limit of 13 mm/s.

535000 540000 545000 550000 555000 560000 565000 570000



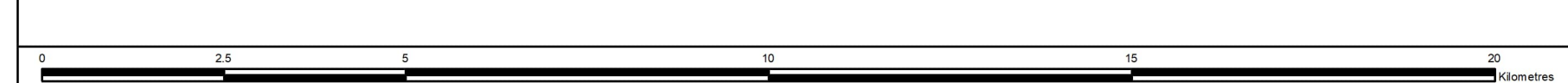
- LEGEND**
- Point of Reception
 - Proposed Open Pit
 - Proposed Dike
 - Proposed 230 kV Transmission Line
 - Other Proposed Mine Feature
 - Wenesaga Forestry Road
 - Watercourse
 - Waterbody
 - Contour (10 m intervals)

NOTES:
 - Topographic information extracted from LIO, MNRF
 - Sensitive Receptor locations provided by First Mining Gold, June 2021.
 - Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.



SPRINGPOLE GOLD PROJECT

Noise Points of Reception Locations



Datum: NAD83
 Projection: UTM Zone 15N



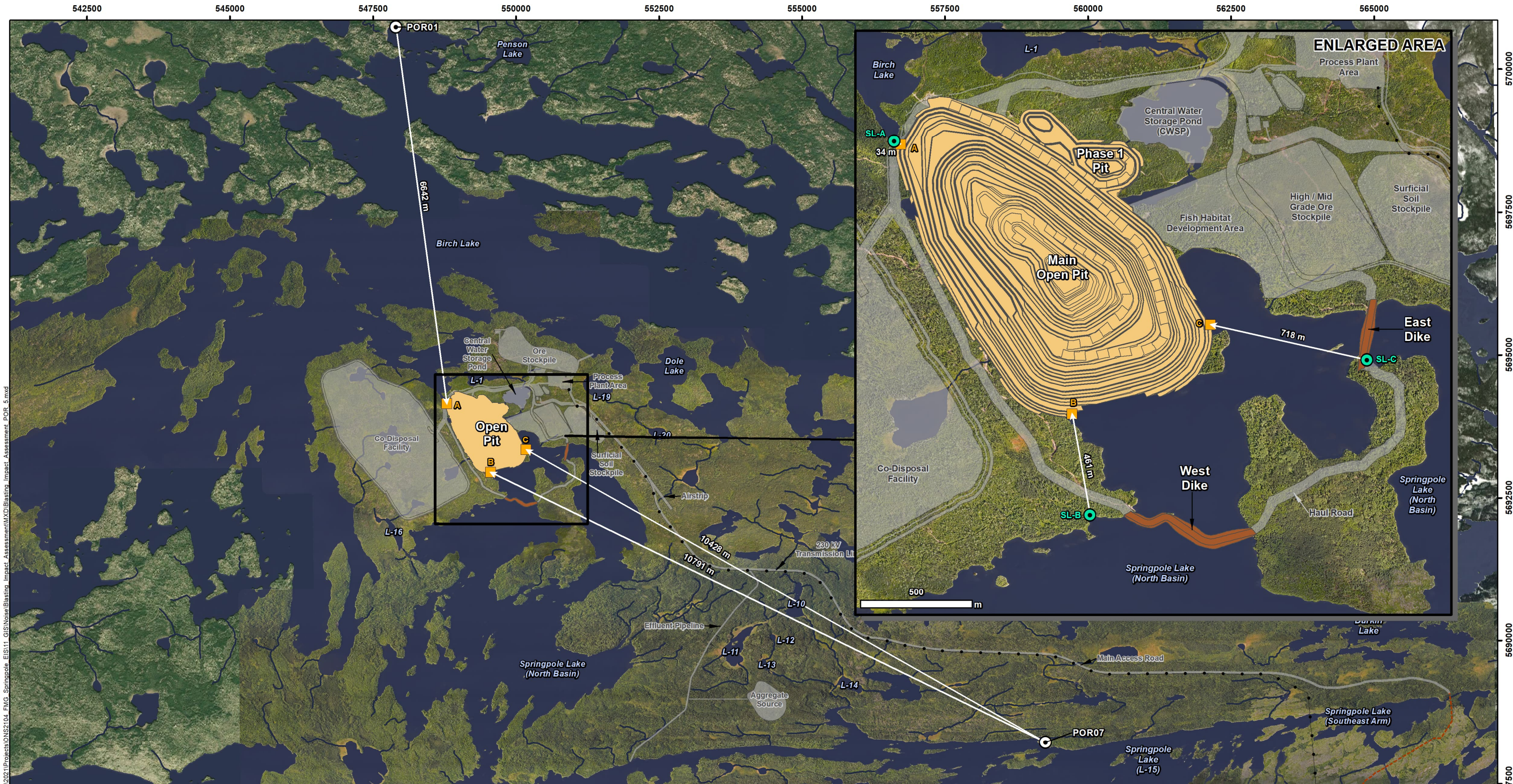
PROJECT N°: ONS2104

FIGURE: 5-1

SCALE: 1:90,000

DATE: June 2024

P:\2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\Noise\Blasing_Impact_Assessment\MD\Noise_POR_Locations_3.mxd



LEGEND

- Reference Source Point
- Points of Reception
- Shoreline Point
- Proposed Open Pit
- Proposed Dike
- Proposed 230 kV Transmission Line
- Other Proposed Mine Feature
- Watercourse
- Waterbody

NOTES:

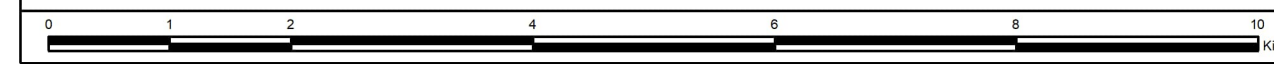
- Topographic information extracted from LIO, MNRF.
- Aerial imagery provided by First Mining Gold, 2020.
- Sensitive Receptor locations provided by First Mining Gold, June 2021.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1, 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

SPRINGPOLE GOLD PROJECT

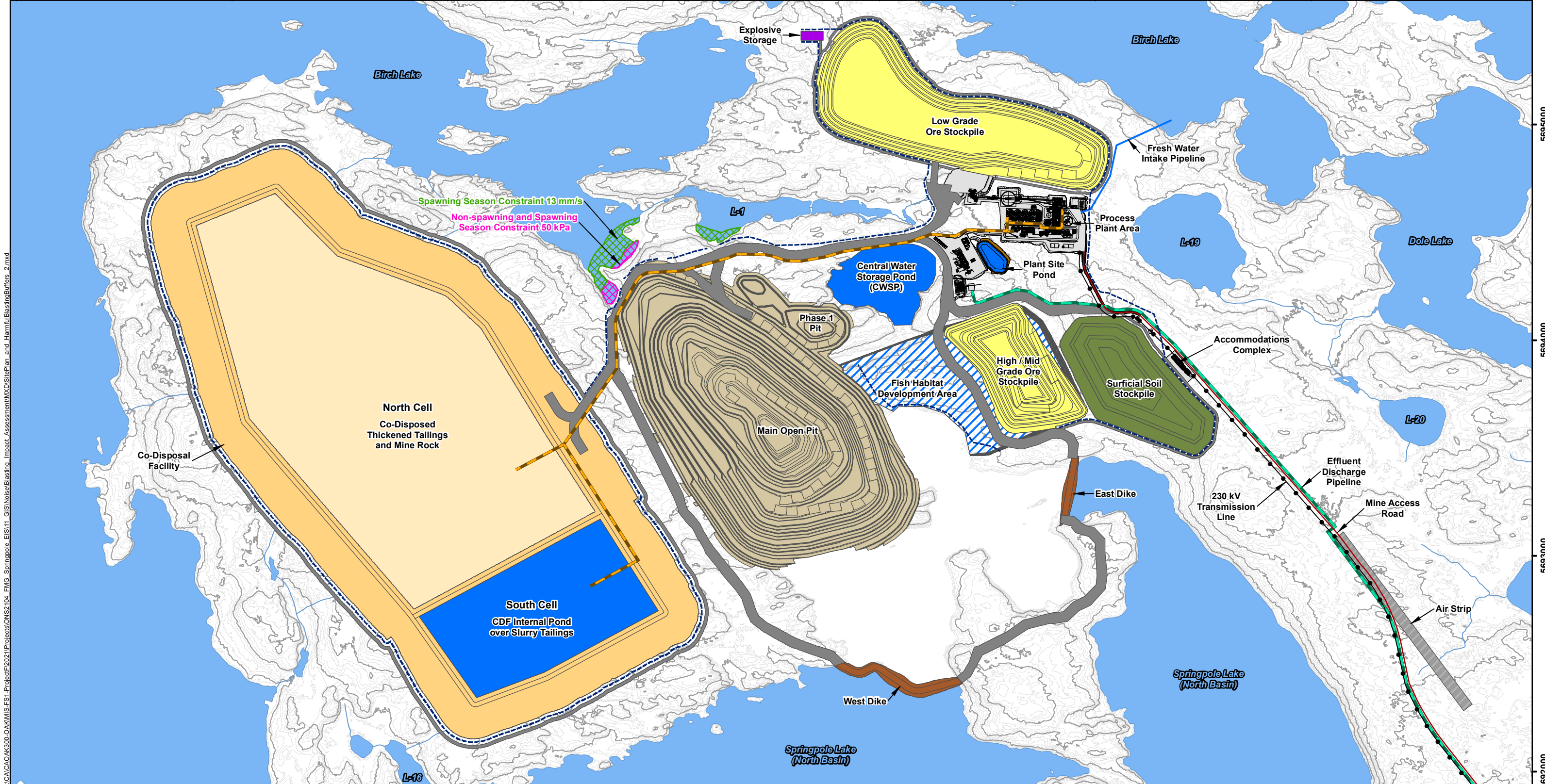
**Blasting Impact Assessment
Points of Reception**

PROJECT N°: ONS2104	FIGURE: 5-2
SCALE: 1:62,500	DATE: June 2024



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546000 547000 548000 549000 550000 551000 552000 553000



LEGEND <ul style="list-style-type: none"> Watercourse Waterbody Major Contours (5 m interval) Minor Contours (1 m interval) 		Proposed Mine Features <ul style="list-style-type: none"> Open Pit Ore Stockpile Surficial Soil Stockpile Co-Disposal Facility Co-Disposed Thickened Tailings and Mine Rock 		<ul style="list-style-type: none"> Process Plant Area Dike Pond Haul / Access Road Explosives Storage Air Strip 		<ul style="list-style-type: none"> Mine Access Road Seepage / Runoff Collection System 230 kV Transmission Line Fresh Water Intake Pipeline Effluent Discharge Pipeline Tailings Pipeline Corridor 		Estimated Distances for Blasting to Meet the DFO Limits <ul style="list-style-type: none"> Non-spawning and Spawning Season Constraint 50 kPa Spawning Season Constraint 13 mm/s 		NOTES: - Contours extracted from 2020 LiDAR survey. - Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.			
PROJECT N°: ONS2104		FIGURE: 5-3		SCALE: 1:17,000		DATE: November 2023		Datum: NAD83 Projection: UTM Zone 15N					

0 0.5 1 2 3 4 5 Kilometres

X:\CACA\OAK300-OAKMIS-FS1-Project\2021\Projects\ONS2104_FMG_Springpole_EIS11_GIS\Noise\Blasting_Impact_Assessment\WXD\SitePlan and Hamm\BlastingBuffers_2.mxd

6.0 SUMMARY

This blasting assessment confirmed that blasting operations can be performed for the Project in compliance with the current blasting guidelines published by the MECP (NPC-119). In accordance with the requirements prescribed in NPC-119, blasting vibration will be monitored during construction and operation phases.

7.0 CLOSING

This Blast Assessment Report was prepared for First Mining Gold Corp. by WSP. The quality of information, conclusions and scheduling estimates contained herein is consistent with the level of effort involved in WSP's services and based on: i) information available at the time of preparation; ii) data supplied by outside sources; and iii) the assumptions, conditions and qualifications set forth in this report.

Yours truly,

WSP Canada Inc.

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Reviewed by:

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8.0 REFERENCES

- AGP Mining Consultants Inc. (2021). *NI 43-101 Technical Report and Pre-Feasibility Study on the Springpole Gold Project, Ontario, Canada*. Barrie.
- First Mining Gold Corp. and C.Portt and Associates. (2018). *Existing Conditions Report - Fish Community and Habitat*.
- Health Canada. (2017, January). *Guidance for Evaluating Human Health Impacts in Environmental Assessment: NOISE*.
- MECP. (1982). *Noise Pollution Control (NPC) Publication 119 of Model Municipal Noise Control By-law*. Ontario Ministry of the Environment, Conservation and Parks.
- Ontario Ministry of Natural Resources and Forestry (MNRF), 2017. "Aggregate Resources Act of Ontario, R.S.O. 1990, Chapter A.8" amended 2017
- World Health Organization (WHO). (1999). *Guidelines for Community Noise*.
- Wright, D. G., & Hopky, G. E. (1998). *Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters*. Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p.

Attachment A
Blast Assessment Table and Calculation
Sheets

Attachment A-1 Blast Assessment Table

Location (Points from Figure 5-2)	POR / SHORELINES (Figure 5-2)	Actual Separation Distance between POR and Point (m)	Criteria Source	Criteria Type	Criteria From Table 2-1, 2-2 and 2-3	Explosive Loading (kg / delay) Corresponding to Criteria and Actual Separation Distance	Explosive Loading Calculation Identifier	Maximum Allowable Explosive Loading W (kg / delay) at Identified Point
A	POR01	6,642	MECP/HC	Air-Overpressure	Peak Pressure Level (L_{peak})	26,344	M.Calc1	5.1 (Spawning Period)
	POR01	6,642	MECP	Vibration	Peak Particle Velocity	77,526	M.Calc1	
	SL-A	34	DFO	Vibration	Peak Particle Velocity	5.1	D.Calc1	19.6 (Non-Spawning Period)
	SL-A	34	DFO	Water Overpressure	Peak Pressure (P_{peak} 50 kPa)	19.6	D.Calc1	
B	POR07	10,791	MECP/HC	Air-Overpressure	Peak Pressure Level (L_{peak})	111,000	M.Calc2	933 (Spawning Period)
	POR07	10,791	MECP	Vibration	Peak Particle Velocity	204,632	M.Calc2	
	SL-B	461	DFO	Vibration	Peak Particle Velocity	933	D.Calc2	3,603 (Non-Spawning Period)
	SL-B	461	DFO	Water Overpressure	Peak Pressure (P_{peak} 50 kPa)	3,603	D.Calc2	
C	POR07	10,428	MECP/HC	Air-Overpressure	Peak Pressure Level (L_{peak})	102,000	M.Calc3	2,263 (Spawning Period)
	POR07	10,428	MECP	Vibration	Peak Particle Velocity	191,096	M.Calc3	
	SL-C	718	DFO	Vibration	Peak Particle Velocity	2,263	D.Calc3	8,740 (Non-spawning Period)
	SL-C	718	DFO	Water Overpressure	Peak Pressure (P_{peak} 50 kPa)	8,740	D.Calc3	

DFO Limit Assessment Calculation Sheet

Project Name: Springpole Gold Project
 Scope of Work: Open Pit Mine Development
 Project Number: ONS2104 Date: July 2024
 Calculation Identifier: D.Calc1 (SL-A)

Criteria

DFO Guidelines

Water overpressure	50 kPa
Peak Particle Velocity - Spawning Area	13 mm/s

Inputs

Water Specific Constants:	Cw	146300 cm/s	Dw	1 g/cm ³
Substrate Specific Constants:	Type	Rock		
	Cr	457200 cm/s	Dr	2.64 g/cm ³
DFO Blasting Constant (default):	k-value	100	β	-1.6

Distance from Blast to Reception Point:	R	34 m
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Results

Zw/Zr	0.1212	Pr	231 kPa
Vr	1.3 cm/s	Pw	100 kPa

Assessment of Results

Weight Per Delay (PPV)	5.1 kg	Spawning Periods
Weight Per Delay (Water Overpressure)	19.6 kg	Non-Spawning Periods

General Notes

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: none considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

- D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.
- Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

DFO Limit Assessment Calculation Sheet

Project Name: Springpole Gold Project
 Scope of Work: Open Pit Mine Development
 Project Number: ONS2104 Date: July 2024
 Calculation Identifier: D.Calc2 (SL-B)

Criteria

DFO Guidelines	
Water overpressure	50 kPa
Peak Particle Velocity - Spawning Area	13 mm/s

Inputs

Water Specific Constants:	Cw	146300 cm/s	Dw	1 g/cm ³
Substrate Specific Constants:	Type	Rock	Cr	457200 cm/s
			Dr	2.64 g/cm ³
DFO Blasting Constant (default):	k-value	100	β	-1.6
Distance from Blast to Reception Point:	R	461 m		

Results

Zw/Zr	0.1212	Pr	231 kPa
Vr	1.3 cm/s	Pw	100 kPa
Assessment of Results			
Weight Per Delay (PPV)	933 kg	Spawning Periods	
Weight Per Delay (Water Overpressure)	3,603 kg	Non-Spawning Periods	

General Notes

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: none considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.
 Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

DFO Limit Assessment Calculation Sheet

Project Name: Springpole Gold Project
 Scope of Work: Open Pit Mine Development
 Project Number: ONS2104 Date: July 2024
 Calculation Identifier: D.Calc3 (SL-C)

Criteria

DFO Guidelines

Water overpressure	50 kPa
Peak Particle Velocity - Spawning Area	13 mm/s

Inputs

Water Specific Constants:	Cw	146300 cm/s	Dw	1 g/cm ³
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Substrate Specific Constants:	Type	Rock	Cr	457200 cm/s
			Dr	2.64 g/cm ³

DFO Blasting Constant (default):	k-value	100	β	-1.6
----------------------------------	---------	-----	---	------

Distance from Blast to Reception Point:	R	718 m
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Results

Zw/Zr	0.1212	Pr	231 kPa
Vr	1.3 cm/s	P	100 kPa
		w	

Assessment of Results

Weight Per Delay (PPV)	2,263 kg	Spawning Periods
------------------------	----------	------------------

General Notes

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: none considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.

Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

DFO Limit Assessment Calculation Sheet

Weight Per Delay (Water Overpressure)

8,240 kg

Non-Spawning Periods

General Notes

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: none considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

- D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.
- Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

Calculation Sheet for to Determine Charge Weight per Delay for Confined Explosives

Project Name: Springpole Gold Project
Scope of Work: Open Pit Mine Development
Project Number: ONS2104 **Date:** July 2024
Location of Calculation: POR01 (from Source Point A)
Calculation Identifier: M.Calc1

Criteria

MOECC NPC-119	4. Concussion - Cautionary Limit	120 dB
Occupational Limit	Ontario	N/A dB
	Override Provincial Limit? (Yes/No)	No
	Define New Limit	dB

Inputs

Distance to Blasting
 D m

Limit for Calculation

SPL dB (Peak Sound Pressure Level)

Results

Weight of Charge per Delay to Achieve 120 dB at a Distance of 6642 m

W Kg

Calculation based on Siskind et al. (1980) formula for calculation of air-overpressure in front of the face.

General Notes

Weight of Charge per Delay to Achieve Compliance with 10 mm/s at a Distance of 6642 m

W Kg

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: None considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.

Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

References

General Notes

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: none considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

- D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.
- Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

Calculation Sheet for to Determine Charge Weight per Delay for Confined Explosives

Project Name: Springpole Gold Project
Scope of Work: Open Pit Mine Development
Project Number: ONS2104 **Date:** July 2024
Location of Calculation: POR07
 (from Source Point B)

Calculation Identifier M.Calc2

Criteria

MOECC NPC-119	4. Concussion - Cautionary Limit	120 dB
	5. Concussion - Peak Pressure Level Limit	128 dB
Occupational Limit	<div style="border: 1px solid black; padding: 2px; display: inline-block; width: 250px;">Ontario</div>	N/A dB
	Override Provincial Limit? (Yes/No)	<div style="border: 1px solid black; padding: 2px; display: inline-block; width: 50px;">No</div>
	Define New Limit	<div style="border: 1px solid black; width: 50px; height: 20px; margin: 2px 0;"></div> dB

Inputs

Distance to Blasting
 D

10791 m

Limit for Calculation

4. Concussion - Cautionary Limit

SPL

120 dB

 (Peak Sound Pressure Level)

Results

Weight of Charge per Delay to Achieve 120 dB at a Distance of 10,791 m

W

111,000

 Kg

Calculation based on Siskind et al. (1980) formula for calculation of air-overpressure in front of the face.

General Notes

Weight of Charge per Delay to Achieve Compliance with 10 mm/s at a Distance of 10,791 m

1. Calculations done in accordance with DFO's Guidelines for the 204,632 Kg Blasts in or Near Canadian Fisheries Waters.
2. Calculation variations are not considered for formula for calculation of vibration levels
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.

Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

References

General Notes

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: none considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

- D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.
- Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

Calculation Sheet for to Determine Charge Weight per Delay for Confined Explosives

Project Name: Springpole Gold Project
Scope of Work: Open Pit Mine Development
Project Number: ONS2104 **Date:** July 2024
Location of Calculation: POR07 (from Source Point C)

Calculation Identifier M.Calc3

Criteria

MOECC NPC-119	4. Concussion - Cautionary Limit	120 dB
	5. Concussion - Peak Pressure Level Limit	128 dB
Occupational Limit	Ontario	N/A dB
	Override Provincial Limit? (Yes/No)	No
	Define New Limit	dB

Inputs

Distance to Blasting
 D 10,428 m

Limit for Calculation
 4. Concussion - Cautionary Limit
 SPL 120 dB (Peak Sound Pressure Level)

Results

Weight of Charge per Delay to Achieve 120 dB at a Distance of 10,428 m

W 102,000 Kg

Calculation based on Siskind et al. (1980) formula for calculation of air-overpressure in front of the face.

Weight of Charge per Delay to Achieve Compliance with 10 m/s at a Distance of 10,428 m

W 191,096 Kg

General Notes

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: none considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

References

D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.

Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

References

General Notes

1. Calculations done in accordance with DFO's Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters.
2. Calculation variations: none considered
3. Limit variations: DFO requirement of 50 kPa water overpressure limit as recommended by the DFO in accordance with Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002 (Cott & Hanna, 2005)

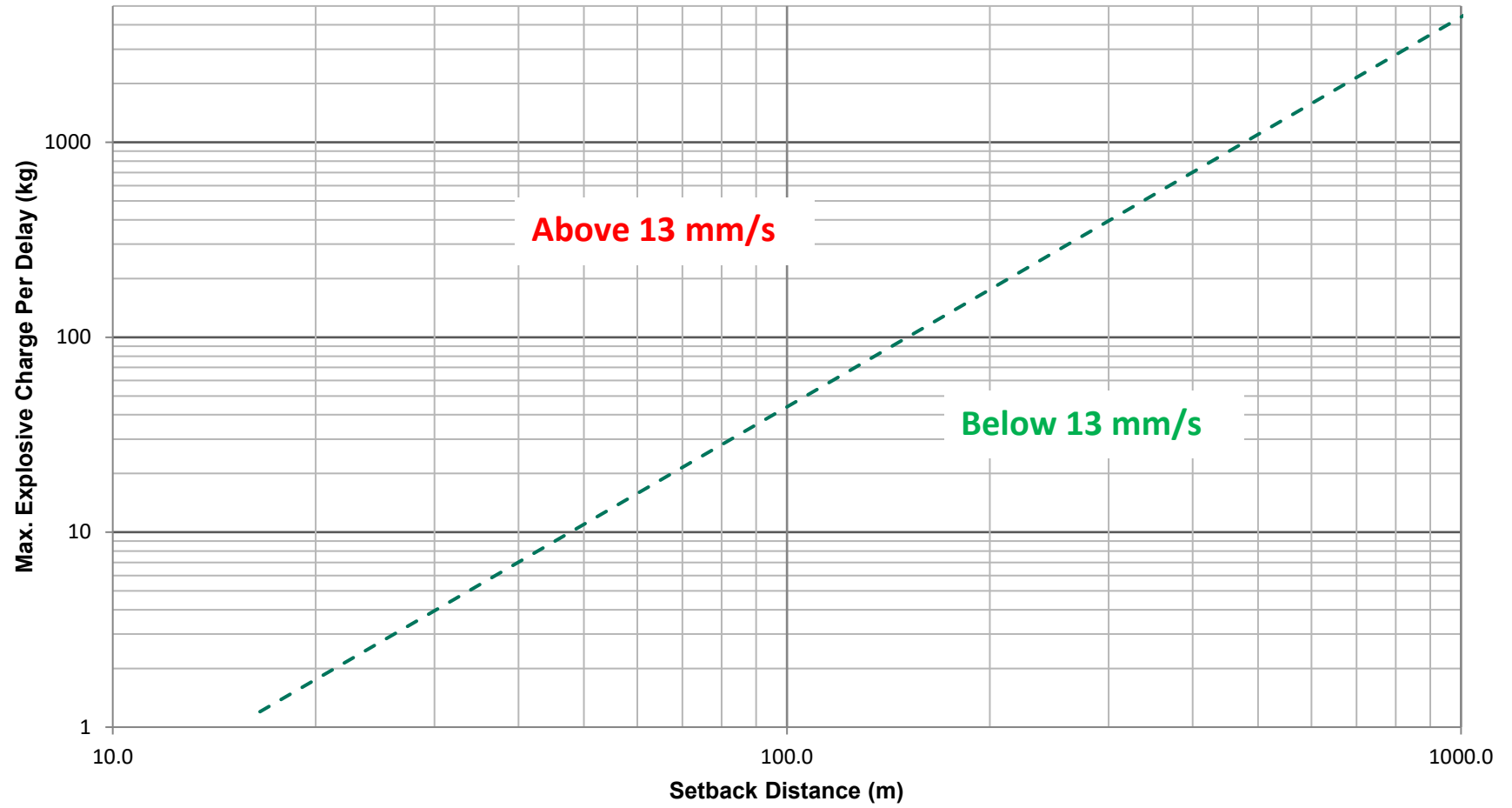
References

- D. G. Wright and G. E. Hopky, "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters," Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p., 1998.
- Cott, P. and Hanna, B. 2005. Monitoring Explosive-Based Winter Seismic Exploration in Waterbodies, 2000 – 2002. In Proceeding of Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies, ed. S.L. Armsworthy, P.J. Cranford and K Lee. Pp 473-490.

Attachment B

Reference Charts

Springpole Gold Project: Quick Reference Chart - DFO
Ground Vibration Limit of 13 mm/s



Springpole Gold Project: Quick Reference Chart - DFO
Water Overpressure Limit of 50 kPa

