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December 9, 2016

Dave Hohnstein
Director of Technical Services
Nunavut Water Board (NWB)
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Dear Mr. Hohnstein,

Re. 2BB-MAE---- Madrid Advanced Exploration Program Type B Water Licence
Application

TMAC Resources Inc. (TMAC) is writing further to our application for an advanced exploration water licence, 2BB-MAE--- (the Application), submitted to the Nunavut Water Board (NWB) in December 2014. With the issuance of the Nunavut Impact Review Board's (NIRB) Notice of Indication for 12.10.2(b) Determination Report (NIRB File No. 12MN001) of June 24, 2016 (the Report), it is TMAC's understanding that the Application is now actively moving forward in the water licencing process. To support technical review of the Application, TMAC is writing to provide a design update with respect to Madrid North.

As planning for the Madrid Advanced Exploration Program (the Program) has progressed, TMAC's engineers and geologists have identified several changes to the Madrid North site layout that need to occur to ensure proper and safe access to ore reserves in this area. Based on recent drilling results, it was determined that the original location of certain Madrid North facilities would overlay mineralized ore which TMAC may wish to mine in future.

Therefore, localized revisions are needed to ensure the feasibility of developing the Madrid North deposit. No changes have been made to the layout of Madrid South. As illustrated in the updated memo (attached; Appendix A) the changes are:

- relocation of surface infrastructure from the bluff north of the Doris-Windy All Weather Road to a bluff 1 km south, on the south side of the existing Doris-Windy All Weather Road; and
- relocation of the vent raise from the west side of the Doris-Windy All Weather Road to a bluff on the east side of the Madrid South All-Weather Road.

These changes are not significant and are not associated with any change in scope, facility design, expansion of the project, or changes to water use or waste disposal. The revised site layout optimizes the Madrid North footprint and results in an overall decrease in surface area by 25%.

TMAC confirms that the revised Madrid North layout will proceed in compliance with the terms and conditions set out in the Report. TMAC retained ERM Consultants Canada Ltd. (ERM) to consider the revised Madrid North layout. As provided in Appendix B, ERM concluded that the effects assessment conclusions and mitigation measures presented in the Application remain valid and sufficient. SRK Consulting (SRK) has also confirmed that the revised Madrid North layout does not impact the closure cost estimate. Table 1 provides a comparative summary of the changes.

Table 1. Comparison of Madrid North Layout, Current vs. Revised

Component	Current (Dec 2014)	Revised (Nov 2016)
Waste Rock Pile		
Design Capacity	285,000 t (158,500 m ³)	285,000 t (158,500 m ³)
Ore stockpile		
Design Capacity	50,000 t (28,000 m ³)	50,000 t (28,000 m ³)
Available Capacity	75,000 t (41,700 m ³)	51,000 t (28,400 m ³)
Pollution Control Pond		
Design Capacity	15,100 m ³	16,000 m ³
Pond Area	13,900 m ²	14,500 m ²
Max depth	2.8 m	3.2 m
Portal Area Pads		
Components	Waste rock pile, ore stockpile, shop, compressor building, diesel generator, emergency trailer, ATCO office trailer, CaCl ₂ laydown, 50,000 L water storage tank with containment, brine mixing facility, laydown area, and fuel storage facility.	
Pad Area	88,010 m ²	63,980 m ²
Vent Raise Pad		
Components	Fuel containment area and air heating facility.	
Pad Area (including access road)	5,340 m ²	5,830 m ²

If approved by the NWB, TMAC currently plans to proceed with advanced exploration at Madrid in Q4 2017. Accordingly, TMAC requests that the NWB proceed with processing of the Application as soon as possible to in order for TMAC proceed with planning and meet sea lift delivery deadlines.

Should you have further questions regarding this letter or the enclosed materials, don't hesitate to contact me.

Regards,



M John Roberts
Vice President, Environmental Affairs

Email: john.roberts@tmacresources.com

cc. Tara Arko, NIRB
John Roesch, KIA

Appendix A:

Hope Bay Project: Madrid North Bulk Sample Surface Infrastructure
SRK, 2016

Memo

To:	John Roberts, TMAC	Client:	TMAC Resources Inc.
From:	Lowell Wade, PEng Maritz Rykaart, PhD, PEng	Project No:	1CT022.010
Updated by:	Megan Miller, PEng	Date:	November 4, 2016
Subject:	Hope Bay Project: Madrid North Bulk Sample Surface Infrastructure		

1 Introduction

TMAC Resources Inc. is currently in the process of constructing their Doris Project (Project) in the Kitikmeot region of Nunavut, Canada. Concurrent with this, TMAC is carrying out regional exploration and have identified the Madrid North area as a potential high quality exploration target. However, advanced exploration and extraction of a bulk sample is needed to verify economic feasibility and milling process methods.

The Madrid North area is located about 9 km south of the Project, along the Madrid South All-Weather Road. This memo provides complete details of the Madrid North surface infrastructure pads and access roads. This should be read in conjunction with the attached set of conceptual level engineering drawings (Attachment 1).

2 Design Concept

All of the infrastructure pads and all-weather access roads associated with the Project, Madrid North and Madrid South are located on Inuit Owned Land (IOL), administered by the Kitikmeot Inuit Association (KIA).

The design concept of the Madrid North pads are based on the same principles applied elsewhere on the Project which is to construct all facilities either on bedrock or on rock fill pads at least 1 m thick to preserve permafrost. Site layouts are designed to minimize the overall footprint and all attempts are made to minimize the volume of contact water. Contact water is captured and contained in secure ponds for appropriate disposal.

TMAC has opted to ensure that all site roads are designed in accordance with the minimum requirements as set out for mine haul roads in the Nunavut Mine Health and Safety Act (2015).

3 Site Layout Alternatives

TMAC considered four surface infrastructure alternatives for Madrid North development:

- South Waste Rock Pile, Gulley Fill: For this alternative, the waste rock pile would span a gulley to the south of the rock outcrop where the portal will be located. The ore stockpile and portal infrastructure would be located uphill from the waste rock pile. Two pollution control ponds would be required to contain contact water, one of which would be expected to have high berms. Extensive freshwater diversions would be required to prevent freshwater from running onto infrastructure pads. This alternative would have a compact footprint.
- South Waste Rock Pile, Sidehill: For this alternative, the waste rock pile would be constructed on the side of the hill south of the rock outcrop where the portal will be located. The ore stockpile and portal infrastructure would be located uphill from the waste rock pile. Two pollution control ponds would be required to contain contact water, one of which would be expected to have high berms. This alternative would have a larger footprint, and only minor freshwater diversions would be required.
- Hilltop Waste Rock Pile, West: For this alternative the waste rock pile would be constructed on top of the rock outcrop west of the portal location. The ore stockpile would be downhill of the waste rock pile, draining into the same pollution control pond. It is expected that one pollution control pond with relatively low berms would be required. Development of the portal and infrastructure pad would require cutting into the rock. This alternative would have a relatively compact layout.
- Hilltop Waste Rock Pile, East: For this alternative, the waste rock pile would be constructed on top of the rock outcrop to the west of the portal location. The waste rock stockpile would be constructed in part on rock outcrop. Two pollution control ponds would be required to collect contact water, both ponds would require low berms. Diversion berms would be required to direct the contact water towards the pollution control ponds and reduce run-on from freshwater. This alternative would have a larger footprint.

Based on portal location and overall footprint size TMAC selected the Hilltop Waste Rock Pile, West as the preferred surface infrastructure alternative.

4 System Design

4.1 Design Criteria

The infrastructure associated with the activities at Madrid North consists of roads, a waste rock pad, an ore stockpile pad, a portal pad, and a vent raise pad.

The infrastructure components required for operations at Madrid North, and their placement requirements and limitations are summarized in Table 1.

Table 1: Surface Infrastructure Facilities Associated With the Portal

Infrastructure Component	Surface Area	Limitations	Comments
Waste Rock Pad	27,900 m ²	Within 500 m haul distance from portal; haul road cannot exceed 7% grade	Storage for 285,000 tonnes minimum of waste rock
Ore Stockpile Pad	5,500 m ²	Within 500 m haul distance from portal; haul road cannot exceed 7% grade	Storage for 50,000 tonnes minimum of ore
Shop	450 m ² (15x30 m)	Horizontal pad of rectangular shape	
Laydown Area	1,000 m ² (20x50 m) minimum		
Diesel Power Generator	19 m ² (2.5x7.5 m)	Required at portal	Seacan container near portal entrance
Site Office Trailer	30 m ² (3x10 m)		ATCO Trailer
Emergency Trailer	30 m ² (3x10 m)		Trailer
Brine Mixing Facility	19 m ² (2.5x7.5 m)	Required at portal	Seacan container. Also includes area for CaCl ₂ laydown
Water Storage Tank with Containment	144 m ² (12x12 m)	Required at portal	50,000L water tank assumed (tank radius ~4.4 m)
Fuel Storage Facility	1,258 m ² (34x37 m)	Drive-through facility (lined containment)	75,000 L Fuel Tank

Table 2: Surface Infrastructure Facilities Associated With the Vent Raise

Infrastructure Component	Surface Area	Limitations	Comments
Air Heating Facility	19 m ² (2.5x7.5 m)	Required immediately adjacent to vent raise	
Fuel Containment Area	441 m ² (21x21 m)	Drive-through facility (lined containment)	60,000 L Fuel Tank

4.2 Survey Data

The design of the Madrid North infrastructure pads and access roads are based on topographic contour maps produced from 2008 aerial photography supplied by Hope Bay Mining Limited.

4.3 Foundation Conditions

Comprehensive geotechnical investigations have been carried out at the Hope Bay site (SRK 2009). This information confirms that the area lies within the zone of continuous permafrost, with the permafrost being up to 550 m deep. Permafrost temperature at the surface is about -8°C and the active layer is generally less than 1 m thick. Laboratory and in-situ tests on disturbed and undisturbed samples indicate that the overburden soils are predominantly comprised of marine silts and clays, and the pore-water in these soils has high salinity, depressing the freezing point to -2°C. The ice-rich overburden soils are typically between 5 and 20 m deep, before encountering competent bedrock, predominantly basalt. Bedrock is frequently exposed, rising columnar 5 to 100 m above the surrounding landscape.

Thermal modelling has determined that a minimum of 1 m rock fill cover would be required over the tundra to preserve the permafrost under the infrastructure pads (SRK 2006). Since all pads are designed to have a flat surface with minor grading for drainage, the fill thickness greatly exceeds 1 m in places due to underlying topography.

The geotechnical design parameters for Hope Bay have been summarized in SRK (2011a).

4.4 Waste Rock Pile and Ore Stockpile

4.4.1 Design Criteria

The waste rock pad is designed to accommodate a minimum of 285,000 tonnes of waste rock while the ore stockpile pad is designed to accommodate a minimum of 50,000 tonnes of ore. Both the waste rock pad and ore stockpile pad will be a minimum of 1 m thick run-of-quarry (ROQ) material placed over the original ground. The waste rock pile and ore stockpile have haul distances of less than 500 m, and are more than 31 m from neighbouring water bodies.

4.4.2 Design

The waste rock pile will be constructed with an overall slope angle of 2.3H:1V. The waste rock pile has a base area of 27,900 m².

The overall ore stockpile will be constructed with an overall slope angle of 2H:1V. The ore stockpile has a base area of 5,500 m².

4.5 Pollution Control Pond

4.5.1 Design Criteria

The pollution control pond has the capacity to contain contact water from the overall drainage area and 25% of annual snow coverage combined with a 100-year, 24-hour storm event which is 16,000 m³ of water.

4.5.2 Design

There is a single pollution control pond at Madrid North. This fully lined pond is located downstream of the portal, waste rock and ore stockpile pads. The pond will be contained by an 8 m wide berm, which doubles as the site access road. This berm and access road will allow for light vehicle access around the pond for regular inspection; any required maintenance; and to allow for a vacuum truck to remove any retained water. The containment berm will be constructed using rock fill. The surface area of the pollution control pond is 14,500 m².

4.6 Madrid North Pads

4.6.1 Design Criteria

The design criteria for the Madrid North pads are as follows:

- Rock fill pads:
 - Minimum 1 m fill thickness must be maintained;
 - 1.5H:1.0V slopes are utilized with fill thickness less than 2 m; and
 - 2.0H:1.0V slopes are utilized with fill thickness greater than 2 m.
- Cut pads:
 - The floor of the pad floor must slope at 1% for drainage;
 - Rock shall not be cut below the elevation of the surrounding overburden; and
 - Highwalls will be sloped at 0.17H:1V, with safety barricades at the top of the cut.
- The maximum particle size for ROQ is 500 mm for fill thickness of 850 mm, and 900 mm for fill thickness exceeding 850 mm. All material shall be free from organic matter, soil, snow and ice; and
- Safety barricades (oversize boulders, Jersey barriers, or berms) are to be placed along the crest where elevation differences are greater than 3 m.

4.6.2 Design

Cut pads will have a minimum of 0.15 m of surfacing material overlying the cut rock surface. Rock-fill pads are to be constructed using a minimum 1 m thick fill material, which will typically consist of a minimum 0.85 m of ROQ overlain by a minimum 0.15 m thick surfacing material layer. The waste rock pad and ore stockpile pad do not require surfacing material; however, the 1 m minimum fill thickness must be maintained for permafrost protection and to allow for adequate seep drainage. All pads will be graded at 0.5% towards the pollution control pond.

4.7 Access and Haul Roads

4.7.1 Design Criteria

There are several road alignments within Madrid North. The portal pad access road is a 470 m long haul road which extends from the Madrid South All-Weather Road west to the portal pads.

This road doubles as the berm for the pollution control pond. There is a 175 m long access ramp between the lower portal pad and the waste rock pile, and a 105 m long access road between the ore stockpile and the lower portal pad. The 135 m long by 8 m wide vent raise access road extends east from the Madrid-South All-Weather Road to the vent raise pad.

The design criteria for the access and haul roads are the same as for the Doris-Windy All-Weather Road (SRK 2012). The key design criteria are:

- Access and haul roads have a maximum grade of 7%;
- A minimum thickness of 1 m over tundra must be maintained and 0.3 m over bedrock;
- The roadway will be crowned to promote drainage by means of 0.5% surface grading in both directions from the centreline of the roadway;
- Road shoulders will be graded to 2H:1V in areas where fill thickness is at least 1.5 m and 1.5H:1V in zones where fill thickness is less than 1.5 m;
- Cut is only allowed in rock, and then only to a grade at least 0.5 m above the surrounding overburden; and
- Culverts should be installed where necessary to prevent ponding of water.

4.7.2 Design

The all-weather roads will be constructed from ROQ material placed in lift thicknesses that do not exceed 0.85 m and compacted by a vibratory drum compactor using a site specific compaction specification. The surfacing layer of the road consists of a 150 mm thick layer of 1¼ inch crush.

The portal pad access road is 9.5 m wide between the Madrid South All-weather Road and the ore stockpile to allow for two-way traffic of larger vehicles, and 8.0 m wide for the rest of the alignment. The ramps to and from the waste rock pile and ore stockpiles are 8.0 m wide.

Culverts will be installed where the portal pad access and vent raise access roads join the Madrid South All-weather Road to prevent ponding of water.

4.8 Fuel Storage

4.8.1 Design Criteria

There will be two locations where fuel will be stored at Madrid North, a 75,000 L fuel storage facility with transfer station will be located on the upper portal pad and a fuel containment area, with a 60,000 L fuel tank, will be located on the vent raise pad.

Both fuel facilities are designed to contain 110% of the entire volume of the fuel tank plus 10% of the fuel transport truck as well as 25% of annual snow cover combined with a 1-in-100 year 24-hour storm event.

Each facility will consist of a fuel tank containment area and a fuel transfer apron which will contain fuel lines as well as the fuel transport truck. The entire footprint of each facility will be lined with a HDPE membrane sandwiched between two layers of 12 oz. non-woven geotextile.

The floor of the containment area will be sunk into the rock fill pad, such that the crest of the liner is flush with the pad surface, and a slightly raised berm (0.3 m high above the pad surface elevation) will enclose the perimeter of the containment area and the fuel transfer apron, to prevent spills outside of the lined area. A 0.2 m thick bedding layer, consisting of $\frac{3}{4}$ inch crushed rock, will be placed and compacted prior to liner deployment. The liner will be covered by a lift of $\frac{3}{4}$ inch crushed rock over its entire surface, including the floor and the slopes of the containment. A second lift, 0.3 m thick, of 1 $\frac{1}{4}$ inch crushed rock will be placed on the floor of the containment, while a third lift of 1 $\frac{1}{4}$ inch crushed rock will be placed over the footprint of the fuel transfer apron.

A sump will be installed in one corner of the containment area, and the surface of the containment area will be graded to drain toward the sump.

In addition, the fuel storage facilities will be designed to the following codes and guidelines:

- NFPA 30, Flammable and Combustible Liquids Code, 2015 Edition (NFPA 2014);
- SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (Government of Canada 2012);
- Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (CCME 2015); and
- ORD-C58.9-1997, Secondary Containment Liners for Underground or Aboveground Tanks.

5 Construction Methodology

The pads and roads will be constructed with ROQ or other geochemically suitable rock fill that meets the ROQ specifications (SRK 2011b). SRK (2008) discusses the details pertaining to geochemical characterization of the Doris-Windy All-Weather Road (Quarry A, B, and D) rock quarries confirming their suitability for use in construction. ROQ material obtained from the portal pad cut will also be used for construction provided it is geochemically suitable. The management and monitoring of quarry development and rock cuts for the construction of the infrastructure pads and access roads is discussed in SRK (2014).

Surface grade material for both the surface infrastructure pads as well as access and haul roads will be from Quarry #2 and the crusher located in Quarry #2. Complete material quantities are included in Attachment 1.

All roads and pads will be constructed in accordance to SRK's Technical Specifications (SRK 2011b).

Disclaimer—SRK Consulting (Canada) Inc. has prepared this document for TMAC Resources Inc.. Any use or decisions by which a third party makes of this document are the responsibility of such third parties. In no circumstance does SRK accept any consequential liability arising from commercial decisions or actions resulting from the use of this report by a third party.

The opinions expressed in this report have been based on the information available to SRK at the time of preparation. SRK has exercised all due care in reviewing information supplied by others for use on this project. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information, except to the extent that SRK was hired to verify the data.

6 References

[CCME] Canadian Council of Ministers of the Environment. 2015. Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products. PN 1326. Updated. October 2015.

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SRK Consulting (Canada) Inc., 2014. Hope Bay Project Quarry Management and Monitoring Plan – Revision 02. Report Prepared for TMAC Resources Inc. Project Number 1CT022.001. December 2014.

Drawings

Engineering Drawings for the Madrid North Bulk Sample Surface Infrastructure, Hope Bay Project, Nunavut, Canada

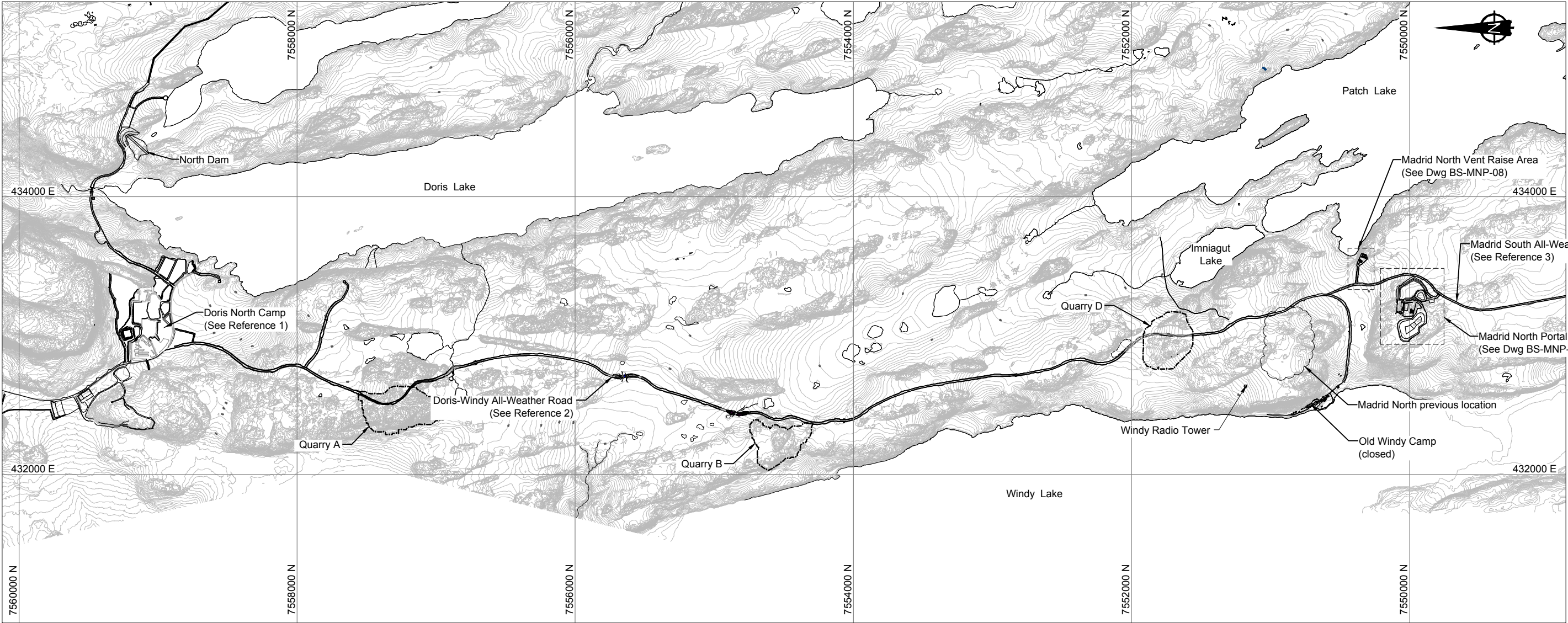
ACTIVE DRAWING STATUS

DWG NUMBER	DRAWING TITLE	REVISION	DATE	STATUS
BS-MN-01	Engineering Drawings for the Madrid North Bulk Sample Surface Infrastructure, Hope Bay Project, Nunavut, Canada	B	Nov. 1, 2016	Issued for Discussion
BS-MN-02	General Arrangement Doris North Camp to Madrid North Portal	B	Nov. 1, 2016	Issued for Discussion
BS-MN-03	Site Layout Portal	B	Nov. 1, 2016	Issued for Discussion
BS-MN-04	Portal Pad Access Road Profile and Portal Pad Section A	B	Nov. 1, 2016	Issued for Discussion
BS-MN-05	Sections B and C	B	Nov. 1, 2016	Issued for Discussion
BS-MN-06	Fuel Storage Facility	B	Nov. 1, 2016	Issued for Discussion
BS-MN-07	Fuel Storage Facility Sections	B	Nov. 1, 2016	Issued for Discussion
BS-MN-08	Site Layout Vent Raise	B	Nov. 1, 2016	Issued for Discussion
BS-MN-09	Vent Raise Section and Profile	B	Nov. 1, 2016	Issued for Discussion
BS-MN-10	Pollution Control Pond Berm and Details	B	Nov. 1, 2016	Issued for Discussion
BS-MN-11	Animal Crossing Plan and Section and Culvert Section	B	Nov. 1, 2016	Issued for Discussion
BS-MN-12	Material List and Quantity Estimates	B	Nov. 1, 2016	Issued for Discussion



PROJECT NO: 1CT022.010
Revision B
November 1, 2016
Drawing BS-MN-01

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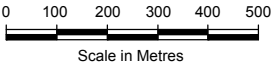


NOTES

- 1. Topographic contour data for the terrain model were provided by Hope Bay Mining, and is based on 2007 Aerial Photography. Contour intervals are 1m.
- 2. The co-ordinate system is UTM NAD 83, Zone 13.
- 3. All dimensions are in metric units, unless specifically mentioned.
- 4. Notes in this drawing apply to all other active drawings.

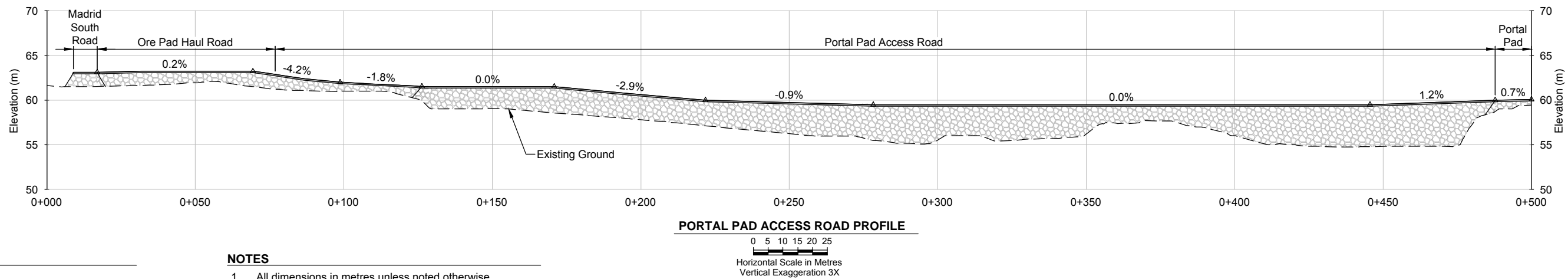
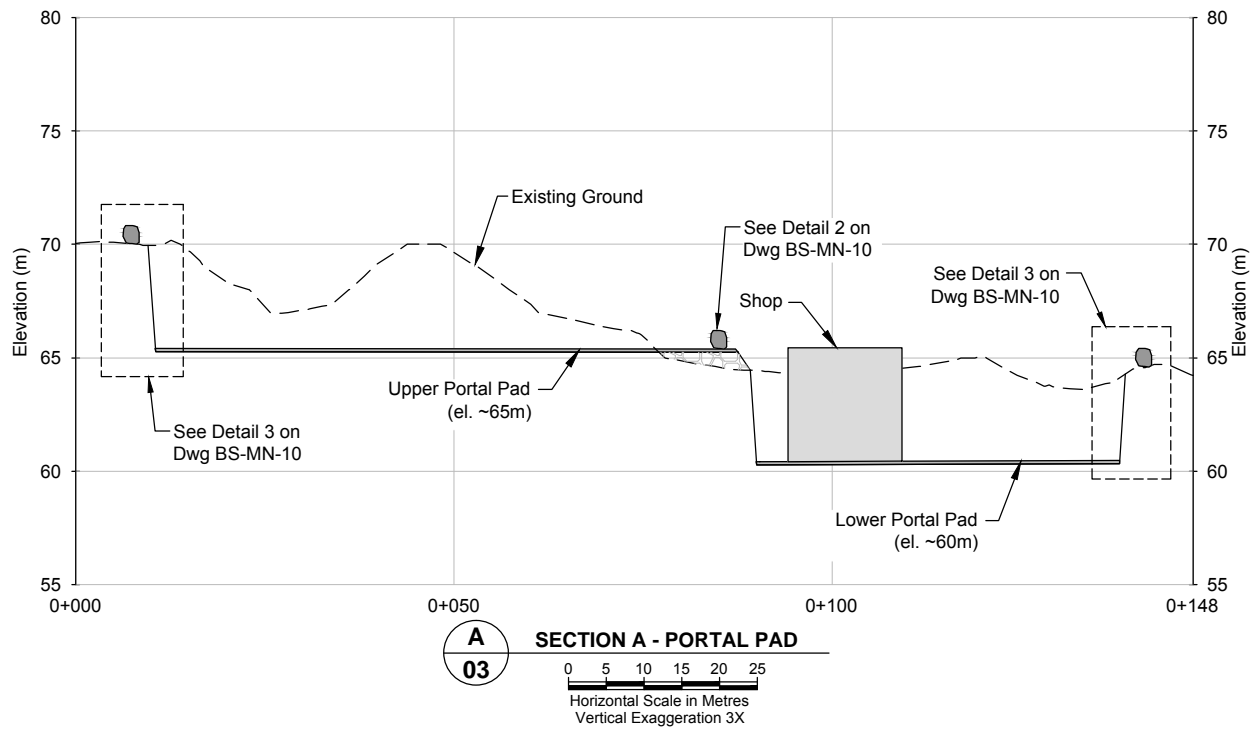
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- 2) Engineering Drawings for the Doris-Windy All-Weather Road, Doris Infrastructure Project, Nunavut, Canada. Revision AB1. As-Built Drawings Prepared for Hope Bay Mining Ltd. Project Number: 1CH008.033/058. May 11, 2012
- 3) Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Revision D. Issued for Discussion Drawings Prepared for TMAC Resources Inc. Project Number 1CT022.001.410. October 31, 2014



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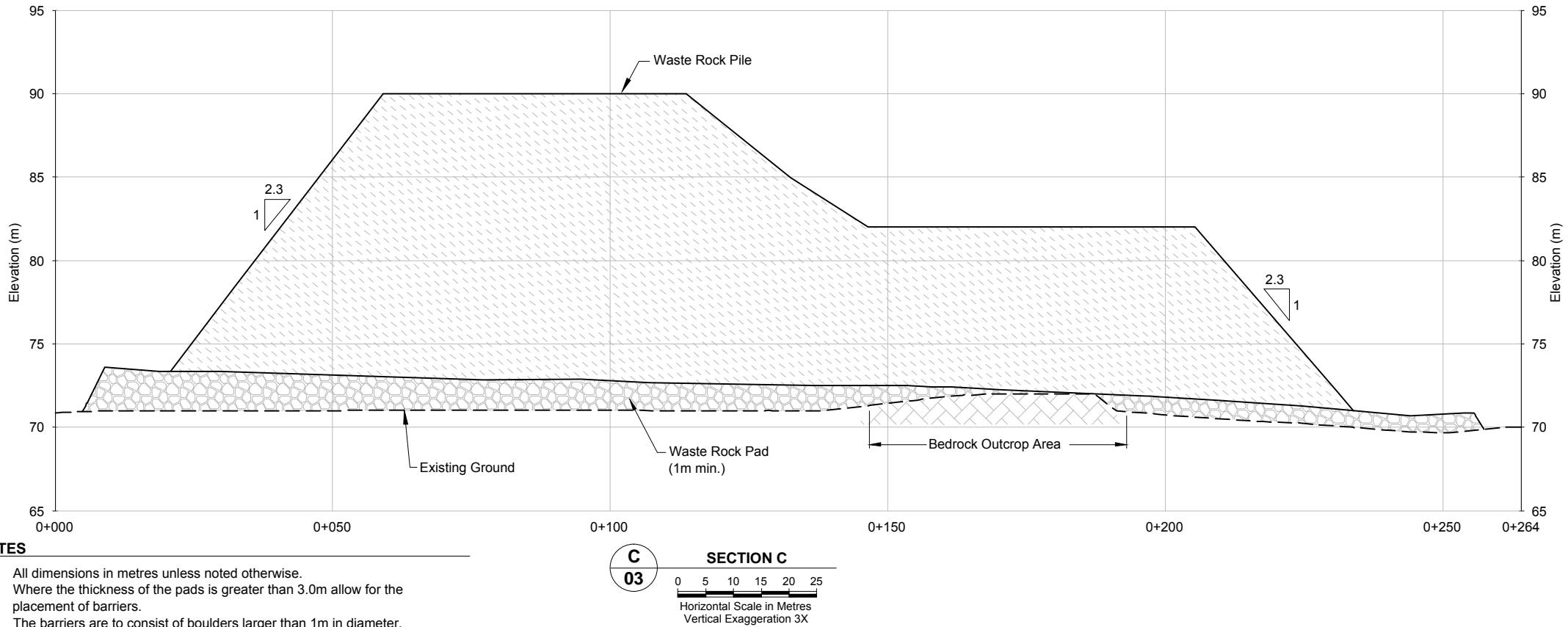
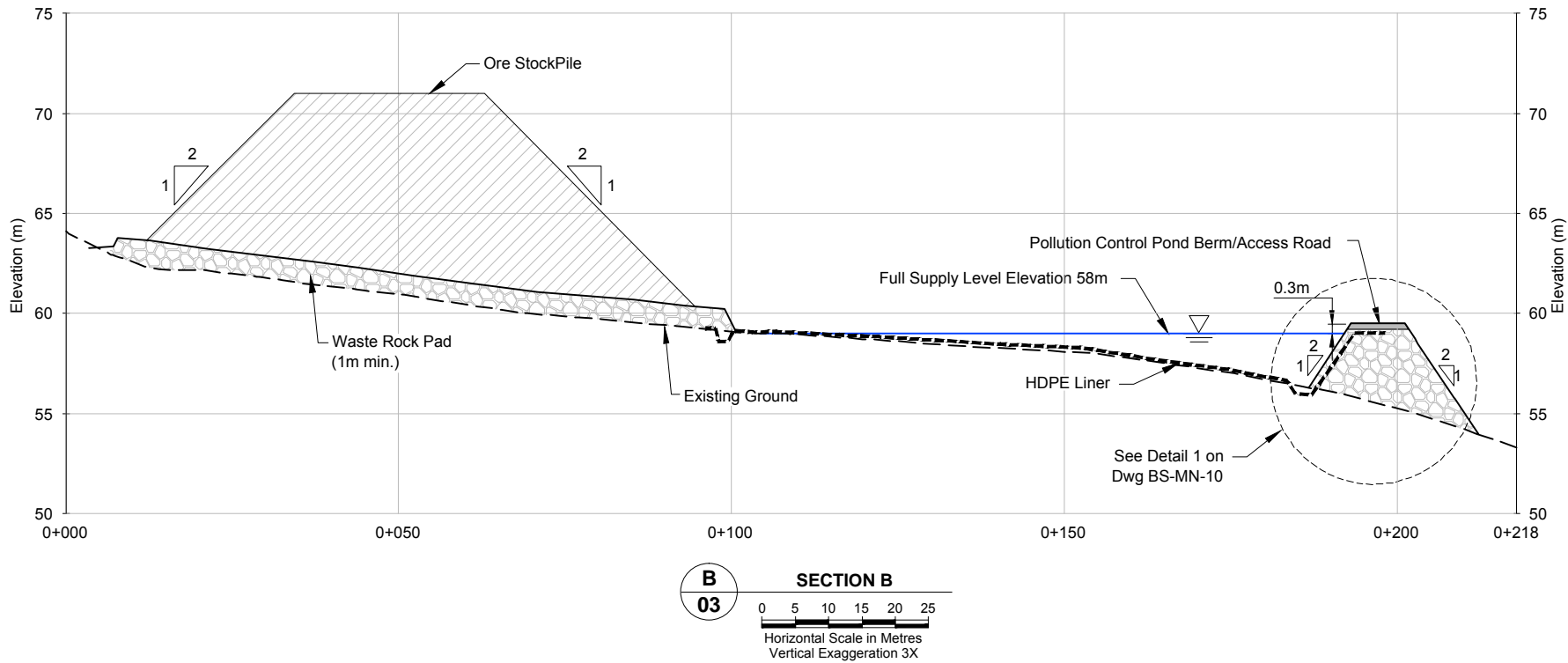
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LEGEND	
	Existing ground surface
	Surfacing Material
	Run of Quarry Material
	Point of Intersection
6.1%	Grade

- NOTES**
1. All dimensions in metres unless noted otherwise.
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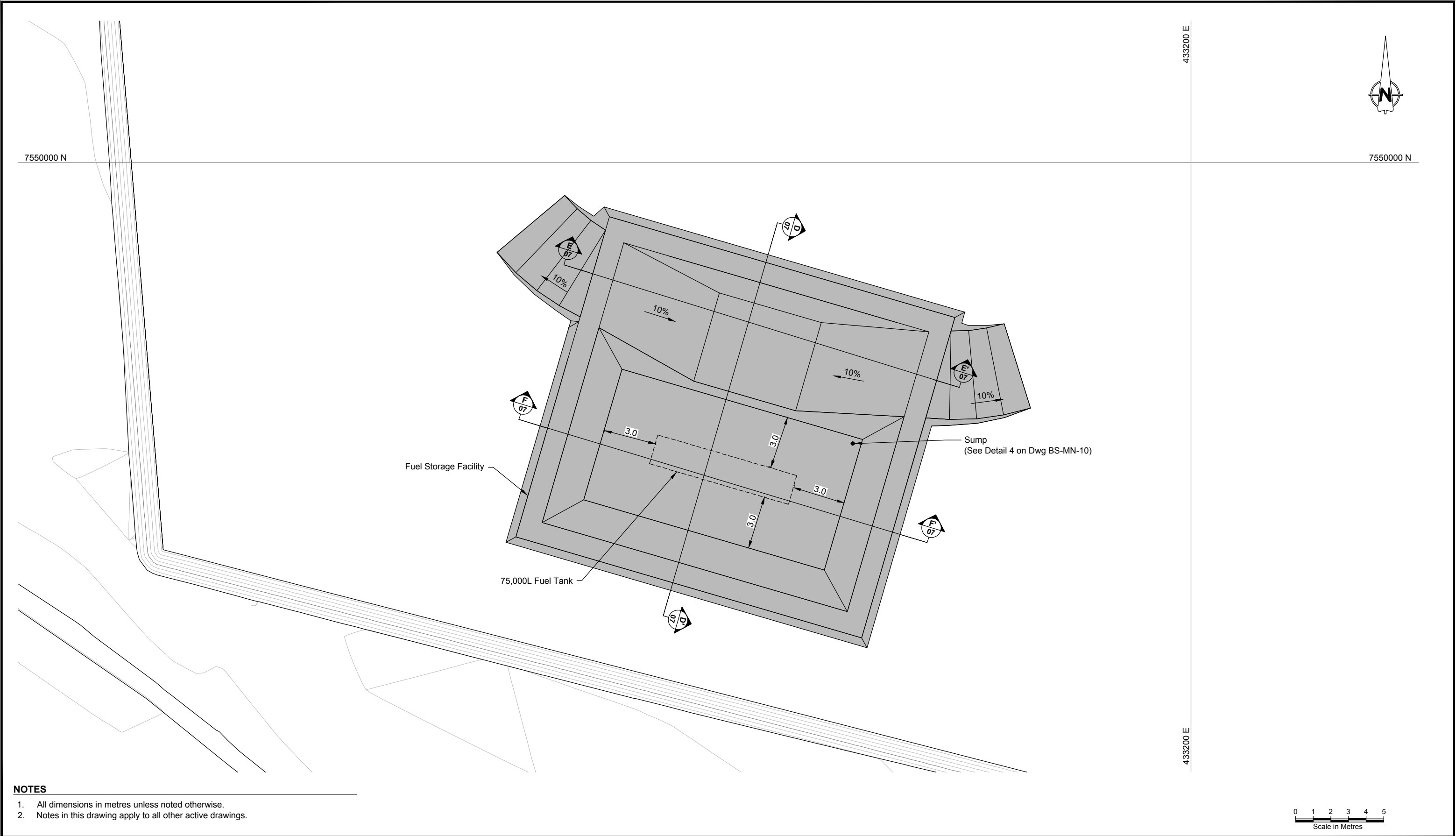


LEGEND	
	Existing ground surface
	Surfacing Material
	Run of Quarry Material
	Waste Rock
	Ore Stockpile

- NOTES**
- All dimensions in metres unless noted otherwise.
 - Where the thickness of the pads is greater than 3.0m allow for the placement of barriers.
 - The barriers are to consist of boulders larger than 1m in diameter, jersey-barriers (1.82 long X 1.37m high X 0.61m wide) or a rock fill berm 0.5m high. Maximum spacing between barriers is 3.3m.
 - Notes in this drawing apply to all other active drawings.

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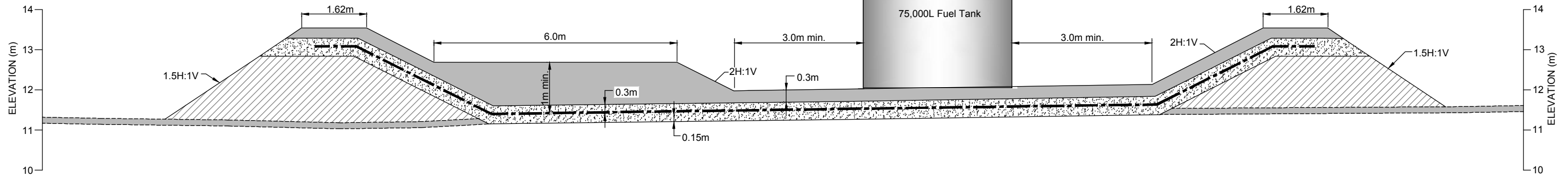
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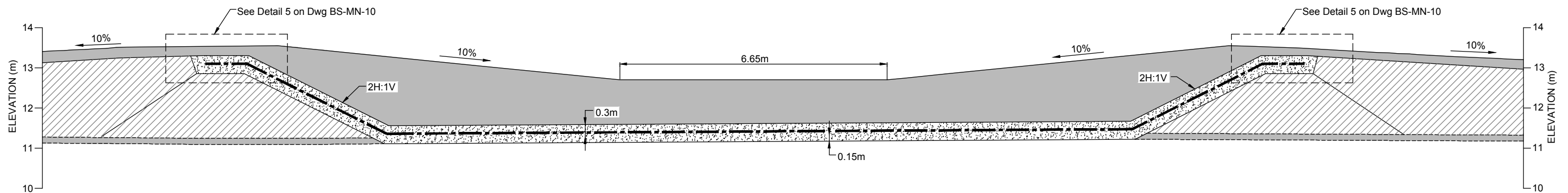
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- 1. All dimensions in metres unless noted otherwise.
 - 2. Notes in this drawing apply to all other active drawings.

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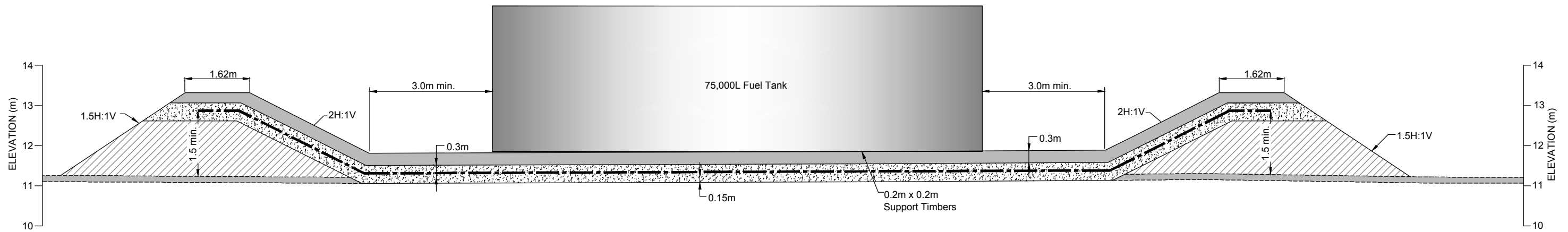
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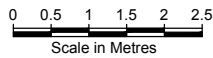
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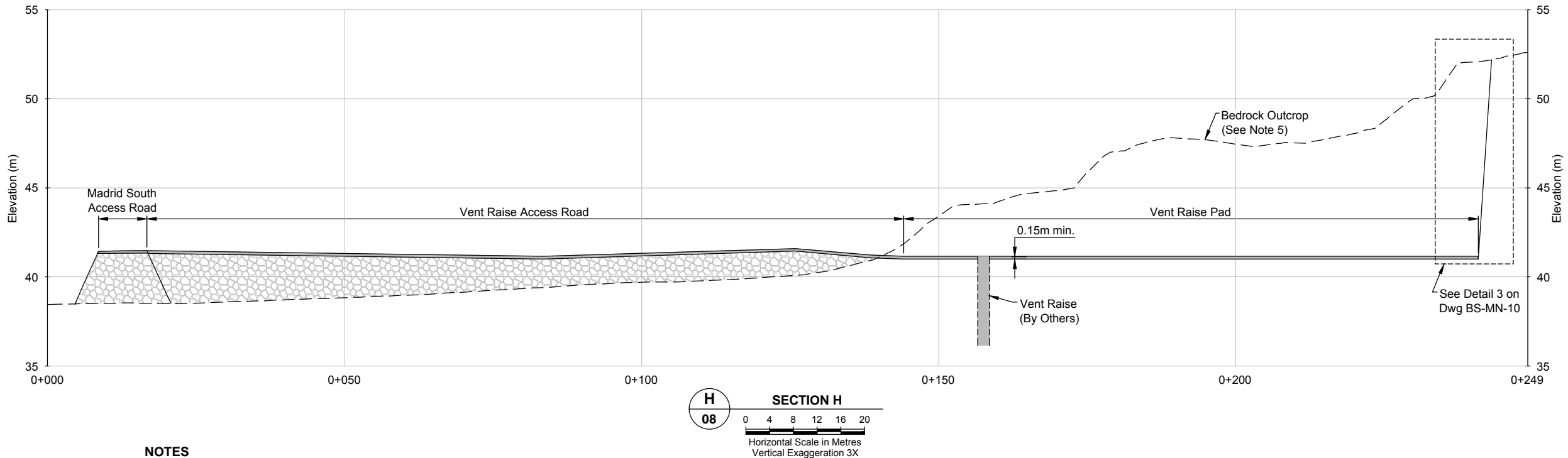
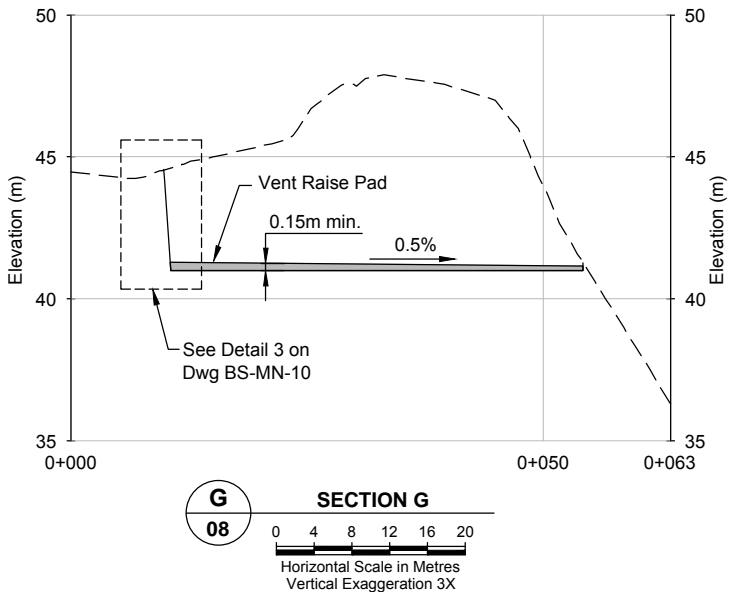
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LEGEND			
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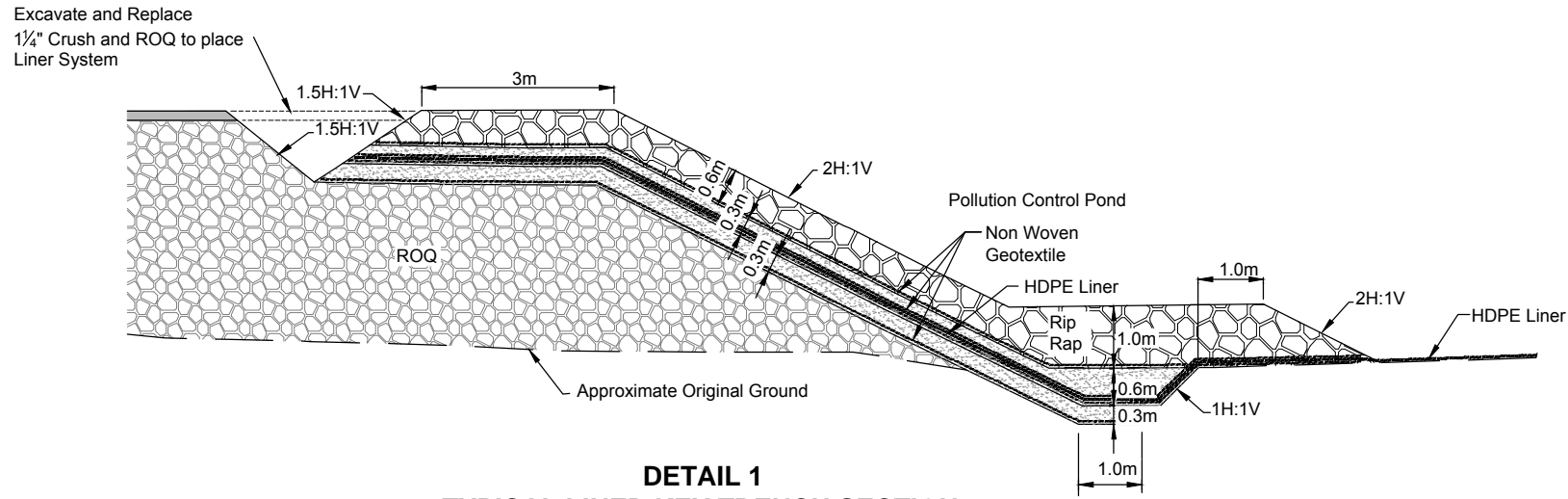


LEGEND

- Existing ground surface
- Surfacing Material
- Run of Quarry Material

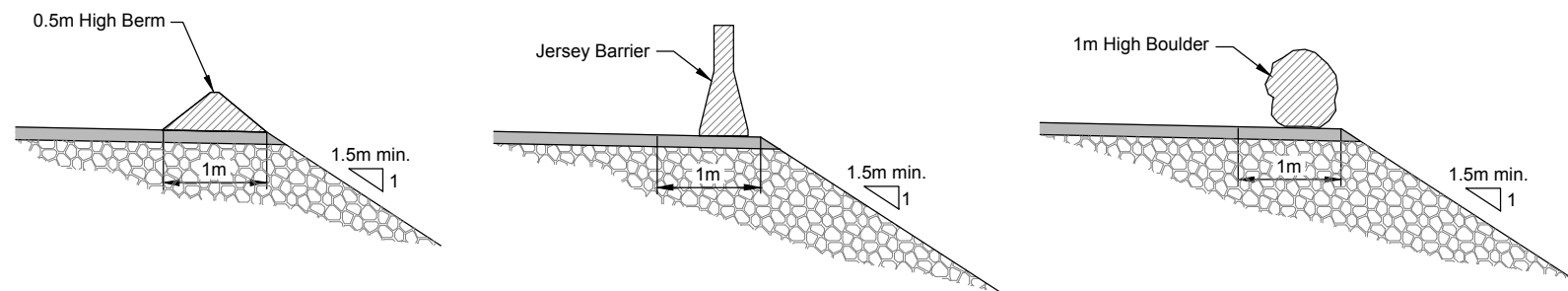
- NOTES**
1. All dimensions in metres unless noted otherwise.
 2. Where the thickness of the pads is greater than 3.0m allow for the placement of barriers.
 3. The barriers are to consist of boulders larger than 1m in diameter, jersey-barriers (1.82 long X 1.37m high X 0.61m wide) or a rock fill berm 0.5m high. Maximum spacing between barriers is 3.3m.
 4. Extents of bedrock outcrop are based on 2007 aerial orthophoto and ground inspection. To ensure layouts match site conditions exact extents of bedrock outcrops are to be surveyed prior to any construction activities.
 5. Cut into bedrock outcrop required for construction of vent raise collar.
 6. Notes in this drawing apply to all other active drawings.

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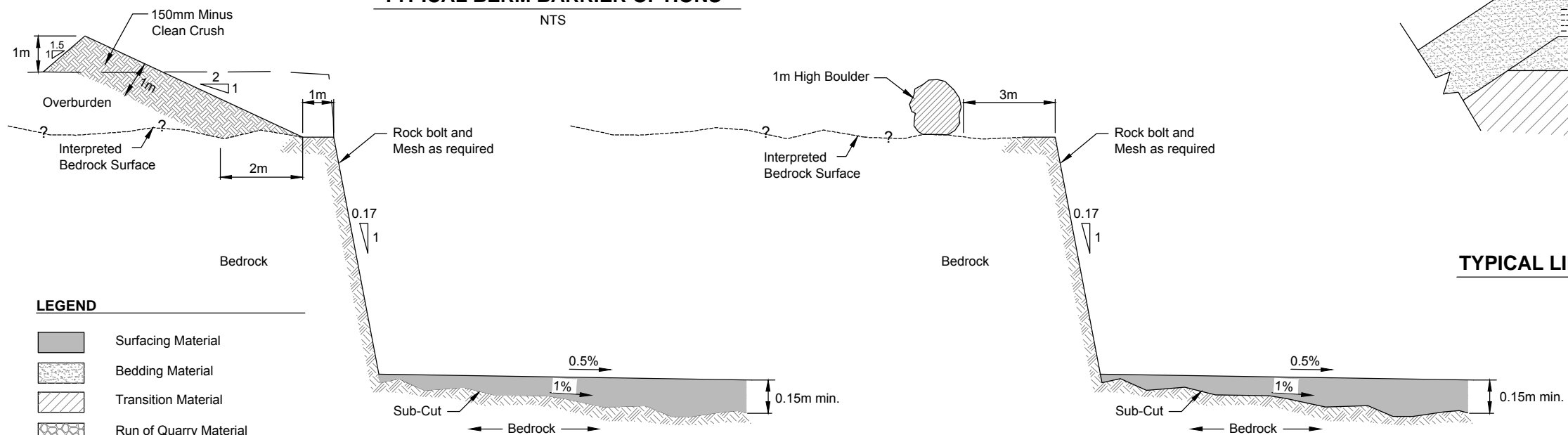
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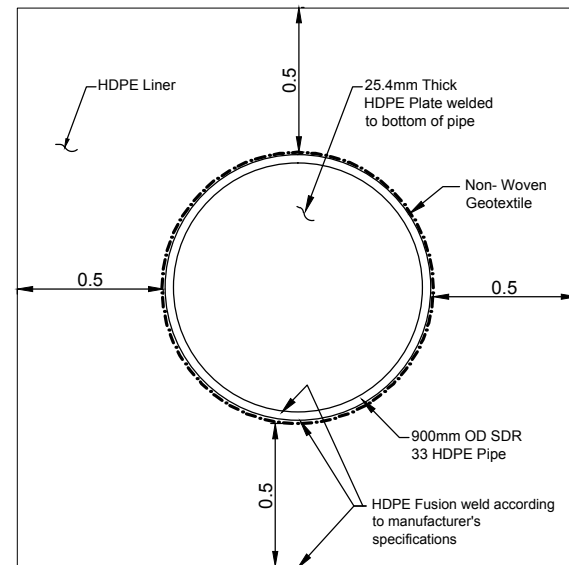
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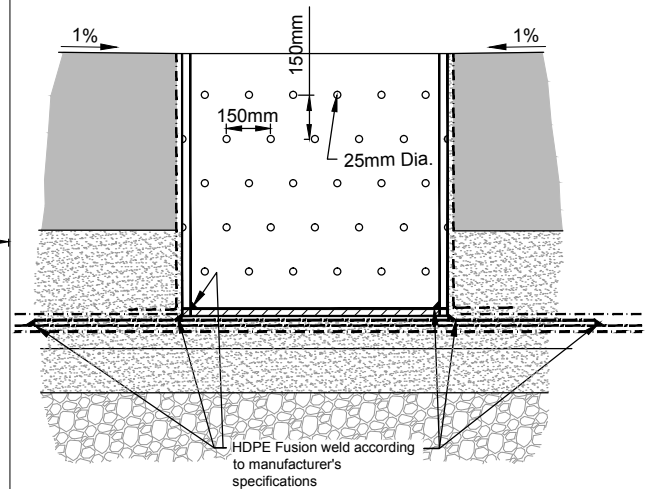
DETAIL 3
TYPICAL SECTIONS OF
HIGHWALL SAFETY BERM/BARRIER

NTS



DETAIL 4 - SUMP

NTS



DETAIL 5
TYPICAL LINER SYSTEM UNDER DRIVING SURFACE

NTS

LEGEND

- Surfacing Material
- Bedding Material
- Transition Material
- Run of Quarry Material
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The diagram shows a cross-section of a road with two lanes, each 10m wide. The slopes are indicated as 5:1. The road is flanked by a grassy area on the left and a hatched area on the right. The road surface is shown with a dashed line indicating the centerline.

The diagram shows a plan view of a four-way road intersection. The roadways are shown with a width of 10m. The proposed drainage system is shown with a width of 26m. The drainage system is designed with a 5:1 slope. The diagram includes dimensions for the roadways (10m, 26m) and the proposed drainage system (5:1 slope, 10m width).

LEGEND

	Surfacing Material
	Run of Quarry Material

1. All dimensions in metres unless noted otherwise.
2. Locations for animal crossings will be identified by Land Owner and Elders once road construction is completed.

[illegible]

Item	Quantity / Area / Volume			Description
1. Run of Quarry Material		ROQ (cu.m.)	Cut (cu.m.)	Approximate In-Place Neat-line Volume (3D volume based on Civil 3D surfaces - no allowance has been made for losses and/or tundra embedment)
	Upper/Lower Portal Pads	6,200	46,800	
	Fuel Storage Facility Pad	2,000		
	Waste Rock Pad	49,000		
	Madrid South Rd to Pollution Control Pond Berm and Ore Pad	2,880		
	Lower Portal to Ore Pad Road	2,310		
	Ramp from Upper Portal Pad to Waste Rock Pad	1,800		
	Pollution Control Pond Berm	19,370		
	Ore Pad	6,400		
	Vent Raise Pad Access Road	2,240		
	Vent Raise	-	21,550	
	Total	92,200	68,350	
2. Surfacing Material	Pads:			Approximate In-Place Neat-line Volume
	Upper/Lower Portal Pads including Ramp	2,220		
	Vent Raise Pad	585		
	Roads:			
	Madrid South Rd to Pollution Control Pond Berm and Ore Pad	220		
	Pollution Control Pond Berm	430		
	Ramp from Upper Portal Pad to Waste Rock Pad	80		
	Ramp from Lower Portal Pad to Ore Pad	90		
	Vent Raise Access Road	160		
	Total	3,785		

Item	Quantity / Area / Volume		Description
Run of Quarry Material		14,900 m³	Approximate In-Place Neat-line Volume
Surfacing Material		400 m³	
Bedding Material (¾" Crush)	OverLiner in Key Trench	470 m³	Volumes approximated by typical section and key trench lengths
	Overliner & Underliner in Berm	2400 m³	
Liner	Geomembrane Liner (in Keytrench and Berm)	3960 m²	Textured HDPE 60 mil or Equivalent
	Geomembrane Liner (in Pond Area)	21500 m²	
Geotextile (2 layers)	Geotextile Overliner (in Keytrench and Berm)	7920 m²	12 oz. Non Woven
	Geotextile Underliner (in Keytrench and Berm)	7920 m²	

Item	Quantity / Area / Volume	Description	
Transition Material (6")	Berm Walls Outer Ramps	575 m³ 2800 m³	Volumes derived by Eagle Point 7.2. - Side slopes 2H:1V Unless otherwise noted
Bedding Material (¾" Crush)	OverLiner	350 m³	
	UnderLiner	120 m³	
Surfacing Material (1¼" Crush)	Final Surface	1260 m³	
Geotextile (2 Layers)	Geotextile OverLiner	750 m²	12 oz. Non Woven
	Geotextile UnderLiner	750 m²	
	Sump	5 m²	
Liner	Geomembrane Liner 1 Base	750 m²	Textured HDPE 60 mil or Equivalent
	Geomembrane Liner 2 Under Driving Surface	25 m²	
	Geomembrane Liner 3 Under Driving Surface	17 m²	
	Sump	5 m²	

Location	Fill (mm)	Excavation (mm)
Vertical Tolerance on Roads	0 to +75	n/a
Horizontal Tolerance on Roads	-150 to +150	

Note: Grade shall not be uniformly high or low.

[illegible]

Appendix B:
Madrid North Advanced Exploration Surface Infrastructure Assessment
ERM, 2016

Memorandum



Date: December 8, 2016
To: John Roberts, TMAC
From: ERM Consultants Canada Ltd.
Subject: Madrid North Advanced Exploration Surface Infrastructure Assessment

1. INTRODUCTION

To enable effective access and efficient mining of the mineralized resource at Madrid North, the site layout for the Madrid North portal location and associated infrastructure previously identified in TMAC Resources' (TMAC) *Madrid Advanced Exploration Program Type B Water Licence Application* (the Madrid Application; ERM Rescan 2014) has been reorganized and relocated to a location approximately 1 km further south. Facility layout changes are summarized in Table 1. This memorandum evaluates the revised Madrid layout against environmental, cultural and heritage impacts assessed in the Madrid Application so as to evaluate if and how this information may alter the conclusions reached in the effects assessment that accompanied the Madrid Application (ERM Rescan 2014).

The original Madrid North layout is shown in Figure 4.2-1 of the Madrid Application (ERM Rescan 2014). The layout included the portal and its associated surface infrastructure such as the pollution control pond, waste rock pile, temporary ore stockpile, laydown areas, fuel transfer station, and vent raise. The area of the portal and its associated surface infrastructure was 93,361 m², including all access roads and the vent raise.

Figure 1 of this memorandum shows the revised Madrid North layout, approximately 1 km south of the original location. The area of the revised Madrid North layout is 69,810 m²; a 25% decrease in the total footprint of the original Madrid North layout.

2. IDENTIFICATION OF POTENTIAL ENVIRONMENTAL EFFECTS

The Madrid Application was submitted in late 2014 (ERM Rescan 2014) and included an effects assessment, guided by the approach used for the Doris North Project Final Environmental Impact Statement (EIS; Miramar 2005): the Madrid Application evaluated the potential effects of the advanced exploration program on the same Valued Ecosystem Components (VECs) as those used in the Doris North Project.

Table 1. Comparison of Madrid North Surface Layout, Original vs. Revised, and Associated Effects Assessment

Component/VEC	Original Layout (December 2014)	Revised Layout (November 2016)	Change in Component / Potential Effect
Waste Rock Pile			
Design Capacity	285,000 t (158,500 m ³)	285,000 t (158,500 m ³)	No Change
Ore stockpile			
Design Capacity	50,000 t (28,000 m ³)	50,000 t (28,000 m ³)	No Change
Available Capacity	75,000 t (41,700 m ³)	51,000 t (28,400 m ³)	No Change
Pollution Control Pond			
Design Capacity	15,100 m ³	16,000 m ³	5% more volume
Pond Area	13,900 m ²	14,500 m ²	4% more area
Max depth	2.8 m	3.2 m	14% deeper
Portal Area Pads			
Components	Waste rock pile, ore stockpile, shop, compressor building, diesel generator, emergency trailer, ATCO office trailer, CaCl ₂ laydown, 50,000L water storage tank with containment, brine mixing facility, laydown area, and fuel storage facility.		No change in Components
Pad Area	88,010 m ² (5,524 m ² in Patch Watershed, and 82,486 m ² in Windy Watershed)	63,980 m ² (48,141 m ² in Patch Watershed, and 15,839 m ² in Windy Watershed)	Footprint 27% smaller (22,220 m ²)
Vent Raise Pad			
Components	Fuel containment area and air heating facility.	Fuel containment area and air heating facility.	No Change
Pad Area (including access road)	5,351 m ² (2,192 m ² in Patch Watershed, and 3,159 m ² in Windy Watershed)	5,830 m ² (all in Patch Watershed)	Footprint 9% larger (479 m ²)
Total Footprint			
Portal Area Pads and Vent Raise Pad (including access road).	93,361 m ²	69,810 m ²	Footprint 25% smaller (23,551 m ²)
Environmental Assessment by VEC			
Sediment Quality	Proposed components, activities and controls are unchanged; site characteristics and effects pathways are unchanged.		Site characteristics and effects pathways are unchanged

Component/VEC	Original Layout (December 2014)	Revised Layout (November 2016)	Change in Component / Potential Effect
Air Quality and Noise	Proposed components, activities and controls are unchanged; site characteristics and effects pathways are unchanged.		Site characteristics and effects pathways are unchanged
Ground Stability and Permafrost	Site characteristics are similar for both sites.		Site characteristics and effects pathways are unchanged
Groundwater	Surficial active layer in tundra over deep permafrost.		Site characteristics and effects pathways are unchanged
Surface Water Quality	Pollution control ponds, discharge to tundra and haul to Doris		Site characteristics and effects pathways are unchanged
Vegetation	Located in area dominated by exposed bedrock with tundra between the outcrops		Site characteristics and effects pathways are unchanged
Aquatic Fauna	No standing water or streams		Site characteristics and effects pathways are unchanged
Historical and Traditional Uses	Field reconnaissance did not identify heritage or archaeological resources. ¹		Site characteristics and effects pathways are unchanged
Terrestrial Fauna	Area of habitat lost: 93,361 m ²	Area of habitat lost: 69,810 m ²	Effects on habitat loss due to infrastructure development and changes in movement and behaviour due to sensory disturbance may differ with a revised Madrid North layout: a smaller footprint may reduce the extent of potential effects. As presented in the Madrid Application, these effects have been identified as being negative and mitigable.
	Activities causing sensory disturbance include construction, operation and closure activities		Potential effects of disturbance on residences and dens may differ given the change in location of the disturbance source. As presented in the Madrid Application, these effects have been identified as being negative and mitigable.
Hydrology	Infrastructure is located in both the Windy Lake and the Patch Lake watersheds.		Similar to the original Madrid North layout with a total footprint of 93,361 m ² , footprint of the revised Madrid North layout (69,810 m ²) lies in the Windy Lake and Patch Lake watersheds (Figure 1). For both the original and revised layouts, the footprint is less than 1% of the Windy Lake watershed (14 km ²) and Patch Lake watershed (32 km ²), and therefore effects of surface disturbance (i.e., runoff diversions) on hydrology of Windy and Patch lakes would be insignificant.

¹ Assessment completed by Points West Heritage Consulting Ltd.

This memorandum compares the potential effects of the revised Madrid North surface layout (as presented in SRK 2016) to the original Madrid North Layout discussed in the Madrid Application, and reassesses effects where necessary; refer to Table 1. The only aspect of the Madrid Advanced Exploration Program that will change is the location and physical size of the footprint. All other processes, timelines, and activities will remain the same as that presented in the Madrid Application (ERM Rescan 2014). As a consequence of the only change being a localized shift in the location of the surface footprint and related reorganization, the potential effects on most VECs remain unchanged (Table 1).

The revised Madrid North layout may alter potential effects on one VEC: terrestrial fauna (Table 1). As a result, VECs unaffected by the change are not discussed further herein, while the one VEC which has been brought forward for re-assessment is evaluated further for the construction, operations, temporary closure/closure, and post-closure phases. The results of this evaluation are presented in the sections below.

2.1 Potential Effects to Valued Ecosystem Components

As identified in Table 1, one VEC with negative and mitigable effects previously identified may have new effects resulting in the revised Madrid North facilities: terrestrial fauna. These are discussed in the following sections.

2.1.1 *Terrestrial Fauna*

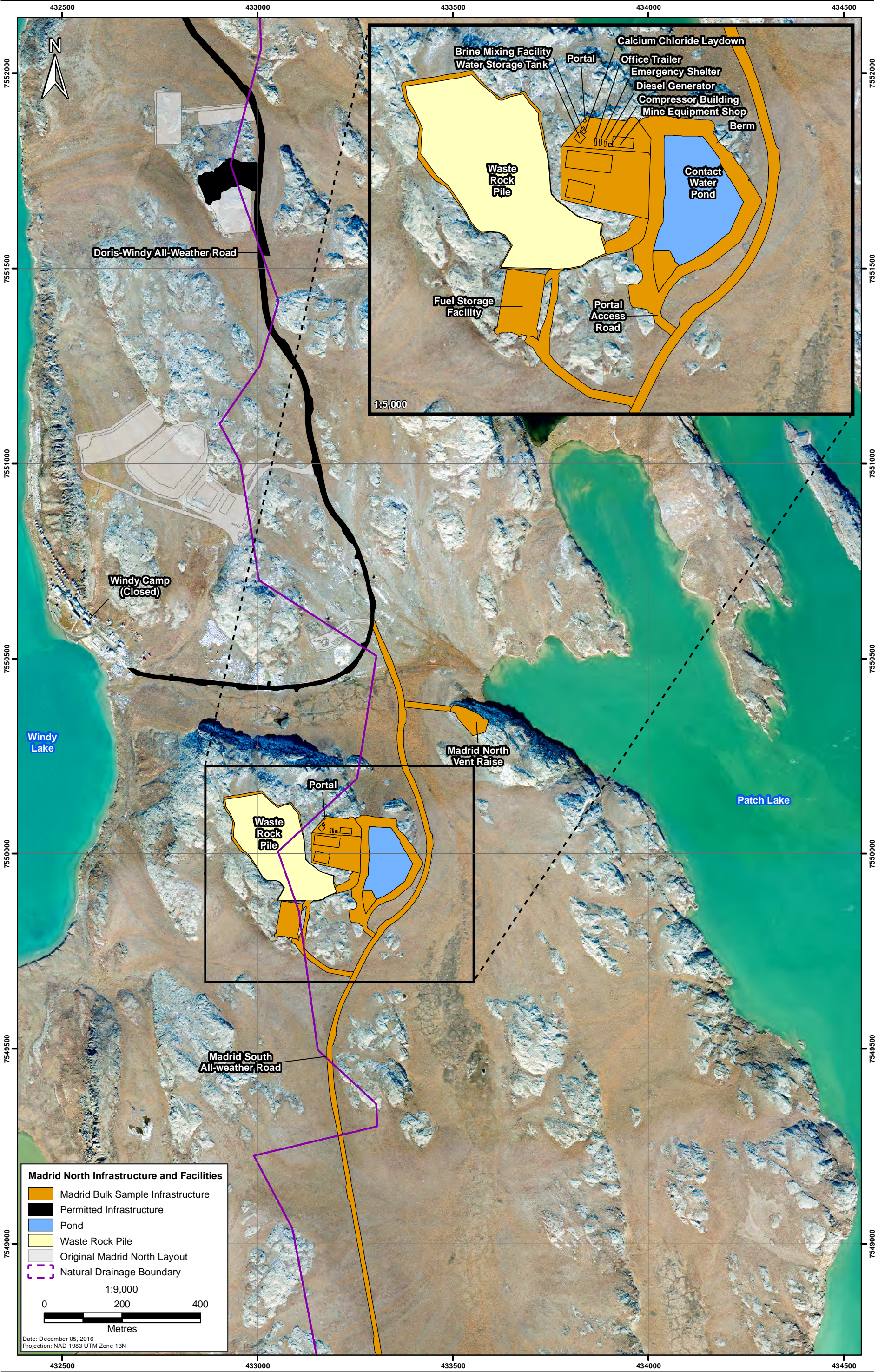
The VEC species identified and assessed in the Madrid Application (ERM Rescan 2014) also apply to the current assessment for the revised layout of Madrid North. Six terrestrial fauna and bird VECs (caribou, wolverine, grizzly bear, upland breeding birds, waterfowl, and raptors) were considered in the impact assessment for the Madrid Application (ERM Rescan 2014). A summary of the various data describing existing biological environmental conditions within both the original and revised Madrid areas were presented in ERM Rescan 2014.

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

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

Table 1 identified the first two project-related effects listed above as those requiring re-assessment. The latter two listed effects are considered unchanged due to the changes associated with the revisions to the Madrid North layout and so are not discussed further herein.

Figure 1
Madrid North



Habitat Loss Due to Infrastructure Development

Habitat is considered in two ways: loss of foraging habitat and loss of special landscape features (e.g., dens or nests). Some foraging habitat will be lost due to the development of Project infrastructure and facilities such as ore and waste stockpiles, a pollution control pond, buildings and additional all-weather road. The Application identified habitat loss as a potential negative, but mitigable effect.

The footprint of the revised Madrid North layout is 25% less than that assessed for the original Madrid North layout, thereby reducing the expected foraging habitat loss relative to the original Madrid North layout.

For some wildlife, which have residences or important habitats that are fixed in space (e.g., dens or nests), the relationship between original Madrid North layout and the revised Madrid North layout may change, resulting in loss of these habitat features.

Baseline data and data from ongoing compliance monitoring for the Doris Mine were evaluated to determine the location of residences and important habitats and whether these would be impacted by the revised Madrid North layout:

- **Caribou:** No sensitive habitat was identified within the footprint of the original or revised Madrid North facilities.
- **Wolverine, wolf or grizzly bear:** No identified dens within the footprint of the original or revised Madrid North facilities.
- **Waterfowl and upland breeding birds:** These birds build their nests on an annual basis and therefore their physical nest locations do not qualify as locations of residences from one year to the next.
- **Raptors (ground-nesting):** No residences have been recorded within the original or revised layout for the Madrid North facilities.
- **Raptors (cliff-nesting):** No residences have been recorded within the footprint, or within 100 m of the original or revised layout of the Madrid North facilities.

As a consequence, the revised Madrid North layout can be expected to have the same effects on foraging habitat and important habitats (e.g., dens and nests) as those presented in the Madrid Application; the effects assessment presented in the Madrid Application remains valid.

Changes in Movement and Behaviour Due to Sensory Disturbance

Sensory disturbance from blasting, human presence, vehicle and aircraft traffic can result in changes in wildlife movement and behavior. Potential effects of disturbance were also evaluated for residences and dens that may be near the original and revised layouts of the Madrid North facilities. An analysis was conducted to determine if any repeatedly used residences were near the project footprint.

No wolverine, wolf, or grizzly bear dens were identified within several kilometers of either the original and revised footprints, and so potential effects on dens were not evaluated further.

There are several cliff-nesting raptor territories within 1.5 km of both the original and revised Madrid North layouts. A raptor territory is an area within the home range of a breeding pair containing one or more nests where no more than one pair is known to have bred at one time. Ongoing monitoring studies indicate that eight raptor territories are located within 1.5 km of the original Madrid North layout, including rough-legged hawk (5), peregrine falcon (2), and gyrfalcon (1). In contrast, the revised Madrid North layout is within 1.5 km of five breeding raptor territories including nests used by gyrfalcon (1), peregrine falcon (1), and rough-legged hawk (3). None of the nests associated with these raptor territories are within 100 m of either the original or revised Madrid North layouts.

As a consequence, the revised Madrid North layout will have the same effect on changes in movement and behaviour due to sensory disturbance as the original Madrid North layout; the effects assessment presented in the Madrid Application remains valid.

2.2 Residual and Cumulative Effects

Given that there are no new residual effects arising from the reassessment of effects to terrestrial fauna, the cumulative effects of the Madrid Advanced Exploration Program remain unchanged from that presented in the Madrid Application.

2.3 Mitigation Measures

Mitigation measures for all pathways of effects presented in the Madrid Application, including those for terrestrial fauna, remain suitable and valid.

3. CONCLUSIONS AND RECOMMENDATIONS

As demonstrated in this memorandum, the effects assessment conclusions presented in the Madrid Application, screened by the NIRB and determined to be an exception pursuant to Section 12.10.2(b) of the Nunavut Final Agreement as outlined in the NIRB's Notice of Indication for 12.10.2(b) Determination Report (NIRB File No. 12MN001) of June 24, 2016 (the NIRB Determination Report), remain valid for the revised Madrid North layout for the following reasons:

- Alternatives assessment, proposed mitigation and monitoring measures, and the environmental impacts and their significance remain unchanged from those presented in the Application;
- Conclusions are supported by the analyses and remain unchanged from those presented in the Application;
- Methodology applied remains unchanged from that presented in the Application;
- Quality of information provided remains unchanged from that presented in the Application;
- Need for and timing of the project remains unchanged from that presented in the Application.

Prepared by:

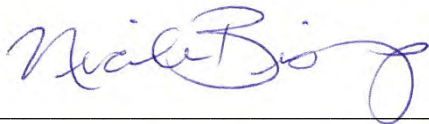


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