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Memo

To:	Chris Hanks, Christine Kowbel	**Date:**	August 4, 2011
Company:	Hope Bay Mining Limited	**From:**	John Kurylo, Iozsef Miskolczi, Maritz Rykaart
Copy to:	Lea-Marie Bowes-Lyon	**Project #:**	1CH008.049
Subject:	Design Brief: Doris North Project Expanded Waste Rock Storage Pad (Pad U)		

1 Introduction

Hope Bay Mining Limited (HBML), a wholly owned subsidiary of Newmont Mining Company (NMC) is currently in the process of constructing their Doris North Project (Project) in the Kitikmeot region of Nunavut, Canada.

Due to the increased mine life of the Doris North Project, there is a need to increase the waste rock storage space at the mine site to a total of 550,000 tonnes. The proposed new waste rock storage pad, referred herein as Pad U would be constructed immediately east of the portal, at a location between the Tail Lake Access Road and Doris Lake. The pad will have a dedicated lined Pollution Control Pond constructed immediately downstream to ensure proper water management. Depending on the requirements for waste rock storage at any stage of the Project, Pad U may be used for additional waste rock storage or as general surface infrastructure pads, or any combination thereof. Due to the terrain configuration, and depending on the functional use of Pad U, the pad will be tiered.

This memo provides complete details of the pad design, and should be read in conjunction with the attached set of detailed engineering drawings (Attachment A).

2 Design Concept

Total waste rock storage requirements for the Project is 550,000 tonnes, which cannot be serviced by the current waste rock storage Pad I, as well as future waste rock storage on Pads F and G. The new waste rock storage pad (Pad U) provides the necessary increased storage capacity. Existing ore and waste rock pads for the Project has been designed on the basis that immediately overlying the tundra, there will be a 1m thick layer of geochemically acceptable material, upon which the ore and/or waste rock can be stockpiled. Pad U has been designed on the same basis; however, given the topography in the area, and to ensure maximum functional use of the area, the pad has three tiers at elevations of 34, 39, and 43.5m. To facilitate maximum functionality of the pads, each tier will have a minimum width of 25m, and the maximum thickness of any tier is limited as far as practicable to less than ~6m. The tiers are connected via series of access ramps, each with a maximum gradient of less than 10%.

Proper water management from Pad U will be ensured through the construction of a lined Pollution Control Pond immediately downstream of the pad.

Pad U will be initially constructed and be used as a general purpose pad for laydown and surface infrastructure, until mine sequencing requires it to be converted to a waste rock storage pad.

The Project, including the proposed Pad U is constructed on KIA land, and HBML has secured a Commercial Lease for the property, including the proposed expansion.

3 Expansion Alternatives

HBML considered a number of alternative waste rock storage pad locations. These included:

- Store the waste rock on a new pad south of the float plane access road: A new waste rock storage pad can be constructed immediately south of the float plane access road opposite the existing Pollution Control Pond and the Sedimentation Pond. Key disadvantages of this alternative included: (1) the area is poorly drained and as a result has poor foundation conditions, (2) the proximity of this area to the helicopter base implies that the height of waste rock storage would be restricted to ensure unhindered aircraft approach angles, (3) hauling waste rock to the pad will require crossing of the primary site access road, and (4) an additional Pollution Control Pond will have to be constructed downstream of the pad. This site has therefore been eliminated from further evaluation.

- Store the waste rock on a new pad immediately north of the existing Pad Q: This will be a tiered pad located north of Pads Q and D. This location would have limited storage capacity and access from underground will be via a short uphill ramp. For these reasons this site was not selected.

- Store the waste rock on a new pad east of the Tail Lake Access Road: Although this site requires construction of a new Pollution Control Pond and crossing of the Tail Lake Access Road with haul trucks; it is located on good foundation conditions and provides good access and flexibility and has thus been selected as the preferred location.

4 System Design

4.1 Design Criteria

The design criteria for the rock fill pads and Pollution Control Pond are as follows:

- Width of the pad tier shall be a minimum of 25m.
- Ramp grades for non-mining underground fleet shall not exceed 10%.
- Ramp grades for mining underground fleet shall not exceed 7%.
- Ramps shall have a minimum width of 8m and turning radius of 12m.
- Each tier shall be constructed with a general drainage gradient of 0.5%.
- A minimum 0.85m thick Run-of-Quarry (ROQ) fill base overlain by a 0.15m surfacing material shall be constructed.
- Maximum pad side slope gradient shall be 1.5H:1V where fill thickness is less than 2m and 2H:1V where fill thickness exceeds 2m.
- The upstream north portion of the berm will incorporate a GCL clay liner to ensure run-off is adequately diverted.
- The overall slope of the waste rock dump should not exceed 2.5H:1V for long-term storage.
- The minimum storage volume for the Pollution Control Pond is 2,700m^3.
- All facilities must be outside of the 31m exclusion zone to the nearest water body (Doris Lake).
- Where elevation difference between the pads exceeds 3m, safety barriers will be constructed at the edge of the pads.

4.2 Survey Data

The design of Pad U is based on 2010 as-built information received from Nuna Logistics and a topographic contour set provided by HBML, based on 2007 aerial photography. Contour intervals shown are typically 0.5m.

4.3 Foundation Conditions

Comprehensive geotechnical investigations have been carried out at the Doris North Site (SRK 2009). This information confirms that the area lies within the zone of continuous permafrost, with the permafrost being up to 550m deep. Permafrost temperature at the surface is about -8ºC and the active layer is generally less than1 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 -2ºC. The ice-rich overburden soils are typically between 5 and 20m deep, before encountering competent bedrock, predominantly basalt. Bedrock is frequently exposed rising columnar 5 to 100m above the surrounding landscape.

Thermal modeling was completed to determine how much fill would be required over the tundra to ensure the permafrost would be preserved for infrastructure construction (SRK 2006). In the case of Pad U, the minimum fill thickness would be 1m; however, due to the nature of the pads actual fill thickness will in most cases far exceed this value.

4.4 Waste Rock Dump

Waste rock will be stockpiled on Pad U. The maximum height of the stockpile is about 30m and the overall slope of the pile will be 2.5H:1.0V. Actual construction of the dump will be via end-dumping in benches of about 6m thick, placed at angle of repose for the rock. Benches between lifts will be spaced to ensure compliance with the overall long-term slope angle. Haul ramps to the stockpile and between lifts will be limited to a 7% angle. Attachment B contains a detailed waste rock pile stability analysis.

4.5 Pollution Control Pond

The new lined Pollution Control Pond immediately downstream of Pad U is designed to capture subsurface and surface drainage emanating from the pad and any associated waste rock stockpiled on it. The design containment volume of the pond is 2,700m^3. This ensures containment of the 100-yr return 24-hr duration storm event of 48.9mm.

The pond is designed as an event pond and will operate as normally-empty. Water collected in this pond will be pumped into the tailings pump box in the mill building, from where it will be pumped to the tailings impoundment. Pumping capacity will be designed such that the entire volume of the pond can be drained in six hours, similar to the other event ponds on site. Pumping would start as soon as at the contained volume is large enough for one hour of continuous pumping.

5 Construction Methodology

Pad U and the Pollution Control Pond will be constructed using conventional load-haul-dump-place techniques. Geochemically acceptable rock (either ROQ or waste rock) will be used. The waste rock would originate from the Doris North Portal and quarried rock from any of the approved rock quarries forming part of the Project.

For the Pollution Control Pond a specialist contractor will be used to install an HDPE liner keyed into permafrost to ensure a leak-proof cut-off. The liner will be protected using a series of geosynthetic products (geotextile), bedding material and finally riprap.

Complete material quantities for constructing Pad U and the new Pollution Control Pond are presented on the attached drawing DN-WRE-03, Rev. A.

Regards,

SRK Consulting (Canada) Inc.

John Kurylo, E.I.T.
Staff Consultant

Iozsef Miskolczi, E.I.T.
Staff Consultant

Reviewed By:

Maritz Rykaart, Ph.D., P.Eng.
Principal

6 References

SRK Consulting (Canada) Inc., 2009. Hope Bay Gold Project: Stage 2 Overburden Characterization Report, Prepared for Hope Bay Mining Limited, Project Number: 1CH008.002, September, 2009.

SRK Consulting (Canada) Inc., 2006. Doris North Project – Thermal modeling to support design thickness for granular pads. Technical Memorandum, Prepared for Miramar Hope Bay Limited, Project Number: 1CM014.008, August 20, 2006.

Attachment A
Engineering Drawings for the Pad U (Waste Rock Expansion) Area

Engineering Drawings for the Pad U (Waste Rock Expansion) Area Doris North Project, Nunavut, Canada Water License Amendment

ACTIVE DRAWING STATUS

DWG NUMBER	DRAWING TITLE	REVISION	DATE	STATUS
DN-WRE-00	Engineering Drawings for the Pad U (Waste Rock Expansion) Area, Doris North Project, Nunavut, Canada	A	June 13, 2011	Issued for Discussion
DN-WRE-01	Pad U - General Arrangement	A	June 13, 2011	Issued for Discussion
DN-WRE-02	Additional Waste Rock Storage - General Arrangement	A	June 13, 2011	Issued for Discussion
DN-WRE-03	Sections and Details 1of 2	A	June 13, 2011	Issued for Discussion
DN-WRE-04	Sections and Details 2 of 2	A	June 13, 2011	Issued for Discussion

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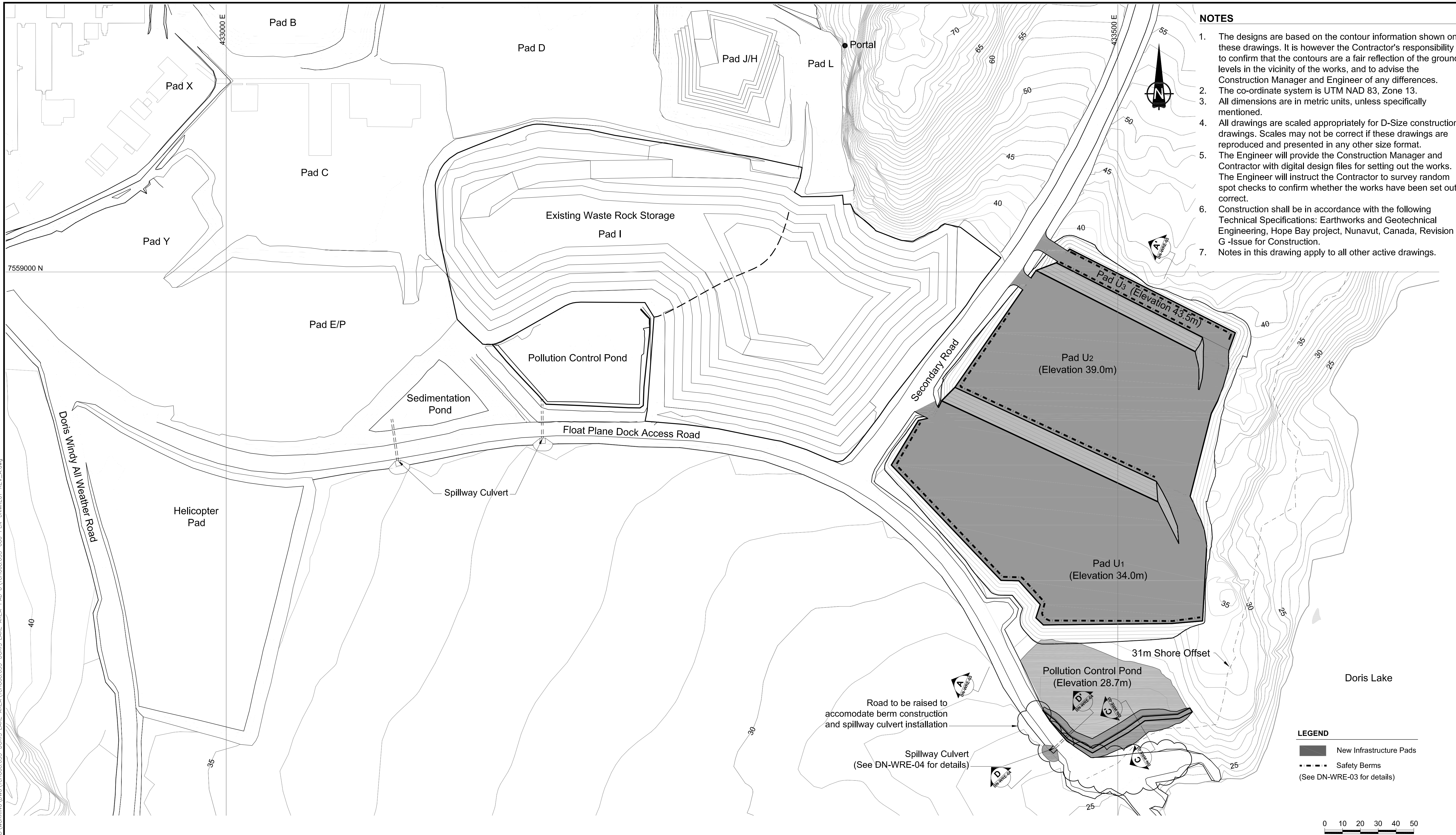
PROJECT NO: 1CH008.049
Revision A
June 13, 2011
Drawing DN-WRE-00 / HB+R-CIV-CIV-OND-0001



NOTES

1. The designs are based on the contour information shown on these drawings. It is however the Contractor's responsibility to confirm that the contours are a fair reflection of the ground levels in the vicinity of the works, and to advise the Construction Manager and Engineer of any differences.
2. The co-ordinate system is UTM NAD 83, Zone 13.
3. All dimensions are in metric units, unless specifically mentioned.
4. All drawings are scaled appropriately for D-Size construction drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format.
5. The Engineer will provide the Construction Manager and Contractor with digital design files for setting out the works. The Engineer will instruct the Contractor to survey random spot checks to confirm whether the works have been set out correct.
6. Construction shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering, Hope Bay project, Nunavut, Canada, Revision G -Issue for Construction.
7. Notes in this drawing apply to all other active drawings.

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
A	ISSUED FOR DISCUSSION	JBK	EMR	13JUN11

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CHECKED: JBK | APPROVED: EMR | DATE: Jun. 13, 2011
FILE NAME: 1CH008.033–000–PLN–DNWRE01–REV_A.dwg | SRK JOB NO.: 1CH008.049

Doris North Project

DRAWING TITLE:
Pad U
General Arrangement

DRAWING NO.: DN-WRE-01 | SHEET: 2 OF 5 | REVISION NO.: A

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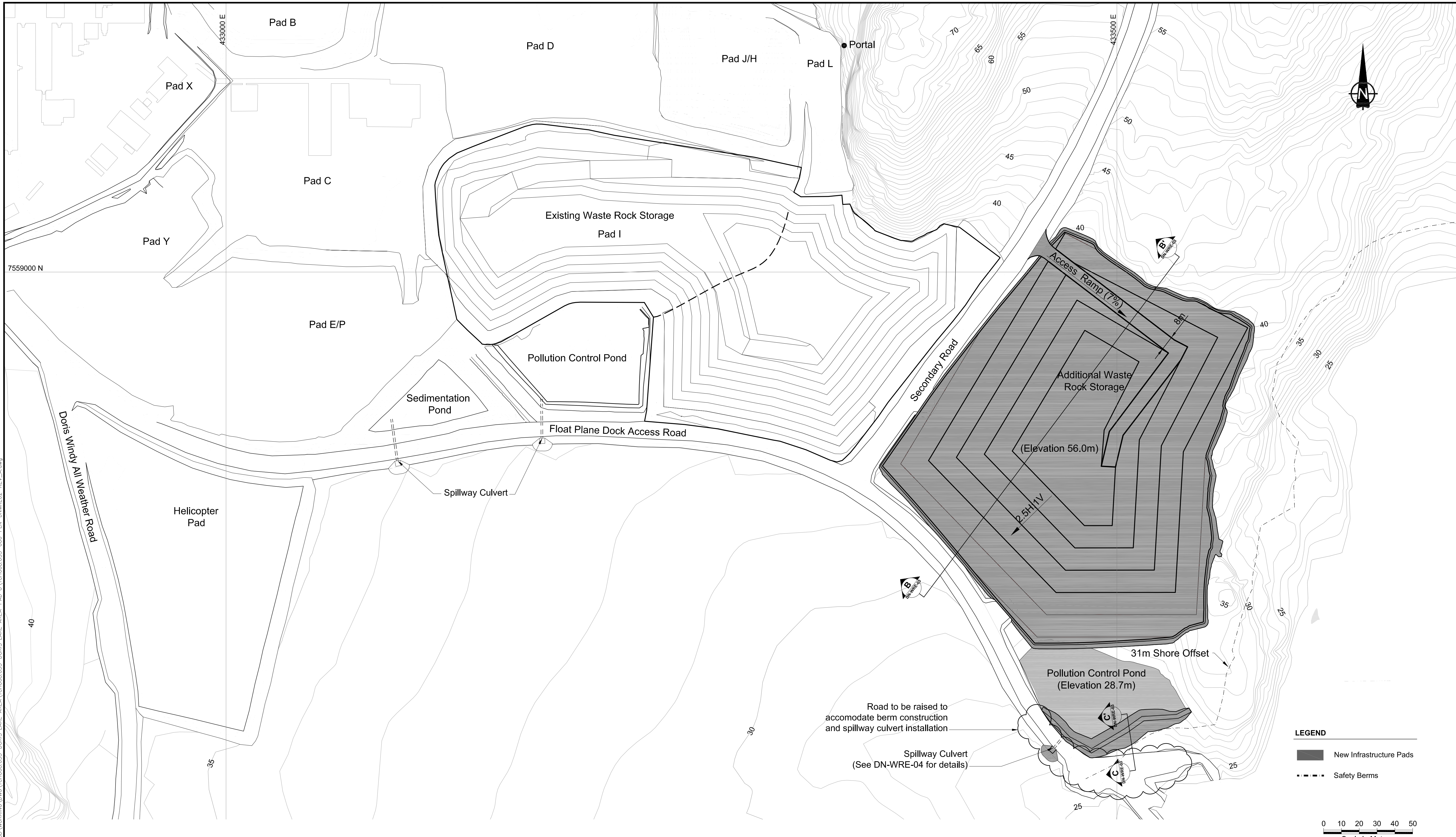

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FILE NAME: 1CH008.033-000-PLN-DNWRE02-REV_A.dwg

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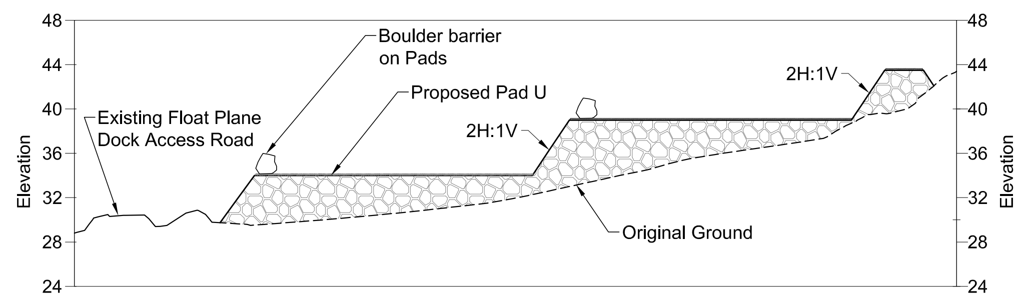
Doris North Project

DRAWING TITLE:

Additional Waste Rock Storage
General Arrangement

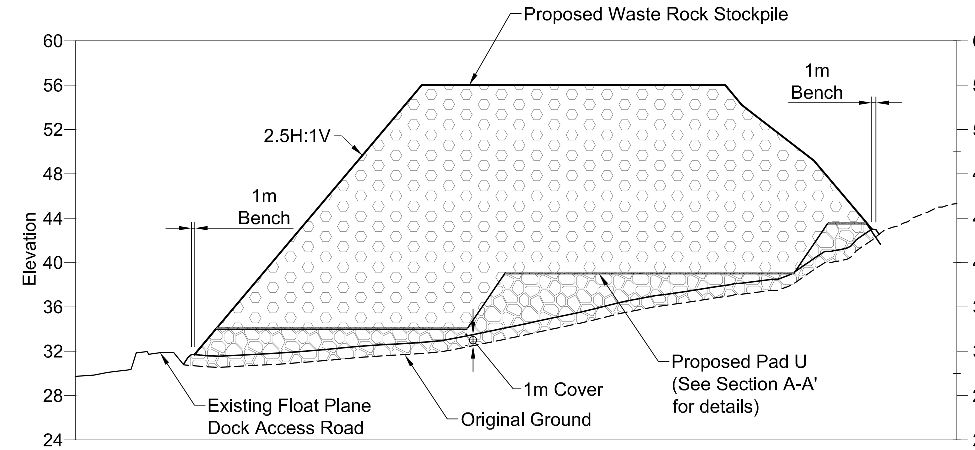
DRAWING NO.: DN-WRE-02 | SHEET: 3 OF 5 | REVISION NO.: A



A DN-WRE-01 **SECTION A - A'**

Horizontal Scale in Meters (0, 10, 20, 30, 40, 50)

3X Vertical Exaggeration Scale in Meters (0, 3.33, 6.67, 10, 13.33, 16.67)



OPTION 1 - LEAVE PAD U IN PLACE

B1 DN-WRE-02 **SECTION B1 - B1'**

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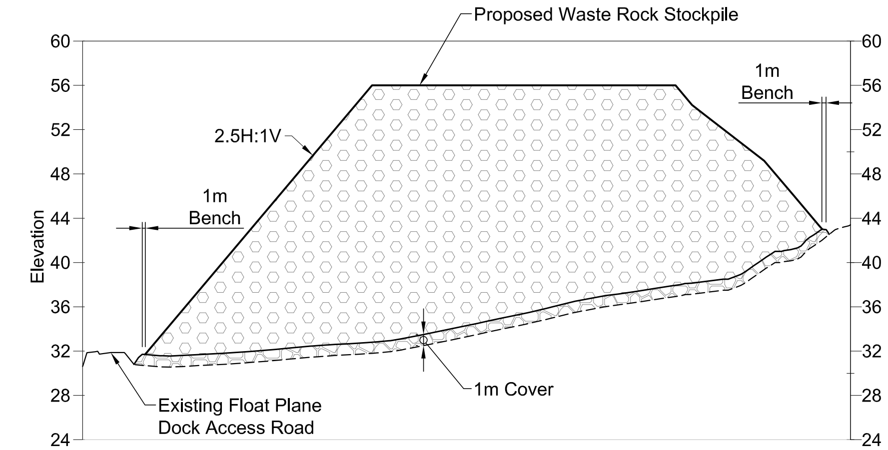
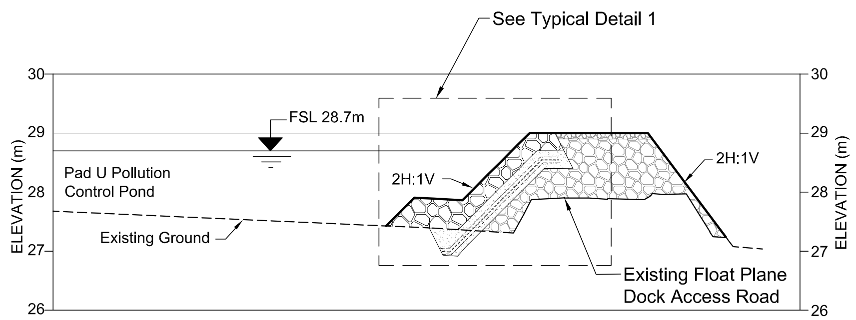


OPTION 2 - REGRADE PAD U

B2 DN-WRE-02 **SECTION B - B'**

Horizontal Scale in Meters (0, 10, 20, 30, 40, 50)

3X Vertical Exaggeration Scale in Meters (0, 3.33, 6.67, 10, 13.33, 16.67)



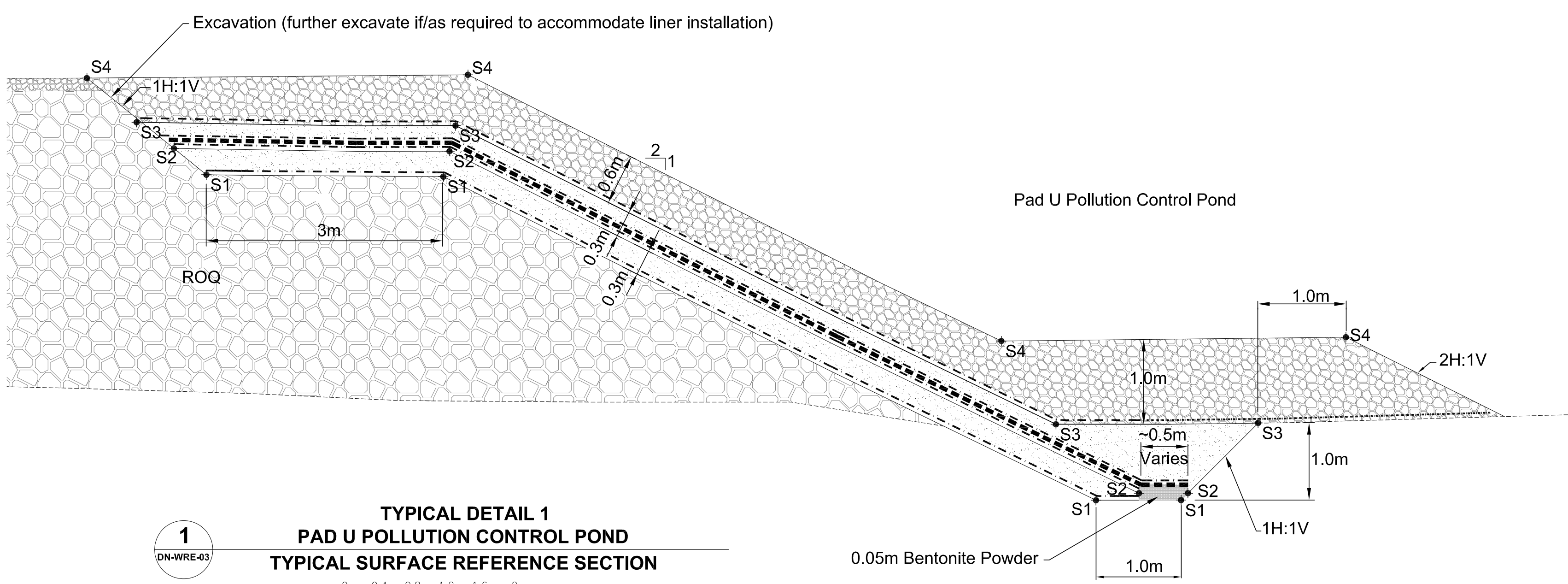
C DN-WRE-01 **SECTION C - C'**

Horizontal Scale in Meters (0, 2.5, 5, 7.5, 10, 12.5)

4X Vertical Exaggeration Scale in Meters (0, 0.625, 1.25, 1.875, 2.5, 3.125)

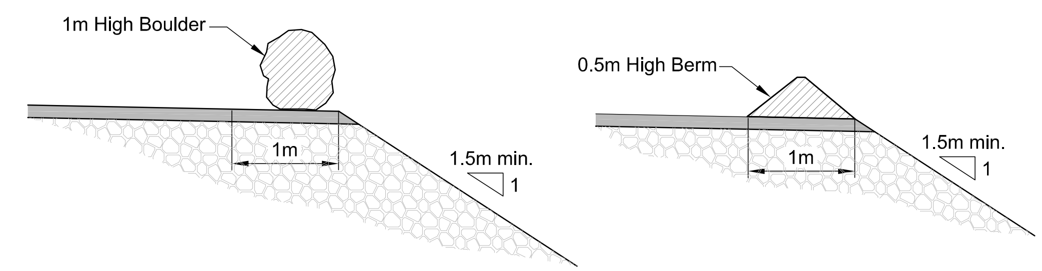
Materials and Quantities

Item	Quantity / Area / Volume		Description
Run of Quarry	Pad U (1m cover over OG) Pad U (above 1m cover) Pollution Pond (to 29m crest elevation) Total	31,300 m³ 57,400 m³ 1,250 m³ 89,950 m³	Approximate in-place neat-line volumes (no allowance has been made for losses and/or tundra embedment) Volumes for ROQ and Surfacing Material derived by Civil 3D (2011)
Surfacing Material	Pad U Total	3,650 m³ 3,650 m³	Side slopes 2H:1V Unless otherwise noted. Lined system / road raise volumes not included (modeling to completed).
Waste Rock Storage	Option 1 (Pad U left as is) Option 2 (Pad U Regraded)	~ 245,750 m³ ~ 306,800 m³	Waste rock storage estimates based on Gemcom gems, volumes, hard calculations and Civil 3D volumes.



1 DN-WRE-03 **TYPICAL DETAIL 1**
PAD U POLLUTION CONTROL POND
TYPICAL SURFACE REFERENCE SECTION

Scale in Meters (0, 0.4, 0.8, 1.2, 1.6, 2)



2 DN-WRE-01 **DETAIL 2**
TYPICAL BERM BARRIER OPTIONS
NOT TO SCALE

LEGEND

- ¾" Crushed Material
- 1 ¼" Crushed Material
- Run of Quarry Material
- Rip Rap
- Existing ground surface
- Textured 60 mil HDPE Liner
- 12 oz. Non-woven Geotextile

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DRAWING NO. DN-WRE-03 | SHEET 4 OF 5 | REVISION NO. A

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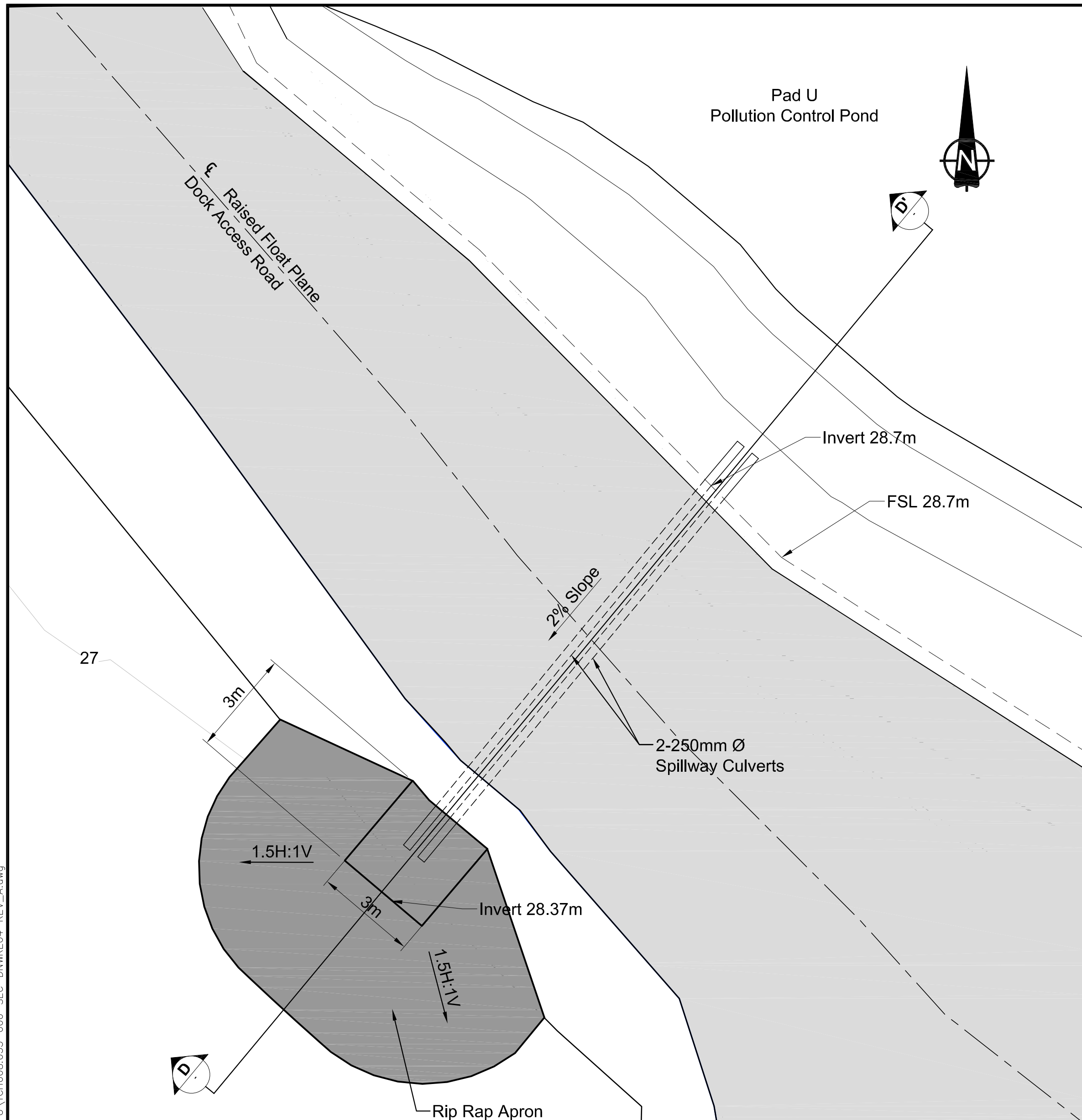
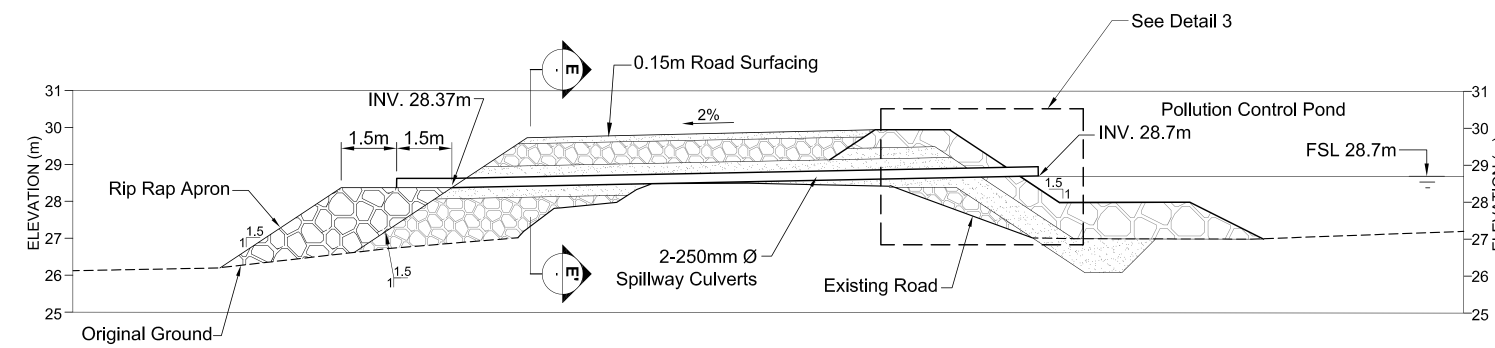


DETAIL 3 - POLLUTION CONTROL POND SPILLWAY CULVERT

3
DN-WRE-01

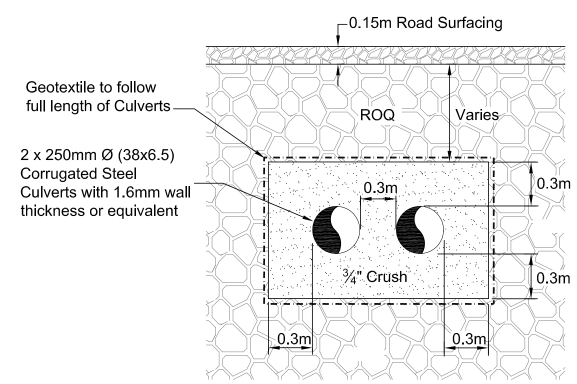
NOT TO SCALE



SECTION D - D'

D

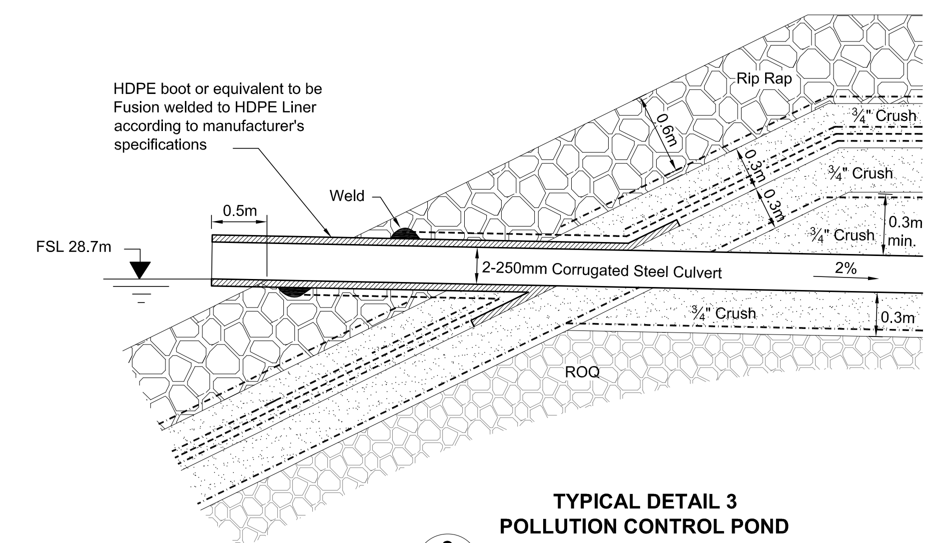
0 1 2 3 4 5
Scale in Meters



SECTION E-E'
SPILLWAY CULVERT SECTION

E

NOT TO SCALE



TYPICAL DETAIL 3
POLLUTION CONTROL POND
PIPE PENETRATION

3

NOT TO SCALE

LEGEND

¾" Crushed Material	Existing ground surface
1 ¼" Crushed Material	Textured 60 mil HDPE Liner
Run of Quarry Material	12 oz. Non-woven Geotextile
Rip Rap	

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SRK JOB NO.: 1CH008.049

Doris North Project

DRAWING TITLE: Sections and Details 2 of 2

DRAWING NO.: DN-WRE-04 | SHEET: 5 OF 5 | REVISION NO.: A

Attachment B

SRK Memo: Doris North Pad U Waste Rock Pile Stability Analysis

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Memo

To:	Project File	**Date:**	June 29, 2011
		From:	Murray McGregor
Copy to:	Maritz Rykaart	**Project #:**	1CH008.033
Subject:	Doris North Pad U Waste Rock Pile Stability Analysis		

1 Introduction

This memo presents the results of a slope stability analyses for the planned waste rock pile on top of Pad U in Doris Camp. The stability analysis was carried out using the Morgenstern-Price method as applied in SLOPE/W. The model is set up using three materials: marine silt and clay, run of quarry foundation pad, and run of mine waste rock. The typical active layer thickness for uncovered marine silt and clay is about 1 m. It will be assumed that the run of quarry foundation pad protects the permafrost of the silts and clays that it sits atop. The run of quarry foundation pad is assumed to be unfrozen since it is the thickness of the active layer. The waste rock is assumed to be unfrozen because the rate it will be dumped will likely surpass the freezeback of the pile.

Table 1 summarizes the material properties used in the analysis taken from the previous Doris Creek Bridge Abutments stability analysis (SRK, 2010).

Table 1: Material Properties

		Run of Quarry Foundation Pad	Waste Rock	Marine Silt and Clay Foundation
Saturated Unit Weight (kN/m^3)		20	20	18.5
Degree of Saturation		30%	30%	85%
Porosity		0.3	0.3	0.52
Volumetric Water Content		0.09	0.09	0.442
Unfrozen	Apparent Cohesion c' (kPa)	0	0	0
	Friction angle, φ ^{0}	40	39	30
Frozen	Apparent Cohesion c' (kPa)	5	n/a	112
	Friction angle, φ ^{0}	40	n/a	26

2 Method

The analysis is carried out using a critical cross-section of the waste rock pile, taking into consideration the foundation slope and ultimate pile height. This typical section, complete with assigned material zones, is presented in Figure 1.

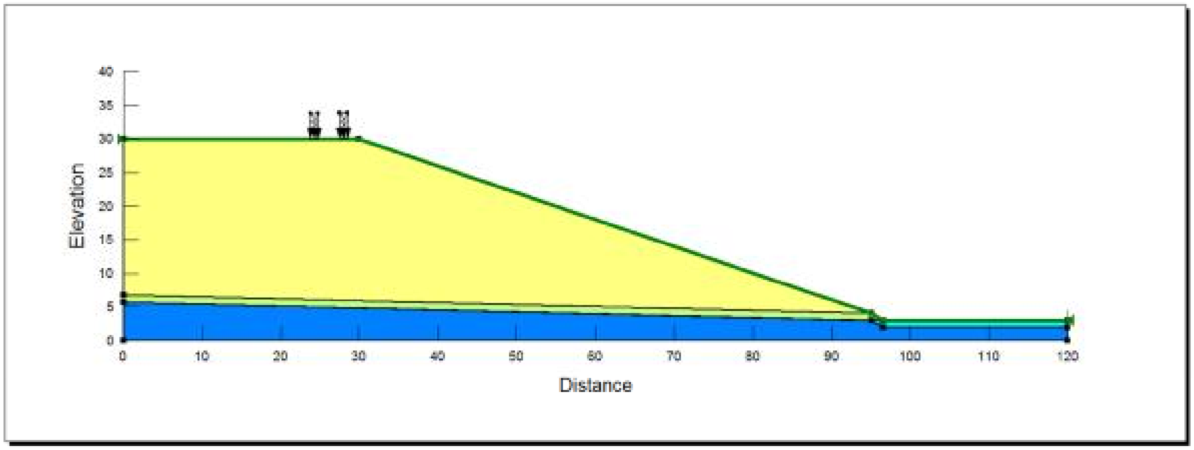


Figure 1: Critical Section of the waste rock pile used for the slope stability analysis.

The critical slip surface was evaluated under two conditions; for a free standing waste rock pile without consideration of haul truck wheel loads at the crest, and with wheel loads. A sample calculation for haul truck wheel loading is included as Appendix A. Both rotational slip surfaces and blocks failure modes were considered in each case.

The Project site is located in a stable seismic zone of Canada with low peak ground accelerations. Because of this, the stability analysis under seismic conditions was not assessed.

Graphic results for the critical slip surfaces of each analysis are presented in Appendix B. In each case where haul truck wheel loads are included, a load induced failure occurs near the crest of the pile. For the case where no wheel loads are considered, the critical slip surface appears as a shallow skin failure along the outer edge of the pile.

Table 2: Calculated Factors of Safety from SLOPE/W Models

	Calculation Method	**Numerical Method**	**Factor of Safety**	**Critical Slip Surface Location**
Haul Truck Wheel Loads Considered	Entrance and Exit	Morgenstern-Price	1.189	Load induced failure occurs near the crest of the pile
		Bishop	1.124	
	Block Specified	Morgenstern-Price	1.058	
		Bishop	1.370	
Free Standing Waste Pile	Entrance and Exit	Morgenstern-Price	2.029	Shallow skin failure along the outer edge of the pile
		Bishop	2.029	
	Block Specified	Morgenstern-Price	2.033	
		Bishop	2.058	

A dump stability rating for the waste rock pile was completed in accordance with the guidelines set by the British Columbia Mine Waste Rock Pile Research Committee (1991). For frozen foundation conditions the stability rating of the waste rock pile is 200 (Class I Stability), while for unfrozen foundation conditions the stability rating increases to 400 (Class II Stability).

The level of stability analysis presented in this memo is in accordance with the stated stability rating assessed for the waste rock pile.

The client should implement measures to ensure proper setback distances for haul trucks from the operating crest of the waste rock pile. Installation of thermistors to monitor foundation frost conditions is recommended to warn against possible onset of unfrozen conditions.

3 References

SRK Consulting (Canada) Inc. 2010. Secondary Road Bridge Abutment Slope Stability Analysis. Prepared for Hope Bay Mining Limited. Project Number: 1CH008.033, May 25, 2010.

British Columbia Mine Waste Rock Pile Research Committee, 1991. Mined Rock and Overburden Piles Investigation and Design Manual Interim Guidelines.

Appendix A
Sample Calculation of Haul Truck Wheel Loading

SRK Consulting
Engineers and Scientists

Project No. 1CH008.027 Site Vancouver

Prepared by Murray McGregor Date Nov. 23, 2010

Approved by ______ Date ______

Subject Vehicle Loading on Waste Rock Piles Calculation Sheet 1 of 1

From Manufacturer Website:

CAT 773 Gross Opperating Weight: 222,000 lbs = 100,698 Kg

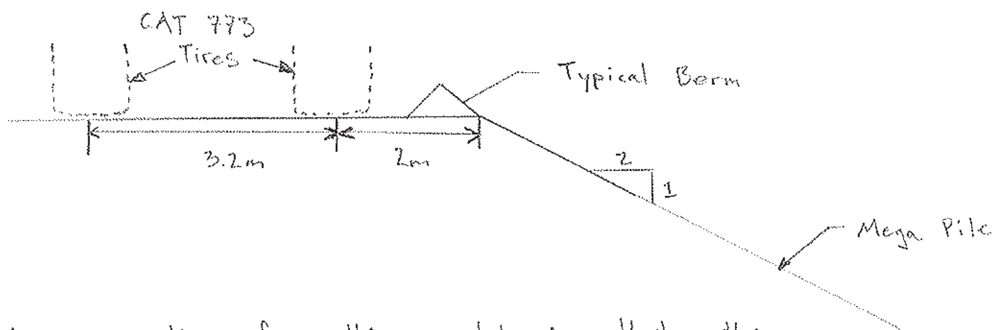
Load Weight Distributions: Front 35% Rear 65%

Rear Tire Load: $(100{,}698\,kg)(65\%)\left(\frac{1\ tire}{Axle\,(2)}\right)\left(\frac{9.81\,N}{kg}\right) = 321\ KN$

Centerline Front Tire Width: 10.5 ft ≅ 3.2 m

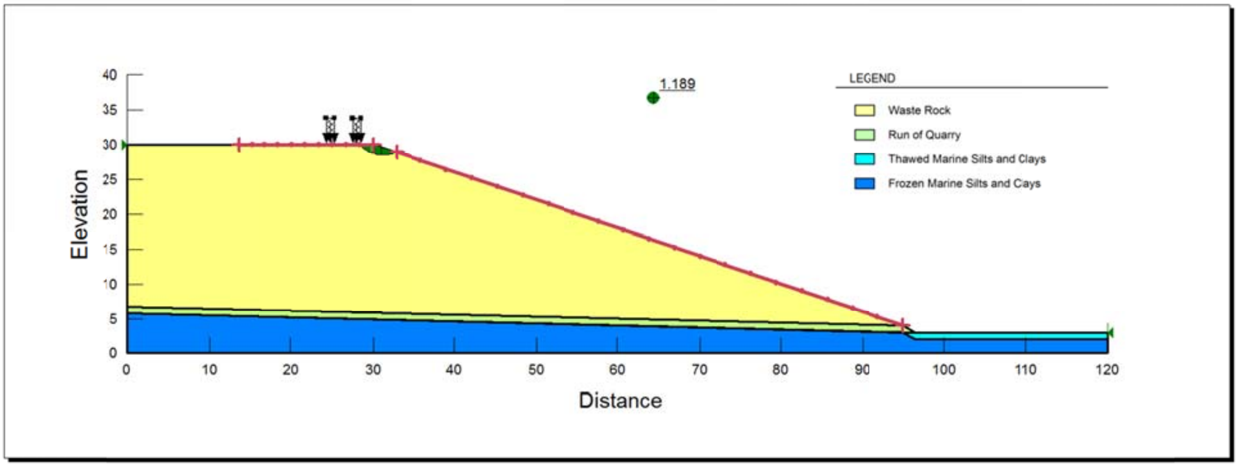
Offset from Slope Edge: (Berm width) + (½ tire width) ≅ 2.0 m

Typical Berm Width = 1 meter minimum

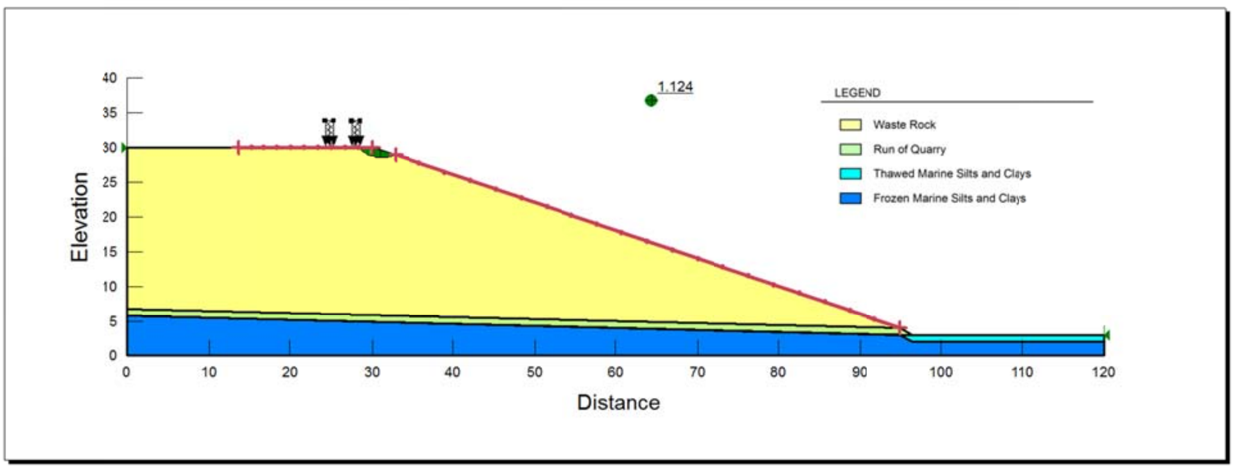


An assumption for this model is that the tires act as equal pressure loads over 1m² areas.

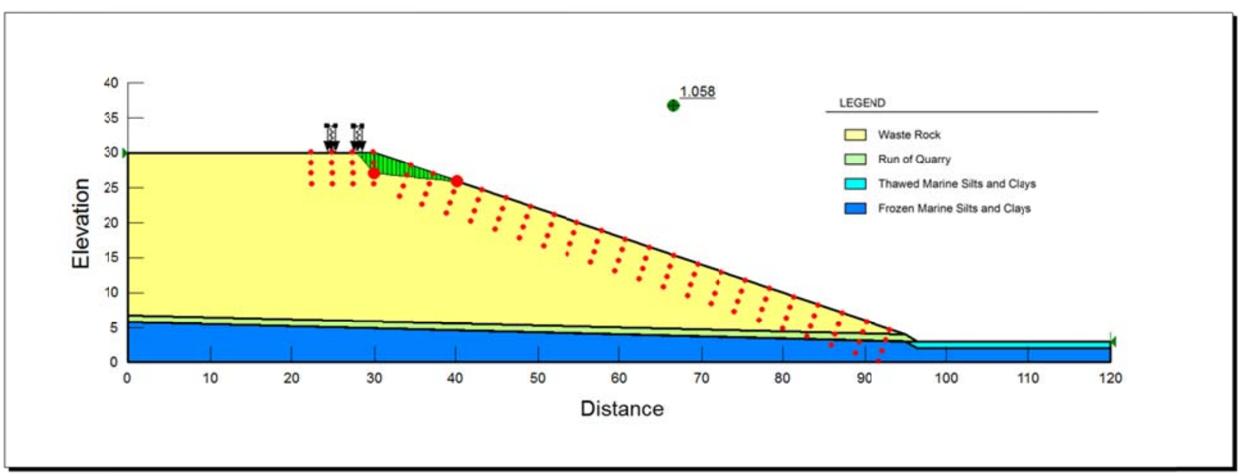
Appendix B
Graphic Results of Critical Slip Surfaces



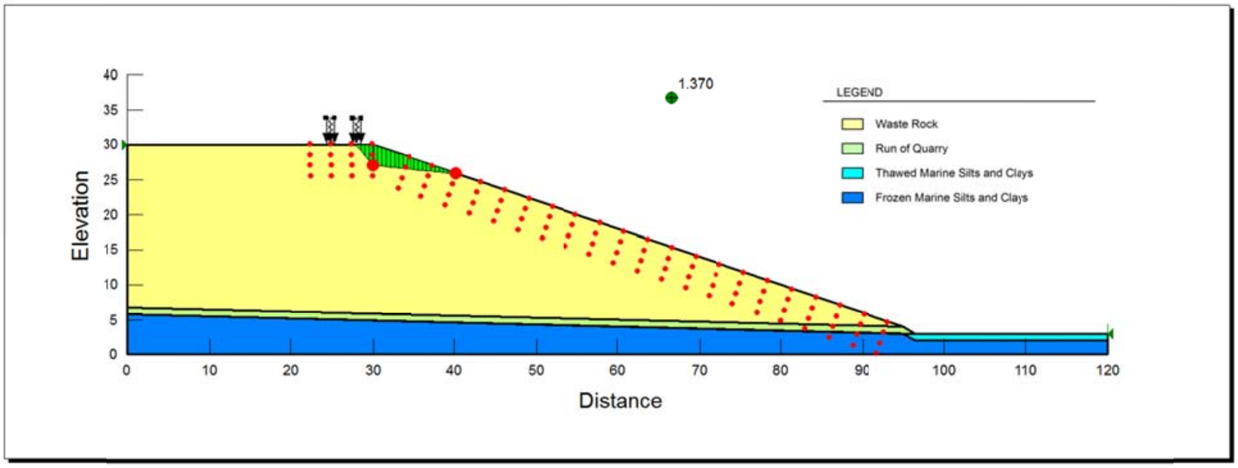
Entry-exit critical slip surface using Morgenstern-Price method with applied wheel loads.



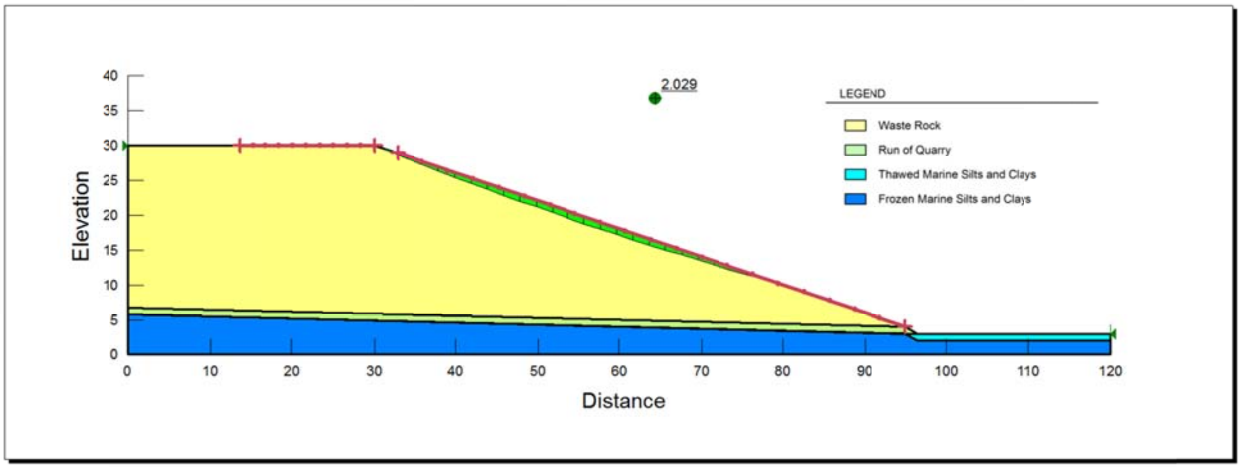
Entry-exit critical slip surface using Bishop method with applied wheel loads.



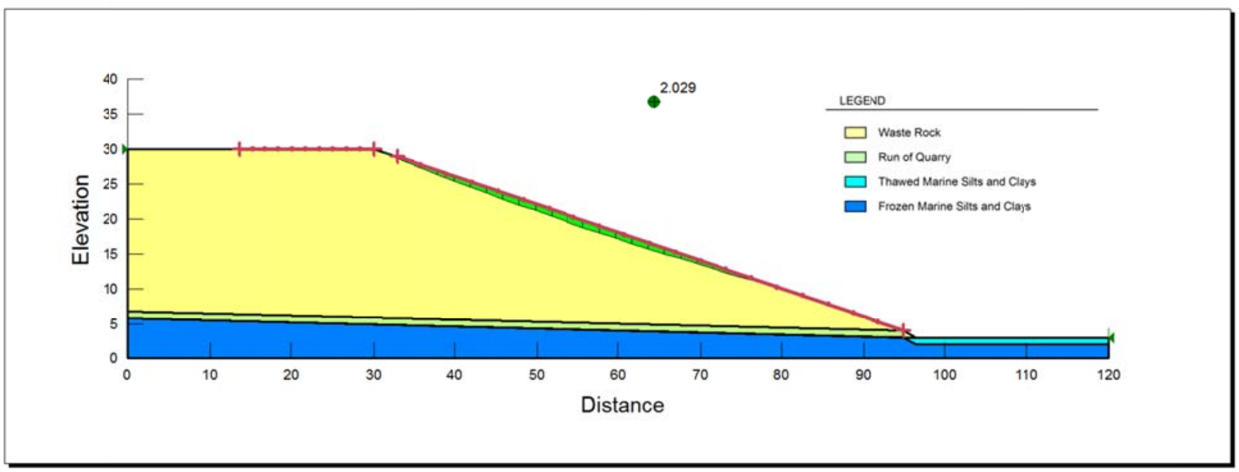
Block specified critical slip surface using Morgenstern-Price method with applied wheel loads.



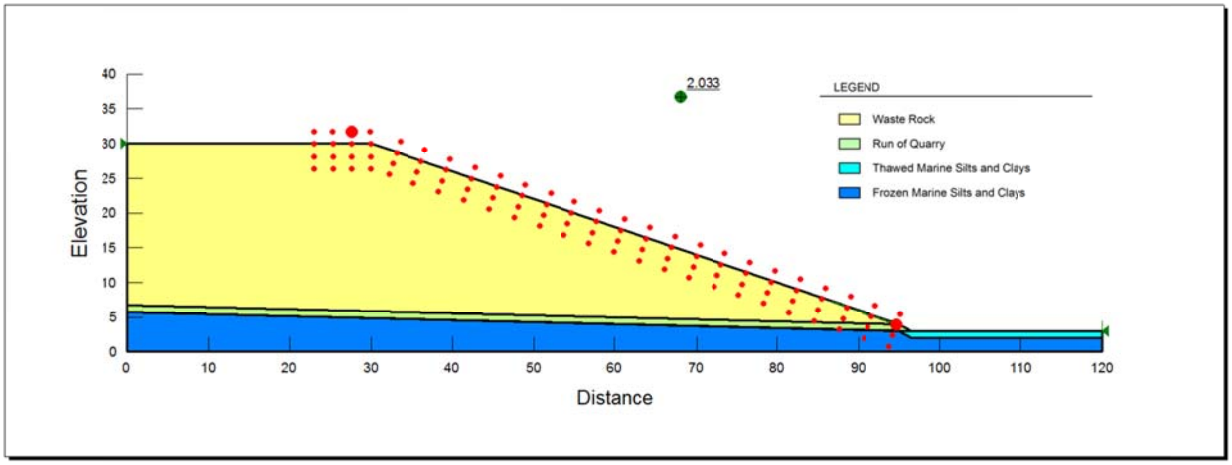
Block specified critical slip surface using Bishop method with applied wheel loads.



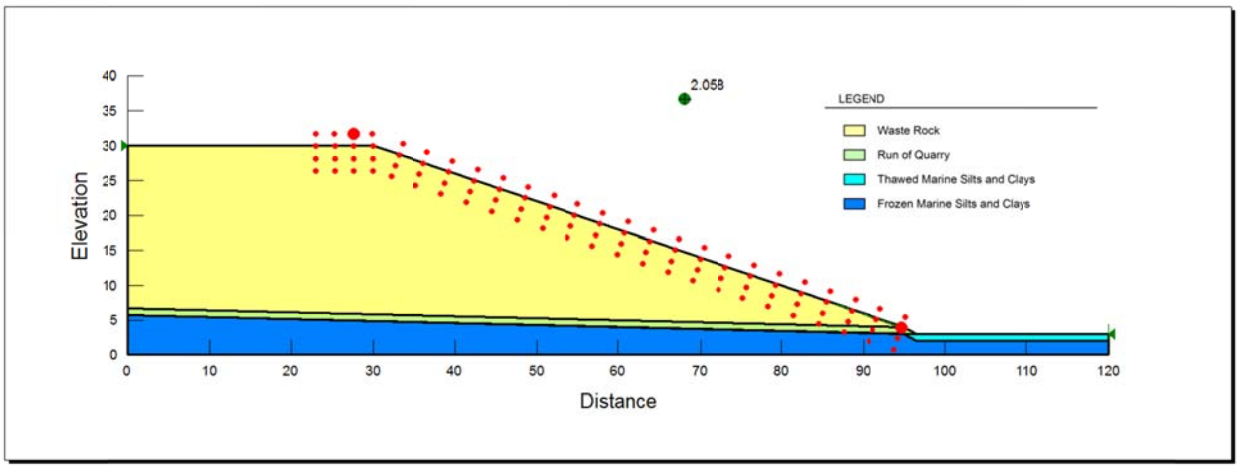
Entry-exit critical slip surface using Morgenstern-Price method for the free standing pile.



Entry-exit critical slip surface using Bishop method for the free standing pile.



Block specified critical slip surface using Morgenstern-Price method for the free standing pile.



Block specified critical slip surface using Bishop method for the free standing pile.

Appendix C
Waste Rock Pile Stability Ratings

Stability Factor	Description	Points
Dump Height	Maximum 26m	0
Dump Volume	306,800m^3	0
Dump Slope	2.5:1 = 21.8° Flat	0
Foundation Slope	5° < 10° Flat	0
Confinement	Convex pile shape - (Unconfined)	100
Foundation Type	Compotent (Frozen) / Weak (Unfrozen)	0 / 200
Dump Material Quality	Strong - (High)	0
Construction Method	Lifts <25m - (Favourable)	0
Peiziometric / Climate	High infiltration into dump - (Intermediate)	100
Dumping Rate	5m^3 per liniar meter per day (Slow)	0
Seismicity	Low seizmic risk zone	0
	Total	200 / 400