



# **Ore Storage Pad 2 Design Report and Drawings 6515-E-132-013-105-REP-033**

30-Day Notice to Nunavut Water Board  
In Accordance with Water License 2AM-MEL1631 (Part D, item 1)

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## 1 INTRODUCTION

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Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Project (the Project), a gold mine located approximately 25 km north of Rankin Inlet and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Project site is located on a peninsula between the east, south, and west basins of Meliadine Lake (63°1'23.8" N, 92°13'6.42"W).

The current mine plan focuses on the development of the Tiriganiaq gold deposit which will be mined using both conventional open-pit and underground mining operations. Current or proposed mining facilities to support this development include a plant site and accommodations, temporary overburden stockpile, tailings storage facility (TSF) and a water management system comprised of collection ponds, diversion channels and retention berms. A Type "A" Water License (No. 2AM-MEL-1631) was awarded to Agnico Eagle for the development of this Project in 2016.

In accordance with Part D of the Type "A" Water License, this report summarizes the design basis and detailed design criteria for ore storage pad OP2 (Stage 1), in addition to construction related items including estimated in-situ volumes and drawings. Ore storage pad OP1 (Stage 2) will be part of a separate Design Report and drawings.

## **2 DESIGN BASIS**

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### **2.1 2015 ORE STORAGE MANAGEMENT PLAN**

As part of the documentation series produced for the Type “A” Water License application, Agnico Eagle presented the Ore Storage Management Plan (Agnico Eagle, 2015) for the Project. This plan described the preliminary design basis and operational procedures for the ore stockpiles and pads to be constructed.

Key points for the design and construction of the ore storage pads from the management plan included the following:

- Approximately 12.1 Mt of ore will be mined over the life of the Project, comprised of approximately 3.6 Mt from the open pits and about 8.5 Mt from underground operations. Ore will be milled in the process plant during mine operations at feeding rates between 3,000 to 5,000 tonnes per day.
- No ore will remain in a stockpile at mine closure.
- Ore stockpile locations were designed and selected to minimize the number of catchments potentially affected by drainage from the stockpiles, provide designed storage capacity including contingency and minimize the haul distances to the crusher.
- High grade ore produced from underground ramp development will be temporarily stored on OP1, located adjacent to the crusher, and will be milled during the early years of mill operations to balance the irregular ore flow from underground. Marginal grade ore from underground operations will be stored on OP2 until the second last year of mine operations. The low and marginal grade ore produced from open pit operations will be stored in stockpiles on newly available space on OP1 and OP3, to be milled during the last year of mill operations.

### **2.2 ADAPTATION SINCE THE 2015 ORE STORAGE MANAGEMENT PLAN**

Since the submission of the 2015 Ore Storage Management Plan, changes have been made to the configuration of various infrastructures within the Industrial Pad footprint. A plan view of the current locations of these infrastructures is shown in Drawing 65-6870210-200 in Appendix A. The Landfarm and Industrial Site Fuel Farm now occupy much of the area previously identified for use as OP3. In addition, the new alignment of the crusher ramp and ancillary crushing infrastructures has affected the footprint of the previously planned OP1. The general location of OP2 has not changed.

Adaptations have also been made to the expected production and milling schedule based on the ore grades encountered to date during underground development. Four classes of ore are identified: high grade, mid-grade, low grade and marginal grade. High and mid grades will be stockpiled until being milled during 2019 and 2020 respectively. Consistent with the initial strategy, low and marginal grades will continue to be stockpiled until they are processed in the final year of mill operations.

Refinements to the expected production schedule and predicted ore quantities available for stockpiling are on-going. The current projections of ore volumes to be stockpiled each year are summarized in Table 1. The overall quantities are in the same range than the values presented in the 2015 Ore Storage Management Plan.

**Table 1: Estimated Volumes of Ore to be stockpiled by Year**

Year	Mine Year	High Grade (t)	Mid-Grade (t)	Low Grade (t)	Marginal Grade (t)	Total	
						(t)	(m3)
2018	Yr-1	48,726	83,339	43,443	89,623	265,132	141,028
2019	Yr1	107,434	145,401	211,231	236,570	700,636	372,679
2020	Yr2	--	134,501	512,619	397,082	1,044,202	555,426
2021	Yr3	--	--	635,401	523,662	1,159,063	616,523
2022	Yr4	--	3,446	895,129	690,630	1,589,205	845,322
2023	Yr5	--	--	890,005	918,400	1,808,404	961,917
2024	Yr6	--	--	735,415	1,106,757	1,842,172	979,172
2025	Yr7	--	--	504,084	1,207,856	1,711,940	910,606
2026	Yr8	--	--	0	0	0	0
Maximum (t)		107,434	145,401	895,129	1,207,856	1,842,172	
Max.Volume (m3)		57,146	77,341	476,132	642, 476	979,879	

## 2.3 CONSTRUCTION AND OPERATION SCHEDULES AND ASSUMPTIONS

To mitigate high initial construction costs associated to infrastructure not required until later in the Life of Mine (LOM) and to better adapt to potential future adjustments in estimated annual volumes, the ore storage facilities will be constructed in stages. The facilities have been planned to be constructed in two stages:

- Stage 1: the required surface areas will support the estimated volumes of all ore grades until capacity is achieved (expected mid-2022); and
- Stage 2: the required surface areas will support the estimated volumes of all ore grades until the end of mine life.

This report focuses solely on the design of the ore storage facilities for Stage 1. Stage 2 will be presented in a separate report and will include OP1.

The following construction and operation schedules are assumed:

1. Start construction in early June, 2018;
2. Complete approximately 25% of the construction by end August, 2018;
3. Start operation (placement of ore) in August, 2018;
4. Complete Stage 1 construction and operation until design capacity is achieved (expected mid-2022).

## **2.4 LOCATION OF PROPOSED ORE STORAGE FACILITIES**

Drawing 65-687-210-200 in Appendix A shows the location of the proposed Stage 1 ore storage facility in relation to other mine infrastructure. The original footprint of OP2 will be expanded to incorporate the available remaining footprint of what originally proposed as OP1, and maximize the space next to the crusher.

### 3 DESIGN OF ORE STORAGE PAD 2

#### 3.1 KEY DESIGN CONSIDERATIONS

In addition to the criteria described in Section 2, OP2 was designed based on the following considerations:

- A minimum 1.0 m of 600 mm minus ROM waste rock will be placed over original ground to reduce any thaw-induced differential settlements.
- Waste rock will be placed to follow the natural topography within each area, thereby reducing the likelihood of water ponding on the surface of the pads requiring additional maintenance. A final grade of about 0.5% sloping towards Channel 1 will be achieved. Any surface run off from the ore stockpiles or the pads will therefore be directed to the CP1 containment area.

#### 3.2 KEY DESIGN PARAMETERS

The key design parameters for the ore stockpiles have been adopted from the Ore Storage Management Plan (Agnico Eagle, 2015). These parameters were used for the maximum pad area calculations and are summarized in Table 2.

**Table 2: Key Design Parameters for Ore Stockpiles**

Design Parameter	Design Value
Pad thickness (m)	1.0
Bench width from crest of pad to toe of first lift of ore (m)	5.0
Thickness of first lift of ore (m)	5.0
Bench width from crest of first lift to toe of second lift of ore (m)	10.0
Maximum elevation (m)	80.0
Assumed side slopes for ore and pad (H:V)	1.3:1
Assumed dry density of ore = 1.88 t/m	

Following the above design parameters during ore placement, a maximum theoretical volume of 1.75 M tonnes, or 930 150 m<sup>3</sup>, of ore can be stored on OP2. Dividing the pad into four stockpiles and maintaining a 15 m distance between the stockpiles provides a sufficient surface area for a total of 1.26 M tonnes, or 672 800 m<sup>3</sup>. It is estimated that this capacity will be achieved mid-2022 (Year 4), at which point additional ore storage capacity will be required (Stage 2).

#### 3.3 STABILITY CONSIDERATIONS

The ore stockpiles are temporary structures and small compared to the waste rock storage facilities (WRSFs). Based on stability and thermal analyses completed for the WRSFs presented in the Mine Waste Management Plan (Agnico Eagle, 2018) and experience with similar structures at other mine



sites (ie. Meadowbank), the ore stockpiles will have an acceptable factor of safety against potential slope failures.

### **3.4 THERMAL CONSIDERATIONS**

Permafrost is expected to exist beneath the footprint of the ore storage pads and it is anticipated that the top surface of the permafrost may aggrade upwards with the placement of the pads.

## 4 CONSTRUCTION OF ORE STORAGE PAD 2

### 4.1 CONSTRUCTION MATERIALS AND ESTIMATED QUANTITIES

Table 3 provides the estimated in-place quantities of the construction materials to be used and key specifications.

**Table 3: Estimated In-Place Quantities for Construction of Ore Storage Pad 2**

Material	Surface Area (m <sup>2</sup> )	Volume of Rockfill (m <sup>3</sup> )	Material Source and Specifications
ROM rockfill	103 000	140 000	Sourced from ROM rock stockpiles or underground mine operation; maximum particle size of 600 mm

### 4.2 WATER MANAGEMENT DURING CONSTRUCTION

To avoid placement of the ROM rockfill in “wet” conditions, construction will be staged around water management. Water accumulated in the area of OP2 will be drained towards Channel 1 prior to placing rockfill. Drainage will occur while pad construction begins from the North Portal road advancing towards the east. In addition, runoff from the rockfill materials during construction may be expected under rainfall events. Any runoff from construction activities will run into Channel 1 and through to CP1. Erosion control devices such as straw logs will be used if required. Therefore, additional and separate water collection systems are not required.

### 4.3 REPORTING

Upon completion of the construction activities, an as-built construction summary report will be prepared and submitted to the regulators within 90 days. This report will provide all relevant supporting documentation compiled during the construction process and is expected to include:

- Construction record drawings based on as-built survey information of the surface of all materials placed;
- Actual construction quantities;
- Summary of any construction issues and applied resolutions;
- Reporting of any construction or design changes made during construction; and
- Photographs during the construction process and the final structures.

### 4.4 MONITORING

The post construction monitoring program for assessing the performance of the ore stockpiles and pads is detailed in the Ore Storage Management Plan (Agnico Eagle, 2015).

## 5 DRAWINGS

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The following drawings are available in Appendix A of this report:

- Drawing 65-687-210-200: Plan View of Ore Storage Pad OP2 Location
- Drawing 65-687-210-201: Typical Cross Section and Construction Details

## REFERENCES

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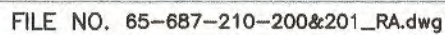
Agnico Eagle. 2015. Meliadine Gold Project: Ore Storage Management Plan. 6513-MPS-08. April 2015.

Agnico Eagle. 2018. Meliadine Gold Project: Mine Waste Management Plan. Version 3. 6513-MPS-09. March 2018.

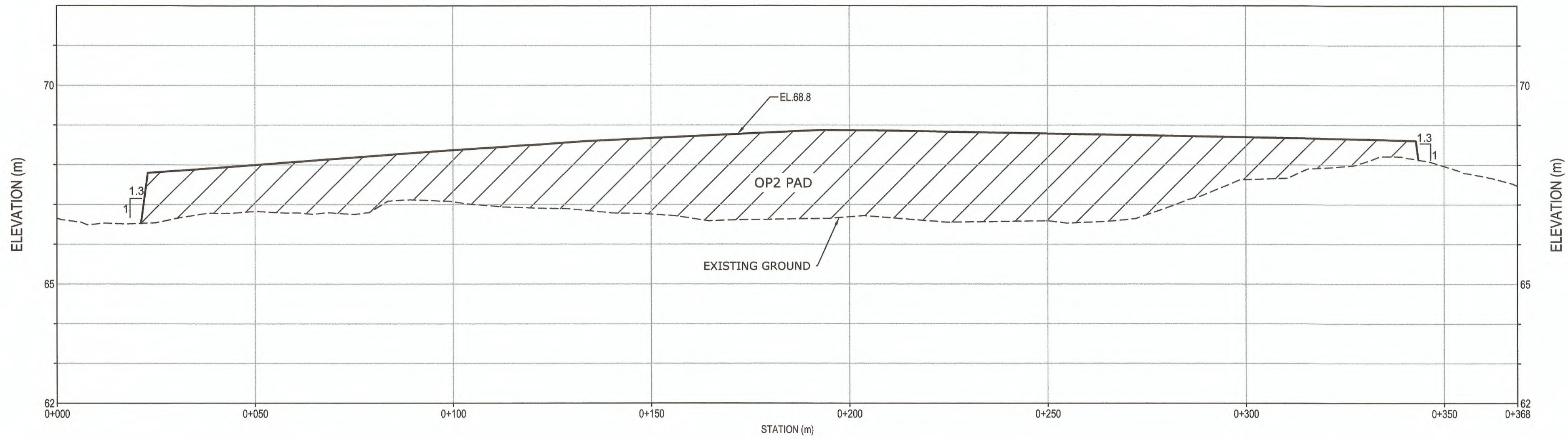
Golder. 2014. SD 6-3 Geochemical Characterization of Waste Rock, Ore, Tailings and Overburden Meliadine Gold Project, Nunavut. Technical Report Submitted as part of the Final Environmental Impact Statement to the Nunavut Impact Review Board. April 2014.

## **Appendix A: Design Drawings**

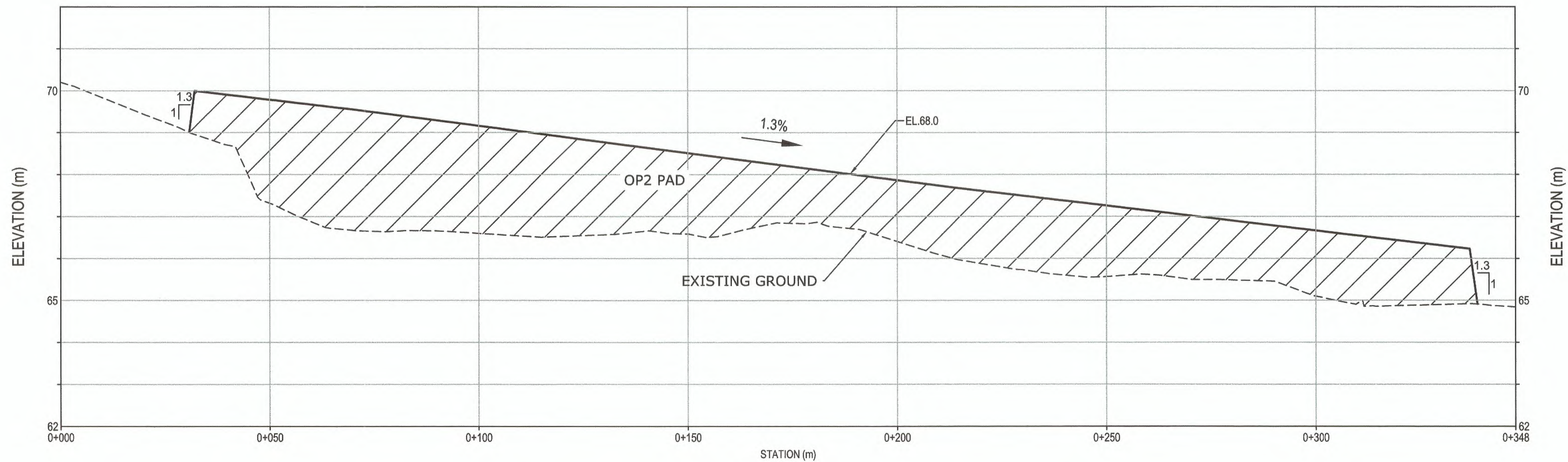




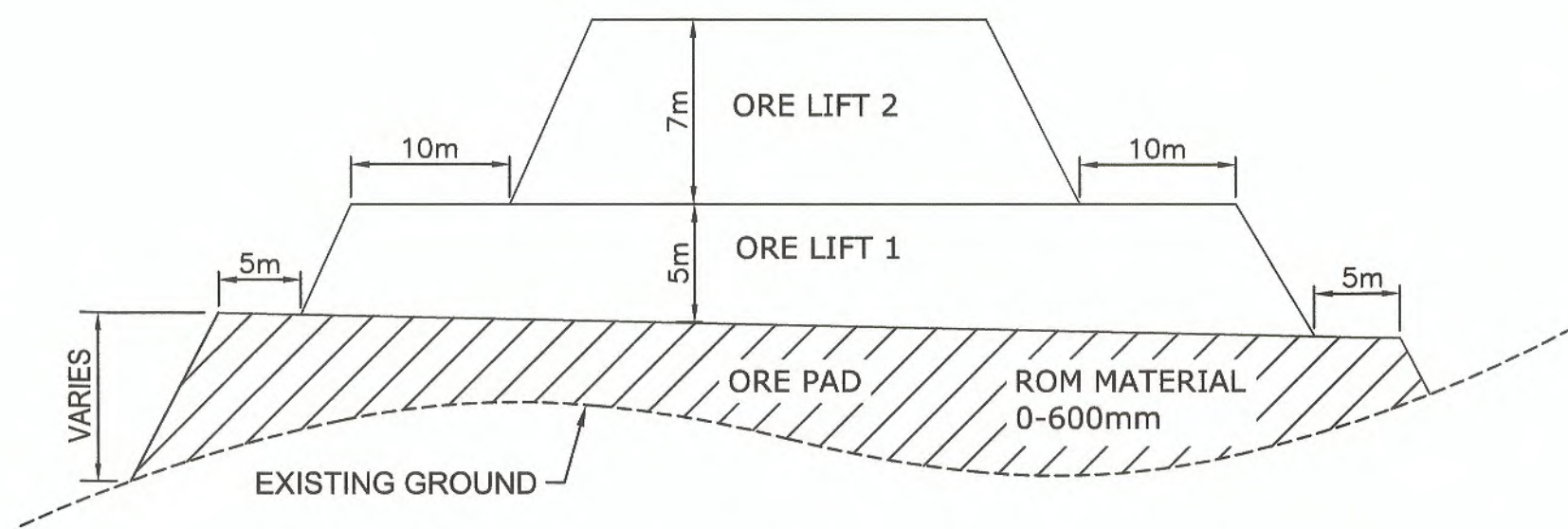




SECTION A  
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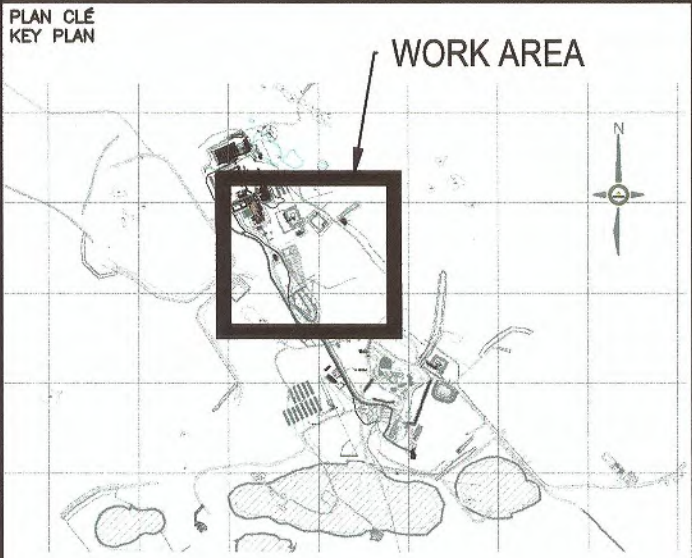


SECTION B  
SCALE : 1:800



ORE STOCKPILING DETAIL

N.T.S.



NOTES GÉNÉRALES / GENERAL NOTES

NOTES:

1. ALL UNITS ARE IN METERS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY, SECURITY AND SLOPES OF ALL EXCAVATIONS/ BACKFILL AND SHALL ABIDE BY ALL RELEVANT STANDARDS AND REGULATIONS. THE STABILITY, DEWATERING AND MAINTENANCE OF ALL EXCAVATIONS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
3. GRANULAR MATERIAL SHALL BE PLACED IN LIFTS NOT EXCEEDING 300mm AND COMPACTED TO A MINIMUM OF 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY. BORROW PIT MATERIAL, GRANULAR FILL MATERIAL 0-600mm OR OVERBURDEN MATERIAL SHALL BE PLACED IN LIFTS NOT EXCEEDING 600mm AND COMPACTED TO A MINIMUM OF 90% OF STANDARD PROCTOR MAXIMUM DRY DENSITY. MOISTURE CONDITIONING MAY BE REQUIRED PRIOR TO COMPACTION.



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TITLE / TITRE	# DWG



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REV.	DATE	DESCRIPTION	PAR/ÉVAL.	APP.	CLIENT
0	2018-05-14	ISSUED FOR CONSTRUCTION	M.S.	J.A.	
A	2018-05-11	ISSUED FOR COMMENTS	M.S.	J.A.	

REVISIONS

PERMIT TO PRACTICE  
TETRA TECH INDUSTRIES, INC.  
O/A TETRA TECH  
Signature: *J. Alarie*  
Date: *2018-08-14*  
PERMIT NUMBER: P 1029  
NTNU Association of Professional Engineers and Geoscientists

TITLE / TITRE  
AGNICO EAGLE - MELIADINE DIVISION  
554 - CRUSHER  
230 - GENERAL EARTH WORKS  
OP2 PAD AREA WITH ORE STOCKPILES  
SECTIONS AND DETAILS

DESSINÉ PAR DRAWN BY	MOURAD SENNAJ	DATE 2017-07-18
VÉRIFIÉ PAR CHECKED BY	MARCO MELLADO	2017-07-18
APPROUVÉ PAR APPROVED BY	JOSÉE ALARIE	2017-07-18

ÉCHELLE  
SCALE 1:2000 DATE 2017-07-19

NO. DESSIN  
DRAWING NO. 65-687-210-201

NO. PROJET PROJECT NO. 6515/28920	REVISION 0	FEMILLE / SHEET 1 / 1
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