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Memo

To:	Oliver Curran, VP Environmental Affairs	**Client:**	TMAC Resources Inc.
From:	Ryan Williams, Senior Consultant, PEng	**Project No:**	1CT022.055
Reviewed By:	Cameron Hore, Senior Consultant, PEng	**Date:**	April 1, 2020
Subject:	Hope Bay Project: Doris and Madrid 2019 Construction Summary Report		

1 Introduction

This memo provides a summary of formal documentation related to the engineering and construction support provided by SRK Consulting (Canada) Inc. (SRK) during 2019 for the following facilities at TMAC Resources Inc's Hope Bay site:

- Madrid South All-Weather Road (from 0 to 1 km);
- Madrid North Contact Water Pond (CWP);
- Madrid North Waste Rock Pile (WRP);
- Madrid North Portal Pad; and
- Naartok East Overburden Stockpile.

For all construction in 2019, SRK provided Issued for Construction (IFC) drawings and construction quality assurance (CQA) where necessary. High-density polyethylene (HDPE) liner installation was performed by A&A Technical Services. Earthworks were completed by Nuna Logistics Ltd. and as-built surveys were conducted by Sub-Arctic Surveys Ltd. SRK has produced the as-built drawings included in this memo based on the survey data provided by Sub-Arctic.

Construction rock for all the components described in this report was sourced from either Quarry 2 at Doris, Quarry D located at approximately kilometre 7 along the Doris-Windy Road, or from approved construction waste rock from the Naartok East Crown Pillar Recovery (CPR). Quarry 2 and Quarry D are both designated construction quarries. Geochemical characterization of this material has been completed (SRK 2007, SRK 2008, SRK 2017) and the material has been confirmed to be non potentially acid generating and non neutral metal leaching. Geochemical characterization of outcrop from within the Naartok East CPR boundaries indicate that arsenic content is low, suggesting that waste rock from Naartok East has a potentially low risk for neutral pH leaching and could be geochemically suitable as construction rock (SRK 2019).

2 Summary of Attachments

The attachments to this memo are organised into separate infrastructure items with sub-level attachments for different forms of documentation.

Of the infrastructure items constructed in 2019, only the Madrid North CWP and the Madrid North Portal Pads involved the installation of liner materials. The complete Madrid North CWP and Madrid North Portal Pad as-built construction reports are provided separately (SRK 2020a, SRK 2020b). The A&A Liner Installation Report for the Madrid North CWP and the Madrid North Portal Pads is provided in Attachment 2.3 and 4.2, respectively.

The contents of all attachments are summarized in Table 1.

Table 1: Contents of Attachments

Attachment		Infrastructure Item	Contents
1	1.1	Madrid South All-Weather Road (0 to 1 km)	Issued for Construction Drawings
	1.2		As-built Drawings
2	2.1	Madrid North CWP (1)	Issued for Construction Drawings
	2.2		As-built Drawings
	2.3		A&A Liner Installation Report
3	3.1	Madrid North WRP	Issued for Construction Drawings
	3.2		Interim As-built Drawings (2)
4	4.1	Madrid North Portal Pad (3)	As-built Drawings
	4.2		A&A Liner Installation Report
5	5.1	Naartok East Overburden Stockpile	Issued for Construction Drawings
	5.2		Interim As-built Drawings (4)
6	6.1	Naartok East Overburden Stockpile Expansion (5)	Issued for Construction Drawings

Notes:

1. The complete as-built report for the Madrid North CWP is provided separately (SRK 2020a).
2. Construction of the Madrid North WRP is on-going as part of operations. The interim as-built drawings reflect construction activities completed in 2019.
3. Under the current water licence, IFC drawings are not required for the construction of pads. However, during construction of the Madrid North Portal Pad, a field decision was made to line one area of the pad to provide contact water management to allow temporary stockpiling of waste rock. Further details of the field decision are provided in Section 3.4.
4. Construction of the Naartok East Overburden Stockpile is on-going as part of operations. The interim as-built drawings reflect construction activities completed in 2019.
5. IFC drawings for the expansion of the Naartok East Overburden Stockpile were submitted in December 2019. However, at the time of this report construction of the expansion had not commenced. Therefore, as-built drawings are provided for the construction of the original stockpile design.

3 Field Decisions and Design Changes

3.1 Madrid South All-Weather Road

As confirmed by the As-Built Drawings in Attachment 1.2, the Madrid South All-Weather Road was constructed in accordance with the IFC drawings. No design changes were made during construction.

3.2 Madrid North CWP

In general, the Madrid North CWP was built to the design lines, grades, and requirements as confirmed by the As-Built Drawings. Deviations from, and amendments to, the designs were generally completed to adapt the design to encountered field conditions. The main field decisions and design changes during construction of the CWP are summarized below. Further details are provided in the as-built construction summary report (SRK 2020a).

3.2.1 Overburden Excavation

During excavation of overburden to expose bedrock for the HDPE liner tie-in, a significant pocket of overburden material was encountered at the southern end of the CWP berm. This overburden pocket was found to be approximately 5 m deep. As a result, a decision was made in the field by TMAC and the SRK Site Engineer to backfill the excavated overburden pocket with ROQ and shift the liner tie-in point to higher ground upstream. Deeper than anticipated overburden was also encountered in the northern end of the CWP. Overburden was up to 4 m deep at its deepest. However, concrete plinths were able to be used and the liner to bedrock tie-in did not shift significantly from the original projected design.

These two deeper than anticipated overburden areas resulted in two main design deviations. Firstly, in the southern section, it resulted in the overburden excavation area being backfilled and moving the alignment of the liner tie-in further north into the CWP basin. Secondly in the northern section, it resulted in taller than anticipated concrete plinths. Both changes, while noteworthy, do not impact the overall design intent of the CWP.

3.2.2 Berm Alignment Modification

After filling in the southern overburden pocket with ROQ, a field decision was made by TMAC and the SRK Site Engineer to modify the CWP berm alignment. This was done in order to simplify the liner to bedrock tie-in. The modification involved adding a new berm, approximately 20 m long and perpendicular to the existing berm, at chainage 0+040. The liner then was tied into a bedrock outcrop to the northwest. This enabled the length of the liner to bedrock tie-in to be shortened and allowed the temporary access ramp (built into the excavation backfill area) to be used as part of the berm fill. The implications of the berm re-alignment meant that the CWP basin area, and therefore pond capacity, was slightly reduced. However, the reduction in storage area was minimal and most of the area that was cut-off by the new berm was above the full supply level (elev. 69.7 m). The as-built CWP storage capacity, with the berm alignment modification, exceeds the design storage capacity and therefore meets the design intent.

3.2.3 Concrete Plinths

The CWP design included an allowance for concrete plinths, if required, once the overburden was excavated and the bedrock exposed. Concrete plinths were designed to be a minimum of 0.3 m high, with a maximum height of 0.5 m.

During excavation of overburden, several overburden pockets were encountered, as well as many undulations in the bedrock. Some areas ended up having near vertical faces up to 2 m high. Except for the one large overburden pocket that was backfilled, concrete plinths were used to bridge across the excavated pockets and/ or bedrock undulations to facilitate a smooth liner tie-in. As a result, some of the concrete plinths were required to be constructed taller than the maximum design plinth height. Therefore, backfill was specified on both sides of the plinth for additional lateral support.

The GSE polylock embedment strip, as recommended in the original design to allow the liner to be welded to the top of concrete, was not available on site. Instead, the liner was bolted directly into the top of concrete using Sopramastic and a stainless-steel plate. This method achieves the design intent.

3.2.4 Berm Downstream Slope

After completion of earthworks and liner installation, the final CWP layout was surveyed by Sub-Arctic. SRK reviewed the as-built survey and identified that the downstream slopes were steeper than design slope of 2H:1V. These over-steepened slopes were also noted at various times during the ongoing QA checks on site. The outside as-built slopes were typically between 1.7H:1V to 1.9H:1V, but some sections were as steep as 1.65H:1V. SRK instructed TMAC to place additional fill or regrade the slopes to achieve the design slope of 2H:1V. Instead, TMAC requested SRK to complete a stability analysis to determine if the steeper than design slopes were stable in the current arrangement to meet the minimum required factors of safety.

SRK completed a stability analysis to assess the risk of geotechnical instability of the CWP berm in its as-built condition. The results of the analysis indicate that the berm is stable and meets minimum factors of safety (FoS), provided the overburden in the foundation remains frozen, or as a minimum, doesn't thaw beyond the average active layer thickness in this area (typically around 1 m). If the overburden completely thaws, the FoS may reduce below the criteria of 1.5 but this is not an indication that immediate failure is expected. Therefore, the risk of failure is low. Additionally, if a failure were to occur it would be slow and progressive rather than rapid, i.e. there would be enough warning provided adequate monitoring is in place.

SRK is therefore satisfied that the berm's downstream slope does not currently need to be regraded to meet a slope of 2H:1V. Further details of the analysis are provided in SRK (2020a).

3.3 Madrid North WRP

Based on the as-built survey data, the Madrid North WRP perimeter berm and access road was built according to design, though the WRP pad was constructed higher than originally intended. However, the pad still achieves the design intent of creating a graded base towards the CWP,

and therefore the increased height of the pad does not affect the design. TMAC operations were in regular communication with SRK during construction of the pad and SRK is satisfied that the constructed pad meets the design objectives.

SRK notes that based on the as-built survey, the toe of the WRP at its southern extent has exceeded the design toe location and is encroaching on the full supply level of the Madrid North CWP. SRK recommends that during freshet and summer months, the WRP toe be monitored to ensure the pond level in the CWP does not reach the toe of the WRP.

TMAC are currently free dumping the first bench of waste rock on the constructed WRP pad and are meeting the overall design slopes of 2.5H:1V based on the as-built survey. At the time of this report, the WRP sumps had not been constructed, though SRK understands TMAC is planning to construct the sumps prior to the 2020 freshet. SRK will continue to provide on-going construction support and will inspect the constructed WRP during the 2020 annual geotechnical inspection (typically scheduled for the months of July or August). The construction process and as-built drawings for the sumps will be reported in the 2020 after they are constructed.

3.4 Madrid North Portal Pad

The Madrid North Portal Pad was originally designed as a pad laydown area to support development of the Madrid North Portal. It was designed in accordance with other pads on site, consisting of a minimum 1 m (for thermal protection of permafrost) of geochemically suitable run-of-quarry (ROQ) or run-of-mine (ROM) rock.

During construction, TMAC decided that it would be preferable for underground trucks delivering waste from the portal development to temporarily place waste rock on the pad and instead allow larger haul trucks designed for surface operations to collect the waste and haul it to the waste rock pile. Based on this decision, the dedicated area of the portal pad where the transfers would occur required contact water management. A field decision was made to line one area of the pad with geomembrane to create a waste rock re-handling area that could manage potential contact water during daily operations.

SRK produced a design for the lined temporary waste storage area to facilitate construction in the field. The design included standard material specifications and thicknesses for transition and bedding material to protect the liner, as well as lined berms to create sufficient storage capacity for the maximum daily snowmelt. The lined cell area was graded to the northeast corner to create a sump area for collection of potential contact water. The size of the lined cell was designed to accommodate underground waste from the portal development for at least one day of operations.

The As-Built Drawings for the pad and lined cell are provided in Attachment 4.1. A&A's Liner Installation Report is also included in Attachment 4.2. Based on the as-built data, the lined cell area meets the design storage capacity and the design grade. Further construction details are provided in SRK (2020b).

3.5 Naartok Overburden Stockpile

As confirmed by the As-Built Drawings in Attachment 5.2, the Naartok East Overburden Stockpile was constructed in general accordance with the IFC drawings. No design changes were made during construction. Additional ROQ/ROM access roads were built within the footprint of the stockpile to facilitate haul truck access. This is considered an operational requirement and does not impact the design or function of the stockpile.

The as-built data (collected January 2020) indicates that the downstream slope of the stockpile is slightly steeper than the design slope of 5H:1V. However, TMAC are continuing to shape and re-grade the stockpile to meet the design grades.

In December 2019, TMAC requested SRK to evaluate expansion options for the overburden stockpile. SRK completed the design to expand the overburden stockpile height and footprint and IFC drawings were submitted in December 2019. At the time of receipt of as-built survey data (January 2020) TMAC had not commenced the stockpile expansion, therefore the as-built drawings only include comparison of as-built surfaces to the original stockpile design.

4 References

SRK Consulting (Canada) Inc., 2007. Geochemical Characterization of Quarry Materials, Doris-North Project, Hope Bay, Nunavut, Canada (Revised March 2007). Report Prepared for Miramar Hope Bay Ltd., April 2007.

SRK Consulting (Canada) Inc., 2008. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report Prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

SRK Consulting (Canada) Inc., 2017. Geochemical Characterization of Madrid-Boston Project Quarries Report, Hope Bay Project. Report Prepared for TMAC Resources Inc., 1CT022.013. November 2017.

SRK Consulting (Canada) Inc. 2019. Classification of Waste Rock in Support of Segregating Construction Rock from Naartok East Crown Pillar Recovery, Madrid North, Hope Bay Project. Report prepared for TMAC Resources Inc. Project No.: 1CT022.037. August 2019.

SRK Consulting (Canada) Inc., 2020a. Madrid North Contact Water Pond As-Built Report, Hope Bay Project. Report Prepared for TMAC Resources Inc., 1CT022.043. March 2020.

SRK Consulting (Canada) Inc., 2020b. Madrid North Portal Pad As-Built Report, Hope Bay Project. Memo Prepared for TMAC Resources Inc., 1CT022.051. April 2020.

Attachment 1 – Madrid South All-Weather Road (0 to 1 km)

Attachment 1.1 Madrid South All-Weather Road - IFC Drawings

Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada

ACTIVE DRAWING STATUS

DWG NUMBER	DRAWING TITLE	REVISION	DATE	STATUS
MSR-00	**Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada**	**0**	**Mar. 18, 2019**	**Issued for Construction**
MSR-01	**General Arrangement (with Orthophoto)**	**0**	**Mar. 18, 2019**	**Issued for Construction**
MSR-02	**General Arrangement**	**0**	**Mar. 18, 2019**	**Issued for Construction**
MSR-03	**Road Alignment Plan and Profile (1 of 5)**	**0**	**Mar. 18, 2019**	**Issued for Construction**
MSR-04	Road Alignment Plan and Profile (2 of 5)	A	Mar. 14, 2014	Issued For Discussion
MSR-05	Road Alignment Plan and Profile (3 of 5)	A	Mar. 14, 2014	Issued For Discussion
MSR-06	Road Alignment Plan and Profile (4 of 5)	A	Mar. 14, 2014	Issued For Discussion
MSR-07	Road Alignment Plan and Profile (5 of 5)	D	Mar. 14, 2014	Issued For Discussion
MSR-08	**Typical Road and Crossing Details**	**0**	**Mar. 18, 2019**	**Issued for Construction**
MSR-09	**Animal Crossings Plan and Sections**	**0**	**Mar. 18, 2019**	**Issued for Construction**
MSR-10	Crossing #1 - Bridge Option - Plan, Section and Detail (1 of 2)	A	Mar. 14, 2014	Discontinued (Removed)
MSR-11	Crossing #1 - Bridge Option - Plan, Section and Detail (2 of 2)	A	Mar. 14, 2014	Discontinued (Removed)
MSR-12	Crossing #1 - Arch Culvert Option	A	Mar. 14, 2014	Discontinued (Removed)
MSR-13	Crossing #2 - Arch Culvert	A	Mar. 14, 2014	Discontinued (Removed)
MSR-14	Typical Arch Culvert Plan and Profile (1 of 2)	A	Mar. 14, 2014	Discontinued (Removed)
MSR-15	Typical Arch Culvert Details (2 of 2)	A	Mar. 14, 2014	Discontinued (Removed)
MSR-16	Material List and Quantity Estimates	B	Aug. 5, 2014	Issued For Discussion
MSR-17	**Madrid North Waste Rock Access Road Plan and Profile**	**0**	**Mar. 18, 2019**	**Issued for Construction**
MSR-18	**Naartok East CPRT Access Road Plan and Profile**	**0**	**Mar. 18, 2019**	**Issued for Construction**

TMAC RESOURCES

Signed and Stamped Copies
2019/04/02

srk consulting

PROJECT NO: 1CT022.043
Revision 0
March 18, 2019
Drawing MSR-00

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 0.5m.
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. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).

MATERIALS LIST AND QUANTITIES ('NEAT LINE')

Run of Quarry or Run of Mine Material

- Madrid South AWR (0 to 1 km): 29,260m³
- Madrid North WRP Access Road: 4,030m³
- Naartok East CPRT Access Road: 3,220m³

**ROQ / ROM volumes reported are in-place quantities calculated to neat lines. No bulking / shrinking factors have been utilized in volume determination. Losses into the tundra are not accounted for.

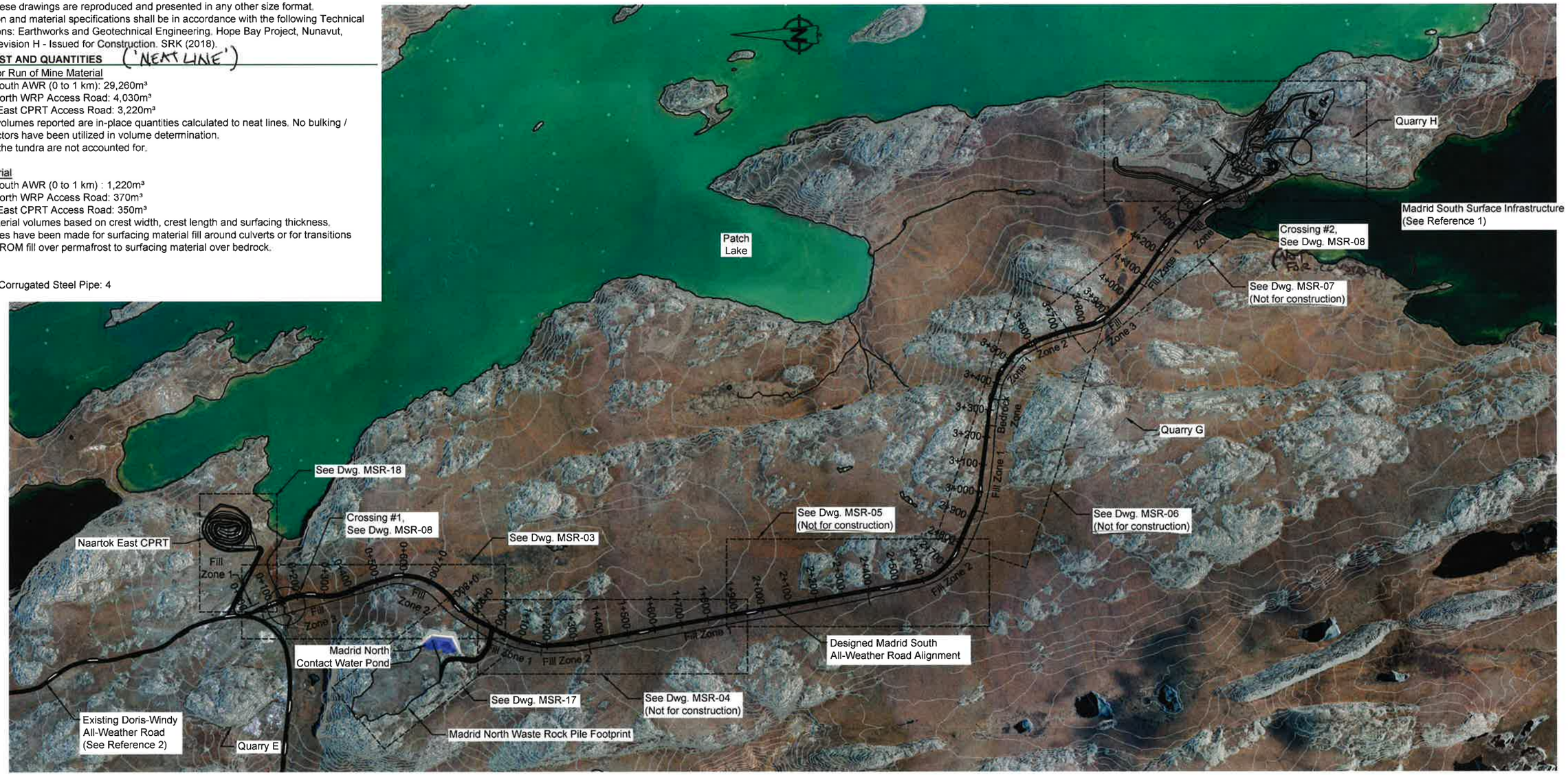
Surfacing Material

- Madrid South AWR (0 to 1 km) : 1,220m³
- Madrid North WRP Access Road: 370m³
- Naartok East CPRT Access Road: 350m³

**Surfacing Material volumes based on crest width, crest length and surfacing thickness. No allowances have been made for surfacing material fill around culverts or for transitions from ROQ / ROM fill over permafrost to surfacing material over bedrock.

Culverts

1.0m Diameter Corrugated Steel Pipe: 4



LEGEND

- Existing Approved and Permitted Quarry
- Proposed Development Quarry
- Road Alignment
- Route Centerline (1+000)

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2.0H:1V Side Slopes
Bedrock Zone	0.3m min Road Thickness (ROQ not required) with Side Slopes to be determined in the field

REFERENCES

1. Engineering drawings for the Madrid South Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Issued for Discussion. Revision F. Project No. 1CT022.001. October 31, 2014.
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. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd. 1CH008.000. August 2008.

0 100 200 300 400 500
Scale in Metres

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHKD	APP'D	DATE
0	Issued for Construction	RW	EMR	18Mar19
D	Issued for Discussion	RW	EMR	5Mar19
C	Minor Edits	LW	EMR	31Oct14
B	Issued for Discussion	LW	EMR	5Aug14
A	Issued for Discussion	JK	EMR	14Mar14

REVISIONS

J.B. KURYLO LICENSEE 2019/07/04 REGISTERED PROFESSIONAL ENGINEERS

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RW	NV/TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	March 18, 2019

FILE NAME: 1CT022.043 Madrid South_all weather road.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE: Madrid South All-Weather Access Road General Arrangement (with Orthophoto)

DRAWING NO.	SHEET	REVISION NO.
MSR-01	2 OF 18	0

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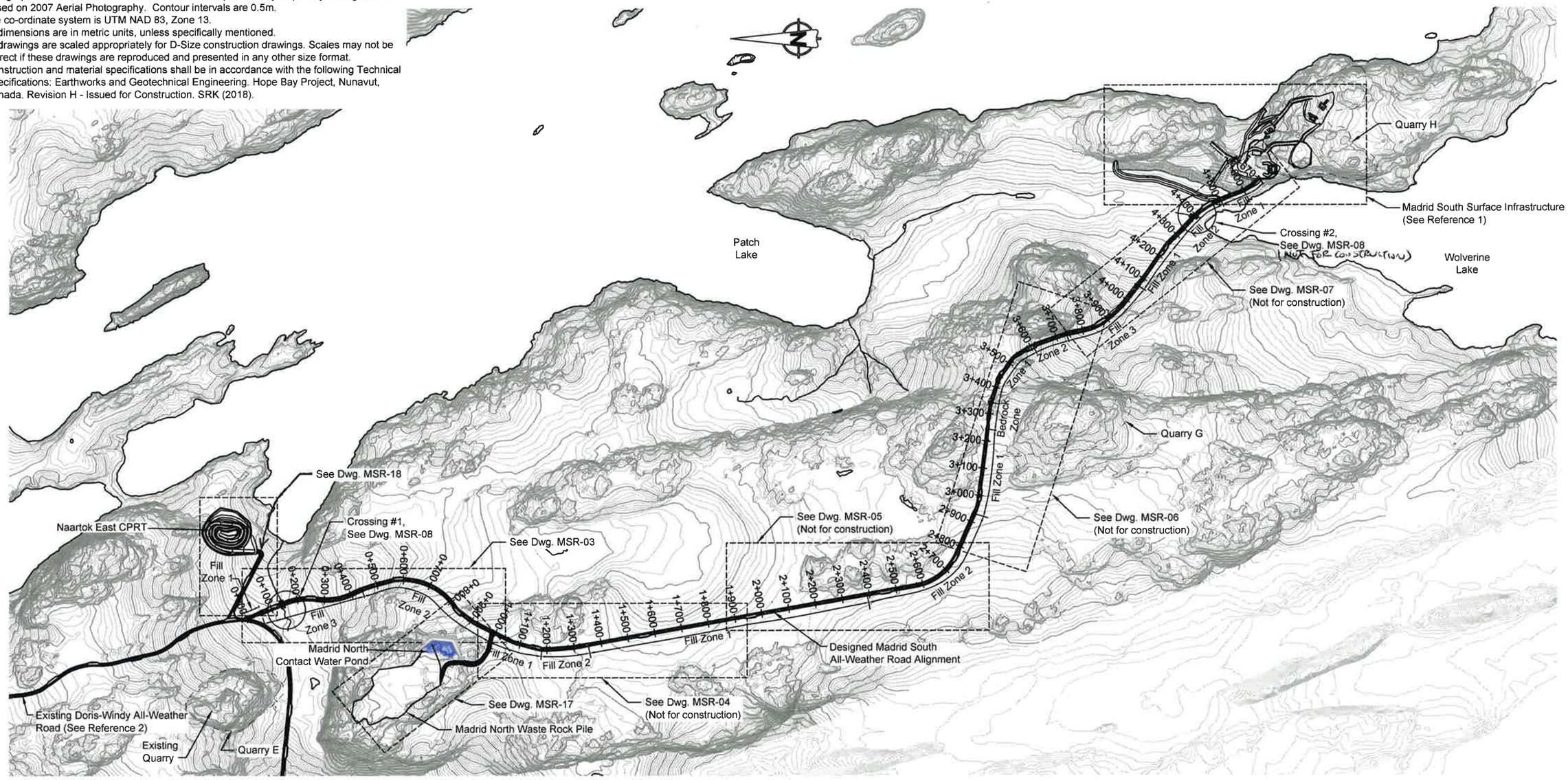
NOTES

1. Topographic contour data for the terrain model were provided by Hope Bay Mining, and is based on 2007 Aerial Photography. Contour intervals are 0.5m.
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. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).



LEGEND

- Existing Approved and Permitted Quarry
- Proposed Development Quarry
- Road Alignment
- Route Centerline (1+000)

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2.0H:1V Side Slopes
Bedrock Zone	0.3m min Road Thickness (ROQ not required) with Side Slopes to be determined in the field

REFERENCES

1. Engineering drawings for the Madrid South Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Issued for Discussion. Revision F. Project No. 1CT022.001. October 31, 2014.
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. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

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Scale in Metres

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	EMR	18Mar19
C	Issued for Discussion	RW	EMR	5Mar19
B	Minor Edits	LW	EMR	31Oct14
A	Issued for Discussion	JK	EMR	14Mar14

REVISIONS

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CHECKED:	APPROVED:	DATE:
RW	EMR	March 18, 2019

FILE NAME: 1CT022.043 Madrid South_all weather road.dwg

MAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE:
Madrid South All-Weather Access Road
General Arrangement

DRAWING NO.	SHEET	REVISION NO.
MSR-02	3 OF 18	0

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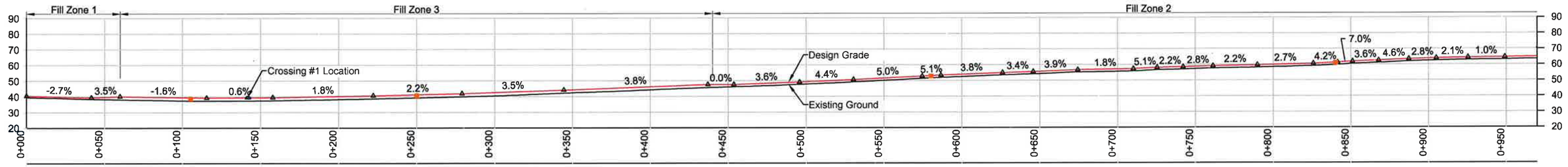
PROFILE LEGEND

- Point of Intersection
- 6.1% Grade
- Turnout Location; not to scale (See Drawing MSR-07 for Typical Layout)



PROFILE
DORIS - WINDY to MADRID NORTH

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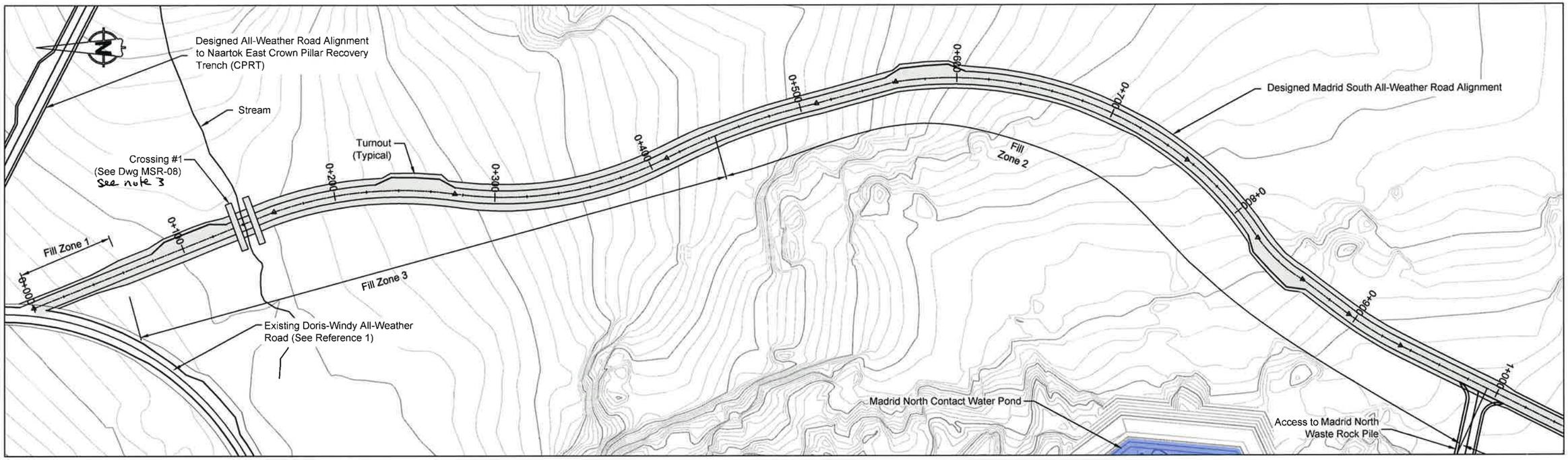
Scale in Metres



PLAN VIEW
DORIS - WINDY TO MADRID NORTH

0 10 20 30 40 50
Scale in Metres

LEGEND

- Point of Intersection
- Road Alignment
- 1+000 Route Centerline
- Crossing Location

NOTES

1. All dimensions in metres unless noted otherwise.
2. Notes in this drawing apply to all other active drawings.
3. Final crossing/culvert alignments to be field fit to best allow for flow conveyance

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2.0H:1V Side Slopes
Bedrock Zone	0.3m min Road Thickness (ROQ not required) with Side Slopes to be determined in the field

REFERENCES

1. 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.
2. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	EMR	18Mar19
E	Issued for Discussion	RW	EMR	5Mar19
D	Minor Edits	LW	EMR	31Oct14
C	Minor Edits	LW	EMR	12Sep14
B	Issued for Discussion	LW	EMR	5Aug14
A	Issued for Discussion	JK	EMR	14Mar14

REVISIONS

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CHECKED:	APPROVED:	DATE:
RW	EMR	March 18, 2019

FILE NAME: 1CT022.043 Madrid South_all weather road.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE: Road Alignment Plan and Profile (1 of 5)

DRAWING NO.	SHEET	REVISION NO.
MSR-03	4 OF 18	0

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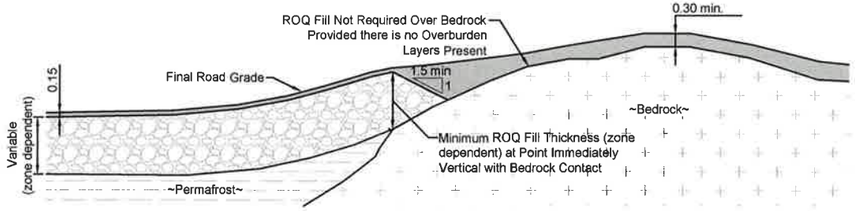
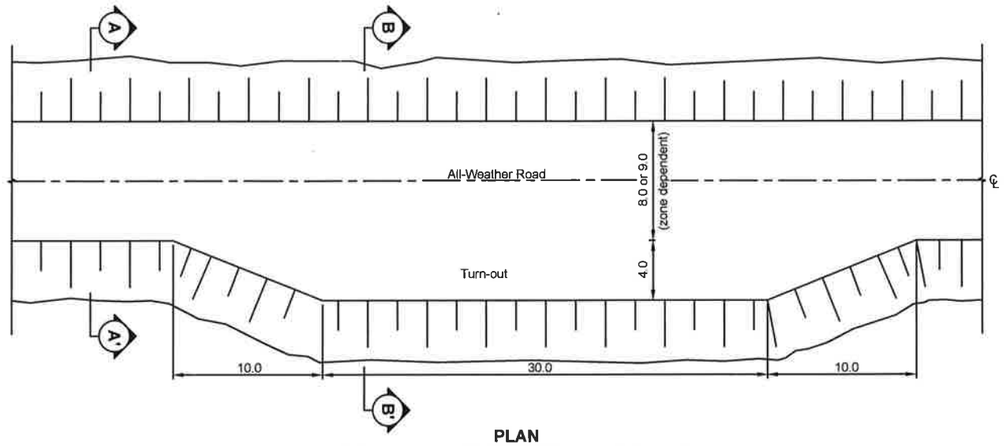


ALL-WEATHER ROAD PROFILE
TRANSITION FROM PERMAFROST TO BEDROCK

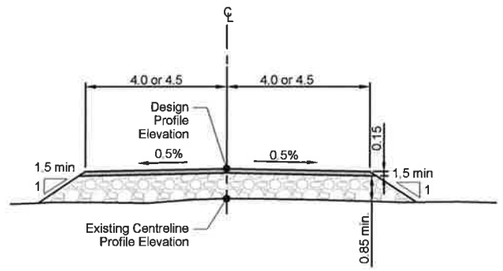
Scale in Metres 0 1 2 3 4 5



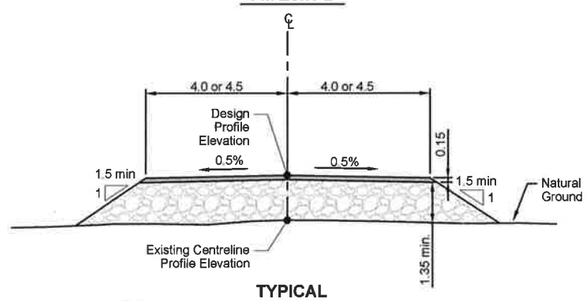
PLAN
TYPICAL ALL-WEATHER ROAD & TURNOUT

Scale in Metres 0 2 4 6 8 10

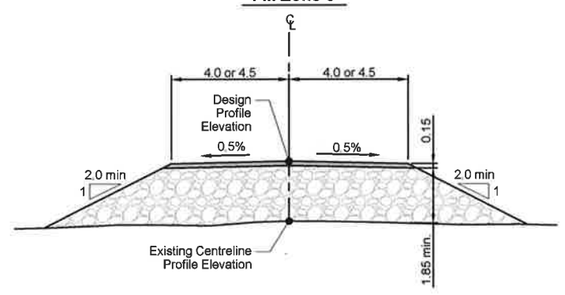
Fill Zone 1



Fill Zone 2

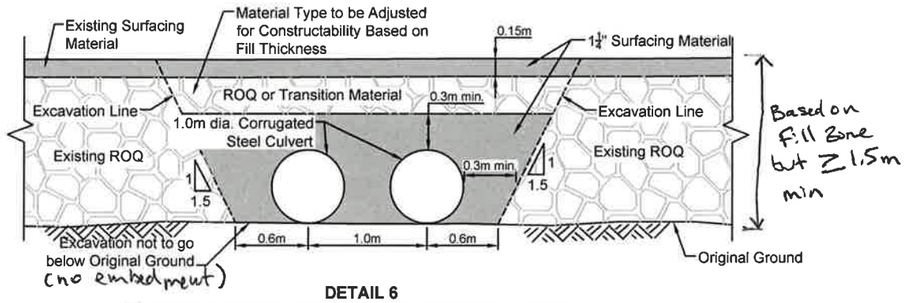


Fill Zone 3

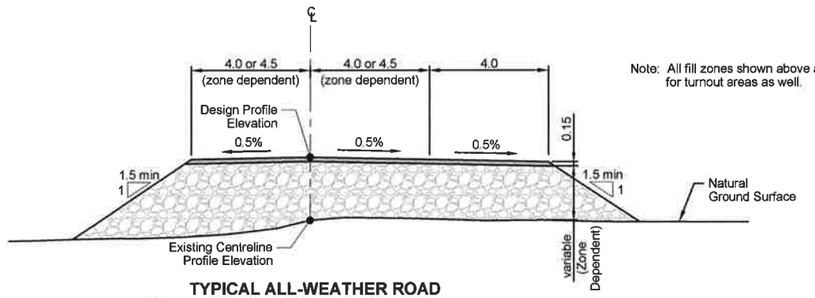


TYPICAL
A ALL-WEATHER ROAD SECTION

Scale in Metres 0 1 2 3 4 5



DETAIL 6
6 TYPICAL CROSS SECTION OF CULVERT CROSSING
NOT TO SCALE



Note: All fill zones shown above apply for turnout areas as well.

TYPICAL ALL-WEATHER ROAD WITH TURN-OUT SECTION
B

Scale in Metres 0 1 2 3 4 5

LEGEND

- Surfacing Material
- Run of Quarry Material

NOTES

1. All dimensions in metres unless noted otherwise.
2. Minimum design thickness must be maintained for all sections of the all-weather road including turnouts. See Drawings MSR-01 for fill zone chainage intervals.
3. Safety barriers expected to be required in any areas where fill thicknesses are ≥ 3m.

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

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	EMR	18Aug19
B	Issued for Discussion	LW	EMR	5Aug14
A	Issued for Discussion	JK	EMR	14Mar14

REVISIONS

PROFESSIONAL ENGINEERS STAMP

J.B. KURYLO
LICENCE
PROVINCE OF BRITISH COLUMBIA
REGISTERED PROFESSIONAL ENGINEER

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DESIGN:	DRAWN:	REVIEWED:
LW/RW	NV/TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	March 18, 2019

FILE NAME: 1CT022.043 Madrid South_plan_sections.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE: Typical Road and Crossing Details

DRAWING NO.	SHEET	REVISION NO.
MSR-08	9 OF 18	0

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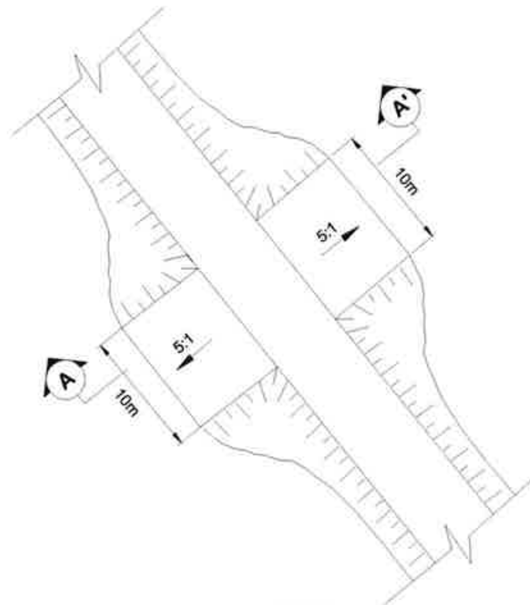
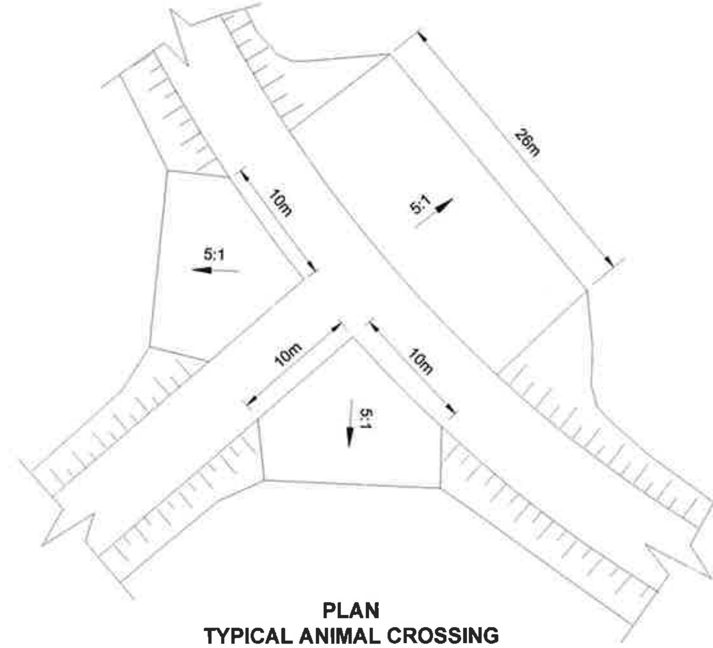
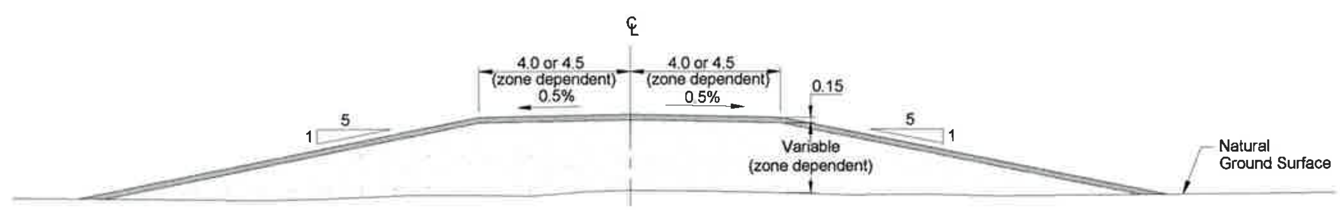


PLAN
TYPICAL ANIMAL CROSSING
NTS



PLAN
TYPICAL ANIMAL CROSSING
AT ROAD JUNCTION
NTS



SECTION
A **TYPICAL ANIMAL CROSSING**
0 1 2 3 4 5
Scale in Metres

LEGEND

- Surfacing Material
- Run of Quarry Material

NOTES

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.

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

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Discussion	RW	EMR	18Mar19
A	Issued for Discussion	JK	EMR	14Mar14
REVISIONS				

REGISTERED PROFESSIONAL ENGINEER
J.B. KURYLO
LICENSEE
2019/04/12

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CHECKED: RW	APPROVED: EMR	DATE: March 18, 2019

FILE NAME: 1CT022.043 Madrid South plan_sections.dwg

TMAC RESOURCES

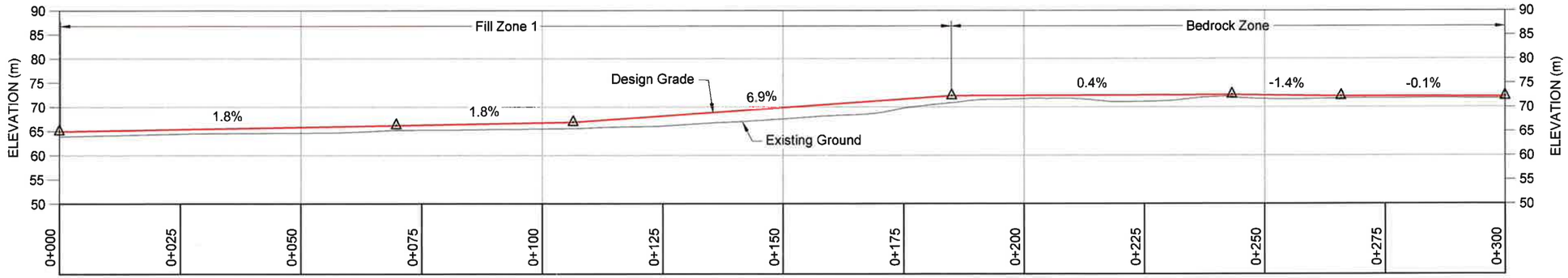
HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

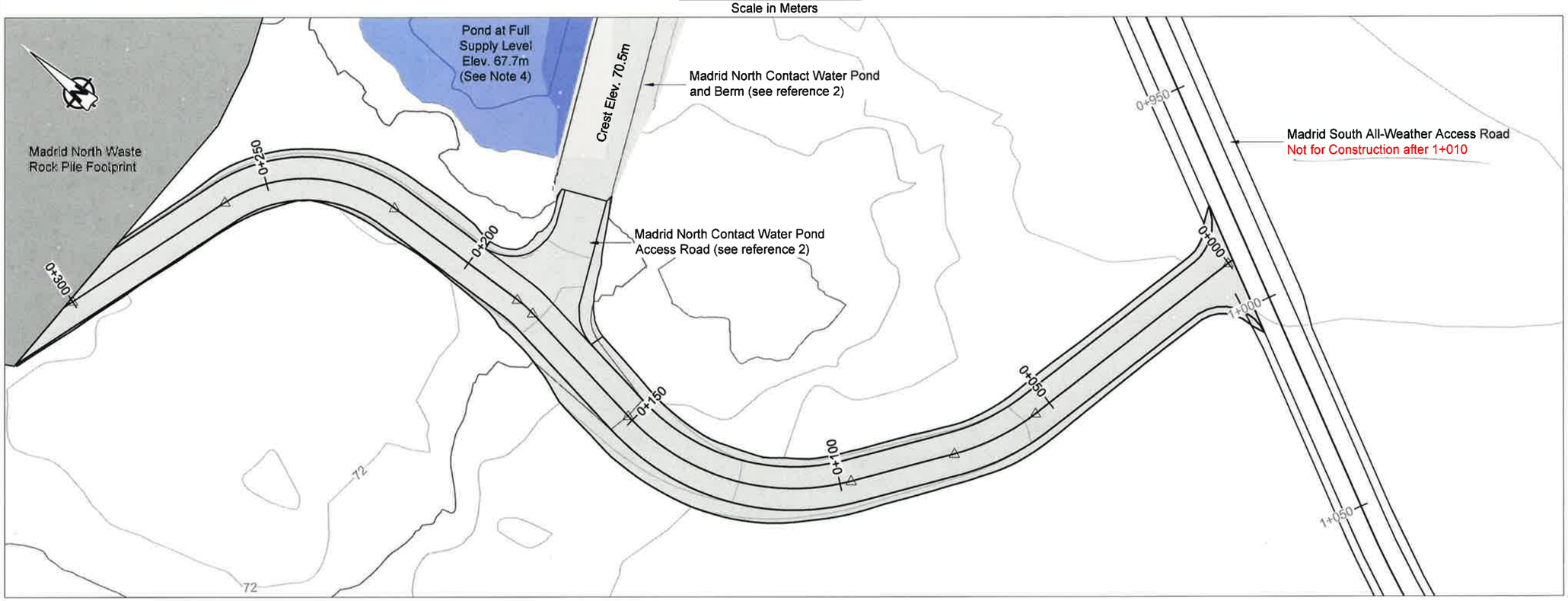
DRAWING TITLE:
Animal Crossings
Plan and Sections

DRAWING NO.	SHEET	REVISION NO.
MSR-09	10 OF 17	0



PROFILE
WASTE ROCK PILE ACCESS ROAD

0m 10 20 30 40
Scale in Meters



PLAN VIEW
WASTE ROCK PILE ACCESS ROAD

0m 10 20 30 40
Scale in Meters

LEGEND

- Point of Intersection
- Route Centerline
- Road Alignment

PROFILE LEGEND

- Point of Intersection
- 4.1% Grade

NOTES

1. Contours shown at 2.0m intervals.
2. All units shown in meters unless otherwise specified.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
4. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen day) residence time for water in the pond.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid North Contact Water pond, Hope Bay Project, Nunavut, Canada. Revision A. Issued for Discussion drawings prepared for TMAC Resources. Project number 1CT022.043. March 2019.

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2H:1V Side Slopes
Bedrock Zone	0.3m min. Road Thickness (ROQ not required) Side Slopes to be determined in the field

DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	EMR	18Mar19
A	Issued for Discussion	RW	EMR	5Mar19

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LICENSEE
2019/04/02
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CHECKED:	APPROVED:	DATE:
RW	EMR	March 18, 2019

FILE NAME: 1CT022.043 - AR-PP.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.036

Madrid South All-Weather Road

DRAWING TITLE:
Madrid North Waste Rock Pile Access Road Plan and Profile

DRAWING NO.	SHEET	REVISION NO.
MSR-17	17 OF 18	0

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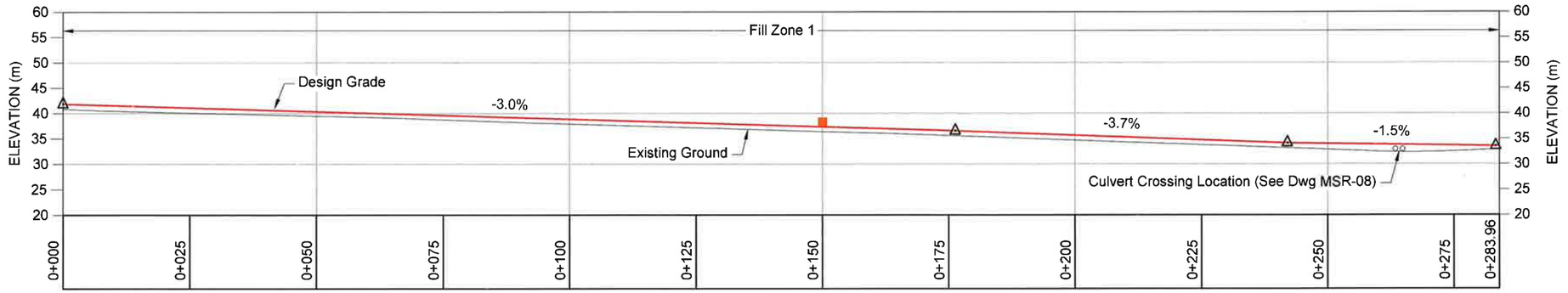
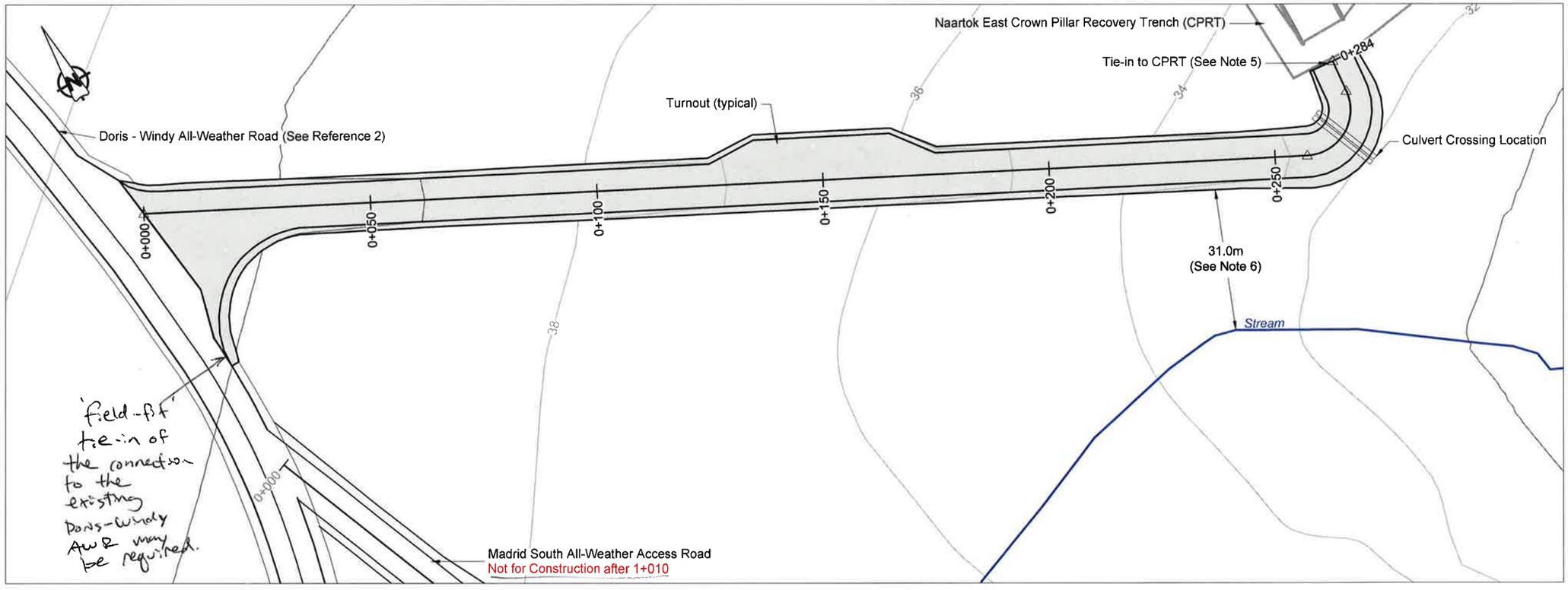


PROFILE
NAARTOK EAST CPRT ACCESS ROAD

0m 10 20 30 40
Scale in Meters



PLAN VIEW
NAARTOK EAST CPRT ACCESS ROAD

0m 10 20 30 40
Scale in Meters

LEGEND

- Point of Intersection
- Route Centerline
- Road Alignment
- Crossing Location

PROFILE LEGEND

- Point of Intersection
- 4.1% Grade
- Turnout Location; not to scale (See Drawing MSR-08 for Typical Layout)

NOTES

1. Contours shown at 2.0m intervals.
2. All units shown in meters unless otherwise specified.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction.
4. Naartok East CPRT design provided by TMAC Resources.
5. Access road tie-in to be optimized based on final CPRT design.
6. A minimum 31.0m setback from streams and shorelines is required.

REFERENCES

1. NAD83 UTM Zone 13.
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.

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2H:1V Side Slopes
Bedrock Zone	0.3m min. Road Thickness (ROQ not required) Side Slopes to be determined in the field

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	--	--	0	Issued for Construction	RW	EMR	16Mar19
--	--	--	--	--	--	--	A	Issued for Discussion	RW	EMR	5Mar19

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RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	March 18, 2019

FILE NAME: 1CT022.043 - AR-PP.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.036

Madrid South All-Weather Road

DRAWING TITLE:
Naartok East CPRT
Access Road Plan and Profile

DRAWING NO.	SHEET	REVISION NO.
MSR-18	18 OF 18	0

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Attachment 1.2 Madrid South All-Weather Road – As-built Drawings

Engineering Drawings for the Madrid South All-Weather Road (0 - 1km), Hope Bay Project, Nunavut, Canada

ACTIVE DRAWING STATUS

DWG NUMBER	DRAWING TITLE	REVISION	DATE	STATUS
MSR-00	Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada	AB1	Mar. 31, 2020	As-Built
MSR-01	General Arrangement (with Orthophoto)	AB1	Mar. 31, 2020	As-Built
MSR-02	General Arrangement	AB1	Mar. 31, 2020	As-Built
MSR-03	Road Alignment Plan and Profile (1 of 5)	AB1	Mar. 31, 2020	As-Built
MSR-04	Road Alignment Plan and Profile (2 of 5)	A	Mar. 14, 2014	Issued For Discussion
MSR-05	Road Alignment Plan and Profile (3 of 5)	A	Mar. 14, 2014	Issued For Discussion
MSR-06	Road Alignment Plan and Profile (4 of 5)	A	Mar. 14, 2014	Issued For Discussion
MSR-07	Road Alignment Plan and Profile (5 of 5)	D	Mar. 14, 2014	Issued For Discussion
MSR-08	Typical Road and Crossing Details	AB1	Mar. 31, 2020	As-Built
MSR-09	Animal Crossings Plan and Sections	AB1	Mar. 31, 2020	As-Built
MSR-10	Crossing #1 - Bridge Option - Plan, Section and Detail (1 of 2)	A	Mar. 14, 2014	Discontinued (Removed)
MSR-11	Crossing #1 - Bridge Option - Plan, Section and Detail (2 of 2)	A	Mar. 14, 2014	Discontinued (Removed)
MSR-12	Crossing #1 - Arch Culvert Option	A	Mar. 14, 2014	Discontinued (Removed)
MSR-13	Crossing #2 - Arch Culvert	A	Mar. 14, 2014	Discontinued (Removed)
MSR-14	Typical Arch Culvert Plan and Profile (1 of 2)	A	Mar. 14, 2014	Discontinued (Removed)
MSR-15	Typical Arch Culvert Details (2 of 2)	A	Mar. 14, 2014	Discontinued (Removed)
MSR-16	Material List and Quantity Estimates	B	Aug. 5, 2014	Discontinued (Removed)
MSR-17	Madrid North Waste Rock Access Road Plan and Profile	AB1	Mar. 31, 2020	As-Built
MSR-18	Naartok East CPRT Access Road Plan and Profile	AB1	Mar. 31, 2020	As-Built
MSR-19	Typical Road Fill Comparison Sections	AB1	Mar. 31, 2020	As-Built

REGISTERED PROFESSIONAL ENGINEER
R.C. WILLIAMS
LICENSEE
NT/NU

TMAC RESOURCES

srk consulting

Project No: 1CT022.055
March 31, 2020
Drawing MSR-00

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 0.5m.
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. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
6. Only the first kilometer of the Madrid South All-Weather Road was constructed in 2019.
7. Only the as-built information for the Madrid South All-Weather Road (AWR) from 0 to 1km are shown in this drawing package. The 2019 construction summary report should be consulted for the as-built information for the other areas at Madrid (See Reference 5).

MATERIALS LIST AND QUANTITIES (0-1km)

Run of Quarry or Run of Mine Material

- Madrid South AWR (0 to 1 km): 29,260m³
- Madrid South AWR (0 to 1 km): 26,420m³
- Madrid North WRP Access Road: 4,030m³
- Madrid North WRP Access Road: 3,320m³
- Naartok East CPRT Access Road: 3,220m³
- Naartok East CPRT Access Road: 5,640m³

**ROQ / ROM volumes reported are bulk quantities calculated to neat lines. No bulking / shrinking factors have been utilized in volume determination. Losses into the tundra are not accounted for

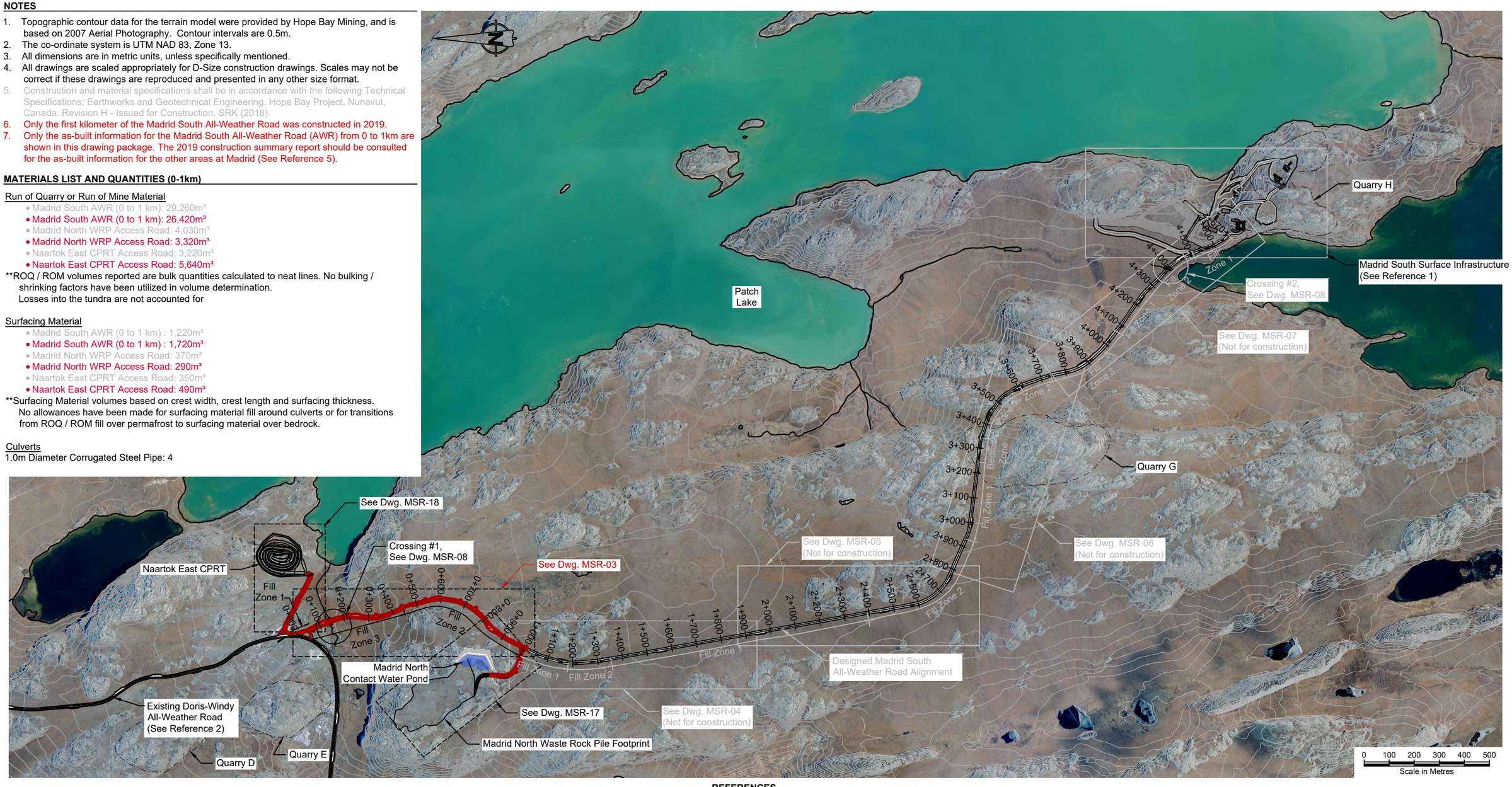
Surfacing Material

- Madrid South AWR (0 to 1 km) : 1,220m³
- Madrid South AWR (0 to 1 km) : 1,720m³
- Madrid North WRP Access Road: 370m³
- Madrid North WRP Access Road: 290m³
- Naartok East CPRT Access Road: 350m³
- Naartok East CPRT Access Road: 490m³

**Surfacing Material volumes based on crest width, crest length and surfacing thickness. No allowances have been made for surfacing material fill around culverts or for transitions from ROQ / ROM fill over permafrost to surfacing material over bedrock.

Culverts

1.0m Diameter Corrugated Steel Pipe: 4



LEGEND

- Existing Approved and Permitted Quarry
- Proposed Development Quarry
- Road Alignment
- Route Centerline (1+000)
- 2019 As-Constructed Infrastructure

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2.0H:1V Side Slopes
Bedrock Zone	0.3m min Road Thickness (ROQ not required) with Side Slopes to be determined in the field

REFERENCES

1. Engineering drawings for the Madrid South Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Issued for Discussion. Revision F. Project No. 1CT022.001. October 31, 2014.
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. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd. 1CH008.000. August 2008.
4. As-built data provided by Sub-Arctic Geomatics Ltd. File: 0527-MS+NAART RD AB.dwg. May 27,2019.
5. Doris and Madrid 2019 Construction Summary Report. Hope Bay Project. Memo prepared for TMAC Resources. Project Number 1CT022.055. April 2020

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REVISIONS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	31Mar20
0	Issued for Construction	RW	EMR	18Mar19
D	Issued for Discussion	RW	EMR	5Mar19
C	Minor Edits	LW	EMR	31Oct14
B	Issued for Discussion	LW	EMR	5Aug14
A	Issued for Discussion	JK	EMR	14Mar14

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srk consulting

DESIGN: RW	DRAWN: NV/TAH	REVIEWED: RW
CHECKED: RW	APPROVED: JBK	DATE: March 31, 2020

FILE NAME: 1CT022.043 Madrid South_all weather road.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE: Madrid South All-Weather Access Road General Arrangement (with Orthophoto)

DRAWING NO.	SHEET	REVISION NO.
MSR-01	2 OF 19	AB1

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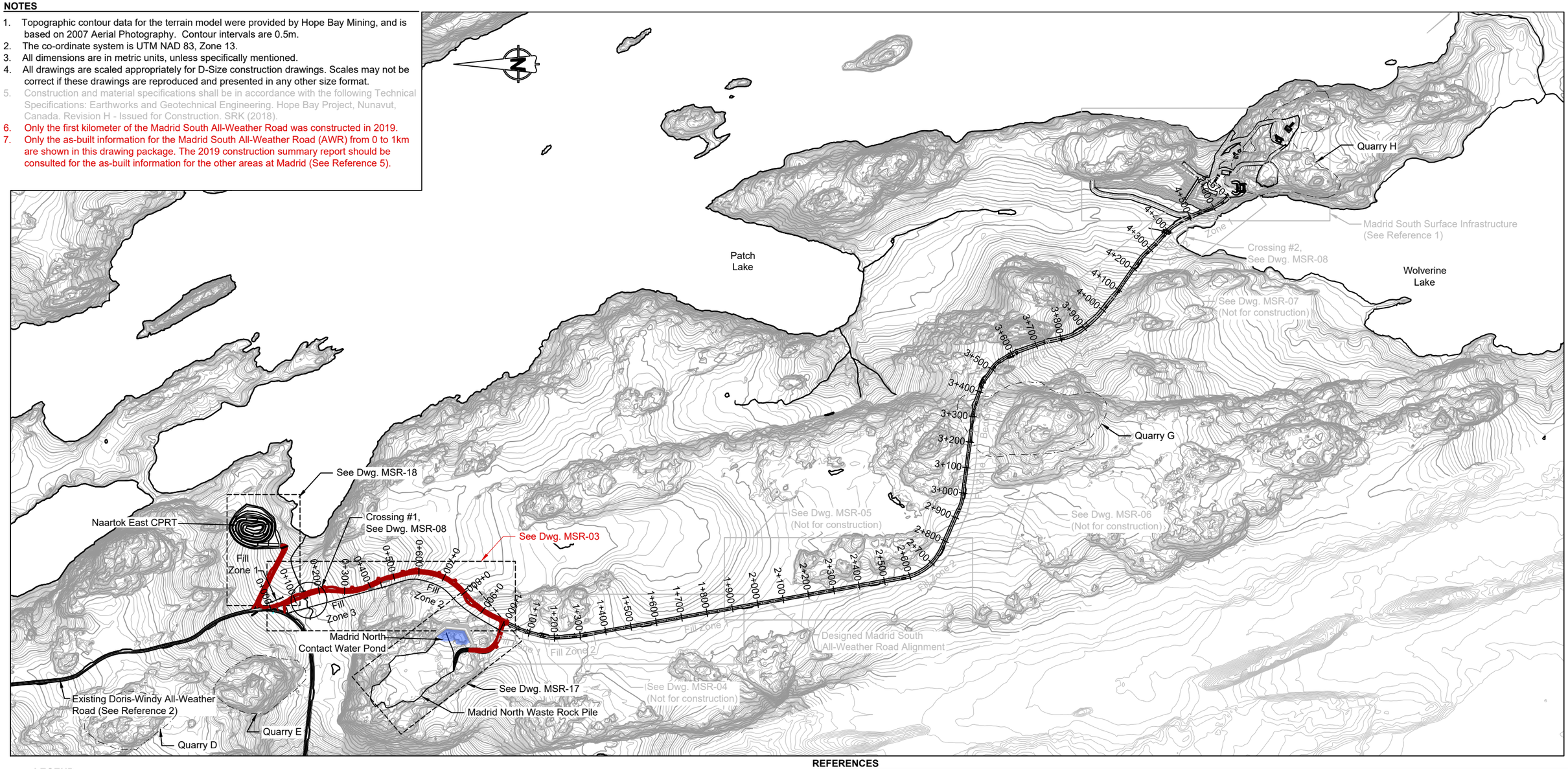
NOTES

1. Topographic contour data for the terrain model were provided by Hope Bay Mining, and is based on 2007 Aerial Photography. Contour intervals are 0.5m.
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. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
6. Only the first kilometer of the Madrid South All-Weather Road was constructed in 2019.
7. Only the as-built information for the Madrid South All-Weather Road (AWR) from 0 to 1km are shown in this drawing package. The 2019 construction summary report should be consulted for the as-built information for the other areas at Madrid (See Reference 5).



LEGEND

- Existing Approved and Permitted Quarry
- Proposed Development Quarry
- Road Alignment
- Route Centerline (1+000)
- 2019 As-Constructed Infrastructure

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2.0H:1V Side Slopes
Bedrock Zone	0.3m min Road Thickness (ROQ not required) with Side Slopes to be determined in the field

REFERENCES

1. Engineering drawings for the Madrid South Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Issued for Discussion. Revision F. Project No. 1CT022.001. October 31, 2014.
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. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
4. As-built data provided by Sub-Arctic Geomatics Ltd. File: 0527-MS+NAART RD AB.dwg. May 27, 2019.
5. Doris and Madrid 2019 Construction Summary Report. Hope Bay Project. Memo prepared for TMAC Resources. Project Number 1CT022.055. April 2020.

0 100 200 300 400 500
Scale in Metres

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REVISIONS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	31Mar20
0	Issued for Construction	RW	EMR	18Mar19
C	Issued for Discussion	RW	EMR	5Mar19
B	Minor Edits	LW	EMR	31Oct14
A	Issued for Discussion	JK	EMR	14Mar14

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DESIGN:	DRAWN:	REVIEWED:
JK/RW	NV/TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 31, 2020

FILE NAME: 1CT022.043 Madrid South_all weather road.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE: Madrid South All-Weather Access Road General Arrangement

DRAWING NO.	SHEET	REVISION NO.
MSR-02	3 OF 19	AB1

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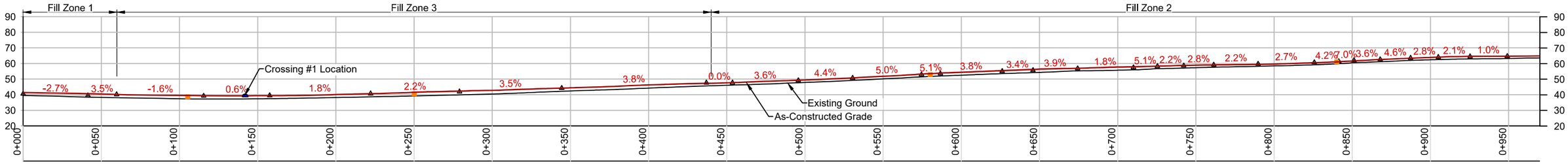
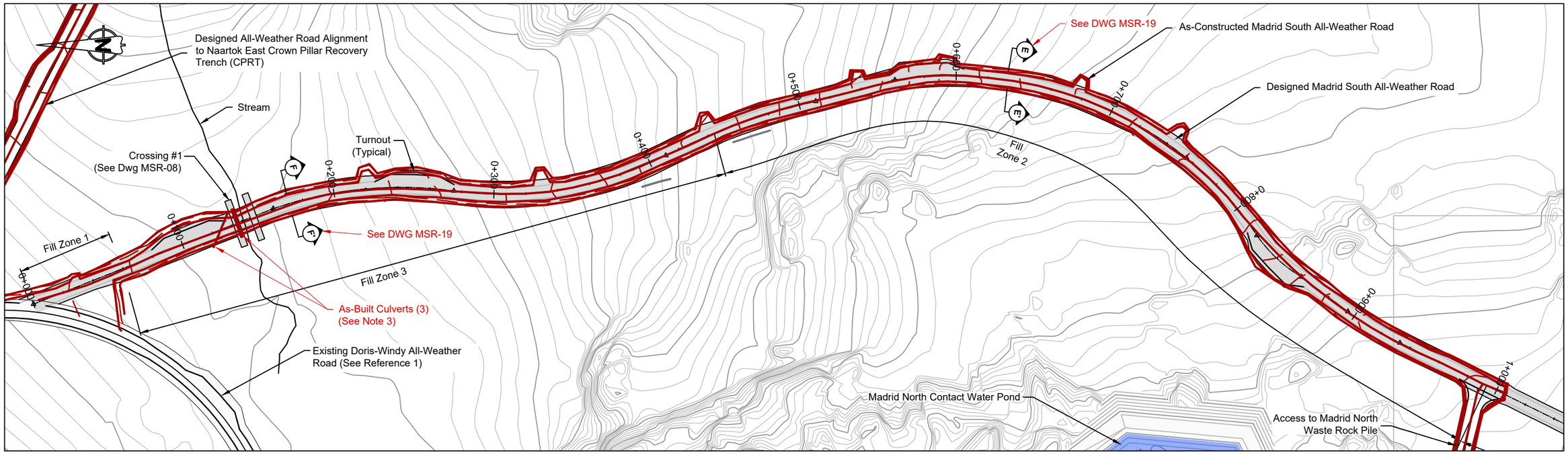


PROFILE
DORIS - WINDY to MADRID NORTH

0 10 20 30 40 50
Scale in Metres



PLAN VIEW
DORIS - WINDY TO MADRID NORTH

0 10 20 30 40 50
Scale in Metres

LEGEND

- Point of Intersection
- Road Alignment
- Route Centerline (0+000)
- Crossing Location
- 2019 As-Built Infrastructure

PROFILE LEGEND

- Point of Intersection
- Turnout Location; not to scale (See Drawing MSR-07 for Typical Layout)
- 6.1% Grade
- As-Constructed Top of Road

NOTES

1. All dimensions in metres unless noted otherwise.
2. Notes in this drawing apply to all other active drawings.
3. As-built culverts are 300 mm diameter corrugated steel culverts.

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2.0H:1V Side Slopes
Bedrock Zone	0.3m min Road Thickness (ROQ not required) with Side Slopes to be determined in the field

REFERENCES

1. 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.
2. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
3. As-built data provided by Sub-Arctic Geomatics Ltd. File: 0527-MS+NAART RD AB.dwg. May 27,2019.
4. As-built data provided by Sub-Arctic Geomatics Ltd. File: Madrid Culverts Enviro.dxf. March 11,2020

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	31Mar20
0	Issued for Construction	RW	EMR	18Mar19
E	Issued for Discussion	RW	EMR	5Mar19
D	Minor Edits	LW	EMR	31Oct14
C	Minor Edits	LW	EMR	12Sep14
B	Issued for Discussion	LW	EMR	5Aug14
A	Issued for Discussion	JK	EMR	14Mar14

REVISIONS

PROFESSIONAL ENGINEER'S STAMP
REGISTERED PROFESSIONAL ENGINEER R.C. WILLIAMS LICENSEE NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
JK/RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 31, 2020

FILE NAME: 1CT022.043 Madrid South_all weather road.dwg

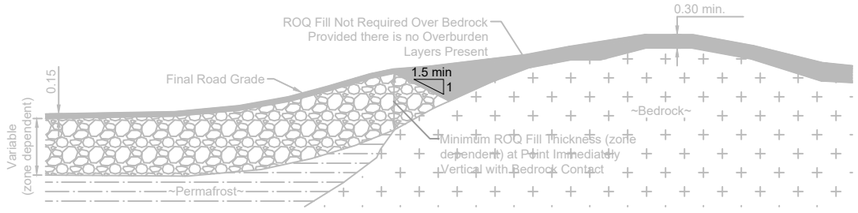
MAC RESOURCES
HOPE BAY PROJECT
SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE:
Road Alignment
Plan and Profile
(1 of 5)

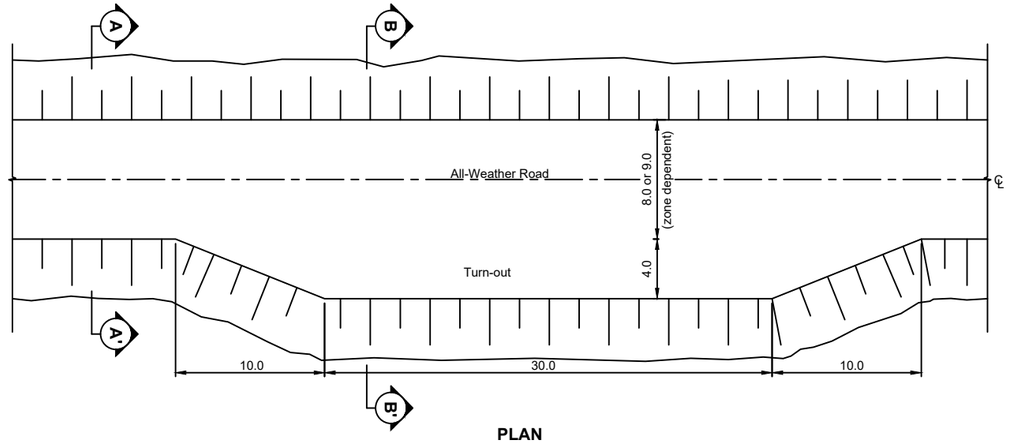
DRAWING NO.	SHEET	REVISION NO.
MSR-03	4 of 19	AB1

P:\Projects\01_SITES\Hope Bay\LACAD\As-Builts\Madrid Access Roads\Sta 0 to 1000\1CT022.043 Madrid South_all weather road.dwg



ALL-WEATHER ROAD PROFILE
TRANSITION FROM PERMAFROST TO BEDROCK

Scale in Metres: 0 1 2 3 4 5



PLAN
TYPICAL ALL-WEATHER ROAD & TURNOUT
CONSTRUCTED AS PER DESIGN

Scale in Metres: 0 2 4 6 8 10

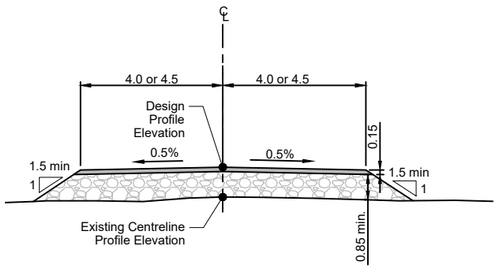
LEGEND

- Surfacing Material
- Run of Quarry Material

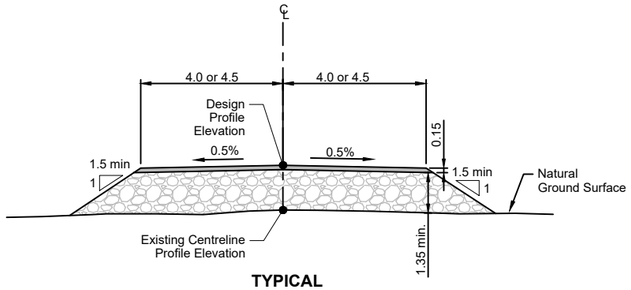
NOTES

1. All dimensions in metres unless noted otherwise.
2. Minimum design thickness must be maintained for all sections of the all-weather road including turnouts. See Drawings MSR-01 for fill zone chainage intervals.
3. As-built culverts are 300 mm diameter corrugated steel culverts. A total of three culverts were installed, and the third culver was installed on an angle to the road approximately 10m north of the two parallel culverts as shown in as-built Detail 6.
4. Road constructed as per design with the exception of some road segment not 'crowned' in the middle. See drawing MSR-19 for additional as-built details.
5. Location of the culverts are based on the as-built polylines provided by Sub-Arctic. As-built linework provided is assumed to be the culvert centerline. The 0.3m diameter culverts were projected from this survey line. Survey of bedding material was not provided.

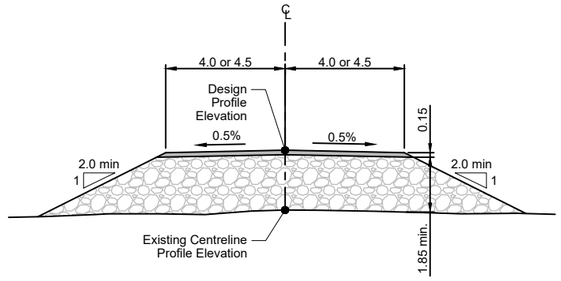
Fill Zone 1



Fill Zone 2

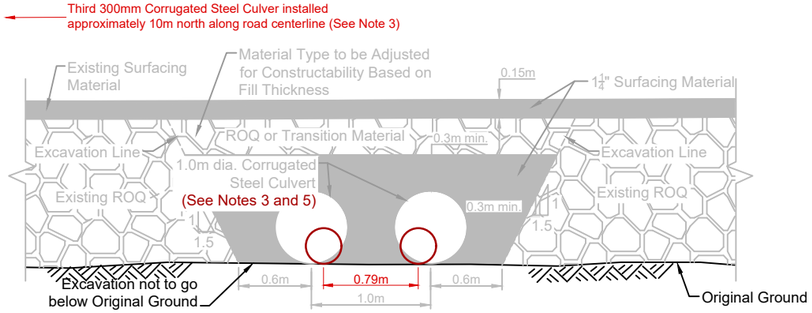


Fill Zone 3

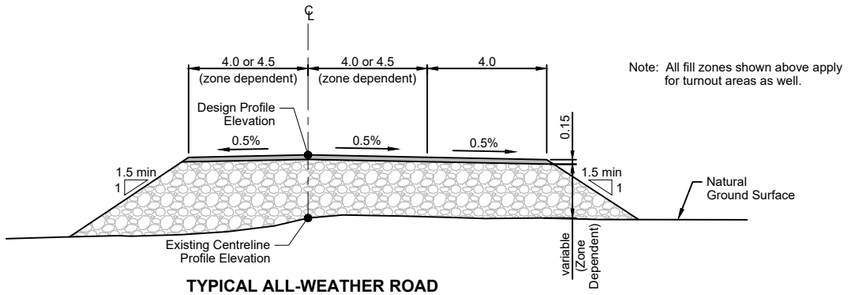


TYPICAL
A ALL-WEATHER ROAD SECTION
CONSTRUCTED AS PER DESIGN (SEE NOTE 4)

Scale in Metres: 0 1 2 3 4 5



DETAIL 6
6 TYPICAL CROSS SECTION OF CULVERT CROSSING
NOT TO SCALE



Note: All fill zones shown above apply for turnout areas as well.

TYPICAL ALL-WEATHER ROAD
WITH TURN-OUT SECTION
B
CONSTRUCTED AS PER DESIGN (SEE NOTE 4)

Scale in Metres: 0 1 2 3 4 5

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

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Constructed	RW	JBK	31Mar20
0	Issued for Construction	RW	EMR	18Aug19
B	Issued for Discussion	LW	EMR	5Aug14
A	Issued for Discussion	JK	EMR	14Mar14

REVISIONS

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER R.C. WILLIAMS LICENSEE NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
LW/RW	NV/TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 31, 2019

FILE NAME: 1CT022.043 Madrid South plan_sections.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE: Typical Road and Crossing Details

DRAWING NO.	SHEET	REVISION NO.
MSR-08	9 OF 19	AB1

P:\Projects\01_SITES\Hope Bay\ACAD\As-Builts\Madrid Access Roads\Sta 0 to 100\1CT022.043 Madrid South plan_sections.dwg

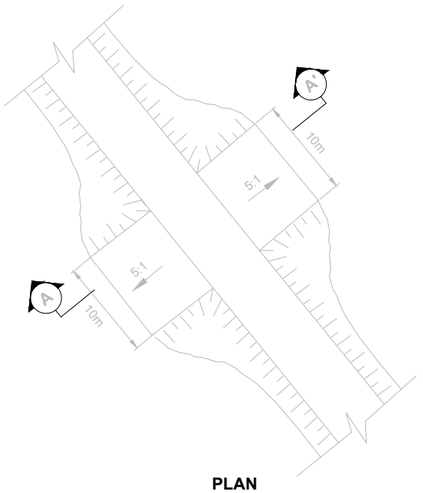
LEGEND

Surfacing Material

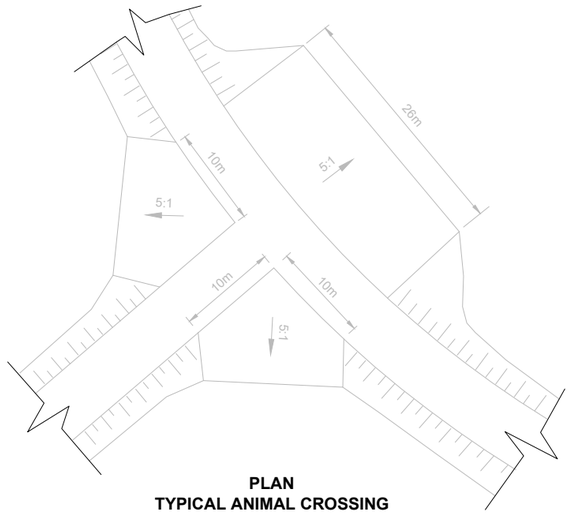
Run of Quarry Material

NOTES

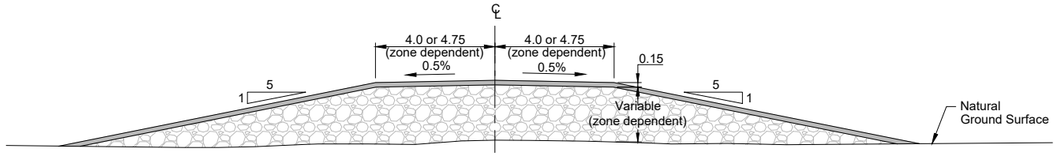
1. All dimensions in metres unless noted otherwise.
2. Locations for animal crossings will be identified by Land Owner and Elders once road construction is completed.



PLAN
TYPICAL ANIMAL CROSSING
NTS



PLAN
TYPICAL ANIMAL CROSSING
AT ROAD JUNCTION
NTS



SECTION
A TYPICAL ANIMAL CROSSING

NOT YET INSTALLED (AS OF DECEMBER 2019)

0 1 2 3 4 5
Scale in Metres

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	31Mar20
0	Issued for Discussion	RW	EMR	18Mar19
A	Issued for Discussion	JK	EMR	14Mar14

REVISIONS

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R.C. WILLIAMS LICENSEE NTNU

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DESIGN:	DRAWN:	REVIEWED:
LW/RW	NV	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 31, 2020

FILE NAME: 1CT022.043 Madrid South plan_sections.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE:
Animal Crossings
Plan and Sections

DRAWING NO.	SHEET	REVISION NO.
MSR-09	10 OF 19	AB1

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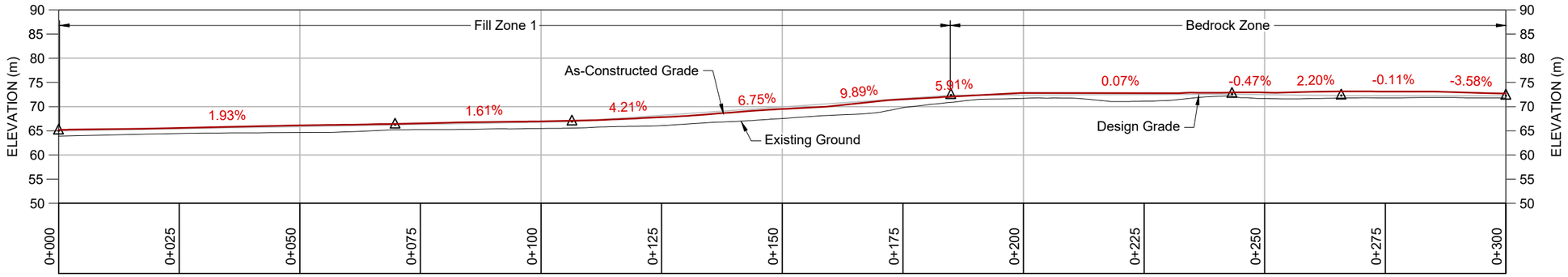
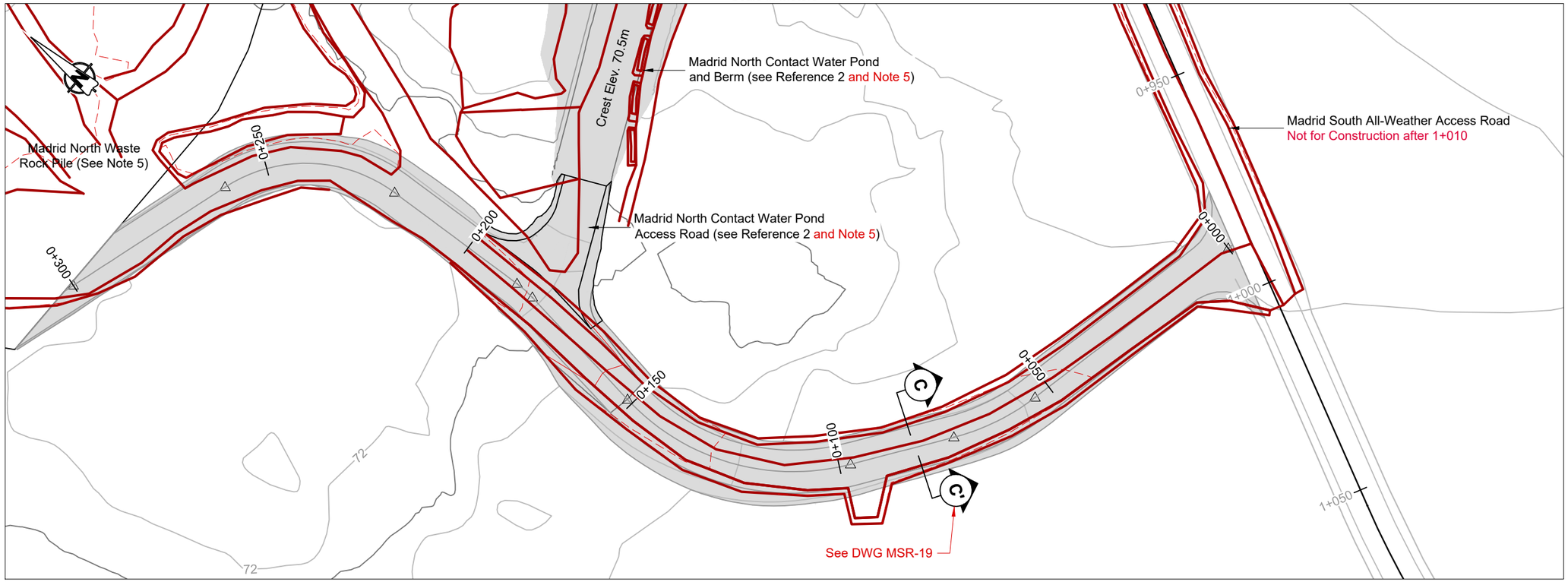


PROFILE
WASTE ROCK PILE ACCESS ROAD

0m 10 20 30 40
Scale in Meters



PLAN VIEW
WASTE ROCK PILE ACCESS ROAD

0m 10 20 30 40
Scale in Meters

LEGEND

- Point of Intersection
- Route Centerline
- Road Alignment
- 2019 As-Built Infrastructure

PROFILE LEGEND

- Point of Intersection
- 4.1% Grade

NOTES

1. Contours shown at 2.0m intervals.
2. All units shown in meters unless otherwise specified.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
4. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen day) residence time for water in the pond.
5. Only the as-built information for the Madrid South All-Weather Road (AWR) from 0 - 1km are shown in this drawing package. The 2019 construction summary report should be consulted for the as-built information for the other areas at Madrid (See Reference 4).

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid North Contact Water pond, Hope Bay Project, Nunavut, Canada. Revision A. Issued for Discussion drawings prepared for TMAC Resources. Project number 1CT022.043. March 2019.
3. As-built data provided by Sub-Arctic Geomatics Ltd. File: 0527-MS+NAART RD AB.dwg. May 27,2019.
4. Doris and Madrid 2019 Construction Summary Report. Memo prepared for TMAC Resources. Project Number 1CT022.055. April 2020.

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2H:1V Side Slopes
Bedrock Zone	0.3m min. Road Thickness (ROQ not required) Side Slopes to be determined in the field

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	--	--	AB1	As-Built	RW	JBK	31Mar20
							0	Issued for Construction	RW	EMR	18Mar19
							A	Issued for Discussion	RW	EMR	5Mar19

PROFESSIONAL ENGINEERS STAMP

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DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 3, 2020

FILE NAME: 1CT022.043 - AR-PP.dwg

TMAC RESOURCES

HOPE BAY PROJECT

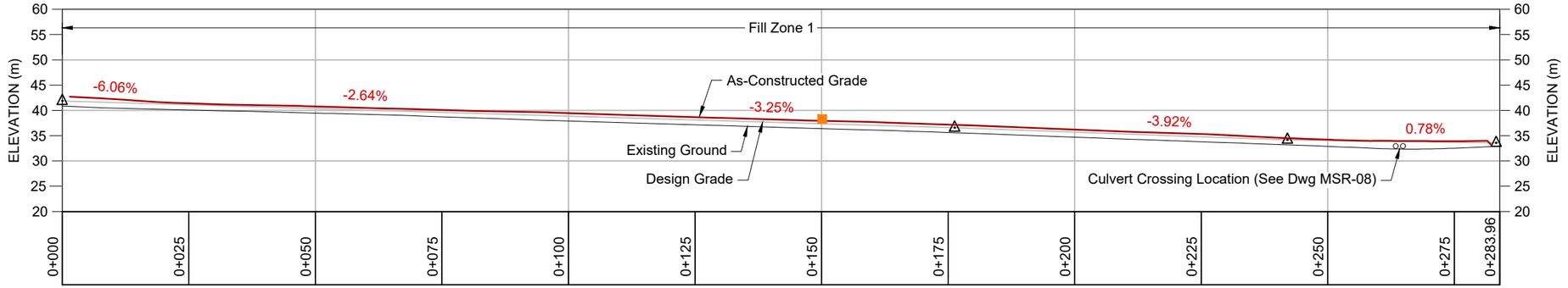
SRK JOB NO.: 1CT022.036

Madrid South All-Weather Road

DRAWING TITLE:
Madrid North Waste Rock Pile Access Road Plan and Profile

DRAWING NO.	SHEET	REVISION NO.
MSR-17	17 OF 19	AB1

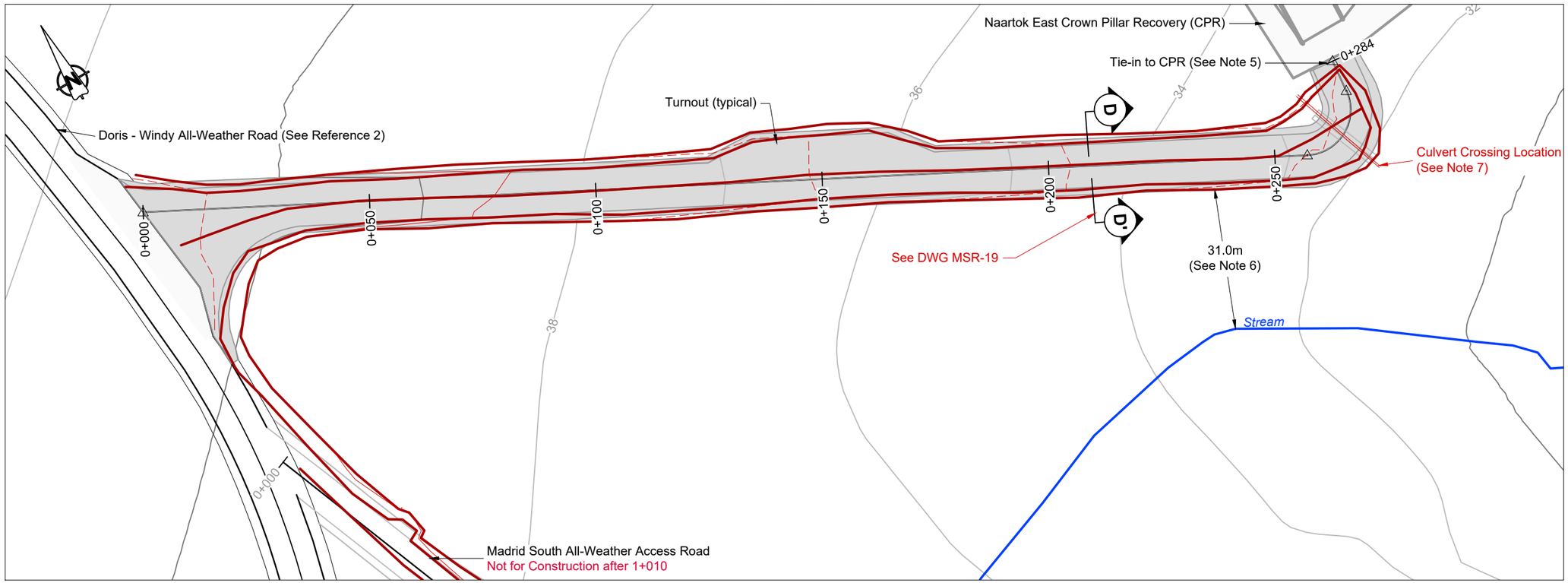
P:\Projects\01_SITES\Hope Bay\ACAD\As-Builts\Madrid Access Roads\Sta 0 to 1000\1CT022.043 - AR-PP.dwg



PROFILE
NAARTOK EAST CPRT ACCESS ROAD

0m 10 20 30 40

Scale in Meters



PLAN VIEW
NAARTOK EAST CPRT ACCESS ROAD

0m 10 20 30 40

Scale in Meters

LEGEND

- Point of Intersection
- Route Centerline
- Road Alignment
- 2019 As-Built Infrastructure

PROFILE LEGEND

- Point of Intersection
- 4.1% Grade
- Turnout Location; not to scale (See Drawing MSR-08 for Typical Layout)

NOTES

1. Contours shown at 2.0m intervals.
2. All units shown in meters unless otherwise specified.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction.
4. Naartok East CPRT design provided by TMAC Resources.
5. Access road tie-in to be optimized based on final CPRT design.
6. A minimum 31.0m setback from streams and shorelines is required.
7. As-built culverts are 300 mm diameter corrugated steel culverts.

REFERENCES

1. NAD83 UTM Zone 13.
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. As-built data provided by Sub-Arctic Geomatics Ltd. File: 0527-MS+NAART RD AB.dwg. May 27, 2019.
4. As-built data provided by Sub-Arctic Geomatics Ltd. File: Madrid Culverts Enviro.dxf. March 11,2020

ROAD CONSTRUCTION ZONES TABLE:

Fill Zone 1	1.0m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 2	1.5m min. Overall Road Thickness with 1.5H:1V Side Slopes
Fill Zone 3	2.0m min. Overall Road Thickness with 2H:1V Side Slopes
Bedrock Zone	0.3m min. Road Thickness (ROQ not required) Side Slopes to be determined in the field

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	--	--	AB1	AsBuilt	RW	JBK	31Mar20
							0	Issued for Construction	RW	EMR	18Mar19
							A	Issued for Discussion	RW	EMR	5Mar19

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DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 31, 2020

FILE NAME: 1CT022.043 - AR-PP.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.036

Madrid South All-Weather Road

DRAWING TITLE:
Naartok East CPRT
Access Road Plan and Profile

DRAWING NO.	SHEET	REVISION NO.
MSR-18	18 OF 19	AB1

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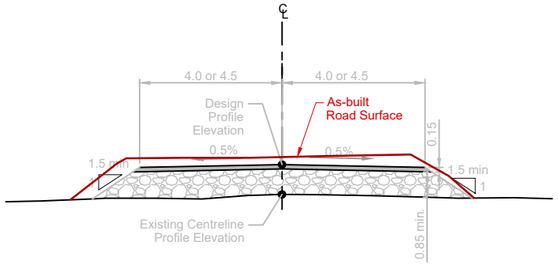
LEGEND

- Surfacing Material
- Run of Quarry Material
- 2019 As-Built Infrastructure

NOTES

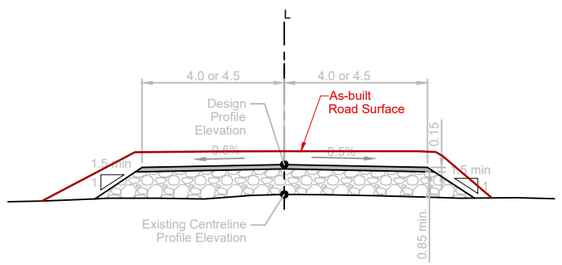
1. All dimensions in metres unless noted otherwise.
2. Minimum design thickness must be maintained for all sections of the all-weather road including turnouts. See Drawings MSR-01 for fill zone chainage intervals.



C TYPICAL ROAD FIII - Zone 1

See MSR-17 for section location

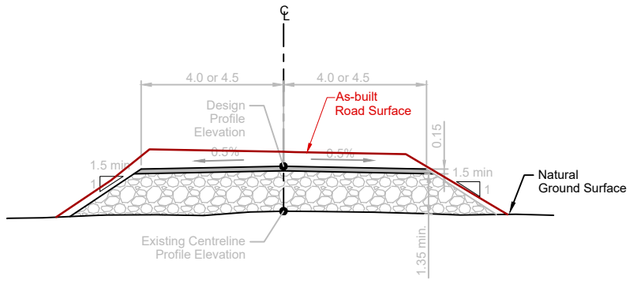
0 1 2 3 4 5
Scale in Metres



D TYPICAL ROAD FIII - Zone 1

See MSR-18 for section location

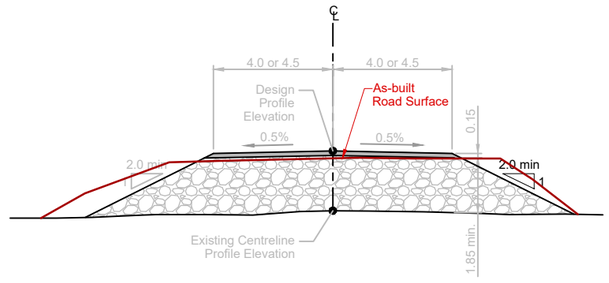
0 1 2 3 4 5
Scale in Metres



E ROAD FIII - Zone 2

See MSR-03 for section location

0 1 2 3 4 5
Scale in Metres



F TYPICAL ROAD FIII - Zone 3

See MSR-03 for section location

0 1 2 3 4 5
Scale in Metres

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DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	31Mar30

REVISIONS

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER R.C. WILLIAMS LICENSEE NTNU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
LW/RW	NV/TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 31, 2020

FILE NAME: 1CT022.043 Madrid South plan_sections.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

DRAWING TITLE: Typical Road Fill Comparison

DRAWING NO.	SHEET	REVISION NO.
MSR-19	19 OF 19	AB1

Attachment 2 – Madrid North Contact Water Pond

Attachment 2.1 Madrid North Contact Water Pond – IFC Drawings

Engineering Drawings for the Madrid North Contact Water Pond

Hope Bay Project, Nunavut, Canada

Active Drawing Status

Drawing Number	Drawing Title	Issue	Date	Revision
MN-CWP-01	General Arrangement (With Orthophoto)	Issued for Construction	March 19, 2019	0
MN-CWP-02	General Arrangement	Issued for Construction	March 19, 2019	0
MN-CWP-03	Contact Water Pond Anticipated Foundation Conditions Plan and Profile	Issued for Construction	March 19, 2019	0
MN-CWP-04	Contact Water Pond Plan and Profile	Issued for Construction	March 19, 2019	0
MN-CWP-05	Contact Water Pond Typical Sections	Issued for Construction	March 19, 2019	0
MN-CWP-06	Contact Water Pond Typical Details	Issued for Construction	March 19, 2019	0
MN-CWP-07	Liner Tie-in Typical Details	Issued for Construction	March 19, 2019	0

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Signed and stamped copies
2019/04/02

srk consulting

Project Number: 1CT022.043

P:\01_SITES\Hope Bay\JACAD\IFC\Madrid North CWP\1CT022.043 - Cover.dwg

LEGEND

- Proposed Road
- Proposed Contact Water Pond

NOTES

1. Contours shown at 2.0m intervals.
2. All units shown in meters unless otherwise specified.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
4. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen day) residence time for water in the pond.
5. Imagery provided by client.

REFERENCES

1. NAD83 UTM Zone 13.
2. Details found in "Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada". Revision E Issued for Discussion drawings prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

0m 100 200 300 400

DRAWING NO.	DRAWING TITLE
--	--

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	A	Issued for Discussion	RW	EMR	19/03/05
					0	Issued for Construction	RW	EMR	19/03/19

REVISIONS

J.B. KURYLO
LICENSEE
2019/04/02

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PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN: RW	DRAWN: TAH	REVIEWED: RW
CHECKED: RW	APPROVED: EMR	DATE: March 19, 2019

FILE NAME: 1CT022.043 - GA.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: General Arrangement (With Orthophoto)

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-01	1 OF 7	0

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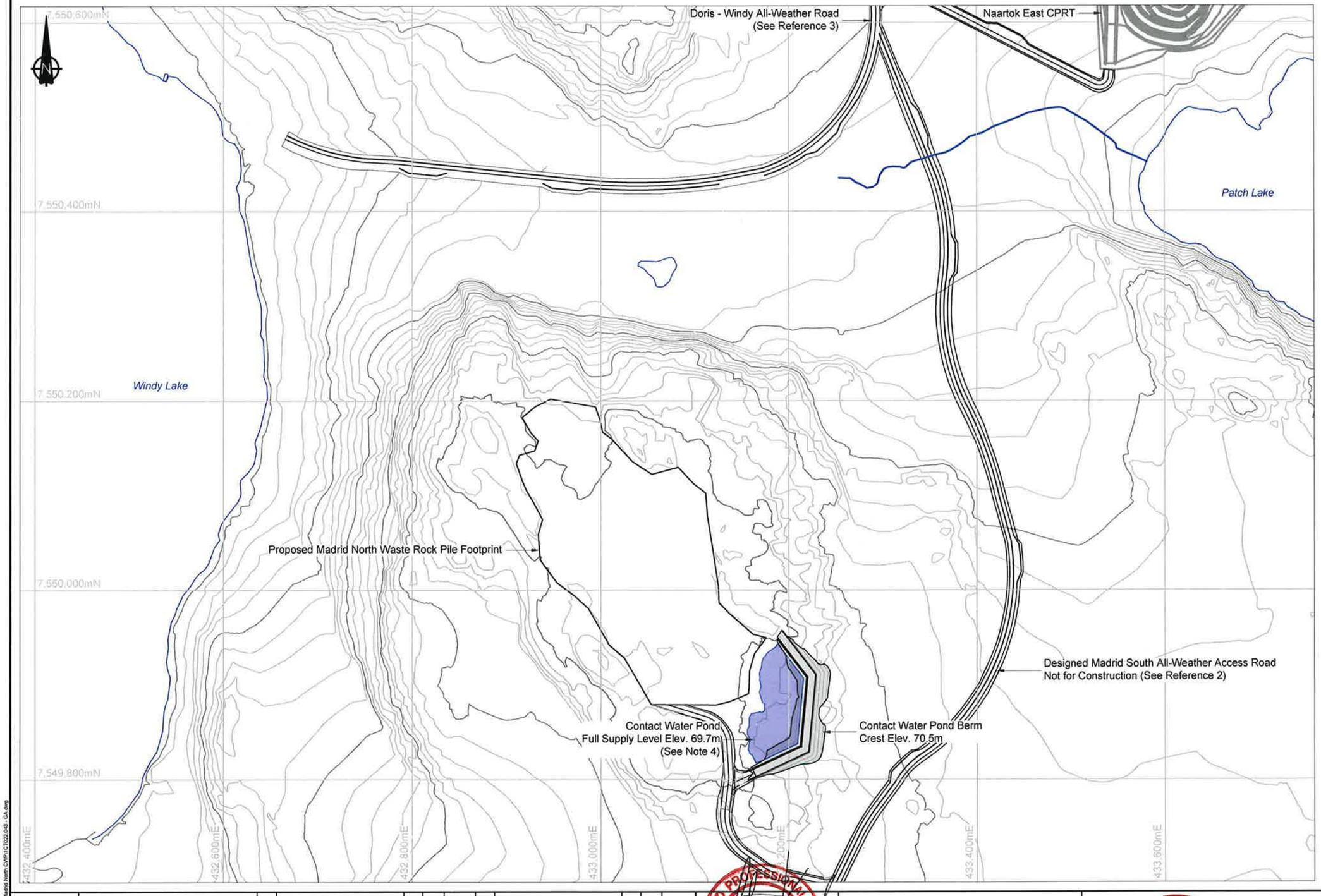

LEGEND

- Proposed Road
- Proposed Contact Water Pond

NOTES

1. Contours shown at 2.0m intervals.
2. All units shown in meters unless otherwise specified.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018)
4. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.

REFERENCES

1. NAD83 UTM Zone 13.
2. Details found in "Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada". Revision E Issued for Discussion drawings prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

MATERIAL LIST AND QUANTITIES

Overburden Excavation: 250m³
ROQ / ROM Material: 13,450m³
Transition Material: 1,705m³
Bedding Material: 450m³
Surfacing Material: 2,80m³
HDPE Geomembrane Liner: 2,005m²
Non-woven Geotextile: 2,005m²

*All volumes reported are calculated to neat lines. No bulking / shrinking factors have been utilized in volume determination.
Losses into the Tundra are not accounted for.

0m 100 200 300 400

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE
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REVISIONS

NO.	DESCRIPTION	CHKD	APPD	DATE
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A	Issued for Discussion	RW	EMR	19/03/05
0	Issued for Construction	RW	EMR	19/03/19

REGISTERED PROFESSIONAL ENGINEER
J.B. KURYLO
LICENSEE
PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	March 19, 2019

FILE NAME: 1CT022.043 - GA.dwg

TMAC RESOURCES

Hope Bay Project

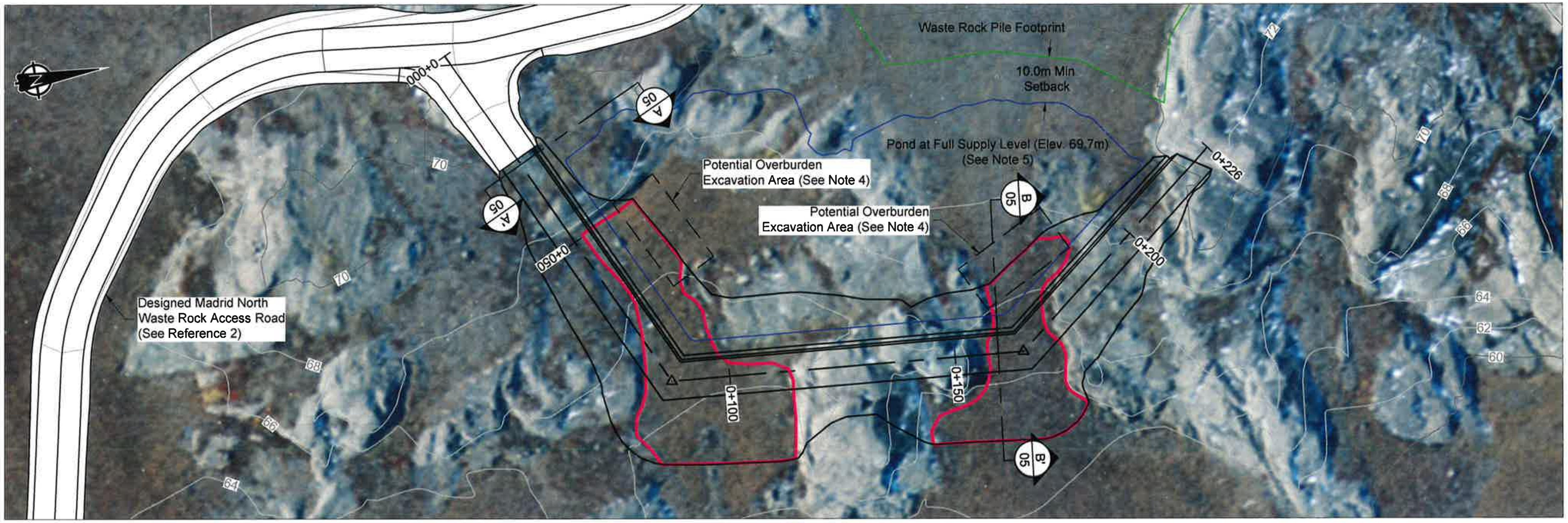
SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

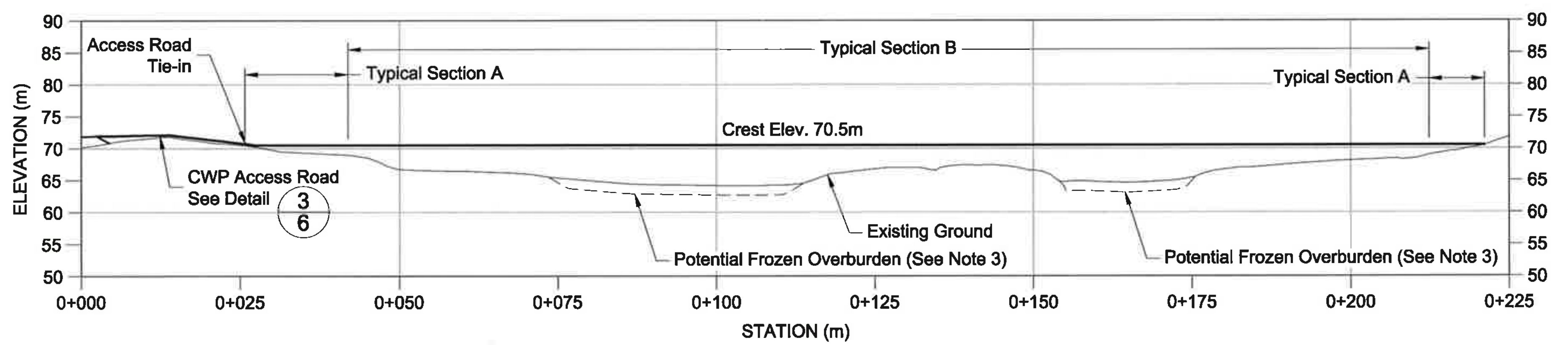
DRAWING TITLE:
General Arrangement

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-02	2 OF 7	0

P:\01_SITES\Hope Bay\ACAD\FC\Madrid North CWP\1CT022.043 - GA.dwg



Contact Water Pond Berm Plan View



Contact Water Pond Berm Profile View

LEGEND

- Anticipated Overburden
- Contact Water Pond
- Contact Water Pond Berm
- Waste Rock Pile Footprint

NOTES

1. Contours shown at 2.0m intervals.
2. All dimensions shown in meters unless otherwise stated.
3. The majority of the CWP berm footprint is expected to encounter bedrock outcrop. However, based on aerial imagery overburden may be encountered in low-lying areas, including tundra matt of organics.
4. If overburden is encountered at the upstream toe, it will be excavated to bedrock to allow liner to tie-in to the bedrock foundation.
5. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
6. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope ay Project, Nunavut, Canada. Issued for Discussion. Revision A. Project No. 1CT022.043. March 2019.
3. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

0m 10 20 30 40

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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							A	Issued for Discussion	RW	EMR	19/03/05
REFERENCE DRAWINGS		REVISIONS									

PROFESSIONAL ENGINEERS STAMP: J.B. KURYLO LICENSEE

srk consulting

DESIGN: RW	DRAWN: TAH	REVIEWED: RW
CHECKED: RW	APPROVED: EMR	DATE: March 19, 2019
FILE NAME: 1CT022.043 - OB.dwg		

TMAC RESOURCES

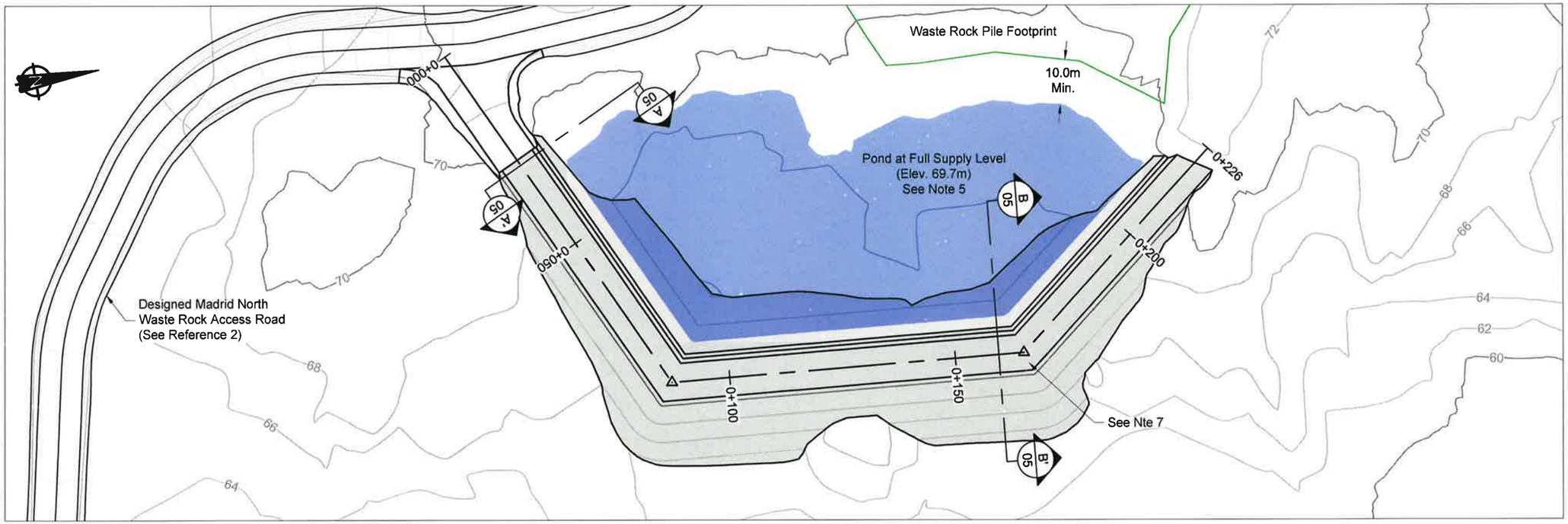
Hope Bay Project

SRK JOB NO.: 1CT022.043

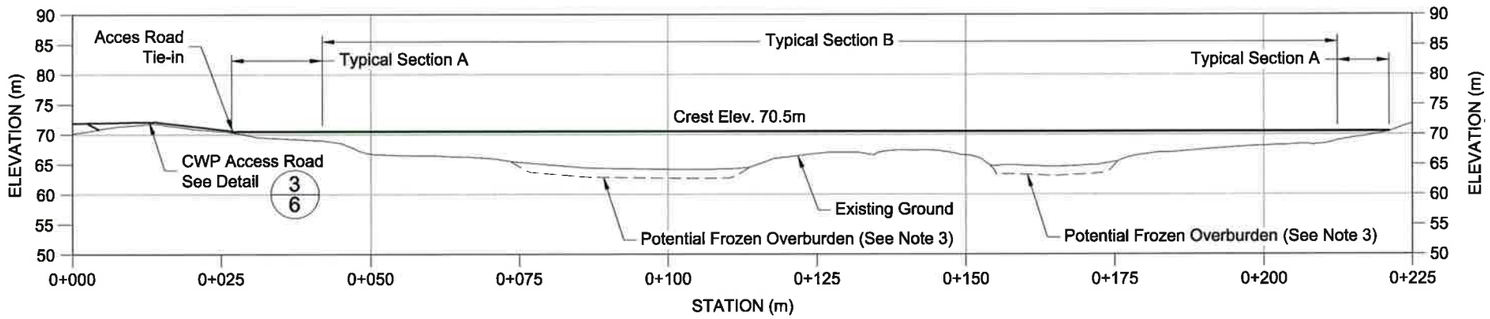
Madrid North Contact Water Pond

DRAWING TITLE: Contact Water Pond Anticipated Foundation Conditions Plan and Profile

DRAWING NO.: MN-CWP-03 | SHEET: 3 OF 7 | REVISION NO.: 0



Contact Water Pond Berm Plan View



Contact Water Pond Berm Profile View

LEGEND

- Contact Water Pond
- Contact Water Pond Berm
- Waste Rock Pile Footprint

NOTES

1. Contours shown at 2.0m intervals.
2. All dimensions shown in meters unless otherwise stated.
3. The majority of the CWP berm footprint is expected to encounter bedrock outcrop. However, based on aerial imagery overburden may be encountered in low-lying areas.
4. If overburden is encountered at the upstream toe, it will be excavated to bedrock to allow liner to tie-in to the bedrock foundation.
5. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
6. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
7. Where the height of the berm exceeds 3.0m, safety berms or barries are required on the crest. See Typical Berm Barrier Options on drawing MN-CWP-06.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope ay Project, Nunavut, Canada. Issued for Discussion. Revision A. Project No. 1CT022.043. March 2019.
3. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

0m 10 20 30 40

DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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REVISIONS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	EMR	19/03/19
A	Issued for Discussion	RW	EMR	19/03/05

REGISTERED PROFESSIONAL ENGINEER — J.B. KURYLO — LICENSEE — NTINU

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	March 19, 2019

FILE NAME: 1CT022.043 - PP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: Contact Water Pond Plan and Profile

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-04	4 OF 7	0

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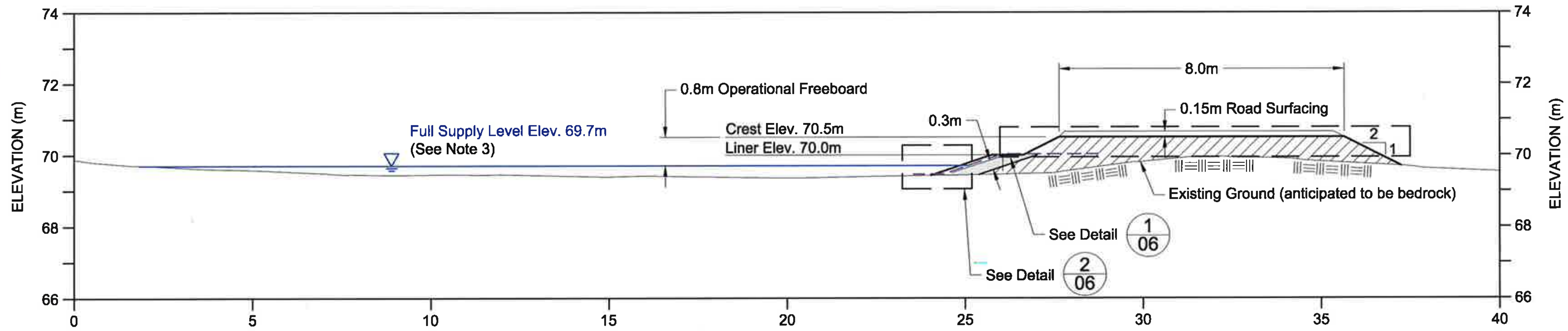


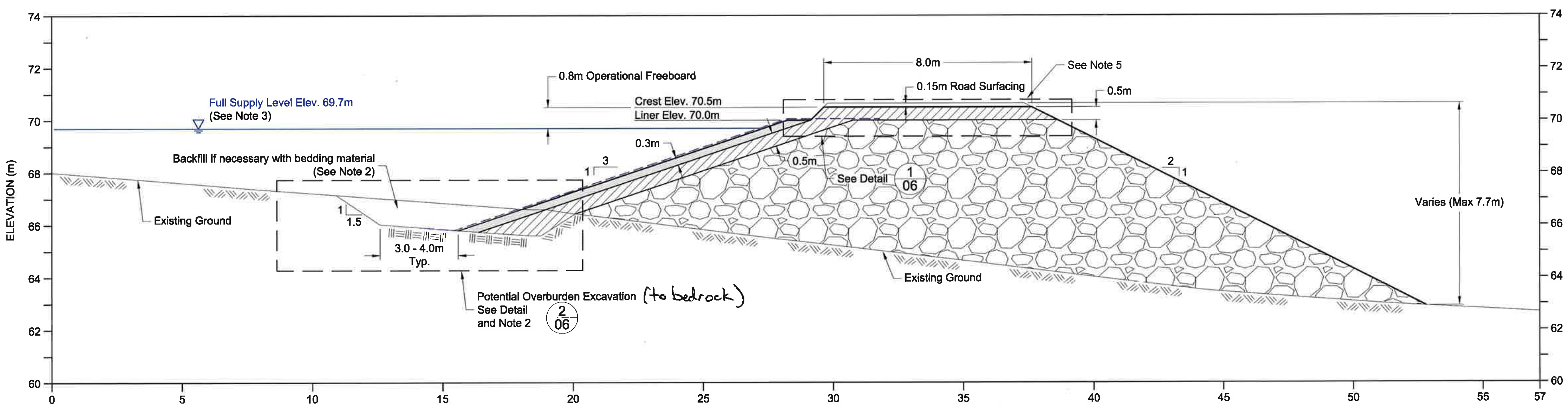
A/03 **Cross Section A-A' - Berm Sections less than 1.5m**

LEGEND

- Liner System
- Bedding Material
- Transition Material
- Run of Quarry (ROQ) or Run of Mine (ROM) Material

NOTES

1. All dimensions shown in meters unless otherwise stated.
2. If overburden or organics is encountered at the upstream toe, it will be excavated to bedrock to tie-in to the bedrock foundation. Thickness of excavation will vary and will depend on conditions encountered. Excavation to be backfilled with bedding material if necessary to protect the liner tie-in.
3. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Where the height of the berm exceeds 3.0m, safety berms or barriers are required on the crest. See Typical Berm Barrier Options on drawing MN-CWP-06.



B/03 **Cross Section B-B' - Berm Sections 1.5m or higher**

0m 1 2 3 4 5 6

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	EMR	19/03/19
A	Issued for Discussion	RW	EMR	19/03/05

REFERENCE DRAWINGS — DRAWING NO. / DRAWING TITLE

REVISIONS

PROFESSIONAL ENGINEERS STAMP — J.B. KURYLO — LICENSEE

srk consulting

DESIGN: RW | DRAWN: TAH | REVIEWED: RW
CHECKED: RW | APPROVED: EMR | DATE: March 19, 2019
FILE NAME: 1CT022.043 - PP.dwg

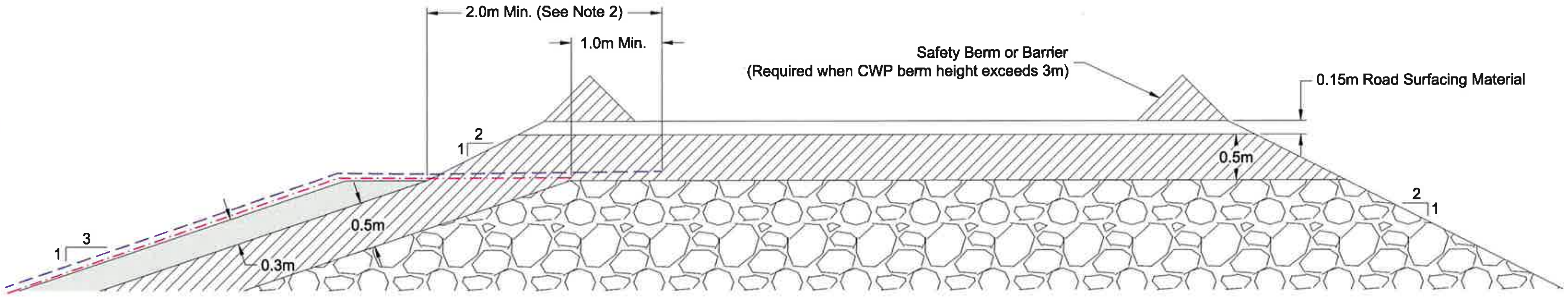
MAC RESOURCES — Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: Contact Water Pond Typical Sections

DRAWING NO.: MN-CWP-05 | SHEET: 5 OF 7 | REVISION NO.: 0



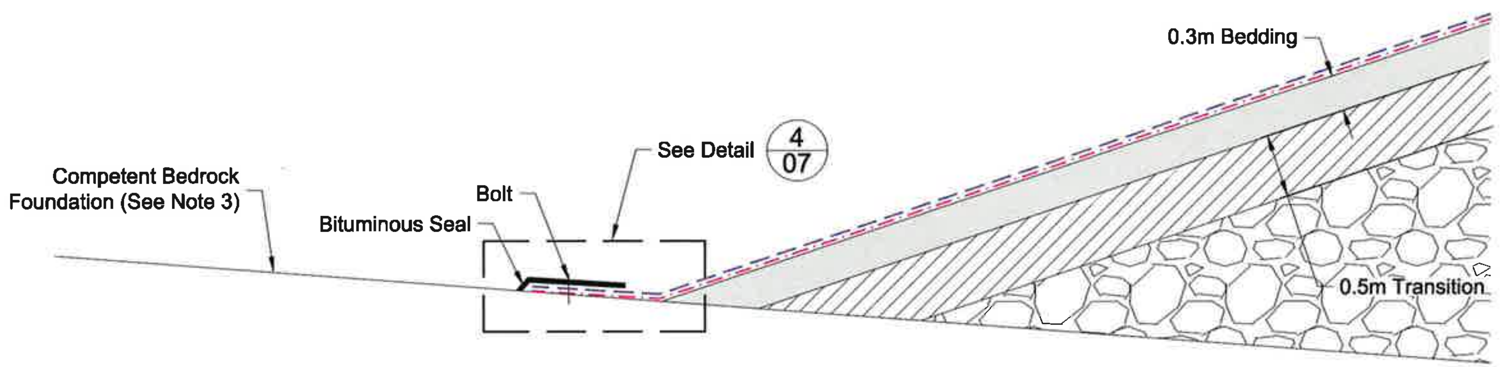
1/05 **Typical Liner Anchor Detail**

LEGEND

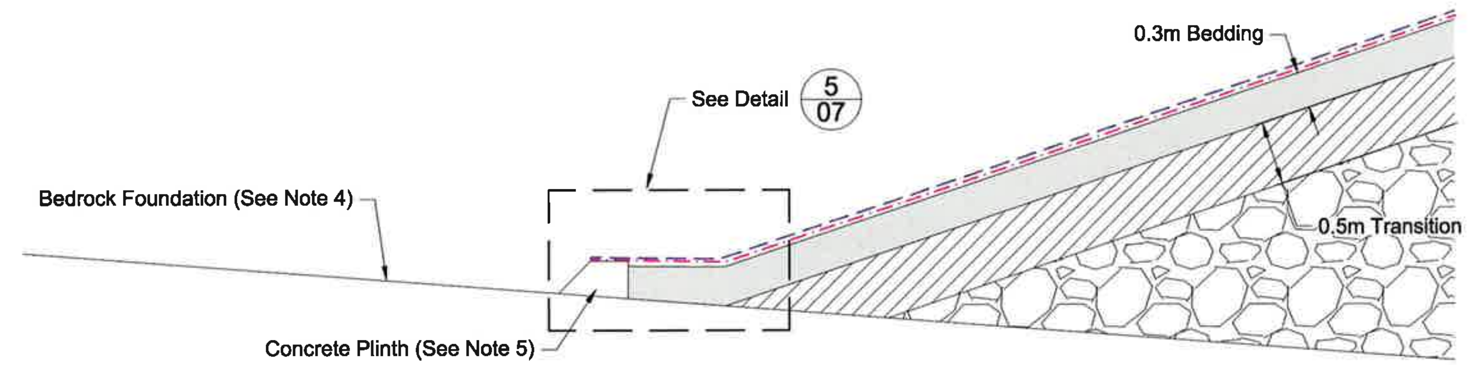
- Liner
- Non-woven Geotextile
- Bedding Material
- Transition Material
- Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Bituminous Seal

NOTES

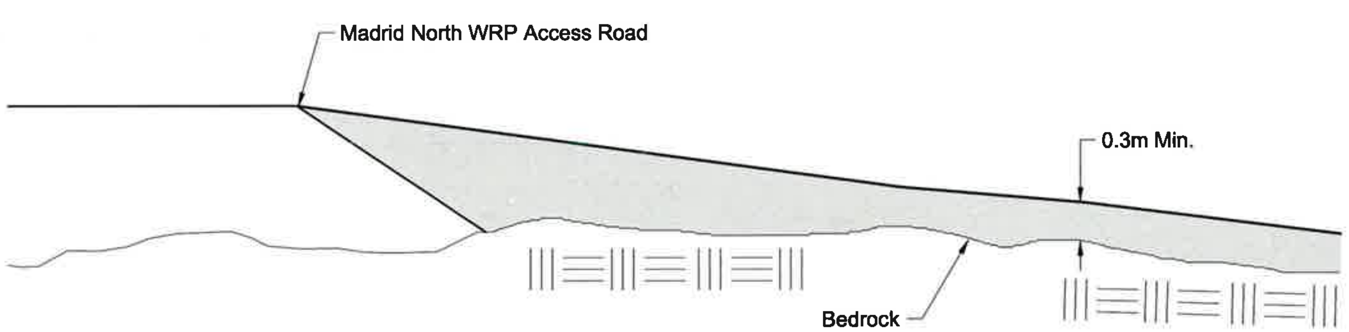
1. All dimensions shown in meters unless otherwise stated.
2. Minimum 1.0m liner overlap with ROQ/ROM material. Total covered liner overlap must be a minimum of 2.0m. Non-woven geotextile to terminate at ROQ/ROM.
3. If competent bedrock conditions are encountered, liner can be mechanically tied in to bedrock. A bituminous seal may also be applied. Bedrock conditions to be inspected and approved by field engineer.
4. If bedrock conditions are unfavourable (e.g. weathered, highly fractured) or the bedrock surface is highly irregular, a concrete plinth may be required to facilitate liner tie-in. Bedrock conditions to be inspected and approved by the field engineer.
5. Liner to be affixed to top of concrete plinth with GSE Polylock Concrete Embedment Strip or Approved Alterative. Steel reinforcement bars also required and should be typically drilled and grouted a minimum 450mm into bedrock.
6. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).



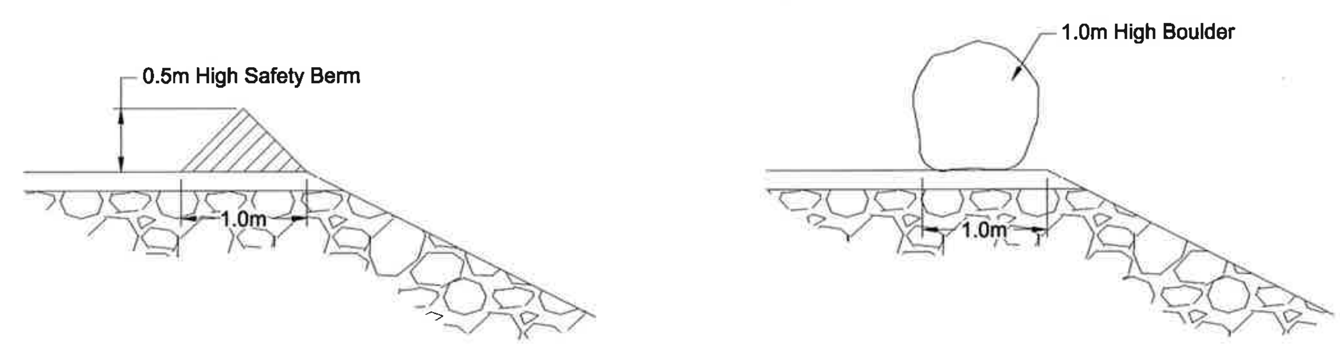
2/05 **Typical Liner Anchor at Bedrock - Mechanical Tie-down Option**



2/05 **Typical Liner Anchor at Bedrock - Concrete Plinth Option**



3/04,05 **CWP Access Road Detail**



Typical Safety Berm or Barrier Options

0m 0.5 1.0 1.5 2.0m

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	EMR	19/03/19
A	Issued for Discussion	RW	EMR	19/03/05

REFERENCE DRAWINGS: DRAWING NO. -- | DRAWING TITLE --

REVISIONS

J.B. KURYLO LICENSEE NT/NU — PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN: RW | DRAWN: TAH | REVIEWED: RW
CHECKED: RW | APPROVED: EMR | DATE: March 19, 2019
FILE NAME: 1CT022.043 - PP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: Contact Water Pond Typical Details

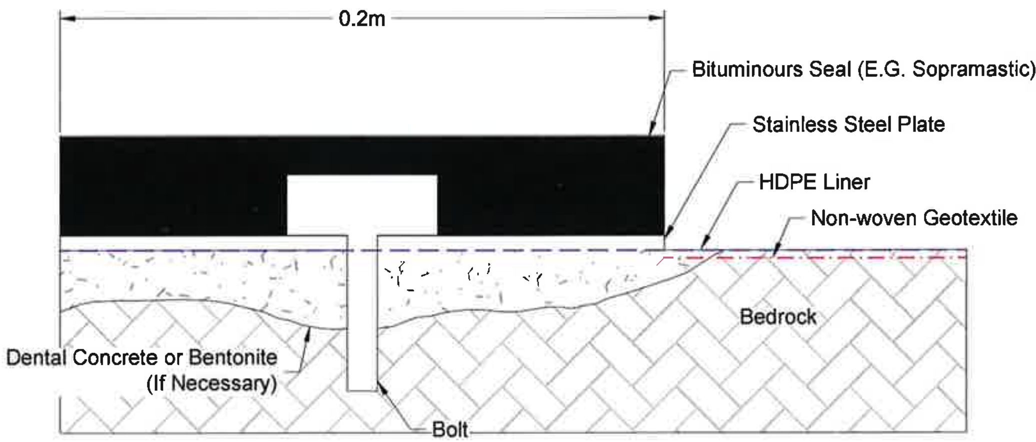
DRAWING NO.: MN-CWP-06 | SHEET: 6 OF 7 | REVISION NO.: 0

LEGEND

- HDPE Liner (dashed line)
- Non-woven Geotextile (dash-dot line)
- Bedding Material
- Concrete
- HDPE Liner (hatch)
- Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Bedrock
- Bituminous Seal

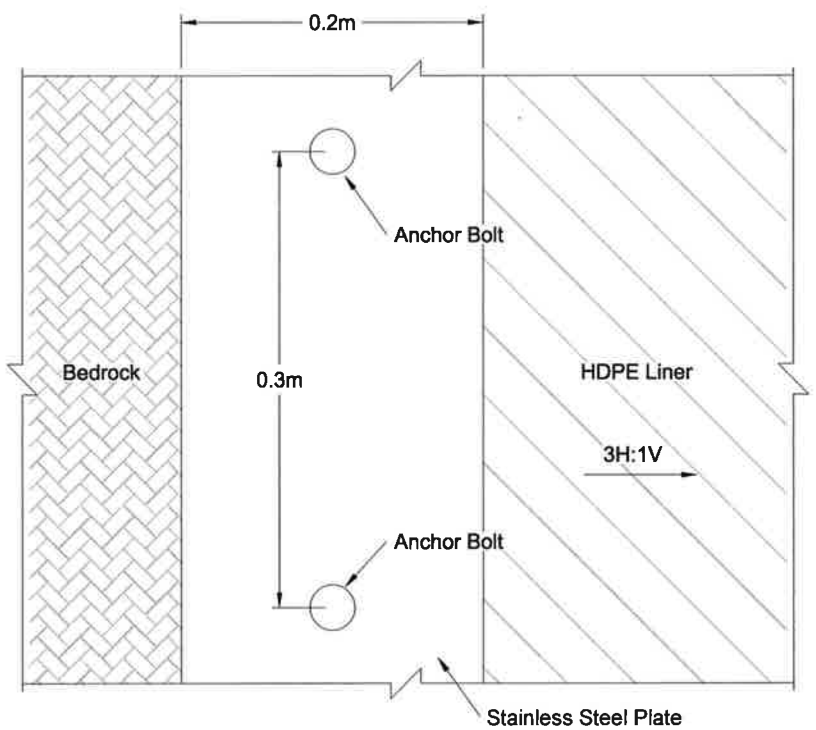
NOTES

1. All dimensions shown in meters unless otherwise stated.
2. Bedrock conditions and contact point for the liner will be inspected in the field by the engineer. The engineer will make a final decision for the required adhesion method.
3. Typical details shown may vary and additional details will be provided if required.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. In cold (~<0°C) ambient air temperature periods, the area where concrete is placed or poured, may be required to be heated and horded, or a polymer added to the mix. This would be done to ensure the concrete cures appropriately and maintains its strength and integrity (i.e. does not excessively crack).



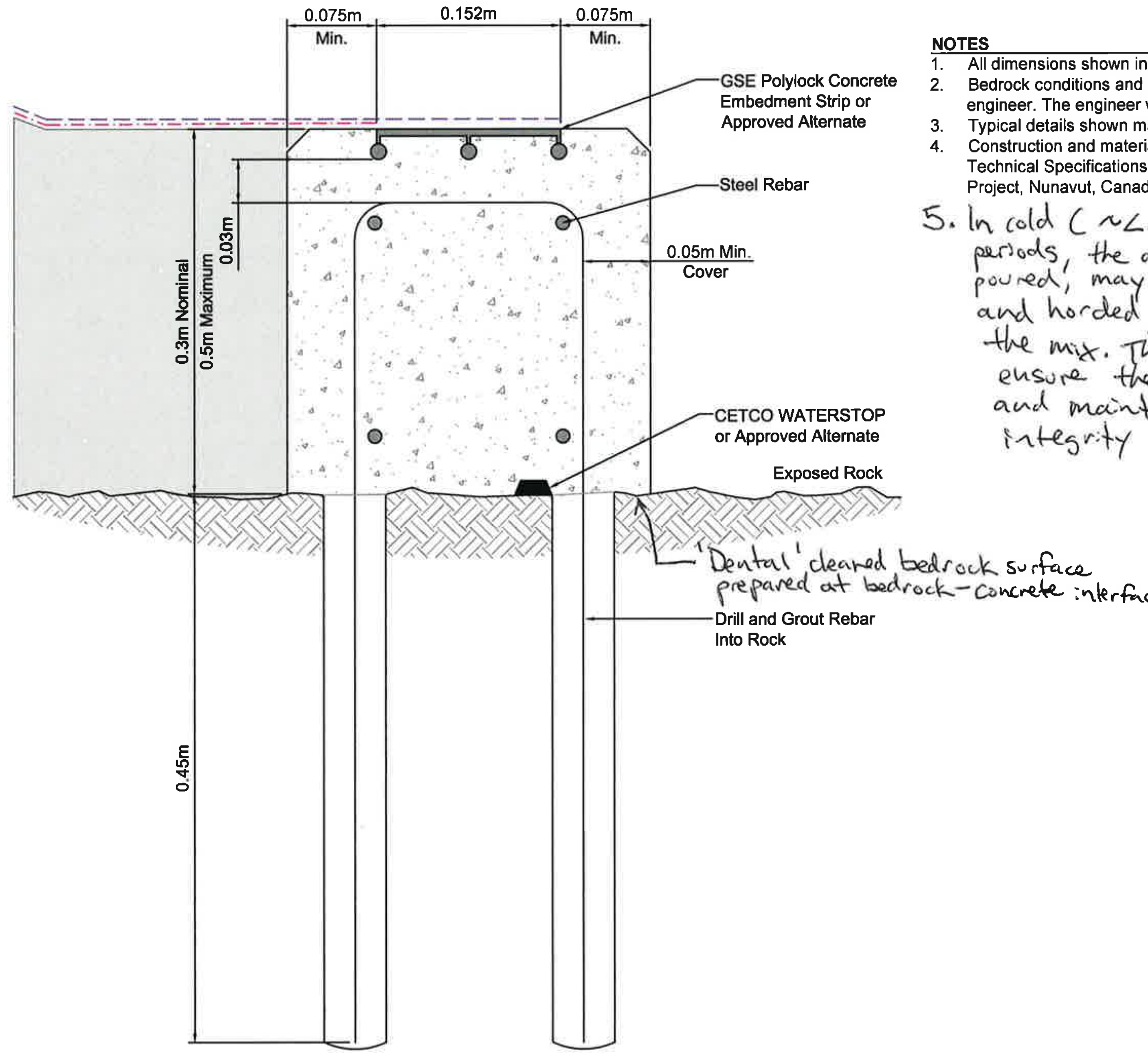
4/06 **Liner Anchored to Bedrock - Side View Typical Detail**

NOT TO SCALE



4/06 **Liner Anchored to Bedrock - Plan View Typical Detail**

NOT TO SCALE



5/06 **Liner Anchored to Concrete Plinth - Typical Detail**

0m 50 100 150 200

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
							0	Issued for Construction	RW	EMR	19/03/19
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REFERENCE DRAWINGS — REVISIONS

PROFESSIONAL ENGINEERS STAMP: J.B. KURYLO, LICENSEE, 2019/04/02

srk consulting

DESIGN: RW | DRAWN: TAH | REVIEWED: RW
CHECKED: RW | APPROVED: EMR | DATE: March 19, 2019
FILE NAME: 1CT022.043 - PP.dwg

TMAC RESOURCES — Hope Bay Project

SRK JOB NO.: 1CT022.043

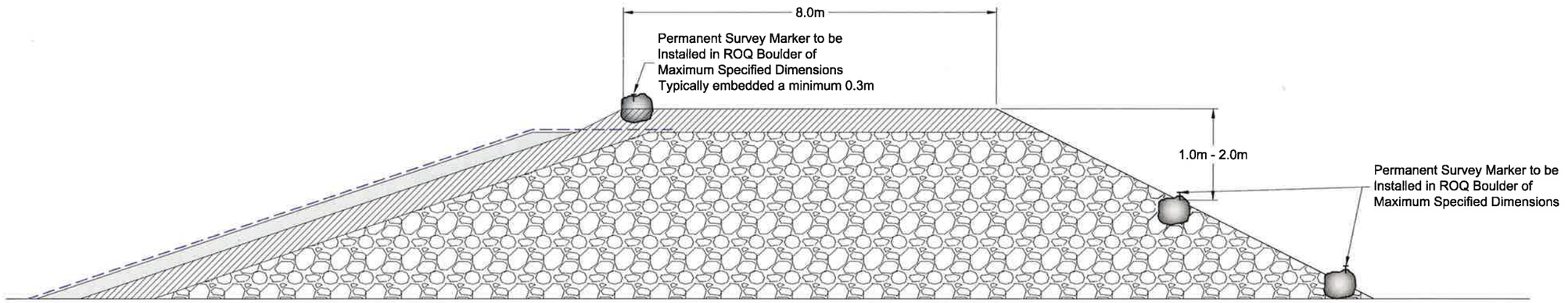
Madrid North Contact Water Pond

DRAWING TITLE: Liner Tie-in Typical Details

DRAWING NO.: MN-CWP-07 | SHEET: 7 OF 7 | REVISION NO.: 0

Contact Water Pond Berm Instrumentation Plan

0m 10 20 30 40



Surficial Survey Point Installation

0m 1 2 3 4

LEGEND

- Surficial Survey Monitoring Point
- Liner System
- Anticipated Overburden
- Contact Water Pond
- Contact Water Pond Berm
- Waste Rock Pile Footprint
- Bedding Material
- Transition Material
- Run of Quarry (ROQ) or Run of Mine (ROM) Material

NOTES

1. Contours shown at 2.0m intervals.
2. All dimensions shown in meters unless otherwise stated.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope ay Project, Nunavut, Canada. Issued for Discussion. Revision A. Project No. 1CT022.043. March 2019.
3. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

REFERENCE DRAWINGS		REVISIONS								
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PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER J.B. KURYLO LICENSEE 2019/04/08 NUNAVUT

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	April 5, 2019

FILE NAME: 1CT022.043 - Instrumentation Plan.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE:
Contact Water Pond
Instrumentation Plan - 1 of 2

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-08	8 OF 9	A

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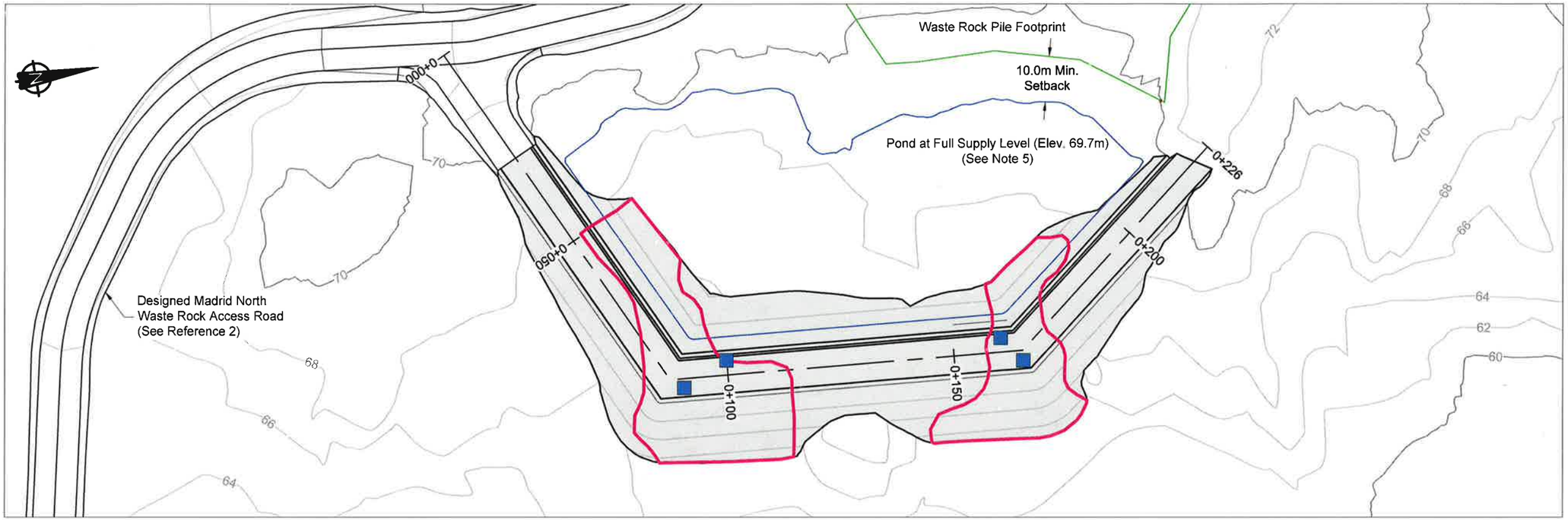
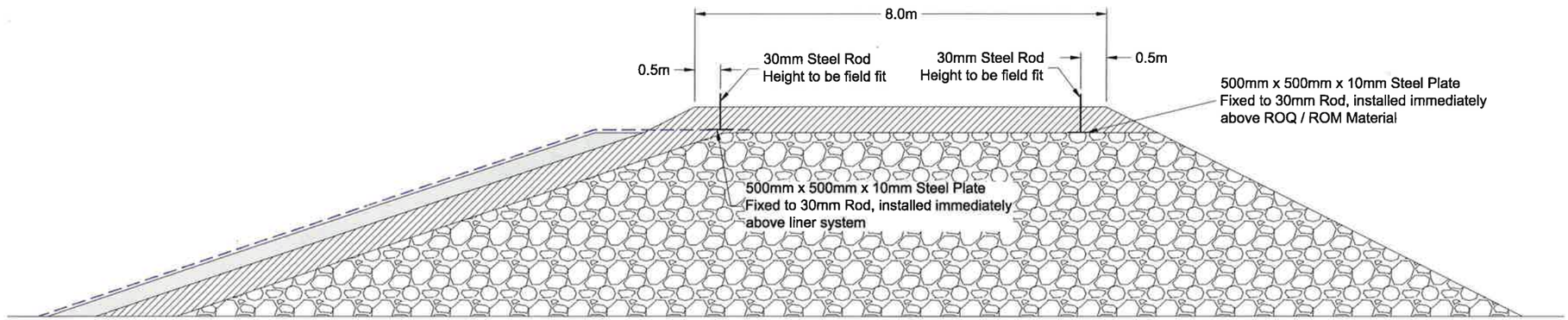


Contact Water Pond Berm Instrumentation Plan

0m 10 20 30 40



Settlement Monitoring Plate Installation

0m 1 2 3 4

LEGEND

- Settlement Monitoring Plate
- Liner System
- Anticipated Overburden
- Contact Water Pond
- Contact Water Pond Berm
- Waste Rock Pile Footprint
- Bedding Material
- Transition Material
- Run of Quarry (ROQ) or Run of Mine (ROM) Material

NOTES

1. Contours shown at 2.0m intervals.
2. All dimensions shown in meters unless otherwise stated.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope ay Project, Nunavut, Canada. Issued for Discussion. Revision A. Project No. 1CT022.043. March 2019.
3. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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							A	Issued for Discussion	RW	EMR	19/04/04

REGISTERED PROFESSIONAL ENGINEER — J.B. KURYLO — LICENSEE — 19/04/08 — NUNAVUT

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	April 5, 2019

FILE NAME: 1CT022.043 - Instrumentation Plan.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE:
Contact Water Pond
Instrumentation Plan - 2 of 2

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-09	9 OF 9	A

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Attachment 2.2 Madrid North Contact Water Pond – As-built Drawings

As-Built Drawings for the
Madrid North Contact Water Pond
Hope Bay Project, Nunavut, Canada

Active Drawing Status

Drawing Number	Drawing Title	Issue	Date	Revision
MN-CWP-01	General Arrangement (With Orthophoto)	As-Built	2020/03/24	AB1
MN-CWP-02	General Arrangement	As-Built	2020/03/24	AB1
MN-CWP-03	Contact Water Pond Foundation Conditions Plan and Profile	As-Built	2020/03/24	AB1
MN-CWP-04	Contact Water Pond As-Built Berm and Concrete Plinths	As-Built	2020/03/24	AB1
MN-CWP-05	Contact Water Pond Typical Sections	As-Built	2020/03/24	AB1
MN-CWP-06	Contact Water Pond Typical Sections	As-Built	2020/03/24	AB1
MN-CWP-07	Contact Water Pond Typical Details	As-Built	2020/03/24	AB1
MN-CWP-08	Liner Tie-in Typical Details	As-Built	2020/03/24	AB1
MN-CWP-09	Contact Water Pond Instrumentation Plan	As-Built	2020/03/24	AB1
MN-CWP-10	As-Built Liner Panel Layout	As-Built	2020/03/24	AB1

TMAC RESOURCES

REGISTERED PROFESSIONAL ENGINEER
R.C. WILLIAMS
LICENSEE
2020.03.24
NT/NU

srk consulting

Project Number: 1CT022.043

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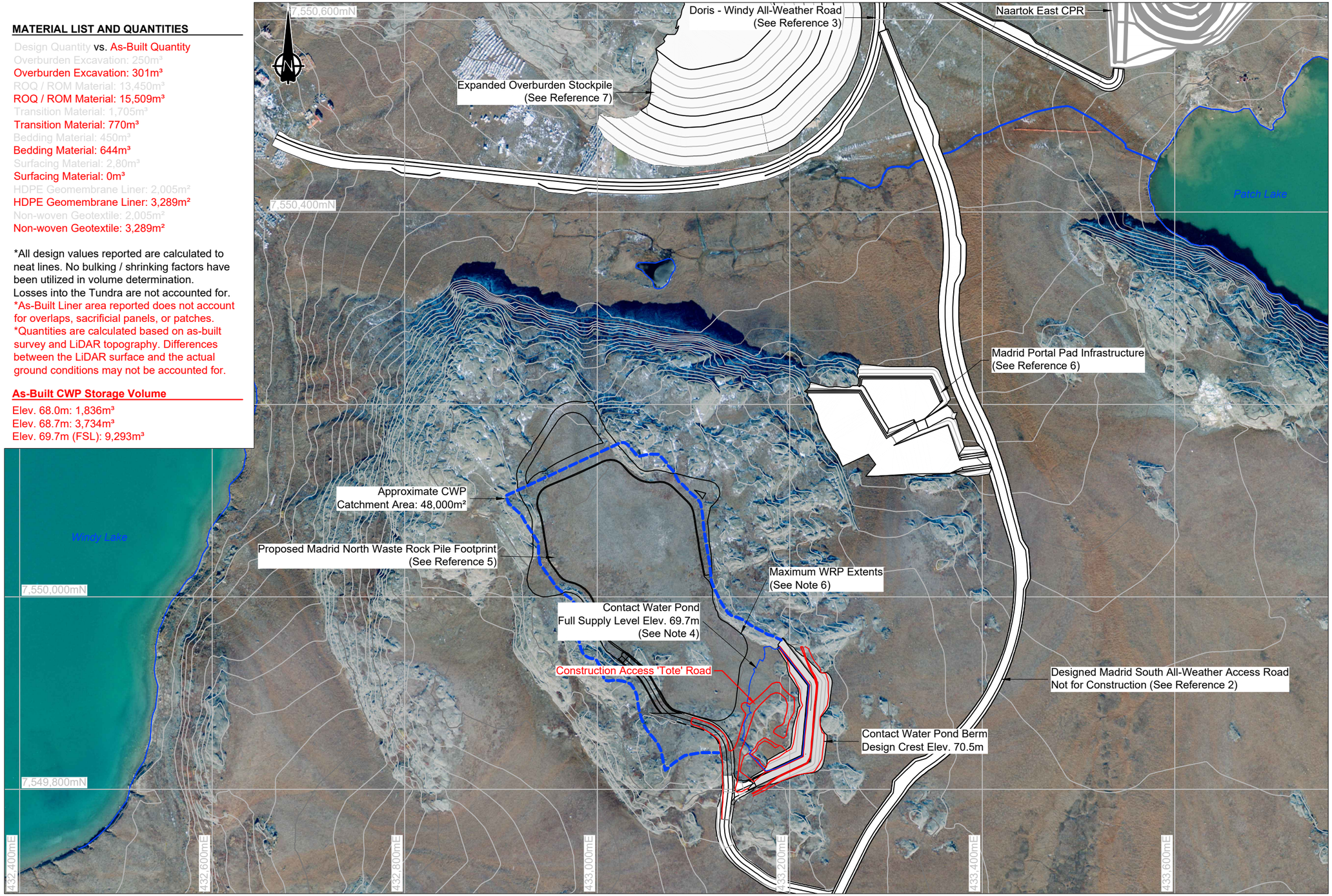
MATERIAL LIST AND QUANTITIES

Design Quantity vs. As-Built Quantity
Overburden Excavation: 250m³
Overburden Excavation: 301m³
ROQ / ROM Material: 13,450m³
ROQ / ROM Material: 15,509m³
Transition Material: 1,705m³
Transition Material: 770m³
Bedding Material: 450m³
Bedding Material: 644m³
Surfacing Material: 2,80m³
Surfacing Material: 0m³
HDPE Geomembrane Liner: 2,005m²
HDPE Geomembrane Liner: 3,289m²
Non-woven Geotextile: 2,005m²
Non-woven Geotextile: 3,289m²

*All design values reported are calculated to neat lines. No bulking / shrinking factors have been utilized in volume determination. Losses into the Tundra are not accounted for.
*As-Built Liner area reported does not account for overlaps, sacrificial panels, or patches.
*Quantities are calculated based on as-built survey and LiDAR topography. Differences between the LiDAR surface and the actual ground conditions may not be accounted for.

As-Built CWP Storage Volume

Elev. 68.0m: 1,836m³
Elev. 68.7m: 3,734m³
Elev. 69.7m (FSL): 9,293m³



LEGEND

- Proposed Infrastructure
- Design Footprint
- As-built Infrastructure
- Proposed Contact Water Pond

NOTES

1. Contours shown at 2.0m intervals, based off of LiDAR, 2007.
2. All units shown in meters unless otherwise specified.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
4. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen day) residence time for water in the pond.
5. Imagery provided by client, 2007.
6. WRP toe must stay above elevation 70.0m where it is immediately upstream of the CWP.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Revision 0 Issued for Construction drawings prepared for TMAC Resources Inc.. Project Number: 1CT022.043. March 2019.
3. 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.
4. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
5. Engineering Drawings for the Madrid North Waste Rock Pile, Hope Bay Project, Nunavut, Canada. Revision 1. Prepared for TMAC Resources Inc. Project Number, 1CT022.043. August 2019.
6. Engineering Drawings for the Madrid North Portal Surface Infrastructure Pad, Hope Bay Project. Revision 1. Prepared for TMAC Resources Inc. Project Number, 1CT022.051. October 2019.
7. Engineering Drawings for the Naartok East CPR Overburden Stockpile, Madrid North Project, Hope Bay. Revision 0. Prepared for TMAC Resources Inc. Project Number 1CT022.043. December 2019
8. As-built surveys provided by Sub-Arctic Geomatics Ltd. dated May 2019 - September 2019.

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REFERENCE DRAWINGS

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A	Issued for Discussion	RW	EMR	19/03/05

REVISIONS

REGISTERED PROFESSIONAL ENGINEER — R.C. WILLIAMS — LICENSEE — 2020.03.24 — NT&NU

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RW	TAH	RW
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RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - GA.dwg

TMAC RESOURCES

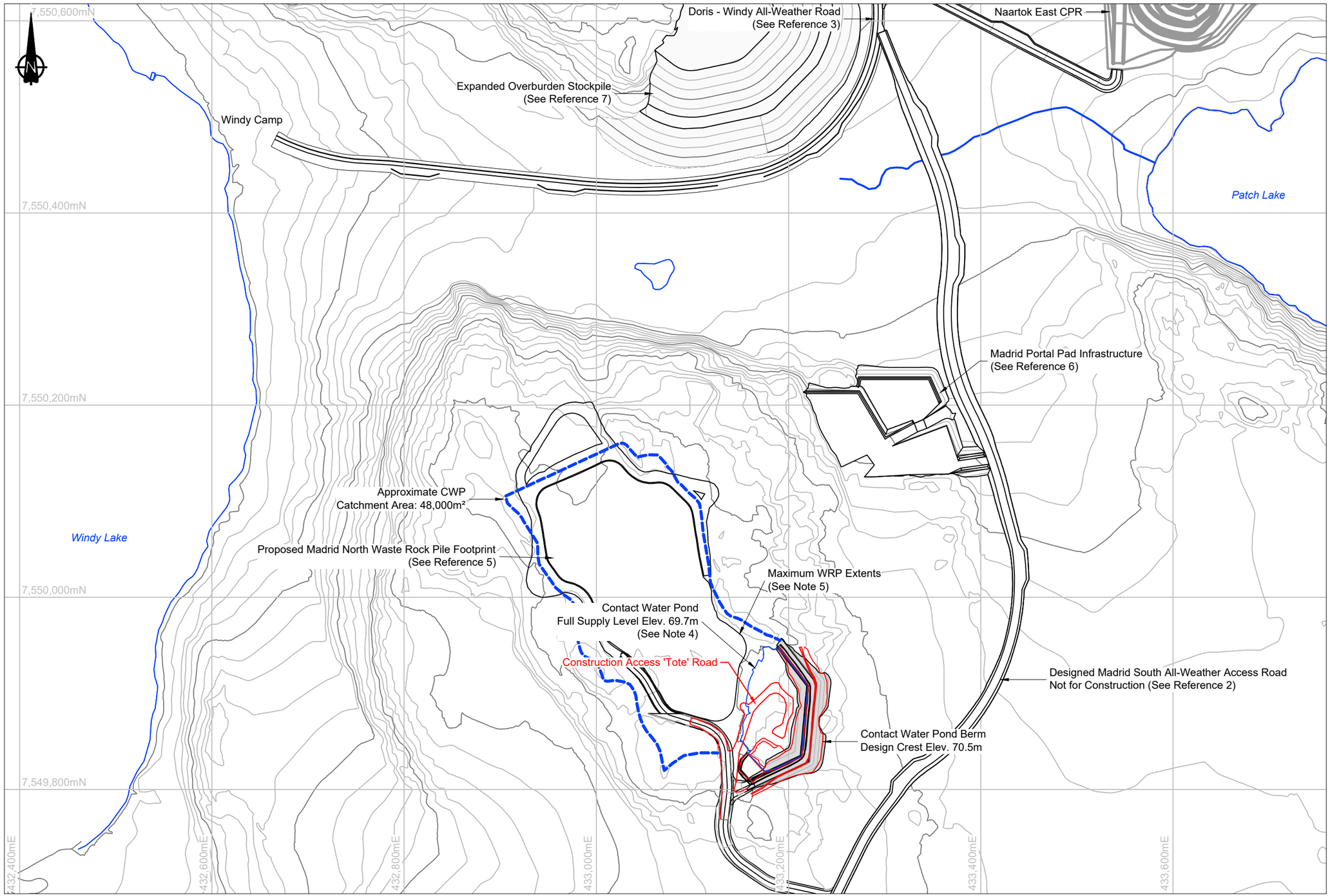
Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE:
General Arrangement
(With Orthophoto)

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-01	1 OF 10	AB1



LEGEND

- Proposed Infrastructure
- Design Footprint
- As-built Infrastructure
- Proposed Contact Water Pond

NOTES

1. Contours shown at 2.0m intervals from LiDAR, 2007.
2. All units shown in meters unless otherwise specified.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018)
4. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
5. WRP toe must stay above elevation 70.0m where it is immediately upstream of the CWP.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Revision 1 Issued for Construction drawings prepared for TMAC Resources Inc. Project Number: 1CT022.043. March 2019.
3. 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.
4. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
5. Engineering Drawings for the Madrid North Waste Rock Pile, Hope Bay Project, Nunavut, Canada. Revision 1. Prepared for TMAC Resources Inc. Project Number, 1CT022.043. August 2019.
6. Engineering Drawings for the Madrid North Portal Surface Infrastructure Pad, Hope Bay Project. Revision 1. Prepared for TMAC Resources Inc. Project Number, 1CT022.051. October 2019.
7. Engineering Drawings for the Naartok East CPR Overburden Stockpile, Madrid North Project, Hope Bay. Revision 0. Prepared for TMAC Resources Inc. Project Num,ber 1CT022.043. December 2019.
8. As-built surveys provided by Sub-Arctic Geomatics Ltd. dated May 2019 - September 2019.

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NO.	DESCRIPTION	CHK'D	APP'D	DATE
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A	Issued for Discussion	RW	EMR	19/03/05

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
R.C. WILLIAMS
LICENSEE
2020.03.24
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RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - GA.dwg

TMAC RESOURCES

Hope Bay Project

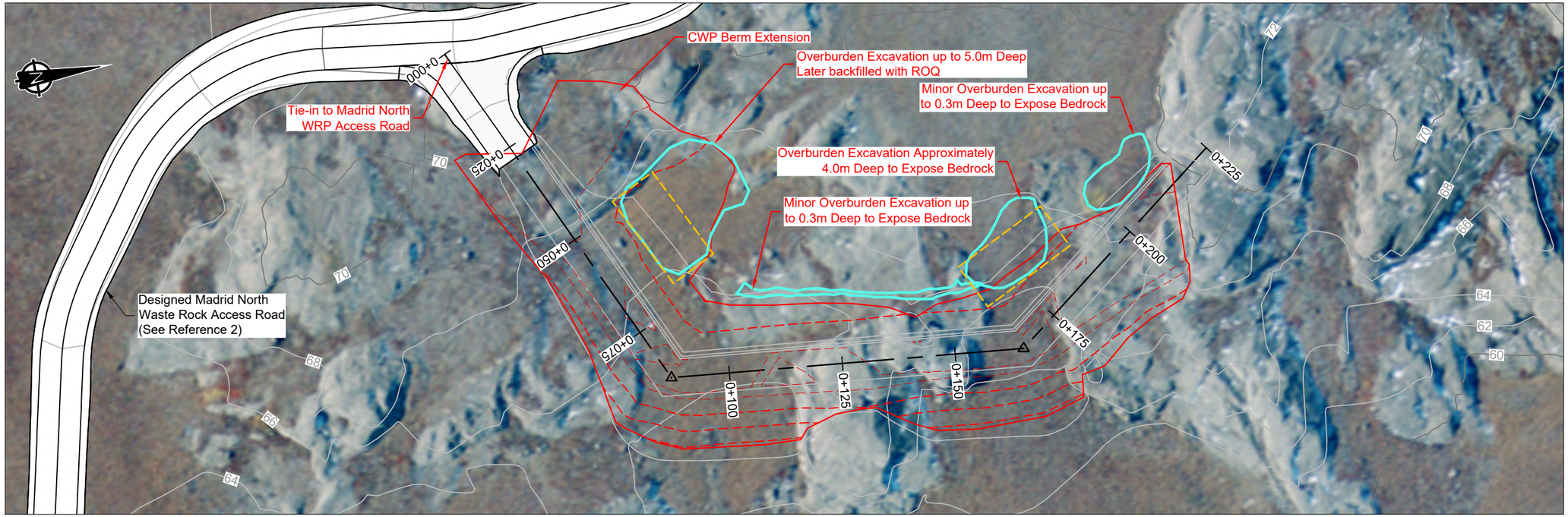
SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

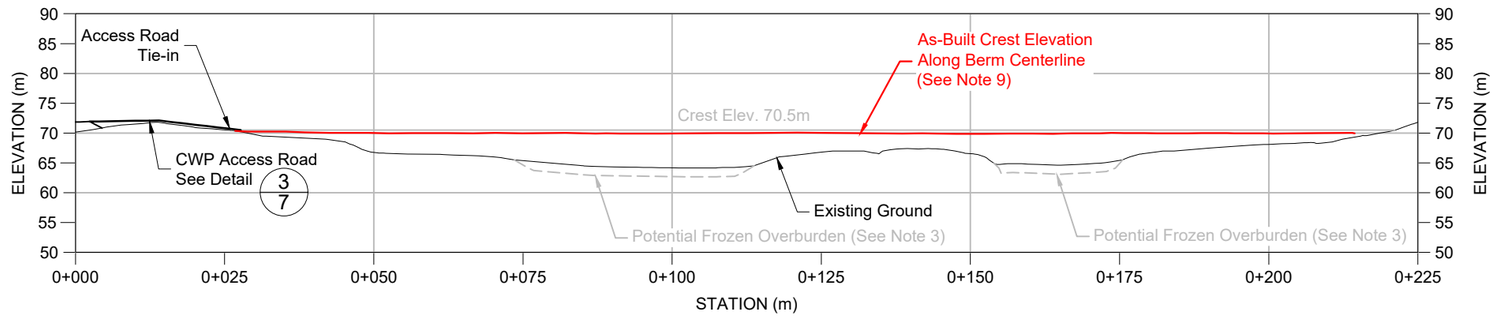
DRAWING TITLE:

General Arrangement

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-02	2 OF 10	AB1



Contact Water Pond Berm Plan View



Contact Water Pond Berm Profile View

LEGEND

- Anticipated Overburden Excavation Area (Design)
- As-built Overburden Excavation (See Note 7)
- Design Contact Water Pond Berm
- As-Built Contact Water Pond Berm

NOTES

1. Contours shown at 1.0m intervals, based off LiDAR, 2007.
2. All dimensions shown in meters unless otherwise stated.
3. The majority of the CWP berm footprint is expected to encounter bedrock outcrop. However, based on aerial imagery overburden may be encountered in low-lying areas.
4. If overburden is encountered at the upstream toe, it will be excavated to bedrock to allow liner to tie-in to the bedrock foundation.
5. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
6. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
7. As-built overburden excavation extents are approximate, and are based on as-built surveys and site observation.
8. Construction access 'tote' road (MN-CWP-01 & 02) is not shown on this drawing.
9. As-built crest elevation along berm centerline is approximately 70.0m (i.e. minimum elevation of the liner). As-built crest elevation along the upstream and downstream crest edge is approximately 70.5m. See as-built cross sections on MN-CWP-05 & 06.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope ay Project, Nunavut, Canada. Issued for Discussion. Revision A. Project No. 1CT022.043. March 2019.
3. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
4. As-built surveys provided by Sub-Arctic Geomatics Ltd. dated May 2019 - September 2019.

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REFERENCE DRAWINGS		REVISIONS									
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RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - OB.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE:
Contact Water Pond
Foundation Conditions Plan and Profile

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-03	3 OF 10	AB1

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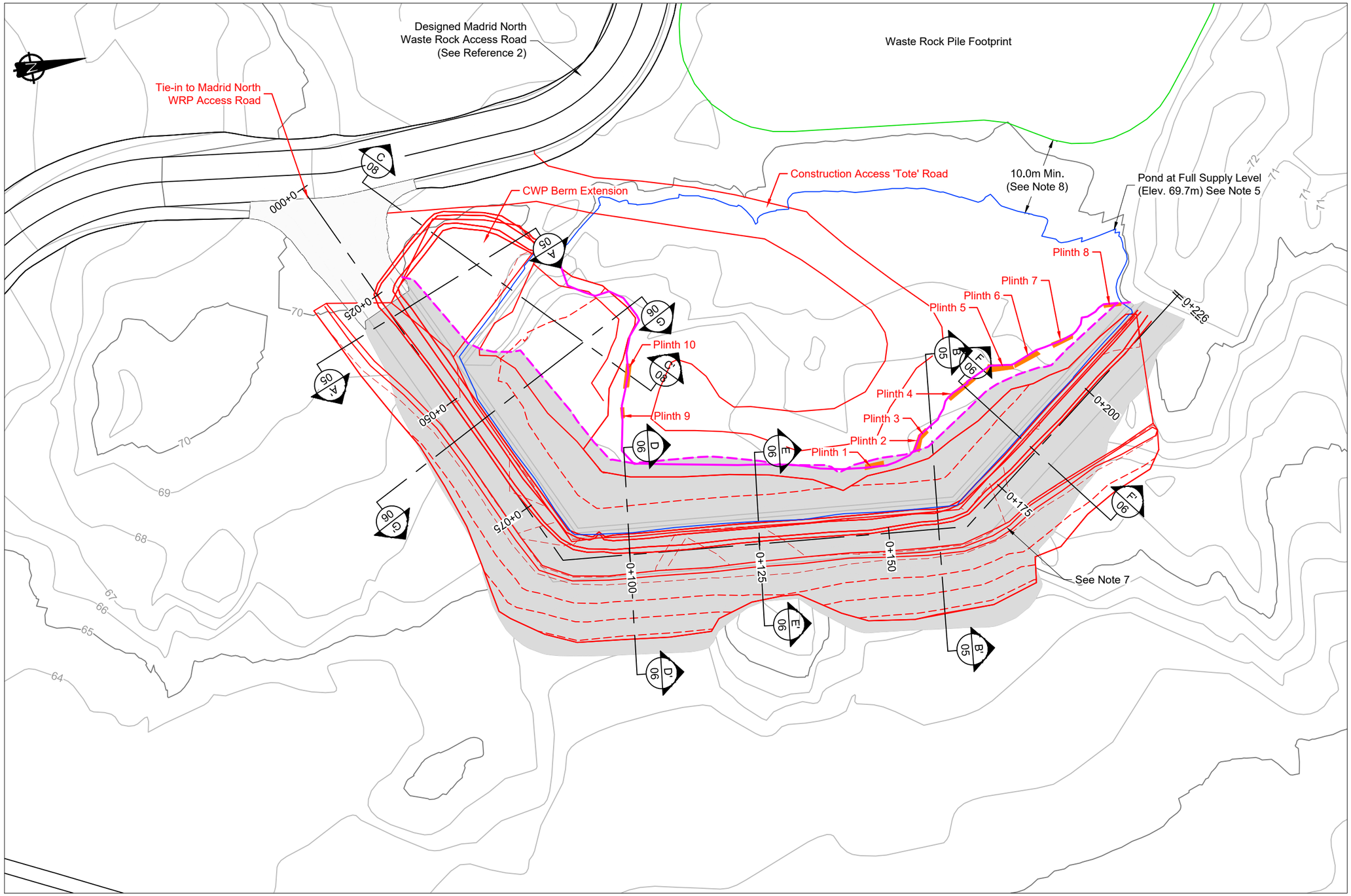

LEGEND

- Design Liner to Bedrock Tie-in
- As-Built Liner to Bedrock Tie-in
- Contact Water Pond
- As-Built Contact Water Pond Berm
- Design Contact Water Pond Berm
- As-Built Plinth Location
- Maximum Proposed Waste Rock Pile Footprint

NOTES

1. Contours shown at 1.0m intervals.
2. All dimensions shown in meters unless otherwise stated.
3. The majority of the CWP berm footprint is expected to encounter bedrock outcrop. However, based on aerial imagery overburden may be encountered in low-lying areas.
4. If overburden is encountered at the upstream toe, it will be excavated to bedrock to allow liner to tie-in to the bedrock foundation.
5. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
6. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
7. Where the height of the berm exceeds 3.0m, safety berms or barries are required on the crest. See Typical Berm Barrier Options on drawing MN-CWP-06.
8. WRP toe must stay above elevation 70.0m or a minimum of 10m away from the pond's full supply extents.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope ay Project, Nunavut, Canada. Issued for Discussion. Revision A. Project No. 1CT022.043. March 2019.
3. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
4. As-built surveys provided by Sub-Arctic Geomatics Ltd. dated May 2019 - September 2019.

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DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

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A	Issued for Discussion	RW	EMR	19/03/05

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RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - PP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE:

Contact Water Pond As-Built Berm and Concrete Plinths

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-04	4 OF 10	AB1

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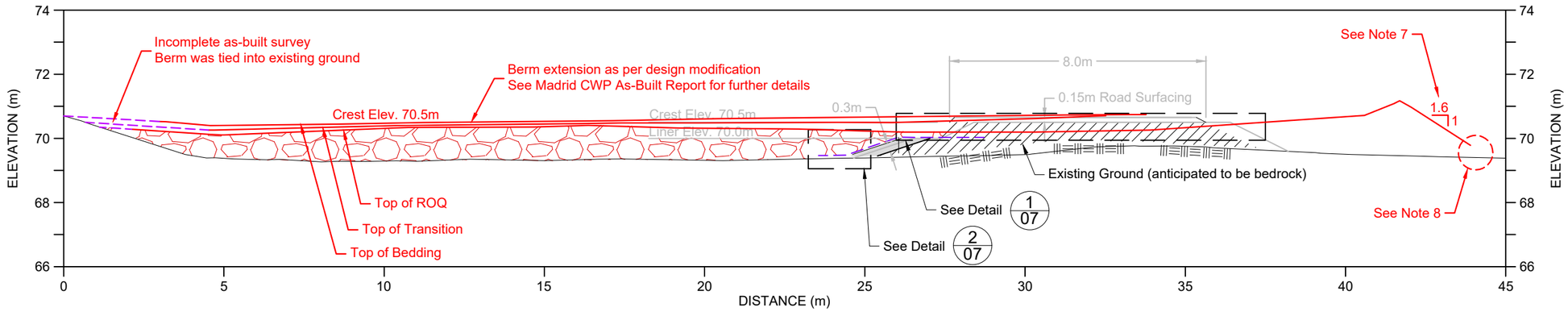


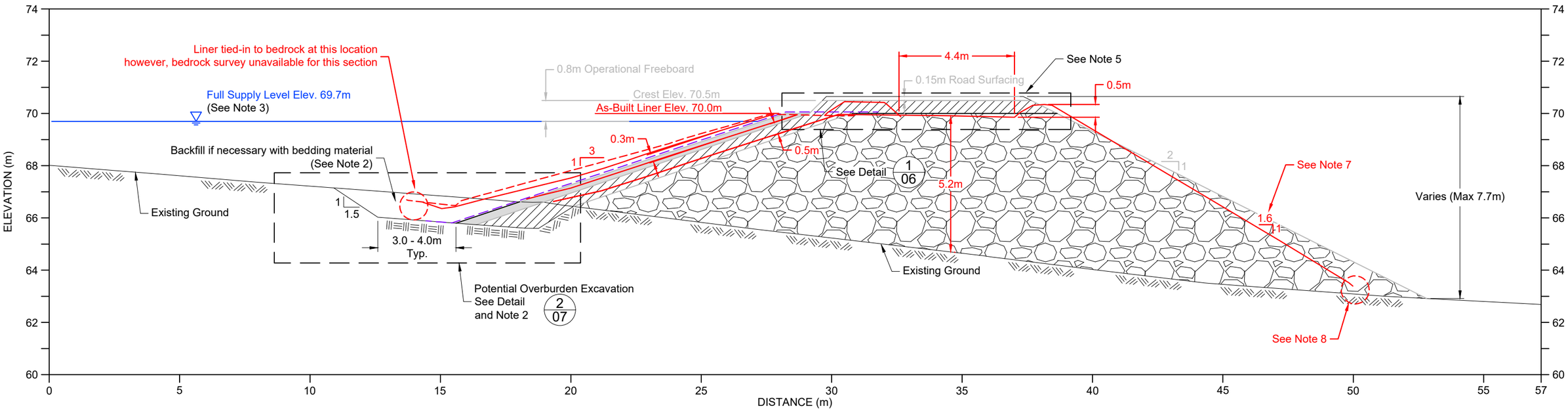
A/04 **Cross Section A-A' - Berm Sections less than 1.5m**

LEGEND

- Design Liner System
- As-Built Liner System
- As-Built Survey
- Design Bedding Material
- Design Transition Material
- Design Run of Quarry (ROQ) or Run of Mine (ROM) Material

NOTES

1. All dimensions shown in meters unless otherwise stated.
2. If overburden is encountered at the upstream toe, it will be excavated to bedrock to tie-in to the bedrock foundation. Thickness of excavation will vary and will depend on conditions encountered. Excavation to be backfilled with bedding material if necessary to protect the liner tie-in.
3. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Where the height of the berm exceeds 3.0m, safety berms or barriers are required on the crest. See Typical Berm Barrier Options on drawing MN-CWP-06.
6. As-built surveys provided by Sub-Arctic Geomatics Ltd. dated May 2019 - September 2019.
7. Stability analyses completed on over-steepened downstream slopes have determined that the risk of instability is low. See Appendix D of the Madrid CWP As-Built Report for further details.
8. Updated topography survey not available. Difference is attributed to differences between LiDAR survey and actual field conditions.



B/04 **Cross Section B-B' - Berm Sections 1.5m or higher**

0m 1 2 3 4 5 6

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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A	Issued for Discussion	RW	EMR	19/03/05

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RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - PP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: Contact Water Pond Typical Sections

DRAWING NO. MN-CWP-05 | SHEET 5 OF 10 | REVISION NO. AB1

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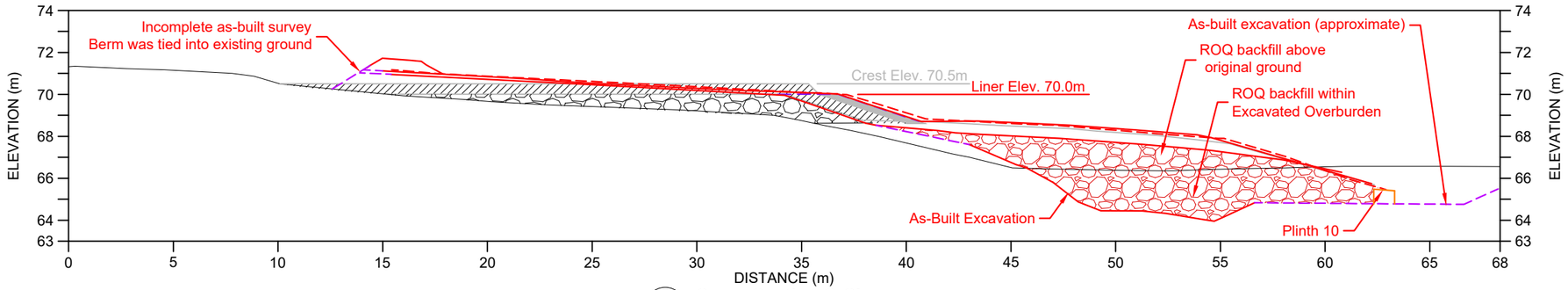
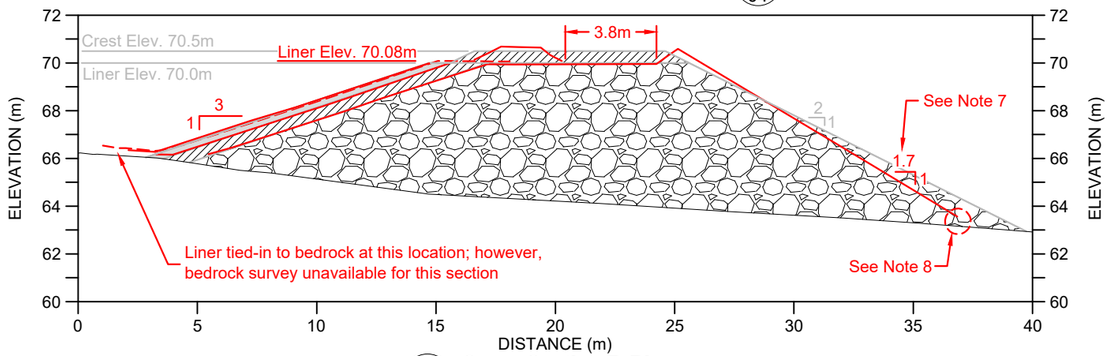
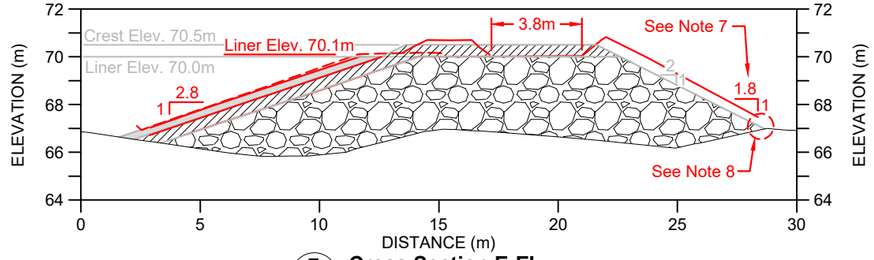


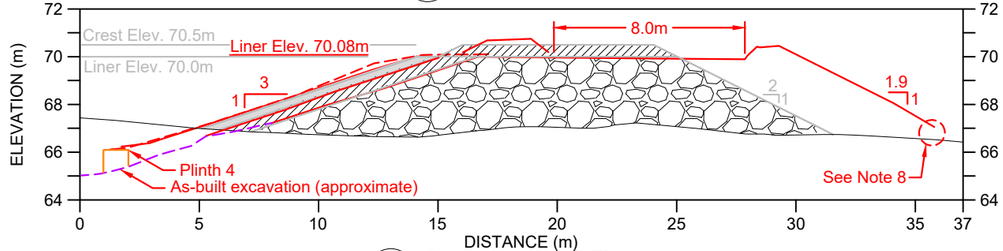
C 04 **Cross Section C-C'**



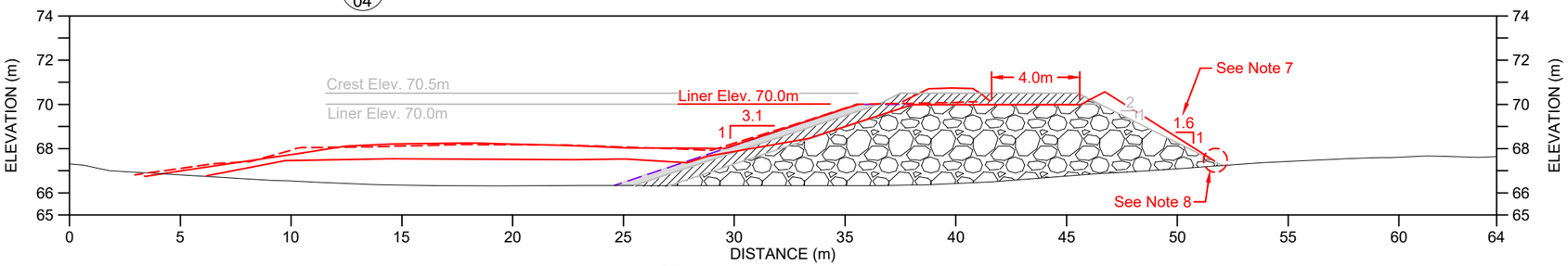
D 04 **Cross Section D-D'**



E 04 **Cross Section E-E'**



F 04 **Cross Section F-F'**



G 04 **Cross Section G-G'**

LEGEND

- Design Liner System
- As-Built Liner System
- As-Built Survey
- Design Bedding Material
- Design Transition Material
- Design Run of Quarry (ROQ) or Run of Mine (ROM) Material

NOTES

1. All dimensions shown in meters unless otherwise stated.
2. If overburden is encountered at the upstream toe, it will be excavated to bedrock to tie-in to the bedrock foundation. Thickness of excavation will vary and will depend on conditions encountered. Excavation to be backfilled with bedding material if necessary to protect the liner tie-in.
3. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Where the height of the berm exceeds 3.0m, safety berms or barriers are required on the crest. See Typical Berm Barrier Options on drawing MN-CWP-07.
6. As-built surveys provided by Sub-Arctic Geomatics Ltd. dated May 2019 - September 2019.
7. Stability analyses completed on over-steepend downstream slopes have been determined that the risk of instability is low. See Appendix D of the Madrid CWP As-Built Report for further details.
8. Updated topography survey not available. Difference is attributed to differences between LiDAR and actual field conditions.

0m 2 4 6 8 10

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	As-Built DESCRIPTION	CHK'D	APP'D	DATE
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RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - PP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: Contact Water Pond Typical Sections

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-06	6 OF 10	AB1

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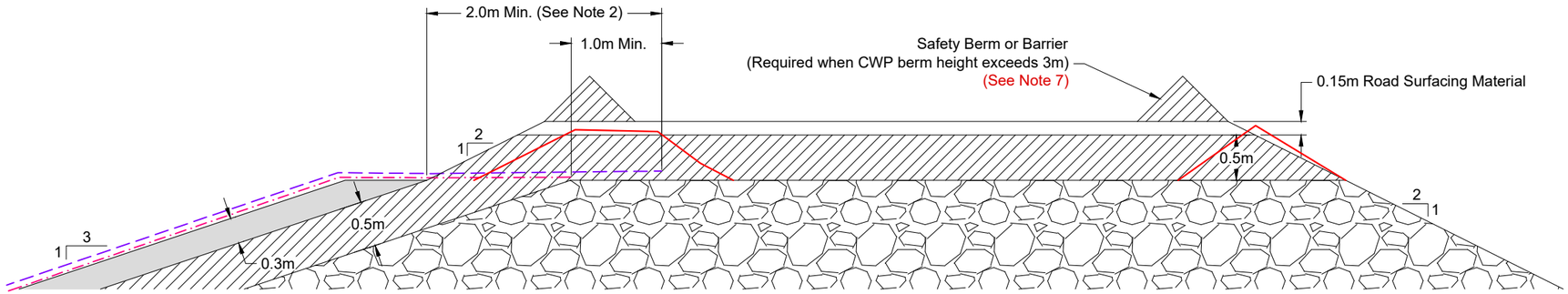
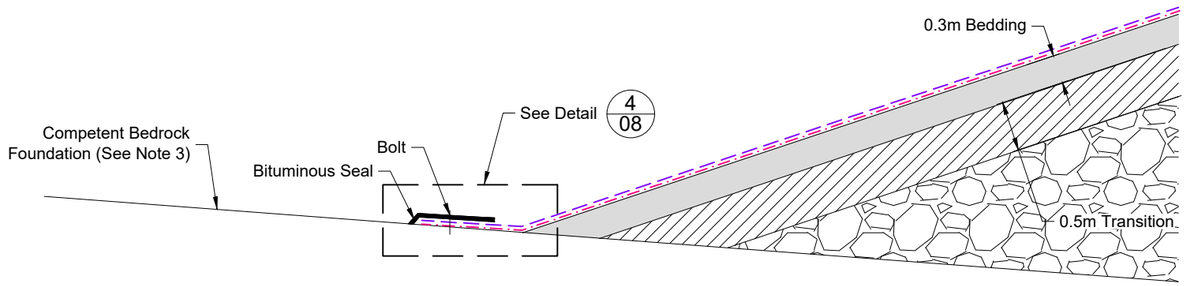
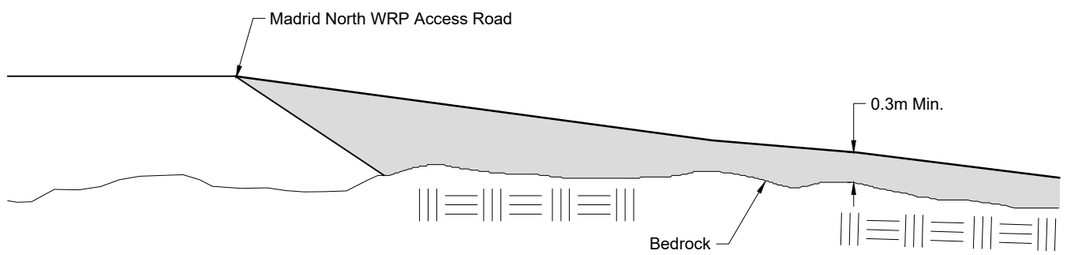


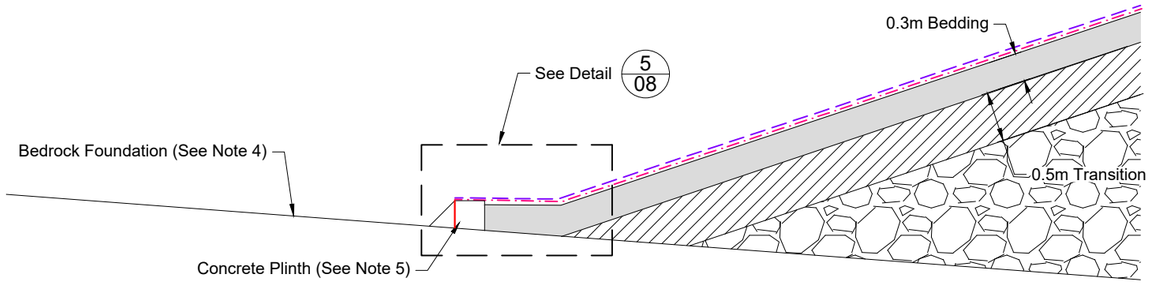
1/05 **Typical Liner Anchor Detail**



2/05 **Typical Liner Anchor at Bedrock - Mechanical Tie-down Option**
(Constructed as per design)



3/04,05 **CWP Access Road Detail**
(Constructed as per design)



2/05 **Typical Liner Anchor at Bedrock - Concrete Plinth Option (See Note 8)**

Typical Safety Berm or Barrier Options

0m 0.5 1.0 1.5 2.0m

LEGEND

- Liner
- Non-woven Geotextile
- Bedding Material
- Transition Material
- Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Bituminous Seal

NOTES

1. All dimensions shown in meters unless otherwise stated.
2. Minimum 1.0m liner overlap with ROQ/ROM material. Total covered liner overlap must be a minimum of 2.0m. Non-woven geotextile to terminate at ROQ/ROM.
3. If competent bedrock conditions are encountered, liner can be mechanically tied in to bedrock. A bituminous seal may also be applied. Bedrock conditions to be inspected and approved by field engineer.
4. If bedrock conditions are unfavourable (e.g. weathered, highly fractured) or the bedrock surface is highly irregular, a concrete plinth may be required to facilitate liner tie-in. Bedrock conditions to be inspected and approved by the field engineer.
5. Liner to be affixed to top of concrete plinth with GSE Polylock Concrete Embedment Strip or Approved Alterative. Steel reinforcement bars also required and should be typically drilled and grouted a minimum 450mm into bedrock.
6. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
7. Safety berms on the downstream crest edge were constructed with regular breaks to allow drainage and prevent ponding on the crest.
8. As-built concrete plinths varied in height as required to adapt to the field conditions. See the Madrid CWP As-Built Report for further details.
9. Safety berm height to suit light vehicles and water trucks.

REFERENCE DRAWINGS			REVISIONS								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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							A	Issued for Discussion	RW	EMR	19/03/05

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REGISTERED PROFESSIONAL ENGINEER — R.C. WILLIAMS — LICENSEE — 2020.03.24 — NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - PP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: Contact Water Pond Typical Details

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-07	7 OF 10	AB1

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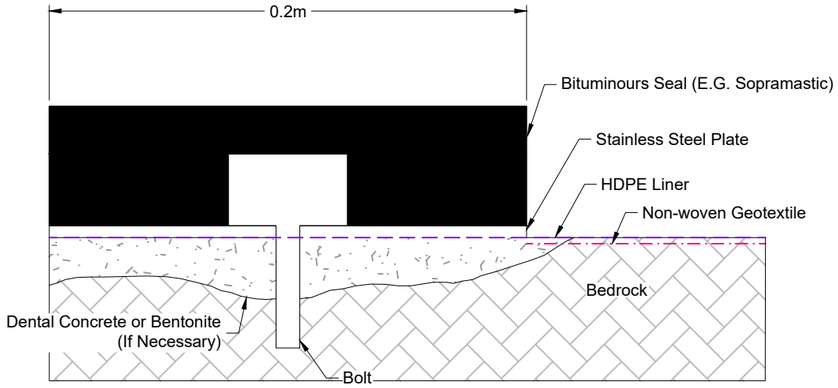
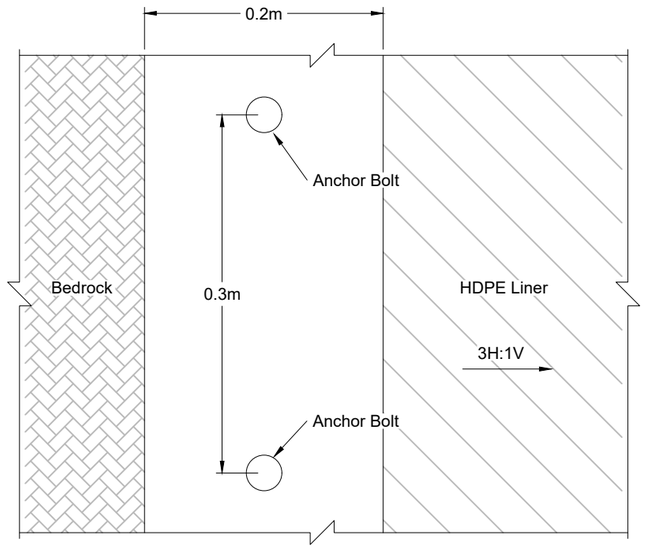


4/06 **Liner Anchored to Bedrock - Side View Typical Detail**

NOT TO SCALE

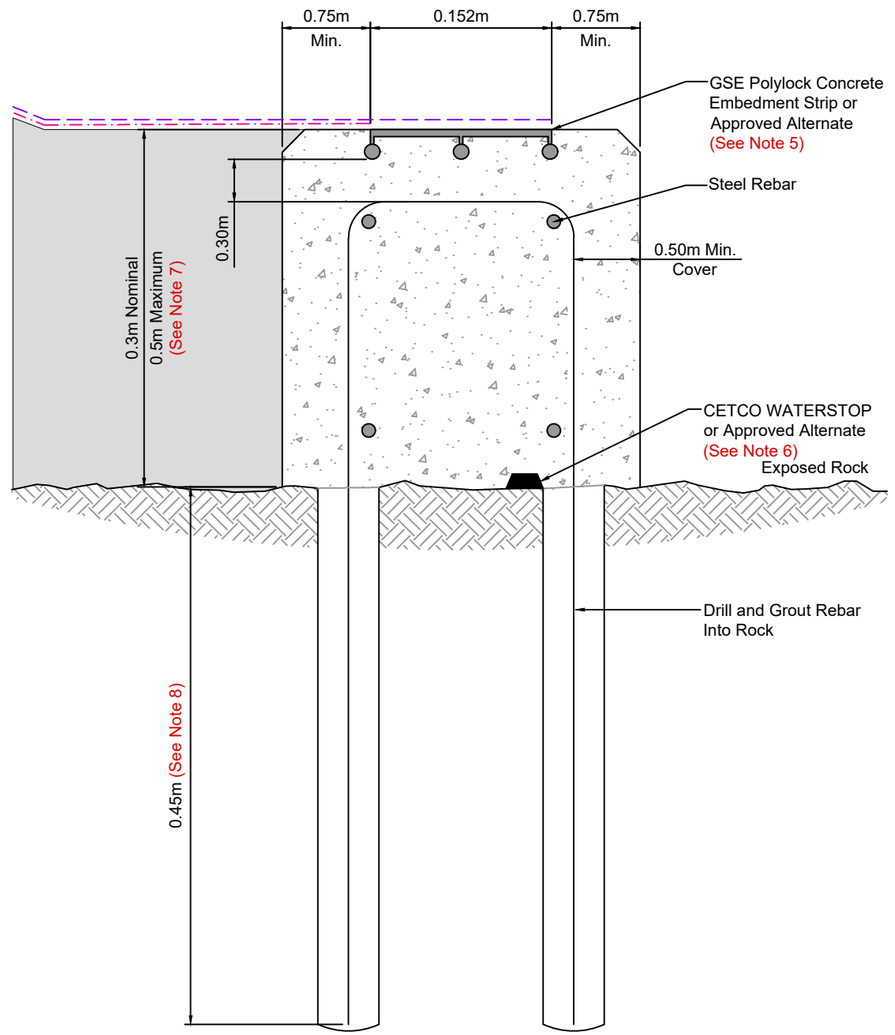
(Constructed as per design)



4/06 **Liner Anchored to Bedrock - Plan View Typical Detail**

NOT TO SCALE

(Constructed as per design)



5/06 **Liner Anchored to Concrete Plinth - Typical Detail**

0m 50 100 150 200

LEGEND

- HDPE Liner
- Non-woven Geotextile
- Bedding Material
- Concrete
- HDPE Liner
- Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Bedrock
- Bituminous Seal

NOTES

1. All dimensions shown in meters unless otherwise stated.
2. Bedrock conditions and contact point for the liner will be inspected in the field by the engineer. The engineer will make a final decision for the required adhesion method.
3. Typical details shown may vary and additional Details will be provided if required.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. GSE Polylock Concrete Embedment trip was not available. Instead, liner was bolted and anchored to top of concrete using stainless steel plate and bituminous seal as per detail 4.
6. CETCO Waterstop was not available. Instead, grout (Multicrete Sub Zero Grout) and mortar (Sikaset Plug) were used as necessary to fill bedrock fractures and any voids identified underneath plinths.
7. Where concrete plinths exceeded the maximum design height, bedding material fill was placed on both sides of the plinth for lateral support. Note that concrete plinths are not load bearing.
8. Maximum rebar embedment depth was approximately 0.3m due to equipment limitations.

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	--	--

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/24
0	Issued for Construction	RW	EMR	19/03/19
A	Issued for Discussion	RW	EMR	19/03/05

REVISIONS

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER R.C. WILLIAMS LICENSEE 2020.03.24 NT&NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - PP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE:

Liner Tie-in Typical Details

DRAWING NO. MN-CWP-08 | SHEET 8 OF 10 | REVISION NO. AB1

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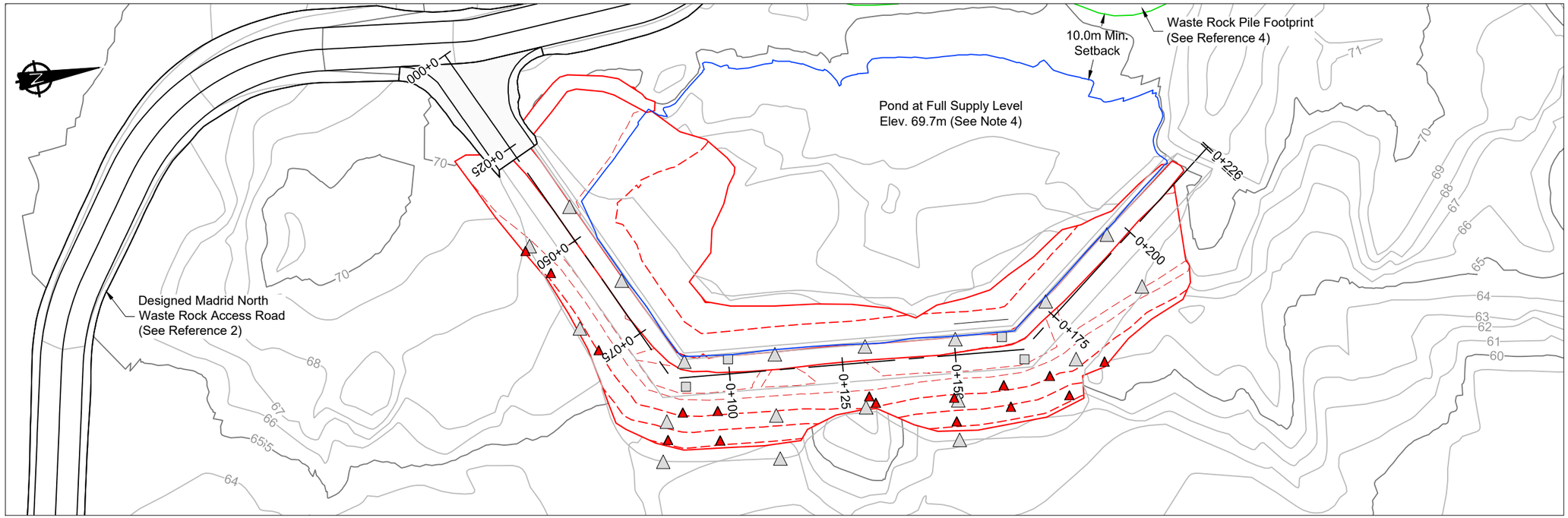
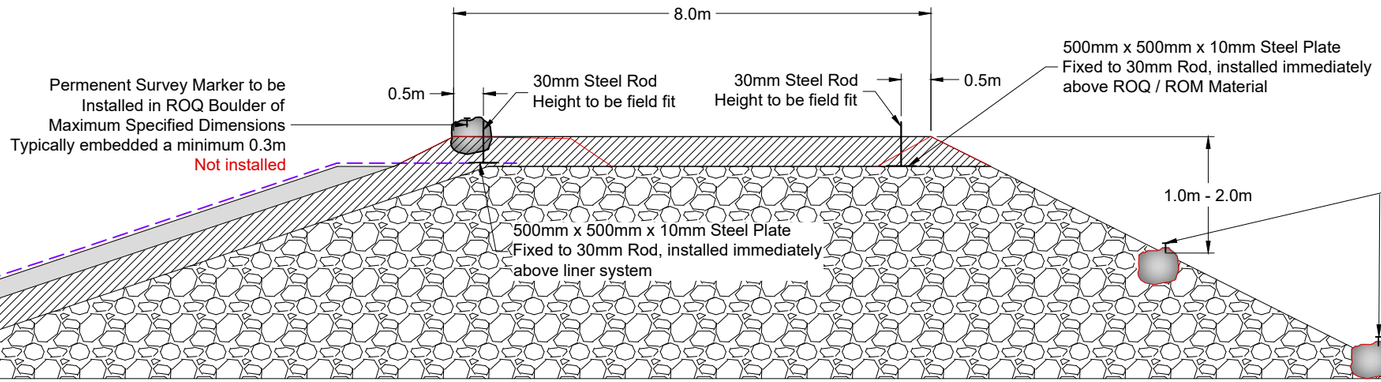


Contact Water Pond Berm Instrumentation Plan

0m 10 20 30 40



Surficial Survey Point Installation (as per design)

0m 1 2 3 4

LEGEND

- Design Surficial Survey Monitoring Point
- As-Built Surficial Survey Monitoring Point
- Design Settlement Monitoring Plate
- As-Built Settlement Monitoring Plate (See Note 7)
- Liner System
- Design Anticipated Overburden
- Contact Water Pond
- As-Built Contact Water Pond Berm
- Maximum Proposed Waste Rock Pile Footprint
- Design Bedding Material
- Design Transition Material
- Design Run of Quarry (ROQ) or Run of Mine (ROM) Material

NOTES

1. Contours shown at 1.0m intervals.
2. All dimensions shown in meters unless otherwise stated.
3. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
4. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
5. A total of 16 of the 19 proposed surficial settlement monitoring points were installed in the CWP berm. The surficial settlement monitoring points should be revisited, and if determined necessary by the design Engineer, the remaining points should be installed in the summer of 2020 after the snow has melted.
6. Construction access 'tote' road (MN-CWP-01 & 02) is not shown on this drawing.
7. Settlement monitoring plates were installed; however, as-built survey was unavailable at this time. It is recommended that they be surveyed in the summer of 2020.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope ay Project, Nunavut, Canada. Issued for Discussion. Revision A. Project No. 1CT022.043. March 2019.
3. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
4. Engineering Drawings for the Madrid North Waste Rock Pile, Hope Bay Project, Nunavut, Canada. Revision 1. Prepared for TMAC Resources Inc. Project Number: 1CT022.043. August 2019.
5. As-built surveys provided by Sub-Arctic Geomatics Ltd. dated May 2019 - September 2019.

REFERENCE DRAWINGS			REVISIONS								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	--	--	AB1	As-Built	RW	JBK	20/03/24
							0	Issued for Construction	RW	EMR	19/04/05
							A	Issued for Discussion	RW	EMR	19/04/04

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER R.C. WILLIAMS LICENSEE 2020.03.24 NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - Instrumentation Plan.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE:

Contact Water Pond Instrumentation Plan

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-09	9 OF 10	AB1

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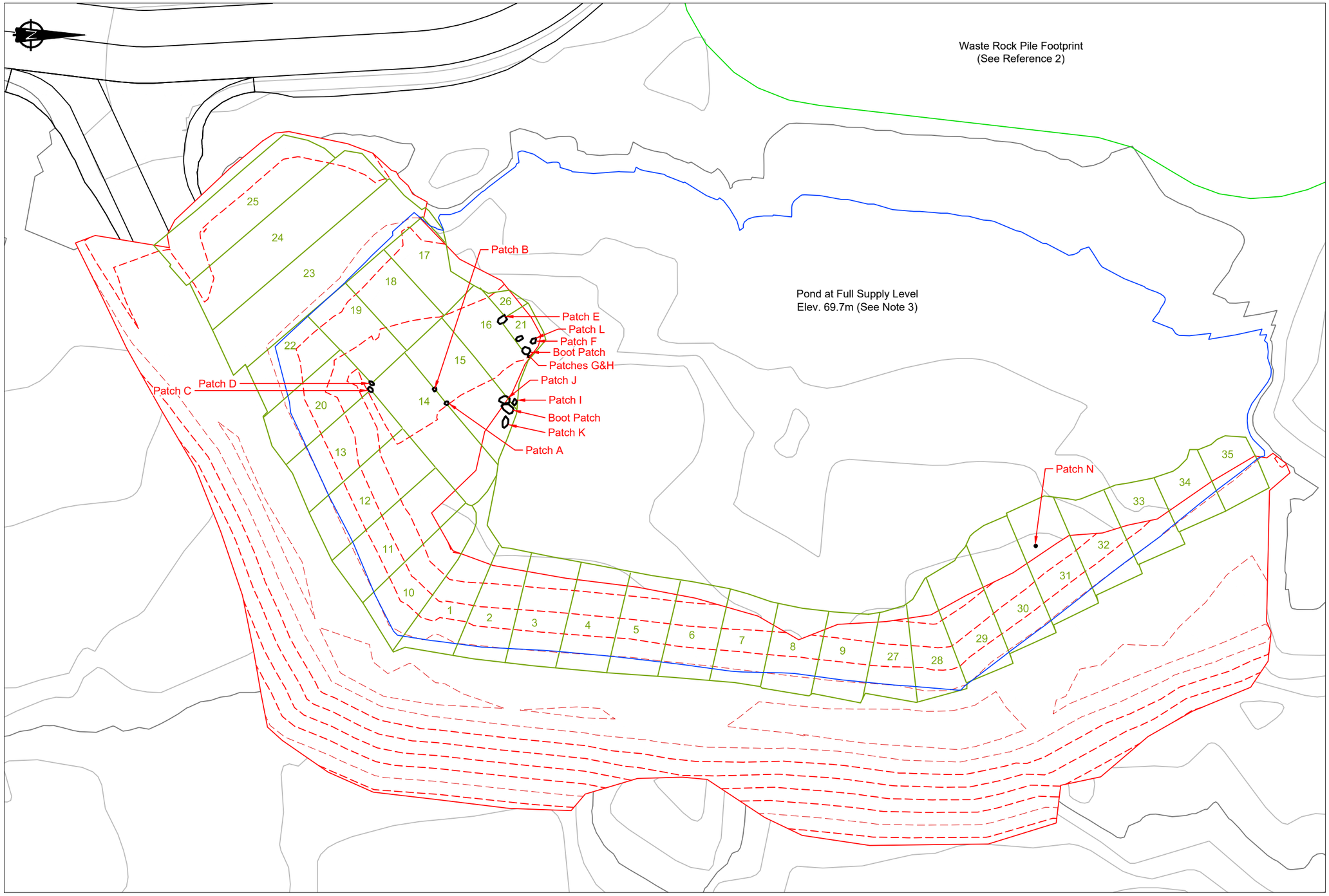

LEGEND

- As-Built Liner Panel
- As-Built Patch Panel
- As-Built Contact Water Pond Berm
- Maximum Proposed Waste Rock Pile Footprint
- Contact Water Pond

NOTES

1. Contours shown at 1.0m intervals.
2. All dimension shown in meters unless otherwise stated.
3. The CWP will normally be kept in a dry state with a maximum two-week (i.e. fourteen-day) residence time for water in the pond.
4. Liner installation and quality control provided by A&A Technical Services.
5. Construction access 'tote' road (MN-CWP01 & 02) is not shown on this drawing.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid North Waste Rock Pile, Hope Bay Project, Nunavut, Canada. Revision 1. Prepared for TMAC Resources Inc. Project Number: 1CT022.043. August 2019.
3. As-built surveys provided by Sub-Arctic Geomatics Ltd. dated May 2019 - September 2019.

0m 5 10 15 20

DRAWING NO.	DRAWING TITLE
--	--

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--
AB1	As-Built	RW	JBK	20/03/24

REVISIONS

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER — R.C. WILLIAMS — LICENSEE — 2020.03.24 — NT&NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 24, 2020

FILE NAME: 1CT022.043 - Liner Layout.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE:

As-Built Liner Panel Layout

DRAWING NO.	SHEET	REVISION NO.
MN-CWP-10	10 OF 10	AB1

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Attachment 2.3 Madrid North Contact Water Pond – Liner Installation Report

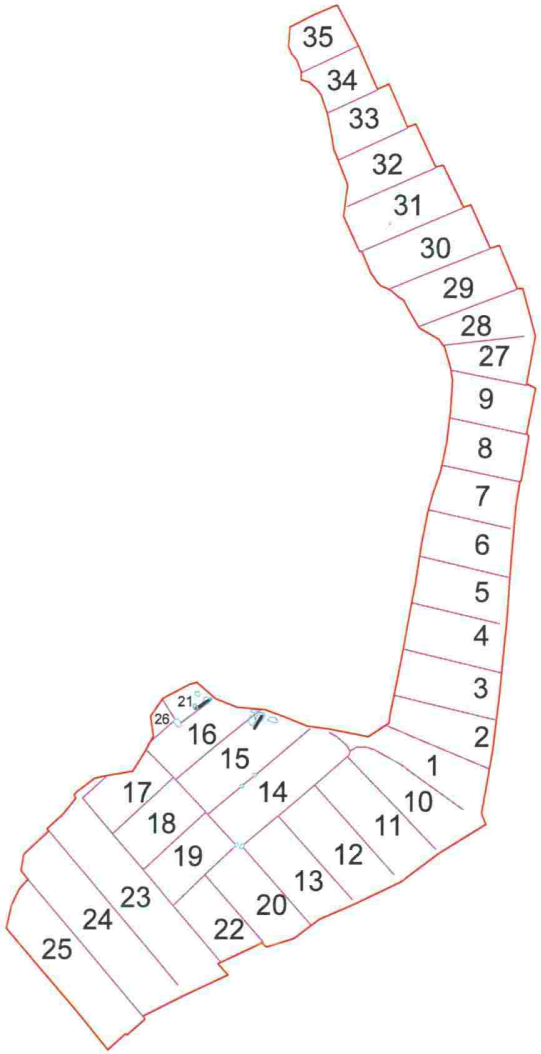
A&A Technical Services
Yellowknife NT

TMAC Resources
Hope Bay
Madrid CWP HDPE Liner installation
June 25 - July 24, 2019

A&A Technical Services
Yellowknife NT

TMAC Resources
Hope Bay
Madrid CWP HDPE Liner installation
June 25 - July 24, 2019

TECHNICAL SERVICES



NOTES:
ALL UNITS IN METRES U.N.O.

PERIMETER : 409 m

AREA : 3202 m2

DATA FILE(S):			REV	DESCRIPTION
DRAWN BY: Jean-Simon Hurtubise	CHECKED BY: Jean-Simon Hurtubise	SURVEYED BY: Jean-Simon Hurtubise		
DATE DRAWN: JULY 23 , 2019		DATE SURVEYED: JULY 19-23, 2019		
FILE NAME: CWP LINER ASB			SUB-ARCTIC GEOMATICS JOB NO.:	80003

Sub-Arctic Geomatics Ltd.
a CHALLENGER GEOMATICS LTD. company

BOX 2441 YELLOWKNIFE
NORTHWEST TERRITORIES
X1A 2P8
PHONE: 867-873-2047 FAX: 867-873-9079
WEB: WWW.SUB-ARCTIC.CA
EMAIL: SAG@SUB-ARCTIC.CA

TMAC RESOURCES

HOPE BAY PROJECT

HOPE BAY

CWP LINER AS BUILT

DRAWING NO.	SHEET	REVISION NO.
CWP LINER ASB	1 OF 1	0

A&A Technical Services
Yellowknife NT

TMAC Resources
Hope Bay - Madrid CWP HDPE Liner
Panel log

Panel #	Solmax roll number	Length m	width	m2
P-1	138390	22.5	6.7	150.8
P-2	138390	14.5	6.7	99.3
P-3	138390	14.3	6.7	97.2
P-4	138390	14.5	6.7	95.8
P-5	138390	13.5	6.7	97.2
P-6	138390	11.8	6.7	90.5
P-7	138390	11.4	6.7	79.1
P-8	138390	11.0	6.7	76.4
P-9	138390	12.0	6.7	73.7
P-10	138390	11.0	6.7	80.4
P-11	138390	16.0	6.7	73.7
P-12	138390	15.0	6.7	107.2
P-13	138390	15.0	6.7	100.5
P-14	138390	19.5	6.7	100.5
P-15	138390	18.4	6.7	130.7
P-16	138390	17.6	6.7	123.3
P-17	138390	6.0	6.7	117.9
P-18	138390	12.0	6.7	40.2
P-19	138390	12.0	6.7	80.4
P-20	138401	12.0	6.7	80.4
P-21	138401	7.0	6.7	80.4
P-22	138401	11.3	2.3	46.9
P-23	138401	28.5	6.7	26.0
P-24	138401	27.1	6.7	191.0
P-25	138401	28.1	6.7	181.6
P-26	138401	3.7	1.1	188.3
P-27	138401	4.0	5.5	4.1
P-28	138401	11.2	5.5	22.0
P-29	138401	14.5	6.8	61.6
P-30	135267	14.7	6.6	98.6
P-31	135267	16.1	6.7	97.0
P-32	135267	15.1	6.7	107.9
P-33	135267	11.5	6.7	101.2
P-34	135267	9.1	6.7	77.1
P-35	135267	7.9	6.7	61.0
P-36	135267	8.9	6.7	52.9
			Total m2	**3292.26**

A&A Technical Services
Yellowknife NT
June/July 2019

TMAC Resources
Hope Bay - Madrid CWP HDPE Liner
Daily welder qualifiction tests

Peel strength Temp. 400 C Speed 2.3m/minute

28-Jun-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	136	141	91
2	140	140	91
3	142	136	91
4	145	142	91
28-Jun-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	161		120
2	155		120

Peel strength Temp. 400 C Speed 2.3m/minute

05-Jul-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	144	135	91
2	146	150	91
3	148	151	91
4	146	149	91
05-Jul-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	161		120
2	160		120

Peel strength Temp. 400 C Speed 2.3m/minute

08-Jul-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	140	142	91
2	146	138	91
3	139	144	91
4	142	145	91
08-Jul-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	158		120
2	155		120

A&A Technical Services
Yellowknife NT
June/July 2019

TMAC Resources
Hope Bay - Madrid CWP HDPE Liner
Daily welder qualifiction tests

Peel strength Temp. 400 C Speed 2.3m/minute

16-Jul-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	144	142	91
2	140	137	91
3	148	142	91
4	139	139	91
16-Jul-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	158		120
2	161		120

Peel strength Temp. 400 C Speed 2.3m/minute

22-Jul-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	144	145	91
2	135	139	91
3	140	143	91
4	145	140	91
22-Jul-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	153		120
2	159		120

Extrusion welder qualification Preheat 250 C Extrudite 250 C

08-Jul-19	**Peel strength**		Minimum ppi (lbs/inch)
1	138		78
2	144		78
	Shear Strength		
1	158		120
2	152		120

Extrusion welder qualification Preheat 250 C Extrudite 250 C

22-Jul-19	**Peel strength**		Minimum ppi (lbs/inch)
1	141		78
2	139		78
	Shear Strength		
1	162		120
2	158		120

A&A Technical Services
Yellowknife NT
June/July 2019

TMAC Resources
Hope Bay - Madrid CWP HDPE Liner

Non destructive air pressure testing of wedge weld seams. (5minutes)

Date	Technician	Seam location	Start psi	Finish psi	Pass/Fail	Comments
28-Jun-19	AH	P1-P2	35	35	Pass	
28-Jun-19	AH	P2-P3	30	30	Pass	
28-Jun-19	AH	P-3-P4	32	32	Pass	
28-Jun-19	AH	P-4-P5	32	32	Pass	
28-Jun-19	AH	P-5-P-6	35	35	Pass	
28-Jun-19	AH	P6-P7	30	30	Pass	
03-Jul-19	AH	P7-P8	30	30	Pass	Witnessed by SRK
03-Jul-19	AH	P8-P9	35	35	Pass	
05-Jul-19	AH	P1-P10	30	30	Pass	
05-Jul-19	AH	P10-P11	35	35	Pass	
05-Jul-19	AH	P11-P12	35	35	Pass	
05-Jul-19	AH	P12-P13	35	35	Pass	
08-Jul-19	AH	P14-P15a	35	35	Pass	
08-Jul-19	AH	P14-P15b	32	32	Pass	
08-Jul-19	AH	P15-P16	35	35	Pass	
16-Jul-19	GH	P17-P18	30	30	Pass	
16-Jul-19	GH	P18-P19	30	30	Pass	
16-Jul-19	GH	P13-P20	30	30	Pass	
16-Jul-19	GH	P20-P22	30	30	Pass	
16-Jul-19	GH	Toe P11	30	30	Pass	
16-Jul-19	GH	Toe P12	30	30	Pass	
16-Jul-19	GH	Toe P13	30	30	Pass	
16-Jul-19	GH	Toe P20	30	30	Pass	
16-Jul-19	GH	Toe P22	30	30	Pass	
16-Jul-19	GH	P22-P23	30	30	Pass	
17-Jul-19	GH	P19-P23	30	30	Pass	
17-Jul-19	GH	P18-P23	30	30	Pass	
17-Jul-19	GH	P17-P23	30	30	Pass	
17-Jul-19	GH	P23-P24	30	30	Pass	
17-Jul-19	GH	P21-P26	32	32	Pass	
17-Jul-19	GH	P26-P16	30	30	Pass	
22-Jul-19	GH	P9-P27	30	30	Pass	
22-Jul-19	GH	P27-P28	30	30	Pass	
22-Jul-19	GH	P28-P29	30	30	Pass	

P1 = Liner panel number in relation to drawing

A&A Technical Services
Yellowknife NT
June/July 2019

TMAC Resources
Hope Bay - Madrid CWP HDPE Liner

Non destructive air pressure testing of wedge weld seams. (5minutes)

Date	Technician	Seam location	Start psi	Finish psi	Pass/Fail	Comments
22-Jul-19	GH	P29-P30	30	30		
22-Jul-19	GH	P30-P31	30	30		
22-Jul-19	GH	P31-P32	30	30		
22-Jul-19	GH	P32-P33	30	30		
22-Jul-19	GH	P34-P35	30	30		
	Vaccum box testing of extrusion patches					
Date	Technician	Location			Pass/Fail	
18-Jul-19	patches on seam				Pass	
		P14-P15				
18-Jul-19	Patches at toe of				Pass	
		P20 and P13				
22-Jul-19	Patches on P15-P16-P26				Pass	

P1 = Liner panel number in relation to drawing

CERTIFIED WELDING TECHNICIAN

The International Association of Geosynthetic Installers
Certifies:

ALAN HARMAN

As a **Certified Welding Technician**, in polyethylene wedge and extrusion welding, having demonstrated superior hands-on skills, knowledge and experience in the welding and installation of polyethylene (PE) geomembranes, and having basic mechanical aptitude for working with welders and equipment on the job site.
Registration number: **CWT162010**

Valid 07 June 2016 — 07 June 2021

International Association of Geosynthetic Installers

President, IAGI

Managing Director, IAGI

CERTIFIED WELDING TECHNICIAN

The International Association of Geosynthetic Installers
Certifies:

GUY HORESAY

As a **Certified Welding Technician**, in polyethylene wedge and extrusion welding, having demonstrated superior hands-on skills, knowledge and experience in the welding and installation of polyethylene (PE) geomembranes, and having basic mechanical aptitude for working with welders and equipment on the job site.
Registration number: **CWT170010**

Valid 07 June 2016 — 07 June 2021

International Association of Geosynthetic Installers

President, IAGI

Managing Director, IAGI

A&A Technical Services
Subgrade acceptance and warranty

Client –TMAC Resources
Hope Bay
Madrid CWP HDPE Liner installation
June 25 - July 24, 2019

Upon arrival to site the fuel tank pad area to be lined was thoroughly inspected by A&A Technical Services installation supervisor and deemed to be a suitable surface on which to place the HDPE lining system. The SOLMAX 60mil textured HDPE liner was under laid with a layer of 540g/m2 non-woven geotextile supplied by the client.

Warranties issued by A&A Technical Services shall cover only the cost of replacement and/or repair of defective installations, determined or agreed to be the responsibility of A&A Technical Services, provide that the warranty work will be performed to the same standards and scope of work set out in the contract documents. A&A's installation warranty shall commence upon acceptance of the individual geosynthetic components by the owner or its representative as such components are completed. The installation warranty period shall not exceed beyond 1 years. Our installation warranty is rendered null and void if the installed geosynthetics are subject to abuse by machinery, equipment or personnel not under the control of A&A, harmful chemicals or unusual weather conditions or catastrophic earthworks failures.

A&A Technical Services shall not be held liable for defects, damage and/or deficient materials and installations, either in whole or in part should the defects, damage or deficient materials and installations arise as the result from the use of poor quality and inappropriate or unsuitable earthworks material or site preparation. This limitation of liability extends to improper and/or construction techniques, and methods and equipment used to create the earthworks covering all or any portion of the completed geosynthetic installation.

Signed: Allan Harman Dated: July 25, 2019

Al Harman
President
A&A Technical Services
Yellowknife NT

Attachment 3 – Madrid North Waste Rock Pile

Attachment 3.1 Madrid North Waste Rock Pile – IFC Drawings

Engineering Drawings for the Madrid North Waste Rock Pile

Hope Bay Project, Nunavut, Canada

Active Drawing Status

Drawing Number	Drawing Title	Issue	Date	Revision
MN-WRP-01	Existing Conditions (with orthophoto)	Issued for Construction	2019/08/13	1
MN-WRP-02	Existing Conditions	Issued for Construction	2019/08/13	1
MN-WRP-03	Existing Drainage Flowpaths	Issued for Construction	2019/08/13	1
MN-WRP-04	Waste Rock Pile Pad - Part 1	Issued for Construction	2019/08/13	1
MN-WRP-05	Waste Rock Pile Pad - Part 2	Issued for Construction	2019/08/13	1
MN-WRP-06	Waste Rock Pile Pad Sections	Issued for Construction	2019/08/13	1
MN-WRP-07	Waste Rock Pile	Issued for Construction	2019/08/13	1
MN-WRP-08	Waste Rock Pile Sections	Issued for Construction	2019/08/13	1
MN-WRP-09	Typical Details	Issued for Construction	2019/08/13	1
MN-WRP-10	Typical Sump Details	Issued for Construction	2019/08/13	0

MAC RESOURCES

srk consulting

Project Number: 1CT022.043

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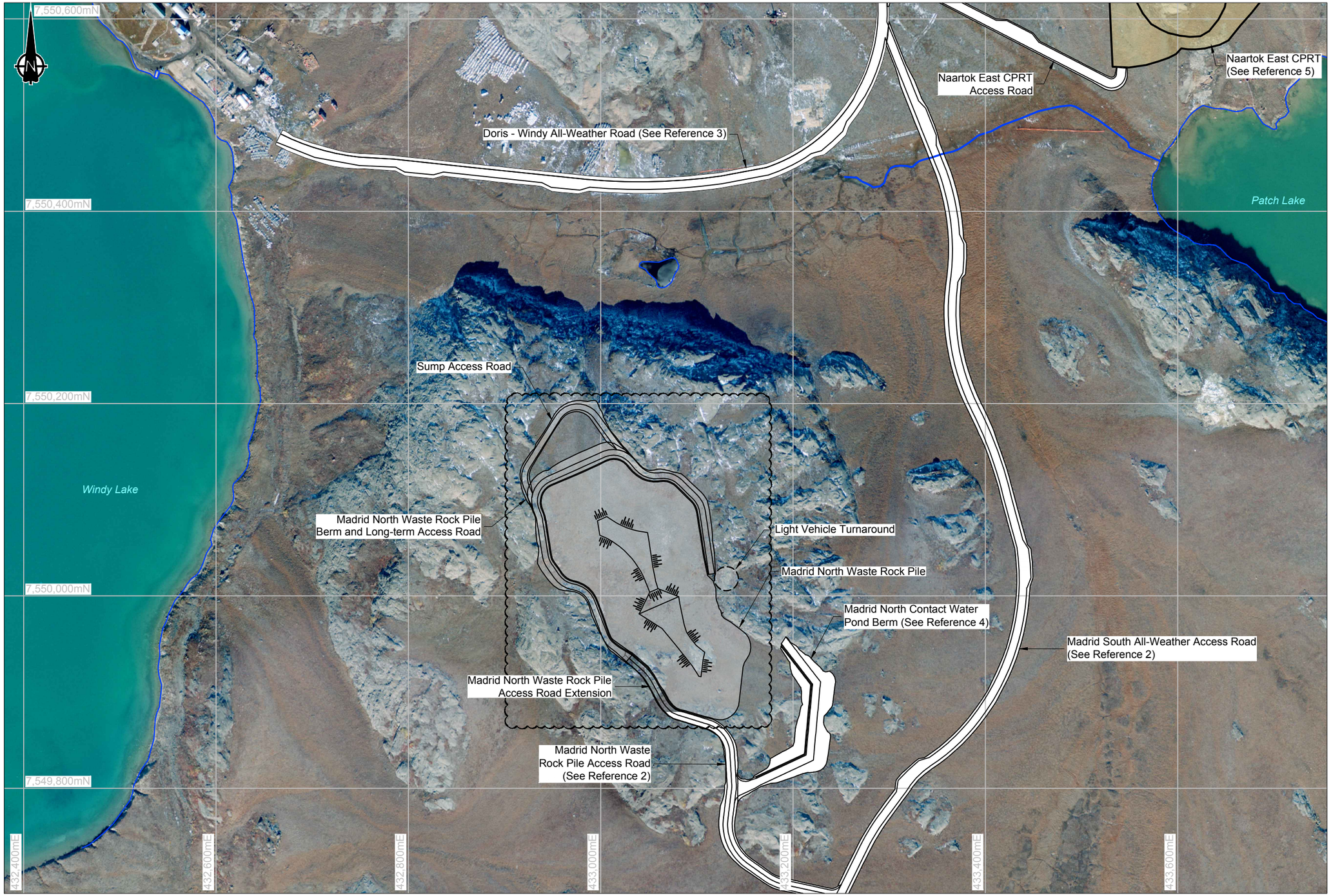

LEGEND

- Proposed Infrastructure
- Streams and Waterbodies
- Crown Pillar Recovery Trench
- Proposed Infrastructure
- Previously Submitted Designs

NOTES

1. All units are in meters unless otherwise specified.
2. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
3. Imagery provided by client.
4. Madrid North Waste Rock Pile permitting design provided in Reference 5.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
5. Engineering Permitting Drawings for the Madrid North DEIS Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.

0m 40 80 120 160

DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
1	Issued for Construction	RW	JBK	19/08/12
0	Issued for Construction	RW	JBK	19/06/14
A	Issued for Discussion	--	--	--

REVISIONS

Original Drawings Stamped and Signed by Engineer

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CH	JBK	2019/08/12

FILE NAME: 1CT022.043 - EC.dwg

TMAC RESOURCES

Hope Bay Project

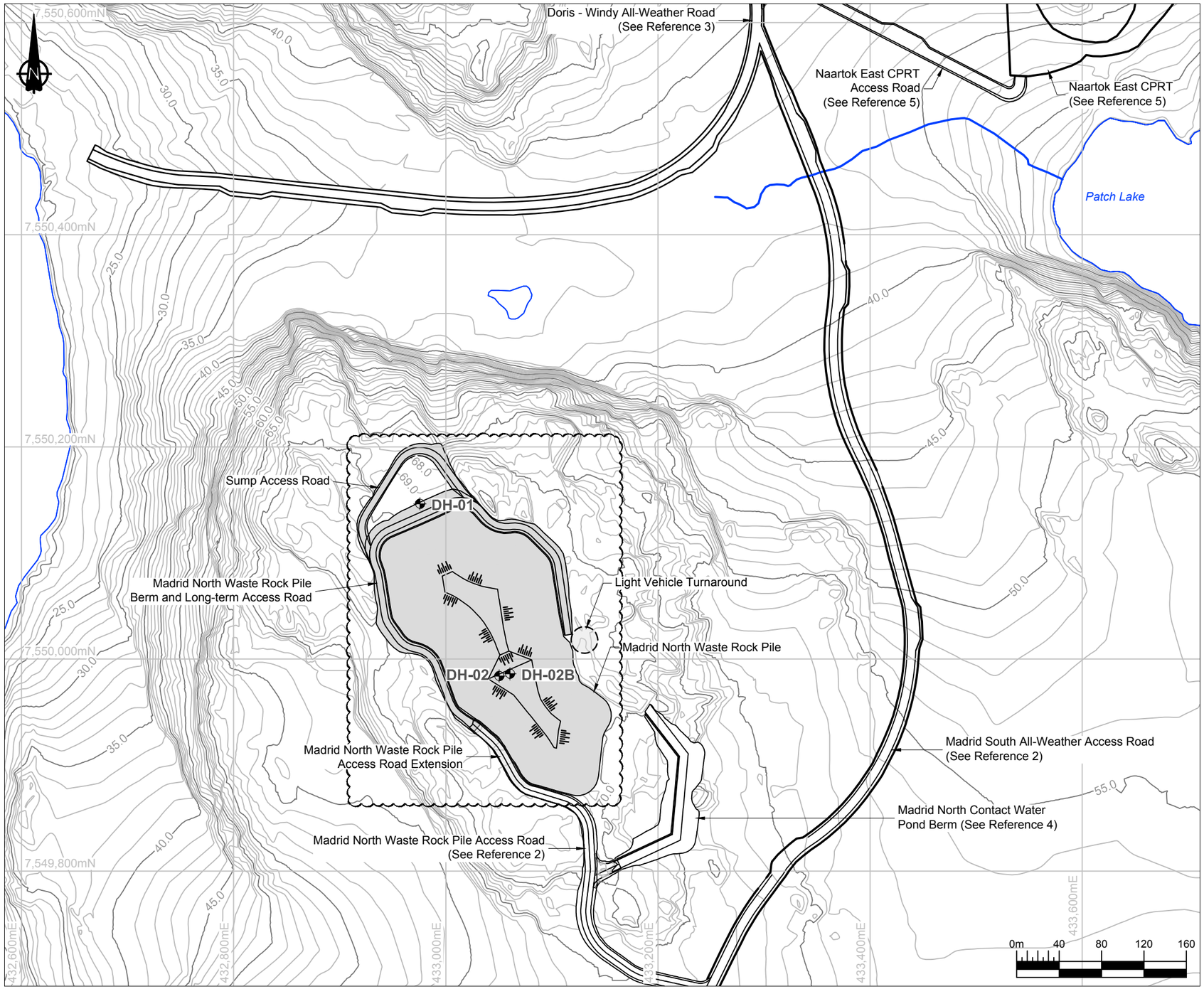
SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Existing Conditions (with orthophoto)

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-01	1 OF 10	1

P:\01_SITES\Hope Bay\ACAD\IFC\Madrid North WRD\1CT022.043 - EC.dwg



LEGEND

- SRK 2018 Site Investigation Borehole
- Proposed Road
- Streams and Waterbodies
- Proposed Infrastructure

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 1.0m intervals.
3. All units shown in meters unless otherwise specified.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Madrid North Waste Rock Pile permitting design provided in Reference 5.

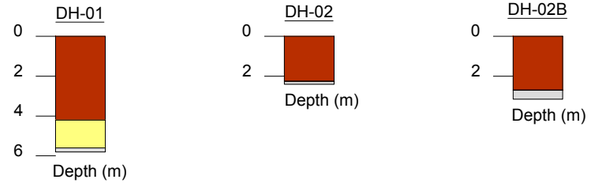
REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
5. Engineering Permitting Drawings for the Madrid North DEIS Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.

STRATIGRAPHIC LEGEND

- Clay / Silt
- Sand / Gravel
- Bedrock

STRATIGRAPHY SECTIONS



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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
1	Issued for Construction	RW	JBK	19/08/12
0	Issued for Construction	RW	JBK	19/06/14
A	Issued for Discussion	--	--	--

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CH	JBK	2019/08/12

FILE NAME: 1CT022.043 - EC-contours.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Existing Conditions

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-02	2 OF 10	1

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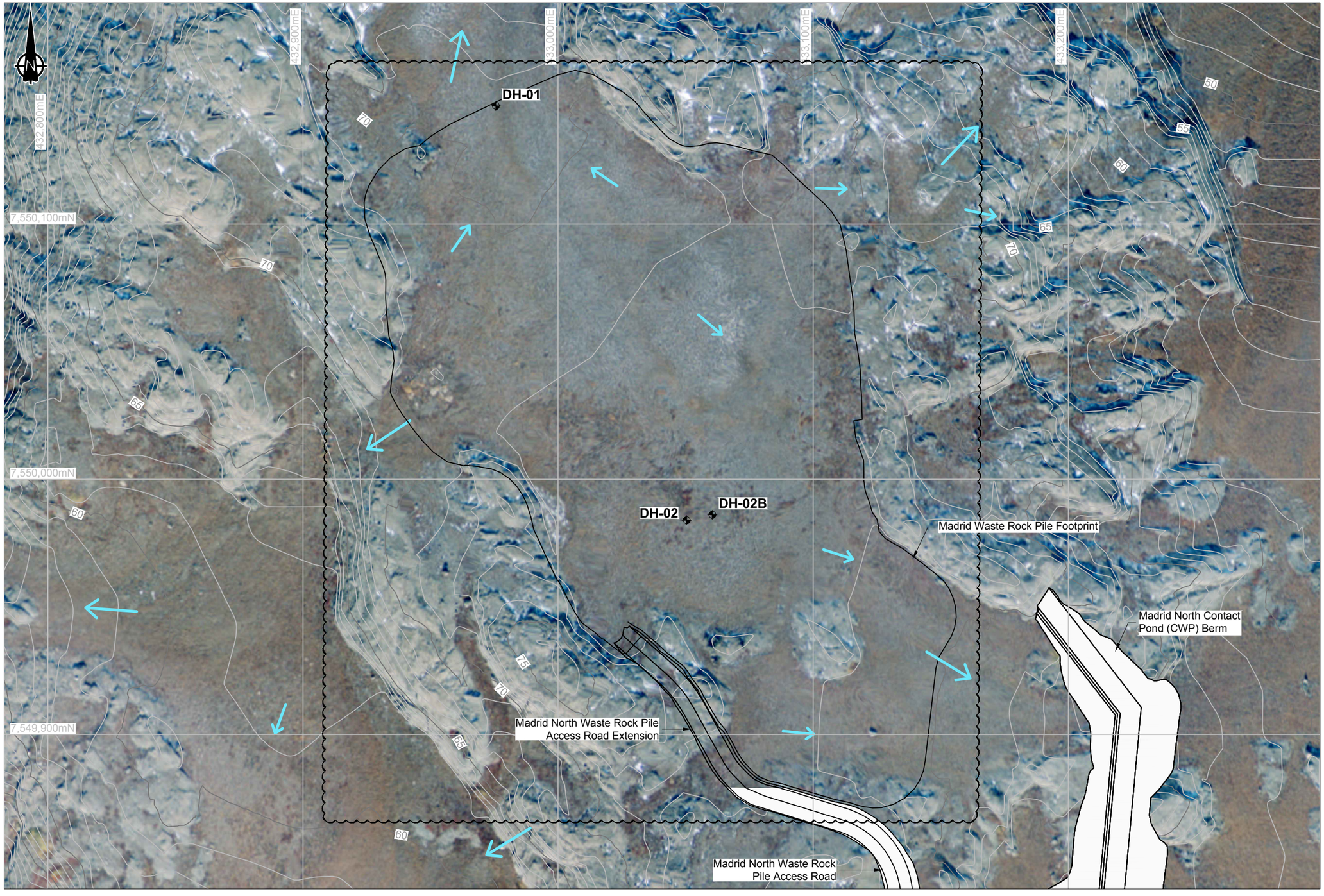

LEGEND

- SRK 2018 Site Investigation Borehole
- Drainage Direction
- Proposed Infrastructure Footprint
- Previous Submitted Design

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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 advice the Construction Manager and Engineer of any differences.
2. All units are in meters unless otherwise specified.
3. Contours shown at 1.0m intervals based on 2007 LiDAR survey.
4. Imagery provided by client.
5. Drainage pathway analysis completed using Autodesk AutoCAD Civil 3D 2018 and available topographic data.

REFERENCES

1. NAD83 UTM Zone 13.

0m 10 20 30 40 50 60

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
1	Issued for Construction	RW	JBK	19/08/12
0	Issued for Construction	RW	JBK	19/06/14
A	Issued for Discussion	--	--	--

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CH	JBK	2019/08/12

FILE NAME: 1CT022.043 - Drainage.dwg

MAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Existing Drainage Flowpaths

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-03	3 OF 10	1

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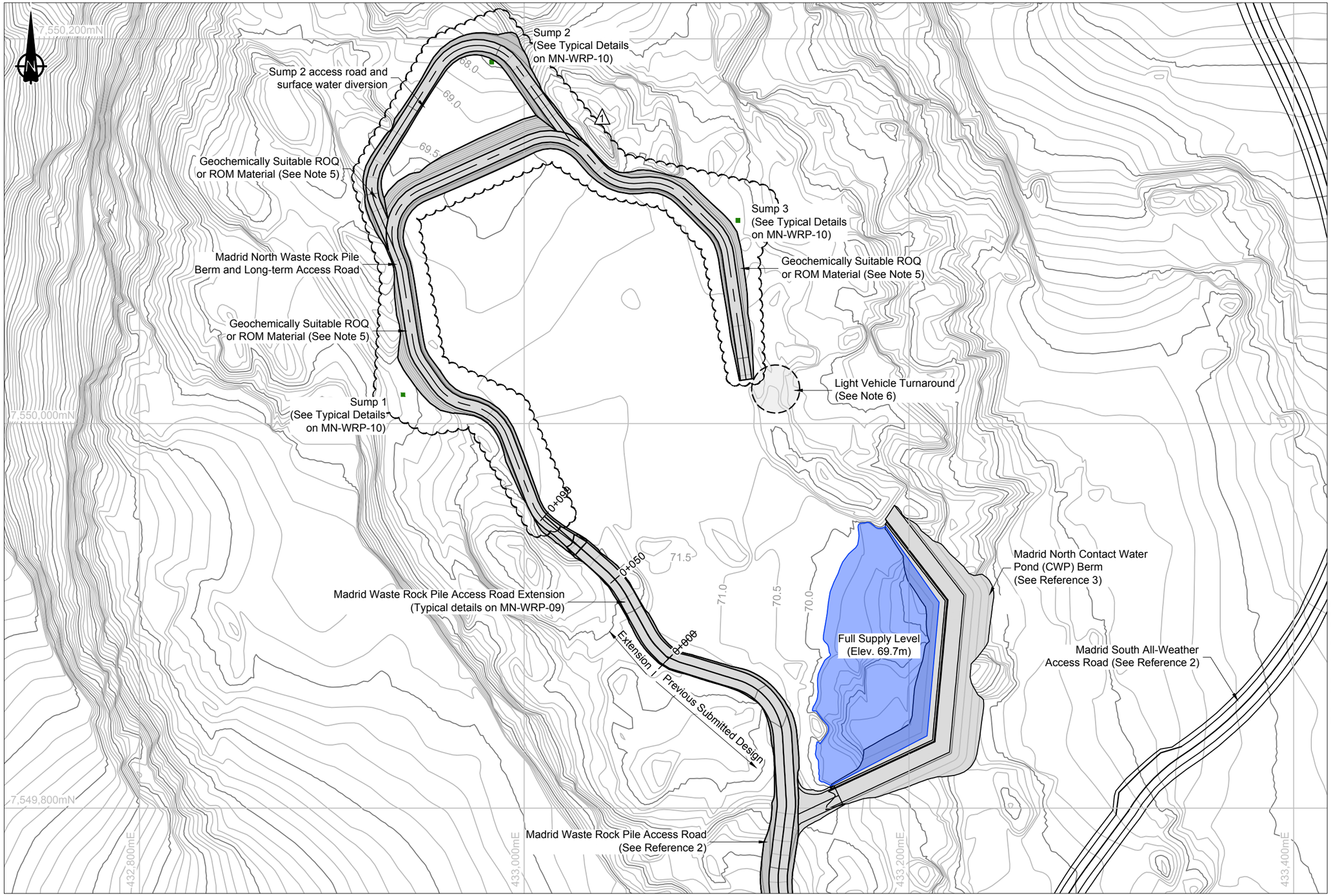

LEGEND

- Sump Location
- Contact Water Pond
- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 0.5m intervals.
3. All units shown in meters unless otherwise specified.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Geochemically suitable ROQ or ROM to be built as per ROQ technical specifications.
6. Light vehicle turnaround to be field fit to facilitate long-term access. (1)

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Report prepared for TMAC Resources. Project Number 1CT022.043. March 2019.

SUMP LOCATIONS

ID	Northing	Easting
Sump 1	7550014.85	432936.92
Sump 2	7550187.98	432983.03
Sump 3	7550105.44	433111.08

(1)

0m 20 40 60 80

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
1	Issued for Construction	RW	JBK	19/08/12
0	Issued for Construction	RW	JBK	19/06/14

REVISIONS

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RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2019/08/12

FILE NAME: 1CT022.043 - Pad Berms.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Waste Rock Pile Pad - Part 1

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-04	4 OF 10	1

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Sump 2
(See Typical Details
on MN-WRP-10)

Run of Mine (See Note 5)

Sump 2 access road and
surface water diversion

Geochemically Suitable ROQ
or ROM Material

Sump 3
(See Typical Details
on MN-WRP-10)

Madrid North Waste Rock Pile Pad

Madrid North Waste Rock Pile
Berm and Long-term Access Road

Geochemically Suitable ROQ
or ROM Material

Geochemically Suitable ROQ
or ROM Material

Min. 0.5% Drainage
to the CWP

0.5%

Min. 0.5% Drainage
to the CWP

Light Vehicle Turnaround
(See Note 6)

Sump 1
(See Typical Details
on MN-WRP-10)

Madrid North Contact Water
Pond (CWP) Berm
(See Reference 3)

Madrid South All-Weather
Access Road (See Reference 2)

Madrid Waste Rock Pile Access Road Extension
(Typical details on MN-WRP-09)

Extension

Previous Submitted Design

Full Supply Level
(Elev. 69.7m)

Madrid Waste Rock Pile Access Road
(See Reference 2)

7,550,200mN
7,550,000mN
7,549,800mN
432,800mE
433,000mE
433,200mE
433,400mE

LEGEND

- Sump Location
- Approximate Catchment Boundary
- Contact Water Pond
- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Compacted and Sorted Run of Mine Material

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 0.5m intervals.
3. All units shown in meters unless otherwise specified.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Compacted and Sorted Run of Mine Material to be built as per ROQ technical specifications, with maximum particle size reduced to 0.75m.
6. Light vehicle turnaround to be field fit to facilitate long-term access. (1)
7. As-built survey of compacted pad layers is required. Final as-built survey of the pad and berms is required before waste rock for the waste rock pile can be placed.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Report prepared for TMAC Resources. Project Number 1CT022.043. March 2019.

0m 20 40 60 80

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MN-WRP-06	Waste Rock Pile Pad Sections	- -	- -	- -	- -	- -	A	Issued for Discussion	--	--	--
							0	Issued for Construction	RW	JBK	19/06/14
							1	Issued for Construction	RW	JBK	19/08/13

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DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2018/08/12

FILE NAME: 1CT022.043 - GA-max.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Waste Rock Pile Pad - Part 2

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-05	5 OF 10	1

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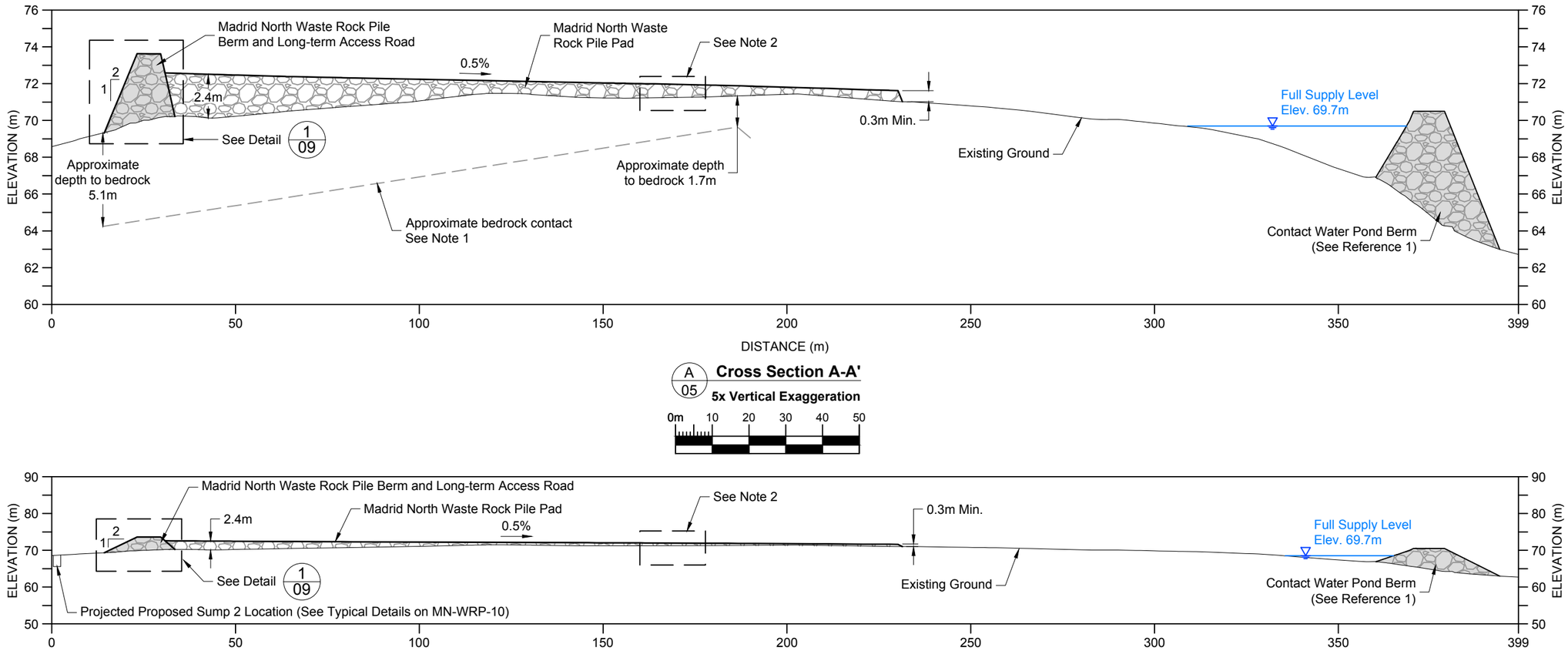


A/05 **Cross Section A-A'**

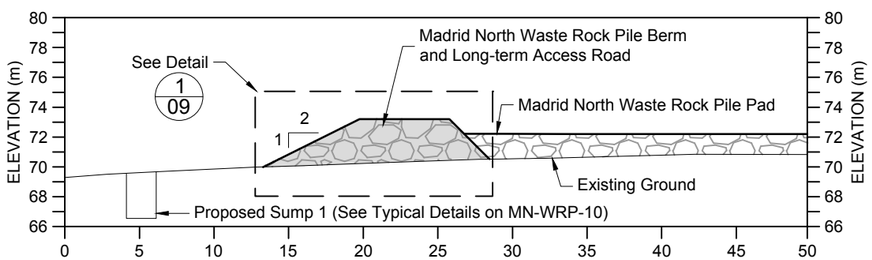
5x Vertical Exaggeration

0m 10 20 30 40 50

A/05 **Cross Section A-A'**

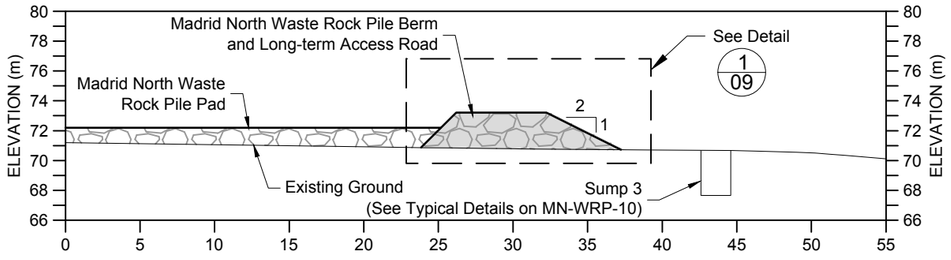
1x Vertical Exaggeration

0m 10 20 30 40 50



B/05 **Cross Section B-B'**

0m 4 8 12 16



C/05 **Cross Section C-C'**

0m 4 8 12 16

LEGEND

- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Compacted and Sorted Run of Mine Material

NOTES

1. Approximate bedrock contact based on 2018 borehole investigation locations shown on drawing MN-WRP-02.
2. Pad thickness is less than maximum allowable particle size of 0.75m. Additional sorting will be required.
3. Compacted and Sorted Run of Mine Material to be built as per ROQ technical specifications, with maximum particle size reduced to 0.75m.
4. As-built survey of compacted pad layers is required. Final as-built survey of the pad and berms is required before waste rock for the waste rock pile can be placed.
5. Safety barriers required when berm and long-term access roads is 3m or higher in height.

REFERENCE

1. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.

REFERENCE DRAWINGS		REVISIONS								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MN-WRP-09	Typical Details	--	--	--	--	--	A	Issued for Discussion	--	--	--
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							1	Issued for Construction	RW	JBK	19/08/12

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CHECKED:	APPROVED:	DATE:
CH	JBK	2018/08/12

FILE NAME: 1CT022.043 - GA-max.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Waste Rock Pad Sections

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-06	6 OF 10	1

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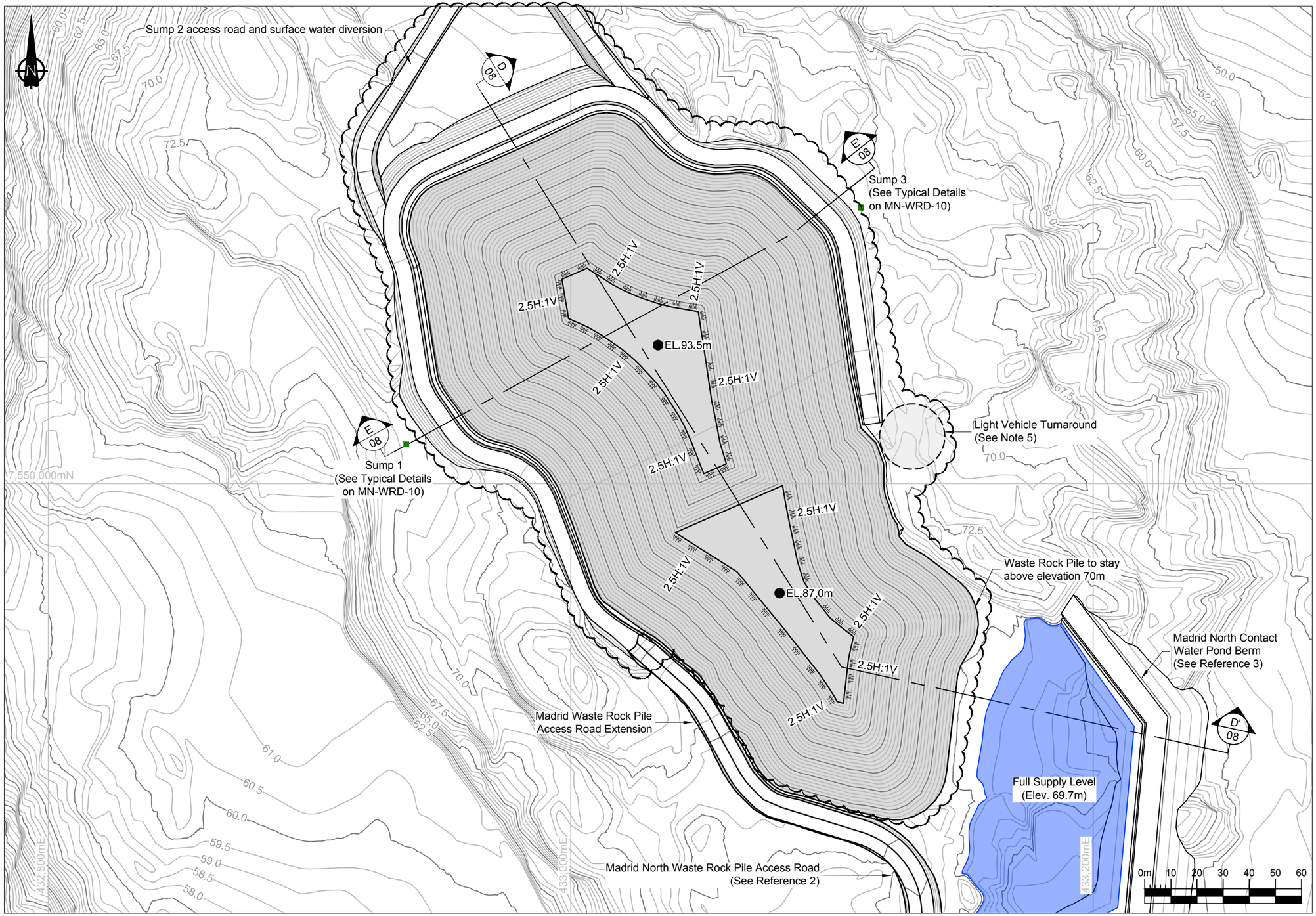

LEGEND

- Sump Location
- Contact Water Pond
- Waste Rock Pile

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 0.5m intervals.
3. All units shown in meters unless otherwise specified.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Light vehicle turnaround to be field fit to facilitate long-term access. (1)
6. Final as-built survey of the pad and berms is required before waste rock for the waste rock pile can be placed.
7. Waste Rock Pile designed in accordance with Reference 4. Waste Rock Pile benches and access ramps to be determined by TMAC during operations. Bench heights, widths and slope angles as per Reference 4.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, CanadaP repared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Report prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
4. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.

MATERIALS LIST AND QUANTITIES

Waste Rock Pile Pad and Berm
Surfacing: 430m³
Berm ROQ: 10,710m³
Pad ROQ: 28,830m³
Access Road Extension:
Surfacing: 100m³
ROQ: 250m³
Waste Rock Pile Storage Capacity: 344,200m³
Sump 2 Access Road:
Surfacing: 155m³
ROQ: 3,000m³

All volumes reported are calculated to neat lines. No bulking / shrinking factors have been utilized in volume determination.
Losses into the Tundra are not accounted for.
Waste Rock Pile volume calculated on the 3D model shown. No benching or ramps included.

NO.	DESCRIPTION	CHK'D	APP'D	DATE
1	Issued for Construction	RW	JBK	19/08/12
0	Issued for Construction	RW	JBK	19/06/14
A	Issued for Discussion	--	--	--

REFERENCE DRAWINGS: MN-WRP-08 Waste Rock Pile Sections

REVISIONS

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CH	JBK	2019/08/12

FILE NAME: 1CT022.043 - WRP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Waste Rock Pile

DRAWING NO.: MN-WRP-07

SHEET: 7 OF 10

REVISION NO.: 1

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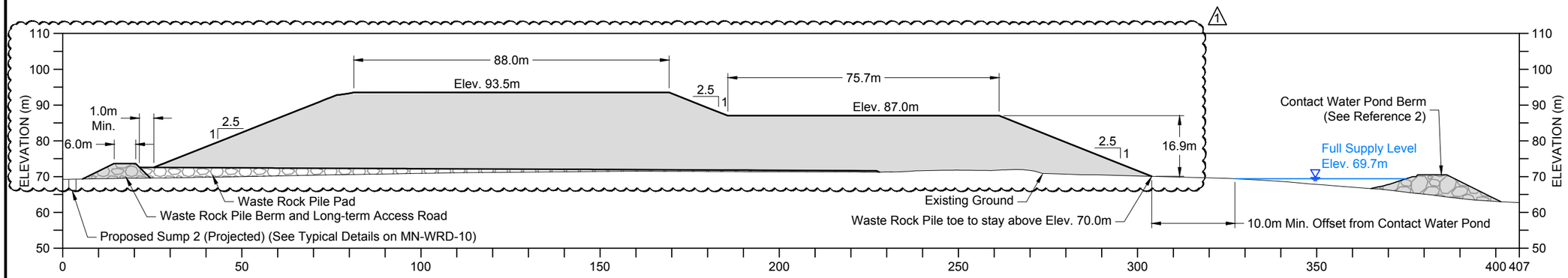

D/07 **Cross Section D-D'**

0m 10 20 30 40 50

E/07 **Cross Section E-E'**

0m 6 12 18 24

LEGEND

- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Compacted and Sorted Run of Mine Material
- Bulk Waste Rock Material

NOTES

1. Final as-built survey of the pad and berms is required before waste rock for the waste rock pile can be placed.
2. Waste Rock Pile designed in accordance with Reference 1. Waste Rock Pile benches and access ramps to be determined by TMAC during operations. Bench heights, widths, and slope angles as per Reference 1.

REFERENCE

1. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.
2. Engineering Drawings for the Madrid North Contact Water Pond. Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.

REFERENCE DRAWINGS		REVISIONS									
							1	Issued for Construction	RW	JBK	19/08/12
							0	Issued for Construction	RW	JBK	19/06/14
MN-WRD-07	Waste Rock Pile	- -	- -	- -	- -	- -	A	Issued for Discussion	--	--	--
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE

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CHECKED:	APPROVED:	DATE:
CH	JBK	2019/08/12

FILE NAME: 1CT022.043 - WRP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Waste Rock Pile Sections

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-08	8 OF 10	1

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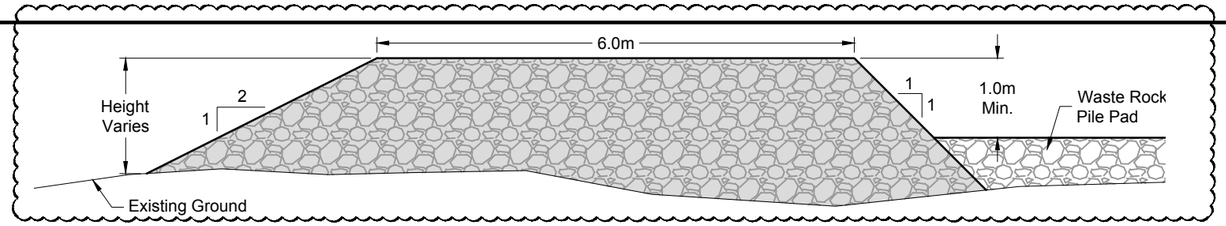
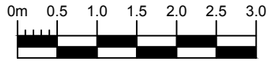
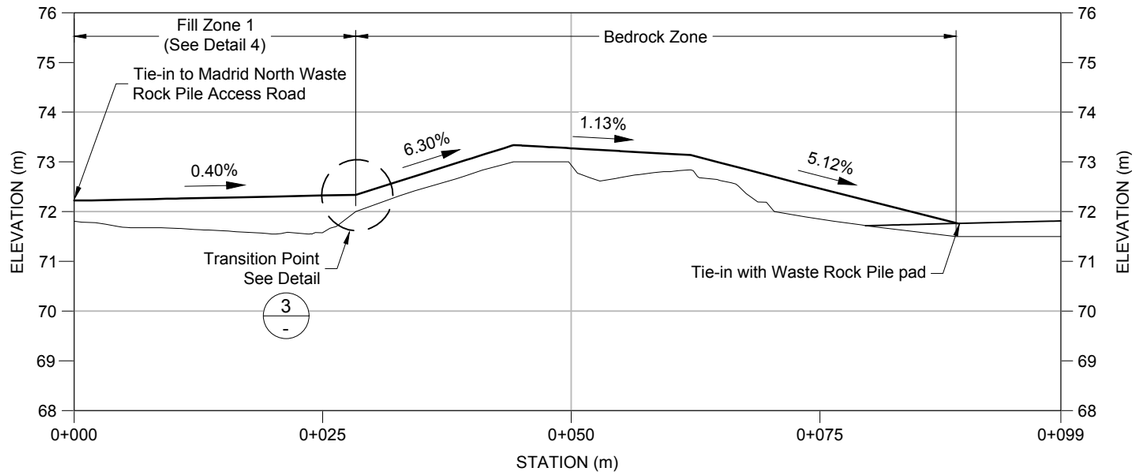


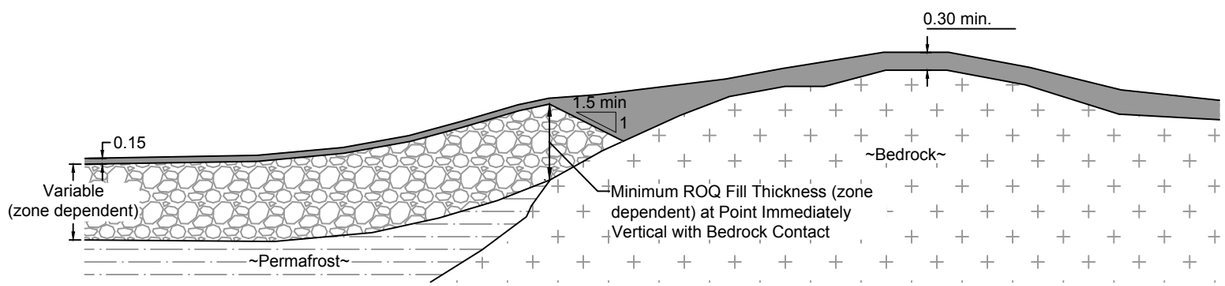
1/06 **Detail 1 - Waste Rock Pile Berm and Long-term Access Road**



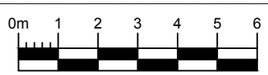


2/04 **Access Road Extension Profile**

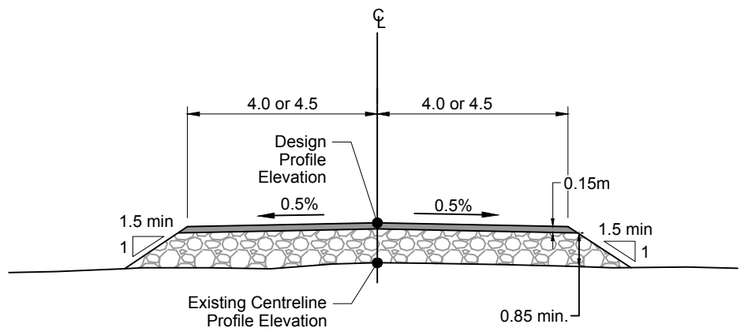
5x Vertical Exaggeration



3/- **All-Weather Road Profile Transition from Permafrost to Bedrock**



Fill Zone 1



4/- **Typical All-Weather Road Section**

LEGEND

- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Compacted and Sorted Run of Mine Material

NOTES

1. Access road profile may be adjusted and rounded to optimize traffic operations

NO.	DESCRIPTION	CHK'D	APP'D	DATE
1	Issued for Construction	RW	JBK	19/08/12
0	Issued for Construction	RW	JBK	19/06/14
A	Issued for Discussion	--	--	--

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE
MN-WRP-06	Waste Rock Pad Sections
MN-WRP-04	Waste Rock Pile Pad - Part 1

Original Drawings Stamped and Signed by Engineer

This drawing is uncontrolled when printed unless stamped / certified in accordance with the requirements of the applicable jurisdiction and recorded on a Distribution Register.

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2019/08/12

FILE NAME: 1CT022.043 - Details.dwg

TMAC RESOURCES

Hope Bay Project

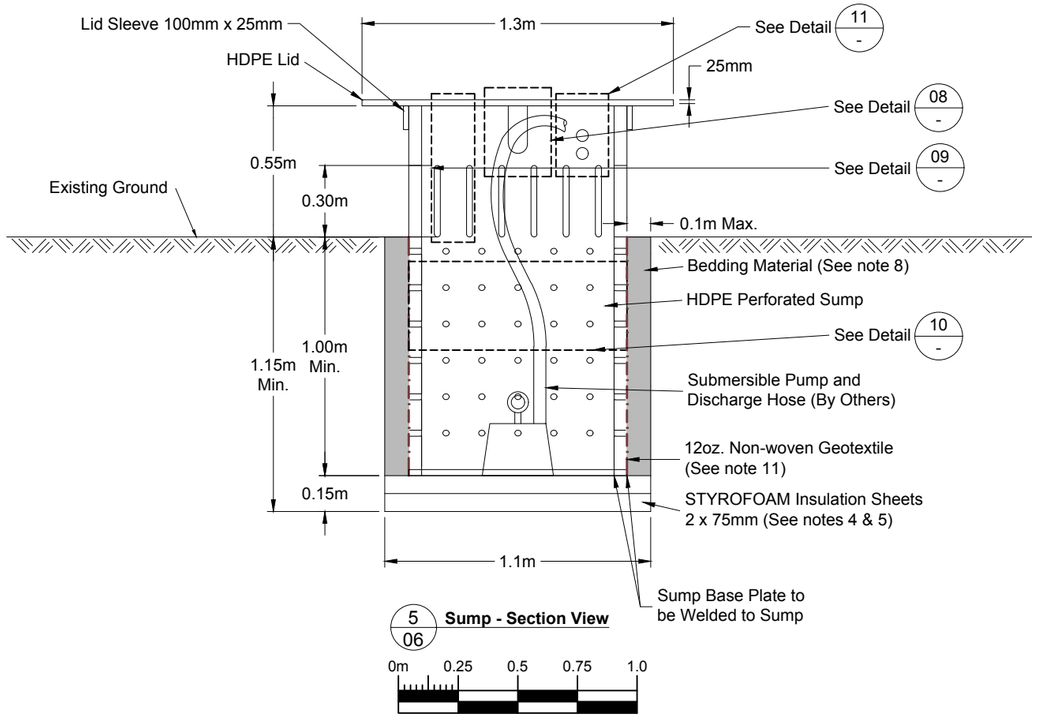
SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

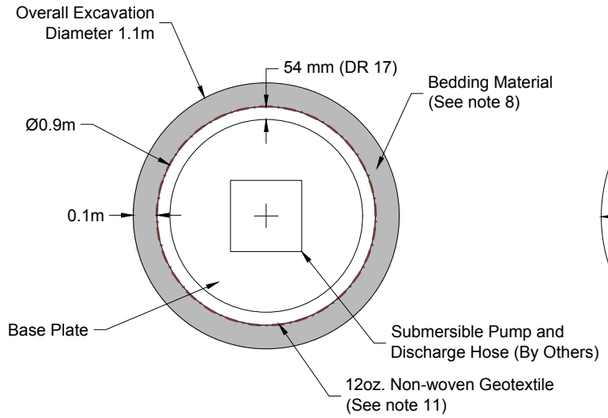
DRAWING TITLE: Typical Details

DRAWING NO. MN-WRP-09 | SHEET 9 OF 10 | REVISION NO. 1

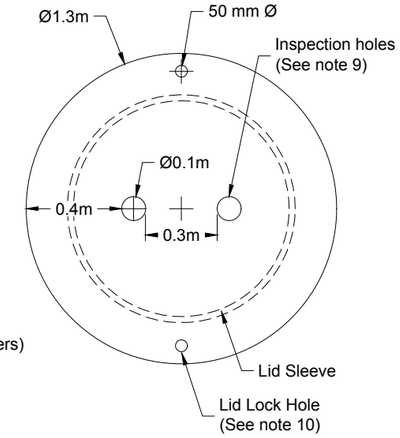
P:\01_SITES\Hope Bay\ACAD\IFC\Madrid North WRD\1CT022.043 - Details.dwg



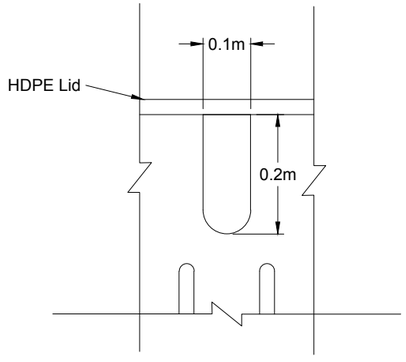
5 06 **Sump - Section View**



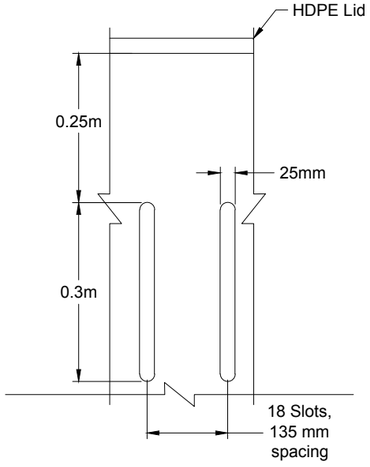
6 - **Sump - Plan View Without Lid**



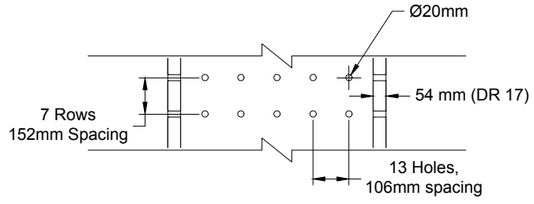
7 - **Lid - Plan View**



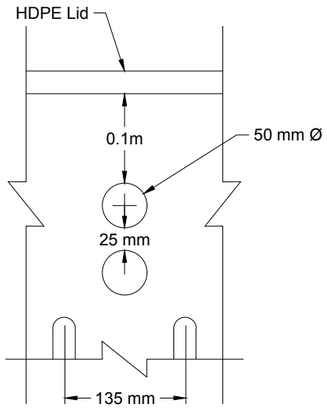
8 - **Slot Cut for Discharge Hose and Power Cables**



9 - **Sump Drainage Slots**



10 - **Sump Drainage Holes**



11 - **Sump Lid Lock Detail**

Not To Scale

LEGEND

- 12oz. Non-Woven Geotextile
- Bedding Material

NOTES

1. All units in meters unless otherwise specified.
2. Construction shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction.
3. The size and type of pump shall be specified by others, but no continuous or intermittent heat source shall be located within the sump.
4. The insulation sheets shall be of type STYROFOAM Highload 40 manufactured by Dow Chemical Company, or equivalent. Adjacent horizontal layers of STYROFOAM insulation shall be rotated by 90 degrees.
5. Contractor to place STYROFOAM insulation by cutting to suit.
6. Special hand excavation techniques shall be considered for inserting the sump into the ground. The maximum annulus between the outside edge of the sump and the excavation shall be 100 mm. No excavation into the tundra is permitted outside the sump footprint. A 10 m buffer zone on the undisturbed tundra around the sump shall be established, and no tracked or wheeled construction equipment is allowed within this buffer zone.
7. Excavated overburden to be disposed of on existing Naartok East Overburden Stockpile. No excavated overburden to be left on tundra surrounding sump.
8. Bedding material to be backfilled in thin layers (<0.3 m) and compacted by hand with crowbar or similar to ensure no bridging or large voids within backfill.
9. Inspection holes to be covered with wire mesh to prevent animal entry.
10. Lid to be secured to sump via lid lock holes with rope or straps (by others).
11. Geotextile to be secured to sump prior to placement in excavation.

REVISIONS											
NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
- -	- -	- -	- -	- -	0	Issued for Construction	RW	JBK	19/08/12

REFERENCE DRAWINGS

MN-WRP-06 DRAWING NO. | Waste Rock Pad Sections DRAWING TITLE

Original Drawings Stamped and Signed by Engineer

This drawing is uncontrolled when printed unless stamped / certified in accordance with the requirements of the applicable jurisdiction and recorded on a Distribution Register.

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN: CH | DRAWN: TH | REVIEWED: TW

CHECKED: CH | APPROVED: JBK | DATE: 2019/08/12

FILE NAME: 1CT022.043 - Sump.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Typical Sump Details

DRAWING NO. MN-WRP-10 | SHEET 10 OF 10 | REVISION NO. 0

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Attachment 3.2 Madrid North Waste Rock Pile – Interim As-built Drawings

Engineering Drawings for the Madrid North Waste Rock Pile

Hope Bay Project, Nunavut, Canada

Active Drawing Status

Drawing Number	Drawing Title	Issue	Date	Revision
MN-WRP-01	Existing Conditions (with orthophoto)	As-Built	2020/03/31	AB1
MN-WRP-02	Existing Conditions	As-Built	2020/03/31	AB1
MN-WRP-03	Existing Drainage Flowpaths	As-Built	2020/03/31	AB1
MN-WRP-04	Waste Rock Pile Pad - Part 1	As-Built	2020/03/31	AB1
MN-WRP-05	Waste Rock Pile Pad - Part 2	As-Built	2020/03/31	AB1
MN-WRP-06	Waste Rock Pile Pad Sections	As-Built	2020/03/31	AB1
MN-WRP-07	Waste Rock Pile	As-Built	2020/03/31	AB1
MN-WRP-08	Waste Rock Pile Sections	As-Built	2020/03/31	AB1
MN-WRP-09	Typical Details	As-Built	2020/03/31	AB1
MN-WRP-10	Typical Sump Details	As-Built	2020/03/31	AB1

TMAC RESOURCES

REGISTERED PROFESSIONAL ENGINEER
R.C. WILLIAMS
LICENSEE
NT/NU

srk consulting

Project Number: 1CT022.043

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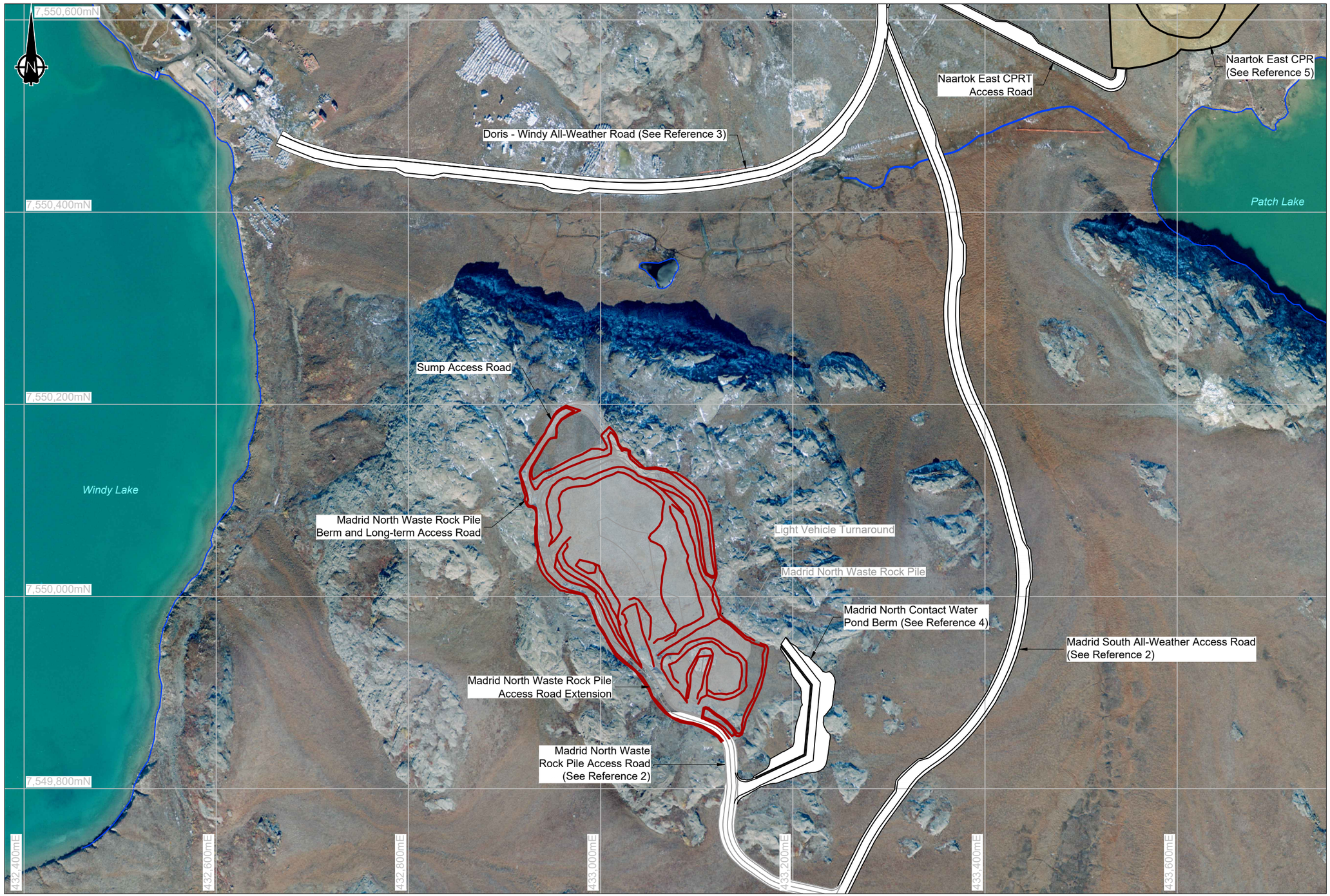


LEGEND

- Proposed Infrastructure
- Streams and Waterbodies
- Crown Pillar Recovery Trench
- As-Constructed WRP (2019)
- Proposed Infrastructure
- Previously Submitted Designs

NOTES

1. All units are in meters unless otherwise specified.
2. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
3. Imagery provided by client.
4. Madrid North Waste Rock Pile permitting design provided in Reference 5.
5. The focus of this drawing set is soley on the as-built conditions of the Madrid North Waste Rock Pile (WRP) for 2019. The 2019 construction summary report (Reference 7) should be consulted to see the as-built arrangements for any infrastructure outside of the Madrid North WRP extents.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
5. Engineering Permitting Drawings for the Madrid North DEIS Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.
6. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.
7. Doris and Madrid 2019 Construction Summary Report, Hope Bay Project. Memo prepared for TMAC Resources. Project Number 1CT022.055. April 2020.

0m 40 80 120 160

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	--	--	A	Issued for Discussion	--	--	--
							0	Issued for Construction	RW	JBK	19/06/14
							1	Issued for Construction	RW	JBK	19/08/12
							AB1	As-Built	RW	JBK	20/03/31

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER R.C. WILLIAMS LICENSEE NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2020/03/31

FILE NAME: 1CT022.043 - EC.dwg

TMAC RESOURCES

Hope Bay Project

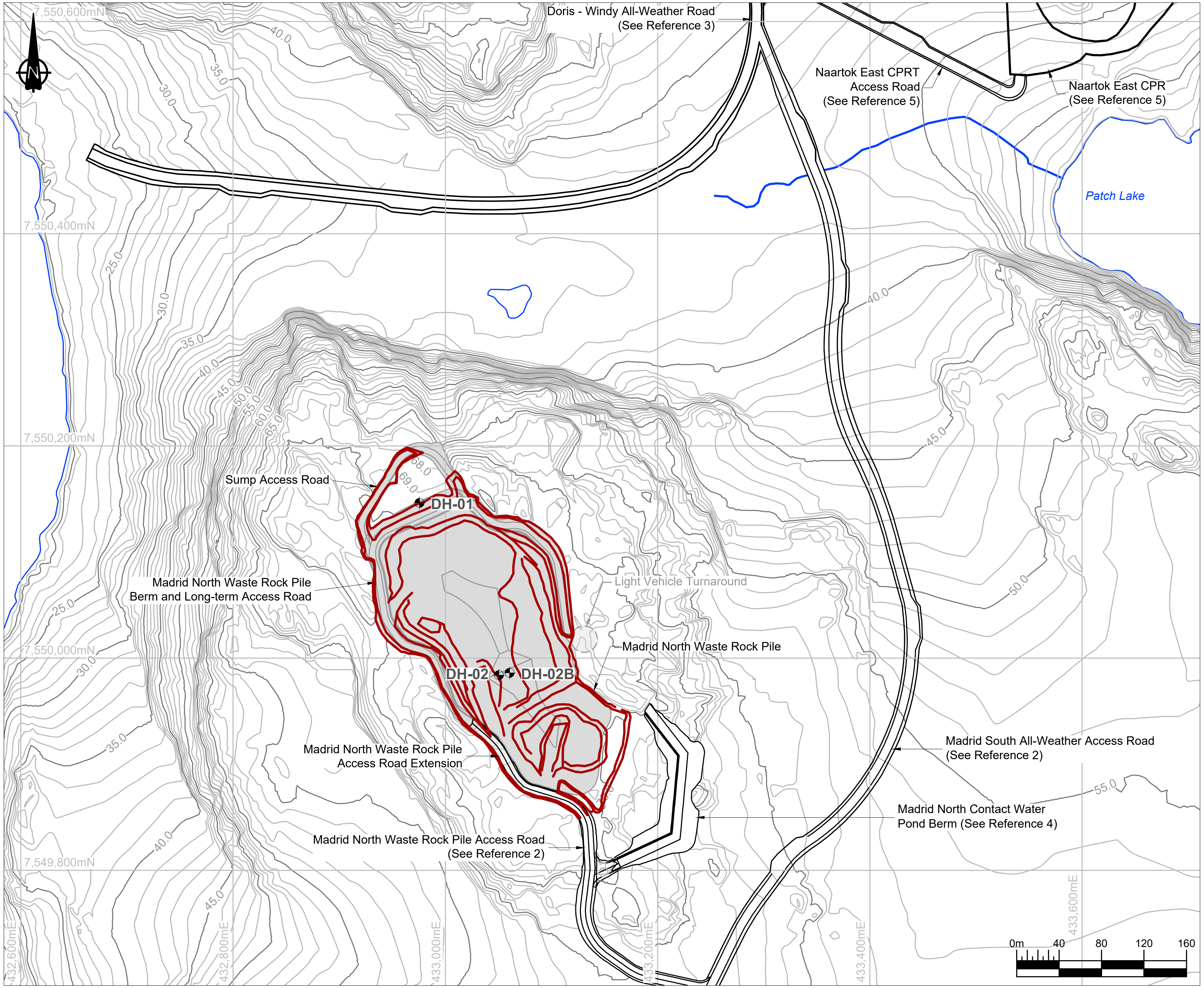
SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Existing Conditions (with orthophoto)

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-01	1 OF 10	AB1

P:\Projects\01_SITES\Hope Bay\ACAD\As-Builts\Madrid North WRP\1CT022.043 - EC.dwg



LEGEND

- SRK 2018 Site Investigation Borehole
- Proposed Road
- Streams and Waterbodies
- As-Constructed WRP (2019)
- Proposed Infrastructure

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 1.0m intervals.
3. All units shown in meters unless otherwise specified.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Madrid North Waste Rock Pile permitting design provided in Reference 5.
6. The focus of this drawing set is solely on the as-built conditions of the Madrid North Waste Rock Pile (WRP) for 2019. The 2019 construction summary report (Reference 7) should be consulted to see the as-built arrangements for any infrastructure outside of the Madrid North WRP extents.

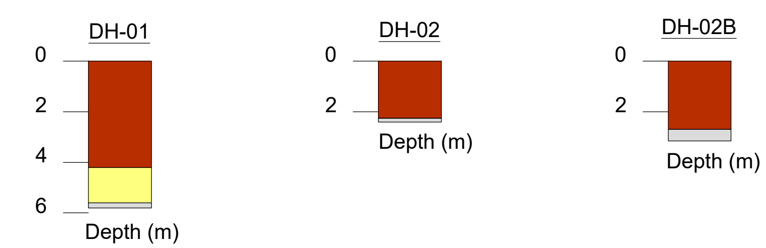
REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
5. Engineering Permitting Drawings for the Madrid North DEIS Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.
6. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.
7. Doris and Madrid 2019 Construction Summary Report. Hope Bay Project. Memo prepared for TMAC Resources. Project Number 1CT022.055. April 2020.

STRATIGRAPHIC LEGEND

- Clay / Silt
- Sand / Gravel
- Bedrock

STRATIGRAPHY SECTIONS



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NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/31
1	Issued for Construction	RW	JBK	19/08/12
0	Issued for Construction	RW	JBK	19/06/14
A	Issued for Discussion	--	--	--

REFERENCE DRAWINGS (DRAWING NO. / DRAWING TITLE / NO. / DESCRIPTION / CHK'D / APP'D / DATE): -- -- -- -- -- -- --

REVISIONS

PROFESSIONAL ENGINEERS STAMP: R.C. WILLIAMS, LICENSEE, NT/NU

srk consulting

DESIGN: RW	DRAWN: TAH	REVIEWED: RW
CHECKED: CH	APPROVED: JBK	DATE: 2020/03/31

FILE NAME: 1CT022.043 - EC-contours.dwg

TMAC RESOURCES

Hope Bay Project

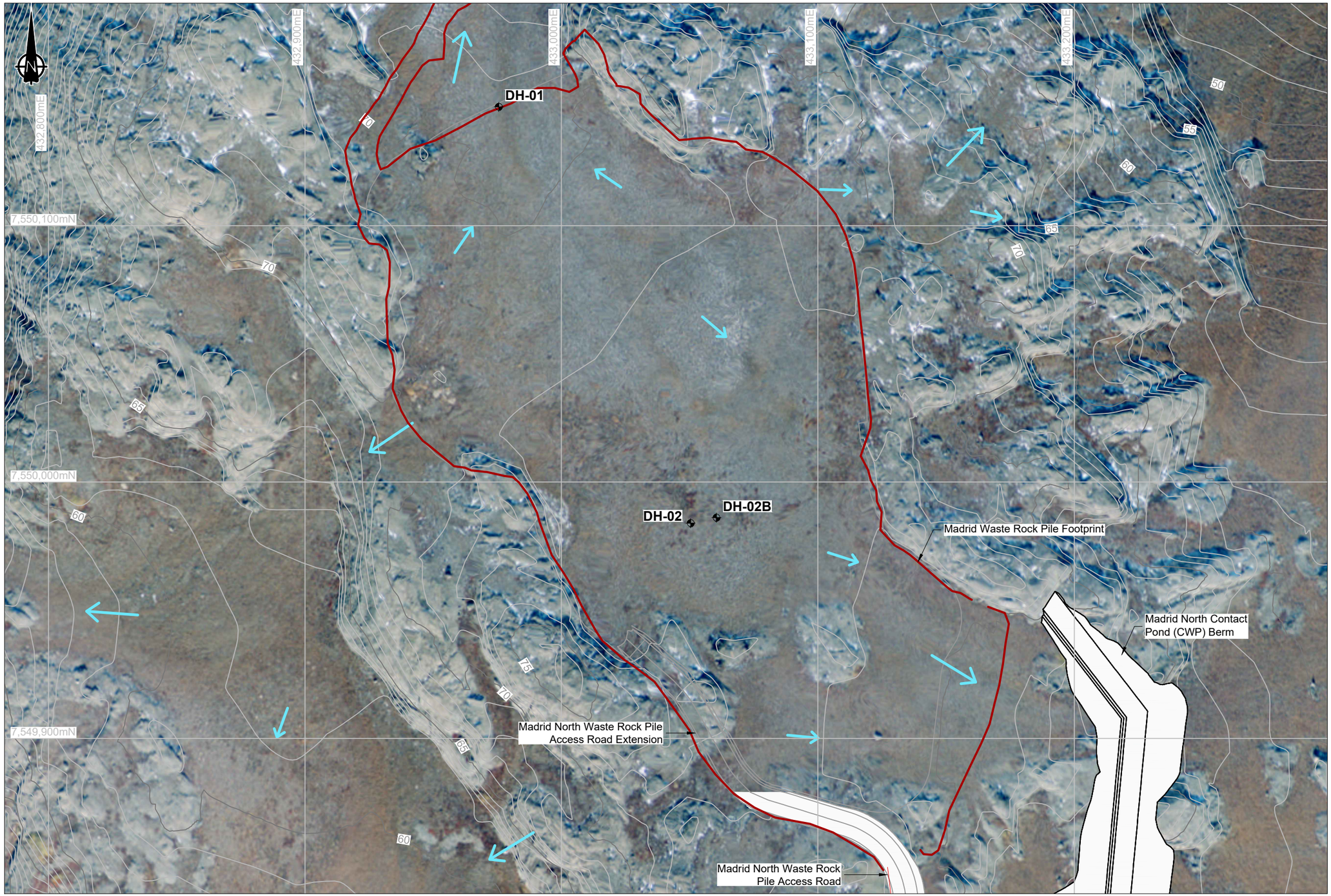
SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Existing Conditions

DRAWING NO.: MN-WRP-02 | SHEET: 2 OF 10 | REVISION NO.: AB1



LEGEND

- SRK 2018 Site Investigation Borehole
- Drainage Direction
- As-Constructed WRP (2019
- Proposed Infrastructure Footprint
- Previous Submitted Design

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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 advice the Construction Manager and Engineer of any differences.
2. All units are in meters unless otherwise specified.
3. Contours shown at 1.0m intervals based on 2007 LiDAR survey.
4. Imagery provided by client.
5. Drainage pathway analysis completed using Autodesk AutoCAD Civil 3D 2018 and available topographic data.

REFERENCES

1. NAD83 UTM Zone 13.
2. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.

0m 10 20 30 40 50 60

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MN-WRP-04	Waste Rock Pile Pad - Part 1	- -	- -	- -	- -	- -	A	Issued for Discussion	- -	- -	- -
							0	Issued for Construction	RW	JBK	19/06/14
							1	Issued for Construction	RW	JBK	19/08/12
							AB1	As-Built	RW	JBK	20/03/31

PROFESSIONAL ENGINEERS STAMP

R.C. WILLIAMS LICENSEE NTNU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2020/03/31

FILE NAME: 1CT022.043 - Drainage.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Existing Drainage Flowpaths

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-03	3 OF 10	AB1

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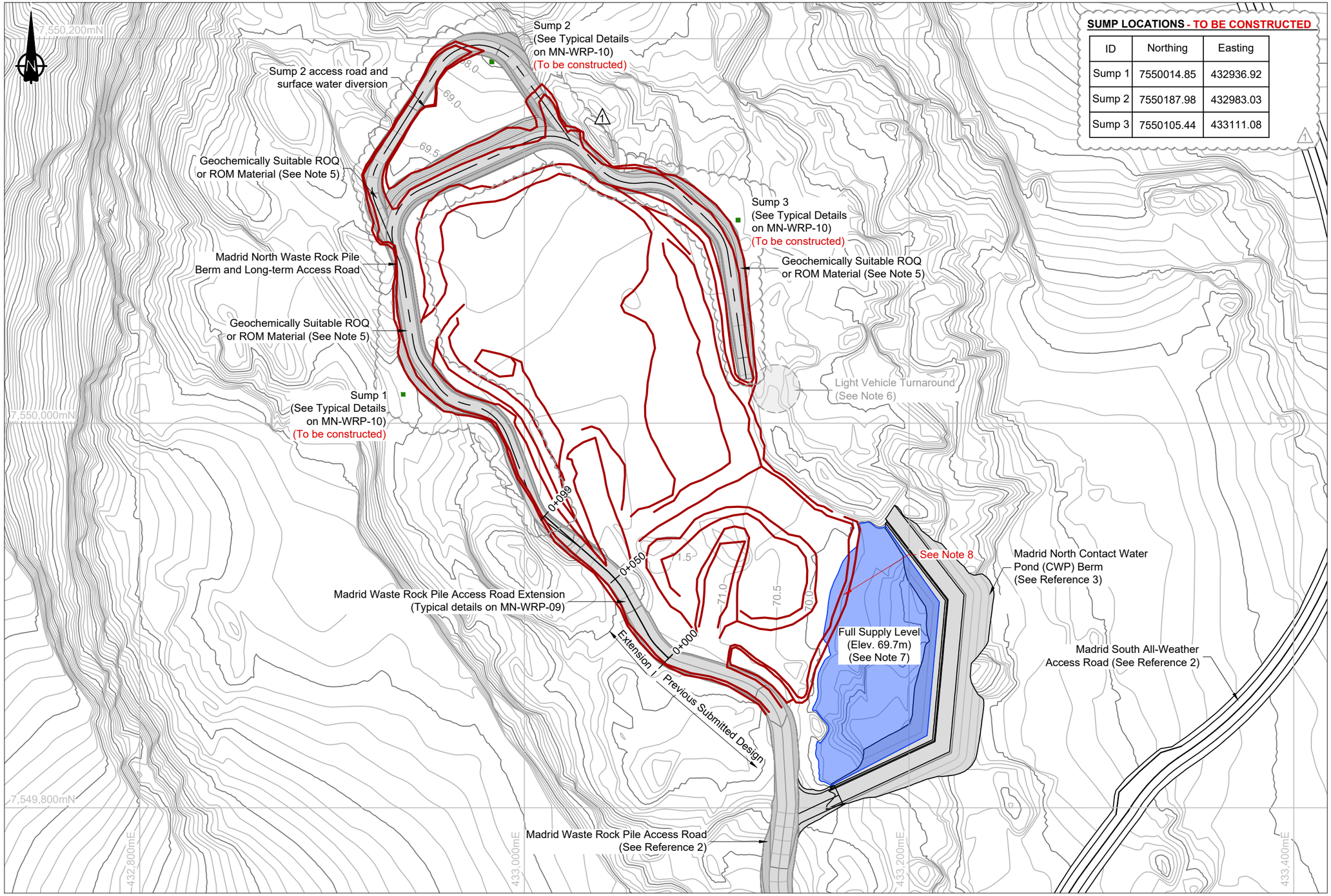

SUMP LOCATIONS - TO BE CONSTRUCTED

ID	Northing	Easting
Sump 1	7550014.85	432936.92
Sump 2	7550187.98	432983.03
Sump 3	7550105.44	433111.08

LEGEND

- Sump Location
- As-Constructed WRP (2019)
- Contact Water Pond
- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 0.5m intervals.
3. All units shown in meters unless otherwise specified.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Geochemically suitable ROQ or ROM to be built as per ROQ technical specifications.
6. (1) Light vehicle turnaround to be field fit to facilitate long-term access.
7. The CWP is intended to be operated in a dry state with a maximum two weeks residence time.
8. Existing topography shown is based on LiDAR survey and not actual field conditions. During construction, the 70.0m contour was surveyed and staked out by Sub-Arctic. The WRP toe is built along the true 70.0m contour and is above the CWP Full Supply Level.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Report prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
4. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.

0m 20 40 60 80

						AB1	As-Built	RW	JBK	20/03/31
						1	Issued for Construction	RW	JBK	19/08/12
MN-WRP-03	Existing Drainage Flowpaths	--	--	--	--	0	Issued for Construction	RW	JBK	19/06/14
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
REFERENCE DRAWINGS		REVISIONS									

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER R.C. WILLIAMS LICENSEE NTA/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2020/03/31

FILE NAME: 1CT022.043 - Pad Berms.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Waste Rock Pile Pad - Part 1

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-04	4 OF 10	AB1

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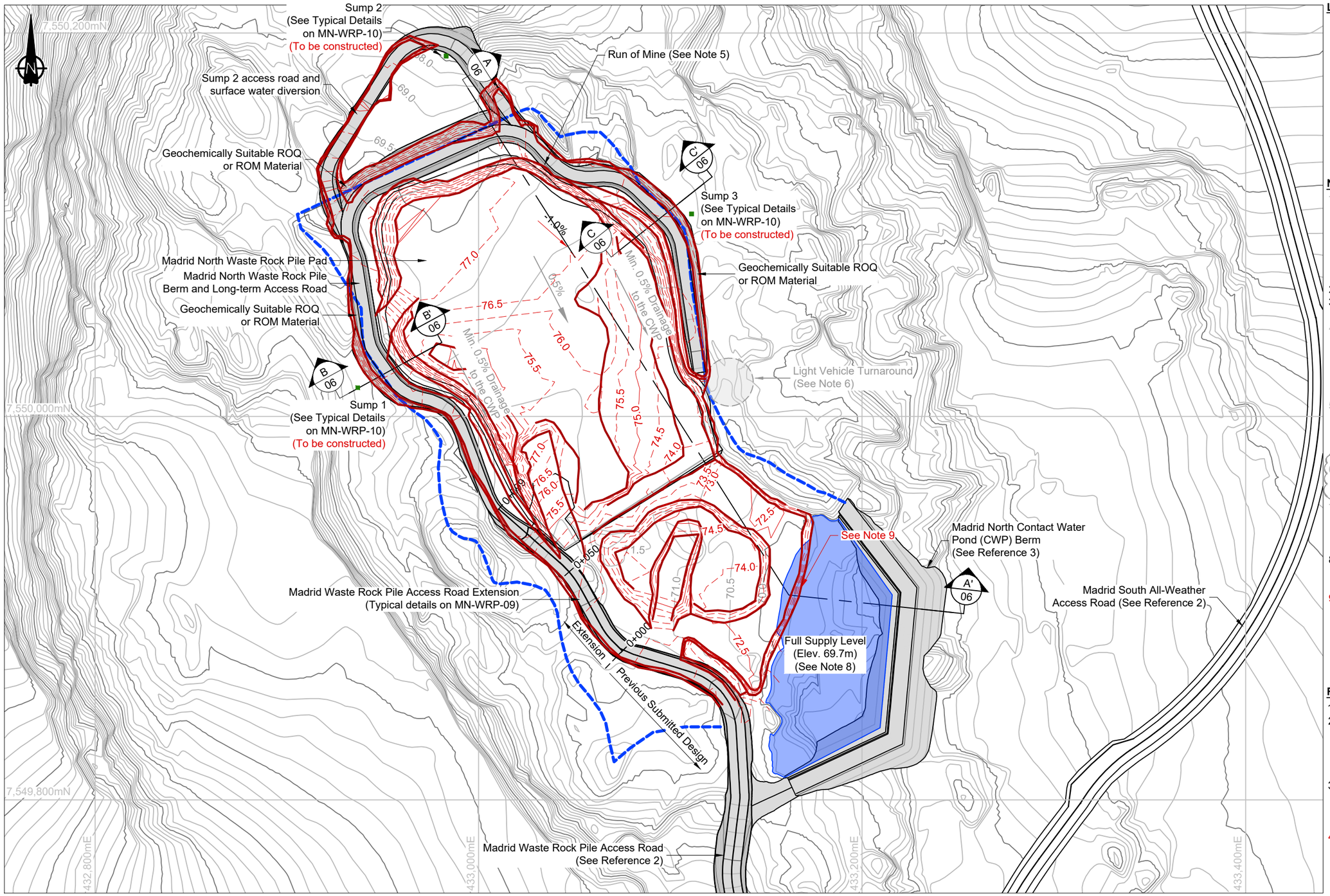

LEGEND

- Sump Location
- Approximate Catchment Boundary
- Contact Water Pond
- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Compacted and Sorted Run of Mine Material
- As-Constructed WRP (2019)

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 0.5m intervals.
3. All units shown in meters unless otherwise specified.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Compacted and Sorted Run of Mine Material to be built as per ROQ technical specifications, with maximum particle size reduced to 0.75m.
6. Light vehicle turnaround to be field fit to facilitate long-term access. 1
7. As-built survey of compacted pad layers is required. Final as-built survey of the pad and berms is required before waste rock for the waste rock pile can be placed.
8. The CWP is intended to be operated in a dry state with a maximum two weeks residence time.
9. Existing topography shown is based on LiDAR survey and not actual field conditions. During construction, the 70.0m elevation contour was surveyed and staked-out by Sub-Arctic. The WRP toe is built along the true 70.0m contour and is above the CWP Full Supply Level.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Report prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
4. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.

0m 20 40 60 80

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/31
1	Issued for Construction	RW	JBK	19/08/13
0	Issued for Construction	RW	JBK	19/06/14
A	Issued for Discussion	--	--	--

REVISIONS

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MN-WRP-06	Waste Rock Pile Pad Sections	--	--	--	--	--

REFERENCE DRAWINGS

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2020/03/31

FILE NAME: 1CT022.043 - GA-max.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Waste Rock Pile Pad - Part 2

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-05	5 OF 10	AB1

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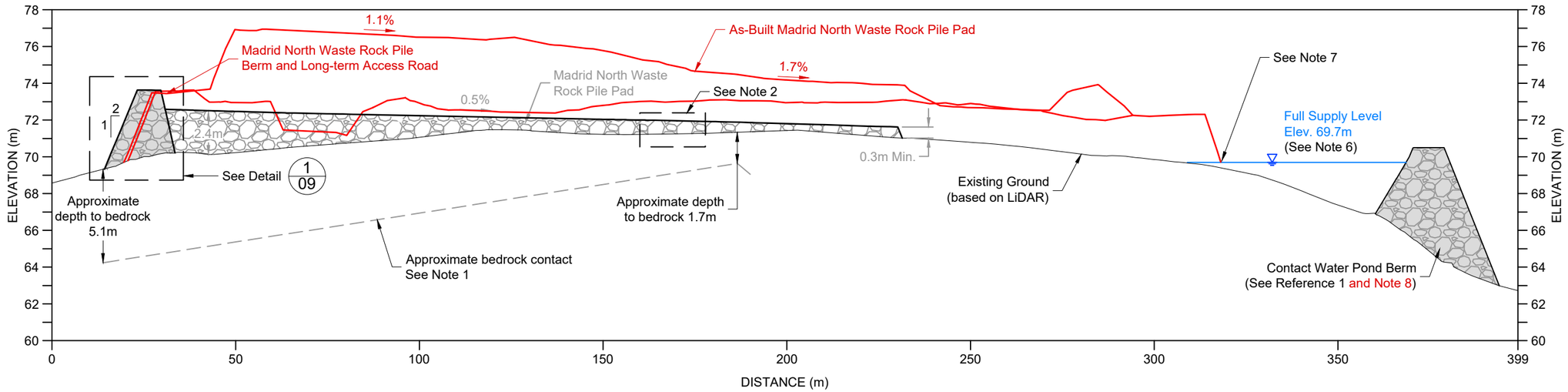
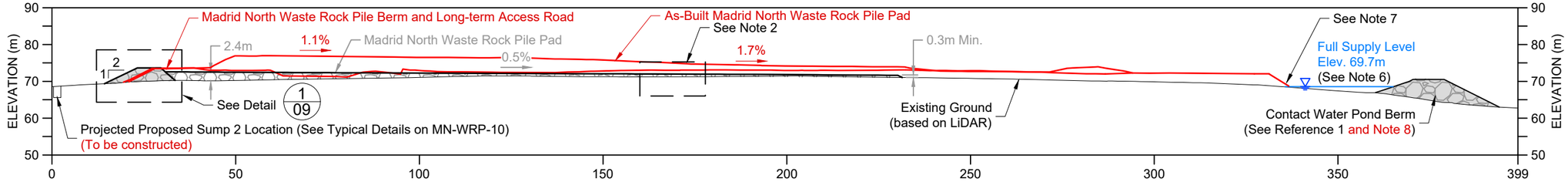


A/05 **Cross Section A-A'**

5x Vertical Exaggeration

0m 10 20 30 40 50



A/05 **Cross Section A-A'**

1x Vertical Exaggeration

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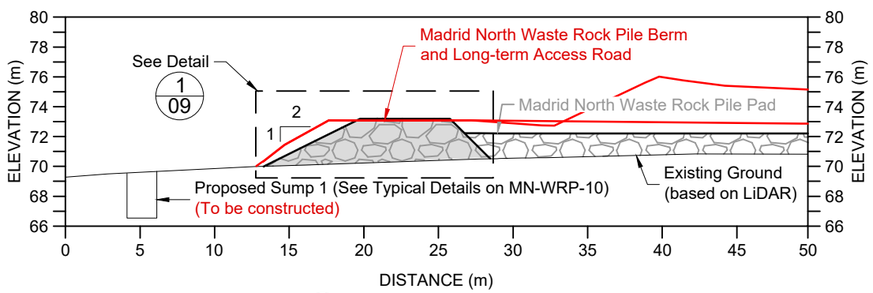

B/05 **Cross Section B-B'**

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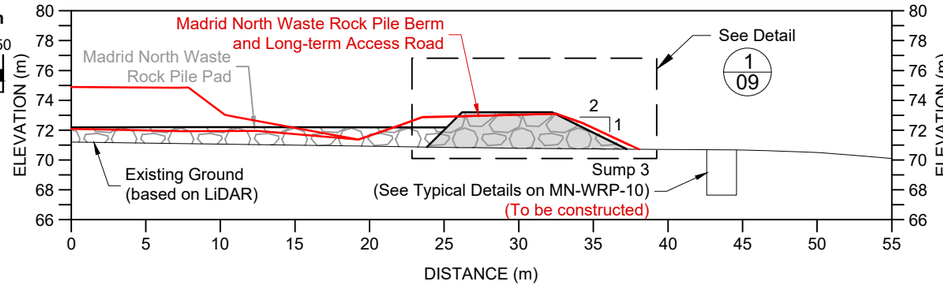

C/05 **Cross Section C-C'**

0m 4 8 12 16

LEGEND

- As-Constructed WRP (2019)
- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Compacted and Sorted Run of Mine Material

NOTES

1. Approximate bedrock contact based on 2018 borehole investigation locations shown on drawing MN-WRP-02.
2. Pad thickness is less than maximum allowable particle size of 0.75m. Additional sorting will be required.
3. Compacted and Sorted Run of Mine Material to be built as per ROQ technical specifications, with maximum particle size reduced to 0.75m.
4. As-built survey of compacted pad layers is required. Final as-built survey of the pad and berms is required before waste rock for the waste rock pile can be placed.
5. Safety barriers required when berm and long-term access roads is 3m or higher in height.
6. The WCP is intended to operate in a dry state with a maximum two weeks residence time.
7. Existing topography shown is based on LiDAR survey and not actual field conditions. During construction, the 70.0m elevation contour was surveyed and staked-out by Sub-Arctic. The WRP toe is built along the true 70.0m contour and is above the CWP Full Supply Level.
8. The focus of this drawing set is solely on the as-built conditions of the Madrid North Waste Rock Pile (WRP) for 2019. The 2019 construction summary report (Reference 3) should be consulted to see the as-built arrangements for any infrastructure outside of the Madrid North WRP extents.

REFERENCE

1. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
2. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.
3. Doris and Madrid 2019 Construction Summary Report. Hope Bay Project. Memo prepared for TMAC Resources. Project Number 1CT022.055. April 2020.

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/31
1	Issued for Construction	RW	JBK	19/08/12
0	Issued for Construction	RW	JBK	19/06/14
A	Issued for Discussion	--	--	--

REVISIONS

DRAWING NO.	DRAWING TITLE
MN-WRP-09	Typical Details

REFERENCE DRAWINGS

PROFESSIONAL ENGINEERS STAMP

R.C. WILLIAMS LICENSEE NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2020/03/31

FILE NAME: 1CT022.043 - GA-max.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE:

Waste Rock Pad Sections

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-06	6 OF 10	AB1

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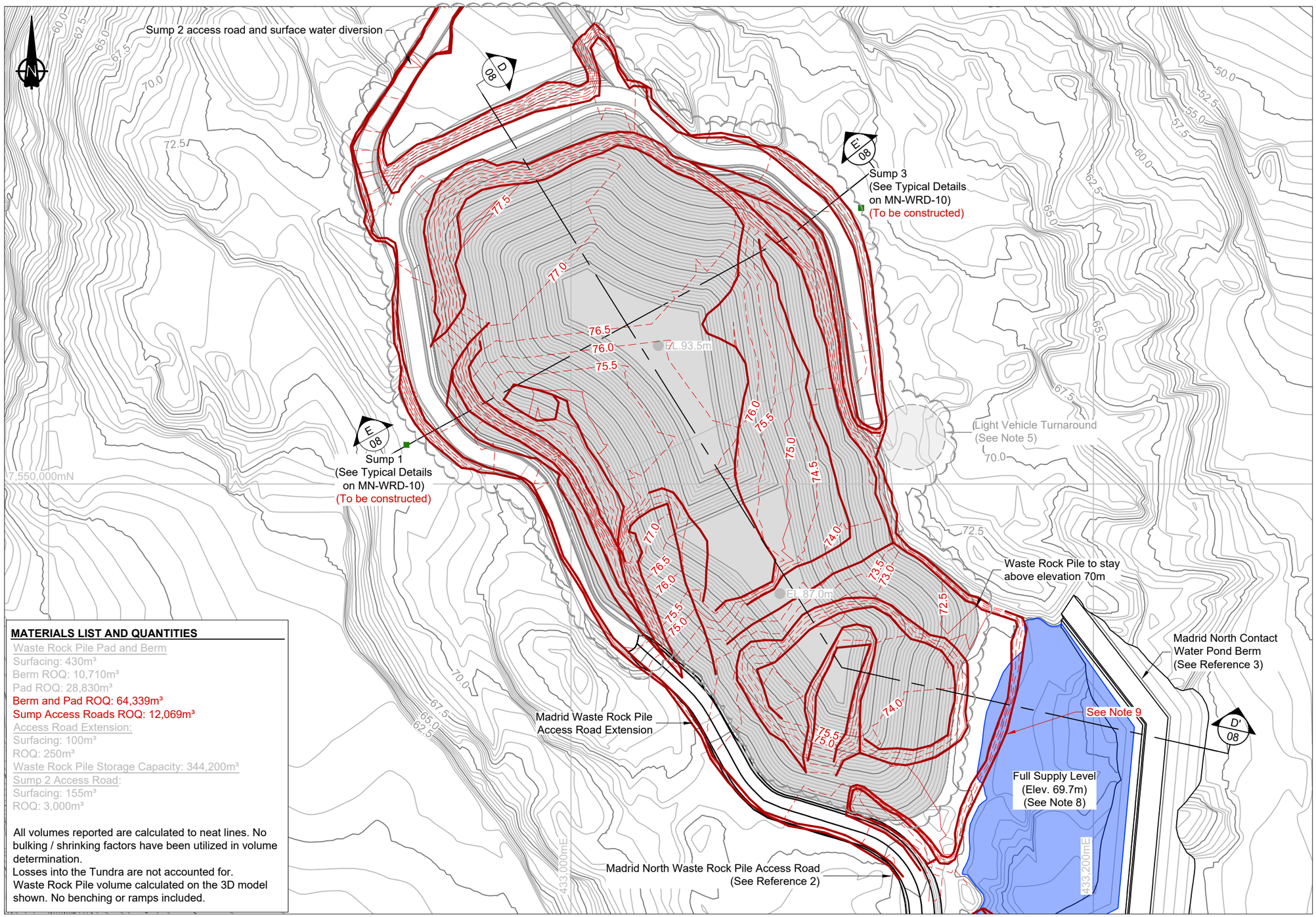

MATERIALS LIST AND QUANTITIES

Waste Rock Pile Pad and Berm
Surfacing: 430m³
Berm ROQ: 10,710m³
Pad ROQ: 28,830m³
Berm and Pad ROQ: 64,339m³
Sump Access Roads ROQ: 12,069m³
Access Road Extension:
Surfacing: 100m³
ROQ: 250m³
Waste Rock Pile Storage Capacity: 344,200m³
Sump 2 Access Road:
Surfacing: 155m³
ROQ: 3,000m³

All volumes reported are calculated to neat lines. No bulking / shrinking factors have been utilized in volume determination.
Losses into the Tundra are not accounted for.
Waste Rock Pile volume calculated on the 3D model shown. No benching or ramps included.

LEGEND

- Sump Location
- Contact Water Pond
- Waste Rock Pile
- As-Constructed WRP (2019)

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 0.5m intervals.
3. All units shown in meters unless otherwise specified.
4. Construction and material specifications shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
5. Light vehicle turnaround to be field fit to facilitate long-term access. (1)
6. Final as-built survey of the pad and berms is required before waste rock for the waste rock pile can be placed.
7. Waste Rock Pile designed in accordance with Reference 4. Waste Rock Pile benches and access ramps to be determined by TMAC during operations. Bench heights, widths and slope angles as per Reference 4.
8. The CWP is intended to be operated in a dry state with a maximum two weeks residence time.
9. Existing topography shown is based on LiDAR survey and not actual field conditions. During construction, the 70.0m elevation contour was surveyed and staked-out by Sub-Arctic. The WRP toe is built along the true 70.0m contour and is above the CWP Full Supply Level.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, CanadaP repared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Report prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
4. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.
5. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.

0m 10 20 30 40 50 60

REFERENCE DRAWINGS			REVISIONS								
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							0	Issued for Construction	RW	JBK	19/06/14
MN-WRP-08	Waste Rock Pile Sections	--	--	--	--	--	A	Issued for Discussion	--	--	--
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE

PROFESSIONAL ENGINEERS STAMP

R.C. WILLIAMS LICENSEE NTNU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2020/03/31

FILE NAME: 1CT022.043 - WRP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Waste Rock Pile

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-07	7 OF 10	AB1

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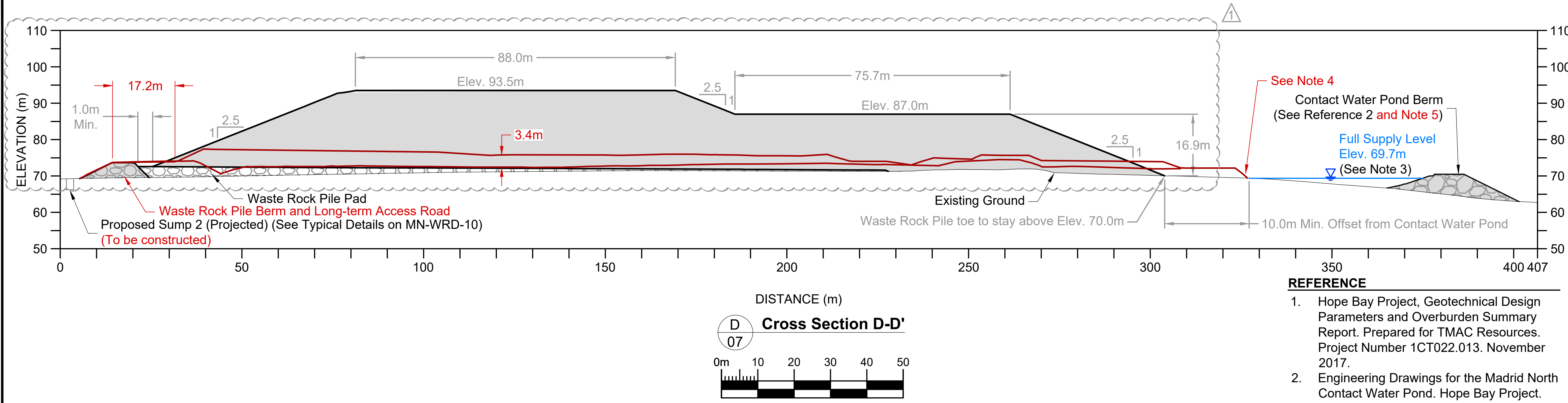
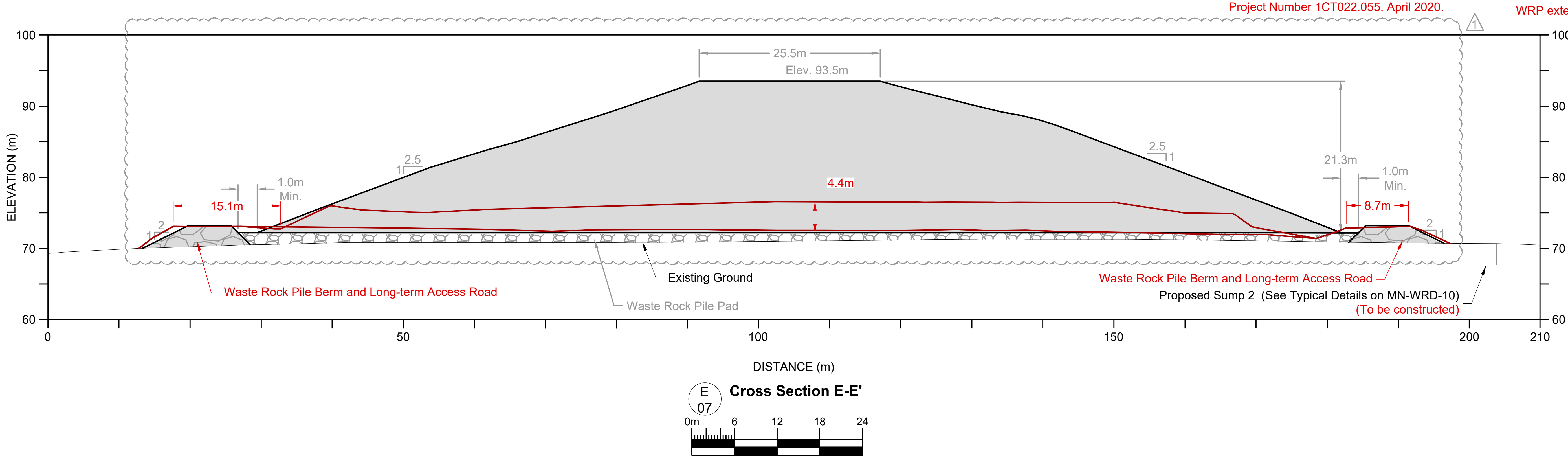


Cross Section D-D'
D 07



Cross Section E-E'
E 07

LEGEND

- As-Constructed WRP (2019)
- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Compacted and Sorted Run of Mine Material
- Bulk Waste Rock Material

NOTES

1. Final as-built survey of the pad and berms is required before waste rock for the waste rock pile can be placed.
2. Waste Rock Pile designed in accordance with Reference 1. Waste Rock Pile benches and access ramps to be determined by TMAC during operations. Bench heights, widths, and slope angles as per Reference 1.
3. The CWP is intended to be operated in a dry state with a maximum two weeks residence time.
4. Existing topography shown is based on LiDAR survey and not actual field conditions. During construction, the 70.0m elevation contour was surveyed and staked-out by Sub-Arctic. The WRP toe is built along the true 70.0m contour and is above the CWP Full Supply Level.
5. The focus of this drawing set is solely on the as-built conditions of the Madrid North Waste Rock Pile (WRP) for 2019. The 2019 construction summary report (Reference 4) should be consulted to see the as-built arrangements for any infrastructure outside of the Madrid North WRP extents.

REFERENCE

1. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.
2. Engineering Drawings for the Madrid North Contact Water Pond. Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
3. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.
4. Doris and Madrid 2019 Construction Summary Report. Hope Bay Project. Memo prepared for TMAC Resources. Project Number 1CT022.055. April 2020.

DRAWING NO.	DRAWING TITLE
MN-WRD-07	Waste Rock Pile

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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					0	Issued for Construction	RW	JBK	19/06/14
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REVISIONS

PROFESSIONAL ENGINEERS STAMP: R.C. WILLIAMS, LICENSEE, NT/NU

srk consulting

DESIGN: RW	DRAWN: TAH	REVIEWED: RW
CHECKED: CH	APPROVED: JBK	DATE: 2020/03/31

FILE NAME: 1CT022.043 - WRP.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Waste Rock Pile Sections

DRAWING NO.: MN-WRP-08 | SHEET: 8 OF 10 | REVISION NO.: AB1

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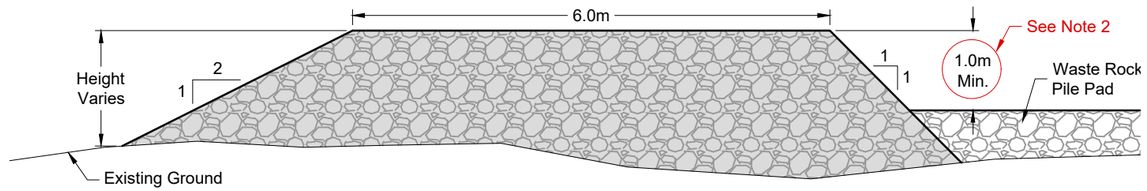
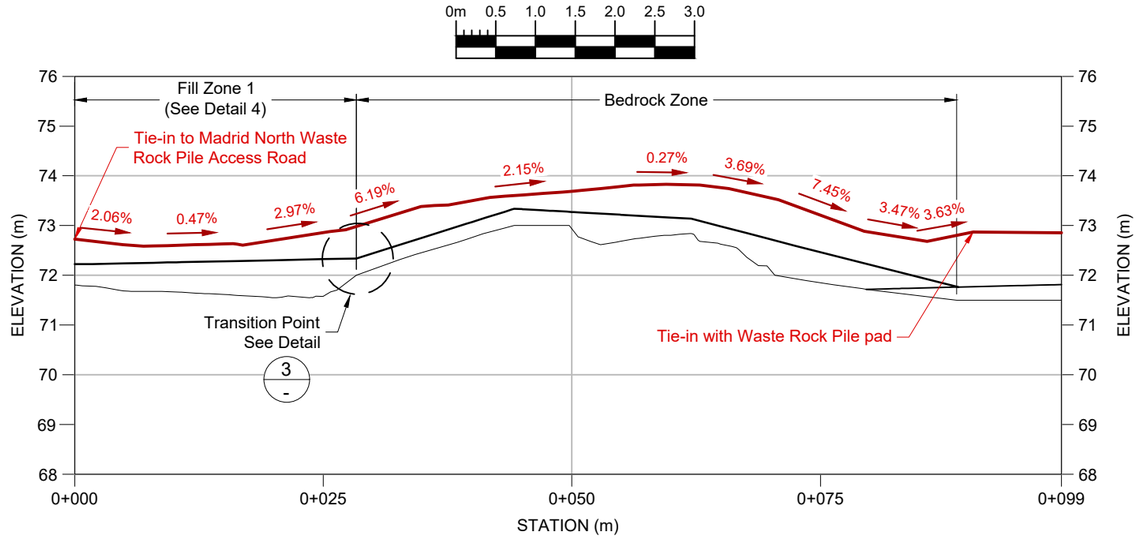
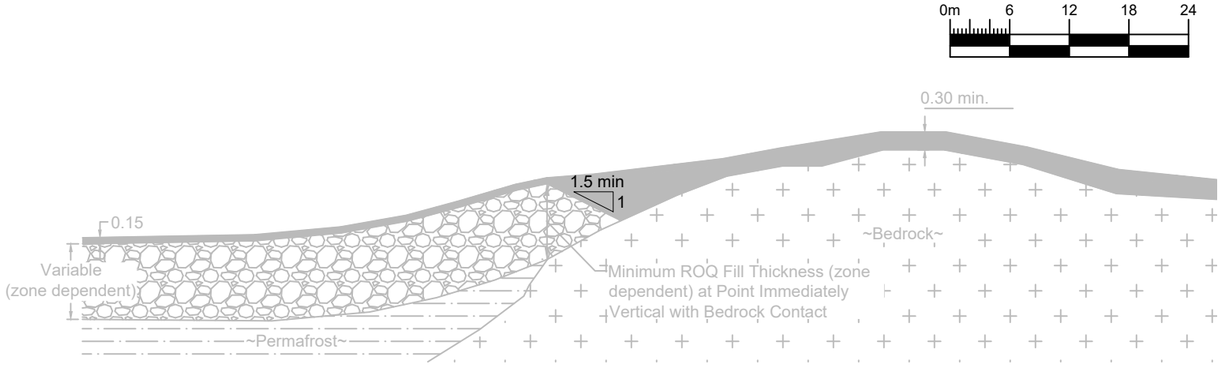


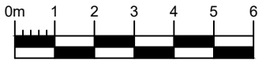
1/06 **Detail 1 - Waste Rock Pile Berm and Long-term Access Road**
- Berm Constructed as per design



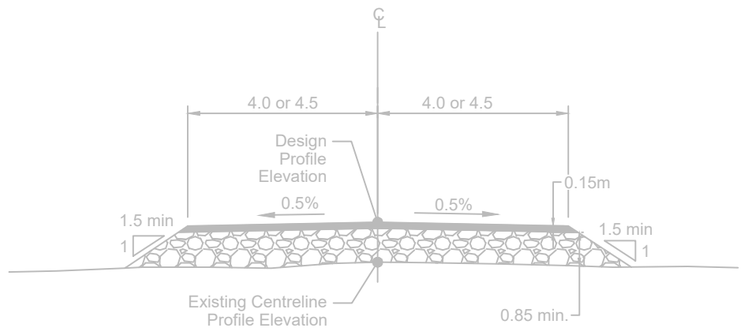
2/04 **Access Road Extension Profile**
5x Vertical Exaggeration



3/- **All-Weather Road Profile Transition from Permafrost to Bedrock**



Fill Zone 1



4/- **Typical All-Weather Road Section**

LEGEND

- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM) Material
- Compacted and Sorted Run of Mine Material

NOTES

1. Access road profile may be adjusted and rounded to optimize traffic operations
2. Where the WRP pad was over-built the 1.0m height difference between the pad and the berm does not exist, drainage ditches are to be constructed.

REFERENCE

1. As-Built data provided by Sub-Arctic Geomatics Ltd. June 2019 - January 2020.

REVISIONS											
NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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					1	Issued for Construction	RW	JBK	19/08/12
					0	Issued for Construction	RW	JBK	19/06/14
					A	Issued for Discussion	--	--	--

REFERENCE DRAWINGS	
DRAWING NO.	DRAWING TITLE
MN-WRP-06	Waste Rock Pad Sections
MN-WRP-04	Waste Rock Pile Pad - Part 1

PROFESSIONAL ENGINEERS STAMP

R.C. WILLIAMS LICENSEE NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2020/03/31

FILE NAME: 1CT022.043 - Details.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Typical Details

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-09	9 OF 10	AB1

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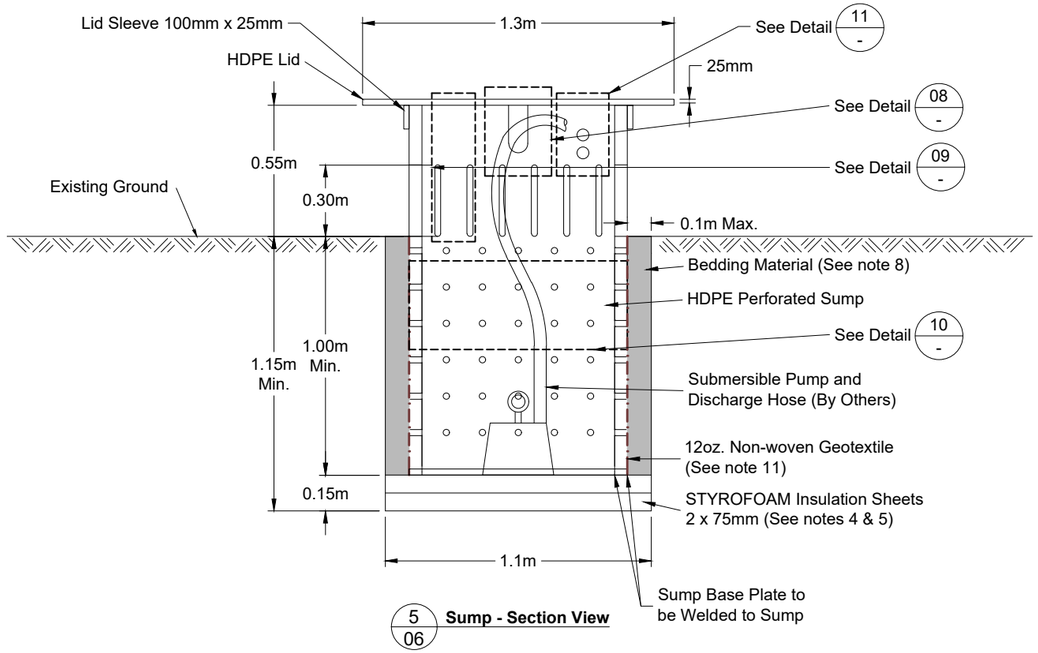
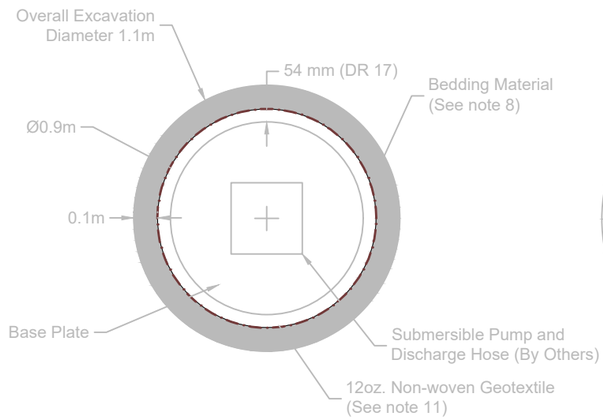


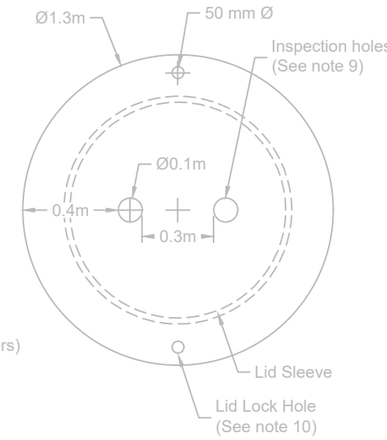
5 / 06 **Sump - Section View**

0m 0.25 0.5 0.75 1.0



6 / - **Sump - Plan View Without Lid**

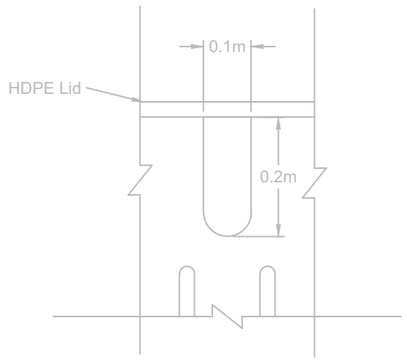
0m 0.25 0.5 0.75 1.0



7 / - **Lid - Plan View**

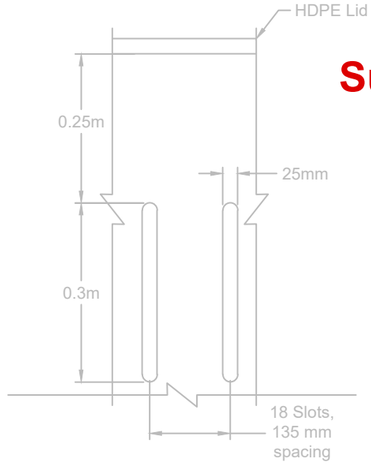
0m 0.25 0.5 0.75 1.0

Sumps not yet constructed (See Note 12)



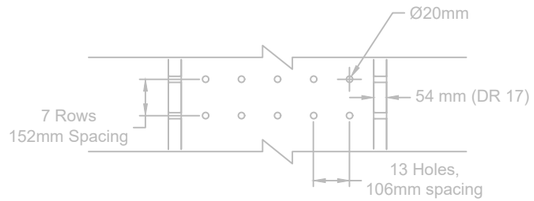
8 / - **Slot Cut for Discharge Hose and Power Cables**

0m 0.1 0.2 0.3 0.4



9 / - **Sump Drainage Slots**

0m 0.1 0.2 0.3 0.4



10 / - **Sump Drainage Holes**

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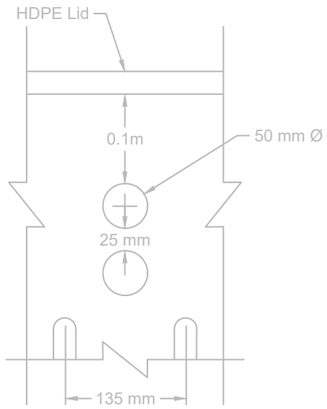

11 / - **Sump Lid Lock Detail**

Not To Scale

LEGEND

- 12oz. Non-Woven Geotextile
- Bedding Material

NOTES

1. All units in meters unless otherwise specified.
2. Construction shall be in accordance with the following Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction.
3. The size and type of pump shall be specified by others, but no continuous or intermittent heat source shall be located within the sump.
4. The insulation sheets shall be of type STYROFOAM Highload 40 manufactured by Dow Chemical Company, or equivalent. Adjacent horizontal layers of STYROFOAM insulation shall be rotated by 90 degrees.
5. Contractor to place STYROFOAM insulation by cutting to suit.
6. Special hand excavation techniques shall be considered for inserting the sump into the ground. The maximum annulus between the outside edge of the sump and the excavation shall be 100 mm. No excavation into the tundra is permitted outside the sump footprint. A 10 m buffer zone on the undisturbed tundra around the sump shall be established, and no tracked or wheeled construction equipment is allowed within this buffer zone.
7. Excavated overburden to be disposed of on existing Naartok East Overburden Stockpile. No excavated overburden to be left on tundra surrounding sump.
8. Bedding material to be backfilled in thin layers (<0.3 m) and compacted by hand with crowbar or similar to ensure no bridging or large voids within backfill.
9. Inspection holes to be covered with wire mesh to prevent animal entry.
10. Lid to be secured to sump via lid lock holes with rope or straps (by others).
11. Geotextile to be secured to sump prior to placement in excavation.
12. Sumps were not constructed / installed in 2019. No as-built information for the sumps was available at the time these drawings were completed. Sumps to be installed before freshet 2020 (approximately before mid May 2020).

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/31
0	Issued for Construction	RW	JBK	19/08/12

REVISIONS

DRAWING NO.	DRAWING TITLE
MN-WRP-06	Waste Rock Pad Sections

REFERENCE DRAWINGS

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
CH	TH	RW
CHECKED:	APPROVED:	DATE:
CH	JBK	2020/03/31

FILE NAME: 1CT022.043 - Sump.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Waste Rock Pile

DRAWING TITLE: Typical Sump Details

DRAWING NO.	SHEET	REVISION NO.
MN-WRP-10	10 OF 10	AB1

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Attachment 4 – Madrid North Portal Pad

Attachment 4.1 Madrid North Portal Pad – As-built Drawings

Engineering Drawings for the Lined Waste Re-handling Area at the Madrid North Portal Pad

Hope Bay Project, Nunavut, Canada

Active Drawing Status

Drawing Number	Drawing Title	Issue	Date	Revision
MN-NP-01	Site Overview (with orthophoto)	As-Built	2020/03/24	AB1
MN-NP-02	Existing Conditions Prior to Pad Construction (Orthophoto)	As-Built	2020/03/24	AB1
MN-NP-03	Existing Conditions Prior to Pad Construction	As-Built	2020/03/24	AB1
MN-NP-04	Portal Pad Infrastructure	As-Built	2020/03/24	AB1
MN-NP-05	Portal Pad Infrastructure Sections Sheet 1/2	As-Built	2020/03/24	AB1
MN-NP-06	Portal Pad Infrastructure Sections Sheet 2/2	As-Built	2020/03/24	AB1
MN-NP-07	Typical Details	As-Built	2020/03/24	AB1
MN-NP-08	As-Built Liner Layout	As-Built	2020/03/24	AB1

TMAC RESOURCES

REGISTERED PROFESSIONAL ENGINEER
R.C. WILLIAMS
LICENSEE
2020/03/24
NT/NU

srk consulting

Project Number: 1CT022.051

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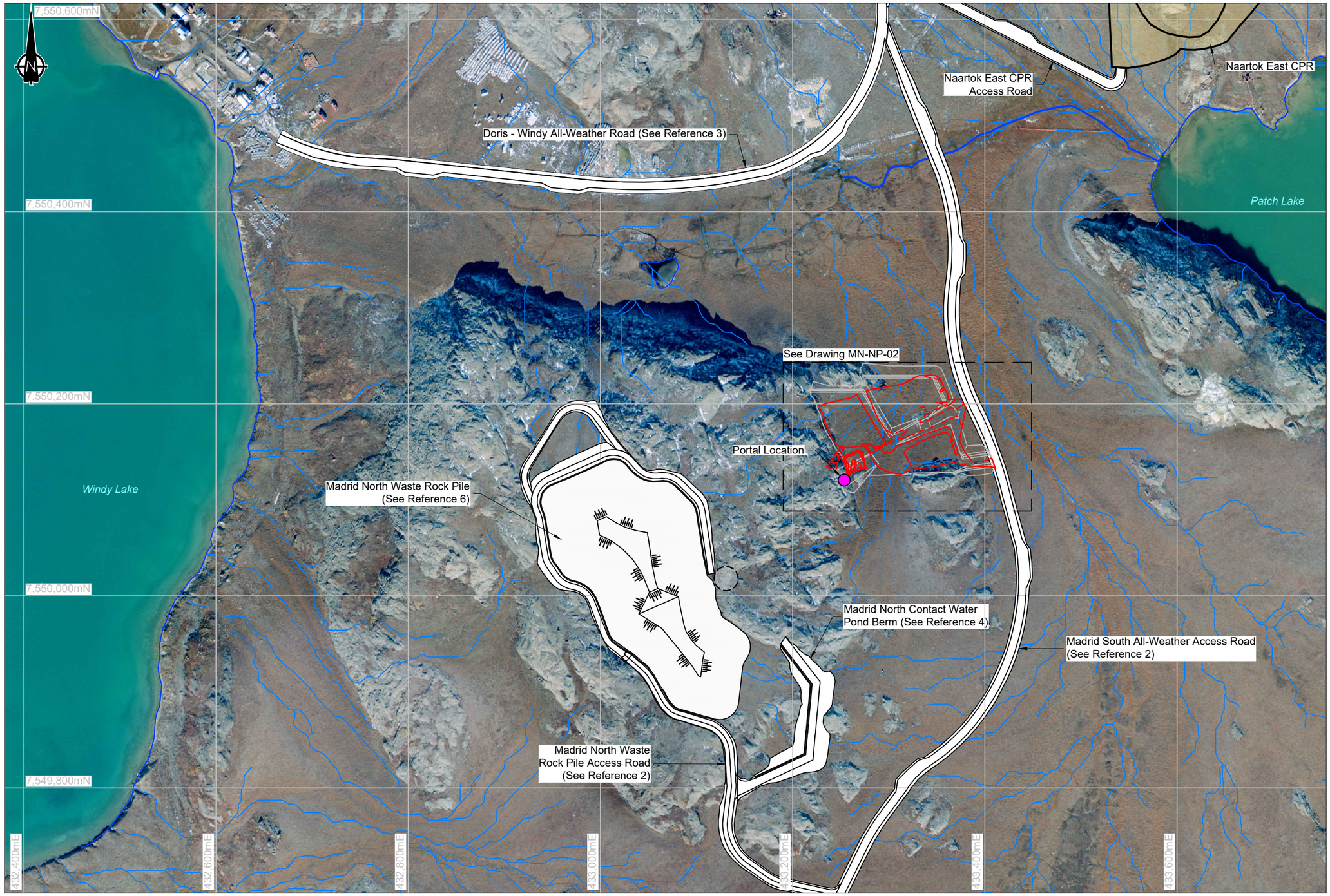

LEGEND

- Portal Location
- Streams and Waterbodies
- Pre-mining Drainage Pathway
- Crown Pillar Recovery Area
- Proposed Infrastructure
- Previously Submitted Designs
- 2019 As-Built Infrastructure

NOTES

1. All units are in meters unless otherwise specified.
2. Construction and material specifications shall be in accordance with the latest Technical Specifications: Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. SRK (2018).
3. Imagery provided by client (2007).
4. Madrid North Waste Rock Pile permitting design provided in Reference 5.
5. Drainage pathway analysis completed using Global Mapper and LiDAR surface (2007).
6. These as-built drawings have been prepared specifically for the lined waste re-handling area constructed within the portal pad. Other as-built parts of the pad were provided but in some instances were either incomplete or missing as-built survey due to snow cover at the time these drawings were produced..

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Engineering Drawings for the Madrid North Contact Water Pond, Hope Bay Project. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.
5. Engineering Permitting Drawings for the Madrid North DEIS Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number 1CT022.013. November 2017.
6. Engineering Drawings for the Madrid North Waste Rock Pile, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number: 1CT022.043. August 2019.
7. As-Built survey provided by Sub-Arctic Geomatics Ltd. Dated July 2019 - October 2019.

0m 40 80 120 160

DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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NO.	DESCRIPTION	CHK'D	APP'D	DATE
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B	Issued for Information	RW	JBK	19/09/20
A	Issued for Information	RW	JBK	19/09/06

REVISIONS

REGISTERED PROFESSIONAL ENGINEERS — R.C. WILLIAMS — LICENSEE 2020/03/24 — NT&NU

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	2020/03/24

FILE NAME: 1CT022.051 - Site.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.051

Madrid North Portal Pad

DRAWING TITLE: Site Overview (with orthophoto)

DRAWING NO.	SHEET	REVISION NO.
MN-NP-01	1 OF 8	AB1

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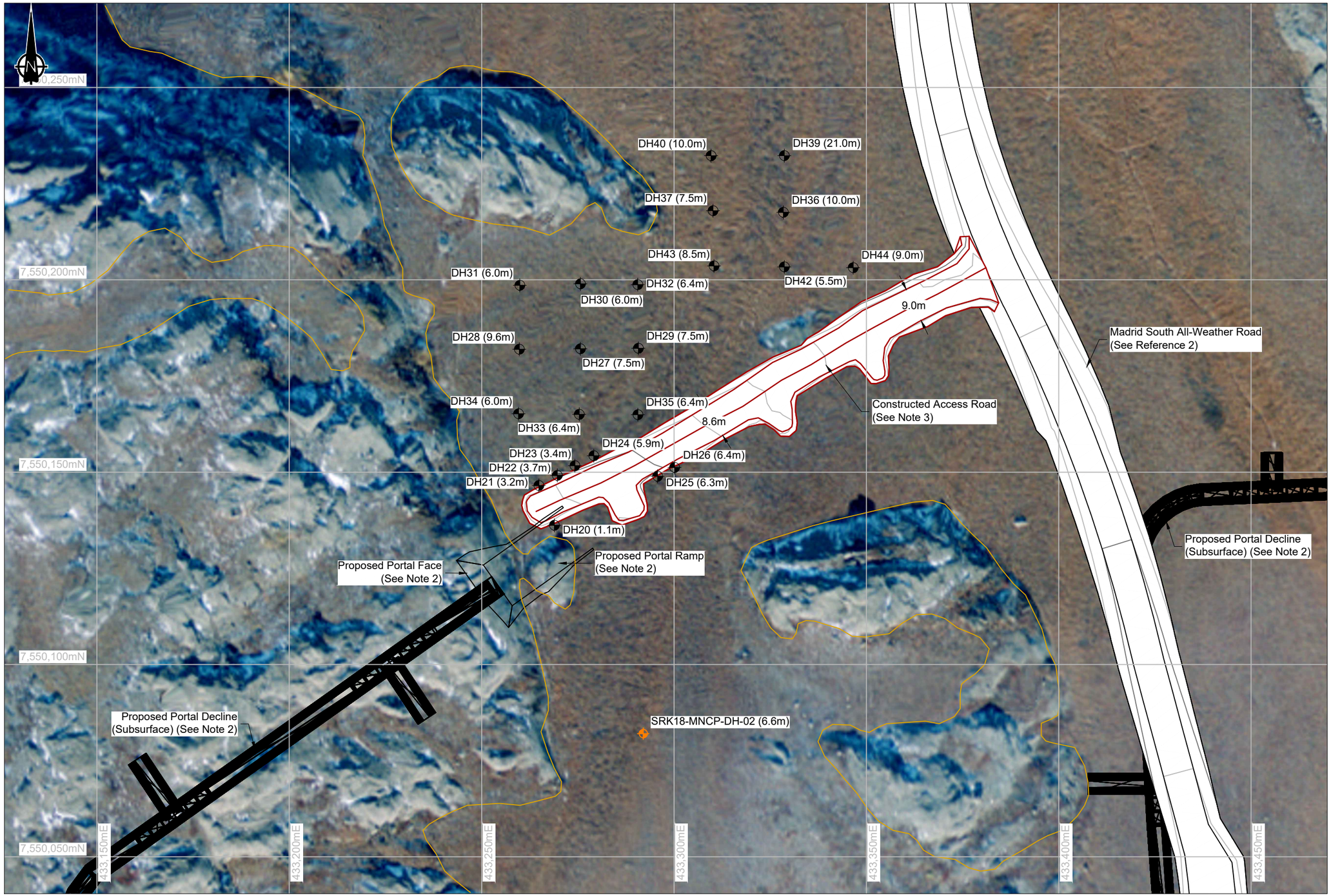

LEGEND

- Overburden Drill Hole Investigation by TMAC (Overburden Thickness)
- Drill Hole Investigation by SRK (Overburden Thickness)
- Portal Design by TMAC
- Bedrock Outcrop (approximate)

NOTES

1. All dimensions shown in meters unless otherwise specified.
2. Portal area design provided by TMAC Resources Inc. August 2019.
3. Access road constructed in July 2019 to facilitate access to overburden drill holes.
4. Overburden thickness is indicated in brackets after each drill hole.
5. Extents of bedrock outcrop estimated from aerial imagery (2007).

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.

0m 10 20 30 40

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
REFERENCE DRAWINGS						

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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C	Issued for Information	RW	JBK	19/09/20
B	Issued for Information	RW	JBK	19/09/06
A	Issued for Information	RW	JBK	19/08/30
REVISIONS				

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REGISTERED PROFESSIONAL ENGINEERS — R.C. WILLIAMS — LICENSEE — 2020/03/24 — NTAU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	2020/03/24

FILE NAME: 1CT022.051 - GA.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.051

Madrid North Portal Pad

DRAWING TITLE: Existing Conditions Prior to Pad Construction (Orthophoto)

DRAWING NO.	SHEET	REVISION NO.
MN-NP-02	2 OF 8	AB1

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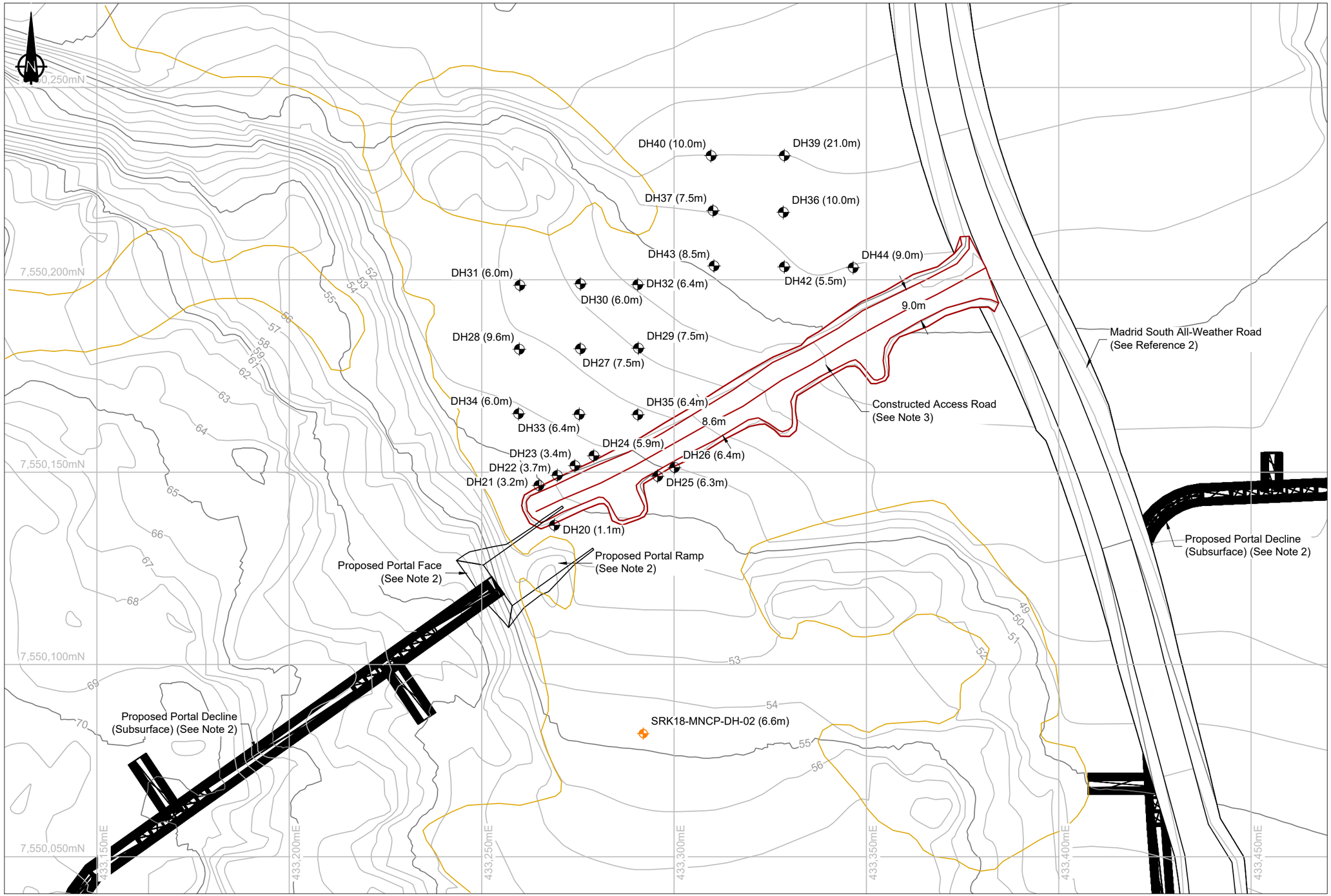

LEGEND

- Overburden Drill Hole Investigation by TMAC (Overburden Thickness)
- Drill Hole Investigation by SRK (Overburden Thickness)
- Portal Design by TMAC
- Bedrock Outcrop (approximate)

NOTES

1. All dimensions shown in meters unless otherwise specified.
2. Portal area design provided by TMAC Resources Inc. August 2019.
3. Access road constructed in July 2019 to facilitate access to overburden drill holes.
4. Overburden thickness is indicated in brackets after each drill hole.
5. Extents of bedrock outcrop estimated from aerial imagery.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number 1CT022.043. March 2019.

DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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NO.	DESCRIPTION	CHK'D	APP'D	DATE
A	Issued for Information	RW	JBK	19/08/30
B	Issued for Information	RW	JBK	19/09/06
C	Issued for Information	RW	JBK	19/09/20
0	Issued for Construction	RW	JBK	19/09/27
AB1	As-Built	RW	JBK	20/03/24

REVISIONS

PROFESSIONAL ENGINEERS STAMP

R.C. WILLIAMS LICENSEE 2020/03/24 NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	2020/03/24

FILE NAME: 1CT022.051 - GA.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.051

Madrid North Portal Pad

DRAWING TITLE:
Existing Conditions
Prior to Pad Construction

DRAWING NO.	SHEET	REVISION NO.
MN-NP-03	3 OF 8	AB1

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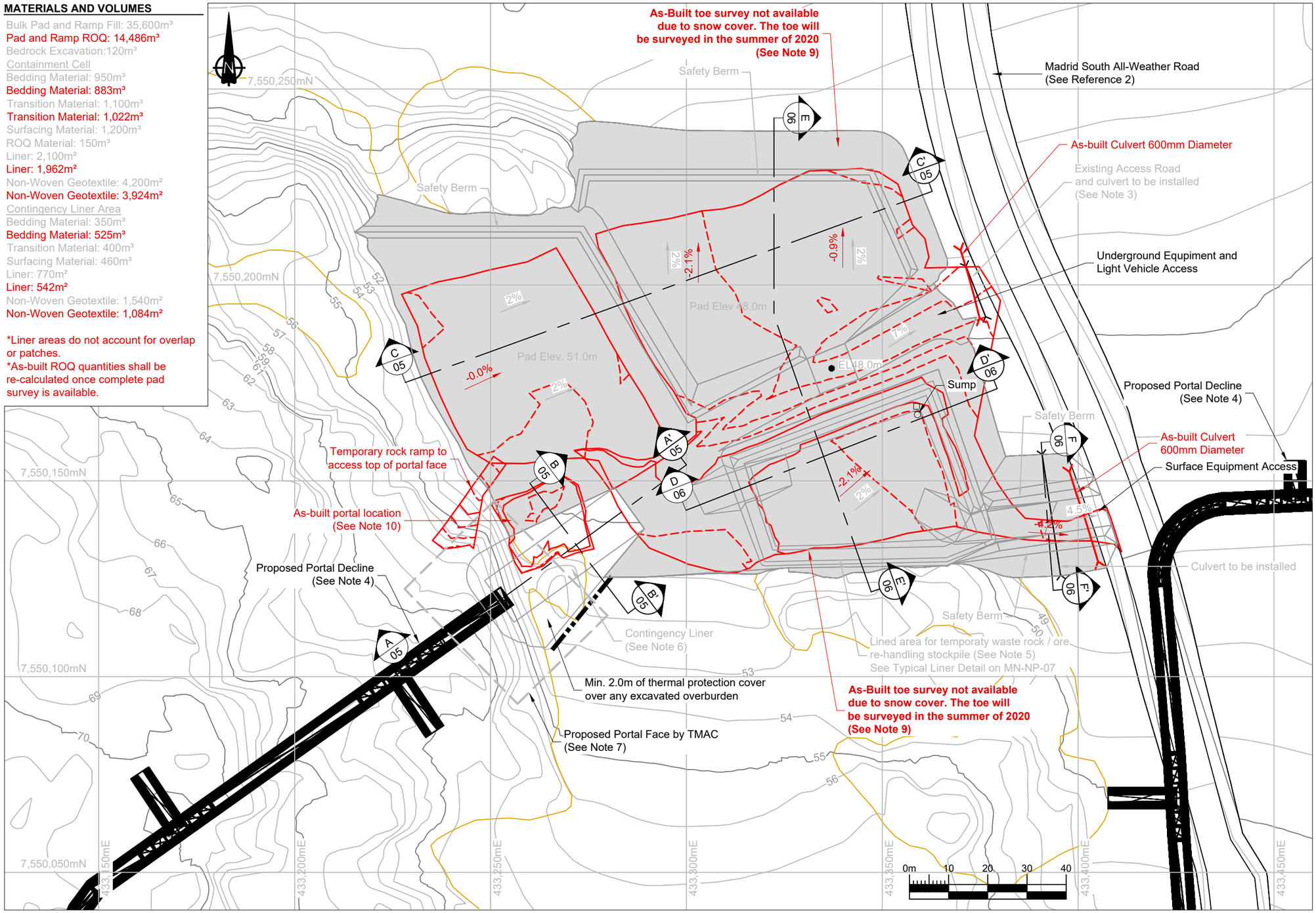
MATERIALS AND VOLUMES

Bulk Pad and Ramp Fill: 35,600m³
Pad and Ramp ROQ: 14,486m³
Bedrock Excavation:120m³
Containment Cell
Bedding Material: 950m³
Bedding Material: 883m³
Transition Material: 1,100m³
Transition Material: 1,022m³
Surfacing Material: 1,200m³
ROQ Material: 150m³
Liner: 2,100m²
Liner: 1,962m²
Non-Woven Geotextile: 4,200m²
Non-Woven Geotextile: 3,924m²
Contingency Liner Area
Bedding Material: 350m³
Bedding Material: 525m³
Transition Material: 400m³
Surfacing Material: 460m³
Liner: 770m²
Liner: 542m²
Non-Woven Geotextile: 1,540m²
Non-Woven Geotextile: 1,084m²

*Liner areas do not account for overlap or patches.
*As-built ROQ quantities shall be re-calculated once complete pad survey is available.



LEGEND

- Design Culvert Locations
- As-Built Culvert Locations
- Surface Water Diversion Berm
- Portal Design by TMAC
- 2019 As-Built Infrastructure
- Bedrock Outcrop (approximate)

NOTES

1. Contours shown at 1.0m intervals.
2. All dimensions shown in meters unless otherwise specified.
3. Access road constructed in July 2019 to facilitate access to overburden drill holes.
4. Portal design provided by TMAC Resources Inc. August 2019.
5. Fully lined cell for temporary waste rock / ore re-handling stockpile (maximum 1,000 tonnes). Designed to contain contact water up to the 1 in 100 year storm plus maximum daily snowmelt. Minimum 0.9m liner cover to accommodate heavy equipment (see Typical Liner Detail on MN-NP-07).
6. Contingency liner embedded in the pad fill and sloped back towards the portal. Contingency against spillages from underground trucks.
7. Portal face contours generated by projecting TMAC's portal design to surface. See cross section A on drawing MN-NP-05.
8. Locations of offices, shops, generators, fuel tanks, etc. to be surveyed in summer 2020 and provided in final as-built drawing, along with final pad toes.
9. Based on interim survey, SRK is currently unable to check the side slope grades and confirm stability requirements of the pad have been met.
10. Final as-built portal location adjusted in the field as per TMAC mining personnel. SRK did not provide input to the portal design.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Prepared for TMAC Resources. Project Number 1CT022.43. March 2019.
3. As-Built survey provided by Sub-Arctic Geomatics Ltd. Dated July 2019 - October 2019.

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
REFERENCE DRAWINGS						

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/24
1	Issued for Construction	RW	JBK	19/10/10
0	Issued for Construction	RW	JBK	19/09/30
D	Issued for Information	RW	JBK	19/09/26
C	Issued for Information	RW	JBK	19/09/20
B	Issued for Information	RW	JBK	19/09/06
A	Issued for Information	RW	JBK	19/08/30
REVISIONS				

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R.C. WILLIAMS LICENSEE 2020/03/24 NT/NU

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DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 24, 2020

FILE NAME: 1CT022.051 - Portal Pad.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.051

Madrid North Portal Pad

DRAWING TITLE: Portal Pad Infrastructure

DRAWING NO.	SHEET	REVISION NO.
MN-NP-04	4 OF 8	AB1

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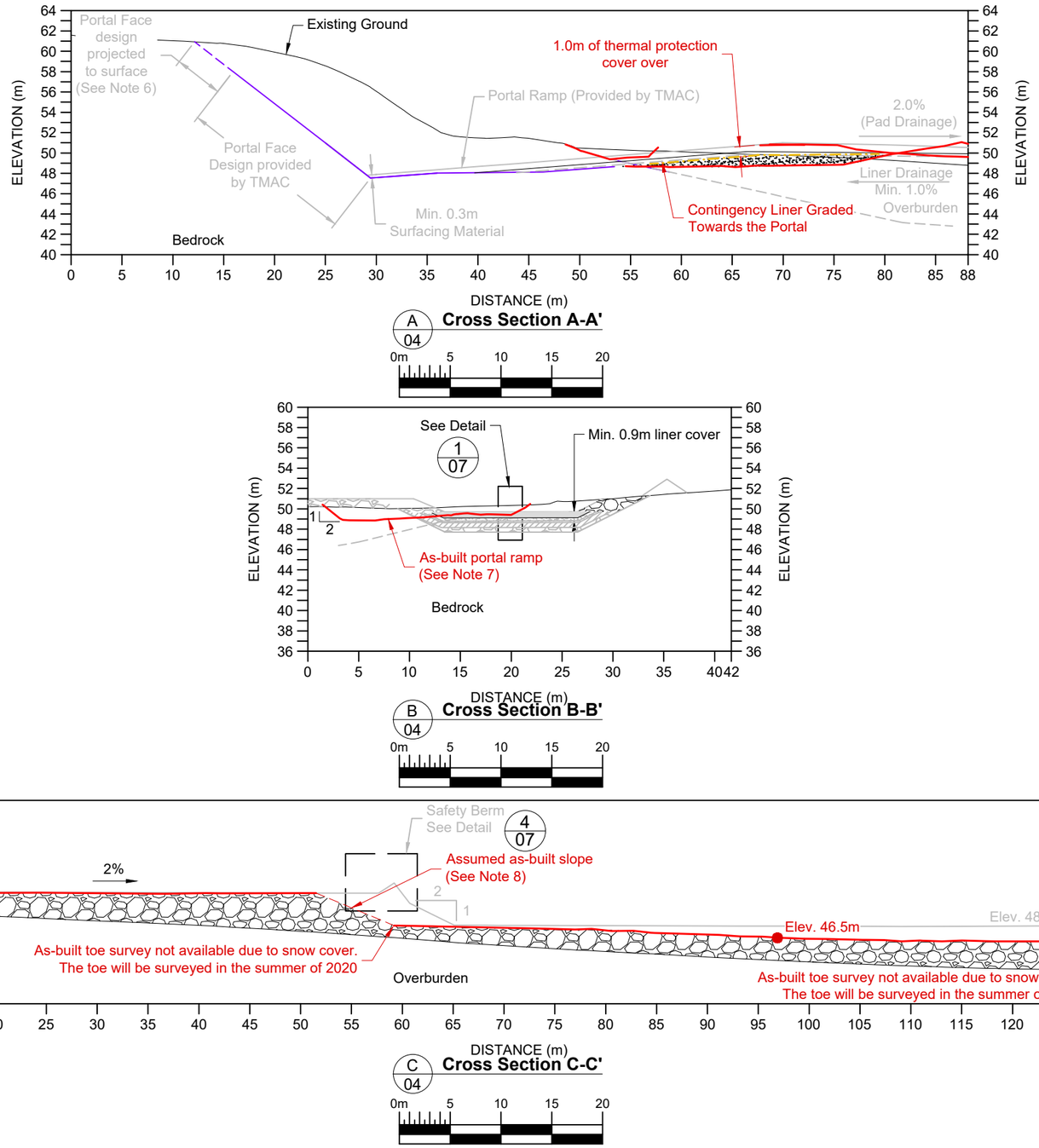

LEGEND

- Overburden Drill Hole Investigation Location and depth
- Inferred Bedrock Contact
- Excavation Surface
- Proposed Design Surface
- Liner System
- 2019 As-Built Infrastructure
- 2019 As-Built Liner System
- Run of Quarry (ROQ) or Geochemically Suitable Run of Mine (ROM)
- Bedding Material

NOTES

1. All dimensions in meters unless otherwise stated.
2. Overburden excavation to be inspected by the Engineer. Additional excavation and ROQ fill may be required depending on conditions encountered. Minimum 2.0m ROQ thermal cover is required over any excavation into overburden.
3. Minimum thickness of fill placed directly on overburden is 1.0m.
4. Crushed and screened quarry rock (ROQ) and / or geochechmically suitable waste rock (ROM) from selected areas of the mine will be used for construction material (References 1, 2, and 3).
5. Construction and material specifications shall be in accordance with the Technical Specifications (Reference 4).
6. Portal face design, rock support and stabilization requirements was completed by TMAC / others.
7. Final as-built portal location adjusted in field as per TMAC mining personnel. SRK did not provide input to the portal design.
8. Final pad as-built survey to be completed in summer 2020.

REFERENCE

1. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
2. Geochemical Characterization of Madrid-Boston Project Quarries Report, Hope Bay Project. Report prepared for TMAC Resources Inc., 1CT022.013. November 2017.
3. Classification of Waste Rock in Support of Segregating Construction Rock from Naartok East Crown Pillar Recover Trench, Madrid North, Hope Bay Project. Report prepared for TMAC Resources Inc., 1Ct022.037. July 2019.
4. Technical Specifications Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. Report prepared for TMAC Resources Inc., 1CT022.031. April 2018.
5. As-Built survey provided by Sub-Arctic Geomatics Ltd. Dated July 2019 - October 2019.

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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B	Issued for Information	RW	JBK	19/09/06
A	Issued for Information	RW	JBK	19/08/30

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R.C. WILLIAMS LICENSEE 2020/03/24 NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	March 24, 2020

FILE NAME: 1CT022.051 - Portal Pad.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.051

Madrid North Portal Pad

DRAWING TITLE: Portal Pad Infrastructure Sections Sheet 1/2

DRAWING NO.	SHEET	REVISION NO.
MN-NP-05	5 OF 8	AB1

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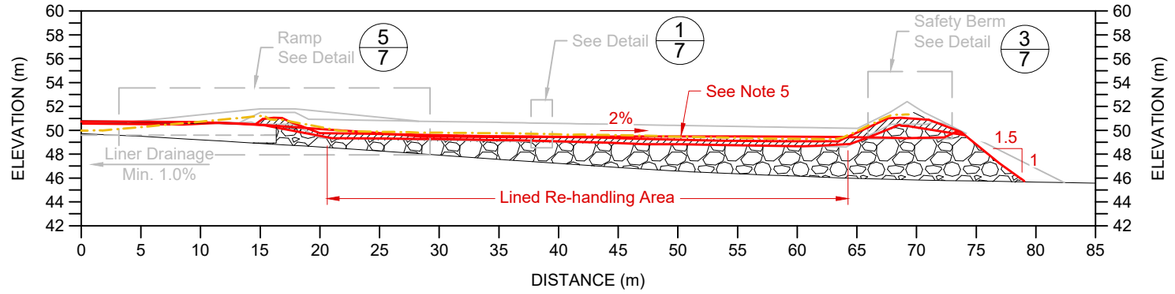
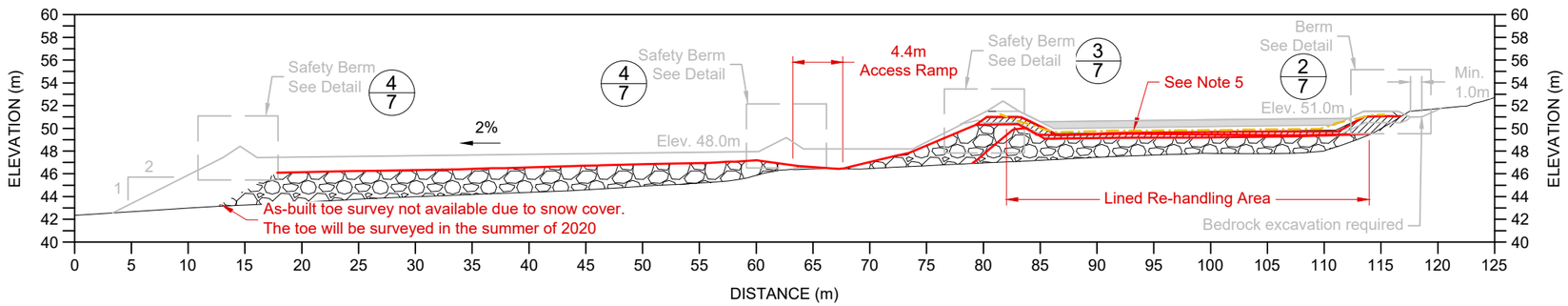
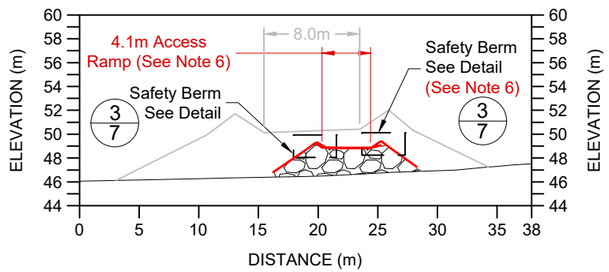


D/04 **Cross Section D-D'**



E/04 **Cross Section E-E'**



F/04 **Cross Section F-F'**

LEGEND

- Proposed Design Surface
- Liner System
- Excavation Surface
- 2019 As-Built Infrastructure
- 2019 As-Built Liner System
- Run of Quarry (ROQ) or Geochemically Suitable Run of Mine (ROM)
- Surfacing Material
- Transition Material

NOTES

1. All dimensions in meters unless otherwise stated.
2. Minimum thickness of fill placed directly on overburden is 1.0m.
3. Crushed and screened quarry rock (ROQ) and/or geochemically suitable waste rock (ROM) from selected areas of the mine will be used for construction material (References 1, 2, and 3).
4. Construction and material specifications shall be in accordance with the Technical Specifications (Reference 4)
5. As-built data above liner was unavailable at the time of as-built drawing updates.
6. As-built survey of access road from waste re-handling area to Madrid South All-Weather Road to be re-surveyed in summer 2020 to confirm minimum design road width and berm heights are met.

REFERENCE

1. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
2. Geochemical Characterization of Madrid-Boston Project Quarries Report, Hope Bay Project. Report prepared for TMAC Resources Inc., 1CT022.013. November 2017.
3. Classification of Waste Rock in Support of Segregating Construction Rock from Naartok East Crown Pillar Recover Trench, Madrid North, Hope Bay Project. Report prepared for TMAC Resources Inc., 1Ct022.037. July 2019.
4. Technical Specifications Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision H - Issued for Construction. Report prepared for TMAC Resources Inc., 1CT022.031. April 2018.
5. As-Built survey provided by Sub-Arctic Geomatics Ltd. Dated July 2019 - October 2019.

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DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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							B	Issued for Information	RW	JBK	19/09/06
							A	Issued for Information	RW	JBK	19/08/30
REFERENCE DRAWINGS		REVISIONS									

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DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
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RW	JBK	March 24, 2020

FILE NAME: 1CT022.051 - Portal Pad.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.051

Madrid North Portal Pad

DRAWING TITLE:
Portal Pad Infrastructure Sections
Sheet 2/2

DRAWING NO.	SHEET	REVISION NO.
MN-NP-06	6 OF 8	AB1

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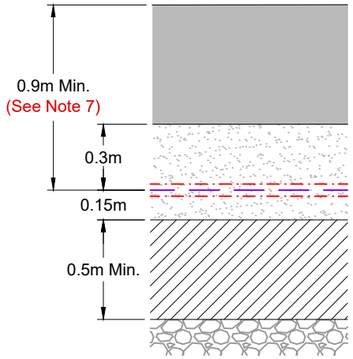
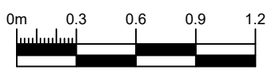
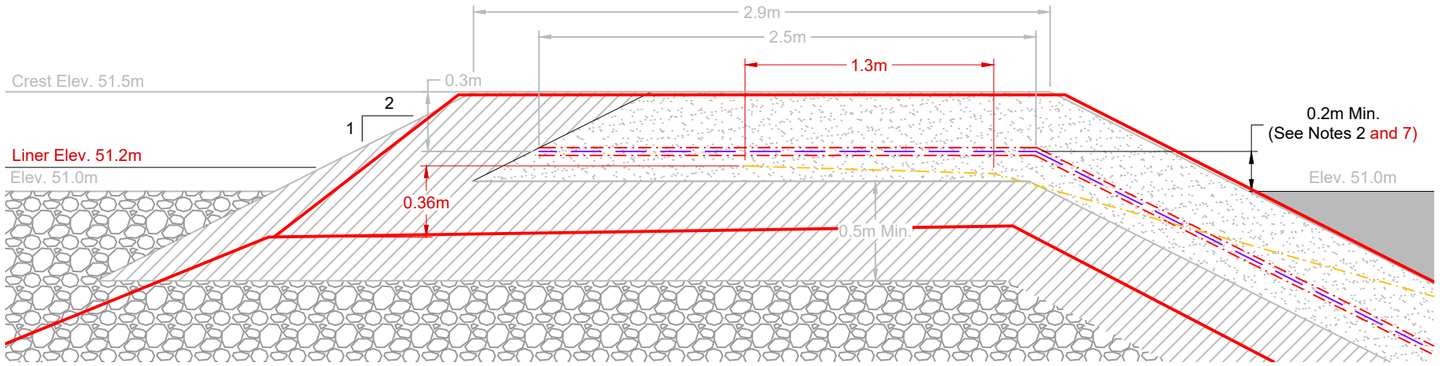
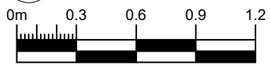


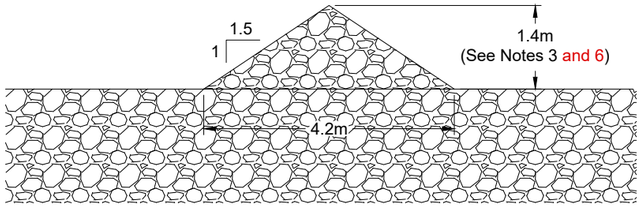
1/6 **Liner Layer Detail**



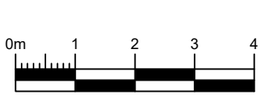


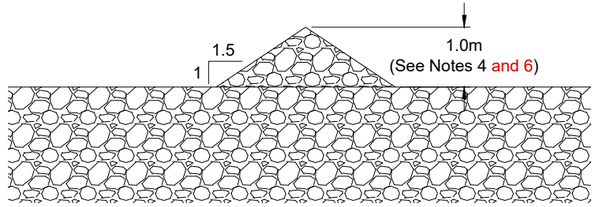
2/6 **Berm Layer Detail**



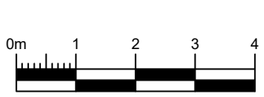


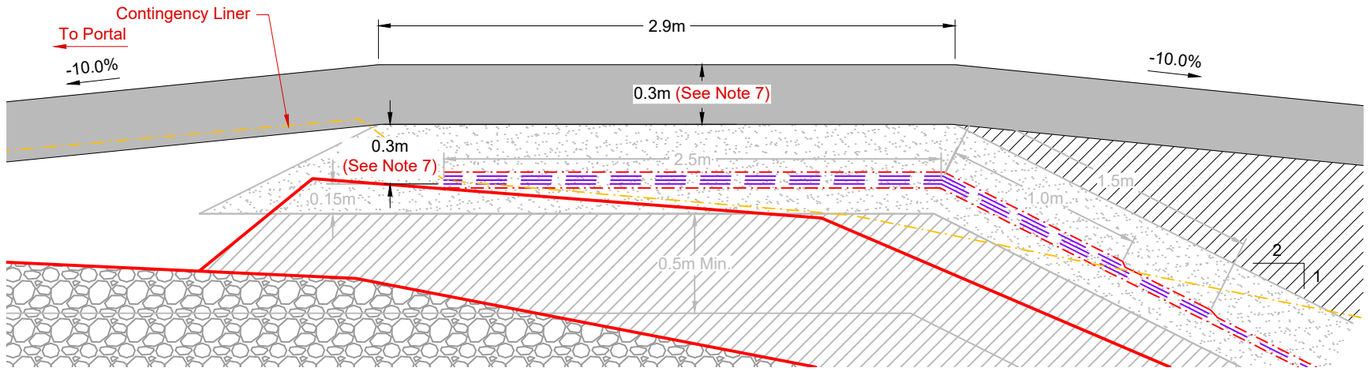
3/5,6 **Safety Berm Detail - Surface Equipnment**



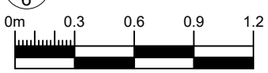


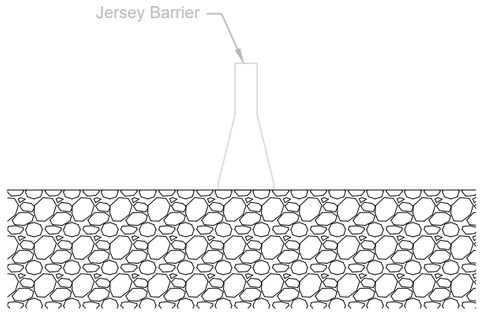
4/5,6 **Safety Berm Detail - Underground Equpiment and Light Vehicles**

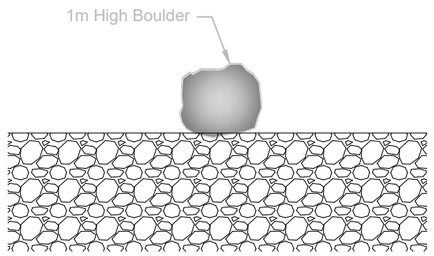




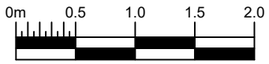
5/6 **Ramp Layer Detail**







Safety Barriers - Not Required since safety berms were constructed



LEGEND

- Proposed Design Surface
- 2019 As-Built Surface
- 2019 As-Built Liner System
- Design Textured (double sided) 60mil HDPE Liner
- Design 12 oz. Non-woven Geotextile
- Bedding Material
- Transition Material
- Surfacing Material
- Run of Quarry (ROQ) or Geochemically Suitable Run of Mine (ROM

NOTES

1. All dimensions in meters unless otherwise stated.
2. Design storm is 55mm (1:100-yr, 24hr flood) plus maximum daily snowmelt (18mm) = 73mm. Catchment area is designed to be limited to the lined pad area, therefore required capacity is equal to the design flood depth i.e. 73mm. The design capacity has conservatively been selected as 0.2m
3. Berm height equal to the two-thirds the tire size of the maximum vehicle, which is assumed to be a Volvo A60H haul truck (2,097mm tire diameter).
4. Berm height equal to the greater of two-thirds the tire size of a CAT R1300 Underground Miner (1,374mm tire diameter) or a standard pickup truck (885mm tire diameter).
5. Jersey barriers and/or ROQ boulders may be used as safety barriers instead of safety berms, provided they meet the minimum height requirement in the respective location.
6. As-built survey of access road from waste re-handling area to Madrid South All-Weather Road to be re-surveyed in summer 2020 to confirm minimum design road width and berm heights are met.
7. To be confirmed once complete as-built survey of backfill above the liner is available.

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/24
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D	Issued for Information	RW	JBK	19/09/26
C	Issued for Information	RW	JBK	19/09/20
B	Issued for Information	RW	JBK	19/09/06
A	Issued for Information	RW	JBK	19/08/30

REVISIONS

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER — R.C. WILLIAMS — LICENSEE 2020/03/24 — NT&NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	2020/03/24

FILE NAME: 1CT022.051 - Details.dwg

MAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.051

Madrid North Portal Pad

DRAWING TITLE: Typical Details

DRAWING NO.	SHEET	REVISION NO.
MN-NP-07	7 OF 8	AB1

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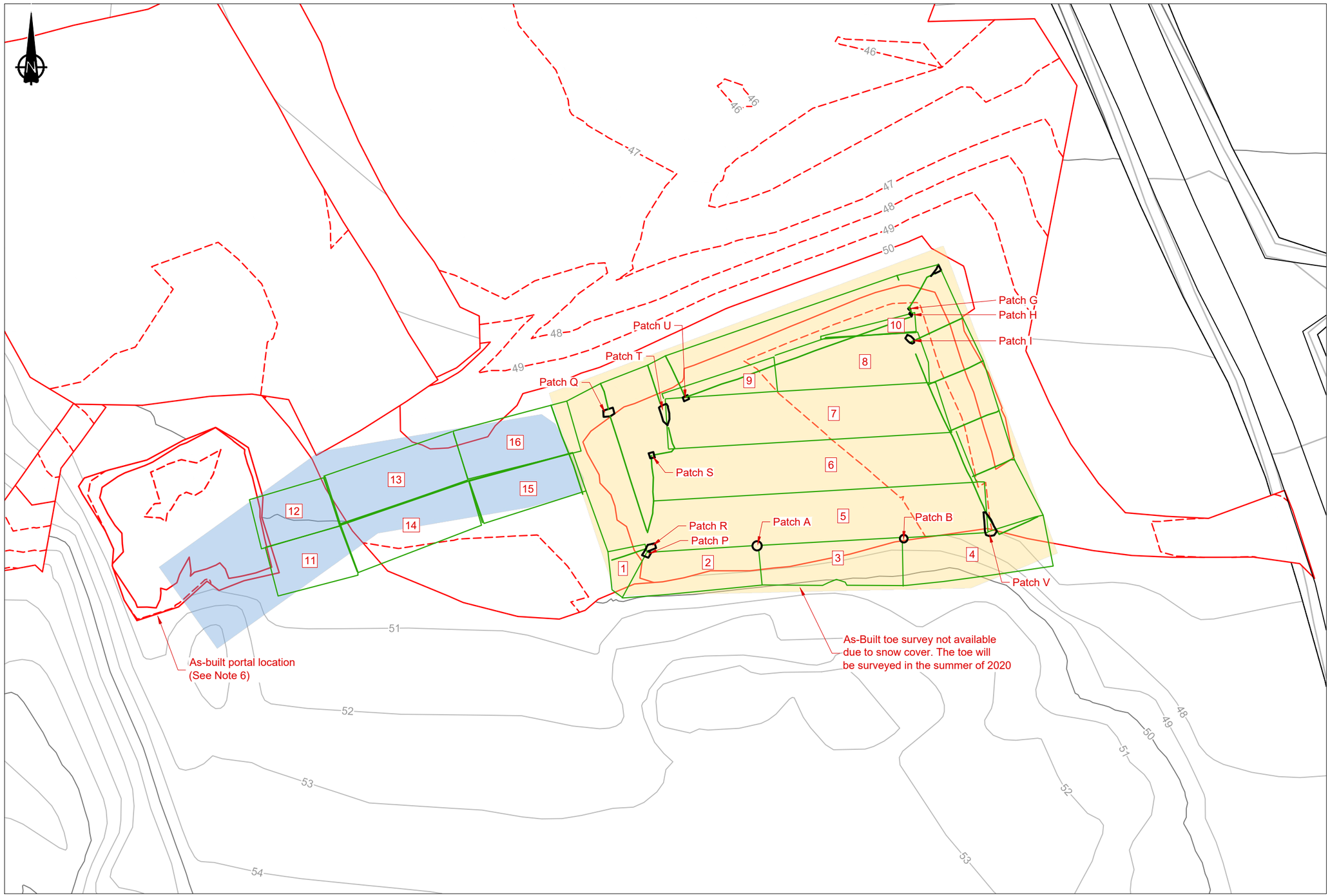

LEGEND

- As-Built HDPE Liner Panel
- Liner Patch Location
- Design Lined Waste Rock / Ore Re-handing Area
- Design Contingency Liner Area
- 2019 As-Built Infrastructure

NOTES

1. Contours shown at 1.0m intervals.
2. All dimensions shown in meters unless otherwise specified.
3. SRK was not present on site for the placement of backfill above the liner.
4. Liner installation and quality control provided by A&A Technical Services.
5. Quality control for all fill placement, including liner backfill, was provided by Nuna logistics Ltd.
6. Final as-built portal location adjusted in the field as per TMAC mining personnel. SRK did not provide input to the portal design.

REFERENCES

1. NAD83 UTM Zone 13.
2. As-Built survey provided by Sub-Arctic Geomatics Ltd. Dated July 2019 - October 2019.

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DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/24

REVISIONS

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER
R.C. WILLIAMS
LICENSEE
2020/03/24
NT/NU

srk consulting

DESIGN:	DRAWN: TAH	REVIEWED: RW
CHECKED: RW	APPROVED: JBK	DATE: 2020/03/24

FILE NAME: 1CT022.051 - Liner.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.0581

Madrid North Portal Pad

DRAWING TITLE:

As-Built Liner Layout

DRAWING NO.	SHEET	REVISION NO.
MN-NP-08	8 OF 8	AB1

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Attachment 4.2 Madrid North Portal Pad – Liner Installation Report

A&A Technical Services
Yellowknife NT

Madrid Portal 60mil HDPE liner Installation
October 23 – November 7, 2019

Client: TMAC Resources Inc.

A&A Technical Services
Yellowknife NT

Madrid Portal 60mil HDPE liner Installation
October 23 – November 7, 2019

Client: TMAC Resources Inc.

August 25 – Oct 5, 2019

Table of contents

TECHNICAL SERVICES

A&A Technical Services
Yellowknife NT

TMAC Resources Inc.
Hope Bay NT
Madrid Portal HDPE Liner
60mil textured HDPE sandwiched between 540g/m2 non-woven geotextile.
Panel layout drawing.

P-1 Panel number

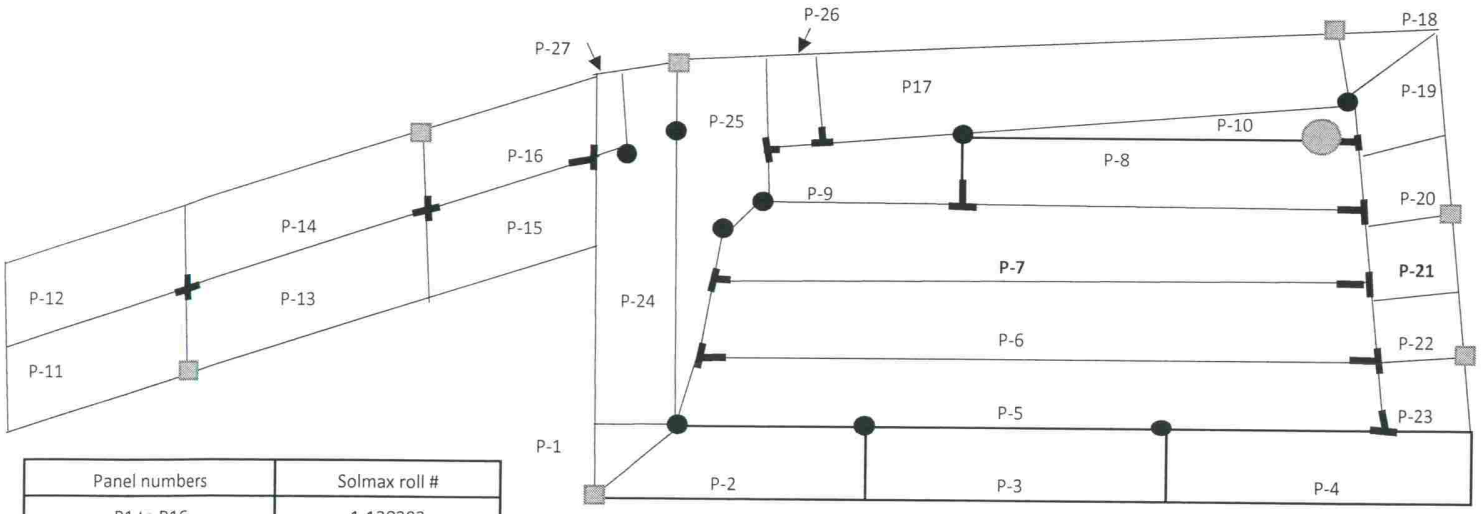
Extrusion Patch

Extrusion T weld

Sump

Destruct sample location

N



Panel numbers	Solmax roll #
P1 to P16	1-138393
P17 to P24	1-138388
P25 to P27	1-138401

* Note: Not to scale

A&A Technical Services
Yellowknife NT
October 22- November 7, 2019

TMAC Resources
Hope Bay - Madrid Portal Solmax 60mil single textured HDPE
Daily wedge and extrusion welder qualification and destruct sample tests.

Test welds were completed in ambient conditions at site.
Peel and shear tests were conducted inside Madrid office trailer
at room temperature for prequalification of welders and
destruct test samples.
Portable hoarding was used for all wedge and extrusion welding.

Wedge Welder - Demtech Prowedge #2 Tech: AH

Peel strength Temp. 420 C Speed 1.8m minute

27-Oct-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	142	145	91
2	138	136	91
3	145	142	91
4	139	141	91
27-Oct-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	160		120
2	162		120

Wedge Welder - Demtech Prowedge #2 Tech: AH

Peel strength Temp. 420 C Speed 1.8m minute

30-Oct-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	144	135	91
2	146	150	91
3	148	151	91
4	146	149	91
30-Oct-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	161		120
2	160		120

Wedge Welder - Demtech Prowedge #2 Tech: GH

Peel strength Temp. 420 C Speed 1.8m minute

02-Nov-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	140	145	91
2	142	150	91
3	139	142	91
4	135	142	91
02-Nov-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	161		120
2	164		120

Wedge Welder - Demtech Prowedge #2 Tech: GH

Peel strength Temp. 420 C Speed 1.8m minute

03-Nov-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	137	141	91
2	139	145	91
3	144	138	91
4	140	148	91
03-Nov-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	159		120
2	162		120

Wedge Welder - Demtech Prowedge #2 Tech: GH

Peel strength Temp. 420 C Speed 1.8m minute

04-Nov-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	139	148	91
2	144	140	91
3	142	139	91
4	136	139	91
04-Nov-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	155		120
2	155		120

Extrusion welder daily prequalifications

Extrusion Welder- ProXL #1 Tech: AH

Hot air temp: - 260 C Extrudite temp: 250 C

27-Oct-19	Peel strength		Minimum ppi (lbs/inch)
1	138		78
2	144		78
3	132		78
4	138		78
27-Oct-19	Shear Strength		
1	158		120
2	152		120

Extrusion Welder- ProXL #1 Tech: GH

Hot air temp: - 260 C Extrudite temp: 250 C

30-Oct-19	Peel strength		Minimum ppi (lbs/inch)
1	141	144	78
2	132	135	78
3	140	131	78
4	136	136	78
30-Oct-19	Shear Strength		
1	158		120
2	160		120

Extrusion Welder- ProXL #1 Tech: GH

Hot air temp: - 260 C Extrudite temp: 250 C

03-Nov-19	Peel strength		Minimum ppi (lbs/inch)
1	145		78
2	139		78
3	140		78
4	132		78
03-Nov-19	Shear Strength		
1	152		120
2	158		120

Destruct samples from wedge weld seams

Location : Top of seam panels 1 and 2. Tech: AH

Peel strength

27-Oct-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	137	139	91
2	139	134	91
3	142	141	91
4	140	144	91
27-Oct-19			Minimum ppi (lbs/inch)
1	157		120
2	163		120

Location : S end of seam P11 and P13 Tech: AH

Peel strength Temp. 420 C Speed 1.8m minute

30-Oct-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	144	139	91
2	138	135	91
3	140	140	91
4	144	140	91
30-Oct-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	167		120
2	155		120

Location : N end of seam P14 and P16 Tech: AH

Peel strength

30-Oct-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	144	144	91
2	144	138	91
3	142	141	91
4	136	145	91
30-Oct-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	158		120
2	162		120

Location : Top of seam P17 and P-18 Tech: GH

Peel strength

02-Nov-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	141	132	91
2	140	145	91
3	137	135	91
4	138	139	91
02-Nov-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	161		120
2	157		120

Location : Top of seam P20 and P21 Tech: GH

Peel strength

02-Nov-19			Minimum ppi (lbs/inch)
1	139	144	91
2	142	141	91
3	136	139	91
4	137	135	91
02-Nov-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	161		120
2	163		120

Location : Top of seam P22 and P23 Tech: GH

Peel strength

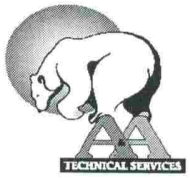
02-Nov-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	137	144	91
2	141	142	91
3	137	142	91
4	144	142	91
02-Nov-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	154		120
2	159		120

Location : Top of seam P24 and P25 Tech: GH

Peel strength

03-Nov-19	Inside weld	Outside weld	Minimum ppi (lbs/inch)
1	144	142	91
2	142	145	91
3	134	144	91
4	149	142	91
03-Nov-19	**Shear Strength**		Minimum ppi (lbs/inch)
1	160		120
2	165		120

A&A Technical Services
Yellowknife NT
October 22- November 7, 2019



TMAC Resources

Hope Bay - Madrid Portal Solmax 60mil single textured HDPE

Non - Destructive air pressure testing of dual wedge weld seams.

Minimum 30 psi over 5 minutes with less than 4 psi loss in pressure = Pass

Date	Technician	Seam location	Start psi	Finish psi	Pass/Fail	Comments
Oct. 27/19	AH	P-1 - P-2	30	30	Pass	
Oct. 27/19	AH	P-2 - P-3	35	35	Pass	
Oct. 27/19	AH	P-3- P-4	35	35	Pass	
Oct. 27/19	AH	P-4 - P-5	35	35	Pass	
Oct. 27/19	AH	P-3 - P-5	35	35	Pass	
Oct. 27/19	AH	P-2 - P-5	35	35	Pass	
Oct. 27/19	AH	P-8 -P-9	34	34	Pass	
Oct. 27/19	AH	P-5-P-6	34	34	Pass	
Oct. 27/19	AH	P-6-P-7	35	35	Pass	
Oct. 27/19	AH	P-7 - P-8	35	35	Pass	
Oct. 27/19	AH	P-8 P-10	35	35	Pass	
	Due to broken valve on air tank, weather and time constraints additional destruct samples					
	were taken from wedge weld seams instead of air testing.					

CERTIFIED WELDING TECHNICIAN

The International Association of Geosynthetic Installers
Certifies:

ALAN HARMAN

As a **Certified Welding Technician**, in polyethylene wedge and extrusion welding, having demonstrated superior hands-on skills, knowledge and experience in the welding and installation of polyethylene (PE) geomembranes, and having basic mechanical aptitude for working with welders and equipment on the job site.
Registration number: **CWT162010**

Valid 07 June 2016 — 07 June 2021

President, IAGI

Managing Director, IAGI

CERTIFIED WELDING TECHNICIAN

The International Association of Geosynthetic Installers
Certifies:

GUY HORESAY

As a **Certified Welding Technician**, in polyethylene wedge and extrusion welding, having demonstrated superior hands-on skills, knowledge and experience in the welding and installation of polyethylene (PE) geomembranes, and having basic mechanical aptitude for working with welders and equipment on the job site.
Registration number: **CWT170010**

Valid 07 June 2016 — 07 June 2021

International Association of Geosynthetic Installers

President, IAGI

Managing Director, IAGI

A&A Technical Services
Yellowknife NT

Madrid Portal 60mil HDPE liner Installation
October 23 – November 7, 2019

Client: TMAC Resouces Inc.

Upon arrival to site the containment area to be lined was thoroughly inspected by A&A Technical Services installation supervisor and deemed to be a suitable surface on which to place the HDPE lining system. The Solmax 60 mil single textured HDPE was sandwiched between two layers of 540g/m2 non-woven geotextile. The lining system was placed over a compacted layer of -25mm crushed rock and backfilled with the same.

Warranties issued by A&A Technical Services shall cover only the cost of replacement and/or repair of defective installations, determined or agreed to be the responsibility of A&A Technical Services, provide that the warranty work will be performed to the same standards and scope of work set out in the contract documents. A&A's installation warranty shall commence upon acceptance of the individual geosynthetic components by the owner or its representative as such components are completed. The installation warranty period shall not exceed beyond 1 years. Our installation warranty is rendered null and void if the installed geosynthetics are subject to abuse by machinery, equipment or personnel not under the control of A&A, harmful chemicals or unusual weather conditions or catastrophic earthworks failures.

A&A Technical Services shall not be held liable for defects, damage and/or deficient materials and installations, either in whole or in part should the defects, damage or deficient materials and installations arise as the result from the use of poor quality and inappropriate or unsuitable earthworks material or site preparation. This limitation of liability extends to improper and/or construction techniques, and methods and equipment used to create the earthworks covering all or any portion of the completed geosynthetic installation.

Signed: Alan Harman Dated: November 7, 2019

Al Harman
President
A&A Technical Services
Yellowknife NT

Attachment 5 – Naartok East Overburden Stockpile

Attachment 5.1 Naartok East Overburden Stockpile – IFC Drawings

TMAC Resources Inc.

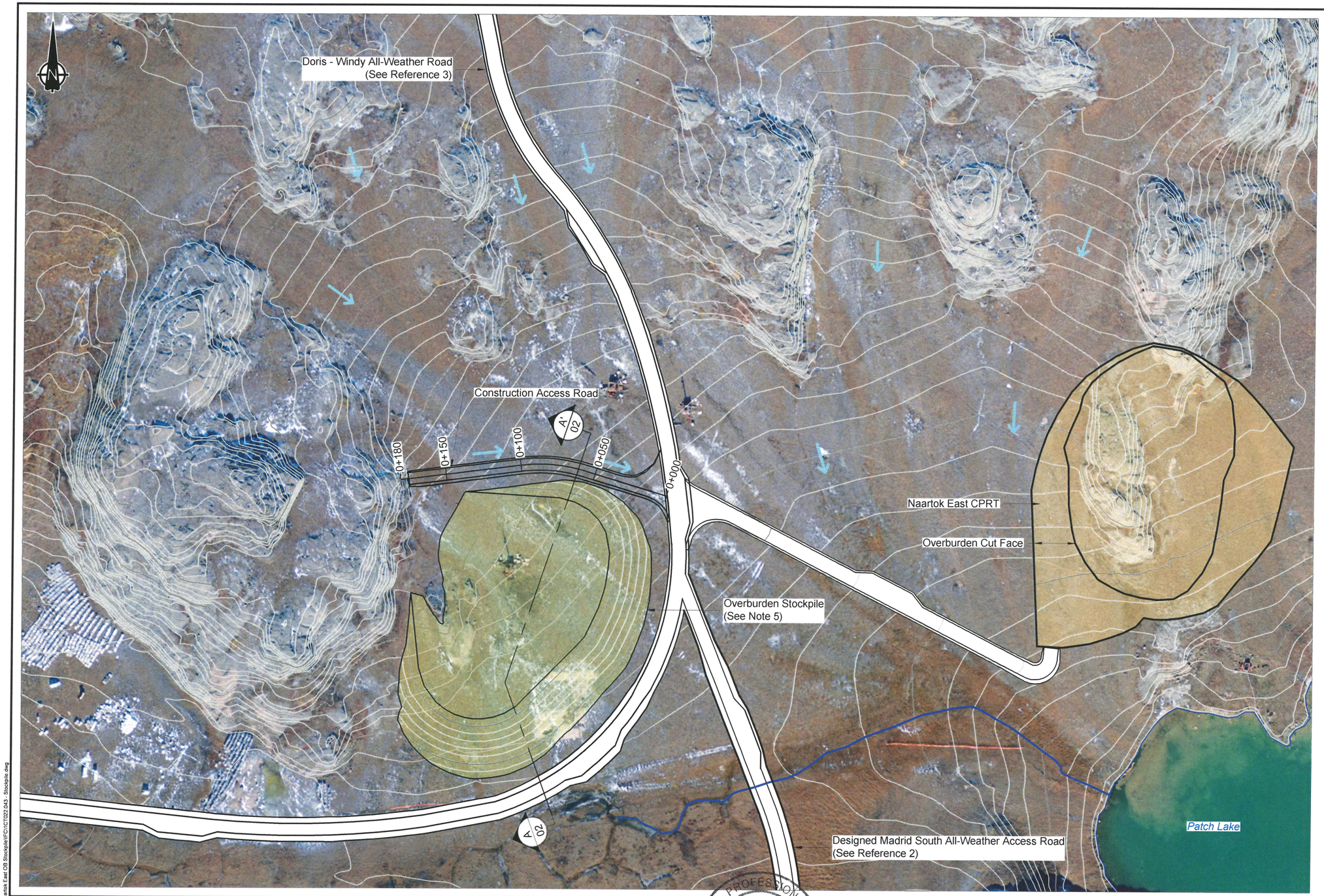
Madrid North Project

Naartok East CPRT Overburden Stockpile

Drawing Number	Drawing Title	Issue	Date	Revision
01	Overburden Stockpile Location and Surface Water Drainage	Issued for Construction	2019/05/30	0
02	Cross Section A-A' and Typical Construction Access Road Detail	Issued for Construction	2019/05/30	0

Signed and stamped copies
2019/05/30

srk consulting



LEGEND

- Drainage Direction
- Crown Pillar Recovery Trench (CPRT)
- Overburden Stockpile Location

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 1.0m intervals.
3. All units shown in meters unless otherwise specified.
4. A minimum 31.0m setback from waterbodies is required.
5. Overburden stockpile designed in accordance with design principles as per Reference 5. This includes:
   - Overall slope angles should not exceed 5H:1V (11°).
   - Maximum height of 10m.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Revision E. Issued for Discussion drawings prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd. Project Number: 1CH008.000. August 2008.
5. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Report prepared for TMAC Resources. Project Number: 1CT022.013. November 2017.

MATERIALS LIST AND QUANTITIES

Overburden Stockpile Capacity: 75,000m³
Construction Access Road Material: 1,450m³

* All volumes reported are calculated to neat lines. Losses into the Tundra are not accounted for. The overburden stockpile capacity includes a 15% bulking factor.

0m 20 40 60 80 100

REFERENCE DRAWINGS		REVISIONS								
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							A	Issued for Discussion	RW	EMR	19/05/29

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER
M.M. MILLER
LICENSEE
2019/05/30

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	2019/05/30

FILE NAME: 1CT022.043 - Stockpile.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Naartok East Overburden Stockpile

DRAWING TITLE:
Overburden Stockpile Location and Surface Water Drainage

DRAWING NO.	SHEET	REVISION NO.
01	1 OF 2	0

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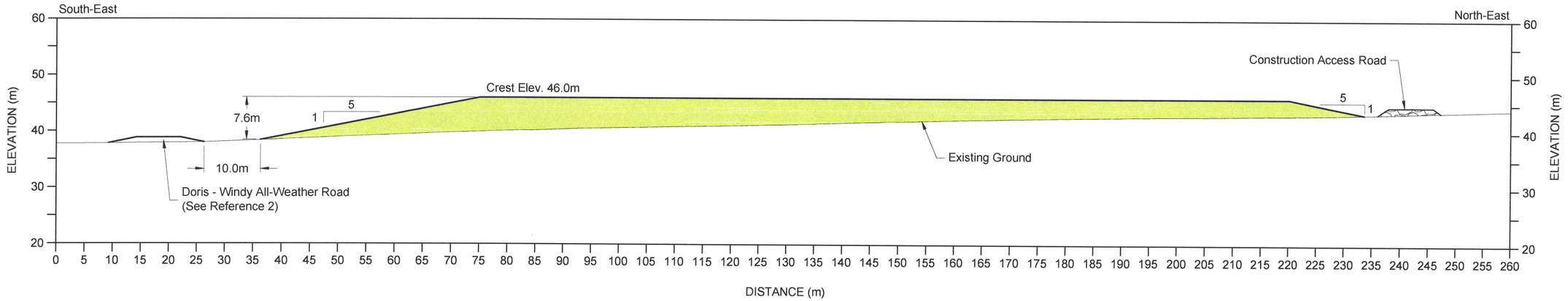

A/01 **Cross Section A-A'**

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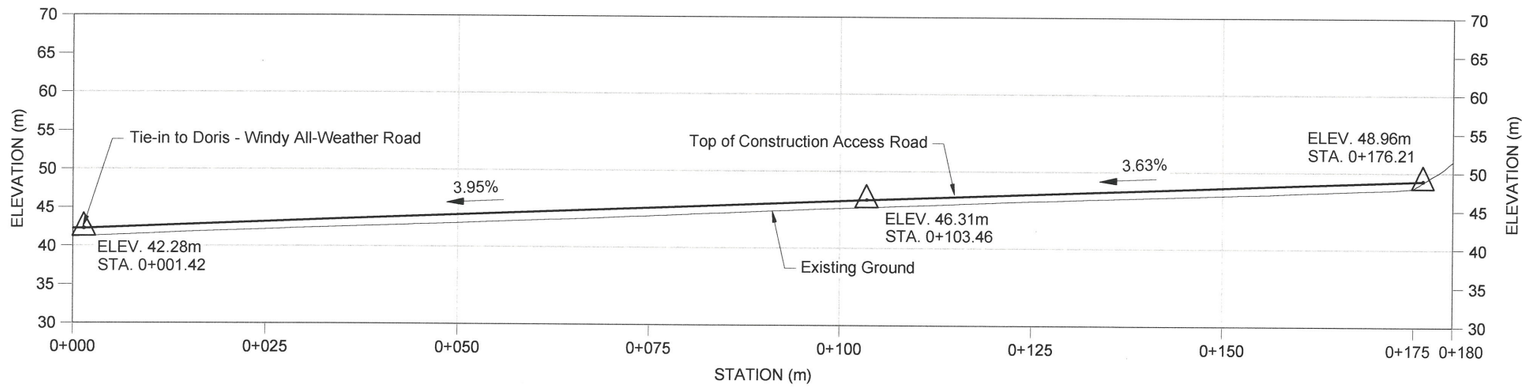
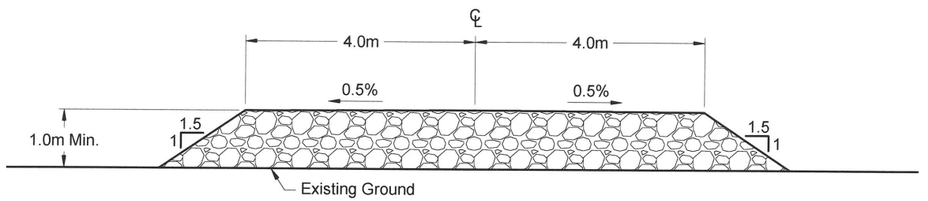


Construction Access Road Profile

0m 5 10 15 20 25 30



Typical Construction Access Road Detail

0m 1 2 3 4

LEGEND

- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM)
- Overburden Stockpile

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. All units shown in meters unless otherwise specified.

REFERENCES

1. NAD83 UTM Zone 13.
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. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd. Project Number: 1CH008.000. August 2008.

REFERENCE DRAWINGS		REVISIONS								
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							A	Issued for Discussion	RW	EMR	19/05/29

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER
M.M. MILLER
LICENSEE
2019/05/30
NT/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	EMR	2019/05/30

FILE NAME: 1CT022.043 - Stockpile.dwg

MAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Naartok East Overburden Stockpile

DRAWING TITLE: Cross Section A-A' and Typical Construction Access Road Detail

DRAWING NO.	SHEET	REVISION NO.
02	2 OF 2	0

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Attachment 5.2 Naartok East Overburden Stockpile – As-built Drawings

TMAC Resources Inc.

Engineering Drawings for the Naartok East Crown Pillar Recovery (CPR) Overburden Stockpile at Madrid North, Hope Bay Project, Nunavut, Canada

Drawing Number	Drawing Title	Issue	Date	Revision
01	Overburden Stockpile Location and Surface Water Drainage	As-Built	2020/03/31	AB1
02	Cross Section A-A' and Typical Construction Access Road Detail	As-Built	2020/03/31	AB1

srk consulting

SRK Job No. 1CT022.043

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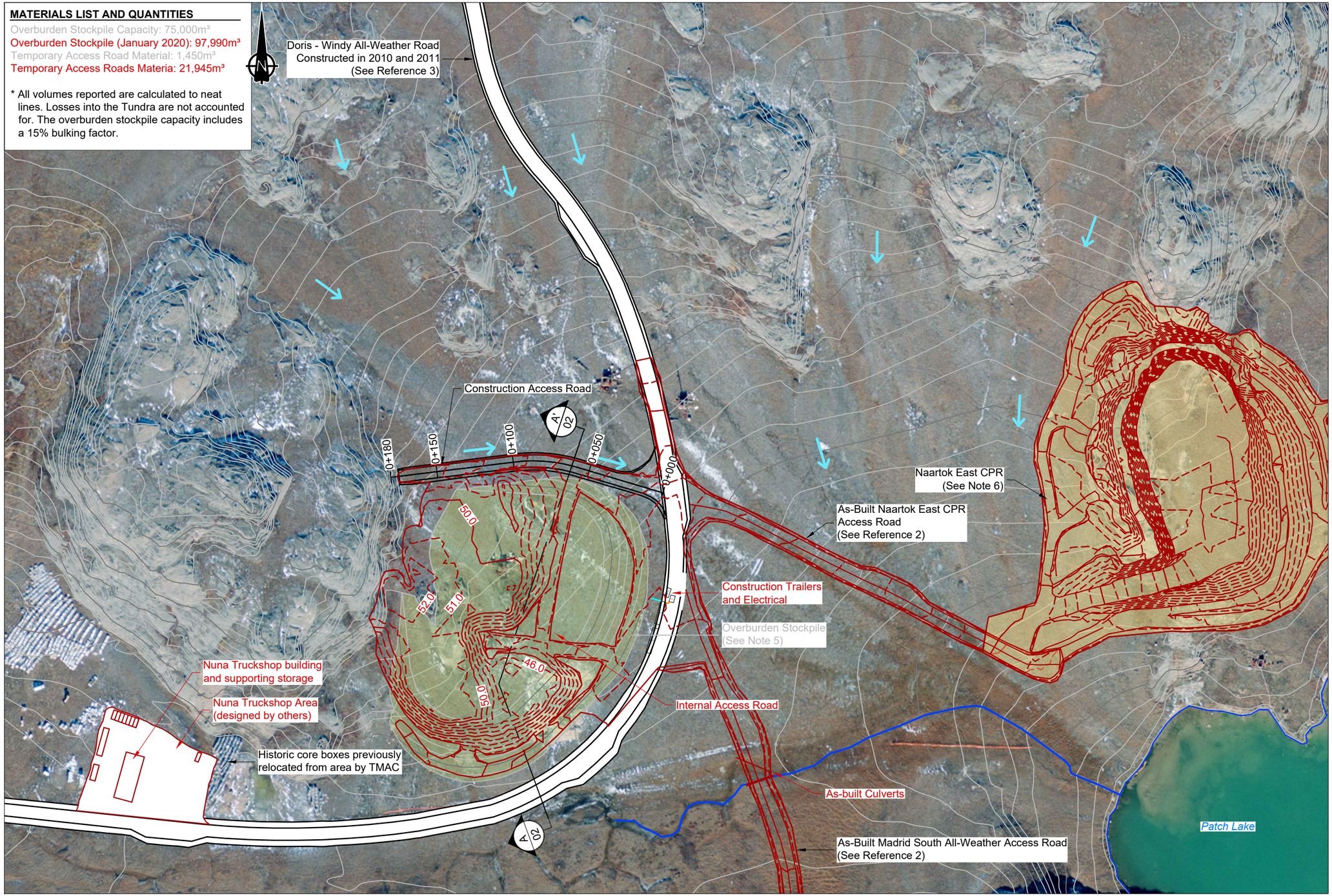
MATERIALS LIST AND QUANTITIES

Overburden Stockpile Capacity: 75,000m³
Overburden Stockpile (January 2020): 97,990m³
Temporary Access Road Material: 1,450m³
Temporary Access Roads Materia: 21,945m³

* All volumes reported are calculated to neat lines. Losses into the Tundra are not accounted for. The overburden stockpile capacity includes a 15% bulking factor.



LEGEND

- Drainage Direction
- Crown Pillar Recovery Area
- Design Overburden Stockpile Location
- 2019 As-Built Infrastructure

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 1.0m intervals.
3. All units shown in meters unless otherwise specified.
4. A minimum 31.0m setback from waterbodies is required.
5. Overburden stockpile designed in accordance with design principles as per Reference 5. This includes:
   - Overall slope angles should not exceed 5H:1V (11°).
   - Maximum height of 10m.
6. Interim as-built configuration for the Phase 1 Naartok East CPR shown for information purposes only. Development of the CPR is currently on-going.

REFERENCES

1. NAD83 UTM Zone 13.
2. Details found in "Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada". Revision E Issued for Discussion drawings prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
5. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Report prepared for TMAC Resources. Project Number: 1CT022.013. November 2017.
6. As-built survey provided by Sub-Arctic Geomatics Ltd. Dated May 27, 2019 and January 14/15, 2020.

0m 20 40 60 80 100

REFERENCE DRAWINGS		REVISIONS								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
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							A	Issued for Discussion	RW	EMR	19/05/29

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER R.C. WILLIAMS LICENSEE NTANU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	2020/03/31

FILE NAME: 1CT022.043 - Stockpile.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Naartok East CPR

DRAWING TITLE:
Overburden Stockpile Location and Surface Water Drainage

DRAWING NO.	SHEET	REVISION NO.
01	1 OF 2	AB1

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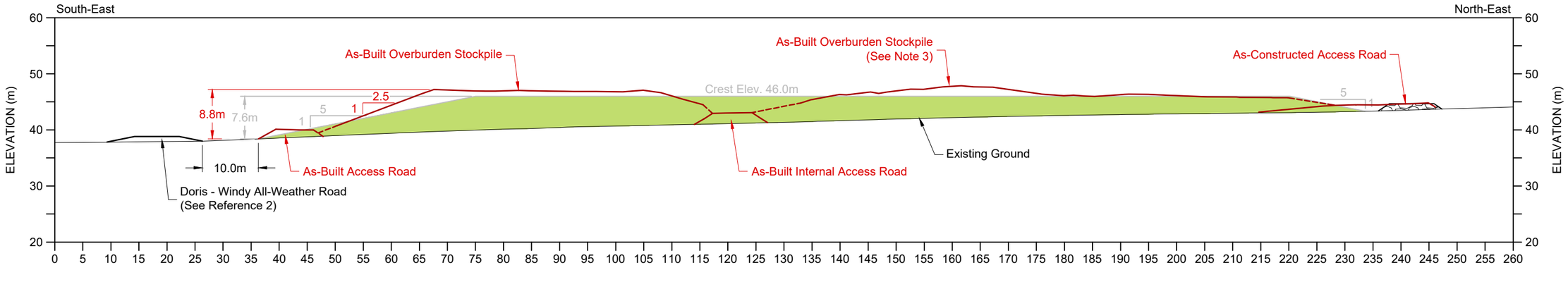

A 01 **Cross Section A-A'**

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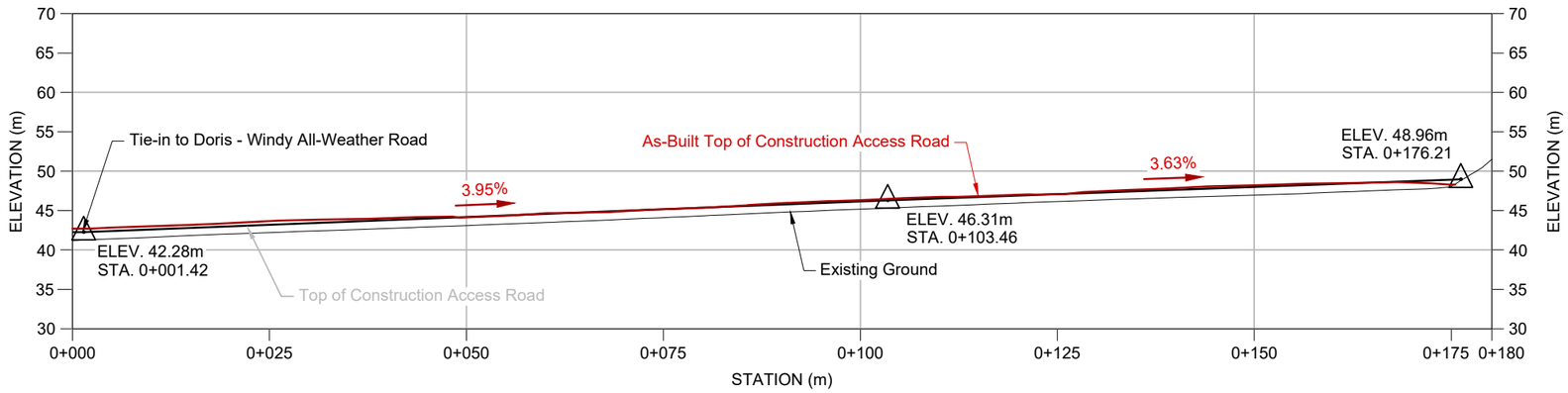
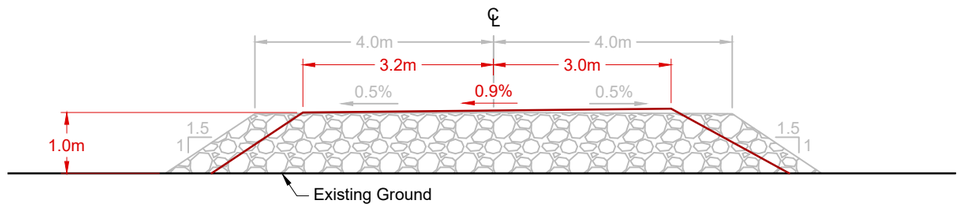


Construction Access Road Profile

0m 5 10 15 20 25 30



Typical Construction Access Road Detail

0m 1 2 3 4

LEGEND

- 2019 As-Built Infrastructure
- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM)
- Overburden Stockpile

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. All units shown in meters unless otherwise specified.
3. As-Built slopes will continue to be re-graded to meet design slopes as part of on-going operations.

REFERENCES

1. NAD83 UTM Zone 13.
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. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
4. As-built survey provided by Sub-Arctic Geomatics Ltd. Dated May 27, 2019 and January 14/15, 2020.

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	--	--

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
AB1	As-Built	RW	JBK	20/03/31
0	Issued for Construction	RW	EMR	19/05/30
A	Issued for Discussion	RW	EMR	19/05/29

REVISIONS

PROFESSIONAL ENGINEERS STAMP

R.C. WILLIAMS LICENSEE NTA/NU

srk consulting

DESIGN:	DRAWN:	REVIEWED:
RW	TAH	RW
CHECKED:	APPROVED:	DATE:
RW	JBK	2020/03/31

FILE NAME: 1CT022.043 - Stockpile.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.043

Madrid North Naartok East CPR

DRAWING TITLE: Cross Section A-A' and Typical Construction Access Road Detail

DRAWING NO.	SHEET	REVISION NO.
02	2 OF 2	AB1

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Attachment 6 – Naartok East Overburden Stockpile Expansion

Attachment 6.1 Naartok East Overburden Stockpile Expansion – IFC Drawings

TMAC Resources Inc.

Madrid North Project

Naartok East CPR Overburden Stockpile

Drawing Number	Drawing Title	Issue	Date	Revision
MN-OB-01	Overburden Stockpile Expansion Drainage Pathways	Issued for Construction	12/19/2019	0
MN-OB-02	Overburden Stockpile Expansion Location and Primary Filter Berm	Issued for Construction	12/19/2019	0
MN-OB-03	Cross Section A-A' and Typical Construction Access Road Centerline Profile	Issued for Construction	12/19/2019	0
MN-OB-04	Typical Details	Issued for Construction	12/19/2019	0

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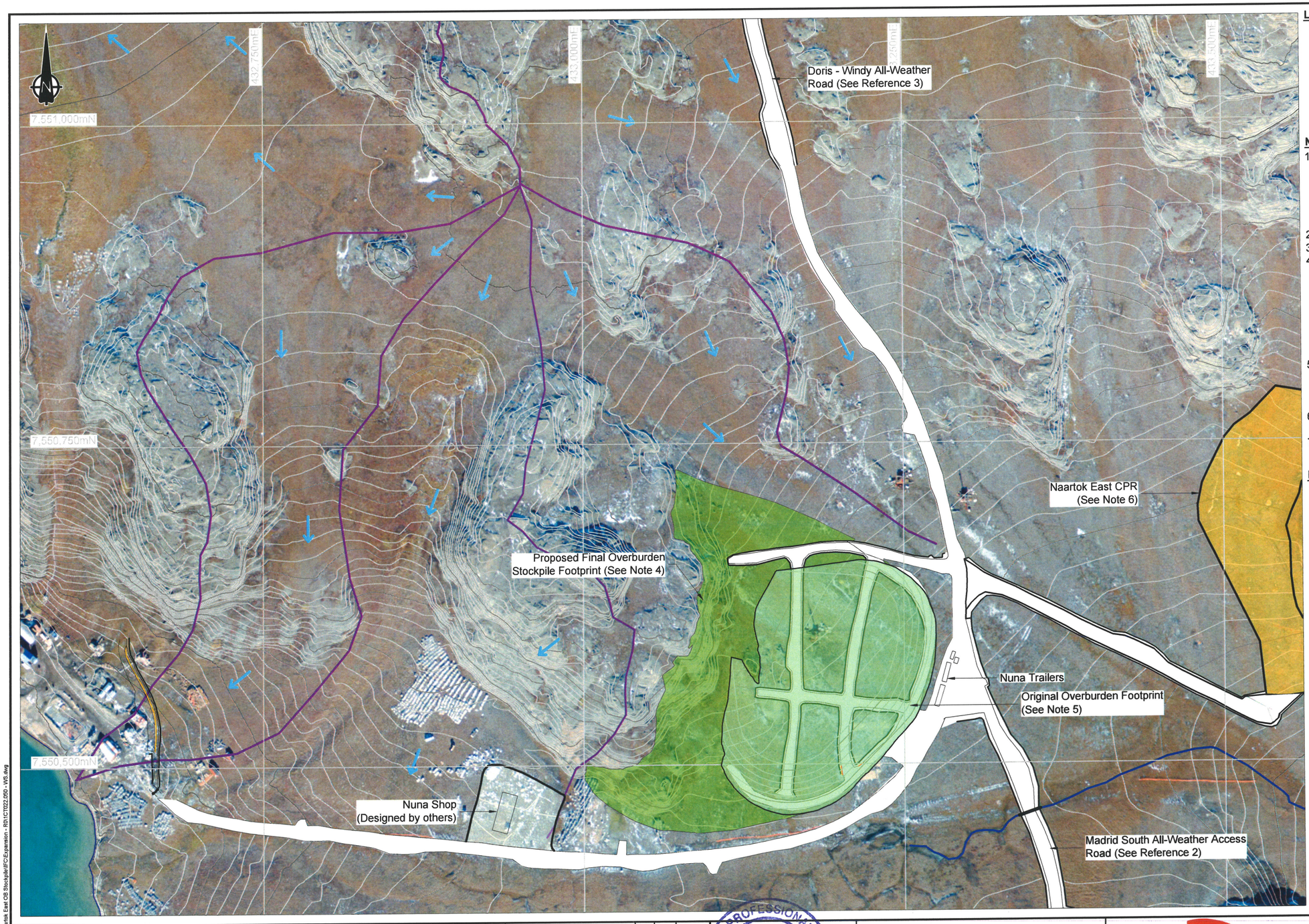

LEGEND

- Drainage Direction
- Crown Pillar Recovery
- Existing Infrastructure
- Original Overburden Footprint
- Proposed Final Overburden Footprint
- Watershed Boundary (approximate)

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 1.0m intervals.
3. All units shown in meters unless otherwise specified.
4. Overburden stockpile designed in accordance with design principles as per Reference 5. This includes:
   - Overall slope angles should not exceed 5H:1V (11°).
   - Maximum bench height of 10m.
   Where overburden slopes exceed 10m in height, appropriate geotechnical stability analysis has been performed.
5. The previous overburden stockpile design (see Reference 6) has been mostly constructed; however, final as-built information was not available at the time of these drawings.
6. Naartok East CPR Version 7 design provided by TMAC Resources, October 2019.
7. A minimum 31.0m setback from waterbodies is required.

REFERENCES

1. NAD83 UTM Zone 13.
2. Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Revision E Issued for Discussion drawings prepared for TMAC Resources. Project Number 1CT022.043. March 2019
3. 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
4. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd. 1CH008.000. August 2008.
5. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Report prepared for TMAC Resources. Project Number 1CT022.013. November 2017.
6. Engineering Drawings for the Naartok East CPRT Overburden Stockpile, Hope Bay Project, Nunavut, Canada. Revision 0. Issued for Construction drawings prepared for TMAC Resources. Project Number 1CT022.043. May 2019.

0m 30 60 90 120

DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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0	Issued for Construction	RW	JBK	19/12/19
A	Issued for Review	RW	JBK	19/12/11

REVISIONS

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RW	JBK	2019/12/19

FILE NAME: 1CT022.050 - WS.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.050

Naartok East Overburden Stockpile

DRAWING TITLE:
Overburden Stockpile Expansion Surface Water Drainage Pathways

DRAWING NO.	SHEET	REVISION NO.
MN-OB-01	1 OF 4	0

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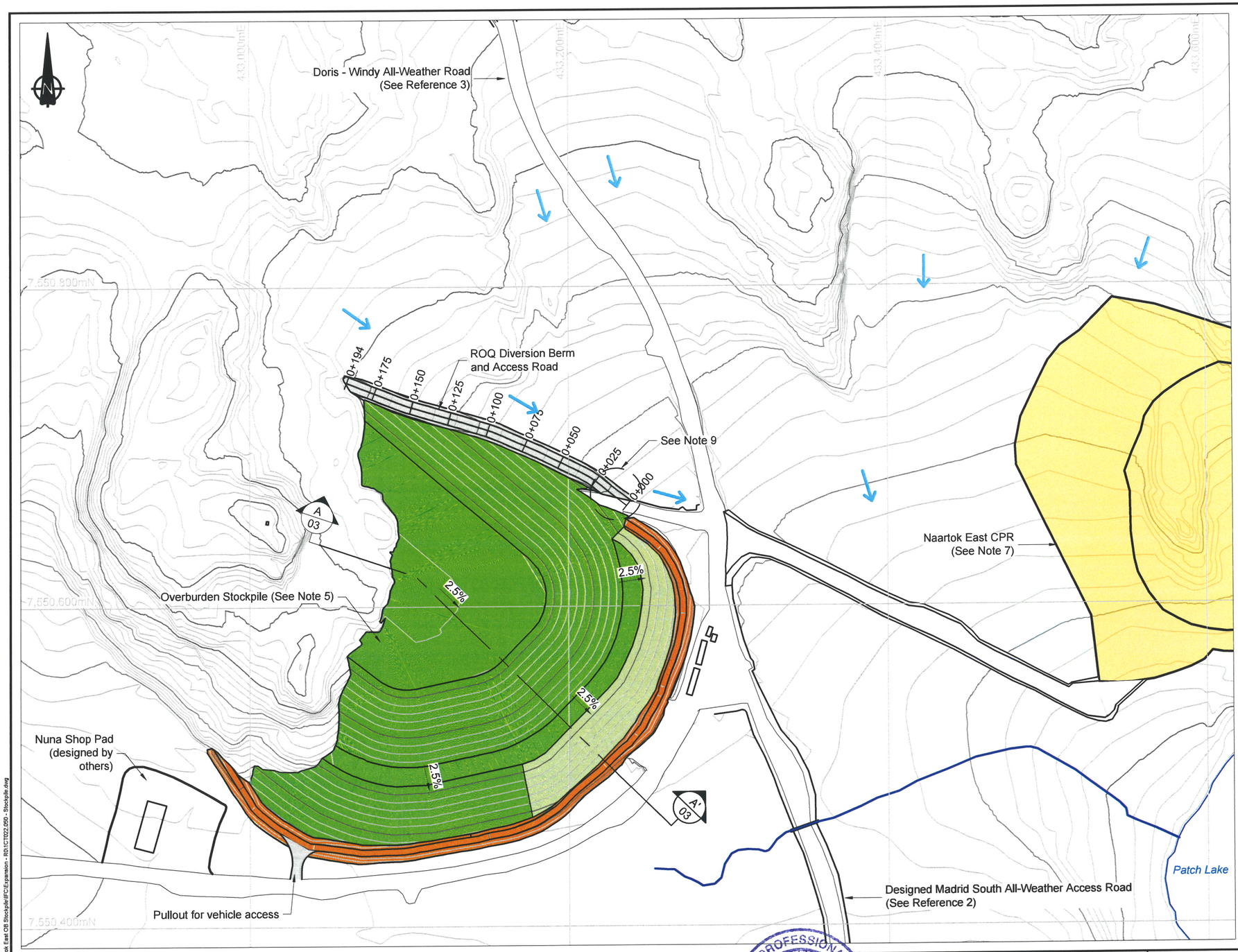

LEGEND

- Drainage Direction
- Crown Pillar Recovery
- Original Overburden Stockpile Location
- Overburden Stockpile Expansion Location
- Primary Filter Berm (See Note 8)
- Diversion Berm / Access Road

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. Contours shown at 1.0m intervals.
3. All units shown in meters unless otherwise specified.
4. A minimum 31.0m setback from waterbodies is required.
5. Overburden stockpile designed in accordance with design principles as per Reference 5. This includes:
   - Overall slope angles should not exceed 5H:1V (11°).
   - Maximum height of 10m.

   Where overburden slopes exceed 10m in height, appropriate geotechnical stability analysis has been performed.
6. The previous overburden stockpile design (see Reference 6) has been mostly constructed; however, final as-built information was not available at the time of these drawings.
7. Naartok East CPR Version 7 design provided by TMAC Resources, October 2019.
8. Primary filter berm to consist of transition size, geochemically suitable ROQ or ROM.
9. Connection between primary filter berm and existing ROQ access road to be field fit.

REFERENCES

1. NAD83 UTM Zone 13.
2. Details found in "Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada". Revision E Issued for Discussion drawings prepared for TMAC Resources. Project Number: 1CT022.043. March 2019.
3. 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.
4. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
5. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Report prepared for TMAC Resources. Project Number: 1CT022.013. November 2017.
6. Engineering Drawings for the Naartok East CPRT Overburden Stockpile, Hope Bay Project, Nunavut, Canada. Revision 0. Issued for Construction drawings prepared for TMAC Resources. Project Number 1CT022.043. May 2019.

MATERIALS LIST AND QUANTITIES

Existing Overburden Stockpile Capacity: 75,000m³
Expanded Overburden Stockpile Capacity: 175,000m³
Total Overburden Stockpile Capacity: 250,000m³
Temporary Access Road Material: 1,915m³
Primary Filter Berm Material: 5,000m³

* All volumes reported are calculated to neat lines. Losses into the Tundra are not accounted for. The overburden stockpile capacity includes a 15% bulking factor.

0m 20 40 60 80 100

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RW	JBK	2019/12/19

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TMAC RESOURCES

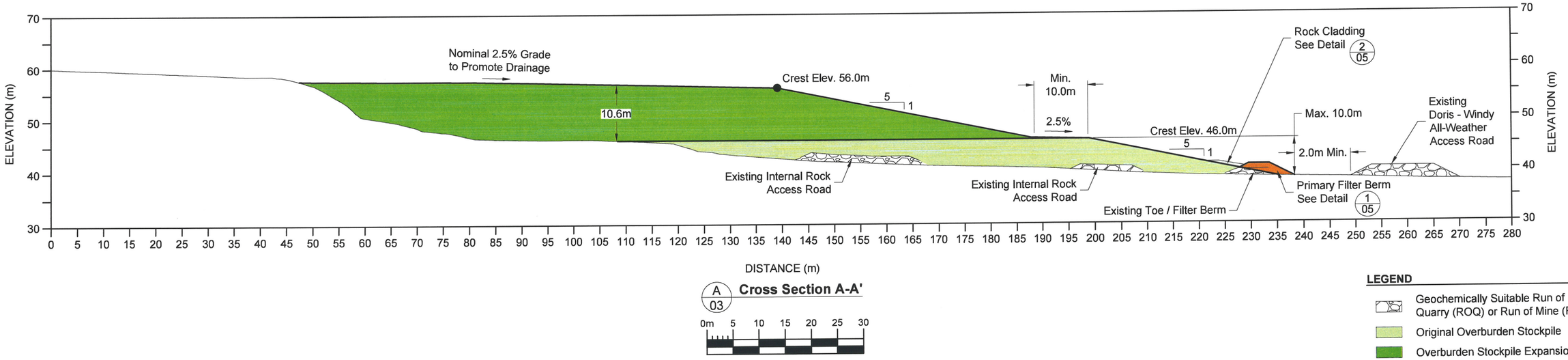
Hope Bay Project

SRK JOB NO.: 1CT022.050

Naartok East Overburden Stockpile

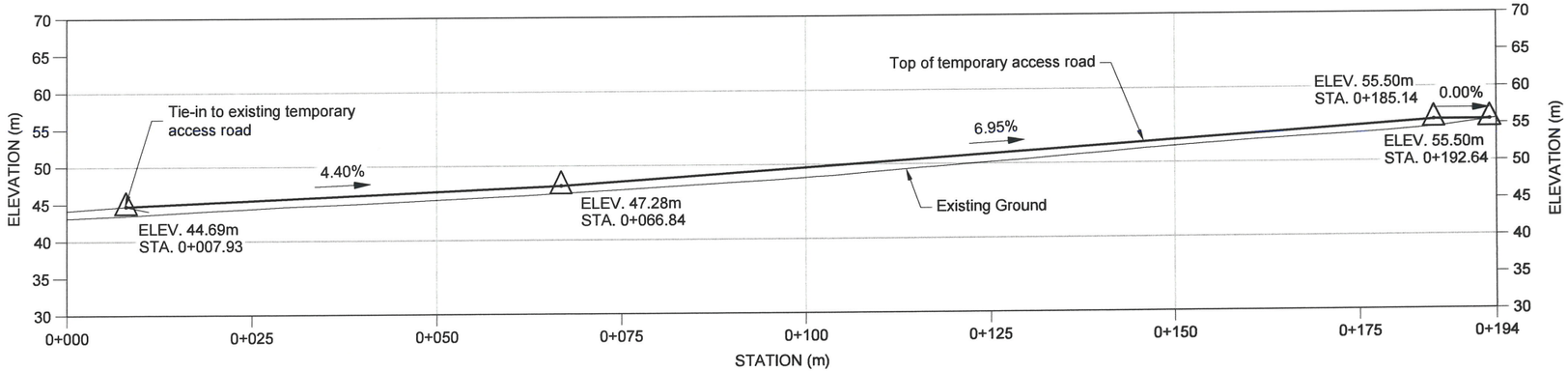
DRAWING TITLE:
Expanded Overburden Stockpile and Primary Filter Berm

DRAWING NO.	SHEET	REVISION NO.
MN-OB-02	3 OF 4	0



A/03 **Cross Section A-A'**

0m 5 10 15 20 25 30



Construction Access Road Profile

0m 5 10 15 20 25 30

LEGEND

- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM)
- Original Overburden Stockpile
- Overburden Stockpile Expansion
- Primary Filter Berm (See Note 5)

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. All units shown in meters unless otherwise specified.
3. Where overburden slopes exceed 10m in height, appropriate geotechnical stability analysis has been performed.
4. Filter berm access road to be constructed from geochemically suitable ROQ or ROM rock.
5. Primary filter berm to consist of transition size, geochemically suitable ROQ or ROM.

REFERENCES

1. NAD83 UTM Zone 13.
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. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.
4. Hope Bay Project, Geotechnical Design Parameters and Overburden Summary Report. Report prepared for TMAC Resources. Project Number: 1CT022.013. November 2017.

REFERENCE DRAWINGS

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RW	JBK	2019/12/19

FILE NAME: 1CT022.050 - Stockpile.dwg

TMAC RESOURCES

Hope Bay Project

SRK JOB NO.: 1CT022.050

Naartok East Overburden Stockpile

DRAWING TITLE: Cross Section A-A' and Typical Construction Access Road Centerline Profile

DRAWING NO.	SHEET	REVISION NO.
MN-OB-03	3 OF 4	0

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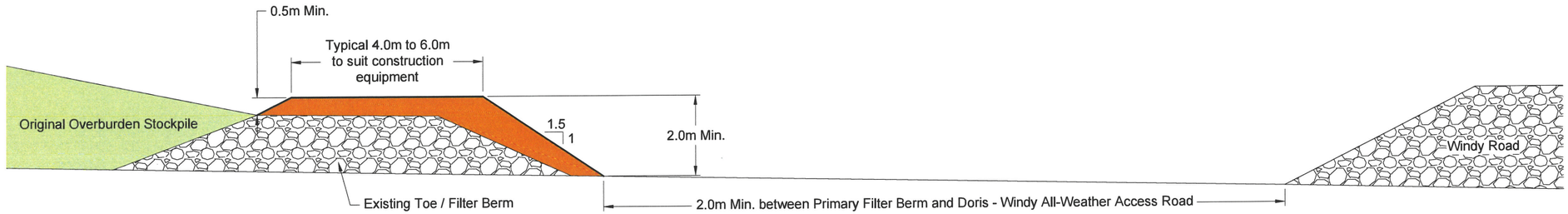
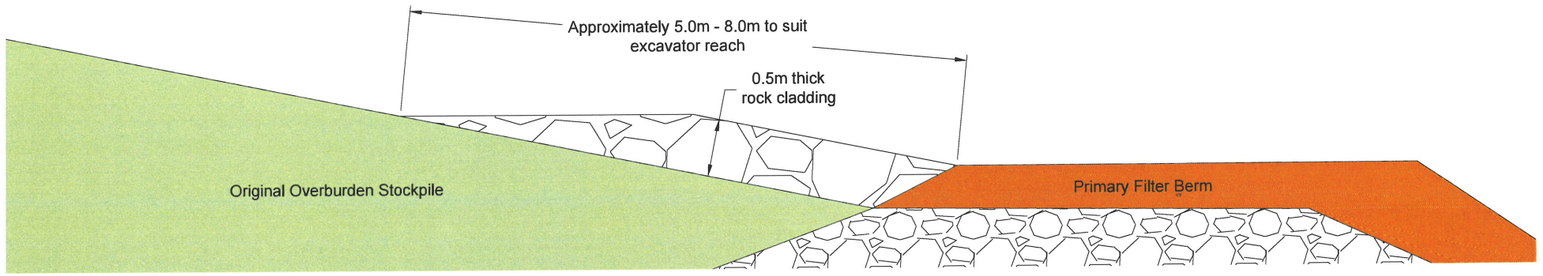


1/04 **Primary Filter Berm Detail**

0m 1 2 3 4



2/04 **Rock Cladding Detail**

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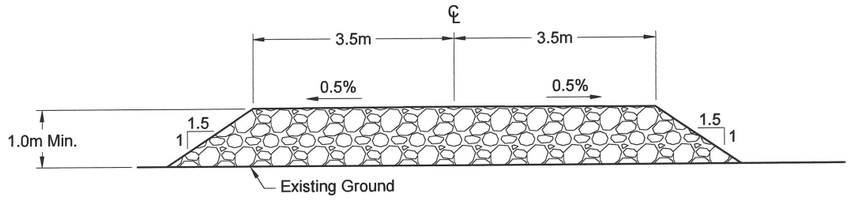

Typical Construction Access Road Detail

0m 1 2 3 4

LEGEND

- Geochemically Suitable Run of Quarry (ROQ) or Run of Mine (ROM)
- Original Overburden Stockpile
- Primary Filter Berm (See Note 3)

NOTES

1. The designs are based on the contour information shown on these drawings. It is 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. All units shown in meters unless otherwise specified.
3. Primary filter berm to consist of transition size, geochemically suitable ROQ or ROM.

REFERENCES

1. NAD83 UTM Zone 13.
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. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road, Hope Bay Project. Report prepared for Hope Bay Mining Ltd., 1CH008.000. August 2008.

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE
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Hope Bay Project

SRK JOB NO.: 1CT022.050

Naartok East Overburden Stockpile

DRAWING TITLE: Typical Details

DRAWING NO.	SHEET	REVISION NO.
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