95 Wellington Street
Suite 1010
Toronto, Ontario
M5J 2N7
416-628-0216

April 9, 2019

Derek Donald
Technical Advisor
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0

Sent via Email: licensing@nwb-oen.ca; derek.donald@nwb-oen.ca

Re: TMAC Response to Comments Received Regarding Notification of Construction of the All-Weather Road km 0-1 and Contact Water Pond at Madrid North

Dear Mr. Donald,

On April 2, 2019, TMAC Resources Inc. (TMAC) received comments from Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) in relation to the Notification of Construction submitted by TMAC for the All-Weather Road km 0-1 and Contact Water Pond at Madrid North.

TMAC's responses to CIRNAC's comments, along with signed and stamped "Issued for Construction" drawings, are presented in Attachment A of this submission.

Should you have any further questions please feel free to contact me at oliver.curran@tmacresources.com.

Sincerely,

Oliver Curran

Vice President, Environmental Affairs, TMAC

Cc:

Ida Porter (NWB)
Kyle Conway (TMAC)
Sarah Warnock (TMAC)

Brendan Barron (TMAC)
Bridget Cambell (CIRNAC)

Attachment A: TMAC Response to Comments Received Regarding Notification of Construction of the All-Weather Road km 0-1 and Contact Water Pond at Madrid North

Attachment A: TMAC Resources Inc. Responses to Crown-Indigenous Relations and Northern Affairs Canada Comments on Notification of Construction of the Contact Water Pond Berm as part of Madrid North, Water Licence 2AM-DOH1335 – Amendment No. 2

Agency Comment	Topic	Reference	Comment	Recommendation	TMAC Response
CIRNAC-1	Minimization of soil and permafrost disturbance	o TMAC Resources Inc., Notification of Construction, Detailed Design of the Contact Water Pond Berm at Madrid North, March 19, 2019.	TMAC has indicated in the Detailed Design of the Contact Water Pond Berm at Madrid North, under Section 3.1 Berm Design Criteria, that soil and permafrost disturbance should be minimized. TMAC does not indicate how minimization of disturbance will be achieved or what mitigations will be put in place in the case of unexpected soil disturbances.	CIRNAC recommends that TMAC provide further details to describe how any unexpected soil disturbance, including permafrost degradation resulting from the contact water pond berm construction activities, will be mitigated.	Construction will be undertaken in accordance with the Technical Specifications (SRK Consulting (Canada) Inc., 2018. 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). These Specifications includes specific clauses and procedures specifically intended to ensure preservation of permafrost. The Specifications has been in effect since construction started at Hope Bay in 2007 and has proven to be effective, as there has never been any instances where unnecessary permafrost damage has occurred because of construction activities. In the highly unlikely event that such damage would occur, TMAC will have the damage inspected by the Design Engineer who will provide an appropriate unique remediation plan that will ensure that the Contact Water Pond will still meet its design criteria while ensuring mitigation of the permafrost damage. It is not possible (or appropriate) to provide a prescriptive remediation plan for unknown (and unanticipated) damage at this time, as every solution needs to be unique.
CIRNAC-2	Linear System Design Criteria	o TMAC Resources Inc., Notification of Construction, Detailed Design of the Contact Water Pond Berm at Madrid North, March 19, 2019.	TMAC has indicated in the Detailed Design of the Contact Water Pond Berm at Madrid North, under Section 3.2 Liner System Design Criteria, angles in degrees which need to be rectified to properly match their slope gradients. The angles in degrees should be 33.7o for a 1.5H:1V slope gradient, and 26.5o for a 2H:1V slope gradient.	CIRNAC recommends that TMAC rectify the angles provided to properly match their slope gradients.	TMAC acknowledges that there was an error in the angles listed in degrees in the Technical Memo. The angles in degrees should be 33.7 degrees for a 1.5H:1V slope gradient, and 26.5 degrees for a 2H:1V slope gradient. It should be noted that the Issue-For-Construction (IFC) Drawings do not show degrees but only show the slope ratios as per normal practice and these slope ratios are correct.
CIRNAC-3	Installation Requirements for Monitoring Devices	o TMAC Resources Inc., Notification of Construction, Detailed Design of the Contact Water Pond Berm at Madrid North, March 19, 2019.	TMAC has indicated in the Detailed Design of the Contact Water Pond Berm at Madrid North, under Section 3.3 Design Overview, that monitoring devices will be installed to measure berm settlement. TMAC does not provide any installation requirements for these monitoring devices.	CIRNAC recommends that TMAC provide installation requirements for the indicated monitoring devices required to measure berm settlement.	Surficial survey monitoring points, consisting of a permanent steel survey marker installed in a ROQ boulder, will be installed to monitor for any settlement. Survey points will be installed at two longitudinal transects along the dam; one at the upstream crest and one approximately 2 m below the crest on the downstream slope. The frequency of survey points will be approximately every 20 m. These survey points will be installed after the Contact Water Pond construction has been completed. An Issue-For-Construction drawing is being submitted to the Nunavut Water Board as part of this package.
CIRNAC-4	Construction Standards	o TMAC Resources Inc., Notification of Construction, Detailed Design of the Contact Water Pond Berm at Madrid North, March 19, 2019.	TMAC has indicated in the Detailed Design of the Contact Water Pond Berm at Madrid North that they will lay and compact bedding material, made of crushed and screened geochemically suitable quarry or waste rock material, underneath the high-density polyethylene liner. However, the standard to which the bedding material will be compacted is not provided.	CIRNAC recommends that TMAC specify the standard to which bedding material compaction must be done.	Bedding material will be placed in accordance with the Technical Specifications (SRK Consulting (Canada) Inc., 2018. 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). The Specification state that Bedding material underlying geosynthetic products must be compacted to 95% of the maximum dry density (ASTM D698). A method specification may be introduced by the contractor if they can demonstrate a minimum number of passes to achieve the target density, given the equipment to be used during construction.

TMAC Resources Inc. Responses to Crown-Indigenous Relations and Northern Affairs Canada Comments on Notification of Construction of the All Weather Road km 0-1 as part of the Madrid North, Water Licence 2AM-DOH1335 – Amendment No. 2

Agency Comment	Topic	Reference	Comment	Recommendation	TMAC Response
CIRNAC-1	Professional Engineer to Stamp and Sign IFC Drawings	TMAC Resources Inc., Notification ofConstruction, Hope Bay Project – Madrid South All-Weather Road (0 to 1 km) Detailed Design Package, March 19, 2019. Nunavut Water Board Water Licence No. 2AM-DOH1335 – Amendment 2	The AWR design memo and drawings submitted by TMAC are well presented and CIRNAC does not have any specific comments regarding the design criteria. However, the Issued for Construction (IFC) drawings need to be stamped and signed by a qualified Professional Engineer in good standing with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists. This is outlined in the Water Licence Schedule D, Item 1(g).	CIRNAC recommends that TMAC provide the IFC drawings with stamps and signatures from a qualified Professional Engineer in good standing with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists.	TMAC are providing the stamped and signed IFC drawings in this package.
CIRNAC-2	Timing of Construction in Relation to 60 day review period	TMAC Resources Inc., Notification of Construction, Hope Bay Project – Madri South All-Weather Road (0 to 1 km) Detailed Design Package, March 19, 2019.E-mail correspondence between TMAC Resources Inc., Crown-Indigenous Relations and Northern Affairs Canada, the Nunavut Water Board, and th Kitikmeot Inuit Association, regarding the 60 day review period between IF submissions and construction commencement, dated March 22, 2019. Nunavut Water Board Water Licence No. 2AM-DOH1335 - Amendment 2	In phone and e-mail correspondence, TMAC has requested to commence construction of the AWR prior to the completion of the 60 day review period following the submission of IFC drawings, as required in Part D, Item 1, and in Schedule D, Item 1 of the Amended Type A Water Licence 2AM-DOH1335. The reasons for this proposed change included construction occurring prior to freshet, while the active layer is still frozen, and before the migratory birds arrive. CIRNAC can see the merit in this reasoning. CIRNAC does not have any concerns with TMAC commencing construction of the AWR km 0 to km 1 as presented in the design package, provided that IFC drawings are stamped by a qualified engineer, as noted above in comment No. 1, and that security for Madrid North is received and accepted by CIRNAC prior to the commencement of construction activities.	CIRNAC recommends the following as conditions to TMAC commencing construction of the AWR prior the completion of the 60 day review period which usually follows the submission of IFC drawings: (1) that CIRNAC receives and accepts security for Madrid North; (2) that comment No. 1 is resolved by submitting drawings which contain stamps and signatures from a qualified professional engineer; and (3) that the Nunavut Water Board approves the proposed change in duration of the review period.	1) Based on correspondance recived on April 5, 2019, CIRNAC have reviced the letters from TMAC and they are reviewing the adequacy of the letters to ensure that they are acceptable to the Minister. 2) TMAC is submitting the stamped and signed Issued For Construction drawings as part of this package to the NWB. 3) TMAC requests that the Nunavut Water Board approve the propsed change in duration of the review period.

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

TMAC RESOURCES

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.

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE
--	--

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

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER J.B. KURYLO LICENSEE NT/NU 2019/04/02

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

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

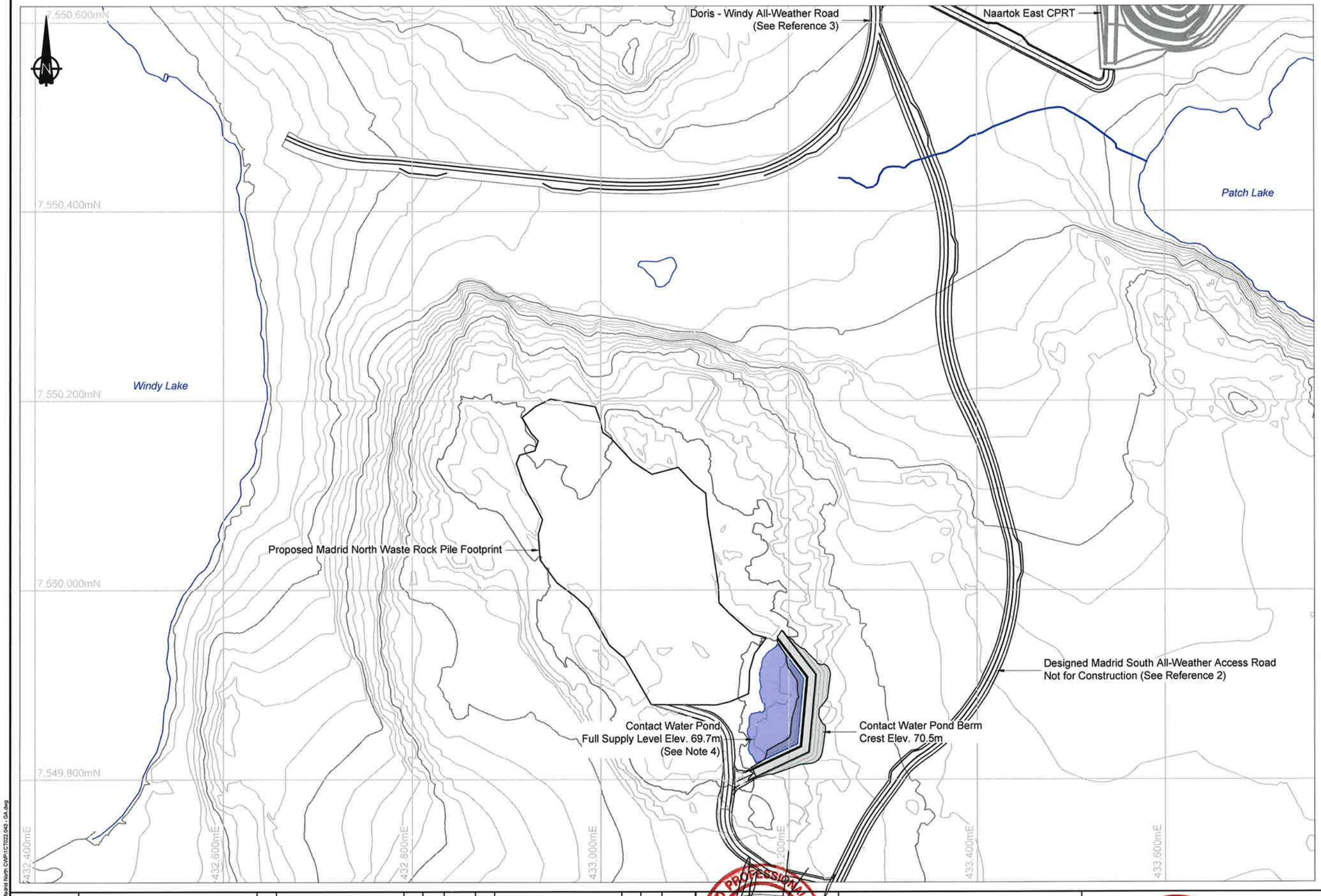
SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: General Arrangement (With Orthophoto)

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

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

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
--	--

REVISIONS

NO.	DESCRIPTION	CHKD	APPD	DATE
--	--	--	--	--
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

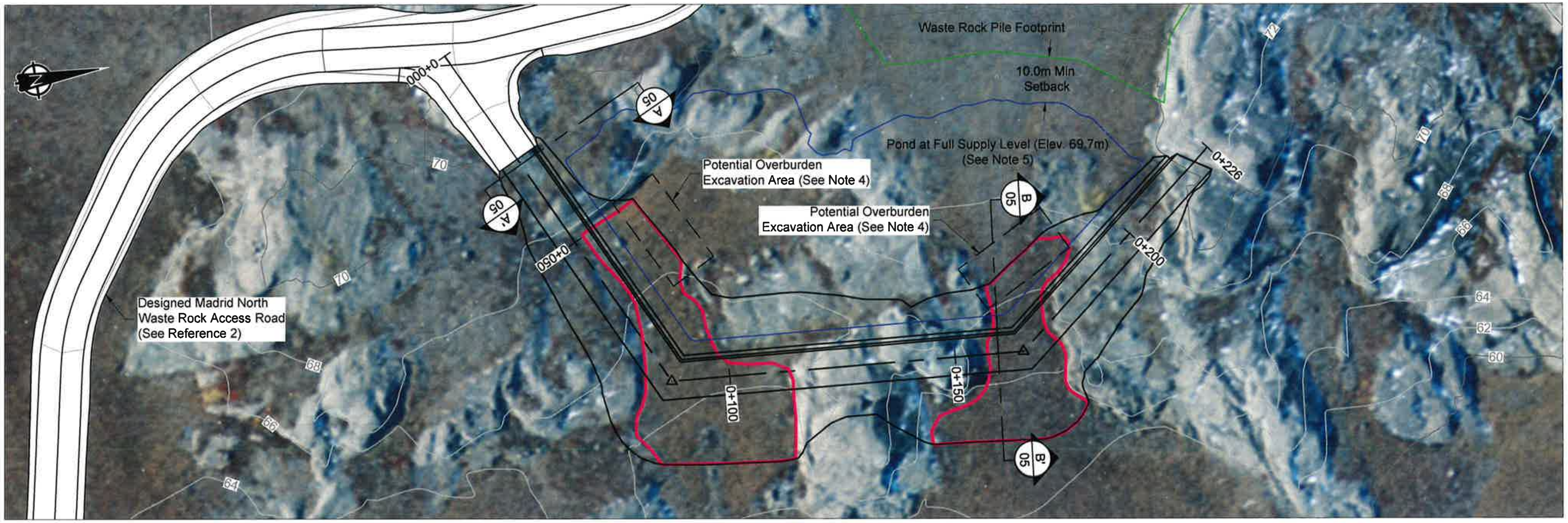
SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

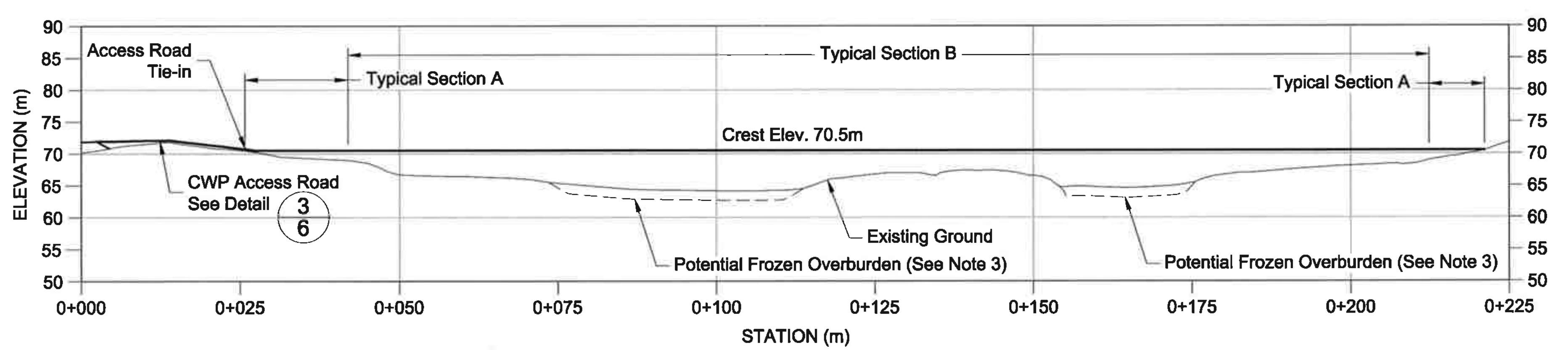
DRAWING TITLE:
General Arrangement

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
--	--

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE	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

REVISIONS

PROFESSIONAL ENGINEERS STAMP: REGISTERED PROFESSIONAL ENGINEER 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

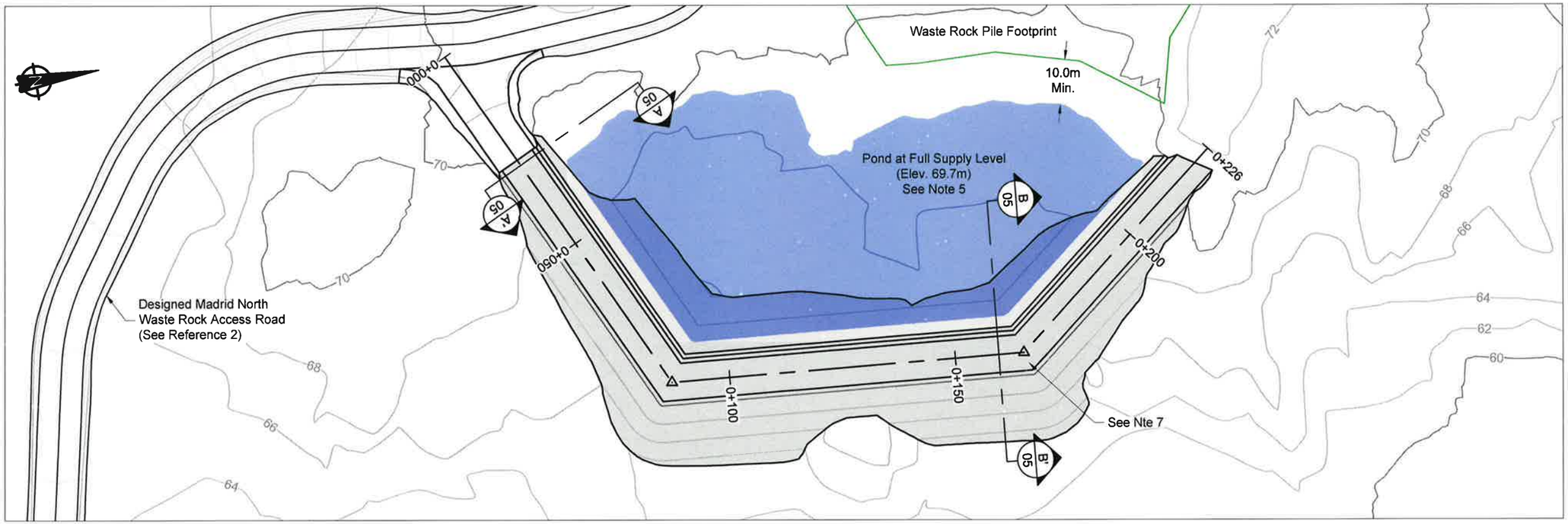
Hope Bay Project

SRK JOB NO.: 1CT022.043

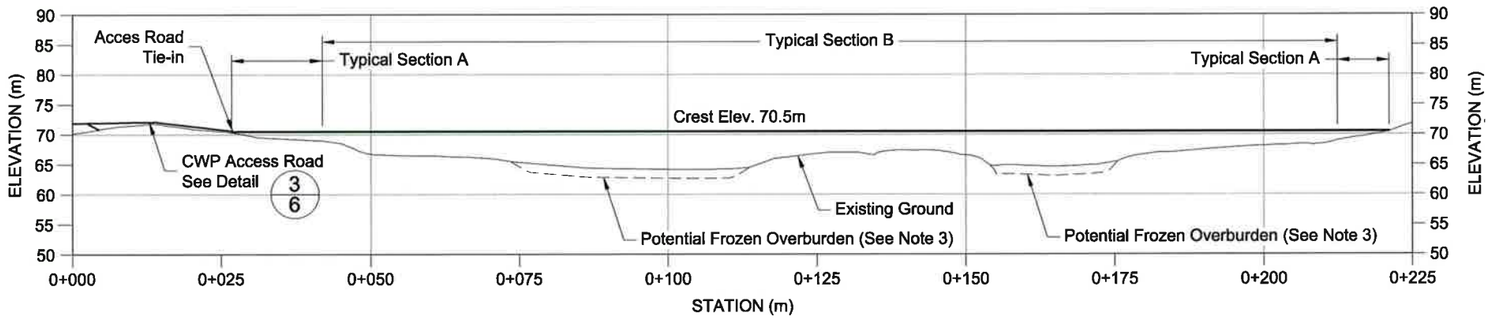
Madrid North Contact Water Pond

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
--	--

REFERENCE DRAWINGS

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

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

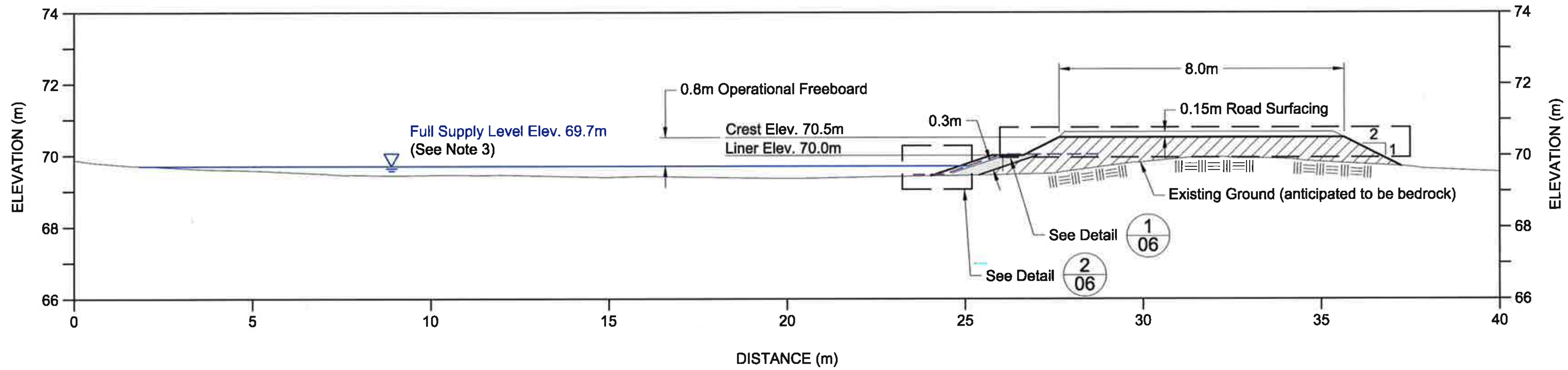
SRK JOB NO.: 1CT022.043

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

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



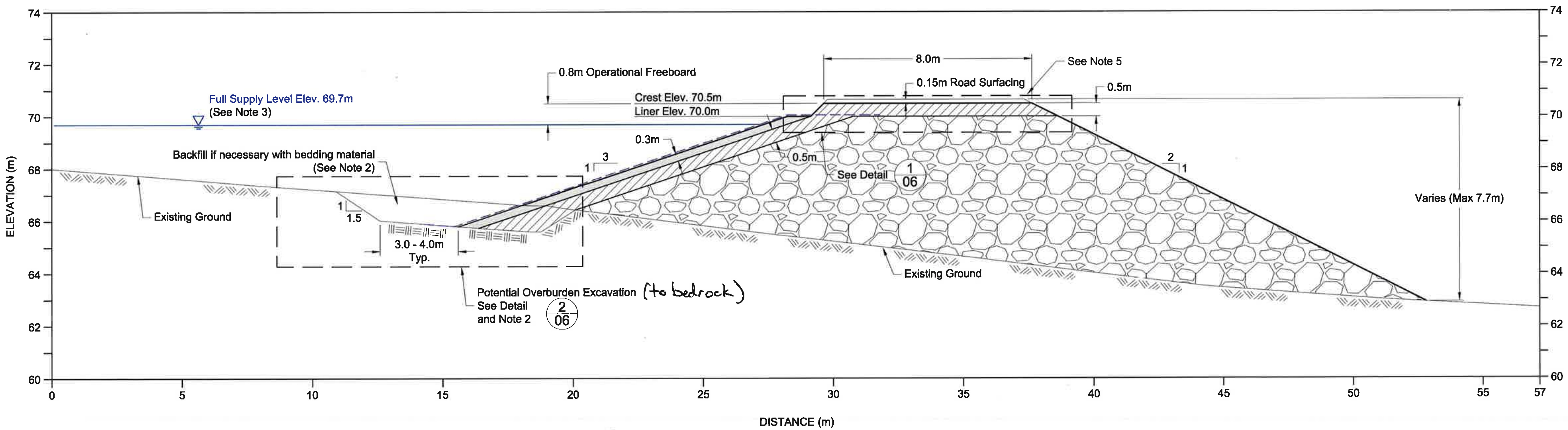
A/03 **Cross Section A-A' - Berm Sections less than 1.5m**

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

REVISIONS

DRAWING NO.	DRAWING TITLE
--	--

REFERENCE DRAWINGS

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

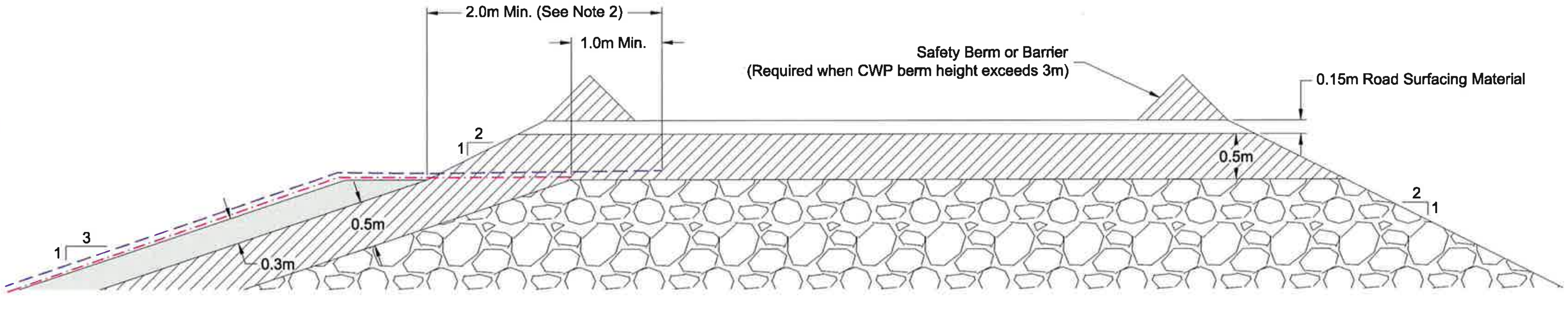
Hope Bay Project

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



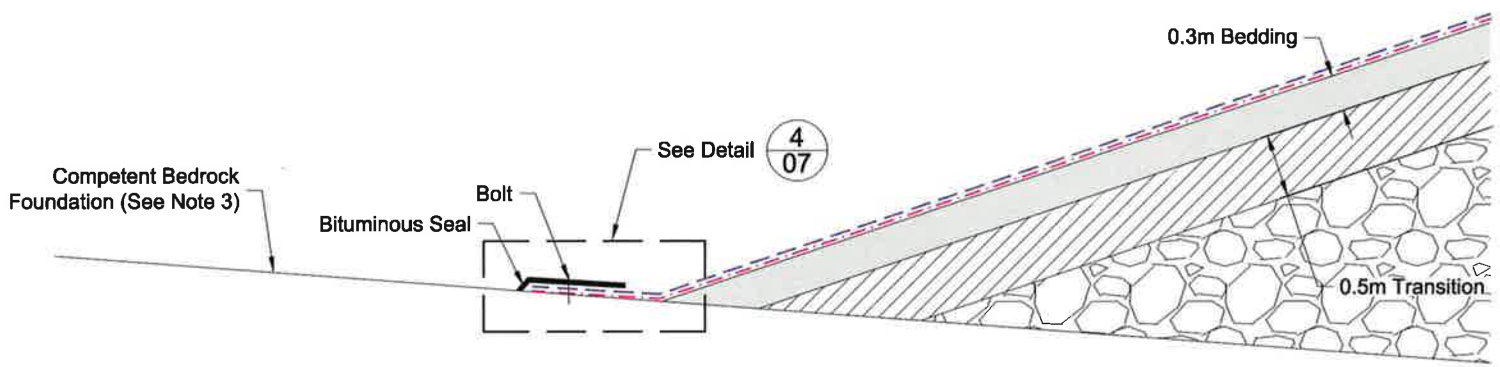
1 / 05 **Typical Liner Anchor Detail**

LEGEND

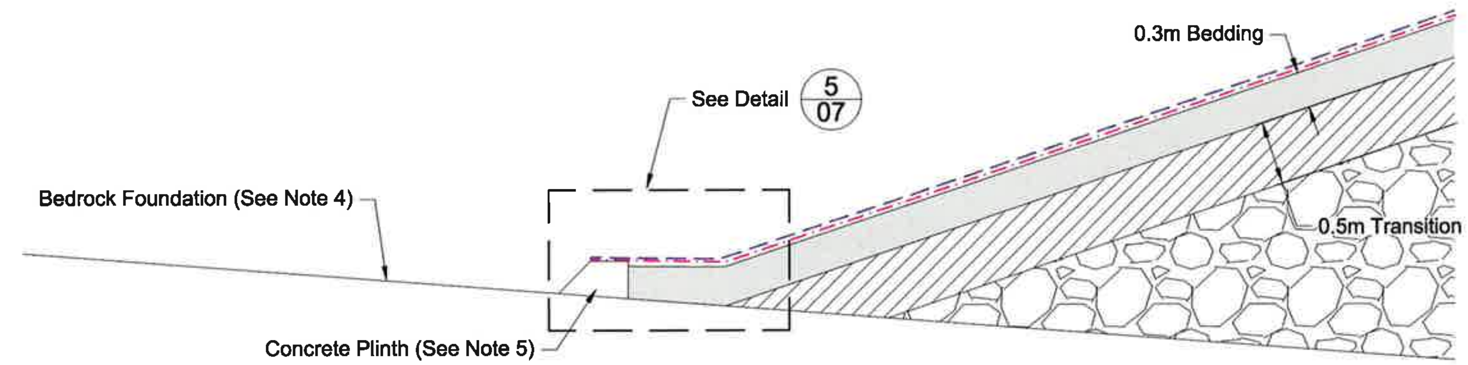
Liner		Transition Material	
Non-woven Geotextile		Run of Quarry (ROQ) or Run of Mine (ROM) Material	
Bedding Material		Bituminous Seal	

NOTES

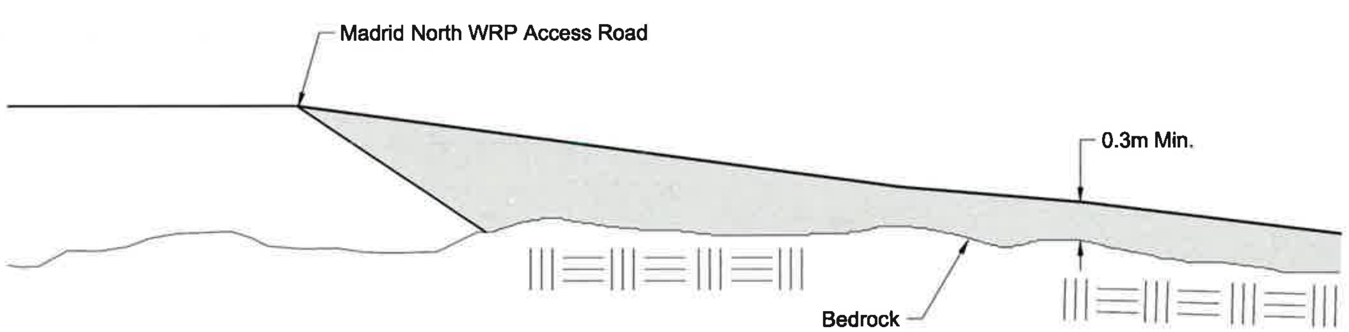
1. All dimensions shown in meters unless otherwise stated.
2. Minimum 1.0m liner overlap with ROQ/ROM material. Total covered liner overlap must be a minimum of 2.0m. Non-woven geotextile to terminate at ROQ/ROM.
3. If competent bedrock conditions are encountered, liner can be mechanically tied in to 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).



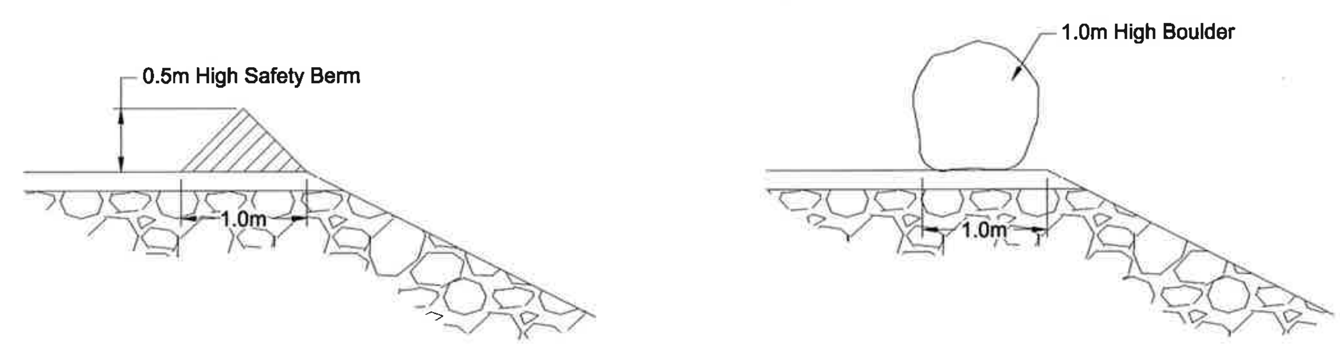
2 / 05 **Typical Liner Anchor at Bedrock - Mechanical Tie-down Option**



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

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
--	--	--	--	--	--	--	A	Issued for Discussion	RW	EMR	19/03/05

REFERENCE DRAWINGS | REVISIONS

PROFESSIONAL ENGINEERS STAMP: J.B. KURYLO LICENSEE NT/NU — This drawing is uncontrolled when printed unless stamped, certified in accordance with the requirements of the applicable jurisdiction and recorded on a Distribution Register.

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

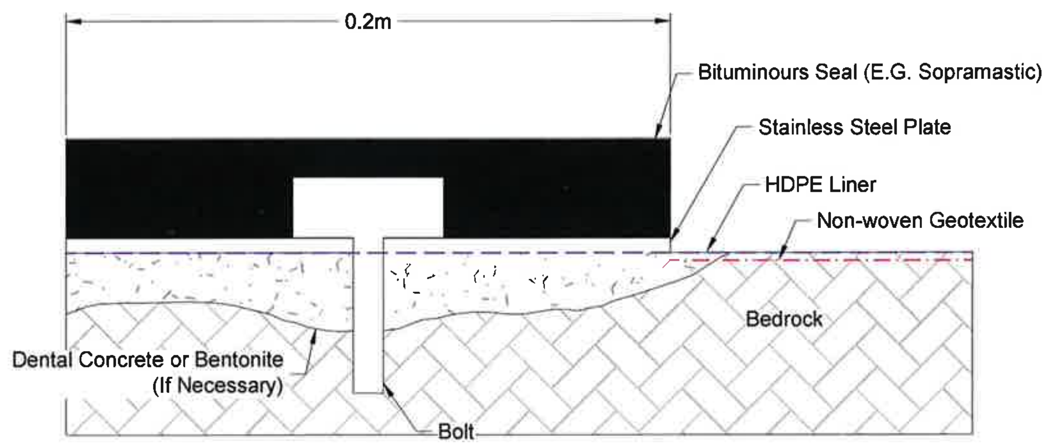
SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

DRAWING TITLE: Contact Water Pond Typical Details

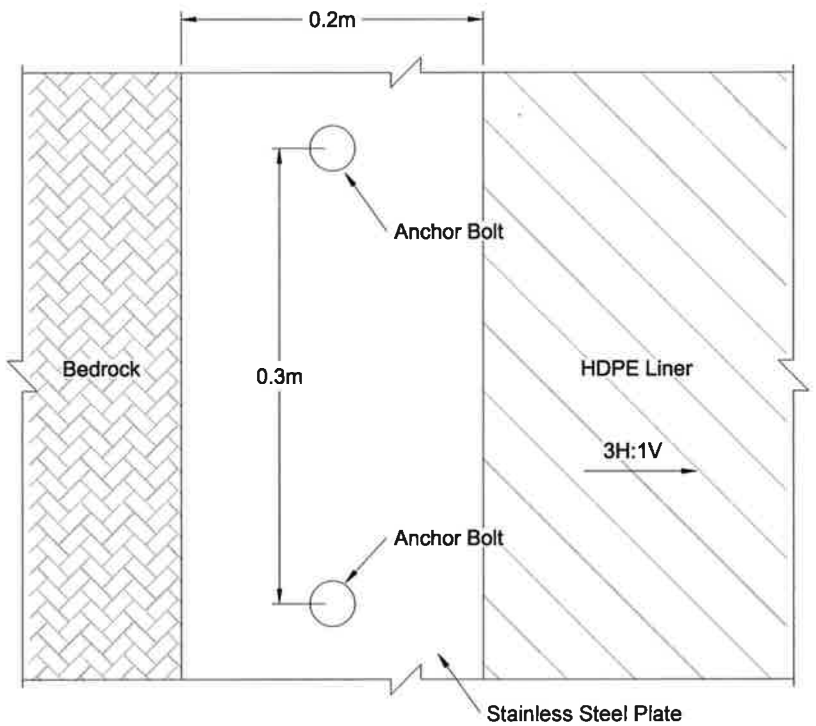
DRAWING NO.: MN-CWP-06 | SHEET: 6 OF 7 | REVISION NO.: 0

P:\01_SITES\Hope Bay\!ACAD\IFC\Madrid North CWP\1CT022.043 - PP.dwg



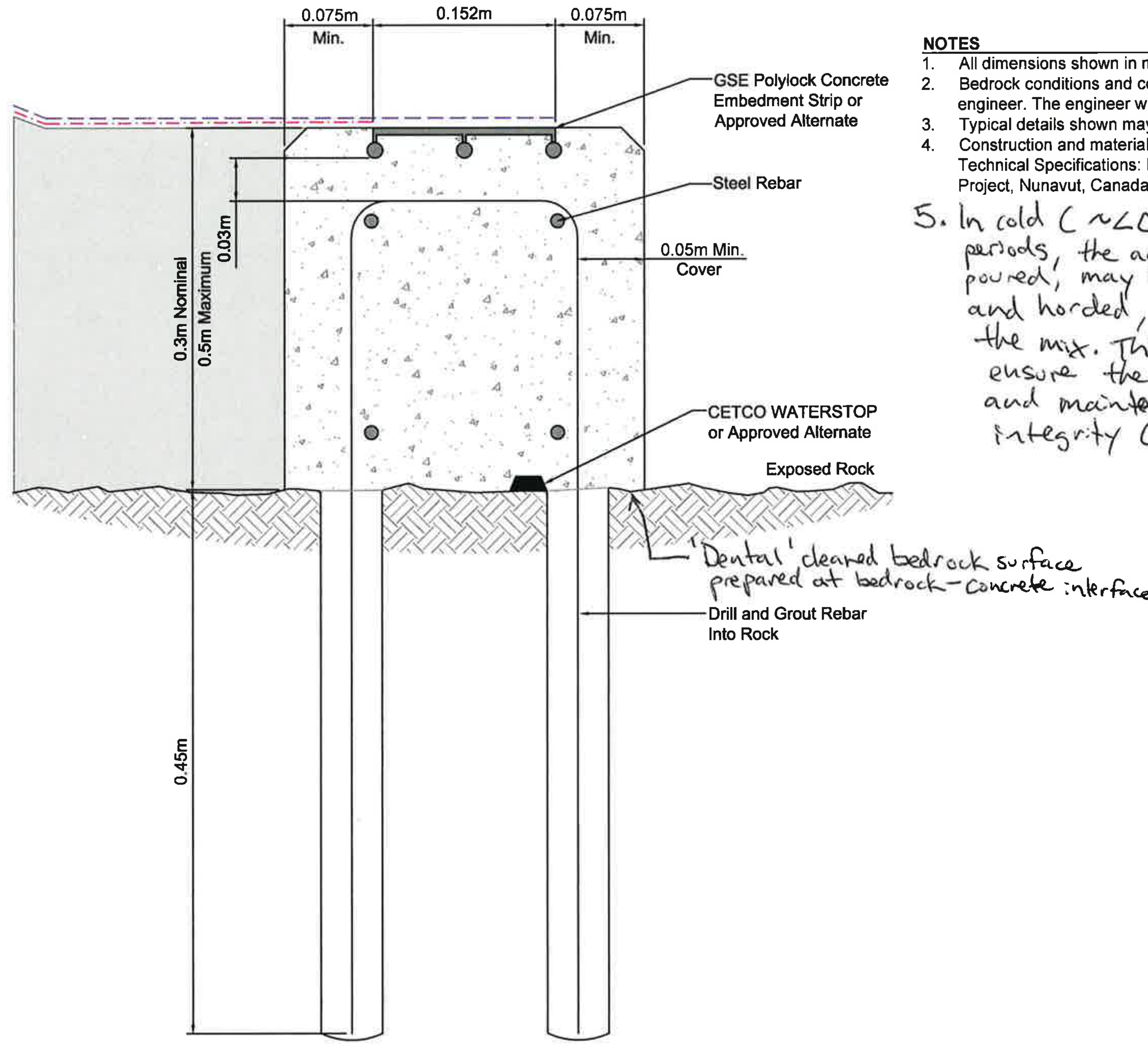
4 / 06 **Liner Anchored to Bedrock - Side View Typical Detail**

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

LEGEND

— — —	HDPE Liner		HDPE Liner
—·—	Non-woven Geotextile		Run of Quarry (ROQ) or Run of Mine (ROM) Material
	Bedding Material		Bedrock
	Concrete		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).

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

REVISIONS

DRAWING NO.	DRAWING TITLE
--	--

REFERENCE DRAWINGS

PROFESSIONAL ENGINEERS STAMP: REGISTERED PROFESSIONAL ENGINEER — J.B. KURYLO — LICENSEE — 2019/04/02 — This drawing is uncontrolled when printed unless stamped/certified in accordance with the requirements of the applicable jurisdiction and recorded on a Distribution Register

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

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.

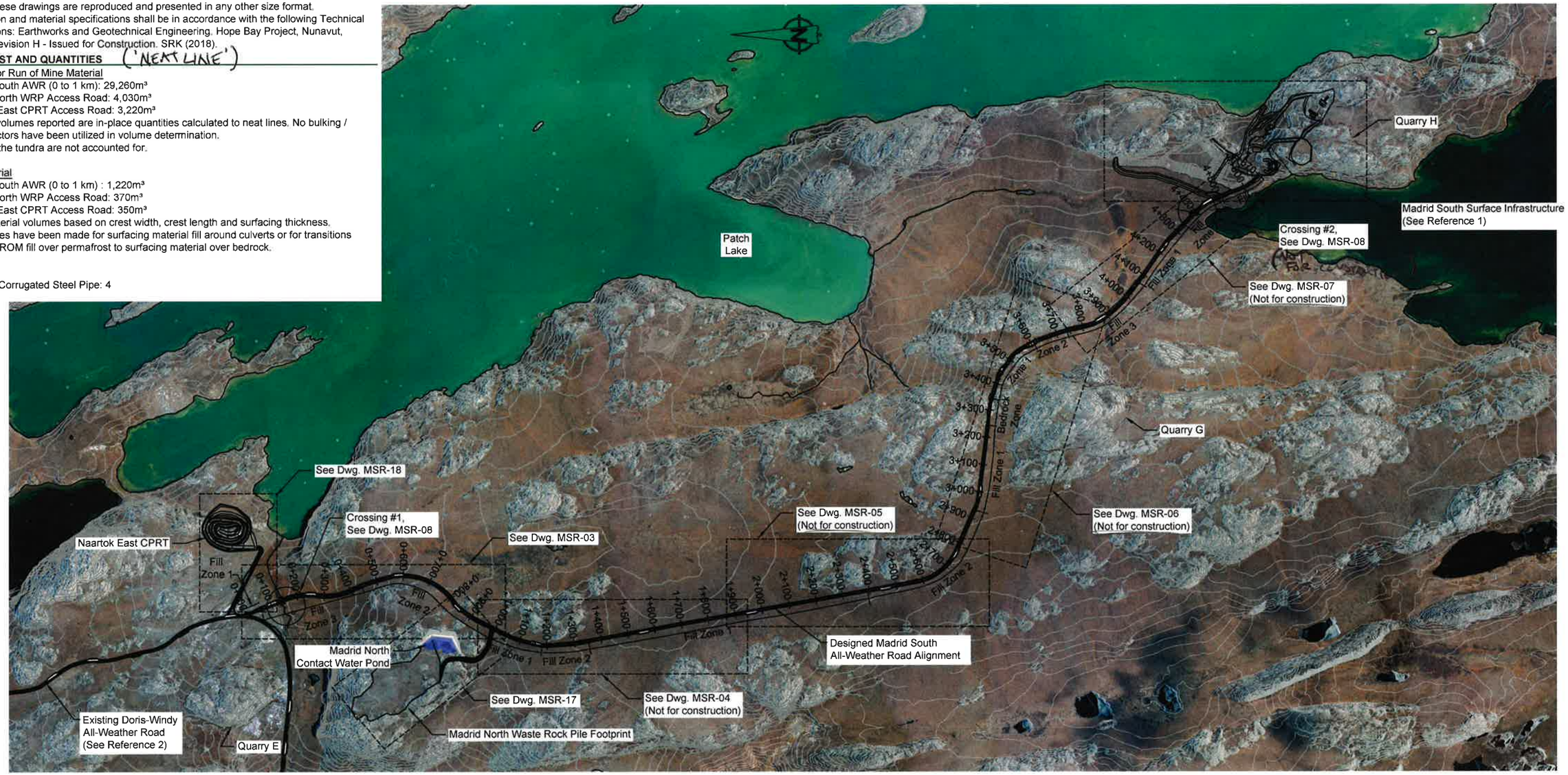
Surfacing Material

- 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

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

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
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

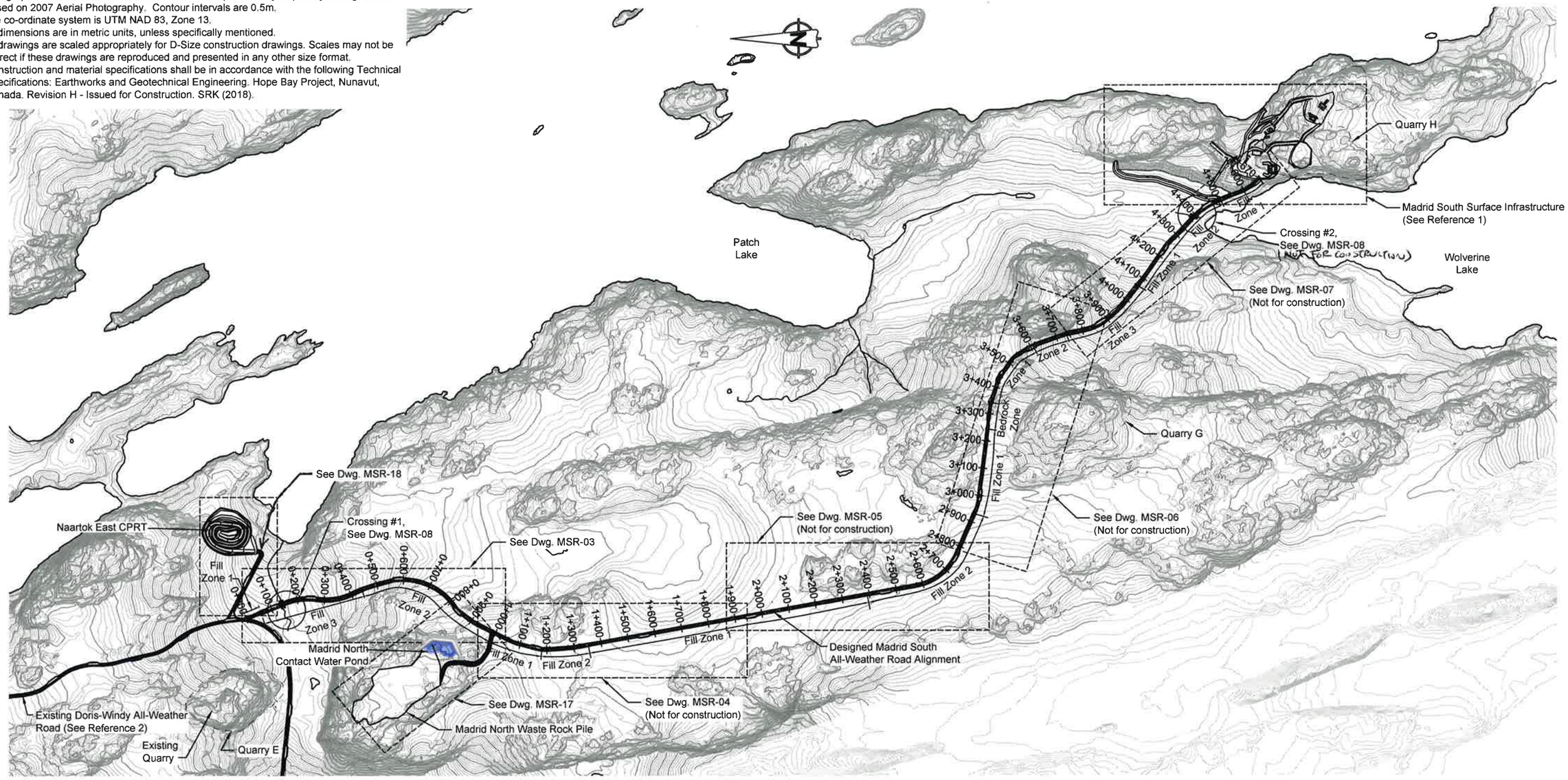
DRAWING TITLE: Madrid South All-Weather Access Road General Arrangement (with Orthophoto)

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

P:\01_SITES\Hope Bay\ACAD\FC\Madrid Access Roads\1CT022.043 Madrid South_all weather road.dwg

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.

0 100 200 300 400 500
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

REGISTERED PROFESSIONAL ENGINEER — J.B. KURYLO — LICENSEE — 2019/04/18

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:
JK/RW	NV/TAH	RW
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

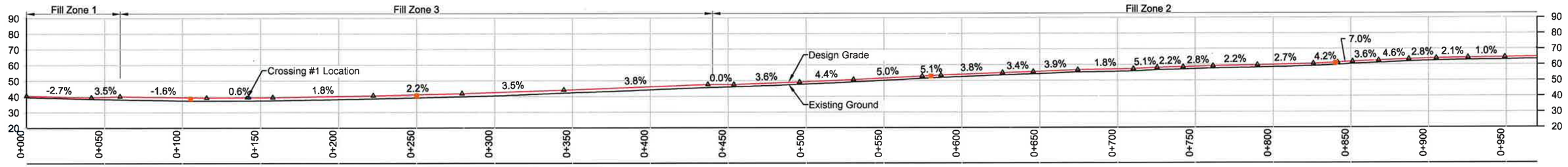
DRAWING TITLE:
Madrid South All-Weather Access Road
General Arrangement

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

P:\01_SITES\Hope Bay\ACAD\FC\Madrid Access Roads\1CT022.043 Madrid South_all weather road.dwg

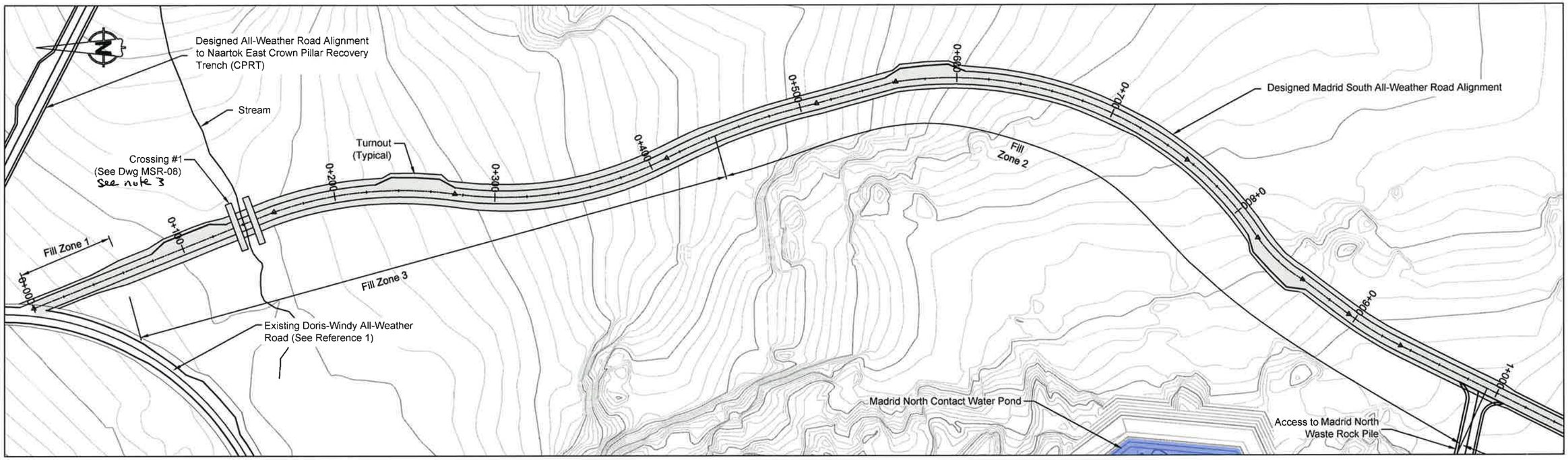
PROFILE LEGEND

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



PROFILE
DORIS - WINDY to MADRID NORTH

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
- 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

PROFESSIONAL ENGINEER'S STAMP

REGISTERED PROFESSIONAL ENGINEER — J.B. KURYLO — LICENSEE — 2019/04/02
This drawing is uncontrolled when printed. Unless stamped, certified in accordance with the requirements of the applicable jurisdiction and recorded on a Distribution Matrix.

srk consulting

DESIGN:	DRAWN:	REVIEWED:
JK/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

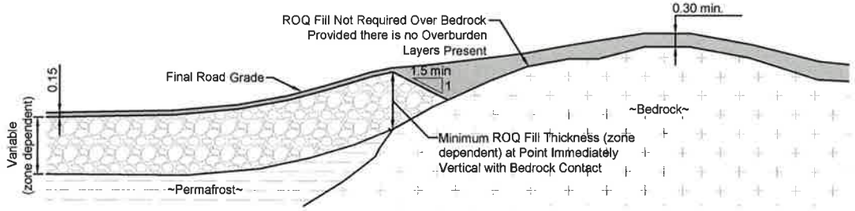
SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

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

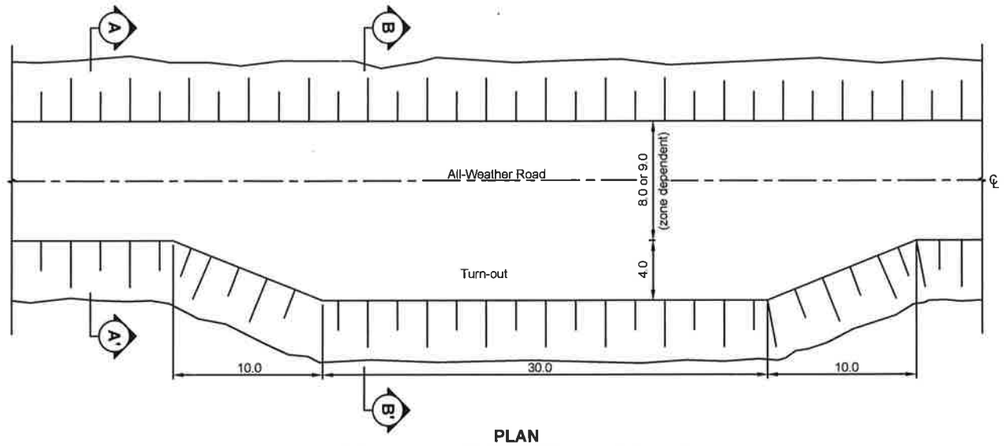
DRAWING NO.	SHEET	REVISION NO.
MSR-03	4 OF 18	0

P:\01_SITES\Hope Bay\ACAD\PC\Madrid Access Roads\1CT022.043 Madrid South_all weather road.dwg



ALL-WEATHER ROAD PROFILE
TRANSITION FROM PERMAFROST TO BEDROCK

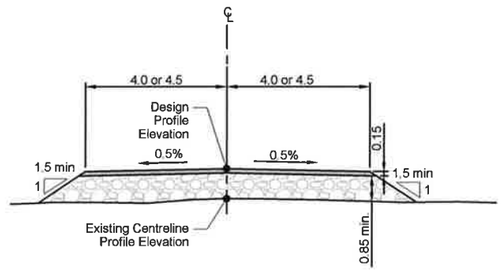
Scale in Metres 0 1 2 3 4 5



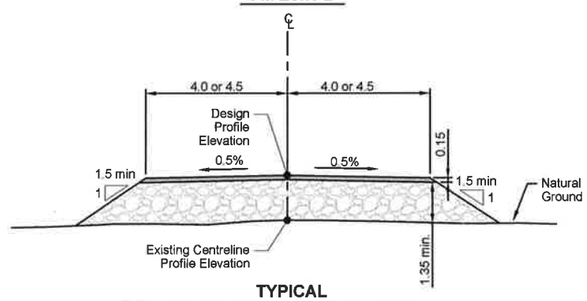
PLAN
TYPICAL ALL-WEATHER ROAD & TURNOUT

Scale in Metres 0 2 4 6 8 10

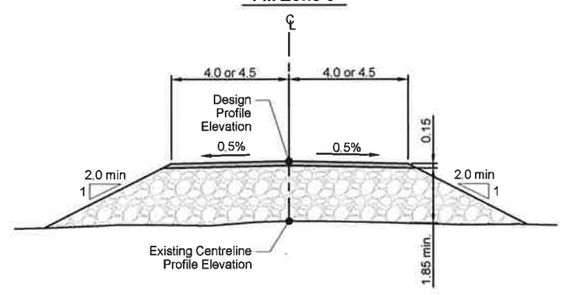
Fill Zone 1



Fill Zone 2

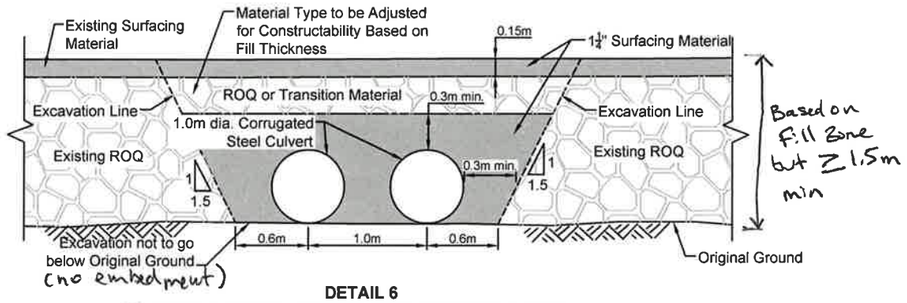


Fill Zone 3

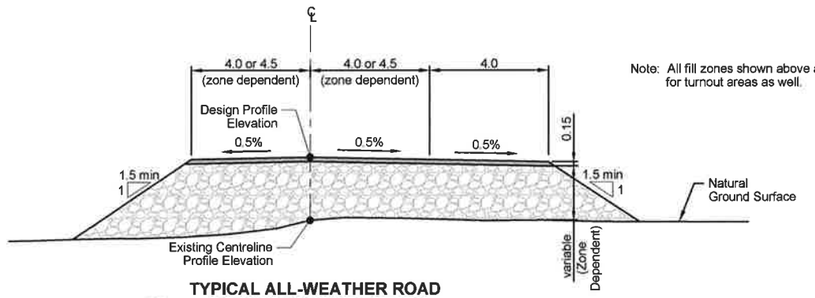


TYPICAL
A ALL-WEATHER ROAD SECTION

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

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

srk consulting

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

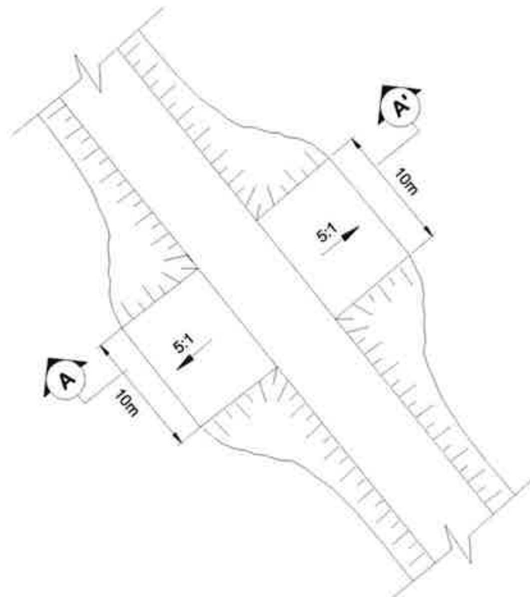
SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

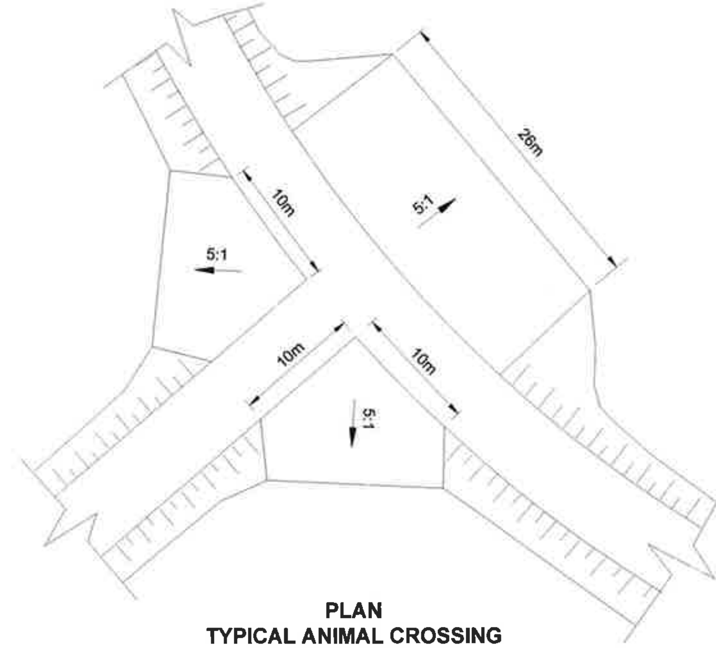
DRAWING TITLE: Typical Road and Crossing Details

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

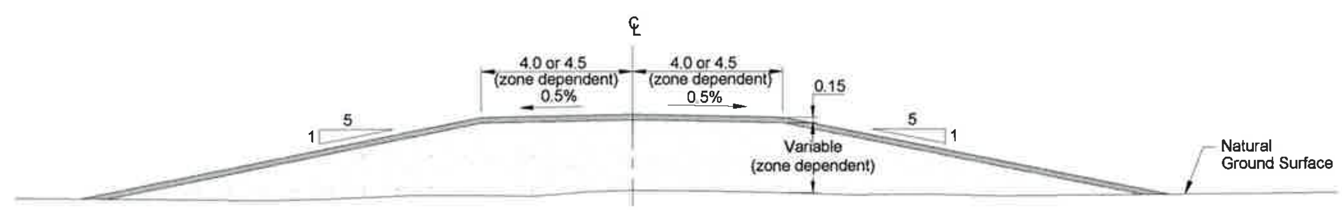
P:\8_SITES\Hope Bay\ACAD\FC\Madrid Access Roads\1CT022.043 Madrid South_plan_sections.dwg



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.

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REVISIONS

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

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER J.B. KURYLO LICENSEE 2019/04/02

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

srk consulting

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

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

TMAC RESOURCES

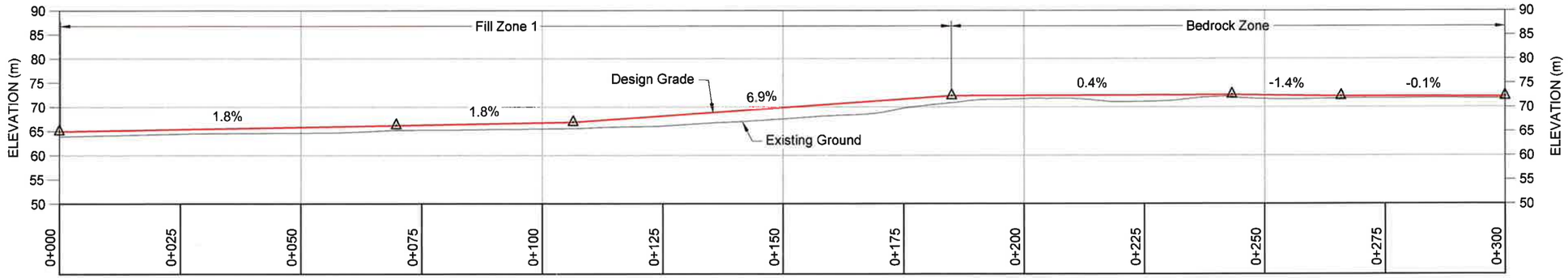
HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid South All-Weather Road

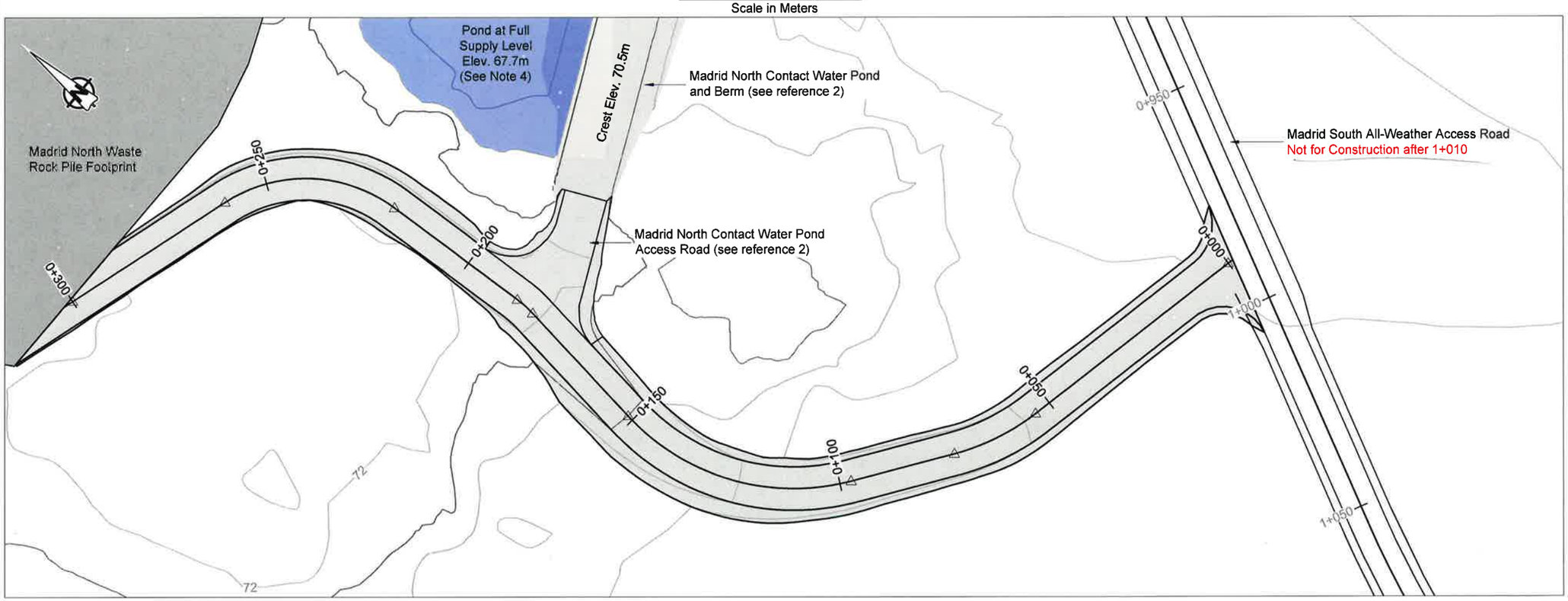
DRAWING TITLE: Animal Crossings Plan and Sections

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

REFERENCE DRAWINGS

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

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

REVISIONS

PROFESSIONAL ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER
J.B. KURYLO
LICENSEE
2019/04/02
This drawing is uncontrolled when printed unless stamped & certified in accordance with the requirements of the applicable APEGA's and recorded on a Distribution Register.

srk consulting

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

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

TMAC RESOURCES

HOPE BAY PROJECT

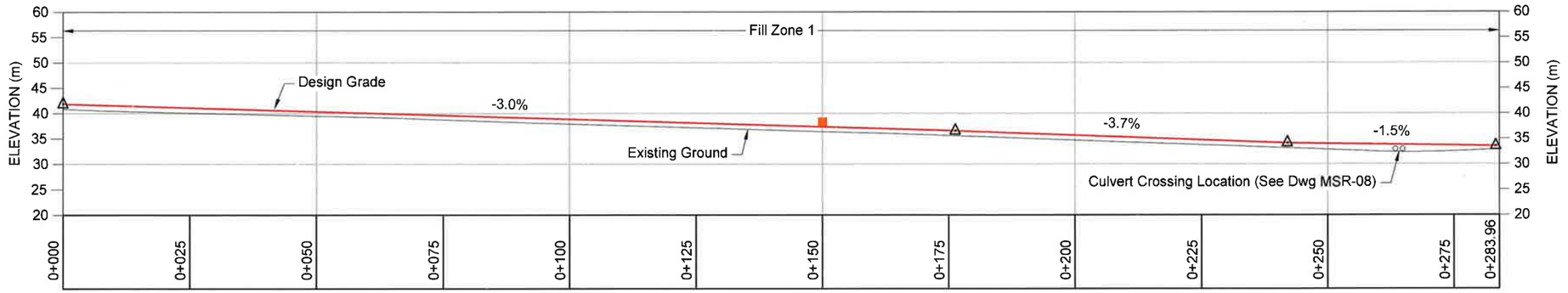
SRK JOB NO.: 1CT022.036

Madrid South All-Weather Road

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

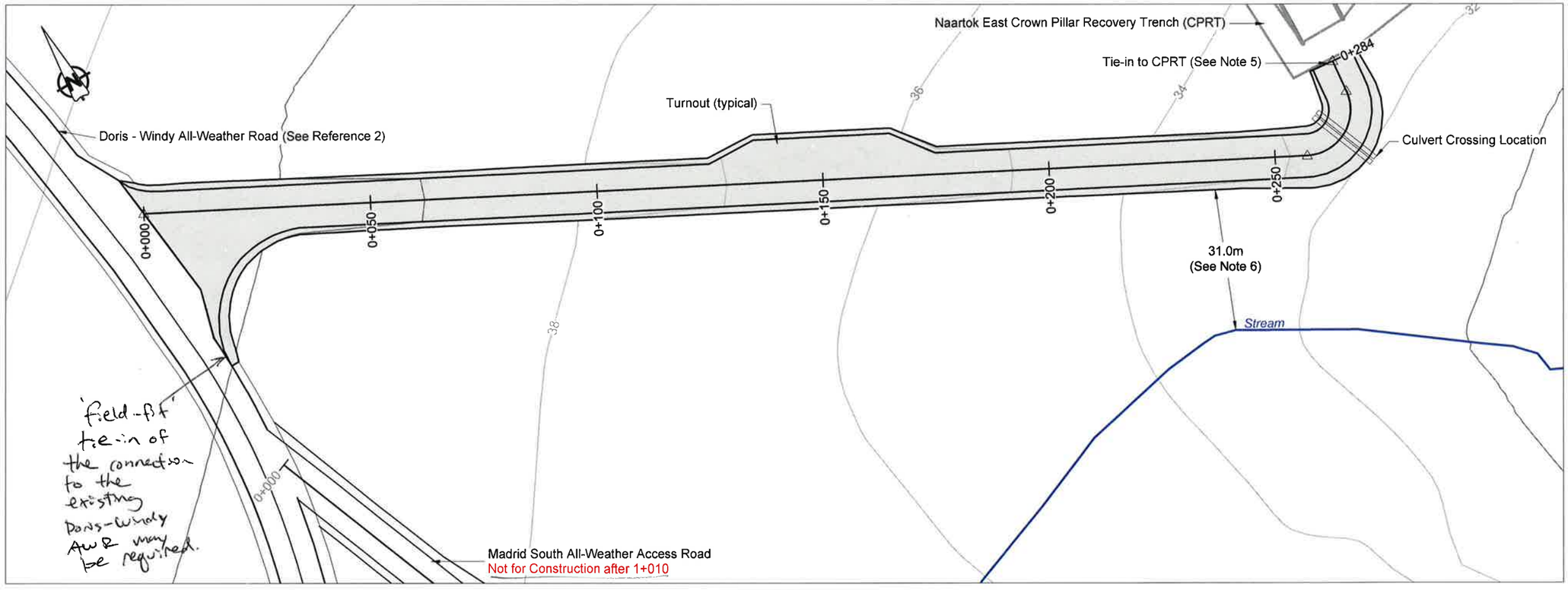
DRAWING NO.	SHEET	REVISION NO.
MSR-17	17 OF 18	0

P:\01_SITES\Hope Bay\ACAD\FC\Madrid Access Roads\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
- 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

PROFESSIONAL ENGINEERS STAMP

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

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

srk consulting

DESIGN:	DRAWN:	REVIEWED:
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

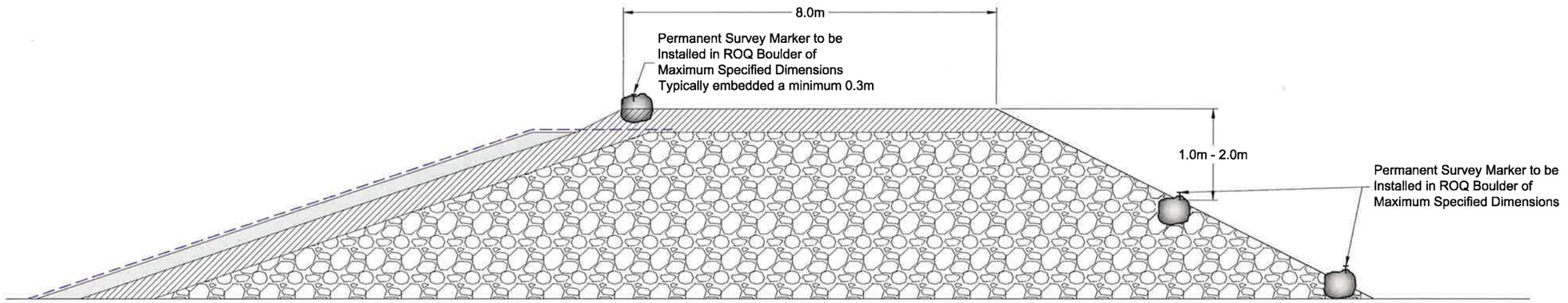
DRAWING TITLE:
Naartok East CPRT
Access Road Plan and Profile

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

P:\01_SITES\Hope Bay\ACAD\IFC\Madrid Access Roads\1CT022.043 - AR-PP.dwg

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								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
--	--	--	--	--	--	--	0	Issued for Construction	RW	EMR	19/04/05
--	--	--	--	--	--	--	A	Issued for Discussion	RW	EMR	19/04/04

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

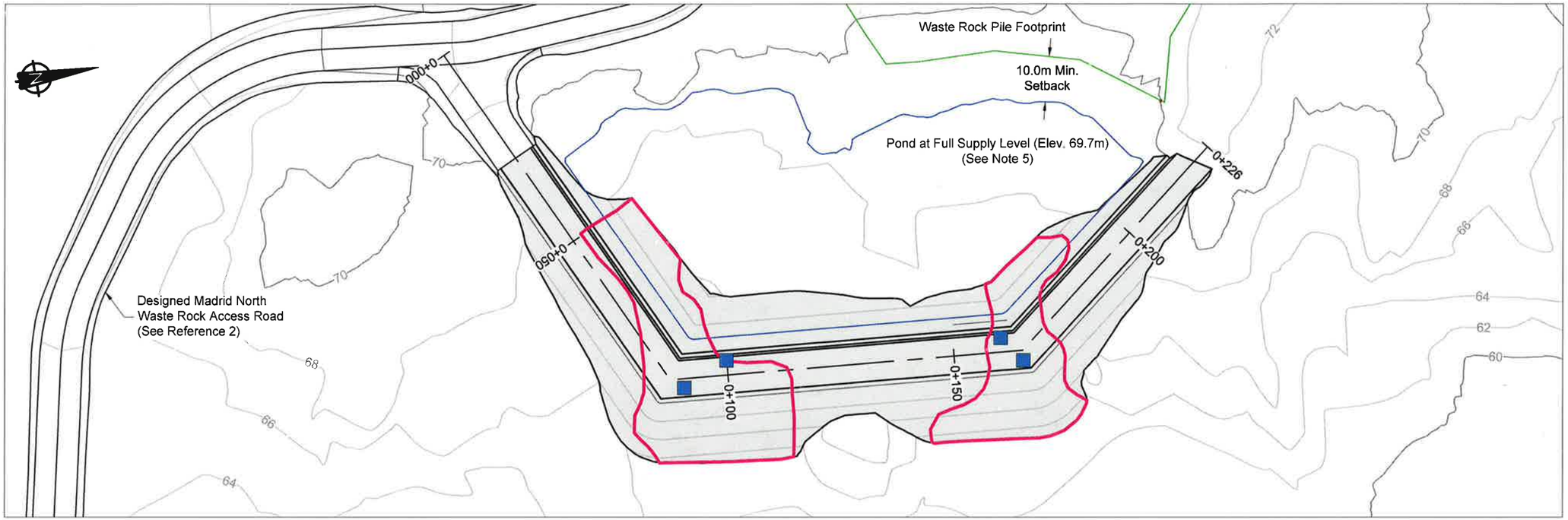
SRK JOB NO.: 1CT022.043

Madrid North Contact Water Pond

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

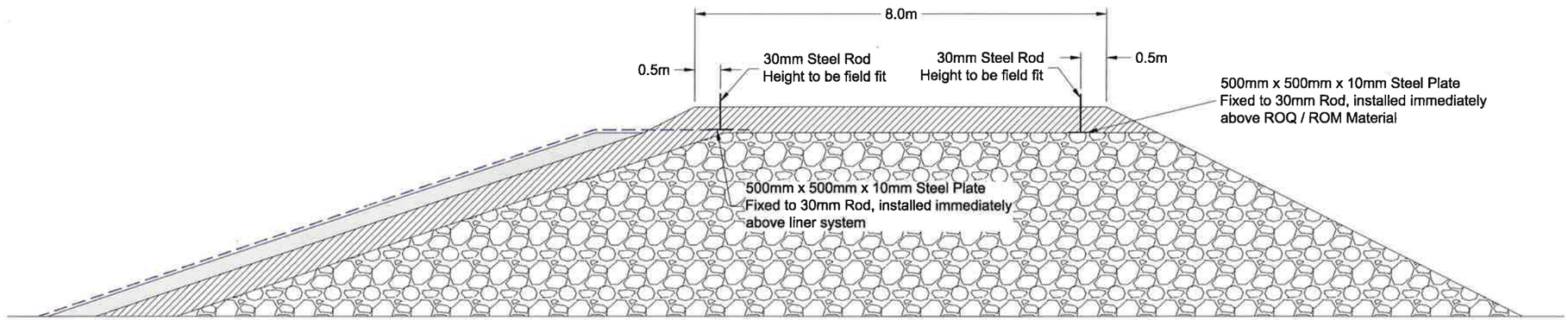
DRAWING NO.	SHEET	REVISION NO.
MN-CWP-08	8 OF 9	A

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



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
--	--	--	--	--	--	--	0	Issued for Construction	RW	EMR	19/04/05
							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

P:\01_SITES\Hope Bay\CAD\FIG\Madrid North CWP\1CT022.043 - Instrumentation Plan.dwg