Knight Piésold CONSULTING

Management System Certified By: bsi ISO 9001 Quality Management Systems CERTIFIED FS 64925 | ISO 14001 Environmental Management CERTIFIED EMS 550121 | ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 550122

August 28, 2024

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Mr. Jim Patterson
Mr. Rudolf Dietrich
Deputy Project Directors - Sustaining Projects
Baffinland Iron Mines Corporation
#300 - 360 Oakville Place Drive
Oakville, Ontario L6H 6K8
Canada

Dear Jim and Rudy,

RE: Construction Summary of CV-001 Remedial Measures

1.0 INTRODUCTION

Baffinland Iron Mines Corporation (Baffinland) completed remedial work on culverts installed on fish-bearing streams along the Milne Inlet Tote Road (Tote Road) between February 18, 2024, and May 13, 2024. The completed work was based on the design presented in the Knight Piésold Ltd. (KP) Design Report "*Tote Road Permanent Crossing Plan - Round CSP Culvert Installations*" (KP, 2024a). This letter summarizes the work completed at water crossing CV-001 on April 22, 2024, shortly after the as-built was completed. This letter will also be appended to the As-Built Summary Report for the February to May 2024 construction season, to be issued under separate cover.

2.0 BACKGROUND

Water crossing CV-001 is located at km 94.5 along the Tote Road which connects the Milne Inlet Port Site and the Mary River Mine Site. The existing water crossing at CV-001 consisted of three culvert barrels, two x 0.5 m culvert barrels and one x 1 m culvert barrel. The proposed (remediated) design for the crossing consisted of one x 1.8 m diameter low flow CSP culvert, and one x 1.0 m diameter high flow CSP culvert. The 1.8 m diameter low flow culvert was embedded 40% of the total diameter below grade, with protruding coarse riprap mixed with finer material similar to natural stream substrate to replicate the stream bottom and create velocity refuge for fish. The 1.0 m diameter high flow culvert was installed 0.15 m above the infill elevation (top of embedment material) of the 1.8 m diameter low flow culvert.

3.0 MATERIALS USED

The following materials were used for the installation of the CV-001 remediated water crossing.

- Culvert Backfill - Culvert Backfill material consisted of 32 mm minus material that was crushed and screened at the aggregate quarry located at the Milne Inlet Port. The material was backhauled to the km 94 laydown area using Baffinland's ore hauling trucks (OHTs) southbound on the Tote Road. The 32 mm minus material was stockpiled at the km 94 laydown area for use at water crossings CV-001 and BG-04. Particle size gradations from laboratory tests show that the processed material met the material specifications as shown on Figure 1.

- Bedding Material - 3/16 inch (4.75 mm) minus material was used in limited quantities for the 2 inch (50 mm) thick uncompacted bedding material below the low and high flow culverts. Similar to the Culvert Backfill material, the Bedding Material was crushed, screened, and hauled from the aggregate quarry at Milne Inlet Port and stockpiled at the km 94 laydown area. As per the culvert manufacturer's specifications The maximum particle size for the Bedding Material was required to be half of the depth of the culvert undulations (corrugations), which are 13 mm, as per the culvert Manufacturer's Specifications. Particle size gradations from laboratory tests are shown on Figure 2 and show that approximately 3% of the particles in the record samples exceeded the maximum particle size of 6.5 mm. The small quantity of slightly larger particles was considered acceptable to meet the design intent.
- Riprap - Coarse and fine riprap were crushed and screened at the Mary River Mine Site. The riprap materials were hauled to the km 94 laydown area using CAT 745 articulated haul trucks northbound on the Tote Road.
- Local Borrow Material - This material consisted primarily of reusing excavated material from the existing road embankment. Excavation of this material was completed by blasting frozen material that surrounded the existing culverts.
- Non-Woven Geotextile - 4.1 mm thick Texel 160E needle punched non-woven geotextile rolls was stored at the km 94 laydown. The non-woven geotextile was installed beneath the fine riprap on the road embankment slopes according to the manufacturer's recommendations and generally as shown on the design drawings.
- Round CSP Culverts - 8 m sections of 1.8 m diameter round CSP for low flow culvert, and 6 m sections of 1.0 m diameter round CSP for high flow culvert were stored at the km 94 laydown.

4.0 CONSTRUCTION SEQUENCE

Construction activities for CV-001 began on March 24, 2024, and were completed on April 22, 2024. The construction sequence is described below:

1. Excavation
   a. Drilling of blast holes in the frozen road embankment and underlying foundations soils were completed on March 24, 2024.
   b. The blast holes were loaded and blasted on March 24, 2024.
   c. Excavation of the blasted material commenced on March 25, 2024 and was completed on March 26, 2024. This involved the removal of unsuitable materials (frozen blasted material, previous culverts), preparation of the foundation surface and as-built survey. Additional ripping using an excavator was required to achieve the excavation design grade.
   d. The as-built survey of CV-001 excavation was completed on March 26, 2024.

2. Backfilling and Culvert Installation
   a. Backfilling of the excavation commenced on March 26, 2024 and was completed to the base of the 1.8 m diameter culvert on March 27, 2024. Culvert Backfill material was placed and compacted in 200 and 300 mm lifts (200 mm for material compacted using the hand-guided compactor and 300 mm where the 10 ton vibratory roller was used), prior to placement and compaction of the bedding layer for the low flow culvert.
   b. The 1.8 m diameter round CSP low flow culvert was installed between March 27 and 28, 2024. The 1.8 m diameter low flow culvert was installed using two, 8 m sections followed by one, 1.7 m cut section and then one final 8 m section for a total length of 25.7 m.

c. The 1.0 m diameter round CSP high flow culvert was installed between March 28 and 29, 2024. The 1.0 m diameter high flow culvert was installed using two, 6 m sections followed by a cut 4.5 m section, and then one final 6 m section for a total length of 22.5 m.
d. Backfill placement around the culverts continued until April 8, 2024. This included continued placement of Culvert Backfill and local borrow area fill.
e. Local Borrow Area Fill (March 29 to April 8, 2024) and road topping (April 9 to 16, 2024) were placed and compacted above the culvert backfill material and culverts. Baffinland made the decision to use the frozen blasted material as "local borrow area fill" above the Culvert Backfill placed directly around the culverts.
f. Coarse riprap and stream substrate material were placed within the interior of the 1.8 m diameter round CSP low flow culvert from March 31 to April 1, 2024.
g. Fine riprap placed over non-woven geotextile was installed along the upstream and downstream 2H:1V road embankment side slopes, and the additional identified areas requiring slope stabilization measures, between April 4 and 8, 2024.
h. Mixed coarse riprap and stream substrate material were placed and graded for the inlet and outlet aprons between April 5 and 7, 2024.
i. An as-built survey of the in-culvert boulders was completed on April 16, 2024. The as-built details for the in-culvert boulders are shown on Drawing 750.
j. An as-built survey of the completed road surface was approximately completed on April 22, 2024.

5.0 AS-BUILT DETAILS

Details of the water crossing installation are shown on Drawings 750 and 751 (attached).

Select photos taken during construction are included in Appendix A.

6.0 DESIGN CHANGES AND DEVIATIONS

The following design changes and deviations were made for water crossing CV-001 during construction:

1. Baffinland chose to re-use blasted frozen material from the existing road embankment as local borrow area fill outside of the Culvert Backfill material area (i.e. culvert structural backfill zones). KP recommended against the use of this material as road embankment fill during the installation of the round CSP culverts (KP, 2024c). It is highly possible that some of the frozen material contained higher than desired ice content significantly increasing the likelihood of significant settlement of the fill material following thaw, given the inability to properly compact frozen material with higher ice content.
2. Design Change 01 (No. CVDC-01, KP, 2024b) was issued on February 28, 2024 documenting the approved design change to use finer bedding material to meet the culvert manufacturer's recommendations. The specified 25 mm minus material was changed to a 3/16 inch minus to meet the revised recommendations.

The design change documentation is included in the As-Built Summary Report for the February to May 2024 construction season.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Culvert crossing CV-001 was generally constructed in agreement with the design (KP, 2024a). However, a key construction deviation included the use of frozen blasted material as local borrow area fill within the road embankment.

KP recommends monitoring of the final road surface elevation and side slopes for signs of settlement and instability as a result of the thaw or creep settlement of frozen blast material as backfill. As communicated during construction, Baffinland should be prepared for localized thaw settlement of the road surface leading to the requirement for repairs and/or maintenance of the road crossing over the initial years of operation. Care will need to be taken to maintain and/or repair any softer areas, or areas of settlement that may develop in close proximity to the culvert installations are managed in order to minimize potential damage to the culverts.

Additionally, KP recommends the water crossing remediation in its entirety for signs of sloughing, erosion, or other potential issues. It is understood that this monitoring will be completed as part of the post-construction monitoring plan to be implemented by Baffinland.

8.0 REFERENCES

Knight Piésold Ltd. (KP), 2024a. *Tote Road Permanent Crossing Plan - Round CSP Culvert Installations.* February 8. North Bay, Ontario. Ref. No. NB102-181/77-4, Rev. 2.

Knight Piésold Ltd. (KP), 2024b. Design Change (CVDC-01) to: Baruck Wile and Rudolf Dietrich, Baffinland Iron Mines Corporation. Re: *Culvert Bedding Design Change.* February 26.

Knight Piésold Ltd. (KP), 2024c. Memorandum to: Michael Burns and Rudolf Dietrich, Baffinland Iron Mines Corporation. Re: *Permanent Crossing Plan - Round CSP Culverts, Response to Baffinland Request for Information (RFI) No. 1.* March 8. North Bay, Ontario. Ref No. NB24-00286 (NB102-181/93).

Yours truly,
Knight Piésold Ltd.

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-08-28
NT/NU

Prepared: Greg Johnstone
Greg Johnstone, P.Eng., CPESC
Project Engineer

Reviewed:
C. A. (Andy) Phillips, P.Eng.
Senior Engineer

Approval that this document adheres to the Knight Piésold Quality System:

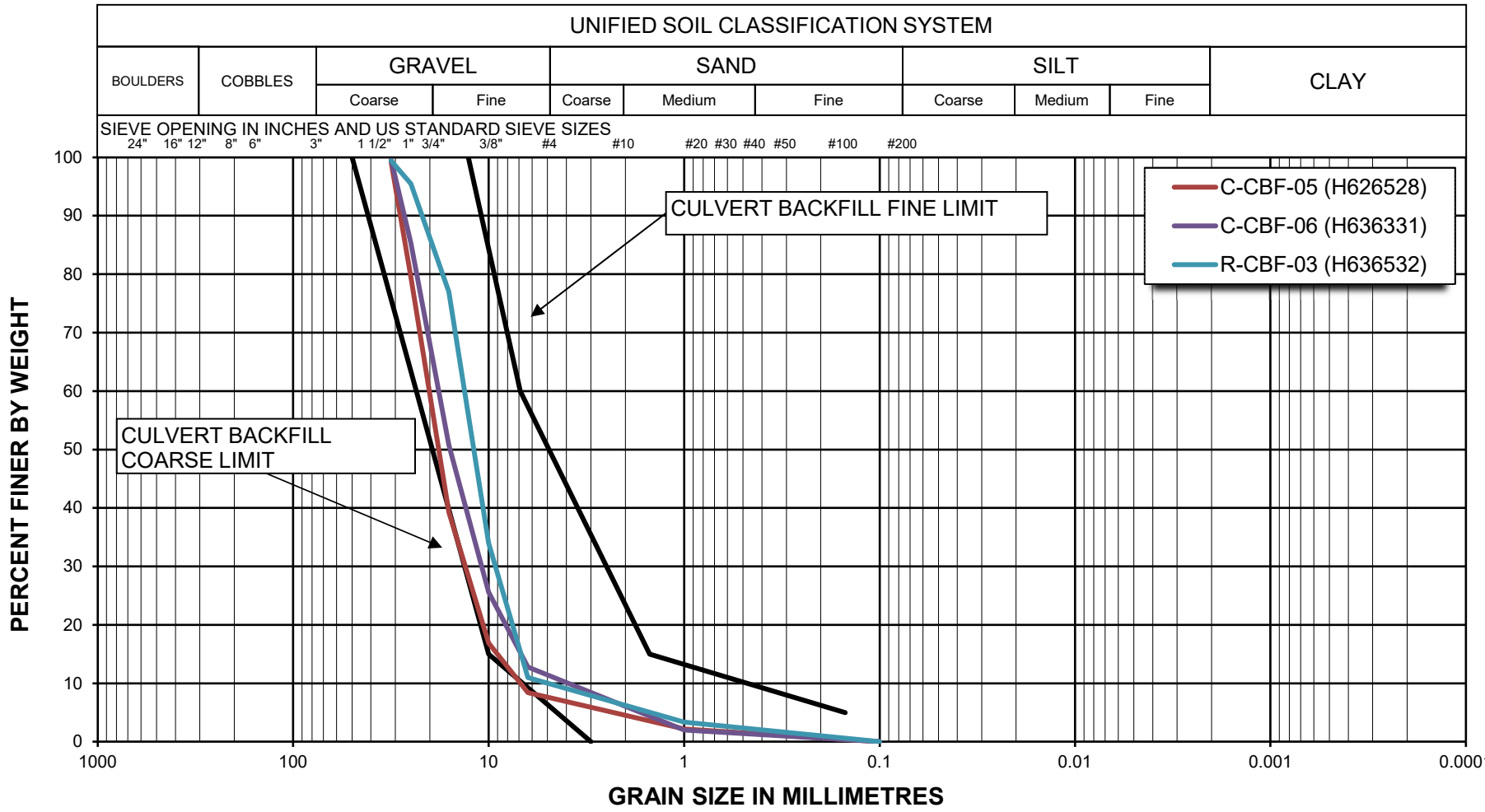
PERMIT TO PRACTICE
KNIGHT PIESOLD LTD.
Signature
Date 2024-08-28
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

Attachments:

Figure 1 Rev 0	Grain Size Distribution - Culvert Backfill - CV-001
Figure 2 Rev 0	Grain Size Distribution - Culvert Bedding (3/16 Inch Minus) - CV-001
Drawing 750 Rev 3	CV-001 General Arrangement
Drawing 751 Rev 3	CV-001 Plan and Section
Appendix A	CV-001 As-Built Photo Log

Copy To: Michael Burns, Baffinland Iron Mines Corporation
Jocelyn Larocque, Baffinland Iron Mines Corporation
George Liston, Baffinland Iron Mines Corporation
Connor Devereaux, Baffinland Iron Mines Corporation
Todd Swenson, Baffinland Iron Mines Corporation
Pat Smith, Baffinland Iron Mines Corporation
Shannon Mulhall, Baffinland Iron Mines Corporation

/gj



NOTES:

1. CONTROL TESTS (C) CARRIED OUT ON FILL MATERIALS SAMPLED FROM THE BORROW AREA AND STOCKPILE, PRIOR TO MATERIAL COMPACTION.
2. RECORD TESTS (R) CARRIED OUT ON PLACED AND COMPACTED FILL MATERIALS.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	28AUG'24	ISSUED WITH LETTER NB24-00503	GMJ	CAP

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

GRAIN SIZE DISTRIBUTION
CULVERT BACKFILL - CV-001

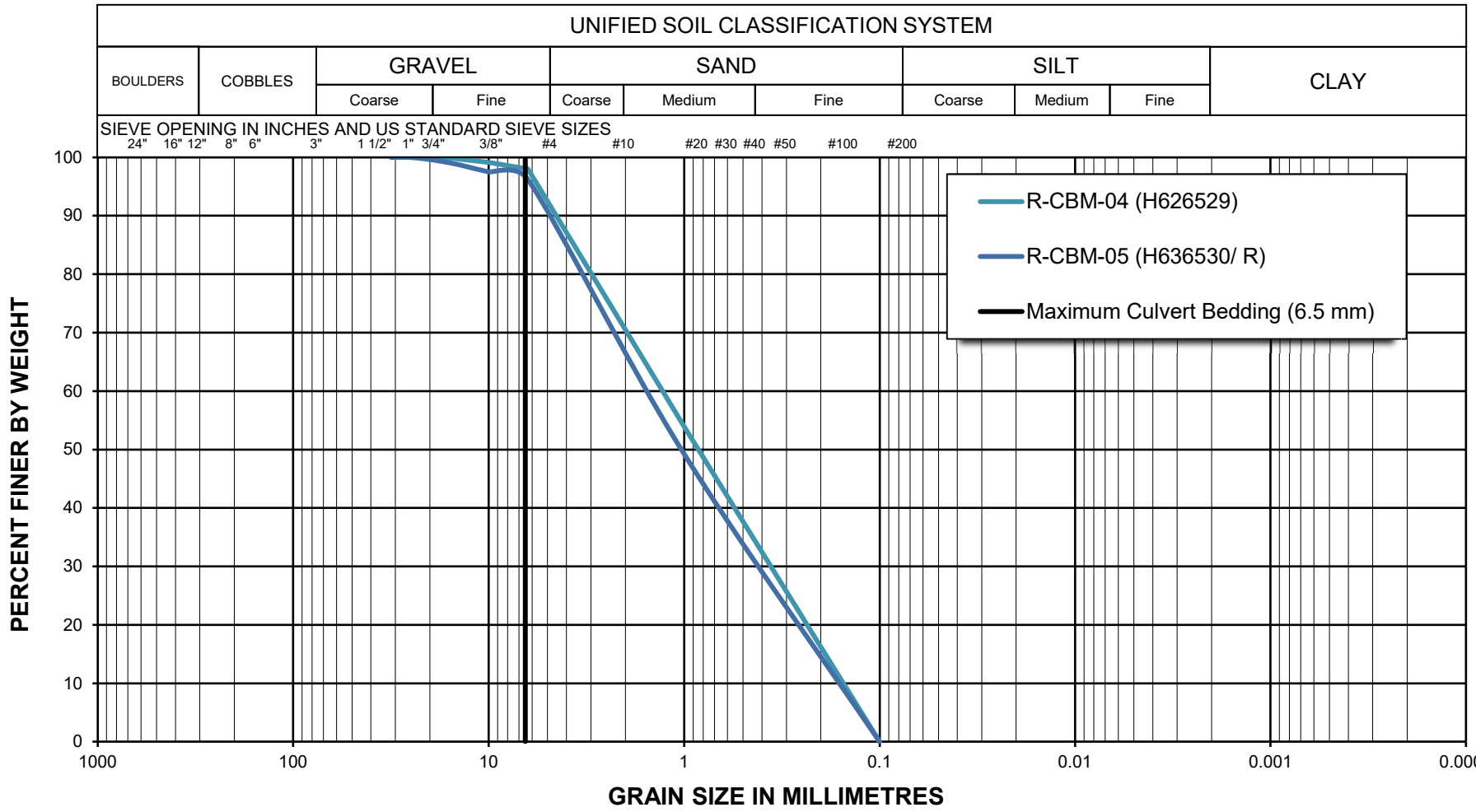
Knight Piésold CONSULTING

NB102-00181/93

REF. NO. NB24-00503

FIGURE 1

REV 0



NOTES:

1. CONTROL TESTS (C) CARRIED OUT ON FILL MATERIALS SAMPLED FROM THE BORROW AREA AND STOCKPILE, PRIOR TO MATERIAL COMPACTION.
2. RECORD TESTS (R) CARRIED OUT ON PLACED AND COMPACTED FILL MATERIALS.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	28AUG'24	ISSUED WITH LETTER NB24-00503	GMJ	CAP

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

GRAIN SIZE DISTRIBUTION
CULVERT BEDDING (3/16 INCH MINUS) - CV-001

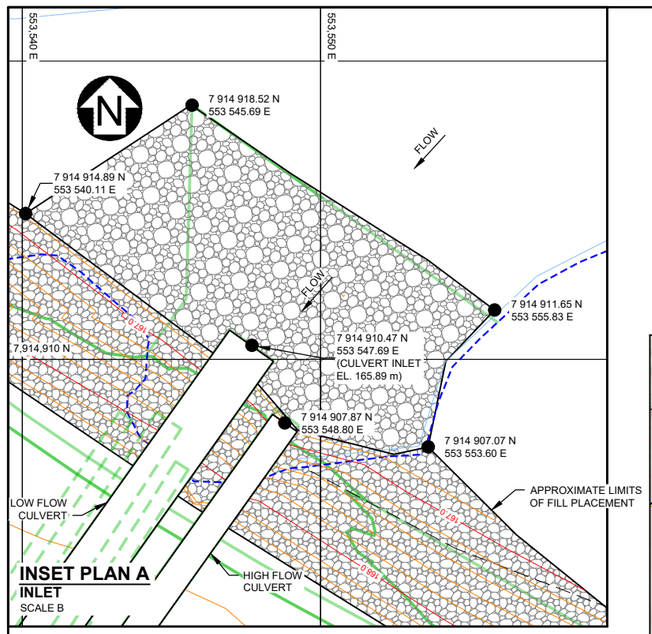
Knight Piésold CONSULTING

NB102-00181/93

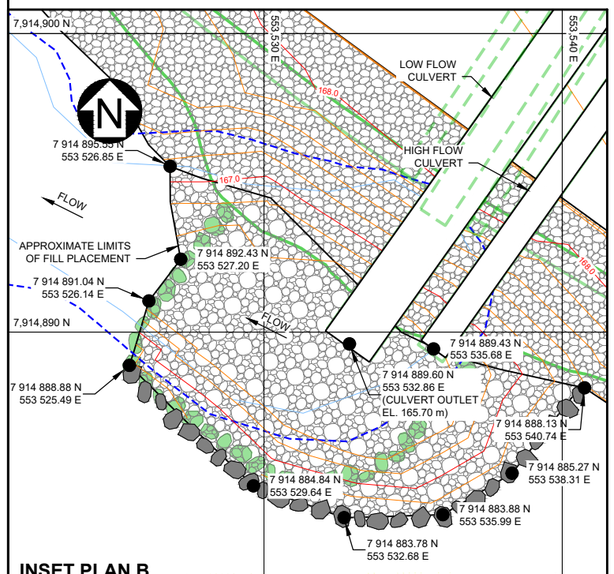
REF. NO. NB24-00503

FIGURE 2

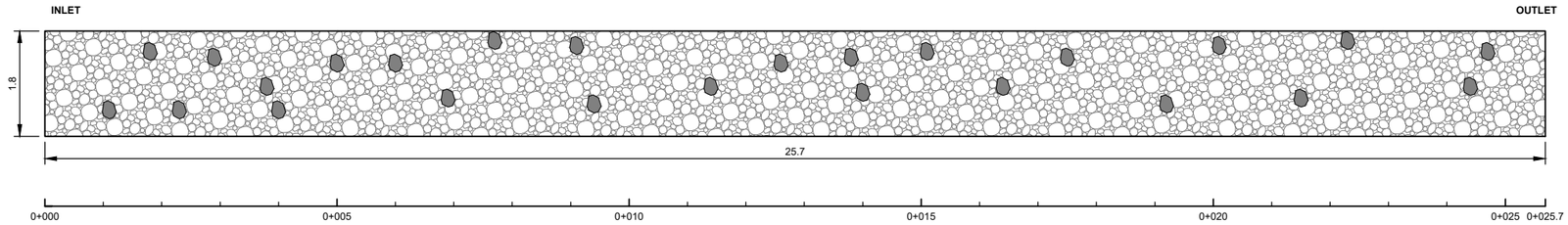
REV 0



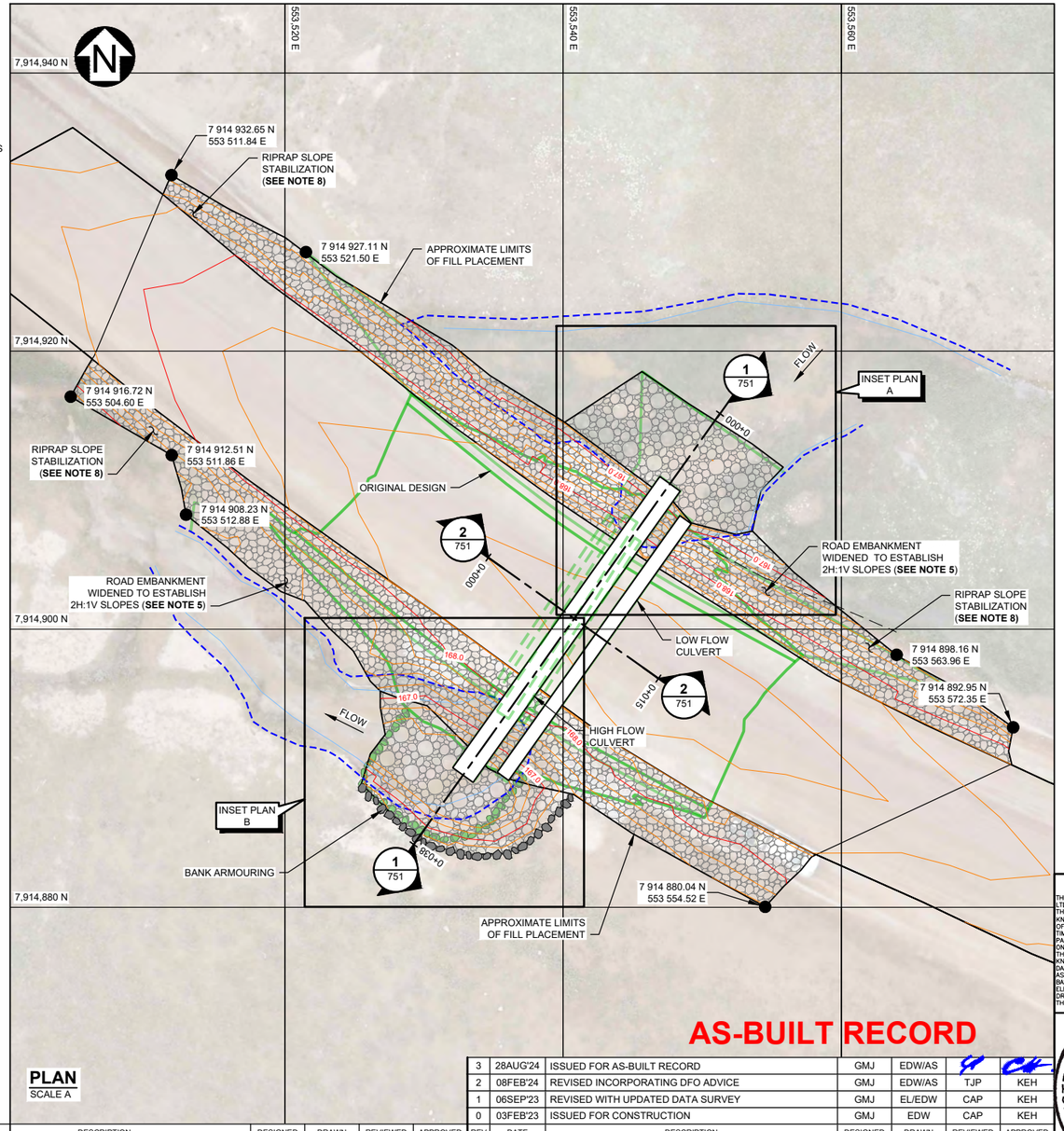
INSET PLAN A
INLET
SCALE B



INSET PLAN B
OUTLET
SCALE B



A - DETAIL
CV-001 IN CULVERT AS-BUILT BOULDER PLACEMENT PLAN
SCALE C



PLAN
SCALE A

LEGEND:

- COARSE RIPRAP
- FINE RIPRAP
- CONTOUR
- PREVIOUS CULVERT CONFIGURATION
- ORIGINAL DESIGN LINEWORK
- APPROXIMATE LIMITS OF FILL PLACEMENT
- APPROXIMATE HIGH WATER MARK (HWM)
- SURVEYED WETTED WIDTH
- AS-BUILT SURVEY POINT
- RIPRAP FOR BANK ARMOURING AND FIELD FIT CHANNEL OUTLET
- BOULDER LOCATION WITHIN CULVERT

AS-BUILT BOULDER PLACEMENT SUMMARY (SEE DETAIL A)

CHAINAGE	DIMENSIONS
0+001	0.3 x 0.4
0+002	0.2 x 0.3
0+002	0.2 x 0.4
0+003	0.1 x 0.4
0+003	0.1 x 0.3
0+004	0.2 x 0.3
0+005	0.1 x 0.4
0+006	0.4 x 0.5
0+007	0.4 x 0.3
0+007	0.3 x 0.3
0+009	0.2 x 0.2
0+009	0.1 x 0.3
0+011	0.2 x 0.4
0+012	0.3 x 0.15
0+013	0.2 x 0.3
0+014	0.3 x 0.3
0+015	0.4 x 0.15
0+016	0.4 x 0.2
0+017	0.4 x 0.4
0+019	0.3 x 0.2
0+020	0.4 - 0.3
0+021	0.3 x 0.3
0+022	0.2 x 0.3
0+024	0.1 x 0.3
0+024	0.3 x 0.5

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023. CULVERT CV-001 AS-BUILT SURVEYS PROVIDED BY NUNA, APRIL 22, 2024.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. ALL WORK WAS COMPLETED DURING FROZEN CONDITIONS.
5. ROAD EMBANKMENT FILL PLACED TO ESTABLISH ROAD SIDE SLOPES AT MIN. 2H:1V. ALL SLOPES WERE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE AS SHOWN ON **DRAWING 751 (SECTION 1)**.
6. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
7. EROSION AND SEDIMENT CONTROL MEASURES WERE LIMITED TO THE WATER CROSSING AND THE IMMEDIATE SURROUNDING AREA.
8. SLOPE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE.

SCALE A: 4 2 0 4 8 12 16 20 m
SCALE B: 2 1 0 2 4 6 8 10 m
SCALE C: 1 0.5 0 1 2 3 4 5 m

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Signature
Date 2024-08-28
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

AS-BUILT RECORD

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
3	28AUG'24	ISSUED FOR AS-BUILT RECORD	GMJ	EDW/AS		
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	TJP	KEH
1	06SEP'23	REVISED WITH UPDATED DATA SURVEY	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
751	CSP CULVERTS - CV-001 PLAN AND SECTION

REFERENCE DRAWINGS

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-08-28
NT/NU

Knight Piésold CONSULTING

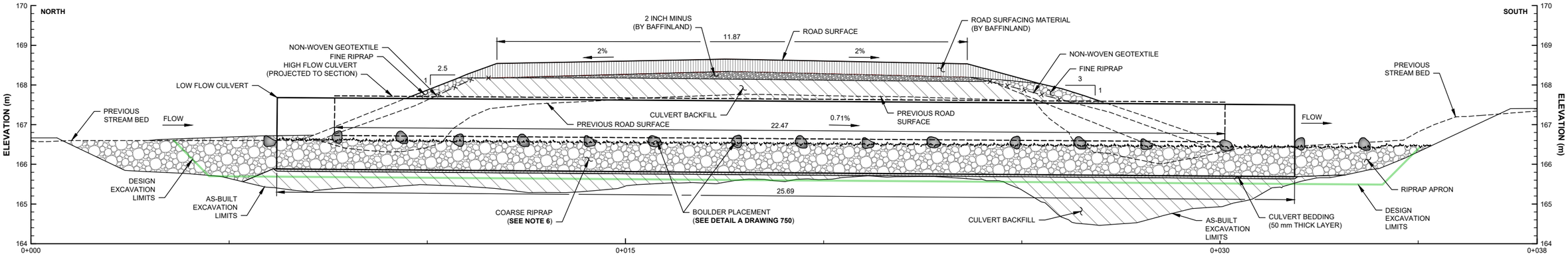
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

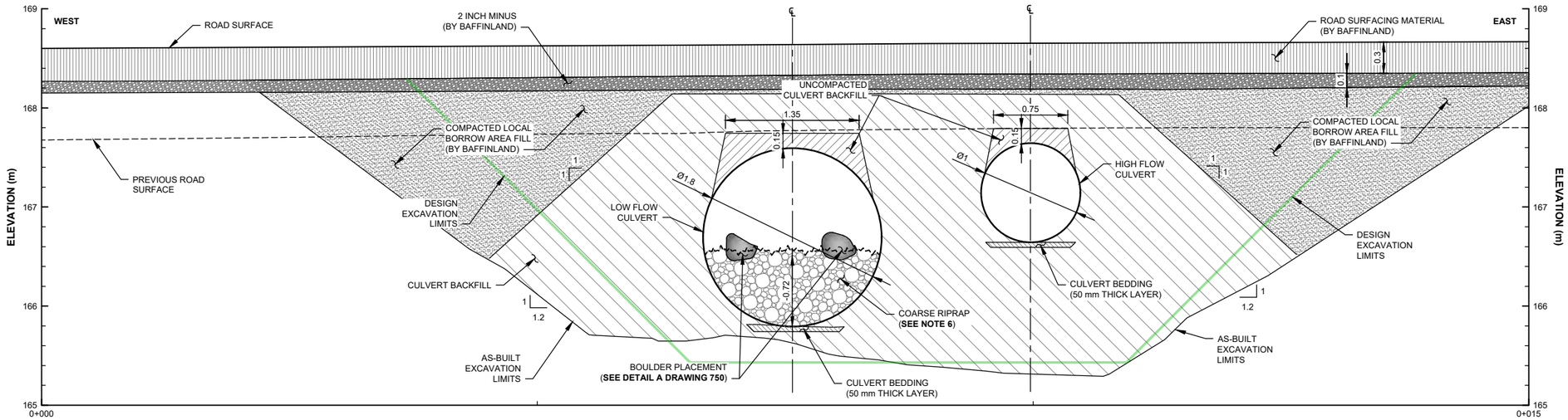
PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-001
GENERAL ARRANGEMENT

P/A NO.	DRAWING NO.	REVISION
NB102-181/93	750	3

SAVED: I:\1\02\00181\177\A\Acad\DWGS\750 751\750 751 R3, 8/28/2024 9:17:11 AM, EWARDELL PRINTED: 8/28/2024 9:26:02 AM, 750, EWARDELL ACAD VERSION: 25.0S (LMS TECH)



1 / 750 **SECTION**
CV-001 PROFILE
SCALE A



2 / 750 **SECTION**
CV-001 INSTALLATION DETAILS
SCALE B

LEGEND:

- COMPACTED LOCAL BORROW AREA FILL (BY BAFFINLAND)
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL (BY BAFFINLAND)
- 2 INCH MINUS (BY BAFFINLAND)
- COARSE RIPRAP
- FINE RIPRAP
- CULVERT BEDDING MATERIAL
- DESIGN LINEWORK
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE
- BOULDER PLACEMENT

NOTES:

1. CULVERT AS-BUILT SURVEYS PROVIDED BY NUNA APRIL 22, 2024.
2. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
3. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.
4. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
5. CULVERT INFILL MATERIAL TO BE INSPECTED DURING AND AFTER FIRST FRESHET FOLLOWING CONSTRUCTION TO DETERMINE IF ADDITIONAL MATERIAL IS REQUIRED.
6. RIPRAP INTERSTITIAL SPACE ON THE CHANNEL BED FILLED WITH MATERIAL SIMILAR TO THE ADJACENT CHANNEL BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER). VOID SPACE MINIMIZED BETWEEN COARSE RIPRAP SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. FINISHED SURFACE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS.

SCALE A 1 0.5 0 1 2 3 4 5 m

SCALE B 0.5 0.25 0 0.5 1.0 1.5 2.0 2.5 m

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AS-BUILT RECORD

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
750	CSP CULVERTS - CV-001 GENERAL ARRANGEMENT

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
3	28AUG'24	ISSUED FOR AS-BUILT RECORD	GMJ	EDW/AS	TJP	KEH
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0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
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2024-08-28
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Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-001
PLAN AND SECTION

P/A NO.	DRAWING NO.	REVISION
NB102-181/93	751	3

SAVED: I:\1\02\00181\177\A\Acad\DWGS\750 751\751 R3, 8/28/2024 9:17:11 AM, EWARDELL PRINTED: 8/28/2024 9:26:29 AM, 751, EWARDELL ACAD VERSION: 25.0S (LMS TECH)

APPENDIX A

CV-001 As-Built Photo Log

(Pages A-1 to A-15)

CV-001 AS-BUILT PHOTO LOG

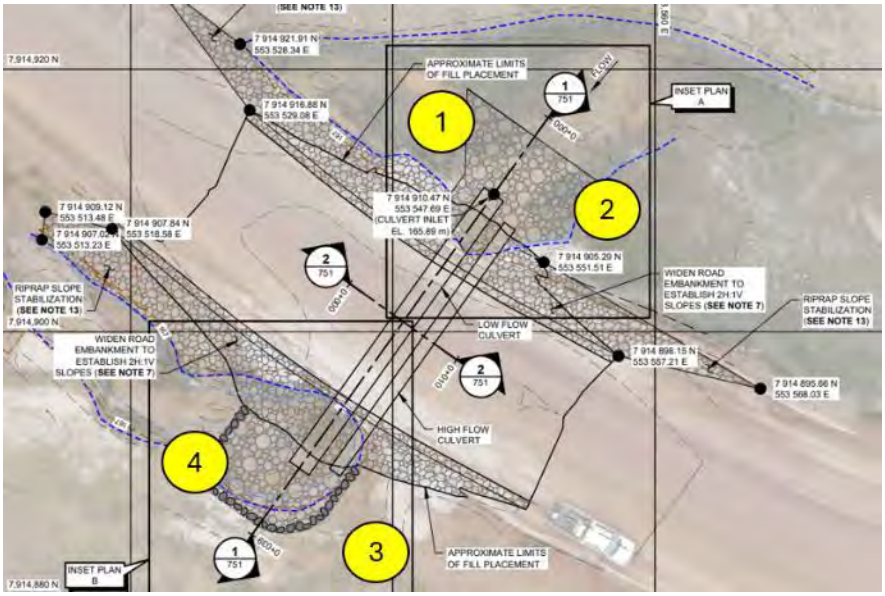

PHOTO 1. Culvert Crossing CV-001 - Photographic Vantage Points (Approximate Locations, Indicated with Yellow Circles).

PHOTO 2. During Construction - Vantage Point 1 - Blast Excavation - Road crossing and upstream inlet - Looking South (March 26, 2024).

PHOTO 3. During Construction - Vantage Point 2 - Blast Excavation - Road crossing and upstream inlet - Looking Southwest (March 26, 2024).

PHOTO 4. During Construction - Vantage Point 3 - Blast Excavation - Road crossing and downstream outlet - Looking North (March 26, 2024).

PHOTO 5. During Construction - Vantage Point 4 - Blast Excavation - Road crossing and downstream outlet - Looking Northeast (March 26, 2024).

PHOTO 6. During Construction - Vantage Point 2 - Placement of culvert backfill - Road crossing and upstream inlet - Looking South (March 27, 2024).

PHOTO 7. During Construction - Vantage Point 1 - Compaction of culvert backfill material - Road crossing and upstream inlet - Looking South (March 27, 2024).

PHOTO 8. During Construction - Vantage Point 3 - Compaction of culvert backfill material - Road crossing and upstream inlet - Looking North (March 27, 2024).

PHOTO 9. During Construction - Vantage Point 4 - Installation of 1.8 m diameter corrugated steel pipe low flow culvert - Road crossing and downstream outlet - Looking Northeast (March 28, 2024).

PHOTO 10. During Construction - Vantage Point 1 - Installation of 1.0 m diameter corrugated steel pipe high flow culvert - Road crossing and upstream inlet - Looking South (March 29, 2024).

PHOTO 11. During Construction - Vantage Point 1 - Installation of 1.8 m diameter corrugated steel pipe low flow culvert and 1.0 m diameter corrugated steel pipe high flow culvert - Road crossing and upstream inlet - Looking South (March 30, 2024).

PHOTO 12. During Construction - Vantage Point 1 - Placement of culvert backfill material above the low and high flow CSP culverts - Road crossing and upstream inlet - Looking South (March 30, 2024).

PHOTO 13. During Construction - Vantage Point 1 - Placement of geotextile on the north slope at CV-001 - Road crossing and upstream inlet - Looking South (April 5, 2024).

PHOTO 14. During Construction - Vantage Point 1 - Placement of geotextile and riprap on the north side slope at CV-001 - Road crossing and upstream inlet - Looking South (March 30, 2024).

PHOTO 15. Following Construction - Vantage Point 1 - Road crossing and upstream inlet - Looking South (April 16, 2024).

PHOTO 16. Following Construction - Vantage Point 2 - Road crossing and upstream inlet - Looking Southwest (April 16, 2024).

PHOTO 17. Following Construction - Vantage Point 3 - Road crossing and downstream outlet - Looking North (April 16, 2024).

PHOTO 18. Following Construction - Vantage Point 4 - Blast Excavation - Road crossing and downstream outlet - Looking Northeast (April 16, 2024).

PHOTO 19. Following Construction - Completed placement of coarse riprap and stream substrate material within the interior of the low flow CSP culvert at CV-001 (April 1, 2024).

PHOTO 20. Following Construction - Completed placement of coarse riprap and stream substrate material within the interior of the low flow CSP culvert at CV-001 (April 16, 2024).

PHOTO 21. Material Stockpile - 32 mm minus culvert backfill material - km 94 laydown - Looking South (March 24, 2024).

PHOTO 22. Material Stockpile - Culvert Bedding Material - km 94 laydown - Looking Southeast (March 27, 2024).

PHOTO 23. Material Stockpile - Fine Rip Rap - km 94 laydown - Looking South (April 5, 2024).

PHOTO 24. Material Stockpile - Coarse Rip Rap - km 94 laydown - Looking Northwest (April 5, 2024).

PHOTO 25. Material Stockpile - Stream Substrate Material - km 97 stockpile (February 29, 2024).

PHOTO 26. Equipment - CAT 349F Excavator - km 60 Laydown - looking East (March 08, 2024).

PHOTO 27. Equipment - CAT 745C articulated dump truck - km 60 Laydown (February 08, 2024).

PHOTO 28. Equipment - Mikasa MVH408 1000 lb Plate Compactor - km 60 Laydown (March 05, 2024).

PHOTO 29. Equipment - Ducar Motorized Wheel Barrow loaded with Coarse Riprap (April 4, 2024).

PHOTO 30. Equipment - CAT CS56B Smooth Drum Compactor (March 02, 2024).

Knight Piésold CONSULTING

Management System Certified By:
bsi
ISO 9001 Quality Management Systems CERTIFIED FS 64925
ISO 14001 Environmental Management CERTIFIED EMS 550121
ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 550122

August 27, 2024

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Mr. Jim Patterson
Mr. Rudolf Dietrich
Deputy Project Directors - Sustaining Projects
Baffinland Iron Mines Corporation
#300 - 360 Oakville Place Drive
Oakville, Ontario L6H 6K8
Canada

Dear Jim and Rudy,

RE: Construction Summary of CV-102 Remedial Measures

1.0 INTRODUCTION

Baffinland Iron Mines Corporation (Baffinland) completed remedial work on culverts installed on fish-bearing streams along the Milne Inlet Tote Road (Tote Road) between February 18, 2024, and May 13, 2024. The completed work was based on the design presented in the Knight Piésold Ltd. (KP) Design Report "*Tote Road Permanent Crossing Plan - Round CSP Culvert Installations*" (KP, 2024a). This letter summarizes the works completed at water crossing CV-102 on May 14, 2024, shortly after the as-built survey was completed. There has been settlement at the culvert since this work was completed, and additional remediation measures are being evaluated. This letter will be appended to the As-Built Summary Report for the February to May 2024 construction season, to be issued under separate cover.

2.0 BACKGROUND

Water crossing CV-102 is located at km 36 on the Tote Road which connects the Milne Inlet Port Site and the Mary River Mine Site. The existing water crossing at CV-102 consisted of four corrugated steel pipe (CSP) culvert barrels, three x 0.5 m culvert barrels and one x 1 m culvert barrel. The proposed (remediated) design for the crossing consisted of one x 1.8 m diameter low flow CSP culvert, and one x 1.0 m diameter high flow CSP culvert. The 1.8 m diameter low flow culvert was embedded 40% of the total diameter below grade, with protruding coarse riprap mixed with finer material similar to the natural stream substrate to replicate the stream bottom and create velocity refuge for fish. The 1.0 m diameter high flow culvert was to be installed 0.15 m above the infill elevation (top of embedment material) of the 1.8 diameter low flow culvert.

3.0 MATERIALS USED

The following materials were used for the installation of the CV-102 remediated water crossing.

- Culvert Backfill - Culvert Backfill material consisted of 32 mm minus material that was crushed and screened at the aggregate quarry located at the Milne Inlet Port. The material was backhauled to the km 36 laydown area on the Tote Road using Baffinland's ore hauling trucks (OHTs). Particle size gradations from laboratory tests show that the processed material met the material specifications, as shown on Figure 1. Two control samples and one record sample were collected for CV-102. The initial control test result (C-CBF-11) indicated that the stockpile was coarser than the specified envelope. It

was determined that the stockpile had become segregated and that the sample was not representative. After the results were received an additional control sample (C-CBF-13) was collected and the results were within the material specifications. The record test result (R-CBF-07) was slightly coarser than a small portion of the specified gradation envelope The material was considered to satisfy the material specifications due to the majority of the sample being within the specified gradation envelope.

- Bedding Material - 3/16 inch (4.75 mm) minus material was used in limited quantities for the 2 inch (50 mm) thick uncompacted bedding material below the low and high flow culverts. Similar to the 32 mm minus material, the 3/16 inch minus material was crushed, screened, and hauled from the aggregate quarry at Milne Inlet Port and stockpiled at the km 36 laydown area. The maximum particle size for the Bedding Material was required to be half of the depth of the culvert undulations (corrugations), which are 13 mm as per the Manufacturer's Specifications. Particle size gradations from laboratory tests are shown on Figure 2 and show that approximately 5% of the particles in the record sample exceeded the maximum particle size of 6.5 mm. This small quantity of slightly larger particles was considered acceptable to meet the design intent.
- Riprap - Coarse and fine riprap were crushed and screened at the Mary River Mine Site. The riprap materials were hauled to the km 36 laydown area using CAT 745 articulated haul trucks on the Tote Road.
- Local Borrow Material - This material consisted primarily of reusing excavated material from the existing road embankment. Excavation of this material was completed by blasting frozen material that surrounded the existing culverts.
- Non-Woven Geotextile - 4.1 mm thick Texel 160E needle punched non-woven geotextile rolls were stored at the km 36 laydown. The non-woven geotextile was installed beneath the fine riprap on the road embankment slopes and the drainage ditch, and within the inlet key-in trench according to the manufacturers recommendations and generally as shown on the design drawings.
- HDPE Geomembrane - 60 mm thick Layfield EL6060 HDPE geomembrane was stored at the km 36 laydown. The HDPE geomembrane was installed between two layers of non-woven geotextile within the inlet key-in trench.
- Insulation - 50 mm thick Styrofoam™ Highload 60 Extruded Polystyrene Insulation was stored at the km 80 laydown. Two layers of insulation (total thickness of 100 mm) was installed across the foundation beneath the culverts.
- Round CSP Culverts - 8 m sections of 1.8 m diameter round CSP for low flow culvert, and 6 m sections of 1.0 m diameter round CSP for high flow culvert were stored at the km 36 laydown.

4.0 CONSTRUCTION SEQUENCE

Construction activities for CV-102 began on April 21, 2024, and were completed on May 13, 2024. The construction sequence is described below:

1. Excavation
   a. Drilling of blast holes in the frozen road embankment and underlying foundations soils was completed on April 22, 2024.
   b. The drilled holes were loaded and blasted on April 23, 2024.
   c. The excavation of blast material commenced on April 23, 2024 and was completed on April 24, 2024. This involved the removal of unsuitable materials (frozen blast material, previous culverts), preparation of the foundation surface and as-built survey.

d. As-built surveys of the CV-102 excavation were completed as the excavation progressed between April 24 and April 27, 2024.

2. Backfilling and Culvert Installation
   a. Backfilling of the excavation commenced on April 24, 2024 and was completed to the base of the 1.8 m diameter culvert on April 29, 2024. Culvert Backfill material was placed and compacted in 200 and 300 mm lifts (200 mm for material compacted using the hand-guided compactor and 300 mm where the 10 ton vibratory roller was used), prior to placement and compaction of the bedding layer for the low flow culvert.
   b. Key-in trenches consisting of a geomembrane between two geotextile cushion layers backfilled with 3/4 inch minus material were installed beneath the inlet of the low flow culverts between April 25 and 26, 2024.
   c. Two layers of Styrofroam™ Highload 60 extruded polystyrene insulation (total thickness of 0.1 m) were installed below the low flow culverts between April 26 and 29, 2024. A 200 mm thick lift of Culvert Backfill material was placed on top of the insulation and compacted with one pass of a hand guided plate compactor.
   d. The 1.8 m diameter round CSP low flow culvert was installed on April 29, 2024. The 1.8 m diameter low flow culvert was installed using two, 8 m sections followed by one, 1.5 m cut section and then one final 8 m section for a total length of 25.5 m.
   e. The 1.0 m diameter round CSP high flow culvert was installed on April 30, 2024. The 1.0 m diameter high flow culvert was installed using two, 6 m sections followed by a cut 4.5 m section, and then one final 6 m section for a total length of 22.5 m.
   f. Backfilling around the culverts continued until May 3, 2024. This included continued placement of Culvert Backfill and local borrow area fill.
   g. Borrow Area Fill (May 1 to 3, 2024) and road topping (May 4 to 13, 2024) were placed and compacted above the culvert backfill material and culverts. Baffinland made the decision to use the frozen blasted material as “local borrow area fill” above the Culvert Backfill material placed directly around the culverts.
   h. Coarse riprap and stream substrate material were placed within the interior of the 1.8 m diameter round CSP low flow culvert on May 12, 2024.
   i. Fine riprap was placed above the non-woven geotextile along the upstream and downstream 2H:1V road embankment side slopes and drainage swales between May 4 and 5, 2024.
   j. Six boulder clusters using 300 mm boulders were installed every 5 m along the entire length of the 1.8 m diameter round CSP low flow culvert on May 12, 2024.
   k. The thermal berm was constructed against the road embankment along the constructed inlet channel area on May 12, 2024.
   l. Mixed coarse riprap and stream substrate materials were placed and graded for the inlet and outlet aprons between May 12 and 13, 2024.
   m. An as-built survey of the in-culvert boulders was completed on May 23, 2024. The as-built details for the in-culvert boulders are shown on Drawing 720.
   n. An as-built survey of the completed road surface was completed on May 14, 2024.

5.0 AS-BUILT DETAILS

Details of the water crossing installation are shown on Drawings 720 and 721 (attached).

Select photos taken during construction are included in Appendix A.

6.0 DESIGN CHANGES AND DEVIATIONS

The following design changes and deviations were made for water crossing CV-102 during construction.

1. Baffinland chose to re-use blasted frozen material from the existing road embankment as local borrow area fill placed outside of the Culvert Backfill area (i.e. culvert structural backfill zones). KP recommended against the use of this material as road embankment fill during the round CSP culvert installations (KP, 2024b). It is highly possible that some of the excavated frozen material contained higher than desired ice content significantly increasing the likelihood of significant settlement of the fill material following thaw, given the inability to properly compact frozen material with higher ice content.
2. Design Change 01 (No. CVDC-01, KP, 2024c) was issued on February 28, 2024 documenting the approved design change to use finer bedding material to meet the culvert manufacturer's recommendations. The specified 25 mm minus material was changed to a 3/16 inch minus material to meet the revised recommendations.

The design change documentation is included in the As-Built Summary Report for the February to May 2024 construction season.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Culvert crossing CV-102 was generally constructed in agreement with the design (KP, 2024a). However, a key construction deviation included using frozen blasted material as local borrow area fill.

Following completion of the installation, settlement of the culverts was observed along the culvert crossing alignment on approximately July 21, 2024. This change of condition and the planned remediation measures will be documented under separate cover.

KP recommends monitoring of the final road surface elevation and side slopes for signs of settlement and instability as a result of the thaw or creep settlement of frozen blast material as backfill. As communicated during construction, Baffinland should be prepared for localized thaw settlement of the road surface leading to the requirement for repairs and/or maintenance of the road crossing over the initial years of operations of the crossing. Care will need to be taken to maintain and/or repair any softer areas or areas of settlement that may develop in close proximity to the culvert installations in order to minimize potential damage to the culverts.

Monitoring the water crossing remediation in its entirety for signs of sloughing, erosion, or other potential issues is also recommended. It is understood that this monitoring will be completed as part of the post-construction monitoring plan to be implemented by Baffinland.

8.0 REFERENCES

Knight Piésold Ltd. (KP). 2024a. *Tote Road Permanent Crossing Plan - Round CSP Culvert Installations.* February 8. North Bay, Ontario. Ref. No. NB102-181/77-4, Rev. 2.

Knight Piésold Ltd. (KP). 2024b. Memorandum to: Michael Burns and Rudolf Dietrich, Baffinland Iron Mines Corporation. Re: *Permanent Crossing Plan - Round CSP Culverts, Response to Baffinland Request for Information (RFI) No. 1.* March 8. North Bay, Ontario. Ref No. NB24-00286 (NB102-181/93).

Knight Piésold Ltd. (KP). 2024c. Design Change (CVDC-01) to: Baruck Wile and Rudolf Dietrich, Baffinland Iron Mines Corporation. Re: *Culvert Bedding Design Change.* February 26.

Yours truly,
Knight Piésold Ltd.

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-08-27
NT/NU

Prepared:
Greg Johnstone, P.Eng., CPESC
Project Engineer

Reviewed:
C. A. (Andy) Phillips, P.Eng.
Senior Engineer

Approval that this document adheres to the Knight Piésold Quality System:

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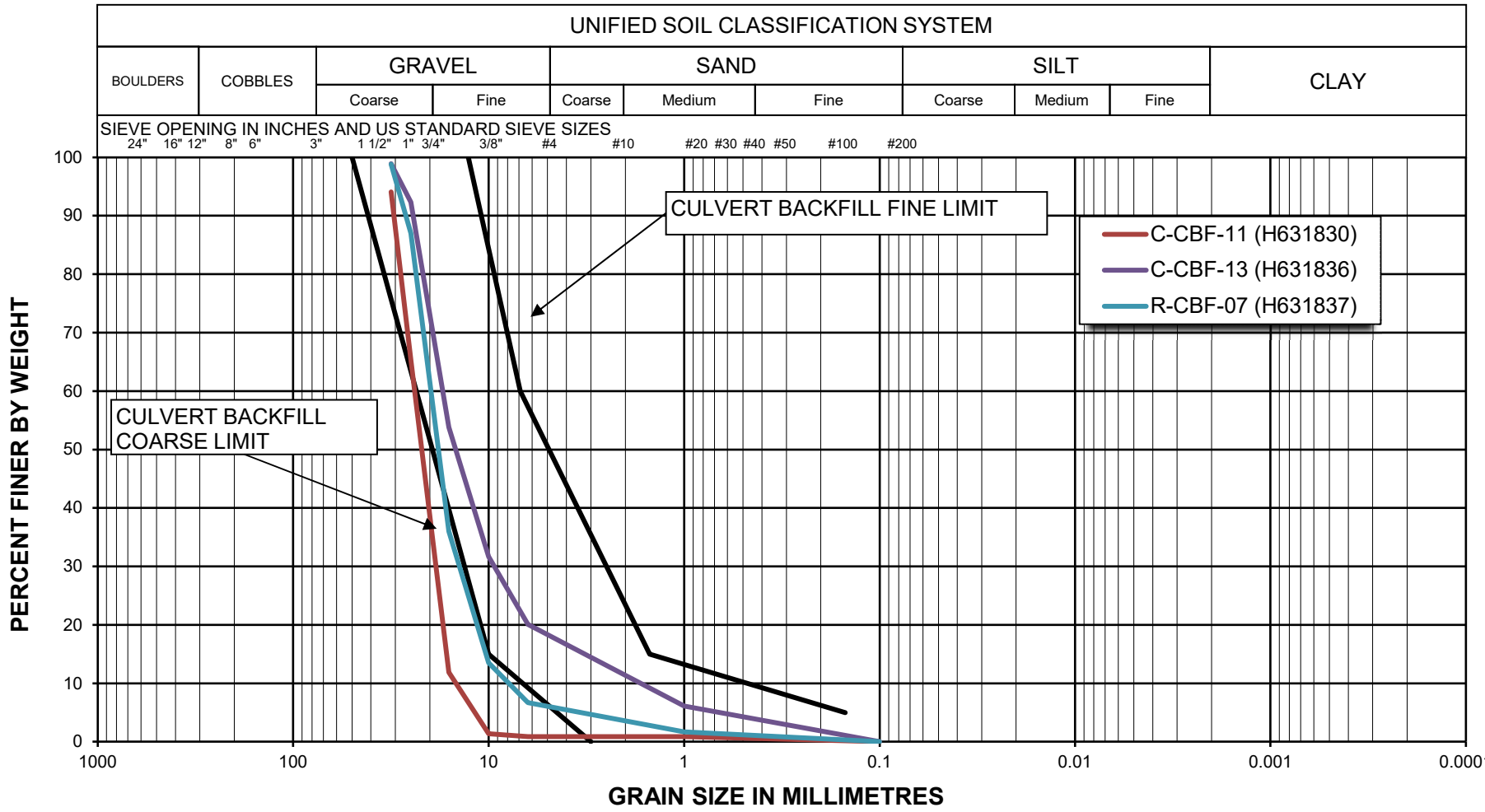
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

Attachments:

Figure 1 Rev 0	Grain Size Distribution - Culvert Backfill - CV-102
Figure 2 Rev 0	Grain Size Distribution - Culvert Bedding (3/16 Inch Minus) - CV-102
Drawing 720 Rev 3	CV-102 General Arrangement
Drawing 721 Rev 3	CV-102 Plan and Section
Appendix A	CV-102 As-Built Photo Log

Copy To:
Michael Burns, Baffinland Iron Mines Corporation
Jocelyn Larocque, Baffinland Iron Mines Corporation
George Liston, Baffinland Iron Mines Corporation
Connor Devereaux, Baffinland Iron Mines Corporation
Todd Swenson, Baffinland Iron Mines Corporation

/mb



NOTES:

1. CONTROL TESTS (C) CARRIED OUT ON FILL MATERIALS SAMPLED FROM THE BORROW AREA AND STOCKPILE, PRIOR TO MATERIAL COMPACTION.
2. RECORD TESTS (R) CARRIED OUT ON PLACED AND COMPACTED FILL MATERIALS.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	27AUG'24	ISSUED WITH LETTER	GMJ	CAP

BAFFINLAND IRON MINES CORPORATION

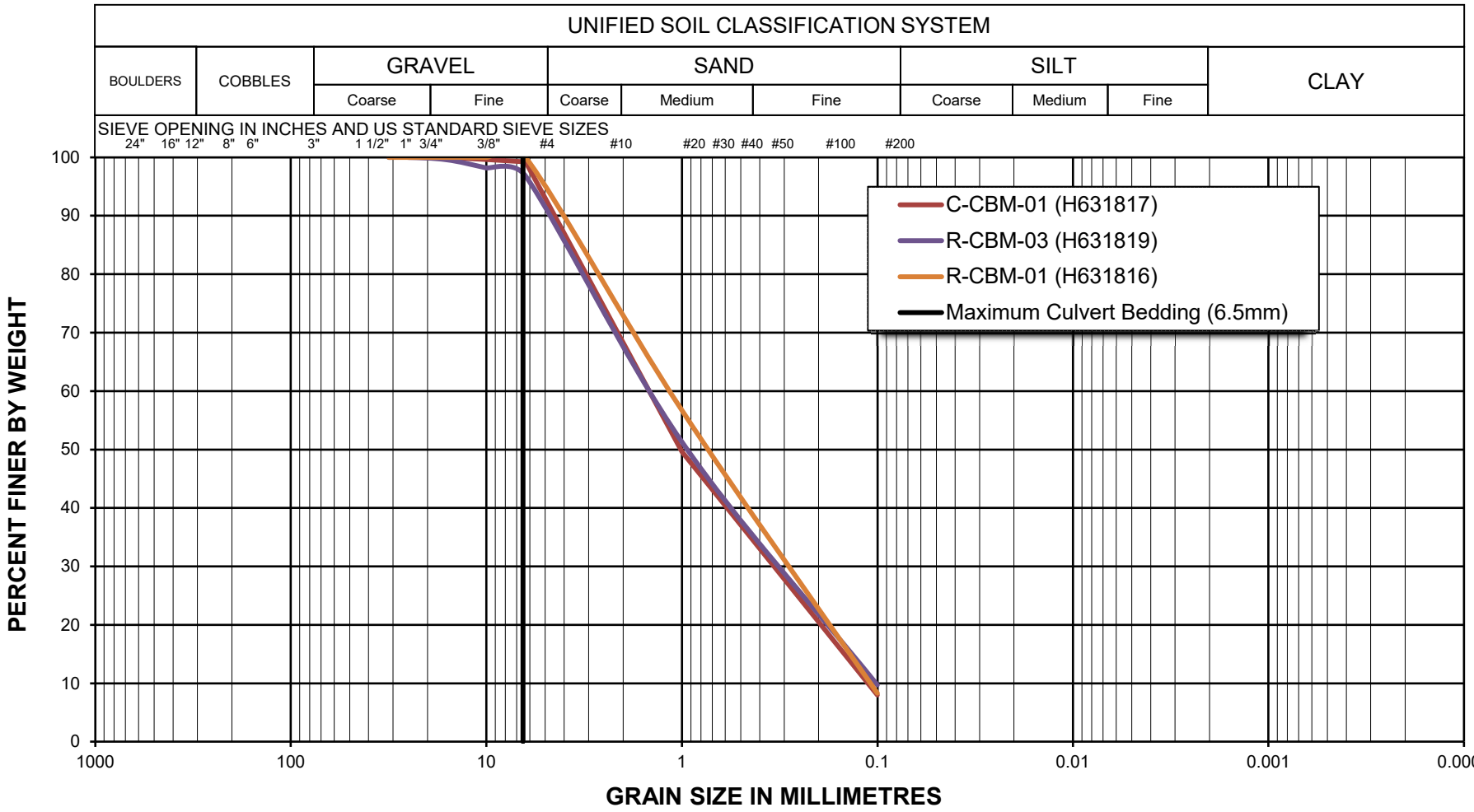
MARY RIVER PROJECT

GRAIN SIZE DISTRIBUTION
CULVERT BACKFILL - CV-102

Knight Piésold CONSULTING

P/A NO.	REF. NO.
NB102-00181/93	NB24-00557

FIGURE 1 REV 0



NOTES:

1. CONTROL TESTS (C) CARRIED OUT ON FILL MATERIALS SAMPLED FROM THE BORROW AREA AND STOCKPILE, PRIOR TO MATERIAL COMPACTION.
2. RECORD TESTS (R) CARRIED OUT ON PLACED AND COMPACTED FILL MATERIALS.

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MARY RIVER PROJECT

GRAIN SIZE DISTRIBUTION
CULVERT BEDDING (3/16 INCH MINUS) - CV-059

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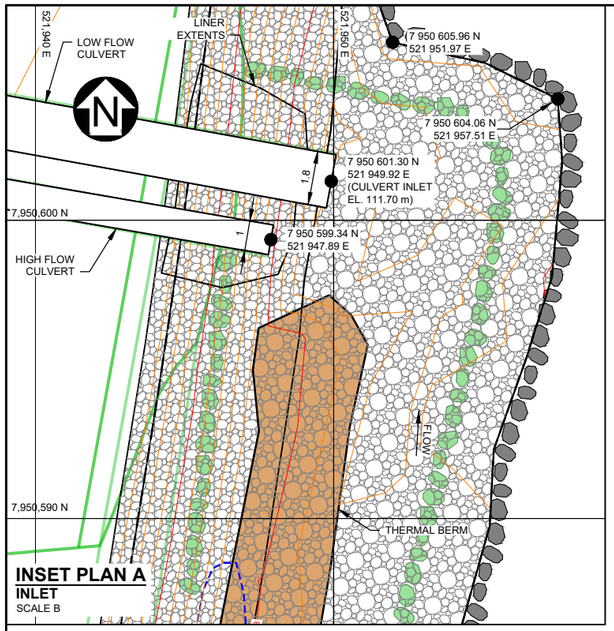
P/A NO. NB102-181/93

REF. NO. NB24-00899

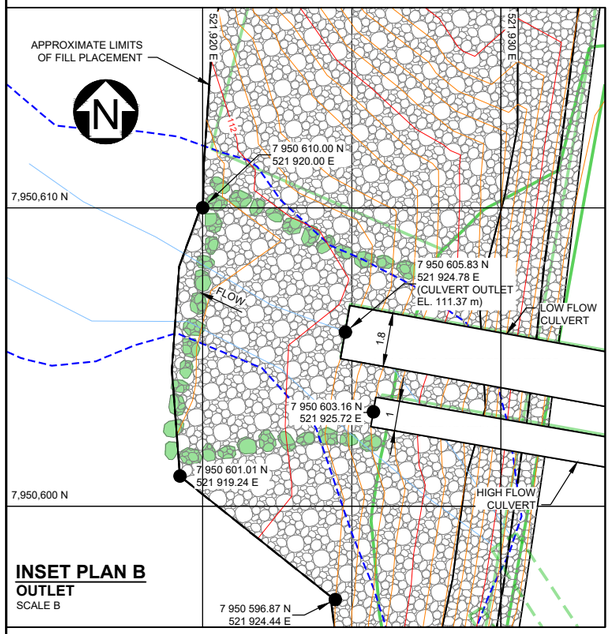
FIGURE 2

REV 0

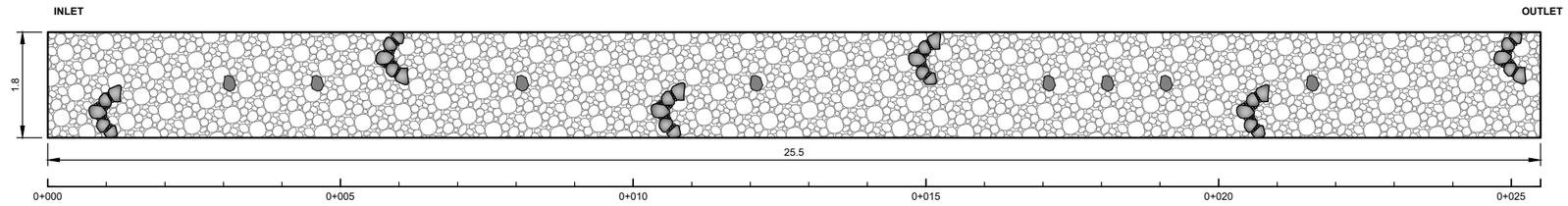
REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	27AUG'24	ISSUED WITH LETTER	GMJ	CAP



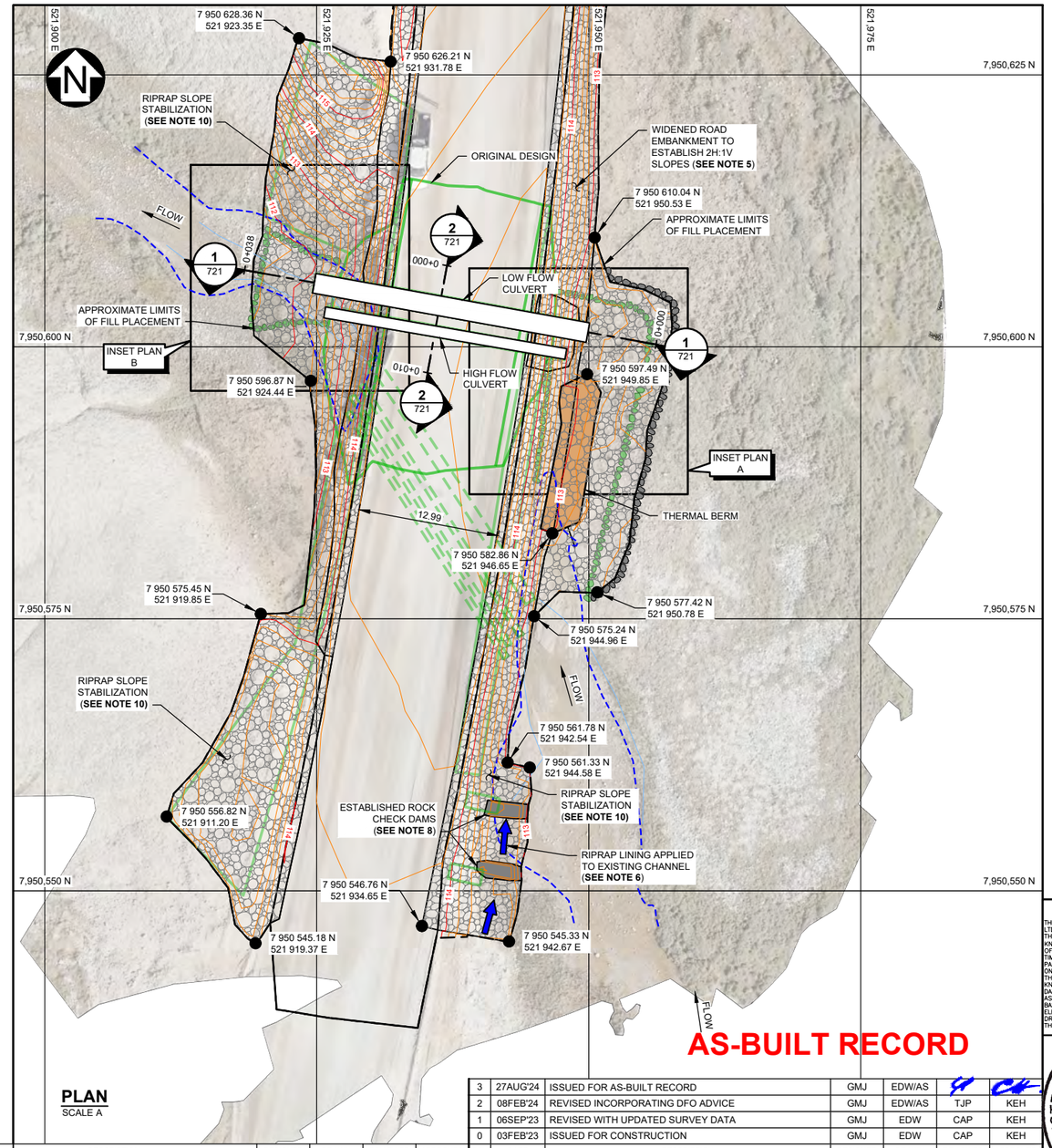
INSET PLAN A
INLET
SCALE B



INSET PLAN B
OUTLET
SCALE B



A - DETAIL
CV-102 IN CULVERT AS-BUILT BOULDER PLACEMENT PLAN
SCALE A



PLAN
SCALE A

AS-BUILT RECORD

LEGEND:

- COARSE RIPRAP (SECTION)
- FINE RIPRAP
- CONTOUR
- THERMAL BERM
- ROCK CHECK DAM
- PREVIOUS CULVERT CONFIGURATION
- ORIGINAL DESIGN LINEWORK
- APPROXIMATE LIMITS OF FILL PLACEMENT
- APPROXIMATE HIGH WATER MARK (HWM)
- PROPOSED STREAM EXCAVATION EXTENTS
- EXTENTS OF DETAILED TOPOGRAPHY
- SURVEYED WETTED WIDTH
- RIPRAP LINED EXISTING CHANNEL
- AS-BUILT SURVEY POINT
- RIPRAP FOR BANK ARMOURING AND FIELD FIT CHANNEL OUTLET
- BOULDER LOCATION WITHIN CULVERT

AS-BUILT BOULDER PLACEMENT SUMMARY (SEE DETAIL A)

CHAINAGE	DIMENSIONS (m)
0+001	0.95 x 0.70 (cluster)
0+003	0.20 x 0.20
0+004	0.15 x 0.20
0+006	0.75 x 0.80 (cluster)
0+008	0.15 x 0.15
0+010	0.95 x 0.80 (cluster)
0+012	0.20 x 0.15
0+015	0.90 x 0.65 (cluster)
0+017	0.25 x 0.15
0+018	0.20 x 0.20
0+019	0.25 x 0.17
0+020	0.90 x 0.60 (cluster)
0+021	0.35 x 0.15
0+025	0.90 x 0.60 (cluster)

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NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023. CULVERT CV-102 AS-BUILT SURVEYS PROVIDED BY NUNA, APRIL 26, APRIL 30, MAY 4, MAY 12-14, 2024.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. ALL WORK WAS COMPLETED DURING FROZEN CONDITIONS.
5. ROAD EMBANKMENT FILL PLACED TO ESTABLISH ROAD SIDE SLOPES AT MIN. 2H:1V. ALL SLOPES WERE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE AS SHOWN ON **DRAWING 721 (SECTION 1)**.
6. EXISTING DRAINAGE CHANNELS LINED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE.
7. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
8. ROCK CHECK DAMS WERE CONSTRUCTED OF FINE RIPRAP THAT WAS FREE OF FINE AND DELETERIOUS MATERIALS. THE STRUCTURES WERE CONSTRUCTED IN A STABLE MANNER TO REDUCE RUNOFF WATER FLOW VELOCITIES AND PROMOTE SETTLING OF SUSPENDED PARTICLES. PERIODIC MAINTENANCE WILL BE REQUIRED TO REMOVE ACCUMULATED SEDIMENT.
9. EROSION AND SEDIMENT CONTROL MEASURES INCLUDED ARE LIMITED TO THE WATER CROSSING AND THE IMMEDIATE SURROUNDING AREA. THE DESIGN AND INSTALLATION OF OTHER TOTE ROAD EROSION AND SEDIMENT CONTROL MEASURES WILL BE DOCUMENTED SEPARATELY.
10. SLOPE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE.

SCALE A 5 2.5 0 5 10 15 20 25 m
SCALE B 2 1 0 2 4 6 8 10 m

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-08-27
NT/NU

Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

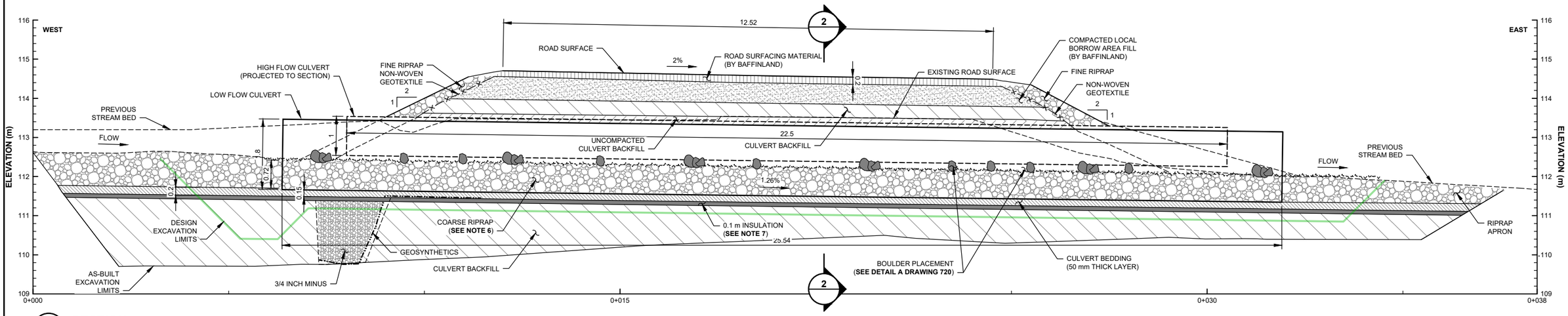
PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-102
GENERAL ARRANGEMENT

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	720	3

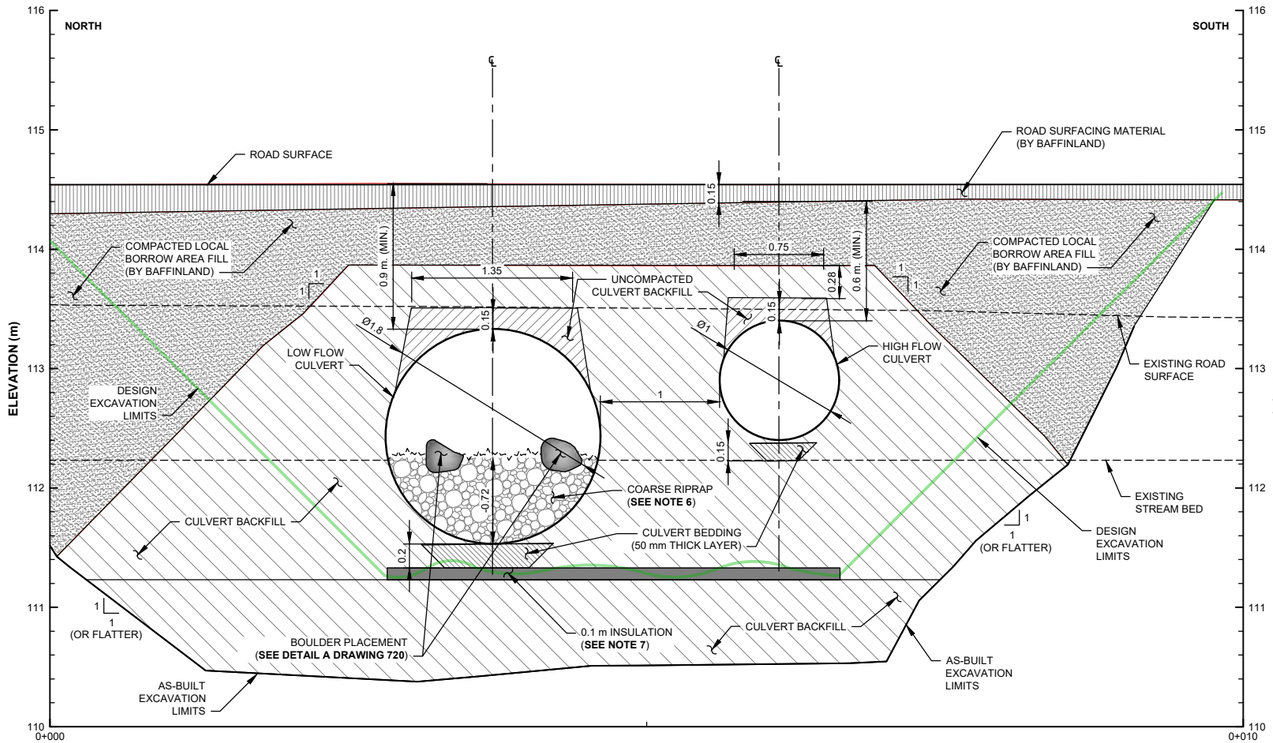
REFERENCE DRAWINGS	
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
721	CSP CULVERTS - CV-102 PLAN AND SECTION
DRG. NO.	DESCRIPTION

REVISIONS					
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
3	27AUG'24	ISSUED FOR AS-BUILT RECORD	GMJ	EDW/AS	GJ	KEH
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	TJP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

SAVED: I:\1\02\00181\177\A\Acad\DWGS\720 721\720 721 R3, 8/27/2024 1:13:45 PM, EWARDELL PRINTED: 8/27/2024 2:00:50 PM, 720, EWARDELL ACAD VERSION: 25.0S (LMS TECH)



1 / 720 **SECTION**
CV-102 PROFILE
SCALE A



2 / 720 | 2 / - **SECTION**
CV-102 INSTALLATION DETAILS
SCALE B

LEGEND:

- COMPACTED LOCAL BORROW AREA FILL (BY BAFFINLAND)
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL (BY BAFFINLAND)
- COARSE RIPRAP
- FINE RIPRAP
- CULVERT BEDDING MATERIAL
- INSULATION
- 3/4 INCH MINUS (BY BAFFINLAND)
- DESIGN LINEWORK
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE
- GEOSYNTHETICS

SCALE A: 1 0.5 0 1 2 3 4 5 m
SCALE B: 0.5 0.25 0 0.5 1.0 1.5 2.0 2.5 m

NOTES:

1. CULVERT CV-102 AS-BUILT SURVEYS PROVIDED BY NUNA, APRIL 26, APRIL 30, MAY 4, MAY 12-14, 2024.
2. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
3. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.
4. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
5. CULVERT INFILL MATERIAL TO BE INSPECTED DURING AND AFTER FIRST FRESHET FOLLOWING CONSTRUCTION TO DETERMINE IF ADDITIONAL MATERIAL IS REQUIRED.
6. RIPRAP INTERSTITIAL SPACE ON THE CHANNEL BED FILLED WITH MATERIAL SIMILAR TO THE ADJACENT CHANNEL BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER). VOID SPACE MINIMIZED BETWEEN COARSE RIPRAP SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. FINISHED SURFACE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS.
7. THE INSULATION USED WAS STYROFOAM™ HIGHLOAD 60 EXTRUDED POYSTYRENE INSULATION.

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Date 2024-08-27
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AS-BUILT RECORD

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
720	ROUND CSP CULVERTS - CV-102 GENERAL ARRANGEMENT

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
3	27AUG'24	ISSUED FOR AS-BUILT RECORD	GMJ	EDW/AS	CAP	KEH
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	CAP	KEH
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0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

PROFESSIONAL ENGINEER — G.M. JOHNSTONE — LICENSEE — 2024-08-27 — NT/NU

Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-102
PLAN AND SECTION

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	721	3

SAVED: I:\1\02\00181\77\A\Acad\DWGS\720 721\720 721 R3, 8/27/2024 1:13:45 PM, EWARDELL PRINTED: 8/27/2024 2:01:58 PM, 721, EWARDELL ACAD VERSION: 25.0S (LMS TECH)

APPENDIX A

CV-102 As-Built Photo Log

(Pages A-1 to A-20)

CV-102 AS-BUILT PHOTO LOG

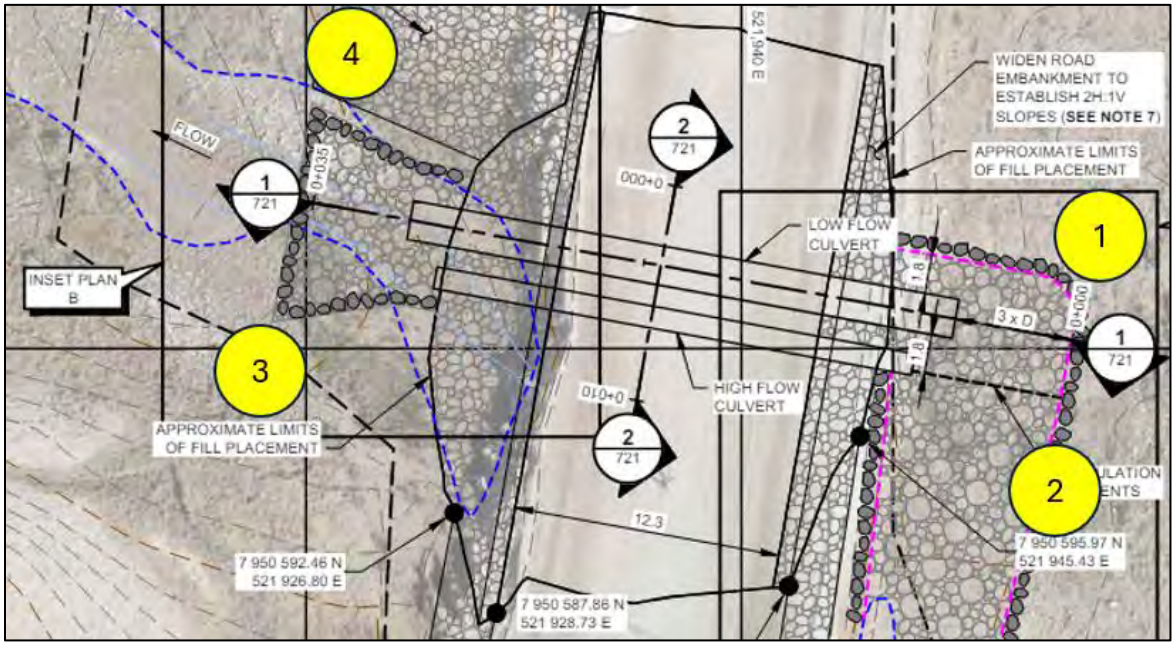

PHOTO 1. Culvert Crossing CV-102 - Photographic Vantage Points (Approximate Locations, Indicated with Yellow Circles).

PHOTO 2. Prior to Construction - Vantage Point 4 - Upstream Side of Crossing - Looking Southeast (April 19, 2024).

PHOTO 3. Prior to Construction - Vantage Point 2 - Upstream Side of Crossing - Looking Northwest (April 19, 2024).

PHOTO 4. Prior to Construction - Vantage Point 3 - Downstream Side of Crossing - Looking Northeast (April 19, 2024).

PHOTO 5. Prior to Construction - Vantage Point 4 - Downstream Side of Crossing - Looking Southeast (April 19, 2024).

PHOTO 6. During Construction - Vantage Point 1 - Blasted Upstream Side of Crossing - Looking Southeast (April 24, 2024).

PHOTO 7. During Construction - Vantage Point 4 - Blast Excavation - Road Crossing and Upstream Inlet - Looking Northwest (April 24, 2024).

PHOTO 8. During Construction- Vantage Point 1 - Compaction of Culvert Backfill Material - Upstream inlet - Looking Southwest (April 24, 2024).

PHOTO 9. During Construction - Vantage Point 3 - Placement of Culvert Backfill Material - Upstream inlet - Looking North (April 24, 2024).

PHOTO 10. During Construction - Vantage Point 4 - Placement of Culvert Backfill Material - Road Crossing and downstream outlet - Looking Southeast (April 24, 2024).

PHOTO 11. During Construction - Vantage Point 4 - Excavation of key-in trench in downstream end of crossing - Looking Southeast (April 25, 2024).

PHOTO 12. During Construction - Vantage Point 4 - Installation of geotextile and geomembrane in key-in trench in downstream end of crossing - Looking Southeast (April 26, 2024).

PHOTO 13. During Construction - Vantage Point 2 - Compaction of 3/4 inch minus Material in key-in trench in downstream end of crossing - Looking Northwest (April 26, 2024).

PHOTO 14. During Construction - Vantage Point 1 - Placement of Styrofoam Insulation in downstream end of crossing - Looking Southwest (April 26, 2024).

PHOTO 15. During Construction - Vantage Point 2 - Excavation of upstream inlet area - Looking Northwest (April 27, 2024).

PHOTO 16. During Construction - Vantage Point 3 - Compaction of Culvert Backfill Material in upstream inlet area - Looking Northeast (April 29, 2024).

PHOTO 17. During Construction - Vantage Point 4 - Installation of 2.0 m diameter low flow culvert - Looking Southeast (April 29, 2024).

PHOTO 18. During Construction- Vantage Point 3 - Installation of 2.0 m diameter low flow culvert - Looking Northeast (April 29, 2024).

PHOTO 19. During Construction - Vantage Point 4 - Compaction of Culvert Backfill Material around low flow culvert - Looking Southeast (April 30, 2024).

PHOTO 20. During Construction - Vantage Point 1 - Placement of Culvert Bedding Material under high flow culvert - Looking Southwest (April 30, 2024).

PHOTO 21. During Construction - Vantage Point 3 - Installation of high flow culvert - Looking Northeast (April 30, 2024).

PHOTO 22. During Construction - Vantage Point 3 - Compaction of Culvert Backfill Material above high and low flow culverts - Looking Northeast (April 31, 2024).

PHOTO 23. During Construction - Vantage Point 3 - Slope stabilization and riprap placement on inlet side of crossing - Looking South (May 04, 2024).

PHOTO 24. During Construction - Vantage Point 4 - Installation of geotextile on outlet side of crossing - Looking Southeast (May 04, 2024).

PHOTO 25. During Construction - Vantage Point 3 - Installation of geotextile and riprap placement on outlet side of crossing - Looking Northeast (May 05, 2024).

PHOTO 26. During Construction - Vantage Point 4 Riprap and geotextile placement in ditches on west side of crossing - Looking Southeast (May 05, 2024).

PHOTO 27. During Construction - Riprap and Stream Substrate Material placement in low flow culvert - Looking East (May 12, 2024).

PHOTO 28. After Construction - Vantage Point 1 - Final arrangement of inlet apron - Looking Southeast (May 13, 2024).

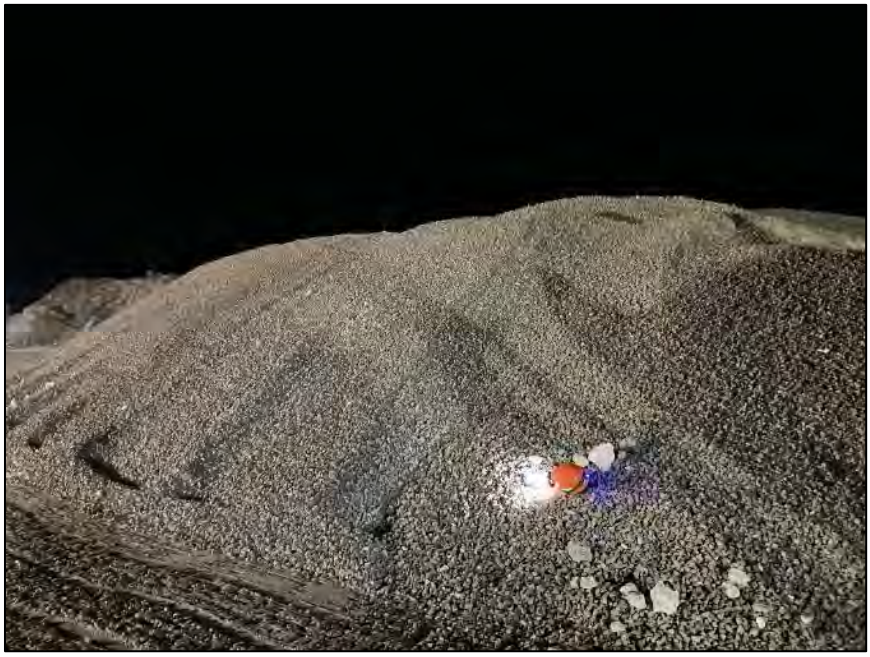

PHOTO 29. Material Stockpile - 32 mm minus Culvert Backfill Material - km 60 Laydown - Looking Northeast (March 10, 2024).

PHOTO 30. Material Stockpile - Culvert Bedding Material - km 60 Laydown - Looking North (March 15, 2024).

PHOTO 31. Material Stockpile - Fine Rip Rap - km 60 Laydown - Looking Southeast (March 22, 2024).

PHOTO 32. Material Stockpile - Coarse Rip Rap - km 60 Laydown (March 21, 2024).

PHOTO 33. Material Stockpile - Stream Substrate Material - km 97 Stockpile (February 29, 2024).

PHOTO 34. Equipment - CAT 349F Excavator - km 60 laydown - Looking East (March 08, 2024).

PHOTO 35. Equipment - CAT 745C articulated dump truck - km 60 Laydown (February 08, 2024).

PHOTO 36. Equipment - Mikasa MVH408 1000 lb Plate Compactor - km 60 Laydown (March 05, 2024).

PHOTO 37. Equipment - Ducar Motorized Wheel Barrow loaded with Coarse Riprap - CV-059 (March 26, 2024).

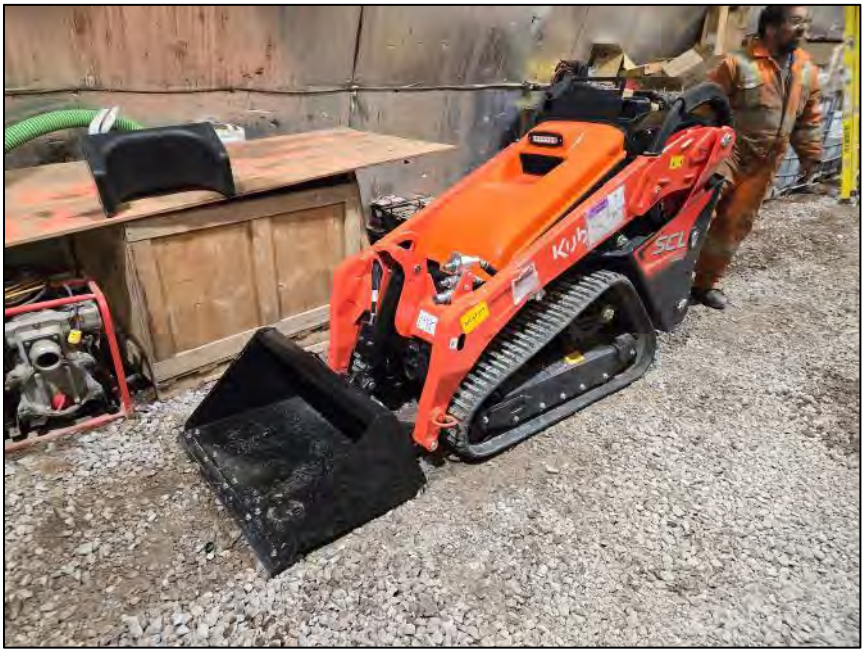

PHOTO 38. Equipment - Kubota Stand-on Compact Loader (April 30, 2024)

PHOTO 39. Equipment - CAT CS56B Smooth Drum Compactor (March 02, 2024).

Knight Piésold CONSULTING

Management System Certified By:
bsi
ISO 9001 Quality Management Systems CERTIFIED FS 64925
ISO 14001 Environmental Management CERTIFIED EMS 550121
ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 550122

August 27, 2024

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Mr. Jim Patterson
Mr. Rudolf Dietrich
Deputy Project Directors - Sustaining Projects
Baffinland Iron Mines Corporation
#300 - 360 Oakville Place Drive
Oakville, Ontario L6H 6K8
Canada

Dear Jim and Rudy,

RE: Construction Summary of CV-106 Remedial Measures

1.0 INTRODUCTION

Baffinland Iron Mines Corporation (Baffinland) completed remedial work on culverts installed on fish-bearing streams along the Milne Inlet Tote Road (Tote Road) between February 18, 2024, and May 13, 2024. The completed work was based on the design presented in the Knight Piésold Ltd. (KP) Design Report "*Tote Road Permanent Crossing Plan - Round CSP Culvert Installations*" (KP, 2024a). This letter summarizes the works completed at water crossing CV-106 on May 14, 2024, shortly after the as-built survey was completed. There has been settlement at the culvert since this work was completed, and additional remediation measures are being evaluated. This letter will be appended to the As-Built Summary Report for the February to May 2024 construction season, to be issued under separate cover.

2.0 BACKGROUND

Water crossing CV-106 is located at km 33 on the Tote Road which connects the Milne Inlet Port Site and the Mary River Mine Site. The existing water crossing at CV-106 consisted of one x 1 m diameter corrugated steel pipe (CSP) culvert barrel. The proposed (remediated) design for the crossing consisted of included one x 1.8 m diameter low flow CSP culvert, and one x 1.0 m diameter high flow CSP culvert. The 1.8 m diameter low flow culvert was embedded 40% of the total diameter below grade, with protruding coarse riprap mixed with finer material similar to the natural stream substrate to replicate the stream bottom and create velocity refuge for fish. The 1.0 m diameter high flow culvert was to be installed with an invert set at 0.15 m above the infill elevation (top of embedment material) of the 1.8 m diameter low flow culvert.

3.0 MATERIALS USED

The following materials were used for the installation of the CV-106 remediated water crossing.

- Culvert Backfill - Culvert Backfill material consisted of 32 mm minus material that was crushed and screened at the aggregate quarry located at the Milne Inlet Port. The material was backhauled to the km 33 laydown area on the Tote Road using Baffinland's ore hauling trucks (OHTs). Particle size gradations from laboratory tests show that the processed material met the material specification, as shown on Figure 1. Two control samples and one record sample were collected for CV-106. The initial control test result (C-CBF-12) indicated that the stockpile was coarser than the specified envelope. It was determined that the stockpile had become segregated and that the sample was not representative.

After the results were received an additional control sample (C-CBF-14) was collected and the results were within the material specifications; however, the sample was on the coarse limit of the specification. The record test result (R-CBF-08) met the material specifications.

- Bedding Material - 3/16 inch (4.75 mm) minus material was used in limited quantities for the 2 inch (50 mm) thick uncompacted bedding material below the low and high flow culverts. Similar to the 32 mm minus material, the 3/16 inch minus material was crushed, screened, and hauled from the aggregate quarry at Milne Inlet Port and stockpiled at the km 33 laydown area. The maximum particle size for the Bedding Material was required to be half of the depth of the culvert undulations (corrugations), which are 13 mm as per the Manufacturer's Specifications. Particle size gradations from laboratory tests are shown on Figure 2 and show that approximately 7% of the particles in the record sample exceeded the maximum particle size of 6.5 mm. The small quantity of slightly larger particles was considered acceptable to meet the design intent.
- Riprap - Coarse and fine riprap were crushed and screened at the Mary River Mine Site. The riprap materials were hauled to the km 33 laydown area using CAT 745 articulated haul trucks on the Tote Road.
- Local Borrow Material - This material consisted primarily of reusing excavated material from the existing road embankment. Excavation of this material was completed by blasting frozen material that surrounded the existing culverts.
- Non-Woven Geotextile - 4.1 mm thick Texel 160E needle punched non-woven geotextile rolls were stored at the km 33 laydown. The non-woven geotextile was installed beneath the fine riprap on the road embankment slopes, the drainage ditch and within the inlet key-in trench according to the Manufacturer's Specifications and generally as shown on the design drawings.
- HDPE Geomembrane - 60 mm thick Layfield EL6060 HDPE geomembrane was stored at the km 33 laydown. The HDPE geomembrane was installed between two layers of non-woven geotextile within the inlet key-in trench.
- Insulation - 50 mm thick Styrofoam™ Highload 60 Extruded Polystyrene Insulation was stored at the km 80 laydown. Two layers of insulation (total thickness of 100 mm) was installed across the foundation beneath the culverts.
- Round CSP Culverts - 8 m sections of 1.8 m diameter round CSP for low flow culvert, and 6 m sections of 1.0 m diameter round CSP for high flow culvert were stored at the km 33 laydown.

4.0 CONSTRUCTION SEQUENCE

Construction activities for CV-106 began on April 26, 2024, and were completed on May 13, 2024. The construction sequence is described below:

1. Excavation
   a. Drilling of blast holes in the frozen road embankment and underlying foundations soils was completed on April 28, 2024.
   b. The drilled holes were loaded and blasted on April 28, 2024.
   c. The excavation of blast material commenced on April 28, 2024 and was completed on May 11, 2024. This involved the removal of unsuitable materials (frozen blast material, previous culverts), preparation of the foundation surface and as-built survey.
   d. As-built surveys of the CV-106 excavation were completed as the excavation progressed between May 5 to 11, 2024.

2. Backfilling and Culvert Installation
   a. Backfilling excavation commenced on May 5, 2024 and was completed to the base of the 1.8 m diameter culvert on May 6, 2024. Culvert Backfill material was placed and compacted in 200 and 300 mm lifts (200 mm for material compacted using the hand-guided compactor and 300 mm where the 10 ton vibratory roller was used), prior to placement and compaction of the bedding layer for the low flow culvert.
   b. Key-in trenches consisting of a geomembrane between two geotextile cushion layers backfilled with 3/4 inch minus material were installed beneath the inlet of the low flow culverts between May 5 and 6, 2024.
   c. Two layers of Styrofroam™ Highload 60 extruded polystyrene insulation (total thickness of 0.1 m) were installed below the low flow culverts on May 6, 2024. A 200 mm thick lift of Culvert Backfill was placed on top of the insulation and compacted with one pass of a hand guided plate compactor.
   d. The 1.8 m diameter round CSP low flow culvert was installed on May 6, 2024. The 1.8 m diameter low flow culvert was installed using two, 8 m sections followed by one, 2 m cut section and then one final 8 m section for a total length of 26 m.
   e. The 1.0 m diameter round CSP high flow culvert was installed on May 6 and 7, 2024. The 1.0 m diameter high flow culvert was installed using one, 6 m section followed by a cut 4.8 m section, and then two final 6 m sections for a total length of 22.8 m.
   f. Backfilling around the culverts continued until May 7, 2024. This included continued placement of culvert backfill and local borrow area fill.
   g. Local Borrow Area Fill (May 6 to 7, 2024) and road topping (May 8 to 11, 2024) were placed and compacted above the culvert backfill material and culverts. Baffinland made the decision to use the frozen blasted material as “local borrow area fill” above the Culvert Backfill material placed directly around the culverts.
   h. Coarse riprap and stream substrate material were placed within the interior of the 1.8 m diameter round CSP low flow culvert on May 10and 11, 2024.
   i. Fine riprap was placed above the non-woven geotextile along the upstream and downstream 2H:1V road embankment side slopes between May 8 and 13, 2024.
   j. Eight boulder clusters using 300 mm boulders were installed every 3.5 m along the entire length of the 1.8 m diameter round CSP low flow culvert on May 10 and 11, 2024.
   k. The thermal berm was constructed against the road embankment along the constructed inlet channel area on May 11, 2024.
   l. Mixed coarse riprap and stream substrate material was placed and graded for the inlet and outlet aprons on May 11, 2024.
   m. An as-built survey of the in-culvert boulders was completed on May 23, 2024. The as-built details for the in-culvert boulders are shown on Drawing 715.
   n. An as-built survey of the completed road surface was completed on May 14, 2024.

5.0 AS-BUILT DETAILS

Details of the water crossing installation are shown on Drawings 715 and 716 (attached).

Select photos taken during construction are included in Appendix A.

6.0 DESIGN CHANGES AND DEVIATIONS

The following design changes and deviations were made for water crossing CV-106 during construction.

1. Baffinland chose to re-use blasted frozen material from the existing road embankment as local Borrow Area Fill placed outside of the Culvert Backfill area (i.e. culvert structural backfill zones). KP recommended against the use of this material as road embankment fill during the round CSP culvert installations (KP, 2024b). It is highly possible that some of the excavated frozen material contained higher than desired ice content significantly increasing the likelihood for significant settlement of the fill material following thaw, given the inability to properly compact frozen material with higher ice content.
2. Design Change 01 (No. CVDC-01, KP, 2024c) was issued on February 28, 2024 documenting the approved design change to use a finer bedding material to meet the culvert manufacturer's recommendations. The specified 25 mm minus was changed to a 3/16 inch minus material to meet the revised recommendations.

The design change documentation is included in the As-Built Summary Report for the February to May 2024 construction season.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Culvert crossing CV-106 was generally constructed in agreement with the design (KP, 2024a). However, a key construction deviation included using frozen blasted material as local borrow area fill.

Following completion of the installation, settlement of the culverts was observed along the culvert crossing alignment on approximately July 19, 2024. This change of condition and planned remediation measures will be documented under separate cover.

KP recommends monitoring of the final road surface elevation and side slopes for signs of settlement and instability as a result of the thaw or creep settlement of frozen blast material as backfill. As communicated during construction, Baffinland should be prepared for localized thaw settlement of the road surface leading to the requirement for repairs and/or maintenance of the road crossing over the initial years of operations of the crossing. Care will need to be taken to maintain and/or repair any softer areas or areas of settlement that may develop in close proximity to the culvert installations in order to minimize potential damage to the culverts.

Monitoring the water crossing remediation in its entirety for signs of sloughing, erosion, or other potential issues is also recommended. It is understood that this monitoring will be completed as part of the post-construction monitoring plan to be implemented by Baffinland.

8.0 REFERENCES

Knight Piésold Ltd. (KP). 2024a. *Tote Road Permanent Crossing Plan - Round CSP Culvert Installations.* February 8. North Bay, Ontario. Ref. No. NB102-181/77-4, Rev. 2.

Knight Piésold Ltd. (KP). 2024b. Memorandum to: Michael Burns and Rudolf Dietrich, Baffinland Iron Mines Corporation. Re: *Permanent Crossing Plan - Round CSP Culverts, Response to Baffinland Request for Information (RFI) No. 1.* March 8. North Bay, Ontario. Ref No. NB24-00286 (NB102-181/93).

Knight Piésold Ltd. (KP). 2024c. Design Change (CVDC-01) To: Baruck Wile and Rudolf Dietrich, Baffinland Iron Mines Corporation. *Culvert Bedding Design Change.* February 26.

Yours truly,
Knight Piésold Ltd.

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-08-27
NT/NU

Prepared: _____
Greg Johnstone, P.Eng., CPESC
Project Engineer

Reviewed: _____
C. A. (Andy) Phillips, P.Eng.
Senior Engineer

Approval that this document adheres to the Knight Piésold Quality System: _____

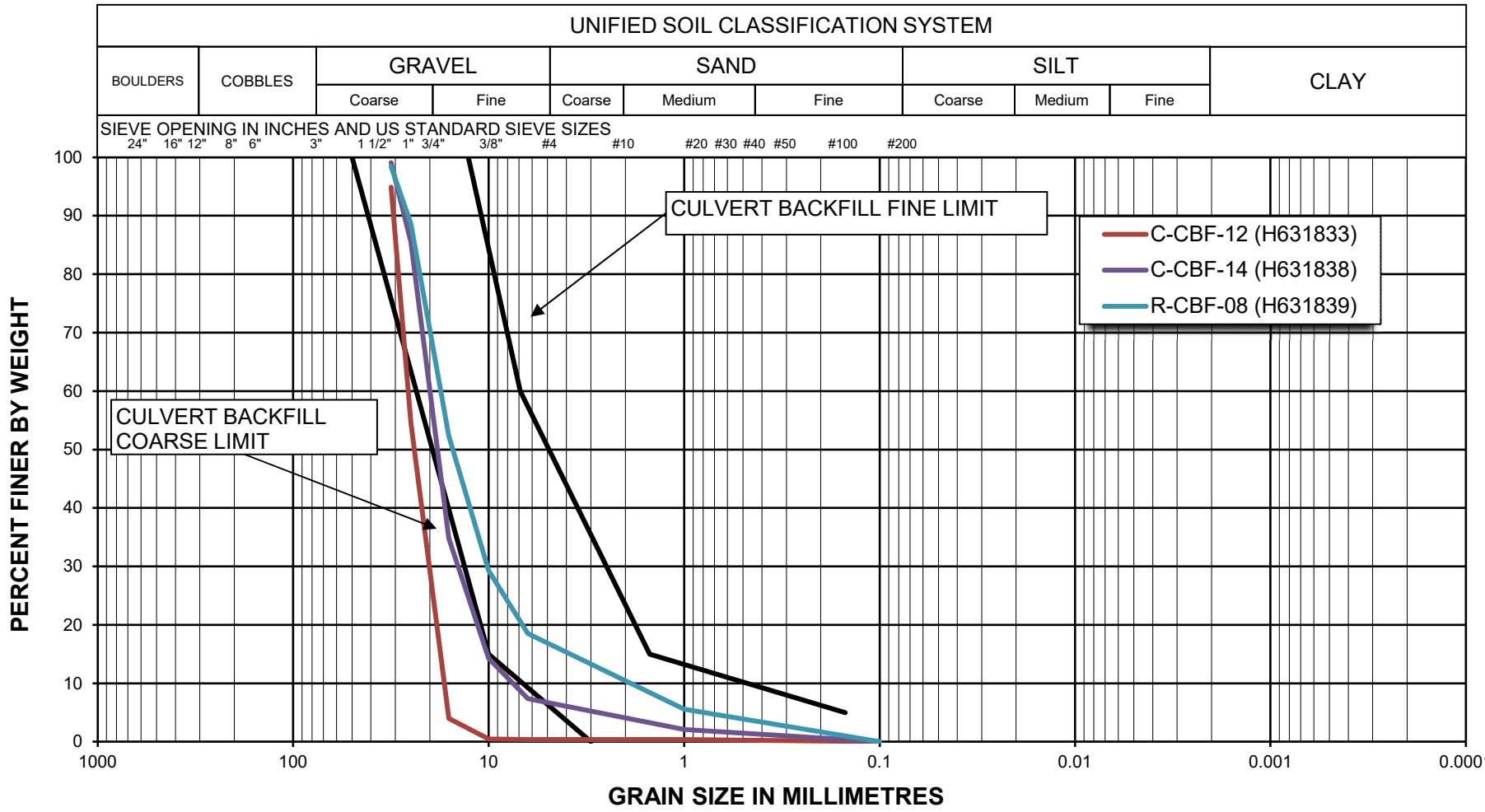
PERMIT TO PRACTICE
KNIGHT PIESOLD LTD.
Signature _____
Date 2024-08-27
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

Attachments:

Figure 1 Rev 0	Grain Size Distribution - Culvert Backfill - CV-106
Figure 2 Rev 0	Grain Size Distribution - Culvert Bedding (3/16 Inch Minus) - CV-106
Drawing 715 Rev 3	CV-106 General Arrangement
Drawing 716 Rev 3	CV-106 Plan and Section
Appendix A	CV-106 As-Built Photo Log

Copy To: Baruck Wile, Baffinland Iron Mines Corporation
Jocelyn Larocque, Baffinland Iron Mines Corporation
George Liston, Baffinland Iron Mines Corporation
Connor Devereaux, Baffinland Iron Mines Corporation
Todd Swenson, Baffinland Iron Mines Corporation

/mb



NOTES:

1. CONTROL TESTS (C) CARRIED OUT ON FILL MATERIALS SAMPLED FROM THE BORROW AREA AND STOCKPILE, PRIOR TO MATERIAL COMPACTION.
2. RECORD TESTS (R) CARRIED OUT ON PLACED AND COMPACTED FILL MATERIALS.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	27AUG'24	ISSUED WITH LETTER	GMJ	CAP

BAFFINLAND IRON MINES CORPORATION

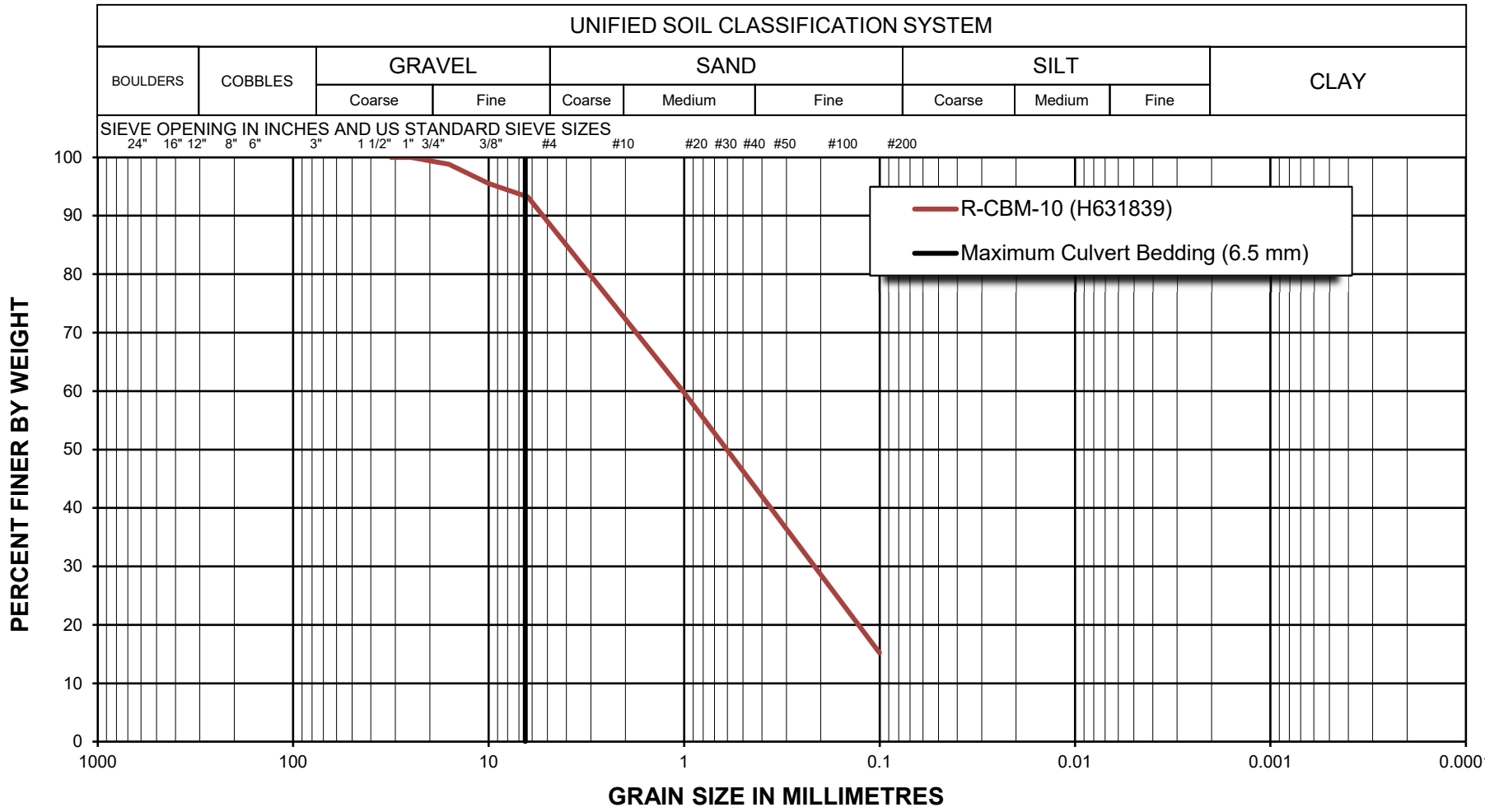
MARY RIVER PROJECT

GRAIN SIZE DISTRIBUTION
CULVERT BACKFILL - CV-106

Knight Piésold CONSULTING

P/A NO.	REF. NO.
NB102-00181/93	NB24-00558

FIGURE 1 REV 0



NOTES:

1. CONTROL TESTS (C) CARRIED OUT ON FILL MATERIALS SAMPLED FROM THE BORROW AREA AND STOCKPILE, PRIOR TO MATERIAL COMPACTION.
2. RECORD TESTS (R) CARRIED OUT ON PLACED AND COMPACTED FILL MATERIALS.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	27AUG'24	ISSUED WITH LETTER	GMJ	CAP

BAFFINLAND IRON MINES CORPORATION

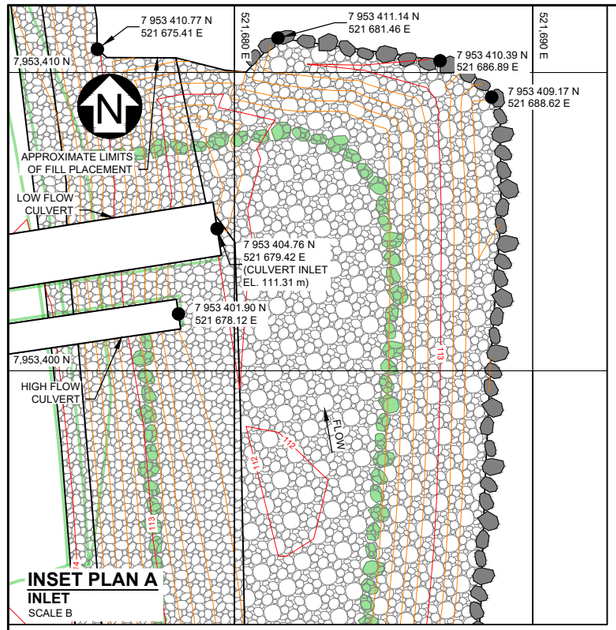
MARY RIVER PROJECT

GRAIN SIZE DISTRIBUTION
CULVERT BEDDING (3/16 INCH MINUS) - CV-106

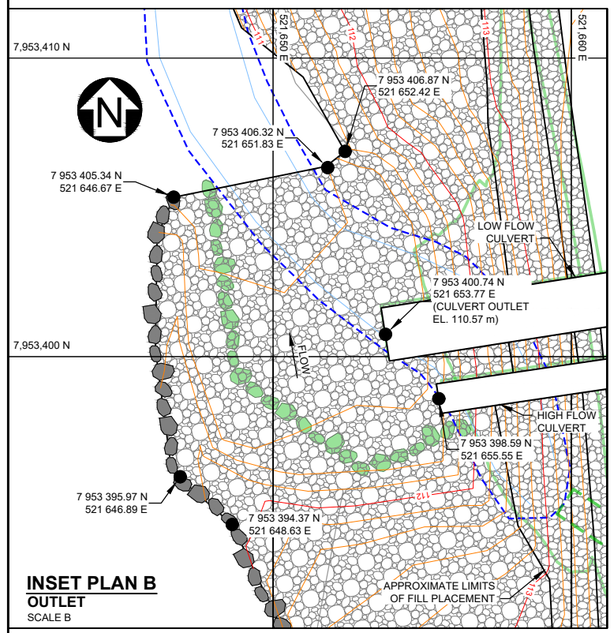
Knight Piésold CONSULTING

P/A NO.	REF. NO.
NB102-00181/93	NB24-00558

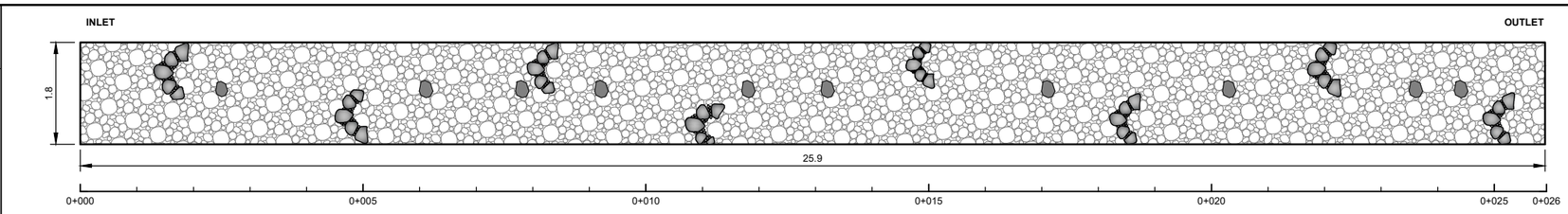
FIGURE 2 REV 0



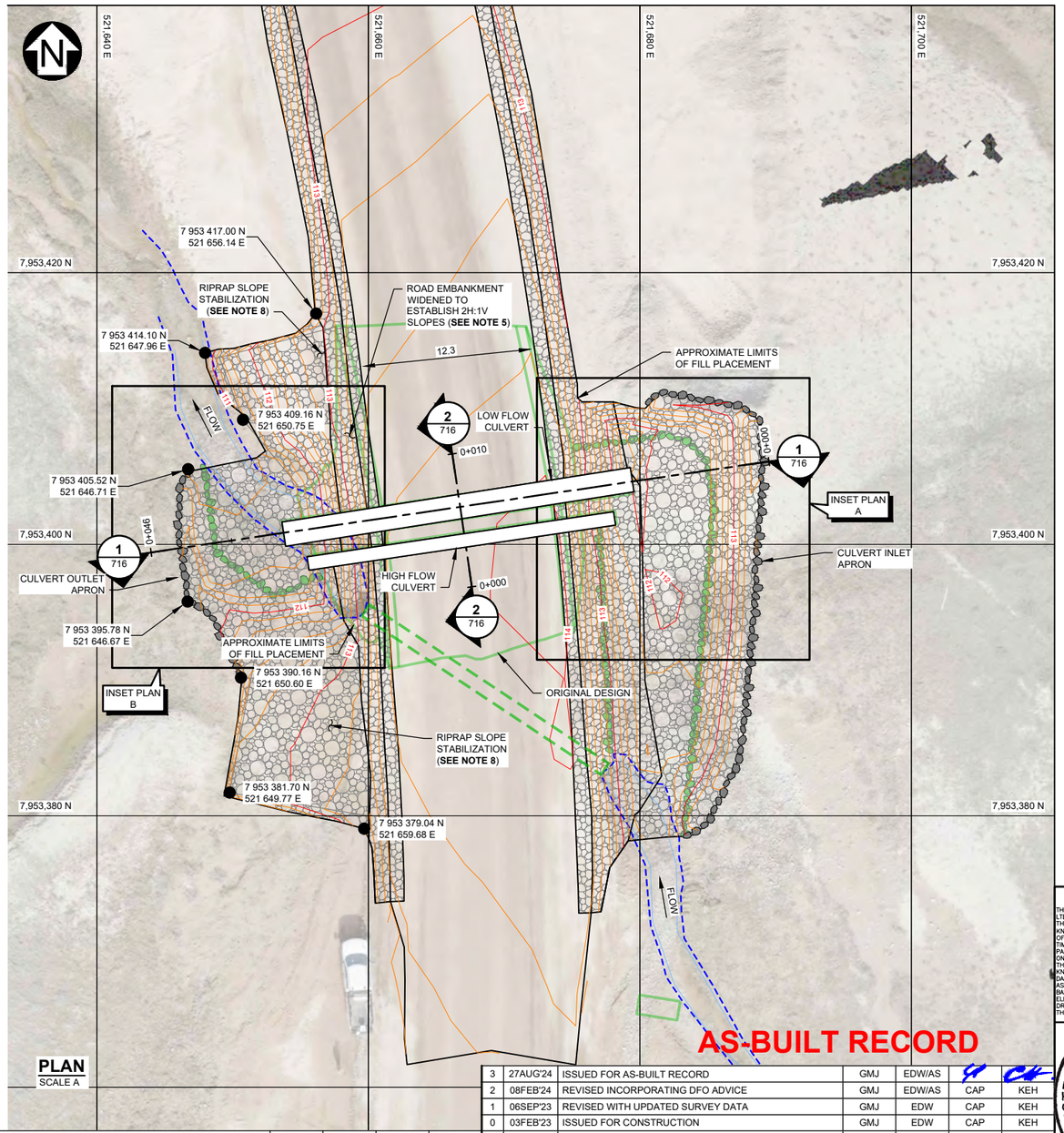
INSET PLAN A
INLET
SCALE B



INSET PLAN B
OUTLET
SCALE B



A - DETAIL
CV-0106 IN CULVERT AS-BUILT BOULDER PLACEMENT PLAN
SCALE A



PLAN
SCALE A

AS-BUILT RECORD

LEGEND:

- COARSE RIPRAP
- FINE RIPRAP
- CONTOUR
- PREVIOUS CULVERT CONFIGURATION
- ORIGINAL DESIGN LINEWORK
- APPROXIMATE LIMITS OF FILL PLACEMENT
- APPROXIMATE HIGH WATER MARK (HWM)
- PROPOSED STREAM EXCAVATION EXTENTS
- EXTENTS OF DETAILED TOPOGRAPHY
- SURVEYED WETTED WIDTH
- AS-BUILT SURVEY POINT
- RIPRAP FOR BANK ARMOURING AND FIELD FIT CHANNEL OUTLET

AS-BUILT BOULDER PLACEMENT SUMMARY (SEE DETAIL A)

CHAINAGE	DIMENSIONS (m)
0+001	1.00 x 0.60 (cluster)
0+002	0.26 x 0.20
0+005	0.95 x 0.70 (cluster)
0+006	0.25 x 0.25
0+008	0.23 x 0.20
0+008	0.90 x 0.50 (cluster)
0+009	0.20 x 0.30
0+011	0.70 x 0.70 (cluster)
0+012	0.30 x 0.20
0+013	0.25 x 0.35
0+015	0.80 x 0.60 (cluster)
0+017	0.15 x 0.20
0+018	0.90 x 0.60 (cluster)
0+020	0.20 x 0.20
0+022	0.95 x 0.60 (cluster)
0+023	0.10 x 0.10
0+024	0.20 x 0.20
0+025	0.90 x 0.70 (cluster)

PERMIT TO PRACTICE
KNIGHT PIESOLD LTD.
Signature
Date 2024-08-27
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023. CULVERT SURVEYS PROVIDED BY NUNA, MAY, 2024. CONTOUR INTERVAL IS 0.2 m.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. ALL WORK WAS COMPLETED DURING FROZEN CONDITIONS.
5. ROAD EMBANKMENT FILL PLACED TO ESTABLISH ROAD SIDE SLOPES AT 2H:1V. ALL SLOPES WERE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE AS SHOWN ON **DRAWING 716 (SECTION 1)**.
6. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
7. EROSION AND SEDIMENT CONTROL MEASURES INCLUDED ARE LIMITED TO THE WATER CROSSING AND THE IMMEDIATE SURROUNDING AREA. THE DESIGN OF OTHER TOTE ROAD EROSION AND SEDIMENT CONTROL MEASURES WILL BE REPORTED SEPARATELY.
8. SLOPE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE.

SCALE A 4 2 0 4 8 12 16 20 m
SCALE B 2 1 0 2 4 6 8 10 m

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
716	CSP CULVERTS - CV-106 PLAN AND SECTION

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
3	27AUG'24	ISSUED FOR AS-BUILT RECORD	GMJ	EDW/AS		
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	CAP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-08-27
NT/NU

Knight Piésold CONSULTING

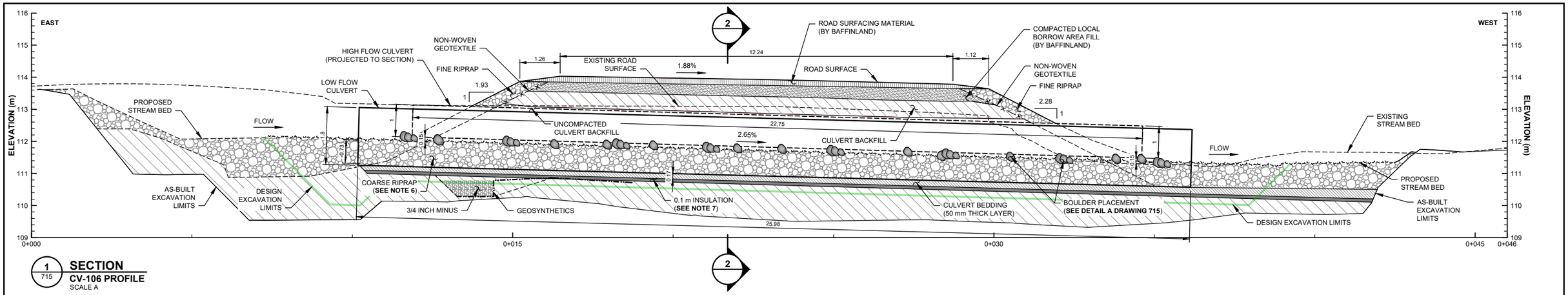
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

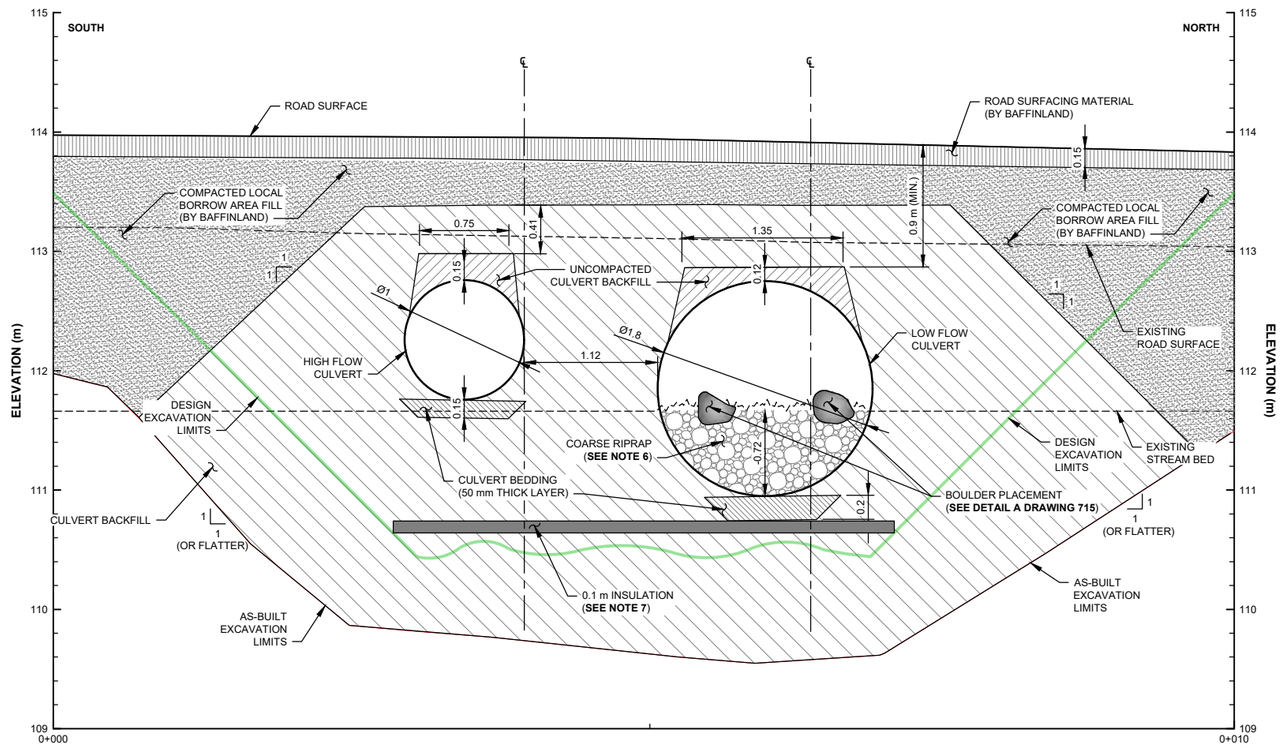
PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-106
GENERAL ARRANGEMENT

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	715	3

SAVED: I:\1\02\00181\177\A\Acad\DWGS\715 716\715 716 R3, 8/27/2024 1:30:25 PM, EWARDELL PRINTED: 8/27/2024 2:03:04 PM, 715, EWARDELL ACAD VERSION: 25.0S (LMS TECH)



1/715 **SECTION**
CV-106 PROFILE
SCALE A



2/715 2/- **SECTION**
CV-106 INSTALLATION DETAILS
SCALE B

LEGEND:

- COMPACTED LOCAL BORROW AREA FILL (BY BAFFINLAND)
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL (BY BAFFINLAND)
- COARSE RIPRAP
- FINE RIPRAP
- CULVERT BEDDING MATERIAL
- INSULATION
- 3/4 INCH MINUS (BY BAFFINLAND)
- DESIGN LINEWORK
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE
- GEOSYNTHETICS
- BOULDER PLACEMENT

NOTES:

1. CULVERT CV-106 AS-BUILT SURVEYS PROVIDED BY NUNA, MAY 2024.
2. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
3. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.
4. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
5. CULVERT INFILL MATERIAL TO BE INSPECTED DURING AND AFTER FIRST FRESHET FOLLOWING CONSTRUCTION TO DETERMINE IF ADDITIONAL MATERIAL IS REQUIRED.
6. RIPRAP INTERSTITIAL SPACE ON THE CHANNEL BED FILLED WITH MATERIAL SIMILAR TO THE ADJACENT CHANNEL BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER). VOID SPACE MINIMIZED BETWEEN COARSE RIPRAP SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. FINISHED SURFACE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS.
7. THE INSULATION USED WAS STYROFOAM™ HIGHLOAD 60 EXTRUDED POYSTYRENE INSULATION.

PERMIT TO PRACTICE
KNIGHT PIESOLD LTD.
Signature
Date 2024-08-27
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

SCALE A 1.2 0.6 0 2 4 6 m
SCALE B 0.5 0.25 0 0.5 1.0 1.5 2.0 2.5 m

AS-BUILT RECORD

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
715	CSP CULVERTS - CV-106 GENERAL ARRANGEMENT

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
3	27AUG'24	ISSUED FOR AS-BUILT RECORD	GMJ	EDW/AS	CAP	KEH
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	CAP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-08-27
NT/NU

Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PERMANENT CROSSING PLAN
CULVERT CSP CULVERTS - CV-106
PLAN AND SECTION

PA NO.	DRAWING NO.	REVISION
NB102-181/77	716	3

SAVED: I:\102\00181\177\A\Acad\DWGS\715 716\715 716 R3, 8/27/2024 1:30:25 PM, EWARDELL PRINTED: 8/27/2024 2:03:41 PM, 716, EWARDELL ACAD VERSION: 25.0S (LMS TECH)

APPENDIX A

CV-106 As-Built Photo Log

(Pages A-1 to A-24)

CV-106 AS-BUILT PHOTO LOG

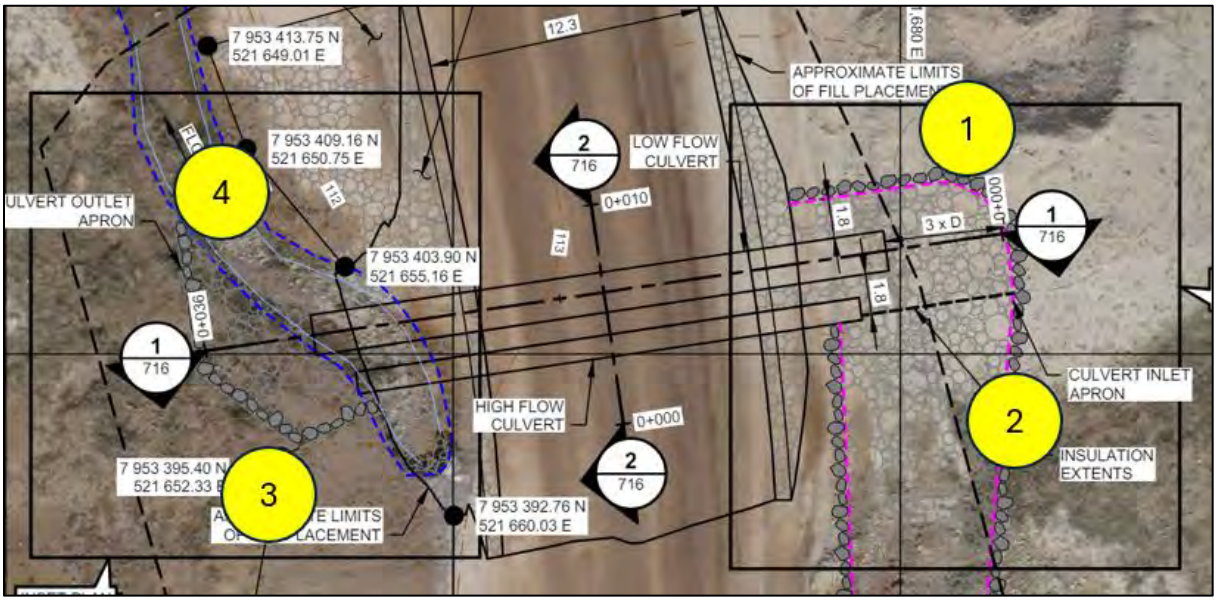


PHOTO 1. Culvert Crossing CV-106 - Photographic Vantage Points (Approximate Locations, Indicated with Yellow Circles).

PHOTO 2. Prior to Construction - Vantage Point 1 - Upstream Side of Crossing - Looking Southwest (April 26, 2024).

PHOTO 3. Prior to Construction - Vantage Point 2 - Upstream Side of Crossing - Looking Northwest (April 26, 2024).

PHOTO 4. Prior to Construction - Vantage Point 3 - Downstream Side of Crossing - Looking East (April 26, 2024).

PHOTO 5. Prior to Construction - Vantage Point 4 - Downstream Side of Crossing - Looking Southeast (April 26, 2024).

PHOTO 6. During Construction - Vantage Point 3 - Blast Excavation - Looking Northeast (April 30, 2024).

PHOTO 7. During Construction - Vantage Point 4 - Blast Excavation - Looking Southeast (April 30, 2024).

PHOTO 8. During Construction - Vantage Point 1 - Blast Excavation - Looking Southwest (May 03, 2024).

PHOTO 9. During Construction - Vantage Point 1 - Excavation of Unsuitable Material from Inlet Apron - Looking South (May 04, 2024).

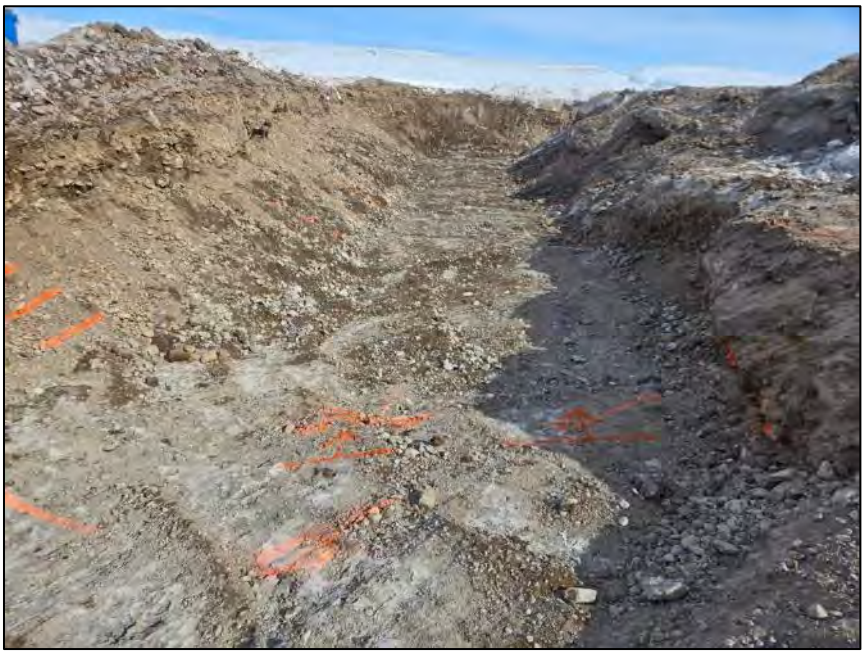


PHOTO 10. During Construction - Vantage Point 3 - Completed Blast Excavation - Looking East (May 05, 2024).

PHOTO 11. During Construction - Vantage Point 2 - Compaction of Culvert Backfill Material - Looking Northwest (May 05, 2024).

PHOTO 12. During Construction - Vantage Point 3 - Placement of Culvert Backfill Material in Inlet Apron - Looking North (May 05, 2024).

PHOTO 13. During Construction - Vantage Point 3 - Compacted Culvert Backfill Material - Looking Northeast (May 05, 2024).

PHOTO 14. During Construction - Vantage Point 2 - Ripping of Outlet Apron - Looking Northeast (May 05, 2024).

PHOTO 15. During Construction - Vantage Point 2 - Installation of Geotextile and Geomembrane Anchor Trench and Styrofoam - Looking Northwest (May 06, 2024).

PHOTO 16. During Construction - Vantage Point 2 - Compaction of Culvert Backfill Material in Anchor Trench - Looking North (May 06, 2024).

PHOTO 17. During Construction - Vantage Point 3 - Placement of Culvert Backfill Material and Installation of Styrofoam Insulation - Looking Northeast (May 06, 2024).

PHOTO 18. During Construction - Vantage Point 3 - Installation of Low Flow Culvert - Looking Northeast (May 06, 2024).

PHOTO 19. During Construction - Vantage Point 2 - Installation of Low Flow Culvert - Looking Northwest (May 06, 2024).

PHOTO 20. During Construction - Vantage Point 3 - Placement and Grading of Culvert Bedding Material - Looking Northeast (May 06, 2024).

PHOTO 21. During Construction - Vantage Point 2 - Installation of High Flow Culvert - Looking Northeast (May 06, 2024).

PHOTO 22. During Construction - Vantage Point 3 - Installation of Styrofoam Insulation - Looking Northeast (May 06, 2024).

PHOTO 23. During Construction - Vantage Point 1 - Compaction of Culvert Backfill Material around Culverts - Looking Southwest (May 06, 2024).

PHOTO 24. During Construction - Vantage Point 4 - Compaction of Culvert Backfill Material around Culverts - Looking Southeast (May 06, 2024).

PHOTO 25. During Construction - Vantage Point 3 - Installation of Geotextile for Slope Stabilization - Looking Northeast (May 09, 2024).

PHOTO 26. During Construction - Vantage Point 3 - Placement of Riprap for Slope Stabilization - Looking North (May 09, 2024).

PHOTO 27. During Construction - Culvert Infill in Low Flow Culvert - Looking West (May 10, 2024).

PHOTO 28. During Construction - Culvert Infill in Low Flow Culvert - Looking East (May 10, 2024).

PHOTO 29. During Construction - Vantage Point 1 - Compaction of Culvert Backfill Material in Inlet Apron - Looking South (May 10, 2024).

PHOTO 30. During Construction - Vantage Point 3 - Placement of Riprap for Slope Stabilization - Looking Northeast (May 10, 2024).

PHOTO 31. During Construction - Vantage Point 2 - Placement of Coarse Riprap and Stream Substrate Material in Inlet Apron - Looking North (May 11, 2024).

PHOTO 32. During Construction - Completed Boulder Cluster in Low Flow Culvert - Looking West (May 11, 2024).

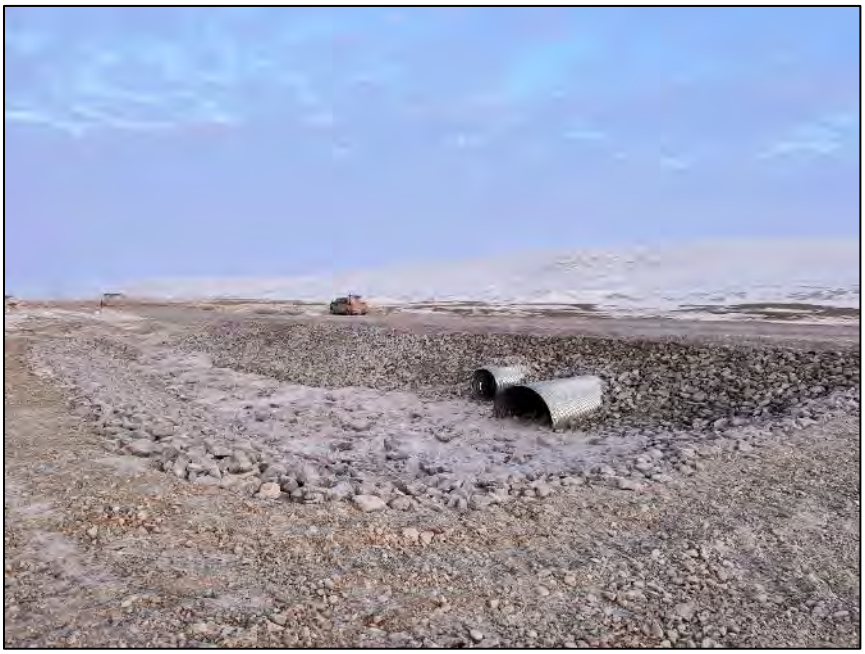


PHOTO 33. After Construction - Vantage Point 1 - Inlet Apron and Road Crossing - Looking Southwest (May 14, 2024).

PHOTO 34. After Construction - Vantage Point 2 - Inlet Apron and Road Crossing - Looking Northwest (May 14, 2024).

PHOTO 35. During Construction - Vantage Point 3 - Outlet Apron and Road Crossing - Looking Northeast (May 11, 2024).

PHOTO 36. During Construction - Vantage Point 4 - Outlet Apron and Road Crossing - Looking Southeast (May 11, 2024).

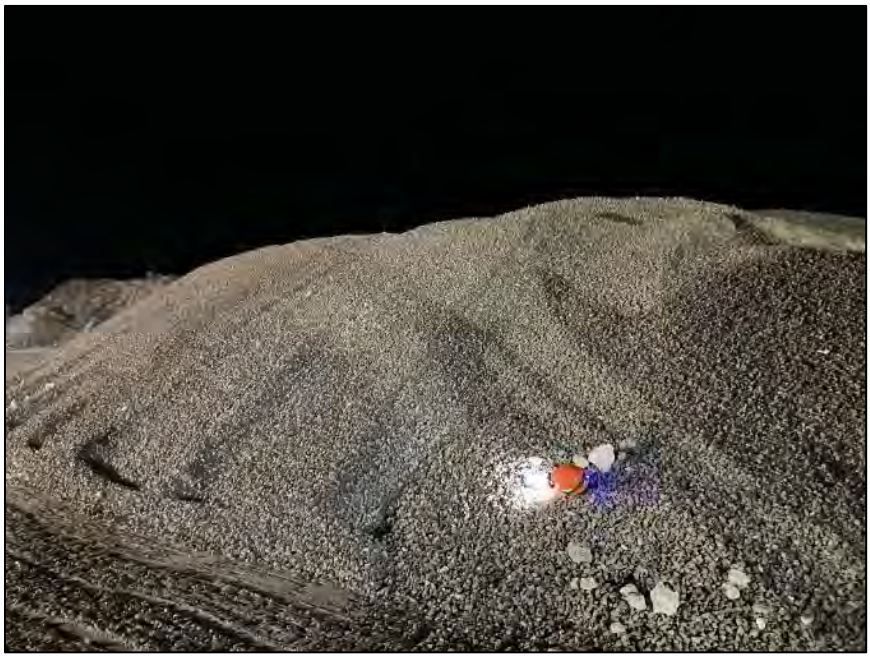


PHOTO 37. Material Stockpile - 32 mm minus Culvert Backfill Material - km 60 Laydown - Looking Northeast (March 10, 2024).

PHOTO 38. Material Stockpile - Culvert Bedding Material - km 30 Laydown - Looking West (May 10, 2024).

PHOTO 39. Material Stockpile - Fine Rip Rap - km 60 Laydown - Looking Southeast (March 22, 2024).

PHOTO 40. Material Stockpile - Coarse Rip Rap - km 30 Laydown - Looking West (May 10, 2024).

PHOTO 41. Material Stockpile - Stream Substrate Material - km 97 Stockpile (February 29, 2024).

PHOTO 42. Equipment - CAT 349F Excavator - km 60 Laydown - looking East (March 08, 2024).

PHOTO 43. Equipment - CAT 745C articulated dump truck - km 60 Laydown (February 08, 2024).

PHOTO 44. Equipment - Mikasa MVH408 1000 lb Plate Compactor - km 60 Laydown (March 05, 2024).

PHOTO 45. Equipment - Ducar Motorized Wheel Barrow loaded with Coarse Riprap - CV-059 (March 26, 2024).

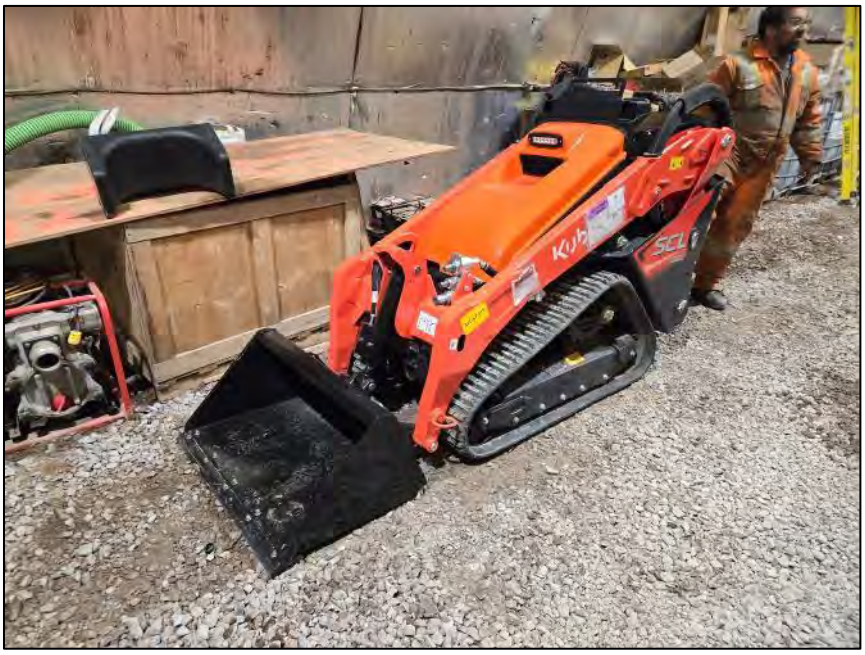


PHOTO 46. Equipment - Kubota Stand-on Compact Loader (April 30, 2024).

PHOTO 47. Equipment - CAT CS56B Smooth Drum Compactor (March 02, 2024).