Baffinland Iron Mines Corporation
Mary River Project

Construction Summary Report: Milne Port Tank Farm & Dispensing Package

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 16 JAN 15
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

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2015-01-13	0	Approved for Use	S. Hess	M. Coakley	J. Cleland	D. Matthews
DATE	REV.	STATUS	PREPARED BY	CHECKED BY	APPROVED BY	APPROVED BY
			HATCH			CLIENT

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1. Facility Description

Baffinland Iron Mines Corporation (Baffinland) recently expanded the existing fuel tank farm storage and distribution facility at Milne Inlet, Baffin Island, Nunavut.

The berm built in 2011 is considered “existing” for the purpose of this report.

The existing tank farm facility consisted of one (1) 5ML aboveground steel arctic diesel tank located within an earth dyke with synthetic liner.

Diesel fuel was delivered to the existing tank farm via a marine pipeline from a shoreline ship manifold.

The existing diesel tank farm distribution facility supported vehicle fuelling and truck loading activities. The truck loading system consisted of a diesel supply line from the diesel tank to a truck loading module located within a granular truck loading area constructed with a synthetic liner which drained the loading area into the dyke.

1.1 Purpose and Design Basis

The Milne Port Tank Farm and Dispensing Package described in this report includes the new marine pipeline (connecting the marine manifold building to the arctic diesel system), the expansion to the arctic diesel system, the new Jet-A1 system, the fuel dispensing systems, the secondary containment earth dyke with synthetic liner, and all interconnecting piping. The package was designed for marine loading/offloading, tank truck loading/offloading, vehicle fueling, and genset fuel feed at the port facility.

The tank farm includes:

a. Three (3) new 12ML arctic diesel field-fabricated tanks with tag numbers 2613-TK-004, 2613-TK-005, and 2613-TK-006, where the first two tanks were installed in 2013 and 2613-TK-006 was installed in 2014.

b. One (1) new 5ML arctic diesel field-fabricated tank with tag number 2613-TK-002 installed in 2013.

c. Three (3) new 0.75ML Jet-A1 fuel pre-fabricated tanks with tag numbers 2614-TK-007, 2614-TK-008, and 2614-TK-009 installed in 2013.

The tank farm included space for two extra tank pads for future expansion of one additional 0.75ML Jet-A1 tank (2614-TK-010) and one additional 12ML arctic diesel tank (2613-TK-003).

These tanks are all vertical single wall steel construction, designed to API 650.

The existing secondary containment dyke was modified to include the new 5ML tank in addition to the existing 5ML tank. The existing secondary containment dyke was also extended to include four (4) 12ML tank pads and four (4) 0.75ML tank pads.

The tank assembly has been inspected and tested to API 650 Section 8 which includes visual inspections of all welds, radiograph inspection, vacuum box test of welds, liquid penetration tests, shell to floor joint, magnetic particle and UT tests on reinforcing pads. In lieu of hydrostatic testing, additional liquid penetration tests and vacuum box tests have been completed in compliance with API 650 Section 7.3.5. All inspection and test reports have been confirmed by the contractor and construction management personnel.

Quality documentation for the tanks and piping installed at the Mine Site are available in Appendix F.

The secondary containment dyke is designed to the requirements of the National Fire Code of Canada.

The Milne Port tank farm will be refuelled annually by ocean going tanker. A floating hose is deployed from the ship and connected to the onshore manifold. An aboveground steel marine pipeline transfers the fuel from the shore manifold to the tank farm.

The facility expansion includes the removal of the old marine pipeline, the addition of a new marine offload pipeline from the Milne Inlet shoreline running to the new tank farm facility, and new distribution piping from the tank farm outlet flange to the new dispensing equipment. All piping was constructed to ANSI B31.1 – 2010, Process Piping.

The ship floater manifold connection is equipped with a gate valve and check valve assembly to enable ship-to-shore connection and to prevent backflow. All connections are contained within a spill containment assembly with a hinged and lockable cover.

The fuel dispensing system includes two (2) new prefabricated fuel dispensing modules: the Arctic Diesel Fuel Module, and the JetA1 Fuel Module. The existing Arctic Diesel Fuel Module was relocated to the west side of the tank farm. The new modules are insulated and heated 40 ft ISO shipping containers, complete with piping, fuel transfer equipment, temperature corrected delivery systems, electrical and control components, and code compliant fire suppression systems.

For more information on fuel module's operation, refer to the Operations and Maintenance manuals included in Appendix G.

The facility was designed and constructed to the following codes and standards:

a. Tank construction will adopt the API 650 12th Edition, 2013, Welded Steel tanks for Oil Storage.

b. Tank inspection, repair, alteration and reconstruction will use API 653 4th Edition, 2009; including Addendums 1 and 2.

c. National Building Code of Canada (NBC) 2010.

d. National Fire Code of Canada (NFCC) 2010.

e. NFPA 30, 2012 Edition, Flammable and Combustible Liquids Code.

f. CCME Environmental Code of Practice for Aboveground Storage Tank Systems containing Petroleum Products, 2003.

g. ANSI B31.3-2012, Process Piping.

h. CSA W47.1-09, Certification of Companies for Fusion Welding of Steel.

i. CSA W59-03 (R2008) – Welded Steel Construction (Metal Arc Welding)

j. Canadian Environmental Protection Act 1999 (2008 Update), Storage Tank System for Petroleum Products and Allied Petroleum Products Regulations.

k. CSA W178.2-08, Certification of Welding Inspectors.

A mobile oil-water separator (OWS) water treatment system is used to treat storm water runoff, overfills, or spills from within the secondary containment area in order to meet the water licence discharge criteria. For more information on the mobile OWS, refer to E349000-00-118-0001Sub01 Portable Oil Water Separator (OWS) Operation and Maintenance Manual, included in Appendix H.

A list of the contractors involved in construction of the Mine Site fuel tank farm and dispensing package has been included in Appendix C.

1.2 Location and Base Elevations

The tank farm and dispensing package are located on the north side of the Milne Port facility on the east side of the ore stockpile with northing between N7976099 and N7976298 and easting between E503 582 and E503 581. The new Arctic Diesel Fuel Module is located on the east side of the tank farm. The new Jet-A1 Fuel Module and the relocated Arctic Diesel Fuel Modules are located on the west side of the tank farm. Both refueling areas consist of ramps up to and down from the fuel modules to ensure appropriate management of potential spills during fueling operations. The lined refueling area drains into the secondary containment dyke.

The new containment area's elevation at the inside toe of the dyke is EL. 10.7m and at the top of the dyke is EL. 12.5m. The existing containment area's elevation at the inside toe of the dyke is EL. 11.70m and at the top of the dyke is EL. 13.20m. The existing dyke wall between the new and existing containment areas was removed.

1.3 Geometry and Access

The tank farm has been constructed as rectangular shape to optimize the earthworks materials (granular fills and liner). The tank farm is surrounded by dykes with side slopes not steeper than 2H:1V and the berm top width is 600mm. The secondary containment area includes ten (10) tank foundation pads, ramp loading areas, dyke access roads and dyke walls, and dyke access stairs on the east side behind the fuelling module.

There are two (2) access ramps into the dyke containment area to allow emergency vehicle and maintenance vehicle access. One ramp is on the south side, into the existing/modified dyke area. The second ramp is on the east side, leading from the fueling area down into the new dyke area.

The ramp up to and out of the fuelling module has a 5% grade at the high points. Between these high points, there is a 6% grade down to a low point where contained liquids drain into the secondary containment area with a 2% grade.

Inside the primary dyke containment area, there is a 1% slope towards the sump.

The tanks are equipped with spiral access stairways and guardrails at the roof of each tank.

Access to the fuelling equipment is through lockable equipment doors and side rollup door.

1.4 Earthworks Materials Details

The containment area around the tank farm and dispensing package has been constructed with raised earthworks and synthetic welded liner for the containment of spills. Additionally, the facility is designed for containment of rainwater and snowmelt that can potentially be contaminated by contact with fuel originating from leakage or spills. Contact water is removed and treated if required before it is discharged to the receiving environment.

The liner is buried 450mm below the floor of the dyke.

2. Construction Activity Summary

Construction activities on the Milne Port tank farm and dispensing package started in May 2013. The handover certificate was completed in May 2014. The construction punch list remains open, with the most recent item closed out in October 2014. The remaining punch list items are scheduled for completion in 2015.

The following summarizes the construction activities:

a. Crushed blast rock and fill material was quarried, crushed, screened, and hauled from the Milne Inlet Quarry (Q1).

2.1 Tank Farm Containment Dyke Modification

a. Construction followed standard operating procedures (SOP's) and hot work permits as stipulated by the project due to construction being inside an operating fuel storage facility.

b. Constructed/modified access ramp into the existing containment dyke.

c. Constructed granular tank foundation for 2613-TK-002 using quarried fill and rock materials with rigid insulation, geotextile and geomembrane liner.

d. Connected 2613-TK-002 to existing grounding system.

2.2 Marine/Pipeline Modifications

a. Removed existing marine 150mm pipeline and support structures to allow construction of the containment dyke extension.

b. Cut existing marine line near pipe support PS041 and PS042 and PS05 to allow sufficient space for construction activities.

c. Protected pipe from internal contamination using pipe caps during construction for temporary use during 2013 sealift refuelling.

d. Removed existing marine line.

e. Installed new marine pipeline complete with all valving and fittings.

2.3 Tank Farm Containment Dyke Extension

a. Constructed tank farm containment dyke extension for new tanks (4x12ML and 4x0.750ML), including excavation to sub-grade, placed quarried rock and fill materials with rigid insulation, geotextile and geomembrane liner.

b. Constructed tank foundation pads, ramp loading areas, dyke roads and dyke walls.

c. Installed dyke access stairs.

d. Installed new tank grounding system in conjunction with earthworks construction and connected to the existing ground grid.

e. Removed existing dyke wall (north) to connect existing dyke liner system and new dyke extension.

2.4 Fuel Piping and Tanks

a. Installed fuel tank bodies.

b. Installed piping, valves and fittings to extend the marine pipeline to 2613-TK-002.

c. Installed piping, valves and fittings for all tanks to interconnect the inlet/outlet piping and low suction piping per design to the fuel module supply piping.

d. Installed piping vents and drain assemblies.

e. Installed pressure relief valves, piping and gate valve assemblies.

f. Installed tank emergency vent/gauge hatch.

g. Installed radar gauge assembly and components.

h. Installed new pre-cast pipe supports and structural steel to match existing.

i. Installed miscellaneous bolting, gaskets for all piping systems.

j. Installed cable tray supports, cable tray and tech cable for tank gauging system, tank lighting and tank obstruction light.

k. Installed tank obstruction lights (where indicated).

l. Installed tank/ stairway station and light fixture.

m. Tested and calibrated tank level gauges and display units.

2.5 Quality Assurance and Quality Control

The quality assurance and quality control (QA/QC) for earthworks and liner installation was conducted by Layfield and Nuna East Ltd, documents the preparation of the subgrade, installation and testing of the membrane with a final inspection of the completed liner. The following documents are contained in Section 8 of Appendix D.

a. A certificate of acceptance of the soil subgrade for installation of the liner was verified and signed by the NUNA project coordinator and Layfield Environmental supervisor.

b. A geomembrane deployment log describes the location, size, temperature when placed, visually observed and initialled that the panel had been checked

c. A geomembrane trial seam log tested the welding before the entire installation proceeded. Connection of the trial panels checked and signed off.

d. An air lance test log had been completed for each seam and signed off.

e. Layout drawings show all of the panel numbers, as described in the log documents.

f. A certificate of final inspection and acceptance was signed by Layfield and Nuna East Ltd. representatives.

3. Photographic Records

Figure 1: Commencement of earthworks [north view]

Figure 2: Preparation of sub-base

Figure 3: Placement of sand layer below liner

Figure 4: Preparation for liner installation [northwest view]

Figure 5: Installation of liner

Figure 6: Liner installation in-progress [northeast view]

Figure 7: Berm construction

Figure 8: Containment earthworks completed [south view]

Figure 9: Valves and piping between the tanks and dispensing modules

Figure 10: Valves and piping between the tanks and dispensing modules

Figure 11: Placement of the dispensing module

Figure 12: Dispensing module inlet piping from tanks

Figure 13: Completion of tank farm and dispensing package construction [southwest view]

4. As-Built Drawings

The as-built drawings incorporate contractor red line markups, field instructions, requests for information, field sketches, and all other inputs provided by the field engineering team. The Hatch as-built drawings are attached in Appendix A.

Table 4-1: Hatch 'As-Built' Drawing List

Drawing Number	Title	Revision
H349000-2613-10-014-0001	Milne Port - Site Preparation Bulk Fuel Storage Overall Plan	2
H349000-2613-10-014-0002	Milne Port - Site Preparation Bulk Fuel Storage Site Grading Plan	2
H349000-2613-10-035-0001	Milne Port - Site Preparation Bulk Fuel Storage Dyke Sections	2
H349000-2613-10-035-0002	Milne Port - Site Preparation Bulk Fuel Storage Sections Through Truck Loading Area	2
H349000-2613-10-035-0003	Milne Port - Site Preparation Bulk Fuel Storage Tank Pad Details	2
H349000-2613-10-035-0004	Milne Port - Site Preparation Bulk Fuel Storage Dyke Sections and Details	2
H349000-2613-10-035-0005	Milne Port TK-002 Tank Pad Detail	1
H349000-2610-05-031-0001	Milne Port Tank Farm P&ID	1

Contractor supplied as-built drawings for the tank construction and piping installation have been attached in Appendix F. Contractor supplied as-built drawings for the fuel dispensing module has been attached in Appendix G.

5. Field Decisions

The following describes the most relevant field decisions made during construction activities:

5.1 Earthworks

a. Cut depth changed to limit disruption of permafrost (design included maximum cut depth of 2.2m whereas permafrost is typically reached 1.5m below surface. Issued for construction (IFC) drawings were revised to reflect the site request for change in cut depth.

b. Liner width for Milne Port Tank Pad reduced by 150mm on two sides of the tanks. Milne Port tank pad drawing indicates a diameter width of liner required of 29.6m. The panels are manufactured 43m x 29.3m. Variance of 150mm allowed on two sides of the tank.

c. In areas of good quality subgrade (well graded and compacted material) with no large rocks, excavation for the containment dyke was only required to the underside of the crusher fines/ sand bedding. In areas of poor subgrade, excavation was required to the underside of the Type 5. Type 5 material was substituted for Type 8 in areas where the lift thickness did not allow for use of the Type 8.

d. There was a large amount of permafrost encountered along the south edge of the dyke expansion where it meets the existing berm. Solution proposed to raise the subgrade elevation within the berm footprint to the elevation of the underside of sand bedding at the existing containment dyke. Toe was excavated to the new dike floor level; some areas left at the elevation of the existing dike floor.

e. The fuel dispensing modules all required grounding which was not shown on the design. Grounding was attached to the tank grounding cables in conjunction with completion of the earthworks.

f. Due to limited material availability on-site, the Type 7 (-32mm clear) material was not installed. This scope item was transferred to Baffinland scope for completion. As of the data collection cut-off date for this report (October 19, 2014) the Type 7 (-32mm clear) material has not yet been installed.

g. Due to the limited scheduling availability of Nuna on-site (fixed time contract), the corrugated steel sump culverts, perimeter fencing and concrete barriers were not installed. These scope items were transferred to Baffinland scope for completion. As of the data collection cut-off date for this report (October 19, 2014) these items have not yet been installed.

5.2 Mechanical and Piping

a. The specified quick open covers for the pig launchers and pig receivers were replaced by a weld neck flange and blind flange assembly in lieu due to material sourcing and availability.

b. Marine pipeline was relocated closer to toe of the berm than design as it enters the tank farm. Prevented traffic interruptions during construction and in future during maintenance.

c. Marine manifold building was moved 6.1m (20 ft) southwest along the marine pipeline routing. The building coordinates had it located on the edge of the bank.

d. Marine line feeding JetA1 2614-TK-009 was raised to EL 13.000M to match the 600mm elevation change of the tank 2614-TK-009.

e. The two inch diesel fuel supply line was moved to be inside the berm, sharing the supports used for the 200mm (8 inch) line to avoid having the pipe sitting on top of the berm.

f. Two 90 degree elbows are being used to accommodate the change in piping elevation on both the JetA1 fuel dispensing module and the arctic diesel duel dispensing module in lieu of the sloped pipe shown on the IFC. The change allows for improved clearance on the electrical tray.

g. Typical drain size was increased to 50mm (2 inch) compared to the IFC detail of 1-1/2 inch due to material sourcing schedule requirements.

h. Drain added to marine line running east to 2614-TK-007 600mm east of PS-56.

i. Design included two drains in close proximity to each other on marine line to 2614-TK-007. Only one required so vent deleted near PS-66.

j. Bolt type A320 L7 was replaced by A325M structural bolts due to material sourcing restrictions onsite.

k. Steel grade 350WT not readily available in structural shapes. Replaced by 350W steel.

5.3 Electrical and Instrumentation & Control

a. 100mm (4 inch) channel tray was used for the vertical climb of each tank, dividers provided between LV and MV/control cables in the common tray, and 2-1PR#18 AWG Twisted Teck to be replaced by 1-2PR#18 AWG Twisted Shield Teck Armoured Cable.

b. 3m standard length obstruction light support brackets were installed instead of specialty 4m lengths due to restrictive project scheduling.

6. Performance Evaluation

As of the data collection cut-off date for this report (October 19, 2014) there have been no adverse observations in operational performance of the Milne Port tank farm and dispensing package.

7. Vibration Monitoring and Quarrying Activity

No vibration monitoring was conducted during the construction of the Milne Port Tank Farm & Dispensing Package as it was not deemed necessary based on scope of activities required for construction.

Control for quarrying activity was conducted as per the project's specific management plans:

- BAF-PH1-830-P16-0017 (H349000-1000-07-126-0013): Quarry Management Plan Milne Inlet Quarry (Q1)
- BAF-PH1-830-P16-0004 (H349000-1000-07-126-0011): Borrow Pit and Quarry Management Plan

8. Environmental Monitoring

Environmental monitoring during the construction of the tank farm and dispensing package was conducted as per the BAF-PH1-830-P16-0008 Environmental Protection Plan (EPP) recently updated in July 2014.

The Baffinland on-site Environmental Management Team was responsible for environmental monitoring during construction and following-up with the construction team(s) if there were any reported environmental incidents or non-conformances.

Tank farm and dispensing package construction on site was also required to follow the requirements of the Surface Water and Aquatic Ecosystems Management Plan (March 2014),

BAF-PH1-830-P16-0026. This Management Plan outlines the best management practices implemented to limit the potential for adverse impacts to receiving waters, aquatic ecosystems, fish and fish habitats. In addition this plan details the systems in place to mitigate and manage drainage and runoff at building sites, address point and non-point discharges to surface waters and assess those discharges on water quality and quantity relative to their receiving water systems.

The Spill Contingency Plan (March 2014), BAF-PH1-830-P16-0036, in conjunction with the Emergency Response Plan (March 2014), BAF-PH1-830-P16-0007, provides guidance and instructions for first responders and Baffinland Management in the event of a spill event or other emergency such as fire or accident.

The risks to the water quality in the respective rivers and streams as a result of construction of the tank farm and dispensing package would originate from following sources based on construction methodology:

- Spills from equipment

  There were four hydraulic spills reported during the construction of the tank farm and dispensing package that included three spills less than 4 L and a fourth spill of 60 L. The spills were cleaned up immediately and any excavated snow or gravel was stored in secure containment awaiting on-site treatment or offsite disposal. There were also two minor fuel leaks of 1 L each, also cleaned up immediately.

- Increase in sediment load in the water

During the period of construction, water quality monitoring conducted at downstream stations under Part D, Section 16, and Part I, of the Type “A” Water Licence 2AM-MRY1325 and Type “B” Water Licence 8BC-MRY1314 indicated total suspended solids (TSS) and other parameters at levels below specified Water Licence criteria. The results for water quality monitoring were provided in monthly reports submitted to the Nunavut Water Board and other stakeholders. In consideration of the above, the environmental mitigation strategies were effective in maintaining runoff water quality.

9. Fuel Storage System

The facility design and construction has been reviewed with the specific requirements of the CCME Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products, 2003. The results are tabulated in Appendix I. With regards to the specific sections that apply to construction; it is Hatch’s opinion that the facility conforms to the requirements as laid out in the CCME document.

10. Earthworks Data

Completion surveys were conducted for each material required to build the fuel tank farm containment. NUNA East Ltd's completion of construction reports for the Tank Farm Containment Dyke Modification (E349000-YX001-00-124-0003 Sub01) and for the Tank Farm Containment Dyke Extension (E349000-YX001-00-124-0004 Sub01) includes this information in Section 4 in Appendix D.

Additional survey data collected in 2014 for the access ramp and tank farm area has been included in Appendix E.

Geotechnical inspections were conducted in 2013 and 2014 by a 3rd party, independent, Nunavut certified engineer under Part D, Section 19 of Type "A" Water Licence 2AM-MRY1325. The inspections are inclusive of waste containment structures at the Mary River Mine Site and Milne Port site including the new Milne Port fuel tank farm containment. At the time of the 2013 inspection, the two 5ML tanks were complete and two of the 12ML tanks were under construction. As noted in Section 4.08 of Appendix B Attachment A, the inspector wrote "We would classify the quality of work in the construction of the dykes and pads, including the base of the structure as exceptionally good and of a quality that should last for decades". At the time of the 2014 inspection, the planned fuel tank additions had been completed. As noted in Section 4.08 of Appendix B attachment B, the inspector stated "We noted no sign of weakness in any of the structure construction".

11. Unanticipated Observations

Not applicable.

12. Surface Monitoring

None conducted.

13. Required Maintenance

None conducted to-date.

14. Adaptive Management

For discussion of adaptive management principles and practices applied during the Construction Phase of the Project and their overall effectiveness please refer to the 2013 Annual Report to the Nunavut Impact Review Board. Any additional adaptive management practices implemented as a result of works completed in 2014 will be reported in the updated 2014 Annual Report to the Nunavut Impact Review Board.

15. Concordance with Type "A" Water Licence

The Nunavut Water Board Type "A" Licence 2AM-MRY1325, Schedule D, outlines the requirements for Construction Monitoring Reports. The following table provides a concordance of the report, herein, with the requirements included in Part D.

Table 15-1: Table of Concordance for Schedule D

Schedule D Item No.	Schedule D Description	Corresponding Section in this Report
1a	description of all infrastructure and facilities designed and constructed to contain, withhold, divert or retain Water and/or Waste;	1
1b	a summary of construction activities including photographic records before, during and after construction of the facilities and infrastructure designed to contain, withhold, divert or retain Water and/or Waste;	2, 3
1c	as-built drawings and design for facilities and infrastructure, in Item 1(a) of this schedule, designed and constructed to contain, withhold, divert or retain Water and/or Waste;	4
1d	documentation of field decisions that deviate from the original plans and any data used to support or developed facilities and infrastructure to withhold, divert or retain Water and/or Waste;	5
1e	a comparison of measured versus predicted performance of infrastructure and facilities;	6
1f	any blast vibration monitoring and control for quarrying activity carried out in close proximity to fish bearing waters;	7
1g	monitoring conducted for sediment and explosives residue release from construction areas;	8
1h	monitoring undertaken in accordance with Part D of the during the Construction Phase of the Project;	8
1i	details confirming that the requirements of the CCME guidance document entitled "Aboveground Storage Tank Systems for Petroleum and Allied Petroleum Products (2003)" have been met by the Licensee;	9
1j	data collected from instrumentation used to monitor earthworks and the interpretation of that data;	10
1k	a discussion of any unanticipated observations including changes in risk and mitigation measures implemented to reduce risk during construction;	11
1l	an overview of any method including frequency used to monitor deformations, seepage and geothermal responses;	12
1m	a summary of maintenance work undertaken as a result of settlement or deformation of dikes and dams;	13
1n	a summary of adaptive management principles and practices applied during the relevant phases of the Project and their overall effectiveness.	14

Appendix A

As-Built Drawings

A. H349000-2613-10-014-0001 Rev01: Milne Port - Site Preparation Bulk Fuel Storage Overall Plan ***[1 page]***

B. H349000-2613-10-014-0002 Rev02: Milne Port - Site Preparation Bulk Fuel Storage Site Grading Plan ***[1 page]***

C. H349000-2613-10-035-0001 Rev02: Milne Port - Site Preparation Bulk Fuel Storage Dyke Sections ***[1 page]***

D. H349000-2613-10-035-0002 Rev02: Milne Port - Site Preparation Bulk Fuel Storage Sections Through Truck Loading Area ***[1 page]***

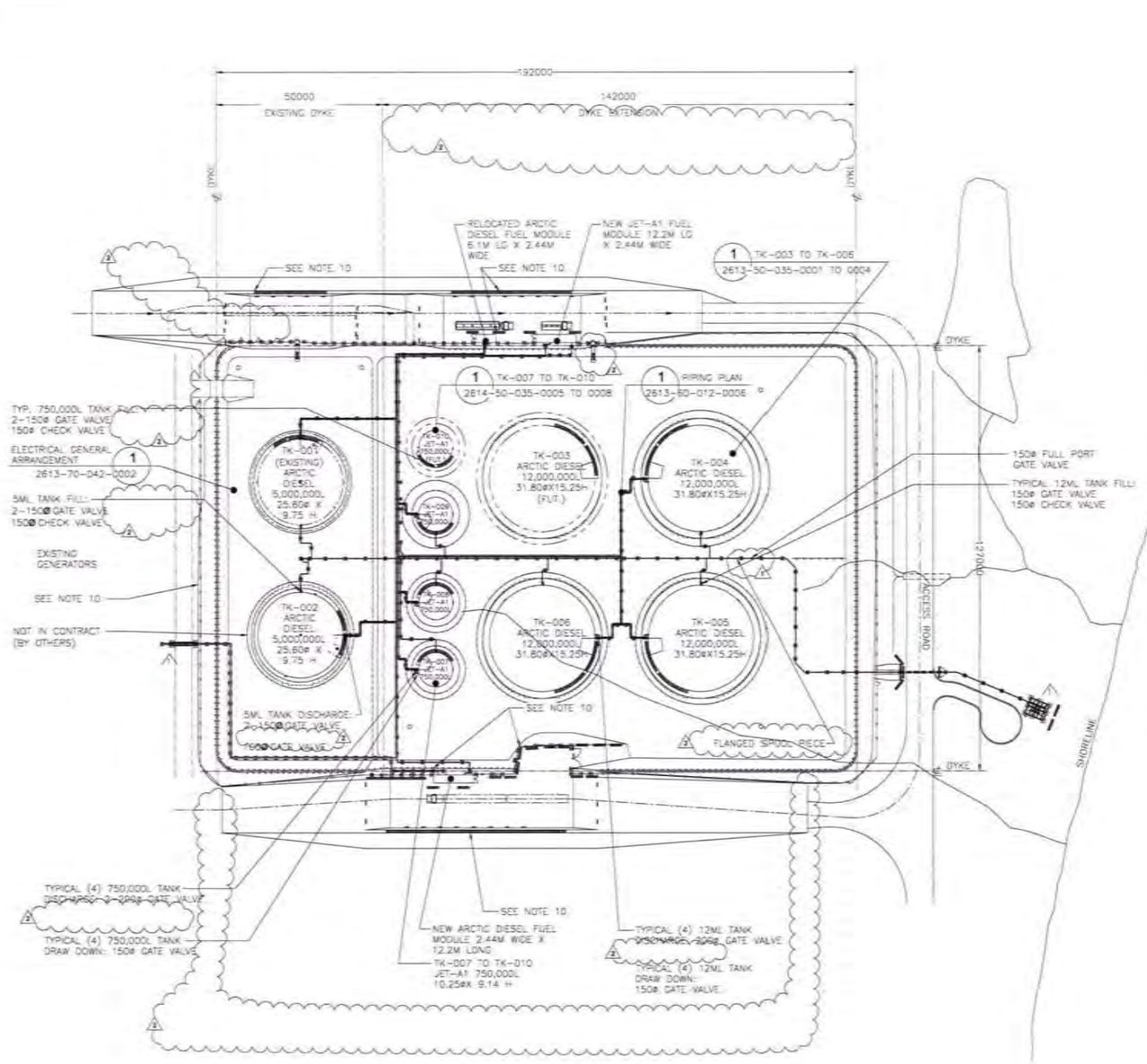
E. H349000-2613-10-035-0003 Rev02: Milne Port - Site Preparation Bulk Fuel Storage Tank Pad Details ***[1 page]***

F. H349000-2613-10-035-0004 Rev02: Milne Port - Site Preparation Bulk Fuel Storage Dyke Sections and Details ***[1 page]***

G. H349000-2613-10-035-0005 Rev01: Milne Port TK-002 Tank Pad Detail ***[1 page]***

H. H349000-2610-05-031-0001 Rev01: Milne Port Tank Farm P&ID ***[1 page]***

DWG NO H349000-2613-10-014-0001



NOTES:

1. ALL WORK MUST CONFORM TO THE REQUIREMENTS OF THE MOST RECENT EDITION OF THE FOLLOWING CODES, ACTS AND STANDARDS:
   - 1.1. APPLICABLE FEDERAL, PROVINCIAL AND TERRITORIAL CODE
   - 1.2. NATIONAL BUILDING CODE OF CANADA (2010).
   - 1.3. NATIONAL FIRE CODE OF CANADA (2010).
   - 1.4. CANADIAN ELECTRICAL CODE (2009).
   - 1.5. CCME ENVIRONMENTAL CODE OF PRACTICE FOR ABOVEGROUND STORAGE TANK SYSTEMS CONTAINING PETROLEUM PRODUCTS.
   - 1.6. API 650, 11TH EDITION, 2008, WELDED STEEL TANKS FOR OIL STORAGE INCLUDING ADDENDUMS 1 AND 2.
   - 1.7. API 653, 4TH EDITION, 2008, TANK INSPECTION, REPAIR, ALTERATION AND RECONSTRUCTION.
   - 1.8. NFPA 30, 2008 EDITION, FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE.
   - 1.9. ANSI/ASME B31.3-2010, PROCESS PIPING.
   - 1.10. API 1104 2005 AND CSA W47.1-09, CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL.
   - 1.11. CSA W59-03 (R2008) – WELDED STEEL CONSTRUCTION (METAL ARC WELDING).
   - 1.12. CANADIAN ENVIRONMENTAL PROTECTION ACT 1999, (2008 UPDATE), STORAGE TANK SYSTEM FOR PETROLEUM PRODUCTS AND ALLIED PETROLEUM PRODUCTS REGULATIONS.
   - 1.13. CSA W178.2-08, CERTIFICATION OF WELDING INSPECTORS.
   - 1.14. OCCUPATIONAL HEALTH AND SAFETY.
   - 1.15. ENVIRONMENTAL PROTECTION ACT.
   - 1.16. API 2000 VENTING ATMOSPHERIC AND LOW PRESSURE STORAGE TANKS.
   - 1.17. API RECOMMENDED PRACTICE 2003 – PROTECTION AGAINST IGNITIONS ARISING OUT OF STATIC, LIGHTNING AND STAY CURRENTS.
   - 1.18. API STANDARD 2610 – DESIGN, CONSTRUCTION, OPERATION, MAINTENANCE AND INSPECTION OF TERMINAL & TANK FACILITIES.
   - 1.19. API MANUAL OF PETROLEUM MEASUREMENT STANDARDS.
   - 1.20. ASME SECTION VIII – NON FIRED PRESSURE VESSEL.
   - 1.21. MEASUREMENT CANADA.
2. COORDINATES TO NAD-83 6 DEGREE UTM, ZONE 17.
3. ALL SURFACE DRAINAGE WILL BE SELF CONTAINED, COLLECTED AND DISCHARGED AT A LOCATION TO BE APPROVED BY THE LOCAL AUTHORITY.
4. THE WORK SHALL MEET OR EXCEED THE REQUIREMENTS OF THE SPECIFIED STANDARDS, CODES AND REFERENCE DOCUMENTS.
5. EXAMINE SITE OF WORK AND INVESTIGATE ALL MATTERS RELATING TO THE NATURE OF THE WORK TO BE UNDERTAKING. BEFORE COMMENCING WITH THE WORK OBTAIN ALL REQUIRED PERMITS.
6. DO NOT BURY RUBBISH AND WASTE MATERIALS ON SITE.
7. DIVERT SURFACE DRAINAGE WATER AWAY FROM EXCAVATION.
8. PROVIDE TEMPORARY DRAINAGE AND PUMPING AS NECESSARY TO KEEP EXCAVATIONS AND SITE FREE FROM WATER FROM WHATEVER SOURCE UNTIL BACKFILL OPERATIONS ARE COMPLETED.
9. DO NOT PUMP WATER CONTAINING SUSPENDED MATERIALS INTO WATERWAYS.
10. NOT CONSTRUCTED (FUTURE WORK) AS INDICATED. 2

REFERENCE DRAWINGS	
DRAWING NO.	DRAWING TITLE
H349000-2000-00-014-0001	MILNE PORT – SITE LAYOUT

THIS AS-BUILT DOCUMENT HAS BEEN PREPARED BASED ON INFORMATION PROVIDED BY THIRD PARTIES. HATCH HAS NOT VERIFIED THE ACCURACY OR COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR, AND DISCLAIMS, ANY LIABILITY IN CONNECTION WITH, ANY ERRORS OR OMISSIONS THAT MAY BE INCORPORATED HEREIN AS A RESULT.

REVISIONS						
NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE	
2	AS BUILT	JC			2015-01-13	
1	MARINE MANIFOLD REVISED, GENSET FUEL PIPING REVISED	BR	DS	FB	13-07-10	

AS BUILT
REVISED AS MARKED. ALL OTHER DETAILS CONSTRUCTED WITHIN ACCEPTABLE TOLERANCES.

ISSUE AUTHORIZATION				
REV.	ISSUE FOR:	AUTH. BY	DATE	
2	AS BUILT	JC	2015-01-13	
1	REISSUED FOR CONSTRUCTION	DS	FB	13-01-10
0	ISSUED FOR CONSTRUCTION	DS	FB	13-02-20

HATCH

DESIGNED BY: D. STEPHENSON DATE 13-02-20	DRAWN BY: M. PETERSON DATE 13-02-20
CHECKED BY: D. STEPHENSON DATE 13-07-10	DISCIP. ENGR.: F. BUTTS DATE 13-07-10
PROJ. DES. COORD.: T. THERTELL DATE 13-07-10	PROJ. ENGR.: J. CLELAND DATE 13-07-10
PROJ. MGR.: S. PERRY DATE 13-07-10	

Baffinland

MARY RIVER PROJECT

MILNE PORT – SITE PREPARATION
BULK FUEL STORAGE
OVERALL PLAN

SCALE	DWG. NO.	REV
1:750 OR AS NOTED	H349000-2613-10-014-0001	2

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

$FILES
$DATES
$USERNAME$ $TIMES

DWG NO. H349000-2613-10-014-0002

NOTES:
1. FOR DETAILS OF THE DRAINAGE BETWEEN THE DYKE AND PADS B1, B2 & B3 SEE DWG. H349000-2135-10-035-0001.
2. NOT CONSTRUCTED (FUTURE WORK) AS INDICATED.
3. AS BUILT DETAILS NOT VERIFIED AS INDICATED.

FOR CONTINUATION SEE DWG. H349000-2130-10-013-0004

FOR CONTINUATION SEE DWG. H349000-2139-10-012-0004

FOR CONTINUATION SEE DWG. H349000-2130-10-035-0002

FOR CONTINUATION SEE DWG. H349000-2130-10-035-0001

192000
142000
JERSEY BARRIER SEE NOTE 2
DYKE ACCESS STAIRS
TOE OF DYKE VARIES
DYKE
SLOPE
EXISTING ACCESS STAIRS
INSIDE TOE OF DYKE EL. 10.95M (TYP.)
BOTTOM OF SWALE
TOP OF DYKE SUMP SEE NOTE 2
TOP OF DYKE EL. 12.65M (TYP.)
SEE NOTE 2
EXISTING TANK BASE TK-001
TANK BASE TK-003
TANK BASE TK-004
HIGH POINT RIDGE EL. 10.95M (TYPICAL)
RIGID INSULATION XD 60, 76mm THK, 2-LAYERS 600mmx2400mmx38mm NOM. SHEETS, (STAGGERED JOINTS) ON 7.125M MIN. RADIUS
40742
32000
47720
46539
39640
37000
1720
TANK BASE TK-002
TANK BASE TK-008
TANK BASE TK-007
TANK BASE TK-006
TANK BASE TK-005
10675
9325
1000
SUMP DETAIL SEE DETAIL 1 ON DWG H349000-2613-10-035-0004
BOTTOM OF SWALE HIGH POINT EL. 10.30M (TYP.)
N 7976303.796
E 503675.393
SEE NOTE 3
N 7976316.796
E 503675.393
SEE NOTE 3
600ø CULVERT, 13M LONG
CULVERT DETAIL SEE DETAIL 4 ON DWG 2613-10-035-0004

AS BUILT
REVISED AS MARKED. ALL OTHER DETAILS CONSTRUCTED WITHIN ACCEPTABLE TOLERANCES.

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DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	BY	DWD	APP'D	DATE
2	AS BUILT	JS		JC	2015-01-13
1	SUMP DELETED	BS	DS	FB	13-06-13
0	TANK COORDINATES DELETED, DIMENSIONS ADDED	MP	DS	FB	13-05-14

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
2	IS BUILT	SH	JC 2015-01-13
1	ISSUED FOR CONSTRUCTION	DS	FB 13-06-13
0	ISSUED FOR CONSTRUCTION	DS	FB 13-05-14

ISSUE AUTHORIZATION

HATCH

DESIGNED BY	DRAWN BY
D. STEPHENSON	M. PETERSON
DATE: 13-03-06	DATE: 13-03-06
CHECKED BY	DISCIP. ENGR.
B. BROPHY	F. BUTTS
DATE: 13-06-13	DATE: 13-06-13
PROJ. MGR.	PROJ. ENGR.
T. THERRELL	J. CLELAND
DATE: 13-06-13	DATE: 13-06-13
PROJ. MGR.	
S. PERRY	
DATE: 13-06-13	

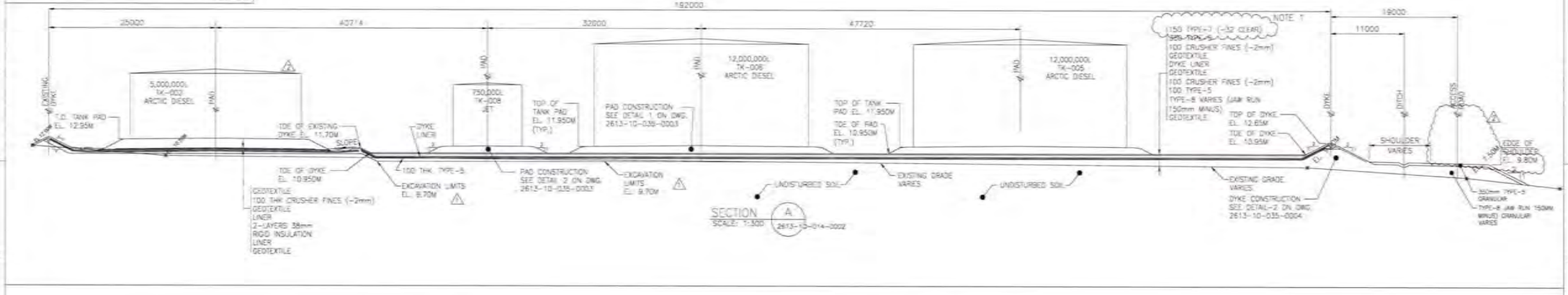
Baffinland

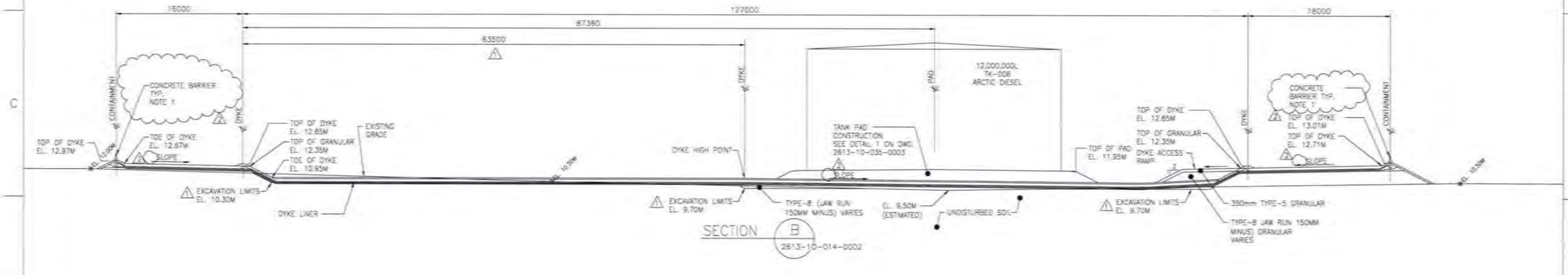
MARY RIVER PROJECT

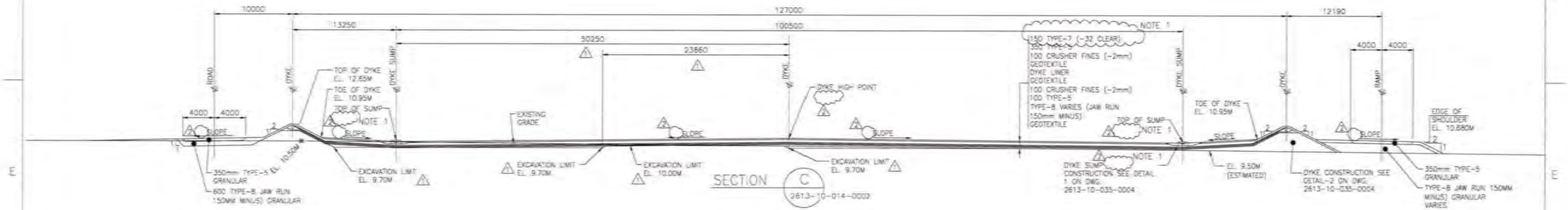
MILNE PORT – SITE PREPARATION
BULK FUEL STORAGE
SITE GRADING PLAN

SCALE	DWG. NO.	REV.
1:500 OR AS NOTED	H349000-2613-10-014-0002	2

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)







AS BUILT

REVISED AS MARKED. ALL OTHER DETAILS CONSTRUCTED WITHIN ACCEPTABLE TOLERANCES.

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NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
2	AS BUILT	JB	MK	JC	2015-01-13
1	SUMP DELETED; EXCAVATION LIMIT REVISED; DIMENSIONS ADDED	BB	RS	TB	13-06-13

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
2	AS BUILT	JC	2015-01-13
1	ISSUED FOR CONSTRUCTION	DS	TB	13-06-14
0	ISSUED FOR CONSTRUCTION	DS	TB	13-05-14

ISSUE AUTHORIZATION

DRAWING NO. | DRAWING TITLE

REFERENCE DRAWINGS

HATCH

DESIGNED BY: D. STEPHENSON DATE 13-02-21	DRAWN BY: M. PETERSON DATE 13-02-21
CHECKED BY: B. BROPHY DATE 13-06-13	DISCIP. ENGR: F. BUTTS DATE 13-06-13
PROJ. DES. COORD: T. THERTELL DATE 13-06-13	PROJ. ENGR: J. OLELAND DATE 13-06-13
PROJ. MGR: S. PERRY DATE 13-06-13	

Baffinland

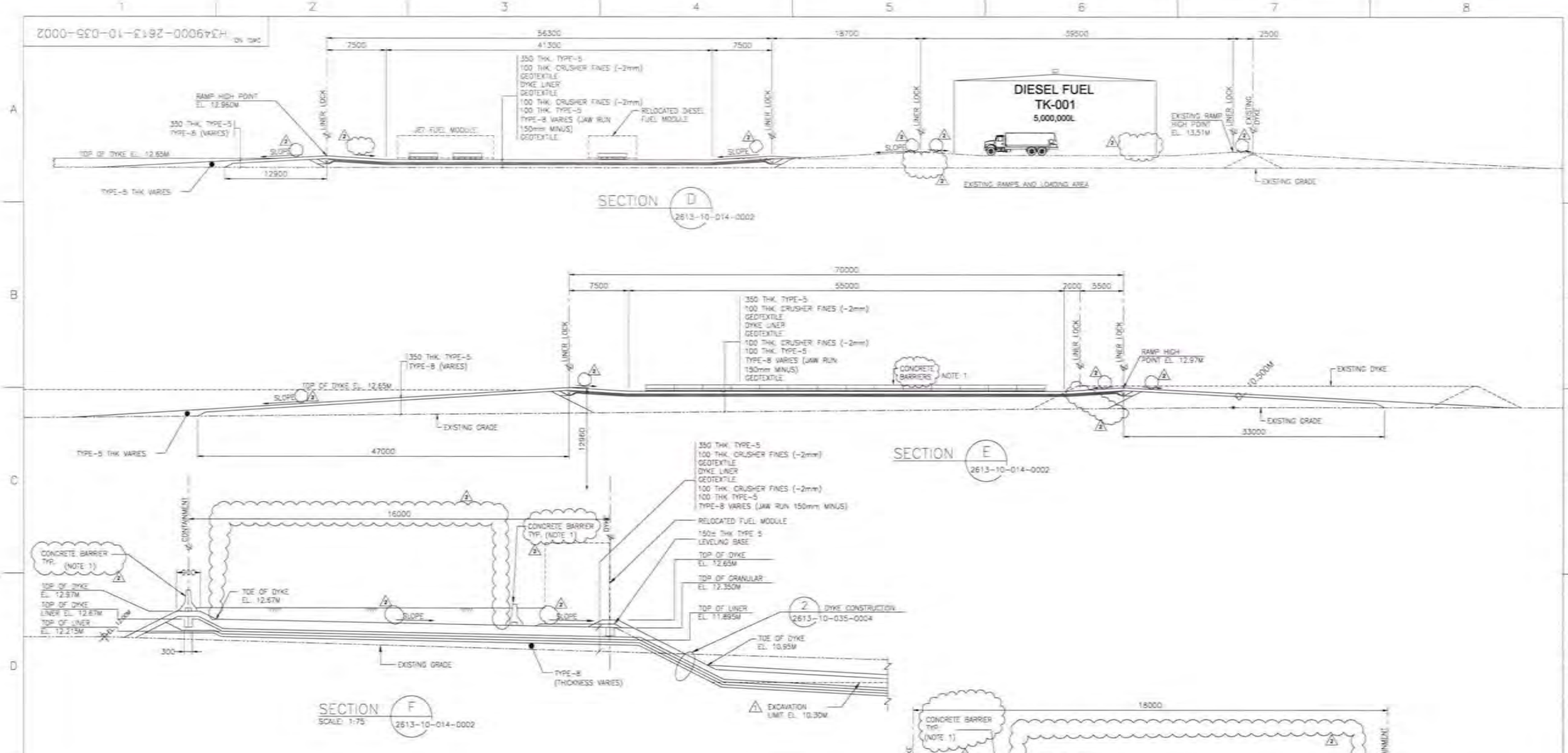
MARY RIVER PROJECT

MILNE PORT – SITE PREPARATION
BULK FUEL STORAGE
DYKE SECTIONS

SCALE	DWG. NO.	REV.
1:250 OR AS NOTED	H349000-2613-10-035-0001	2

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

DWG NO. H349000-2613-10-035-0002



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AS BUILT

REVISED AS MARKED. ALL OTHER DETAILS CONSTRUCTED WITHIN ACCEPTABLE TOLERANCES.

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	BY	CHK'D/APP'D	DATE
2	AS BUILT	JC	DS / JC	2015-01-13
1	EXCAVATION LIMIT REVISED	BB	DS	FB 13-06-13

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
2	AS BUILT	JC	2015-01-13
1	ISSUED FOR CONSTRUCTION	DS	FB 13-06-13
0	ISSUED FOR CONSTRUCTION	DS	FB 13-05-14

ISSUE AUTHORIZATION

HATCH

DESIGNED BY: D. STEPHENSON DATE: 13-03-08	DRAWN BY: M. PETERSON DATE: 13-03-08
CHECKED BY: B. BROPHY DATE: 13-06-13	DSCP. ENGR: F. BUTTS DATE: 13-06-13
PROJ. DES. COORD: T. THERTELL DATE: 13-06-13	PROJ. ENGR: J. CLELAND DATE: 13-06-13
PROJ. MGR: S. PERRY DATE: 13-06-13	

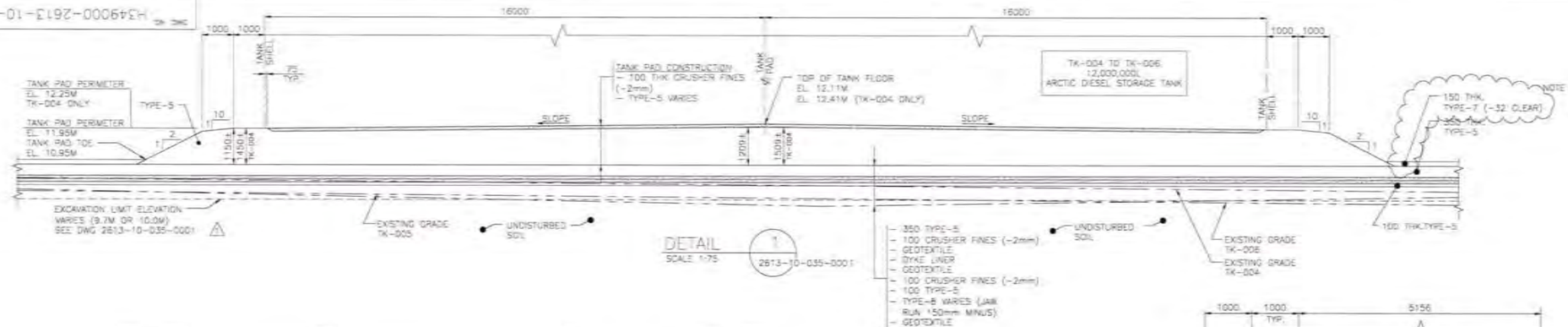
Baffinland

MARY RIVER PROJECT

MILNE PORT – SITE PREPARATION
BULK FUEL STORAGE
SECTIONS THROUGH TRUCK LOADING AREA

SCALE:	DWG. NO.	REV.
1:250 OR AS NOTED	H349000-2613-10-035-0002	2

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)



NOTES:
1. NOT CONSTRUCTED (FUTURE WORK) AS INDICATED.
2. CUT TO UNDERSIDE OF LINER SAND EL.10.3 IF UPGRADE IS ACCEPTABLE TO PLACE LINER SAND ON TOP. IF NOT ACCEPTABLE CUT TO EL. 10.15 BOTTOM OF TYPE 5 FILL.

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DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
2	AS BUILT	SS	JC		2015-01-13
1	EXCAVATION LIMIT REVISED; TK-009 FLOOR ELEV. REVISED & NOTE ADDED;	BB	DS	FB	13-06-13

REVISIONS

AS BUILT

REVISED AS MARKED. ALL OTHER DETAILS CONSTRUCTED WITHIN ACCEPTABLE TOLERANCES

REV.	ISSUE FOR	AUTH. BY	DATE
2	AS BUILT	SS / JC	2015-01-13
1	ISSUED FOR CONSTRUCTION	DS	FB	13-06-13
0	ISSUED FOR CONSTRUCTION	DS	FB	13-05-14

ISSUE AUTHORIZATION

HATCH

DESIGNED BY: D. STEPHENSON, DATE: 03-7-2013	DRAWN BY: M. PETERSON, DATE: 03-7-2013
CHECKED BY: B. BRIDPHY, DATE: 06-13-2013	DISCIP. ENGR.: F. BUTTS, DATE: 06-13-2013
PROJ. DES. COORD.: T. THERTELL, DATE: 06-13-2013	PROJ. ENGR.: J. CLELAND, DATE: 06-13-2013
PROJ. MGR.: J. CLELAND, DATE: 06-13-2013	

Baffinland

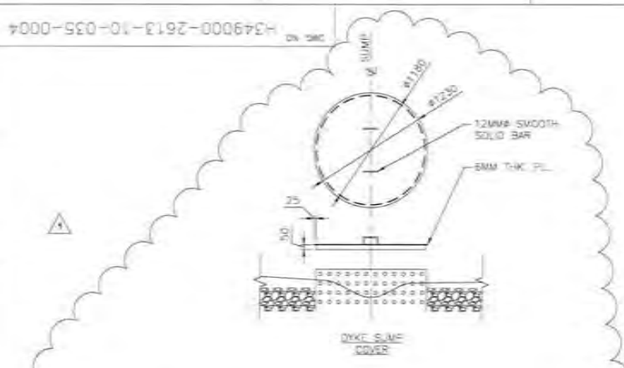
MARY RIVER PROJECT

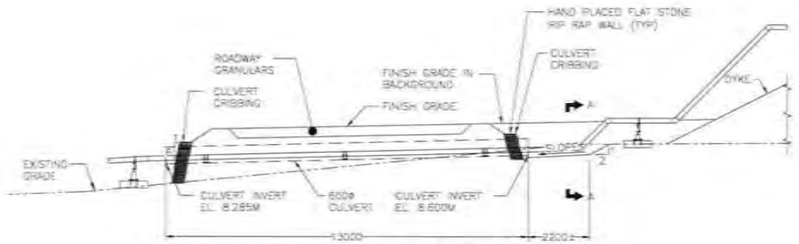
MILNE PORT – SITE PREPARATION
BULK FUEL STORAGE
TANK PAD DETAILS

SCALE	DWG. NO.	REV.
1:50 OR AS NOTED	H349000-2613-10-035-0003	2

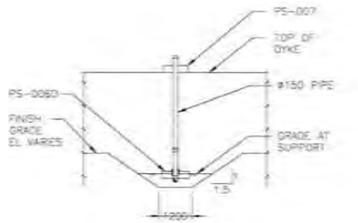
ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

H349000-2613-10-035-0004

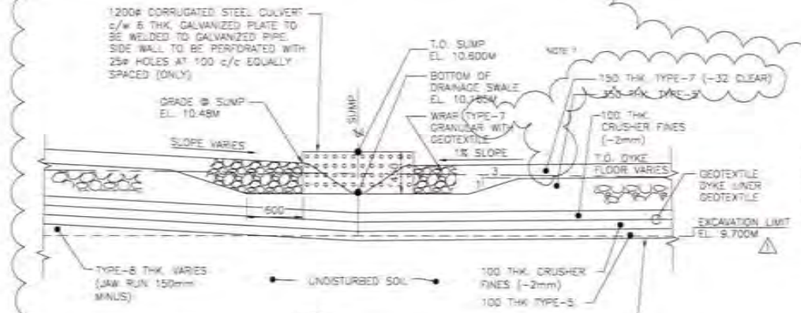




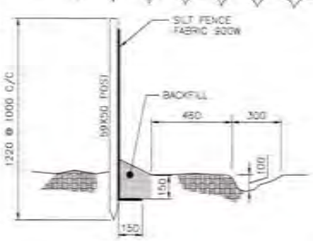
DETAIL 4
SCALE 1:100
2613-10-014-0002



SECTION A
SCALE 1:100
2613-10-035-0004



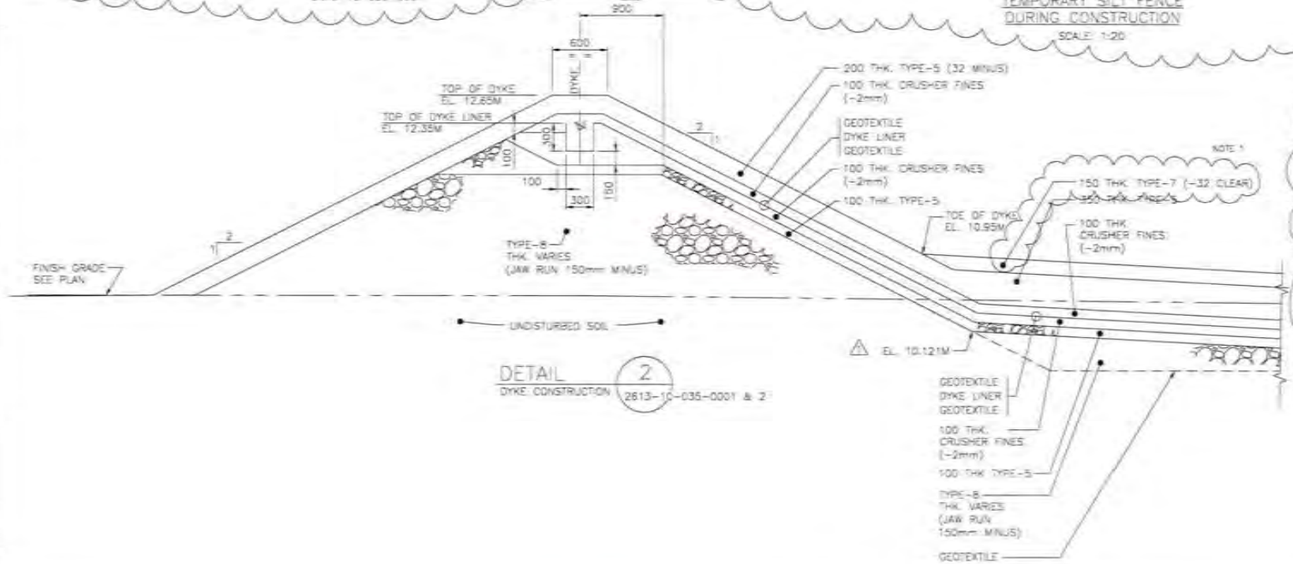
DETAIL 1
DYKE SUMP CONSTRUCTION
2613-10-014-0002 & 2613-10-035-0001



SILT FENCE

TYP. FENCE JOINT
NTS

TEMPORARY SILT FENCE DURING CONSTRUCTION
SCALE 1:20



DETAIL 2
DYKE CONSTRUCTION
2613-10-035-0001 & 2

NOTE:
1. NOT CONSTRUCTED (FUTURE WORK) AS INDICATED.

AS BUILT

REVISED AS MARKED. ALL OTHER DETAILS CONSTRUCTED WITHIN ACCEPTABLE TOLERANCES

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
2	AS BUILT	JB	DS	FB	2015-01-13
1	EXCAVATION LIMIT & DETAIL 2 REVISED	BB	DS	FB	13-06-13

REVISIONS

REV	ISSUE FOR	AUTH. BY	DATE
2	AS BUILT		2015-01-13
1	ISSUED FOR CONSTRUCTION	DS	FB	13-06-13
0	ISSUED FOR CONSTRUCTION	DS	FB	13-05-14

ISSUE AUTHORIZATION

HATCH

DESIGNED BY	DRAWN BY
D. STEPHENSON DATE: 3/6/2013	M. PETERSON DATE: 3/6/2013
CHECKED BY	DISCIP. ENGR
S. SROPHY DATE: 13/6/2013	F. BUTTS DATE: 13/6/2013
PROJ. DES. COORD.	PROJ. ENGR
T. THERTELL DATE: 13/6/2013	J. CLELAND DATE: 13/6/2013
PROJ. MGR.	
J. CLELAND DATE: 13/6/2013	

Baffinland

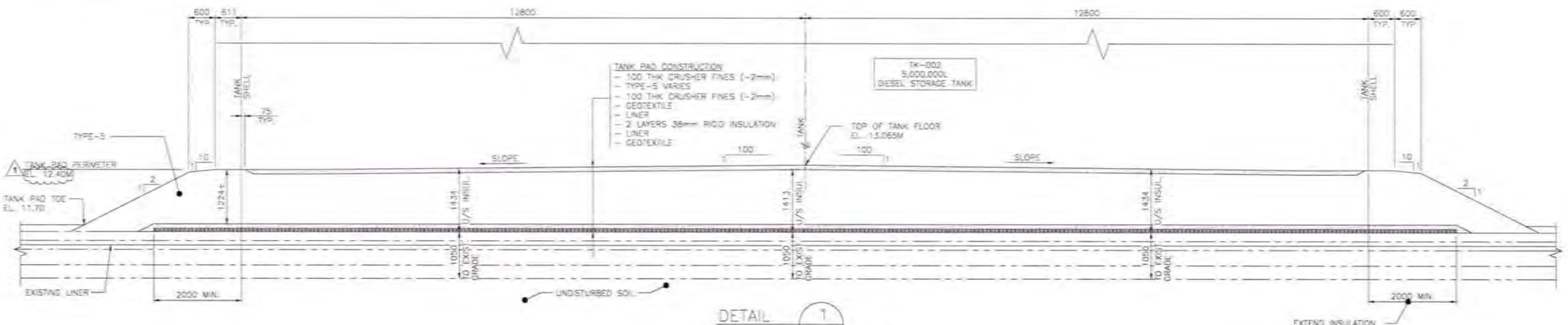
MARY RIVER PROJECT

MILNE PORT – SITE PREPARATION
BULK FUEL STORAGE
DYKE SECTIONS AND DETAILS

SCALE	DWG. NO.	REV.
1:50 OR AS NOTED	H349000-2613-10-035-0004	2

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

DWG NO H349000-2613-10-035-0005



DETAIL 1
2613-60-042-0002

AS BUILT

REVISED AS MARKED. ALL OTHER DETAILS CONSTRUCTED WITHIN ACCEPTABLE TOLERANCES.

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DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
1	AS BUILT	JB	SV	JC	2015-01-13

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
1	AS BUILT	SV	JC 2015-01-13
0	ISSUED FOR CONSTRUCTION	DS	FB 13-05-16

ISSUE AUTHORIZATION

HATCH

DESIGNED BY: D. STEPHENSON DATE: 13-03-07	DRAWN BY: M. PETERSON DATE: 13-03-07
CHECKED BY: E. BONO DATE: 13-05-16	DISCIP. ENGR.: F. BUTTS DATE: 13-05-16
PROJ. DES. COORD.: T. THERTELL DATE: 13-05-16	PROJ. ENGR.: J. CLELAND DATE: 13-05-16
PROJ. MGR.: S. PERRY DATE: 13-05-16	

Baffinland

MARY RIVER PROJECT

MILNE PORT
TK-002 TANK PAD
DETAIL

SCALE: 1:50 OR AS NOTED	DWG. NO. H349000-2613-10-035-0005	REV. 1

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

H349000-2610-05-031-0001

PIG RECEIVER
PIG INDICATOR
PIG RECEIVER
PIG INDICATOR
PIG LAUNCHER
HOSE CAMLOCK ADAPTER
FUEL TANKER OFFLOAD
FLOATING HOSE
CONTAINMENT BOOM

VENDOR DATA DOCUMENT No.: E349000-PM004-70-083-0003 SUB 02
TO NEW DIESEL MODULE
ø150 150# WN FLANGES

2613-TK-005
ARCTIC DIESEL STORAGE TANK
12 000 000 L

2613-TK-006
ARCTIC DIESEL STORAGE TANK
12 000 000 L

2614-TK-007
JET A1 STORAGE TANK
750 000 L

2614-TK-008
JET A1 STORAGE TANK
750 000 L

2613-TK-002
ARCTIC DIESEL STORAGE TANK
5 000 000 L

2613-TK-004
ARCTIC DIESEL STORAGE TANK
12 000 000 L

2614-TK-009
JET A1 STORAGE TANK
750 000 L

2613-TK-001
ARCTIC DIESEL STORAGE TANK
5 000 000 L

RADAR GAUGE
PRESSURE INDICATOR (PI)
ø150 150# WN FLANGE & BLIND FLANGE
UNDER WING ADAPTER
HOSE CAMLOCK ADAPTER

VENDOR DATA DOCUMENT No.: E349000-PM004-50-042-0002-003 SUB 03
TO NEW JET-A1 MODULE

VENDOR DATA DOCUMENT No.: E349000-PM004-70-083-0003 SUB 02
TO EX. DIESEL MODULE

REFERENCE DRAWINGS	
DRAWING NO.	DRAWING TITLE
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H349000-1000-T5-041-0006	LEGEND SHEET 6 OF 7 - EQUIPMENT
H349000-1000-T5-041-0005	LEGEND SHEET 5 OF 7 - INSTRUMENTATION
H349000-1000-T5-041-0004	LEGEND SHEET 4 OF 7 - INSTRUMENTATION
H349000-1000-T5-041-0003	LEGEND SHEET 3 OF 7 - PIPING
H349000-1000-T5-041-0002	LEGEND SHEET 2 OF 7 - ASSET TAGGING
H349000-1000-T5-041-0001	LEGEND SHEET 1 OF 7 - ASSET TAGGING

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REVISIONS				
NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
1	AS-BUILT				

AS BUILT
REVISED AS MARKED. ALL OTHER DETAILS CONSTRUCTED WITHIN ACCEPTABLE TOLERANCE.

ISSUE AUTHORIZATION				
REV.	ISSUE FOR	AUTH. BY	DATE
1	AS-BUILT	SH	2015-01-07
0	ISSUED FOR CONSTRUCTION	DS	FS	13-10-10

HATCH

DESIGNED BY: D. STEPHENSON DATE 13-03-07	DRAWN BY: E. BOND DATE 13-03-07
CHECKED BY: D. STEPHENSON DATE 13-10-10	DISCIP. ENGR: F. BUTTS DATE 13-10-10
PROJ. DES. COORD: T. THERTELL DATE 13-10-10	PROJ. ENGR: J. CLELAND DATE 13-10-10
PROJ. MGR: S. PERRY DATE 13-10-10	

Baffinland

MARY RIVER PROJECT

MILNE PORT
TANK FARM
P&ID

SCALE	DWG. NO.	REV.
NTS OR AS NOTED	H349000-2610-05-031-0001	1

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

2015-01-08
$FILES
$DATE$
$USERNAME$
$TIME$

Appendix B

Annual Geotechnical Inspection

A. BHM 13-053: Annual Geotechnical Inspection 2013-08-31 Baffinland Iron Mines Corporation Mary River Project ***[17 pages]***

B. BHM 14-084: Annual Geotechnical Inspection Baffinland Iron Mines Corporation Mary River Project – 2014 Inspections ***[59 pages]***

ANNUAL GEOTECHNICAL INSPECTION
Baffinland Iron Mines Corporation
Mary River Project

Prepared for:

Mr. Dave McCann
Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
Oakville, Ontario L6H 0C3

Prepared by:

Mr. Barry H. Martin, P. Eng., MRAIC
Consulting Engineer and Architect
1499 Kraft Creek Road
Timmins, Ontario P4N 7C3

Reference 13-053
August 2013

Barry H. Martin, P. Eng., MRAIC
Consulting Engineer and Architect
1499 Kraft Creek Road
Timmins, Ontario P4N 7C3
705-268-5621 (tel)
705-360-3106 (cell)
barrymartin1499@gmail.com (e-mail)

August 31, 2013

Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
Oakville, Ontario L6H 0C3

Attention: Dave McCann
david.maccann@baffinland.com

RE: ANNUAL GEOTECHNICAL INSPECTION 2013-08-31
BAFFINLAND IRON MINES CORPORATION
OUR REFERENCE NO. 13-053

1.0 INTRODUCTION

Barry H. Martin Consulting Engineer and Architect completed the 6th annual water licence geotechnical inspection of the on-site containment structures at Baffinland Iron Mines Corporation Mary River Project.

The earthwork structures designed to carry water or waste were inspected in accordance with Dam Safety Guidelines 2007 and the solid waste disposal site, was inspected using similar guidelines set out.

The previous 5 annual water license geotechnical inspections were completed by Mr. Martin working on behalf of B. H. Martin Consultants Ltd and GENIVAR Inc. Mr. Martin was the design Engineer on all original structures.

The containment structures for the operation are located at two main campsites comprising the Mary River project being the Mary River site itself and the Milne Inlet site at the sea coast.

The soil structures reviewed are the following:

Mary River Mine Site

1. Bulk Fuel Storage Facility Containment
2. Generator Fuel Storage Facility Containment
3. Polishing Waste Stabilization Pond No. 1
4. Polishing Waste Stabilization Pond No.2 and No. 3 (Constructed as a 2 cell structure)
5. Helicopter Fuel Cell Containment.
6. Barrel Fuel Containment (Constructed as a 2 cell structure).
7. Stove Oil Storage
8. Enviro-Tank Storage (Constructed contiguous with hazardous waste storage and stove oil storage)
9. Hazardous Waste Storage
10. Jet Fuel Tank and Pump Containment
11. Solid Waste Disposal Site
12. Waste Oil Storage Containment

A site plan for the Mary River site showing most containment structures is attached.

Milne Inlet Site

1. Bulk Fuel Containment Facility
2. Polishing/Waste Stabilization Pond
3. Barrel Fuel Storage (Constructed as a 2 cell structure)
4. Hazardous Waste Storage (Constructed as a 2 cell structure)
5. Oil and Antifreeze Containment
6. Jet "A" Pump Containment
7. 5 M Litre Steel Fuel Storage Tank Containment which has now been expanded to contain 48.25m litres

8. New Effluent Pond to accommodate the new camp

This report presents the findings.

2.0 METHODOLOGY FOR INSPECTION

The geotechnical inspector was Mr. Barry H. Martin, P. Eng., who reviewed the sites on August 29, 30 and 31, 2013. The inspections were focused principally on the following aspects:

1. The structures were inspected for conformance with the design basis as presented in as-constructed and as-built drawings (provided in the first annual report).

2. The structures were specifically inspected for settlement, cracking and seepage through the berms.

3. The areas around the sites were examined for evidence of seepage.

   Construction drawings are attached for new structures.

   Photographs were taken to document observations made during the inspection and are attached.

3.01 MARY RIVER CAMP

3.01 General

There had not been a particularly large amount of rainfall in the month immediately preceding the inspection, although there had been a large amount of precipitation at the end of July.

Hence, it was expected that there would be some water in the containment dykes.

The weather at the time of the inspection was at freezing and minor snow flurries had occurred in the week preceding the inspection as well as during the inspection.

A monitoring surveillance program is in place to test storm water that does accumulate within the dykes. As required, water that does not meet water license effluent requirements is treated on site prior to release.

At the Bulk Fuel Storage Facility Containment , the water that collects within the dyke is treated at the end of the containment structure.

We report on the Waste Oil Storage Containment for the first time.

3.02 Bulk Fuel Storage Facility

General Conditions

The containment structure has not varied from its use as noted in the2009 report. Some bladders are empty and some bladders are currently full.

Stability

At the time of our review, the water had not been removed for a period from within the containment and water was ponding just above the level of the gravel within the bottom of the containment. There was still considerable factor of safety against failure of oil holding bladders within the dykes with the water level as it exists.

The structure was visually inspected for any signs of cracking or subsidence. There was no indication of any settlement seepage or cracking in the soil structures that formed the dykes. As well, there was no indication of seepage at the base of the structure around the exterior. The soil structure is considered to be stable in the present condition and is in conformance with the design basis for the facility.

There had been a considerable amount of precipitation prior to our inspection. The presence of the water in the gravel to just above the level of the top of the gravel is an indication of the integrity of the liner.

Capacity

There was a minor concern at the load-out end of the facility where the gravel ramps over the berm have worn down and some gravel from the ramps had migrated into the loading area at the end of the dyke.

Some grave was removed while we were on site to return this area to its design intent.

Recommendations

With the gravel removed, we have no further recommendations with respect to this structure.

3.03 Generator Fuel Storage Containment

General Conditions

The containment structure has not varied from its use since our 2010 annual inspection. At that time our recommendation was to limit the fuel contained in this containment facility to 77,376 litres.

There is currently one bladder in this containment facility that has a capacity when full of 120,000 litres. This bladder contains 77,376 litres when the bladder is 32" high. The guideline for Baffinland Iron Mines is to fill this bladder to no more than 76 cm (30") which represents 70,097 litres.

There is a sign posted to limit the bladder height at 30".

At the time of our visit on August 29, 2013, the bladder height was measured at 20". There was a small amount of water ponding in the bottom of the containment at the time of our review.

Stability

The structure was visually inspected for any signs of subsidence or cracking and no such indications were noted. There was no sign of seepage at the base of the structure noted. The soil structure is considered to be stable in its present condition and is in conformance with our design principles.

Recommendation

We recommended that the small amount of water ponding above the bottom of the containment be removed by creating a sump in the gravel and pumping out the water to below the gravel surface. This was done while we were on site.

We recommend that Baffinland Iron Mines continue to control the fuel in the bladder at a height of 30".

3.04 Polishing/Waste Stabilization Pond No. 1

General Conditions

PWSP No. 1 continues to be utilized as a holding facility for sewage plant effluent that does not meet water effluent quality criteria.

Currently the pond is be used primarily as a repository for sewage sludge that is periodically removed from the RBC.
The supernatant from PWSP No. 1 is periodically decanted to PWSPs Nos. 2 and 3 where it is tested and treated as required to meet Water Licence effluent requirements.

At the time of our visit there was considerable freeboard to accommodate further sewage and the structure readily conforms to its design intent.

Stability

Our review of the area around the pond at the base of the slopes showed no sign of seepage and hence we conclude that the liner has been effective in containing sewage and there are no tears or ruptures in the membrane, excepting some minor tears from past activity at the top of the dyke well above the allowable effluent level in the structure in the horizontal portion of the membrane.

A review of the top of the dyke showed no indication of cracking or settlement which would indicate stresses within the structure.

Most tears that had occurred in the liner on the top of the dyke have been patched during the period between reviews in 2008 and 2009 and are holding well. As well, there are no signs of weather related deterioration of the liner where it is exposed.

Monitoring points have been set up on the top of the dyke and have been monitored since 2009. Settlements of approximately 26 cm have occurred since that time. These settlements have not led to any stress cracks in the structure. These settlements are an indication of consolidation in the berm structure and the active layer beneath the dyke and are not considered to be of any concern.

There appears to be no sign of erosion of the dykes, even with the large amount of precipitation that occurred this current summer season.

Recommendations

We recommend that monitoring of the top of the berm continue on an annual basis through 2014. With the excellent condition of the dyke construction, we see no reason to complete this function other than annually prior to the next inspection.

3.05 Polishing Ponds/Waste Stabilization Ponds #2 and #3

General Conditions

This structure was designed and constructed as a 2 cell structure.

Treated sewage effluent from the RBC is currently discharged to PWSPs Nos. 2 and 3. The treated effluent is tested for Water Licence effluent requirements, treated if necessary, and discharged to the environment.

At the time of our visit there was considerable freeboard to accommodate further sewage and the structure readily conforms to its design intent.

Stability

Our review of the area around the pond at the base of the slopes showed no sign of seepage and hence we conclude that the liner has been effective in containing the sewage and there are no tears or ruptures in the membrane.

Longitudinal cracking which appeared in the dykes of PWSP#3 due to the melt of permafrost wedges in 2009 has not reoccurred and we consider this structure to be stable in its present condition.

Monitoring points have been set upon the top of the dyke and have been monitored since 2009. Settlements in the order of up to 26 cm have occurred since that time. These settlements have not led to any stress cracks in the structure.

There appears to be no sign of erosion of the dykes and plants are continuing to seed themselves on the dykes. This growth is minimal however.

Recommendations

We recommend that monitoring of the top of the berm continue on an annual basis through 2014. With the excellent condition of the dyke construction, we see no reason to complete this function other than annually prior to the next inspection.

3.06 Helicopter Fuel Tank Containment

General Conditions

The structure was designed and constructed as a single cell structure that contains a 1000 gal fuel storage tank.

The structure currently conforms to its design intent,

In the past, a liner clad wood curb had been added to the top of the berm to prevent the erosion of gravel off the berm, caused by pulling the fuel hose from within the dyke out to the helicopters to provide them with fuel.

Stability

Our review of the area around the pond at the base of the slopes showed no sign of seepage. There is a minor amount of water ponding in the bottom of the containment indicating the integrity of the liner.

A review of the exterior and the top of the berms showed no sign of cracking or settlement which would indicate stress within the structure.

The structure is considered to be stable in its present condition.

Recommendation

We have no recommendations with respect to this structure.

3.07 Barrel Fuel Containment

General Conditions

This particular structure which we called "Barrel Fuel Containment" in our previous inspection reports is a two cell structure which is currently used to accommodate cubes of lubricant in one cell and a number of stove fuel barrels on skids and a number of fuel dispensing tanks in the other cell.

Stability

Our review of the area around this containment structure showed no sign of seepage. This shows that there is reasonably little chance of tearing or rupture of the membrane having taken place.

A review of the exterior and top of the dyke showed no sign of cracking or settlement which would indicate stresses within the structure.

The structure is considered to be stable in its present condition.

Recommendations

We have no recommendations with respect to this structure.

3.08 Hazardous Waste Storage

General Conditions

This particular cell was constructed contiguous with an existing cell, which is referred to on site as the "Enviro Tank Storage", from drawings by our office in 2010 and conforms to our drawings. It is also contiguous with the Stove Oil Storage cell.

This structure contains barrels and containers of hazardous waste.

Stability

Our review of the area around this cell at the base of the slopes, showed no sign of seepage.

The structure appears stable in its present condition.

Recommendation

There are no recommendations at this time.

3.09 Enviro Tank Storage

General Conditions

This particular structure is constructed contiguous with the Hazardous Waste Storage constructed in 2010 and the Stove Oil Storage cell. It is now empty.

Our review of the area around this cell at the base of the slopes showed no sign of seepage.

The structure is stable in its present condition.

Recommendations

There are no recommendations at this time.

3.10 Stove Oil Storage

General Conditions

This particular structure had been used to store barrels of stove fuel in 2011

The structure is currently empty.

This structure was constructed in accordance with a standardized drawing provided by this office utilizing a one piece liner.

Stability

Our review of the area around the containment structure shows no sign of seepage. This shows that there is reasonably little chance of tearing or rupture of the membrane having taken place.

A review of the exterior and the top of the dyke showed no sign of cracking or settlement which would indicate stresses with the structure.

The structure is considered to be stable in its present condition.

3.11 Jet Fuel Tank and Pump Containment

This particular structure was reconstructed based on our recommendation of the 2012 Geotechnical Inspection.

The construction was completed in accordance with our recommendations for such structures and the liner was constructed as a one piece liner with geotextile protection on both sides and gravel over the geotextile as protection.

The construction appears proper and the structure is in excellent condition.

Minor water ponding confirms the integrity of the liner.

Stability

Our review of the area around this cell at the base of the slopes showed no sign of seepage.

The structure is stable in its present condition.

Recommendations.

There are no recommendations at this time.

3.12 Solid Waste Disposal Site

Berms appear stable and no erosion appears to have taken place.

Solid waste is being placed at the edge of the site and progressively covered.

The disposal is being done in exact conformity with plans prepared and guidelines set out for disposal of solid waste.

3.12 Waste oil Storage Containment

This particular structure has been used to store small amounts of waste oil.

The structure was constructed in accordance with standardized drawings designed by myself and utilized a one piece liner.

Stability

Our review of the area around the containment structure showed no sign of seepage.

There was water ponding in the bottom of the containment structure proving the integrity of the liner.

A review of the exterior and top of the dyke showed no sign of cracking or settlement which would indicate stresses within the structure.

The structure is considered to be stable in its present condition.

Recommendations

We have no recommendations with respect to this structure.

3.13 Overview

This report is the 6th annual Geotechnical Inspection at the Mary River and Milne Inlet sites on behalf of Baffinland Iron Mines Corporation.

Over this five year period between the first and sixth inspections we have noted the following:

1. The weather conditions are such that little or no erosion takes place from wind or rain and the dykes constructed of the sand/gravel soil remain stable at slopes of 3:1 and 4:1.

2. The dykes, after a 5 year period still have only minor vegetation growing on the horizontal surfaces and it shall most certainly take decades for the dykes to naturally vegetate to form a stabilized surface.

   Nonetheless, there has been no erosion to the surface over the last 5 year period.

3. With the construction of the new camp and facilities in process much of what has been reported on is due for demolition in the immediate future.

4.0 MILNE INLET

4.01 General

As with Mary River, the containment facilities over the 5 years that we have been doing Annual Geotechnical Inspections for, have changed in function from their initial use.

In order to maintain continuity, we have maintained the same names as with previous reports.

For example, the Hazardous Waste Containment structure is still a containment structure that is in excellent condition, but it is no longer being used to contain hazardous waste. Instead, this structure is now used to contain cubes of lubricant and barrel fuel. In this report, it still referred to as Hazardous Waste Containment as was its first use for continuity in the reports.

As well, there are new geotechnical structures that have been added to the list of geotechnical structures. These new geotechnical structures are the pads upon which the very large 12M litre and smaller fuel tanks sit upon, the containment dykes around this very large tank farm and the new effluent pond for the new sewage plant.

These structures have been reviewed.

4.2 Bulk Fuel Containment Facility

General Conditions.

This particular containment has been in place for in excess of five years. It is currently being decommissioned and the last of the fuel is being removed from a small number of remaining bladders.

As well, the last of the oil impacted water contained in this containment area is being treated.

The dykes around this containment areas have remained stable and the ponding of water confirms the integrity of the liner.

It is intended that the oil impacted sand in the containment facility be landfarmed in the next season being 2014. We understand that this oil impacted sand shall remain in the containment area until the landfarm treatment area is constructed.

The structure around the fuel bladdders and the area formerly occupied by fuel bladders conforms to the original design.

A review of the interior of the containment showed minor ponding of water. The ponding of water, although minor, confirms the integrity of the structure.

The treatment system used to treat the water which collects in the structure, is in place and operational and we understand shall remain so until the structure is decommissioned.

Stability

Our review of the area around the pond at the base of the slopes, showed no sign of oil, water, or oil/water mixture and hence we conclude that the integrity of the liner, has been maintained. There were no tears or ruptures in the liner observed.

There was no sign of any settlements or seepage, at the base of the soil structures forming the dykes.

The structure is considered to be stable in its present condition.

Recommendations

The performance of the structure has been tested since 2009 with the ponding of water. The observations noted during past inspections have supported the conservative design of the structure. We have no recommendations at this time.

4.03 Existing Polishing/Waste Stabilization Pond

General Conditions

This particular pond is the original PWSP that was constructed prior to 2008, is associated with the original sewage plant, and is servicing the man camp that is still in place.

The PWSP was designed as storage and polishing of effluent from the man camp that could not be immediately released to the environment.

The camp was occupied with a large construction crew and the sewage plant was operating as designed. The PWSP was not being utilized to contain additional effluent at the time of our review.

There was considerable capacity remaining in the PWSP at the time of our inspection.

Currently the PWSP conforms to the design basis for the facility.

Stability

With the PWSP constructed as it is, the structure is considered stable for long term use.

There was no sign of seepage at the bottom of the dyke. There were no signs of settlement or cracking, which are signs of stress in the structure.

Recommendations

Currently, the Milne Inlet PWSP conforms to the design intent and we have no recommendations.

4.04 Barrel Fuel Storage

General Conditions

This particular structure is constructed as a two cell structure.

This structure was originally intended for use as barrel fuel storage. However with time, this structure's use changed to that of storing lubricant cubes as well as barrel storage.

For continuity, we continue to refer to this storage/containment structure as Barrel Fuel Storage.

The structure around these two cells conforms to standardized drawings, prepared by our office for such a structure.

At the time of our inspection, there were two cells in use with minor water ponding in the bottom of the two cells.

Stability

Our review of the area around the ponds, at the base of the slopes, showed no signs of seepage.

The structures are considered stable in their present conditions.

Recommendations

We have no recommendations with respect to this structure at this time.

4.05 Hazardous Waste Storage

General Conditions

This particular structure is constructed as a 2 cell structure.

The structure conforms to the design basis for the facility.

At the time of our last inspection, this structure was utilized to store hazardous waste contained in barrels.

Since last year, the waste has been tested and hazardous materials have been removed and are in the process of being shipped out off site. Materials that have proven to be non-hazardous are currently in barrels adjacent to the structure awaiting disposal.

This containment structure, is now used as containment for barrel fuel and lubricant cubes.

The minor ponding of water in the bottom of the cells confirms the integrity of the liner.

Stability

Our review of the area around the dykes, at the base of the slopes, showed no sign of seepage.

There were no signs of stress noted in the structure. The structure is considered stable in its present condition.

Recommendations

Currently, this containment structure conforms to the design intent and we have no recommendations.

4.06 Oil and Antifreeze Containment

General Conditions

This particular structure is located between the air strip and the Bulk Fuel Storage.

The structure around this containment area conforms to standardized drawings prepared under my direction in the past.

Stability

Our review of the area around the structure at the base of the slopes, showed no signs of seepage.

There was no signs of stress in the dykes and the structure is considered stable.

Recommendations

We have no recommendations with respect to this structure.

4.07 Jet "A" Pump Containment

General Conditions

This small cell on the north side and adjacent to the Bulk Fuel Storage Containment is to control spillage during refuelling.

There was water ponding above the sand cover which confirms the integrity of the liner.

Stability

Our review of the area around the base of the dykes, showed no sign of seepage.

There was no cracking or settlement observed in the dyke structures.

Recommendations

We have no recommendations at this time with respect to this structure.

4.08 Fuel Tank Farm

General Conditions

This particular structure was discussed in the 2012 Annual Geotechnical Report as "5M litre Steel Fuel Storage Tank Containment".

The fuel storage facility has been considerably expanded since 2012.

There has been a second 5m litre tank constructed and two 12M litre tanks are under construction.

Pads have been constructed for one more 12 M litre tank and 3 more 0.75 M litre tanks which were being delivered as the report was being written.

We noted the following:

1. The containment structure was put in place prior to the construction of the tanks and the pads for the tanks were constructed with the containment dykes.

2. The dykes that had been constructed as containment for the initial 5 M litre tank, were incorporated into the overall dyke construction for the entire tank farm.

3. The drainage of the tank farm structure now utilizes the sump constructed for the initial tank.

4. The dykes incorporate rip-rap on the exterior of the dyke.

5 We would classify the quality of the work in the construction of the dykes and pads, including the base of the structure as exceptionally good and of a quality that should last for decades.

Stability

We noted no sign of weakness in any of the construction.

Design

We attach a copy of the design drawings of the fuel storage site being the following Hatch drawings:

2613-10-35-001
2613-10-035-002
2613-10-035-004

These drawings set out the plan, section, and details of the containment structure. The construction conforms to these drawings.

4.09 New Effluent Pond

General Conditions

This New Effluent Pond was constructed in 2013 to accommodate the new sewage plant and serve as a PWSP for this new plant which had yet to be put into operation at the time of our inspection.

We noted the following;

1. The pond has a design capacity of 1080 m^3 with 1.0 m freeboard.
2. The dyke is constructed of 150 mm crushed mine rock material that is not subject to erosion.
3. The dyke has a summer design capacity of 2230 m^3 with 0.3 m freeboard.
4. The quality of construction is such that this structure should last for many decades.

Stability

We noted no sign of weakness in any of the construction.

Design

We attach a copy of the following Hatch drawing:

2735-10-035-0001
2735-10-035-0002

These drawings set out the plan, section, and details of the Effluent Pond construction.

4.10 Overview

The permanent facilities for Milne Inlet are currently under construction and many of the facilities reported on are scheduled for decommissioning over the next 12 months as the new facilities are constructed.

Design drawings and photos of new facilities have been included with this report.

Respectfully submitted

Barry H. Martin, P. Eng., MRAIC
BHM/jw

REGISTERED PROFESSIONAL ENGINEER
B.H. MARTIN
LICENSEE
NWT/NU

BHM Project No.: 14-084

BAFFINLAND IRON MINES CORPORATION

ANNUAL GEOTECHNICAL INVESTIGATION
MARY RIVER PROJECT
2014 INSPECTIONS

Prepared for:

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PHOTOS

DRAWINGS

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October 28, 2014

Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
Oakville, Ontario L6H 0C3

Attention: Jeff Bush
Jeff.bush@baffinland.com

RE: ANNUAL GEOTECHNICAL INSPECTIONS
BAFFINLAND IRON MINES CORPORATION
OUR REFERENCE NO. 14-084

1.0 INTRODUCTION

Barry H. Martin, P. Eng., Consulting Engineer completed the 7th annual water licence geotechnical inspection of the following on-site engineered facilities:

Pit Walls
Quarries
Landfills
Land farms
Bulk Fuel Storage Facilities
Sediment Ponds
Collection Ponds
Polishing and Waste Stabilization Ponds

The inspection that took place July 31st/August 5th is the first phase of a biannual inspection to be carried out within the open water shipping season at the two Baffinland sites in Mary River at the mine site and at Milne Inlet at the port facility. A second inspection took place September 25th/30th.

The inspections were carried out in accordance with the guidelines set out in "Dam Safety Guidelines 2007" as published by the Canadian Dam Association.

The inspections were completed by Mr. Barry H. Martin, P. Eng., the design Engineer for the initial containment facilities at both Mary River and Milne Inlet, the runway extension, initial bridges on the connecting road plus the solid waste disposal site.

The previous 6 annual water license geotechnical inspections were completed by Mr. Martin.

The facilities inspected are as per the following:

Mary River Site

1. Bulk Fuel Storage Containment
2. Genorator Fuel Storage Facility Containment
3. Polishing/Waste Stabilization Pond No. 1
4. Polishing/Waste Stabilization Ponds No. 2 and No. 3 (Constructed as a 2 cell structure)
5. Helicopter Fuel Cell Containment
6. Barrel Fuel Containment (Constructed as a 2 cell structure)
7. Hazardous Waste Storage
8. Enviro-Tank Storage (Constructed contiguous with hazardous waste storage and stove oil storage)
9. Stove Oil Storage
10. Jet Fuel Tank and Pump Containment
11. Solid Waste Disposal Site
12. Waste Oil Storage Containment
13. Minesite Steel Fuel Tank Farm Containment
14. Quarry

A site plan for the Mary River site showing most structures reviewed is attached.

Milne Inlet Site

1. Bulk Fuel Containment Facility
2. Existing Polishing/Waste Stabilization Pond
3. Barrel Fuel Storage (Constructed as a 2 cell structure)
4. Hazardous Waste Storage (Constructed as a 2 cell structure)
5. Oil and Antifreeze Containment
6. Jet “A” Pump Containment

7. Fuel Tank Farm

8. New Sewage Effluent Pond

9. Land farm

10. Contaminated Snow Containment

11. Sediment Ponds East and West

12. Quarry

A site plan for the Milne Inlet site is attached.

2.0 METHODOLOGY FOR INSPECTION

The geotechnical inspector was Barry H. Martin, P. Eng., who reviewed the two sites for the first of the biannual inspections on July 31st, 2014 to August 4th, 201, just as the annual shipping season commenced and on Sept 25th, 2014 to Sept. 30th, 2014 for the second inspection, just as the shipping season ended.

The inspections primarily focused on the following aspects:

1. The structures were inspected for conformance with the design basis as presented in "as-constructed" and "as-built drawings (provided in the first and subsequent reports).

2. The structures were specifically inspected for settlement, cracking, and seepage through the berms.

3. The areas around the structures were examined for evidence of seepage.

4. Quarry walls were reviewed for relative stability. I note that the quarries were active removal areas and long term stability was not yet established.

5. New structures under construction were reviewed for conformity with design drawings.

6. Photographs were taken to document observations made during the inspection and are attached.

3.0 MARY RIVER CAMP

3.01 General

As with other years, there had been a fair amount of rainfall at Mary River preceding the first inspection and it was expected that there would be some water in the containment dykes. Such was the case. During the second inspection we found ice at the bottom of the containment areas.

A monitoring program is in place to test storm water that does accumulate within the containment structures. As reviewed, the water that does not meet the water license effluent requirements is treated on site prior to release.

At the Bulk Fuel Storage Facility Containment, the water that collects within the dyke is treated at the end of the containment structure.

We report on the quarry and the steel fuel tank containment structure for the first time.

The bulk fuel storage containment is coming due for decommissioning and shall only be in use to accommodate jet "A" fuel until the end of this summer/autumn season.

3.02 Bulk Fuel Storage Facility

General Conditions

A new steel tank storage facility has been constructed at the mine site and it is intended that this facility shall replace the bulk fuel storage facility during this summer season at which time the remaining bladders still containing product shall be emptied.

Only Jet A fuel shall be accommodate by this facility until November at the latest when the total use of this facility shall be discontinued and it shall be due for decommissioning and a final decision has been made on land farming of oil impacted granular cover within the structure.

Stability

At the time of our first review, water had not been removed for a period from within the containment and water was ponding above the level of the gravel within the bottom of the containment. There was still considerable factor of safety against failure of oil holding bladders within the dykes with the water level as it exists. Such was the case during the second inspection, but the water had frozen.

The structure was visually inspected for any signs of cracking or subsidence. There was no indication of any settlement, seepage, or cracking in the soil structures that formed the dykes. As well, there was no indication of seepage at the base of the structure around the exterior.

The soil structure is considered stable in the present condition and is in conformance with the design basis for the facility.

The presence of water within the structure is an indication of the integrity of the liner.

Recommendations

We have one recommendation. There is limited storage for spills at the load out end of the facility. Water currently ponds above the gravel in this area confirming the integrity of the liner but minimizing the capacity of the structure for spill containment.

We recommend that this water be removed on a regular basis. If the water proves to be oil impacted, it may be pumped to within the storage containment for treatment at a future date.

3.03 Generator Fuel Storage Containment

General Conditions

The containment structure has not varied from its use since our 2010 annual inspection. At that time our recommendation was to limit the fuel contained in this containment facility to 77,376 litres.

There is currently one bladder in this containment facility that has a capacity when full of 120,000 litres. This bladder contains 77,376 litres when the bladder is 32" high. The guideline for Baffinland Iron Mines is to fill this bladder to no more than 76 cm (30") which represents 70,097 litres.

There is a sign posted to limit the bladder height at 30".

At the time of our visit on August 1, 2013, the bladder height was measured at 21". There was water ponding in the bottom of the containment at the time of our review. At the time of our seond review on Sept 26, 2014 the bladder height was measured at 20" and there was ice just above the gravel in the bottom of the containment.

Stability

The structure was visually inspected for any signs of subsidence or cracking and no such indications were noted. There was no sign of seepage at the base of the structure noted. The soil structure is considered to be stable in its present condition and is in conformance with our design principles.

Recommendation

We recommended that the water ponding above the bottom of the containment gravel cover be removed regularly by creating a sump in the gravel and pumping out the water to below the gravel surface.

We recommend that Baffinland Iron Mines continue to control the fuel in the bladder at a height of 30".

3.04 Polishing/Waste Stabilization Pond No. 1

General Conditions

PWSP No. 1 continues to be utilized as a holding facility for sewage plant effluent that does not meet water effluent quality criteria.

Currently the pond is being used primarily as a repository for sewage sludge that is periodically removed from the RBC.

The supernatant from PWSP No. 1 is periodically decanted to PWSPs Nos. 2 and 3 where it is tested and treated as required to meet Water Licence effluent requirements.

At the time of our first visit there was approximately 4’ of freeboard to accommodate further sewage and the structure readily conforms to its design intent. At the time of our second visist, there was approximately 6’ of freeboard.

Stability

Our review of the area around the pond at the base of the slopes showed no sign of seepage and hence we conclude that the liner has been effective in containing sewage and there are no tears or ruptures in the membrane, excepting some minor tears from past activity at the top of the dyke well above the allowable effluent level in the structure in the horizontal portion of the membrane.

A review of the top of the dyke showed no indication of cracking or settlement which would indicate stresses within the structure.

Many of the tears that had occurred in the liner on the top of the dyke have been patched during the period between reviews in 2008 and 2009 and are holding well. As well, there are no signs of weather related deterioration of the liner where it is exposed.

Monitoring points have been set up on the top of the dyke and have been monitored since 2009. Settlements have occurred since that time. These settlements have not led to any stress cracks in the structure. These settlements are an indication of consolidation in the berm structure and the active layer beneath the dyke and are not considered to be of any concern.

It now can be seen where the structure has settled slightly relative to the soils away from the structure.

There appears to be no sign of erosion of the dykes, even with the large amount of precipitation that occurred this current summer season.

The settlements have had little effect on the integrity of the structure.

Recommendations

We see no reason to continue the monitoring of the top of the berm on an annual basis. With the excellent condition of the dyke construction, we see no reason to continue this function.

3.05 Polishing Ponds/Waste Stabilization Ponds #2 and #3

General Conditions

This structure was designed and constructed as a 2 cell structure.

The supernatant from PWSP #1 is currently discharged to PWSPs Nos. 2 and 3. The treated effluent is tested for Water Licence effluent requirements, treated if necessary, and discharged to the environment.

At the time of our visits there was considerable freeboard to accommodate further sewage and the structure readily conforms to its design intent. There was 5’ of freeboard in one cell and the second cell was empty at the time of our second inspection.

Stability

Our review of the area around the pond at the base of the slopes showed no sign of seepage and hence we conclude that the liner has been effective in containing the sewage and there are no tears or ruptures in the membrane.

Longitudinal cracking which appeared in the dykes of PWSP#3 due to the melt of permafrost wedges in 2009 has not reoccurred and we consider this structure to be stable in its present condition.

Monitoring points have been set upon the top of the dyke and have been monitored since 2009. Settlements have occurred since that time. These settlements have not led to any stress cracks in the structure.

There appears to be no sign of erosion of the dykes and plants are continuing to seed themselves on the dykes. This growth is minimal however.

Recommendations

We see no reason to continue the monitoring of the top of the berm on an annual basis. With the excellent condition of the dyke construction, we see no reason to continue this function.

3.06 Helicopter Fuel Tank Containment

General Conditions

The structure was designed and constructed as a single cell structure that contains a 1000 gal fuel storage tank.

The structure currently conforms to its design intent,

In the past, a liner clad wood curb had been added to the top of the berm to prevent the erosion of gravel off the berm, caused by pulling the fuel hose from within the dyke out to the helicopters to provide them with fuel.

Stability

Our review of the area around the pond at the base of the slopes showed no sign of seepage. There is a minor amount of water ponding in the bottom of the containment indicating the integrity of the liner.

A review of the exterior and the top of the berms showed no sign of cracking or settlement which would indicate stress within the structure.

The structure is considered to be stable in its present condition.

Recommendation

We have no recommendations with respect to this structure.

3.07 Barrel Fuel Containment

General Conditions

This particular structure which we called “Barrel Fuel Containment” in our previous inspection reports is a two cell structure which is currently used to accommodate cubes of lubricant and barrels in the east cell and cubes of lubricant and antifreeze in the west cell.

Stability

Our review of the area around this containment structure showed no sign of seepage. This shows that there is reasonably little chance of tearing or rupture of the membrane having taken place.

A review of the exterior and top of the dyke showed no sign of cracking or settlement which would indicate stresses within the structure.

The structure is considered to be stable in its present condition.

Recommendations

We have no recommendations with respect to this structure.

3.08 Hazardous Waste Storage

General Conditions

This particular cell was constructed contiguous with an existing cell, which is referred to on site as the “Enviro Tank Storage”, from drawings by our office in 2010 and conforms to our drawings. It is also contiguous with the Stove Oil Storage cell.

This structure contains barrels and bags of hazardous waste.

Stability

Our review of the area around this cell at the base of the slopes, showed no sign of seepage.

The structure appears stable in its present condition.

Recommendation

There are no recommendations at this time.

3.09 Enviro Tank Storage

General Conditions

This particular structure is constructed contiguous with the Hazardous Waste Storage constructed in 2010 and the Stove Oil Storage cell. It is now utilized as a wash down cell.

There was concern for the integrity of this cell as the cell was dry and the geotextile is exposed from heavy traffic during our initial inspection. During our second inspection, the cell was holding a small amount of water confirming the integrity of the liner.

Recommendations

We recommend that the geotextile over the liner and the granular cover be made good prior to continuing use of this cell as a wash down cell.

3.10 Stove Oil Storage

General Conditions

This particular structure had been used to store barrels of stove fuel in 2011

The structure again contains barrels of stove oil and some Jet "A" fuel.

This structure was constructed in accordance with a standardized drawing provided by this office utilizing a one piece liner.

Stability

Our review of the area around the containment structure shows no sign of seepage. This shows that there is reasonably little chance of tearing or rupture of the membrane having taken place.

A review of the exterior and the top of the dyke showed no sign of cracking or settlement which would indicate stresses with the structure.

The structure is considered to be stable in its present condition.

3.11 Jet Fuel Tank and Pump Containment

This particular structure was reconstructed based on our recommendation of the 2012 Geotechnical Inspection.

The construction was completed in accordance with our recommendations for such structures and the liner was constructed as a one piece liner with geotextile protection on both sides and gravel over the geotextile as protection.

The construction appears proper and the structure is in good condition.

Minor water ponding confirms the integrity of the liner.

Stability

Our review of the area around this cell at the base of the slopes showed no sign of seepage.

The structure is stable in its present condition.

Recommendations.

There are no recommendations at this time.

3.12 Solid Waste Disposal Site

Berms appear stable and no erosion appears to have taken place on the back and both sides of the site.

Solid waste was being placed at the front edge of the site and was awaiting salvage of wood and lumber prior to the placing of cover at the time of our first site review in August. There was considerably more waste covered during the time of our second review on September 25th.

The disposal was being done in exact conformity with plans prepared and guidelines set out for the disposal of solid waste.

The current footprint as established by the existing covered material and the "blow control" fence at the front of the immediate site shall soon be filled and the site footprint shall have to be expanded within the plans and guidelines set out for this solid waste disposal site.

Surveying for the expansion of the site was taking place at the time of our second review in September.

3.13 Waste Oil Storage Containment

This facility has been decommissioned and removed from the site.

3.14 Minesite Steel Fuel Tank Farm Containment

This fuel tank farm has been constructed since the last annual inspection in 2013 in accordance with drawings and specifications prepared by Hatch Engineering under their supervision.
Drawings setting out the construction details are attached to this report.

All work appears to be complete excepting the installation of the sump pits that are on site awaiting installation and which shall be utilized to facilitate the removal of water that collects from precipitation.

Stability

All work appears to have been completed in accordance with drawings and we have no concerns with the stability of this containment structure.

Recommendations

We have no recommendations to make with respect to this containment once the sump is installed.

3.15 Quarry

General Conditions

The quarry has well defined benches. The quarry faces at the benches shall be scaled when quarry operations cease and the benches shall be cleaned and berms placed at the edges of the bench to control the movement of weather induced loose in the long term.

Currently overburden from the top surface is being cleaned and pushed as thawing permits, to serve as long term protection against moving aggregate and the establishment of long term stability.

It is expected that the quarry shall be closed on a permanent basis by next year in 2015.

Stability

The quarry shall be closed in a manner as set out to maintain long term stability.

3.16 Overview

This report is the 7th annual Geotechnical Inspection at Mary River and Milne Inlet completed by this author on behalf of Baffinland Iron Mines Corporation and the first report covering two inspections in one shipping season.

As set out in our past reports, there has been little or no erosion take place from wind or rain and the dykes constructed of the sand/gravel soil have remained stable at slopes of 3:1 and 4:1.

There are only just now, signs of settlement appearing at PSWP's 1, 2 and 3. The settlements are not differential settlements of the dykes but are minor overall settlements of the total structures with respect to the surrounding area.

These settlements appear to be settlements within the one metre ± active layer above the permafrost and are of little concern as the PWSP's are temporary structures and the settlements have no effect on the dyke stability.

It is expected that many of the structures that form the basis for the inspections set out in the biannual Geotechnical inspections shall be decommissioned as the mine facilities are finalized.

PHOTOS

Mary River August Inspection

Minesite Steel Fuel Tank Farm Containment

Generator Fuel Storage Facility Containment

Polishing/Waste Stabilization Pond #1.

Polishing/Waste Stabilization Ponds #2 and #3.

Helicopter Fuel Tank Containment.

Bulk Fuel Storage Containment.

Barrel Fuel Containment.

Jet Fuel Containment.

Solid Waste Disposal Site.

Enviro Tank Storage

Hazardous Waste Storage.

Stove Oil Storage.

Quarry at Mary River.

PHOTOS

Mary River September Inspection

Mary River Steel Fuel Tanks Containment

Quarry

Solid Waste Disposal Site

Bulk Fuel Storage Containment

Generator Fuel Containment

PWSP No 1

PWSP No 2 and 3

Helicopter Fuel Containment

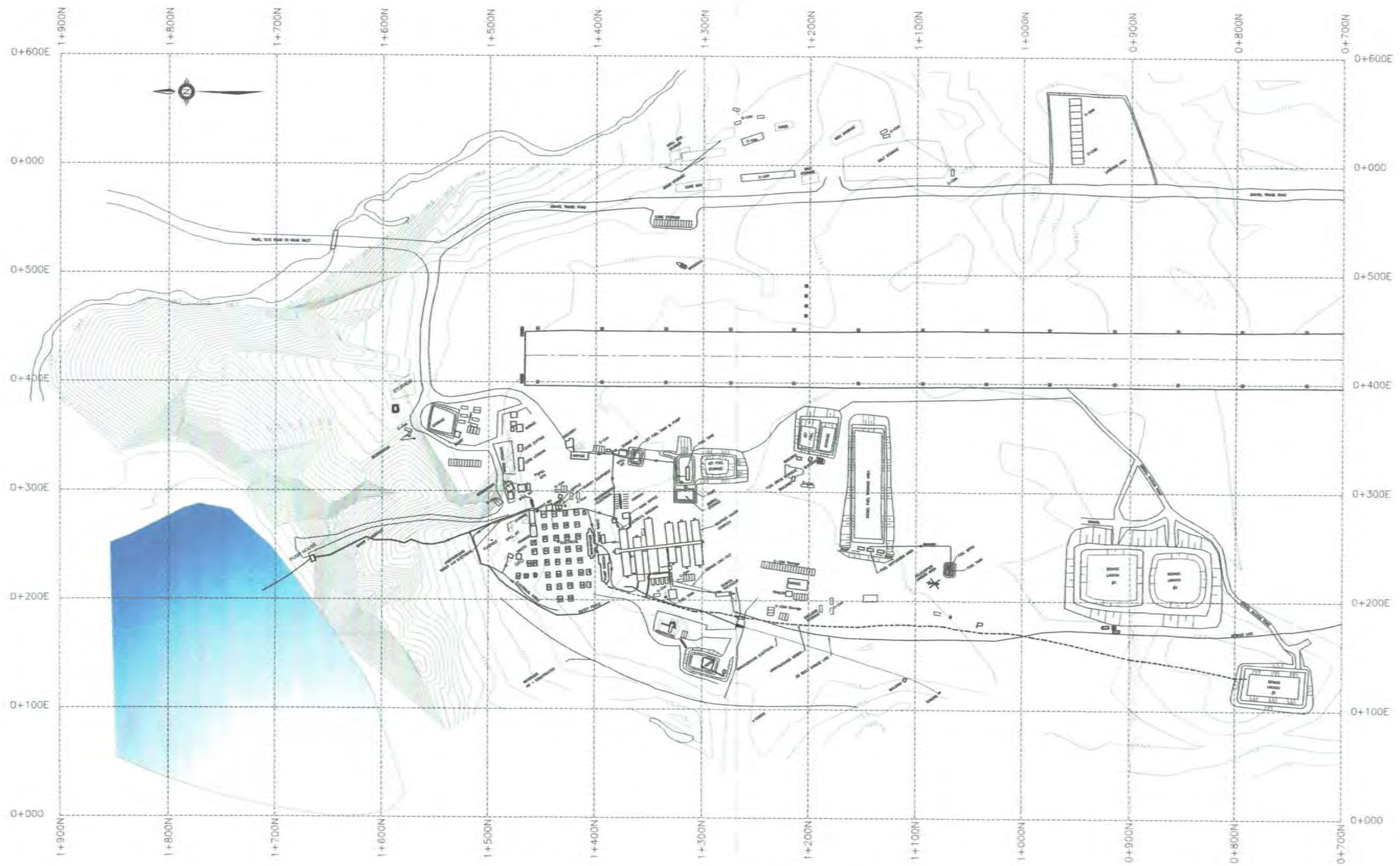
Barrel Fuel Storage Containment

Hazardous Waste Containment

Stove Oil Barrel Containment

Enviro Tank Storage (Wash Bay)

Jet Fuel Containment



SCALE 1 : 1500

0 50 100 150m

SITE PLAN
BAFFINLAND – MARY RIVER CAMP

JULY 2010

NOTE :
THE GRID SHOWN ON THIS PLAN IS TO BE USED AS A LOCAL GRID ONLY. THE GRID IS BASED ON THE RUNWAY LIGHTS AT THE WEST SIDE OF THE EXISTING AIRSTRIP. THE LIGHT AT THE SOUTH WEST CORNER IS GRID STATION 0+000, 0+400E AND THE 0+000 GRID LINE IS BASED ON THE LINE BETWEEN THE SOUTH WEST AND NORTH WEST RUNWAY LIGHTS.

ACCOMMODATION COMPLEX
EMERGENCY RESPONSE OFFICE
EMERGENCY RESPONSE GARAGE
MAINTENANCE BUILDING
FUEL TANK FARM
MS-01
MS-C-C
MS-C-F
WATER BUILDING
SEWAGE TRUCK BUILDING
WASTE MANAGEMENT BUILDING
INCINERATOR
TRUCK WEIGH BUILDING
RUN OF MINE
FINE STOCKPILE
LUMPS STOCKPILE

560 000 E
561 500 E
563 000 E
564 500 E
N

PROJECT DEVELOPMENT
WASTE ROCK DUMP BOUNDARY AT THE END OF OPERATION (RAIL PHASE)
PROPOSED FINAL OPEN PIT OUTLINE
FUTURE WASTE ROCK FOOTPRINT FOR ERP
DEPOSIT NO.1 MINING LEASE 2484
NEW HAUL ROAD
EXISTING WEATHERED ORE AND WASTE ROCK STOCKPILE
MS-MRY-10 (MRY-10)
QUARRY D1Q1
OPEN PIT DEVELOPMENT
MS-MRY-9 (MRY-9)
2008 BULK SAMPLE PIT
PIT 1 HAUL ROAD
QUARRY D1Q2
TRUCK WEIGH SCALE BUILDING
ORE CRUSHING AND LOADING
FUTURE RAIL PHASE PRELIMINARY AND SECONDARY CRUSHING
FUTURE RAIL PHASE STOCKPILE AND INFRASTRUCTURE

HAZARDOUS WASTE CONTAINMENT BERM
BARRELED FUEL LINED CONTAINMENT
TEMPORARY INCINERATOR LOCATION
STAGE AREA
OLD INCINERATOR
EXISTING LAYDOWN AREA
CONCRETE BATCH PLANT
BULK FUEL STORAGE FACILITY (BLADDER FARM)
RAW WATER PUMP HOUSE
RAW WATER INTAKE (IN CONSTRUCTION)
MS-MRY-1 (MRY-1)
MS-MRY-5 (MRY-5)
MS-MRY-6
MS-MRY-4 (MRY-4)
MS-MRY-4a (MRY-4a)
FUTURE AERODROME APRON
QUARRY QMR2
MQ-C-D
RAW WATER INTAKE PIPELINE
MQ-C-B
CONSTRUCTION LAYDOWN AREA
CAMP INFRASTRUCTURE
EXPLORATION CAMP FACILITIES
HELIPAD
POLISHING WASTE STABILIZATION PONDS (PWSPs)
WASTE WATER TREATMENT FACILITY
MS-C-A
MS-C-B
MS-C-E
MS-C-D
MS-C-C
MS-01
MS-C-F
MS-MRY-11 (MRY-11)
SHEARDOWN NW LAKE
AERODROME RUNWAY AND APRON EXTENSION
EXPLORATION CAMP SEWAGE DISCHARGE PIPELINE
FUTURE ORE CRUSHING SEDIMENTATION POND
MS-MRY-13b (MRY-13b)
MS-MRY-13a (MRY-13a)
UTILITY BERM
EXISTING LANDFILL ROAD
EXISTING LANDFILL
FUTURE EXPLOSIVES MAGAZINE STORAGE AND ACCESS ROAD
TREATED SEWAGE SUMMER DISCHARGE
FUTURE EMULSION PLANT
TREATED SEWAGE WINTER DISCHARGE #1 AND #2

7 914 500 N
7 913 000 N
7 911 500 N

UTILITIES, INCLUDED:
- POWER GENERATION MODULE
- FUEL TANK FARM & DYKE
- SEWAGE TREATMENT PLANT
- POTABLE WATER TREATMENT PLANT

SITE SERVICE FACILITIES, INCLUDING:
- MAINTENANCE BUILDING
- WAREHOUSE
- WELDING WORKSHOP
- WASTE MANAGEMENT FACILITY
- HAZARDOUS WASTE CONTAINMENT CELL
- NEW INCINERATOR

LEGEND:
- WATER
- LAYDOWN AREA (CONSTRUCTION PHASE)
- BORROW AREAS (2013 UNDER Q10C3001)
- QUARRY AREA (EXISTING UNDER Q13C301)
- RIVER/STREAM/DRAINAGE
- ROAD
- PROJECT DEVELOPMENT AREA
- BAFFINLAND'S COMMERCIAL LEASE ON INUIT OWNED LAND
- RAW WATER INTAKE PIPELINE
- WATER LICENCE WATER QUALITY MONITORING LOCATION

NOTES:
1. COORDINATE GRID IS UTM NAD83 ZONE 17N.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PLAN BASED ON INFORMATION PROVIDED BY HATCH, DATED (JAN 31, 2014).
4. CONTOUR INTERVAL IS 2.5 METRES.
5. ALL SAMPLE ID'S SHOWN IN BRACKETS REPRESENT THE TYPE B WATER LICENCE(S) MONITORING POINTS. ALL OTHERS ARE MONITORING POINTS AS PER THE TYPE A WATER LICENCE (2AMMRY1325)

SCALE A: 300 150 0 500 1000 1500 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHKD	APP'D
0	25MAR14	ISSUED WITH 2013 QIA AND NWB ANNUAL REPORT	RAC	AS	SP	JM

Baffinland

MARY RIVER PROJECT

MINE SITE LAYOUT AND WATER LICENCE MONITORING LOCATIONS

Knight Piésold CONSULTING

PA NO. NB102-181/34 | REV NO. 4

FIGURE 1.5 | REV 0

DWG NO H349000-4613-10-014-0002

TRUE NORTH

34°

PLANT NORTH

ACCESS ROAD

67800

12000 | 14600 | 14600 | 14600 | 12000

DYKE | TANK | TANK | TANK | TANK | DYKE

OUTSIDE TOE OF DYKE VARIES

TOP OF DYKE EL. 196.10M

N 7913328.184
E 561235.839

N 7913290.276
E 561292.052

INSIDE TOE OF DYKE EL.194.60M

TANK PAD DETAIL SEE DETAIL-1 ON DWG. H349000-4613-10-035-0001

1% SLOPE

TANKS

N 7913312.354
E 561239.639
ELEV. 195.645M

N 7913304.191
E 561251.743
ELEV. 195.645M

N 7913296.028
E 561263.848
ELEV. 195.645M

N 7913287.865
E 561275.953
ELEV. 195.645M

RIGID INSULATION HD60 75MM THK. 2-LAYERS 1200MMX2400MMX38MM NOM. SHEETS EXTENDING 2M BEYOND TANK FLOOR

OUTSIDE TOE OF DYKE VARIES

A 4613-10-035-0001

TOP OF DYKE EL. 196.10M

26500

19500

SUMP DETAIL SEE DETAIL-1 ON DWG. H349000-4613-10-035-0003

ACCESS STAIRS DETAIL SEE DETAIL-3 ON DWG. H349000-4613-10-035-0003

BOTTOM OF SWALE EL. 194.11M

BOTTOM OF SWALE HIGH POINT EL. 194.25M

BOTTOM OF SWALE EL. 194.25M

INSIDE TOE OF DYKE EL.194.60M

T.O. SUMP EL. 194.56M

T.O. GRANULAR DYKE EL.195.79M

N 7913306.212
E 561221.023

N 7913268.305
E 561277.236

FUEL MODULE

DOWN

UP

5200

2% SLOPE

TOE OF DYKE EL.195.98M

TOP OF CONTAINMENT DYKE EL. 196.28M

CONCRETE BARRIERS

C 4613-10-035-0002

4613-10-035-0002

4613-10-035-0001

29150 RAMP

25000 CONTAINMENT AREA

29150 RAMP

83300

0 1.25 2.5 3.75 5.0 6.25
SCALE IN METRES

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
0	ISSUED FOR CONSTRUCTION	DS	13-07-23

ISSUE AUTHORIZATION

HATCH

DESIGNED BY	DRAWN BY
D. STEPHENSON DATE 13-02-20	M. PETERSON DATE 13-02-20
CHECKED BY DATE 13-07-12	DSGN. ENGR. DATE 13-07-12
PROJ. DES. COORD. T. TINERTELI DATE 13-07-22	PROJ. ENGR. J. CLELAND DATE 13-07-22
PROJ. MGR. S. PERRY DATE 13-07-22	

Baffinland

MARY RIVER PROJECT

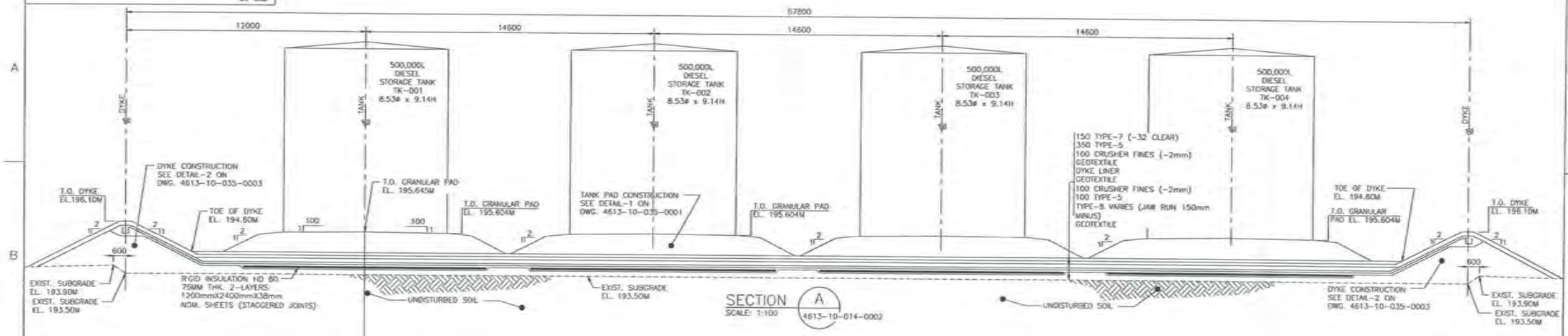
MINE SITE
SITE GRADING PLAN

SCALE	DWG. NO.	REV.
1:125 OR AS NOTED	H349000-4613-10-014-0002	0

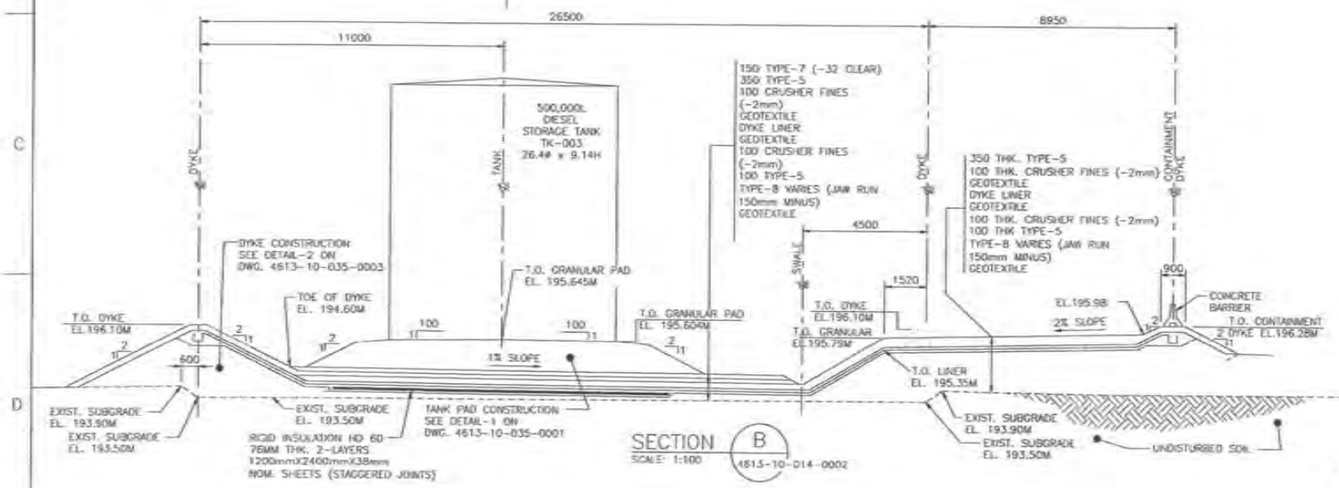
ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

$FILE$
$DATE$
$USERNAME$

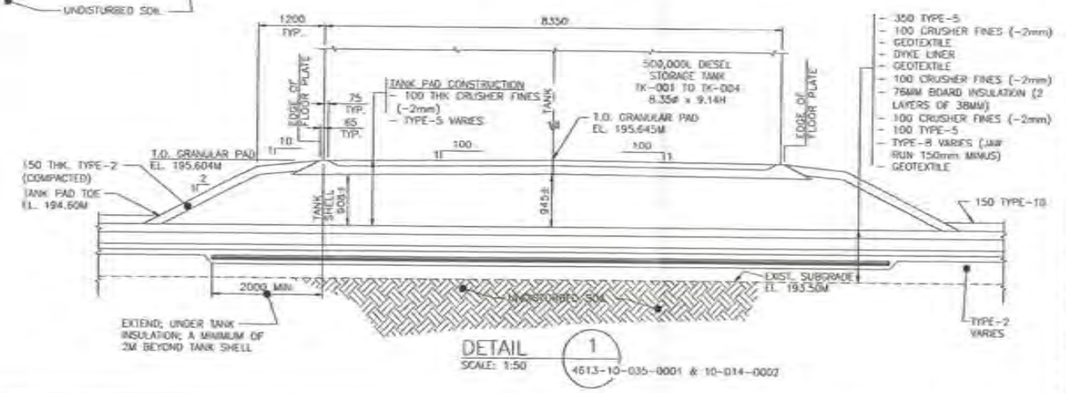
DWG. NO. H349000-4613-10-035-0001



SECTION A
SCALE: 1:100
4613-10-014-0002



SECTION B
SCALE: 1:100
4613-10-014-0002



DETAIL 1
SCALE: 1:50
4613-10-035-0001 & 10-014-0002

REFERENCE DRAWINGS

DRAWING NO.	DRAWING TITLE

REVISIONS

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

ISSUE AUTHORIZATION

REV.	ISSUED FOR	ISSUE FOR	AUTH. BY	DATE
0	ISSUED FOR CONSTRUCTION	05	FS	13-07-22

HATCH

DESIGNED BY D. STEPHENSON DATE 13-02-20	DRAWN BY M. PETERSON DATE 13-02-20
CHECKED BY DATE 13-07-22	CHK'D ENGR. DATE 13-07-22
PROJ. DES. COORD. T. THERTELL DATE 13-07-22	PROJ. ENGR. J. CLELAND DATE 13-07-22
PROJ. MGR. S. PERRY DATE 13-07-22	

Baffinland

MARY RIVER PROJECT

MINE SITE
DYKE SECTIONS & DETAILS

SCALE:	DWG. NO.	REV.
1:100 OR AS NOTED	H349000-4613-10-035-0001	0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

STYLES
DATES
USERNAMES
STAMPS

4.0 MILNE INLET

4.01 General

The containment facilities that we have been doing inspections on for the last 6 years are now rapidly changing in function with the construction underway at the Milne Inlet site.

Structures and facilities that were under construction during our inspection in 2013 have now been completed and new facilities are under construction.

Currently under construction is a large landfarm and contaminated snow containment facility which are being designed as contiguous structures.

Also reviewed was the active quarry from which blasted rock was being removed.

New facilities, just now under construction in August, were the two ore sediment ponds upon which construction was beginning and due for inspection and reporting in the second of two geotechnical inspections in the latter part of September from September 25th until September 30th as the shipping season draws to a close. This was done but the settling ponds were as yet incomplete as noted during thisfinal review

4.02 Bulk Fuel Containment Facility

This particular facility started to undergo decommissioning last summer season after having been in operation in excess of 5 years.

The oil impacted water had been removed and treated and the oil impacted sand/ gravel that was in the bottom of the structure and over the liner on the dykes had been removed from the south end of the structure and had been piled up in the north end where it had been covered to prevent an accumulation of further oil impacted water as noted during our first review in August. By September this facility had been decommissioned and the oil impacted material had been placed in the landfarm.

At the time of our August review roughly 60% of the former Bulk Fuel Containment Facility had been decommissioned and the facility was gone in September.

Stability

Our review of the area around the south end of the former Bulk Fuel Containment Facility showed no sign of oil or oil/water mixture and we conclude that the integrity of the liner has been maintained during the decommissioning process.

Recommendations

We have no recommendations at this time.

4.03 Existing Polishing/Waste Stabilization Pond

This particular PWSP is no longer part of the treatment process for sanitary sewage and in August was being pumped of effluent which was being transferred to the new effluent pond.

This transfer of effluent was part of the decommissioning of this PWSP. At the time of our second review in September, all effluent had been removed and the dykes were awaiting removal.

Stability

The structure is considered stable over the projected short life of the structure.

Recommendations

We have no recommendations at this time pending the immediate decommissioning.

4.04 Barrel Fuel Storage

General Conditions

As set out in our 2013 Geotechnical Inspection, this structure is constructed as a two cell structure.

This structure was originally intended for use as barrel fuel storage. However, with time, this structure's use changed to that of storing lubricant cubes as well as barrel storage.

For continuity, we continue to refer to this two cell structure as Barrel Fuel Storage.

This structure around these two cells conforms to standardized drawings prepared by myself for such a structure.

The structure was in place during our first review but had been decommissioned at the time of our second review in September.

Stability

At the time of my August inspection, there was wet sand in the bottom of the two cells indicating the integrity of the liner.

Our review of the area around the cells, at the base of the exterior dyke slopes showed no sign of seepage, at that time.

There was no sign of oil impacted granular in the area following decommissioning.

Recommendations.

We have no recommendations with respect to this structure at this time.

4.05 Hazardous Waste Storage

General Conditions

This particular structure has been constructed as a two cell structure.

Due to an excess of hazardous waste in the two cells, a third temporary cell has been constructed for the very short term until the ship picks up the hazardous waste at the end of this summer season.

The third cell is constructed with a one piece liner and wood timber curb for this very short term and is contiguous with the south side of the structure.

This cell actually stores hazardous waste in containers, barrel fuel, and lubricant cubes.

Stability

There is water ponding in both cells of the original structure confirming the integrity of the liner at this time.

Our review of the area around the dykes, at the base of the slopes, showed no sign of seepage. The structure is considered stable.

Recommendations

We recommend that the use of the temporary third cell, recently constructed, be discontinued when the currently stored hazardous waste is shipped out by the end of this shipping season.

4.06 Oil and Antifreeze Containment

This structure has been decommissioned and totally removed.

4.07 Jet ”A” Pump Containment

This structure has been decommissioned and totally removed since our 2013 inspection.

4.08 Fuel Tank Farm

General Conditions

This particular structure has been reported on both our 2012 and 2013 inspection reports.

Since both 2012 and 2013 the fuel tank farm has been expanded considerably with the addition of a number of new tanks.

At the time of our last inspection in 2013, the containment structure had been put in place for the entire tank farm but not all tanks were in place.

Since that time, all fuel tanks have been constructed.

There existed in place, a temporary ramp at the north west corner of the containment structure to facilitate the construction of the last tank and entry of crane(s) into the containment structure at the time of our August review.

This temporary ramp did not affect the integrity of the containment structure nor infringe upon the required capacity of the structure. The reamp had been removed by the time of our September review.

We noted no sign of weakness in any of the structure construction.

Stability

We attach the Hatch Bulk Fuel Storage Site Grading Plan setting out the final tank and containment layout.

At both inspections we noted minor water ponding at the low end of the containment confirming the integrity of the liner.

Recommendations

We have no recommendation for this structure.

4.09 New Effluent Pond

General Conditions

This particular effluent pond was first reported up on in 2013 but had not yet been put into operation.

This effluent pond has now been put into operation and sewage effluent from the Polishing/Waste Stabilization Pond was being transferred to permit the decommissioning of that structure at the time of our August review.

There was approximately 5’ of freeboard at the time of our September review.

Stability

We noted no sign of weakness in any of the construction.

Recommendations

We have no recommendations with respect to the use of this structure having no negative comments on the construction of this structure.

4.10 Landfarm

General Conditions

The Landfarm was just under construction to facilitate the decommissioning of the contaminated soil in the north end of the former Bulk Fuel Containment Facility during our August review.

The Landform was constructed to accommodate approximately 9000 m^3 of oil contaminated soil and seasonal water accumulations.

At the time of our August review, the base and dykes of the structure had been formed and the HDPE liner had been installed with a geotextile protection on each side. At the time of our September review the cover had yet to be installed on a small section of the dyke but other areas were covered.

The landfarm had been put into operation at the time of our September review.

It appears as though the structure is being constructed in accordance with good construction practice for structures of this type.

Stability

We see no reason to expect that the construction underway shall not produce a stable structure.

Recommendations

We recommend that the remaining dyke structure without protective cover over it be covered as per the design drawings.

4.11 Contaminated Snow Containment

General Conditions

The construction of the contaminated snow containment structure is contiguous with the east end of the Landfarm.

At the time of our August review, the base and dykes of the structure had been formed and the HDPE liner had been placed with a geotextile protection on each side. At the time of our September review construction had been completed in accordance with design drawings.

It appears as though the structure has been constructed in accordance with good construction practice for structures of this type.

The snow containment facility has a containment volume of 929 m^3 based on estimates of snow volume provided by the Owner.

The structure has been constructed with good quality control.

Stability

We have no reason to expect that the construction shall not produce a stable structure.

Recommendations

We have no recommendations with respect to this construction at this time.

4.12 Sediment Pond East

General Conditions

The construction of this sedimentation pond for drainage from the east side of the site is nearing completion.

The basin is shaped and the liner has been installed throughout the basin from inlet to the berms on the north side of the basin.

There has been no cover placed over the liner to this point and rip rap has not yet been placed in the outlet weir.

Stability

We have no reason to expect that construction underway shall not produce a stable structure when complete.

Recommendations

We have no recommendations with respect to this construction at this time.

4.13 Sediment Pond West

General Conditions

The construction of this sedimentation pond for drainage from the west side of the site is nearing completion in a manner similar to that on the east side.

As with the east side, the liner is in place over the basin but the liner has yet to be covered

Stability

We have no reason to expect that construction underway shall not produce a stable structure when complete.

Recommendations

We have no recommendations with respect to the construction at this time.

4.14 Quarry

General Conditions

There is an active quarry to the south of the port development on the high rock outcrop.

As with our review in August, quarrying was underway in September and benches had been developed for the removal of substantial quantities of rock.

Stability

Rock faces appear stable.

Recommendation

We have no recommendations to be made with respect to the existing operation.

4.15 Overview

Decommissioning is underway with the former structures constructed of sand and gravel and new long term structures are recently completed or under construction utilizing crushed quarried material with a projected long term serviceability.

Respectfully submitted,

Barry H. Martin, P. Eng., MRAIC
BHM/jw

PHOTOS

Milne Inlet August Inspections