Appendix D

834 Mountjoy Street South
P.O. Box 120
Timmins, Ontario P4N 7C5
Tel. (705) 264-9413
Fax. (705) 267-2725

March 25, 2009

Jim Millard
Environmental Superintendent
Baffinland Iron Mines Corporation
Suite 1016, 120 Adelaide Street West
Toronto, Ontario
M5H 1T1

Dear Jim,

RE:

MARY RIVER PROJECT
Polishing/Waste Stabilization Pond #3
AS-BUILT REPORT
OUR REFERENCE NO. 09-058

Genivar Consultants (GENIVAR) was retained by Baffinland Iron Mines Corporation (BIMC) to design the sewage works for their camp at Mary River site in Nunavut and to complete the as-built reports.

A Rotating Biological Contactor (RBC), Sewage Treatment Plant has been installed and commissioned at the camp for sewage treatment. The effluents from the RBC were directed to Polishing/Waste Stabilization Ponds (PWSPs). Upon satisfactory results of the RBC effluents meeting the required discharge criteria, the RBC effluents are to be discharged to Sheardown Lake. Details are described in the Wastewater Management Plan first submitted in September 2007 and recently revised in March 2009.

The as-built report for PWSP #1 and #2 was previously submitted to the Nunavut Water Board (NWB) in July 2008. The third PWSP (PWSP #3) was designed by GENIVAR, constructed by BIMC and was reviewed during the construction by GENIVAR for Quality Assurance and Quality Control (QA/QC).

PWSP #3 was designed to have a capacity of 4,800 cubic meters. Based on the recent survey of the pond, as set out on drawings included in Appendix 1, the installed pond has a capacity of approximately 4,800 cubic meters.

The pond was designed to be lined with a geomembrane, commercially known as Envirliner60 purchased from Layfield Industries. The liner for the PWSP #3 was manufactured at Layfield manufacturing facility and delivered to the site in one piece. No field fusing was therefore required and as such certification by the manufacturer was not warranted.

GENIVAR QA/QC personnel were present during construction and were satisfied with the subgrade material prior to installation of the liner. All berms and liner were constructed as per the design drawings. As-constructed drawings and photos are included as attachments to this letter.

Yours truly,

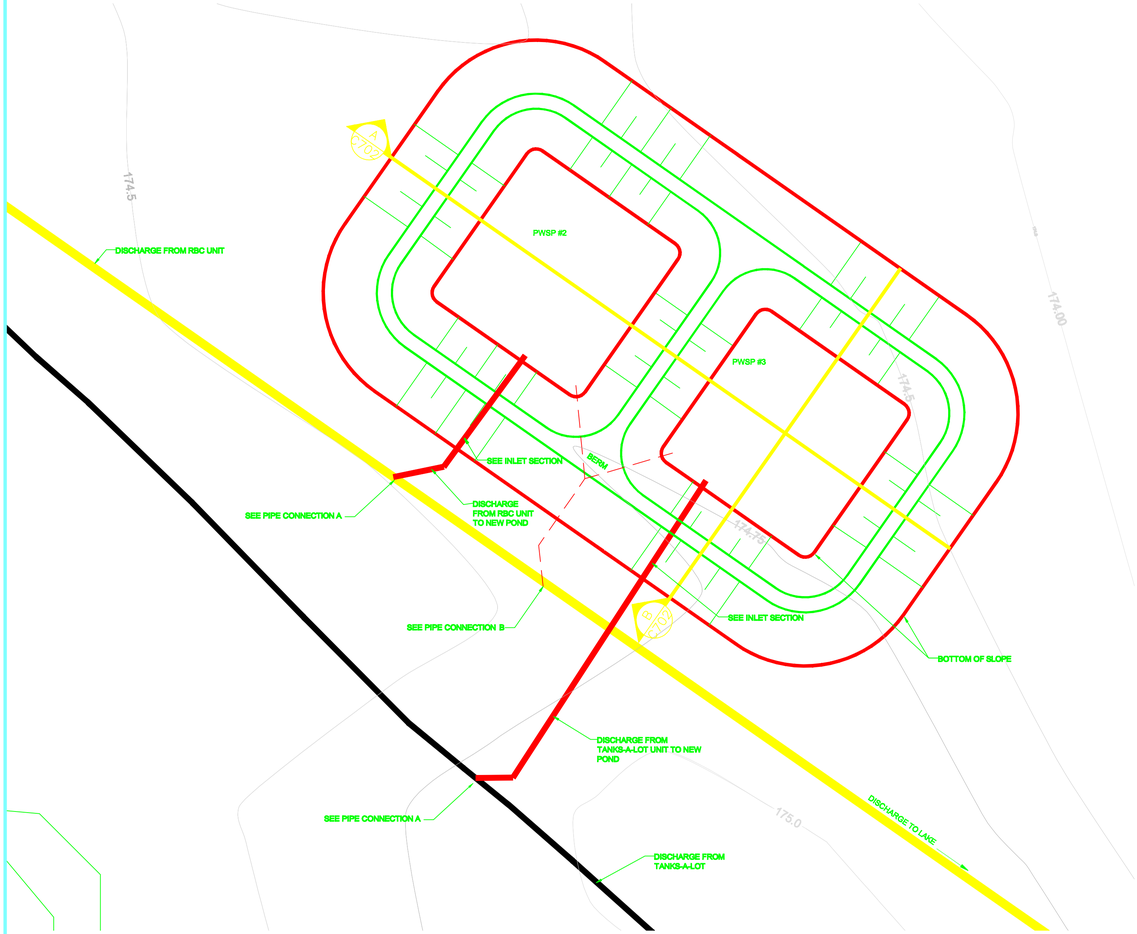
Genivar Consultants

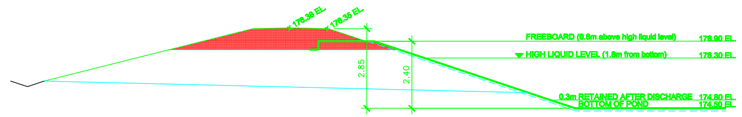
Marz G. Kord, P. Eng., M.Sc., MBA
Mk/

➢ ATTACHMENTS

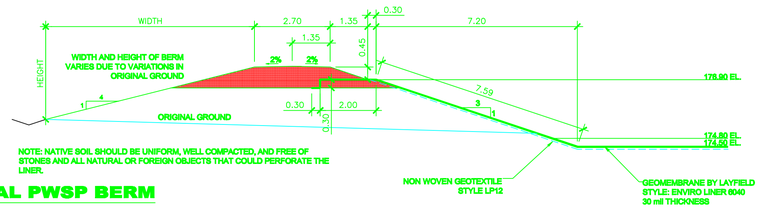
- **Design Drawing**
- **As-Built drawing**
- **Photos**

PWSP PLAN VIEW
SCALE 1:500

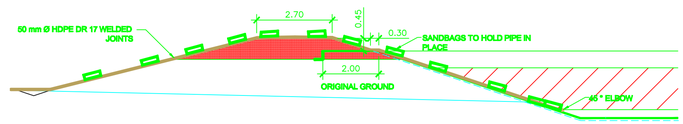




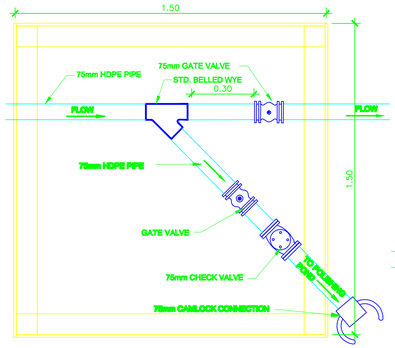
TYPICAL PWSP BERM ELEVATIONS
SCALE 1:100



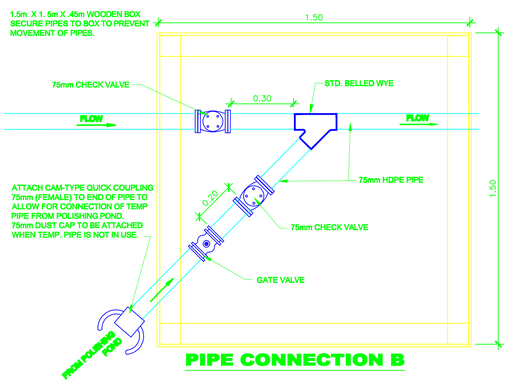
TYPICAL PWSP BERM
SCALE 1:100



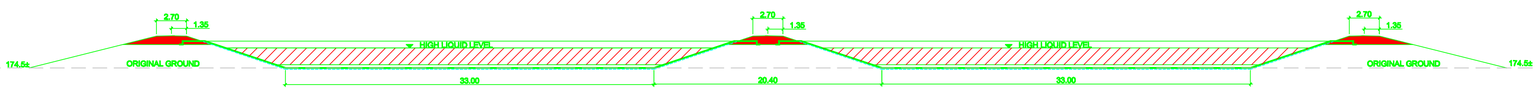
INLET SECTION
SCALE 1:100



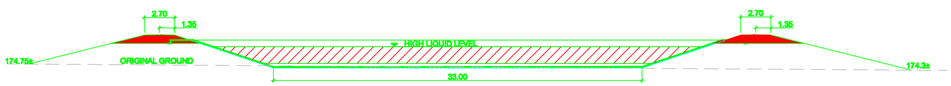
PIPE CONNECTION A



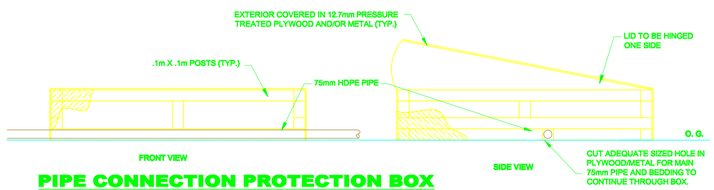
PIPE CONNECTION B



SECTION
SCALE 1:250
A C702



SECTION
SCALE 1:250
B C702



PIPE CONNECTION PROTECTION BOX

Revisions and Issues	Description	Date	No.

NORTH Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

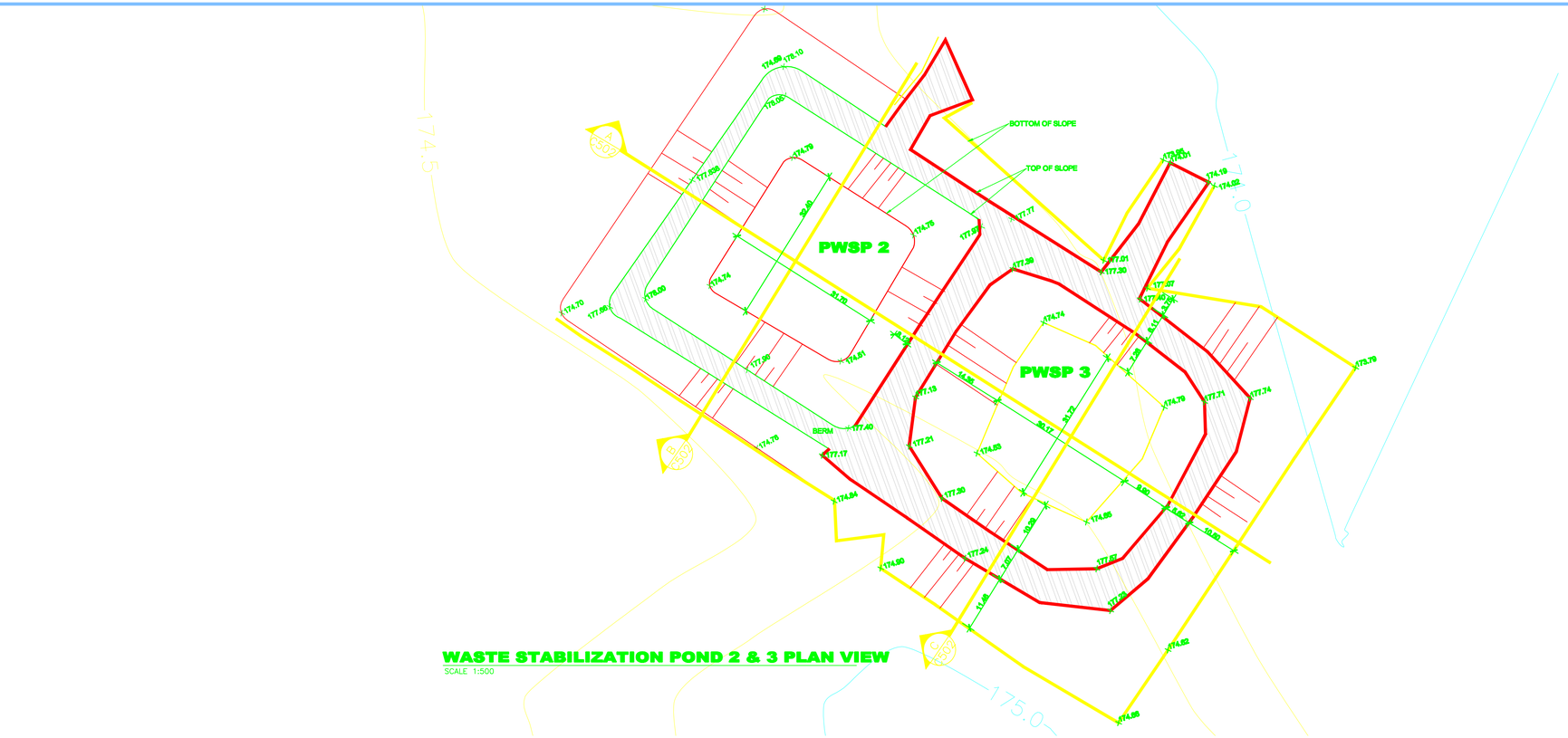
ARCHITECT STRUCTURAL/CIVIL

MECHANICAL ELECTRICAL

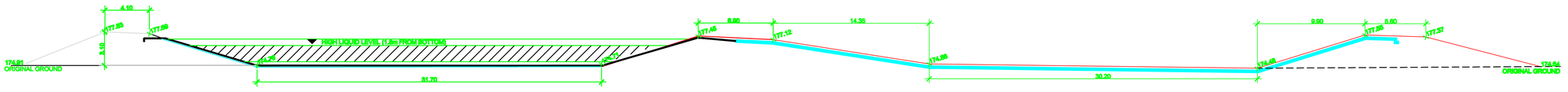
Project
MARY RIVER PROJECT
BAFFIN LAND IRON MINES CORP
BAFFIN ISLAND NUNAVUT

Drawing
MARY RIVER PWSP #2 PLAN/PROFILE

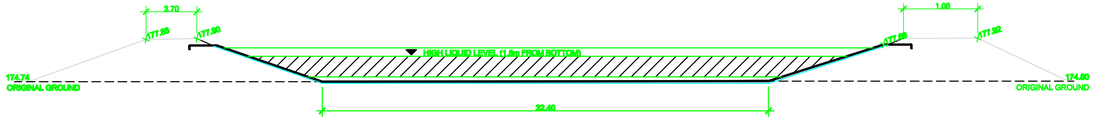
Date	CADD File Number
APRIL 2006	civil/design/mdl/ncamp/dwg
Scale: AS NOTED	Job Number: 09-058
Drawn: AB	
Checked: BM	Drawing Number: C101
Approved: BM	



WASTE STABILIZATION POND 2 & 3 PLAN VIEW
SCALE 1:500



SECTION A C502
SCALE 1:200



SECTION B C502
SCALE 1:200

SECTION C C502
SCALE 1:200

Description	Date	No.
2nd Pond	Nov 4_08	1

Revisions and Issues

NORTH Date Printed

GENIVAR
834 Mountjoy Street South
P.O. Box 130
Timmins, Ontario P4N 7C5
www.genivar.com
Tel. 705-264-9413
Fax. 705-267-2725

ARCHITECT STRUCTURAL/CIVIL

MECHANICAL ELECTRICAL

Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND NUNAVUT

Drawing
AS CONSTRUCTED
MARY RIVER PWSP2 & PWSP3
PLAN AND SECTIONS

Date: MARCH 2009	CADD File Number: REPORT/WWMP DRAWINGS/
Scale: AS NOTED	Job Number: 09-058
Drawn: SS/SO	
Checked: M.K	Drawing Number: C102
Approved: M.K	

Photo 1: Material has been brought to the PWSP #3 site for placement and berm construction

Photo 2: Crew is installing the liner at PWSP #3

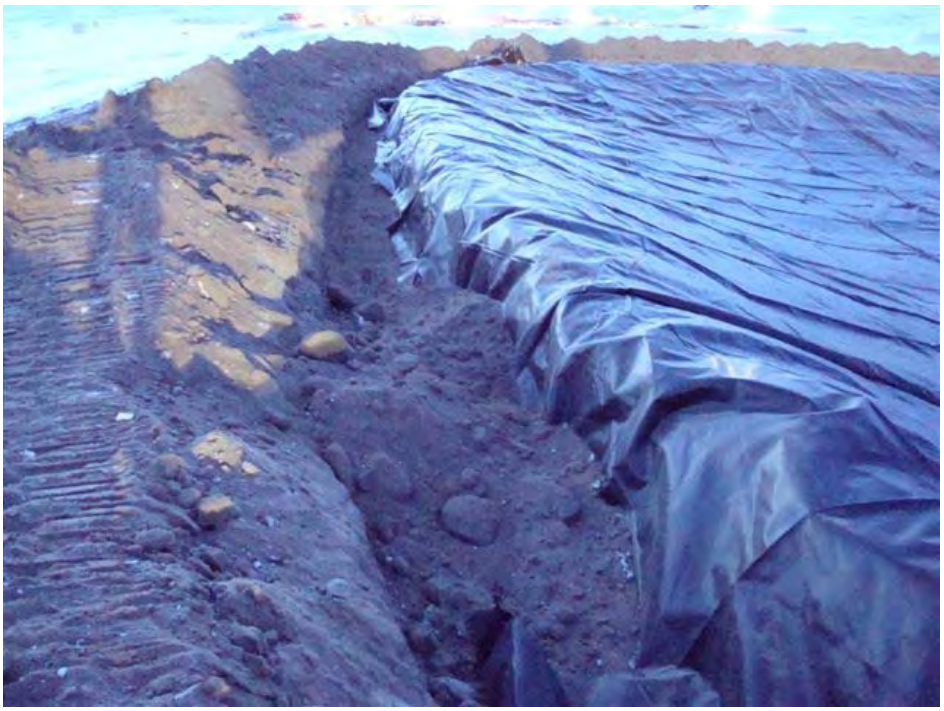


Photo 3: The liner is anchored in the trench at the top of the berm

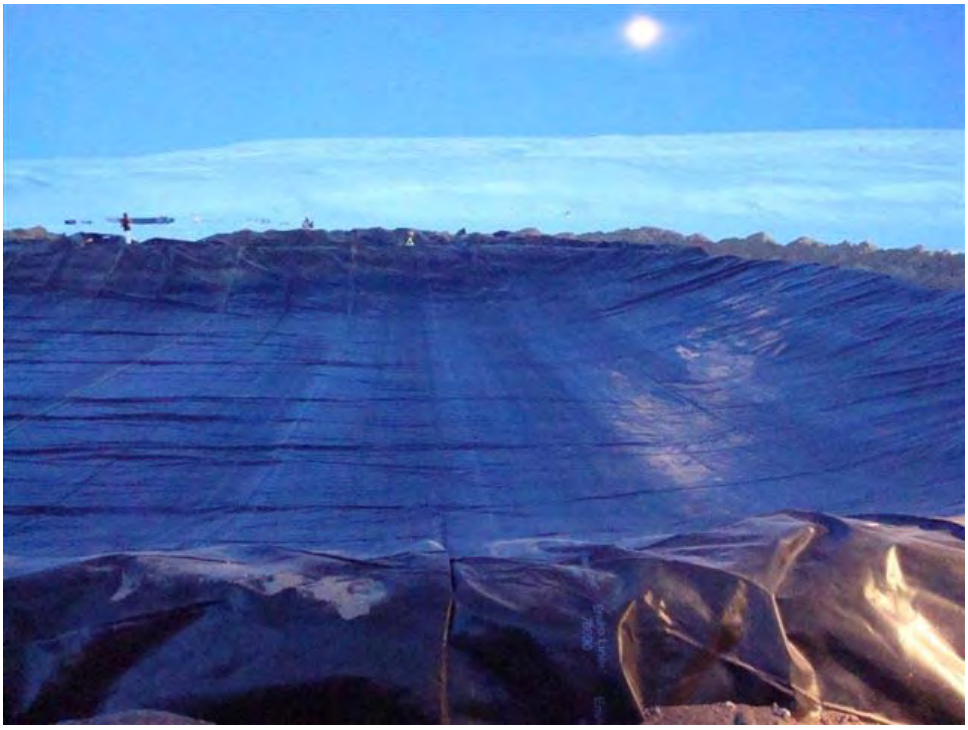


Photo 4: The liner was manufactured and placed as one piece. Thus there was no need for field fusing.

Photo 5: The top of berm is being covered with granular material.


Photo 6: Completed top of berm can be seen above.

GENIVAR

834 Mountjoy Street South
P.O. Box 120
Timmins, Ontario P4N 7C5
Tel. (705) 264-9413
Fax. (705) 267-2725

July 25, 2008

Cheryl Wray
Environmental Superintendent
Baffinland Iron Mines Corporation
Suite 1016, 120 Adelaide Street West
Toronto, Ontario
M5H 1T1

Dear Cheryl,

RE:

MARY RIVER PROJECT
ROTATING BIOLOGICAL CONTACTOR (RBC SYSTEM) SEWAGE TREATMENT AND DISCHARGE- MARY RIVER AS-CONSTRUCTED REPORT
OUR REFERENCE NO. 06-090

GENIVAR Consultants was retained by Baffinland Iron Mines Inc. to design the sewage works for their camp at Mary River site in Nunavut and to complete the as-constructed reports.

The site is located approximately 100km south of Pond Inlet, in the north-eastern section of Baffin Island. Approximate distances from the project site to other communities in the region are 270 km to Arctic Bay, and 415 km to Clyde River.

Presently the site consists of a 200-person camp of predominantly Weatherhaven tents situated approximately 200 meters from the shores of Camp Lake.

A Rotating Biological Contactor "RBC", Sewage Treatment Plant has been installed and commissioned at the camp for sewage treatment during the bulk sampling program. It generally takes 3 weeks for any RBC system to operate at full efficiency. In the meantime, the effluents from the RBC were directed to the Polishing/Waste Stabilization Pond (PWSP) that was already in place at the time the RBC was installed. Upon satisfactory results of the RBC effluents meeting the required discharge criteria, the RBC effluents are to be discharged to Sheardown Lake. Details are described in the Sewage Management Plan submitted in September 2007.

As-Constructed Conditions

Prior to the RBC unit being installed and commissioned, the Owner had commissioned a pre-engineered mechanical sewage treatment plant, "Tanks-A-Lot", to treat the sewage from their exploration camp at Mary River. This system discharged to a Polishing/Waste Stabilization Pond, PWSP, approximately 600 meters from the camp. Details of the system were submitted in July 2007 and subsequently in our report "WWMP Final Report, September 15, 2007". The effluent from this plant was discharged via a 3-inch HDPE line to the PWSP #1. This PWSP #1 was designed to have capacity for storing the effluents from the exploration camp as well as enough capacity until the RBC plant became fully operational.

The Owner installed and commissioned a Rotating Biological Contactor, RBC, from Seprotech on or about February 18, 2008. The unit is capable of handling a daily sewage 34 cubic meters with 15.66 kg of BOD_5, 16.7 kg of TSS as well as 2.2 kg of TKN per day. No non-domestic waste or stormwater has been directed to the treatment system. The details of the Seprotech unit are attached in Appendix 1.

Due to unforeseen events at the site, it took longer than the normal 3-week period to achieve satisfactory effluents from the RBC system. The original PWSP#1 was nearing its capacity by early April. The Owner proactively decided to have an additional pond designed and constructed to ensure adequate capacity for the effluents of RBC in case it does not achieve satisfactory results before the original PWSP#1 is full. BIMC constructed the second Polishing/Waste Stabilization Pond (PWSP #2) on or about April 20th, 2008. The effluents from the RBC unit have been redirected to PWSP #2 since April 29, 2008.

PWSP #1 was designed to have a capacity of 2,800 Cubic Meters. Based on the recent survey of the pond, as set out on drawings included in Appendix 2, the installed pond had a capacity of 2,577 Cubic Meters. The pond was lined with a geomembrane liner. The installation of the pond underlying material and the liner installation have been certified by Layfield Industries. The Treatment System as-constructed drawings and the QA/QC report from Layfield is attached to Appendix 3. PWSP#1 reached its capacity on or about April 29, 2008.

PWSP #2 was designed to have a capacity of 4,800 cubic meters. Based on the recent survey of the pond, as set out on drawings included in Appendix 2, the installed pond has a capacity of 5,114 cubic meters. This pond was also lined with a geomembrane, Enviroliner 60. The installation of the pond underlying material and liner installation have not been certified by the liner manufacturer however, GENIVAR QA/QC personnel were present during construction. All berms and liner were constructed as per the design drawings. As-constructed drawings and photographs are included in Appendix 2.

It is currently planned to direct the sewage to PWSP#2 until the Effluents from RBC unit are satisfactory for discharge to Sheardown Lake.

Yours truly,

Genivar Consultants

F. G. Kord

Marz G. Kord, P. Eng., M.Sc., MBA
V.P. Northern Ontario
Mk/

➢ APPENDIX 1

- **Seprotech N70 RBC Unit Operations & Maintenance Manual**

ROTORDISK®
Aerobic Wastewater
Treatment Plant

Model N70

BAFFINLAND
Project #60052

ROTORDISK®
Aerobic Wastewater Treatment Plant
Model N70

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

BAFFINLAND
Project #: 60052

Seprotech
Water. Pure and Simple

Seprotech
Water. Pure and Simple

Seprotech Systems Incorporated
2378 Holly Lane, K1V 7P1
Ottawa, Ontario, Canada
Telephone (613) 523-1641
Fax (613) 731-0851

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

TABLE OF CONTENTS

IMPORTANT: READ THIS INSTALLATION PROCEDURE PRIOR TO START-UP.

1.0 SITE INSTALLATION OF ROTORDISK® SEWAGE TREATMENT PLANTS:

1.1 (applies to Steel Tankage only)

When there is a complete ROTORDISK® unit supplied, site preparation is as follows:

A level concrete or well-compacted gravel base is to be supplied by Customer/Contractor.

Unit to be lifted only at lifting points by use of hooks and spreader bars.

All anchoring and levelling of ROTORDISK® on site to be done by customer/contractor. Check alignment of shaft and sprockets and clearances of couplings where applicable prior to start-up, failure to do so may void manufacturer's warranty. Refer to this ROTORDISK® manual for details. If required, the contractor must perform levelling.

All hydraulic piping, to and from the unit, is to be supplied and installed by customer/contractor.

All input electric and hydro hook-ups to be done by customer/contractor to local governing regulations and a signed approval sent to SEPROTECH SYSTEMS INCORPORATED. Under no circumstances must electrical connections, junction boxes or equipment pertaining to the electrical function of the unit be installed in the ROTORDISK® tank.

SEPROTECH SYSTEMS INCORPORATED GROUP INC. will supply a man on-site to assist customer/contractor at a specified rate and at customer/contractor discretion.

If unit is not shipped completely assembled assembly instructions and drawings will be supplied.

IMPORTANT: READ THIS INSTALLATION PROCEDURE PRIOR TO START-UP.

1.2 - (applies to Concrete Tankage for ROTORDISK® only)

If the ROTORDISK® unit supplied is to be encased in concrete tankage, the site preparation is as follows:

The unit is lowered into the concrete tankage, the pipe at the end of the unit is placed into the opening of the intermediate wall between the primary and final settlement chambers and lowered onto the anchor bolts (contractors supply).

Unit to be lifted only at lifting points by use of hooks and spreader bars.

All anchor bolts (contractors supply) should be correctly located in concrete in a vertical position. In addition, all bolts should include a levelling nut.

All anchoring and levelling of ROTORDISK® on site to be done by customer/contractor. When the unit is set onto the anchor bolts in the concrete tank, it must be levelled to a slope of no more than 3/4" in 20' along the length. The unit is then centred in the tank and completely bolted down.

After the unit has been bolted down, check alignment of shaft and sprockets and clearances of couplings where applicable prior to start-up, failure to do so may void manufacturer's warranty. Refer to this ROTORDISK® manual for details. If required, the contractor must perform levelling.

All hydraulic piping, to and from the unit, is to be supplied and installed by customer/contractor.

All input electric and hydro hook-ups to be done by customer/contractor to local governing regulations and a signed approval sent to SEPROTECH SYSTEMS INCORPORATED. Under no circumstances must electrical connections, junction boxes or equipment pertaining to the electrical function of the unit be installed in the ROTORDISK® tank.

SEPROTECH SYSTEMS INCORPORATED will supply a man on-site to assist customer/contractor at a specified rate and at customer/contractor discretion.

If unit is not shipped completely assembled assembly instructions and drawings will be supplied. (As shown)

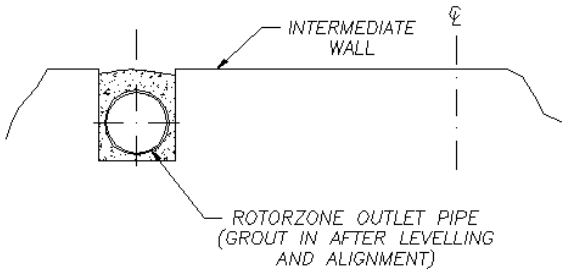


Figure a - **ROTORDISK®** tank outlet through intermediate wall between settlement tank chambers.

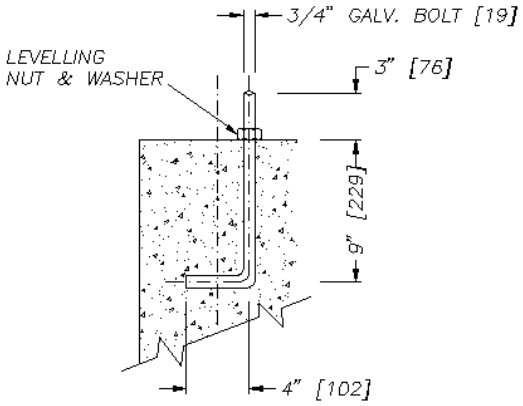
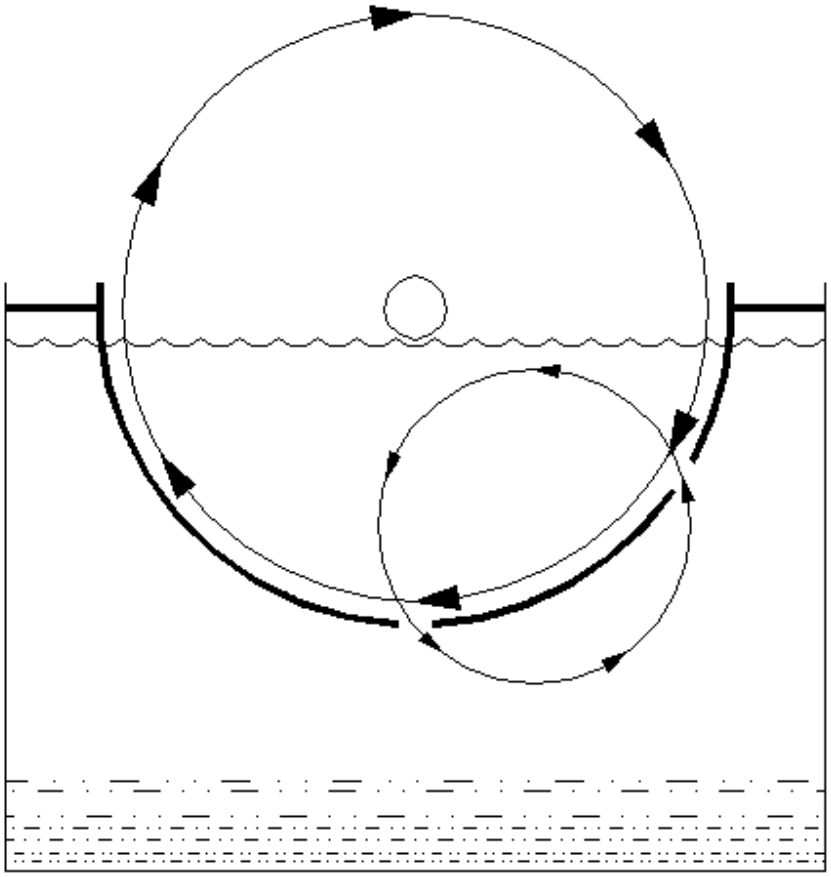


Figure b - anchor bolt detail for **ROTORDISK®** tank.

1.3 - DIRECTION OF SHAFT ROTATION



The direction of shaft rotation should be such that disks mounted on shaft will enter water on the side where inlet to "Rotorzone" is located. The electric motor driving the shaft should be wired accordingly.

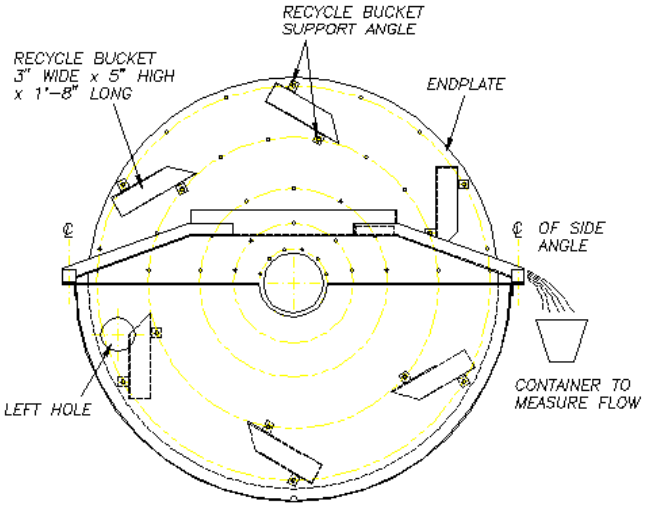
1.4 - DISSOLVED OXYGEN (D.O.) RECYCLE for ROTORDISK®

1.4.1 Recycle buckets are mounted on the last stage of the ROTORDISK®. These buckets rotate at the same speed as the disks. See the attached elevation view of the recycle buckets and trough on the Rotorzone tank.

1.4.2 As the disks rotate, the buckets scoop-up treated wastewater. As this wastewater falls into the recycle trough, it is exposed to the atmosphere, where it absorbs fresh oxygen. The wastewater then cascades on one side of the trough through a narrow steel channel and mixes back with the contents of the Primary Clarifier, thereby introducing fresh dissolved oxygen in the Primary Clarifier. See the section of diskbank assembly showing buckets and recycle trough.

1.4.3 The set-up described above is comprised of the recycle buckets and recycle trough, is what we term as our D.O. re-circulation device. This is especially advantageous to preventing septic conditions from occurring in the Primary Clarifier in small flow or low flow situations.

1.4.4 It is **important** to measure the **actual recycle rate** on the **ROTORDISK®**. This data is compared to our theoretical recycle rate designed. This is advantageous prior to connecting and setting-up for service. Using a container (5 gallon bucket is ideal) and a stopwatch, record the water flowing out of the effluent channel of the recycle trough. Make 3-5 readings, and report this data to SEPROTECH SYSTEMS INCORPORATED for future reference.



SECTION OF DISKBANK ASSEMBLY SHOWING 6 BUCKETS AND RECYCLE TROUGH

1.5 - SUMMARY OF OPERATION

(ROTORDISK® systems designed for BOD/SS/Ammonia/Nitrate removal)

A). The sewage plant (as supplied by SEPROTECH SYSTEMS INCORPORATED) is comprised of five (5) main components: the primary settling tank, the RBC tank, the denitrification tank, the secondary settling tank and the multi-media filters.

B). The RBC tank is the aerobic section of the treatment plant divided into four (4) stages.

Raw sewage is pumped and/or gravity flows into the primary settling tank (PST). When the sewage is pumped into the plant, pumping must simulate conditions encountered in gravity fed systems. Indeed, over a 24-hour period, the plant is designed to handle a flow rate corresponding to the Average Daily Flow (ADF) and can accommodate for two Peak Daily Flow (PDF) periods of two (2) hours per day. Each PDF event can be at a maximum of three times ADF.

In the PST, sedimentation separates heavy solids from the bulk of the liquid and the supernatant enters the aerobic section through the inlet slot located at the front section of the RBC tank.

The aerobic section is made up of four stages. The 1st stage is mounted on one common shaft. This 1st stage is comprised of one (1) to three (3) disk banks. The normal colour of the bacteria in the 1st stage is dark brown. This is the stage where most of the BOD removal by biological oxidation occurs. The succeeding 2nd, 3rd, and 4th stages are mounted on the rest of the shaft or another common shaft. Each stage has one (1) to three (3) disk banks. It is in the 2nd stage that further BOD is removed, and nitrifying bacteria (those which convert ammonia (NH_3) in the form of ammonium ions (NH_4^+) into nitrite (NO_2^-) and, ultimately, nitrate (NO_3^-)) start to predominate in the 3rd and 4th stages. The 4th and last aerobic stage has recycle buckets that introduce both fresh dissolved oxygen into the primary settling tank and nitrifying bacteria present in the recycled water.

The rotation of the disks in and out of the water provides a mean of air and heat transfer from the ambient air to the water. The transfer of air to the water is important for aerobic bacteria to remove BOD and ammonia. The transfer of heat to the water is important to maintain the water at an optimum temperature of 15 °C and above such that BOD and ammonia removal rates by the bacteria are maximised (removal rates are a function of the water temperature). Because maintaining a temperature that provides acceptable removal rates is important to the process, RBC's are installed indoors and ambient air is maintained at 15 °C and above.

C). The media in the denitrification section is completely submerged since denitrifying bacteria convert nitrate (NO_3^-) to nitrogen gas (N_2) in an anoxic (i.e., in the absence of dissolved oxygen (DO)) environment.

(Text missing pending completion of patent application process.)

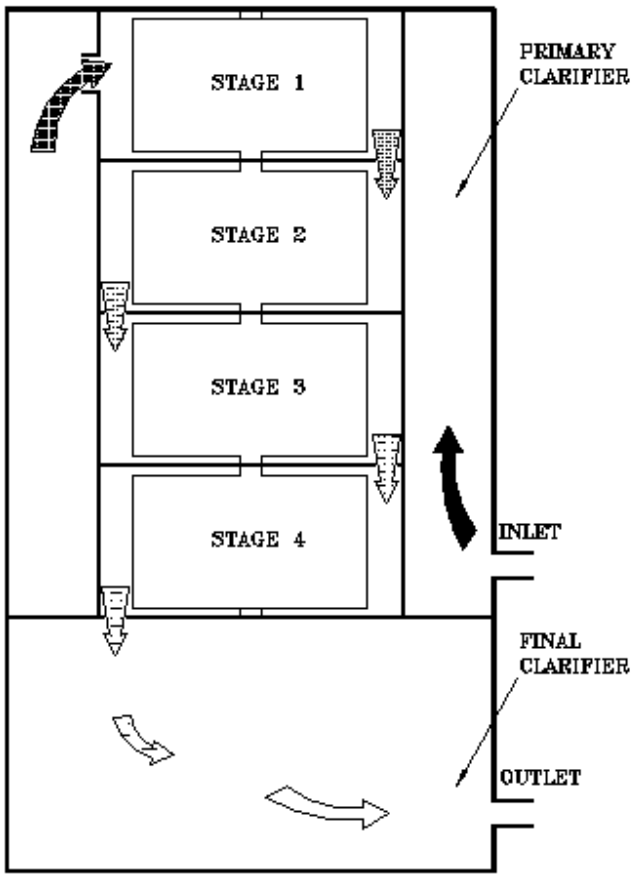
The denitrification section is comprised of two stages separated by a baffle. An equal amount of media is provided in both stages.

D). Partially treated water from the denitrification section then enters the secondary settling tank. Sloughed off biomass from the disks and media bundles and other suspended solids is further settled in this chamber.

E). The partially treated water is then fed to three (3) multi-media filters using one of two (2) submerged pumps. The purpose of these filters is to further reduce the concentration of suspended solids in the final effluent.

2.0 - ROUTINE VISUAL CHECKS ON PHYSICAL AND BIOLOGICAL FUNCTIONING OF ROTORDISK® & DESCRIPTION OF TREATMENT PROCESS

ROTORDISK® sewage treatment plants have three major steps in the purification process. In the primary settling tank, gross solids separate from the flow by either sinking or floating. In the Rotorzone, dissolved pollutants are broken down to simple, non-pollutant compounds by the bacteria ("biomass") which grows on the rotating disks. The final settling tank permits gravity separation of spent biological growth, which continually sloughs off the disks in the Rotorzone preceding it.



2.1 - PRIMARY SETTLING TANK (PST OR PRIMARY "CLARIFIER")

The accumulation of floating scum on the surface of the primary clarifier is normal. It is proportional to the accumulation of settle-able solids at the bottom of the tank. Periodic (9-12 months) removal of sludge at the bottom of the tank is required for proper operation of the Unit.

If no sludge measuring device is available, the accumulation of 9"-12" depth of scum on the surface is a good indication that it is time to remove the accumulated deposits of sludge from the bottom of the tank(s).

2.2 - ROTORZONE

The Rotorzone is subdivided into four sections, with disk banks in each. The wastewater first enters the Rotorzone in the section marked "1" in the sketch (furthest away from the inlet to the plant). The flow then proceeds through sections 2, 3, and 4 before entering the denitrification zone.

The accumulation of biological growth will be greatest in section 1, and gradually decrease through subsequent sections. Generally, the growth will be thick, and often filamentous ("stringy"), in section 1, becoming thinner and more compact through sections 2-4.

The colour of the growth will typically be dark brown to black in Section 1. Some grey growth may also be noticed, depending on the relative load and type of wastewater being treated. Growth in sections 2-4 will typically vary from medium brown to a light brown or tan growth in section 4.

In a well-functioning unit with the appropriate feed of wastewater, there will be an earthy, humus-like ("musty") smell inside the unit. A substantial sour, "sewage" smell may be an indication of sub-optimal conditions in the treatment process.

2.2.1 - 'BATHTUB RING'

The wastewater flows by gravity within a ROTORDISK® Plant thus the water level is relatively constant. Changes in water level of 1" to 2" are not unusual due to surge flows entering the unit. The evidence of this is a 'bathtub ring' 1" - 2" above the normal level. A 'bathtub ring' higher than this suggests that partial or complete flooding of the unit has occurred since the last check. If so, the (gravity or pump) discharge system should be checked for blockages or mechanical malfunction. Another condition which can lead to the level of water rising to greater levels than 1" – 2" is if the plant is fed by pumps that exceed the design limits of the plant (i.e., ADF over a period of 24 hours including a maximum of two (2) PDF events no longer than 2 hours each).

2.3 – ACETIC ACID INJECTION SYSTEM

One of the most important building blocks of life is carbon. The bacteria responsible for denitrification need carbon in an organic form to grow and thus convert nitrate to nitrogen gas. Most soluble organic carbon (often measured in terms of Biochemical Oxygen Demand or BOD) has been consumed in the aerobic section of the wastewater treatment plant and there is thus very little left for the denitrifiers by the time the wastewater reaches the denitrification section of the plant. It is for this reason that acetic acid (vinegar), an easily biodegradable organic carbon source, is injected at the inlet of the denitrification zone.

The system provided consists in a 125 imp. gal. storage tank (ϕ=30", H=49") equipped with a mixer and of a dosing pump of maximum capacity 12.3 l/h mounted on a skid.

The dosing pump can be controlled in either of two ways: by a 4-20 mA signal coming from the flowmeter located on the effluent outlet pipe (the system is programmed to be operated that way by default) or by a dry contact (by others) located outside SEPROTECH SYSTEMS INCORPORATED's main control panel. For example, that dry contact (by others) could be closed when the pumps (by others) feeding the wastewater treatment plant are running and opened when they are not.

The target dose of pure acetic acid (CH_3COOH) in the water is: 175 mg/litre. Assuming that commercial acetic acid is at a concentration of 12% by weight, this means that the target dose of commercial acetic acid at the inlet of the denitrification section would be 1460 mg of commercial acetic acid per liter of water. At ADF (i.e., 49,000 litres per day), this corresponds to a dosing rate of 2.9 litres of commercial acetic acid per hour. If the 4-20 mA signal from the flowmeter is used to control the dosing pump (again, this is the default mode), then the actual dosing rate will be $3 \times 2.9 = 8.7$ litres of commercial acetic acid per hour one third of the time since the flow exiting the plant (via the flowmeter) is pumped from the FST to the multi-media filters at a rate of $3 \times$ ADF = PDF (i.e., 147,000 litres per day).

The average daily quantity of commercial acetic acid necessary has been estimated at 70 l/day (15.4 imp. gal per day) based on an ADF of 49,000 litres/day.

2.4 – DENITRIFICATION ZONE

(Text missing pending completion of patent application process.)

In the denitrification zone, the media is completely submerged such that anoxic conditions (i.e., the absence of Dissolved Oxygen (DO) in the water) prevail and thus the denitrification process (i.e., the conversion of nitrate (NO_3^-) to nitrogen gas (N_2)) can take place. The denitrification zone includes two (2) stages that are separated by a baffle.

2.5 – FINAL SETTLING TANK (FST OR FINAL "CLARIFIER")

The effluent near the outlet at the backside of the final clarifier should be relatively clear and colourless and relatively free of suspended matter. Clarity can best be judged by scooping a small volume of the final effluent into a clear glass container. This is particularly true of larger units where the depth and dark colour of the tank walls may make clarity hard to determine. (Note: Although the risk of infection is very small, the wearing of rubber gloves is a rational safety precaution when hand-scooping the effluent for a clarity check. This is particularly true if there are open cuts on the hands.)

Although the final effluent itself should be relatively clear, some floating matter may accumulate on the surface of the final clarifier. This is normal, and will typically be much less than the accumulation of floating scum in the primary clarifier.

2.6 – FILTERS FEED PUMPS LOGIC AND LEVELS IN THE FST

The level in the FST is controlled in the following manner:

- Level Switch Low (LSL or float #1): both filter feed pumps (each of capacity = 3 × ADF) stop when this level is reached;
- Level Switch High (LSH or float #2): lead filter feed pump starts when this level is reached;
- Level Switch High High (LSHH or float #3): lag filter feed pump starts (lead filter feed pump is maintained in operation) and an alarm goes off when this level is reached (i.e., the alarm light is activated);
- Overflow: the FST is equipped with an outlet that can be connected directly to the storm sewer in the exceptional case that the plant is overflowed (piping between this outlet and the storm sewer is out of SEPROTECH SYSTEMS INCORPORATED' scope of supply).

2.7 – POST FILTRATION SYSTEM

The clarified water is pumped from the FST to three multi-media filters operating in parallel. The purpose of these multi-media filters is to reduce further the concentration of suspended solids in the treated wastewater.

The three filters operated in parallel are designed to treat peak low rates (PDF) of 3 times the design average daily flow (ADF) and are fed at this flow rate since each filter feed pump also has a capacity of PDF.

Each of the three filters is filled with anthracite, sand and garnet with gravel underbedding. The water is filtered from top to bottom of each filter with the coarser filtration media placed on top and the finer on the bottom of the filter. Each vessel is made of fibreglass. In normal operation (i.e., when all 3 filters operate in parallel), the filtration velocity is about 10 m/h on each filter.

A backwash of one of the three filters is performed approximately every 4 hours. The filters are backwashed alternately, i.e., filter no. 2 gets backwashed approximately 4 hour (exactly 4 hours + the time it takes to backwash and rinse a filter) after filter no. 1 gets backwashed and filter no. 3 gets backwashed approximately 4 hour after filter no. 2 gets backwashed. These operating parameters are adjustable on the plant's main control panel (see Section 2.9). When a backwash occurs, the water pumped at PDF from the FST is fed to two of the filters and the filtrate from these is used to backwash the third filter from bottom to top (inverse direction than in filtration mode). The two filters used to produce the filtrate operate at velocities of approximately 15 m/h while the third filter gets backwashed at a velocity of approximately 30 m/h.

The filtration system is controlled by the main control panel for the plant. The automatic diaphragm valves installed on the filtration unit are pneumatic and are thus opened and closed using compressed air. A compressor is provided with the plant. The compressed air transits through a filters solenoid valves panel.

2.8 – MONITORING OF DISCHARGE FLOW RATE

The plant is equipped with a magnetic flow meter located on the clean effluent's discharge pipe. This instrument is equipped with a counter that allows tracking of the total volume of clean effluent discharged by the plant. As mentioned in paragraph 2.3, the flow meter is also used to control the injection rate of acetic acid. A thermal chart recorder was also provided in order to produce hardcopies of the flow measurements taken by the flowmeter.

2.9 – OPERATING PARAMETERS ADJUSTABLE ON THE CONTROL PANEL

The following operating parameters were set as default in the Programmable Logic Control (PLC) panel provided with the plant but are adjustable within the ranges shown below. Making changes and adjustments to the default plant's operating parameters requires a good understanding of the wastewater treatment process and should therefore only be performed by qualified and trained staff. Please contact SEPROTECH SYSTEMS INCORPORATED if assistance is needed to optimise the operation of the plant.

	T1 Time between backwashes	T2 Time for a backwash	T3 Time for rinse	T4 Time between sludge pumping	T5 Time for sludge pumping
Factory Setting	4 h	10 min	5 min	1.0 h	0.25 min
Minimum	1 h	5 min	2 min	0.5 h	0.10 min
Maximum	18 h	30 min	30 min	12.0 h	1.00 min

2.10 - FREQUENCY OF INSPECTION

Visual checks every week should be sufficient. However, for better preventative maintenance of the wastewater treatment plant and thus the capital investment, a daily walk through is often the preferred frequency of visit. Many owners prefer the visual and audible (look and listen) walk through. A standard operator checklist should be prepared and used by the person responsible for periodic maintenance of the plant at every visit. SEPROTECH SYSTEMS INCORPORATED can assist in preparing such checklist upon request.

The acetic acid storage tank should be topped off every time the plant is being visited.

The pressure loss on every filter should also be controlled. Two pressure gauges were provided for this purpose, one on the inlet pipe and one on the outlet pipe of each filter. The pressure drop across a filter shouldn't exceed 15 PSI. If it does even after a filter has been backwashed, the frequency and/or duration of backwashes should be increased.

3.0 - STANDARD RECOMMENDATIONS AND PROCEDURES FOR SLUDGE REMOVAL

3.1 - STORAGE CAPACITIES

A design feature of ROTORDISK®, which contributes greatly to overall simplicity of the process, is the sizing of clarifiers to accommodate static internal sludge storage for extended periods. Depending on such factors as raw wastewater solids concentrations, and design organic loading in a given application, maximum sludge storage levels will typically be reached in 6-9 months of operation.

This period is based on calculated rates of initial decomposition of raw and biological solids, and, upon operating experience, indicating the degree of auto-digestion/compacting, which proceeds during the storage period. The 6-9 month period will be shortened to the extent that design hydraulic and waste loads are exceeded. It will be lengthened to the extent that flows and waste load are less than those designed for.

3.2 - DETERMINATION OF ACCUMULATED SLUDGE VOLUMES

The accumulation of maximum storage capacities can be indirectly monitored through visual observation of the thickness of the scum blanket on the surface of the primary clarifier. When the scum blanket has matured to a height of approximately 7"-10", this is a good indication that sludge accumulations at the bottom of both clarifiers are at or near maximum levels, and that sludge withdrawal is indicated.

A more accurate procedure of determining sludge levels is to directly measure actual accumulations, and compare these to the maximum storage capacities listed on the "Details" section of the general arrangement drawing for the ROTORDISK® model in question.

A variety of sludge measuring devices is commercially available. The two most common are the weighted hollow tube type, and, the (electronic) turbidity-change detector type. The former is less costly, relatively easy to use, and more appropriate because of the low frequency with which measurements need to be made in a ROTORDISK® unit.

Whatever means of measuring the sludge may be selected, it must be kept in mind that the sludge is <u>not</u> a firm solids substance. Domestic wastewater sludge is mostly trapped water and other liquids. Only to determine sludge levels by "feeling" for a solid layer with a stick or pole. The settled sludge is far more liquid than the surface scum, which is perhaps 30-40% solids by volume.

Irrespective of the type of device used, sludge levels should be measured at several locations in each settlement tank to ensure a reasonably accurate calculation of accumulated volumes. This is required since sludge accumulation levels are not uniform; being highest at the inlet ends of both clarifiers, and, below the slot at the bottom of the first section of the Rotorzone trough.

Once an average sludge height has been determined, multiply by the surface area of the clarifier in question to determine the existing volume of stored sludge. Compare to maximum design capacity listed on the general arrangement drawing. If the accumulated levels equal or exceed design values, it is time to remove the sludge from the unit.

3.3 - SLUDGE REMOVAL

A pump-out truck of the same type that pumps out septic tanks normally does the sludge removal. For smaller ROTORDISK® units, the entire liquid contents of the treatment plant can be withdrawn. For larger installations, the haulage contractor should be instructed to get the suction hose directly to the bottom of the tanks and withdraw the sludge only, while taking as little of the supernatant as possible. Once the primary sludge is withdrawn from the primary settlement tank, the supernatant of the secondary clarifier can be transferred to the primary settlement tank to expose the secondary sludge. The suction hose should be placed down at a multiple number of points to help ensure complete removal of accumulated sludge deposits. Floating surface scum should also be removed. Haulage contractors should be given a brief description of the unit and its operation if they are not already familiar with it. A particular point to emphasise is that the biological growth on the disks should not be washed off, but should be left in place. The exception to this is if the disks have accumulated excess biomass due to sludge pump out being delayed past the indicated intervals.

Sludge removed from the unit is normally hauled away by the pumping truck and disposed of at municipal facilities, or, by controlled spreading on farmland. On-site disposal in shallow trenches and/or some form of on-site volume reduction (prior to export) may be feasible or desirable depending on the specific opportunities and limitations afforded by the site of a given installation.

3.4 - POTENTIAL CONSEQUENCES OF OPERATING ROTORDISK® UNITS PAST DESIGNATED MAXIMUM SLUDGE STORAGE LEVELS

Sludge accumulations should be removed once they reach indicated maximum storage levels, because failure to do so could result in lowered treatment efficiency, and possibly cause serious damage to the structure of the Rotating Assembly and drive unit. The potential for problems is as described below and depicted in the attached sketches.

Figure (c) shows a unit operating with sludge build-ups at or near maximum storage levels. This will cause no problem since the storage heights are designated so that flows through the primary clarifier will not disturb the sludge layer. Characteristics of wastewater reaching the Rotorzone at this time (and since start-up) will be in the range of 180-200 mg BOD/1 and 50-250 mg SS/1. The supporting structure of the rotating assembly is over designed for the amount of biological build-up which will occur on the disks under this operating condition, and the shear force of the rotation through the trough water will limit the thickness of growth.

However, if sludge is allowed to accumulate past designated storage heights, flow through the primary clarifier will begin to disturb the sludge blanket, and thus carry loads of solids and dissolved organic matter into the Rotorzone which are not anticipated in the design of the unit (Figure d). The pollutant load reaching the biomass on the first stage of disks will overload that biomass (in terms of F:M ratio), and force a change in its activity and growth. The biomass becomes more gelatinous, and does not shear off as well with disk rotation. Additionally, the biomass will readily adsorb and entrap the extra solids with the sum effect being an increase in weight on the rotating assembly that considerably exceeds that which its design is based on.

This tendency reaches its extreme if sludge is allowed to accumulate to the point where it will be disturbed by-, and caught up in -, the re-circulation pattern created by the two slots in the trough on the first section of the Rotorzone (see Figure e).

The sludge will have characteristics in the order of 20,000 mg TSS/1 and 10,000 mg BOD/1, so it is obvious that even a minor amount of this material caught up in the re-circulation flow will significantly increase the concentration of the waste stream entering the Rotorzone. If, for example, the sludge was caught up in the recycle flow at a ratio of as little as 1:10 or 1:15, the resulting concentration would be sufficient to produce a considerable first-stage overload on an amount of disk area selected based on normal concentrations.

The resulting build-up of poorly-shearing gelatinous biomass and trapped solids would pose a serious potential for strain on the drive unit, and for structural damage to disk bank assemblies and shaft, in spite of them being considerably over designed for loads anticipated in normal operation.

Clearly, these potential problems should be avoided by the removal of sludge once it reaches the level specified as maximum for the ROTORDISK® unit in question.

3.5 - FRONT VIEW SCHEMATIC OF ROTORDISK®

UNIT OPERATING AT-, AND ABOVE-,
RECOMMENDED MAXIMUM SLUDGE STORAGE LEVELS

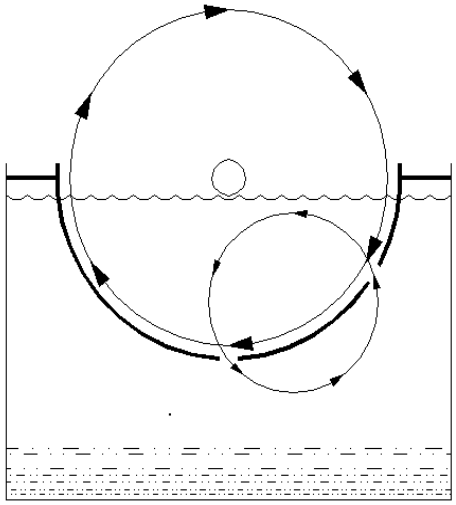


Figure c-unit operating at maximum sludge storage levels. Neither influent flows, nor re-circulating flows, disturb sludge blanket.

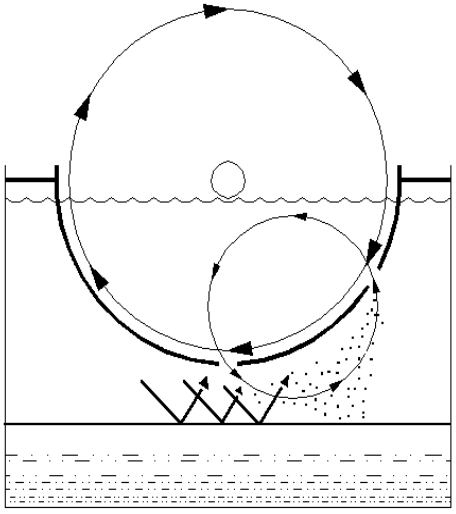


Figure d- unit operating with excess accumulations. Influent flows may disturb sludge blanket and increase BOD and solids loads to Rotorzone to levels above treatment design.

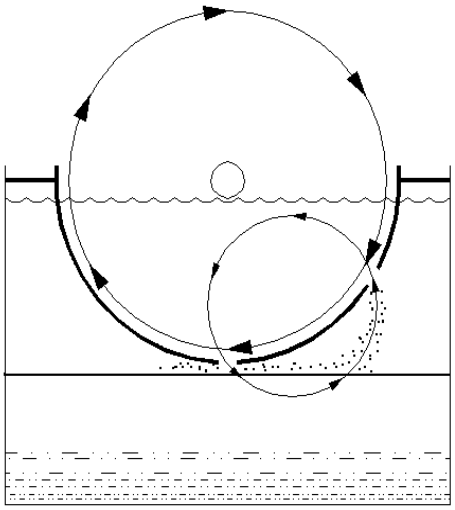


Figure e-Unit operating with excess sludge accumulated to base of Rotorzone. Both influent flows and re-circulation flows will disturb and carry sludge solids. Increase in BOD and solids loads entering Rotorzone will be substantially above design treatment levels, increase accumulated masses on rotating assembly, produce potential for damage to structure and drive unit.

3.6 - PUMPOUT PROCEDURES FOR ROTORDISK® TREATMENT SYSTEMS (summary)

Using suction hose, floating or surface scum should be removed first. Place the suction hose directly to the bottom of the tank and withdraw sludge only, while taking as little as possible of the volume of waste liquid above the sludge blanket (supernatant).

Move the hose at multiple number of points along the bottom of the settlement tanks. Do not wash off biological growth (biomass) on the disks. The exception to this is excess accumulated biomass on the disks due to an overdue sludge pump-out. Excess accumulated biomass is when a disk bank is 100% fully covered with biomass and the colour is grey with a slight odour.

Keep a record of all pump-outs to arrive at an actual normal operating interval for sludge pump-outs. For systems with several flow meters, it is also beneficial to note the total flow generated between pump-outs.

3.7 - START-UP PROCEDURES OF ROTORDISK®

WARNING: A VALVE LOCATED AT THE BOTTOM OF THE DENITRIFICATION TANK AND EQUIPPED WITH A REMOTE ACTUATION MECHANISM WAS PROVIDED WITH YOUR UNIT. THIS VALVE:

- Needs to be OPEN: when the plant is first filled with water, during draining if the plant ever requires such operation and during subsequent refilling operations. FAILURE TO OPEN THIS VALVE DURING FILLING AND DRAINING WILL RESULT IN SERIOUS DAMAGE TO THE PLANT. This is because, during a filling operation, the water rising in the PST would push the denitrification tank upwards while it is empty (this tank wouldn't have had a chance to fill with water until the water level reaches the inlet slot between the PST and the aerobic ROTORDISK®. Th open valves provide a mean of filling the PST and the through (denitrification tank included) at the same time.

- Needs to be CLOSED: during normal operation of the plant. Indeed, the denitrification section contains water already partly treatment thus this water and that contained in the PST shouldn't mix. FAILURE TO CLOSING THIS VALVE DURING NORMAL OPERATION OF THE PLANT WILL RESULT IN A POOR QUALITY EFFLUENT.

The ROTORDISK® sewage treatment plant is based on a fixed film treatment process referred to as the Rotating Biological Contactor (RBC). In this process, micro-organisms or bugs are attached and grown on the surface of a media, the quantity of bugs being directly proportional to the amount of food in the wastewater. When starting up a new system, it will normally take about two weeks to get organic removal from the wastewater and three to four weeks to establish the nitrification process at normal domestic sewage temperatures. The method of and effluent discharge during system start-up should be discussed and thoroughly communicated with the environmental authority. The primary sedimentation tank and RBC of the system should, preferably, be filled with fresh water before admitting wastewater to the system. A flow less than design is not a problem. The biomass will develop themselves on the media. If there is a small flow only a portion of the disk will have biomass. As the flow increases the amount of biomass will increase.

Seeding a ROTORDISK® with activated sludge, although not required, can be accomplished. The activated sludge should be at the same temperature as the influent. Sudden changes in wastewater temperature cause biomass sloughing. In most cases, the use of domestic waste as a seed culture has provided the required biomass for continuous operation. When seeding the ROTORDISK® with activated sludge is decided, the primary sedimentation tank and RBC of the system should first be filled with fresh water (preferably) and the activated sludge added to the RBC. The RBC should be rotating at all times. The wastewater introduced to the tank needs to have only 20% of the disks covered with waste. This can already provide the needed wetting and still provide some time to reach normal operating levels when source flow is introduced. The final clarifier does not need to be filled with anything.

Alternately, seeding can be accomplished using dry bacteria and a source of organic carbon such as raw molasses or sugar. This can be done, for example, in situations where wastewater or activated sludge are not available and the plant needs to be ready to treat wastewater very shortly after it begins receiving it. By simulating the conditions encountered in wastewater (where large amounts of organic carbon and bacteria are present), biomass will establish on the ROTORDISK® and the plant can thus be prepared to work under actual conditions before these are actually encountered. SEPROTECH SYSTEMS INCORPORATED can help find appropriate supplies of both dry bacteria and raw molasses.

The preferred start up is the introduction of source wastewater at design or less than design loading. The disks need to be rotating at all times. When the disks are rotating and wastewater is introduced the biomass will develop and the pollutants will be removed.

The practice of starting up a sewage plant with a charge of septage or activated sludge may be appropriate for suspended growth systems where sludge return is an essential and necessary part of the process. However, start-up with septage is not an appropriate practice for fixed film systems such as the Rotating Biological Contactor process and is not recommended. This is especially true of the ROTORDISK® process and its static, internal storage of sludge.

Studies have shown that the natural start-up time for a ROTORDISK® is 2 1/2 – 3 weeks (normal temperatures and BOD reduction only), and that it has already developed sufficient biomass for 50% removals in only 1 week. These are time frames significantly shorter than respective ones for suspended growth systems. Thus there is little rationale for "pre-starting" a ROTORDISK® unit with septage.

Further, septage contains solids that are already well digested, and therefore not subject to further digestion-compaction in the storage zones. This contrasts to the fresh solids, which will undergo considerable digestion-compaction in the 6 – 9 months after initial settlement. Therefore, a charge of septage would contribute disproportionately to the accumulation of sludge levels, and necessitate a shorter interval to the first pump-out of the unit.

The ROTORDISK® concept of static sludge storage contributes greatly to its overall operation and maintenance simplicity. Following the above guidelines and recommendations will help ensure that the trouble-free simplicity of ROTORDISK® is maintained.

4.0 - STORAGE OF **ROTORDISK®** SEWAGE TREATMENT EQUIPMENT

If the unit is not to be operated for an extended period, then the motor-reducer assembly (drive unit) should be removed from its mound and stored at room temperature in a reasonably dry area (unless the whole unit is being stored in such an area).

Additionally:

1. Reducer: The input shaft should be given several turns once a month to re-lubricate the upper bearings.

NOTE: Some reducers are shipped to site filled with synthetic lubrication. Otherwise, fill the reducer with the lubricant (see reducer section of installation & maintenance instructions).

2. Motor: The motor has a tendency to take on moisture when not in operation. It requires no attention during storage, but before it goes into operation the insulation should be measured using a Meger. It should be at least 1.0 mega-ohm. If below 1.0 mega-ohm, it has taken on excessive condensation, and must be dried out before being operated. (Note: any electrical contractor or repair shop commonly understands these terms and procedures).

3. Support bearings on main ROTORDISK® shaft(s) should be re-lubricated prior to start-up.

4. The system should not be installed and operated in water. In the absence of sewage inputs and normal biological activity, freezing and consequent mechanical damage would be a distinct possibility. Water level in the primary settlement tank to be dropped to below the bottom of the Rotorzone tank level, if freezing of the tank contents is possible.

5.0 - ASSEMBLY PROCEDURE OF ROTORDISK® COMPONENTS SUPPLIED BY SEPROTECH SYSTEMS INCORPORATED

1. Upon receipt of mechanical components:

   a. Check packing list for any missing items on delivery.

   b. Motor/Reducer is shipped loose, for assembly on the reducer flange. The reducer is shipped completely filled with synthetic lubricant.

   c. Bearing components are shipped as a set. Open only when ready for assembly, to avoid moisture contamination.

   d. Chain and sprockets are shipped as a set. Check for the following:

   -Large sprocket bushing (O.D.) fits into the large sprocket bore.
   -Large sprocket bushing bore (I.D.) fits the Rotordisk® shaft drive end.
   -Small sprocket bore (I.D.) fits on the reducer output shaft.
   -Cottered chain fits or matches the teeth on the sprockets.

   e. Coupling (applicable only to split-shaft ROTORDISK® is shipped as a set. Check the coupling hubs if they fit the center stub ends of the ROTORDISK® shafts.

   f. Disk banks are shipped pre-assembled on the shaft by SEPROTECH SYSTEMS INCORPORATED and are shipped on A-frames. Handle with care, as the Fiberglass of the disk banks is brittle.

   g. Hardware (bolts, nuts, washers) for mounting the following items are provided:

   -Bearings
   -Reducer
   -Recycle trough

2. If, for any reason, the diskbanks must be removed from the shaft, the procedure for remounting them is as follows:

If disk banks are 5 ft. in diameter or larger (supplied in semicircular sections)

Mount them on shaft(s) as shown on Dwg.# GL-28D, with 1/2-20NFX1-1/2 Bolts. Connect two half sections with two connecting plates (see sketch of typical mounting details) Remove outer nuts on required tie rods, fit connecting plate on tie rods over the end plates, then fasten them together with nuts and washers.

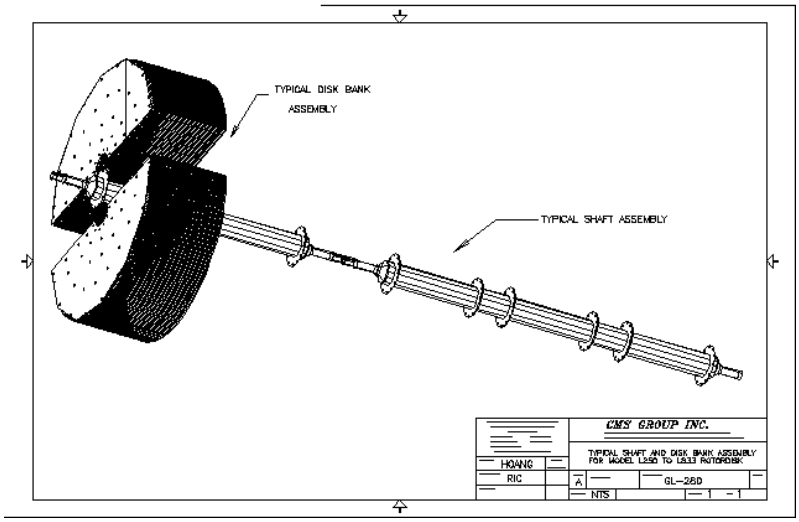


Figure f - typical mounting of disk banks on the shaft(s).

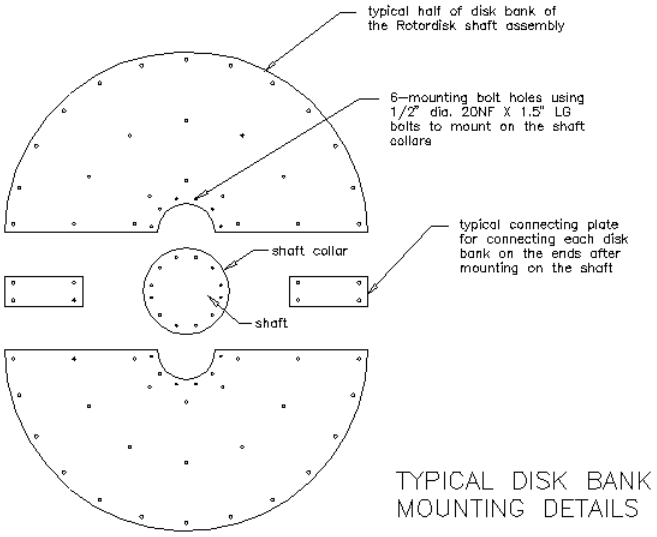


Figure g - exploded view of disk bank mounting parts.

3. Mount Bearings on Shaft(s).

a) Bearing should be mounted at the centre of stub end. Follow bearing manufacturer's installation instructions.
b) Use of the bearing fixing rings: one bearing of each pair is "fixed", the other "floating". Install the fixed bearing on the drive end of the shaft and the floating bearing on the non-drive end.

FOR 'L'Rotordisk® models ONLY: On the shaft where the large sprocket will be mounted, fix the bearing into its housing closest to the sprocket. On the other shaft fix the bearing into its housing closest to the coupling (i.e. one bearing should be fixed on every shaft).

NOTE: All bearings mounted on tapered sleeves have to be driven up the taper to the tolerances given in the manual, using a bearing locking tool or equal. See installation, operation and maintenance instructions section of this manual regarding bearings.

4. Mount coupling hubs on their respective shafts (if applicable) so that hub face is flush with the end of its shaft (for direct drive and 'L' models). See installation, operation and maintenance instructions section of this manual regarding couplings.

5. Install shaft(s) in ROTORDISK® tank.

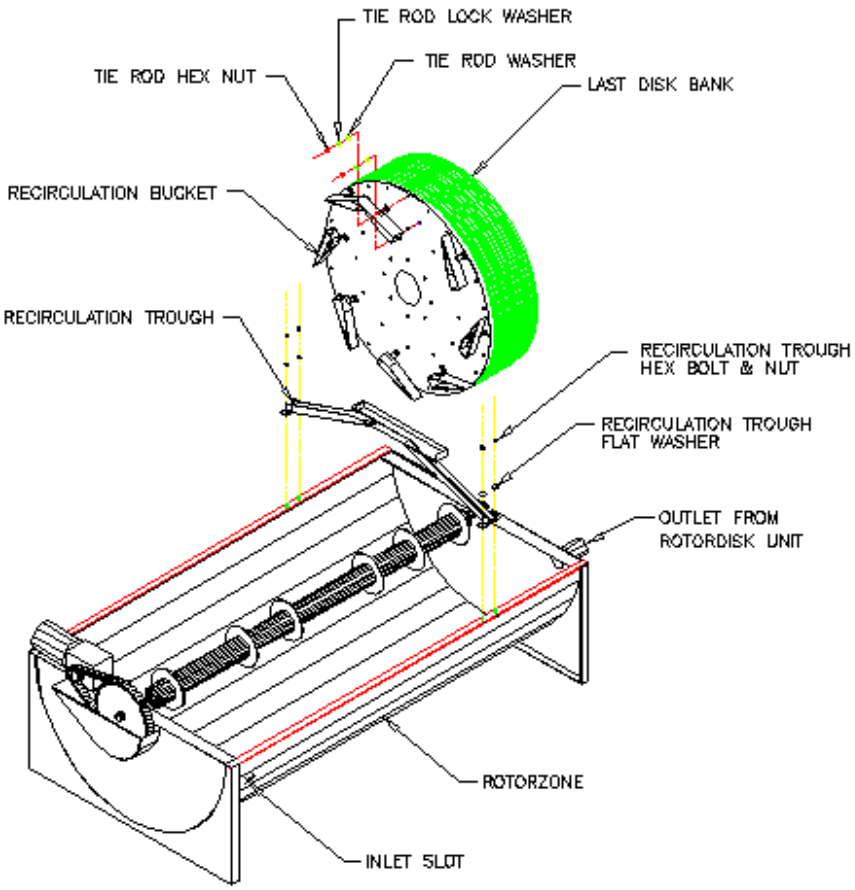
6. Mount small sprocket/coupling hubs on reducer output shaft (whichever is applicable).

7. Install Reducer-Motor Assembly in place. The reducer comes completely filled with synthetic lubricant. Ensure that the breather plug (mounted on top of one of the reducer oil intake ports) is installed on the reducer, after it is mounted on the ROTORDISK®. It is recommended that the motor be mounted into the reducer prior to assembly into the ROTORDISK® tank. Allow for some play in the reducer mounting bolt tightness so the chain tightness can be adjusted later.

8. Connect sprockets with chain. Check the axial alignment of the sprockets while tightening the chain. Tighten the previously loosened reducer mounting bolts after the sprockets are aligned and set in place. See installation, operation and maintenance instructions section of this manual regarding roller chain drives.

9. Connect two coupling hubs, grease, and fit coupling cover (if applicable). Before mounting, check bore on both hubs to match the shaft diameter. See installation, operation and maintenance instructions section of this manual regarding couplings.

10. Mount the stainless steel recycle trough on the ROTORDISK® tank with the bucket opening points to the proper rotation of the shaft.



NOTES:

1. Follow manufacturers instructions in the "Installation & Maintenance Manuals" included by SEPROTECH SYSTEMS INCORPORATED for mounting bearings, couplings (if applicable), reducer, sprockets and chain (if applicable).

2. Make sure all setscrews on sprockets and coupling hubs; bolts on reducer and bearings, are all well tightened before machine goes into operation.

6.0 - ROUTINE MECHANICAL MAINTENANCE OF **ROTORDISK®** SEWAGE TREATMENT PLANTS

6.1 - MOTOR:

If motor is equipped with grease fittings and relief plugs, it should be re-lubricated using a low-pressure gun once a year with Shell Alvenia R2" grease (DO NOT OVER-LUBRICATE). There is no lubrication required for motors without grease fittings and relief plugs

6.2 - REDUCER:

Reduction gear on ROTORDISK® units is filled with synthetic long life lubricant. No inspection or maintenance outside of periodic visual inspection is normally required. If there are no evidence of oil leaks on the seals, the synthetic lubricant must be changed every five (5) years for ROTORDISK® units running 24 hours a day.

Reduction Gear on medium and large ROTORDISK® size units are filled with Shell Tivela 75 oil and does not require oil changes (permanent lubrication). Periodic visual inspection is required. Check oil level and top up to required level with same oil, if necessary.

6.3 - BEARINGS:

Lubricant will deteriorate in time and rate of deterioration is a function of the operating conditions encountered. Lubrication cycle can be determined by analysing the samples taken near the bearing. See bearing manufacturer's maintenance instructions.

6.4 - SPROCKETS AND CHAIN:

(Applicable to non-direct drive ROTORDISK® units)

Chain drive should be inspected every six- (6) months for following points:
- If Chain is covered with grit or chips, it should be cleaned in kerosene and re-lubricated.
- Inspect oil for contamination, such as chips, dirt or grit. Replace oil if necessary (Oil with viscosity of SAE30 at ambient temperature 40^{o} to 100^{o} F is recommended).
- Milky white colour of the oil is indicative of flooding. Replace oil and determine the cause of the flood.
-Check Chain tension and adjust if required.

6.5 - COUPLING:

(Applicable for direct drive ROTORDISK® units and 'L' models)

Coupling should be checked for lubricant level. Lubricant is to be added if required. Re-lubrication with NLGI#2 or LTG Grease once a year is usually adequate.

7.0 - TROUBLE SHOOTING

7.1 - MECHANICAL HARDWARE

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
Noisy chain	1. Loose chain 2. Faulty lubrication 3. Misalignment 4. Worn Parts 5. Moving parts rubbing stationary parts	1. Tighten chain 2. Lubricate properly 3. Correct sprocket alignment 4. Replace worn chain 5. Align & tighten chain to clear oil bath
Rapid wear on chain	1. Faulty lubrication 2. Loose or misalign parts	1. Lubricate properly 2. Align & tighten entire drive
Chain climbing sprockets	1. Worn out chain and sprockets 2. Loose chain	1. Replace worn out parts 2. Tighten chain
Stiff chain	1. Misalignment 2. Worn out chain or sprockets 3. Faulty lubrication 4. Rust corrosion	1. Correct alignment 2. Replace worn out parts 3. Lubricate properly 4. Clean and lubricate
Noisy Bearing	Rollers or bearings damaged	Replace bearing cartridge
Bearing grease discoloured or mixed with water	Insufficient grease in the bearings	Purge bearing with grease and increase lubrication interval
Hot bearing	1. Improper lubrication 2. Rollers or bearing race damaged	1. Purge bearing with grease and decrease lubrication interval 2. Replace bearing cartridge
Reducer temperature rises above 200 degrees Fahrenheit.	Oil level too high or too low	Maintain proper oil level
Oil leakage from reducer	1. Oil seals need to be replaced 2. Ventilators/breather plugged causing pressure build-up inside the reducer. 3. Oil level too high	1. Replace oil seals 2. Clean Ventilators 3. Correct oil level
Noisy reducer	1. Bearing failure 2. Misalignment in worm gear inside 3. Coupling between motor and reducer worn out and misalign	1. Check bearings and replace if necessary 2. Align worm gear shafts. 3. Replace coupling between motor and reducer. Align coupling hub vertically
Noisy Motor	Bearing damage	Replace damaged bearings
Motor overheating	1. Reducer overheating 2. Cooling fins on motor are clogged 3. Overload 4. Rotor rubbing on stator 5. Over greasing or lubrication	1. Check reducer 2. Clean fins 3. Check for excess friction or imbalance 4. Replace bearings 5. Avoid packing grease too tightly
Motor won't start	1. Power trouble 2. Single phasing at station 3. Fuse blown	1. Check source of power supply 2. Do not try to make it go and "fry" motor. Check starter windings 3. Replace fuse
Knocking/rumbling on motor bearings	1. Bearing worn due to lack of lubrication or excessive mechanical overload 2. bearings slack in housing	1. Replace bearing and put new grease of recommended grade. 2. Fir new end shields
Rotordisk® shaft doesn't turn	1. Power failure 2. Motor failure 3. Reducer failure 4. chain drive failure	1. Check power supply 2. Check and replace motor and bearings. 3. Check teeth worn gears and bearings. Replace necessary parts 4. Replace chain

7.2 - ROTORDISK® PROCESS

ROTORDISK® TROUBLESHOOTING GUIDE

Problem	Cause	Corrective Action
1. Slime on media appears shaggy with a brown colour	PROPER OPERATION	NO PROBLEM NORMAL CONDITION
2. Black slime growing on disks	Solids and/or BOD overloading	**a.** Pre-aerate RBC influent **b.** For severe organic overloads, increase recycle rate **c.** De-sludge unit **d.** Place another RBC unit in parallel
3. Rotten egg or other obnoxious odors	Solids or BOD overloading	See Problem 2, solutions a, b, c and d, above
4. Development of odors and white biomass over most of the media surface	1. Septic influent wastewater or high hydrogen sulfide or sulfate concentration	**e.** Determine the cause of the problem and correct it at source. For example, aerate equalization tank **f.** Pre-aerate influent wastewater **g.** Determine the cause of the problem, possibly with the addition of chlorine or hydrogen peroxide; potassium permanganate has also been used
	2. Overload first stage	**a.** Check dissolved oxygen levels to confirm overload problem **b.** Increase number of recycle buckets
5. White slime	1. Bacteria that feed on sulfur compounds. Also, industrial discharges containing sulfur compounds may cause an overload	▪ See Problem 2, solutions a and b above
	2. Grease on the disks	**a.** Remove grease at source **b.** Install grease traps
6. Sloughing or loss of slime (biomass)	1. Toxic or inhibitory substances in influent, including abrupt pH changes	**a.** Eliminate source of toxic or inhibitory substances **b.** Reduce peaks of toxic or inhibitory substances by carefully regulating inflow to plant **c.** Dilute influent using plant effluent or any other source of water **d.** See Problem 7.4
	2. Variation in flow or organic loading	**a.** - During low flow or loading periods, pump from secondary clarifier or 4th stage RBC unit effluent to recycle water with food and dissolved oxygen through the RBC unit **b.** - During high flow or loading conditions, attempt to throttle plant inflow during peak periods **c.** - For severe organic under loads, add a cheap source of soluble carbon in the PST such as molasses

ROTORDISK® TROUBLESHOOTING GUIDE

Problem	Cause	Corrective Action
7. Decrease in process efficiency	1. Reduced wastewater temperature	**a.** Decrease air opening in RBC building **b.** Heat air inside RBC unit cover or building
	2. Unusual variations in flow or organic loading	▪ See Problem 6, cause 2, solutions a and b above
	3. Sustained flows or loads above design levels	▪ Install additional treatment units
	4. High or low pH values	▪ Adjust pH to near neutral
	5. Improper rotation of media	▪ Inspect chain tension and adjust
8. Accumulation of solids and clogging in the RBC system	Solids removal in pre-treatment steps is not adequate	**a.** Improve pre-treatment efficiencies **b.** Provide supplemental aeration to help prevent solids from settling **c.** De-sludge primary tank
9. Floating or rising sludge in the secondary clarifier	Removal of sludge from the clarifier is inadequate	**a.** Increase the duration of pumping sludge from the clarifier **b.** Remove sludge from the clarifier more often
10. Excess shaft weight or biomass thickness	1. Organic loading too high	▪ Decrease organic loading
	2. Stage loading too high	**a.** Increase number of recycle buckets
	3. Inorganic solids accumulation because of inadequate pre-treatment	▪ Check primary treatment and grit removal equipment for proper operation
	4. Accumulation of minerals	▪ Use chemical pre-treatment to eliminate minerals
	5. Digester supernatant adding excessive BOD or sulfides	▪ Modify supernatant pumping frequency
11. Shaft rotation non-uniform or “jerky”	1. Normal variations in balance	▪ Time rotation by quarters. A difference of less than 3 seconds in quarter rotation time is normal
	2. Uneven biomass weight due to power outage	**a.** If severe, shut unit down and wash down disks **b.** Turn off the unit temporarily and rotate manually to uniformly wet biomass growth before restarting **c.** Decrease or stop flow of wastewater to affected units **d.** contact manufacturer for assistance

ROTORDISK® TROUBLESHOOTING GUIDE

Problem	Cause	Corrective Action
12. Effluent quality apparently below requirements	1. Organic loading too high	**a.** Add additional operating RBCs **b.** Identify cause of additional loading and eliminate at source **c.** Add supplemental air to RBC trough
	2. Sampling or testing procedures inaccurate	**a.** If nitrification is occurring, analyze for carbon BOD only by using nitrification inhibitor **b.** Check for contaminated dilution water, sampler lines, or improper sampling storage
	3. Inadequate secondary clarifier operation	**a.** Clean and de-sludge clarifier **b.** Modify sludge removal procedures to eliminate BOD kickback **c.** Install filters after clarifier **d.** Increase alum dose to enhance flocculation
	4. Anaerobic solids in the RBC tanks producing BOD kickback	▪ Flush or drain tanks
13. Snails or other nuisance organisms in RBC tanks	Nutritional and conducive environment for reproduction of hard-bodied shell snails ($^1/_8$" - $^1/_2$" in size)	**a.** Addition of controlled dosages of chlorine. Physical removal may be required with taking units out of service temporarily **b.** Contact manufacturer

Contact SEPROTECH SYSTEMS INCORPORATED for advice on how to resolve problems related to the process before making changes to the process or equipment.

Adapted from Water Pollution Control Federation “Manual of Practice OM-10”, 1988.

8.0 - MAINTENANCE PROGRAM – Do's and Don'ts

DO'S

1. Do use biodegradable soap if at all possible. The system will however handle a certain amount of normal soap. When laundering clothes, please follow manufacturer's instructions regarding quantity of detergent. Excessive use of detergent can cause odour in the system.

2. Do put large amounts of grease in a container and dump in garbage. The system will handle a certain amount of fat and grease. If a tile bed is used and if fats and grease get into it, they may plug the pores of the soil and seal up the bed. Never put large amounts of grease (i.e. old grease from deep fryer) into the sewer lines.

3. Have your system pumped out a minimum of once a year to remove sludge and scum to maintain top operating treatment in your system and filter bed.

4. For small systems equipped with a service hatch, keep the service hatch above the ground. Do not let run-off water enter system, as this will cause hydraulic overload.

5. If a tile bed is used, do keep traffic such as cars, snowmobiles, etc., away from the system bed areas as they will break pipes and seal the soil over the bed.

6. If a tile bed is used, do leave the raised filter in place without disturbing it. The filter is specifically designed to provide maximum dispersal of the water. Altering it by adding fill, covering it up or changing in any way may destroy its water dispersal characteristics and result in bed failure.

7. If a tile bed is used, do encourage a growth of ground cover over the filter bed as it helps disperse water by evaporation and transpiration.

DON'Ts

1. Do not put non-biodegradable materials downs the drain, put them in the garbage, these include any plastics, rubber, disposable diapers, sanitary napkins, rubber goods, cigarettes, children's toys, cellophane, etc. They will plug the system, and a pump out will be needed.

2. Do not put harsh chemicals down the drain. They will kill the bacteria necessary for efficient treatment. These include acid or caustic cleaners, gasoline, oil, turpentine, photographic chemicals, etc. Disinfectant and chlorine bleaches should be kept to domestic uses.

3. Do not leave taps running or faulty toilets. The excess water may overload the system and, if used, tile field causing breakout and poor treatment.

4. If you do not have access to workers with appropriate training, do not attempt to fix the mechanical parts yourself. Your dealer is trained to repair your plant and work safely with electrical and mechanical components. Call him if you have a problem or concerns.

5. Do not connect any other electrical load to the fuse or breaker feeding the plant as it will cause damage to the controls.

6. Never put large amounts of grease (i.e. old grease from deep fryer) into the sewer lines.

YOUR CO-OPERATION WITH RESPECT TO THE ABOVE POINTS SHOULD ENSURE TROUBLE-FREE OPERATION OF YOUR TREATMENT PLANT AND WILL BE GREATLY APPRECIATED.

9.0 - INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR VARIOUS MECHANICAL PARTS OF THE **ROTORDISK®** AND OTHER EQUIPMENT SUPPLIED

9.1 INSTALLATION & MAINTENANCE DETAILS FOR ROLLER CHAIN DRIVES

CHAIN TENSIONING:

The proper fit of a chain may be obtained by adjusting the sprocket centres. When a chain is correctly tensioned, the total mid-span movement (double amplitude) in the slack span should be 4-6% of the span length for normal drives.

Where there is no adjustment means, adjustment may be made by removing links to compensate for elongation due to wear (Drives with fixed centres). Proper lubrication and proper drive maintenance may minimize chain wear.

LUBRICATION:

Although many slow speed drives operate successfully with little or no lubrication beyond the initial factory lubrication, proper lubrication will greatly extend the useful life of every chain drive.

A good grade of clean petroleum oil without additives, free from flowing at the prevailing temperatures should be used.

Chain drives should be protected from abrasive and corrosive conditions, and the oil supply kept free of contamination. Periodic oil change is desirable. The lubricant viscosity recommended for ambient temperature 40^{o} - 100^{o}F is SAE 30.

OIL BATH:

With bath lubrication, the lower strand of chain runs through a sump of oil in the drive housing. The oil level should reach the pitch line of the chain at its lowest point while operating. Only a short length of chain should run through oil.

INSTALLATION RECOMMENDATIONS:

Shafting, bearings and foundations should be supported rigidly to maintain the initial alignment. Roller chain should be free of grit and dirt. Wash chain in kerosene when required. Re-lubricate!

Misalignment results in uneven loading across the width of the chain and may cause roller link-plate and sprocket tooth wear. Drive alignment involves two things:

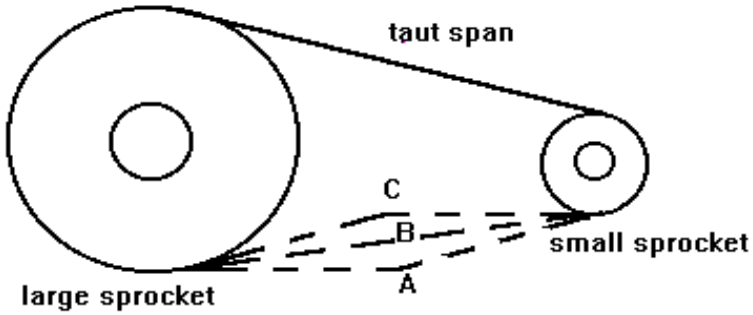
a) Parallel shaft alignment: Shafts should be parallel and level.
b) Axial sprocket alignment: Sprocket axial alignment can be checked with a straight edge, which will extend across the finished sides of the two sprockets.

Normally, it is good practice to align sprockets as close to the shaft bearings as possible.

Installing the Chain: Recheck all preceding adjustments for alignment and make sure all setscrews, bolts and nuts are tight. Fit chain around both sprockets and bring free ends together around one sprocket for connection.

Chain Tension: Check chain tension to be sure that the slack span has 4-6% mid-span movement in horizontal drives.

Recommended Possible Mid-Span Movement AC									
Drive	Tangent Length Between Sprockets								
Center-Line									
	5”	10”	15”	20”	30”	40”	60”	80”	100”
Horizontal to 45	.25”	.5”	.75”	1”	1.5”	2”	3”	4”	5”
Vertical to 45	.12”	.25”	.38”	.5”	.75”	1”	1.5”	2”	2.5”



AC = Total Possible Mid-Span Movement
Depth of Free Sag = .866 AB, approximately

MAINTENANCE RECOMMENDATIONS:

Regular maintenance schedules should be followed for all chain drives. Each drive should be inspected every six months. At each inspection period the following points should be checked:

a) Check Lubrication: If chain is covered with grit or chips, it should be cleaned in kerosene and re-lubricated before reinstalling. With bath lubrication, oil should be maintained at the proper level, as shown in lubrication instructions. Add oil if necessary. At each inspection, oil should be checked for contamination, such as chips, dirt or grit.

b) Check sprocket alignment: If the chain is properly aligned, no wear will show on the inner surfaces of the chain roller link-plates. If wear is apparent, this is evidence that sprockets are misalign and should be realigned as outlined in the installation instructions to prevent further chain and sprocket wear.

c) Check sprocket tooth wear: If sprocket shows evidence of wear high on the sprocket teeth, this is evidence of excessive wear in the chain, the chain should be replaced. If the sprocket teeth are severely worn, the sprocket should be replaced. Do not run new chain on worn sprockets.

d) Check chain tension: At each inspection period, the chain tension should be adjusted. If excessive slack has accumulated which cannot be removed by available shaft centre adjustment (i.e. by moving reducer away from large sprocket using chain tensioning bolts), two or more pitches of chain should be removed and chain reconnected.

9.2 PROCEDURE FOR ASSEMBLING BEARINGS AND PILLOW BLOCKS

Shaft Preparation
Clean shaft and remove any burrs or sharp edges. Check the shaft diameter to given specifications.

Seal Installation
Place seal, which consists of: Double lip 'G' type seal

MOUNTING OF BEARING ON SHAFT

Adapter Sleeve Mounting
Position adapter sleeve on the shaft to correct location with respect to required bearing centerline. A smear of lubricating oil (SAE 10 or 20) applied to the sleeve outside diameter surface results in easier bearing mounting and removal. (For pillow blocks mounted close to a pulley hub or similar obstruction, mount the adapter sleeve with threads inboard for easy removal. Remember to slide lock-nut, lock-washer and bearing onto the shaft before positioning the sleeve.)

NOTE: All bearings mounted on tapered sleeves have to be driven up the taper to the tolerances given in SKF tables, to ensure correct fits. Spherical roller bearings can be measured between the unloaded rollers and the outer ring sphere surface.

Un-mounted Clearance, Spherical Roller Bearings
Measure the un-mounted internal clearance in the bearing by inserting and sliding progressively larger feeler blades the full length of the roller between the most vertical unloaded rollers and the outer ring sphere. Never run the rollers over the feeler blade, as the wrong value will be obtained. Record the measurement of the largest size blade that will slide through. This is the un-mounted internal clearance.

Bearing
Mount the bearing hand tight on the adapter sleeve. Be sure the large end of the bore of the inner ring matches the taper of the adapter. To avoid damage to the bearing it is most important during this and subsequent operation that the shaft is blocked up so the bearing is unloaded. Do not apply lock-washer. Drive up procedure may damage it.

Bearing Drive Up, Spherical Roller Bearings
Lubricate the face and thread of the lock nut and apply to sleeve with chamfered face toward the bearing. Tighten the lock nut. Do not attempt to tighten the lock nut with a hammer and drift (use proper wrenches), the lock nut can be damaged and chips can enter the bearing. Further tighten the lock nut and measure the internal clearance until the internal clearance is less than the un-mounted clearance figure by the amount shown in the attached table (see last page). Finally, remove lock nut, position lock washer with outer tangs facing away from the bearing, and inner tang properly seated in the slot provided in the adapter. Replace lock nut and tighten until firmly seated.

PREPARATION OF PILLOW BLOCK HOUSING

Check to be sure all pillow block parts are free of burrs and are completely clean. Internal surfaces should be removed. Apply a thin coat of grease to the bearing seat in the base. Fit the bearing and seal inserts into the pillow block base, being careful not to damage to O-rings. For assembling larger sizes where hoists must be used, it may be convenient to seat both bearings into their housing bases simultaneously.

FIXING RINGS

On each shaft one bearing is generally "Held" and other bearings are "Free", to permit shaft expansion. For "Held" bearing housings, use two fixing rings. Place one on each side of bearing.

CAPPING THE PILLOW BLOCK

Place the cap on the base so that the dowel pins in the base align with the holes in the cap, being careful not to damage the O-rings. Caps and bases are not manufactured for interchangeable assembly. They must be kept together. Install cap-bolts with lock washers and tighten securely.

GREASE LUBRICATED BLOCKS

Lubrication Notes

Grease Lubrication

If grease is used as a lubricant, it should be smeared between the rolling elements and worked in. The lower half of the housing should be packaged $^{1}/_{2}$ to $^{3}/_{4}$ full.

PROCEDURE FOR APPLYING LUBRICANT TO BEARINGS AND PILLOW BLOCKS

Pack each bearing as completely full of the specified grease as possible by swiveling the outer ring open and rotating it as necessary to inject the grease. Then, swivel the outer ring closed being careful not to use force in the event a roller end catch the corner of the outer ring sphere.

B) Before assembling the pillow block cap to the base, and after completing bearing and base assembly, fill $^{1}/_{2}$ to $^{3}/_{4}$ of the pillow block base with the same lubricant that was used to pack the bearing.

LUBRICATION PROCEDURE TO BE USED AT START-UP

A) All pillow block assemblies that have not been prepared for stage are ready for use, assuming the installation procedures have been correctly followed.

B) While shaft is rotating, lubricate each seal through the outside lubricant fittings until grease is seen emerging from the labyrinth areas. Make sure the outside of the lubricant fitting is clean before applying grease.

RE LUBRICATION

Lubricants deteriorate in time, and the rate of deterioration is a function of the lubricant used at the operating conditions encountered. Determining the re-lubrication cycle depends on sampling the grease and analysis of the samples. Provisions must be made to adequately evaluate the contamination by solids. Samples for grease evaluation should be taken from near the bearing, and evaluation of the samples should dictate the re-lubrication cycle.

Remove caps once a year and re-apply new grease.

Each seal assembly should be lubricated once a month, while the bearing is rotating, with the same grease that is used in the bearing.

GREASE CLASSIFICATION

		Oil Viscosity Saybolt Second (approx. SSU)		
Class	Type of Base (1)	@ 100 F	@ 210 F	NLGI (2) Grade
A	Lithium or Equal	200 - 500	48 – 55	0
B	Lithium or Equal	400 - 600	58 – 68	1
C	Lithium or Equal	800 - 1,000	75 – 82	1
D	Lithium only	800 - 1,000	75 – 82	2

	Grease requirement from above			
Operating temperature of bearing (4)	Low (5)	Medium	High	Suggested Re-lube cycle
0 – 70	A or B			6 – 12 months
70 – 120	B or C			6 – 12 months
120 – 160	B or C	C or D (6)	D (7)	2 - 3 weeks
160 – 200	C	C or D (6)	D (7)	1 - 4 weeks

1) Calcium Complex Greases NOT recommended for spherical roller bearings.

2) National Lubricating Grease Institute Consistency Code.

3) Definition of speed categories:
Low: up to 1/4 of catalog speed limit for static oil lubrication.
Medium: 1/4 to 1/2 catalog speed limit for static oil lubrication.
High: 1/2 to full catalog speed limit for static oil lubrication.

4) Consult SKF Engineering if temperature is below 0^{o} or above 200^{o}F.

5) Extremely slow speed will require special consideration if loads are high.

* Under all conditions, application should be checked using the SKF lubricant film parameter found in the Engineer Data Catalog.

6) Use type "C" where load is heavy, 15,000 hours-rating life or less and/or speed are less than RPM.

7) Consult SKF Engineering - Grease lube not normally recommended under this combination of operating conditions.

8) Dry clean applications only. For moderate conditions of dirt and/or moisture, use cycle of 1 to 2 months. For extreme conditions of dirt and/or moisture, use cycle of 1 week. Vertical applications normally require shorter than normal re-lube cycle.

9) Never mix greases with unlike bases.

10) Remove old grease at least once a year.

10 - LIMITED WARRANTY

SEPROTECH SYSTEMS INCORPORATED warrants the parts in each treatment plant to be free from defects in material and workmanship; for a period of 15 months from shipment or 12 months from start-up, whichever occurs first, in the treatment of domestic wastewater. Sole obligation under this warranty is as follows:

SEPROTECH SYSTEMS INCORPORATED shall fulfil this warranty by repairing or exchanging any component part, F.O.B. our factory, that in SEPROTECH SYSTEMS' judgement, shows evidence of defects, provided said component part has been paid for and is returned through an authorized dealer, transportation prepaid. The warranty must also specify the nature of the defect to the manufacturer. New placed parts are under warranty for one year.

The warranty does not cover treatment plants that have been flooded, by external means, or that have been disassembled by unauthorized persons, improperly installed, subjected to external damage or damage due to altered or improper wiring or overload protection.

This warranty applies only to the treatment plant and does not include any other electrical wiring, plumbing, drainage, or disposal system. SEPROTECH SYSTEMS INCORPORATED is not responsible for any delay or damages caused by defective components or material, or for loss incurred because of interruption of service, or for any other special or consequential damages or incidental expenses arising from the manufacture, sale, or use of this plant.

SEPROTECH SYSTEMS INCORPORATED reserves the right to revise, change, or modify the construction and design of the treatment plant for domestic wastewater or any component part or parts thereof without incurring any obligation to make such changes for modifications in previously sold equipment. SEPROTECH SYSTEMS INCORPORATED also reserves the right, in making replacements of component parts under this warranty, to furnish a component part, which, in its judgement is equivalent to the Company part replaced.

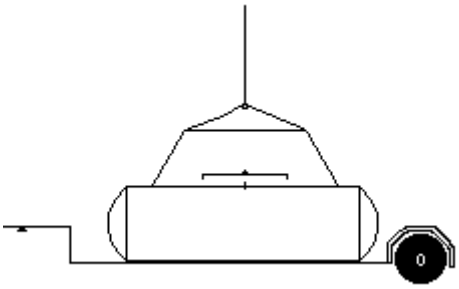
Under no circumstance will SEPROTECH SYSTEMS INCORPORATED, be responsible to the warrantee for any other direct or consequential damages. Including but not limited to; lost profits, lost income, labour charges, delays in production, and/or idle production, which damages are caused by a defect in material and/or workmanship in its parts.

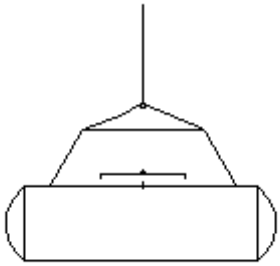
This warranty is expressly in lieu of any other expressed or implied warranty, excluding any warranty of merchantability or fitness, and of any other obligation on the part of SEPROTECH SYSTEMS INCORPORATED.

Seprotech Systems Incorporated
2378 Holly Lane, K1V 7P1
Ottawa, Ontario, Canada
Telephone (613) 523-1641
Fax (613) 731-0851

LIFTING

INSTRUCTIONS





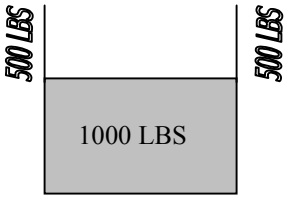
CENTER OF GRAVITY

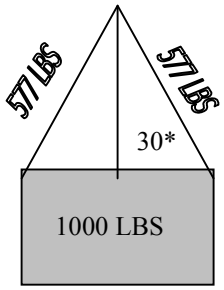
It is always important in rigging practice to rig the load so that it is stable. A stable load is one in which the center of gravity of the load is directly below the main hook and below the lowest point of attachment of the slings. The center of gravity of an object is that point at which the object will balance. The entire weight may be considered as concentrated at this point. A suspended object will always move so that the center of gravity is below the point of support. In order to make a level or stable lift, the crane or hook block must be directly above this point. Thus a load, which is slung above and through the center of gravity, will be stable and will not tend to topple or slide out of the slings.

Predicting the center of mass for an object to be lifted is not a trivial matter. It may require several attempts at rigging to find the appropriate balance point. Many objects are not rectangular such that predicting the center of mass is often difficult. In all crane lifts the center of mass must remain below the hook and below the point of attachment for any rigging. A center of mass above the hook is inherently unstable and will cause the load to flip. Similarly, loads that are not balanced in the horizontal plane may slip form the rigging. The overall stability of the load is a combination of balance with respect to the center of mass, weight distribution, and rigging tightness.

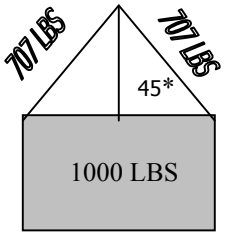
Crane operators should adjust the rigging and test for the actual center of gravity before the load is lifted.

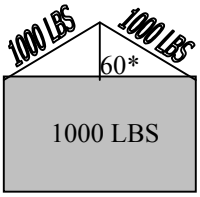
WEIGHT vs. ANGLE





Sling Angle With Vertical △	Stresses per Sling Leg Per 1000 LBS Total Load
0	500
5	502
10	508
15	518
20	532
25	552
30	577
35	610
40	653
45	707
50	778
55	872
60	1000
80	2880





The angle at which a sling holds a given load influences the effective weight of the load. Stresses are minimal for loads with slings held perpendicular to the load, as shown in Figure A. For distributing the load vertically among more than a single leg of a sling, a spreader bar may be used. As shown in figures B-D, increasing the angle of the sling to the hook from 30 to 60 degrees increases the effective mass of the load from 1154 lbs. to 2000 lbs., essentially doubling the weight on each leg of the sling at 60 degrees. The chart in the middle offers a handy guide for assessing the effective angle of the sling to the relative weight. Thus, it is always better to limit the angle of the sling. Further, such changes in sling angle must be accounted for in lifts that are close to the sling weight limit and/or for critical lifts (greater than 90% of the crane limit). Crane operators should download a copy of this chart and carry it with them during crane operations.

RIGGING

- Loads should be well secured
- Slings should be adequate to the task
- Slings should be un-kinked and load balanced and secured
- No sudden stops
- No obstructions while lifting or traveling
- No loose items on load or crane before lift
- Bumping into runway stops is prohibited
- Hoist line must be vertical prior to the lift (remove slack in the hoist slowly)
- No crane load should pass overhead of personnel, clear the area before making the lift
- No one is to ride the crane without permission

The most important job of any crane operation is rigging of the load. Poor rigging may result in personnel injury, property damage, or other serious hazards. Rigging is the most time consuming of any crane operation and represents the single most hazardous potential of crane operation. In a multi-sling operation, each leg must be of the same length and must contribute equally to load distribution. Nylon slings are susceptible to damage by sharp corners on the item to be rigged. Caution must be taken to ensure that slings are not damaged by sharp corners or by excessive loading. Rigging requires years of practice to perfect. If in doubt about the security of your rigging, ask for help. Rigging should be checked by lifting the load a few inches off the ground to ensure that no swing develops and that the load is completely secure. Remember it is important to take the time to accomplish this task correctly. Not doing so may result in catastrophic consequences. One of the most important things to check before lifting a load is to look for loose items, such as screws or tools, which may have been used to secure the load. Such items can become projectiles during a lift. This is the reason why crane operators or especially tag line operators should wear hard hats when operating the crane and why it is essential to make sure the path of the crane does not pass over the head of any individual.

Spreader bars must be used when lifting the N-70. Slings are to be attached at the lifting lugs located at the Four Inside Corners of the N-70.

Overall Weight	55,580 Lbs
- Weight Tank alone	14,925
- Weight Trough	4,850
- Weight Shaft	7,492
- Miscellaneous	8,000
- Cover Assembly	7,800
- EQ Tank	8,420
Overall Dimensions (Assembled)	33.6 Ft Long x 11.9Ft Wide x 16.4 Ft High

(Refer to the General Arrangement Drawing #60063-L00 for exact dimensions)

The following handling and installation instructions are intended to help customers install the RBC properly and efficiently.

Handling and installation instructions are only recommendations. They do not relieve the purchaser from full responsibility for proper inspection, handling and installation. Improper handling or installation, which results in damage or tank failure, is the sole responsibility of the purchaser. Failure by the customer to comply with the handling or installation instructions will void the tank warranty. Unknown situations or conditions are also the burden of the purchaser.

The presence of SEPROTECH SYSTEMS personnel or an authorized representative at the installation site does not relieve the purchaser of their responsibilities.

DO NOT fully assemble RBC prior to lifting. First install the tank, and then assemble the shaft and other components onto installed tank.

INSPECTION

At the time of delivery, the customer shall be responsible for inspecting the tank for damage during transit. Both the inside and the outside of the tank must be inspected. If damage has occurred it should be noted on the delivery receipt prior to signing acceptance, whether it be a SEPROTECH SYSTEMS truck of common carrier. If a SEPROTECH SYSTEMS truck makes delivery, the factory should be immediately contacted prior to unloading or acceptance. The customer accepts all future responsibility for a damaged tank if the procedures set forth are not followed.

Minor damage can be repaired at the delivery site.

SEPROTECH SYSTEMS tanks are designed to withstand normal handling. Note the following handling precautions:

1. NEVER roll or slide a RBC. Lift the tank using a crane or other approved method.
2. Operators of hoist equipment should follow proper rigging procedures at all times. NEVER allow RBC to swing out of control.
3. Do not drop or allow hard impact from tools, spreader bars, etc.
4. Avoid the use of equipment inside the tank that could scratch or damage the inner corrosion barrier.
5. NEVER use cables or chains around tank.
6. NEVER lift tank by using fittings. Use designated lifting lugs.
7. If RBC is being stored prior to installation, be sure to lay on padded surface and tie down securely.

➢ APPENDIX 2

- **Seprotech As-Built drawings**
- **PWSP #1 Plans and Sections**
  - **Design Drawings**
  - **As-Constructed Drawings**
- **PWSP #2 Plans & Sections**
  - **Design Drawings**
  - **As-Constructed Drawings**
- **Construction Photographs**

SITE BENCH MARK
CP501
N7914648.66
E 557882.33
ELEV.=167.37

EXISTING CAMP

Sewage Treatment (Tanks-A-Lot) see Mech. dwg.

Sewage Treatment

PROPOSED PIPELINE TO BE INSTALLED BY OCTOBER 2007 (BULK SAMPLE)

DISCHARGE PIPE CONNECTION POINT FOR COLLAPSIBLE 38mm DISCHARGE HOSE.

PORTABLE, AMT-3HP UTILITY PUMP (see Mechanical dwgs. for details

STA. 1+640
N 7914150.26
E 558496.27

1+000
N=7914517.51
E=558010.41
PC = 1+018.27

1+040
PCC = 1+037.69
PT = 1+053.77

N=7914486.54
E=558016.25

1+080 1+120 1+160 1+200 1+240 1+280 1+320 1+360 1+400 1+440 1+480 1+520 1+560 1+600 1+640 1+680

EXIST. WEATHER STATION

173.5 173.0 172.5 172.0 174.0 174.5 175.0 175.5

50 mm HDPE DR17 SEWAGE DISCHARGE PIPE WELDED JOINTS.
(PIPE COIL SIZE = 1.9m X .3m)

PLACE FILL UNDER PIPE @ LOW AREAS TO ENSURE PIPE IS ON GRAVEL (no voids under pipe)
USE SANDBAGS TO SECURE PIPE IN PLACE.

1+000

1+763.49

173.45 173.50 173.25 173.30 173.52 173.67 173.79 173.85 173.87 173.84 174.01 174.25 174.45 174.51 174.54 174.74 174.94 174.20

180.00

CONNECT INTO TANKS-A-LOT SYSTEM

PROPOSED PIPELINE

EXISTING GROUND

POND BERM (SEE C108 & C109 FOR BERM AND PIPE INLET DETAILS)

DATUM ELEV. 170.00

1+000 1+040 1+080 1+120 1+160 1+200 1+240 1+280 1+320 1+360 1+400 1+440 1+480 1+520 1+560 1+600 1+640 1+680

PROFILE THRU SEWAGE DISCHARGE PIPE

SCALE
50.0m 0 50.0m

THE POSITION OF POLE LINES , CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THIS DRAWING AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Description	Date	No.
ISSUED FOR CONSTRUCTION	July 03,2007	1
ISSUED FOR TENDER/REVIEW	May 25,2007	0

Revisions and Issues

NORTH Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT STRUCTURAL/CIVIL

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

MECHANICAL ELECTRICAL

Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND NUNAVUT

Drawing
FORCEMAIN TO POLISHING POND PLAN/PROFILE

Date JUNE 2007	CADD File Number ...\maincamp\dwg\Issued...\c107-R1
Scale 1:1000	Job Number **06-090**
Drawn CM/SO	
Checked MK	Drawing Number **C107-R1**
Approved	

SITE BENCH MARK

PROPOSED PIPELINE

DISCHARGE PIPE CONNECTION POINT FOR POND

38mm (1 1/2") ø COLLAPSIBLE DISCHARGE HOSE

NOTE:
IF THE CONTRACTOR CAN EXCAVATE DEEPER THAN 1.0 METER FROM ORIGINAL GROUND, THE TOP OF BERM ELEVATIONS CAN BE DECREASED BY AS MUCH AS THE ADDITIONAL DEPTH OF EXCAVATION. IN ANY EVENT, THE MINIMUM DEPTH OF POND SHALL BE 2.4 METERS FROM BOTTOM TO THE TOP OF LINER AND THE POND DIMENSIONS SHALL BE MAINTAINED AT 30m X 63.4m.

BERM REQ. =4727.4m³
EXCAVATION =2200m³
REQUIRED MATERIAL =2527m³

X 174.9 ELEV.

X 174.6 ELEV.

X 174.3 ELEV.

SLOPE 4:1
TO ORIGINAL GROUND

6.20

8.60

8.60

AMT UTILITY PUMP
model #2858-95 3HP

38mm DISCHARGE
PIPE c/w COUPLING

6.20

63.40

PROPOSED CULVERT
MIN. 400mm

A-3
C109

PIPE INLET

N 7914135.49
E 558520.42

0.70

INLET PIPE c/w 45° ELBOW

SANDBAGS SECURELY IN POSITION AGAINST MOVEMENT

N 7914098.18
E 558572.40

DISCHARGE PIPE c/w 45° ELBOW

ROAD SLOPED 10:1 TO TOP OF BERM

23.10

0.30

7.20

8.85

SLOPE 3:1

SANDBAGS SECURELY IN POSITION AGAINST MOVEMENT

X 175.0 ELEV.

AREA FOR EXCESS MATERIAL FROM GRUBBING (approx. 352m²) SLOPED 10:1 FROM TOP OF BERM TO ORIGINAL GROUND.
NOTE: CONTRACTOR TO ENSURE DITCH RUNS CONTINUOUSLY AROUND PERIMETER TO OUTLET POINT.

30.00

X 174.2 ELEV. typical
(SEE NOTE)

X 174.14 ELEV.

DITCH c/w 3:1 SIDE SLOPES

2.70

N 7914110.91
E 558503.23

N 7914074.61
E 558555.19

A-4
C109

7.40

9.88

X 177.05 ELEV.
(177.08 AT CENTERLINE)
typical top of berm

2.00

7.40

9.68

X 174.5 ELEV.

X 174.2 ELEV.

X 173.98 ELEV.

TO EXISTING POND

A-1
C109

A-2
C109

PLAN VIEW
SCALE 1:200

SCALE
10m 0 10m

THE POSITION OF POLE LINES , CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THIS DRAWING AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Description	Date	No.
ISSUED FOR CONSTRUCTION	July 03,2007	1
ISSUED FOR TENDER/REVIEW	May 25,2007	0
Revisions and Issues		

NORTH

Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT

STRUCTURAL/CIVIL

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

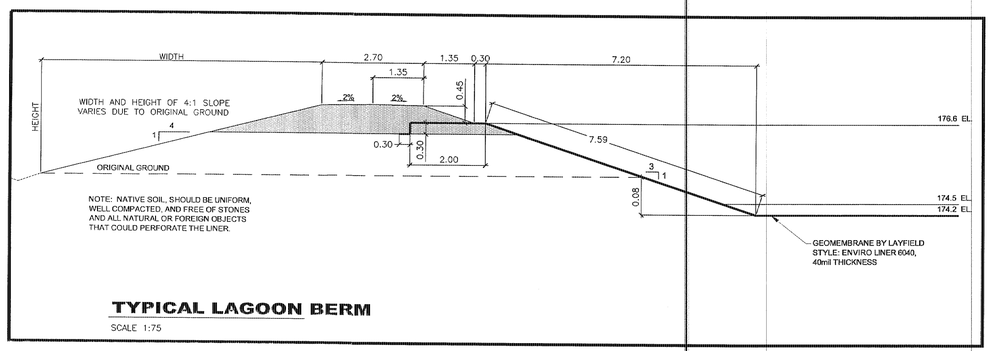
MECHANICAL

ELECTRICAL

Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND NUNAVUT

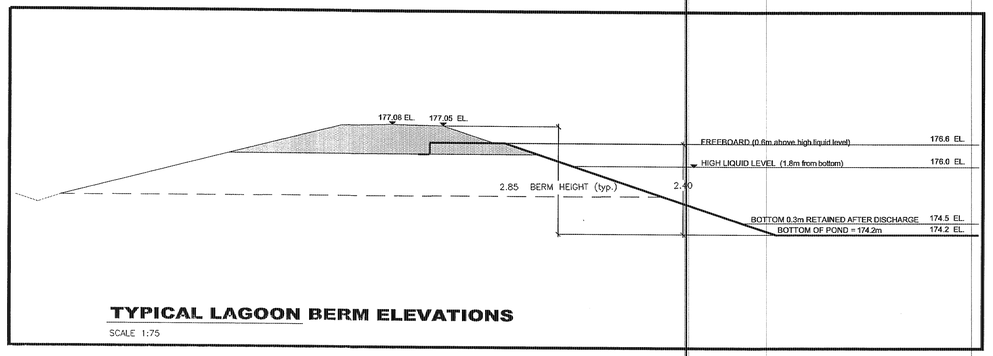
Drawing
POLISHING POND PLAN VIEW

Date: MAY 2007	CADD File Number: ...\mainsample\dwg\issued...\c108-R1
Scale: 1:200	Job Number: **06-090**
Drawn: CM/SO	
Checked: MK	Drawing Number: **C108-R1**
Approved:	



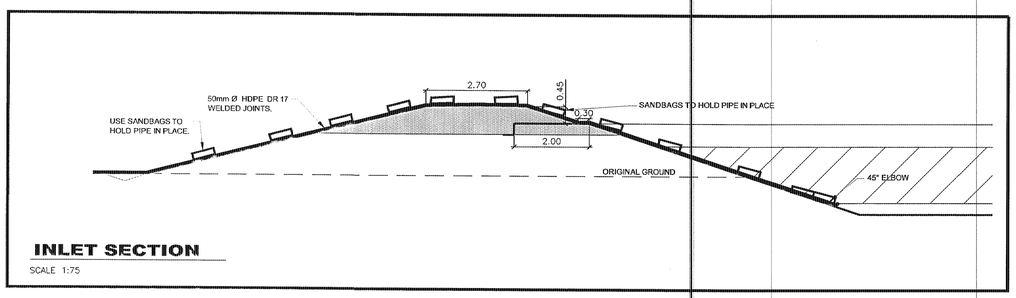
TYPICAL LAGOON BERM

SCALE 1:75



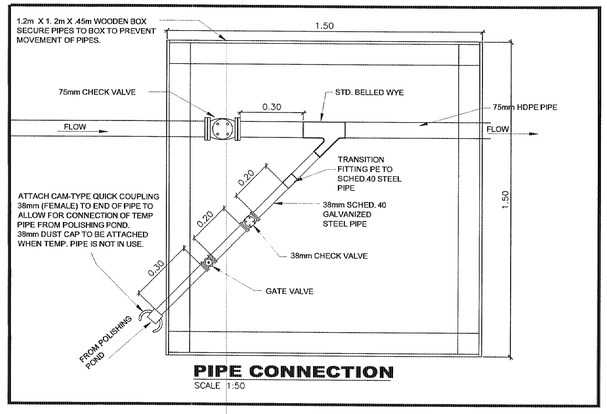
TYPICAL LAGOON BERM ELEVATIONS

SCALE 1:75



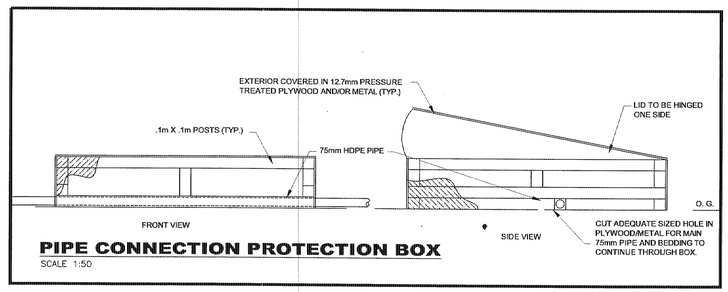
INLET SECTION

SCALE 1:75



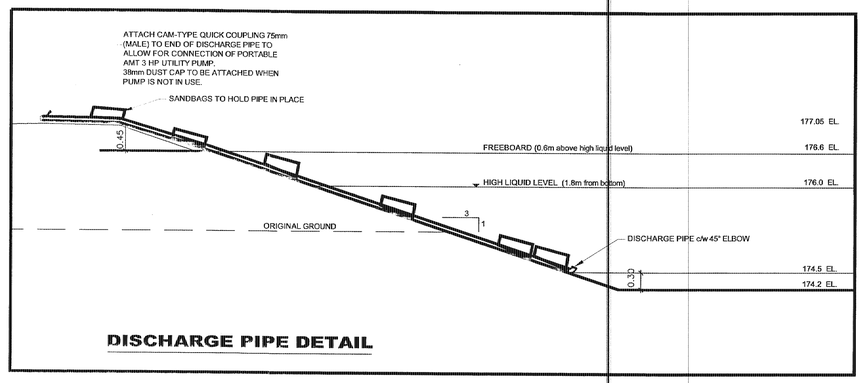
PIPE CONNECTION

SCALE 1:50



PIPE CONNECTION PROTECTION BOX

SCALE 1:50



DISCHARGE PIPE DETAIL

NOTE:
IF THE CONTRACTOR CAN EXCAVATE DEEPER THAN 1.0 METER FROM ORIGINAL GROUND, THE TOP OF BERM ELEVATIONS CAN BE DECREASED BY AS MUCH AS THE ADDITIONAL DEPTH OF EXCAVATION.
IN ANY EVENT, THE MINIMUM DEPTH OF POND SHALL BE 2.4 METERS FROM BOTTOM TO THE TOP OF LINER AND THE POND DIMENSIONS SHALL BE MAINTAINED AT 30m X 53m.

Revisions and Issues	Date	No.
ISSUED FOR CONSTRUCTION	July 03,2007	1
ISSUED FOR TENDER/REVIEW	May 25,2007	0

NORTH

Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT

STRUCTURAL/CIVIL

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

MECHANICAL

ELECTRICAL

Project

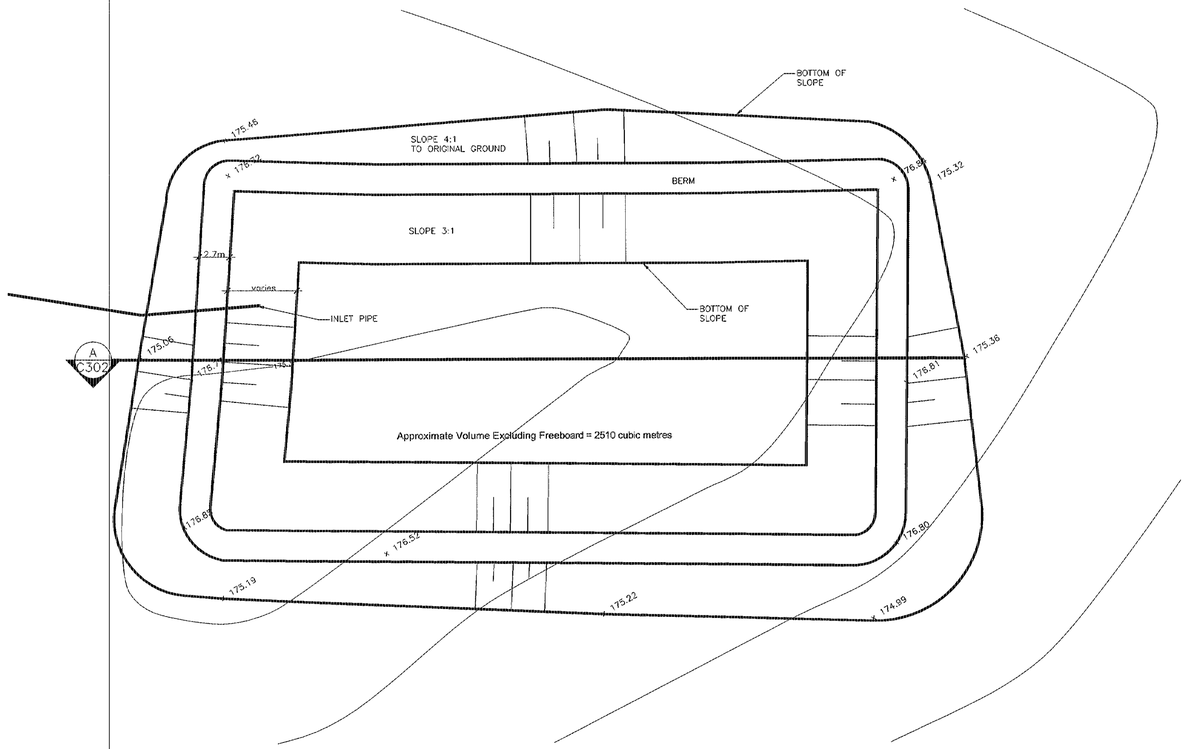
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION

BAFFIN ISLAND NUNAVUT

Drawing

POLISHING POND SECTIONS AND DETAILS

Date: MAY 2007	CADD File Number: ...\MAIN CAMP\dwg\Issued...\C109-R1
Scale: AS NOTED	Job Number: **06-090**
Drawn: CM/SO	
Checked: MK	Drawing Number: **C109-R1**
Approved	



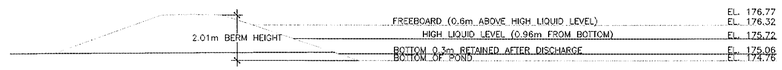
TOTAL CAPACITY OF POND: 2,577m³

LAGOON PLAN VIEW
SCALE 1:250

SCALE
10m 0 10m

TYPICAL LAGOON BERM
SCALE 1:125

TYPICAL LAGOON BERM ELEVATIONS
SCALE 1:125



SCALE
5m 0 5m

Description	Date	No.
Revisions and Issues		

NORTH Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

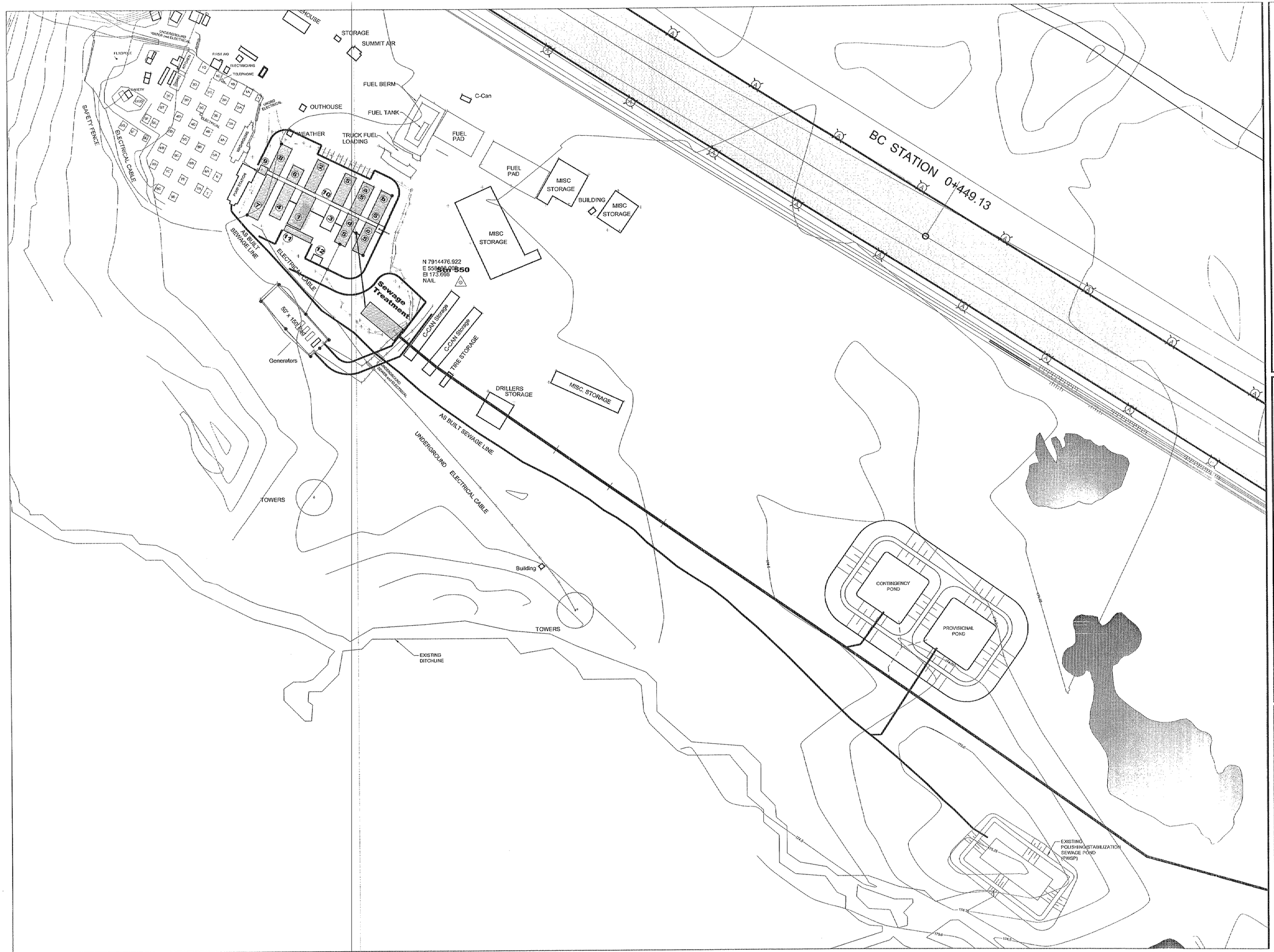
ARCHITECT STRUCTURAL/CIVIL

MECHANICAL ELECTRICAL

Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND NUNAVUT

Drawing
AS CONSTRUCTED
PWSP 1
PLAN AND SECTIONS

Date	CADD File Number
JAN 2008	survey/maryriver/c302
Scale: AS NOTED	Job Number: **07-039**
Drawn: AB	
Checked: M.K	Drawing Number: **C302**
Approved: M.K	



Description	Date	No.

Revisions and Issues

NORTH

Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT STRUCTURAL/CIVIL

MECHANICAL ELECTRICAL

Project

MARY RIVER PROJECT
BAFFIN LAND IRON MINES CORP

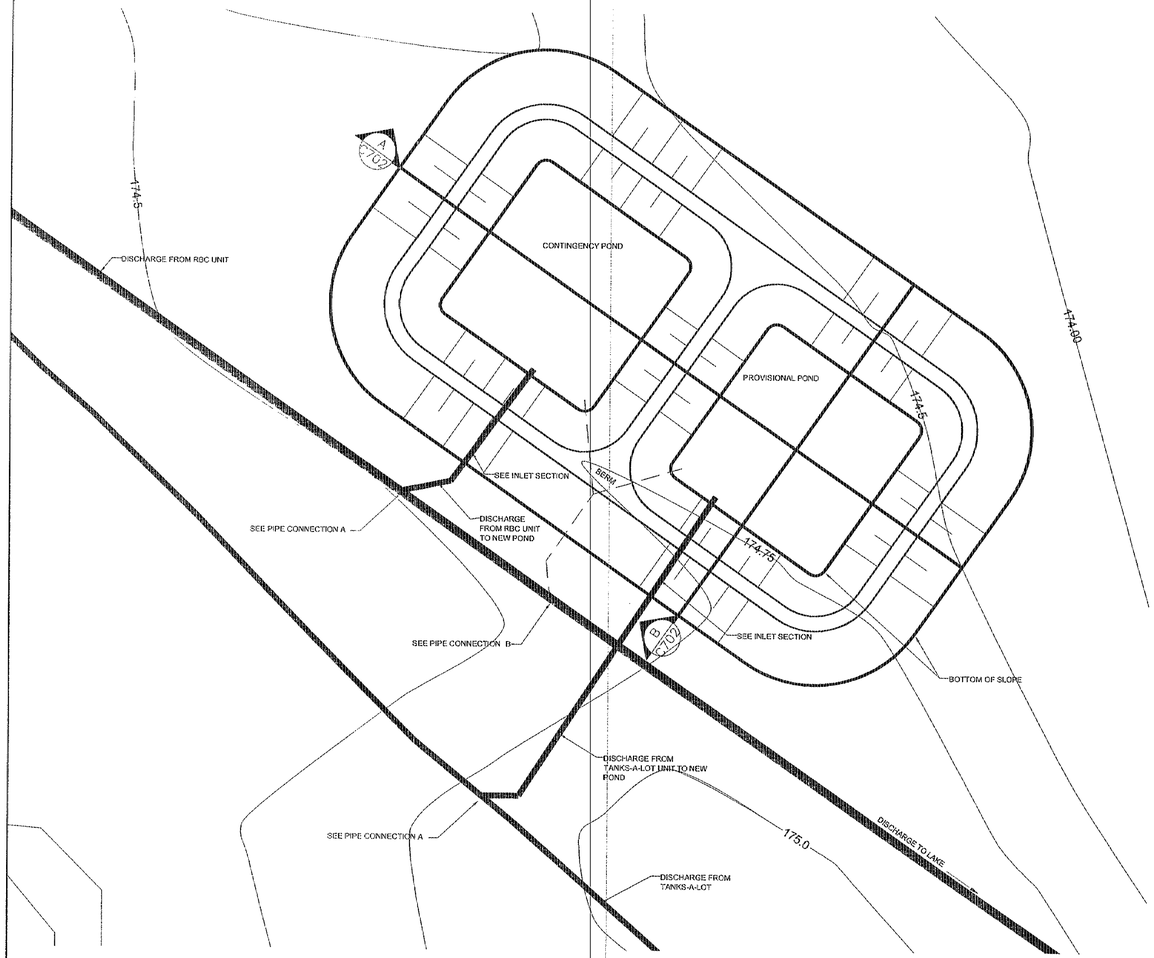
BAFFIN LAND NUNAVUT

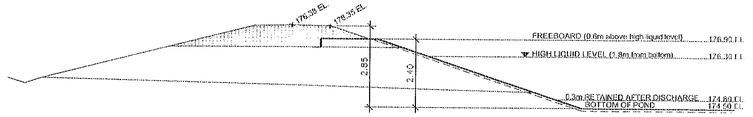
Drawing

MARY RIVER PWSP #2 SITE PLAN

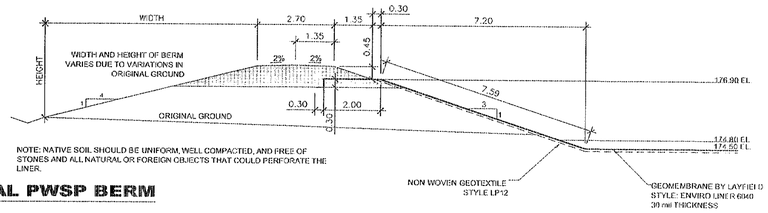
Date	CADD File Number
APRIL 2008	civil/design/maincamp
Scale 1:1000	Job Number **06-090**
Drawn AB	
Checked	Drawing Number **C701**
Approved	

PWSP PLAN VIEW
SCALE 1:500



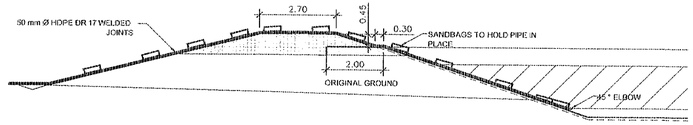


TYPICAL PWSP BERM ELEVATIONS
SCALE 1:100

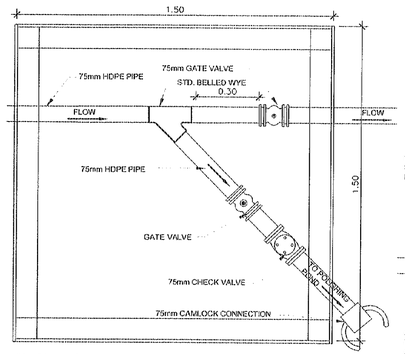


NOTE: NATIVE SOIL SHOULD BE UNIFORM, WELL COMPACTED, AND FREE OF STONES AND ALL NATURAL OR FOREIGN OBJECTS THAT COULD PERFORATE THE LINER.

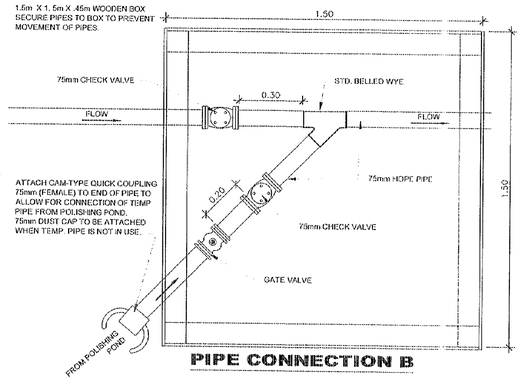
TYPICAL PWSP BERM
SCALE 1:100



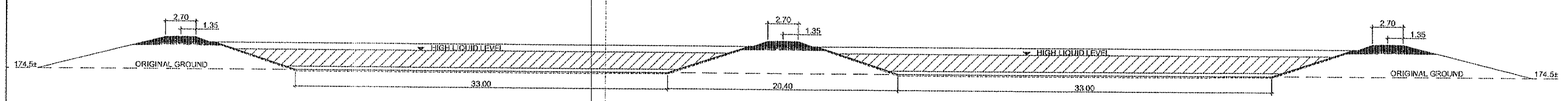
INLET SECTION
SCALE 1:100



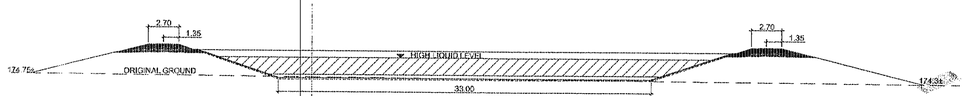
PIPE CONNECTION A



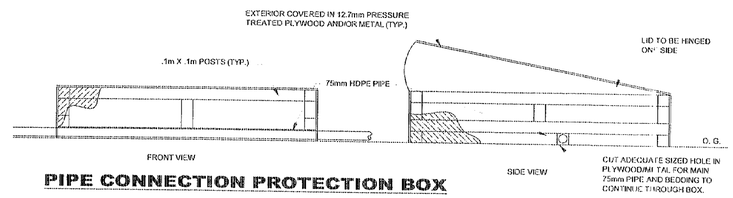
PIPE CONNECTION B



SECTION
SCALE 1:250
A C702



SECTION
SCALE 1:250
B C702



PIPE CONNECTION PROTECTION BOX

Description	Date	No.

Revisions and Issues

NORTH

Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT STRUCTURAL/CIVIL

MECHANICAL ELECTRICAL

Project

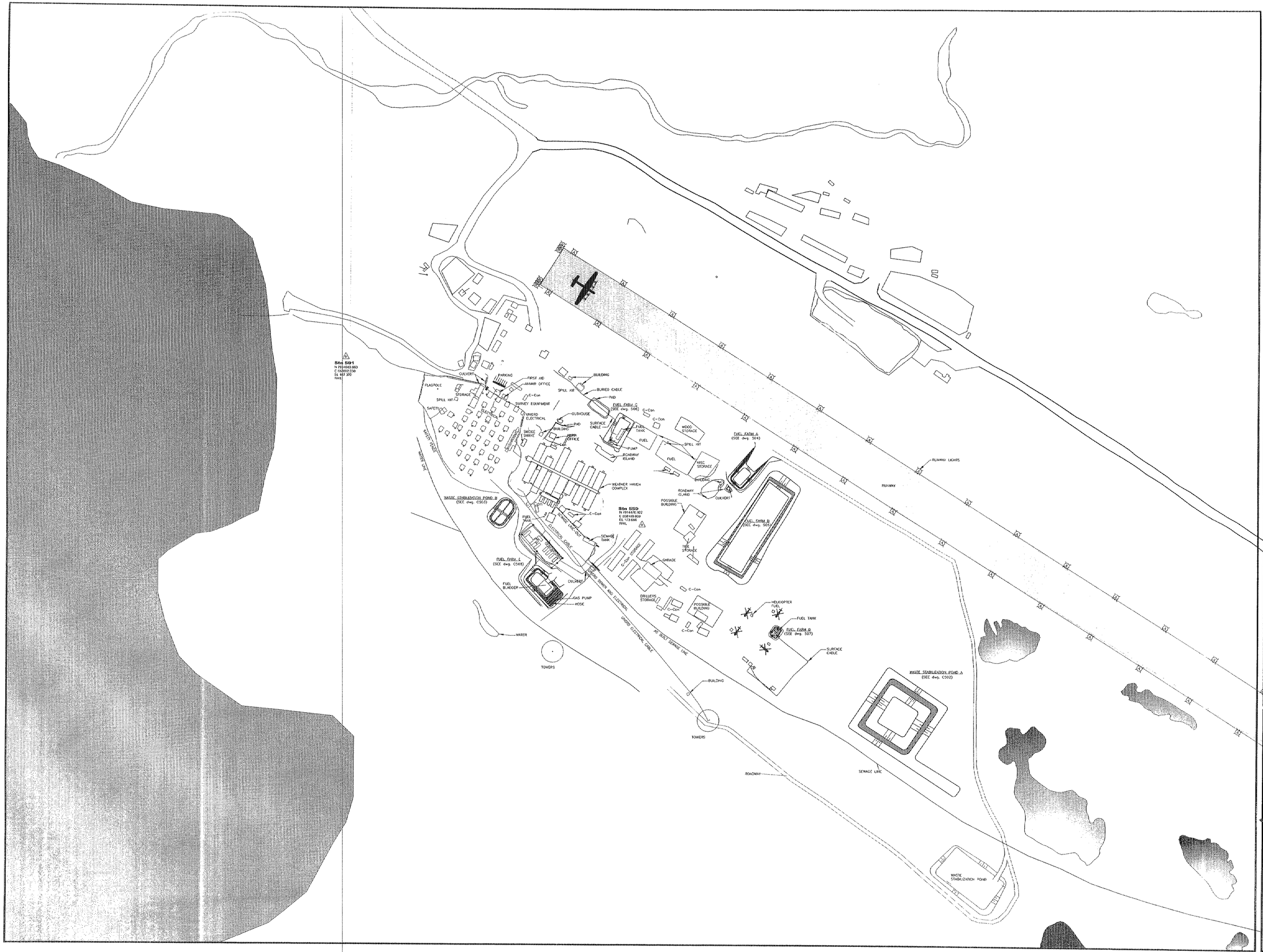
MARY RIVER PROJECT
BAFFIN LAND IRON MINES CORP

BAFFIN ISLAND NUNAVUT

Drawing

MARY RIVER
PWSP #2
PLAN/PROFILE

Date: APRIL 2008	CADD File Number: civil/design/maincamp/dwg
Scale: AS NOTED	Job Number: **06-090**
Drawn: AB	
Checked: BM	Drawing Number: **C702**
Approved: BM	



Description	Date	No.
Revisions and Issues		

NORTH

Date Printed

GENIVAR

GENIVAR
624 Membley Street South
P.O. Box 170
Timmins Ontario P4N 7C3
www.genivar.com
Tel 705-264-9411
Fax 705-267-2715

ARCHITECT | STRUCTURAL/CIVIL

MECHANICAL | ELECTRICAL

Project

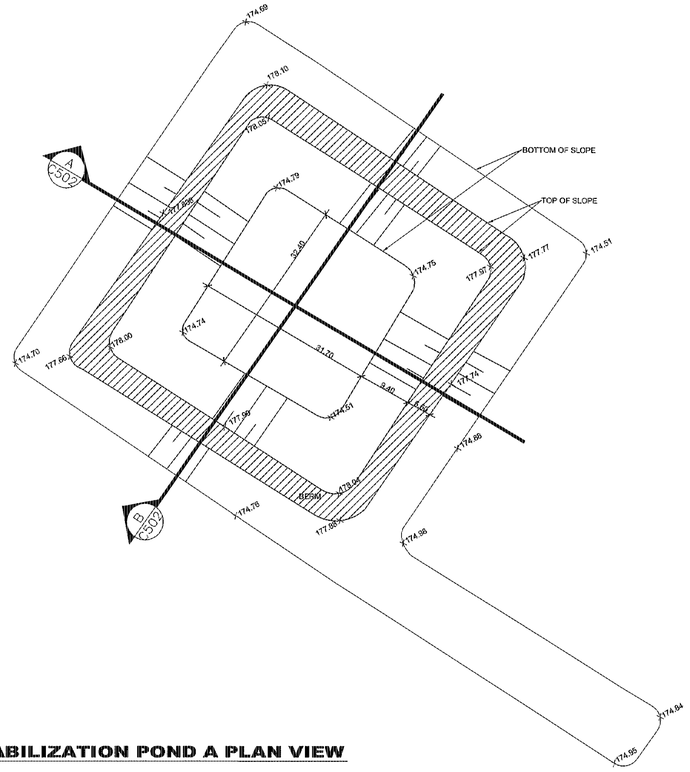
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION

BAFFIN ISLAND NUNAVUT

Drawing

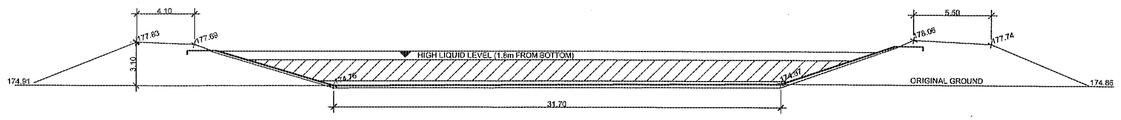
MARY RIVER
SITE PLAN
AS CONSTRUCTED

Date	CADD File Number
JUNE 2008	As Builts\dwg\C501-R2
Scale: 1:1500	Job Number: **07-039**
Drawn: SS	
Checked: CHECKED	Drawing Number: **C501-R2**
Approved: APPROVED	

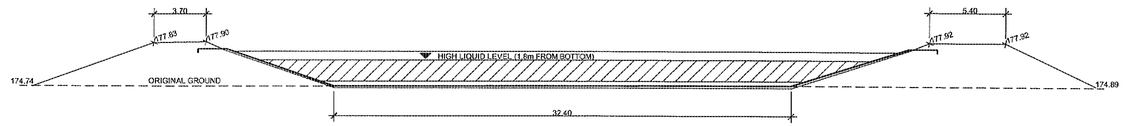


WASTE STABILIZATION POND A PLAN VIEW
SCALE 1:500

TOTAL CAPACITY OF POND: 5,114m³



SECTION A C502
SCALE 1:200



SECTION B C502
SCALE 1:200

Description	Date	No.
Revisions and Issues		

NORTH Date Printed

GENIVAR

GENIVAR
Consulting Engineers and Architect
Timmins Ontario
www.genivar.com

ARCHITECT STRUCTURAL/CIVIL

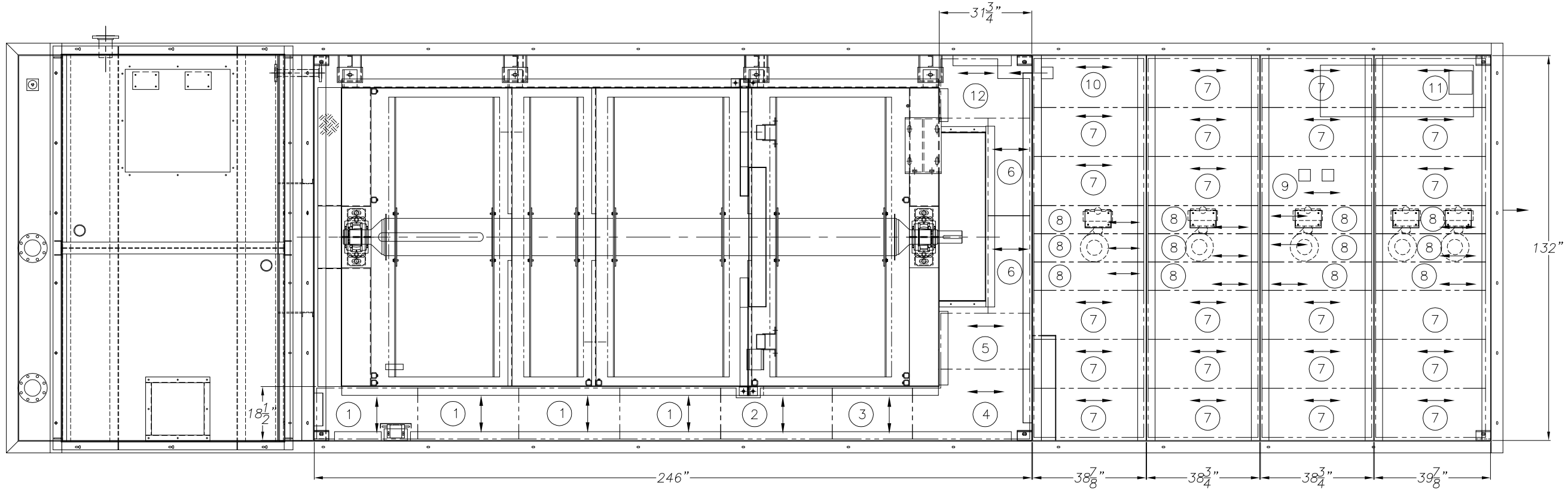
MECHANICAL ELECTRICAL

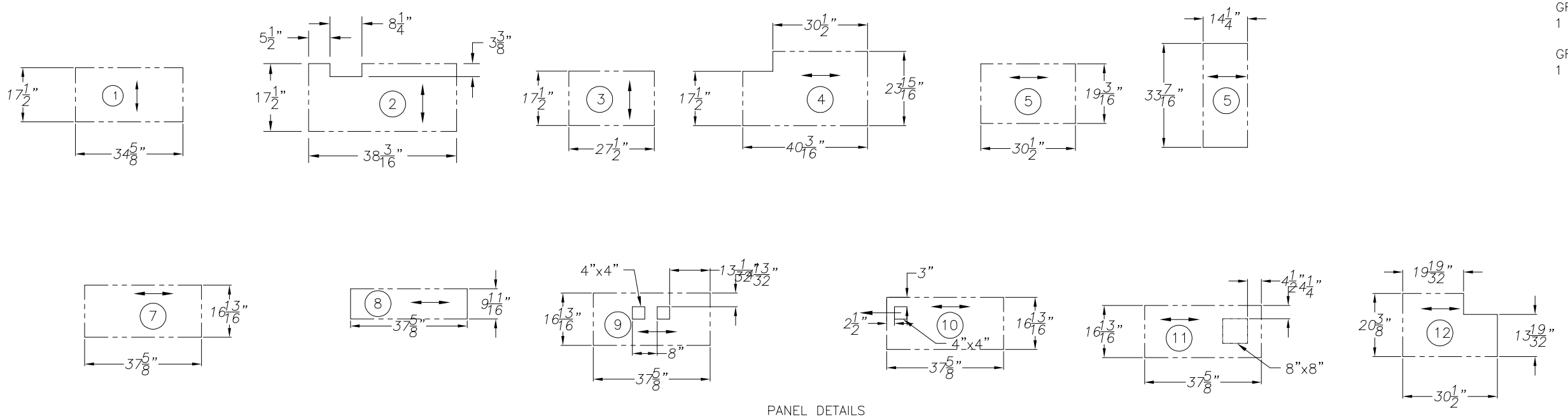
REGISTERED PROFESSIONAL ENGINEER P. Kordgharechorloo LICENSEE 2570 NUNAVUT

Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND NUNAVUT

Drawing
AS CONSTRUCTED PWSP 2 PLAN AND SECTIONS

Date: APRIL 2008	CADD File Number: ..\Mary...\Asbuilt\dwg\C502
Scale: AS NOTED	Job Number: **07-039**
Drawn: SS	
Checked: M.K	Drawing Number: **C502**
Approved: M.K	





PANEL DETAILS
SCALE = 1:32

BANDED GALVANIZED GRATING

GRATINGS 1 – 6 & 12 = W/B–6
1 1/4" X 3/16" (8.9 LB/SQ FT)

GRATING 7 – 11 = W/B–8
1 1/2" X 3/16" (10.6 LB/SQ FT)

SADDLE CLIPS INCLUDED.
2 PER PANEL. 94 TOTAL.

GRATING	QTY
1	4
2	1
3	1
4	1
5	1
6	2
7	21
8	12
9	1
10	1
11	1
12	1

NOTES:
1. SADDLE CLIPS INCLUDED, 2 PER PANEL.

NOTES:

REV	DESCRIPTION	YY/MM/DD	BY
XX	XXXXX	YY/MM/DD	XX

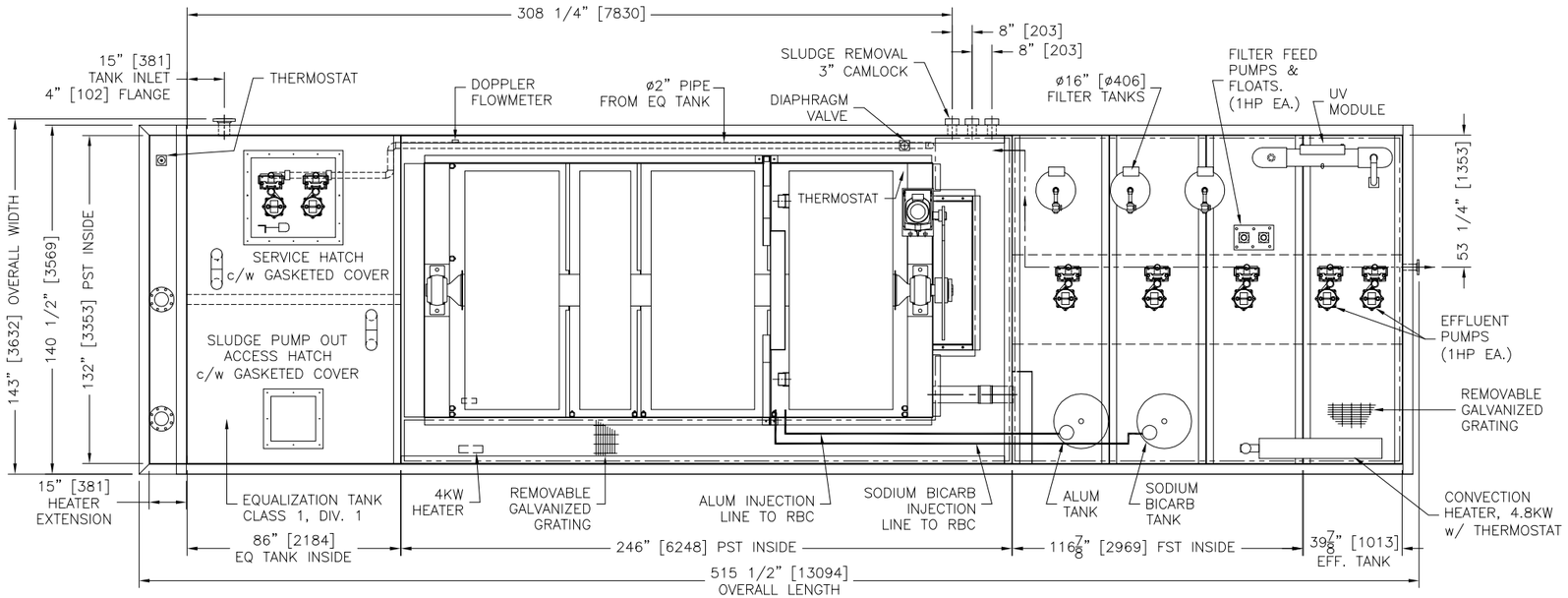
ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

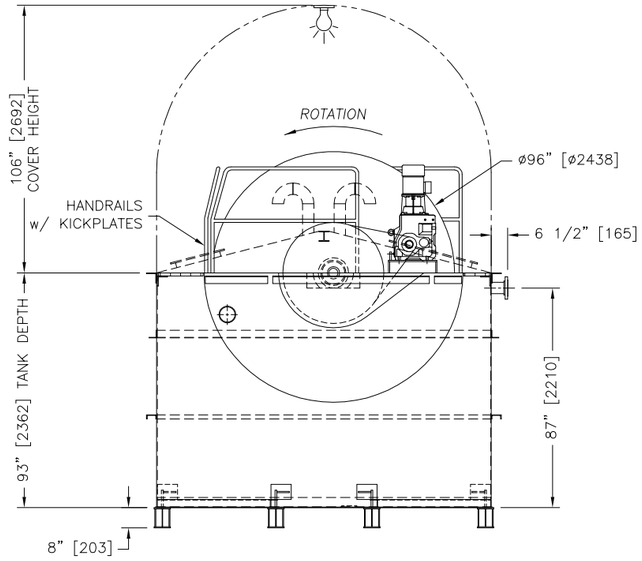
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION
GRATING, N70 – SPECIAL
E70S/F70 w/ FILTERS & EFF. TANK

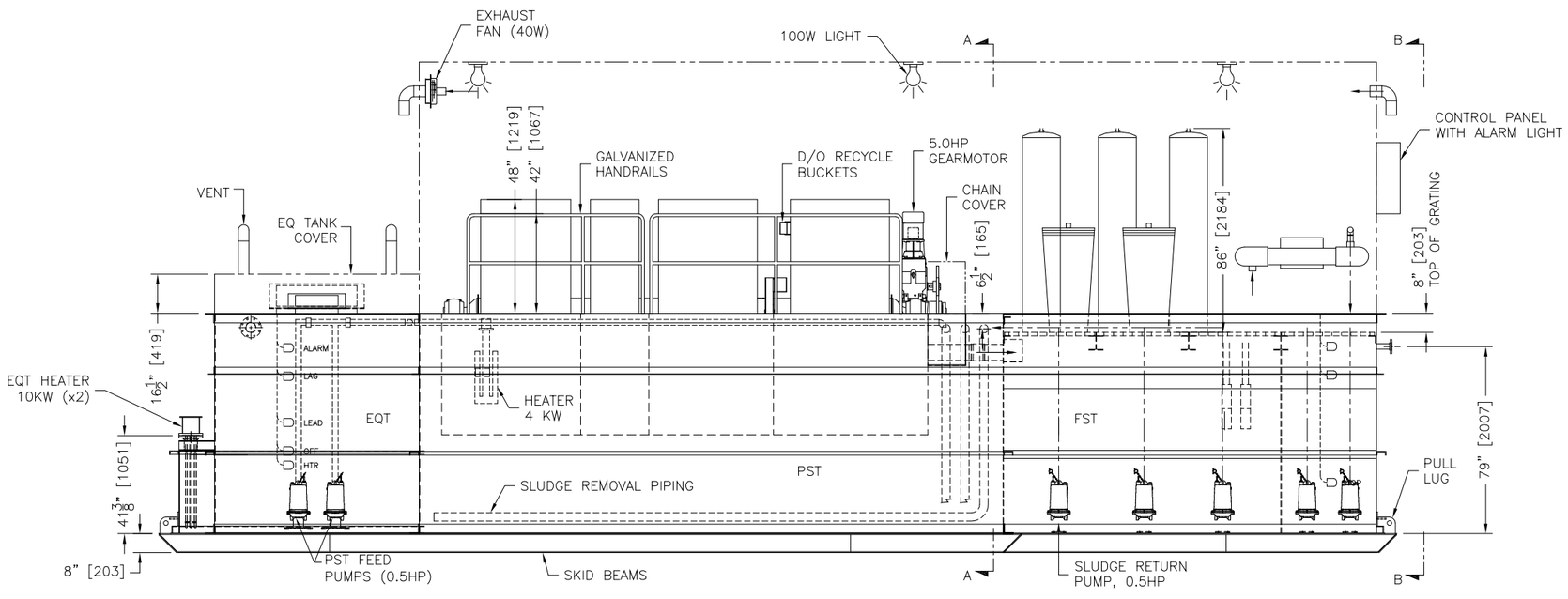
DRAWN	CHECKED	DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
SA		30–MAY–2007	B	1:40	1980 LB.	1 OF 1	60052–S03	0

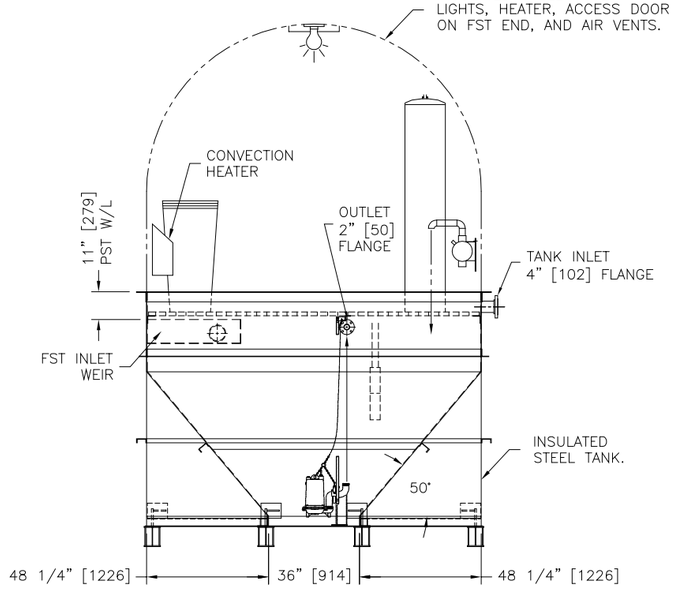
PRELIMINARY
NOT FOR CONSTRUCTION





SECTION A–A





SECTION B–B

NOTES:
1. UNIT TO BE PLACED LEVEL ON CONCRETE OR WELL COMPACTED GRAVEL. (PAD DESIGN BY OTHERS)
2. ALL DIMENSIONS IN BRACKETS ARE IN MILLIMETERS.
3. TANKS, RBC TROUGH, & SHAFT SANDBLASTED AND PAINTED WITH DEVTAR 5A FINISH.
4. INLET/OUTLET ARE STD. 150# ANSI B16.5 RAISED FACE FLANGES.

NOTES:
5. WEIGHT SHOWN IS DRY WEIGHT ONLY.
6. TANKS ARE EQUIPPED WITH DRAIN PORTS FOR SHIPPING PURPOSES ONLY.
7. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION WITHOUT PRIOR APPROVAL OF SEPROTECH SYSTEMS INC.

REV	DESCRIPTION	YY/MM/DD	BY
XX	XXXXX	YY/MM/DD	XX

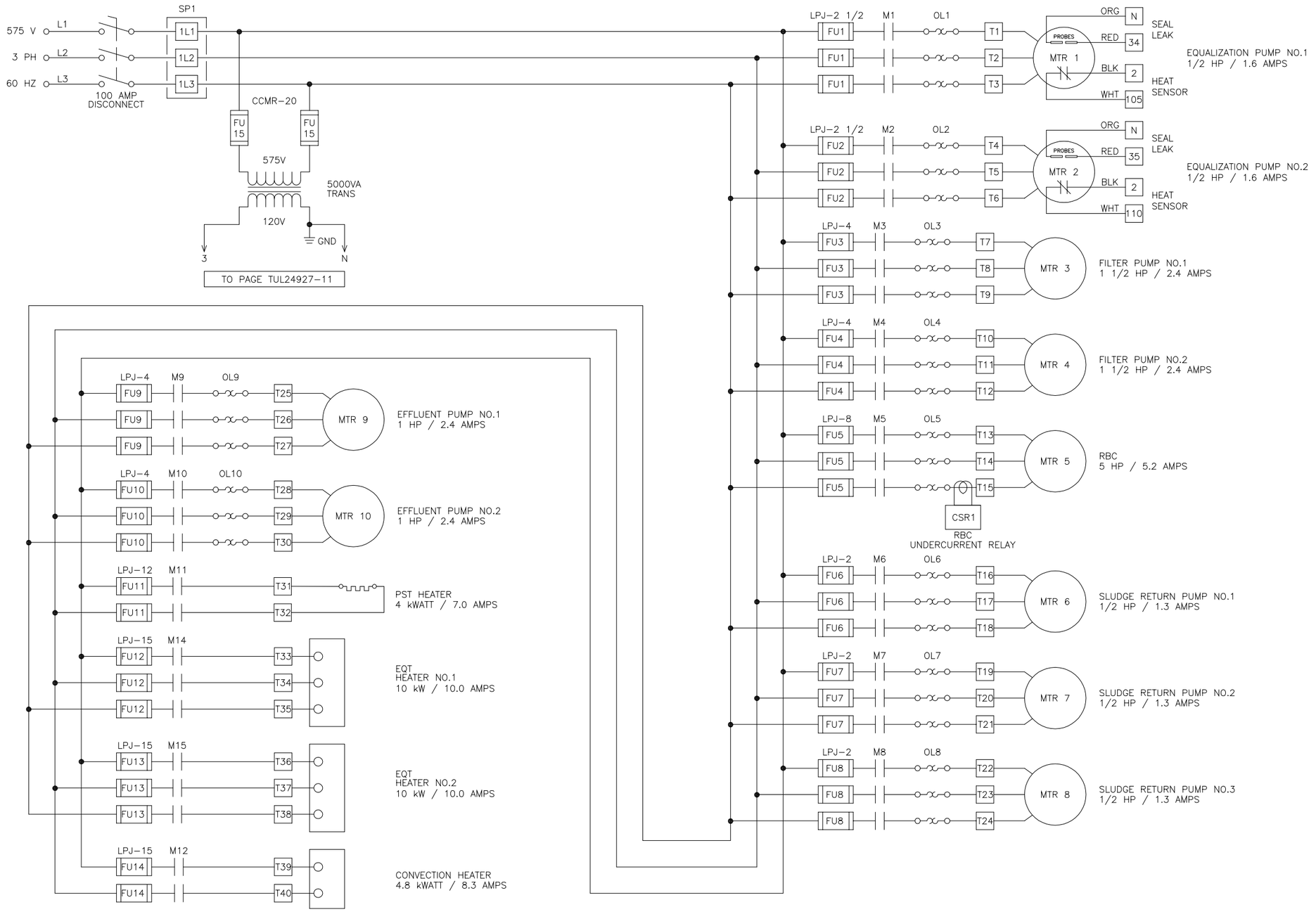
PROJECT:
BAFFINLAND IRON MINES
MARY RIVER, NUNAVUT

ALL TOLERANCES ARE +/– 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech
Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION
MODEL N70, GENERAL ARRANGEMENT
FULL STEEL, w/ FILTERS, EQT & EFFLUENT TANK

DRAWN	CHECKED						
AH							
DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
28–MAY–2007	B	1:60	50000 LB.	1 OF 1	60052–L01	0



NOTES:
BAFFINLAND N70:
REF.: TUL24927-10 R3
(DWG. NO.: T1217-24927, 1 OF 10)

NOTES:

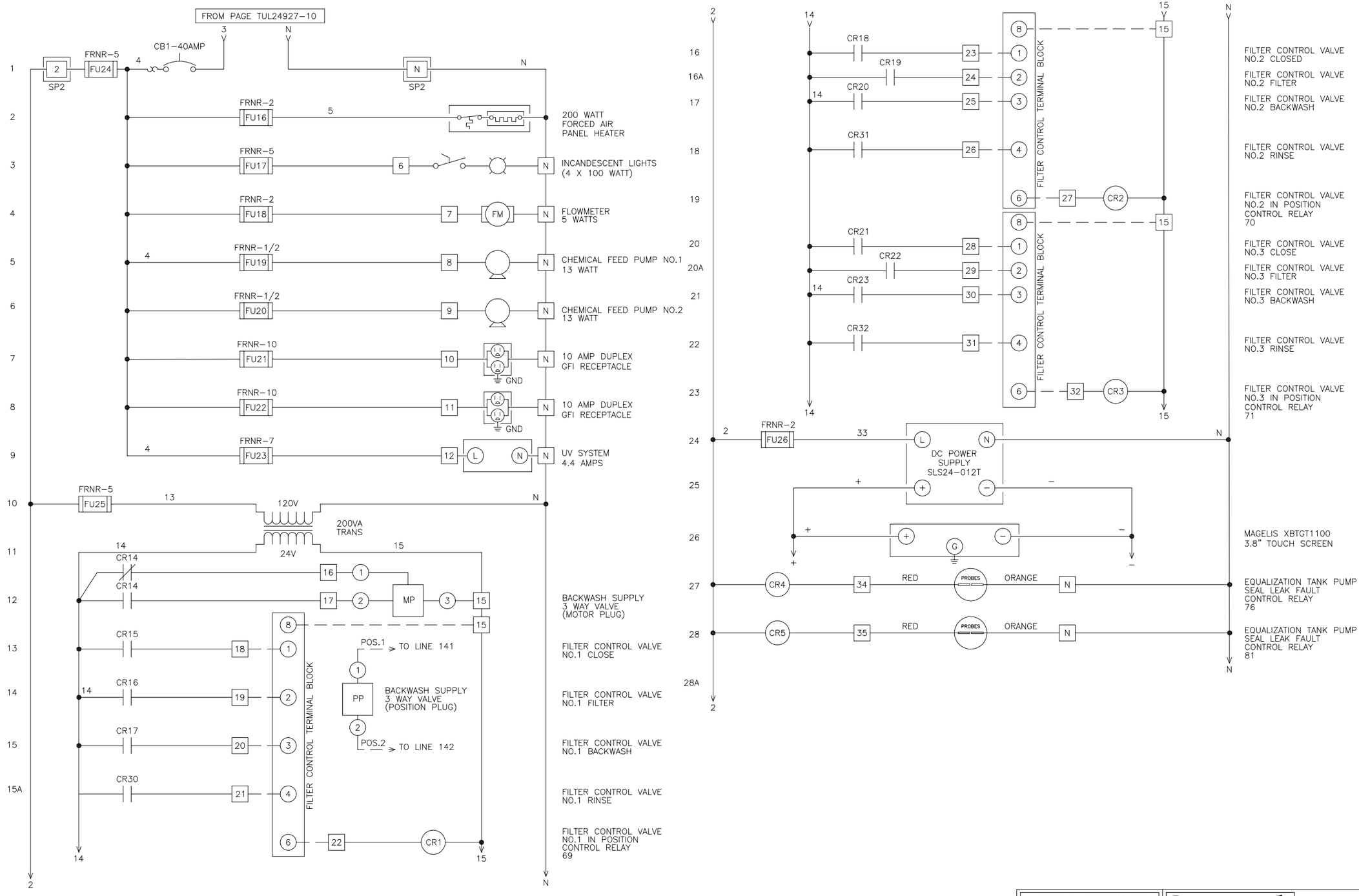
REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL-R3)	07/07/31	KR
1	MISC. CHANGES (TUL-R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL-R1)	07/06/11	KR

ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

DRAWN	CHECKED	DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
DC		20-JUN-2007	B	N.T.S	N/A LB.	1 OF 10	60052-E00	2



NOTES:
BAFFINLAND N70:
REF.: TUL24927-11 R3
(DWG. NO.: T1217-24927, 2 OF 10)

NOTES:

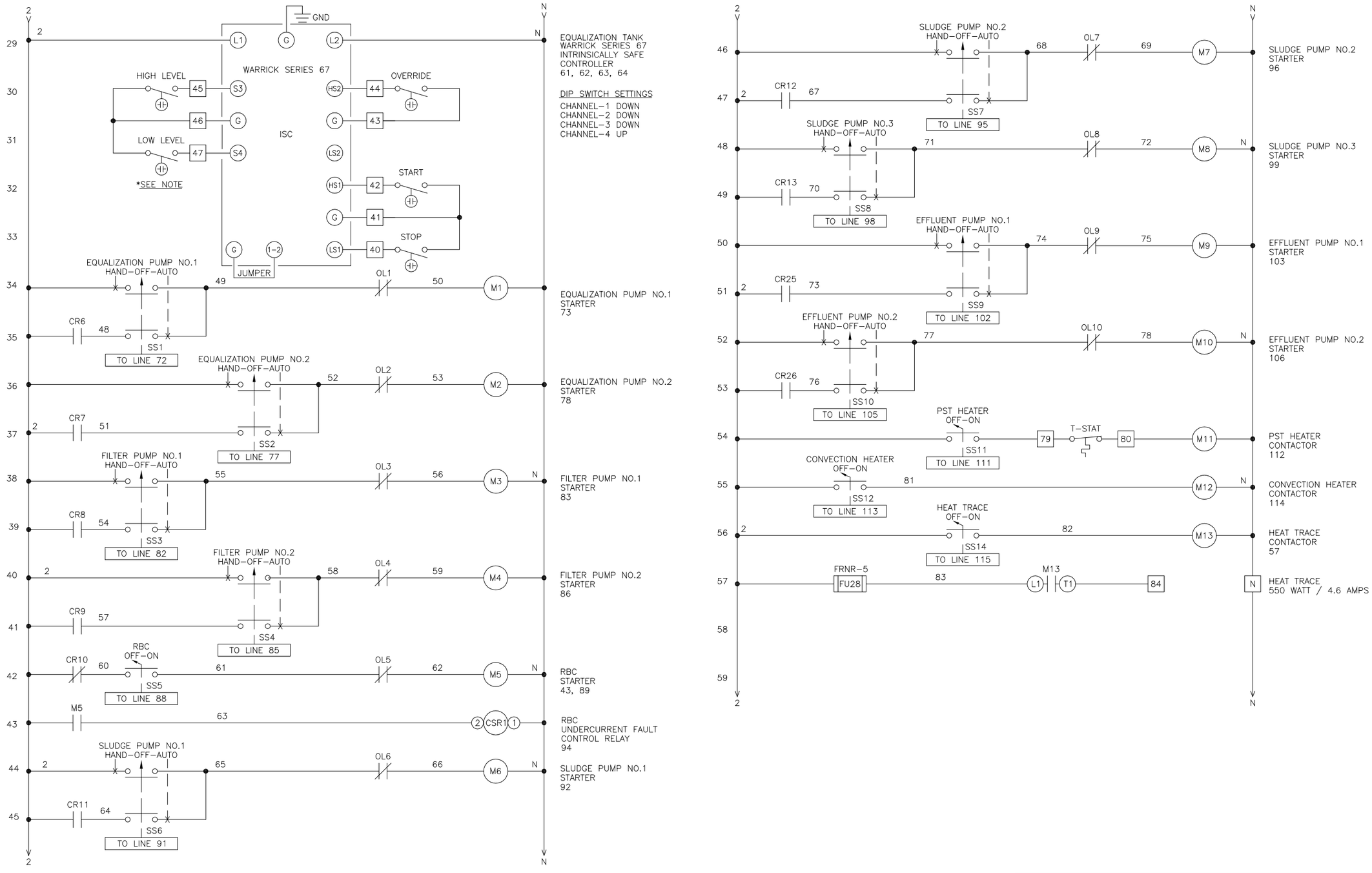
REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL-R3)	07/07/31	KR
1	MISC. CHANGES (TUL-R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL-R1)	07/06/11	KR

ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech
Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

DRAWN	CHECKED	DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
DC		20-JUN-2007	B	N.T.S	N/A LB.	2 OF 10	60052-E00	2



NOTES:
BAFFINLAND N70:
REF.: TUL24927–12 R3
(DWG. NO.: T1217–24927, 3 OF 10)

NOTES:

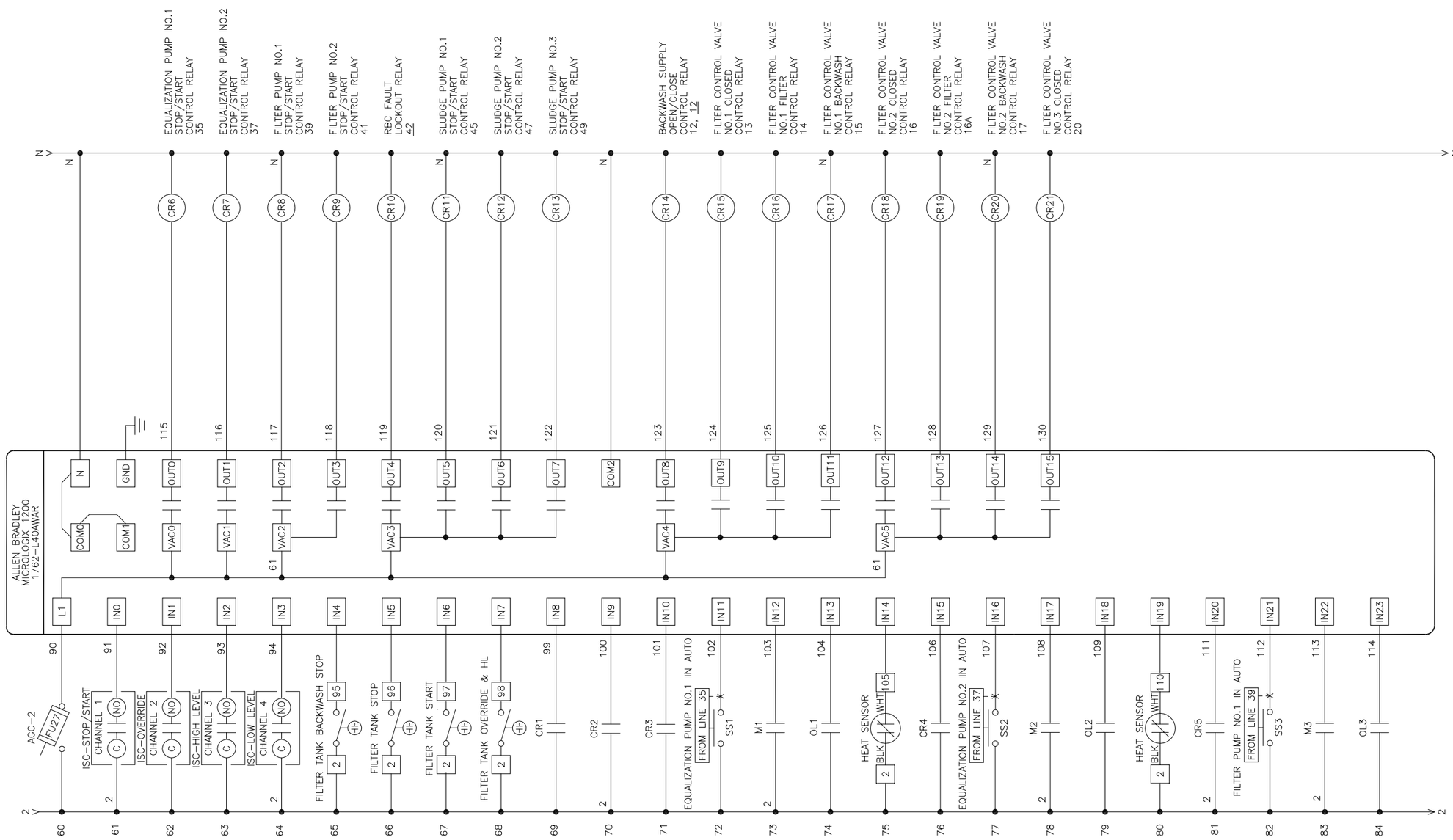
REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL–R3)	07/07/31	KR
1	MISC. CHANGES (TUL–R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL–R1)	07/06/11	KR

ALL TOLERANCES ARE +/– 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523–1641 FAX: (613) 731–0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

DRAWN	CHECKED	DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
DC		20–JUN–2007	B	N.T.S	N/A LB.	3 OF 10	60052–E00	2



NOTES:
BAFFINLAND N70:
REF.: TUL24927-13 R3
(DWG. NO.: T1217-24927, 4 OF 10)

NOTES:

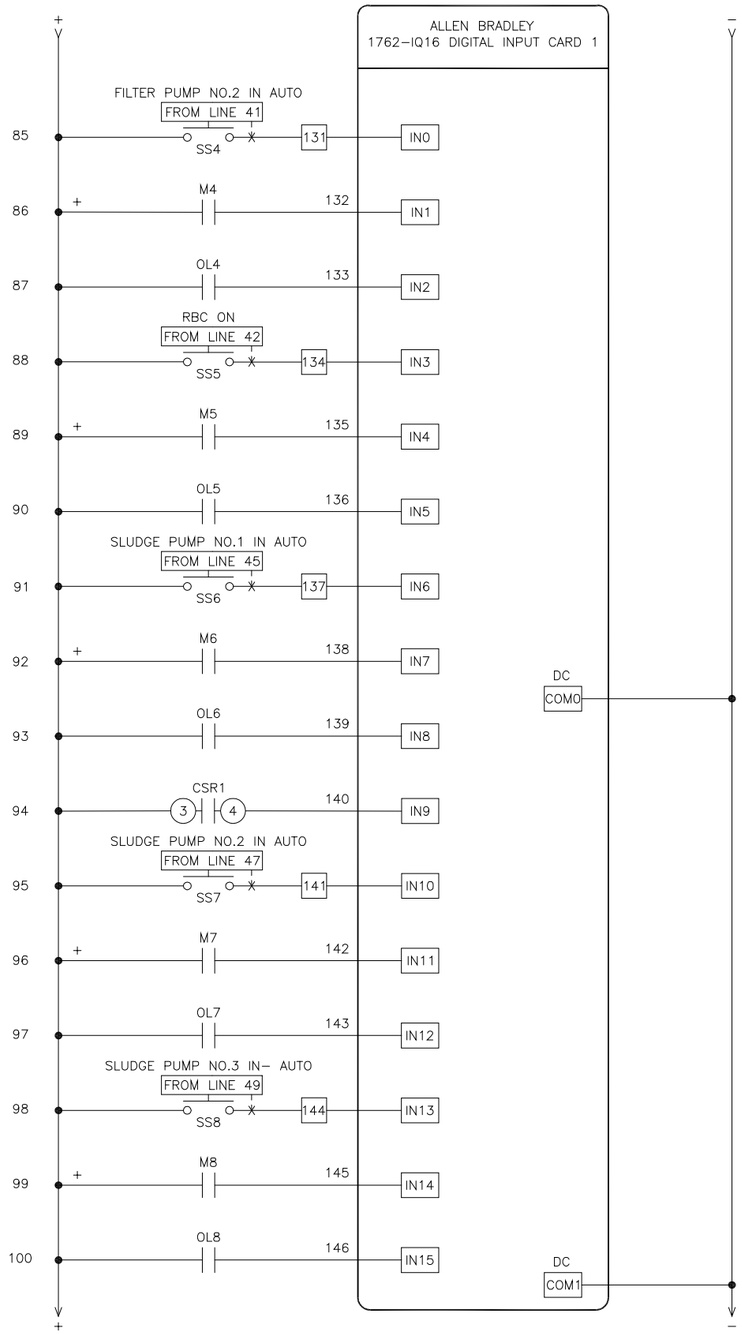
REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL-R3)	07/07/31	KR
1	MISC. CHANGES (TUL-R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL-R1)	07/06/11	KR

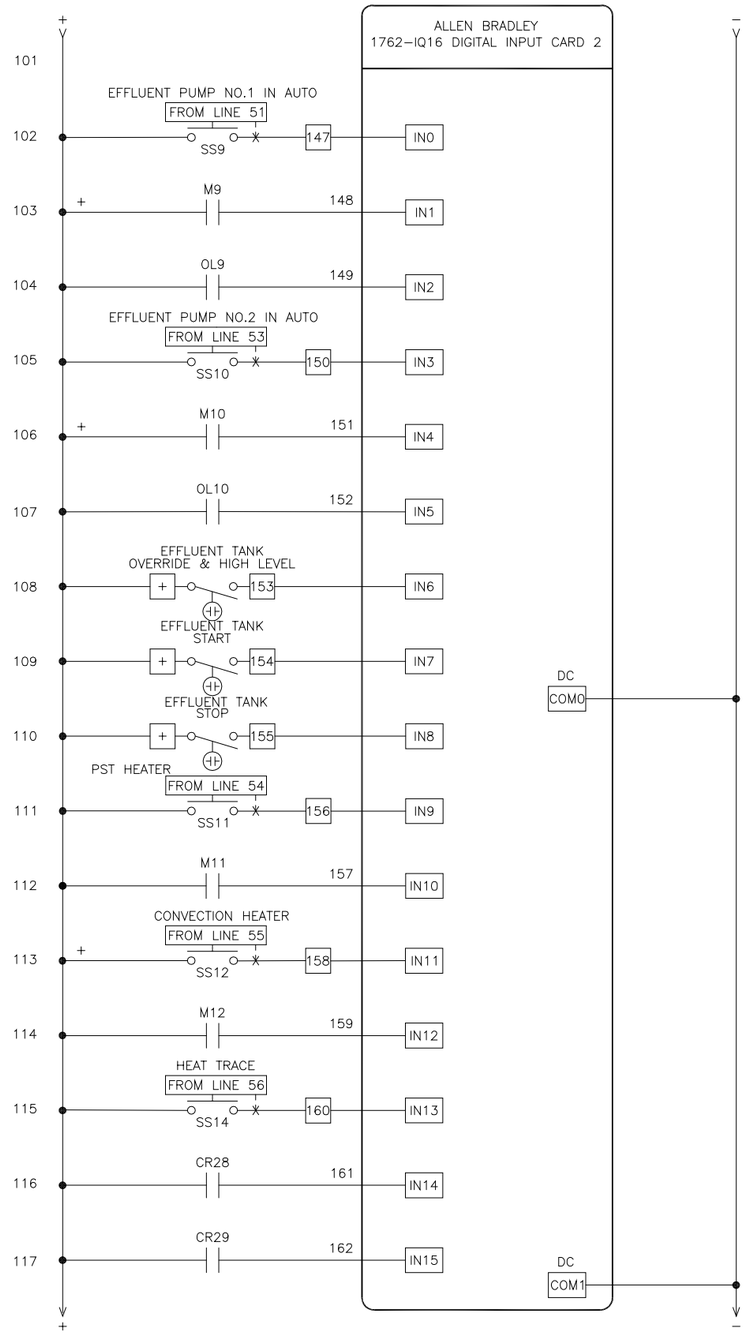
ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech
Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

DRAWN	CHECKED	DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
DC		20-JUN-2007	B	N.T.S	N/A LB.	4 OF 11	60052-E00	2





NOTES:
BAFFINLAND N70:
REF.: TUL24927–14 R3
(DWG. NO.: T1217–24927, 5 OF 10)

NOTES:

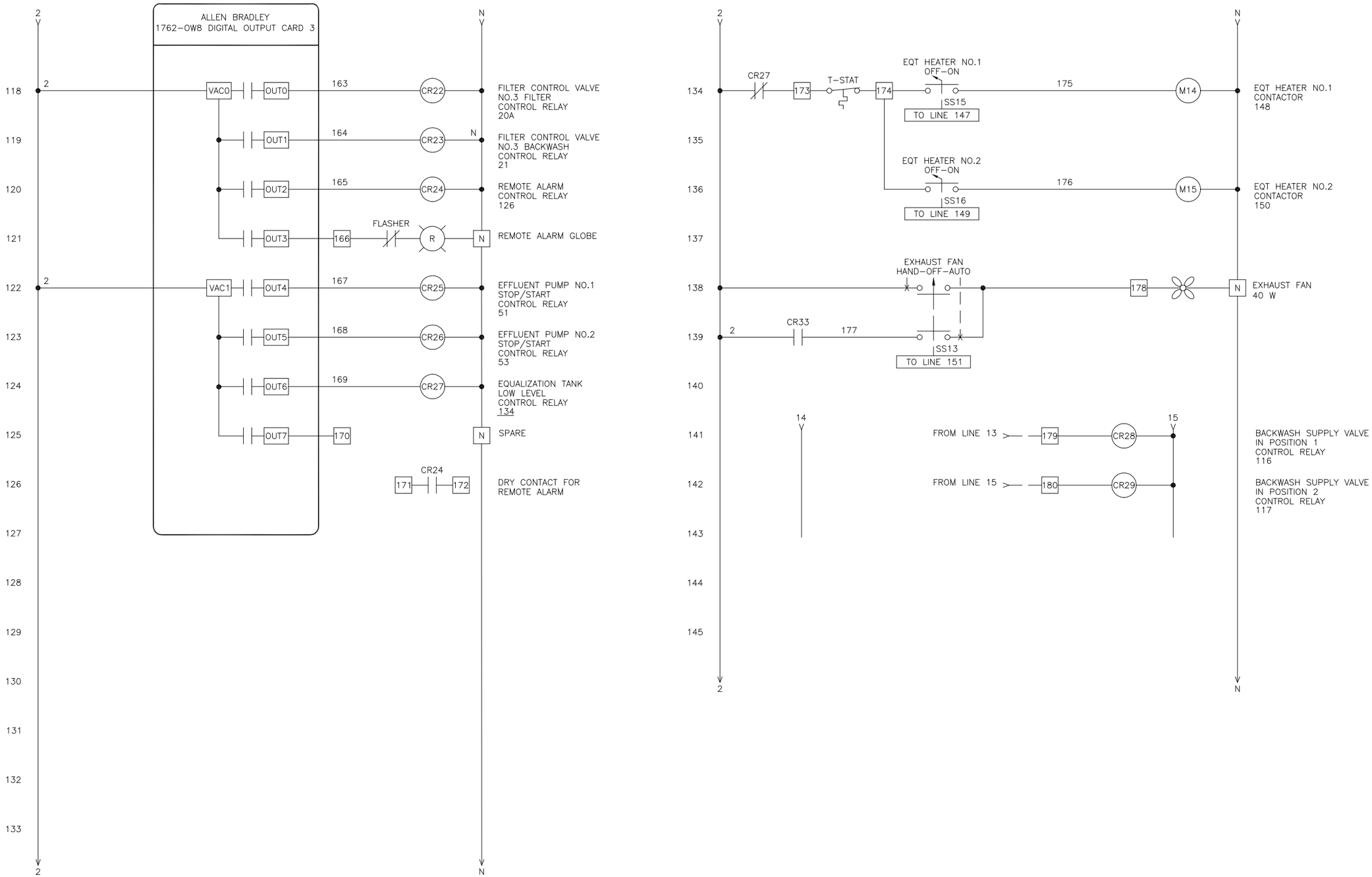
REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL–R3)	07/07/31	KR
1	MISC. CHANGES (TUL–R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL–R1)	07/06/11	KR

ALL TOLERANCES ARE +/– 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech
Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523–1641 FAX: (613) 731–0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION
PUMP & FILTER CONTROL PANEL
BAFFINLAND N70

DRAWN	CHECKED						
DC							
DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
20–JUN–2007	B	N.T.S	N/A LB.	5 OF 10	60052–E00	2



NOTES:
BAFFINLAND N70:
REF.: TUL24927-15 R3
(DWG. NO.: T1217-24927, 6 OF 10)

NOTES:

REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL-R3)	07/07/31	KR
1	MISC. CHANGES (TUL-R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL-R1)	07/06/11	KR

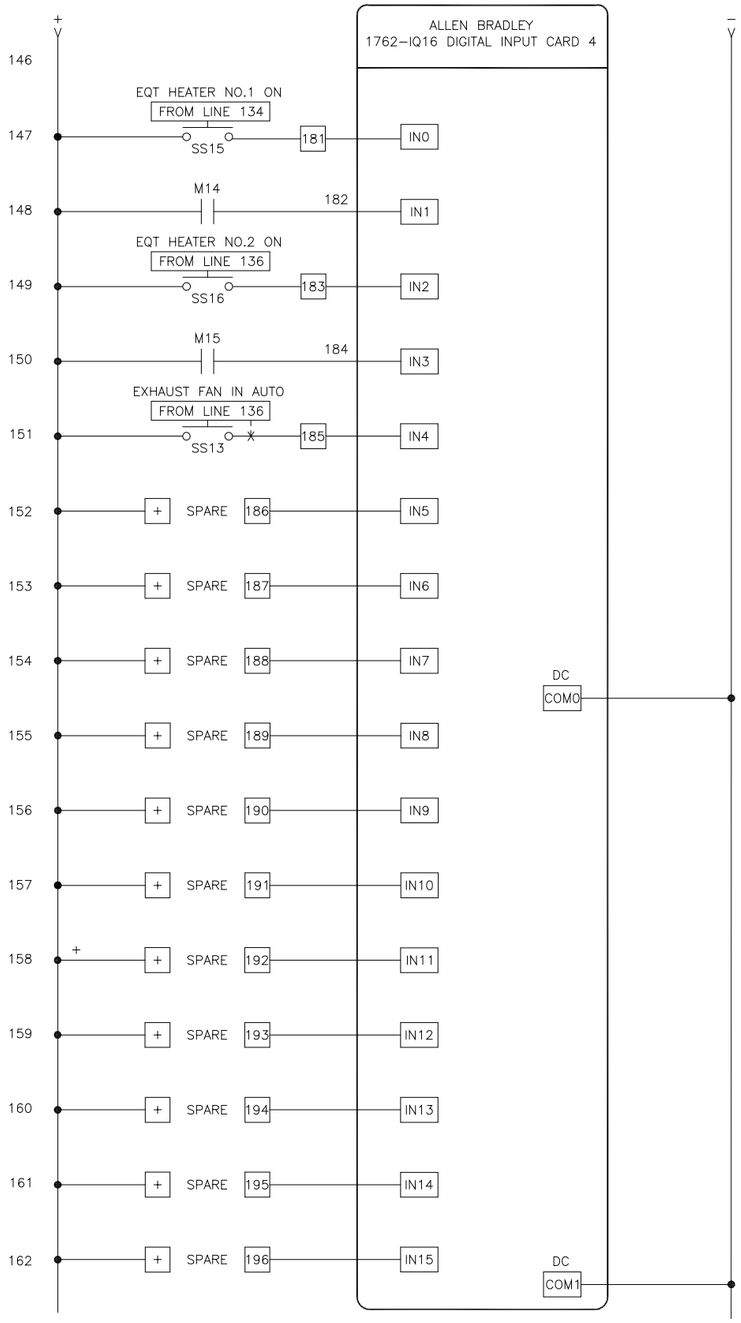
ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

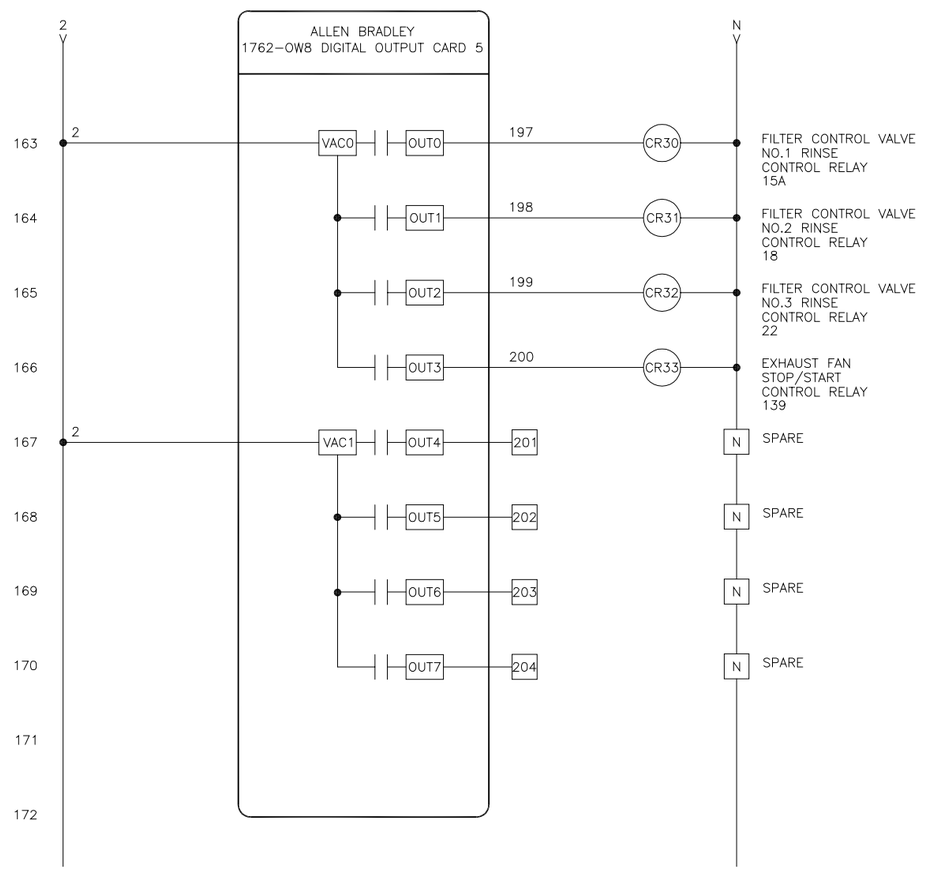
DRAWN: DC | CHECKED:
DATE: 20-JUN-2007 | SIZE: B

Seprotech Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

SCALE	WEIGHT	SHEET	DWG NO.	REV
N.T.S	N/A LB.	6 OF 10	60052-E00	2





NOTES:

BAFFINLAND N70:
REF.: TUL24927-16 R3
(DWG. NO.: T1217-24927, 7 OF 10)

NOTES:

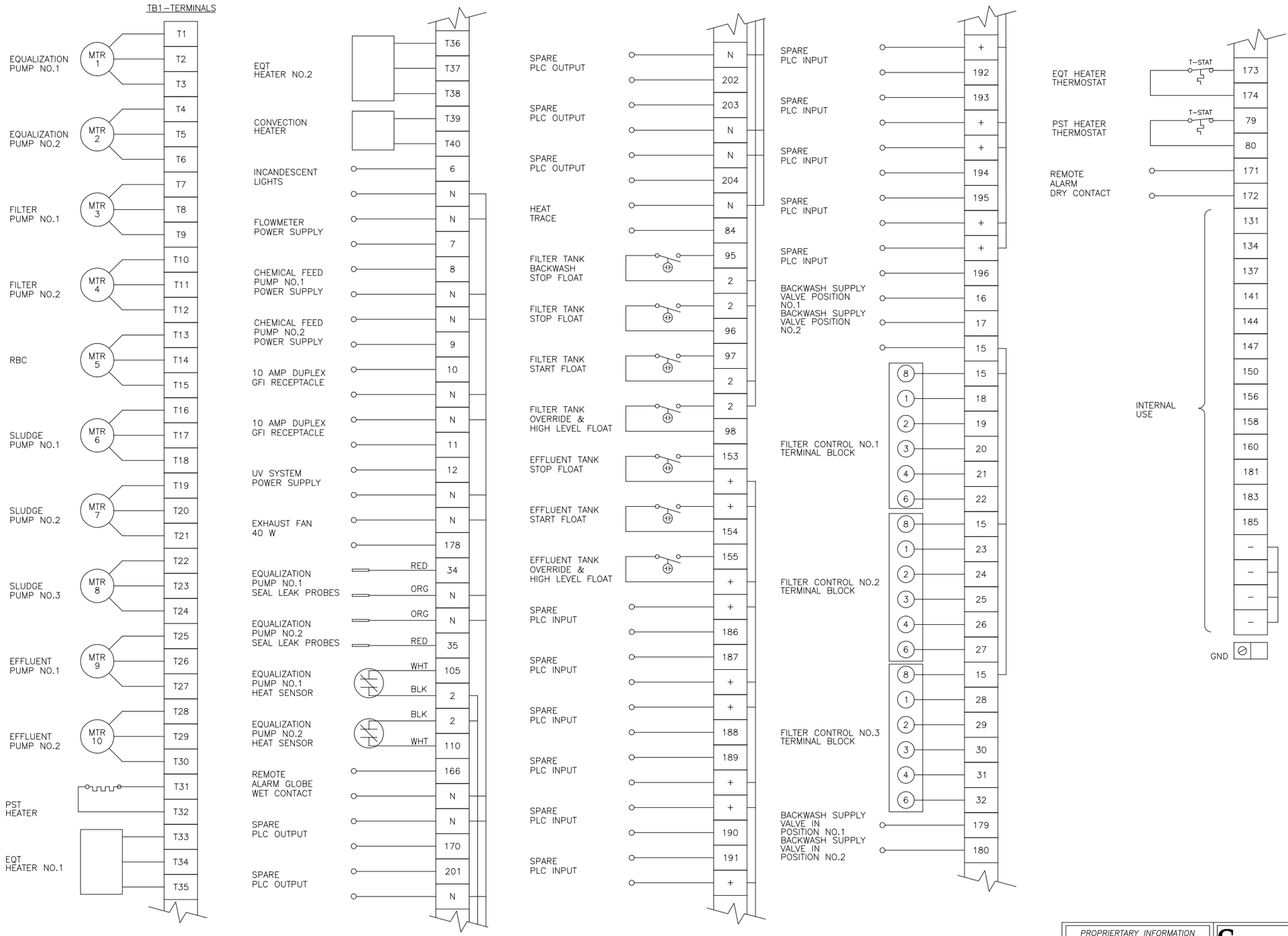
REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL-R3)	07/07/31	KR
1	MISC. CHANGES (TUL-R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL-R1)	07/06/11	KR

ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

DRAWN	CHECKED	DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
DC		20-JUN-2007	B	N.T.S	N/A LB.	7 OF 10	60052-E00	2



NOTES:
BAFFINLAND N70:
REF.: TUL24927–17 R3
(DWG. NO.: T1217–24927, 8 OF 10)

NOTES:

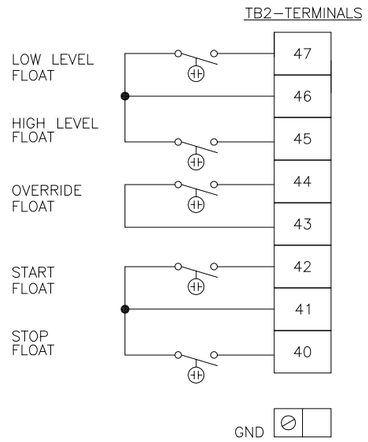
REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL–R3)	07/07/31	KR
1	MISC. CHANGES (TUL–R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL–R1)	07/06/11	KR

ALL TOLERANCES ARE +/– 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523–1641 FAX: (613) 731–0851
Email: contact@seprotech.com Web: http://www.seprotech.com

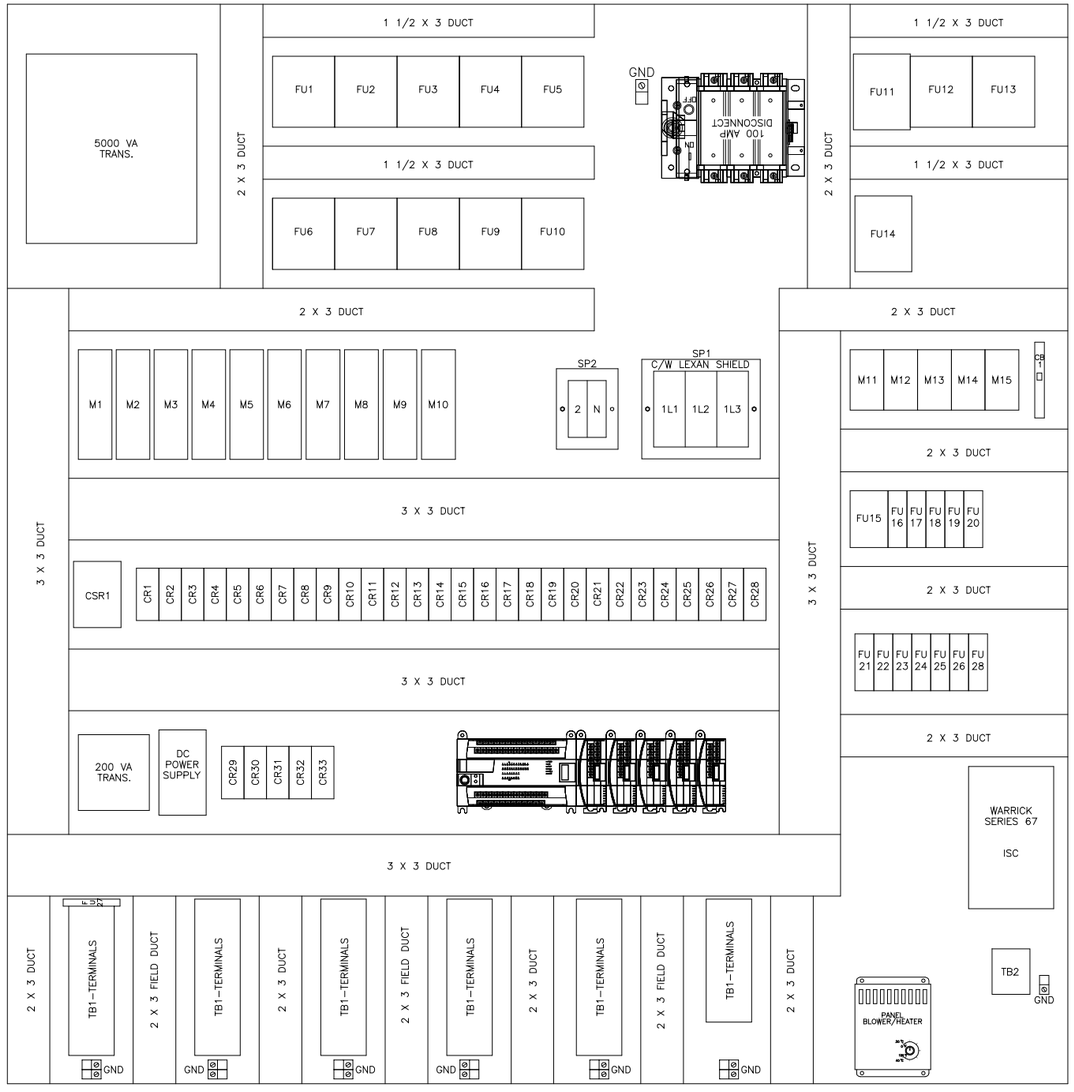
DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

DRAWN	CHECKED	DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
DC		20–JUN–2007	B	N.T.S	N/A LB.	8 OF 10	60052–E00	2



NOTES: A) INTRINSICALLY SAFE FLOAT WIRING MUST BE RUN IN SEPERATE CONDUIT TO TERMINALS IN CONTROL PANEL.

B) IF FLOATS ARE NOT WIRED DIRECTLY TO TERMINALS IN CONTROL PANEL, CAUTION MUST BE TAKEN TO PREVENT CONDENSATION FROM FORMING ACROSS FLOAT CONTACT CIRCUIT. THIS MAY CAUSE FALSE OPERATION OF INTRINSICALLY SAFE RELAY.



PANEL LAYOUT

NOTES:
BAFFINLAND N70:
REF.: TUL24927–18 R3
(DWG. NO.: T1217–24927, 9 OF 10)

NOTES:

REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL–R3)	07/07/31	KR
1	MISC. CHANGES (TUL–R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL–R1)	07/06/11	KR

ALL TOLERANCES ARE +/– 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

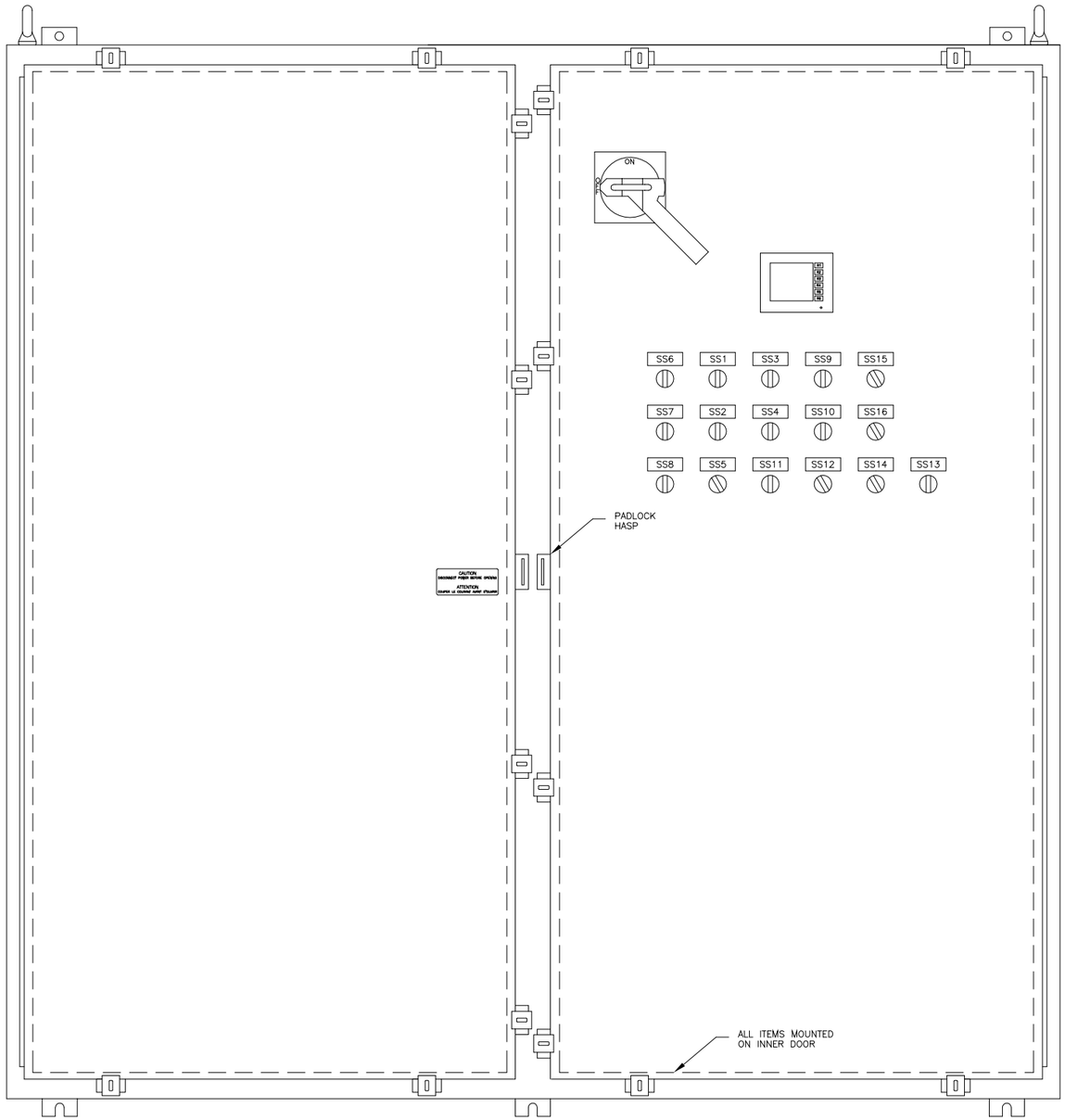
DRAWN: DC | CHECKED:

DATE: 20–JUN–2007 | SIZE: B

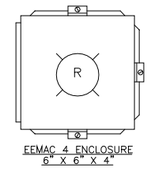
Seprotech Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523–1641 FAX: (613) 731–0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

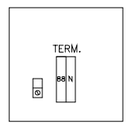
SCALE	WEIGHT	SHEET	DWG NO.	REV
N.T.S	1:8 LB.	9 OF 10	60052–E00	2



EEMAC 4 DD ENCLOSURE 60" X 60" X 12"



EEMAC 4 ENCLOSURE
6" X 6" X 4"



INTERIOR LAYOUT

REMOTE ALARM GLOBE

NOTES:
NOVAGOLD – FILTER CAMP N100:
REF.: TUL24927-19 R3
(DWG. NO.: T1217-24927, 10 OF 10)

NOTES:

REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL-R3)	07/07/31	KR
1	MISC. CHANGES (TUL-R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL-R1)	07/06/11	KR

ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

Seprotech Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION
PUMP & FILTER CONTROL PANEL
BAFFINLAND N70

DRAWN	CHECKED						
DC							
DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
20-JUN-2007	B	1:8	N/A LB.	10 OF 10	60052-E00	2

Photo 1: Seprotech N70 RBC Unit

Photo 2: Seprotech N70 RBC Unit, looking closer

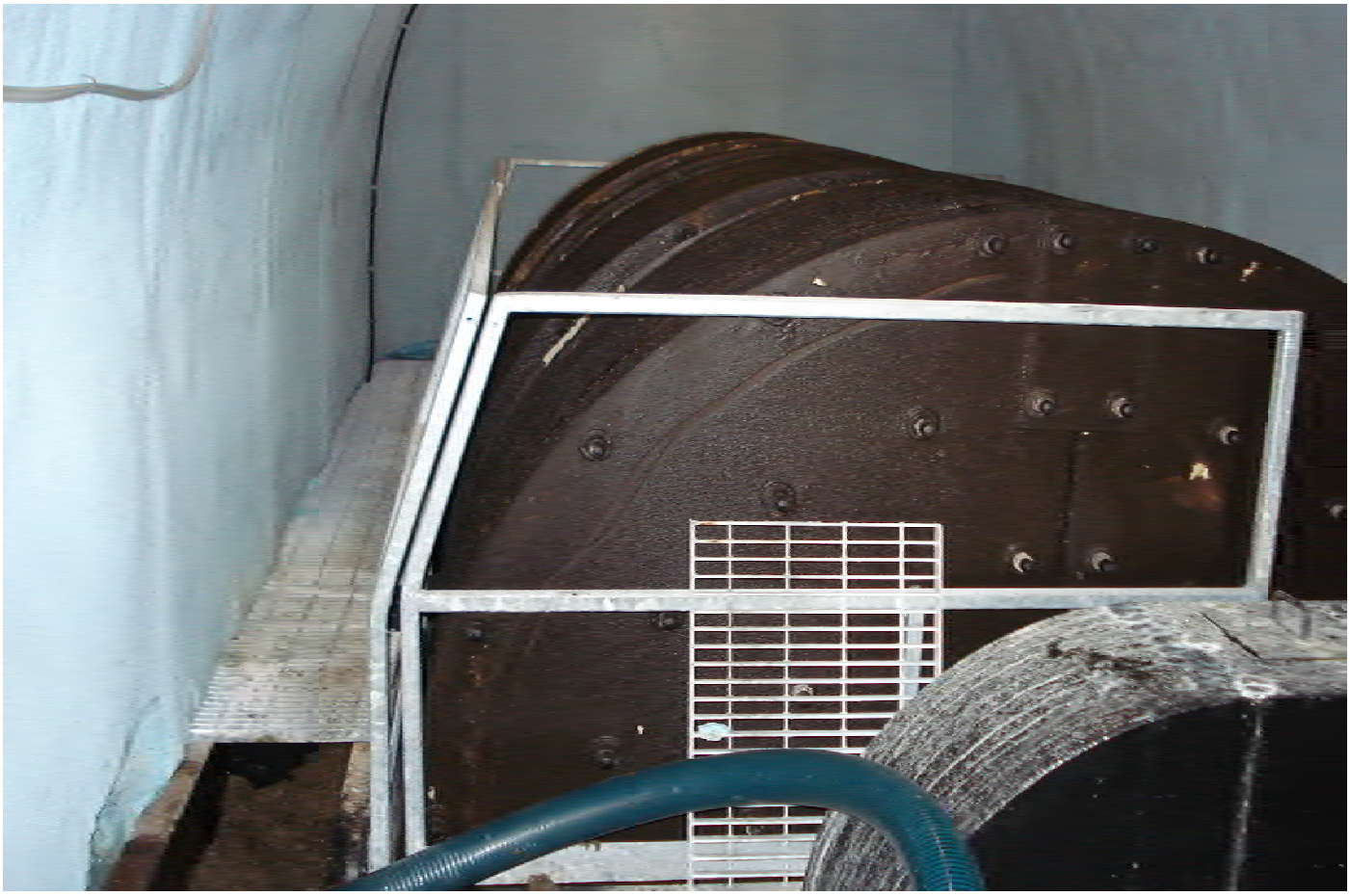


Photo 3: Rotodisc

Photo 4: Alum & Sodium Bicarbonate Tanks

Photo 5: RBC Filters

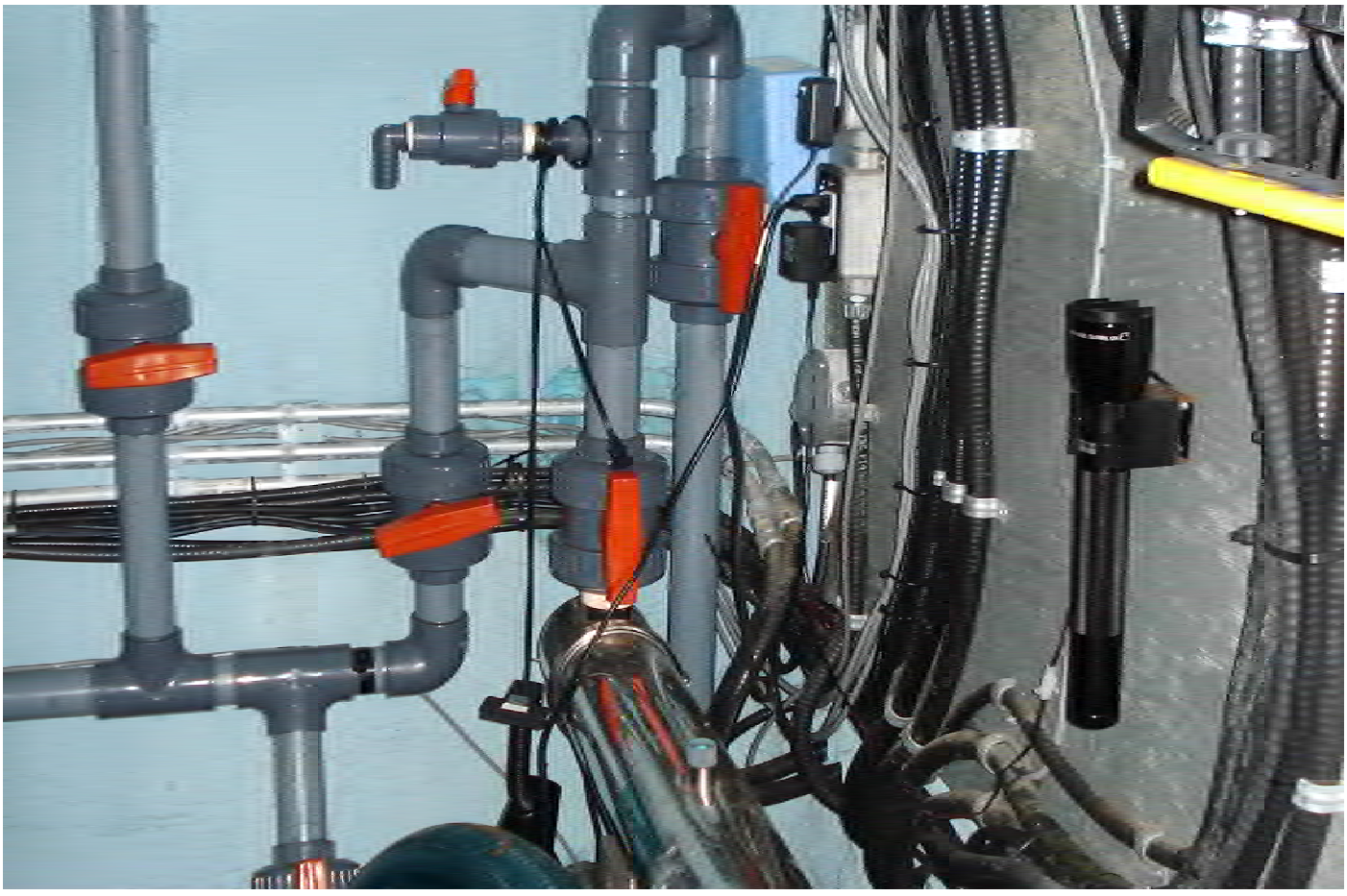


Photo 6: RBC's UV System

Photo 7: RBC Inlet Pipe

Photo 8: RBC Effluent Discharge pipe

Photo 9: View of the PWSP #1 with discharge (during construction)

Photo 10: View of the PWSP #2 (during construction)

Photo 11: PWSP #2 slopes

Photo 12: View of the PWSP #2 trench for liner during construction)

➢ APPENDIX 3

- **QA/QC Report**

LAYFIELD

TRANSMITTAL

LAYFIELD ENVIRONMENTAL SYSTEMS LTD.
11603-180 Street NW, Edmonton, AB T5S 2H6

To : Baffinland Iron Mines Corp.
1016 - 120 Adelaide Street West
Toronto, ON M5H-1T1

Date : October 22/ 2007

Attn. : David Alexander(416)364-8820

Project : Baffinlands Polishing Pond

Re : QA/QC

Please find the following documentation enclosed:

Copies	Pages	Description
3	Booklets	Qa/Qc Baffinlands Polishing Pond

_____ For approval and/or comments

_____ For your information & use

__X__ For your files

_____ Approved or approved as noted

_____ Not approved Re-submit

_____ Revised

Remarks :
Please sign and return the original five year warranty A.S.A.P enclosed in this package.

Copy to :

Signed : _____
Amritpal Hunjan

_____
(Signed as received)

Please sign as received and return a copy via fax (780) 452-9495

LS-03-QF-011

Layfield Environmental Systems Ltd.

Project Completion QA/QC Package
for

Baffinlands

Polishing Pond

Mary River, NWT

Supply and Install of EL 6040

Prepared By: Amritpal Hunjan

Reviewed By: Greg Van Petten

Date Submitted: September 4, 2007

LAYFIELD

Layfield Environmental Systems Ltd.

Table of Contents

for

Baffinlands

Supply and Install of EL 6040

Marry River, NWT

New Construction

LAYFIELD

Layfield Environmental Systems Ltd.

Table of Contents

for

Baffinlands

Supply and Install of EL 6040

Marry River, NWT

New Construction

LAYFIELD

CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT NAME: Polishing Pond
PROJECT NUMBER: 07C-046
OWNER: Baffinlands
LOCATION: Mary River

I, the undersigned, a duly appointed representative of Layfield Environmental Systems Ltd. (LESL), have visually observed the soil subgrade described below, and found it to be an acceptable surface on which to install geomembrane.

This certification is based on observations of the surface of the subgrade only. No subterranean inspections or tests have been performed by Layfield Environmental Systems, and LESL makes no representations or warranties regarding conditions which may exist below the surface of the subgrade. Layfield Environmental Systems accepts no responsibility for conformance of the subgrade to this project's specifications.

The soil subgrade accepted on this date refers to its present condition. Any changes in the subgrade condition that result from the effects of inclement weather and/or other forces beyond the control of Layfield Environmental Systems and remedial work to correct the resulting deficiencies, will be the direct responsibility of the General Contractor.

Area Being Accepted: Area under Panels 1, 2, 3 & 4. Uncompacted sand with rock, subject to sluffing. Used LP-16 as an underlay

LAYFIELD ENVIRONMENTAL SYSTEMS REPRESENTATIVE:

Date: August 30, 2007
Signature:
Name: Allan McKinnon
Title: Project Supervisor

OWNERS REPRESENTATIVE:

Date: Aug 30 / 2007
Signature:
Name: ROLAND LANDRY
Title: PROJECT MANAGER
Company: BAFFINLAND IRON MINES

LAYFIELD

CERTIFICATE OF FINAL INSPECTION AND ACCEPTANCE

PROJECT NAME: Polishing Pond
PROJECT NUMBER: 07C2046 **DATE:** August 30 2007
OWNER: Baffinlands
LOCATION: Mary River.

Scope of Installation(s): **THE WORK**
Installed approx 2690 sq. metres of LP-16 as an underlay. Installed, welded, repaired/tested approx 3,659 sq metres of E.L. 6040.

Part 1 – LAYFIELD ENVIRONMENTAL SYSTEMS LTD.

I, Allan McKinnon, a duly appointed representative of Layfield Environmental Systems Ltd. (LESL), have visually observed the installations (as outlined above), and have found the Work to be complete and free of defects and declare that the Work was completed in accordance with the project specifications, Layfield Environmental Systems' QC program and the terms and conditions of the contract.

Layfield Environmental Systems Representative:
Name: Allan McKinnon
Title: Project Supervisor
Date: August 30, 2007 **Signature:**

Part 2 – OWNER (or Representative)

I, Roland Landry, a duly appointed representative of BAFFINLAND IRON MINES, do hereby take over and accept the installation(s) described above, and confirm that the work has been completed in accordance with the project specifications and the terms of the conditions of the contract.

I have evaluated and measured the work together with the Layfield Environmental Systems representative, and agree that the measurements shown are both true and correct, and that the installation has met our approval.

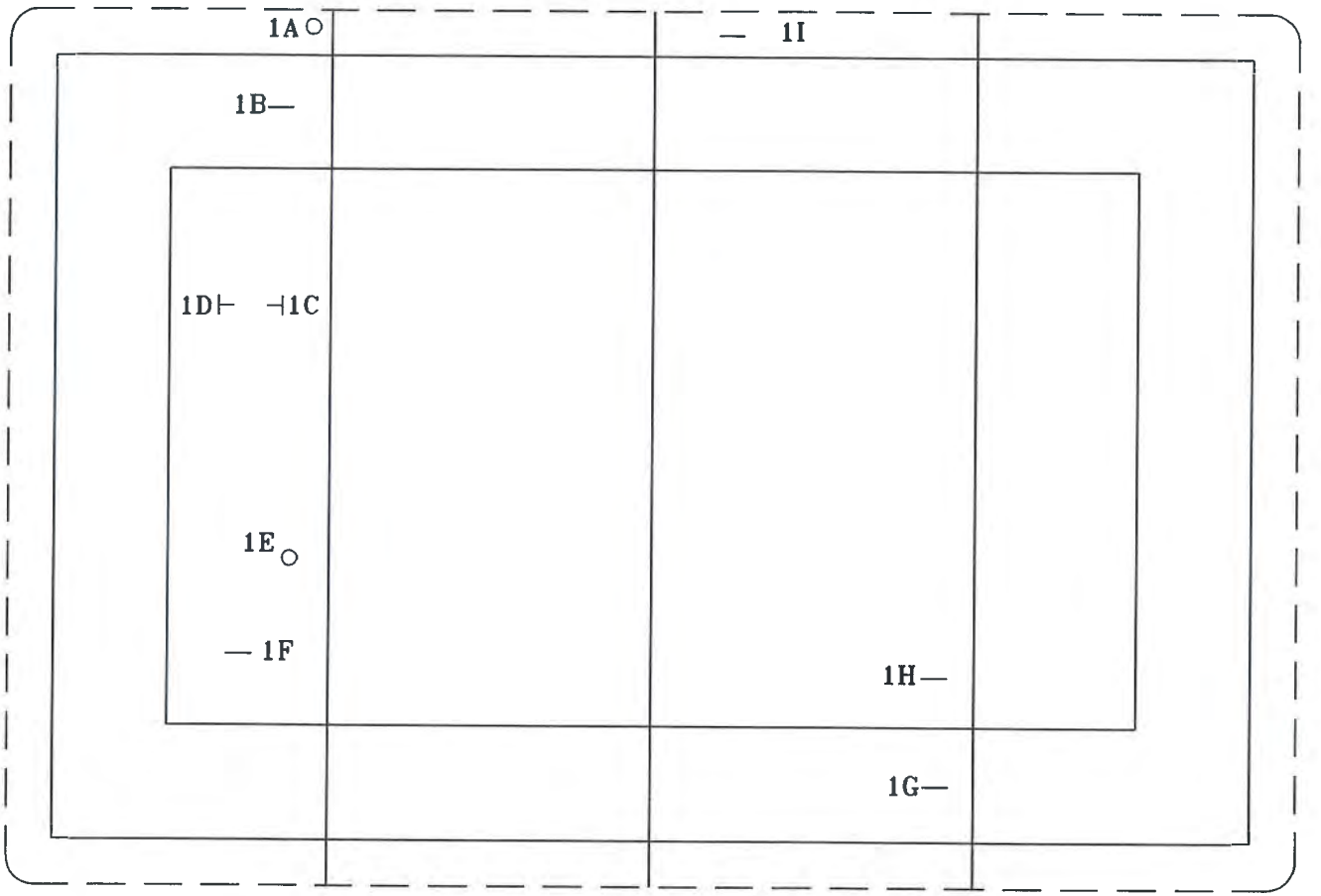
Owners Representative:
Name: ROLAND LANDRY
Title: PROJ. MANAGER
Company: BAFFINLANDS IRON MINES
Date: Aug 30/07 **Signature:**

Comments: Informed Baffinlands on how to fill anchor tronch and to leave slack in liner

FILE NAME: 07C-046

LS-04-QF-001

No.	REVISIONS	DATE (MM/DD/YY)	BY
1	AS-BUILT REVISED	09/20/07	AH



T WELDS

MANUFACTURER/DELIVERY DAMAGE

INSTALLATION DAMAGE

LAYFIELD
ENVIRONMENTAL SYSTEMS LTD.

POLISHING POND
EL 6040
AS-BUILT
BAFFINLAND
MARY RIVER, NWT

Quote No.	PROJECT No.
P8055	07C-046

DWG: 0F 1	SCALE : N.T.S.	
DWN: AH	CHKD:	APP'D:
DATE: 09/20/07	REVISION: 0	

GEOSYNTHETICS INVENTORY LOG

PROJECT NUMBER: 076-046
PROJECT TITLE: Mary River Polishing Pond
OWNER: Baffin land
CONTRACTOR: Raymac
LOCATION: Mary River
SHEET NUMBER: 1

MATERIAL TYPE: (GEOMEMBRANE) GEONET GEOTEXTILE OTHER
DATE OF ARRIVAL: Aug 19/07
DATE OF INVENTORY:
UNLOADING METHOD: Fork lift
INVENTORY BY: Adam Gandy
PRODUCT TYPE: Enviro liner
CONDITION IN TRUCK:
MATERIAL MANUFACTURER: Layfield

Panel / Roll Number	Material Dimensions			QC Certificate Available Y / N	Conf. Sample Removed Y / N	Other	Remarks
	Length	Width	Thickness or Weight				
1	53.4m	18.29m	40 mil			203795	
2	53.4m	18.29m	40 mil			203795	
3	53.5m	18.29m	40 mil			"	
4	53.4m	18.29m	40 mil			"	
5	53.4m	18.29m	40 mil			"	

SUBMITTED BY:

DATE:

LPL FORM 1

LAYFIELD PLASTICS (1978) LTD.

GEOMEMBRANE DEPLOYMENT LOG

PROJECT NUMBER: 07C-046 PROJECT TITLE: Polishing Pond
OWNER: Baffin land CONTRACTOR: _____
LOCATION: Mary River

GEOMEMBRANE: SECONDARY (PRIMARY) CLOSURE OTHER _____
SUBGRADE CONDITION (SURFACE COMPACTION, (PROTRUSIONS), DESICCATION, EXCESSIVE MOISTURE):

REMARKS: _____ DATE: _____
SHEET NUMBER: 1

DEPLOYMENT EQUIPMENT: _____

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER	1	2	3
DEPLOYED LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP	4"	4"	4"
CHECKED BY			
ADJACENT PANEL	N = E = S = W = 2	N = E = 1 S = W = 3	N = E = 2 S = W = 4
MEASURED THICKNESS	LEAD / L SIDE / R SIDE / TRAIL	LEAD / L SIDE / R SIDE / TRAIL	LEAD / L SIDE / R SIDE / TRAIL

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER	4		
DEPLOYED LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP	4"		
CHECKED BY			
ADJACENT PANEL	N = E = 3 S = W =	N = E = S = W =	N = E = S = W =
MEASURED THICKNESS	LEAD / L SIDE / R SIDE / TRAIL	LEAD / L SIDE / R SIDE / TRAIL	LEAD / L SIDE / R SIDE / TRAIL

SUBMITTED BY: _____

DATE: _____

LAYFIELD

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 07C-046 **PROJECT TITLE:** Polishing Pond

OWNER: Baffinland **CONTRACTOR:**

LOCATION: Mary River **SHEET NUMBER:** 3

✓ **TF - # FUSION** _____ **TX - # = EXTRUSION** _____ **TS - # = SOLVENT**

SAMPLE NUMBER	APPROX. TIME & DATE	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES				TEST RESULTS			PASS OR RETEST	CHECKED BY	REMARKS
				AMBIENT AIR TEMP.	PREHEAT OR MACHINE SPEED	EXTRUDER	WEDGE TEMP.	INSIDE PEEL MODE / STRENGTH	OUTSIDE PEEL MODE / STRENGTH	SHEAR MODE / STRENGTH			
1	12:30 Aug 30/07	9	AG	10°C	60%		420°C	61/60/62/62/65	63/63/61/61/65	80/77	Pass	AG	
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			

SUBMITTED BY: [signature]
DATE: Aug 30/07

LAYFIELD

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 07C-046 **PROJECT TITLE:** Polishing Pond

OWNER: Baffinland **CONTRACTOR:** _____

LOCATION: Mary River **SHEET NUMBER:** 1

✓ **TF - # FUSION** _____ **TX - # = EXTRUSION** _____ **TS - # = SOLVENT**

SAMPLE NUMBER	APPROX. TIME & DATE	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES				TEST RESULTS			PASS OR RETEST	CHECKED BY	REMARKS
				AMBIENT AIR TEMP.	PREHEAT OR MACHINE SPEED	EXTRUDER	WEDGE TEMP.	INSIDE PEEL MODE / STRENGTH	OUTSIDE PEEL MODE / STRENGTH	SHEAR MODE / STRENGTH			
1	15:00 Aug 29/07	#9	AG	10°C	60%		420°C	70/64/65/70/68	60/71/66/66/65	74/79	Pass	AG	
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			

LS FORM 3

LAYFIELD ENVIRONMENTAL SYSTEMS

SUBMITTED BY: _____

DATE: Aug 30/07

LAYFIELD

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 07C-046 **PROJECT TITLE:** Polishing Pond

OWNER: Baffinland **CONTRACTOR:**

LOCATION: Mary River **SHEET NUMBER:** 2

_____ **TF - # FUSION** ✓ **TX - # = EXTRUSION** _____ **TS - # = SOLVENT**

SAMPLE NUMBER	APPROX. TIME & DATE	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES				TEST RESULTS			PASS OR RETEST	CHECKED BY	REMARKS
				AMBIENT AIR TEMP.	PREHEAT OR MACHINE SPEED	EXTRUDER	WEDGE TEMP.	INSIDE PEEL MODE / STRENGTH	OUTSIDE PEEL MODE / STRENGTH	SHEAR MODE / STRENGTH			
1	18:45 Aug 29/07	Dem 1	AM	10° C	235° C		235°C	60/58/61/59/66	/ / / /	74 / 81	Pass	AG	
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			

LS FORM 3

LAYFIELD ENVIRONMENTAL SYSTEMS

SUBMITTED BY: _____

DATE: Aug 30/07

LAYFIELD

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 07C-046 **PROJECT TITLE:** Polishing Pond

OWNER: Baffinland **CONTRACTOR:**

LOCATION: Mary River **SHEET NUMBER:** 4

____ **TF - # FUSION** __✓__ **TX - # = EXTRUSION** ____ **TS - # = SOLVENT**

SAMPLE NUMBER	APPROX. TIME & DATE	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES				TEST RESULTS			PASS OR RETEST	CHECKED BY	REMARKS
				AMBIENT AIR TEMP.	PREHEAT OR MACHINE SPEED	EXTRUDER	WEDGE TEMP.	INSIDE PEEL MODE ---------- STRENGTH	OUTSIDE PEEL MODE ---------- STRENGTH	SHEAR MODE ---------- STRENGTH			
1	15:45 Aug 30/07	Dem 1	AM	10° C	235° C		235° C	66/63/60/60/61	/ / / /	81 / 81			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			
								/ / / /	/ / / /	/			

LS FORM 3

LAYFIELD ENVIRONMENTAL SYSTEMS

SUBMITTED BY: _____

DATE: Aug 30/07

LAYFIELD

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 07C-046
PROJECT TITLE: Polishing Pond
OWNER: Baffinland
CONTRACTOR:
LOCATION: Mary River

PASSING TRIAL SEAMS

✓ FUSION
_____ EXTRUSION
_____ SOLVENT

NO.	TIME	TECH ID
1	12:30	AG

SHEET NUMBER: 2
DATE: Aug 30/07

SEAM NUMBER	SEAM SECTION * START POINT	SEAM SECTION * FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	APPROX. LENGTH WELDED	DESTR. NUMBER	CHK'D BY	REMARKS	NON-DESTRUCTIVE TEST DATE	NON-DESTRUCTIVE CHECKED BY
2/3	SOES	NOES	12:45PM	10°c	AG	60%	420°C	-	38.72m		AG		Aug 30/07	AG
3/4	SEOS	NEOS	1:30PM	10°c	AG	60%	420°C	-	36.84m		AG		Aug 30/07	AG
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
								DAILY TOTAL						

* *REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR, OR A POINT LOCATION ON THE SEAM.*

SUBMITTED BY: _____
DATE: _____

LAYFIELD

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 07C-046
PROJECT TITLE: Mary River Polishing Pond
OWNER: Baffinland
CONTRACTOR: Raymac
LOCATION: Mary River

PASSING TRIAL SEAMS

✓ FUSION
_____ EXTRUSION
_____ SOLVENT

NO.	TIME	TECH ID
1	15:30	AG

SHEET NUMBER: 1
DATE: Aug 29/07

SEAM NUMBER	SEAM SECTION * START POINT	SEAM SECTION * FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	APPROX. LENGTH WELDED	DESTR. NUMBER	CHK'D BY	REMARKS	NON-DESTRUCTIVE TEST DATE	NON-DESTRUCTIVE CHECKED BY
1/2	S	N	4:00PM		AG	60%	420°C	-	38.72m		AG		Aug 29/07	AG
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
							DAILY TOTAL							

* *REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR, OR A POINT LOCATION ON THE SEAM.*

SUBMITTED BY: _____
DATE: _____

LAYFIELD

GEOMEMBRANE VACUUM / AIR LANCE TEST LOG

PROJECT NUMBER: 07C-046 **PROJECT TITLE:** Polishing Pond

OWNER: Baffinland **CONTRACTOR:**

LOCATION: Mary River **DATE:** Aug 30/07

VACUUM BOX ✓ **AIR LANCE** _____ **SHEET NUMBER:** 1

SEAMS								REPAIRS					
SEAM NUMBER	SEAM SECTION * FROM TO	TEST DATE	TECH ID	DEFECTS **	SEAM COMPLETE NO YES	CHK'D BY	REMARKS **	DEFECT CODE	TEST DATE	TECH ID	DEFECTS **	CHK'D BY	REMARKS **
1-2	WEOS - SEOS	Aug 29	AG.		✓	Am		A1	Aug 30/07	AG		AG	
2-3	WEOS - SEOS	Aug 30	A.G.		✓	Am		B1	Aug 30/07	AG		AG	
3-4	SEOS - WEOS	Aug 30	A.G.		✓	Am		C1	Aug 30/07	AG		AG	
	-							D1	Aug 30/07	AG		AG	
	-							E1	Aug 30/07	AG		AG	
	-							F1	Aug 30/07	AG		AG	
	-							G1	Aug 30/07	AG		AG	
	-							H1	Aug 30/07	AG		AG	
	-							I1	Aug 30/07	AG		AG	
	-												
	-												
	-												
	-												
	-												
	-												
	-												
	-												
	-												
	-												
	-												
	-												
	-												

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM

** RECORD QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS

SUBMITTED BY: _____

DATE: _____

LAYFIELD

GEOMEMBRANE DEFECT / REPAIR LOG

PROJECT NUMBER: 07C - 046 **PROJECT TITLE:** Polishing Pond

OWNER: Baffinland **CONTRACTOR:**

LOCATION: Mary River **SHEET NUMBER:** 1

DEFECT CODE	LOG DATE	DEFECT LOCATION		DEFECT TYPE	REPAIR TYPE	WELD TECH.	REPAIR DATE	REMARKS **	TEST DATE	CHECKED BY
		SEAM OR PANEL NO.	DEFECT LOCATION DESCRIPTION							
1A	Aug 30/07	P 1	1.25m fr start .53m E	D	G & W	AM	Aug 29/07		Aug 30/07	AG
1B	Aug 30/07	P 1	2.81m fr start 1.2m E	CR	G & W	AM	Aug 29/07		Aug 30/07	AG
1C	Aug 30/07	P 1	11.24m fr start 4.06m E	T	G & W	AM	Aug 29/07		Aug 30/07	AG
1D	Aug 30/07	P 1	11.24m fr start 7.81m E	T	G & W	AM	Aug 29/07		Aug 30/07	AG
1E	Aug 30/07	P 1	19.67m fr start 1m E	D	G & W	AM	Aug 29/07		Aug 30/07	AG
1F	Aug 30/07	P 1	24.98m fr start 7.81m E	MD	G & W	AM	Aug 29/07	hOle from shop or shiping	Aug 30/07	AG
1G	Aug 30/07	S 3/4	6.56 fr start	IO	G & W	AM	Aug 30/07		Aug 30/07	AG
1H	Aug 30/07	S 3/4	9.37 fr start	CO	G & W	AM	Aug 30/07	welded over a shop seem	Aug 30/07	AG
1I	Aug 30/07	S 2/3	At End 5.62m Long	Ext	G & W	AM	Aug 30/07	Extended the Anchortrench	Aug 30/07	AG

DEFECT TYPE: AD - ANIMAL RELATED DAMAGE; B - UNDISPERSED RESIN BEAD; BO - FUSION WELDER BURN; BS - BOOT/SKIRT FROM FML PENETRATION; CO - CHANGE OF OVERLAP; CR - CREASE; D - INSTALLATION DAMAGE; DS-# - DESTRUCTIVE TEST NUMBER; EE - EARTHWORK EQUIPMENT DAMAGE; EXT - EXTENSION; FM - FISHMOUTH; FS - FAILED SEAM LENGTH; FTS - FIELD TEST STRIP; HT - HEAT TACK BURN; IO - INSUFFICIENT OVERLAP (UNDER SPEC.); MD - MANUFACTURER/DELIVERY DAMAGE; PT - PRESSURE TEST CUT; SI - SOIL SURFACE IRREGULARITY; SL - SLAG ON TEXTURED SHEET; T - THREE PANEL INTERSECTION; VL - VACUUM TEST LEAK; WR - WRINKLE; WS - WELDER RESTART; OTHER:

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND/WELD

PASSING TRIAL SEAMS		
NO.	TIME	TECH ID.

** COLUMNS TO BE USED BY THE PROJECT SUPERVISOR OR LEAD TECHNICIAN ONLY.

SUBMITTED BY: Adam Gould

DATE: Aug 30/07

S/O 203795

TRACEABILITY REQUIRED

LAYFIELD

SHOP QC

Job Desc.	Mary River Polishing Pond		
Customer:	Baffinland Iron Mines		
Sales Person:	JL	Date:	8-Jun-07
Material Type:	EL 6040 black 148" wide 40 mil		
Prod Code:	0		
Fab Code:	03LE1040		
Length	175.2	Width	60.0

Special Fabrication Instructions

Description of Operations/Procedures

In-Process Inspection				
#1	#2	#3	Completed	

Roll Tag #	#	Piece #	Liner# / Panels	Quantity	Repairs
35378	E22996	018	1/1 + 185'		
35248	E22947	015	1/58'		
35378	E22996	010	1/3		
35378	E22996	010	2/ 2+ 126'		
35378	E22996	009	2/ 60' + 2		
35378	E22996	009	3/ 3 + 50'		
35378	E22996	015	3/126' + 1		
35378	E22996	015	4/ 4		
35378	E22996	013	4/2 5/5		

Mach: PFS Speed: Temp: Splice:

3

Shear (Seam #)

Liner #		1	4			
P8055	1	65	83			
P8055	2	79	81			
P8055	3	86	76			
P8055	4	79	84			
P8055	5	70	76			
P8055						
P8055						
P8055						
P8055						
P8055						

Peel (Seam #)

1 L	R	4 L	R	L	R	L	R	L	R
72	69	71	72						
68	72	65	69						
64	69	66	68						
65	68	70	66						
70	70	54	55						

Tech/Date (Seam #)

1	4			
NL	NL			
MO	MO			
MO	MO			
MO	BIA			
BIA	BIA			

Inspections #1 Norm June 27/07 #2 MO June 27/07 #3

Final

LAYFIELD ENVIRONMENTAL SYSTEMS LTD.
11603 – 180 Street Edmonton, Alberta T5S 2H6 Canada
Phone: (780) 453-6731
Fax: (780) 452-9495
Toll Free: 1 800 840-2884
Web: www.layfieldgroup.com
E-Mail: edm@layfieldgroup.com

INSTALLATION WARRANTY

Layfield Reference No: (Job#) 07C-046

LAYFIELD ENVIRONMENTAL SYSTEMS LTD. (LAYFIELD) hereby warrants to Baffinlands ; (the Customer) that the work performed by LAYFIELD on the Installation described as Polishing Ponds (EL 6040, LP16) will:

1. Meet the field seam specifications set out in the contract between LAYFIELD and the Customer (as amended by LAYFIELD's quotation), all workmanship to meet the requirements of LAYFIELD's Field Installation Quality Assurance program, and be free of defects at the time of completion of the Installation; and

2. Be free of installation defects from the date of the completion of the Installation (08/20/07) for a period of 1 year so long as the completed Installation is used for the purposes and in the manner for which the Installation was designed.

Should damage or defects within the scope of the aforesaid warranties occur, LAYFIELD shall repair the damage or defects, PROVIDED THAT the area to be repaired must first be made ready by the Customer and be in a clean, dry, unencumbered condition, free from all water, soil, sludge, residuals, and liquids of any kind.

To enable LAYFIELD to investigate and determine the cause of any alleged damage or defect, notice and details of any claim hereunder must be presented in writing to LAYFIELD within thirty (30) days after the alleged damage or defect was first noticed or observed. Failure to provide such notice and details shall invalidate all warranties provided hereunder.

The liability of LAYFIELD under the aforesaid warranties are subject to the following conditions:

a. LAYFIELD's only obligation shall be to repair or replace any defective workmanship and in no event shall LAYFIELD be liable for any amount in excess of the cost of the Installation;

b. No allowance will be made for repairs, replacements or alterations made by the Customer unless with the prior written consent of LAYFIELD;

c. The warranties hereunder extend only to the Customer and are not transferable;

d. The warranties hereunder shall not apply to any damage or defects resulting from misuse, mechanical abuse by machinery, equipment or persons, excessive pressures or stresses, exposure of the completed Installation of harmful chemicals, unusual weather conditions, casualty catastrophe such as (but not limited to) earthquake, flood, hail, tornado, or any other act of God;

e. Under no circumstances shall LAYFIELD be liable for any special, direct, indirect, or consequential damages including the loss of use of the Installation howsoever caused;

f. All liner materials provided for the Installation are covered by a separate warranty provided by the material manufacturer and LAYFIELD shall not be liable for material failure claims hereunder;

g. The warranties hereunder are given in lieu of all other warranties, express, implied, statutory, or otherwise, and the Customer expressly waives all other warranties and claims whatsoever except those specifically given herein, and the Customer acknowledges that the warranties hereunder are accepted in preference to and to the exclusion of any or all other warranties; and

h. An Installation Warranty will <u>not</u> be provided for lining projects unless the installation is completed by LAYFIELD personnel or designated Layfield subcontractors.

LAYFIELD ENVIRONMENTAL SYSTEMS LTD.

James Teppan VP & General Manager

➢ APPENDIX 2

- **PHOTOS**

Photo 1: Sewage Treatment Building (Tanks-A-Lot System)

Photo 2: Storage Tank

Photo 3: Pre-treatment tanks and aeration chamber at the bottom of the photo

Photo 4: Aeration, final process and UV tanks

Photo 5: Final pumping chamber going to the PWSP

March 16, 2009

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Email: licensing@nunavutwaterboard.org

Re: Submission of Bulk Fuel Storage Facility As-Built, Mary River Camp
Type B Water License #2BB-MRY0710, Part J, Item 4
Mary River Project

Dear Ms. Beaulieu,

Baffinland Iron Mines Corporation (BIM) is pleased to submit, herewith, the required as-built documentation for the Mary River Bulk Fuel Storage Facility, which is a requirement of the above referenced water licence.

Please contact me should you have any questions concerning this submission at 902-495-0490 or by e-mail at jim.millard@baffinland.com.

Yours sincerely,
Baffinland Iron Mines Corporation

ORIGINAL COPY SIGNED

Jim Millard, M.Sc., P.Geo.
Environmental Superintendent

Cc. David McCann, BIM
Dick Matthews, BIM
Cheryl Wray, BIM

Attachment: As-Built Report for Mary River Bulk Fuel Storage Facility (Genivar)

GENIVAR

834 Mountjoy Street South
P.O. Box 120
Timmins, Ontario P4N 7C5
Tel. (705) 264-9413
Fax. (705) 267-2725

March 15, 2009

Jim Millard, M. Sc., P. Geo.
Environmental Superintendent
Mary River Project
Baffinland Iron Mines Corporation
Suite 1016, 120 Adelaide Street West
Toronto, Ontario M5H 1T1

Dear Jim,

RE:

MARY RIVER PROJECT
BULK FUEL STORAGE FACILITY AT MARY RIVER CAMP
AS-BUILT CONSTRUCTION REPORT
OUR REFERENCE NO. 09-058

Genivar Consultants LP (Genivar) was retained by Baffinland Iron Mines Corporation (BIMC) to design the Bulk Fuel Storage Facility at their Mary River Camp site in Nunavut, provide limited QA/QC services during construction and subsequently to compile the required documentation of as-built conditions of the storage facility.

BACKGROUND

Part J (4) of the Water Licence (#2BB-MRY0710) for the Mary River Project issued by the Nunavut Water Board (NWB) states that:

> *"The Licensee shall provide as-built plans and drawings, stamped and sealed by a professional Engineer registered in Nunavut, within ninety (90) days of completion of all construction works, including ....iii. Bulk Storage of fuel Facilities."*

During 2007 and 2008, bulk fuel for the Mary River Project has been delivered to the Milne Inlet port. A Bulk Fuel Storage Facility has been built to contain all the required fuel at Milne Inlet camp. The as-built construction report for this facility was submitted to the NWB in December 2007. The plan in 2008 and 2009 is to transfer fuel from the Milne Inlet facility by tanker truck to the Mary River Camp

(approximately 100 km from Milne Inlet along the Milne Inlet Tote Road). Bulk fuel at the Mary River Camp is/will be stored in the Mary River Bulk Fuel Storage Facility which is the subject of the report, herein.

PROPOSED DESIGN OF THE FACILITIES AT MARY RIVER CAMP SITE

Figure 1 shows the site map indicating the Mary River Project sites from Steensby in the south to Mary River Camp in the north and Milne Inlet Camp in the north. Figure 2 shows the site plan arrangements at Mary River Camp Site.

Fuel was shipped via ocean tankers from the port of Montreal to Milne Inlet. All bulk fuel at Milne inlet has been stored in the Milne Inlet Bulk Fuel Storage Facility consisting of 74 fuel bladders within a lined and bermed containment. Bulk fuel is transferred by tanker truck from Milne Inlet to the Mary River bulk fuel storage facility. Figures 3 and 4 included in Appendix 1 show the construction design details of the Bulk Fuel Storage Facility design at the Mary River Camp Site. The Fuel bladders are identified in NIRB's Northern Remote Site Protocols document (Dillon, 1998) and have been used by both private companies and the federal government in Nunavut, Yukon and other arctic regions of the world. The fuel bladders were supplied by Raymac Industries and engineered by SEI Industries. Detailed arrangement of the fuel bladders in the containment as well as piping arrangement is included in Appendix 2.

As shown in the related drawings in Appendix 1, the fuel storage facility was designed with an earthen berm lined with a petroleum-resistant geomembrane liner (Hazgard HZ-500) that meets ULC/ORD-C58.9-1997 specifications for Underground and Aboveground flammable and combustible liquid storage tanks. The liner was to be covered with approximately 300mm of granular material to protect it from damage.

The containment was designed to hold 110% of total aggregate capacity of the fuel facility as per the CCME's "Environmental Code of Practice for Aboveground and Underground Storage Tank Systems containing Petroleum and Allied Petroleum Products" and "National Fire Code of Canada" standards. As well, the containments design consisted of a sump for collection of precipitation. The containments floors were designed to grade towards the sump. The sump was designed to be periodically pumped and contaminated water treated by an appropriate portable treatment unit. The treatment process involves oil water separator, filtration through two types of media, and polishing using activated carbon if required. The clean water from the process (that meets Water Licence Criteria) was designed to be discharged to the receiving environment while the oil and filter media was to be collected in drums and subsequently shipped offsite for recycling.

The Mary River Bulk Fuel Storage Facility was designed to contain 16 bladders, each containing 113,560 litres. Two to four of the bladders were to be used for

the storage of aviation fuel while the remaining bladders were to be used for the storage of diesel fuel.

The fuel facility was designed to be equipped with dispensing stations consisting of electric pumps and shut-off valves in a lined pad backfilled with granular material. The precipitation within this area was to be collected in a sump and treated as required. Any fuel spills was designed to be contained within the lined areas which can then be excavated, tested and treated as necessary at the end of the project.

AS-CONSTRUCTED CONDITIONS OF THE FACILITY

Containment construction

The containment for the Bulk Fuel Storage Facility was constructed in general conformance with the design. For details on the plans and sections of the containment construction, please refer to Figure 5 in Appendix 1 for as-constructed drawing of the Mary River Bulk Fuel Storage Facility.

The material used for the containment berms and base was obtained from nearby borrow sources. The material was free of any deleterious substances and was approved by the liner construction staff. A certificate of acceptance is included in Appendix 2 by Raymac/Layfield who was the supplier and contractor for the containment liner.

The liner was installed and welded as per the design criteria as well as liner manufacturer's recommendations. The liner was a nominal 40-mil impermeable material (commercially known as Hazgard 50). Quality Assurance and Quality Control was provided by Layfield (the liner material supplier) and a QA/QC report is included in Appendix 2.

Mechanical (bladders, pipes, valves…)

All mechanical components of the Bulk Fuel Storage Facility including the bladders (fuel tanks), the piping network within the containment, valves, the sump, oil/water separator, the piping from the shore to the Bulk Fuel Storage Facility, and the contaminated water treatment system were designed by SEI Industries and constructed by Raymac Inc.

Design drawing of the mechanical components of the Bulk Fuel Storage Facility at the Mary River Camp Site is included in Appendix 2.

It is our opinion that the Bulk Fuel Storage Facility containment was designed and built in general conformance with CCME's "Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products" as well as "National Fire Code of Canada".

The following requirements have either been followed or shall be followed by BIMC in order to ensure compliance with CCME and NFC guidelines prior to the operation of the facility:

Tank Registration

Each storage tank (bladder) will be registered with the Fire Marshal in 2009. The registration document will include the name of owner, address of owner, type of facility, location of the tanks, storage capacity of the tank, type of product stored, year of installation, ULC standard of tank (bladder), type of storage material, type of piping material, type of corrosion protection (if any), type of pumps, description of leak detection system, type of secondary containment, name of operator, name of land owner, name of installer, manufacturer of storage tanks as per CCME, item 2.4.2.

Visual Leak Detection

BIMC conducts periodic visual inspections of each fuel bladder in accordance with the fuel management practice and schedule that has been developed for the Project. An inventory reconciliation plan has been developed for facility operations as part of the leak detection system.

Spill Contingency plan

The Bulk Fuel Storage Facility operation shall comply with the guidelines set forth by the Spill Contingency Planning and Reporting Regulations. This spill Contingency Plan has been provided by BIMC to the Nunavut Water Board and a copy is available at each site.

Bladder and Product Identification

Each tank/bladder should be identified in conformance with the Canadian Petroleum Products Institute (CPPI) "using the CPPI Colour-symbol system to mark equipment and vehicles for product identification".

Fire Protection

At least two (2) fire extinguishers, each having a rating of not less than 80-B:C, has been provided at the truck loading pad and at the fuel intake to the Bulk Fuel Storage Facility.

Please note that in all cases, the authority having jurisdiction is as follows:

Fire Marshall
Department of Community Government & Transportation
Government of Nunavut
P.O. Box 1000, Station 700
Iqaluit, Nunavut X0A 0H0
Tel. 879-975-5310
Fax. 867-979-4221

We trust this report is satisfactory and meets your requirements. However, should you have any questions, please do not hesitate to contact the undersigned for further discussion.

Yours truly,

Genivar Consultants LP

Marz G. Kord, P. Eng., M.Sc., MBA

➢ APPENDIX 1

DRAWINGS

ᑐᑭᓯᖏᓐᓂ
LEGEND:

- ᐃᒥᖅ WATER
- ᑕᒪᓐᓇᐅᔾᔪᖅ ᓄᓇᖅ CAMP LOCATION
- ᓄᓇᓕᒃ COMMUNITY

ᐊᖏᓂᖅ
(ᓇᓗᐅᑦᑎᓯᒪᔪᖅ) SCALE (APPROX.) 40 20 0 40 80 120 160 200 ᑭᓪᓕᑕ km

Baffinland Iron Mines Corporation

ᓄᓇᓕᒋᓂ ᐅᔾᕕᖏᐅᑎᑦ MARY RIVER PROJECT

ᐱᓕᕆᐊᐅᔾᔪᖅ ᓄᓇᖅᑕ ᓄᓇᕗᑦᖅ
PROJECT LOCATION MAP

Knight Piésold CONSULTING	P/A NO. NB102-00181/15	REF. NB09-00192	REV. 0
	ᑎᑎᕋᐅᓯᒪᔪᖅ FIGURE	1	

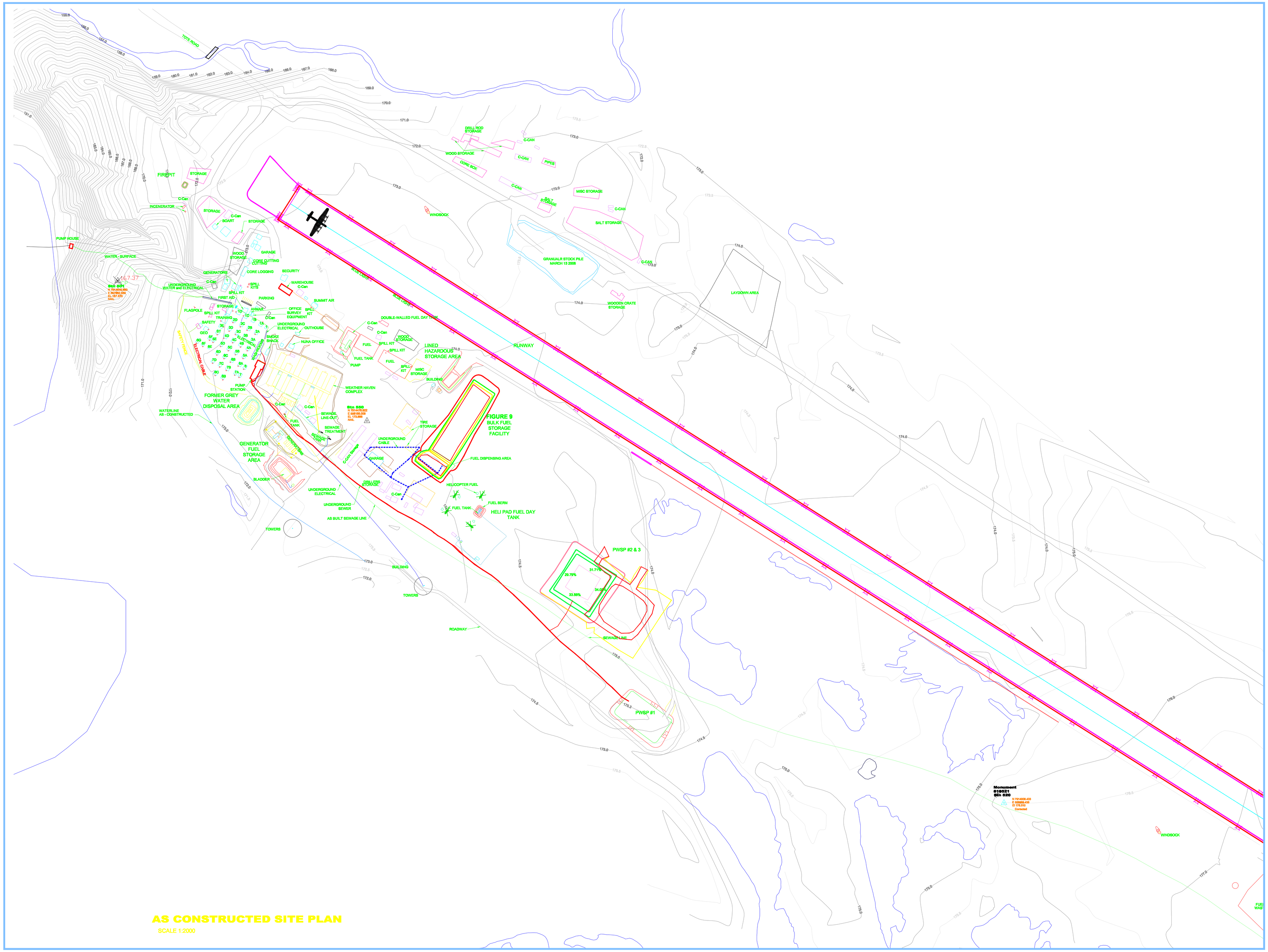


FIGURE 9
BULK FUEL STORAGE FACILITY

AS CONSTRUCTED SITE PLAN

SCALE 1:2000

Description	Date	No.

Revisions and Issues

NORTH

Date Printed

GENIVAR
834 Mountjoy Street South
P.O. Box 130
Timmins, Ontario P4N 7C5
www.genivar.com
Tel. 705-264-9413
Fax 705-267-2725

ARCHITECT | STRUCTURAL/CIVIL

MECHANICAL | ELECTRICAL

Project

MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION

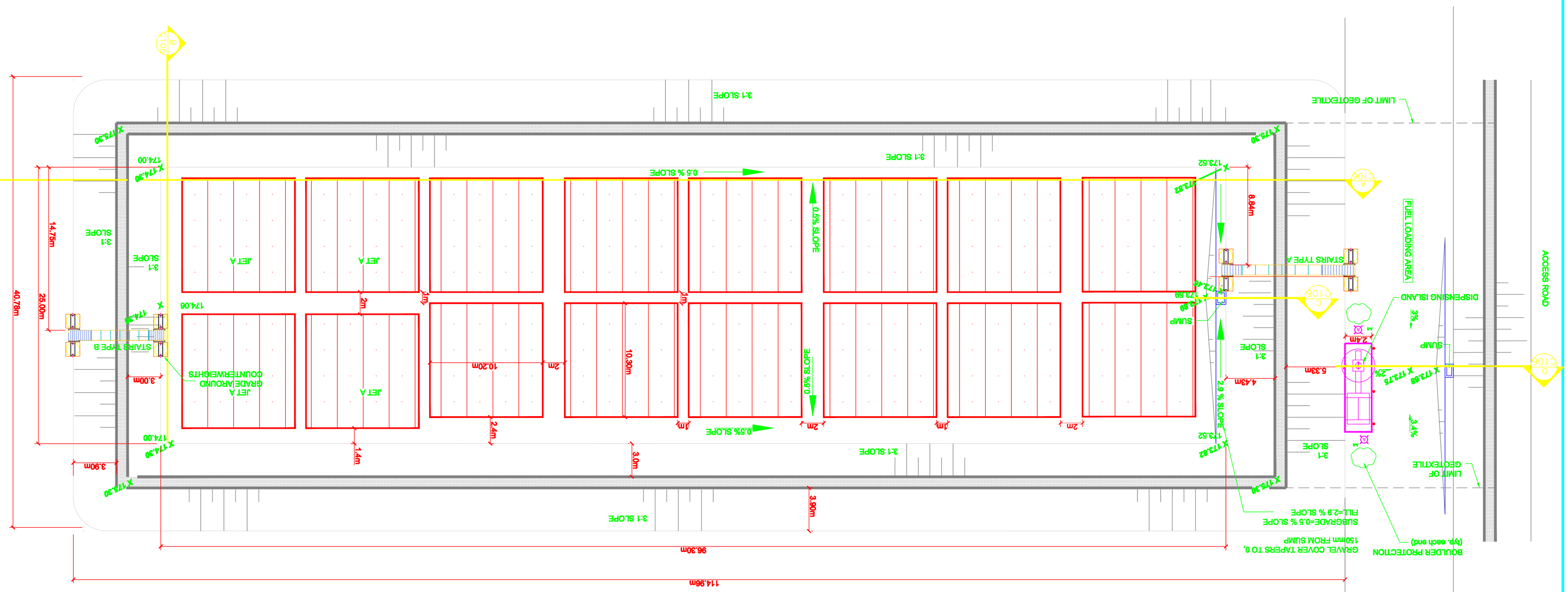
BAFFIN ISLAND NUNAVUT

Drawing

AS CONSTRUCTED MARY RIVER SITE PLAN

Date	CADD File Number
MARCH 2009	REPORT/FUEL FARM/
Scale 1:2000	Job Number 09-058
Drawn SO	
Checked MK	Drawing Number FIGURE 2
Approved	

NOTES:
12 DIESEL TANKS 10.2m X 10.3m
4 JET FUEL TANKS 10.2m X 10.3m
CONNECTION PIPES BY OTHERS



Project	MARY RIVER PROJECT BAFFINLAND IRON MINES CORPORATION BAFFIN ISLAND, NUNAVUT
Drawing	MARY RIVER BULK FUEL STORAGE FACILITY PLAN
Date	MARCH 2009
CADD File Number	report#plot.nwa
Scale	1:200
Job Number	09-058
Drawn	SO/CM
Checked	
Drawing Number	FIGURE 3
MK	
Approved	

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT STRUCTURAL/CIVIL
MECHANICAL ELECTRICAL

NORTH Date Plotted

LEGEND
X174.30 PROPOSED ELEVATION
174.00 EXISTING ELEVATION

No.	Description	Date
0	ISSUED FOR TENDER/REVIEW	Mar. 28,2007
1	ISSUED FOR CONSTRUCTION	July 03,2007

Revisions and Issues

Drawings shall not be scaled.

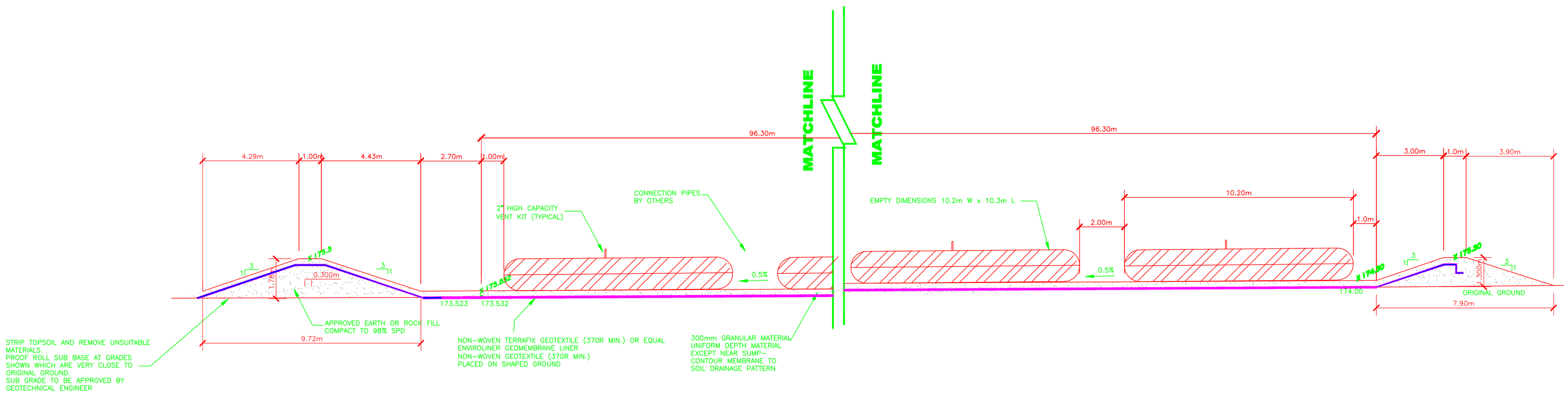
Contractors shall verify and be responsible for all dimensions and conditions on the job and report any discrepancies to the Architect and/ or Engineer before proceeding with the work.

This Drawing is an instrument of service and shall remain the property of B.H. Martin Consultants Ltd. It may not be reproduced or copied in any form. It shall not be used for the construction, enlargement or alteration of a building other than the said project without the authorization of the ARCHITECT and/or ENGINEER.

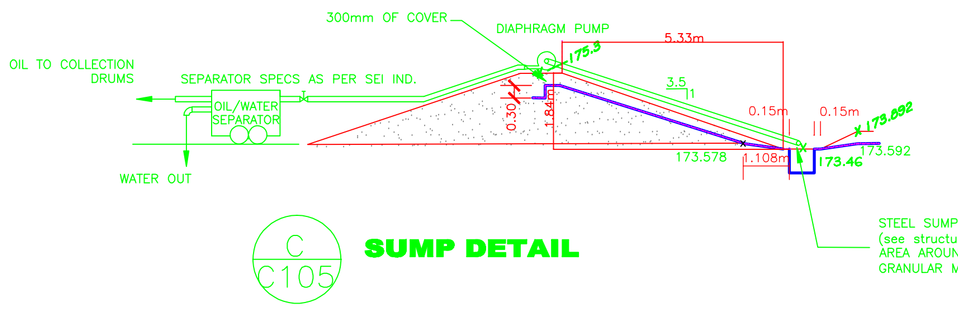
SITE BENCH MARK

THE POSITION OF POLE LINES , CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THIS DRAWING AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

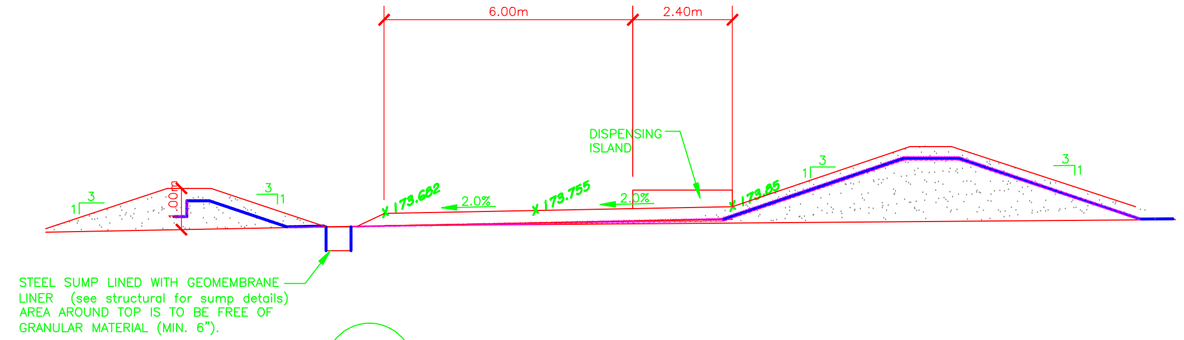
Revisions and Issues		
Description	Date	No.
ISSUED FOR CONSTRUCTION	July 03,2007	1
ISSUED FOR TENDER/REVIEW	Mar. 25,2007	0



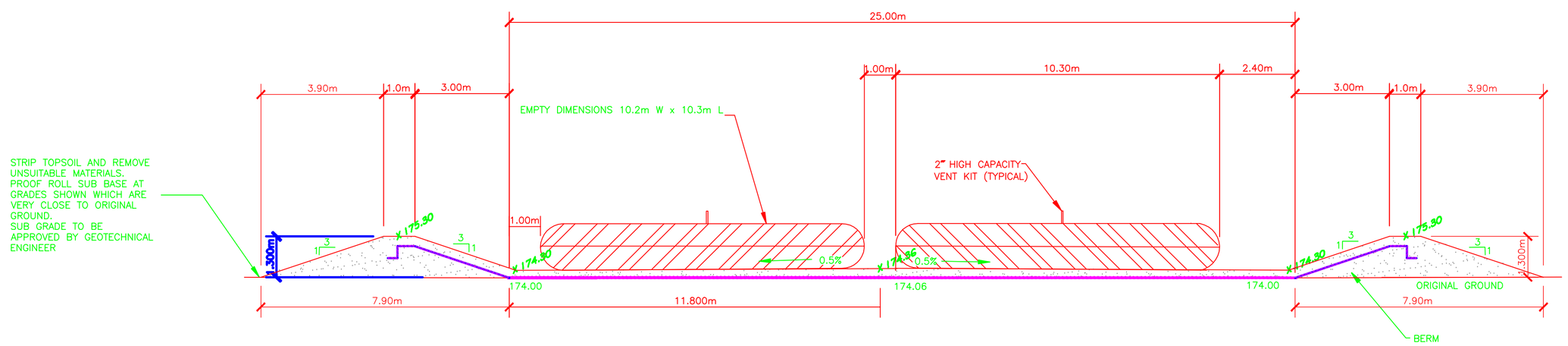
A C105 **CROSS-SECTION**
SCALE 1 TO 100



C C105 **SUMP DETAIL**



D C105 **FUEL LOADING AREA DETAIL**



B C105 **CROSS-SECTION**
SCALE 1 TO 100

SCALE
5.0m 0 5.0m

NORTH Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

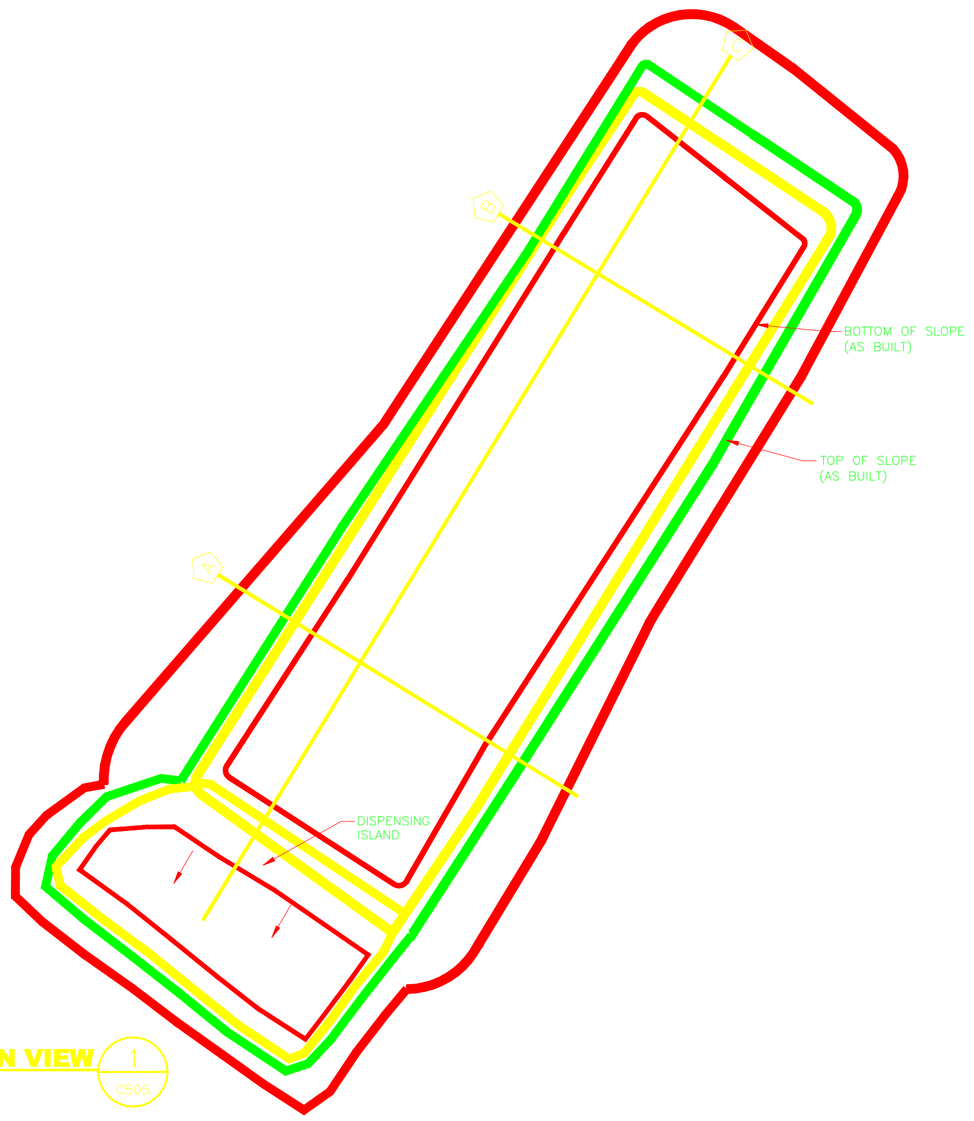
ARCHITECT STRUCTURAL/CIVIL

MECHANICAL ELECTRICAL

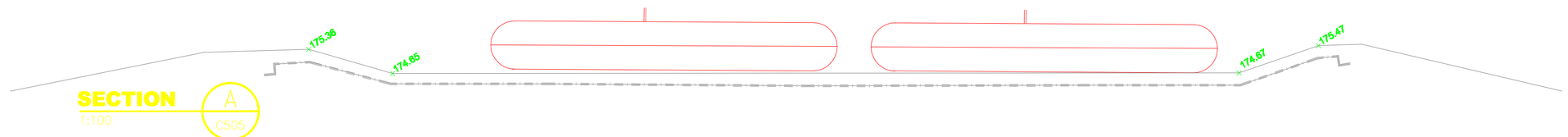
Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND, NUNAVUT

Drawing
MARY RIVER BULK FUEL STORAGE FACILITY SECTION AND DETAILS

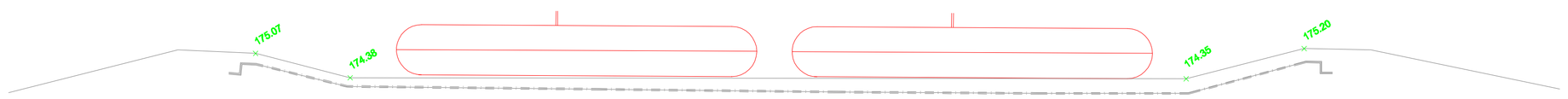
Date MARCH 2009	CADD File Number REPORT/FUEL FARM/
Scale 1:100	Job Number 09-058
Drawn SO/CM	
Checked MK	Drawing Number FIGURE 4
Approved	



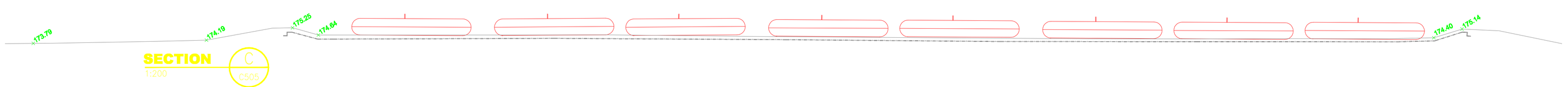
FUEL FARM B PLAN VIEW 1 C505
1:500



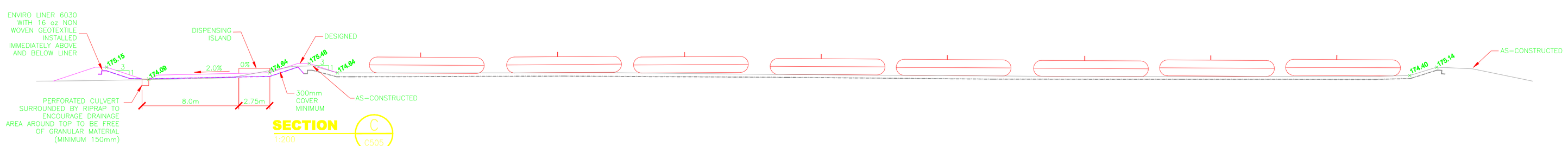
SECTION A C505
1:100



SECTION B C505
1:100



SECTION C C505
1:200



SECTION C C505
1:200

Description	Date	No.

Revisions and Issues

NORTH

Date Printed

GENIVAR

GENIVAR
604 Mountjoy Street South
P.O. Box 120
Timmins, Ontario P4N 7C5
www.genivar.com
Tel. 705-264-9413
Fax 705-267-2725

ARCHITECT

STRUCTURAL/CIVIL

MECHANICAL

ELECTRICAL

Project

MARY RIVER PROJECT
BAFFIN LAND IRON MINES CORPORATION

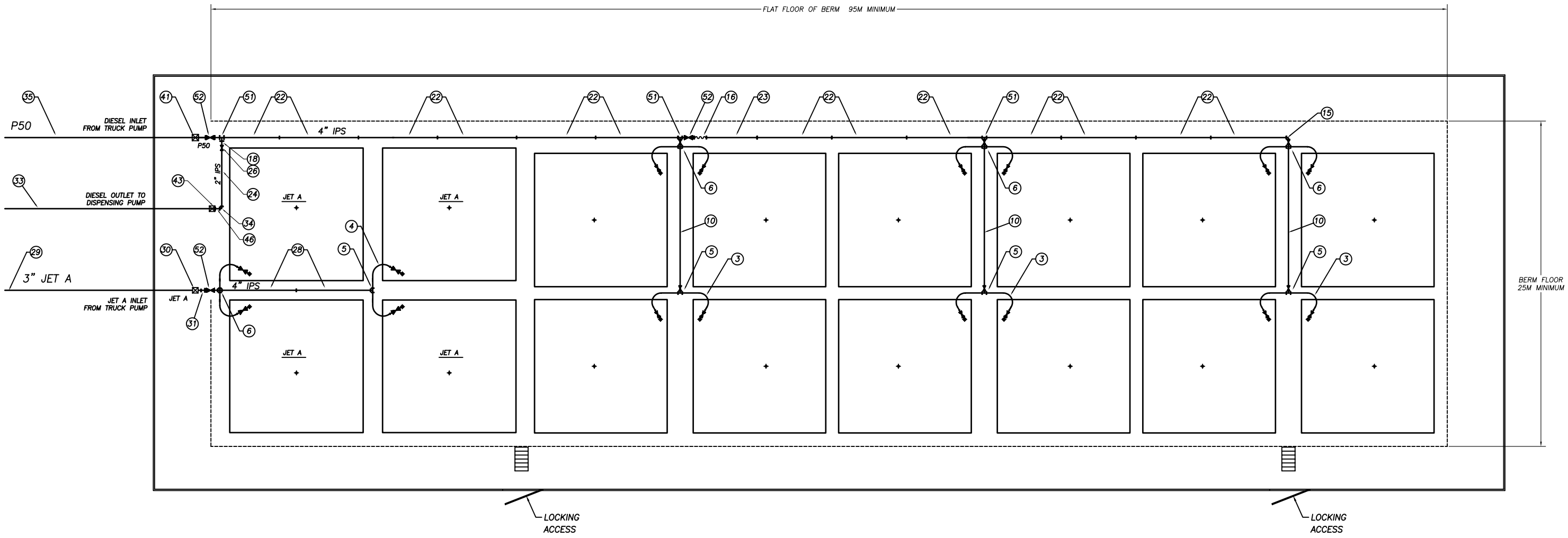
BAFFINISLAND NUNAVUT

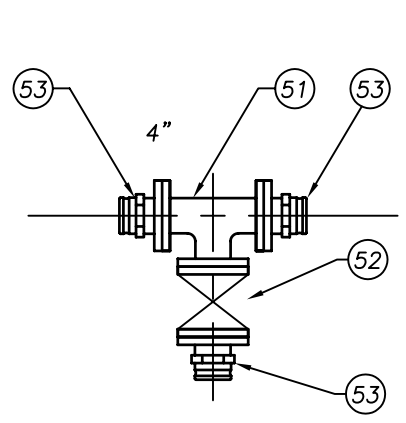
Drawing

MARY RIVER BULK FUEL STORAGE FACILITY
AS-CONSTRUCTED DRAWING

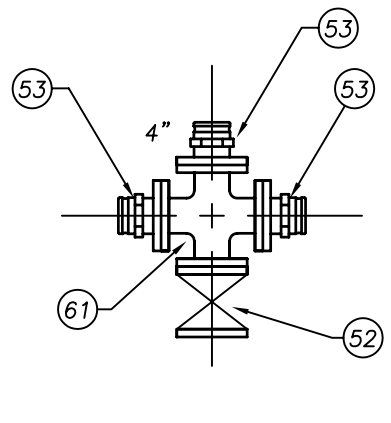
Date	CADD File Number
MARCH 2009	REPORT/FUEL FARM
Scale: AS NOTED	Job Number: 09-058
Drawn: S.S	
Checked: CHECKED	Drawing Number: FIGURE 5
Approved: APPROVED	

REV	REVISION DESCRIPTION	BY	DATE	APPV
P1	PRELIMINARY	G.B.	01AUG06	
P2	FITTINGS AND HOSE ONLY	G.B.	28MAR07	
P3	OUTLETS AND PIPE ADDED	G.B.	9APR07	
P4	ALL PUMPS MOVED TO ONE END	G.B.	7 MAY07	
0	RELEASED FOR PRODUCTION	G.B.	10MAY07	G.B.





ASSEMBLY 5



ASSEMBLY 6

ITEM	QTY	DESCRIPTION	MATERIAL	PART_NO.	U/M	T.QTY
61	4	CROSS, 4" 150# FLANGED	S.S.	–	EA	4
53	24	CAMLOCK ADAPTER, 4" 150# FLANGE	ALUMINUM	–	EA	24
52	11	BALL VALVE, 4" 150# FLANGED	S.S.	–	EA	11
51	7	TEE, 4" 150# FLANGED	S.S.	–	EA	7
P4 46	1	CONC. REDUCER, 2" x 1-1/2", 150#	S.S. SCH. 10S FLANGED	–	EA	1
43	2	1-1/2" DRYBREAK ASSEMBLY	ALUMINUM	–	EA	2
41	2	4" DRYBREAK ASSEMBLY	ALUMINUM	–	EA	2
35	1	DIESEL HOSE ASS'Y, 4" X 25' LONG	ARCTIC GRADE, SCOVILLS	–	EA	1
34	1	ELBOW, 2" 150# FLANGED	S.S.	–	EA	1
33	1	DIESEL HOSE ASS'Y, 1-1/2" X 25' LONG	ARCTIC GRADE, SCOVILLS	–	EA	1
31	1	CONC. REDUCER, 4" x 3", 150#	S.S. SCH. 10S FLANGED	–	EA	1
30	2	3" DRYBREAK ASSEMBLY	ALUMINUM	–	EA	2
29	1	AVIATION HOSE ASS'Y, 3" X 25' LONG	API 1529	–	EA	1
28	2	PIPE SECTION, 4"x 17'-7", 150#	S.S. SCH. 10S FLANGED	–	EA	2
26	1	BALL VALVE, 2" A50# FLANGED	S.S.	–	EA	1
P4 24	1	PIPE SECTION, 2"x 16'-0", 150#	S.S. SCH. 10S FLANGED	–	EA	1
23	1	PIPE SECTION, 4"x 16'-8-1/2", 150#	S.S. SCH. 10S FLANGED	–	EA	1
22	13	PIPE SECTION, 4"x 18'-11-1/2", 150#	S.S. SCH. 10S FLANGED	–	EA	13
18	1	CONC. REDUCER, 4"x 2", 150#	S.S. SCH. 10S FLANGED	–	EA	1
16	1	EXPANSION ASSEMBLY, 4" x 18" LONG	SS FLEX SECTION, FLANGED	–	EA	1
15	1	ELBOW, 4" 150# FLANGED	S.S.	–	EA	1
10	3	DIESEL HOSE ASS'Y, 4"øx 35 FT. LONG	ARCTIC GRADE	–	EA	3
6	4	CROSS ASSEMBLY, 4" CAMLOCK	S.S. AND ALUMINUM	–	EA	4
5	4	TEE ASSEMBLY, 4" CAMLOCK	S.S. AND ALUMINUM	–	EA	4
4	4	AVIATION HOSE ASS'Y, 4"øx 12 FT. LONG	LOW TEMP, ALUMINUM C's	–	EA	4
3	12	DIESEL HOSE ASS'Y, 4"øx 12FT. LONG	ARCTIC GRADE, ALUMINUM C's	–	EA	12
2	16	TANK ASSEMBLY, LEFT HAND, 30,000USG	ARCTIC KING	–	EA	16
1	16	TANK ASSEMBLY, RIGHT HAND, 30,000USG	ARCTIC KING	–	EA	16

SPI INDUSTRIES
7400 WILSON AVE.
DELTA, B.C., CANADA V4G 1E5
PHONE: (604) 946-3131
FAX (604) 940-9566

UNLESS OTHERWISE SPECIFIED
X° = ± 2°
X = ± 1/16
.X = ± .030
.XX = ± .010
.XXX = ± .005

DRAWN	DATE (YY.MM.DD)	APPROVAL	DATE (YY.MM.DD)
G.B.	07.03.28		07

TITLE: TANK FARM MANIFOLD PIPE ASSEMBLY
MARY RIVER SITE

SHEET	UNITS	SCALE	SIZE	DRAWING. No.	PART NO.	REV.
1/1	IN	NTS		TT-D-434	TT-D-434	0

➢ APPENDIX 2

AS-CON STRUCTED REPORTS (QA/QC)
PHOTOGRAPHS

MARY RIVER

CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT NAME: Fuel Farm
PROJECT NUMBER: 07C-015
OWNER: Baffinland Iron Mines
LOCATION: Mary River

I, the undersigned, a duly appointed representative of Layfield Environmental Systems Ltd. (LESL), have visually observed the soil subgrade described below, and found it to be an acceptable surface on which to install geomembrane.

This certification is based on observations of the surface of the subgrade only. No subterranean inspections or tests have been performed by Layfield Environmental Systems, and LESL makes no representations or warranties regarding conditions which may exist below the surface of the subgrade. Layfield Environmental Systems accepts no responsibility for conformance of the subgrade to this project's specifications.

The soil subgrade accepted on this date refers to its present condition. Any changes in the subgrade condition that result from the effects of inclement weather and/or other forces beyond the control of Layfield Environmental Systems and remedial work to correct the resulting deficiencies, will be the direct responsibility of the General Contractor.

Area Being Accepted: Areas under panels A1-A4 and panel B1aB2, uncompacted surface a berms, some rock & snow, generally sand

LAYFIELD ENVIRONMENTAL SYSTEMS REPRESENTATIVE:

Date: October 18, 2007
Signature:
Name: Allan McKinnon
Title: Project Supervisor

OWNERS REPRESENTATIVE:

Date: Oct 18 / 2007
Signature:
Name: ROLAND LAVOIE
Title: PROJECT MNGR
Company: BAFFINLAND IRON MINES

LAYFIELD

CERTIFICATE OF FINAL INSPECTION AND ACCEPTANCE

PROJECT NAME: Fuel Farm
PROJECT NUMBER: 07C-015 **DATE:** Oct. 18, 2007
OWNER: Baffinland Iron Mines
LOCATION: Mary River

Scope of Installation(s): THE WORK
Installed, welded/repaired/tested approx 3,880 sq. metres of Hazgard 500. Installed approx. 8,150 sq. metres of LP-16 Textile as an overlay & underlay. Lined 1 sump as per Owner. Cleaned up area of garbage upon completion

Part 1 – LAYFIELD ENVIRONMENTAL SYSTEMS LTD.

I, Allan McKinnon, a duly appointed representative of Layfield Environmental Systems Ltd. (LESL), have visually observed the installations (as outlined above), and have found the Work to be complete and free of defects and declare that the Work was completed in accordance with the project specifications, Layfield Environmental Systems' QC program and the terms and conditions of the contract.

Layfield Environmental Systems Representative:
Name: Allan McKinnon.
Title: Project Supervisor
Date: Oct. 18, 2007 **Signature:** Allan McKinnon

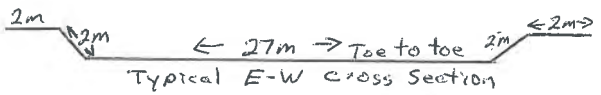
Part 2 – OWNER (or Representative)

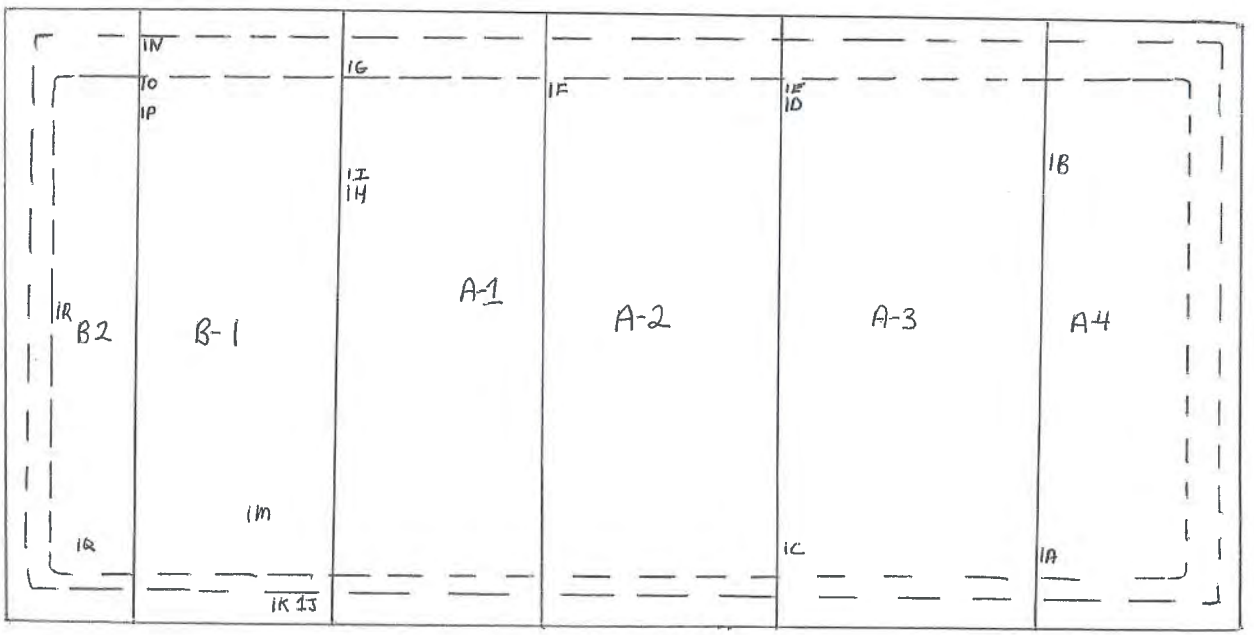
I, ROLAND LANDRY, a duly appointed representative of BAFFINLAND IRON MINES, do hereby take over and accept the installation(s) described above, and confirm that the work has been completed in accordance with the project specifications and the terms of the conditions of the contract.

I have evaluated and measured the work together with the Layfield Environmental Systems representative, and agree that the measurements shown are both true and correct, and that the installation has met our approval.

Owners Representative:
Name: ROLAND LANDRY
Title: PROJECT MANAGER
Company: BAFFINLAND IRON MINES
Date: OCT 18/07 **Signature:** Roland Landry

Comments:





N

Checklist

1. North Arrow ? ✓
2. Repair Numbers & Locations ? ✓
3. Site Dimensions ? _____
4. Slope Lengths ? _____
5. Title Blocks Completed ? _____
6. Cert. of Subgrade Acceptance ? _____
7. Cert. of Final Acceptance ? _____

Notes:

1) Seam numbers shown on testing log sheets represent the adjacent panel numbers.

LEGEND

- —— —— Change in Grade
- ═══ Liner Field Seam
- - - - - - - Anchor Trench
- P3 Panel Number
- ⊗ Pipe Penetration
- R2 Repair Number
- △ Patch
- XXX Extrusion Bead (or Weld)

LAYFIELD PLASTICS

Project Name, Client, Location, Mat'l type, etc.
Raymac
Baffinland Iron mines
Mary River Fuel Farm
Hazgard 500

SCALE: N.T.S.		PROJECT No. 07C-015
DWG: 1 OF 1		
DWN: AM	CHKD:	APP'D:
DATE: October 28, 2007		

GEOSYNTHETICS INVENTORY LOG

PROJECT NUMBER: 07C-015 PROJECT TITLE: Fuel Farm
OWNER: Baffinland Iron Mines CONTRACTOR: _____
LOCATION: Mary River SHEET NUMBER: 1 of 1

MATERIAL TYPE: (GEOMEMBRANE) GEONET (GEOTEXTILE) OTHER _____
DATE OF ARRIVAL: _____ DATE OF INVENTORY: Sept. 29, Oct. 11, 2007
UNLOADING METHOD: _____ INVENTORY BY: ASM
PRODUCT TYPE: LP-16 + Hazgard 500 CONDITION IN TRUCK: _____
MATERIAL MANUFACTURER: _____

Panel / Roll Number	Material Dimensions			QC Certificate Available Y / N	Conf. Sample Removed Y / N	Other _____	Remarks
	Length	Width	Thickness or Weight				
A-4	38.5m	19.28m	Haz 500		N		
A-3	38.5m	19.28m	Haz 500		N		
A-2	38.5m	19.28m	Haz 500		N		
A-1	38.5m	19.28m	Haz 500		N		
B-1	38.5m	18.4m	Haz 500		N		
B-2	38.5m	18.4m	Haz 500		N		
	150'	15'	LP-16				45 rolls

SUBMITTED BY: ASM
DATE: October 26 2007

LAYFIELD

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 07C-015
PROJECT TITLE: Fuel Farm
OWNER: Baffinland
CONTRACTOR:
LOCATION: Mary River
SHEET NUMBER: 1

✓ **TF - # FUSION** ______ **TX - # = EXTRUSION** ______ **TS - # = SOLVENT**

SAMPLE NUMBER	APPROX. TIME & DATE	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES: AMBIENT AIR TEMP.	TEMPERATURES: PREHEAT OR MACHINE SPEED	TEMPERATURES: EXTRUDER	TEMPERATURES: WEDGE TEMP.	TEST RESULTS: INSIDE PEEL MODE / STRENGTH	TEST RESULTS: OUTSIDE PEEL MODE / STRENGTH	TEST RESULTS: SHEAR MODE / STRENGTH	PASS OR RETEST	CHECKED BY	REMARKS
TF-1	10-8 1645	Demtech 20610	Am	-3°C	50%		825°	38/ /29/ /41 31/ / / /36	/ / / / / / / /	109/ /99	P	Am	Cloudy
TF-2	10-9 1245	Demtech 20610	Am	-5°C	50%		825°	37/ /33/ /39 31/ / / /34	/ / / / / / / /	103/ /106	P	Am	
TF-3	10-14 1235	Demtech 20610	Am	-3°C	50%		825°	39/ /31/ /40 42/ / / /36	/ / / / / / / /	111/ /108	P	Am.	Overcast
TF-4	10-15 1330	Demtech 20610	Am	-2°C	50%		825°	43/ /32/ /36 31/ / / /33	/ / / / / / / /	110/ /97	P	Am.	
								/ / / / / / / /	/ / / / / / / /	/ /			
								/ / / / / / / /	/ / / / / / / /	/ /			
								/ / / / / / / /	/ / / / / / / /	/ /			
								/ / / / / / / /	/ / / / / / / /	/ /			
								/ / / / / / / /	/ / / / / / / /	/ /			
								/ / / / / / / /	/ / / / / / / /	/ /			
								/ / / / / / / /	/ / / / / / / /	/ /			

SUBMITTED BY: Oct. 26, 2007
DATE: ASm.

LAYFIELD

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 07C-015 **PROJECT TITLE:** Fuel Farm.

OWNER: Baffinland Iron Mine **CONTRACTOR:**

LOCATION: Mary River

PASSING TRIAL SEAMS

	NO.	TIME	TECH ID
✓ FUSION	TF-1	1645	AM.
EXTRUSION			
SOLVENT			

SHEET NUMBER: 1

DATE: October 8, 2007

SEAM NUMBER	SEAM SECTION * START POINT	SEAM SECTION * FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	APPROX. LENGTH WELDED	DESTR. NUMBER	CHK'D BY	REMARKS	NON-DESTRUCTIVE TEST DATE	NON-DESTRUCTIVE CHECKED BY
A4/A3	WEOS	-EEOS	1710	-3°C	AM	50%	825°	-	37 m		AM		10-8	AM.
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
							DAILY TOTAL		37 m					

* *REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR, OR A POINT LOCATION ON THE SEAM.*

SUBMITTED BY: ASM

DATE: October 26, 2007

LAYFIELD

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 07C-015 **PROJECT TITLE:** Fuel Farm

OWNER: Baffinland Iron Mines **CONTRACTOR:**

LOCATION: Mary River

PASSING TRIAL SEAMS

	NO.	TIME	TECH ID
✓ FUSION	TF-2	1245	A.M
EXTRUSION			
SOLVENT			

SHEET NUMBER: 2

DATE: Oct. 9, 2007

SEAM NUMBER	SEAM SECTION * START POINT	SEAM SECTION * FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	APPROX. LENGTH WELDED	DESTR. NUMBER	CHK'D BY	REMARKS	NON-DESTRUCTIVE TEST DATE	NON-DESTRUCTIVE CHECKED BY
A3/A2	WEOS	EEOS	1303	-5	AM	50%	825°-	-	36.9m		AM		10-9	AM
A2/A1	WEOS	EEOS	1359	-5	AM	50%	825°-	-	36.7m		AM		10-9	AM
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
							DAILY TOTAL		73.6m					

* *REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR, OR A POINT LOCATION ON THE SEAM.*

SUBMITTED BY: ASM

DATE: October 26, 2007

LAYFIELD

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 07C-015 **PROJECT TITLE:** Fuel Farm

OWNER: Baffinland Iron Mines **CONTRACTOR:**

LOCATION: Mary River

PASSING TRIAL SEAMS

	NO.	TIME	TECH ID
✓ FUSION	TF3	1235	AM
EXTRUSION			
SOLVENT			

SHEET NUMBER: 3

DATE: October 14, 2007

SEAM NUMBER	SEAM SECTION * START POINT	SEAM SECTION * FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	APPROX. LENGTH WELDED	DESTR. NUMBER	CHK'D BY	REMARKS	NON-DESTRUCTIVE TEST DATE	NON-DESTRUCTIVE CHECKED BY
A1/B1	WEOS	EEOS	1308	-3°C	AM	50%	825°	-	353m		AM		10-14	AM.
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
							DAILY TOTAL		353m					

* *REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR, OR A POINT LOCATION ON THE SEAM.*

SUBMITTED BY: ASM

DATE: October 26, 2007

LAYFIELD

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 07C-015 **PROJECT TITLE:** Fuel Form

OWNER: Baffinland Iron Mines **CONTRACTOR:**

LOCATION: Mary River

PASSING TRIAL SEAMS

✓ FUSION

_____ EXTRUSION

_____ SOLVENT

NO.	TIME	TECH ID
TF-4	1330	AM

SHEET NUMBER: 4

DATE: October 15, 2007

SEAM NUMBER	SEAM SECTION * START POINT	SEAM SECTION * FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	APPROX. LENGTH WELDED	DESTR. NUMBER	CHK'D BY	REMARKS	NON-DESTRUCTIVE TEST DATE	NON-DESTRUCTIVE CHECKED BY
B2/B1	EEOS-WEOS		1410	-2°C	AM	50%	825 -	-	349m		AM		10-15	AM
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
								DAILY TOTAL	34.9m					

* *REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR, OR A POINT LOCATION ON THE SEAM.*

SUBMITTED BY: ASM

DATE: October 26, 2007

LAYFIELD

GEOMEMBRANE VACUUM / AIR LANCE TEST LOG

PROJECT NUMBER: 07C-015 **PROJECT TITLE:** Fuel Farm

OWNER: Baffinland Iron Mines **CONTRACTOR:**

LOCATION: Mary River **DATE:**

VACUUM BOX _____ **AIR LANCE** ✓ **SHEET NUMBER:** 1

SEAMS							
SEAM NUMBER	SEAM SECTION * FROM TO	TEST DATE	TECH ID	DEFECTS **	SEAM COMPLETE NO YES	CHK'D BY	REMARKS **
A3-A4	WEOS - EEOS	10-8	AM		✓	AM	
A3-A2	WEOS - EEOS	10-9	AM		✓	AM	
A2-A1	WEOS - EEOS	10-9	AM		✓	AM	
A1-B1	WEOS - EEOS	10-14	AM		✓	AM	
B2-B1	WEOS - EEOS	10-15	AM		✓	AM	
	-						
	-						
	-						
	-						
	-						
	-						
	-						
	-						
	-						
	-						
	-						
	-						
	-						
	-						
	-						

REPAIRS					
DEFECT CODE	TEST DATE	TECH ID	DEFECTS **	CHK'D BY	REMARKS **
1A	10-8	AM		AM	
1B	10-8	AM		AM	
1C	10-9	AM		AM	
1D	10-9	AM		AM	
1E	10-9	AM		AM	
1F	10-9	AM		AM	
1G	10-14	AM		AM	
1H	10-14	AM		AM	
1I	10-14	AM		AM	
1J	10-14	AM		AM	
1K	10-14	AM		AM	
1L	10-14	AM		AM	
1M	10-14	AM		AM	
1N	10-15	AM		AM	
1O	10-15	AM		AM	
1P	10-15	AM		AM	
1Q	10-15	AM		AM	
1R	10-17	AM		AM	

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM

** RECORD QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS

SUBMITTED BY: ASM

DATE: October 26, 2007

LAYFIELD

GEOMEMBRANE DEFECT / REPAIR LOG

PROJECT NUMBER: 07C-015 **PROJECT TITLE:** Fuel Farm

OWNER: Baffinland **CONTRACTOR:**

LOCATION: Mary River **SHEET NUMBER:** 1

DEFECT CODE	LOG DATE	DEFECT LOCATION		DEFECT TYPE	REPAIR TYPE	WELD TECH.	REPAIR DATE	REMARKS **	TEST DATE	CHECKED BY
		SEAM OR PANEL NO.	DEFECT LOCATION DESCRIPTION							
1A	10-8	Seam A4-A3	11.4m from WEOS	WR	P	AM	10-8		10-8	AM
1B	10-8	Seam A4-A3	28.1m from WEOS	WR	P	AM	10-8		10-8	AM
1C	10-9	Seam A3-A2	9m from WEOS	XS		AM	10-9	welded flap	10-9	A.M
1D	10-9	Seam A3-A2	30.1m from WEOS	WR	P	AM	10-9		10-9	A.M
1E	10-9	Seam A3-A2	32.3m from WEOS	WR	P	AM	10-9		10-9	A.M
1F	10-9	Seam A2-A1	east toe	XS		AM	10-9	welded flap.	10-9	A M
1G	10-14	Seam A1-B1	3.8m from EEOS	WR	P	AM	10-14		10-14	A.M.
1H	10-14	Seam A1-B1	22.1m from WEOS	WR	P	AM	10-14		10-14	AM
1I	10-14	Seam A1-B1	23.6m from WEOS	WR	P	AM	10-14		10-14	A M.
1J	10-14	Panel B1	West crest	SR	P	AM	10-14	2.3m from S A1-B1	10-14	AM
1K	10-14	Panel B1	West crest	SR	P	AM	10-14	3.6m from S A1-B1	10-14	AM
1L	10-14	Panel B1	22.1m from W edge	SR	P	AM	10-14	4.1m N of SA1-B1	10-14	AM
1m	10-14	Panel B1	8m from W edge	S.R.	P	AM	10-14	12.2m N of SA1-B1	10-14	AM
1N	10-15	Seam B1-B2	East crest	WR		AM	10-15	welded flap	10-15	AM
1O	10-15	Seam B1-B2	East toe	WR	P	AM	10-15		10-15	A.M.
1P	10-15	Seam B1-B2	6.2m from EEOS	WR		AM	10-15	welded flap	10-15	A.M
1Q	10-15	Panel B2	7m from N edge	SR	P	AM	10-15	4m from W toe	10-15	AM
1R	10-17	Panel B2	.8m from N toe	Sump		AM	10-17	13m from E toe	10-17	AM

DEFECT TYPE: AD - ANIMAL RELATED DAMAGE; B - UNDISPERSED RESIN BEAD; BO - FUSION WELDER BURN; BS - BOOT/SKIRT FROM FML PENETRATION; CO - CHANGE OF OVERLAP; CR - CREASE; D - INSTALLATION DAMAGE; DS-# - DESTRUCTIVE TEST NUMBER; EE - EARTHWORK EQUIPMENT DAMAGE; EXT - EXTENSION; FM - FISHMOUTH; FS - FAILED SEAM LENGTH; FTS - FIELD TEST STRIP; HT - HEAT TACK BURN; IO - INSUFFICIENT OVERLAP (UNDER SPEC.); MD - MANUFACTURER/DELIVERY DAMAGE; PT - PRESSURE TEST CUT; SI - SOIL SURFACE IRREGULARITY; SL - SLAG ON TEXTURED SHEET; T - THREE PANEL INTERSECTION; VL - VACUUM TEST LEAK; WR - WRINKLE; WS - WELDER RESTART; OTHER: SR - snow removal

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND/WELD

PASSING TRIAL SEAMS		
NO.	TIME	TECH ID.

** COLUMNS TO BE USED BY THE PROJECT SUPERVISOR OR LEAD TECHNICIAN ONLY.

SUBMITTED BY: ASM

DATE: Oct. 26, 2007

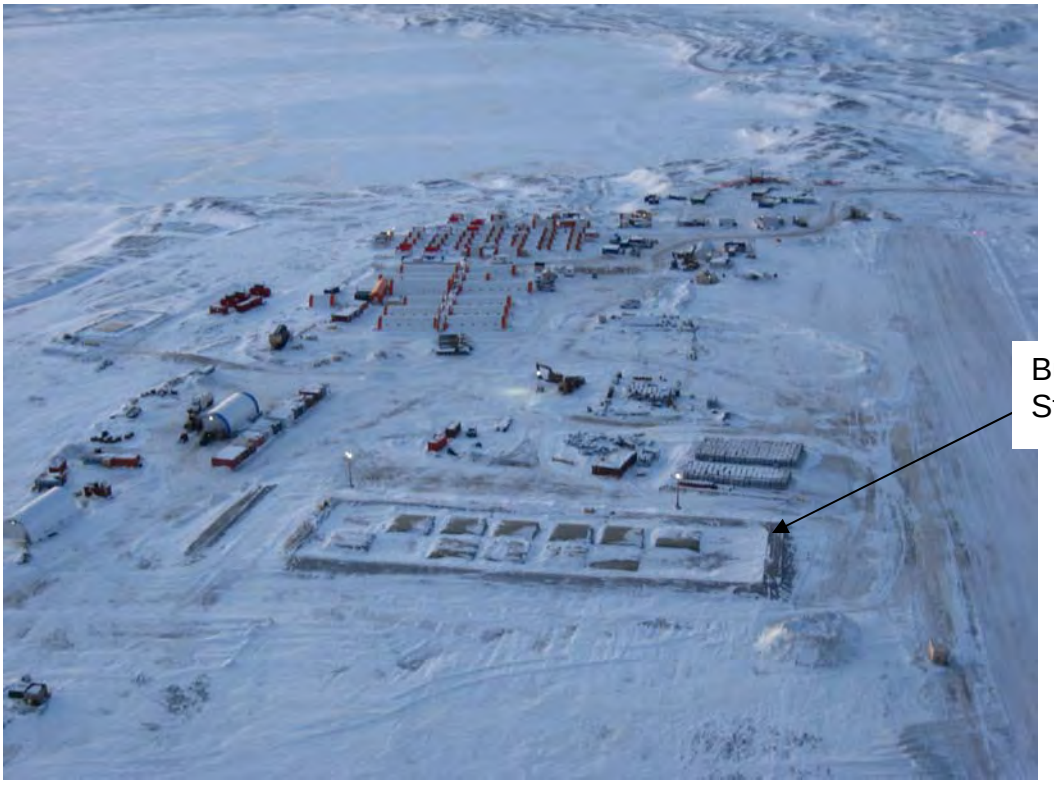


Photo 1: Mary River aerial view. The Bulk Fuel Storage Facility is seen above.


Photo 2: The slopes of the berms are prepared as per the design.

Photo 3: The base of the containment area is being prepared.

Photo 4: The slopes and the base are ready for the installation of the liner.

Photo 5: The liner material is shown above.


Photo 6: The liner is being installed within the containment and slopes.

Photo 7: Liner is installed over the slopes. The slopes and the base of the liner will then be protected with appropriate thickness of granular material.

Photo 8: Granular material is being placed over the liner.

Photo 9: Appropriate amount of cover is being placed over the liner.

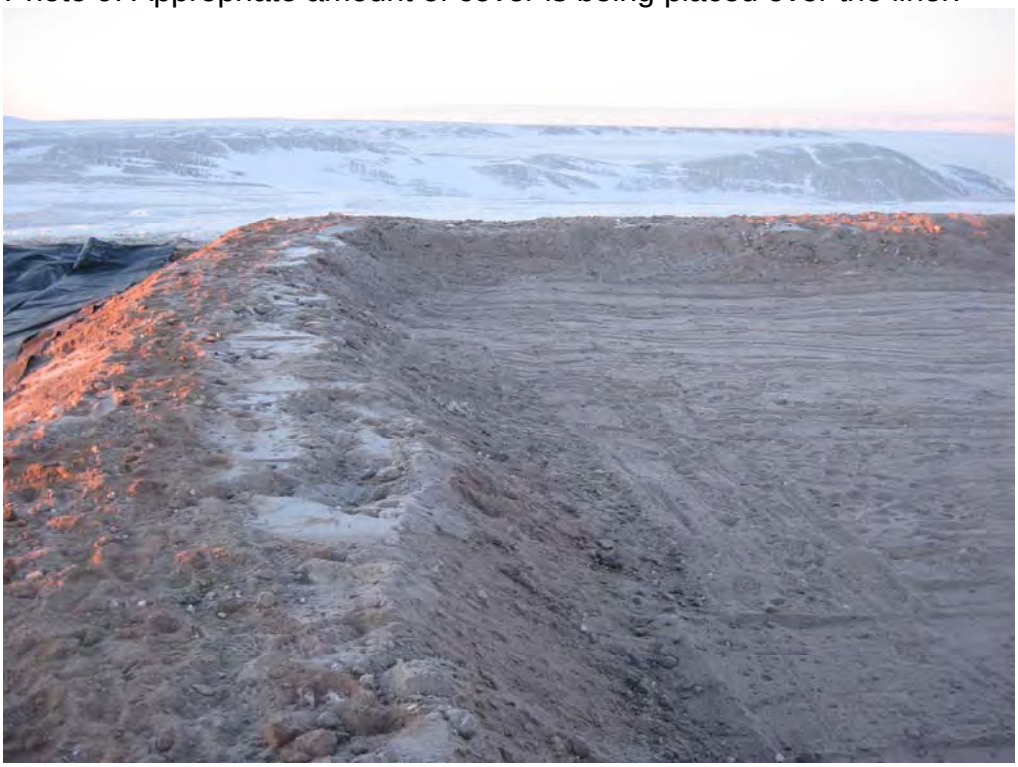


Photo 10: Completed containment is seen above.

Photo 11: Fuel bladders are placed at their appropriate locations as per the design.

Photo 12: Fuel dispensing area is being prepared.

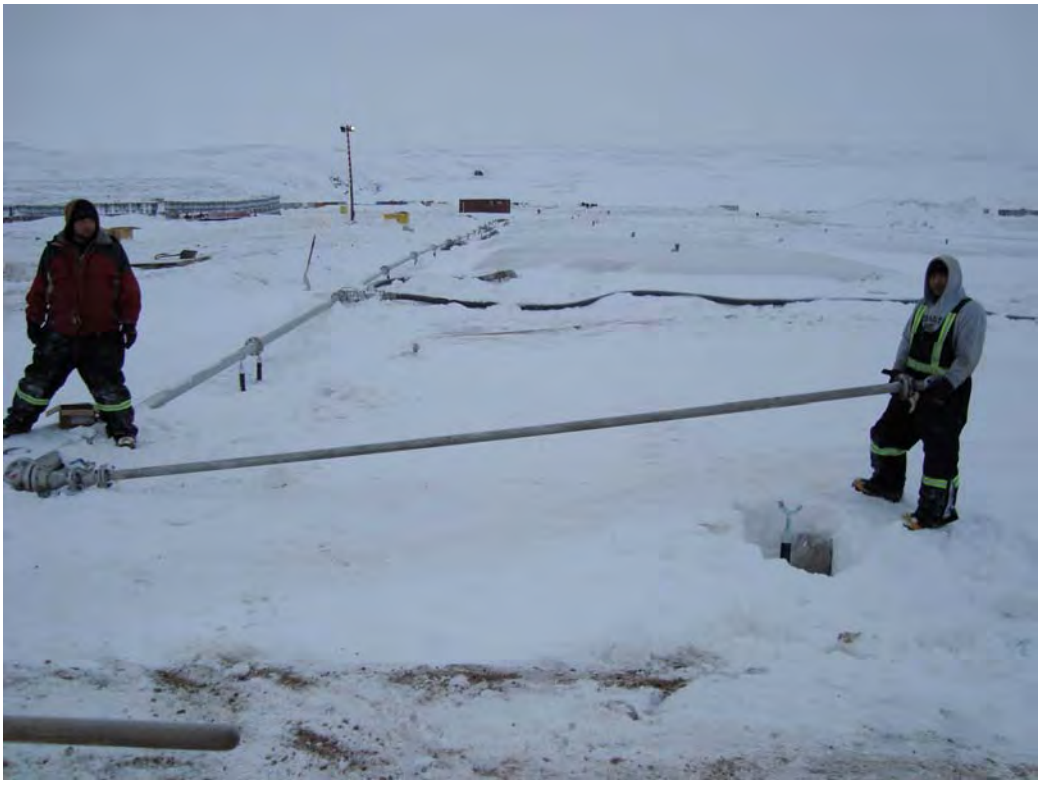


Photo 13: Mechanical crew installing the piping as per the design by SEI.

Photo 14: Bulk Fuel Storage Facility at completion.

February 04, 2009

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
P.O. Box 119, Gjoa Haven NU X0B 1J0

NWB File: 2BB-MRY0710

Dear Ms. Beaulieau:

Re: Baffinland Iron Mines Corporation (BIM) – Submission of Milne Inlet Tote Road – As-Built Final Alignment and Water Crossing Installation Locations Report

Under Part J, Item 4, of Baffinland Iron Mines Corporation (BIM) Water Licence 2BBMRY0710, there is a requirement to submit as-built plans and drawings for all construction works.

Enclosed, herewith, is a copy of the subject report prepared by Knight Piésold Ltd. that describes the as-built final alignment and location of water crossing installations for the Milne Inlet Tote Road.

We trust that this submittal satisfies your current requirements. Should you have any questions, please do not hesitate to contact Cheryl Wray or Jim Millard, Environmental Superintendents at 403-450-8843 or by e-mail at cheryl.wray@bafffinland.com or jim.millard@baffinland.com.

Yours truly,

Baffinland Iron Mines Corporation

Per:

David L. Putnam, P.Eng.
Director of Environment

cc. J. Millard, C. Wray, D. Chubb, D. McCann, A. Keim, INAC

Attach:
Milne Inlet Tote Road - Summary of As-Built Final Alignment and Water Crossing Locations, prepared by Knight Piésold Ltd for Baffinland Iron Mines Corporation, dated February 3, 2009.

Knight Piésold
CONSULTING

File No.:NB102-181/13-A.01
Cont. No.:NB09-00084

1650 Main Street West
North Bay, ON Canada P1B 8G4

Tel: 705.476.2165
Fax: 705.474.8095
www.knightpiesold.com

February 3, 2009

Mr. David Putnam

Director of Environment
Baffinland Iron Mines Corporation
1016 - 120 Adelaide Street West
Toronto, Ontario
Canada, M5H 1T1

Dear David,

Re: Milne Inlet Tote Road - Summary of As-Built Final Alignment and Water Crossing Installation Locations

The Mary River Project (the Project) is an advanced iron ore exploration project located in the North Baffin region of Baffin Island, Nunavut. The Mary River camp coordinates, which are central to the Project area, are approximately Latitude 71° 19' 35" North and Longitude 79° 22' 30" West.

Baffinland Iron Mines Corporation (Baffinland) is undertaking advanced exploration at the Project site, consisting of delineation drilling of the iron ore deposits, geotechnical drilling for proposed future infrastructure, baseline environmental studies and the completion of a Bulk Sampling Program. The purpose of the Bulk Sampling Program, which was completed in fall 2008, was to confirm the quality and marketability of the Mary River iron ore. Approximately 112,000 tonnes of bulk sample ore was transported to Milne Inlet using a fleet of conventional highway tri-axle trucks with pup trailers

As part of the Bulk Sampling Program, upgrades to the original Milne Inlet Tote Road (Tote Road) were necessary to facilitate the transport of the ore from the Mary River iron ore deposit to the port at Milne Inlet located approximately 100 km to the northwest, as shown on Figure 1. The original Tote Road was established in the 1960s and consisted of a track levelled over the natural ground surface. Numerous water crossings were installed along the original road alignment constructed of bolt-together culverts or, more commonly, 45 gallon barrels with their ends removed. These crossings were in various states of disrepair. The upgrades generally included upgrading of the road embankment and installation of water crossings.

This letter report presents the as-built alignment and water crossing installation locations. This information was required by Part J4(i) of License 2BB-MRY010 Type B the Nunavut Water Board's licence issued for the Mary River Project.

Road Construction

The Tote Road was widened from the existing width of approximately 5 m to between 8 to 10 m to accommodate the truck traffic. Pullouts or passing areas (localized areas of road approximately 16 to 20 m wide) were constructed as required to allow traffic to pass. Deviations from the original alignment were only completed for archaeological, environmental or safety reasons. All deviations were minimized. The upgraded Tote Road alignment and profile are shown on Drawing Nos. 300 and 310 respectively.

Road upgrades varied depending upon the foundation conditions that were encountered. Upgrades ranged from minor grading and levelling of the natural ground to placement of over 1 metre of fill in areas of ice rich or thaw susceptible ground. As is standard practice in permafrost regions, only very limited foundation preparation was completed to minimize thermal disturbance. The vast majority of the upgraded road was directly on the original road.

Geotextile was used under select sections of the road embankment where required, to provide additional foundation strength. In these cases, a combination of woven geotextile and geogrid were installed directly on the original road surface prior to placement of road embankment fill.

Material used for road embankment construction was typically free draining sand and gravel. Ice and snow were removed from the fill material as much as practicable. Material with high fines content was avoided due to its higher frost susceptibility. The upgraded road was compacted by routing the truck traffic over the entire road surface. Additionally, select sections of the road embankment were compacted using a vibratory roller.

Borrow Areas

Material used to construct the road embankment and as culvert backfill was obtained from local borrow areas. The three primary borrow areas were the Milne Inlet Borrow Area, the Mid-Way Borrow Area and the Mary River Borrow Area. In addition to these areas, borrow material was also obtained from areas within 30 m of the Tote Road. The primary borrow sources are shown on Drawing No. 400.

The borrow areas were typically excavated to the top of the permafrost. Drainage was provided from the borrow areas where possible. The side slopes were generally graded to a slope of 1H:1V or flatter; however, additional grading and contouring will be completed as part of ongoing progressive reclamation.

Water Crossing Installations

During the initial road investigation, drainage locations were confirmed along the Tote Road. The drainage crossings labelled numerically starting with CV or BG (i.e. CV001 and BG01) were categorized into five main categories based on catchment area, geometry and estimated peak flows: Extra-Small, Small, Medium, Large and Extra-Large. Each crossing classified as Small through Extra-Large required structures to pass the design flows. Culverts or composite; culvert and overflow swale arrangements were constructed at the majority of these crossings (i.e. Small to Large). A system using reinforced sea containers, culverts and overflow swales was used for the Extra-Large drainage crossings. Culverts and pipes were installed in the Extra-Small crossings as required to maintain access along the road. A summary of the installed water crossings is presented on Table 1 and the crossing locations are shown on Drawing No. 400.

Foundation preparation for the culvert and sea container installations generally involved excavation and grading to prepare a suitable base onto which the structures were installed. Each crossing regulated by the Department of Fisheries and Oceans (DFO) had at least one culvert embedded a minimum of 10% of the diameter into the bed of the crossing to provide flow for fish passage during low flow conditions. The individual culvert lengths were coupled together to accommodate the road design width and cross-section. The completed culverts ranged in length from 12 m to over 21 m. Backfill for each culvert was placed in specified lifts and compacted using hand compaction equipment. Riprap erosion protection was placed at the inlet to select water crossings.

The Small, Medium and Large water crossings were installed in accordance with the design intent and as such the design drawings are generally reflective of the as-built conditions. The design drawings for these water crossings are included in Appendix A. As-constructed drawings for the Extra-Large water

crossings CV128, BG50, CV217 and CV223 are presented on Drawing Nos. 441, 442, 443 and 444 respectively.

Quality Assurance / Quality Control

Representatives from Knight Piésold monitored the Quality Assurance / Quality Control (QA/QC) program for the road upgrades. This work generally consisted of:

- Technical direction of road and water crossing construction
- Environmental monitoring - as required by the Department of Fisheries and Oceans (DFO)
- Assistance with locating and marking borrow source
- Assistance with protecting the known archaeological sites along the alignment

Construction Schedule

Upgrades to the Tote Road started in August 2007 and the majority of the work was complete by November 2008. Transportation of the Bulk Sample from Mary River to Milne Inlet was completed by early October 2008. The remaining tasks, which mostly consist of compensation works as required by the DFO, are planned to be completed in 2009. The regrading and contouring works will be completed as part of ongoing reclamation.

Yours truly,
KNIGHT PIESOLD LTD.

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

Reviewed: _____
Kevin E. Hawton, P.Eng.
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
K.E. HAWTON
FEB 03 2009
NWT/NU

PERMIT TO PRACTICE
KNIGHT PIESOLD LTD.
Signature _____
Date Feb 3 / 2009
PERMIT NUMBER: P 547
The Association of Professional Engineers,

Approved: _____
Ken D. Embree, P.Eng.
Managing Director

Knight Piésold
CONSULTING

Attachments:

Table 1 Rev 2	Water Crossing Installation Summary
Figure 1 Rev 0	Project Location Map
Drawing 300 Rev 2	Road Upgrades - Plan
Drawing 310 Rev 2	Road Upgrades - Profile
Drawing 400 Rev 2	Drainage Crossing Locations Plan (All Crossings)
Drawing 441 Rev 2	Extra-Large Crossing CV128 - Plan and Sections
Drawing 442 Rev 2	Extra-Large Crossing BG50 - Plan and Sections
Drawing 443 Rev 2	Extra-Large Crossing CV217 - Plan and Sections
Drawing 444 Rev 2	Extra-Large Crossing CV223 - Plan and Sections
Appendix A	Design Drawings Issued for Construction

Copy To: Derek Chubb, Baffinland Iron Mines Corporation
Richard (Dick) Matthews, Baffinland Iron Mines Corporation

/cap

Knight Piésold
CONSULTING

TABLE 1

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

WATER CROSSING INSTALLATION SUMMARY

Print Feb/03/09 14:48:19

Crossing Number	Crossing Size Classification	Original Chainage [1] (m)	Upgraded Chainage (m)	Date Installed		Number of Culverts Installed			
				Started	Completed	1.2 m Diam.	1.0 m Diam.	0.5 m Diam.	Sea Containers
CV183	Extra-Large	0+145	NA	Pending					
CV181	Medium	0+583	NA	Pending					
CV176	Small	2+638	A2+350	Pending					
CV170	Small	5+267	A4+987	2008-07-17	2008-07-17		1		
CV166	Small	6+056	NA	2008-10-05	2008-10-10		1	1	
CV165	Small	7+038	A6+748	See Note 2					
CV159	Extra-Small	8+407	A8+097	2007-08-26	2007-08-27		1		
CV157	Small	8+960	A8+660	2007-08-28	2007-08-30		1	1	
CV156	Extra-Small	9+223	NA	See Note 3					
CV154	Small	9+570	A9+248	2007-09-02	2007-09-02		1	1	
CV153	Small	10+218	A9+845	2007-09-02	2007-09-03			5	
CV152	Small	10+280	A9+937	2007-09-04	2007-09-04			5	
CV151	Small	10+460	A10+100	2007-09-05	2007-09-05			4	
CV146	Small	11+348	A11+014	2007-09-06	2007-09-06			5	
CV129	Large	15+650	A15+316	2007-09-16	2007-09-17	1			
CV128	Extra-Large	17+486	A17+115	2007-09-18	2007-09-23				20
CV125	Small	20+447	A19+938	2008-10-07	2008-11-07		1	0 (+1)	
CV120	Small	23+515	A23+011	2007-09-26	2007-09-27		1	3	
CV119	Small	24+264	A23+746	2008-07-15	2008-07-15		1		
CV117	Small	27+073	A26+580	2008-05-29	2008-05-29		1	1	
CV115	Small	27+686	A27+199	2008-05-28	2008-05-29		1	1	
CV114	Medium	29+647	A29+145	2007-09-29	2007-09-29		1		
CV113	Small	30+655	A30+152	2007-09-30	2007-09-30			4	
CV112	Small	31+450	A30+950	2008-05-31	2008-05-31	1		1	
CV111	Medium	31+990	A31+493	2007-09-28	2007-09-28		1		
CV202	Small	32+825	A32+332	2008-06-02	2008-06-02		1		
CV106	Small	33+170	A32+684	2008-06-02	2008-06-02		1		
CV104	Medium	33+794	A33+306	2007-10-01	2007-10-01	2			
CV203	Small	34+153	A33+642	2008-06-04	2008-06-05		1	2	
CV102	Small	36+028	A35+541	2007-10-02	2007-10-02		1	3	
CV099	Large	37+840	A37+336	2007-10-03	2007-10-04	3	0 (+1)	0 (+2)	
				2008-10-14	2008-10-15				
CV098	Medium	38+525	A38+055	2008-06-08	2008-06-09		1	0 (+1)	
CV094	Large	41+613	A41+109	2008-06-16	2008-06-17	1	0 (+1)		
				2008-10-08	2008-10-09				
CV093	Small	42+216	A41+694	2008-06-21	2008-06-21		1	1	
CV092	Medium	42+949	A42+432	2008-06-23	2008-06-24		3		
CV091	Medium	42+961	A42+432	See Note 4					
CV090	Small	44+832	A44+363	2008-06-25	2008-06-25		1	1	
CV087	Medium	46+223	A45+734	2008-06-27	2008-06-27	2		1	
CV086	Small	46+300	NA	2008-10-09	2008-10-11		1		
CV085	Small	46+422	A45+934	2008-06-28	2008-06-29		1		
CV083	Small	47+643	A47+174	2008-06-30	2008-07-01		1		
CV082	Small	49+655	A49+170	2008-07-05	2008-07-05			4	
CV079	Large	50+600	A50+061	2008-07-07	2008-07-08	2		0 (+2)	
				2008-10-15	2008-10-16				
CV078	Large	51+171	A50+692	2008-07-09	2008-07-09	1			
				2008-08-13	2008-08-13		0 (+1)		
				2008-10-16	2008-10-17		0 (+2)		
CV076	Small	53+028	A52+546	2008-02-26	2008-02-27		1		
CV075	Small	53+337	A52+828	2008-02-27	2008-02-29			5	
CV072	Large	53+878	A53+343	2008-02-29	2008-03-05	3			
CV060	Medium	58+856	A58+112	2008-02-25	2008-02-27		2		
CV059	Small	59+960	A59+215	2008-01-11	2008-01-13			4	
CV058	Small	60+523	A59+772	2008-02-11	2008-02-12	1		1	
CV057	Small	60+712	A59+965	2008-02-24	2008-02-25			3	
BG50	Extra-Large	62+804	A62+078	2007-10-23	2007-10-30	2			13
CV049	Large	63+302	A62+534	2008-03-09	2008-03-10	2			
CV048	Large	64+312	A63+552	2008-03-06	2008-03-09	2			
CV047	Small	66+426	A65+681	2008-03-09	2008-03-13	2			
CV046	Small	66+490	A65+737	2008-03-09	2008-03-24		1	4	

Knight Piésold
CONSULTING

TABLE 1

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

WATER CROSSING INSTALLATION SUMMARY

Print Feb/03/09 14:48:19

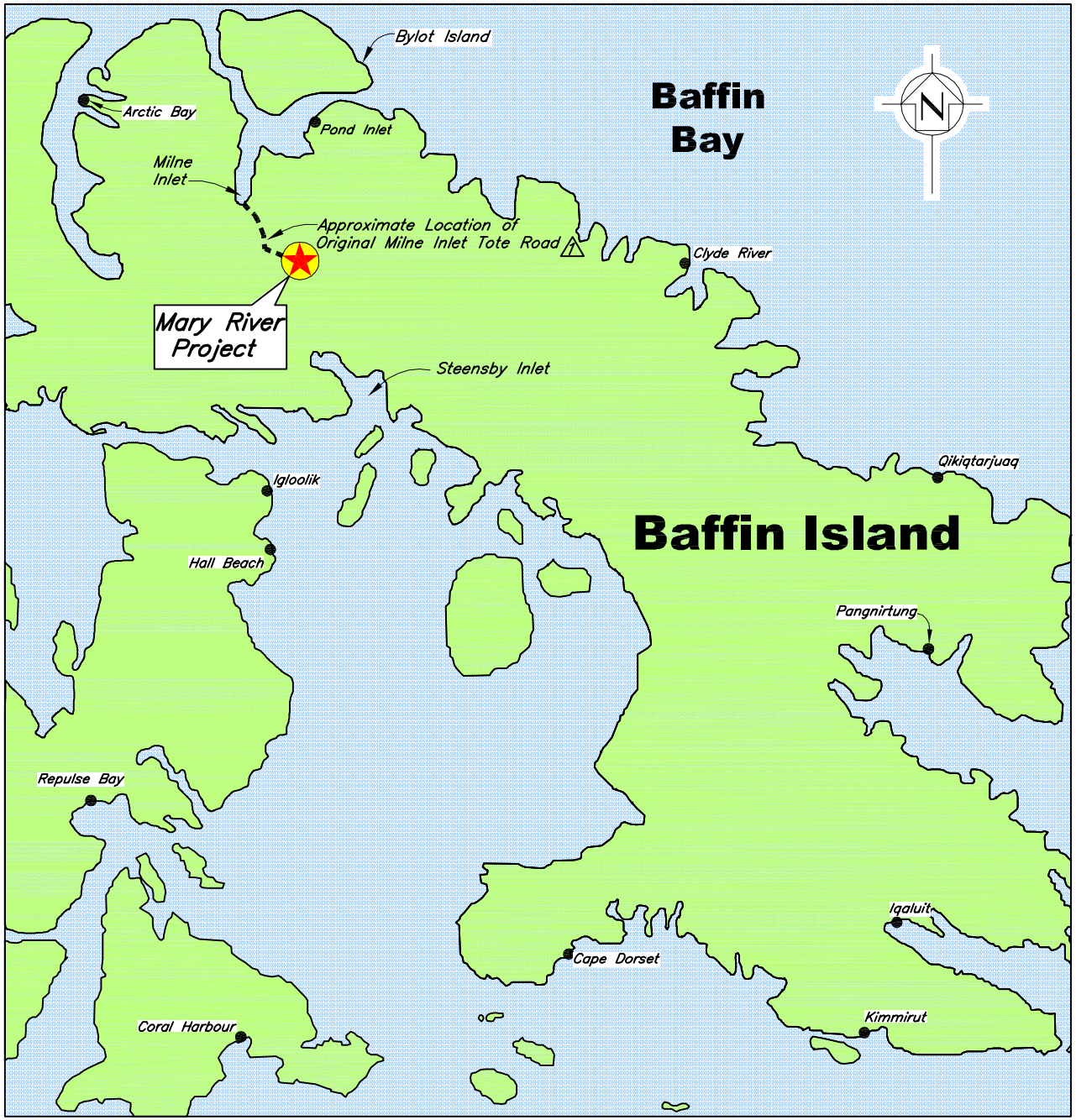
Crossing Number	Crossing Size Classification	Original Chainage [1] (m)	Upgraded Chainage (m)	Date Installed		Number of Culverts Installed			
				Started	Completed	1.2 m Diam.	1.0 m Diam.	0.5 m Diam.	Sea Containers
CV043	Small	67+469	A66+735	2008-03-21	2008-03-25		1	2	
CV040	Large	72+263	A72+049	2008-03-26	2008-03-29	2 (+1)			
				2008-10-17	2008-10-17				
CV030	Small	77+506	A77+434	2008-03-27	2008-04-02		1	1	
BG32	Large	78+161	A78+128	2008-04-02	2008-04-04	2			
CV215	Small	79+572	A79+533	2008-04-04	2008-04-05			4	
CV217	Extra-Large	79+915	A79+829	2008-04-05	2008-04-17	3			14
CV216	Large	80+646	A80+576	2008-06-05	2008-06-08	3			
CV023	Small	83+147	A83+092	2008-05-28	2008-05-30		1		
BG30	Small	84+636	A84+539	2008-05-18	2008-05-21		1		
BG29	Small	84+805	A84+702	2008-05-21	2008-05-22		1		
BG27	Small	86+609	A86+492	2008-05-16	2008-05-18			3	
BG24	Medium	87+710	A87+608	2008-05-13	2008-05-15	3 (+1)			
				2008-10-18	2008-10-19				
BG17	Large	90+167	A90+018	2008-05-05	2008-05-09	2			
BG16	Extra-Small	90+218	NA	See Note 5					
BG04	Medium	94+148	A93+991	2008-05-03	2008-05-05	2			
CV001	Small	94+728	A94+350	2008-05-04	2008-05-08		1	2	
CV223	Extra-Large	97+155	NA	2008-04-14	2008-05-03	5			16
CV224	Medium	97+758	A97+570	2008-05-01	2008-05-04		2		
CV225	Large	98+989	NA	2007-09-21	2007-09-21	1 (+1)			
				2008-10-19	2008-10-20				
BG01	Medium	99+672	NA	2007-09-20	2007-09-20	1 (+2)			
				2008-10-20	2008-10-21				
CV186	Small	102+812	NA	2008-04-24	2008-04-29		1	2	
CV187	Small	103+078	NA	2008-05-06	2008-05-07		1	1	
				2008-06-13	2008-06-14				
CVD1-1	NA	See Note 7	NA	2008-09-24	2008-09-26		1		
CVD1-3	NA	See Note 7	NA	2008-09-22	2008-09-22		1		
CVD1-4	NA	See Note 7	NA	2008-09-24	2008-09-24		1		
CVD1-5	NA	See Note 7	NA	2008-09-17	2008-09-17	1	1		
CVD1-5B	NA	See Note 7	NA	2008-09-21	2008-09-21		1		
CVD1-6	NA	See Note 7	NA	2008-09-18	2008-09-18		1		
CVD1-7	NA	See Note 7	NA	2008-09-18	2008-09-18		1		
CVD1-8	NA	See Note 7	NA	2008-09-19	2008-09-19		1		
CVD1-9	NA	See Note 7	NA	2008-09-19	2009-09-19		1		
CVD1-10	NA	See Note 7	NA	2008-09-20	2008-09-20		1		
CVD1-11	NA	See Note 7	NA	2008-09-19	2008-09-19		1		
CVD1-12	NA	See Note 7	NA	2008-09-20	2008-09-20		1		
CVD1-13	NA	See Note 7	NA	2008-09-21	2008-09-21		1		
CVD1-14	NA	See Note 7	NA	2008-09-23	2008-09-24		1		
CVSSR-1	NA	See Note 8	NA	NA	NA				
CVSSR-2	NA	See Note 8	NA	NA	NA				

I:\102-00181-13\Assignment\Correspondence\NB09-00084 - Road Summary Letter (SS NB09-00042)\[Table 1 - Culvert Summary, Rev 2.xls]Table 1

NOTES:

1. THE ORIGINAL CHAINAGE IS BASED ON THE ORIGINAL TOTE ROAD ALIGNMENT AND IS FOR IDENTIFICATION PURPOSES ONLY.
2. EXISTING CULVERTS REMAINING AT CV165.
3. CROSSING CV156 WAS AVOIDED.
4. CROSSING CV091 AND CV092 WERE COMBINED INTO ONE CROSSING.
5. COMPLETED BUT DATE NOT AVAILABLE.
6. # (+#) THE FIRST NUMBER INDICATES THE ORIGINAL DESIGN QUANTITY AND THE NUMBER IN PARENTHESES INDICATES THE NUMBER OF ADDITIONAL CULVERTS INSTALLED.
7. CROSSINGS CVD1-1 TO 14 ARE LOCATED ON THE ROAD TO DEPOSIT NO. 1.
8. CROSSINGS CVSSR-1 TO 2 ARE LOCATED ON THE SALT STATION ROAD (DEPOSIT NO. 1).
9. "NA" INDICATES NO DATA AVAILABLE.
10. SOME CROSSINGS WERE INSTALLED IN STAGES, THE CONSTRUCTION DATES FOR EACH STAGE ARE SHOWN.
11. THE GENERAL DIMENSIONS OF THE SEA CONTAINERS WERE 2.4M WIDE, 2.6M HIGH AND 6.1M LONG.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
2	FEB03'09	ISSUED WITH CONT. No. NB09-00084	CAP	KEH	KDE
1	JAN23'09	ISSUED WITH CONT. No. NB09-00042	CAP	KEH	KDE
0	DEC19'08	ISSUED WITH CONT. No. NB08-01211	CAP	KEH	KDE



LEGEND:

Water

Existing Community

Scale (Approx.) 65 32.5 0 65 130 195 260 325 Km

Baffinland

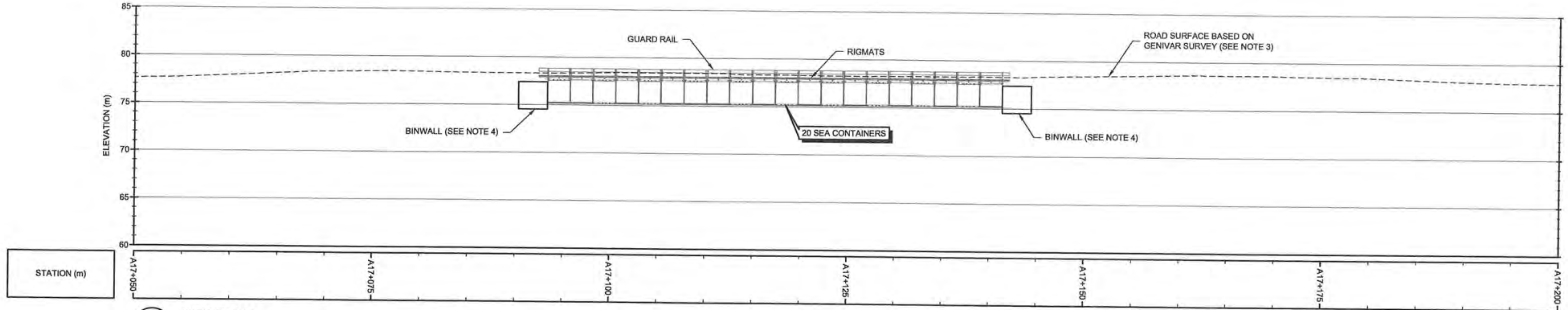
MARY RIVER PROJECT – BULK SAMPLING PROGRAM

PROJECT LOCATION MAP

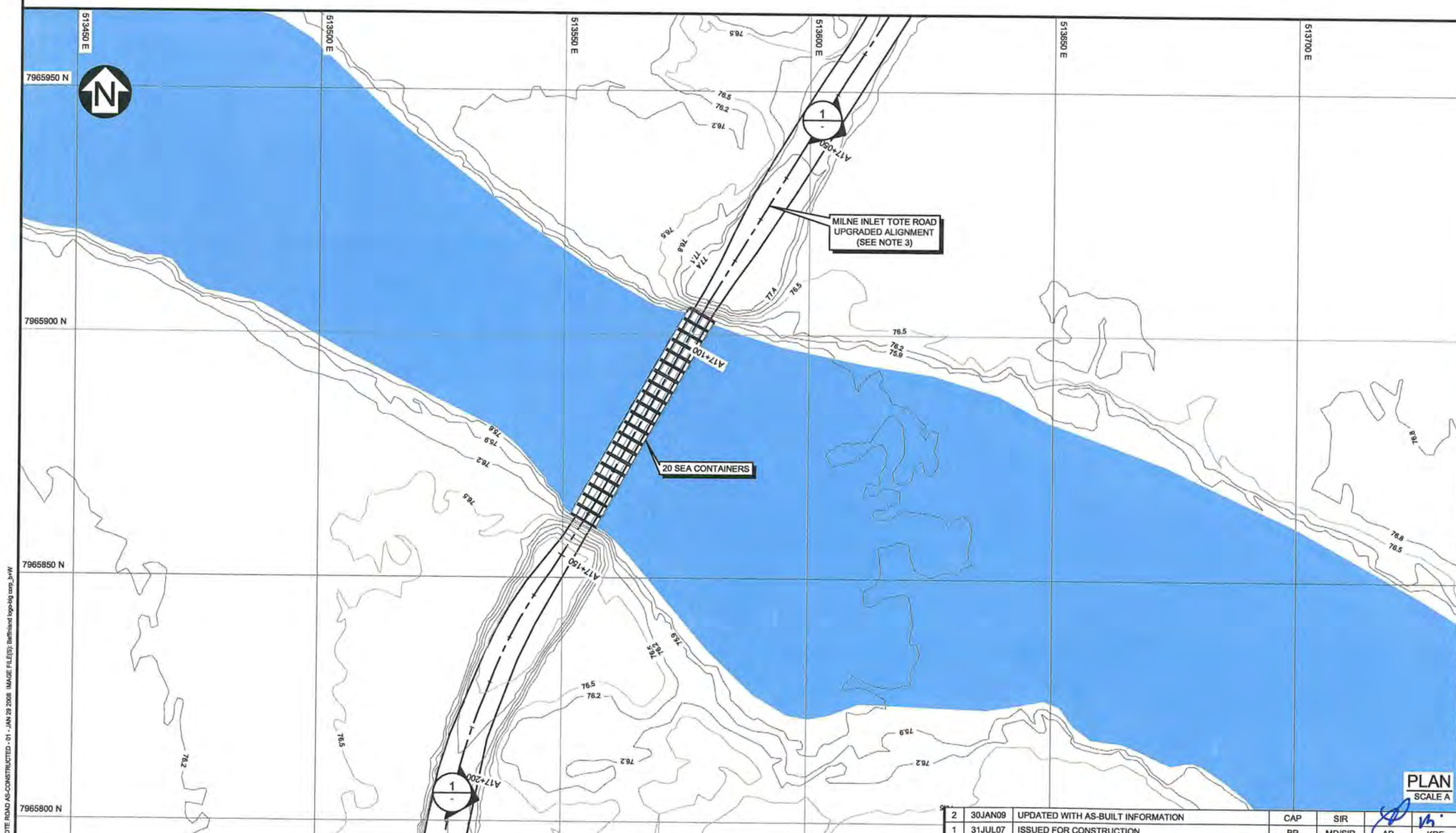
Knight Piésold CONSULTING

P/A NO.	REF.	REV.
NB102-181/13	NB09-00084	0

FIGURE 1



1 SECTION
SCALE B



PLAN
SCALE A

AS-CONSTRUCTED

LEGEND:

- WATER
- MAJOR CONTOUR
- MINOR CONTOUR
- ROAD SURFACE BASED ON GENIVAR (SEE NOTE 3)
- ROAD ALIGNMENT (SEE NOTE 3)

NOTE(S):

1. COORDINATE GRID IS UTM (NAD83) ZONE 17 AND IS IN METRES.
2. CONTOURS BASED ON LIDAR SURVEY COMPLETED NOVEMBER 2008. CONTOUR INTERVAL IS 0.3 METRES.
3. AS-CONSTRUCTED ROAD ALIGNMENT PROVIDED BY GENIVAR DATED JULY 2008.
4. BINWALL LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND WERE NOT SURVEYED.

SCALE A: 10 5 0 10 20 30 40 50 m
SCALE B: 5 2.5 0 5 10 15 20 25 m

Knight Piésold CONSULTING

Baffinland Iron Mines Corporation

MARY RIVER PROJECT - BULK SAMPLING PROGRAM

EXTRA-LARGE CROSSING CV128
PLAN AND SECTIONS

P/A NO.	DRG. NO.	REV
NB102-181/10	441	2

REFERENCE DRAWINGS

DRG. NO.	DESCRIPTION

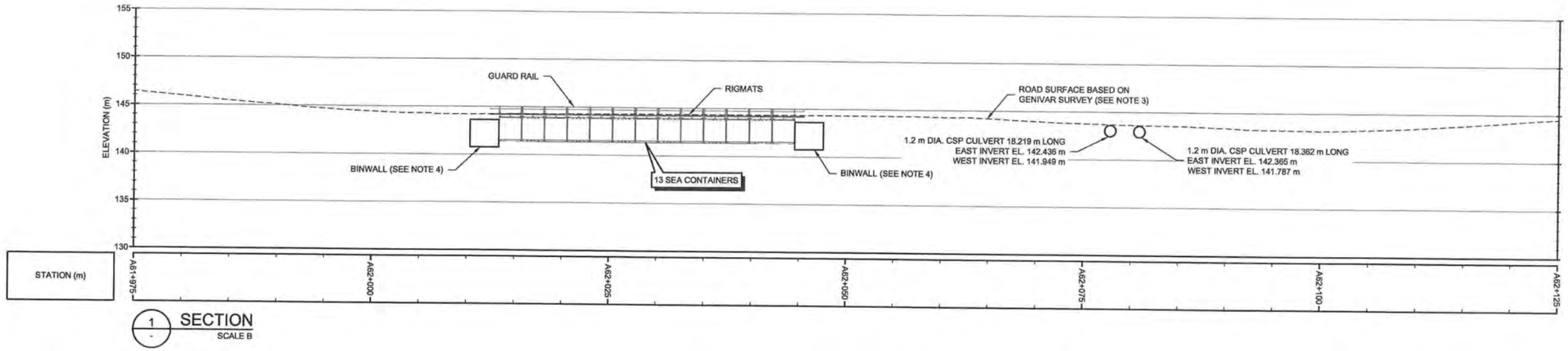
REVISIONS

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D

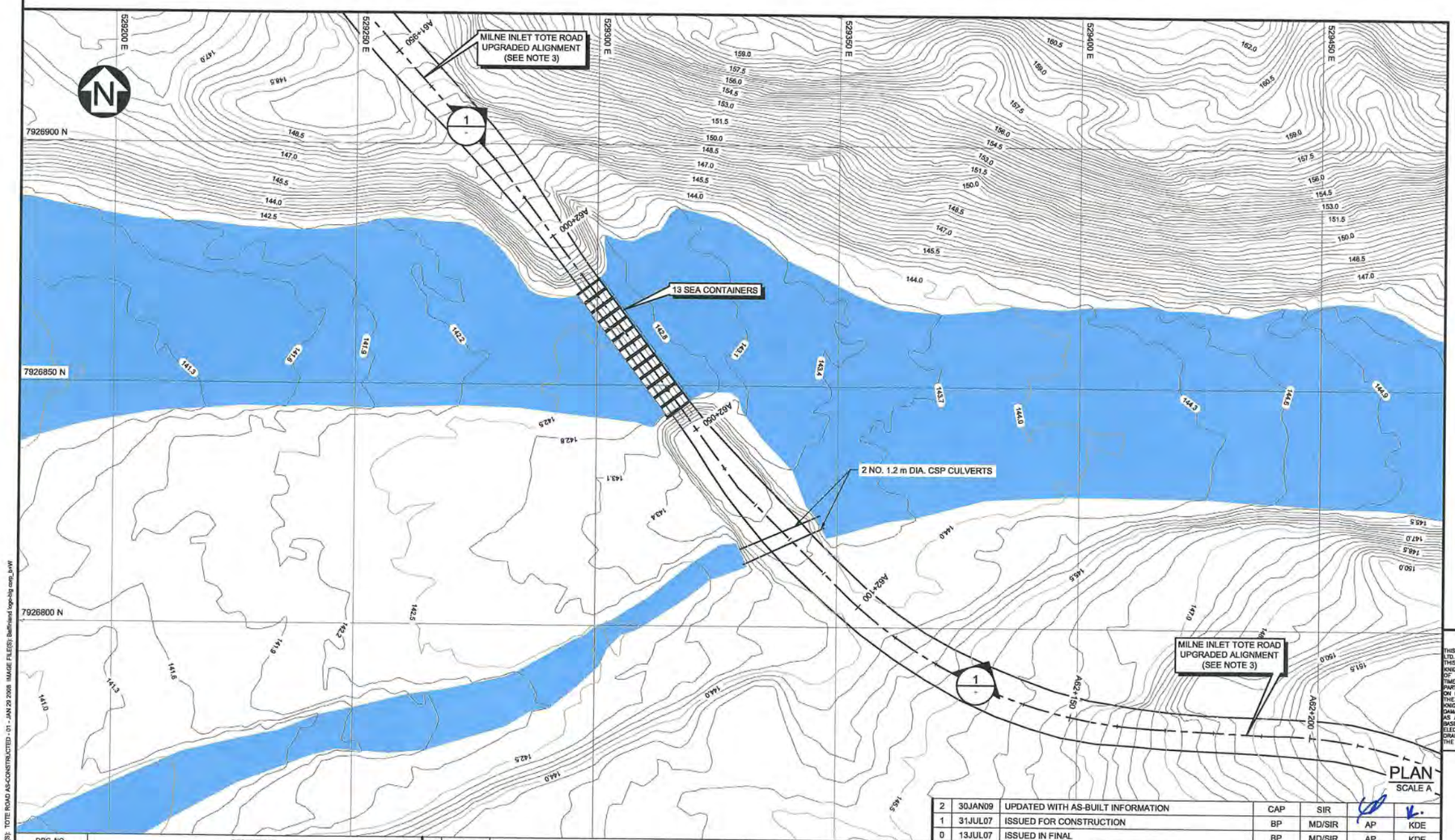
REVISIONS

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
2	30JAN09	UPDATED WITH AS-BUILT INFORMATION	CAP	SIR		
1	31JUL07	ISSUED FOR CONSTRUCTION	BP	MD/SIR	AP	KDE
0	13JUL07	ISSUED IN FINAL	BP	MD/SIR	AP	KDE

XREF FILE(S): TOTE ROAD AS-CONSTRUCTED - 01 - JAN 29 2008 IMAGE FILE(S): Baffinland logo-big cons_b-W



1 SECTION
SCALE B



PLAN
SCALE A

AS-CONSTRUCTED

LEGEND:

- WATER
- MAJOR CONTOUR
- MINOR CONTOUR
- ROAD SURFACE BASED ON GENIVAR SURVEY (SEE NOTE 3)
- ROAD ALIGNMENT (SEE NOTE 3)

NOTE(S):

1. COORDINATE GRID IS UTM (NAD83) ZONE 17 AND IS IN METRES.
2. CONTOURS BASED ON LIDAR SURVEY COMPLETED NOVEMBER 2008. CONTOUR INTERVAL IS 0.3 METRES.
3. AS-CONSTRUCTED ROAD ALIGNMENT PROVIDED BY GENIVAR DATED JULY 2008.
4. BINWALL LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND WERE NOT SURVEYED.

SCALE A: 10 5 0 10 20 30 40 50 m
SCALE B: 5 2.5 0 5 10 15 20 25 m

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
2	30JAN09	UPDATED WITH AS-BUILT INFORMATION	CAP	SIR		
1	31JUL07	ISSUED FOR CONSTRUCTION	BP	MD/SIR	AP	KDE
0	13JUL07	ISSUED IN FINAL	BP	MD/SIR	AP	KDE
REVISIONS						

Knight Piésold CONSULTING

Baffinland Iron Mines Corporation

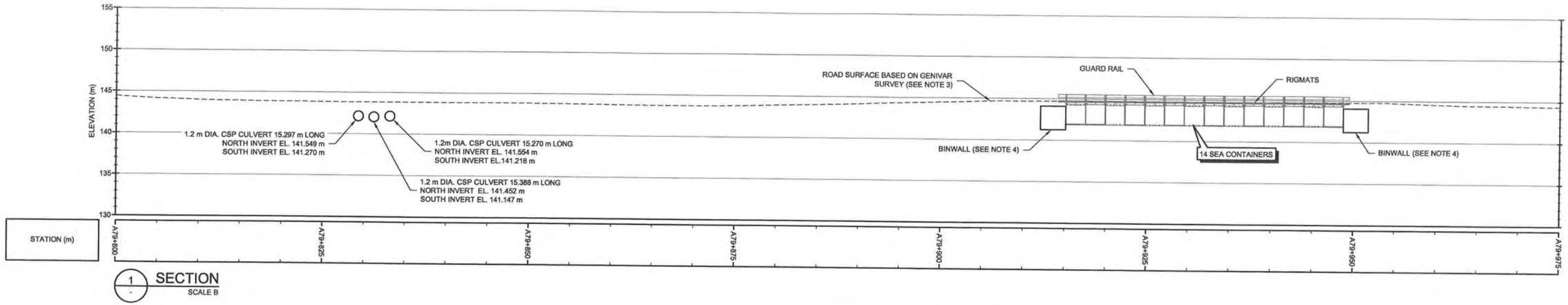
MARY RIVER PROJECT - BULK SAMPLING PROGRAM

EXTRA-LARGE CROSSING BG50 PLAN AND SECTIONS

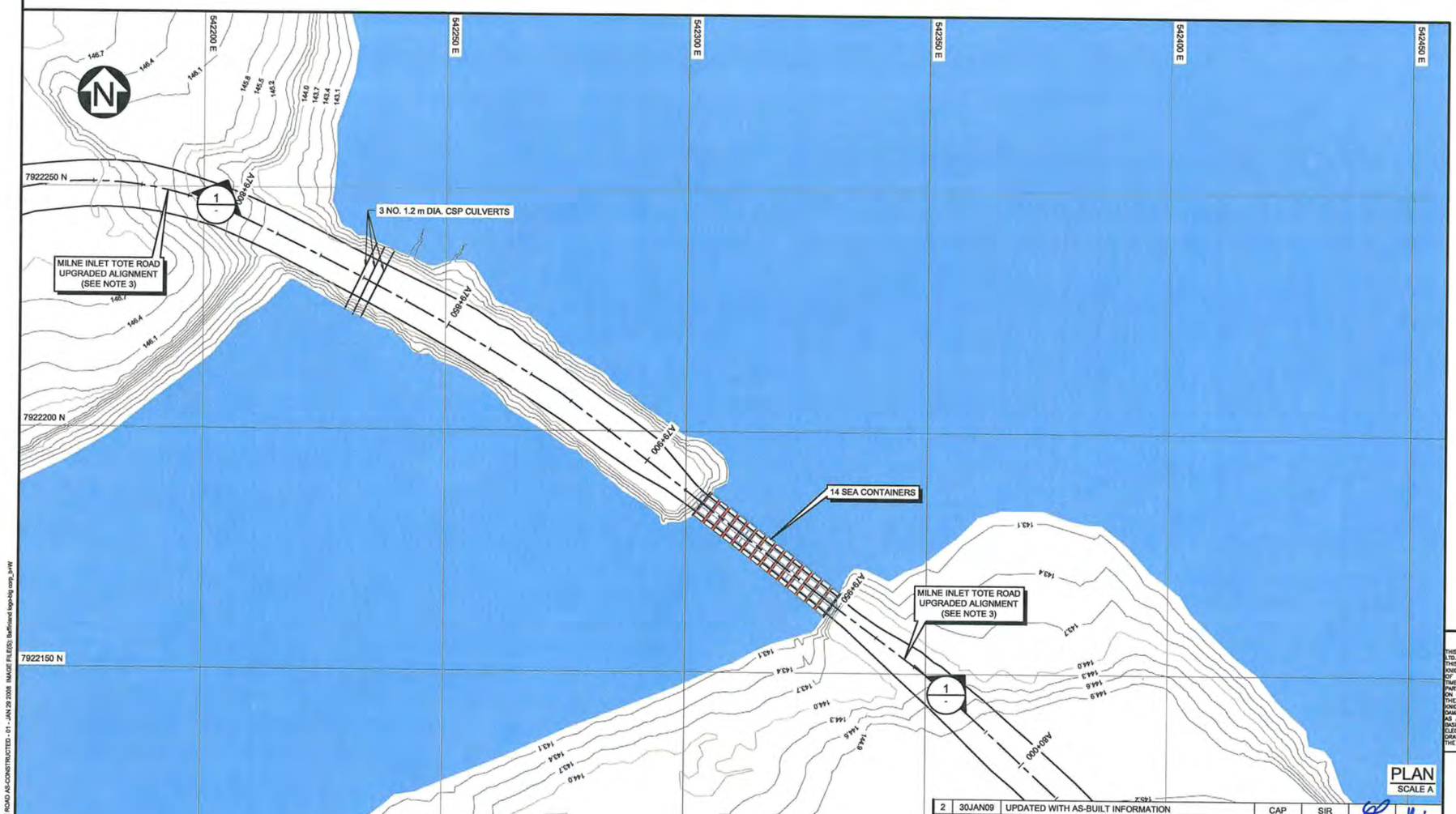
P/A NO.	DRG. NO.	REV
NB102-181/10	442	2

XREF FILE(S): TOTE ROAD AS-CONSTRUCTED - 01 - JAN 29 2009, IMAGE FILE(S): Baffinland logo-big comp_bw.tif

NORTH BAY ON, SAVED: 1/29/2009 3:53:48 PM, PRINTED: 2/2/2009 4:32:09 PM, 442, Black



1 - SECTION
SCALE B



PLAN
SCALE A

AS-CONSTRUCTED

LEGEND:

- WATER
- MAJOR CONTOUR
- MINOR CONTOUR
- ROAD SURFACE BASED ON GENIVAR SURVEY (SEE NOTE 3)
- ROAD ALIGNMENT (SEE NOTE 3)

NOTE(S):

1. COORDINATE GRID IS UTM (NAD83) ZONE 17 AND IS IN METRES.
2. CONTOURS BASED ON LIDAR SURVEY COMPLETED NOVEMBER 2008. CONTOUR INTERVAL IS 0.3 METRES.
3. AS-CONSTRUCTED ROAD ALIGNMENT PROVIDED BY GENIVAR DATED JULY 2008.
4. BINWALL LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND WERE NOT SURVEYED.

SCALE A 10 5 0 10 20 30 40 50 m

SCALE B 5 2.5 0 5 10 15 20 25 m

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
2	30JAN09	UPDATED WITH AS-BUILT INFORMATION	CAP	SIR	AP	KDE
1	31JUL07	ISSUED FOR CONSTRUCTION	BP	MD/SIR	AP	KDE
0	13JUL07	ISSUED IN FINAL	BP	MD/SIR	AP	KDE
REVISIONS						

Knight Piésold CONSULTING

Baffinland Iron Mines Corporation

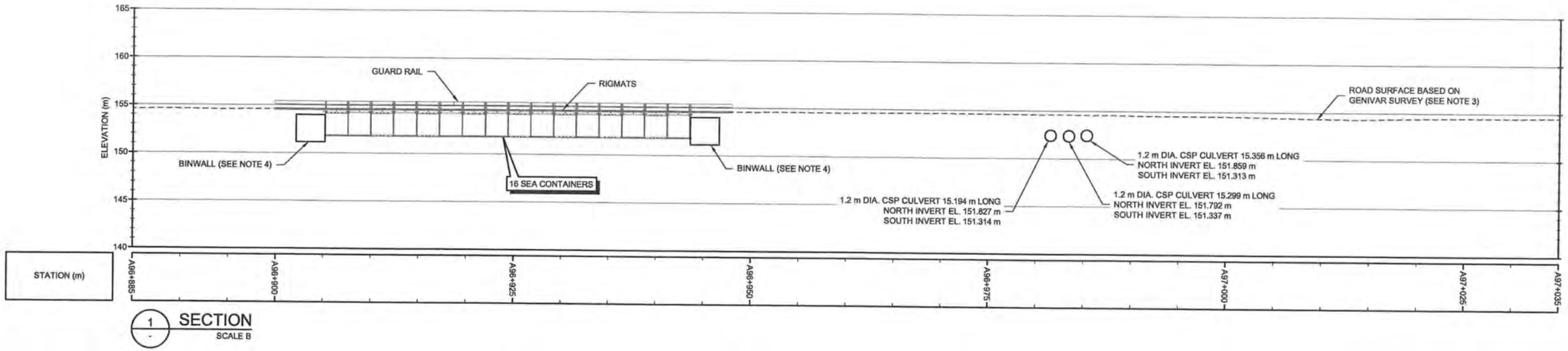
MARY RIVER PROJECT - BULK SAMPLING PROGRAM

EXTRA-LARGE CROSSING CV217 PLAN AND SECTIONS

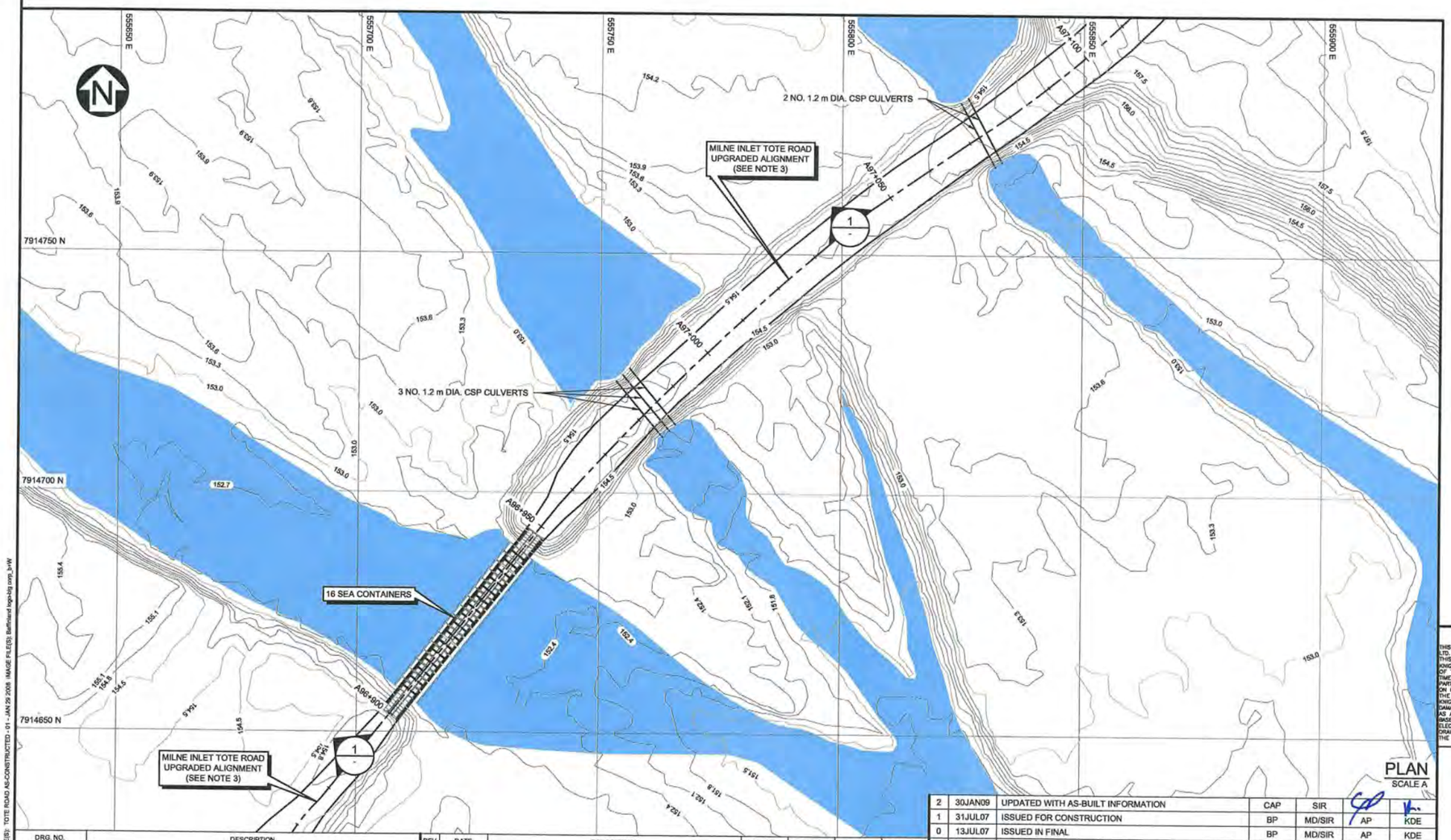
P/A NO.	DRG. NO.	REV
NB102-181/10	443	2

XREF FILE(S): TOTE ROAD AS-CONSTRUCTED - 01 - JAN 29 2009 IMAGE FILE(S): Baffinland logo-big corp_3.sVV

NORTH BAY ON, SAVED: I:\102-20181-13\Alignment\Acad\Dwg\441 442 443 444441 442 443 444442 - 2/2/2009 4:38:30 PM PRINTED: 2/2/2009 4:38:20 PM - 443, Blank



1 - SECTION
SCALE B



PLAN
SCALE A

AS-CONSTRUCTED

LEGEND:

- WATER
- MAJOR CONTOUR
- MINOR CONTOUR
- ROAD SURFACE BASED ON GENIVAR SURVEY (SEE NOTE 3)
- ROAD ALIGNMENT (SEE NOTE 3)

NOTE(S):

1. COORDINATE GRID IS UTM (NAD83) ZONE 17 AND IS IN METRES.
2. CONTOURS BASED ON LIDAR SURVEY COMPLETED NOVEMBER 2008. CONTOUR INTERVAL IS 0.3 METRES.
3. AS-CONSTRUCTED ROAD ALIGNMENT PROVIDED BY GENIVAR DATED JULY 2008.
4. BINWALL LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND WERE NOT SURVEYED.

SCALE A: 10 5 0 10 20 30 40 50 m
SCALE B: 5 2.5 0 5 10 15 20 25 m

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
2	30JAN09	UPDATED WITH AS-BUILT INFORMATION	CAP	SIR		
1	31JUL07	ISSUED FOR CONSTRUCTION	BP	MD/SIR	AP	KDE
0	13JUL07	ISSUED IN FINAL	BP	MD/SIR	AP	KDE
REVISIONS						

Knight Piésold CONSULTING

Baffinland IRON MINES Corporation

MARY RIVER PROJECT - BULK SAMPLING PROGRAM

EXTRA-LARGE CROSSING CV223 PLAN AND SECTIONS

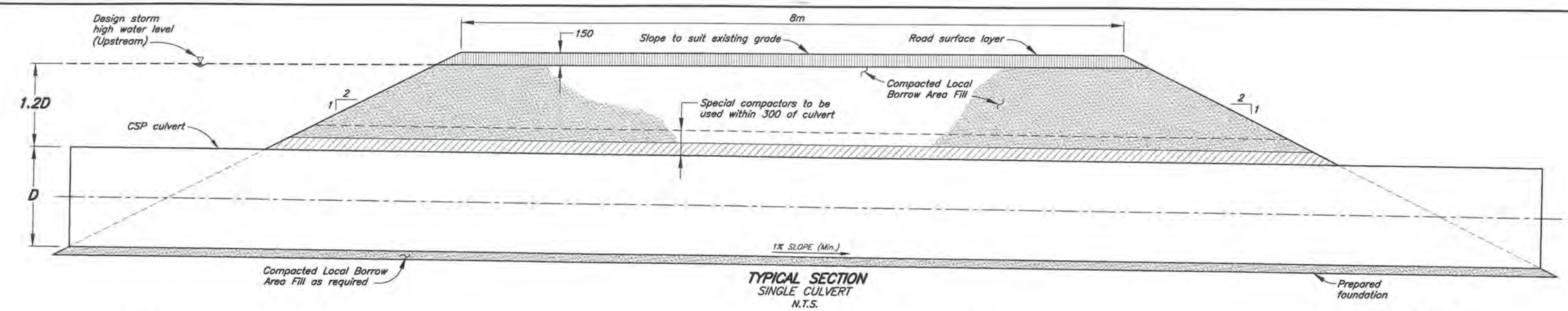
P/A NO.	DRG. NO.	REV
NB102-181/10	444	2

Knight Piésold
CONSULTING

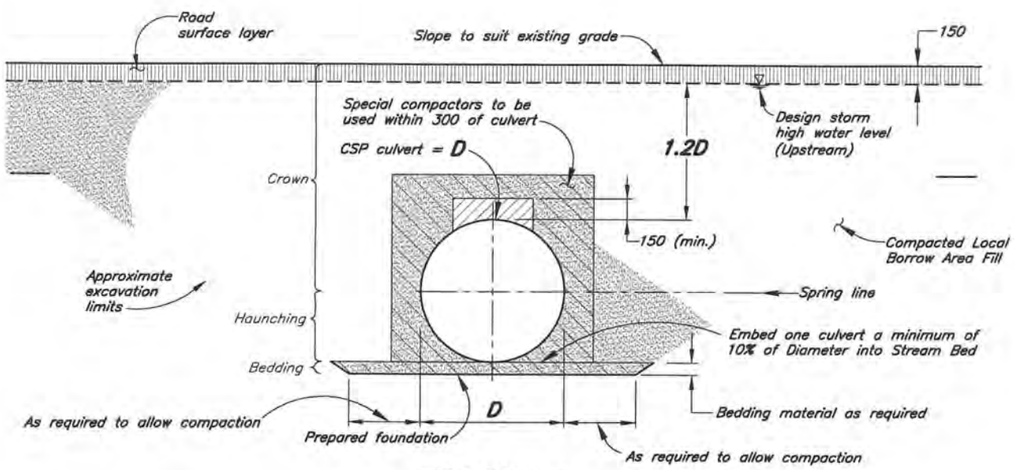
APPENDIX A

DESIGN DRAWINGS ISSUED FOR CONSTRUCTION

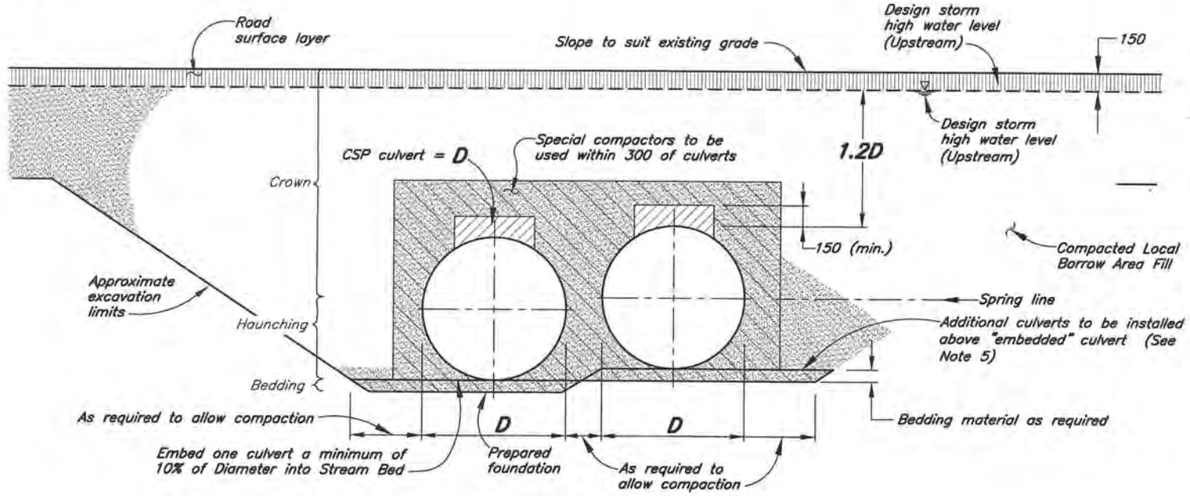
(3 Pages)



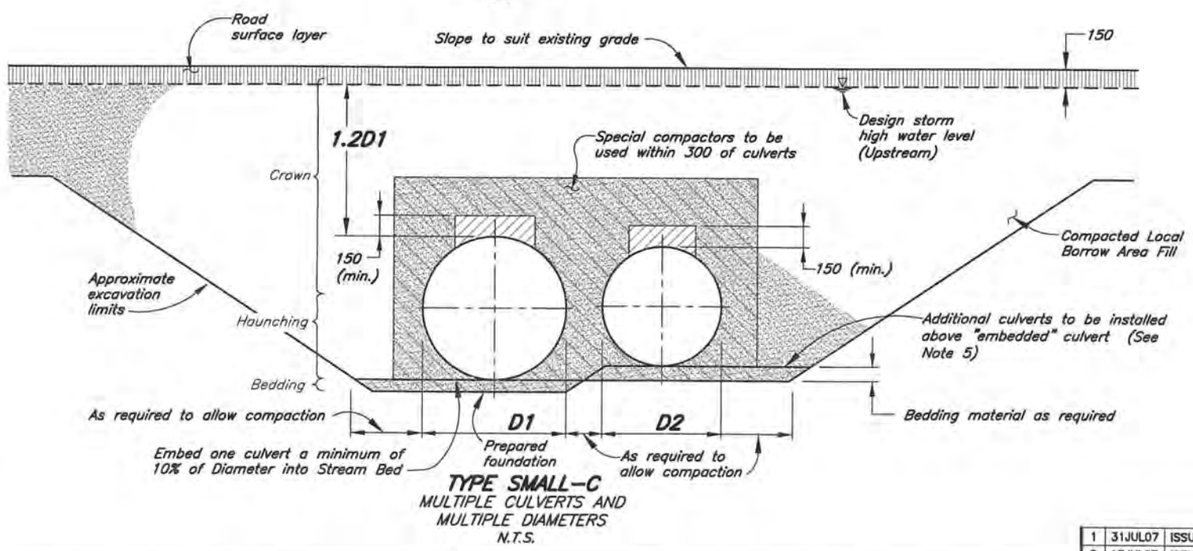
TYPICAL SECTION
SINGLE CULVERT
N.T.S.



TYPE SMALL–A
SINGLE CULVERT
N.T.S.



TYPE SMALL–B
MULTIPLE CULVERTS
N.T.S.



TYPE SMALL–C
MULTIPLE CULVERTS AND MULTIPLE DIAMETERS
N.T.S.

NOTES:

1. All dimensions are in millimetres unless otherwise noted.
2. Traffic crossings preferably located on a straight section of a watercourse, well downstream of any sharp bends.
3. Installation of culverts to be in accordance with the Technical Specifications.
4. Design storm for category small crossing is the 1 in 10 year return.
5. Additional culverts to be installed above "embedded" culvert to provide maximum flow depth during low flow periods.

LEGEND:

Compacted Local Borrow Area Fill | Loose Local Borrow Area Fill | Road surfacing material | Culvert Backfill (1)

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	31JUL07	ISSUED FOR CONSTRUCTION	BP	MD		
0	13JUL07	ISSUED IN FINAL	BP	MD	AP	KE
REVISIONS						

Knight Piésold CONSULTING

Baffinland IRON MINES Corporation

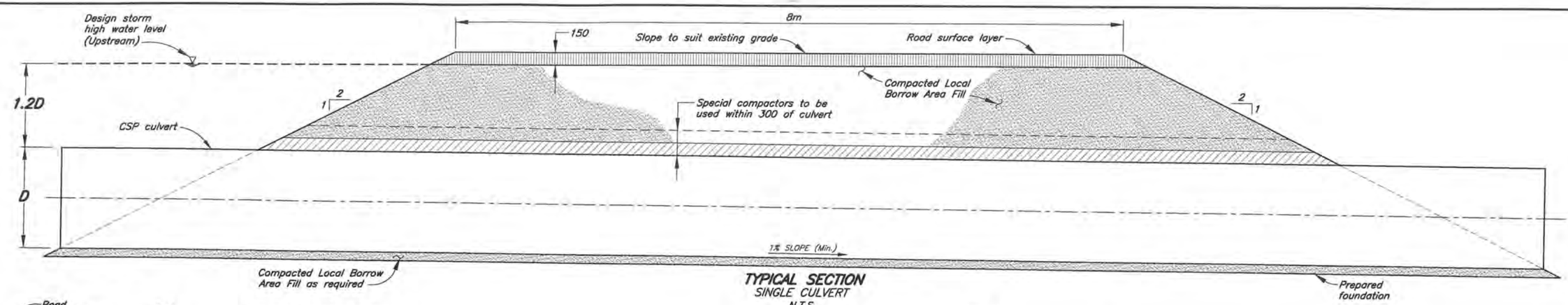
MARY RIVER PROJECT – BULK SAMPLING PROGRAM

SMALL CROSSINGS TYPICAL SECTIONS AND DETAILS

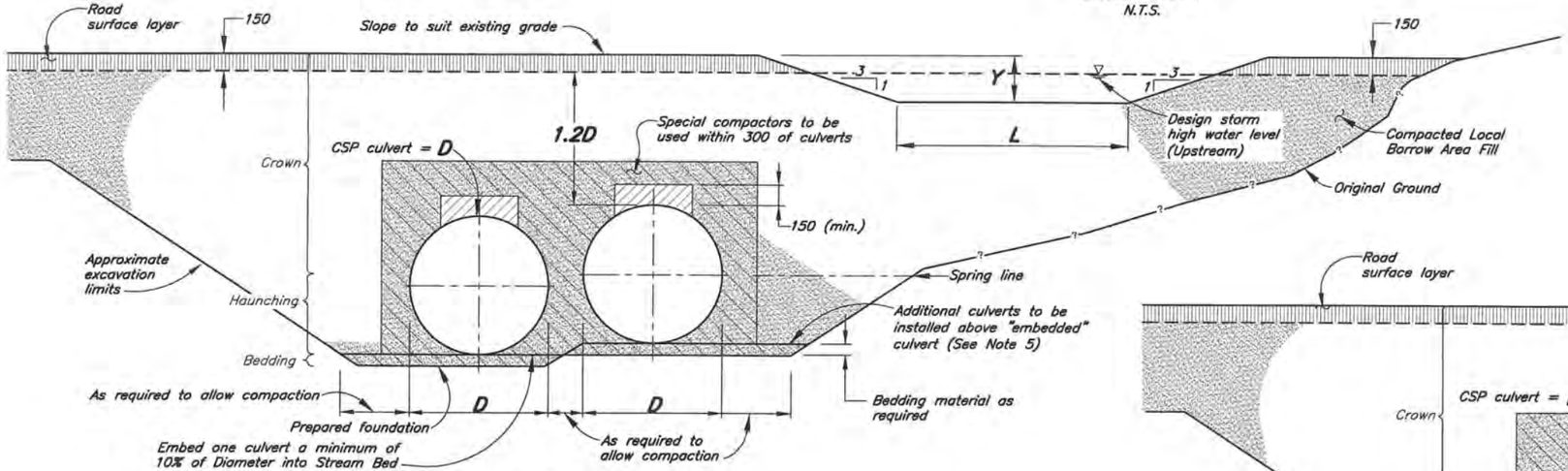
PROJECT/ASSIGNMENT NO.	DRAWING NO.	REVISION
NB102–00181/10	411	1

XREF FILE(S): IMAGE FILE(S): Baffinland logo-big corp_b+w logo-big corp edit

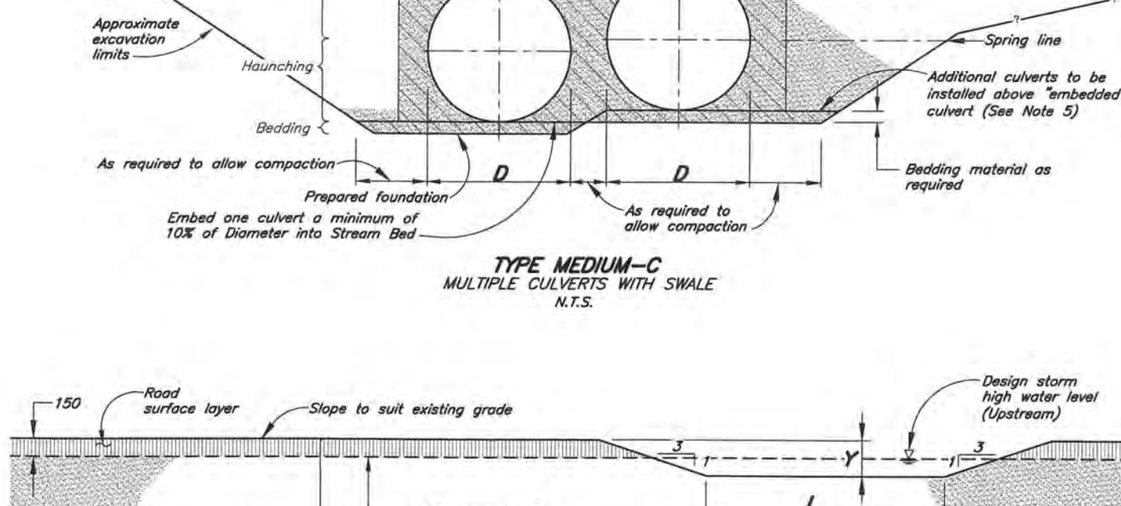
NORTH BAY ON. CREATED BY: mdamers SAVED: I:\102-00181-10\Assignment\Acad\Dwg\04_ISSUED FOR CONSTRUCTION REV-1\411R1, 8/1/2007 2:28:13 PM PRINTED: 8/1/2007 2:28:40 PM, Layout1, Bpark



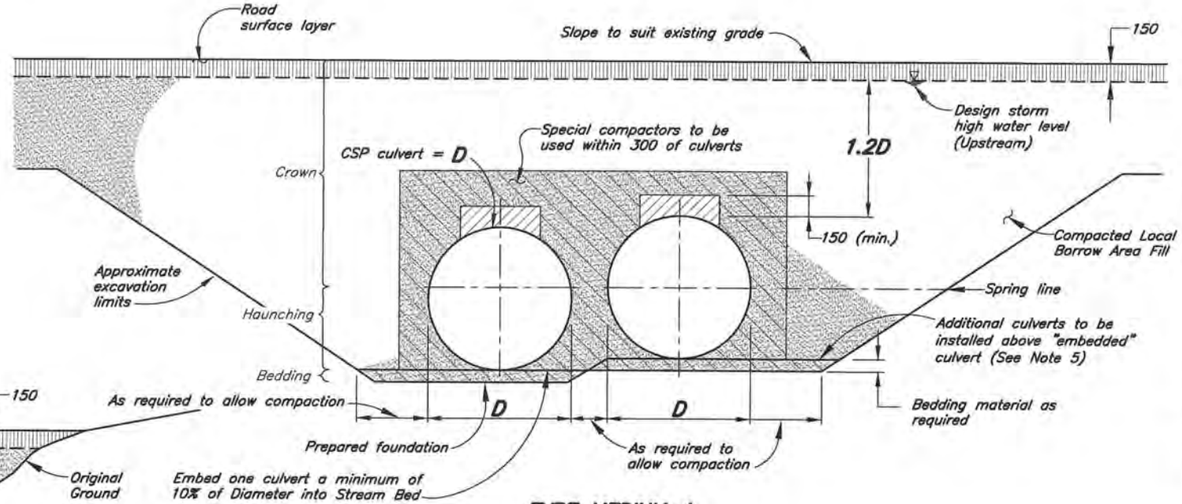
TYPICAL SECTION
SINGLE CULVERT
N.T.S.



TYPE MEDIUM–C
MULTIPLE CULVERTS WITH SWALE
N.T.S.



TYPE MEDIUM–B
SINGLE CULVERT WITH SWALE
N.T.S.



TYPE MEDIUM–A
MULTIPLE CULVERTS
N.T.S.

LEGEND:

- Compacted Local Borrow Area Fill
- Loose Local Borrow Area Fill
- Road surfacing material
- Culvert Backfill ⚠

NOTES:

1. All dimensions are in millimetres unless otherwise noted.
2. Traffic crossings preferably located on a straight section of a watercourse, well downstream of any sharp bends.
3. Installation of culverts to be in accordance with the Technical Specifications.
4. Design storm for category medium crossing is the 1 in 10 year return.
5. Additional culverts to be installed above "embedded" culvert to provide maximum flow depth during low flow periods.

ORG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	31JUL07	ISSUED FOR CONSTRUCTION	BP	MD		
0	13JUL07	ISSUED IN DRAFT	BP	MD	AP	KE

REVISIONS

Knight Piésold CONSULTING

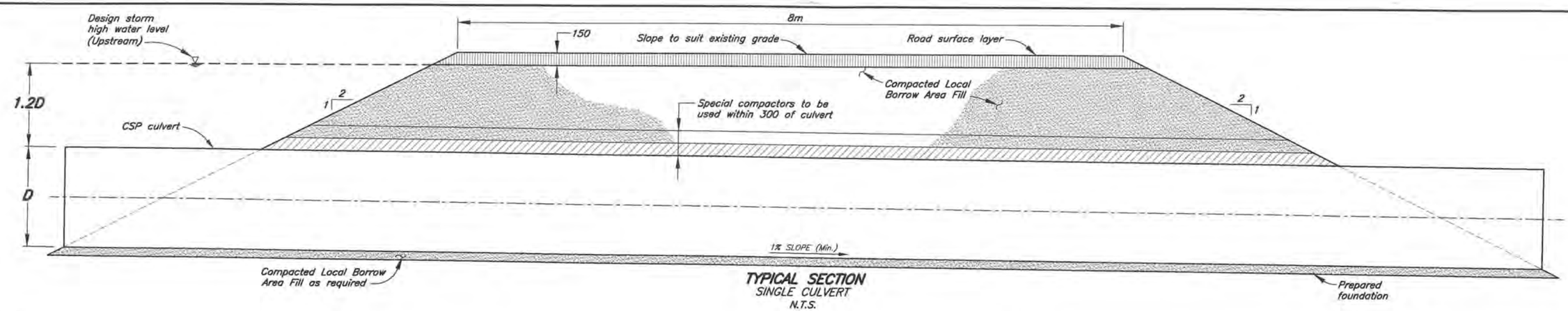
Baffinland Iron Mines Corporation

MARY RIVER PROJECT – BULK SAMPLING PROGRAM

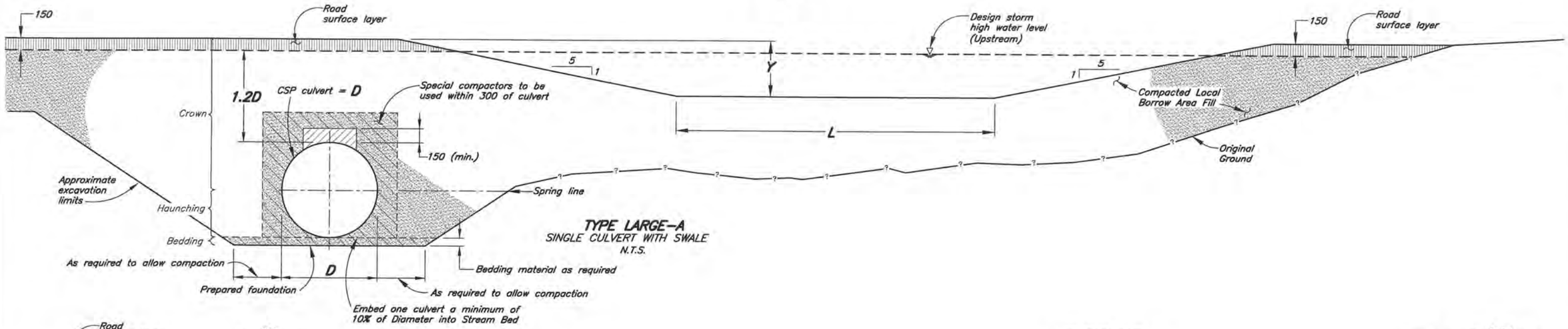
MEDIUM CROSSINGS TYPICAL SECTIONS AND DETAILS

PROJECT/ASSIGNMENT NO.	DRAWING NO.	REVISION
NB102–00181/10	421	1

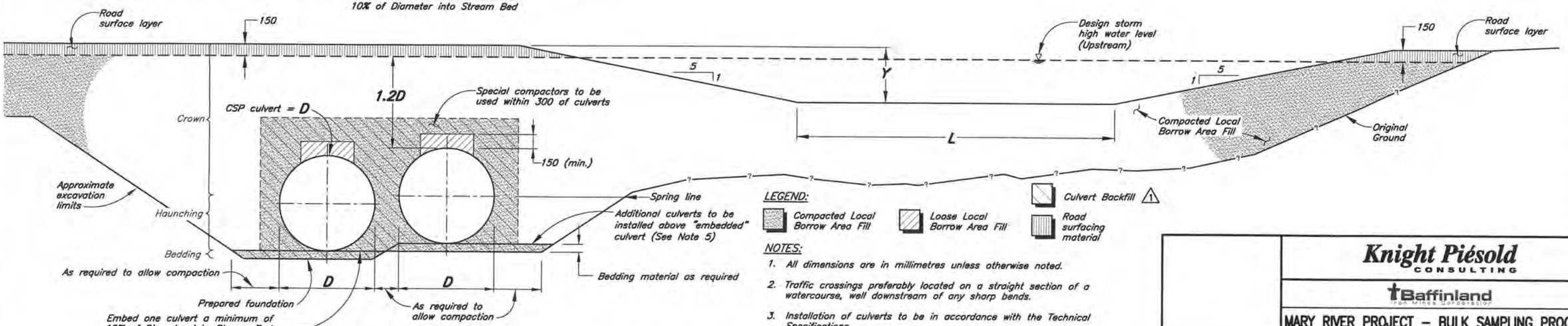
XREF FILE(S): IMAGE FILE(S): Baffinland logo-big corp_b+w
NORTH BAY ON. CREATED BY: mdemers SAVED: I:\102-00181-10\Assignment\Acad\Dwg\04_ISSUED FOR CONSTRUCTION REV-1\421R1, 7/30/2007 4:17:50 PM PRINTED: 8/1/2007 2:40:38 PM, Layout1, Blank



TYPICAL SECTION
SINGLE CULVERT
N.T.S.



TYPE LARGE–A
SINGLE CULVERT WITH SWALE
N.T.S.



TYPE LARGE–B
MULTIPLE CULVERTS WITH SWALE
N.T.S.

LEGEND:

- Compacted Local Borrow Area Fill
- Loose Local Borrow Area Fill
- Road surfacing material
- Culvert Backfill (1)

NOTES:

1. All dimensions are in millimetres unless otherwise noted.
2. Traffic crossings preferably located on a straight section of a watercourse, well downstream of any sharp bends.
3. Installation of culverts to be in accordance with the Technical Specifications.
4. Design storm for category large crossing is the 1 in 25 year return.
5. Additional culverts to be installed above "embedded" culvert to provide maximum flow depth during low flow periods.

ORG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV.	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
1	31JUL07	ISSUED FOR CONSTRUCTION	BP	MD	AP	KE
0	13JUL07	ISSUED IN FINAL	BP	MD	AP	KE
REVISIONS						

THIS DRAWING WAS PREPARED FOR OUR CLIENT. ANY USE WHICH A THIRD PARTY MAKES OF IT, OR ANY RELIANCE ON OR DECISIONS BASED ON IT, ARE THE RESPONSIBILITY OF SUCH THIRD PARTY. KNIGHT PIÉSOLD ACCEPTS NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY THE THIRD PARTY AS A RESULT OF DECISIONS MADE OR ACTIONS BASED ON THIS DRAWING. COPIES RESULTING FROM ELECTRONIC TRANSFER OR REPRODUCTION OF THIS DRAWING ARE UNCONTROLLED AND MAY NOT BE THE MOST RECENT REVISION.

Knight Piésold CONSULTING

Baffinland Iron Mines Corporation

MARY RIVER PROJECT – BULK SAMPLING PROGRAM

LARGE CROSSINGS
TYPICAL SECTIONS AND DETAILS

PROJECT/ASSIGNMENT NO.	DRAWING NO.	REVISION
NB102–00181/10	431	1

XREF FILE(S): IMAGE FILE(S): Baffinland logo-big comp_b+w

NORTH BAY ON. CREATED BY: mtennare SAVED: I:\102-00181-10\Assignment\Acad\Dwg\V04_ISSUED FOR CONSTRUCTION REV-1\43181. 8/1/2007 2:52:47 PM PRINTED: 8/1/2007 2:53:05 PM, Layout1, Book

November 19, 2008

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
P.O. Box 119, Gjoa Haven NU X0B 1J0

Dear Ms. Beaulieau:

Re: Baffinland Iron Mines Corporation (BIM) - Submission of an Annual Geotechnical Inspection, NWB File: 2BB-MRY0710

1.0 INTRODUCTION

Under Part D, Item 16, of Baffinland Iron Mines Corporation (BIM) Water Licence 2BB-MRY0710, there is a requirement to ensure the proper function of earthworks associated with waste disposal facilities at its Mary River Project. This requirement is detailed in Part D, Item 16, which states that:

> *"An inspection of the earthworks, geological regime, and the hydrological regime of the Project is to be carried out during the summer of 2008, by a Geotechnical Engineer. The Geotechnical Engineer's report shall be submitted to the Board within sixty (60) days of the inspection, with a covering letter from the Licensee outlining an implementation plan to respond to the Engineer's recommendations."*

BIM retained GENIVAR Consultants (Genivar) to complete the 2008 annual water license geotechnical inspection of the on-site waste containment structures located at its two main camp sites, known as the Mary River Camp and Milne Inlet Camp. The water and fuel containment structures reviewed at the respective camps included the following:

Mary River Mine Camp
- Bulk Fuel Storage Facility Containment,
- Generator Fuel Storage Facility Containment,
- Polishing/Waste Stabilization Pond No. 1, and
- Polishing/Waste Stabilization Pond No. 2.

Milne Inlet Site
- Bulk Fuel Storage Facility Containment, and
- Polishing/Waste Stabilization Pond.

Attached, herewith, is Genivar's geotechnical report which presents the findings and recommendations for the aforementioned structures. Sections 2.0 and 3.0 of this letter summarize BIM's plan for implementing Genivar's recommendations.

2.0 MARY RIVER MINE CAMP RECOMMENDATIONS

2.1. Bulk Fuel Storage Facility Containment

There were no recommendations made at this time.

2.2. Generator Fuel Storage Facility Containment

~~*Recommendation MR1:*~~ Based on the need to contain 110 % of the bladder volume in the event of a fuel spill, the maximum volume of fuel permitted to be stored in the bladder in this facility as it is constructed, is 77,376 litres.

~~*BIM Response*~~: This recommendation has been implemented.

2.3. Polishing/Waste Stabilization Pond No. 1

~~*Recommendation MR2:*~~ It is recommended that the exterior slopes on the dykes be built out to a 4:1 slope if the effluent level exceeds an elevation of 175.90 m.

~~*BIM Response:*~~ If effluent level exceeds this elevation, dykes will be built out to a 4:1 backslope.

~~*Recommendation MR4:*~~ The liner rips should be repaired as soon as practicable.

~~*BIM Response*~~: The rips to the liner have been repaired.

~~*Recommendation MR3:*~~ An elevation monitoring program should be established on the exterior dyke structure to measure the potential for settlement due to permafrost melting.

~~*BIM Response*~~: A monthly elevation monitoring program will be implemented from May through October 2009.

2.4. Polishing/Waste Stabilization Pond No. 2

~~*Recommendation MR5:*~~ Based on the current 4:1 dyke backslope, the level of treated effluent in the cell shall not exceed a height of 1.8 m.

~~*BIM Response*~~: The recommended maximum effluent height has been adopted as a working operational limit.

~~*Recommendation MR6:*~~ An elevation monitoring program should be established on the exterior dyke structure to measure the potential for settlement due to permafrost melting.

~~*BIM Response*~~: A monthly elevation monitoring program will be implemented from May through October 2009.

3.0 Milne Inlet Camp

3.1. Bulk Fuel Storage Facility Containment

There were no recommendations made at this time.

3.2. Polishing/Waste Stabilization Pond.

Recommendation MI1: The treated effluent level should be decanted to a depth 600 mm below the top of the liner. The effluent can be transported to the Mary River PWSP via tanker truck for disposal. The long term use of this structure for the storage of effluent is acceptable so long as effluent levels are kept to the aforementioned design levels.

BIM Response: The recommended maximum effluent height has been adopted as a working operational limit.

Recommendation MR3: An elevation monitoring program should be established on the exterior dyke structure to measure the potential for settlement due to permafrost melting.

BIM Response: A monthly elevation monitoring program will be implemented from May through October 2009.

We trust that this submittal satisfies your current requirements. Should you have any questions, please do not hesitate to contact Cheryl Wray or Jim Millard, Environmental Superintendents at 403-450-8843 or by e-mail at cheryl.wray@bafffinland.com or jim.millard@baffinland.com.

Best Regards,
Baffinland Iron Mines Corporation

Dave McCann, P.Eng.
Assistant Manager Operations

cc. J. Millard, C. Wray, D. Putnam BIM, A. Keim, INAC

Attach: Annual Geotechnical Inspection 2008, prepared by GENIVAR Consultants for Baffinland Iron Mines Corporation, dated November 19, 2008.

.

GENIVAR

834 Mountjoy Street South
P.O. Box 120
Timmins, Ontario P4N 7C5
Tel. (705) 264-9413
Fax. (705) 267-2725

November 19, 2008

Baffinland Iron Mines Corporation
Suite 1016, 120 Adelaide Street West
Toronto, ON M5T 1T1

Attention: Mr. David McCann
david.mccann@baffinland.com

RE: ANNUAL GEOTECHNICAL INSPECTION 2008
BAFFINLAND IRON MINES CORPORATION
OUR REFERENCE NO. 07-039

1.0 INTRODUCTION

GENIVAR Consultants completed the annual water license geotechnical inspection of the on-site containment structures at Baffinland Iron Mines Corporation (BIM) Mary River Project. The containment structures for the operation are located at two main camp sites known as the Mary River Camp and Milne Inlet Camp.

The soil structures reviewed are as follows:

Mary River Mine Site

- Bulk Fuel Storage Facility Containment,
- Generator Fuel Storage Facility Containment,
- Polishing/Waste Stabilization Pond No. 1, and
- Polishing/Waste Stabilization Pond No. 2.

Milne Inlet Site

- Bulk Fuel Storage Facility Containment, and
- Polishing/Waste Stabilization Pond.

This report presents the findings and recommendations with respect to the aforementioned structures. We understand that this report will be used by BIM to fulfill the requirements of the Nunavut Water Board for an annual geotechnical investigation of onsite water and fuel retaining structures under Water License 2BB-MRY0710.

2.0 METHODOLOGY FOR INSPECTION

The geotechnical inspection team consisted of Mr. Barry H. Martin P. Eng., and Mike Jolink of GENIVAR Consultants, who reviewed the sites on September 3rd, 4th, 5th and 6th 2008. After this date, Mike Jolink continued to provide assistance under Mr. Martin's direction into early October until work was completed on some structures. 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 (refer to Attachment A);
2. Specifically, the structures were inspected for signs of settlement, seepage, and cracking; and
3. The areas around the soil structures were examined for evidence of seepage.

Photographs were taken to document observations made during the inspection.(refer to Attachment B). Recommendations are provided to BIM to facilitate the ongoing operation, management, and monitoring of the facilities.

3.0 MARY RIVER CAMP

3.1 Bulk Fuel Storage Facility Containment

General Conditions

At the time of the inspection of the bulk fuel storage facility, the containment structure was completed; however, the piping and dispensing modules/fuel handling facilities had yet to be constructed.

Stability

At the time of our review, there were localized shallow areas of water within the containment structure that originated from recent rain and snow/snow melt events. These localized ponds were an indication of membrane integrity.

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

Recommendations

There are no recommendations to be made at the present time.

3.2 Generator Fuel Storage Facility Containment

General Conditions

The Generator Fuel Storage Facility containment was constructed utilizing the same principles used in the design and construction of the large fuel containment facilities at the Mary River Camp and the Milne Inlet Camp.

Stability

At the time of our review, there were localized shallow areas of water within the containment structure that originated from recent rain and snow/snow melt events. This was an indication of membrane integrity.

The entire structure was visually inspected for any signs of cracking or subsidence. There was no indication of any settlements, seepage or cracking in the soil structures that formed the dykes. Also there was no indication of seepage at the base of the soil structure dyke around the exterior. The soil containment structure is considered to be stable in its present condition and is in conformance with our design principles.

An as constructed review was carried out on this structure with respect to the height of cover over the base and minimum height of membrane in the dyke.

Recommendations

- Based on the need to contain 110 % of the bladder volume in the event of a fuel spill, the maximum volume of fuel permitted to be stored in the bladder in this facility as it is constructed, is 77,376 litres.

3.3 Polishing/Waste Stabilization Pond (PWSP) No. 1

General Conditions

PWSP No. 1 was originally designed as storage for sewage effluent during the start-up phase of the sewage treatment plants at the Mary River Camp. Once the treated sewage effluent meets water license effluent quality criteria, the plan is to release treated effluent directly to the receiving environment (Sheardown Lake). The residual treated effluent left in the ponds would be treated as necessary and released to the receiving environment once effluent quality criteria are met.

At the time of inspection, the height to the top of the liner from the ground at the exterior of the dyke was 1.25 m. The containment structure consists of a soil berm with width which varies from 2.2 to 4.0 m. The dykes have been constructed with a 3:1 slope on the interior with the exterior slope at varying slopes from 2.75:1 to 3:1. The effluent elevation was 175.897 m elevation at the time of our visit. This allowed for a freeboard of 0.34 meters and a height of effluent 0.91 meters.

The structure currently conforms to its design intent.

Stability

Our inspection of the area around the pond at the base of the slopes showed no signs of water (treated sewage effluent) and hence we conclude that there are probably no tears or ruptures in the membrane below the water table.

A review of the exterior and top of the dykes showed no indication of settlement or cracking which would be indicative of overstress on the structure.

A review of the exposed liner on the upper edge of the dyke showed a number of tears in the upper edge of the liner caused by vehicular traffic on the top of the dyke and generally within a distance of 30 m of the ramp access to the top of the dyke.

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

Recommendations

- It is recommended that the exterior slopes on the dykes be built out to a 4:1 slope if the effluent level exceeds the levels measured on September 4, 2008 (175.90).
- In consideration of the potential for the thawing of permafrost regime under the PWSP, it is recommended that monitoring points be established on the dyke structure and an elevation monitoring program be implemented to measure any potential settlement. It is recommended that a monthly monitoring be implemented from May through October 2009.
- The liner rips should be repaired as soon as practicable.

3.3 Polishing/Waste Stabilization Pond #2

General Conditions

PWSP #2 was originally designed as a two-cell pond structure with a liner. At the time of the inspection, the north pond (PWSP No. 2) was constructed and the south pond (planned PWSP No. 3) was under construction. The inspection was therefore restricted to PWSP No. 2.

The bottom of the PWSP #2 structure liner was set at approximately 174.7 m elev. and the top of the liner was built to approximately 177.97 m elev. The treated effluent level was at 175.98 m elev. on September 4$^{th.}$ This accounted for a liquid depth of 1.28 m. (The slope of the interior of the dyke upon which the membrane was installed was at a slope of 3:1. The exterior slopes of the dyke are at a slope of 4:1. The structure currently conforms to its design intent.

Stability

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

A review of the exterior and top of the dykes showed no indication of settlement, seepage, or cracking which are signs of overstress on the structure. The structure is considered to be stable at its present condition.

Recommendations

- Based on the current 4:1 backslope the level of sewage in the cell shall not exceed a height of 1.8 m.
- In consideration of the potential for the thawing of permafrost regime under the PWSP, it is recommended that monitoring points be established on the dyke structure and an elevation monitoring program be implemented to measure any potential settlement. It is recommended that monthly monitoring be implemented from May to October 2009.

4.0 MILNE INLET

4.1 Bulk Fuel Containment Facility Containment

General Conditions

The structure around the fuel farm currently conforms to the design basis of the facility. A review of the interior of the dyke indicated a water depth averaging approximately 300 mm depth in the central portion of the facility. Water treatment and discharge utilizing an oil/water separation/filtration/batch process was underway. The ponding of water helps to confirm the integrity of the liner.

Stability

Our review of the area around the pond at the base of the slopes showed no signs of water or oil/water mixture and hence we conclude that the integrity of the liner has been maintained. Tears or ruptures in the membrane were not observed.

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

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

Recommendations

The performance of the structure has been recently tested with ponded water within the enclosure. The observations noted during our recent site visit support the conservative design of the structure. We have no recommendations at this time.

4.2 POLISHING/WASTE STABILIZATION POND

General Conditions

PWSP was originally designed as storage for sewage effluent from the RBC sewage plant installed at the site during the start-up phase of the operation. At the time of the inspection,

the effluent water quality criteria had been met and therefore the Milne PWSP was not receiving treated effluent which was being discharged to a ditch that drained to Milne Inlet.

The exterior slopes of the dykes were observed to be at 4:1. The interior slope of the dykes could not be directly observed on September 7, 2008, due to the high level of treated effluent.

Currently, the Milne PWSP structure conforms to the design basis of the facility with the exception of the high levels of treated effluent in the pond.

Stability

Based on the observed 4:1 dyke exterior slopes, the structure appears stable at current conditions which involve treated effluent near or at the top of the liner. It should be noted that despite the high treated effluent levels, there was no sign of effluent break-out or seepage at any location along the bottom of the dyke. However, as noted in the recommendations, the facility should not be operated at this effluent height for any extended period of time.

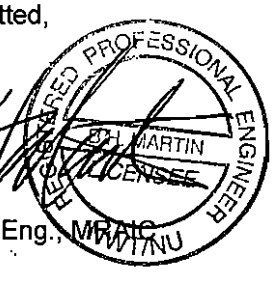
Recommendations

- The treated effluent level should be decanted to a depth 600 mm below the top of the liner. The effluent can be transported to the PWSP at Mary River via tanker truck for disposal. The long term use of this structure for the storage of effluent is acceptable so long as effluent levels are kept to the aforementioned design levels.
- In consideration of the potential for the thawing of permafrost regime under the PWSP, it is recommended that monitoring points be established on the dyke structure and an elevation monitoring program be implemented to measure any potential settlement. It is recommended that monthly monitoring be implemented from May through to October 2009.

We hope that the above report is satisfactory to BIM for inclusion into the annual geotechnical report for Nunavut Water Board. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,

GENIVAR



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

Attach: A-Drawings and B-Photos

ATTACHMENT A: DRAWINGS

DRAWINGS

Mary River Large Fuel Farm Containment

200-06-07 Mary River Fuel Farm Required Grading Plan and Sections (Contains as constructed data)

Mary River Generator Fuel Containment Structure

200-06-10 Genset Bladder Containment As Built Plan and Sections

Mary River Polishing/Waste Stabilization Pond #1

200-06-03 As Constructed PWSP 1 Plan and Sections

Mary River Polishing/Waste Stabilization Pond #2

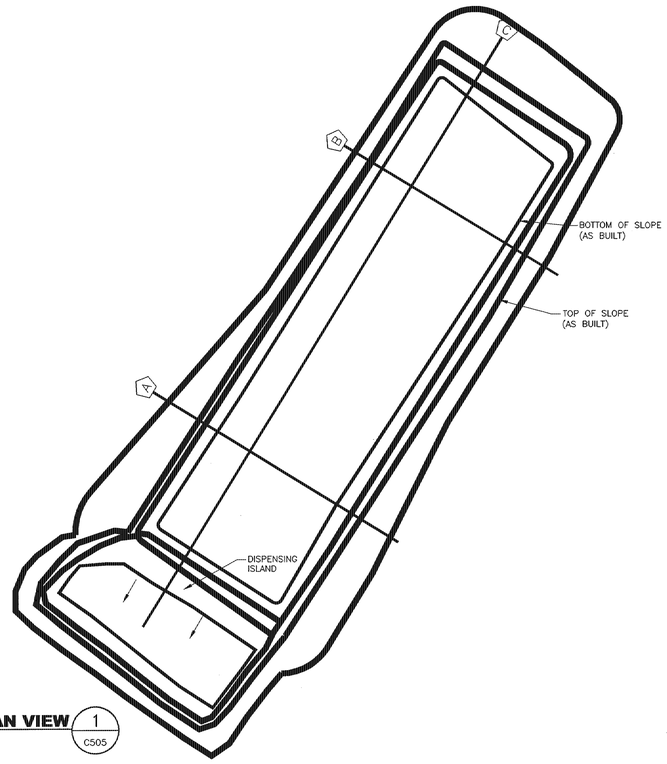
200-06-05 As Constructed PWSP 2 Plan and Sections

Milne Inlet Polishing/Waste Stabilization Pond

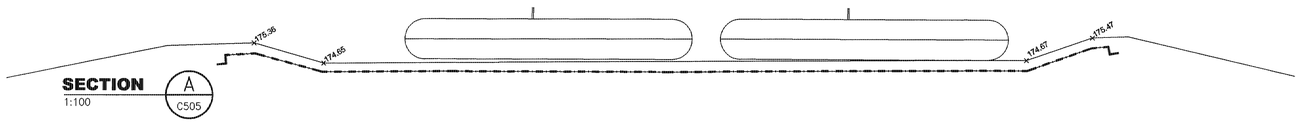
100-06-01 As Built Sewage Lagoon Plan and Profiles

Milne Inlet Fuel Farm Containment

100-06-04 Milne Inlet Fuel Farm Layout – As Built

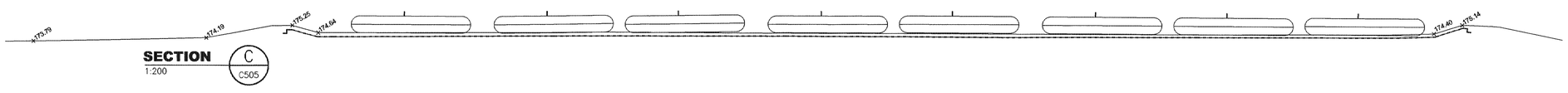


FUEL FARM B PLAN VIEW 1 / C505
1:500

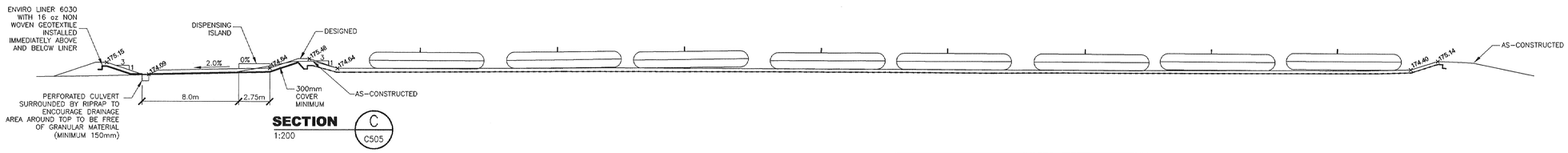


SECTION A / C505
1:100

SECTION B / C505
1:100



SECTION C / C505
1:200



SECTION C / C505
1:200

Description	Date	No.
Revisions and Issues		

NOV 19 2008
NORTH — Date Printed

GENIVAR

GENIVAR
634 Mountjoy Street South
P.O. Box 129
Timmins, Ontario P4N 7C5
www.genivar.com
Tel. 705-264-9413
Fax 705-267-2725

ARCHITECT — STRUCTURAL/CIVIL

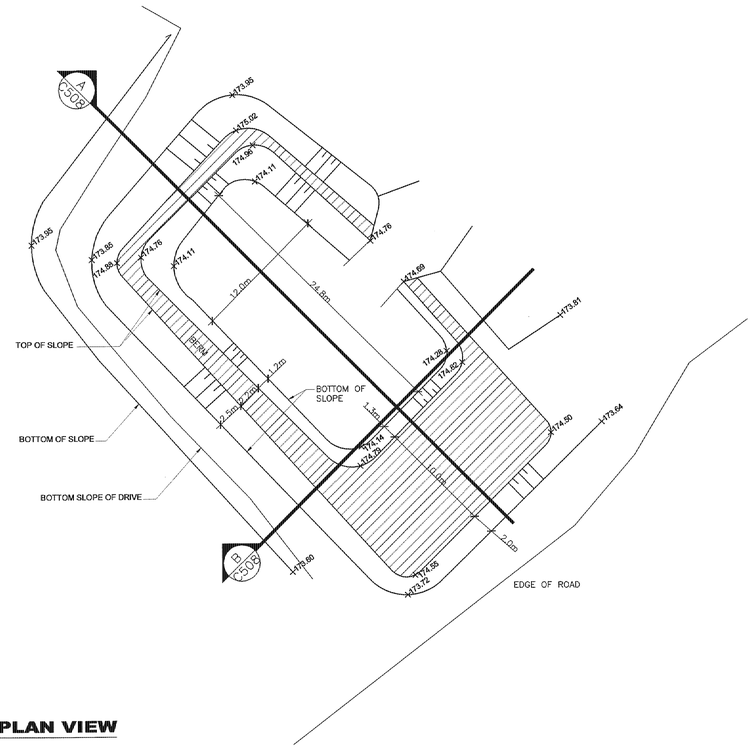
REGISTERED PROFESSIONAL ENGINEER
S.H. MARTIN
LICENSEE
NWT/NU

MECHANICAL — ELECTRICAL

Project
MARY RIVER PROJECT
BAFFIN LAND IRON MINES CORPORATION
BAFFINISLAND — NUNAVUT

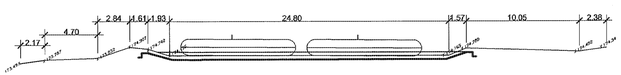
Drawing
MARY RIVER FUEL FARM REQUIRED GRADING PLAN AND SECTIONS

Date	CADD File Number
AUGUST 2008	mary r..\fuel fa..\dwg\200_06_07
Scale: AS NOTED	Job Number: **07-039**
Drawn: S.S	
Checked: CHECKED	Drawing Number: **200_06_07**
Approved: APPROVED	



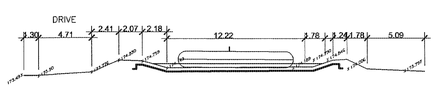
FUEL FARM E PLAN VIEW

SCALE 1:250



SECTION A C508

SCALE 1:250



SECTION B C508

SCALE 1:250

Description	Date	No.
Revisions and Issues		

NOV 19 2008

NORTH Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT

STRUCTURAL/CIVIL

REGISTERED PROFESSIONAL ENGINEER B.H.MARTIN LICENSEE NUNAVUT

MECHANICAL

ELECTRICAL

Project

MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION

BAFFIN ISLAND NUNAVUT

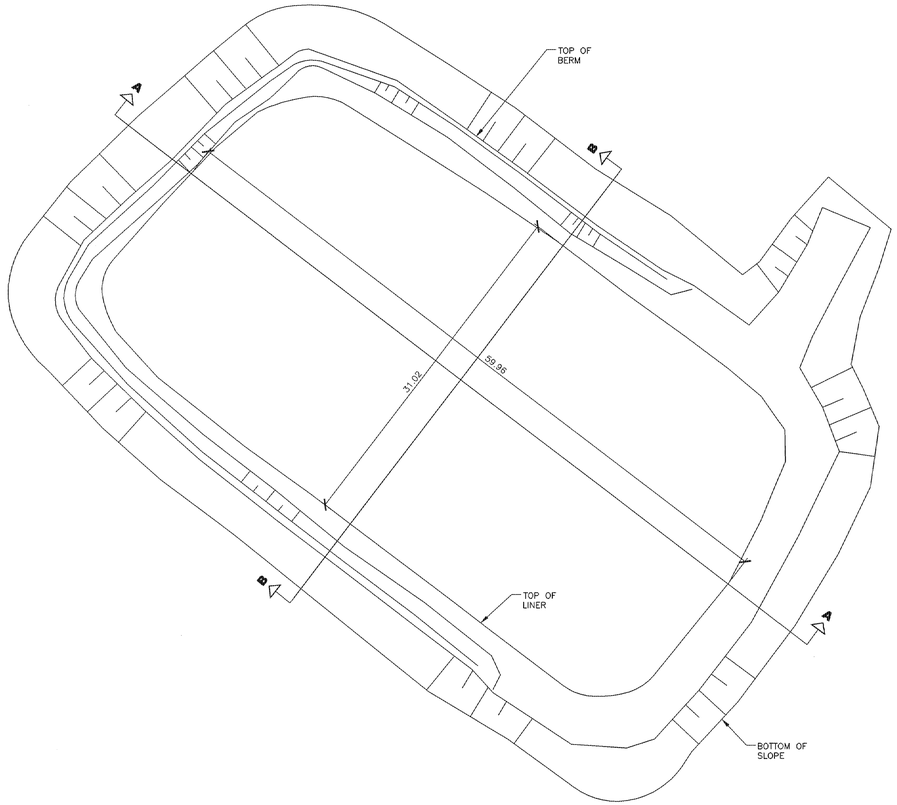
Drawing

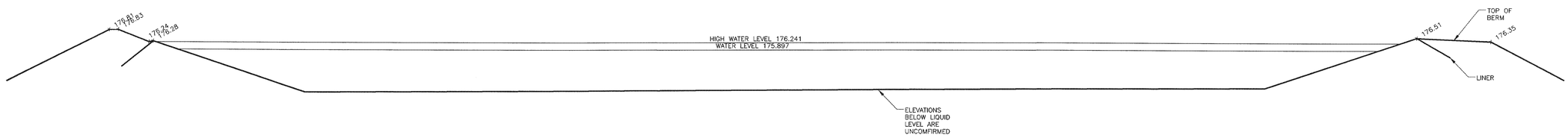
GENSET BLADDER CONTAINMENT AS BUILT PLAN AND SECTIONS

Date	CADD File Number
APRIL 2008	las con. \mary r.\fuel f..\dwg\200_06_10
Scale: AS NOTED	Job Number: **07-039**
Drawn: AB/SO/SS	
Checked	Drawing Number: **200_06_10**
Approved	

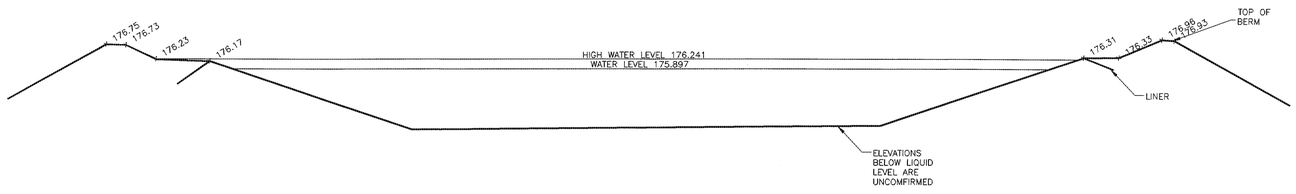
PWSP #1 AS BUILT PLAN VIEW

1:250





PWSP SECTION A
1:100 C302



PWSP SECTION B
1:100 C302

Description	Date	No.
Revisions and Issues		

NOV 19 2008

NORTH Date Printed

GENIVAR

GENIVAR
834 Mountjoy Street South
P.O. Box 120
Timmins, Ontario P4N 7C5
www.genivar.com
Tel. 705-264-9413
Fax.705-267-2725

ARCHITECT STRUCTURAL/CIVIL

MECHANICAL ELECTRICAL

Project

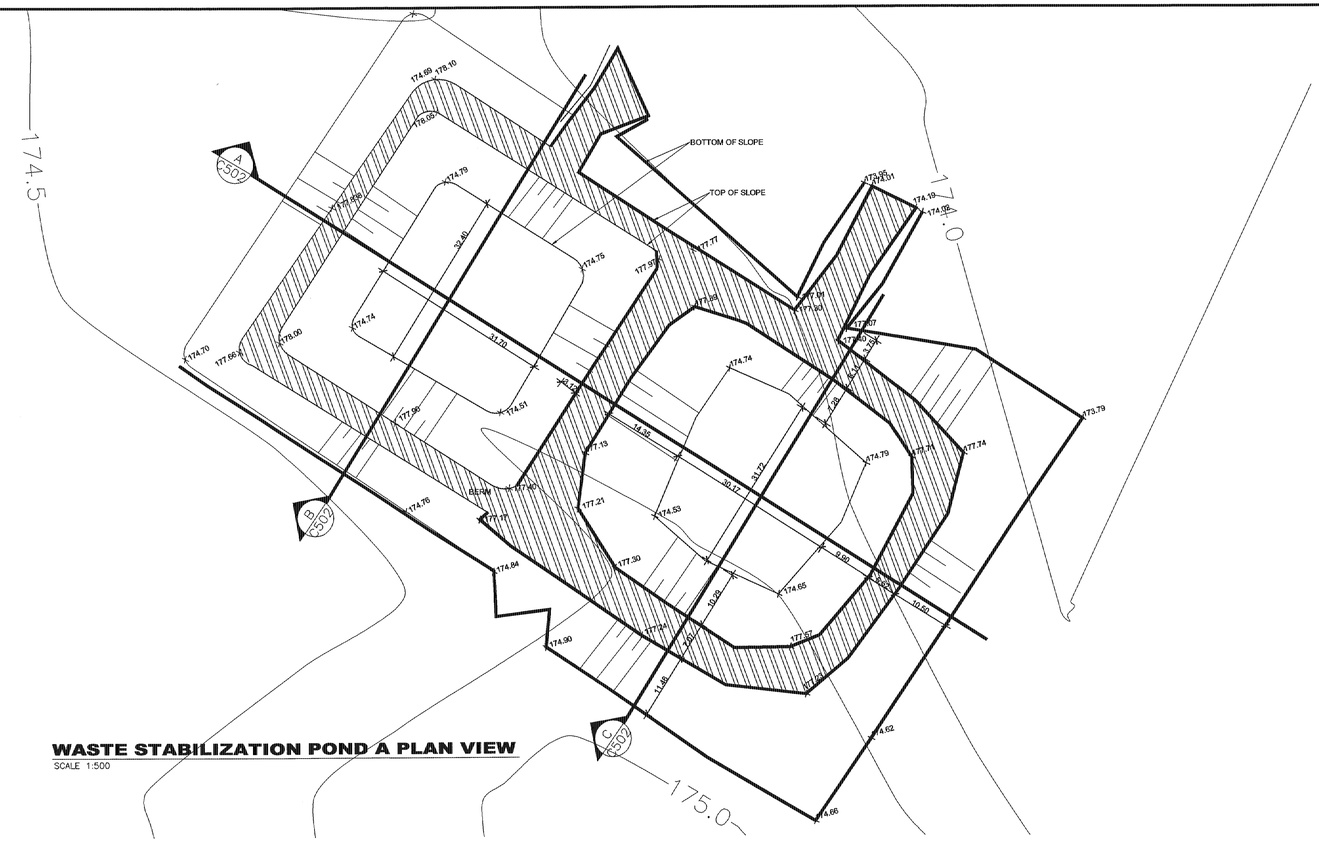
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION

BAFFIN ISLAND NUNAVUT

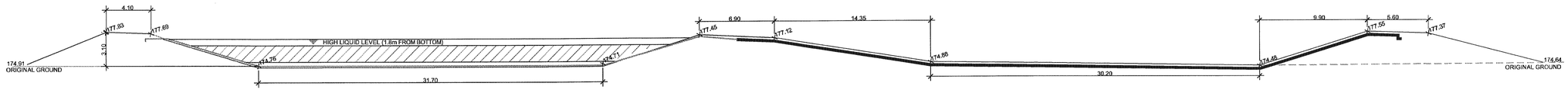
Drawing

AS CONSTRUCTED
PWSP 1
PLAN AND SECTIONS

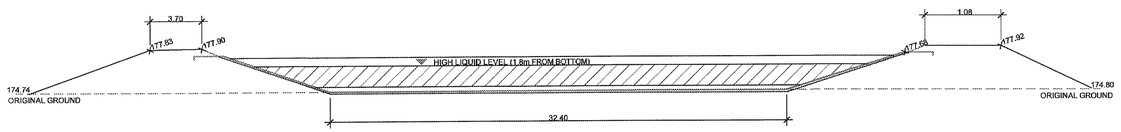
Date	CADD File Number
DATE	ss const\mary...\pwsp..\200_06_03
Scale: SEPT 2008	Job Number: **07-039**
Drawn: AB	
Checked	Drawing Number: **200_06_03**
Approved	



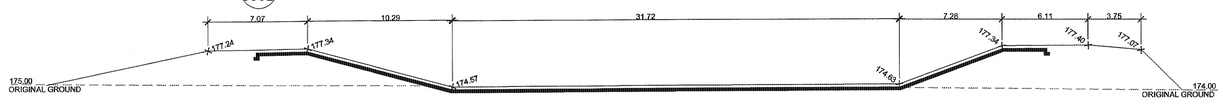
WASTE STABILIZATION POND A PLAN VIEW
SCALE 1:500



SECTION A C502
SCALE 1:200



SECTION B C502
SCALE 1:200



SECTION C C502
SCALE 1:200

Description	Date	No.
2nd Pond	Nov 4_08	1

Revisions and Issues

NOV 19 2008
NORTH Date Printed

GENIVAR

GENIVAR
634 Mountjoy Street South
P.O. Box 120
Timmins, Ontario P4N 7C5
www.genivar.com
Tel: 705-264-9413
Fax 705-267-2225

ARCHITECT STRUCTURAL/CIVIL

REGISTERED PROFESSIONAL ENGINEER M. MARTON LICENSE APPROVED

MECHANICAL ELECTRICAL

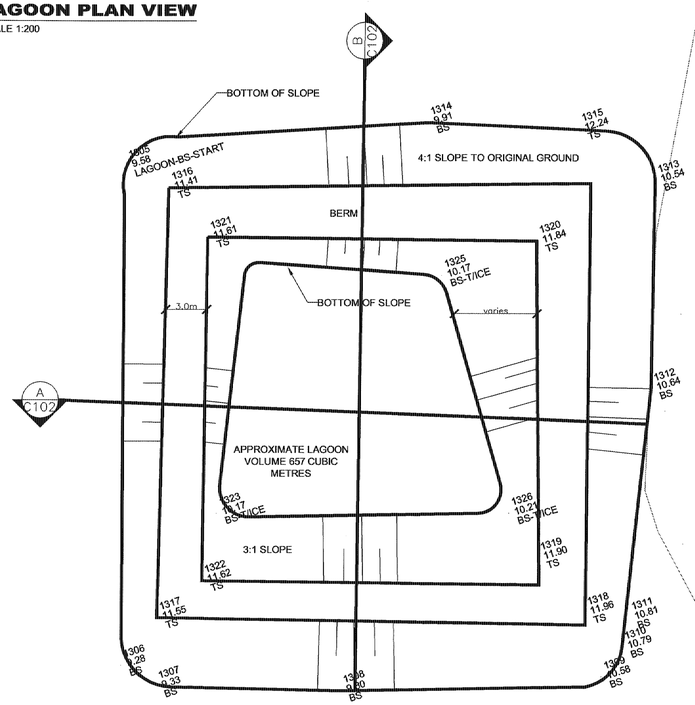
Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND NUNAVUT

Drawing
AS CONSTRUCTED
PWSP 2
PLAN AND SECTIONS

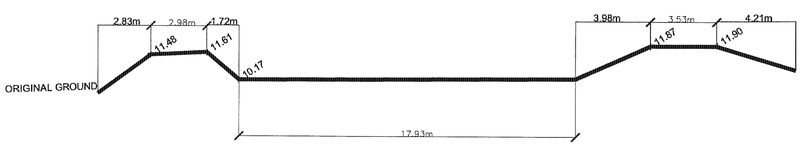
Date: NOVEMBER 2008	CADD File Number: ..\Mary..\PWSP\dwg\200_06_05
Scale: AS NOTED	Job Number: **07-039**
Drawn: SS/SO	
Checked: M.K	Drawing Number: **200_06_05**
Approved: M.K	

LAGOON PLAN VIEW

SCALE 1:200

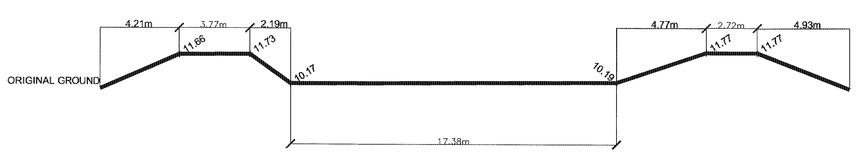


SECTION A C102



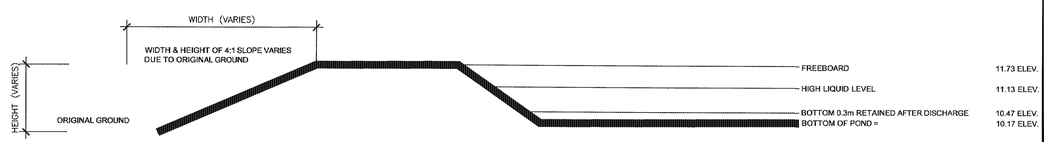
SECTION B C102

SCALE 1:150



TYPICAL LAGOON BERM

SCALE 1:75



Description	Date	No.
Revisions and Issues		

NOV 19 2008

NORTH — Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT STRUCTURAL/CIVIL

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

MECHANICAL ELECTRICAL

Project

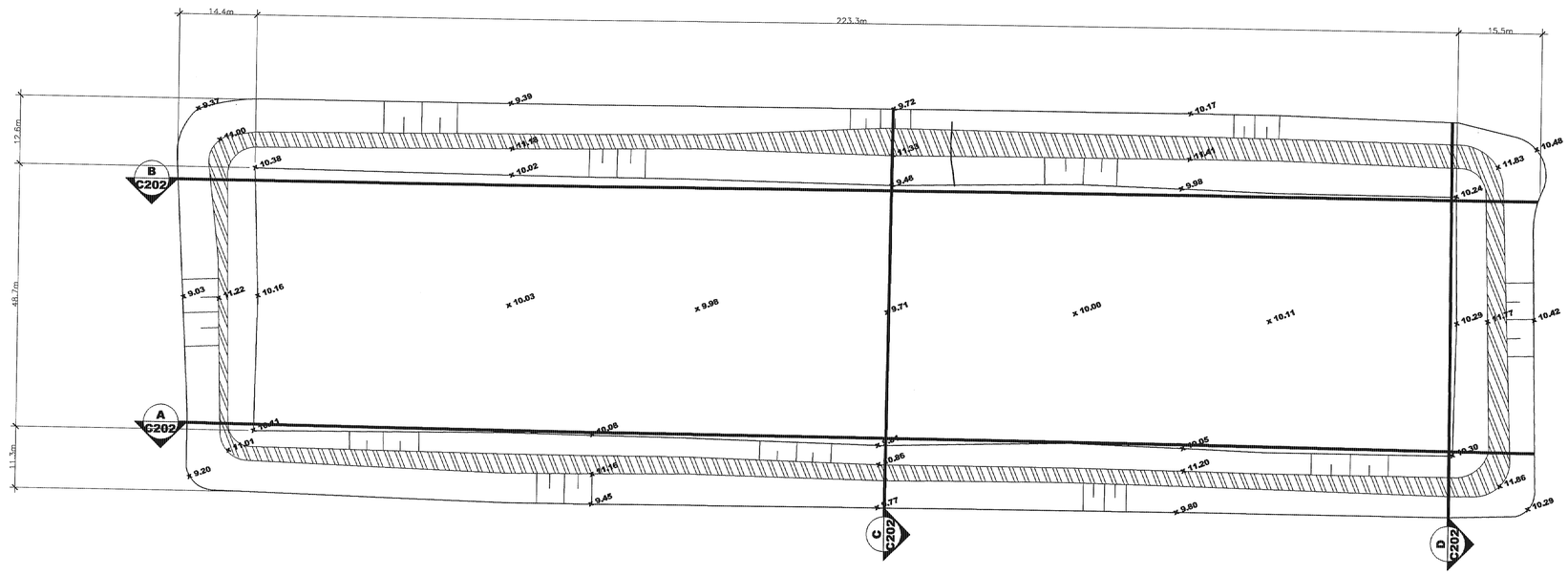
MILNE INLET

MARY-RIVER NUNAVUT

Drawing

AS BUILT SEWAGE LAGOON PLAN AND PROFILES

Date	CADD File Number
JAN 2008	milne..\pwsp..\dwg\100_06_01
Scale: AS NOTED	Job Number: **07-039**
Drawn: AB	
Checked	Drawing Number: **100_06_01**
Approved	



Description	Date	No.
Revisions and Issues		

NOV 19 2008

NORTH Date Printed

B.H. MARTIN CONSULTANTS LTD.
Consulting Engineers and Architect
Timmins Ontario
www.bhmartin.com

ARCHITECT STRUCTURAL/CIVIL

REGISTERED PROFESSIONAL ENGINEER B.H. MARTIN LICENSEE

MECHANICAL ELECTRICAL

Project
Milne Inlet Project
Baffinland Iron Mines Corp
Baffin Island Nunavut

Drawing
Milne Inlet
Fuel Farm Layout
As Built

Date	CADD File Number
Dec 2007	\milne inlet\fuel farm\dwg\100_06_04
Scale 1:500	Job Number 07-039
Drawn AB	
Checked	Drawing Number 100_06_04
Approved	

ATTACHMENT B: PHOTOS

Typical damaged membrane PWSP #1.

PWSP #1

PWSP #2

PWSP #2

Milne Inlet PWSP

Milne Inlet PWSP north dike exterior.

Milne Inlet Fuel Containment Facility

Milne Inlet Fuel Containment Facility

Mary River Fuel Containment Facility
(during bladder installation)

Mary River Fuel Containment dyke

Generator Fuel Containment Cell
(shows test pit to establish membrane elevation)