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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

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INSTALLATION, OPERATION AND MAINTENANCE MANUAL

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10.0 LIMITED WARRANTY

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)

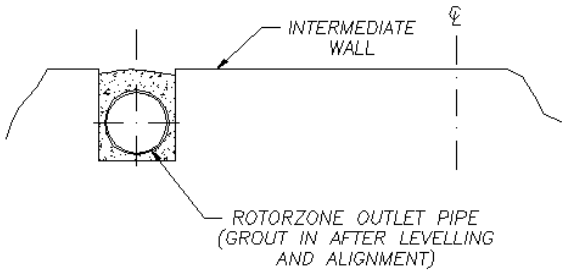


Figure a - **ROTORDISK®** tank outlet through intermediate wall between settlement tank chambers.

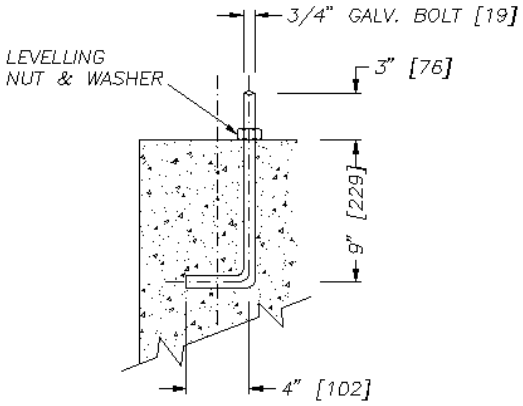
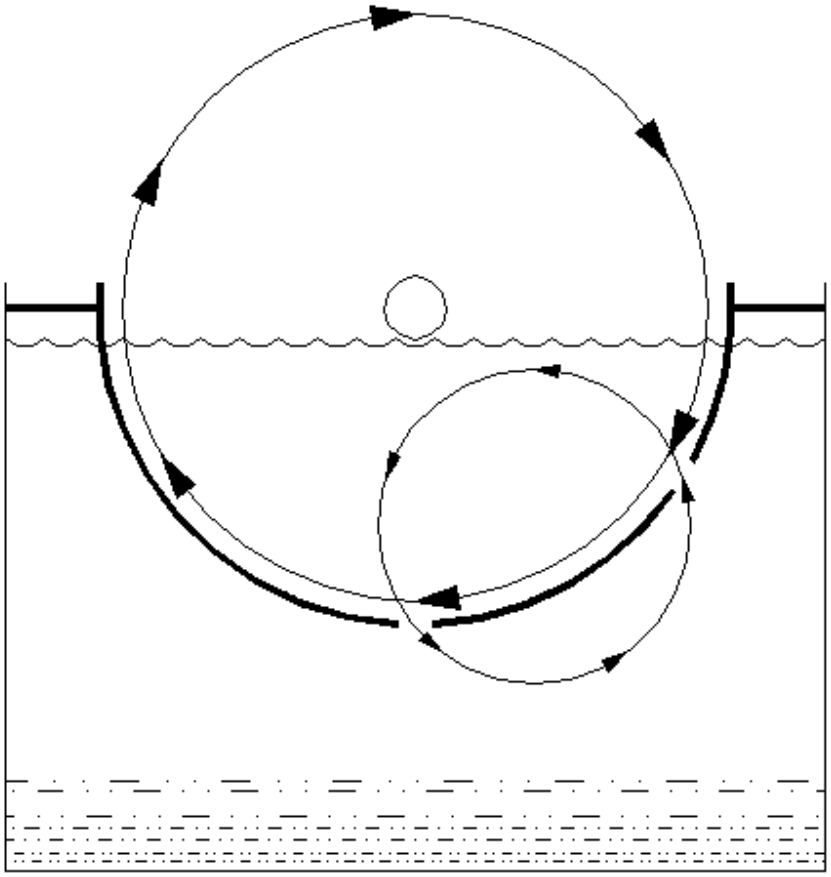


Figure b - anchor bolt detail for **ROTORDISK®** tank.

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.

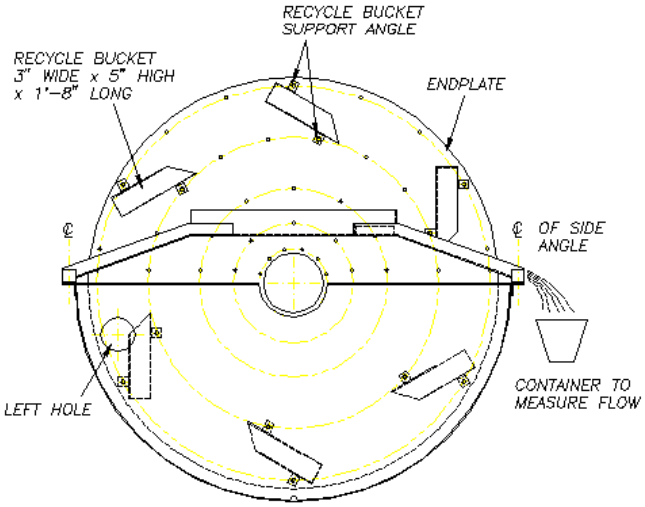
1.4 - DISSOLVED OXYGEN (D.O.) RECYCLE for ROTORDISK®

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.)

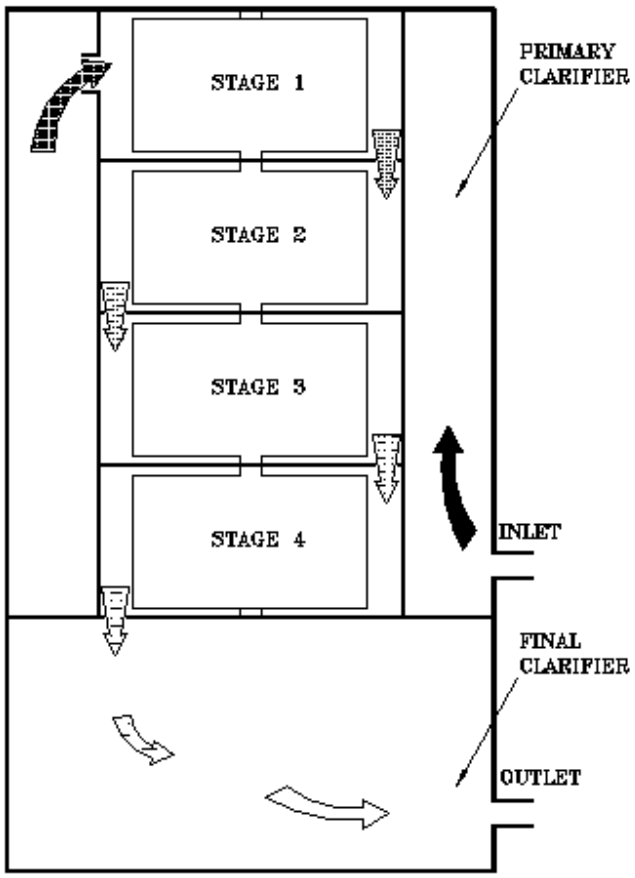
The denitrification section is comprised of two stages separated by a baffle. An equal amount of media is provided in both stages.

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

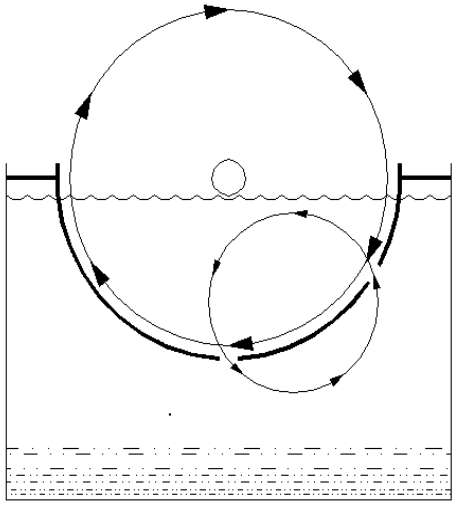


Figure c-unit operating at maximum sludge storage levels. Neither influent flows, nor re-circulating flows, disturb sludge blanket.

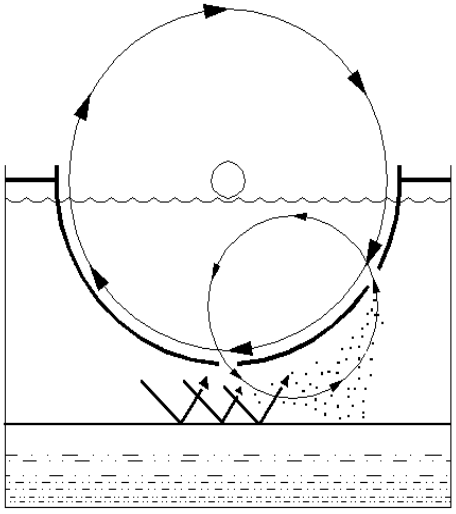


Figure d- unit operating with excess accumulations. Influent flows may disturb sludge blanket and increase BOD and solids loads to Rotorzone to levels above treatment design.

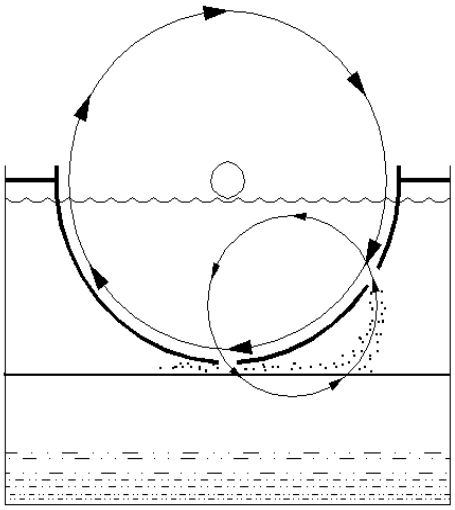


Figure e-Unit operating with excess sludge accumulated to base of Rotorzone. Both influent flows and re-circulation flows will disturb and carry sludge solids. Increase in BOD and solids loads entering Rotorzone will be substantially above design treatment levels, increase accumulated masses on rotating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

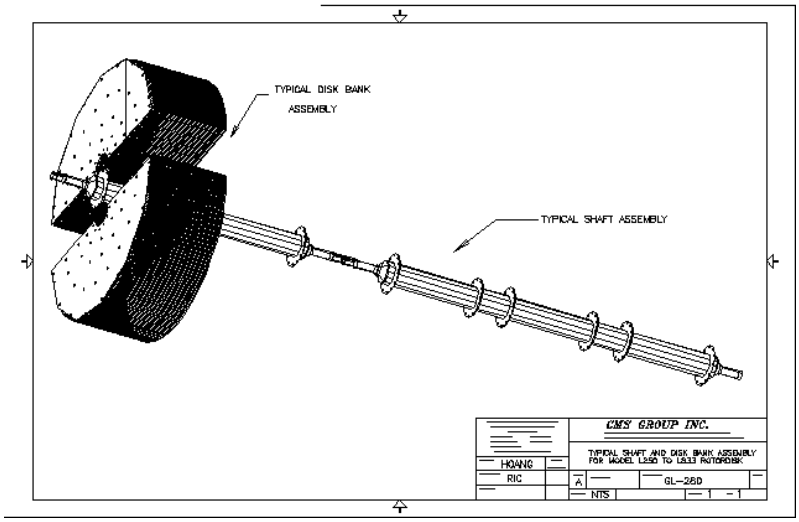


Figure f - typical mounting of disk banks on the shaft(s).

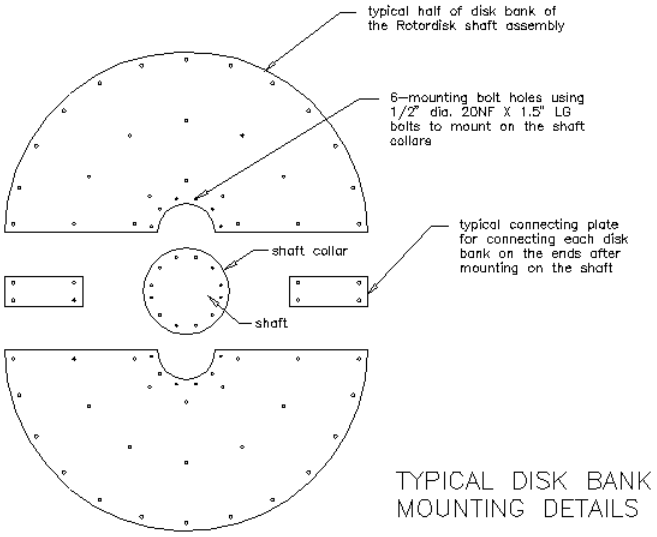


Figure g - exploded view of disk bank mounting parts.

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.

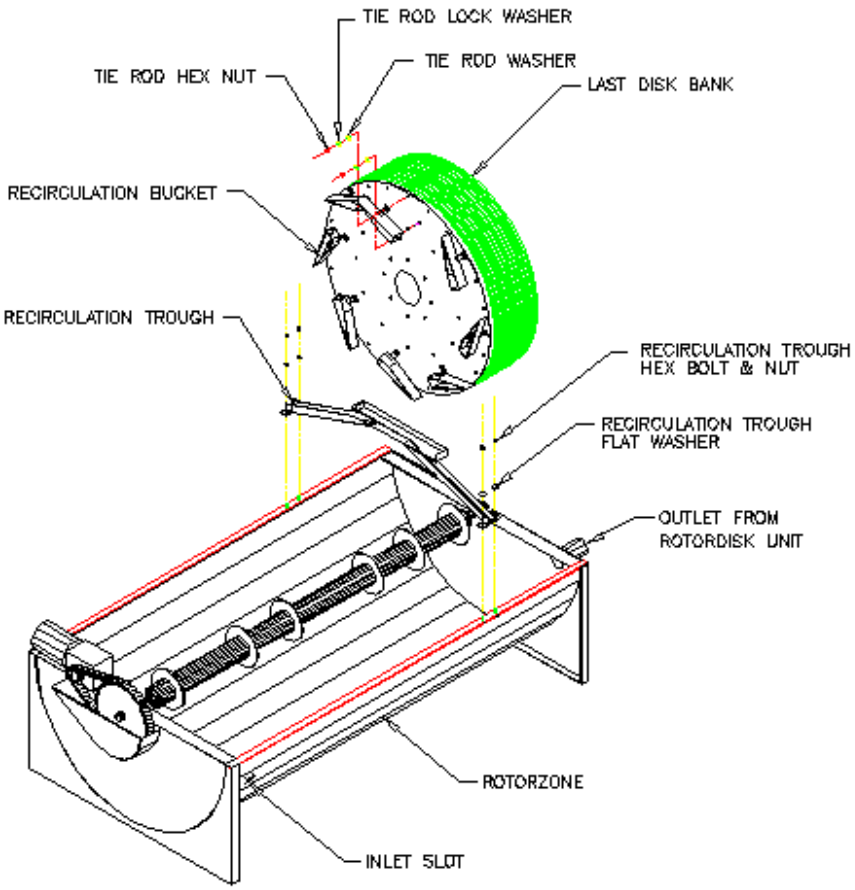
6. Mount small sprocket/coupling hubs on reducer output shaft (whichever is applicable).

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:

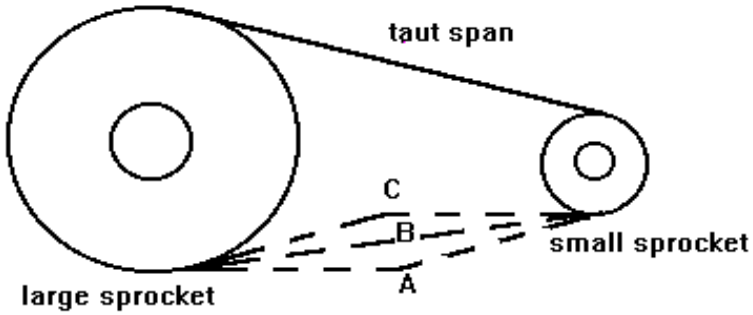
a) Parallel shaft alignment: Shafts should be parallel and level.
b) Axial sprocket alignment: Sprocket axial alignment can be checked with a straight edge, which will extend across the finished sides of the two sprockets.

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.

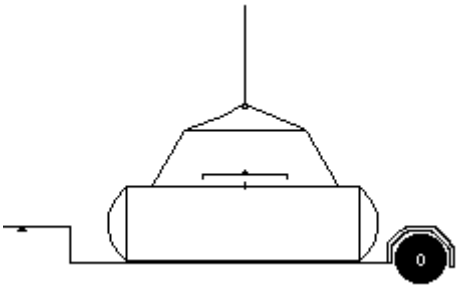
Under no circumstance will SEPROTECH SYSTEMS INCORPORATED, be responsible to the warrantee for any other direct or consequential damages. Including but not limited to; lost profits, lost income, labour charges, delays in production, and/or idle production, which damages are caused by a defect in material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

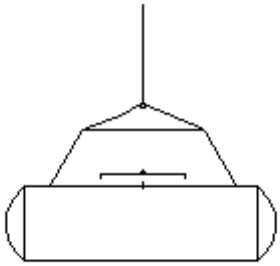
This warranty is expressly in lieu of any other expressed or implied warranty, excluding any warranty of merchantability or fitness, and of any other obligation on the part of SEPROTECH SYSTEMS INCORPORATED.

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

LIFTING

INSTRUCTIONS





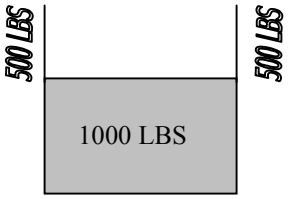
CENTER OF GRAVITY

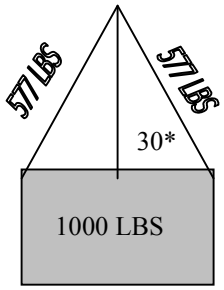
It is always important in rigging practice to rig the load so that it is stable. A stable load is one in which the center of gravity of the load is directly below the main hook and below the lowest point of attachment of the slings. The center of gravity of an object is that point at which the object 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.

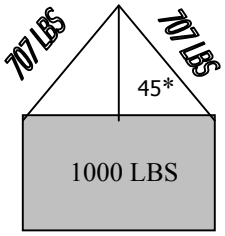
Crane operators should adjust the rigging and test for the actual center of gravity before the load is lifted.

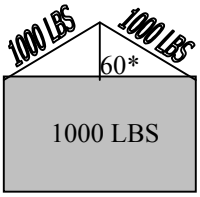
WEIGHT vs. ANGLE





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

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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

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LICENSEE
NWT/NU

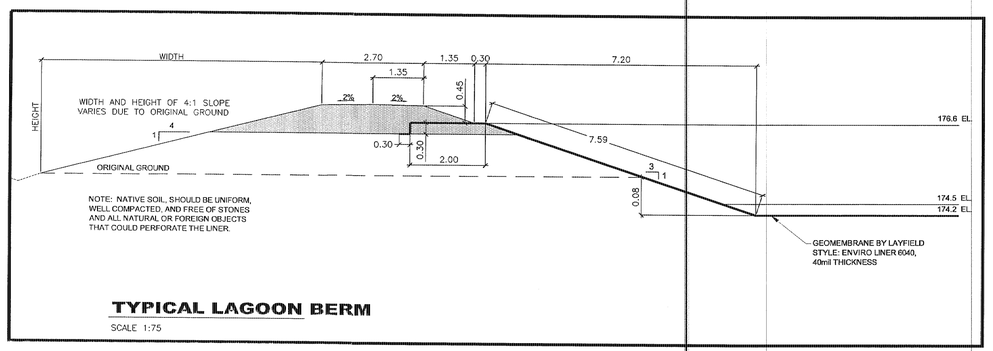
MECHANICAL

ELECTRICAL

Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND NUNAVUT

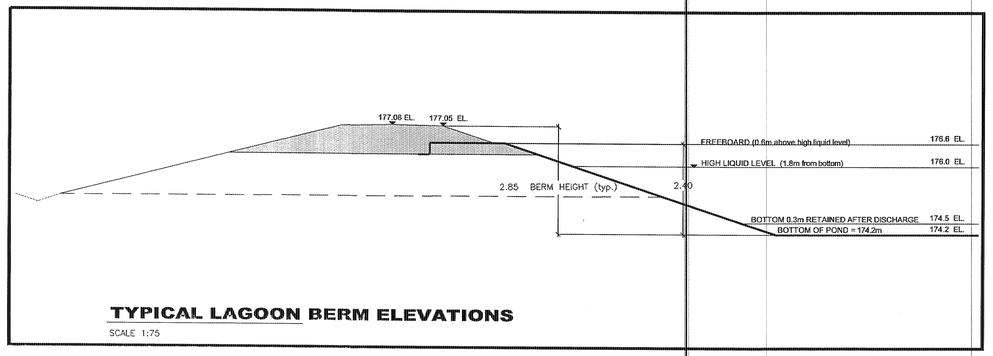
Drawing
POLISHING POND PLAN VIEW

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:	



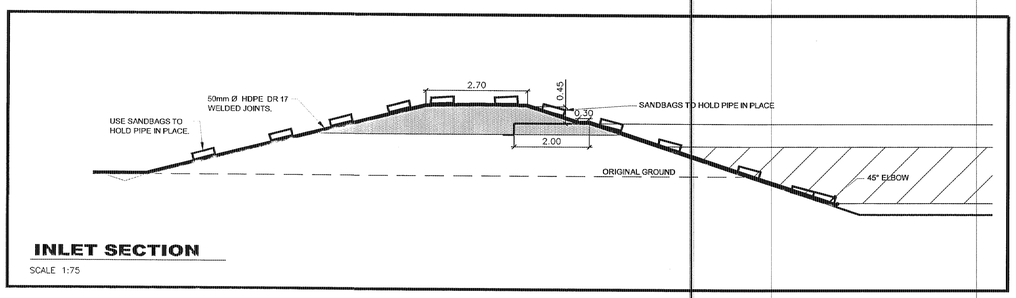
TYPICAL LAGOON BERM

SCALE 1:75



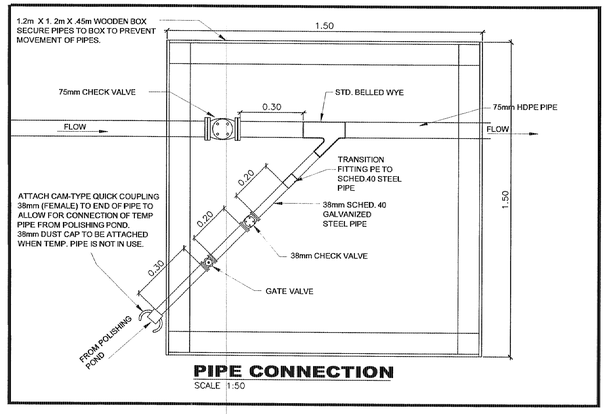
TYPICAL LAGOON BERM ELEVATIONS

SCALE 1:75



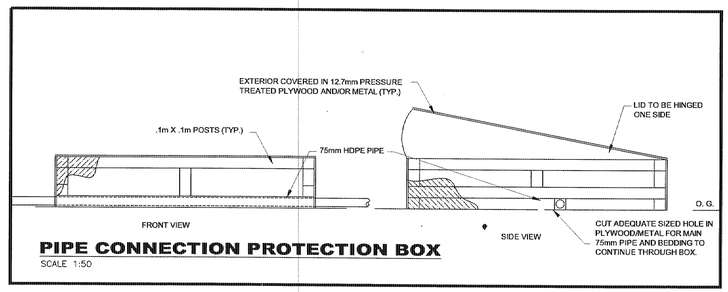
INLET SECTION

SCALE 1:75



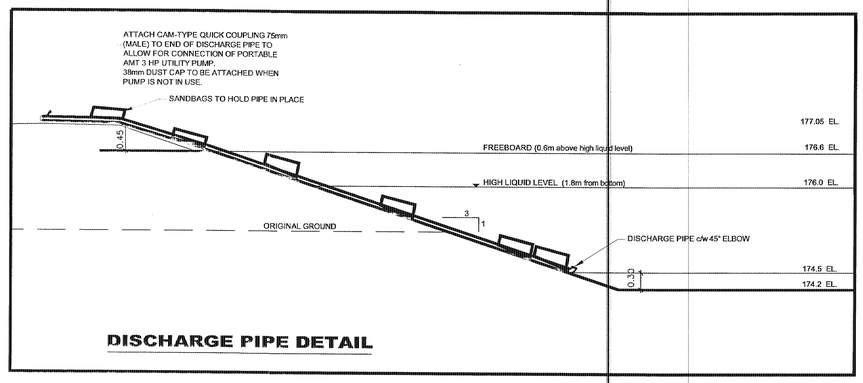
PIPE CONNECTION

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

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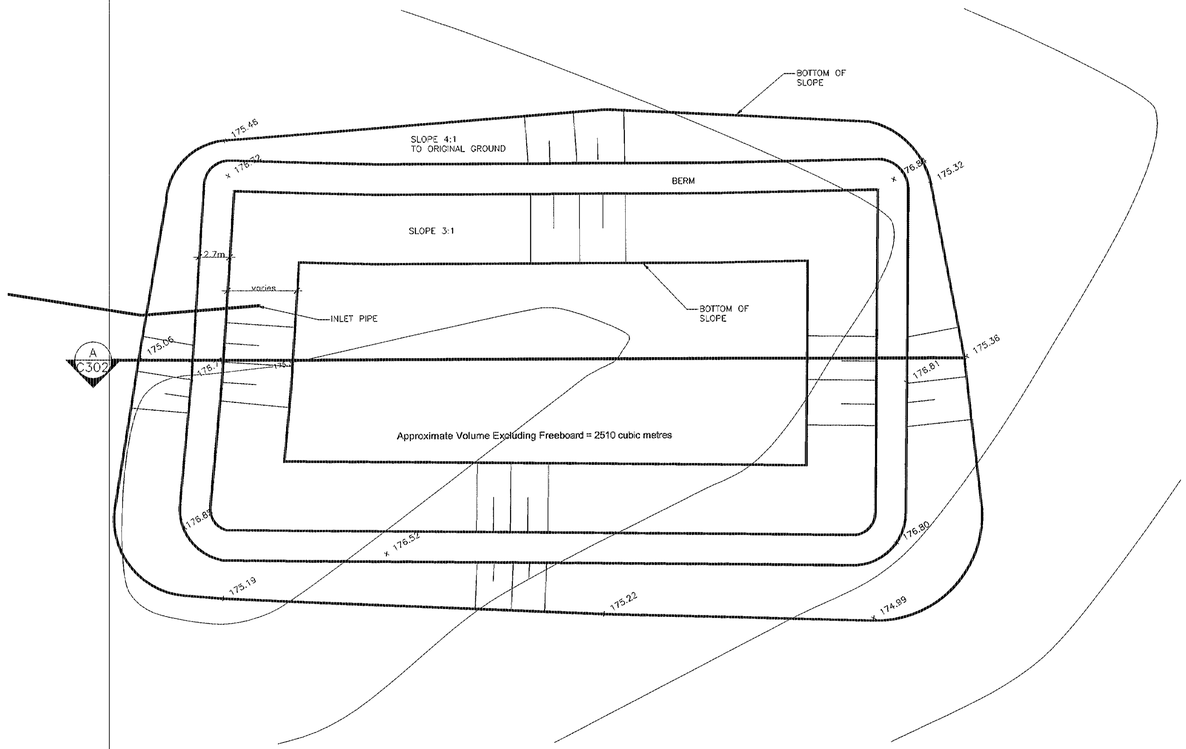
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION

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	



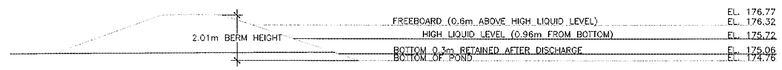
TOTAL CAPACITY OF POND: 2,577m³

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

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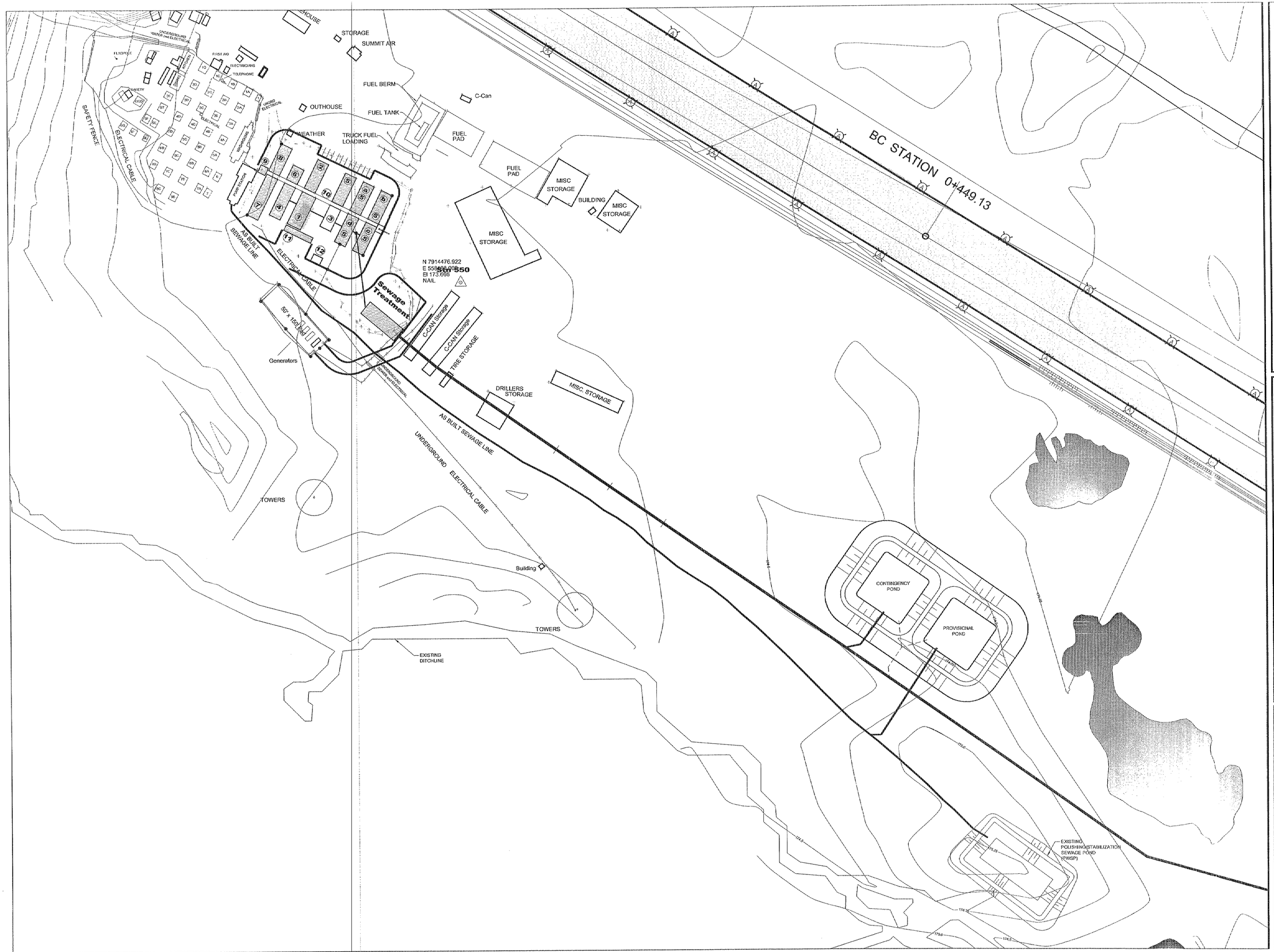
Project
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION
BAFFIN ISLAND NUNAVUT

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

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ARCHITECT STRUCTURAL/CIVIL

MECHANICAL ELECTRICAL

Project

MARY RIVER PROJECT
BAFFIN LAND IRON MINES CORP

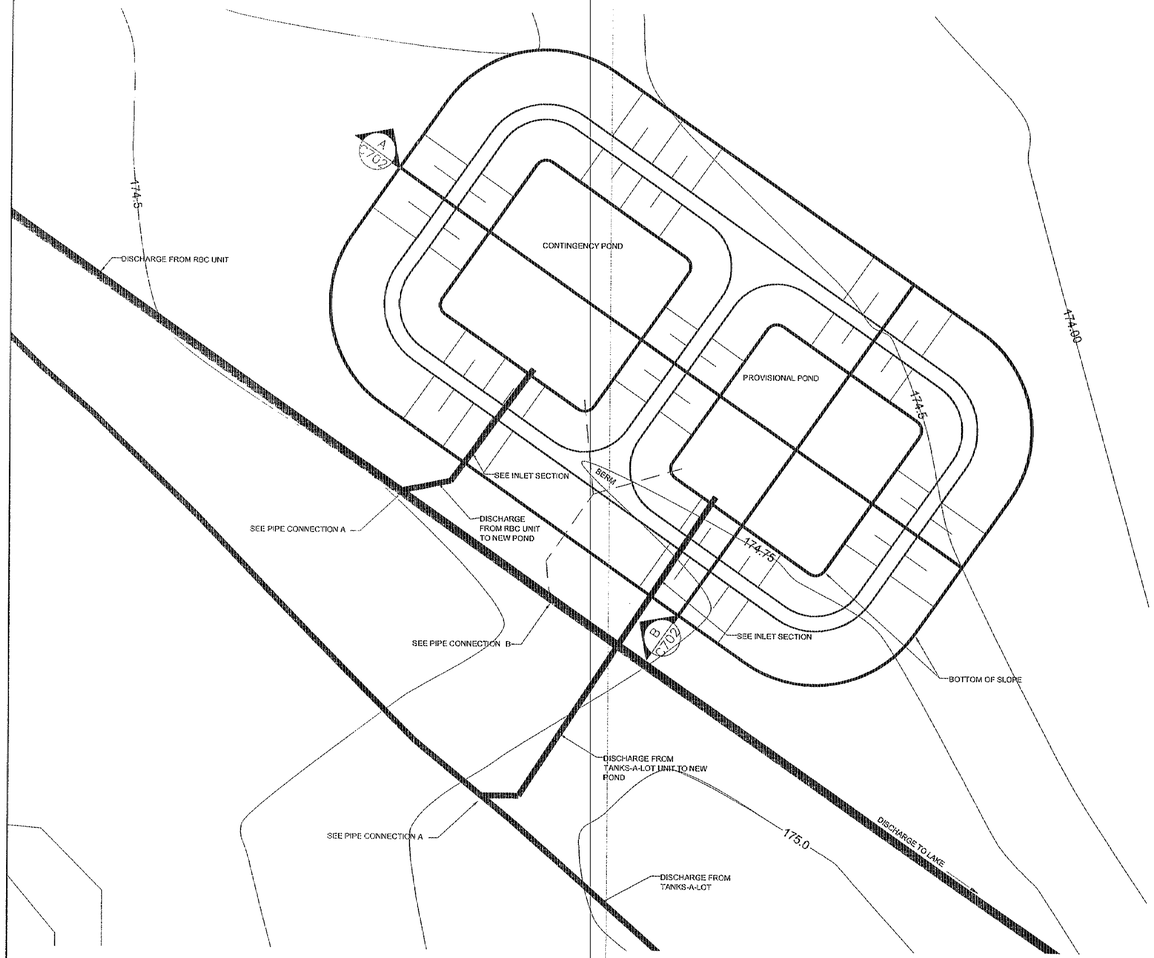
BAFFIN LAND NUNAVUT

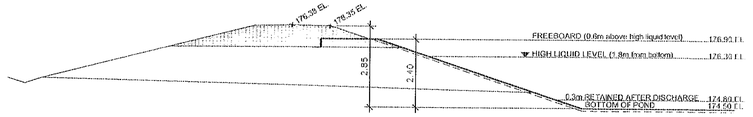
Drawing

MARY RIVER PWSP #2 SITE PLAN

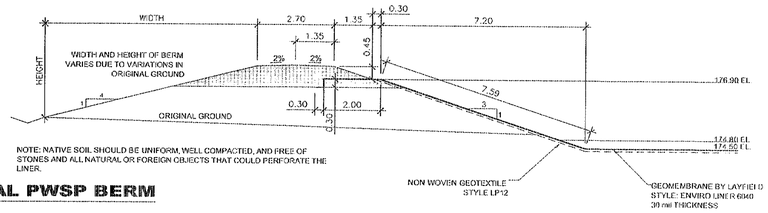
Date	CADD File Number
APRIL 2008	civil/design/maincamp
Scale 1:1000	Job Number **06-090**
Drawn AB	
Checked	Drawing Number **C701**
Approved	

PWSP PLAN VIEW
SCALE 1:500



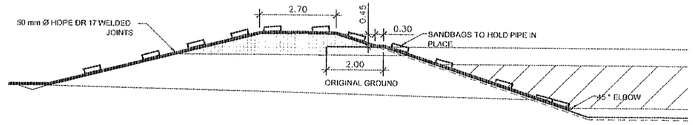


TYPICAL PWSP BERM ELEVATIONS
SCALE 1:100

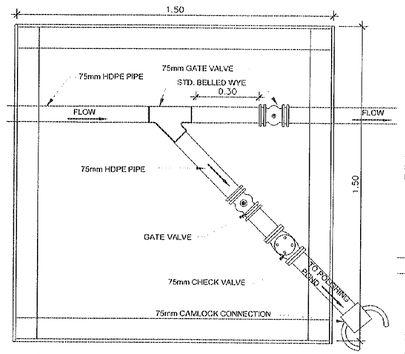


NOTE: NATIVE SOIL SHOULD BE UNIFORM, WELL COMPACTED, AND FREE OF STONES AND ALL NATURAL OR FOREIGN OBJECTS THAT COULD PERFORATE THE LINER.

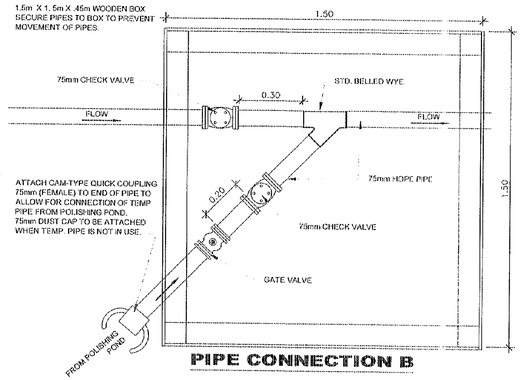
TYPICAL PWSP BERM
SCALE 1:100



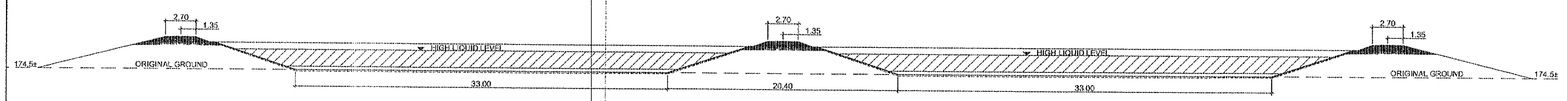
INLET SECTION
SCALE 1:100



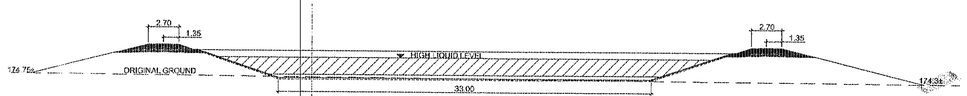
PIPE CONNECTION A



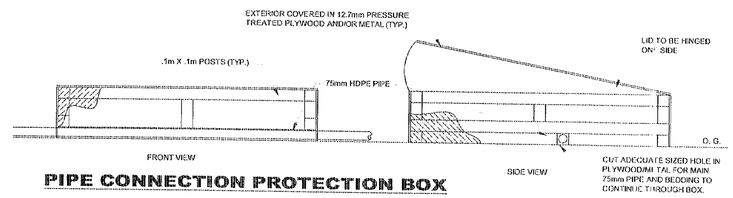
PIPE CONNECTION B



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

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MECHANICAL ELECTRICAL

Project

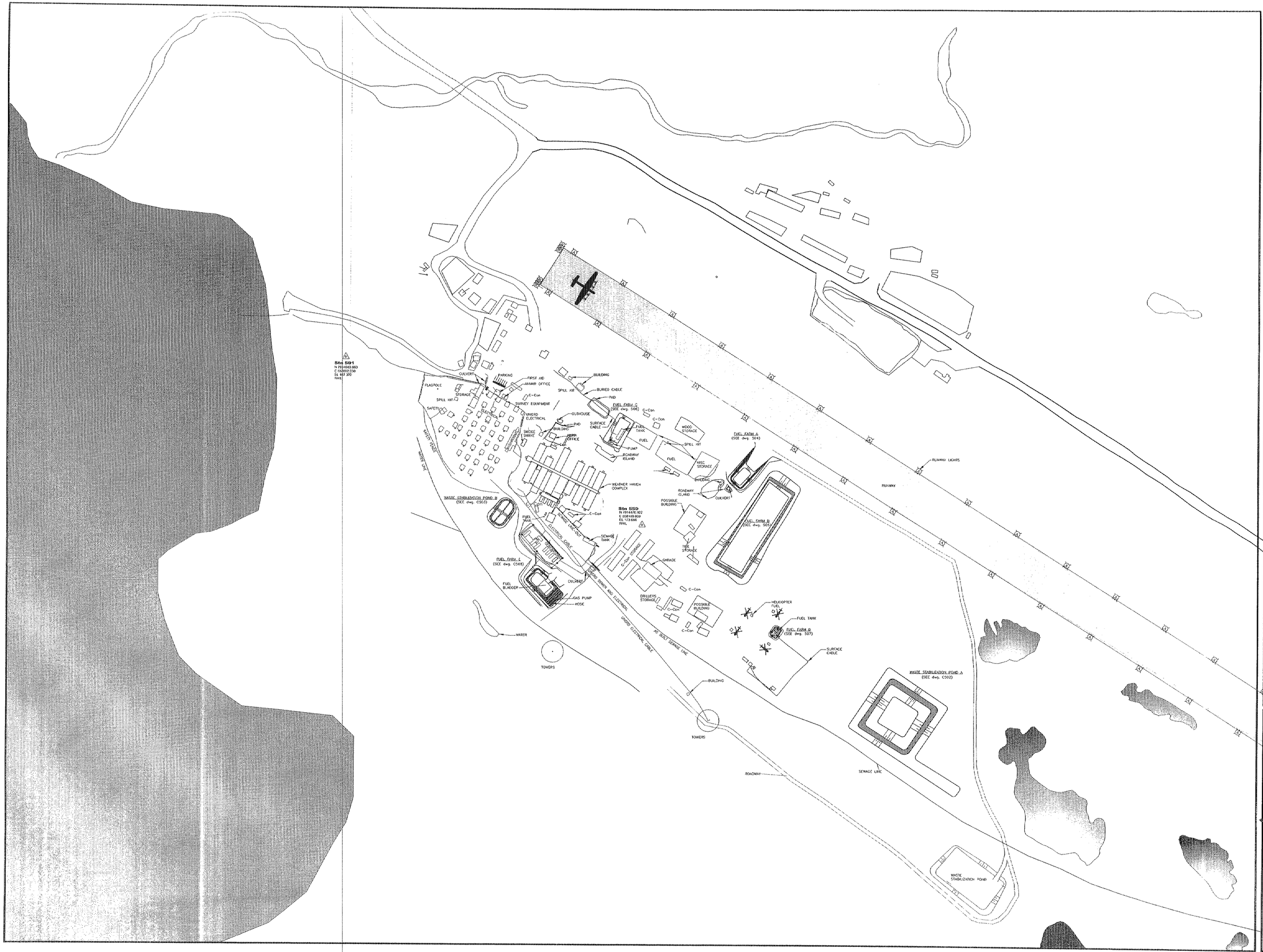
MARY RIVER PROJECT
BAFFIN LAND IRON MINES CORP

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		

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Date Printed

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MECHANICAL | ELECTRICAL

Project

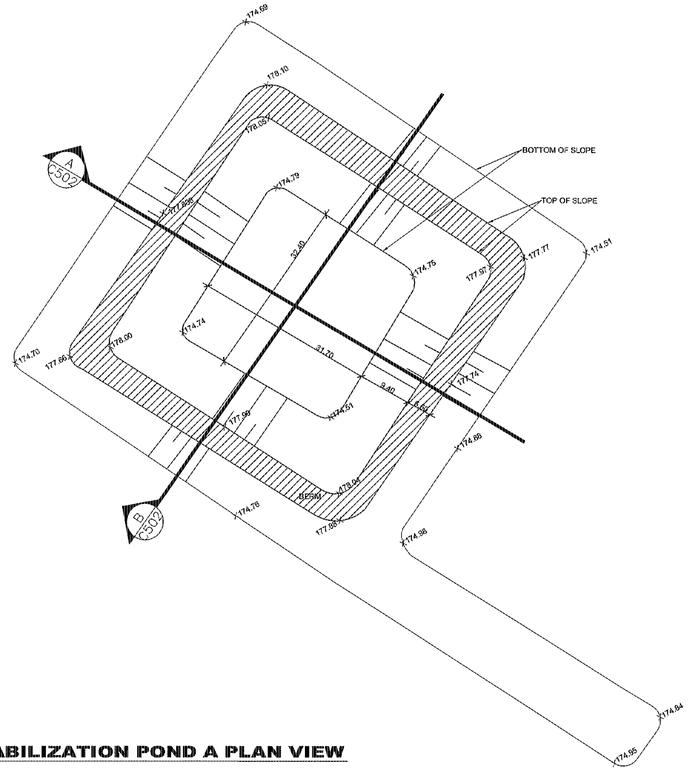
MARY RIVER PROJECT
BAFFINLAND IRON MINES CORPORATION

BAFFIN ISLAND NUNAVUT

Drawing

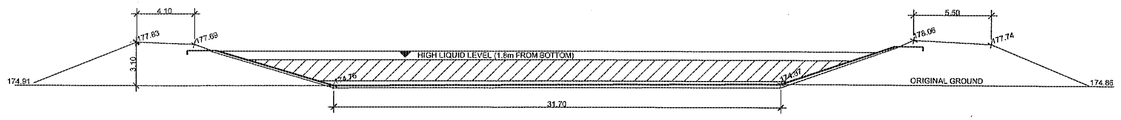
MARY RIVER
SITE PLAN
AS CONSTRUCTED

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	

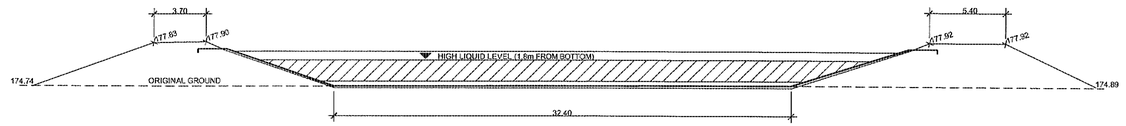


WASTE STABILIZATION POND A PLAN VIEW
SCALE 1:500

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

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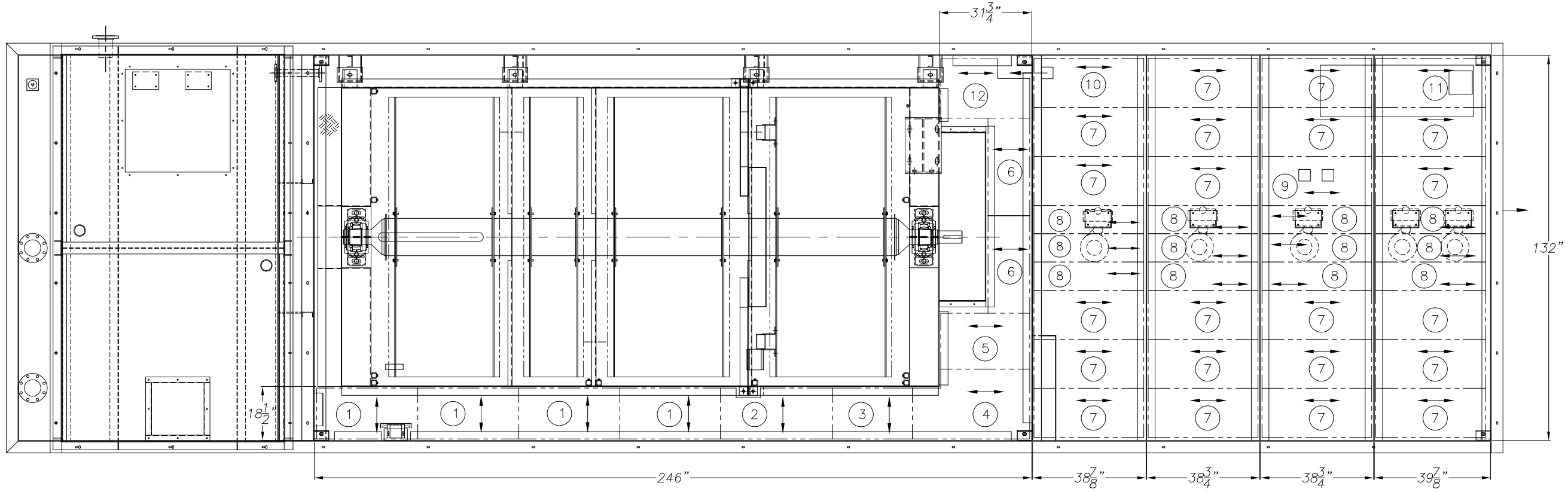
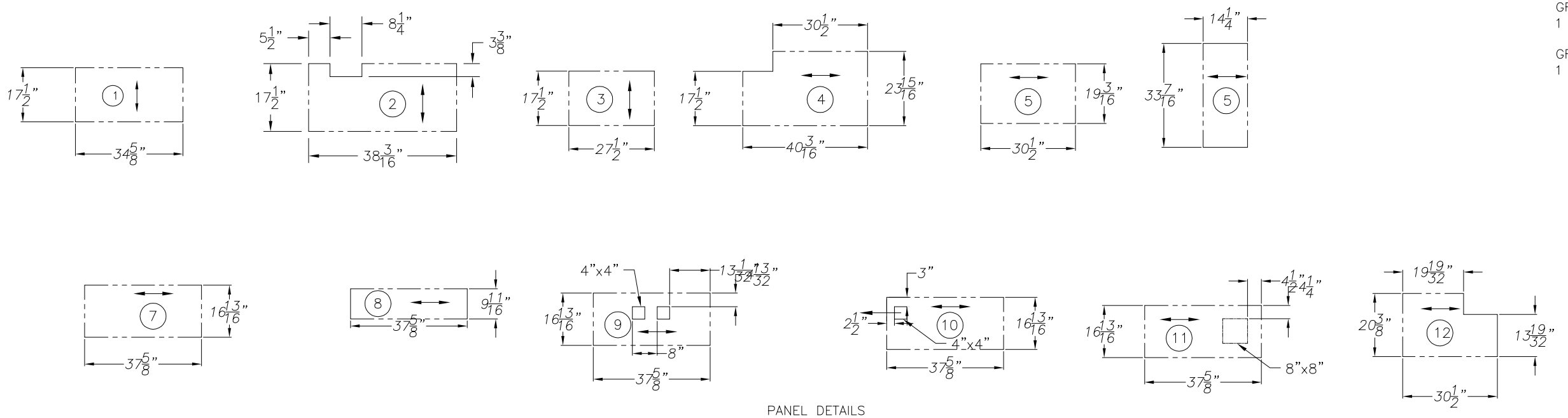
REGISTERED PROFESSIONAL ENGINEER P. Kordgharechorloo LICENSEE 2570 NUNAVUT

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

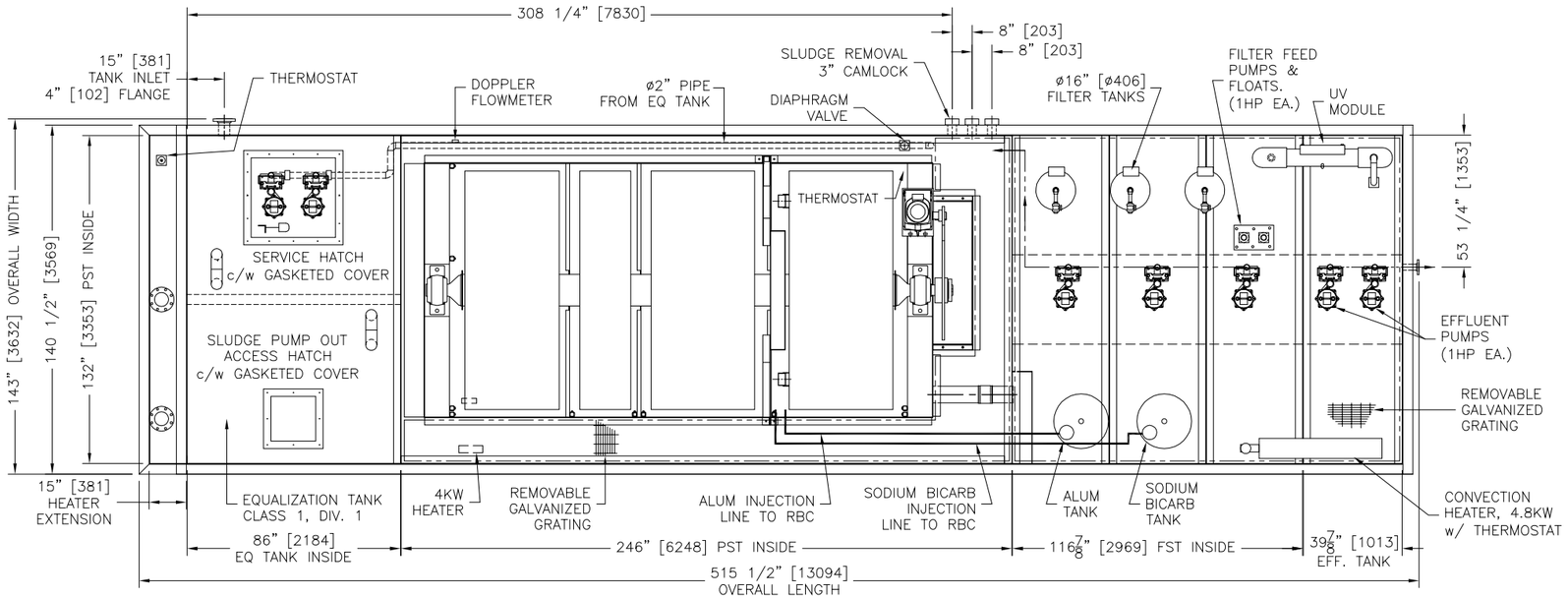
ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

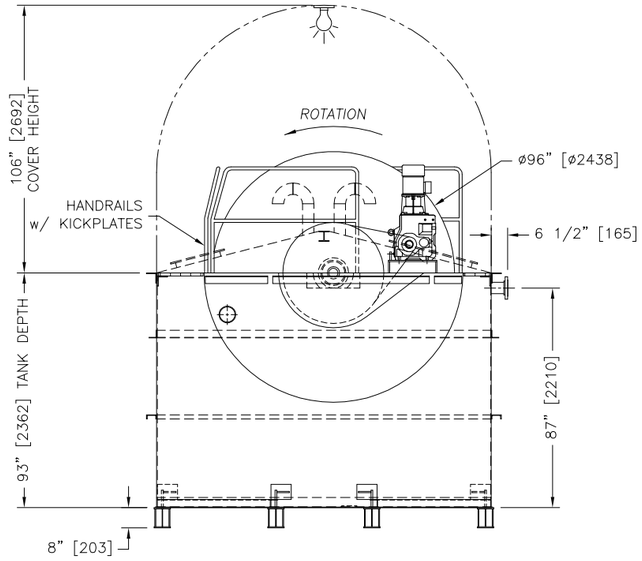
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

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

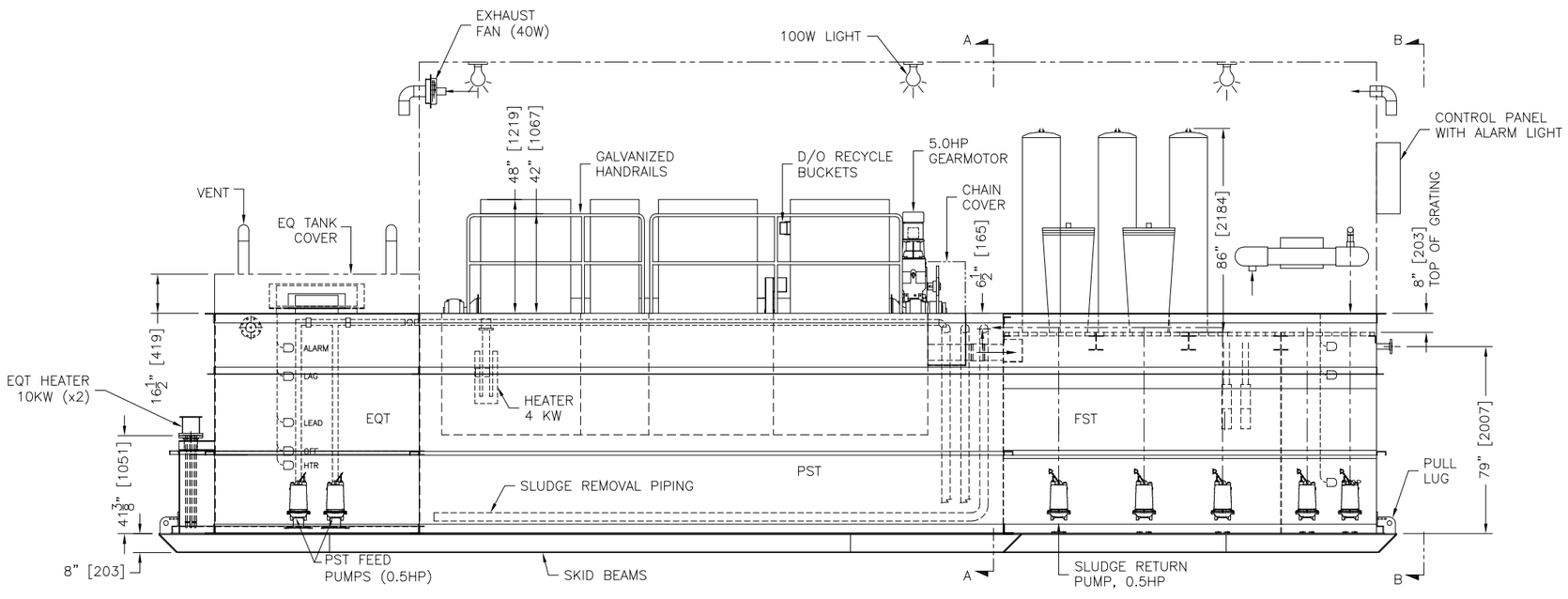
DRAWN	CHECKED	DATE	SIZE	SCALE	WEIGHT	SHEET	DWG NO.	REV
SA		30–MAY–2007	B	1:40	1980 LB.	1 OF 1	60052–S03	0

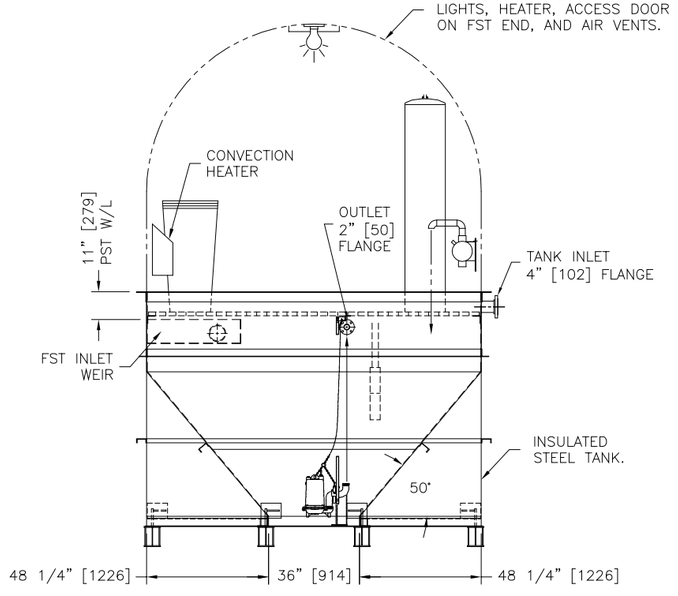
PRELIMINARY
NOT FOR CONSTRUCTION





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

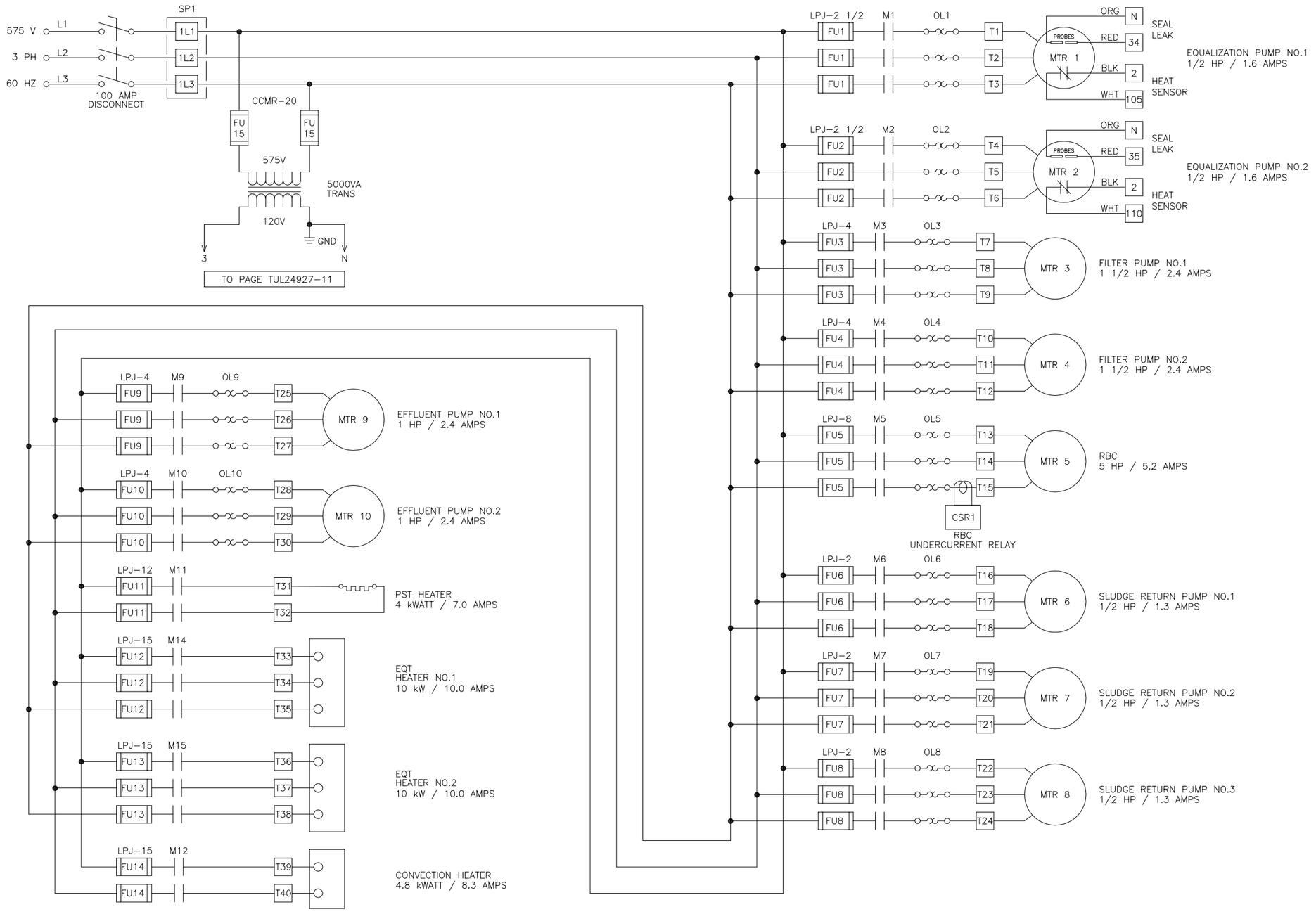
PROJECT:
BAFFINLAND IRON MINES
MARY RIVER, NUNAVUT

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.
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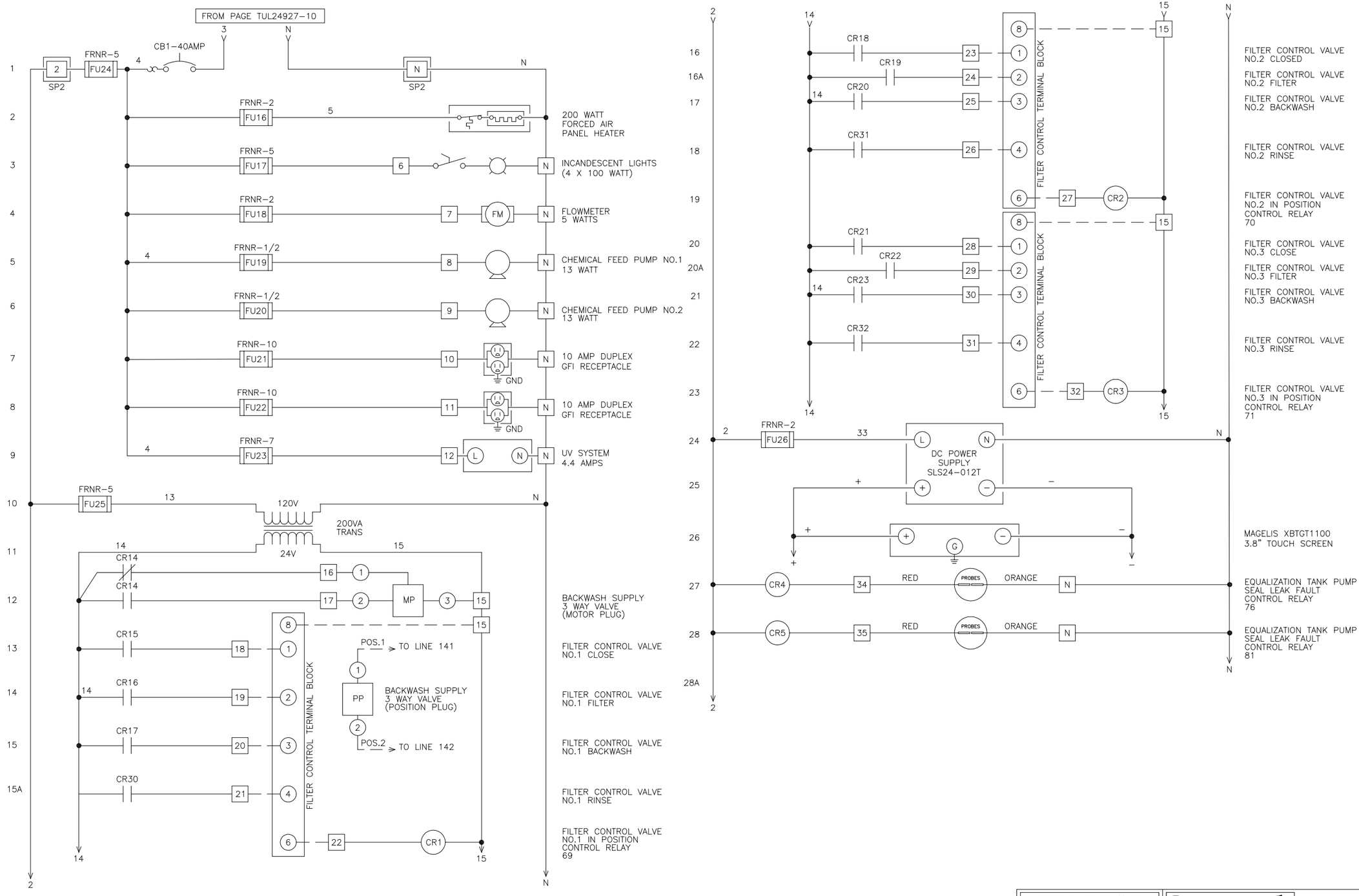
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

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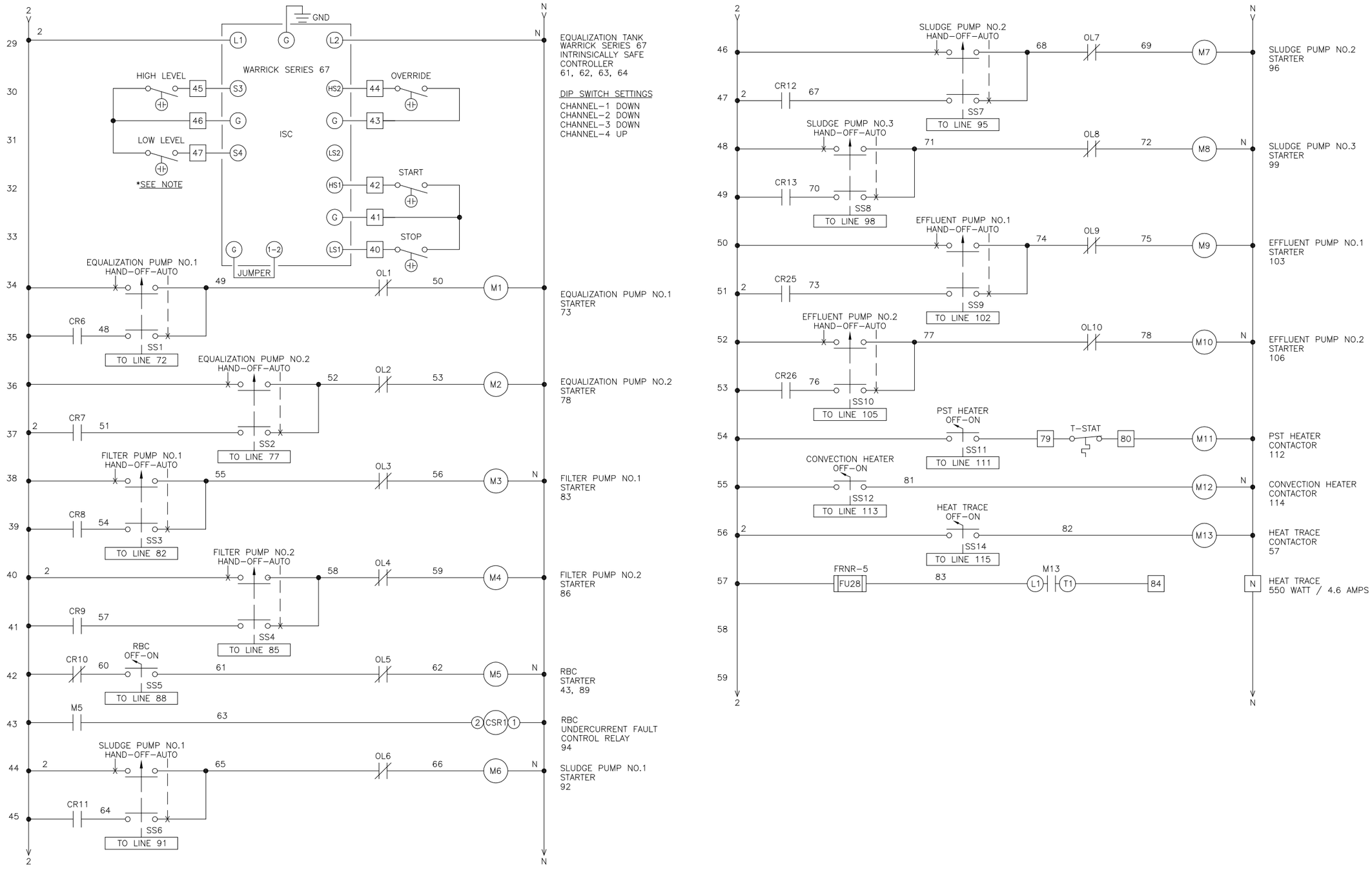
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

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:

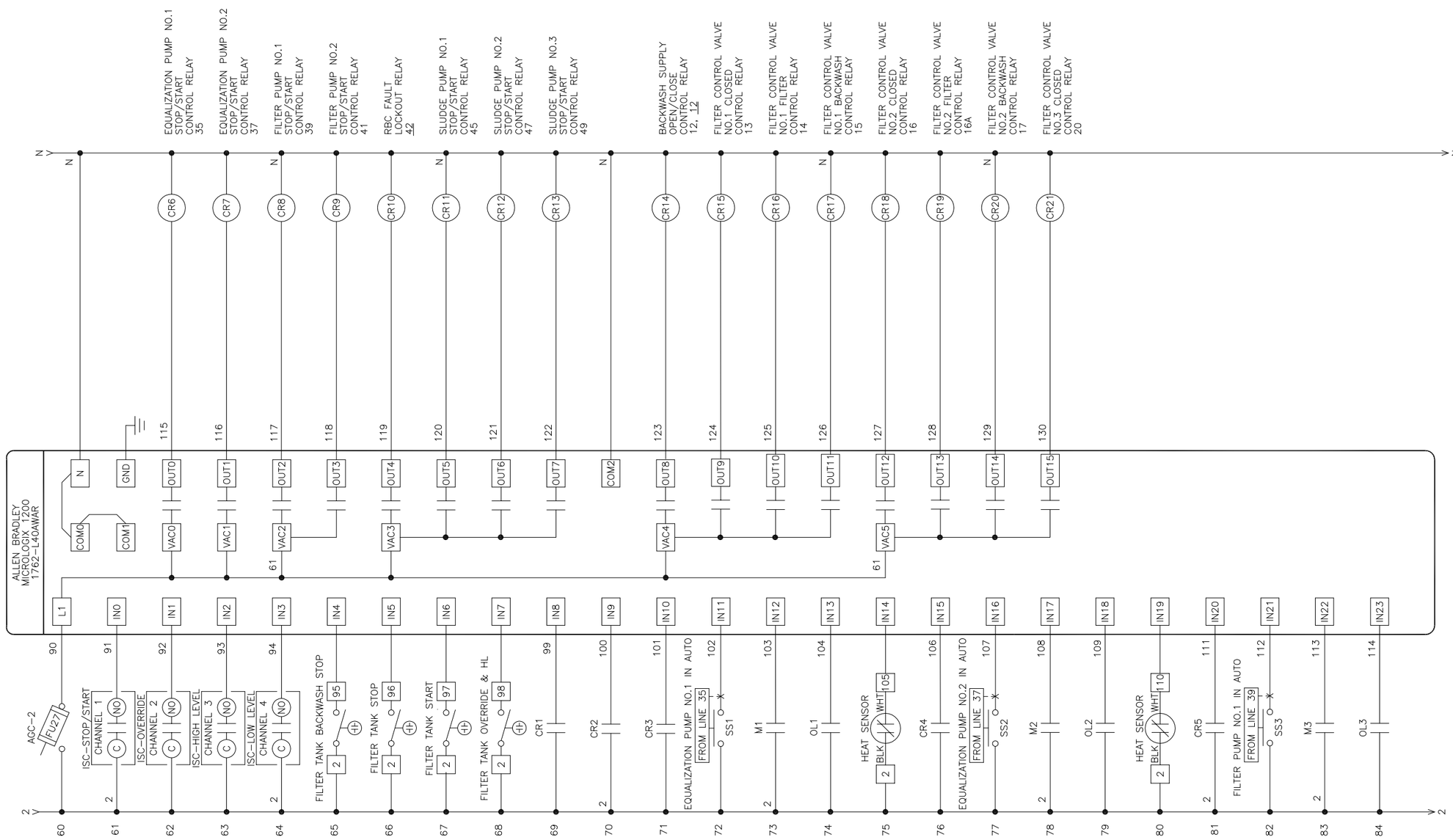
REV	DESCRIPTION	YY/MM/DD	BY
2	AS BUILT CHANGES (TUL-R3)	07/07/31	KR
1	MISC. CHANGES (TUL-R2)	07/06/27	KR
0	CONVECTION HEATER & HEAT TRACE ADDED (TUL-R1)	07/06/11	KR

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.

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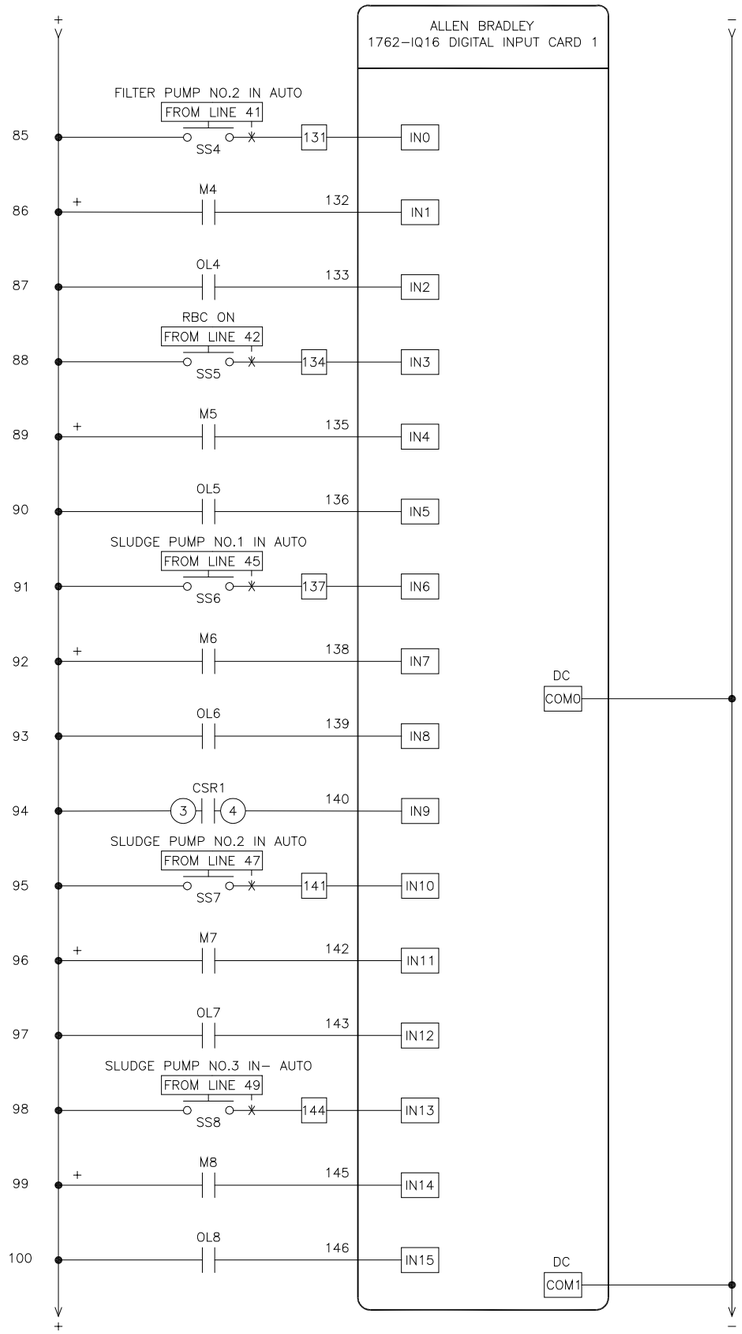
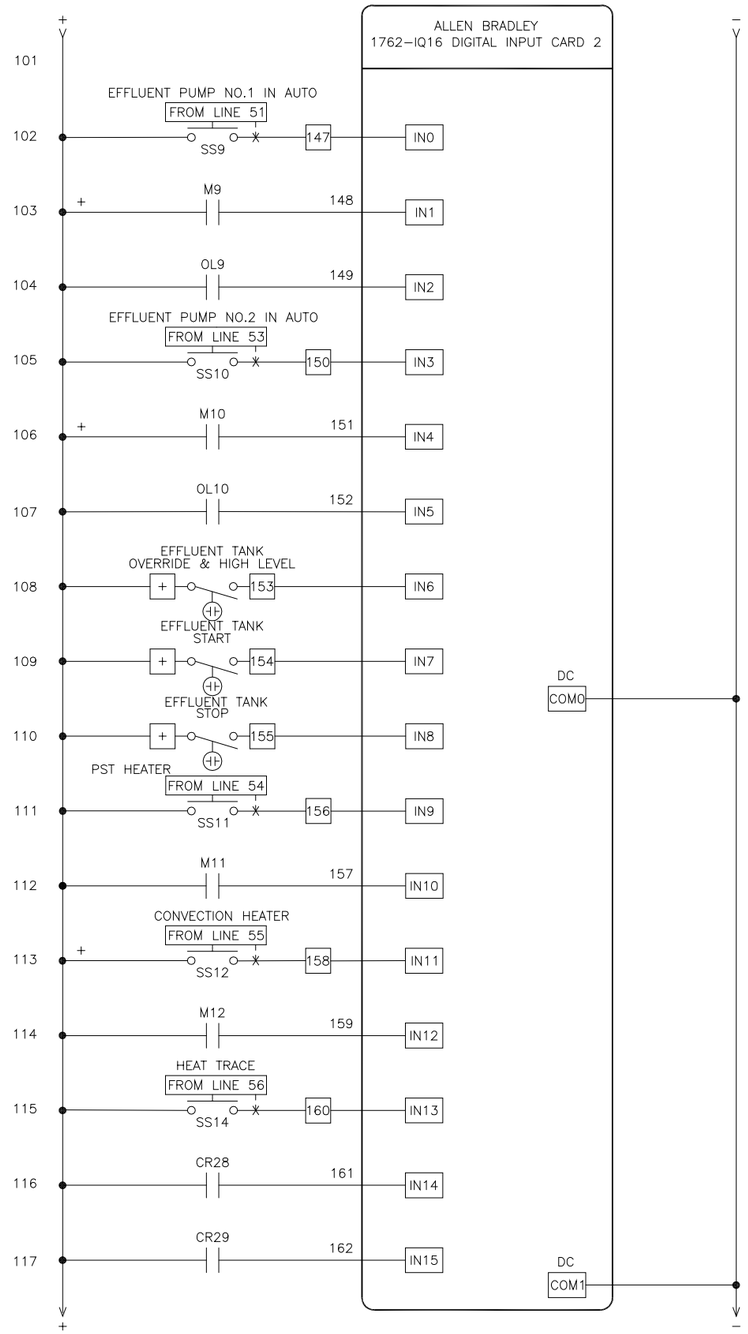
DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

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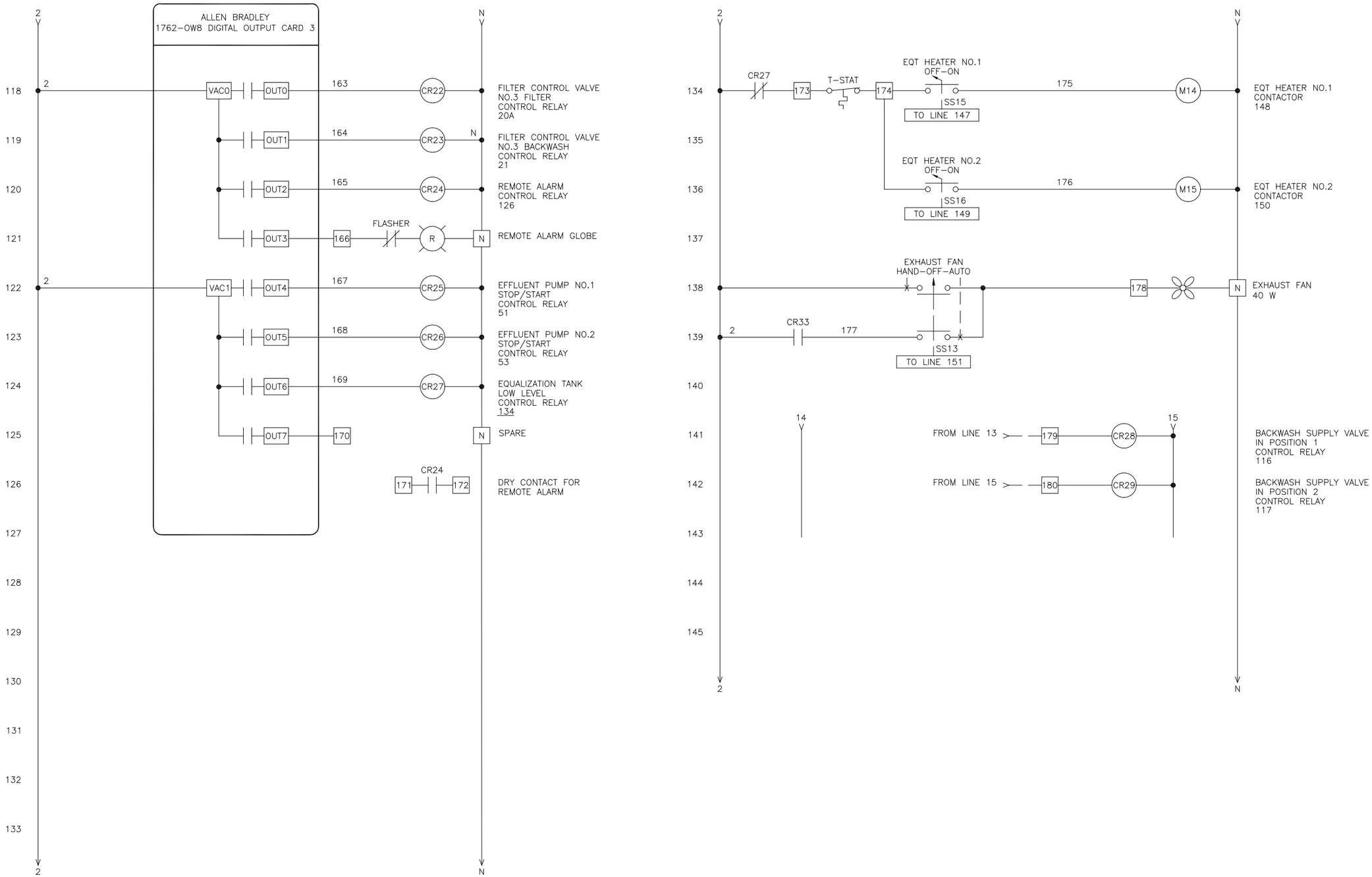
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523–1641 FAX: (613) 731–0851
Email: contact@seprotech.com Web: http://www.seprotech.com

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

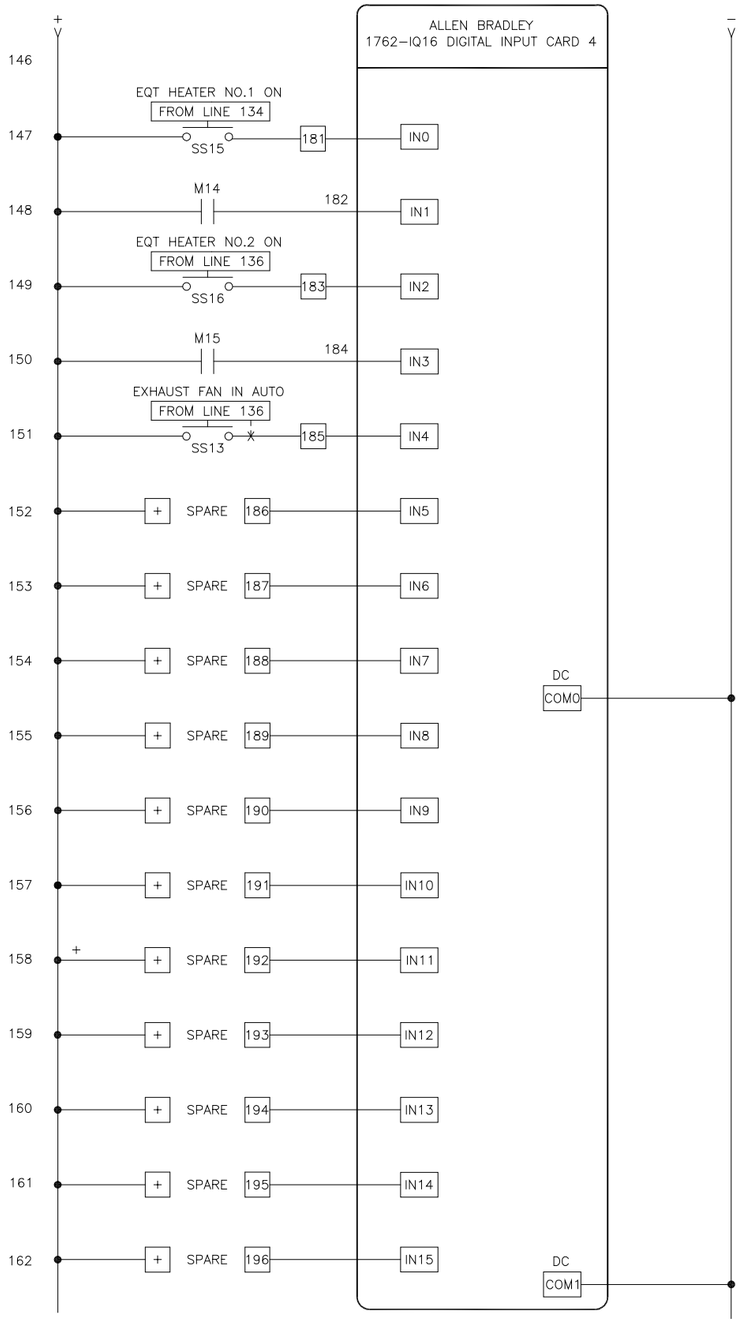
ALL TOLERANCES ARE +/- 1/32" UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE IN INCHES.

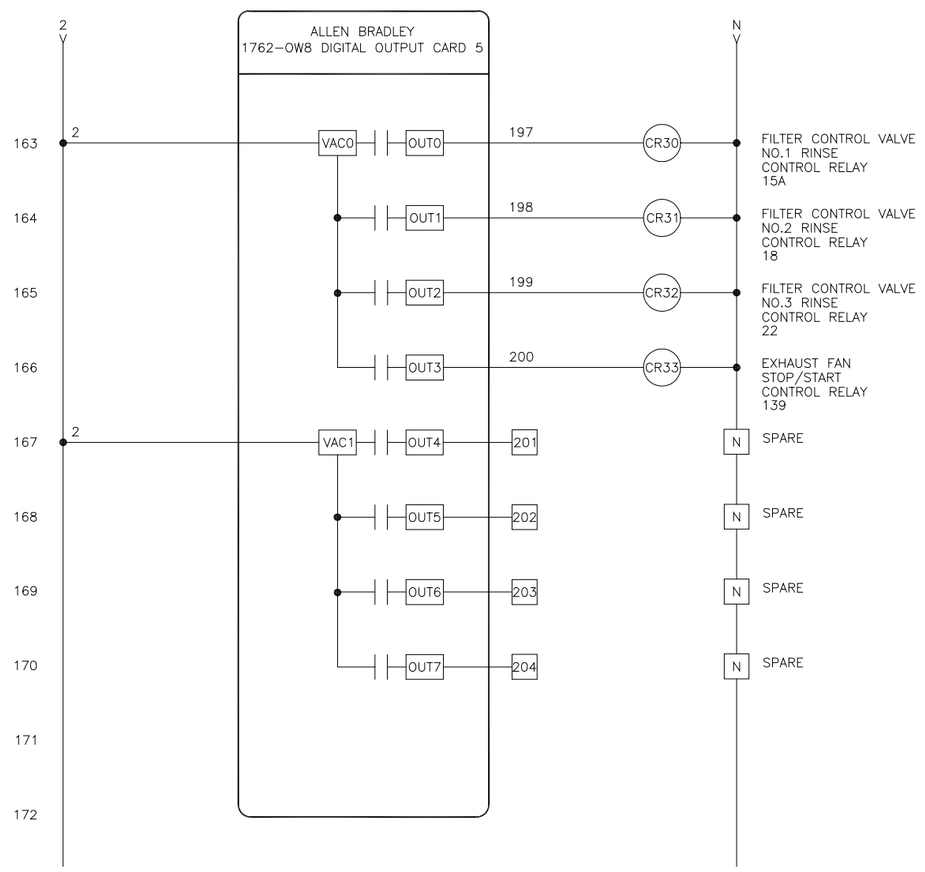
DRAWN: DC | CHECKED:
DATE: 20-JUN-2007 | SIZE: B

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
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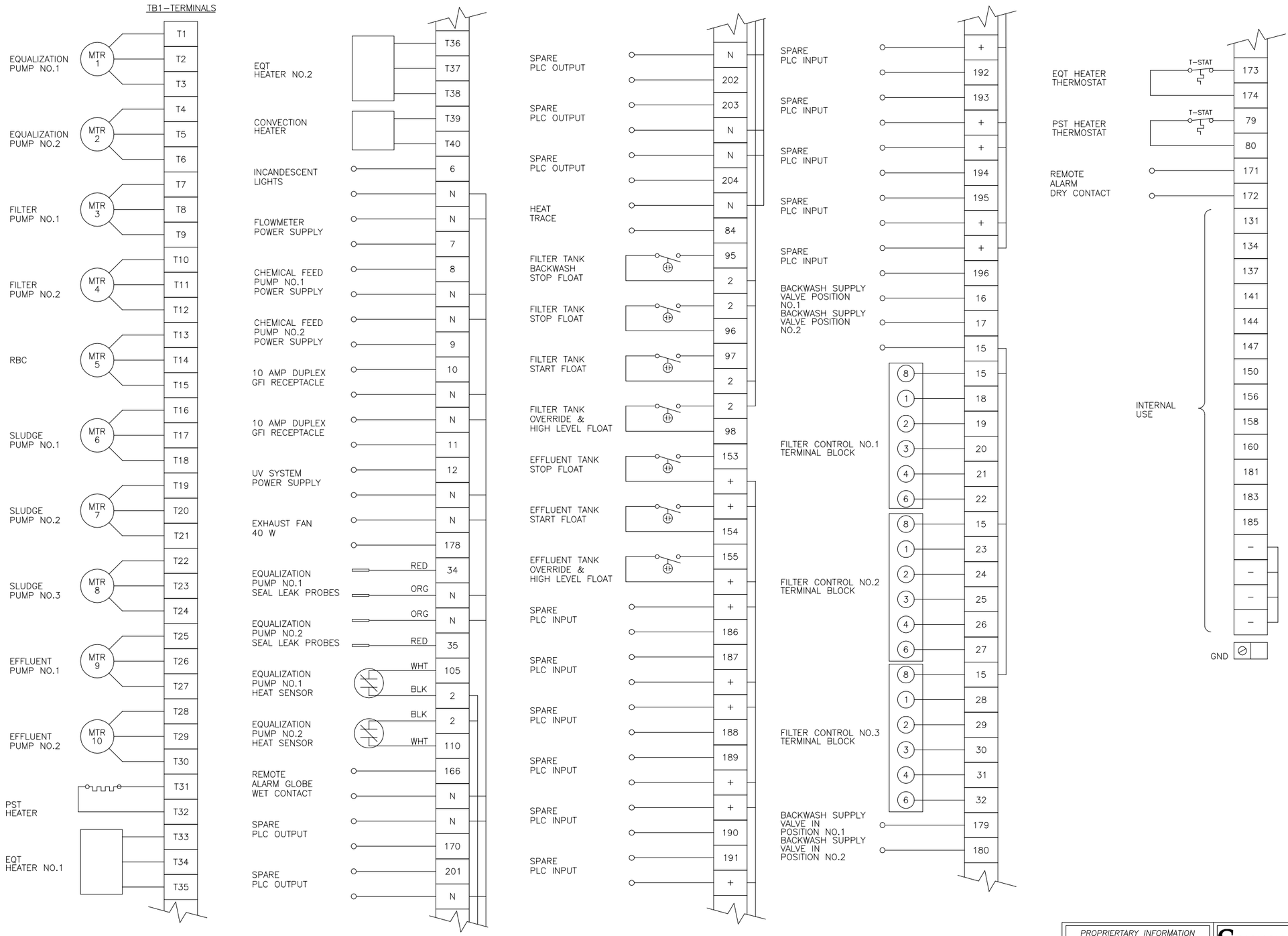
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

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.

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SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
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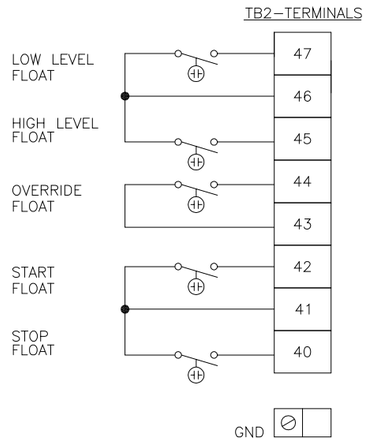
Email: contact@seprotech.com Web: http://www.seprotech.com

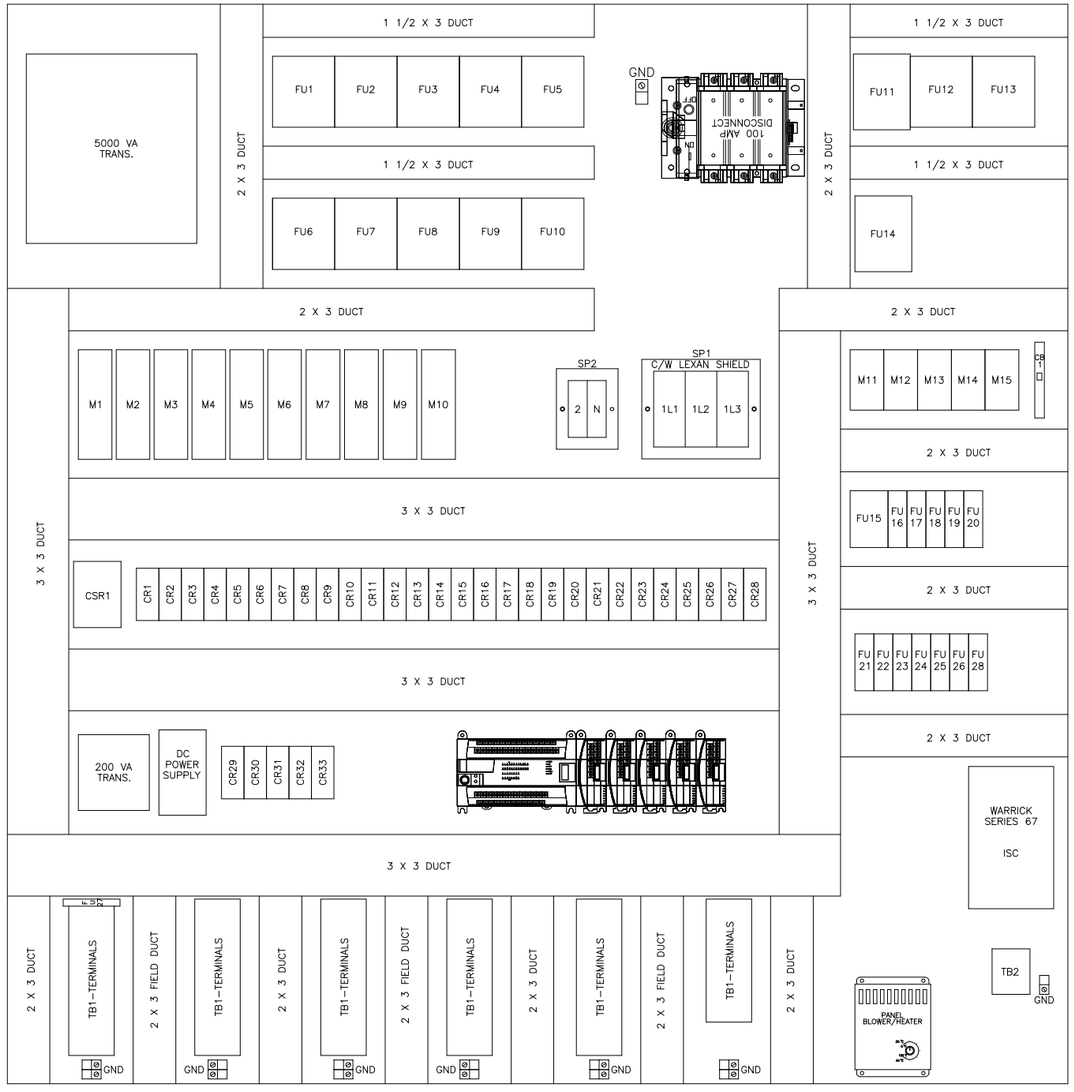
DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

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.

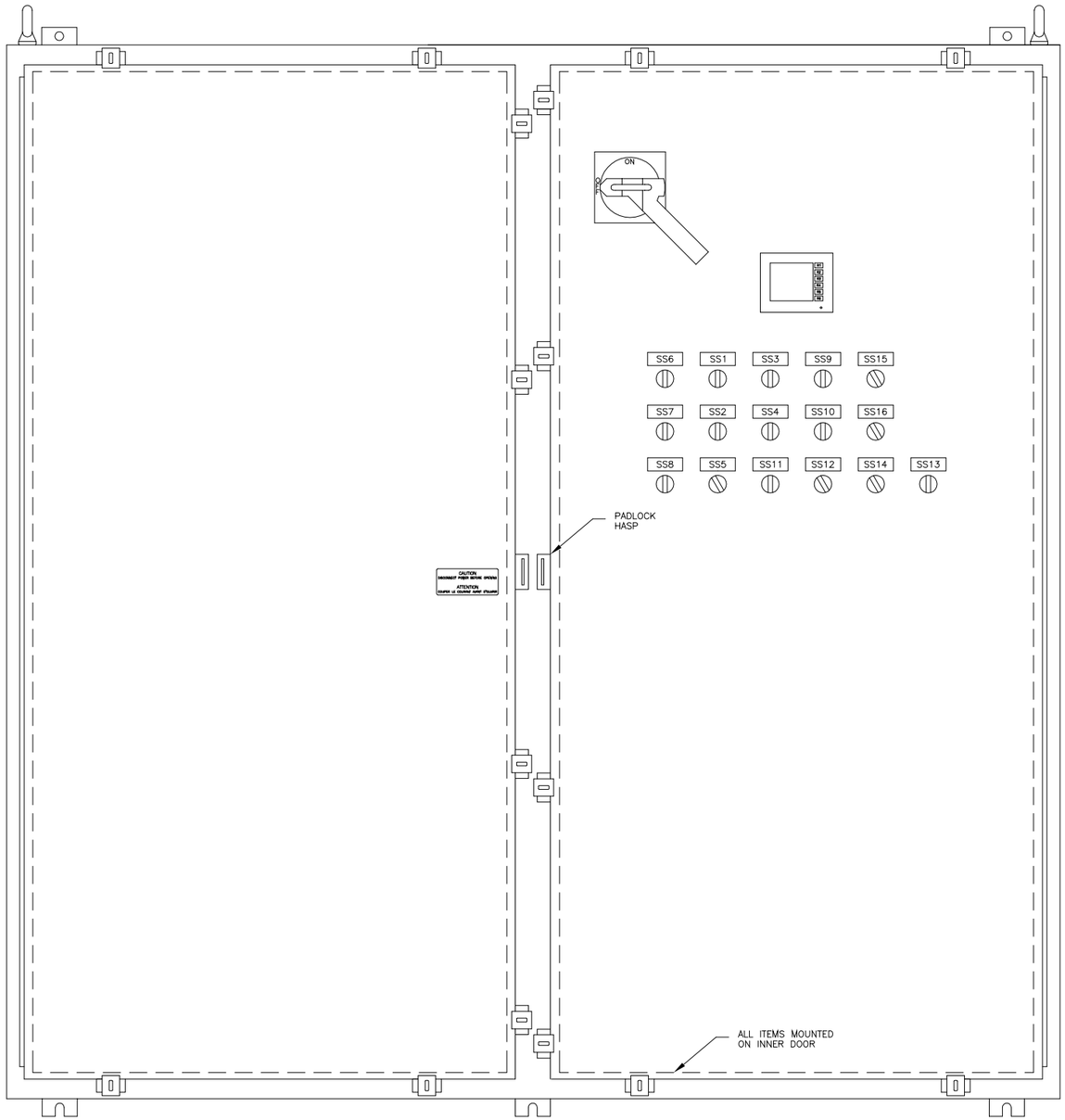
DRAWN: DC | CHECKED:

DATE: 20–JUN–2007 | SIZE: B

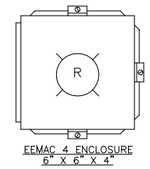
Seprotech Water. Pure and Simple
SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523–1641 FAX: (613) 731–0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION: PUMP & FILTER CONTROL PANEL BAFFINLAND N70

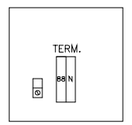
SCALE	WEIGHT	SHEET	DWG NO.	REV
N.T.S	1:8 LB.	9 OF 10	60052–E00	2



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

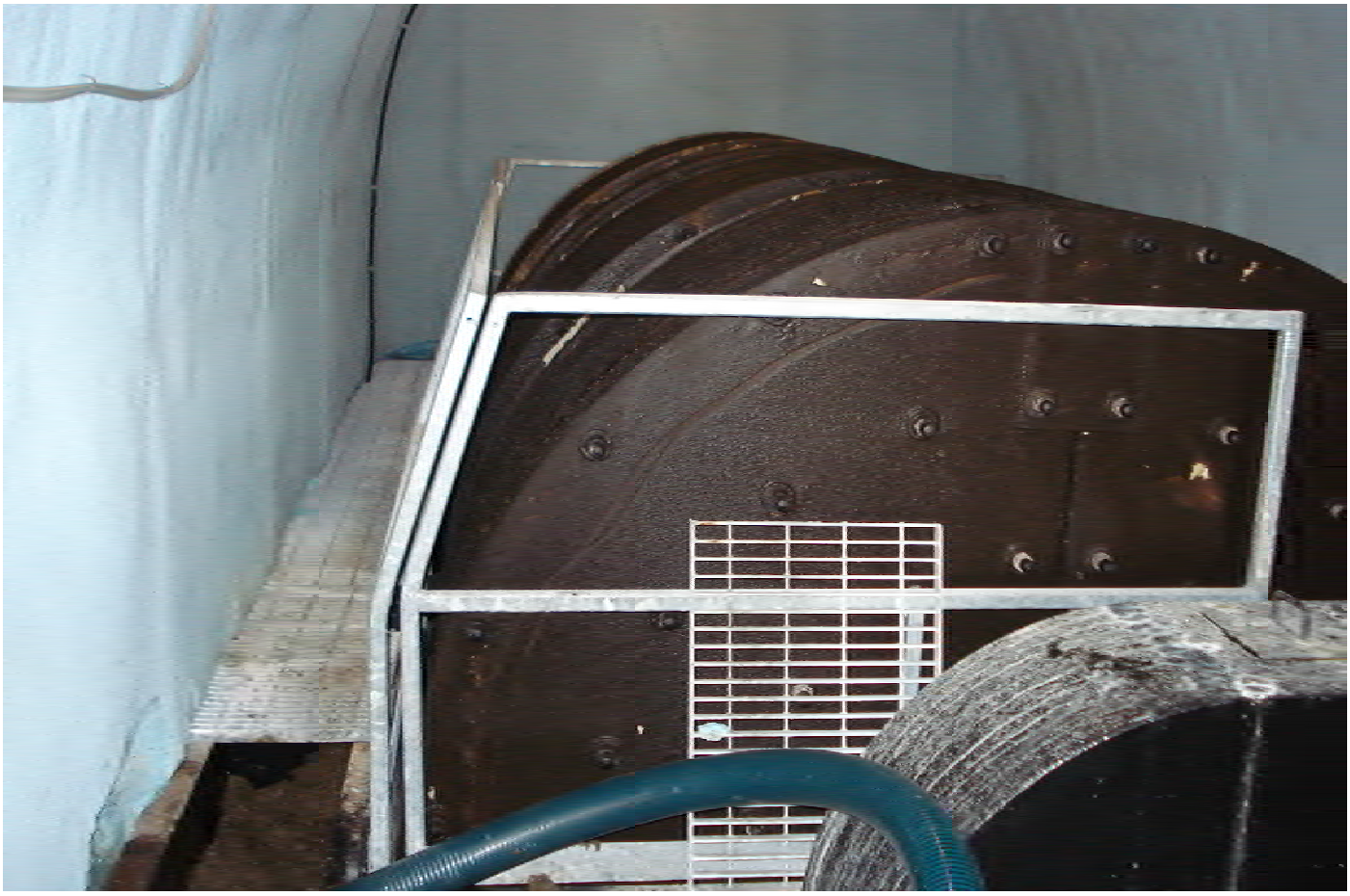


Photo 3: Rotodisc

Photo 4: Alum & Sodium Bicarbonate Tanks

Photo 5: RBC Filters

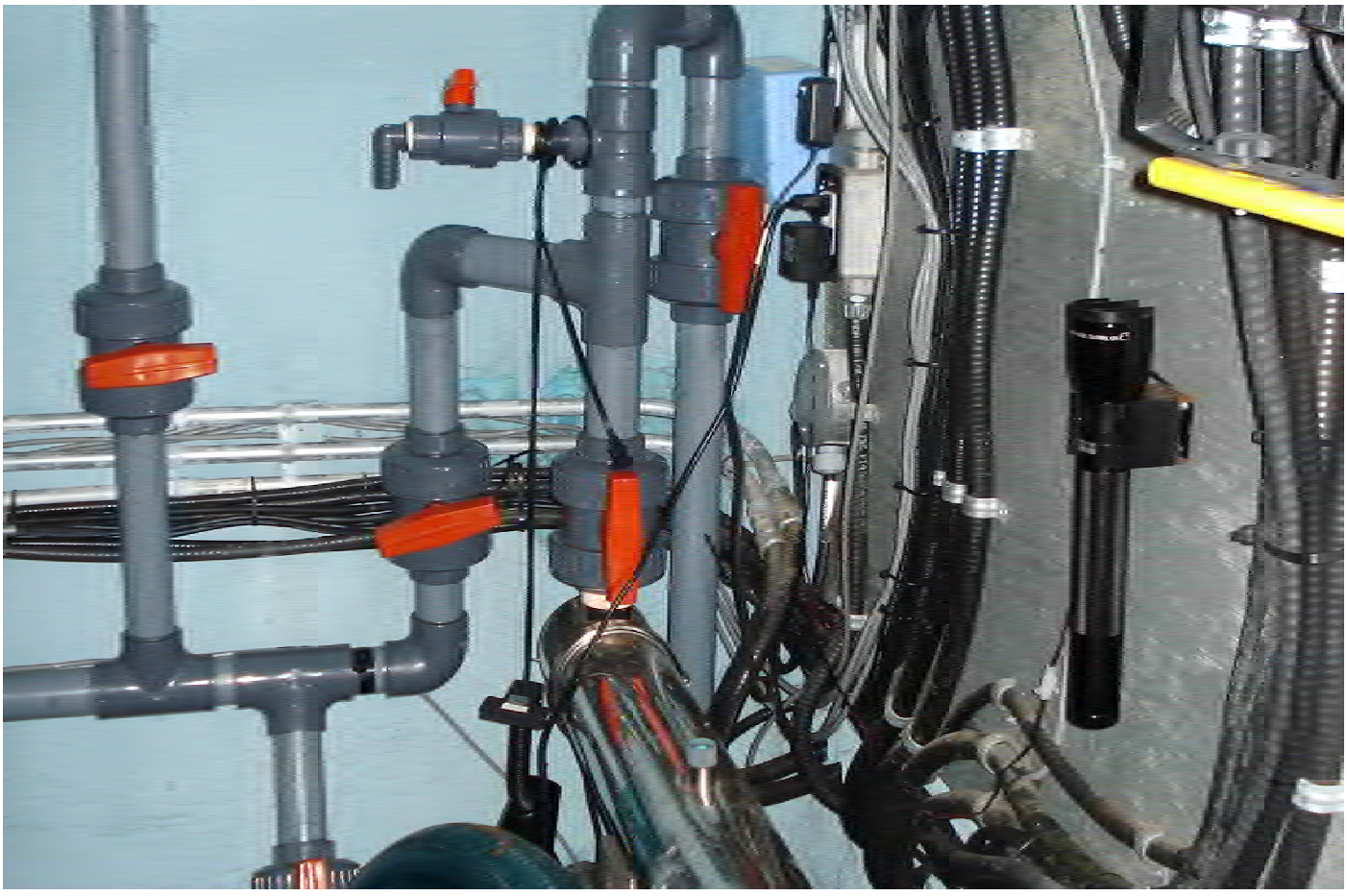


Photo 6: RBC's UV System

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

1)	Certificate of Acceptance of Soil Subgrade Surface	1 pg.
2)	Certificate of Final Inspection and Acceptance	1 pg.
3)	EL 6040 As Built Drawing	1 pg.
4)	Inventory Log	1 pg.
5)	Geomembrane Deployment Log	1 pg.
6)	Geomembrane Trial Seam Log	4 pgs.
7)	Geomembrane Seam Log	2 pgs.
8)	Geomembrane Vacuum / Air Lance Test Log	1 pg.
9)	Geomembrane Defect/Repair Log	1 pg.
10)	EL 6040 Mill Certificates	2 pgs.
11)	Installation Warranty	2 pgs.

LAYFIELD

Layfield Environmental Systems Ltd.

Table of Contents

for

Baffinlands

Supply and Install of EL 6040

Marry River, NWT

New Construction

1)	Certificate of Acceptance of Soil Subgrade Surface	1 pg.
2)	Certificate of Final Inspection and Acceptance	1 pg.
3)	EL 6040 As Built Drawing	1 pg.
4)	Inventory Log	1 pg.
5)	Geomembrane Deployment Log	1 pg.
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8)	Geomembrane Vacuum / Air Lance Test Log	1 pg.
9)	Geomembrane Defect/Repair Log	1 pg.
10)	EL 6040 Mill Certificates	2 pgs.
11)	Installation Warranty	2 pgs.

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.

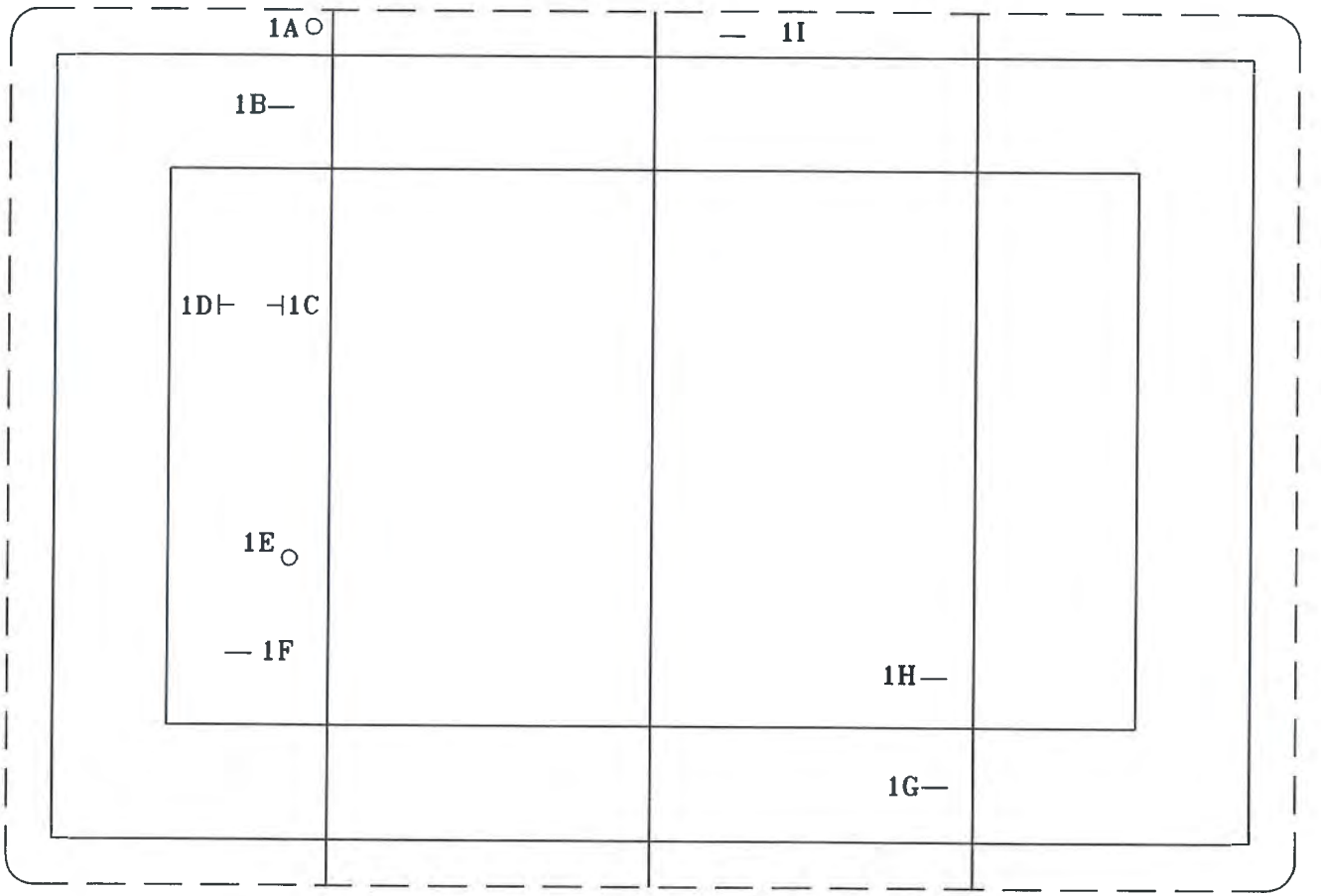
Owners Representative:
Name: ROLAND LANDRY
Title: PROJ. MANAGER
Company: BAFFINLANDS IRON MINES
Date: Aug 30/07 **Signature:**

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	
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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	
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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	
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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			
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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
/	-						-	-						
/	-						-	-						
/	-						-	-						
/	-						-	-						
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/	-						-	-						
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/	-						-	-						
/	-						-	-						
/	-						-	-						
								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
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/	-						-	-						
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/	-						-	-						
/	-						-	-						
							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	
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* 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