



Specification Index

Baffinland Iron Mines Corporation: Mary River Project

H337697

Temporary and Permanent Accommodation and Facilities/CA702

Section: 01 10 00

ATTACHMENTS FORMING PART OF THIS SPECIFICATION:

SECTION	<u>REV.</u>	TITLE OF SECTION
01 10 00	_ ¹E	Specification Index
01 11 00	E	Summary of Work
01 32 19	C	Vendor Data Requirements
01 53 00	, D	Temporary Accommodation Facility Specification
13 24 23	^{2}B	Permanent Accommodation Facility Specification
01 52 00	Α	Temporary Construction Facilities Specification
26 30 00	^{3}B	Electrical Power Distribution Specification
46 07 13	Α	Equipment Specification – Potable Water Treatment
46 07 53	Α	Equipment Specification – Sewage Water Treatment
11 82 19	Α	Equipment Specification – Waste Incinerators
D46 07 13	Α	Data Sheets – Potable Water Treatment
D46 07 53	В	Data Sheets – Sewage Water Treatment Plants
D11 82 19	В	Data Sheets – Waste Incinerators
S01 43 00	Α	Quality Management
S25 00 50	Α	Instrumentation Requirements for Packaged Equipment
S26 00 50	Α	Electrical Requirements for Packaged Equipment

DOCUMENTS FORMING PART OF THIS SPECIFICATION:

DOCUMENT NO.	REV.	TITLE
H337697-0000-10-107-0001	В	Site Conditions Data Sheet
H337697-0000-40-122-0001	<u> </u> C	Architectural Design Criteria
H337697-0000-40-107-0001	⁴ B	Architectural Materials Data Sheet
H337697-0000-00-144-0001	В	Master Building Matrix
H337697-4060-10-109-0001	1	Design Basis for Potable Water System
H337697-4060-10-109-0002	1	Design Basis for Sewage Treatment System
H337697-4060-07-109-0001	Α	Design Basis for Incinerator
H337697-7000-10-014-1001	Α	Milne Inlet Construction Works Site Layout
H337697-7000-10-014-1002	Α	Mary River Mine Site Construction Works Site Layout
H337697-0000-35-109-0001	Α	Structural Design Criteria
H337697-0000-70-122-0001	\triangle ⁵ A	Electrical Design Criteria
H337697-0000-45-122-0001	Α	HVAC Design Criteria
H337697-7000-00-144-0001	Α	Temporary Construction Facilities

¹ Sections 01 10 00, 01 11 00 and 01 32 19 general revisions

⁵ New document (Electrical Design Criteria) added.



² New section 13 24 23 added

³ New section 26 30 00 added

⁴ New document (Electrical Design Criteria) added.





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H337697-7000-10-014-1006	Α	Steensby Inlet Construction Works Site Layout
E337697-PM401-50-031-0010	0	Mary River (Mine Site) Potable Water Treatment Plant P&ID
E337697-PM401-50-042-0010	0	Mary River (Mine Site) Potable Water Treatment Plant General
		Arrangement Plan & Elevations
E337697-PM402-50-031-0010	0	Day Mary River STP (STP2) P&ID
E337697-PM402-50-042-0007	0	Sewage Treatment Plant Mary River (STP2) Belt Filter Press YC-
		100
E337697-PM402-50-042-0008	0	Mary River STP (STP2) Filter System General Arrangement
E337697-PM402-50-042-0009	0	Mary River (STP2) EQ Tank General Arrangement
E337697-PM402-50-042-0010	0	Mary River (STP2) Treated Effluent Tank General Arrangement
E337697-PM402-50-042-0011	0	Mary River (STP2) RBC System General Layout
E337697-PM406-50-042-0001	В	Milne Port Incinerator General Arrangement Plan and
		Elevations ECO 1.0TN1P Incinerator
E337697-PM406-50-042-0001	В	Milne Port Incinerator General Arrangement Sections ECO
		1.0TN1P Incinerator
H337697-4220-40-042-0001	⁶ B	Accommodation Building (MR)- BLD-4220.101 Architectural -
		Cover Sheet
H337697-4220-40-042-0002	В	Accommodation Building (MR)- BLD-4220.101 Architectural -
		Overall Ground Floor Plan
H337697-4220-40-042-0003	В	Accommodation Building (MR)- BLD-4220.101 Architectural -
		Overall Second Floor Plan
H337697-4220-40-042-0004	В	Accommodation Building (MR)- BLD-4220.101 Architectural -
		Overall Third Floor Plan
H337697-4220-40-042-0005	В	Accommodation Building (MR)- BLD-4220.101 Architectural -
11227607 4220 40 042 0006		Overall Roof Plan
H337697-4220-40-042-0006	В	Accommodation Building (MR)- BLD-4220.101 Architectural -
11227607 4220 40 042 0007	D	Dorm Unit
H337697-4220-40-042-0007	В	Accommodation Building (MR)- BLD-4220.101 Architectural - Elevations
H337697-4520-40-042-0001	В	Accommodation Building (SP)- BLD-4520.101 Architectural -
1133/09/-4320-40-042-0001	Ь	Cover Sheet
H337697-4520-40-042-0002	В	Accommodation Building (SP)- BLD-4520.101 Architectural -
11337037-4320-40-042-0002		Overall Ground Floor Plan
H337697-4520-40-042-0003	В	Accommodation Building (SP)- BLD-4520.101 Architectural -
11337 037 1320 10 0 12 0003		Overall Second Floor Plan
H337697-4520-40-042-0004	В	Accommodation Building (SP)- BLD-4520.101 Architectural -
1.667 667 1.626 1.6 6 1.2 666 1		Overall Roof Plan
H337697-4520-40-042-0005	В	Accommodation Building (SP)- BLD-4520.101 Architectural -
		Dorm Unit
H337697-4520-40-042-0006	В	Accommodation Building (SP)- BLD-4520.101 Architectural -
		Elevations

⁶ New drawings and document references added.







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H337697-0000-96-240-0001	A	CAD Design Standards
H337697-4210-10-014-0001	C	Mine Site Proposed Permanent Works Site Layout
H337697-4510-10-014-0001	C	Steensby Inlet Proposed Permanent Layout Site Layout
H337697-4450-40-042-0001	В	Mary River Utilidors Plan, Section, Elevation
H337697-4750-40-042-0001	В	Steensby Utilidors Plan, Section, Elevation



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2012-01-19	Е	Approval for Use - Environmental Permit	A. Smitten	A. Marjara	J. Cleland	ű.
2011-10-13	D	Addendum No. 2	A. Smitten	A. Marjara	J. Cleland	
2011-10-06	С	Addendum No. 1	A. Smitten	T. Ho	J. Cleland	
2011-09-27	В	Issued for Enquiry	A. Smitten	J. Cleland	J. Casson	
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DATE	REV.	STATUS	PREPARED BY	CHECKED BY	APPROVED BY	APPROVED BY
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1. Introduction

1.1 Overall Scope

Baffinland Iron Mines (BIM) requires construction camps facilities at three locations within the project site to aid with the development of the permanent mine, transportation and shipping operations for the 18 Mtpa Iron Ore mine development at Mary River, Baffin Island, Nunavut.



The three locations are:

- Milne Inlet;
- Mary River Mine Site; and
- Steensby Inlet Port.





¹Contractors are requested to provide bids for a complete package incorporating:

- Temporary Accommodation Facilities (including temporary potable water treatment, sewage treatment and waste incineration);
- Temporary Construction Facilities (including 'day' storage tanks); and
- Permanent Accommodation Facilities (including permanent potable water treatment, sewage treatment and waste incineration).

A sketch showing the general site location can be seen in Figure 1-1 below.

Construction works period site layout plans are shown in the following attachments:

- H337697-7000-10-014-1001: Milne Inlet Construction Works Site Layout;
- H337697-7000-10-014-1002: Mary River Mine Site Construction Works Site Layout; and
- H337697-7000-10-014-1006: Steensby Port Construction Works Site Layout.

At all sites, accommodation facilities will be built to house the workers during the construction works phase.

The accommodation strategy for this project will comprise of building temporary accommodation facilities which will be decommissioned and removed / demolished upon completion of the construction phase; and building the permanent accommodation facilities early and utilizing them for construction phase. These permanent accommodation facilities will be refurbished by others prior to the hand-over for operations phase.

At each location, temporary construction facilities will be required for all construction activities. These facilities consist of offices, warehouses, lunchrooms, washrooms and storage units amongst others. All of these buildings will be decommissioned and removed / demolished upon

¹ Additional paragraph and list items added to clarify scope requirements







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the completion of the construction phase and as such should be provided as either pre-fabricated or modular units.

This procurement package includes specifications for provisions of all temporary and permanent accommodation facilities as well as all temporary construction facilities. The contractor is required to provide all items in accordance with the specifications included within this package.

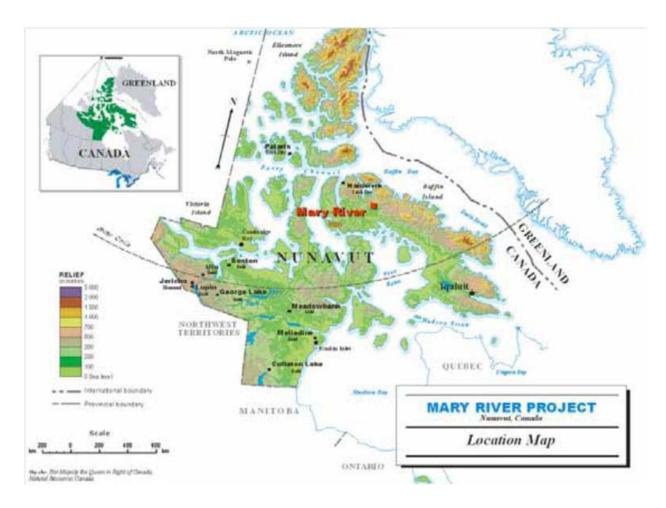


Figure 1-1: Site Location Plan of the Mary River Project in Nunavut Territory, Canada





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1.2 Construction Works Accommodation Deployment Strategy

During the construction phase a strategy has been developed to ensure that enough accommodation is provided to service the peak capacity requirements. This is provided through a number of different methods as detailed in Table 1-1: Accommodation Deployment below:

Table 1-1: Accommodation Deployment

Camp Location	Capacity Req.	Strategy
Milne Inlet	160 person	Refurbish existing 60 person accommodation complex (work carried out by others). ²
		Supplement with 100 person temporary accommodation facility provided by the Contractor.
		Note: Existing utility provisions to be abandoned and replaced with utilities provided by the Contractor sized for maximum 160 person capacity.
Mary River Mine Site	1200 person	500 person self contained temporary accommodation facility provided by the Contractor. Supplement with 500 person permanent accommodation facility and supporting utilities utilized during construction phase.
Steensby Port	600 person	A fully self contained floating accommodation facility provided by others will be used during pre-development works and for the duration of the construction phase. Supplemented with 300 person permanent accommodation facility and supporting utilities utilized during construction phase.



1.3 ³Utility Deployment Strategy

The permanent accommodation facility and supporting utilities (potable water, sewage treatment and waste incineration) will be utilised for the mining operations phase. As such it is imperative that separate utility plants and electrical distribution points for both the temporary and permanent accommodation facilities are supplied. The Owner will decommission all facilities and utilities identified as being temporary following the construction works phase.

³ New Utility Deployment Strategy section (1.3) added.



² Additional statement to clarify refurbishments to be carried out by others





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1.4 Battery Limits

The contractor's equipment will be mounted on foundations that will be designed by the Owner to match the contractor's specified support and load requirements. Other specific battery limits for both the temporary and permanent works stages are listed below in Table 1-2 to Table 1-5

Table 1-2: Battery Limits (Temporary Works – Potable Water)

	Item	Battery Limits	Exclusions
1	Inlet to Potable Water Feed Tank	Flanged Inlet to Potable Water feed tank. Outlet connection to allow filling of vacuum truck.	Water Intake System.
2	Electrical Supply	600 volt electrical feeder cables.	Electrical power generators and power distribution system.
3	Process Control	Ethernet connection to the vendor package PLC(s) and Panel HMI(s) for monitoring and/or remote control of the equipments from the owner process control system.	
4	Fire Alarm Systems	Dedicated Ethernet connection for fire detection from the owner process control system.	
5	Civil Works	Top of graded levelled pad.	Civil earthworks.

Table 1-3: Battery Limits (Temporary – Sewage Water)

	Item	Battery Limits	Exclusions
1	Sewage Truck Connection	Equalization tank connection for sewage truck to allow deposit of sewage from remote site.	
2	Treated Effluent Pump Discharge	Flanged outlet from treated effluent transfer pumps.	Piping from treated effluent pump outlet to the final discharge.
3	Electrical Supply	600 volt electrical feeder cables.	Electrical power generators and power distribution system.
4	Process Control	Ethernet connection to the vendor package PLC(s) and Panel HMI(s) for monitoring and/or remote control of the equipments from the owner process control system.	
5	Fire Alarm Systems	Dedicated Ethernet connection for fire detection from the owner process control system.	
6	Civil Works	Top of graded levelled pad.	Civil earthworks.







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Table 1-4: Battery Limits (Permanent – Potable and Fire Water)

	Item	Battery Limits	Exclusions
1	Suction inlet to Potable Water Treatment Plant feed pumps	Pump suction flange.	Water Intake System and Fresh water Tank. Piping from tank to potable water treatment plant feed pumps.
2	Discharge from Potable Water Tank ⁴ /D	Flanged outlet from potable water storage tank for the provisions of pumping water to external sources. 5	Piping to the final delivery points.
63	Fire Water Supply	Flanged connection(s) at building perimeter.	Fire water supply main. Fire water external ring main.
4	Electrical Supply	600 volt electrical feeder cables.	Electrical power generators and power distribution system.
5	Process Control	Ethernet connection to the vendor package PLC(s) and Panel HMI(s) for monitoring and/or remote control of the equipments from the owner process control system.	
6	Fire Alarm Systems	Dedicated Ethernet connection for fire detection from the owner process control system	
7	Civil Works	Top of Concrete.	Foundations and anchor bolts.

Table 1-5: Battery Limits (Permanent – Sewage Water)

	Item	Battery Limits	Exclusions
1	Inlet to Equalization Tank	Flanged Inlet pipe connection to the equalization tank to \triangle accommodate pumped sewage from external sources. ⁷ Connection for sewage truck.	Collection piping for sewage from remote facilities.
2	Effluent Pump Discharge	Flanged outlet from treated effluent transfer pumps.	Piping from effluent pump outlet to the final discharge.
3	Electrical Supply	600 volt electrical feeder cables	Electrical power generators and power distribution system.

⁷ Revised battery limit definition





⁴ Revised item description

⁵ Revised battery limit definition

⁶ New Fire Water Supply battery limit added





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	Item	Battery Limits	Exclusions
4	Process Control	Ethernet connection to the vendor package PLC(s) and Panel HMI(s) for monitoring and/or remote control of the equipments from the owner process control system.	
5	Fire Alarm Systems	Dedicated Ethernet connection for fire detection from the owner process control system.	
6	Civil Works	Top of Concrete.	Foundations and anchor bolts.

2. Temporary Accommodation Facilities

2.1 Scope of Work

The Contractor shall provide an appropriate facility, based on all information contained herein, including prefabricated modular buildings using new materials, complete with fully operational equipment and all necessary auxiliary equipment and accessories, unless specifically excluded from scope of work.

All exceptions to this specification shall be clearly informed in the proposal, so as to characterize an alternative supply. Nevertheless, compliance to specification does not exempt the Contractor from its responsibilities in furnishing reliable and safe equipment.

2.1.1 Work Included

The key objectives for the provision of the temporary accommodation facility for the contractor includes all project components and installation activities for a complete and total operable facility including but not limited to the followings:

- The design, submission of drawings and / or documents for approval and permitting;
- The supply, manufacture, field installation, commissioning and provisions of necessary training for all buildings, facilities, services and equipment at each location;
- The supply of design loads and required support locations for the provision of foundation and over-turning tie down designs (where necessary);
- The supply of standard temporary accommodation facilities as per the requirements set out in this specification;
- The supply, manufacture, field installation and commissioning of an insulated walkway/utilidor between temporary and permanent accommodation facilities and interconnecting the accommodation buildings with the potable water treatment plant, sewage treatment plant and waste incinerator facility;
- Temporary accommodation facilities shall be provided complete with furniture, equipment, finishes and fixtures for the following:







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- dormitory complex;
- kitchen/diner/recreation complex;
- offices; and
- gymnasium.



- 8Utility services and all supporting infrastructure shall be provided with each accommodation facility (see Section 2.1.2 for exclusions) for the following:
 - electrical power distribution point and all interconnecting wiring between the temporary accommodation facility and all supporting utilities (refer to section 26 30 00) excluding:
 - power generation facility and wiring/cabling to the distribution point.
 - potable water treatment and storage (refer to section 46 07 13) including:
 - all necessary interconnectivity piping and wiring between the treatment plant, temporary accommodation facility and electrical distribution point but excluding supply piping from fresh water intake beyond the limits of a flanged inlet connection point.
 - sewage treatment (refer to section 46 07 53) including:
 - all necessary interconnectivity piping and wiring between the treatment plant, temporary accommodation facility and electrical distribution point but excluding sewage discharge piping to discharge point beyond the limits of a flanged outlet connection point.
 - electrical generation
 - waste management and incineration (refer to section 11 82 19) including:
 - all necessary interconnectivity wiring between the incinerator and electrical distribution point.
- The temporary accommodation facilities shall be supplied as fully self contained units to support services defined below. (Please note that at Milne Inlet utilities will be required to be sized according to total construction camp capacity of 160 persons including both the existing Weather Haven camp and the temporary accommodation facility specified in this package):
 - potable water;
 - sewage;
 - electrical power services connection distribution point;
 - lighting;
 - electrical baseboard heating;



⁸ Updated scope definitions





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- electronic and communications systems;
- ventilation systems;
- fire protection systems; and
- plumbing systems.

The Contractor shall deliver all facilities to a port specified by BIM. BIM shall arrange for shipping, loading and unloading into position all facilities and units.

The Contractor shall provide all necessary construction equipment required for field installation of the temporary accommodation facilities except for cranes for loading and unloading which shall be provided by BIM. The Contractor shall deliver all equipment to a port specified by BIM. BIM shall arrange for shipping, loading and unloading to site. Please note the Contract shall supply all maximum lifting loads and required lifting plans and locations for each facility and unit.

2.1.2 Work Excluded

The scope of work excludes the following components identified below:

- Provision of external works, including rough grading, final grading, road, parking and walkway paving, landscaping and fencing to the perimeter of the camp;
- Fresh water intake and supply pipe to camp facilities;
 - a single source of fresh lake water will be provided to each facility by others for use as fresh water, potable water and fire-fighting water.
- Installation of a sewage discharge pipe beyond the limits of the sewage treatment plant walls;
- Provisions of shipping, loading and unloading of all temporary accommodation facilities to site;



- ⁹Provisions of power generation beyond the tie-in limits at the temporary accommodation facility (including supporting utilities) boundary walls electrical power discharge point;
- All site based communications required during installation shall be provided by BIM; and
- Management and operations of the temporary accommodation facility following assembly.

2.2 Camp Capacities & Deployment Strategy

2.2.1 Capacity Requirements

Table 2-1: Temporary Accommodation Facility Capacity Requirements below provides the capacity for each temporary accommodation facility. The Contractor shall ensure that each facility is sized accordingly to the specified capacities:



⁹ Revision to exclusion item





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Table 2-1: Temporary Accommodation Facility Capacity Requirements

Camp Location	Capacity
Milne Inlet	100 person
Mary River Mine Site	500 person

2.2.2 Utility Provisions

Temporary accommodation facilities shall be supplied and installed as fully self contained facilities complete with all utility provisions as per Table 2-2 below.

Table 2-2: Utility Provisions

¹⁰ Camp Location	Electrical Power Generation	Sewage Treatment	Potable Water Treatment	Waste Management / Incineration	Fire Protection System
Milne Inlet	Not Required	YES (sized for 160 person capacity – see note below	YES (sized for 160 person capacity)	YES (sized for 160 person capacity)	YES
Mary River Mine Site	Not Required	YES (sized for 900 person capacity – see note below	YES	YES	YES

Note: Milne Inlet sewage treatment plant sized to accommodate sewage existing 60 person Weather Haven Camp in addition to 100 person temporary accommodation facility. Mary River Mine Site sewage treatment plant sized to accommodate pumped sewage from two x 200 person capacity rail camps in addition to 500 person temporary accommodation facility.

¹⁰ Sewage treatment design capacity increased for Mary River and clarification notes added.







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3. Permanent Accommodation Facilities



¹¹The Contractor shall provide an appropriate facility, based on all information contained herein and as detailed in the Permanent Accommodation Facility Specification (section 13 24 23), including prefabricated modular buildings using new materials, complete with fully operational equipment and all necessary auxiliary equipment and accessories, unless specifically excluded from scope of work.

All exceptions to this specification shall be clearly informed in the proposal, so as to characterize an alternative supply. Nevertheless, compliance to specification does not exempt the Contractor from its responsibilities in furnishing reliable and safe equipment.

3.1 Work Included

The key objectives for provision of the Contractor includes all project components and installation activities for a complete and total operable permanent facility including but not limited to the following:

- The design, submission of drawings and/or documents for approval and permitting;
- The supply, manufacture, field installation, commissioning and provisions of necessary training for all buildings, facilities, services and equipment at each location;
- The supply of design loads and required support locations for the provision of foundation and over-turning tie down designs (where necessary);



- The supply of standard permanent accommodation facilities as per the requirements set out in this specification;
- 12Permanent accommodation facilities shall be provided complete with furniture, equipment, finishes and fixtures for the following:
 - dormitory complex;
 - service core complex (including kitchen/diner/recreational complex; offices; and gymnasium);
 - kitchen / diner / recreation complex;
 - offices; and
 - gymnasium.
- Utility services and all supporting infrastructure shall be provided with each accommodation facility (see Section 3.2 for exclusions) for the following:

¹² Updated scope items for Permanent Accommodation Facility



¹¹ Additional reference (section 13 24 23) added.





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- electrical power distribution point and all interconnecting wiring between the permanent accommodation facility and all supporting utilities (refer to section 26 30 00)
 excluding:
 - power generation facility and wiring/cabling to the distribution point.
- potable water treatment and storage (refer to section 46 07 13) including:
 - all necessary interconnectivity piping and wiring between the treatment plant, permanent accommodation facility and electrical distribution point but excluding supply piping from fresh water intake beyond the limits of a flanged inlet connection point.
- sewage treatment (refer to section 46 07 53) including:
 - all necessary interconnectivity piping and wiring between the treatment plant, permanent accommodation facility and electrical distribution point but excluding sewage discharge piping to discharge point beyond the limits of a flanged outlet connection point.
- waste management and incineration (refer to section 11 82 19) including:
 - all necessary interconnectivity wiring between the incinerator and electrical distribution point.

The Contractor shall deliver all facilities to a port specified by BIM. BIM shall arrange for shipping, loading and unloading into position all facilities and units.

The Contractor shall provide all necessary construction equipment required for field installation of the permanent accommodation facilities except for cranes for loading and unloading which shall be provided by BIM. The Contractor shall deliver all equipment to a port specified by BIM. BIM shall arrange for shipping, loading and unloading to site. Please note the Contract shall supply all maximum lifting loads and required lifting plans and locations for each facility and unit.

3.2 Work Excluded

The scope of work excludes the following components identified below:

- Provision of external works, including rough grading, final grading, road, parking and walkway paving, landscaping, and fencing to the perimeter of the camp;
- Fresh water intake and supply pipe to camp facilities;
 - A single source of fresh lake water will be provided to each facility by others for use as fresh water and potable water.
- Installation of a sewage discharge pipe beyond the limits of the sewage treatment plant walls;
- The provision of shipping, loading and unloading of all permanent accommodation facilities to site:
- All site based communications required during installation shall be provided by BIM;







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- ¹³The owner will be responsible for any communication services e.g. Satellite TV, subsequent to the complete installation of the camps. These services comprise all negotiations with service providers, any "First Up" and initial fees, and any annual operating service or maintenance fees;
- Management and operations of the permanent accommodation facility following assembly;



- ¹⁴Fire water tanks and fire water pumps.
 - a single supply of fire fighting water will be provided to each facility by others for connection to the fire protection systems provided by the contractor.

3.3 Capacity Requirements

Table 3-1: Permanent Accommodation Facility Capacity Requirements below provides the capacity for each permanent accommodation facility. The Contractor shall ensure that each facility is sized accordingly to the specified capacities:

Table 3-1: Permanent Accommodation Facility Capacity Requirements

Camp Location	Capacity
Mary River Mine Site	500 person
Steensby Inlet	300 person



3.4 ¹⁵Further Information

Please note further information regarding the scope of works for the permanent accommodation facilities will be issued as an addendum in due course.

4. Temporary Construction Facilities

In addition to the temporary and permanent accommodation facilities, a range of other facilities are also required to support construction operations. These items include wash cars, lunchroom facilities, offices, warehouses and storage containers amongst others.

4.1 Construction Camp Locations

Construction camps will be located at Milne Inlet, Mary River Mine Site and Steensby Inlet. Typical camp layouts are shown in the following attachments:

- H337697-7000-10-014-1001: Milne Inlet Construction Works Site Layout;
- H337697-7000-10-014-1002: Mary River Mine Site Construction Works Site Layout; and



¹³ Additional communications exclusion item added

¹⁴ Updated exclusion item to include fire mains

¹⁵ Removal of section 3.4





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• H337697-7000-10-014-1006: Steensby Inlet Construction Works Site Layout.

4.2 Facility Type

The temporary construction facilities will consist of a combination of pre-fabricated units, typical construction style trailers and sea-can storage containers. The sizes of each of facility will vary depending on the work front at which these are being placed and the number of people anticipated to be using them.

4.2.1 Work Included

The key objectives for provision of the Contractor includes all project components and installation activities for a complete and total operable permanent facility including but not limited to the following:

- The design, submission of drawings and / or documents for approval and permitting;
- The supply, manufacture, field installation, commissioning and provisions of necessary training for all buildings, facilities, services and equipment at each location;
- The supply of design loads and required support locations for the provision of foundation and over-turning tie down designs (where necessary);
- The supply of temporary construction facilities as per the requirements set out in this specification;
- The supply of a combination of pre-fabricated units, typical construction style trailers and sea-can storage containers as necessary;
- All units shall be supplied complete with fixtures and fittings to support construction operations
 - this shall be defined further in the technical specification included within this package.
- All units shall be supplied complete with all necessary utility provision as defined in the technical specification including but not limited to the following:
 - electrical wiring;
 - plumbing for potable water, waste water and sewage;
 - overhead lighting;
 - heating;
 - fire protection systems; and
 - day tanks for storage of potable water and sewage.







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4.2.2 Work Excluded

The scope of work excludes the following components identified below:

- Provision of external works, including rough grading, final grading, road, parking and walkway paving, landscaping and fencing to the perimeter of the camp;
- Provision of utilities beyond the limits of the external walls of each facility;
- The provisions of shipping, loading and unloading of all temporary construction facilities to site;
- All site based communications required during installation shall be provided by BIM; and
- Management and operations of the temporary construction facilities following assembly.

4.3 Temporary Construction Facilities Matrix

A Temporary Construction Facilities Matrix has been produced to identify building types, approximate sizes, assumed capacities and utilities required for each. For this please refer to H337697-7000-00-144-0001: Temporary Construction Facilities Matrix. For the purposes of this specification this document shall be further referred to as "the facilities matrix".

The facilities matrix refers to items at rail camps. These are shown for reference purposes only and are not be included in the scope of this package.

The following list confirms the requirements of this scope:

- Milne Inlet Construction Camp Temporary Construction Facilities INCLUDED in this package;
- Mary River Mine Site Construction Camp Temporary Construction Facilities INCLUDED in this package;
- Ravn River Rail Camp Temporary Construction Facilities EXCLUDED from this package;
- Mid Rail Camp Temporary Construction Facilities EXCLUDED from this package; and
- Steensby Port Construction Camp Temporary Construction Facilities INCLUDED in this package.

5. Design Regulations

All temporary accommodation facilities should be supplied to meet the following minimum design criteria.

5.1 Codes and Standards

The design of all facilities shall be at least in accordance with the following:

- National Building Code of Canada 2010 (NBCC); and
- Government of Nunavut Good Building Practices Guideline 2005 Second Edition.







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5.2 Units

The SI (metric) system will be used.

6. Health and Safety

- During installation, The Contractor shall adhere to all relevant clauses specified in Nunavut's Mine Health and Safety Regulations under the Nunavut Mine Health and Safety Act.
- The Contractor shall also adhere to all procedures relating to site health, safety and welfare as stipulated by BIM and their representatives.

END OF SECTION







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1. Introduction

1.1 Overall Scope

Baffinland Iron Mines (BIM) requires construction camps facilities at three locations within the project site to aid with the development of the permanent mine, transportation and shipping operations for the 18 Mtpa Iron Ore mine development at Mary River, Baffin Island, Nunavut.

The three locations are:

- Milne Inlet;
- Mary River Mine Site; and
- Steensby Inlet.



¹Contractors are requested to provide bids for a complete package incorporating:

- Temporary Accommodation Facilities (including temporary potable water treatment, sewage treatment and waste incineration);
- Temporary Construction Facilities (including 'day' storage tanks); and
- Permanent Accommodation Facilities (including permanent potable water treatment, sewage treatment and waste incineration).

A sketch showing the general site location can be seen in **Error! Reference source not found.** below.

Construction works period site layout plans are shown in the following attachments:

- H337697-7000-10-014-1001: Milne Inlet Construction Works Site Layout;
- H337697-7000-10-014-1002: Mary River Mine Site Construction Works Site Layout; and
- H337697-7000-10-014-1006: Steensby Inlet Construction Works Site Layout.

At all sites, accommodation facilities will be built to house the workers during the construction works phase.

The accommodation strategy for this project will comprise of building temporary accommodation facilities which will be decommissioned and removed / demolished upon completion of the construction phase; and building the permanent accommodation facilities early and utilizing them for construction phase. These permanent accommodation facilities will be refurbished by others prior to the hand-over for operations phase.

At each camp location, temporary construction facilities will be required for all construction activities. These facilities consist of offices, warehouses, lunchrooms, washrooms and storage units amongst others. All of these buildings will be decommissioned and removed / demolished

¹ Additional paragraph and list items added to clarify scope requirements







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upon the completion of the construction phase and as such should be provided as either prefabricated or modular units.

This procurement package includes specifications for provisions of all temporary and permanent accommodation facilities as well as all temporary construction facilities. The contractor is required to provide all items in accordance with the specifications included within this package.

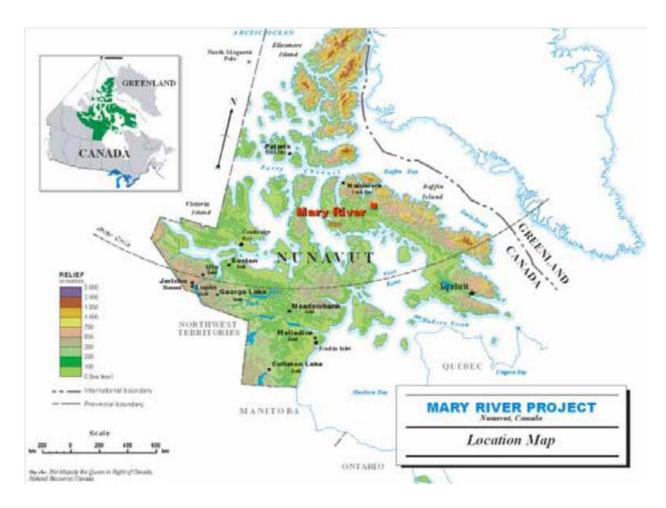


Figure 1-1: Site Location Plan of the Mary River Project in Nunavut Territory, Canada





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1.2 Construction Works Accommodation Deployment Strategy

During the construction phase a strategy has been developed to ensure that enough accommodation is provided to service the peak capacity requirements. This is provided through a number of different methods as detailed in Table 1-1: Accommodation Deployment below:

Table 1-1: Accommodation Deployment

Camp Location	Capacity Req.	Strategy
Milne Inlet	160 person	Refurbish existing 60 person accommodation complex (work carried out by others). ²
		Supplement with 100 person temporary accommodation facility provided by the Contractor.
		Note: Existing utility provisions to be abandoned and replaced with utilities provided by the Contractor sized for maximum 160 person capacity.
Mary River Mine Site	1000 person	500 person self contained temporary accommodation facility provided by the Contractor. Supplement with 500 person permanent accommodation facility and supporting utilities utilized during construction phase.
Steensby Inlet	600 person	A fully self contained floating accommodation facility provided by others will be used during pre-development works and for the duration of the construction phase. Supplemented with 300 person permanent accommodation facility and supporting utilities utilized during construction phase.



1.3 ³Utility Deployment Strategy

The permanent accommodation facility and supporting utilities (potable water, sewage treatment and waste incineration) will be utilised for the mining operations phase. As such it is imperative that separate utility plants and electrical distribution points for both the temporary and permanent accommodation facilities are supplied. The Owner will decommission all facilities and utilities identified as being temporary following the construction works phase.

³ New Utility Deployment Strategy section (1.3) added.



² Additional statement to clarify refurbishments to be carried out by others





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1.4 Battery Limits

The contractor's equipment will be mounted on foundations that will be designed by the Owner to match the contractor's specified support and load requirements. Other specific battery limits for both the temporary and permanent works stages are listed below in Table 1-2 to Table 1-5

Table 1-2: Battery Limits (Temporary Works – Potable Water)

	Item	Battery Limits	Exclusions
1	Inlet to Potable Water Feed Tank	Flanged Inlet to Potable Water feed tank. Outlet connection to allow filling of vacuum truck.	Water Intake System.
2	Electrical Supply	600 volt electrical feeder cables.	Electrical power generators and power distribution system.
3	Process Control	Ethernet connection to the vendor package PLC(s) and Panel HMI(s) for monitoring and/or remote control of the equipments from the owner process control system.	
4	Fire Alarm Systems	Dedicated Ethernet connection for fire detection from the owner process control system.	
5	Civil Works	Top of graded levelled pad.	Civil earthworks.

Table 1-3: Battery Limits (Temporary – Sewage Water)

	Item	Battery Limits	Exclusions
1	Sewage Truck Connection	Equalization tank connection for sewage truck to allow deposit of sewage from remote site.	
2	Treated Effluent Pump Discharge	Flanged outlet from treated effluent transfer pumps.	Piping from treated effluent pump outlet to the final discharge.
3	Electrical Supply	600 volt electrical feeder cables.	Electrical power generators and power distribution system.
4	Process Control	Ethernet connection to the vendor package PLC(s) and Panel HMI(s) for monitoring and/or remote control of the equipments from the owner process control system.	
5	Fire Alarm Systems	Dedicated Ethernet connection for fire detection from the owner process control system.	
6	Civil Works	Top of graded levelled pad.	Civil earthworks.







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Table 1-4: Battery Limits (Permanent – Potable and Fire Water)

	Item	Battery Limits	Exclusions
1	Suction inlet to Potable Water Treatment Plant feed pumps	Pump suction flange.	Water Intake System and Fresh water Tank. Piping from tank to potable water treatment plant feed pumps.
2	Discharge from Potable Water Tank⁴∕॓॓	Flanged outlet from potable water storage tank for the provisions of pumping water to external sources. 5	Piping to the final delivery points.
⁶ 3	Fire Water Supply	Flanged connection(s) at building perimeter.	Fire water supply main. Fire water external ring main.
4	Electrical Supply	600 volt electrical feeder cables.	Electrical power generators and power distribution system.
5	Process Control	Ethernet connection to the vendor package PLC(s) and Panel HMI(s) for monitoring and/or remote control of the equipments from the owner process control system.	
6	Fire Alarm Systems	Dedicated Ethernet connection for fire detection from the owner process control system	
7	Civil Works	Top of Concrete.	Foundations and anchor bolts.

Table 1-5: Battery Limits (Permanent – Sewage Water)

	Item	Battery Limits	Exclusions
1	Inlet to Equalization Tank	Flanged Inlet pipe connection to the equalization tank to \triangle accommodate pumped sewage from external sources. ⁷ Connection for sewage truck.	Collection piping for sewage from remote facilities.
2	Effluent Pump Discharge	Flanged outlet from treated effluent transfer pumps.	Piping from effluent pump outlet to the final discharge.
3	Electrical Supply	600 volt electrical feeder cables	Electrical power generators and power distribution system.







⁴ Revised item description

⁵ Revised battery limit definition

⁶ New Fire Water Supply battery limit added

⁷ Revised battery limit definition





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	Item	Battery Limits	Exclusions
4	Process Control	Ethernet connection to the vendor package PLC(s) and Panel HMI(s) for monitoring and/or remote control of the equipments from the owner process control system.	
5	Fire Alarm Systems	Dedicated Ethernet connection for fire detection from the owner process control system.	
6	Civil Works	Top of Concrete.	Foundations and anchor bolts.

2. Temporary Accommodation Facilities

2.1 Scope of Work

The Contractor shall provide an appropriate facility, based on all information contained herein, including prefabricated modular buildings using new materials, complete with fully operational equipment and all necessary auxiliary equipment and accessories, unless specifically excluded from scope of work.

All exceptions to this specification shall be clearly informed in the proposal, so as to characterize an alternative supply. Nevertheless, compliance to specification does not exempt the Contractor from its responsibilities in furnishing reliable and safe equipment.

2.1.1 Work Included

The key objectives for the provision of the temporary accommodation facility for the contractor includes all project components and installation activities for a complete and total operable facility including but not limited to the following. (Please note that temporary accommodation facility is not required at Steensby Inlet as this will be provided as a floating barge accommodation facility by others):

- The design, submission of drawings and / or documents for approval and permitting;
- The supply, manufacture, field installation, commissioning and provisions of necessary training for all buildings, facilities, services and equipment at each location;
- The supply of design loads and required support locations for the provision of foundation and over-turning tie down designs (where necessary);
- The supply of standard temporary accommodation facilities as per the requirements set out in this specification;
- The supply, manufacture, field installation and commissioning of an insulated walkway/utilidor between temporary and permanent accommodation facilities and interconnecting the accommodation buildings with the potable water treatment plant, sewage treatment plant and waste incinerator facility;







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- Temporary accommodation facilities shall be provided complete with furniture, equipment, finishes and fixtures for the following:
 - dormitory complex;
 - kitchen/diner/recreation complex;
 - offices; and
 - gymnasium.



- *Utility services and all supporting infrastructure shall be provided with each accommodation facility (see Section 2.1.2 for exclusions) for the following:
 - electrical power distribution point and all interconnecting wiring between the temporary accommodation facility and all supporting utilities (refer to section 26 30 00) excluding:
 - power generation facility and wiring/cabling to the distribution point.
 - potable water treatment and storage (refer to section 46 07 13) including:
 - all necessary interconnectivity piping and wiring between the treatment plant, temporary accommodation facility and electrical distribution point but excluding supply piping from fresh water intake beyond the limits of a flanged inlet connection point.
 - sewage treatment (refer to section 46 07 53) including:
 - all necessary interconnectivity piping and wiring between the treatment plant, temporary accommodation facility and electrical distribution point but excluding sewage discharge piping to discharge point beyond the limits of a flanged outlet connection point.
 - electrical generation
 - waste management and incineration (refer to section 11 82 19) including:
 - all necessary interconnectivity wiring between the incinerator and electrical distribution point.
- The temporary accommodation facilities shall be supplied as fully self contained units to support services defined below. (Please note that at Milne Inlet utilities will be required to be sized according to total construction camp capacity of 160 persons including both the existing Weather Haven camp and the temporary accommodation facility specified in this package):
 - potable water;
 - sewage;
 - electrical power services connection distribution point;
 - lighting;



⁸ Updated scope definitions





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- electrical baseboard heating;
- electronic and communications systems;
- ventilation systems;
- fire protection systems; and
- plumbing systems.

The Contractor shall deliver all facilities to a port specified by BIM. BIM shall arrange for shipping, loading and unloading into position all facilities and units.

The Contractor shall provide all necessary construction equipment required for field installation of the temporary accommodation facilities except for cranes for loading and unloading which shall be provided by BIM. The Contractor shall deliver all equipment to a port specified by BIM. BIM shall arrange for shipping, loading and unloading to site. Please note the Contract shall supply all maximum lifting loads and required lifting plans and locations for each facility and unit.

2.1.2 Work Excluded

The scope of work excludes the following components identified below:

- Provision of external works, including rough grading, final grading, road, parking and walkway paving, landscaping and fencing to the perimeter of the camp;
- Fresh water intake and supply pipe to camp facilities;
 - a single source of fresh lake water will be provided to each facility by others for use as fresh water, potable water and fire-fighting water.
- Installation of a sewage discharge pipe beyond the limits of the sewage treatment plant walls;
- Provisions of shipping, loading and unloading of all temporary accommodation facilities to site;



- ⁹Provisions of power generation beyond the tie-in limits at the temporary accommodation facility (including supporting utilities) boundary walls electrical power discharge point;
- All site based communications required during installation shall be provided by BIM;
- Management and operations of the temporary accommodation facility following assembly;
 and
- Floating barge accommodation at Steensby Inlet.
 - this shall be supplied by others.



⁹ Revision to exclusion item





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2.2 Camp Capacities & Deployment Strategy

2.2.1 Capacity Requirements

Table 2-1: Temporary Accommodation Facility Capacity Requirements below provides the capacity for each temporary accommodation facility. The Contractor shall ensure that each facility is sized accordingly to the specified capacities:

Table 2-1: Temporary Accommodation Facility Capacity Requirements

Camp Location	Capacity
Milne Inlet	100 person
Mary River Mine Site	500 person

2.2.2 Utility Provisions

Temporary accommodation facilities shall be supplied and installed as fully self contained facilities complete with all utility provisions as per Table 2-2 below.

Table 2-2: Utility Provisions

¹⁰ Camp Location	Electrical Power Generation	Sewage Treatment	Potable Water Treatment	Waste Management / Incineration	Fire Protection System
Milne Inlet	Not Required	YES (sized for 160 person capacity – see note below	YES (sized for 160 person capacity)	YES (sized for 160 person capacity)	YES
Mary River Mine Site	Not Required	YES (sized for 900 person capacity – see note below	YES	YES	YES

Note: Milne Inlet sewage treatment plant sized to accommodate sewage existing 60 person Weather Haven Camp in addition to 100 person temporary accommodation facility.

Mary River Mine Site sewage treatment plant sized to accommodate pumped sewage from two x 200 person capacity rail camps in addition to 500 person temporary accommodation facility.

¹⁰ Sewage treatment design capacity increased for Mary River and clarification notes added.







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3. Permanent Accommodation Facilities



¹¹The Contractor shall provide an appropriate facility, based on all information contained herein and as detailed in the Permanent Accommodation Facility Specification (section 13 24 23), including prefabricated modular buildings using new materials, complete with fully operational equipment and all necessary auxiliary equipment and accessories, unless specifically excluded from scope of work.

All exceptions to this specification shall be clearly informed in the proposal, so as to characterize an alternative supply. Nevertheless, compliance to specification does not exempt the Contractor from its responsibilities in furnishing reliable and safe equipment.

3.1 Work Included

The key objectives for provision of the Contractor includes all project components and installation activities for a complete and total operable permanent facility including but not limited to the following:

- The design, submission of drawings and/or documents for approval and permitting;
- The supply, manufacture, field installation, commissioning and provisions of necessary training for all buildings, facilities, services and equipment at each location;
- The supply of design loads and required support locations for the provision of foundation and over-turning tie down designs (where necessary);



- The supply of standard permanent accommodation facilities as per the requirements set out in this specification;
- 12Permanent accommodation facilities shall be provided complete with furniture, equipment, finishes and fixtures for the following:
 - dormitory complex;
 - service core complex (including kitchen/diner/recreational complex; offices; and gymnasium);
 - kitchen / diner / recreation complex;
 - offices; and
 - gymnasium.
- Utility services and all supporting infrastructure shall be provided with each accommodation facility (see Section 3.2 for exclusions) for the following:

¹² Updated scope items for Permanent Accommodation Facility



¹¹ Additional reference (section 13 24 23) added.





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- electrical power distribution point and all interconnecting wiring between the permanent accommodation facility and all supporting utilities (refer to section 26 30 00)
 excluding:
 - power generation facility and wiring/cabling to the distribution point.
- potable water treatment and storage (refer to section 46 07 13) including:
 - all necessary interconnectivity piping and wiring between the treatment plant, permanent accommodation facility and electrical distribution point but excluding supply piping from fresh water intake beyond the limits of a flanged inlet connection point.
- sewage treatment (refer to section 46 07 53) including:
 - all necessary interconnectivity piping and wiring between the treatment plant, permanent accommodation facility and electrical distribution point but excluding sewage discharge piping to discharge point beyond the limits of a flanged outlet connection point.
- waste management and incineration (refer to section 11 82 19) including:
 - all necessary interconnectivity wiring between the incinerator and electrical distribution point.

The Contractor shall deliver all facilities to a port specified by BIM. BIM shall arrange for shipping, loading and unloading into position all facilities and units.

The Contractor shall provide all necessary construction equipment required for field installation of the permanent accommodation facilities except for cranes for loading and unloading which shall be provided by BIM. The Contractor shall deliver all equipment to a port specified by BIM. BIM shall arrange for shipping, loading and unloading to site. Please note the Contract shall supply all maximum lifting loads and required lifting plans and locations for each facility and unit.

3.2 Work Excluded

The scope of work excludes the following components identified below:

- Provision of external works, including rough grading, final grading, road, parking and walkway paving, landscaping, and fencing to the perimeter of the camp;
- Fresh water intake and supply pipe to camp facilities;
 - A single source of fresh lake water will be provided to each facility by others for use as fresh water and potable water.
- Installation of a sewage discharge pipe beyond the limits of the sewage treatment plant walls;
- The provision of shipping, loading and unloading of all permanent accommodation facilities to site:
- All site based communications required during installation shall be provided by BIM;







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- 13The owner will be responsible for any communication services e.g. Satellite TV, subsequent to the complete installation of the camps. These services comprise all negotiations with service providers, any "First Up" and initial fees, and any annual operating service or maintenance fees;
- Management and operations of the permanent accommodation facility following assembly;



- ¹⁴Fire water tanks and fire water pumps.
 - a single supply of fire fighting water will be provided to each facility by others for connection to the fire protection systems provided by the contractor.

3.3 Capacity Requirements

Table 3-1: Permanent Accommodation Facility Capacity Requirements below provides the capacity for each permanent accommodation facility. The Contractor shall ensure that each facility is sized accordingly to the specified capacities:

Table 3-1: Permanent Accommodation Facility Capacity Requirements

Camp Location	Capacity
Mary River Mine Site	500 person
Steensby Inlet	300 person



3.4 ¹⁵Further Information

Please note further information regarding the scope of works for the permanent accommodation facilities will be issued as an addendum in due course.

4. Temporary Construction Facilities

In addition to the temporary and permanent accommodation facilities, a range of other facilities are also required to support construction operations. These items include wash cars, lunchroom facilities, offices, warehouses and storage containers amongst others.

4.1 Construction Camp Locations

Construction camps will be located at Milne Inlet, Mary River Mine Site and Steensby Inlet. Typical camp layouts are shown in the following attachments:

- H337697-7000-10-014-1001: Milne Inlet Construction Works Site Layout;
- H337697-7000-10-014-1002: Mary River Mine Site Construction Works Site Layout; and



¹³ Additional communications exclusion item added

¹⁴ Updated exclusion item to include fire mains

¹⁵ Removal of section 3.4





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• H337697-7000-10-014-1006: Steensby Inlet Construction Works Site Layout.

4.2 Facility Type

The temporary construction facilities will consist of a combination of pre-fabricated units, typical construction style trailers and sea-can storage containers. The sizes of each of facility will vary depending on the work front at which these are being placed and the number of people anticipated to be using them.

4.2.1 Work Included

The key objectives for provision of the Contractor includes all project components and installation activities for a complete and total operable permanent facility including but not limited to the following:

- The design, submission of drawings and / or documents for approval and permitting;
- The supply, manufacture, field installation, commissioning and provisions of necessary training for all buildings, facilities, services and equipment at each location;
- The supply of design loads and required support locations for the provision of foundation and over-turning tie down designs (where necessary);
- The supply of temporary construction facilities as per the requirements set out in this specification;
- The supply of a combination of pre-fabricated units, typical construction style trailers and sea-can storage containers as necessary;
- All units shall be supplied complete with fixtures and fittings to support construction operations
 - this shall be defined further in the technical specification included within this package.
- All units shall be supplied complete with all necessary utility provision as defined in the technical specification including but not limited to the following:
 - electrical wiring;
 - plumbing for potable water, waste water and sewage;
 - overhead lighting;
 - heating;
 - fire protection systems; and
 - day tanks for storage of potable water and sewage.







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4.2.2 Work Excluded

The scope of work excludes the following components identified below:

- Provision of external works, including rough grading, final grading, road, parking and walkway paving, landscaping and fencing to the perimeter of the camp;
- Provision of utilities beyond the limits of the external walls of each facility;
- The provisions of shipping, loading and unloading of all temporary construction facilities to site;
- All site based communications required during installation shall be provided by BIM; and
- Management and operations of the temporary construction facilities following assembly.

4.3 Temporary Construction Facilities Matrix

A Temporary Construction Facilities Matrix has been produced to identify building types, approximate sizes, assumed capacities and utilities required for each. For this please refer to H337697-7000-00-144-0001: Temporary Construction Facilities Matrix. For the purposes of this specification this document shall be further referred to as "the facilities matrix".

The facilities matrix refers to items at rail camps. These are shown for reference purposes only and are not be included in the scope of this package.

The following list confirms the requirements of this scope:

- Milne Inlet Construction Camp Temporary Construction Facilities INCLUDED in this package;
- Mary River Mine Site Construction Camp Temporary Construction Facilities INCLUDED in this package;
- Ravn River Rail Camp Temporary Construction Facilities EXCLUDED from this package;
- Mid Rail Camp Temporary Construction Facilities EXCLUDED from this package; and
- Steensby Inlet Construction Camp Temporary Construction Facilities INCLUDED in this package.

5. Design Regulations

All temporary accommodation facilities should be supplied to meet the following minimum design criteria.

5.1 Codes and Standards

The design of all facilities shall be at least in accordance with the following:

- National Building Code of Canada 2010 (NBCC); and
- Government of Nunavut Good Building Practices Guideline 2005 Second Edition.







Vendor Data Requirements Section: 01 32 19

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Information Required with Bid 1.

As a minimum the Contractor is to provide the following documents:



- ¹Drawings and/or documents for approval, permitting, supply, manufacture, installation, and commissioning of all buildings, facilities, services, and equipment for each location.
- General arrangements, layouts, process flow diagrams, P&IDs, equipment lists, instrument lists, and electrical and chemical consumptions.
- The Technical Data Sheets shall be completed in full and returned in native file.
 - Non-compliance may result in rejection of the bid and / or declassification.
- Required lifting arrangements, loads, and lift locations for each facility and unit.
- Design loads and required support locations for the provision of foundation and over-turning tie down requirements.



- ²Refer to Permanent Accommodation Specification section 13 24 23 for further additional vendor data and submittal requirements.
- Following bid period the successful contractor will be required to provide further detailed drawings and documents for design development and construction including for approval and permitting. A schedule of submittals shall be provided and agreed on upon contract award.

END OF SECTION

² Additional vendor data requirements added.



¹ Removal of approval and permitting drawings and document requirements from bid stage.





Temporary Accommodation Facilites Specification

Section: 01 53 00

Baffinland Iron Mines Corporation:Mary River Project H337697

Temporary and Permanent Accommodation and Facilities / CA702

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Temporary Accommodation Facilites
Specification

Section: 01 53 00

Baffinland Iron Mines Corporation:Mary River Project H337697 Temporary and Permanent Accommodation and Facilities / CA702

1. Temporary Accommodation Facility Functional Requirements

1.1 General

1.1.1 Where possible all temporary accommodation facilities shall be based on The Contractor's standard unit size and layout while also in accordance with all of the following requirements:

1.2 **Dormitory / bedrooms**

- 1.2.1 Each facility shall be provided with twin storey wings consisting of single occupancy bedrooms with private en-suite bathrooms. Fixtures and fittings for each bedroom as per the following list:
 - double bed
 - two lockable closets
 - desk with lockable drawers
 - task chair
 - wall mounted hooks
 - reading Chair
 - window c/w insect screen
 - black-out blinds



- 132" Wall / closet mounted flatscreen TV
- clock radio alarm.
- 1.2.2 Private en-suite bathrooms shall be provided within each bedroom, complete with toilet, sink, shower, cabinet / shelving unit, mirror and ceiling exhaust fan.

1.3 Kitchen / Dining Facility

- 1.3.1 The kitchen / dining facility shall be sized to seat and cater for 50% of the accommodation capacity. The kitchen shall be supplied to meet all relevant local and national food preparation health and safety legislation and shall consist of the following facilities:
 - cold and dry food storage suitable for a minimum of four week's groceries
 - fully equipped food preparation and cooking areas complete with (but not limited to) cookers, microwaves, fridges and freezers
 - serving lines and lunch pick-up area
 - seating / tables
 - disposal area for waste and dirty dishes

¹ TV size increased from 26" to 32"







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- dishwashing and cleaning facilities
- waste management area
- loading dock with double doors.

1.4 **Laundry / Housekeeping Facilities**

- 1.4.1 Each storey of the accommodation wings shall be supplied with one washer and one dryer per 25 people. Suitable thermal ventilation equipment shall be provided.
- Storage for all non-personal linen and bedding shall also be provided. 1.4.2



²Communications and Data 1.5

- 1.5.1 The contractor shall design, supply and install all cabling and equipment necessary to distribute data communications throughout the camp from the identified Communications rooms. All patch panels, patch cables and associated distribution from this room to all service points within the camp shall be provided by the contractor as part of its scope of work.
- 1.5.2 The supply and install installation of active equipment (switches, routers etc) shall be carried out by others. The contractor shall provide data communications distribution patch panels and racks, sub-distribution patch panels and lockable cabinets throughout the camp as required to provide a complete data and communications system. As a minimum, the sub-distribution patch panels shall be provided so as to permit the future removal of non long-term facilities without interrupting service to the remaining buildings and facilities. All communications and data systems shall have lightning protection.

1.5.3 **Telephone System**

- The telephone hard ware system will be supplied by others and will be a Voice over IP based 1.5.3.1 system that will use Ethernet as a basis for distribution. All telephone wall/desk outlet ports shall be RJ45 standard outlets with all cabling certified to IEEE Cat6 standards or better.
- This system will be located in a different location and will be distributed to all locations via a 1.5.3.2 Site Wide LAN which will be provided by others. This system will use data ports for distribution throughout the camp.
- 1.5.3.3 Common areas shall be provided with telephone outlets as required.
- 1.5.3.4 Exact number of outlets and location shall be reviewed during the detailed design stage.

1.5.4 **Data Network**

1.5.4.1 The contractor shall supply all passive cabling, patch panels, wall/desk mounted panels and racking equipment within the camp and its buildings.

² General additions and modifications to detail across whole section (1.5).









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- 1.5.4.2 The Active equipment (Switches, routers and uninterruptible power supplies) and its configuration will be supplied by others.
- All wall/desk data outlet ports shall be standard RI45 Single outlet with twisted UTP Cabling 1.5.4.3 terminated into a RJ45 24 Port 19" Rack mounted patch panel located within a Communication Cupboard/room within each building.
- 1.5.4.4 In each bedroom, the wall/desk data outlet port shall be terminated next to a power outlet near the table/desk.
- 1.5.4.5 All UTP Cabling shall conform to IEEE CAT6 Standards and be tested and certified to TIA/EIA-568-B (for CAT6) or better.
- 1.5.4.6 The contractor shall provide a cable numbering standard for all copper and fibre cabling, outlets and panels. No single run of UTP Cabling will be permitted to be over 90m in length. (suggest maybe we come up with a standard for labelling plan).
- 1.5.4.7 All distribution of data services over distances greater than 90m shall be via Single Mode Optic Fibre using ST Connectors and FOBOT's located in the patch racks within the Computer Rooms or Communications Cabinets within each building.
- All Optic Fibre cabling shall be installed in accordance with ANSI/EIA/TIA-526 standard. All 1.5.4.8 testing and certification shall be as required by this standard.
- 1.5.4.9 All FOBOT's shall be 16 Port Single U with ST Connectors.
- 1.5.4.10 All cabling from each data port shall be terminated at the patch panel within the communications cabinet/room within the building.
- 1.5.4.11 Optic cabling shall be provided from the computer rooms or communications cabinets in each location back to the main server / Communications room. The fibre optic cabling will be used for data and phone services.
- 1.5.4.12 Common areas shall be provided with data outlets as required. Exact number of outlets and location shall be reviewed during the detailed design stage.

1.5.5 Television

- 1.5.5.1 The contractor shall provide complete surge and lightning protected, TV distribution systems with return path capability including taps, splitters, surge/lightning arresters and distribution amplifiers. As a minimum, the system shall provide access to all stations normally available in Canada (satellite service - number of channels TBD).
- Three in house video channels (on DVD) shall also be made available through the TV 1.5.5.2 distribution system provided.







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- 1.5.5.3 The received Satellite Dish Antenna (s) and signal receipt/decoding equipment shall be provided and installed. All connection to and distribution from this equipment inclusive of amplification and rebroadcast equipment to service points as required shall be provided by the CONTRACTOR as part of its scope of work.
- 1.5.5.4 The amplification and distribution systems shall be sized to suit signal transmission for the number of planned rooms + 10%.
- 1.5.5.5 Provide signal distribution conduits and cabling from the TV distribution amplifiers to facilities provided with TVs and/or provided with TV signal receipt outlets, i.e. rooms, Recreation facility, etc and as detailed in each facility.
- 1.5.5.6 Provide and install all transmission, reception, control equipment filters and launch equipment including DVD players and a new rack located in the main communication room / communication rooms on each floor of each accommodation building.
- 1.5.5.7 All TV outlets shall be cabled from this distribution facility in the Communications room/main server room through the proposed new TV distribution system.
- 1.5.5.8 The owner will negotiate the provision of all services with the respective facility/service providers and make all applications and pay all and or any fees including all 'First up" and or single payment/annual and initial maintenance fees. All subsequent operating/recurring expenses will be borne by the operator of the camp.

First Aid 1.6

- 1.6.1 An on-site First Aid clinic within the facility shall be supplied for the treatment of minor personal injuries. The facility shall meet all codes and requirements of the Nunavut Mine Health and Safety Act.
- 1.6.2 The first aid facility shall be suitably located to allow for external double door access for ambulance drop-off of patients.
- 1.6.3 The facility shall consist of the following:
 - waiting areas
 - One treatment room (Milne Inlet) / two treatment rooms (Mary River Mine Site) complete
 - treatment bed / stretcher
 - treatment chair
 - waste receptacle







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- wall mounted lockable storage cabinet
- wash sink and cabinet.
- One nurses office (Milne Inlet) / two nurses offices Mary River Mine Site) complete with:
 - desk
 - task chair
 - lockable filing cabinets
 - shelving
- Communications provisions (see Section 1.5)
- lockable storage room.

1.7 **Recreation / Exercise Facilities**

- 1.7.1 A recreational area shall be provided suitable for providing central sports, exercise and recreational functions. It shall include:
 - full sized basket ball court / gymnasium complete with floor markings, fixtures and fittings for multi-purpose sports
 - exercise room complete with cardio and weight training equipment
 - The size of facility should be suitable to support a minimum 10% of accommodation capacity.
 - recreation area complete with:
 - table games (i.e. pool, foosball, air hockey, table tennis, card tables and chairs or appropriate similar)
 - book cases.
 - lounge / rest area complete with:
 - 32" Flatscreen TV's and DVD players
 - sofa's / seating
 - coffee table.
 - commissary see Section 3.1.1 below.
 - changing and wash / shower rooms.







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1.8 Smoking

1.8.1 A separate heated facility fitted with air exchange units complete with fixtures and fittings as per lounge / rest area connected to the facility shall be supplied.

1.9 Shop (Commissary)

1.9.1 A commissary / shop facility shall be provided for the provisions of selling a range of personal items such as snacks, drinks and a limited assortment of food (including some refrigerated and frozen items) and hygiene items. The facility shall be supplied complete with all furniture, equipment and fixtures necessary for such activities. A store room for the shop shall also be included.

1.10 Arrivals

- 1.10.1 Each accommodation facility shall be supplied with lobby style area adjacent to the main entrance to facilitate checking-in, waiting areas and shift rotation baggage storage.
- 1.10.2 This facility shall be sized to receive a minimum of 25% of the accommodation capacity.

1.11 Janitorial

1.11.1 Each accommodation facility shall be supplied with storage area for all janitorial equipment sized sufficiently for each location.

1.12 Offices

- 1.12.1 Each accommodation facility shall be supplied with 2 offices. Each office to be complete with:
 - desk
 - task chair
 - lockable filing cabinets
 - shelving
 - communications provisions (see Section 1.5).

1.13 Mud Rooms & Vestibules

1.13.1 All exits designated as 'common entrances and exits' shall be equipped with mudrooms and vestibules. These shall contain a work boot cleaning area and sufficient space for storage of all personal site safety equipment.







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3Utilidors 1.14

- 1.14.1 The contractor shall provide and install elevated utilidor walkways / corridors between Mary River Mine Site temporary and permanent accommodation facilities and between Milne Inlet Weather Haven Camp and temporary accommodation facility.
- 1.14.2 Utilidors shall be thermally heated, insulated and ventilated (see section 2.3) and shall be sized accordingly to accommodate a sufficient width for passage of people and for the provisions of utility piping and wiring between facilities.
- 1.14.3 The contractor shall provide details for intermediate structural supports and required foundations and ground conditions (see section 1.15). Support spacing to be configured to allow for utilidor to span across 10m wide access road minimum.
- 1.14.4 Utilidors to be supplied with regularly spaced windows c/w insect screens.
- 1.14.5 Fire doors and intermediate exits along utilidors to be provided as per National Building Code of Canada 2010 (NBCC) regulations.

1.15 **Building Foundations**

1.15.1 The Contractor shall provide building supports / founding's suitable for a temporary duration and to sit on a prepared pad. The Contractor shall advise on minimum ground bearing capacities, design loads and locations required for temporary supports. BIM shall ensure ground and bearing pad is prepared accordingly.

Utilities 2.

2.1 **Site Conditions**

- 2.1.1 For climatic data and site conditions please refer to H337697-0000-10-107-0001: Site Conditions Data Sheet.
- 2.1.2 Additional data can be found in the Government of Nunavut – Good Building Practices Guideline 2005 Second Edition.
- 2.1.3 Where conflict occurs between regulations, the most restrictive shall apply.

2.2 **Camp Operations**

2.2.1 It is intended that full construction operations will be carried out 24 hours/day, 7 days per week and 365 days per year. As such all utilities should be designed accordingly.

2.3 **Heating, Insulation and Ventilation**



³ New section (1.4) added.





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- 2.3.1 All bedrooms, work and common areas within the temporary accommodation facility shall be thermally heated, insulation and ventilated.
- 2.3.2 Electrical baseboard and make-up air units shall be utilized for provisions of heating requirements.



2.3.3 ⁴Refer to H337697-0000-45-122-0001: HVAC Design Criteria for all design assumptions.

2.4 Fire Protection

- 2.4.1 The temporary accommodation facility and all necessary utility areas shall be supplied and installed complete with fire protection systems.
- 2.4.2 Fire extinguishers shall be installed throughout the building at all recommended minimum distances apart.



2.5 ⁵Lighting

- 2.5.1 Exterior floodlighting shall be provided at all access / egresses and approach points.
- 2.5.2 For all interior and exterior lighting requirements refer specification S26 00 50 Standard Specification Electrical Requirements for Packaged Equipment.
- 2.5.3 Refer to section 2.7 for power generation.

2.6 Potable Water Treatment, Sewage Treatment and Waste Incinerator

- 2.6.1 Potable water treatment shall comply with specification 46 07 13 Equipment Specification Potable Water Treatment Plants.
- 2.6.2 Sewage treatment shall comply with specification 46 07 53 Equipment Specification Sewage Treatment Plants.
- 2.6.3 Waste incinerators shall comply with specification 11 82 19 Equipment Specification Waste Incinerators.

2.7 Power Generation

The Contractor shall provide all facilities complete with all electrical wiring / switchboards and internal ancillaries to support all heating, lighting, ventilation and general electrical usage throughout.

Electrical power generation will be provided by BIM. The contractor is to provide tie-in points for the generation units at the temporary accommodation facility boundary limits.



⁴ Reference to HVAC Design Criteria added.

⁵ New section (2.5) added.





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- 2.7.1 Load
- 2.7.1.1 The Contractor shall assume a load of 2 kW/person.
- 2.7.2 Duty
- The equipment shall be designed for continuous service under the specified process and 2.7.2.1 operating conditions.



⁶Instrumentation 2.8

All utility facilities shall be supplied with local PLC controllers and panel HMI as required, to 2.8.1 effectively control the operation remotely. Instrumentation shall include a programmable general fault discrete output from the PLC available to activate an automatic dialer for wireless alarm to alert the camp supervisor of potential issues. The common alarms may include (but not limited be to), incinerator general faults, sewage system general faults or loss of power. For further information refer to specification \$25 00 50: Instrumentation Requirements for Packaged Equipment.

Shipping, Installation and Commissioning 3.



⁷Shipping

3.1.1 The Contractor shall deliver all facilities to a port specified by BIM. BIM shall arrange for shipping, loading and unloading into position all facilities and units.

3.2 **Installation, Commissioning and Training**

- 3.2.1 The Contractor shall make available qualified personnel to undertake on-site installation, commissioning and training for all temporary accommodation facilities and related utilities.
- 3.2.2 The Contractor's expense policy shall be outlined in the bid document. The Owner, and / or his representative and any Authorities having jurisdiction over the equipment shall witness all necessary tests.



⁶ New reference to Instrumentation Requirements for Packaged Equipment specification added.

⁷ General modifications to text.





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4. Spare Parts

4.1 The Contractor shall supply lists of recommended spare parts for all facilities and utilities where appropriate.

5. Quality Assurance

5.1 The Contractor shall prepare a quality assurance and inspection / test plan and submit for Owner's approval. No changes to the plan will be allowed during implementation without prior consent from the Owner. Refer to Section S01 43 00 – Quality Management for the requirements of this plan.







Permanent Accommodation Facility Specification

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Forward

The Permanent Accommodations Facility specification contains the following:

- Section 1, Detailed Scope of Work, which provides a more exhaustive description of the Scope of Work than that contained in Section 01 11 00 Summary of Work (H337697-CA702-011100).
- Section 2, General Requirements, highlights the various requirements for tender, design, materials, labour, delivery and installation.
- Section 3, Functional and System Requirements, defines architectural, structural, mechanical, electrical and communication functionalities, specifications and other requirements for the Accommodation Building.







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1. Detailed Scope of Work

1.1 Introduction

Scope of Work of this part of the Contract comprises of design, supply, fabrication, transportation, erection, construction, testing, commissioning and turnover of complete and operational Permanent Accommodation Facilities which include the accommodation buildings and affiliated utility buildings for two separate sites at Baffinland Iron Mine's Mary River Mine in northern Nunavut.

At Mary River Mine site these buildings are referred as:

- 1. Permanent Accommodations Building (MR) 4000--BLD-4220.101
- 2. Sewage Treatment Plant Building (MR) 4000-BLD-4330.101
- 3. Potable Water Treatment Building (MR) 4000-BLD-4310.101 (shown on drawings as 4000-BLD-4330.102)
- 4. Solid Waste Disposal & Incineration Building (MR) 4000-BLD-4350.100 (not shown on part plan below)

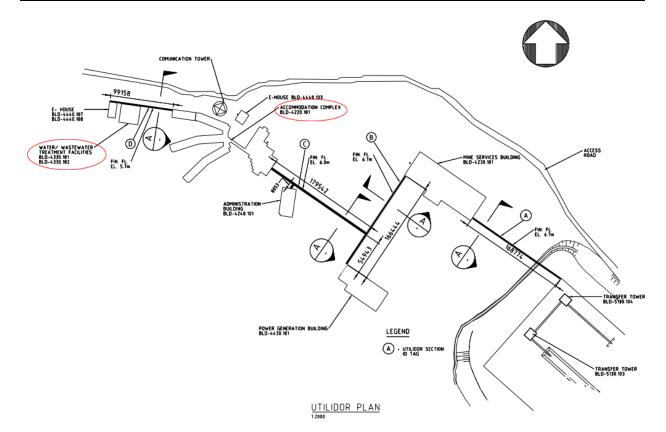






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(Ref.: Mary River Utilidors Plan, Section, Elevation Drawing H337697-4450-40-042-0001)

Figure 1-1: Mary River (MR) Mine Site – Part Site Plan.





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At Steensby Port site these buildings are referred as:

- 1. Permanent Accommodations Building (SP) 4000--BLD-4520.10
- 2. Sewage Treatment Plant Building (SP) 4000-BLD-4630.101
- 3. Potable Water Treatment Building (SP) 4000-BLD-4610.101 (shown on drawings as 4000-BLD-4630.102)
- 4. Solid Waste Disposal & Incineration Building (SP) 4000-BLD-4660.100

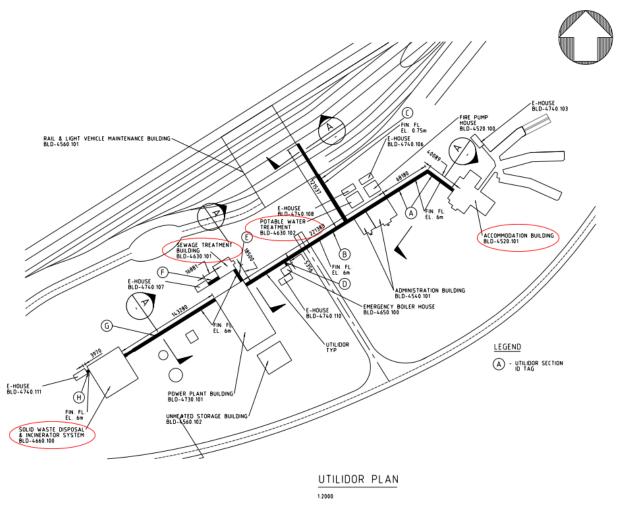


Figure 1-2: Steensby Port (SP) - Part Site Plan

(Ref.: Steensby Port Utilidors Plan, Section, Elevation Drawing H337697-4750-40-042-0001)







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1.2 Definitions

Table 1-1: Definitions

Barrier Free	Complying with access requirements for the disabled as per the National Building Code of Canada	
Building	Any structure used or intended for supporting or sheltering any use or occupancy (ref: NBCC)	
Contractor	Party that performs the work or services for construction, fabrication and installation of equipment and materials at the site or other designated location	
HVAC	Heating Ventilation Air Conditioning	
Owner's Representative	Owner's Engineering Contractor acting through its professional engineers, or other such engineers	
Manufacturer	Party responsible for manufacturing or fabricating the materials, equipment, various system components and related accessories	
MR	Mary River	
Owner	Baffinland Iron Mines Corporation	
Soffit	building enclosure component under suspended floors or roof /ceiling overhangs	
SP	Steensby Port	
Supplier	Party supplying the equipment or materials	
Vendor	Party responsible for supplying one or several pre-assembled or manufactured equipment or structure	

1.3 General Scope Description

- Preparation of conceptual, preliminary and detailed design of all facilities and services during tender, preliminary and detailed design phase (for each Mary River Mine and Steensby Port sites) as detailed in this document.
- Drawings and specifications stamped by professional engineers and architects registered in the province of Nunavut
- The obtaining of all necessary inspections permits, construction permits/licenses, building permits, occupancy permits, and other licenses as applicable (excluding development permit) in order that the facility may be occupied on the dates provided in this Contract
- Mobilization of all equipment, supplies, materials, tools, personnel and support facilities necessary for carrying out the work
- Inspection of the site prior to commencing work
- Supply of all materials and equipment
- Fabrication and inspection
- Transportation of all materials, equipments as well as prefabricated modules to both sites
- Above ground utilities installation
- Building construction and erection on site

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- Installation, testing and commissioning of various systems and equipment
- Temporary blocking if required and initial cleaning
- Design, connection of utilities, complete installation, testing and commissioning of all
 utilities within the camp battery limits and all commissioning of all facilities subject to
 approval by the Owner's Representative.
- Demobilization upon completion of the final set up of the facilities which shall include demobilization of all equipment, Contractor-supplied unused material, personnel, supplies, tools and support facilities.
- Contractor, sub-contractors and their employees shall observe Owner and applicable municipal, provincial and federal Health, Safety, Environmental and Security (SHE&S) requirements at all times

For exclusions refer to Section 01 11 00 Summary of Work (H337697-CA702-011100).

Facilities shall be built based on Contract Documents.

1.4 Tender Phase – Conceptual Design Deliverables

The Contractor's tender deliverables shall include the following documents:

- General Design Criteria
- Site Plan including adjacent structures, buildings and roads
- Facility architectural layouts. Layouts to indicate floor areas as shown on Hatch supplied Architectural design drawings (see "Applicable Specifications and Drawings" section in this document).
- Facility equipment and furniture layouts
- Typical module(s) architectural layouts
- Typical dorm room architectural layout
- Proposed colour scheme
- Elevations
- Sections
- Loadings for foundations
- Typical Wall Sections
- Building Components Materials Data sheets: Exterior wall cladding, roofing, windows, plumbing fixtures, lighting, kitchen equipment, furniture, finishes, gym and fitness equipment. Data sheets shall include illustrations and technical information relating to the items.
- High level code compliance chart for all buildings as shown on Hatch Architectural drawings called "Cover Sheet"







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- Description of proposed structural system (3 directions) with illustrations
- High level single line diagram for 600V
- HVAC System schematic diagrams

1.5 Preliminary Design Phase Deliverables

The preliminary design shall include the following documents:

Structural:

- Introduction and explanation of structural system
- Design Codes and Standards
- Design References
- Description of materials
- Assumptions
- Structural Outline Sketches
- Basic Load Case calculations
- Load Combinations
- Preliminary analysis and design calculations and results
- Preliminary Support reactions and necessary sketches
- Connection details
- Connection to the steel building support structure

Architectural:

- Site Plan
- Facility architectural layout. Layout to indicate floor areas a shown on Hatch supplied Architectural design drawings (see "Applicable Specifications and Drawings" section in this document)
- Module architectural layout
- Room architectural layout
- Proposed colour scheme and material samples
- Elevations
- Sections
- Typical Wall Sections
- Code compliance chart for all buildings
- Access to services
- Preliminary specification and product data sheets

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HVAC:

- HVAC system control schematics
- HVAC load and design calculations
- HVAC layouts showing major equipment and ductworks
- Preliminary specifications and data sheets of HVAC equipment

Plumbing and Drainage:

- Plumbing and drainage schematics including site distribution piping (glycol system to be shown also)
- Plumbing and drainage layouts showing major equipment and systems
- Preliminary specifications and data sheets of equipment and piping

Fire Protection:

• Fire protection systems schematics

Electrical:

- Power distribution including a detailed single line diagram for 600V
- Lighting Layout
- Major electrical equipment specifications

1.6 Detailed Design Phase Deliverables

The detailed design shall include:

Module Fabrication:

Sequence and detail

Structural:

- Loading Diagrams
- Detail structural drawings for building structure
- Specifications and calculations
- Final analysis and design calculations and results
- Final Support Reactions







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Architectural:

- Detailed drawings of those listed in the preliminary phase above
- All details
- Equipment layouts
- Built-in furniture details
- Interface details between finishes and services
- Specifications and data sheets
- Material samples
- Detailed code compliance matrix of all facilities
- Final floor areas

HVAC:

- Detailed HVAC control schematics
- Detailed HVAC layout drawings
- Detailed HVAC Section drawings
- HVAC equipment schedules
- Final HVAC load and design calculations
- Specifications and data sheets for HVAC equipment

Pluming and Drainage:

- Detailed plumbing and drainage schematics including site and building distribution piping (to include glycol system)
- Detailed plumbing and drainage layouts including site and building distribution piping (to include glycol system)
- Detailed Plumbing and Drainage Sections and Details
- Specifications, data sheets, calculations for equipment (including insulation)

Fire Protection and Detection:

- Hydraulic calculations
- Fire water and sprinkler systems installation drawings
- Detailed fire protection systems schematics
- Fire Protection Sections and Details
- Fire alarm system layouts
- Fire alarm system riser diagram







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Electrical:

- Single line diagrams
- Power Distribution Layouts
- Panel schedules
- Lighting layouts
- Emergency lighting
- Heat tracing layouts c/w wiring diagrams
- Heat tracing calculations

Communication System

- Communication and satellite TV system wiring and layout diagrams.
- Communication Room/Cabinet detailed drawings.

1.7 Inspection and Testing During Fabrication

The following shall be provided for the prefabricated modules:

- Preparation of a prototype dormitory bedroom and bath module for Owner's Inspection, prior to fabrication of any other modules
- Inspection during ongoing module fabrication
- Inspection of all key details and actual materials in plant, prior to shipping
- Testing of mechanical and electrical systems within prefabricated modules before shipping

1.8 Included Building Components & Services List

The following is a list of building systems and services which shall form part of the contract scope and are described in further detail in this document. This list is not exhaustive. The Contractor shall provide all facilities and equipments required to operate the facility.

- Architectural Systems
 - All Architectural Components, Exterior And Interior
 - Furnishings
 - Recreational and Kitchen Equipment







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- Structural Systems
 - Building Structure
- HVAC Systems (including Glycol Heating System)
- Plumbing and Drainage Systems
- Fire Protection System (including areas of refuge)
- Fire Detection System
- Electrical Systems
 - Power Distribution System (from multiple 600 V, 3 phase, 3-wire service feeders)
 - Supply to HVAC and refrigeration systems
 - Lighting and convenience outlets
 - Heat Tracing of water and sewage tanks and piping as required
- Communication Systems
- Equipment

1.9 As Built and Record Drawings and Data

Contractor shall provide as-built marked drawings to identify all utility locations and site piping. Contractor shall provide all operating and maintenance manuals for all equipment and systems.

1.10 Accommodation Building Battery limits

1.10.1 General

The co-ordinates for the Permanent Accommodations shall be provided to the Contractor at contract award.

1.10.2 Electrical Battery Limit

The electrical battery limit shall be the 600v Service entrance to the Permanent Accommodations.

1.10.3 Communication Battery Limit

The communication battery limit shall be the patch panels in the communications room(s).

1.10.4 Piping Battery Limits

The battery limit flange for piping shall be a 150# RF flange. The inlet and outlet battery limits are given below:

- Inlet Flange for Glycol Intake
- Inlet Flange for Fire Protection Water Intake

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Outlet Flange for Glycol Return Line

1.11 Facility Completion schedule and milestones

Refer to project schedule.

1.12 Applicable Technical Specifications and Drawings

This specification shall be read in conjunction with and meet the requirements of the following documents listed in the Section 011 10 00 Specification Index (H337697-CA702-011000). (Excluded below are documents relating to the Sewage Treatment, Potable Water Treatment and Incinerator equipment.)

Table 1-2: Applicable Specifications and Drawings

TITLE	TECHNICAL DOCUMENTS
Mater Building Matrix	H337697-0000-00-144-0001
Site Conditions Data Sheet	H337697-0000-10-107-0001
Structural Design Criteria	H337697-0000-35-122-0001
Architectural Design Criteria	H337697-0000-40-122-0001
HVAC Design Criteria	H337697-0000-45-122-0001
Electrical Design Criteria	H337697-0000-70-122-0001
CAD Standards	H337697-0000-96-240-0001
TITLE	DRAWINGS
Site Plans	
Mine Site Proposed Permanent Works Site Layout	H337697-4210-10-014-0001
Steensby Inlet Proposed Permanent Layout site layout	H337697-4510-10-014-0001
Architectural Drawings	
Accommodation Building (MR) - BLD-4220.101 Architectural - Cover Sheet	H337697-4220-40-042-0001
Accommodation Building (MR) - BLD-4220.101 Architectural - Overall Ground Floor Plan	H337697-4220-40-042-0002
Accommodation Building (MR) - BLD-4220.101 Architectural - Overall Second Floor Plan	H337697-4220-40-042-0003
Accommodation Building (MR) - BLD-4220.101 Architectural - Overall Third Floor Plan	H337697-4220-40-042-0004
Accommodation Building (MR) - BLD-4220.101 Architectural - Overall Roof Plan	H337697-4220-40-042-0005
Accommodation Building (MR) - BLD-4220.101 Architectural - Dorm Unit	H337697-4220-40-042-0006
Accommodation Building (MR) - BLD-4220.101 Architectural - Elevations	H337697-4220-40-042-0007







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Accommodation Building (SP) - BLD-4520.101 Architectural - Cover Sheet	H337697-4520-40-042-0001
Accommodation Building (SP) - BLD-4520.101 Architectural - Overall	H337697-4520-40-042-0002
Ground Floor Plan	
Accommodation Building (SP) - BLD-4520.101 Architectural - Overall	H337697-4520-40-042-0003
Second Floor Plan	
Accommodation Building (SP) - BLD-4520.101 Architectural - Overall Roof	H337697-4520-40-042-0004
Plan	
Accommodation Building (SP) - BLD-4520.101 Architectural - Dorm Unit	H337697-4520-40-042-0005
Accommodation Building (SP)- BLD-4520.101 Architectural - Elevations	H337697-4520-40-042-0006
Mary River Utilidors Plan, Section, Elevation	H337697-4450-40-042-0001
Steensby Utilidors Plan, Section, Elevation	H337697-4750-40-042-0001
TITLE	OTHER
Summary of Work	Section 01 11 00 (H337697-
	CA702—011100)
Vendor Data Requirements	Section 01 32 19 (H337697-
	CA702013219

1.13 Specific Work Instructions

1.13.1 General

Area (Building) numbers: Allot each building with number as stipulated in H337697-0000-00-144-0001 Mary River Project Master Building Matrix.

Grid numbers: If applicable, follow grid numbers allotted in the HATCH drawings.

Referenced Structures and Equipments: If applicable, show nearby or attached buildings, structures and equipments.

Floor Elevations: Denote floor levels in meters as per project datum elevations.

Measurement System: All drawings shall be in the Metric system with exception to piping which shall be in imperial. (Imperial units may be provided in brackets alongside metric dimensions).

1.13.2 Code Compliance Report

Contractor shall provide a detailed code compliance report demonstrating compliance to the applicable building and fire codes. Code compliance summary shall be provided on a Cover Sheet drawing for each facility.







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1.13.3 CAD and Procedures

General: In addition to PDF or each drawing, Contractor shall provide Microstation drawing files at each submission.

Drawing Size: Drawings shall be A1 size.

Layers: Follow 2D CAD Manual, for layer naming convention for all disciplines.

Plotting: Follow HATCH Standard Pen Table in 1.3.1 of HATCH document for all disciplines.

Drawing Numbers: Drawing numbers shall follow Hatch naming convention. Contract number shall be provided adjacent to the drawing number.

2. General Requirements

2.1 Description

This section covers general requirements for the Work specified in the Contract Documents.

2.2 Codes and Standards

Except as noted within this specification, all materials, design, and fabrication shall be in accordance with accepted engineering standards and shall comply with the latest editions. All facilities will be designed, manufactured, and erected in accordance with the latest editions of the codes and standards listed in the Design Criteria referenced in section 1.12 of this document.

2.3 Performance

2.3.1 Design Life

The expected life of the facilities is 25 years.

2.3.2 Cold Climate Site Conditions

As mentioned in the introduction, this facility is located in a remote northern location in Nunavut and as such it must be designed and fabricated to withstand the site's extreme environmental conditions. For climatic data information refer to Site Conditions data sheet H337697-0000-10-107-0001.

2.4 Data Submittal requirements

Contractor shall submit documentation in accordance with the attached document entitled Vendor Data Requirements Section 01 32 19 and as listed in Section 1 of this document.







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2.5 Maintenance Materials

Provide maintenance materials for the following:

- Acoustic ceiling tiles amounting to 2% (or 1 carton whichever is greater) of gross ceiling area for each pattern and type required for project
- Ceramic tiles amounting to 2% (or 1 carton whichever is greater) of gross floor area for each pattern and type required for project
- Rubber or vinyl sheet and tile flooring amounting to 2% (or 1 carton whichever is greater) of gross floor area for each pattern and type required for project
- Paint amounting to 2% (or 1 gallon whichever is greater) of gross wall area for each colour and type required for project
- Door hardware repair kit

Extra materials to be from same production run as installed materials.

Clearly identify each material, including colour and texture.

Deliver to site, upon completion of the work of this section.

Store where directed by the Owner's Representative.

Contractor shall provide a list of suggested spare parts for start-up and two (2) years' operation.

2.6 Recommended Equipment Suppliers

The following is a list of recommended Suppliers for mechanical and electrical equipment within this Contract:

HVAC: Carrier, Engineered Air, TRANE, En Mar System or

equivalent

Communications Cabling and

Accessories:

TBD

• Fire Detection Equipment: Edwards of Secutron

2.7 Substitutions

After receipt of a formal bid, substitutions of any kind will not be permitted without the expressed written consent of the Owner or the Owner's Representative.







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2.8 Quality Assurance

The construction of the facility shall be executed to the highest standards of workmanship. The contractor shall afford free access to manufacturing facilities, including those of their subsuppliers, for inspection of ongoing work, as per the attached Section S01 43 00 Specification for Quality Assurance Requirements (H337697 S01 43 00).

The Contractor shall prepare one (1) prototype of a typical dormitory module for the Owner's approval prior to fabrication.

The Owner reserves the right to witness any test or inspections, which they consider necessary, to ensure that components conform to quality assurance requirements. All inspection reports shall be made available to the Owner for inspection. The Contractor shall supply the Owner with a complete list of documentation they intend to produce for review and approval. All defects in excess of agreed acceptance criteria shall be reported to the Owner by the Contractor and evaluated by the Contractor's engineering department for possible corrective actions. All corrections proposed shall be subject to the Owner's approval.

The Contractor shall notify the Owner of any conflicts arising in the interpretation of this specification, the purchase order, drawings or accompanying information. No deviations shall be made from any of the above documentation without prior written approval from the Owner.

2.9 Manufacturing Criteria

The accommodation buildings shall be the product of one manufacturer who has been regularly engaged in the design of pre-engineered and pre-fabricated structures. Manufacturer shall be certified under AISC certification category "MB". All material shall be new, unused, and free from defect.

2.10 Delivery, Storage, and Handling

Protect materials from damage (cuts, scratches, gouges, abrasion, and impacts) before and during delivery.

All items shall be protected and handled so that they will not be over-stressed, bent, broken, deformed or otherwise damaged before and during delivery.

Care shall be taken to avoid damage to protective coating finishes.

All lifting devices and rigging shall conform to the Occupational Health and Safety Regulations and in no case shall have a safety factor less than 4.

All erection bolts and shims shall be shipped with the first delivery of steel in appropriate containers.

One copy of the master shipping list shall be transmitted by the Contractor in a waterproof package with each shipment. One copy shall be mailed to the field office the same day the shipment leaves the shop.







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Materials stored on site before erection shall be stacked and covered with suitable weather tight covering so that any accumulated water will drain off. Materials having defects or damages that affect appearance, serviceability or use will be rejected.

At the site all units shall be stored off the ground with identification marks readily visible on Contractor supplied blocking or skids so that materials are protected from damage, deterioration, and corrosion.

3. Functional and System Requirements

3.1 Accommodation Building Functional Description

3.1.1 Facility Description

The Permanent Accommodations shall be a single facility comprised of a residential section (dormitories) and a central service/recreation building (service core). It shall be a modular building that is manufactured off site, shipped fully equipped to site in manageable units, and erected on site. The buildings shall be elevated to suit permafrost conditions. All areas of dorms and service core shall be accessible from interior corridors. The facility shall be fully equipped with building systems as described herein.

In addition to description provided below, refer to H337697-0000-40-122-0001 'Architectural Design Criteria' Section 2.3.1 for functional description of accommodation facility.

Ground and second floor of the building shall be designed to be barrier free unless otherwise permitted by the authorities having jurisdiction.

The dormitories shall be two or three stories high and linked to the service core by an enclosed pedestrian passageway. The dormitory modules shall contain bedrooms, bathrooms and a portion of the corridor as appropriate. Modules for laundry, housekeeping room, mechanical, electrical rooms and stairs shall be provided as well. The dorms shall provide the capacity to house the number of persons as defined in Section 01 11 00 Summary of Work (H337697-CA702-11100).

The facility will have forced air distribution systems for heating and ventilation and air conditioning (HVAC) as required. HVAC air handling equipment shall be capable of operating on electrical power and using glycol system. In addition, bedrooms shall be equipped with electric baseboard heaters to allow for individual control of space temperature within each room. The entire main facility shall be subdivided into zones, each supplied with its own air handling unit. Domestic water heaters as well as cooking equipment shall be heated electrically.

3.1.2 Facility Concept

Architectural drawings forming part of this package should be used as a design guide for the facilities. The site plans provide the site area allocated to the two facilities and must be taken into consideration for the design. Link to adjacent building must be maintained as described in the Architectural Design Criteria and as shown on the site plans. (Note that the referenced facility







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drawings reflect facilities designed for 282 and 142 persons and must be enlarged when considering the requirements for 500 and 300 persons respectively.)

Architectural Design Criteria shall be used for the qualitative aspects of the building such as building materials and colour scheme.

3.1.3 General

The quality of finishes and materials shall be of commercial quality, standard grade and low maintenance.

Materials specified should minimize maintenance and operating procedures and costs.

Fire safety signage (in colour) shall be provided in each bedroom.

Projecting (perpendicular to walls) signage shall be provided for fire extinguishers, fire hose, pull stations and exit signs, wherever applicable.

All signs shall be in English (with Inuktitut translations as required by local authorities).

The dorm rooms shall be equipped with a security access system comprising of card readers.

3.1.4 Service Core Design

3.1.4.1 Aesthetic and Environmental Characteristics

The main entrance area and lobby area shall be aesthetically pleasing and accommodate attractive display cases, message boards and seating. Creating an environment, not just a space, is important.

The public thoroughfares should offer elements of interest and opportunities for interactions. The daily route of the staff member from his or her room to his or her workplace shall be clear and straightforward and at the same time expose them to the recreational areas thus promoting participation. The layout should visually expose the passer-by to areas and rooms of various activities.

Consideration shall be given to provide natural light and ventilation to public areas as well as the dining and recreational areas.

Maintain uniformity of style throughout the complex.

Floor to ceiling heights of minimum 2.75m (9'-0") shall be provided in all public areas though preference will be shown for buildings that use 3.0 m (9'-10").

Floor and wall finishes shall be provided as appropriate for the use of the space.

When designing the layout of the public washrooms consider the following: protection of sight lines into the toilet rooms; appropriate wall space for toilet accessories, minimizing plumbing chases etc.



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3.1.4.2 Games Room

Provide minimum: Qty:3 - Pool tables; Qty: 1- Ping Pong; Qty:2- Card tables (seating 4 each), Qty:2- Dart boards; all with required equipment and accessories

3.1.4.3 TV Lounges & Movie Room

TV lounge shall contain minimum: Qty:1-60"HDTV; Qty:1- 300 watt home theatre system with DVD & VCR players; Lounge seating for 15; Qty:4- Coffee tables; Qty:4 - End tables; Qty:4 - Table lamps

Movie rooms shall contain minimum: Qty:1-72"HDTV; Qty:1- 300 watt home theatre system with DVD & VCR players; Theatre seating on stepped floor

3.1.4.4 Library

Library shall contain minimum: Qty:8 - Reading tables with privacy screens; Qty:8- Work chairs; 28 linear meters of 5 tiered 250mm deep book shelves; Lounge seating for 4

3.1.4.5 Internet Room

Include a minimum of 6 internet stations

3.1.4.6 Gym

Provide raised running track. Gym must be sized and equipped for basketball, volley ball and badminton. Provide all markings, equipment and accessories for designated sports.

3.1.4.7 Bowling Alley

The Contractor is requested to include in their design a 2 lane bowling alley which is presently not shown on the conceptual architectural drawings.

3.1.4.8 Weight and Fitness Room

Room shall be sized for weights and cardio equipment for minimum 20 users. Provide storage closets for balls, mats, steps etc., with hooks and shelving as required.

Qty:10- Treadmills; Qty:10 - Recumbent cycles; Qty:3- Rowing machine; Qty:2- Vertical chest press machine; Qty:2- Seated leg curl machine; Qty:1- Leg extension machine; Qty:1- universal combination unit with seated row, lateral pull down and triceps extension with all attachments; 5 to 60 lb IVANKA dumbbells including storage shelving; Barbells; Qty: 2 - Incline/ decline benches; Qty:6 - 55cm stability balls; Qty:10 - Floor mats; Qty:6 - Steps; Full height wall mirrors on all walls; Sound system; Qty:2- wall or ceiling hung 42" TV with DVD player.

Provide saunas and whirlpool.

3.1.4.9 Dining and Kitchen Facilities

The kitchen shall serve 2 hot meals, one at breakfast between 5 AM and 8 AM and another at dinner between 5 PM and 8 PM. The seating capacity of the dining area shall be 55% of







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accommodation capacity. There shall be a self service lunch preparation area where employees can prepare sandwiches, drinks, soup, fruit, desserts etc in bags.

Dining area tables and seating shall be ergonomic and suited for above average to ample size persons. Provide tables and cafeteria chairs, in a mixture of sizes to seat 6, 4 and 2.

The servery shall be designed as single line cafeteria style self-service and partly served area located inside the dining area and adjacent to the kitchen. It shall be well lit with all the serving appliances, counters and beverage dispensers organized for efficient and expedient food service.

The kitchen shall be equipped with all required equipment for completely functional kitchen facilities. Most kitchen appliances requiring heat shall electrically powered or be provided with propane burners. The Permanent Accommodations provider shall be responsible to propose a functional kitchen layout and equipment. The kitchen shall be commercial style with several areas including but not limited to general food preparation, vegetable preparation, meat preparation, bakery, dishwashing area, storage, refrigerators and freezers. Cooking equipment shall be provided with appropriate ventilation systems and wet chemical fire-suppression systems as required by applicable codes and standards. The dishwashing area shall be located adjacent to the kitchen with easy access from the dining areas to facilitate employee drop-off of dirty dishes, cutlery and glassware at end of meal. The food storage area shall be designed with easy access, adjacent to food preparation areas. The food storage, walk-in freezers and refrigerators should be easily accessible from loading dock.

3.1.5 Dormitory Design

3.1.5.1 Aesthetic and Environmental Characteristics

Dormitory wings shall be designed and located to maximize privacy and restrict views into bedrooms between facing wings.

Dormitory halls shall be finished and constructed to minimize impact and airborne sound transmission.

Dormitory bedroom areas shall be configured to minimize unwanted traffic. The common areas shall be central and laundry rooms should be easily accessible by persons residing in different wings.

Consideration shall be given to provide natural light and ventilation to public hallways.

3.1.5.2 Bedrooms and Private Baths

The bedroom units shall be designed with a private bathroom for each unit.

Doors to rooms shall be sound and light proof.

Bedroom furniture shall be robust and durable.







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The bedrooms shall be equipped as shown on 'Typical Dorm Layout Plan' H337697-4220-40-042-0006 and H337697-4520-40-042-0005 with the following minimum architectural, mechanical, electrical and communication components:

- Double bed (1370 mm wide by 2030 mm long) with two lockable built-in drawers
- Night tables with lamps
- Desk with shelf, desk or wall lamp and chair
- Lockable clothes closet
- Metal framed full height wall mirror (380 mm wide by 1525 mm high)
- 32" colour TV mounted on wall
- Wastebasket
- Video, data and communication receptacles for TV, internet and phone
- Operable window with insect screen
- Black-out window shade
- Three (3) coat hooks

The bathrooms shall be equipped with the following minimum architectural, mechanical and electrical components:

- Hand wash vitreous china lavatory with single lever faucet, mirror and light fixture
- Bath towel bar
- GFI receptacle at the lavatory
- Floor mounted water closet
- Large shower (minimum 1020 mm by 900 mm clear inside dimension).
- Toilet paper dispenser
- Soap dish
- Glass shower door
- Towel bar
- Wall hooks
- Ceiling mounted light fixture
- Ceiling mounted exhaust fan

3.1.5.3 Dormitory Service Area

Laundry Rooms shall be equipped with heavy-duty washers and dryers, clothes folding counters and laundry tubs.







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Janitor Rooms shall be equipped with mop sink, mop rack, metal janitor's shelving and House Keeping Rooms with shelving for linen.

Baggage Rooms shall be equipped with 31" X 24" X 15" lockable storage compartments for all staff including those on rotation.

3.2 Utility Buildings Systems Requirements

3.2.1 General

Refer to Architectural, HVAC, Electrical and Structural design criteria listed in section 1.12 of this document for building system requirements as well as Architectural Material Data Sheet (H337697-0000-40-107-0001) for specified building materials and insulation values.

Materials specified should minimize maintenance and operating procedures and costs.

3.3 Accommodation Buildings Architectural System Requirements

3.3.1 General

These requirements shall be followed except where otherwise indicated elsewhere in this document or in the Architectural Design Criteria and Architectural Material Data Sheet (H337697-0000-40-107-0001).

Materials specified should minimize maintenance and operating procedures and costs.

3.3.2 Exterior Envelope

The building envelope shall be insulated and provide the following insulating R values (thermal resistance):

Roof: R38 / RSI 6.77

Raised Floor: Same as roof

• Walls: R27 / RSI 4.75

Exterior walls shall be finished in metal cladding.

Snow and icefall protection shall be provided at all exits and entrances.

Building envelope shall be provided with effective air leakage control assuring that the joints between assemblies and all penetrations are airtight.

Structural elements within heated areas shall be insulated.

3.3.3 Doors and Windows

Exterior personnel doors shall be insulated pressed steel with pressed steel frames.







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Interior personnel doors shall be solid wood core unless otherwise required by code. Provide glass side lights wherever suitable and practical.

Door hardware shall be equipped with "master key" system which shall be coordinated with the Owner. Contractor shall provide a key cutter and blank keys

Exterior windows shall be fixed with an operable casement or hopper style section. Slider style of window is not permitted.

3.3.4 Walls, Floors and Ceilings

Interior walls shall be in painted gypsum board.

Where practical, rooms shall have a suspended ceiling with the exception of mechanical, electrical, communication and janitor's rooms.

Suspended ceilings shall be either in acoustic tiles or gypsum board.

Carpeted flooring shall be avoided except where otherwise indicated.

Bedrooms and dorm halls shall be carpeted.

Walls and floors in the bathrooms, washrooms, showers and locker rooms shall have an easily cleanable impervious finishes.

The STC (Sound transmission class) of partitions separating the following rooms shall be as follows (the higher rating shall apply in the case of adjoining rooms from the list below):

• Dormitories (bedrooms): STC 50

Offices: STC 40

Large conference rooms: STC 48

Small Conference Rooms: STC 45

Open office areas: STC 40

Lunchroom/ washrooms/locker rooms/corridors: STC 45

Elevator / Refuse chute and dormitory; STC 55

3.3.5 Lighting

Public area lighting shall be recessed. Lighting in games room, TV lounges, dining room, meeting and training rooms shall be suited to the activities taking place in these rooms. Avoid harsh lighting in these rooms. See electrical section below for further details.







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3.3.6 Plumbing Fixtures, Washroom Accessories and Cabinetry

Plumbing fixtures in washrooms shall be in vitreous china. The water closets shall be wall-hung type in public areas. Showers shall be of thermoformed acrylic with moulded soap dish and shelf. See mechanical section below for further details on plumbing fixtures.

Public area washroom accessories shall be surface mounted type, in stainless steel finish.

Built-in cabinetry exterior shall be in plastic laminate on plywood. Cabinetry shelving shall be in melamine. Countertops shall be in plywood with plastic laminate finish.

Lock mechanisms for lockers and built-ins shall have master key control system.

3.4 Structural System Requirements

The design of the structural systems (wood or steel) shall be done by the module manufacturer as per the governing codes.

Design of the foundations shall be by Owner's (Engineering) Representative. Contractor shall provide all design loads and documentation as specified in section 1 of this document.

3.5 Accommodation Buildings HVAC System Requirements

3.5.1 Design Requirements

3.5.1.1 General

Dormitories and service core of the Permanent Accommodations shall be provided with heating and ventilation systems. Humidifier fixture will be added into air handling unit for the minimum humidity requirement in winter.

The air conditioning system shall not be utilized in the design of heating and ventilation systems for this project.

Design and supply of heating equipment shall be based on the use of electricity and glycol/water (60/40% mixture) heating as heat source. Electric heating shall be used for accommodation facilities before power plant is constructed. Once power plant is in operation, glycol/water shall be utilized as heating source.

Contractor supplied air handling units and make-up air units shall include both electric heating coils and glycol heating coils which can be switched over under different applicable situations.

All HVAC equipment shall be indoor type.

Internal glycol heating system: warm glycol will be supplied to the facility for heating purposes. Contractor shall include necessary distribution system along with fan based heat exchangers. The facility shall allow for one inlet line and one outlet glycol line. Feed glycol will be at a temperature of 70 to 75oC. The return line must be no less than 51oC.







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3.5.1.2 Outdoor Conditions

The HVAC systems design shall be based on the outdoor design conditions shown below. Refer to Site Conditions Datasheet H337697-0000-10-107-0001.

Design dry bulb temperature – summer
 14 °C

• Design wet bulb temperature – summer 8.3 °C

Design temperature – winter - 45 °C

3.5.1.3 Indoor Conditions

The indoor design temperature shall be as follows:

Living / sleeping areas:
 22 °C

• Change Rooms: 24°C

• Dining, office areas: 22°C

Gym, kitchen areas: 16°C

3.5.1.4 Ventilation Air Requirements

The ventilation air is defined as a minimum rate of outdoor air supplied to the indoor space to maintain the required indoor air quality based on ASHRAE standard.

The building ventilation shall be mechanical system utilizing air handling units, exhaust or supply fans.

The air distribution ductwork shall be provided where applicable.

The ventilation air requirements are listed in the table below:







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Table 3-1: Ventilation Air Requirements

Area Description	Ventilation Air Requirements
Living/Sleeping Areas	85 m3/h/dorm
Individual Bathroom	85 m3/h/room
(Shower + Toilet)	
Common Toilets	85 m3/h/toilet
	85 m3/h/urinal
Common Shower	85 m3/h/shower
Office	34 m3/h/person
Gym	Exhaust 3 ACH
	Supply 2 ACH
Kitchen	Exhaust 4 ACH
	Supply 3 ACH
Dining Area	34 m3/h/person

3.5.2 Heating and Ventilation Systems Description for Specific Rooms

3.5.2.1 Dormitories

The ventilation system is described as follows:

Ducted supply air system to individual rooms and corridor; supply air shall be heated.

Ducted exhaust air system from individual washrooms.

Rooms and corridors to be kept under positive pressure to minimize the amount of infiltration from outdoor.

No ventilation openings are allowed in doors and partition between rooms and corridors.

The room air shall not be re-circulated.

3.5.2.2 Office Areas and Recreation Rooms

The ventilation system is described as follows:

- Ducted supply air system; supply air shall be heated.
- Ducted exhaust air system.
- Areas to be kept under a positive pressure relative to their surroundings.





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3.5.2.3 Laundry, Gym, Kitchen and Dining Areas

The ventilation system is described as follows:

- Ducted supply air system; supply air shall be heated.
- Ducted exhaust air system.
- Areas to be kept under negative pressure relative to surroundings.

3.6 Accommodation Buildings Plumbing and Drainage System Requirements

Sanitary drainage and plumbing shall be provided for the washrooms, janitor rooms, kitchen, shower rooms, lunch room, laundry rooms, first aid rooms, mechanical rooms, etc.

Hot water shall be supplied at 60°C from storage type hot water heaters to lavatories, janitor sinks, kitchen sinks, mop sinks, and at 72°C to food preparation area.

Hot water shall be re-circulated to ensure that it is supplied at constant temperature to the plumbing fixtures.

Hot water heaters may be centrally located in the accommodation sector of the facilities or locally one per Dorm Wing.

Cold water will be supplied to the plumbing fixtures from a local plant water treatment plant.

Sanitary sumps complete with pumps shall be provided for collection and transfer of sanitary effluent to the Sewage Treatment Plants.

3.7 Accommodation Buildings Fire Protection System Requirements

3.7.1 Work by Others

- Fire water main ring with freeze protection complete with fire hydrants and valves shall deliver water to each area that requires fire protection. Each heat tracing section shall be monitored for status. In case of failure, alarm shall be initiated and read at the Accommodations.
- Fire water feed header sized for a minimum of 550 USgpm at 80 psig for sprinkler systems, and above 100 psig for Class I standpipe systems.
- Water supply for fire protection meeting the minimum design flow duration of 2 hours for the most demanding zone. Water shall be stored in an insulated storage tank located outdoors equipped with supervised heating.
- A fire pumping module including a dual fire pump assembly (electric/diesel) and a jockey pump to deliver the required flow and maintain pressure in the system.







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3.7.2 Main Requirements

Sprinkler System with a hydraulic demand equivalent to Ordinary Hazard Group II (Loading Dock); 0.2 USgpm over 1,500 ft2 with a hose allowance of 250 USgpm.

The kitchen area, classified as Ordinary Hazard, Group 1, in accordance with NFPA 13 and shall be provided with an automatic wet sprinkler system with design density of 6 L/min/m²(0.15USgal/sq. ft.) over 139.4 m² (1500sq.ft.) design area and a hose allowance of 250 USgpm.

The loading dock area, classified as Ordinary Hazard, Group 2 in accordance with NFPA 13, and shall be provided with an automatic wet sprinkler system with design density of 8 L/min/m²(0.2USgal/sq. ft.) over 139.4 m² (1500sq.ft.) design area and a hose allowance of 250 USgpm.

Remaining areas to be classified as Light Hazard Occupancies in accordance with NFPA 13, and shall be provided with an automatic wet sprinkler system with design density of 4 L/min/m²(0.1USgal/sq. ft.) over 139.4 m² (1500sq.ft.) design area.

Provide a Class III standpipe system in accordance with the requirements of the National Building Code (?) and designed in accordance with NFPA 14.

Cooking equipment shall be provided with automatic wet chemical fire suppression system.

Portable 'K' type fire extinguishers should also be available to kitchen staff.

The ventilation and fire protection systems for cooking equipment shall conform with NFPA 96 – Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, UL 300 – Standard for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas, and NFPA 17A – Standard for Wet Chemical Extinguishing Systems.

3.7.3 Additional Requirements – Areas of Refuge

Contractor shall provide dedicated location(s) within the facility that can safely
accommodate the entire population of the facility during a fire, complete with emergency
telephone and first aid supplies. Refuge must be separated from remainder of building with
fire and smoke barriers and be constructed of fire-proof materials. The refuge should come
complete with separate ventilation system designed for emergency conditions Guidance for
the design of the Refuge Area to be in and be in accordance with NFPA 101.

3.7.4 Additional Requirements – Compartmentalization

Contractor shall include in the building design a compartmentalization scheme, complete
with smoke control/exhaust and fire / smoke barriers, for the
Accommodations. Compartmentalization should be designed with smoke controlled egress
facilities leading to the area of refuge. All designated egress routes to the areas of refuge
must be heated/interior areas and designed for a smoke free egress.







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3.8 Accommodation Buildings Fire Detection System Requirements

The following are the main elements:

- Complete fire alarm system for the Permanent Accommodations facility conforming to CAN/ULC S524 and the National Building Code of Canada except that detection devices must be provided in all areas of the accommodations facility.
- Smoke Detectors (in dormitory areas, near HVAC equipment). As per the National Building Code of Canada requirements.
- Multiple Pull Stations
- Heat Detectors (in kitchen and other fire hazard areas)
- Control System to receive fire detection signals from detectors and provide an output to the site central control system (Ethernet, Profibus or Devicenet) such that the location of the alarm is provided.

The fire alarm system shall be a fully addressable microprocessor based local fire alarm panel with integral battery back-up c/w fibre network640 control module (Notifier -#NFS3030 or equal). It shall have compatible addressable devices for detection, signalling, monitoring. Shutdown devices shall be installed as required by code. The Sprinkler System shall have zones for tamper switches and zones for flow switches. It shall be electrically supervised through the main floor fire alarm panel. Initiation of either zone will signal trouble at the main floor fire alarm panel and a 24 hr manned monitoring station.

Fire alarm system design shall be based on the following:

- FM Data Sheet 5-40 requirements in the absence of Owner requirements
- Owner safety requirements;
- System shall be addressable;
- Provision for data gathering panels (DGP);
- Interface with Air handling units and where required;
- Interlock with smoke exhaust/control systems/fans
- Strobe lights shall be provided in the mechanical rooms;
- Oxygen and Carbon dioxide gas detectors shall be installed where required;
- Manual pull station shall be provided at the following locations:
 - All exit doors at ground level
 - Entrance to exit stairwells







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- Mechanical rooms
- Main electrical room
- All horizontal exits

Provide wiring for the fire alarm system with the following characteristics:

- Copper conductors only
- The device loops for all of the detectors, relays and pull stations are to use red 2 conductor
 + ground #18 AWG Securex wire
- The speaker and horn loops are to use red 4 conductor + ground #18 AWG Securex wires
- The regular strobe light loops are to use red 4 conductor + ground #16 AWG Securex wires
- The explosion proof strobe lights shall be connected to a separate loop using 4 conductors
 + ground #16 AWG Securex wires
- The fireman's handsets are to be homerun to the DGP on 2 conductor + ground #18AWG Securex wires, with a wire to the nearest pull-station to tie into the device loop
- The connections between DGPs are to be multiple red 2 conductor #18AWG shielded solid Securex wire. Install 2 of these cables in on e 1"C for the audio signals and 6 of these cables in the other 1" conduit for the network signals.
- Provide fire rated enclosure around the fire alarm system conduits as required by local authorities. Protect all loops passing through zones other than the control zone.

Maximum Number of devices per loop:

• Speakers: 20

Horn Speakers: 10

Initiating Devices:
 40 (count 2 for each pull station)

• Strobes: 6

Explosion proof strobes: 6

All speakers are to be set to 1 watt. All horns are to be set at 2 watt on installation.

All speakers have a custom back box that is supplied by the fire alarm supplier.

Fire alarm system shall have the following features:

- Two-stage (Alert and Alarm)
- Supports and design as shown on drawings and specifications





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- Addressable with own control facility
- Local LCD annunciation and remote LCD and LED annunciation
- Class A wiring for addressable loops
- Class B wiring EOL devices at panels
- Fire print and addressable devices
- Interface with:
 - Sprinkler Protection System
 - HVAC Systems (Supply, Return, Exhaust)
 - Diesel Generator System
 - Firemen communication and fire fighter telephone (FFT)
 - Smoke control / exhaust fans
- Operate strobe lights and do-not-enter signs
- Monitor sprinkler valves and others for trouble, alert and alarm
- Alert signal by detector, pull station
- Alarm by flow switch
- Alarm after 5 minutes of alert without acknowledgement
- Alarm by second stage pull station operation (KEYED)
- Alarm by single stage blue pull station for hose rack
- Duct smoke detector shut-off return and supply air fans
- All fans and selected motor/equipment shutdown at alarm stage
- Automatic recall with alternate floor selection
- Alert signal reports trouble signal at existing system
- Alarm signal reports alert signal at existing system
- Capable to operate at loop distance of more that 1000 feet.
- Verification report complete with zoning device, description, location and address.
- Tests

The Contractor will provide the system verification documentation (as required by CSA and local code requirements) within 5 working days of the completion of the verification.





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3.9 Accommodation Buildings Electrical System Requirements

3.9.1 *General*

The Accommodation Building Power Distribution and Lighting System shall generally conform to conventional Canadian practice for buildings of this type while including for provisions described in the Nunavut Good Building Practice Guideline. The power distribution system shall feature 3-phase/3-wire 600 V feeders radiating from the service entrance electrical room to satellite electrical rooms strategically located throughout the facility as required. The satellite electrical rooms shall house distribution transformers, lighting and distribution panels and other auxiliary equipment. The satellite electrical rooms shall be clearly indentified and permit only controlled access.

For electrical system requirements refer to Electrical Design Criteria referenced in section 1.12 of this document.

3.10 Accommodation Buildings Communication System

3.10.1 General

Products installed must meet or exceed all local, provincial and federal building, fire, health, safety and electrical codes, as well as CSA, UL and ANSI/TIA/EIA-568-B requirements

To minimize any possibility of disruption, maintain the following minimum clearances from electrical and heat sources when routing cables.

Minimum Clearance Item Motor 1.2 m (4'-0") 1.2 m (4'-0") Transformers 0.3 m (1'-0") Conduit and cables used for electrical distribution less than Conduit and cables used for electrical distribution greater 1.0 m (3'-0") than 1kV Fluorescent Luminaires 12 cm (5") Pipes (gas, oil, water, etc.) 0.3 m (1'-0") 15 cm (6") HVAC (equipment, ducts, etc.)

Table 3-2: Minimum clearances from electrical and heat sources

3.10.2 Communication and Data

The Contractor shall design, supply and install all cabling and equipment necessary to distribute data communications throughout the camp from the identified Communications rooms. All patch panels, patch cables and associated distribution from this room to all service points within the camp shall be provided by the Contractor as part of its scope of work.

The supply and installation of the active equipment (switches, routers etc) will be by others. The Contractor shall provide data communications distribution patch panels and racks, sub-







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distribution patch panels and lockable cabinets throughout the camp as required to provide a complete data and communications system. As a minimum, the sub-distribution patch panels shall be provided so as to permit the future removal of non long-term facilities without interrupting service to the remaining buildings and facilities. All communications and data systems shall have lightning protection.

3.10.3 Telephone System

- The telephone hard ware system will be supplied by OTHERS and will be a Voice over IP based system that will use Ethernet as a basis for distribution. All telephone wall/desk outlet ports shall be RJ45 standard outlets with all cabling certified to IEEE Cat6 standards or better.
- This system will be located in a different location and will be distributed to all locations via a Site Wide LAN which will be provided by OTHERS.
- This system will use data ports for distribution throughout the camp.
- Common areas shall be provided with telephone outlets as required. Exact number of outlets and location shall be reviewed during the detailed design stage.

3.10.4 Data Network

The Contractor shall supply all passive cabling, patch panels, wall/desk mounted panels and racking equipment within the camp and its buildings.

- The Active equipment (Switches, routers and uninterruptible power supplies) and its configuration will be supplied by OTHERS.
- All wall/desk data outlet ports shall be standard RJ45 Single outlet with twisted UTP Cabling terminated into a RJ45 24 Port 19" Rack mounted patch panel located within a Communication Cupboard/room within each building.
- In each dorm room, the wall/desk data outlet port shall be terminated next to a power outlet near the table/desk.
- All UTP Cabling shall conform to IEEE CAT6 Standards and be tested and certified to TIA/EIA-568-B (for CAT6) or better.
- The Contractor shall provide a cable numbering standard for all copper and fibre cabling, outlets and panels. No single run of UTP Cabling will be permitted to be over 90m in length. (suggest maybe we come up with a standard for labelling plan)
- All distribution of data services over distances greater than 90m shall be via Single Mode
 Optic Fibre using ST Connectors and FOBOT's located in the patch racks within the
 Computer Rooms or Communications Cabinets within each building.





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- All Optic Fibre cabling shall be installed in accordance with ANSI/EIA/TIA-526 standard. All
 testing and certification shall be as required by this standard.
- All FOBOT's shall be 16 Port Single U with ST Connectors.
- All cabling from each data port shall be terminated at the patch panel within the communications cabinet/room within the building.
- Optic cabling shall be provided from the computer rooms or communications cabinets in each location back to the main server / Communications room. The fibre optic cabling will be used for data and phone services.
- Common areas shall be provided with data outlets as required. Exact number of outlets and location shall be reviewed during the detailed design stage.

3.10.5 Television

The Contractor shall provide complete surge and lightning protected, TV distribution systems with return path capability including taps, splitters, surge/lightning arresters and distribution amplifiers. As a minimum, the system shall provide access to all stations normally available in Canada (satellite service – number of channels TBD).

- Three in house video channels (on DVD) shall also be made available through the TV distribution system provided.
- The received Satellite Dish Antenna (s) and signal receipt/decoding equipment shall be provided and installed. All connection to and distribution from this equipment inclusive of amplification and rebroadcast equipment to service points as required shall be provided by the CONTRACTOR as part of its scope of work.
- The amplification and distribution systems shall be sized to suit signal transmission for the number of planned rooms + 10%.
- Provide signal distribution conduits and cabling from the TV distribution amplifiers to facilities provided with TVs and/or provided with TV signal receipt outlets, i.e. rooms, Recreation facility, etc and as detailed in each facility.
- Provide and install all transmission, reception, control equipment filters and launch
 equipment including DVD players and a new rack located in the main communication room
 / communication rooms on each floor of each accommodation building.
- All TV outlets shall be cabled from this distribution facility in the Communications room/main server room through the proposed new TV distribution system.





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3.11 Energy Efficiency Measures

Special provisions shall be made for energy efficiency, including but not limited to:

- High efficiency electrical distribution and lighting transformers.
- High efficiency electronic lighting ballasts.
- High efficiency lighting fixtures.
- High efficiency HVAC and refrigeration equipment.
- Appropriate use of automatic light sensors and timers.
- Thermostat control of heat tracing.
- Automated control of space conditioning including sensors and timers
- High efficiency kitchen, laundry equipment and other similar equipment
- High efficiency (low water consumption) plumbing fixtures

END OF SECTION







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1. Introduction

1.1 General

1.1.1 Where possible all temporary construction facilities shall be based on The Contractor's standard unit size and layout while also in accordance with all of the following requirements:

1.2 Temporary Construction Facilities Matrix

- 1.2.1 A Temporary Construction Facilities Matrix has been produced to identify building types, approximate sizes, assumed capacities and utilities required for each. For this please refer to H337697-7000-00-144-0001: Temporary Construction Facilities Matrix. For the purposes of this specification this document shall be further referred to as "the facilities matrix".
- 1.2.2 The facilities matrix refers to items at rail camps. These are shown for reference purposes only and <u>are not</u> be included in the scope of this package.

2. Temporary Construction Facilities' Functional Requirements

2.1 Office Complex

- 2.1.1 Office complex's shall be supplied as typical construction trailer style office facilities complete with a combination of open and private offices (assume 75% / 25% split respectively).
- 2.1.2 Where identified, office complexes shall be provided as multi-width trailer units.
- 2.1.3 Private offices shall be supplied complete with the following furniture:
 - Desk c/w lockable drawers
 - 2 x task chairs
 - lockable filing cabinet
 - shelving / bookcase
 - work table
 - windows c/w insect screens
 - communications provisions (see section 3.9).
- 2.1.4 Open offices shall be provided with the following furniture:
 - desk c/w lockable drawers
 - task chair
 - 1 x lockable filing cabinet per 2 desks
 - shelving / bookcases located throughout







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- 1 x work table per 5 desks
- windows c/w insect screens
- communications provisions (see section 3.9).
- 2.1.5 Lunchroom (as specified in section 2.3)

2.2 Wash Car Complex

- 2.2.1 Wash car complex's shall be supplied as typical construction trailer style wash cars complete with:
 - cubicles / stalls
 - urinals (men's facilities only)
 - hand washing basins c/w soap dispensers
 - mirrors
 - paper towel dispensers
 - extractor fans.
- 2.2.2 Where identified, wash car complexes shall be provided as multi-width trailer units.

2.3 Lunchroom Facility

- 2.3.1 Lunchroom facilities shall be supplied as typical construction trailer style lunchroom facilities complete with:
 - tables
 - chairs
 - windows c/w insect screens
 - kitchen cupboard style cabinets
 - fridge
 - microwave
- 2.3.2 Where identified, lunchroom facilities shall be provided as multi-width trailer units.

2.4 Medical Facility

- 2.4.1 Medical facility shall be supplied as modular or construction trailer style units for the treatment of all injuries occurring on-site. The facility shall meet all codes and requirements of the Nunavut Mine Health and Safety Act.
- 2.4.2 The medical facility shall be supplied with external double door access for ambulance drop-off of patients.







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The facility shall consist of (but not limited to) the following:

- · waiting areas
- four private treatment rooms complete with:
 - treatment bed / stretcher
 - treatment chair
 - waste receptacle
 - wall mounted lockable storage cabinet
 - wash sink and cabinet.
- general ward style treatment area complete with:
 - six hospital style beds
 - chairs (1 per bed)
 - lockable bedside table (1 per bed)
 - curtain dividers c/w curtain rails around each bed
 - waste receptacles
 - nurses station with desk and chair
 - wall mounted lockable storage cabinets
 - wash sinks
 - windows c/w insect screens
- two doctor's offices complete with:
 - desk
 - task chair
 - lockable filing cabinets
 - shelving
 - communications provisions (see section 3.9)
 - windows c/w insect screens
- lockable storage / supply room.
- janitorial storage room
- lunchroom (as specified in section 2.3)







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2.4.3 Where identified, medical facilities shall be provided as multi-width trailer units.

2.5 Warehouse / Workshop / Storage

- 2.5.1 Warehouse / workshop / storage facilities shall be supplied as typical pre-fabricated / pre-engineered buildings with approximate sizes outlined in the facilities matrix. The contractor shall provide alternative options for sizes not available / supplied as standard.
- 2.5.2 Unless specifically noted in the facilities matrix, all buildings shall be fully enclosed.
- 2.5.3 Windows c/w insect screens shall be provided in each building segment.
- 2.5.4 Each building shall be provided with a minimum of two (or as required by local fire regulations) lockable personnel doors complete with entrance awning.
- 2.5.5 Where specified (see the facilities matrix) automated roller shutter / cargo doors shall be supplied complete with all necessary shutters, locks, fixtures and fittings. The contractor shall provide sizing options for small (single width), medium and large width cargo doors.

2.6 Shelter

- 2.6.1 Shelters shall be supplied as typical pre-fabricated / pre-engineered buildings with approximate sizes outlined in the facilities matrix. The contractor shall provide alternative options for sizes not available / supplied as standard.
- 2.6.2 Unless specifically noted in the facilities matrix, all shelters shall be open on all sides.

2.7 Heated Storage Container

2.7.1 The contractor shall supply typical 40' x 8' lockable insulated sea containers.

2.8 Emergency Shelters

- 2.8.1 The contractor shall provide insulated, self contained sea containers for use as emergency overnight shelter to be placed along the Tote Road.
- 2.8.2 Emergency shelters shall be thermally insulated and supplied complete with:
 - Two fold-out / cot style beds
 - A table
 - 2 chairs
 - portable power generator / gen-set
 - portable gravity oil-fed stove heater

2.9 **Building Foundations and Floor Slabs**

2.9.1 The Contractor shall provide building supports / founding's suitable for a temporary duration and to sit on a prepared pad. The Contractor shall advise on minimum ground bearing capacities, design loads and locations required for temporary supports. BIM shall ensure ground and bearing pad is prepared accordingly.







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2.9.2 Concrete floor slabs where required will be provided by others.

3. Utilities

3.1 Site Conditions

- 3.1.1 For climatic data and site conditions please refer to H337697-0000-10-107-0001: Site Conditions Data Sheet. Additional data can be found in the Government of Nunavut Good Building Practices Guideline 2005 Second Edition.
- 3.1.2 Where conflict occurs between regulations, the most restrictive shall apply.

3.2 Camp Operations

3.2.1 It is intended that full construction operations will be carried out 24 hours/day; 7 days per week; 365 days per year. As such all utilities should be designed accordingly.

3.3 Fire Protection

3.3.1 Fire fighting extinguishers shall be installed throughout each trailer and pre-fabricated building as required at all recommended minimum distances apart.

3.4 Potable Water Provisions

- 3.4.1 The contractor shall provide each building identified in the facilities matrix as requiring potable water, with day tanks. Tanks will be sized for a minimum of 3 days storage.
- 3.4.2 For potable water usage per person, please refer to specification section 46 07 13 Equipment Specification Potable Water Treatment Plants.
- 3.4.3 Tanks will be filled on a regular basis by the site services provider.

3.5 Sewage Provisions

- 3.5.1 The contractor shall provide each building identified in the facilities matrix as requiring sewage treatment, with septic tanks. Tanks will be sized for a minimum of 3 days storage.
- 3.5.2 For sewage loads per person, please refer to specification section 46 07 53 Equipment Specification Sewage Treatment Plants.
- 3.5.3 Tanks will be emptied on a regular basis by the site services provider.

3.6 Power Generation

- 3.6.1 Power generation for the camp areas will be provided by others.
- 3.6.2 For all buildings identified in the facilities matrix as requiring electrical power, the contractor is to provide a tie-in / connection point for the electrical power provisions no further than 1m away from the battery limits to each facility.
- 3.6.3 All facilities identified are to be provided complete with (but not limited to) all internal electrical wiring, power points and fuse boards to receive and distribute power around buildings.







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3.6.4 For sizing purposes, the load shall be assumed as 2kW/person.

3.7 Heating, Insulation and Ventilation

- 3.7.1 Refer to the facilities matrix for buildings requiring heating.
- 3.7.2 The contractor is to provide buildings complete with means of heating, insulation and ventilation.
- 3.7.3 Trailers will be provided complete with electrical baseboard heating and make-up air units. Refer to section 3.6 for power generation.
- 3.7.4 Pre-fabricated buildings and storage containers shall be provided with portable oil-burning furnaces such as frost fighter units. Amounts required to be recommended by the contractor based on building size.

For emergency shelter heating refer to requirements in section 2.8.2.

3.8 Lighting

- 3.8.1 The contractor shall provide each building identified in the facilities matrix as requiring lighting with all necessary fixtures and fittings, including wiring and overhead lighting systems.
- 3.8.2 Refer to section 3.6 for power generation.
- 3.8.3 Exterior floodlighting shall be provided at all access / egresses and approach points.
- 3.8.4 For all interior and exterior lighting requirements refer specification S26 00 50 Standard Specification Electrical Requirements for Packaged Equipment.

3.9 Communications

3.9.1 The Contractor shall provide each building identified in the facilities matrix as requiring communications complete with all passive equipment (single mode fibre and copper cabling and termination, cabling raceways and racks) necessary to support hardwired and wireless internet throughout the facility. (Note. Active equipment supply, installation and configuration shall be handled by BIM).

3.10 Instrumentation

3.10.1 All utility facilities shall be supplied with local PLC controllers and panel HMI as required, to effectively control the operation remotely. Instrumentation shall include a programmable general fault discrete output from the PLC available to activate an automatic dialler /or wireless alarm to alert the camp supervisor of potential issues. The common alarms may include (but not limited be to), incinerator general faults, sewage system general faults or loss of power.







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4. Shipping, Installation and Commissioning

4.1 Shipping

4.1.1 The Contractor shall deliver all facilities to a port specified by BIM. BIM shall arrange for shipping, loading and unloading into position all facilities and units.

4.2 Installation, Commissioning and Training

- 4.2.1 The Contractor shall make available qualified personnel to undertake on-site installation, commissioning and training for all temporary construction facilities and related utilities.
- 4.2.2 The Contractor's expense policy shall be outlined in the bid document. The Owner, and / or his representative and any Authorities having jurisdiction over the equipment shall witness all necessary tests.

5. Spare Parts

5.1 The Contractor shall supply lists of recommended spare parts for all facilities and utilities where appropriate.

6. Quality Assurance

The Contractor shall prepare a quality assurance and inspection / test plan and submit for Owner's approval. No changes to the plan will be allowed during implementation without prior consent from the Owner. Refer to Section S01 43 00 – Quality Management for the requirements of this plan.

END OF SECTION







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Electrical Power Distribution Specification Section: 26 30 00

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Temporary and Permanent Accommodation and Facilities/CA702

Electrical Power Distribution Specification

Section: 26 30 00

1. Introduction

1.1 General

- 1.1.1 Both the temporary and permanent accommodation facilities will initially be supplied by a temporary power plant consisting of a 600 V diesel generator island provided by the Owner.
- 1.1.2 Following the construction period, the permanent accommodation facility will ultimately be supplied with permanent power by means of a 13.8/0.6 kV Unit Substation in a standalone E-House provided by the Owner. Hence the permanent accommodation facility power distribution system must make provisions for both these scenarios.
- 1.1.3 The Owner will also be responsible for the buried ground grid which will be installed in conjunction with the facility foundations.

2. Electrical Power Distribution Requirements

2.1 General

- 2.1.1 Both the temporary and permanent accommodation facilities' Power Distribution System shall generally conform to conventional Canadian practice for buildings of this type while including for provisions described in the Nunavut Good Building Practice Guideline.
- 2.1.2 The power distribution system shall feature 3-phase/3-wire 600 V feeders radiating from the service entrance electrical room to satellite electrical rooms strategically located throughout the facility as required. The satellite electrical rooms shall house distribution transformers, lighting and distribution panels and other auxiliary equipment. The satellite electrical rooms shall be clearly indentified and permit only controlled access.
- 2.1.3 Special provisions shall be made for energy efficiency, including but not limited to:
 - High efficiency electrical distribution and lighting transformers;
 - High efficiency electronic lighting ballasts;
 - High efficiency HVAC and refrigeration equipment;
 - Appropriate use of automatic light sensors and timers; and
 - Thermostat control of heat tracing.
- 2.1.4 For other technical requirements please refer to H337697-0000-70-122-0001 Electrical Design Criteria.







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2.2 **Service Entrance**

- 2.2.1 The Contractor shall be responsible for all electrical scope downstream of the 600 V service entrance.
- The Owner will provide multiple 600 V feeders as dictated by the accommodation facilities' 2.2.2 load requirements. The characteristics of the 600 V feeders are as follows:
 - Supply point: Accommodation Facilities Service Entrance Room;
 - Supply voltage: 600 V, 3-phase/3-wire;
 - Supply neutral grounding: 5 A NGR (NB: NOT SOLIDLY GROUNDED!);
 - Supply current: up to 600 A per feeder; and
 - Supply fault level: up to 65 kA symmetrical.
- 2.2.3 The Contractor is responsible for all electrical equipment within the service entrance room including (but not limited to):
 - Motor Control Centers (MCCs);
 - Switchboards;
 - Panel boards; and
 - Distribution transformers.

2.3 **Standby Power**

2.3.1 In conjunction with the permanent power installation, the owner will provide one (1) 600 V feeder backed-up by a local 600 V standby diesel generator. The feeder will have similar characteristics to the above. At their discretion, the contractor may utilize this feeder to service essential loads.

2.4 **Freeze Protection**

The Contractor is responsible for the freeze protection of all tanks and lines within their scope 2.4.1 that are susceptible to freezing. Freeze protection can be achieved by heat tracing, tank heating pads or immersion heaters as required.

2.5 Load

2.5.1 The Contractor shall assume a load of 2 kW/person.

2.6 Duty

2.6.1 The equipment shall be designed for continuous service under the specified process and operating conditions.







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3. Shipping, Installation and Commissioning

3.1 Shipping

3.1.1 The Contractor shall deliver all equipment to a port specified by BIM. BIM shall arrange for shipping, loading and unloading into position all facilities and units.

3.2 Installation, Commissioning and Training

- 3.2.1 The Contractor shall make available qualified personnel to undertake on-site installation, commissioning and training for all equipment.
- 3.2.2 The Contractor's expense policy shall be outlined in the bid document. The Owner, and/or his representative and any Authorities having jurisdiction over the equipment shall witness all necessary tests.

4. Spare Parts

4.1 The Contractor shall supply lists of recommended spare parts for all equipment where appropriate.

5. Quality Assurance

5.1 The Contractor shall prepare a quality assurance and inspection / test plan and submit for Owner's approval. No changes to the plan will be allowed during implementation without prior consent from the Owner. Refer to Section S01 43 00 – Quality Management for the requirements of this plan.

END OF SECTION







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1. Process Conditions

1.1 General

For design requirements and conditions, refer to the equipment datasheet:

Technical Data Sheet - Potable Water Treatment Plant (Doc. No. H337697-CA702-D460713)

Additional specific requirements are provided below.

Equipment and components shall be the Seller's standard design for the service specified, with readily available replacement parts. No new technology shall be applied to the design of the equipment without examples of operating equipment using the technology in similar design conditions.

The equipment shall be designed considering exposure to wash down using fresh water (electrical enclosures to be water tight). The water sources to be used for the different sites are identified along with water analyses in the Design Basis - Potable Water Treatment Plant (Doc. No. H337697-1000-10-109-0001).

The equipment shall be housed in heated enclosures with protection from precipitation and wind. The internal building temperature shall be maintained at > 10 °C.

1.2 Duty and Operational Requirements

The equipment shall be designed and constructed to operate continuously, 24 hours per day, 365 days per year without excessive maintenance. The design and automation shall consider minimum operating supervision of 2 hours/day. It is however anticipated that a dedicated operator (24/7) will be provided for each site.

The control system shall allow for manual and fully automated operation. Manual operation shall be used only for trouble-shooting, maintenance and repair situations, otherwise, the system shall always be in full automation mode.

All equipment will be of the Supplier's best quality and construction to ensure a minimum equipment design life of 25 years (exceptions to be noted). The expected life of the project is twenty-five (25) years.







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1.3 Redundancy Requirements

The supplier shall supply a sufficient number of modular trains such that the system can produce 100% of the required flow during peak demand. The potable water system shall be equipped with installed redundant spares for all critical components, including pumps, blower and motors. Spares are to be provided such that in the event of equipment failure, barring any pressure vessel or tank failure, the faulty component can be replaced and the system put back into service within hours. During regular maintenance or servicing of the equipment the daily design flow shall still be met. During normal operation all trains are to be in service to treat the feed flow.

1.4 Material Characteristics

The Seller shall fabricate the equipment using only new materials of first grade quality, free from defects impairing strength, durability and appearance.

After the Purchase Order is issued, the Seller shall not substitute materials, without prior written approval from the Owner.

Materials of construction shall be suitable for the specified duty and operating conditions.

Use the lowest material density for volumetric capacity calculations. Use this volume and the highest material density for power calculations.

All materials of construction shall be identified by the Supplier by the current ASTM specification number(s) on the data sheets provided.

Design all equipment components such that corrosion and wear are minimized.

1.5 Site Conditions

Site conditions are identified in Site Conditions Data Sheet (Doc. No. H337696-0000-10-107-0001).

For the Mary River (Mine Site) camp, preference will be given to proposed systems that occupy a minimum area or can be installed on multiple small concrete pads. This is to minimize the foundation requirements for the equipment as the site ground has poor load bearing capacity. Modular equipment may be mounted on separate concrete pads so that with flexible connections between the trains the concrete foundations for each train can have slightly disparate elevations after settling in the ground.







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2. Design Conditions

2.1 Fresh Water Characteristics and Potable Water Quality

The main water quality parameters of the all raw water sources are listed in Design Basis - Potable Water Treatment Plant, Document No. H337697-1000-10-109-0001. The potable water treatment plants shall comply with the Canadian Drinking Water Guidelines and the Ontario Drinking Water Quality Standards as outlined in the Design Basis – Potable Water Treatment Plant, Document No. H337697-1000-10-109-0001.

2.2 Potable Water Demand

The average flow requirements of the potable treatment plants shall be based upon the per capita consumption rate given in Section 4.5.2 of the Design Basis – Potable Water Treatment Plant, Doc. No. H337697-4000-10-109-0001).

3. Technical Requirements

3.1 Conformance with the Mary River Environmental Impact Statement

To comply with the owners Environmental Impact Statement the equipment type and configuration shall be similar to and shall achieve performance equivalent or superior to the potable water system specified by:

- E337697-PM401-50-031-0010
- F337697-PM401-50-042-0010

All exceptions to this specification shall be clearly informed in the proposal, so as to characterize an alternative supply. Nevertheless, compliance to specification does not exempt the Bidder from its responsibilities in furnishing reliable and safe equipment.

3.2 Equipment Vendors

Hatch recommends that the following vendors be evaluated by the Supplier for potable water treatment equipment:

- Napier-Reid
- Filter Innovations Inc.
- H2Flow







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3.3 Coagulant Addition System

The coagulant injection system shall allow dosing of suitable coagulant such as polyaluminum chloride, alum or ferric chloride to aid in agglomeration prior to filtration. The supplier will consider the impact of the coagulant on the pH of the water. All metering pumps and components and necessary monitoring and controls shall be pre-assembled onto the skid-mounted system, which shall be composed of:

Metering pumps. Complete with the following:

- Duty/Standby, motor-driven, reciprocating, mechanically actuated diaphragm type, with degassing function.
- Stroke length control shall be adjustable manually by means of a stroke length knob, in increments of 1%, from 0% to 100% of stroke length. The stroke length shall be displayed on the pump LCD in 1% increments. Pump shall normally operate at approximately 70% of the pump maximum design flow.
- Pump shall be able to be calibrated to display pump output in gallons/hour or litres / hour.
- Calibration columns.
- Piping and piping accessories (pulsation dampeners, basket strainers, backpressure and pressure relief valves, etc.).
- Pressure gauge and diaphragm isolators.
- Local control panel.
 - A local control panel shall be supplied with the skid to be mounted on or remote to the skid. The panel shall have a local speed potentiometer for 0-100% local speed command with a digital display of set point and actual pump output. The panel shall have a local/remote selector switch. Remote operation is accomplished by receiving a dry contact maintained for run enable and an analog 4-20 mA input for speed command. Alarm LED and Run LED illuminated selector are located on the control panel door.
 - The control panel shall provide a terminal strip for user interface to connect AC power from the source and terminal strip connection to metering pumps. All control input / output functions shall be located on a terminal strip for user interface.
 - Remote status contacts shall be available for Remote Selected, Run, Alarm, and analog feedback signal. The analog signal shall be a summation of both the pump stroke frequency and stroke length, giving actual pump output scaled over the 4-20 mA range.







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3.4 Media Filters

The media filters shall include automated backwash control valves, back-wash pumps, differential pressure control and gauges. The pressure vessel to be designed in accordance with ASME.

As a minimum the system shall provide flow signal for service and backwash flow, pressure indication on the feed and product lines as well as differential pressure control to initiate backwash.

Filters shall be capable of independent operation and backwashing.

Filter media shall conform to NSF / ANSI Standard 61: Drinking Water System Components - Health Effects and the applicable AWWA Standard B100: Filtering Material or AWWA Standard B604: Granular Activated Carbon. When GAC is used, provisions shall be made for periodic replacement or regeneration.

A flow regulator, flow meter and flow indicator shall be provided on the main backwash header. An air release valve shall be placed at the high point of the header.

For filters 900 mm or more in diameter an access hatches to facilitate inspection and repairs shall be provided.

All filters shall be equipped as follows:

- Means for obtaining influent and effluent samples;
- Indicating flow meter and flow control to each filter/filter train;
- Continuous effluent turbidity measuring and recording device;
- All required filter media, including support media and media traps, to remove suspended solids to a nominal rating of 10 micron;
- Air scour blower assembly;
- Internal flow distributors;
- Underdrain collector system (if required);
- Automated flow control valves;
- Air release valves;
- Ventilation ducts;
- Pressure gauges;
- Differential pressure transmitter;
- Flow meters;







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- Indicating loss of head gauge;
- Filter backwash pump;
- Provisions for filtering-to-waste with appropriate measures for backflow prevention or operational procedures to achieve the same water quality results;
- Minimum water depth over the surface of the filter media of 1 m (1.5m for high rate filtration) to prevent air binding due to dissolved air coming out of solution in the filter bed;
- The system shall control the flow to each individual filter, apportion the total flow among the individual filters and accommodate rising head loss through each individual filter run.

A backwash settling tank is to be provided to treat all filter backwash waste water and produce an underflow solids concentration of > 2%. This flow will be delivered by pump to the sewage treatment plant where the solids will be dewatered before final disposal. The overflow from the settling tank is to be sent by pump back to the fresh water feed tank.

3.5 Chlorine Disinfection System

Chlorine is to added in the form of liquid Sodium hypochlorite. All metering pumps and components and necessary monitoring and controls shall be pre-assembled onto the skid-mounted system, which shall be composed of:

Metering pumps shall be complete with the following:

- Duty / Standby, motor-driven, reciprocating, mechanically actuated diaphragm type, with de-gassing function.
- Stroke length control shall be adjustable manually by means of a stroke length knob, in increments of 1%, from 0% to 100% of stroke length. The stroke length shall be displayed on the pump LCD in 1% increments. Pump shall normally operate at approximately 70% of the pump maximum design flow.
- Pump shall be able to be calibrated to display pump output in gallons/hour or litres / hour.
- Calibration columns.
- Piping and piping accessories (pulsation dampeners, basket strainers, backpressure and pressure relief valves, etc.).
- Pressure gauge and diaphragm isolators.
- Local control panel.
 - A local control panel shall be supplied with the skid to be mounted on or remote to the skid. The panel shall have a local speed potentiometer for 0-100% local speed command with a digital display of set point and actual pump output. The panel shall have a local/remote selector switch. Remote operation is accomplished by receiving a dry contact maintained for run enable and an analog 4-20 mA input for speed

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command. Alarm LED and Run LED illuminated selector are located on the control panel door.

- The control panel shall provide a terminal strip for user interface to connect AC power from the source and terminal strip connection to metering pumps. All control input/output functions shall be located on a terminal strip for user interface.
- Remote status contacts shall be available for Remote Selected, Run, Alarm, and analog feedback signal. The analog signal shall be a summation of both the pump stroke frequency and stroke length, giving actual pump output scaled over the 4-20 mA range.

The chlorine disinfection system shall consist of metering pumps (1 duty + 1 standby) and a polyethylene storage tank with level switches.

Chlorine, on-line monitoring, and chlorine injection control shall be provided.

Chlorine contact tank shall be included.

The disinfectant shall be mechanically mixed as rapidly as possible, with an approximately complete-mix condition achieved within 3 seconds. This may be accomplished by either the use of turbulent flow regime or a mechanical flash mixer.

The tank shall be designed to facilitate maintenance and cleaning without reducing effectiveness of disinfection. This is necessary since some sedimentation occurs in chlorine contact tanks. Duplicate tanks, mechanical scrapers, or portable deck-level vacuum cleaning equipment shall be provided. Consideration shall be given to providing skimming devices on all contact tanks.

All chlorination facilities shall be designed according to recommendations of the Chlorine Institute (http://www.chlorineinstitute.org).

Low pressure lines made of hard rubber, saran-lined, rubber-lined, polyethylene, polyvinyl chloride (PVC), or other approved materials are satisfactory for wet chlorine or aqueous solutions of chlorine.

The chlorine system piping shall be colour coded and labelled to distinguish it from other plant piping.

Minimum dissolved oxygen levels in the final effluent after dechlorination shall be maintained at levels consistent with natural surface waters.

A loose shipped free chlorine residual analyzer shall be provided with a quality control band of plus/minus 0.05 mg / L chlorine.







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3.6 Chemical Addition System for pH Adjustment

If pH adjustment is deemed necessary the chemical addition system shall include chemical metering pumps and static mixers. All metering pumps and components and necessary monitoring and controls shall be pre-assembled onto the skid-mounted system, which shall be composed of:

Metering pumps. Complete with the following:

- Duty / Standby, motor-driven, reciprocating, mechanically actuated diaphragm type, with de-gassing function.
- Stroke length control shall be adjustable manually by means of a stroke length knob, in increments of 1%, from 0% to 100% of stroke length. The stroke length shall be displayed on the pump LCD in 1% increments. Pump shall normally operate at approximately 70% of the pump maximum design flow.
- Pump shall be able to be calibrated to display pump output in gallons / hour or litres / hour.
- Calibration columns.
- Piping and piping accessories (pulsation dampeners, basket strainers, backpressure and pressure relief valves, etc.).
- Pressure gauge and diaphragm isolators.
- Local control panel.
 - A local control panel shall be supplied with the skid to be mounted on or remote to the skid. The panel shall have a local speed potentiometer for 0-100% local speed command with a digital display of set point and actual pump output. The panel shall have a local/remote selector switch. Remote operation is accomplished by receiving a dry contact maintained for run enable and an analog 4-20 mA input for speed command. Alarm LED and Run LED illuminated selector are located on the control panel door.
 - The control panel shall provide a terminal strip for user interface to connect AC power from the source and terminal strip connection to metering pumps. All control input/output functions shall be located on a terminal strip for user interface.
 - Remote status contacts shall be available for Remote Selected, Run, Alarm, and analog feedback signal. The analog signal shall be a summation of both the pump stroke frequency and stroke length, giving actual pump output scaled over the 4-20 mA range.

3.7 Potable Water Storage Tank

The potable water storage tank shall be sized to provide a minimum of retention of 24 hours based upon nominal flow in order to ensure a potable water supply during equipment outages.







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3.8 Air Compressor System

Air compressor systems are to be provided for each site.

Air compressor system shall be reciprocating (piston) type, electric motor, rated for commercial duty, oil-fee air, complete with air receiver tank, intake air filters, air regulator, air dryer, and local control panel. Air shall be oil free (< 0.01 ppm oil) have a maximum dew point of – 65°C and be filtered to 40 micron.

Air receiver to be epoxy coated, carbon steel, and designed and constructed to meet CSA B51 and registered with a valid CRN. The air receiver tank is equipped with a pressure relief valve, pressure gauge, automatic drain, and source isolation valve.

The local control panel shall be NEMA 4X rated complete with motor starters, control wiring, Hand-Off-Auto selector switch, push-buttons, indicator lights and main disconnect switch, complete with a local operating controller and display.

3.9 Tanks (General)

Tanks shall be carbon steel, polyurethane or epoxy coated, closed top, vented with air filters, and in accordance with API and AWWA.

Container shall be designed for seismic conditions that prevail onsite in accordance with API and IBC.

Attachments for anchor bolts shall be by the Supplier.

Tanks shall be painted externally and internally as per "Painting Requirements" section.

Tanks shall include all necessary flanged, nozzle connections (as a minimum inlet, outlet, drain and overflow).

Tanks shall include all level switches, including mounting attachments.

3.10 Enclosures (General)

All potable water treatment plant components shall be housed in enclosures.

Water treatment systems shall be in enclosures that are heated, ventilated, insulated, watertight, complete with lighting system, smoke and security alarm system, lockable doors and gaskets.

The enclosures shall be designed for seismic and wind conditions, in accordance with IBC and shall have attachments for anchor bolts; anchors by others.







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The building enclosure shall be of non combustible construction and include all safety showers, eye wash stations and fire protection system as required by code. In addition a hoist or crane shall be included if required for maintenance of the equipment.

4. Performance Requirements

4.1 Guarantees

The supplied equipment shall be guaranteed as follows:

Table 4-1: Guarantees

Parameter	Guarantee Requirement
Flows	As per section 2
Potable Water Quality	As per section 2

4.2 Warranty

The Seller shall warrant the equipment's manufacture is free of defects or workmanship for the greater period of 18 months from delivery or 12 months from commissioning. All components deemed to be defective shall be replaced to the Owner at no cost (supply and delivery). Installation or consequential damages costs shall not be the responsibility of the Seller.

In case of assistance delay by the Seller, the Owner reserves the right to perform the necessary maintenance at Seller's full expense.

4.3 Test Methods and Procedures

All test method details, timing, sampling protocols and procedures and tolerances shall be developed by the Seller, submitted with the bid package and agreed upon with the Owner before issue of a purchase order.

5. Foundation Requirements

The Vendor shall consider equipment and building options which do not require placement on rigid foundations such as skid mounted units which are interconnected with flexible elements that permit differential settlement.

6. Pumps, Valves and Piping Requirements

All necessary pumps, valves and piping, shall be supplied by the Seller, fully assembled, and installed, within the containerized system.

Pipe supports and pump base plates shall be provided.







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Pump motors shall be rated for VFD, where required; VFDs and motor starters by Supplier.

All installed pumps, piping and valves shall be accessible, and shall have sufficient surrounding space for the purposes of maintenance and repair.

Pneumatic actuators are to be used for valves installed in-doors. Alternatively electric actuators/with heater may to be used for remote locations, where an instrument air supply is not available.

For control valves, on/off and modulating (throttling), refer to Instrumentation Requirements for Packaged Equipment (H337697-S250050).

Check valves shall be located to prevent unintended reverse flow where necessary.

Pipe connections to be Victaulic type with EPDM seals where possible.

7. Mechanical Requirements

All equipment and all components shall be the Seller's standard heavy-duty design and fabrication and shall have been proven effective and reliable under similar operating conditions. No new or unproven design is acceptable.

Not all parts and materials are specified in this specification. For those that are not specified, the Seller shall use their standard parts and materials, which will be subject to the approval of the Owner.

The Seller shall notify the Owner if any specific requested component is unsuitable for the required service and present alternatives, along with the technical justifications.

8. Electrical Requirements

Electrical design shall comply with the following:

• H337967-S260050 – Electrical Requirements for Packaged Equipment.

All electrical panels, transformers, lighting panel, MCCs, including starters, circuit breakers, and VFDs shall be provided by the Seller.

All wiring, cabling conduits, and cable trays to be included by the Seller.







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9. Instrumentation and Controls Requirements

Instrumentation and controls design shall comply with the following:

Instrumentation Requirements for Packaged Equipment, H337967-S250050

The local control system for the water treatment plant shall be supplied by the seller.

The Owner shall approve all exceptions or deviations from these requirements.

The following instruments shall be included, but not limited to, in the supply of the equipment by the Seller:

- Flow meters
- Pressure indicating transmitters, switches and gauges
- Level Switches (High High, High, Low, and Low Low)
- Limit switches for valve (open and close)
- Temperature sensors and transmitters
- Chlorine analyzers (free chlorine)
- Dissolved Oxygen probes

Seller shall include additional instruments, if required, for the safe operation of supplied equipment.

Pressure gauges to be provided on all pump discharges

The Seller shall provide a list of signals (alarms, monitoring and interlocks) to be monitored and / or controlled from the Owner's Plant Control System.

The Owner shall provide a written narrative functional description of all process control requirements as per project standard template.

Enclosure of local control panel shall be NEMA 4X.

Seller shall be responsible for the development of the sequence of operation, and the programming for the PLC.

Flow meters shall be magnetic type, and shall be installed on the main feed, feed to each train, effluent, sludge line to digester, as a minimum

All water tanks, and chemical storage tanks, to have level switches.

All control wiring within the battery limits shall be provided by the Seller.







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Shelf spares to be provided for all critical instruments

All instruments to be smart bus or 4-20mA HART.

Motors communication protocol (i.e: DeviceNet, Profibus, Modbus TCP) to be announced in later in the project

Communication protocol with Owner's network shall be Ethernet.

10. Structural Requirements

Structural design shall comply with the following:

• Structural Design Criteria – Doc. No. H337697-0000-35-109-0001.

The container and water tanks shall be designed for seismic and wind conditions in accordance with local codes, API and IBC.

Container and water tanks shall be anchored.

All equipment, including piping and electrical equipment, shall be secured by base plates, supports, or other means, to withstand seismic or wind loads.

The Seller shall supply certified design data showing dimensions, loadings, locations and sizes of all steel members which will allow others to design concrete foundations, inserts, and anchor bolts to receive Seller's equipment.

All stairs, ladders, platforms and walkways shall be supplied by the Supplier.

11. Painting Requirements

All exterior metallic surfaces shall be primed and painted / coated with a suitable polyurethane, or epoxy product capable of withstanding the noted site conditions, especially temperature variations without cracking chipping or peeling.

All interior carbon steel surfaces shall be primed and painted / coated or lined, with a suitable polyurethane, or epoxy product, and shall be in accordance with NSF61.

Painting shall not be required for parts of equipment that are manufactured of or coated with corrosion resistant materials, that are machine finished or normally left unpainted.

Machine finished parts that are not manufactured of corrosion resistant materials and are not painted, shall be given a heavy coat of rust-inhibiting compound that can be easily removed at installation by the use of solvents and hand wiping.







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12. Regulations, Standards, and Codes

The International System (SI) will be used for all design calculations and on all drawings.

The equipment shall comply with the latest version of all appropriate regulations, standards and codes, including, but not limited to, those listed below:

Table 12-1: Applicable Regulations, Standards and Codes

Number / Acronym	Title	
AWWA	American Water Works Association	
IBC	International Building Codes	
NSF	National Sanitation Foundation	
GCWQ	Guidelines for Canadian Drinking Water Quality	
NWT Reg 108-2009	Northwest Territories Water Supply System Regulations	
Ontario Reg 170/03	Safe Drinking Water Act, 2002	
Nunavut Waters and Nunavut Surface Rights Tribunal Act, SC 2002, c 10		
Northwest Territories Water Act		
Northwest Territories Water Regulations (SOR/93-303)		
	Ontario Drinking Water Quality Standards	
NSF/ANSI Standard 61	Drinking Water System Components	
AWWA Standard B100	Filtering Material	
AWWA Standard B604	Granular Activated Carbon	
OSHA	Occupational Safety and Health Administration	

13. Health, Safety, Environment and Community Requirements

Protection designed for the valid codes and standards shall be installed in order to avoid operator injury. Minimum required protection as follows:

- Operation point protection.
- Moving parts protection.
- Power transmission and gyratory parts protection.
- Hot spots protection.
- Dust emission protection.







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- Tools protection.
- Collision detection system (between machines).
- Fire protection and detection system.

14. Assembly and Testing

14.1 Critical Dimensions

All critical dimensions shall be checked prior to shipment. All ancillaries shall be assembled and all motions tested in accordance with manufacturers standard procedures. Prior to disassembly all components shall be match marked, where practical, for ease of field assembly. The Seller shall describe the extent of field assembly required.

14.2 Equipment Assembly

All equipment shall be shipped assembled to the maximum extent possible consistent with shipping limitations indicated below. The Owner shall be consulted prior to the shipment of large components.

14.3 Pre-Assembly

All pre-piped and pre-assembled lube oil and hydraulic oil systems shall be tested for their output pressures and motions to the maximum extent possible.

14.4 Specific Testing Requirements

Water tanks to be hydrostatically tested.

14.5 Control System Components

At the Owner's option, Seller-furnished control systems components shall be subject to Owner-witnessed Factory Acceptance Test (FAT) in accordance with test procedures that shall be submitted by the Seller and reviewed by the Owner. All input / output signals and control functions shall be simulated. If required, the Seller-furnished components may be subject to integration testing with the main project PCS system.

The Seller shall submit a Site Acceptance Test procedure that will be subject to the Owner's review and permission to proceed. Items such as proper equipment grounding, powering up, checking for correct software installed, etc. shall be included in the procedure.

Wherever possible instruments shall be pre-wired and pre-installed to controller.







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15. Shipping, Construction, Commissioning and Operator Training

15.1 Shipping

The equipment will be shipped to an assembly site in the largest feasible sections that allow transportation by road. Protective coatings and coverings shall be applied to ensure that the equipment is not damaged during shipment. The Seller shall provide match-marking of all parts to facilitate field assembly and shall provide shipping dimensions and weights of all components and assemblies.

15.2 Construction Supervision, Testing and Commissioning

The Seller shall make available qualified personnel to advise and assist with on-site supervision of construction and assist with testing and commissioning. The Seller's expense policy shall be outlined in the bid document. The Owner, and / or his representative and any Authorities having jurisdiction over the equipment shall witness all tests.

15.3 Operator Training

If requested, the Seller shall train operators and supervisors in the operation of the supplied equipment. Such training shall include:

- Training lectures and lecture notes.
- On-the-job training during commissioning and plant operation.

The Seller will supply rates and terms for such training.

16. Spare Parts

The Seller shall supply lists of critical spare parts.

17. Quality Assurance

The Seller shall prepare a quality assurance and inspection / test plan and submit for Owner's approval. No changes to the plan will be allowed during implementation without prior consent from the Owner. Refer to Section S01 43 00 – Quality Management for the requirements of this plan

END OF SECTION





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1. Process Conditions

1.1 General

For design requirements and conditions, refer to the equipment datasheet:

Technical Data Sheet – Sewage Treatment Plant (Doc. No. H337697-CA702-D460753)

Additional specific requirements are provided below.

Equipment and components shall be the Seller's standard design for the service specified, with readily available replacement parts. No new technology shall be applied to the design of the equipment without examples of operating equipment using the technology in similar design conditions.

The equipment shall be designed considering exposure to wash down using fresh water (electrical enclosures to be water tight). The sewage quality to be used for the design of the system is identified in the Design Basis – Sewage Treatment Plant (Doc. No. H337697-1000-10-109-0002).

The equipment shall be housed in heated enclosures with protection from precipitation and wind. The internal building temperature shall be maintained at > 10 deg Celsius.

1.2 Duty and Operational Requirements

The equipment shall be designed and constructed to operate continuously, 24 hours per day, 365 days per year without excessive maintenance. The design and automation shall consider minimum operating supervision of 2 hours/day. It is however anticipated that a dedicated operator (24/7) will be provided for each site.

The control system shall allow for manual and fully automated operation. Manual operation shall be used only for trouble-shooting, maintenance and repair situations, otherwise, the system shall always be in full automation mode.

All equipment will be of the Supplier's best quality and construction to ensure a minimum equipment design life of 25 years (exceptions to be noted). The expected life of the project is twenty-five (25) years.

1.3 Redundancy Requirements

The supplier shall supply a sufficient number of modular trains such that the system can produce 100% of the required flow during peak demand. The sewage treatment system shall be equipped with installed redundant spares for all critical components, including pumps, blower and motors. Spares are to be provided such that in the event of equipment failure, barring any pressure vessel or tank failure, the faulty component can be replaced and the system put back into service within hours. During regular maintenance or servicing of the equipment the daily design flow shall still be met. During normal operation all trains are to be in service to treat the feed flow.







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1.4 Material Characteristics

The Seller shall fabricate the equipment using only new materials of first grade quality, free from defects impairing strength, durability and appearance.

After the Purchase Order is issued, the Seller shall not substitute materials, without prior written approval from the Owner.

Materials of construction shall be suitable for the specified duty and operating conditions.

Use the lowest material density for volumetric capacity calculations. Use this volume and the highest material density for power calculations.

All materials of construction shall be identified by the Supplier by the current ASTM specification number(s) on the data sheets provided.

Design all equipment components such that corrosion and wear are minimized.

1.5 Site Conditions

Site conditions are identified in Site Conditions Data Sheet (Doc. No. H337696-0000-10-107-0001).

For the Mary River (Mine Site) camp, preference will be given to proposed systems that occupy a minimum area or can be installed on multiple small concrete pads. This is to minimize the foundation requirements for the equipment as the site ground has poor load bearing capacity. Modular equipment may be mounted on separate concrete pads so that with flexible connections between the trains the concrete foundations for each train can have slightly disparate elevations after settling in the ground.

2. Design Conditions

2.1 Average Sewage Generation

The average sewage generation rates shall be based upon a per capita generation rate given in the Design Basis – Sewage Treatment Plant (Doc. No. H337697-1000-10-109-0002) using the camp workforce. The supplier shall clearly identify any operating issues in transitioning from higher flows to lower flows during periods of start-up and shutdown.

2.2 Peak Flow

The peak sewage water requirements shall be estimated using the peaking factors given in the Design Basis – Sewage Treatment Plant (Doc. No. H337697-1000-10-109-0002). The peaking factor estimates the peak hourly flowrate above the average demand. This factor is an estimate that is based upon the total number of people that are served by the sewage treatment system.







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2.3 Treated Sewage Requirements

The quality of the sewage treatment plant effluent shall be in accordance with the applicable site discharge limits as given in the Design Basis - Sewage Water Treatment Plant, Document No. H337697-4000-10-109-0002.

3. Technical Requirements

3.1 Conformance with the Mary River Environmental Impact Statement

To comply with the owners Environmental Impact Statement the equipment type and configuration shall be similar to and shall achieve performance equivalent or superior to the sewage water treatment system specified by:

- E337697-PM402-50-042-0007 Sewage Water Treatment Plant Mary River (STP2) Belt Filter Press YC-100.
- E337697-PM402-50-042-0008 Mary River STP (STP2) Filter System General Arrangement
- E337697-PM402-50-042-0009 Mary River (STP2) EQ Tank General Layout
- E337697-PM402-50-042-0010 Mary River (STP2) Treated Effluent Tank General Layout
- E337697-PM402-50-031-0010 Mary River STP (STP2) P & ID
- E337697-PM042-50-042-0011 Mary River (STP2) RBC System General Layout

All exceptions to this specification shall be clearly informed in the proposal, so as to characterize an alternative supply. Nevertheless, compliance to specification does not exempt the Bidder from its responsibilities in furnishing reliable and safe equipment.

3.2 Equipment Vendors

Hatch recommends that the following vendors be evaluated by the Supplier for sewage treatment equipment:

- Napier-Reid
- Filter Innovations Inc.
- H2Flow

3.3 Equalization Tank

The equalization tank shall be an above-ground, carbon steel, epoxy coated tank (insulated and / or heat traced), complete with walkways, grating, and stairs. The tank shall come with an airmixing system complete with diffusers, piping and blower system. The tank shall have all necessary flanged nozzle connections, including emergency overflow, and all necessary instrumentation, including level switches. The tank shall be preferably constructed to standard size shipping containers. Shippable one piece welded round tanks, and bolted tanks, are also







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acceptable. The tank shall be designed with sufficient connections to accommodate piped sewage from remote facilities as well as a connection for trucked sewage from a vacuum truck.

The equalization tank shall be sized to provide a minimum of retention of 24 hours (based upon average flow) in order to provide peak flow normalization and effective mixing for varying sewage compositions.

3.4 Biological Treatment System

The biological treatment system type and configuration must be equivalent <u>or superior</u> to the sewage water system specified by specified by:

- E337697-PM402-50-042-0007 Sewage Water Treatment Plant Mary River (STP2) Belt Filter Press YC-100.
- E337697-PM402-50-042-0008 Mary River STP (STP2) Filter System General Arrangement
- E337697-PM402-50-042-0009 Mary River (STP2) EQ Tank General Layout
- E337697-PM402-50-042-0010 Mary River (STP2) Treated Effluent Tank General Layout
- E337697-PM402-50-031-0010 Mary River STP (STP2) P & ID
- E337697-PM042-50-042-0011 Mary River (STP2) RBC System General Layout

The supplier is free to consider SBR or MBR type technologies provided they are deemed technically superior. However the supplier is required to offer as a minimum a membrane bioreactor (MBR) system as an option for all packages except those at Steensby and Milne Inlet. Biological treatment units shall be complete with all necessary components, such as tanks, clarifier, diffusers, pumps, valves, blowers, etc.

Overflow weirs shall be readily adjustable over the life of the structure to correct for differential settlement of the tank. Overflow weirs shall be located to optimize actual hydraulic detention time and minimize short-circuiting.

Full-surface mechanical scum collection and removal facilities, including baffling, shall be provided for all primary and secondary sedimentation tanks.

Mechanical sludge collection and withdrawal facilities shall be designed to ensure rapid removal of sludge. Each sedimentation tank shall have its own sludge withdrawal line to ensure adequate control of sludge removal rate for each tank. Sludge removal needs to be adequate to handle the expected maximum sludge accumulation rate and avoid excessive blanket levels.

The biological treatment system shall be supplied as train modules, such that the capacity can be adjusted by removing, or adding modules, as required.

The sewage treatment system shall be shipped pre-assembled and enclosed for onsite installation.







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The system shall come with removable grating, platform and stairs, including handrails.

The sewage treatment system shall be designed to require minimum maintenance, for simple operation, and user-friendliness.

The sewage treatment system shall be equipped with installed redundant spares for all critical components, including pumps, blower and motors.

The Seller shall provide any enclosures required for the control system, etc. All equipment will be located indoors.

3.4.1 MBR Design Considerations:

- A cleaning system (with tank and fittings) shall be provided.
- As a minimum the system shall include flow transmitters on the feed and effluent streams with flow indication for internal recycle streams.
- System shall maintain effective backwash procedures, including filter-to-waste or an equivalent procedure, to ensure that the effluent turbidity requirements are met at all times.
- Integrity of the membrane shall be monitored by continuous particle counting or equivalently effective means (e.g., intermittent pressure decay measurements).
- To routinely evaluate membrane and housing integrity and overall filtration performance, the designer shall consider methods for periodic integrity testing.
- Isolation valves are required for each individual membrane assembly.
- Flow Metering Systems Flow meters shall be provided to directly or indirectly continuously monitor:
 - Main raw water supply line (or individual train raw water supply lines) to measure the feed water volume entering the membrane system and for flow pacing of any pretreatment chemicals;
 - Individual permeate lines from each membrane train to measure the filtration rate and volume of each train and pace post disinfection chemicals;
 - Individual reject or concentrate lines from each train to measure the flow rate and volume of waste stream water for calculating the overall recovery rate of the train;
 - Individual backwash lines (or use of the permeate flow meters) to measure the backwash flow rate and volume;
 - Combined filter effluent line and/or the distribution main header leaving the plant; and
 - On-line means for confirming flow paced chemical additive dosing.
- Provisions shall be made for pH and residual measurement, either on-line or at convenient sample points, on each membrane clean-in-place (CIP) tank to monitor the cleaning solution concentrations.







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3.4.2 RBC Design Considerations:

- Enclosures shall be constructed of a suitable corrosion resistant material.
- Windows or simple louvered mechanisms which can be opened in the summer and closed in the winter shall be installed to provide adequate ventilation.
- To minimize condensation, the enclosure shall be adequately insulated and/or heated.
- RBC units may be placed in tanks with baffles when required. The design of the tanks shall include:
 - Adequate structural support for the RBC and drive unit;
 - Elimination of the "dead" areas; Satisfactory hydraulic transfer capacity between stages of units; and
 - Considerations for operator safety.
- The structure shall be designed to withstand the increased loads which could result if the
 tank were to be suddenly dewatered with a full biological growth on the RBC units. The
 sudden loss of buoyancy resulting from unexpected tank dewatering could increase the
 bearing support loadings.
- Provision shall also be made for rotational speed control and reversal. Each stage shall have variable rotational speed.
- A means for removing excess bio-film growth, such as air scouring or water stripping, chemical additives, rotational speed control/reversal shall be provided.
- Consideration shall be given to providing recirculation of RBC effluent flow. This may be
 necessary during initial system start-up and when the inflow rate is reduced. If flow can be
 recycled through the sludge holding or treatment units and then to the RBC process, then the
 organic load from the sludge units can be imposed on the RBC process. This imposed load
 will help to maintain the bio-growth and, as a secondary benefit, help stabilize and reduce
 the sludge.
- In all RBC designs, access to individual shafts for repair or possible removal shall be considered. Bearings shall also be accessible for easy removal and replacement if necessary.
- As a minimum the system shall include flow transmitters on the feed and effluent streams with flow indication for internal recycle streams.

3.4.3 SBR Design Considerations:

- Influent baffling using a baffle wall and adequate physical separation of the influent from the
 decanter is recommended for any basin which may operate with a continuous feed during
 the settle and decant phases. The baffling shall direct the influent wastewater below the
 sludge blanket.
- The treated effluent from each reactor shall be free of scum. Scum removal shall be provided.







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- Decanters shall draw treated effluent from below the water surface and exclude scum or have a means to exclude scum and floatables.
- Treatment facilities with fixed decanters, or any other system where the low-water depth
 cannot be adjusted quickly by the operator, shall be designed to end the decant phase at a
 higher water level than other types.
- Adequate means to accommodate basin dewatering shall be provided. All sludge transfer and wasting pumps shall be accessible for maintenance without dewatering the tank.
- The capability to transfer sludge between SBR tanks shall be provided. If the decant pumps
 are used for sludge transfer, all solids in the decant piping need to be flushed and recycled
 back to the SBR.
- The blowers shall be provided in multiple units, so arranged and in such capacities as to meet the maximum air demand in the aerated portions of the fill/react and react phases of the cycle with the single largest unit out of service.
- Downstream processes need to be sized to handle peak discharge rates that will occur during decant phase unless equalization is provided for decant flow.
- All 24-hour effluent quality composite samples for compliance reporting or monitoring plant operations shall be flow-paced and include samples collected at the beginning and end of each decant phase.
- As a minimum the system shall include flow transmitters on the feed and effluent streams with flow indication for internal recycle streams.

3.5 Media Filters (where required)

The media filters shall include automated backwash control valves, back-wash pumps, differential pressure control and gauges. The pressure vessel to be designed in accordance with ASME.

As a minimum the system shall provide flow signal for service and backwash flow, pressure indication on the feed and product lines as well as differential pressure control to initiate backwash.

A flow regulator, flow meter and flow indicator shall be provided on the main backwash header. An air release valve shall be placed at the high point of the header.

For filters 900 mm or more in diameter an access hatches to facilitate inspection and repairs shall be provided.







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All filters shall be equipped as follows:

- Means for obtaining influent and effluent samples;
- Indicating flow meter and flow control to each filter/filter train;
- Indicating loss of head gauge;
- Head room to permit normal inspection and operation;
- The system shall control the flow to each individual filter, apportion the total flow among the individual filters and accommodate rising head loss through each individual filter run.

3.6 Chlorine Disinfection System

Chlorine is to be added in the form of liquid Sodium hypochlorite.

The chlorine disinfection system shall consist of metering pumps (1 duty + 1 standby) and a polyethylene storage tank with level switches.

Chlorine, on-line monitoring, and chlorine injection control shall be provided.

Chlorine contact tank shall be included.

A minimum of 2 mg/L of free-chlorine shall be maintained in the effluent prior to de-chlorination.

Subsequent de-chlorination of the sewage works effluents shall be provided to ensure that effluent is non-toxic to aquatic organisms. Normal operation of de-chlorination equipment shall provide for an excess of reagents to ensure the effective destruction of the total chlorine residual.

The disinfectant shall be mechanically mixed as rapidly as possible, with an approximately complete-mix condition achieved within 3 seconds. This may be accomplished by either the use of turbulent flow regime or a mechanical flash mixer.

The tank shall be designed to facilitate maintenance and cleaning without reducing effectiveness of disinfection. This is necessary since some sedimentation occurs in chlorine contact tanks. Duplicate tanks, mechanical scrapers, or portable deck-level vacuum cleaning equipment shall be provided. Consideration shall be given to providing skimming devices on all contact tanks.

All chlorination facilities shall be designed according to recommendations of the Chlorine Institute, http://www.chlorineinstitute.org (ref. source: Ontario Design Guidelines for Sewage Works, 2008).

Low pressure lines made of hard rubber, saran-lined, rubber-lined, polyethylene, polyvinyl chloride (PVC), or other approved materials are satisfactory for wet chlorine or aqueous solutions of chlorine.

The chlorine system piping shall be colour coded and labelled to distinguish it from other plant piping.







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The de-chlorination reaction with residual chlorine occurs within 15 to 20 seconds. The de-chlorination chemical shall be introduced at a point in the process where the hydraulic turbulence is adequate to ensure thorough and complete mixing. If no such point exists, mechanical mixing needs to be provided. Minimum dissolved oxygen levels in the final effluent after de-chlorination shall be maintained at levels consistent with natural surface waters.

3.7 Ultraviolet Disinfection System

To minimize degradation of sleeve transmittance the UV system shall include a cleaning system. Possible systems include out-of-channel cleaning tanks, manual wiping and acid recirculation systems and/or automatic wiper systems.

At least two banks in series needs to be provided in each channel for disinfection reliability and to ensure uninterrupted service during lamp sleeve/tube cleaning or other required maintenance. An automatic switchover shall be provided to switch to the standby UV bank operation upon a failure of the duty bank.

The UV system is to be designed to deliver the required UV dose at peak flow, in effluent with a UV transmission stated at the end of lamp life (EOLL) after reductions for quartz sleeve fouling.

An alarm system needs to be provided to separately indicate lamp failure and low UV intensity. A UV intensity meter shall be used for this application as part of continuous monitoring.

Equipment shall be provided with safety interlocks that shut down the UV banks or modules if moved out of their position or the liquid level drops below the top row of lamps in a horizontal system or exposes the top portion of the UV lamps in a vertical system.

All UV disinfection facilities shall continuously monitor such parameters that allow the operator to determine that the target design UV wavelength pass through dose or higher is being delivered, and all systems shall provide annunciated failure alarms when this design dose is not being delivered.

The system shall allow for the following alarms:

- Lamp Age Lamp cumulative run-time and number of starts to guide scheduled replacement;
- Calibration Check of UV Sensor UV sensor requires calibration check based on operating time;
- Low UV Validated Dose Indicated validated UV dose (based on UV reactor parameters, i.e., flow rate, UV intensity, and UVT) falls below required UV dose;
- Low UV Intensity Intensity falls below validated conditions;
- Low UV Transmittance UVT falls below validated conditions;
- High Flow Rate (if applicable; may rely on flow meters) Flow rate falls outside of validated range;







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- Mechanical Wiper Function Failure (if applicable) Wipe function fails;
- Lamp/Ballast Failure Lamp or ballast failure identified;
- Low Liquid Level Liquid level within the UV reactor drops and potential for overheating increases; and
- High Temperature Temperature within the UV reactor or ballast exceeds a set point.

3.8 Treated Effluent Tank

The Treated Effluent Tank shall be above ground, epoxy coated carbon steel, complete with all necessary flanged (or Victaulic) nozzle connections, access stairs, walkways and platforms. All level instruments to be included (complete with attachments pre-wired, pre-installed to controller). Tank can be round or rectangular (standard shipping container dimensions). Knockdown tank is acceptable; however, if tank can be shipped in one piece, this would be preferred. Bolted tanks are also acceptable. Tank shall come with anchor attachments; anchors by others.

The effluent tank will have a hydraulic retention of time of 2 days (at minimum) based upon nominal flows. It is intended that the effluent tank will be at a low level during operation such that if sampling indicates that the effluent quality does not meet the applicable criteria further discharge can be prevented for a period in excess of a day to allow this effluent to be mixed, retreated, and retested. In addition this retention volume will allow for a minimal amount of recirculation through the STP using any spare STP capacity. This will improve the quality of the effluent in the tank. The volume is sufficient to allow for periodic sampling and testing of the treated effluent before discharge or reuse.

3.9 Treated Effluent Pumps

The supplier shall provide $2 \times 100\%$ effluent transfer pumps for the transfer of the treated effluent to the final discharge point. An option shall be included for an additional $2 \times 100\%$ reuse pumps for recycle of the treated effluent. In both cases the pumps shall be sized for the average design flow of treated effluent. The optional re-use pumps are meant to be in addition to the effluent transfer pumps.

3.10 Aerobic Digester (OPTIONAL)

An optional aerobic digester tank shall be proposed. The tank shall be an above ground, epoxy coated carbon steel, complete with all necessary flanged (or Victaulic) nozzle connections, access stairs, walkways and platforms.

The equipment shall be sized appropriately to provide pathogen reduction that complies with CCME Guidelines for Compost Quality (outlined below):

- Fecal coliforms < 1000 most probable number (MPN)/g of total solids calculated on a dry weight basis;
- No Salmonella sp. with a detection level < 3 MPN/4g total solids calculated on a dry weight basis.







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The tank shall come with an air-supply system complete with diffusers, piping and blower system.

The sludge retention time shall be no less than 45 days.

All level instruments to be included (complete with attachments pre-wired, pre-installed to controller).

Tank can be round or rectangular (standard shipping container dimensions).

Knock-down tank is acceptable; however, if tank can be shipped in one piece, this would be preferred. Bolted tanks are also acceptable.

Tank shall come with anchor attachments; anchors by others.

If supernatant separation is performed in the digestion tank, a minimum of 25 percent additional tank volume is required.

If diffusers are used, the non-clog type is recommended and they shall be designed to permit continuity of service. Air supply to each tank shall be separately valved to allow aeration shutdown in either tank. The diffuser type shall not be susceptible to plugging during frequent shutdown periods.

The supernatant draw off unit shall be designed to prevent recycle of scum and grease back to the STP liquid train process units. Facilities shall be provided for the effective collection of scum and grease from the aerobic digester for final disposal to prevent long-term accumulation and potential discharge in the effluent. Provision shall be made to withdraw supernatant from multiple levels of the supernatant withdrawal zone.

An unvalved high level overflow and necessary piping shall be provided to return digester overflow to the head of the sewage treatment plant or to the secondary treatment process in case of accidental overfilling.

The aerobic digester may receive some periodic addition of settled solids from the sewage water treatment system for the site. At present it shall be assumed by the supplier that this does not represent any significant additional hydraulic loading for the digester and dewatering systems. The supplier will be advised in the event that this contribution is later deemed to be significant.

3.11 Dewatering System

The dewatering system shall consist of filter presses (with membrane squeeze), gravity dewatering type, centrifugation or belt press filters.

Filter presses, or belt press filters, shall be supplied as dual systems (i.e. duty + alternating standby) and shall be fully automated complete with all necessary components.







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Sludges shall be concentrated to a solids concentration where they will burn autogenously. This solids concentration will vary somewhat with sludge type, volatile solids percentage and the chemical composition of the solids, but a concentration in the order of 30 percent total solids will generally be required (source: Ontario Design Guidelines for Sewage Works 2008).

The Seller shall also supply all access stairs, platforms, walkways, structural supports, allowing standard size bins to fit underneath the dewatering equipment. Bins to be supplied by Seller.

The filter press, or belt press filter, support structure shall be designed to withstand all loads, including all dynamic loads.

The filter presses, or belt press filters, shall have a local control panel complete with a PLC and HMI.

Some gravity dewatering systems are meant for outdoor use. For those situations the supplier is referred to site climactic data sheet.

3.12 Air Compressor System

Air compressor systems are to be provided for each site.

Air compressor system shall be reciprocating (piston) type, electric motor, rated for commercial duty, oil-fee air, complete with air receiver tank, intake air filters, air regulator, air dryer, and local control panel. Air shall be oil free (< 0.01 ppm oil) have a maximum dew point of -65°C and be filtered to 40 micron.

Air receiver to be epoxy coated, carbon steel, and designed and constructed to meet CSA B51 and registered with a valid CRN. The air receiver tank is equipped with a pressure relief valve, pressure gauge, automatic drain, and source isolation valve.

The local control panel shall be NEMA 4X rated complete with motor starters, control wiring, Hand-Off-Auto selector switch, push-buttons, indicator lights and main disconnect switch, complete with a local operating controller and display.

3.13 Odour Control

Odour control systems (i.e. carbon vents) shall be installed as a minimum at the equalization tank but also where deemed necessary by the supplier.

3.14 Tanks (General)

Tanks shall be carbon steel, polyurethane or epoxy coated, closed top, vented with air filters, and in accordance with API and AWWA.

Container shall be designed for seismic conditions that prevail onsite, in accordance with API and IBC.







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Attachments for anchor bolts shall be by the Supplier.

Tanks shall be painted externally and internally as per "Painting Requirements" Section.

Tanks shall include all necessary flanged, nozzle connections.

Tanks shall include all level switches, including mounting attachments (pre-wired and pre-installed to controller).

Each tank shall be shipped as one complete piece, including coatings, if possible. If each tank is not possible to ship as one piece, the tanks shall then be designed as knock-down tanks and shipped to a modular yard for final erection, including coatings, prior to shipment to site. Bolted tanks are also acceptable.

3.15 Enclosures (General)

All sewage water treatment plant components shall be housed in enclosures.

Water treatment systems shall be in enclosures that are heated, ventilated, insulated, watertight, complete with lighting system, smoke and security alarm system, lockable doors and gaskets.

The enclosures shall be designed for seismic and wind conditions, in accordance with IBC.

The building enclosure shall be of a non-combustible construction and include all safety showers, eye wash stations and fire protection system as required by code. In addition a hoist or crane shall be included if required for maintenance of the equipment.

4. Performance Requirements

4.1 Guarantees

The supplied equipment shall be guaranteed as follows:

Table 4-1: Guarantees

Parameter	Guarantee Requirement
Flows	As per Section 2
Effluent Criteria	As per Section 2
Dewatered Sludge Cake TSS	>30%wt dry solids

4.2 Warranty

The Seller shall warrant the equipment's manufacture is free of defects or workmanship for the greater period of 18 months from delivery or 12 months from commissioning. All components deemed to be defective shall be replaced to the Owner at no cost (supply and delivery). Installation or consequential damages costs shall not be the responsibility of the Seller.

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In case of assistance delay by the Seller, the Owner reserves the right to perform the necessary maintenance at Seller's full expense.

4.3 Test Methods and Procedures

All test method details, timing, sampling protocols and procedures and tolerances shall be developed by the Seller, submitted with the bid package and agreed upon with the Owner before issue of a purchase order.

5. Foundation Requirements

The Vendor shall consider equipment and building options which do not require placement on rigid foundations such as skid mounted units which are interconnected with flexible elements that permit differential settlement.

6. Pumps, Valves and Piping Requirements

All necessary pumps, valves and piping, shall be supplied by the Seller, fully assembled, and installed, within the containerized system.

Pipe supports and pump base plates shall be provided.

Pump motors shall be rated for VFD, where required; VFDs and motor starters by Supplier.

All installed pumps, piping and valves shall be accessible, and shall have sufficient surrounding space for the purposes of maintenance and repair.

Pneumatic actuators are to be used for valves installed in-doors. Alternatively electric actuators / with heater may to be used for remote locations, where an instrument air supply is not available.

For control valves, on / off and modulating (throttling), refer to Instrumentation Requirements for Packaged Equipment (H337697-S250050).

Check valves shall be located to prevent unintended reverse flow where necessary.

Pipe connections to be Victaulic type with EPDM seals where possible.

7. Mechanical Requirements

Standard Mechanical requirements are identified in the Mechanical Design Criteria, XXX-TBD (not published).

All equipment and all components shall be the Seller's standard heavy-duty design and fabrication and shall have been proven effective and reliable under similar operating conditions. No new or unproven design is acceptable.







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Not all parts and materials are specified in this specification. For those that are not specified, the Seller shall use their standard parts and materials, which will be subject to the approval of the Owner.

The Seller shall notify the Owner if any specific requested component is unsuitable for the required service and present alternatives, along with the technical justifications.

8. Electrical Requirements

Electrical design shall comply with the following:

• H337967-S260050 – Electrical Requirements for Packaged Equipment.

All electrical panels, transformers, lighting panel, MCCs, including starters, circuit breakers, and VFDs shall be provided by the Seller.

All wiring, cabling conduits, and cable trays to be included by the Seller.

9. Instrumentation and Controls Requirements

Instrumentation and controls design shall comply with the following:

• Instrumentation Requirements for Packaged Equipment, H337967-S250050.

The local control system for the water treatment plant shall be supplied by the seller.

The Owner shall approve all exceptions or deviations from these requirements.

The following instruments shall be included, but not limited to, in the supply of the equipment by the Seller:

- Flow meters
- Pressure indicating transmitters, switches and gauges
- Level Switches (High High, High, Low, and Low Low)
- Limit switches for valve (open and close)
- Temperature sensors and transmitters
- Chlorine analyzers (free chlorine)
- Dissolved Oxygen probes

Seller shall include additional instruments, if required, for the safe operation of supplied equipment.

Pressure gauges to be provided on all pump discharges







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The Seller shall provide a list of signals (alarms, monitoring and interlocks) to be monitored and/or controlled from the Owner's Plant Control System.

The Owner shall provide a written narrative functional description of all process control requirements as per project standard template.

Enclosure of local control panel shall be NEMA 4X.

Seller shall be responsible for the development of the sequence of operation, and the programming for the PLC.

Flow meters shall be magnetic type, and shall be installed on the main feed, feed to each train, effluent, sludge line to digester, as a minimum

All tanks, and chemical storage tanks, to have level switches.

All control wiring within the battery limits shall be provided by the Seller.

All instruments to be smart bus or 4-20mA HART.

Shelf spares to be provided for all critical instruments.

Motors communication protocol (i.e: DeviceNet, Profibus, Modbus TCP) to be announced later in the project.

Communication protocol with Owner's network shall be Ethernet.

10. Structural Requirements

Structural design shall comply with the following:

• Structural Design Criteria – Doc. No. H337697-0000-35-109-0001.

The container and water tanks shall be designed for seismic and wind conditions in accordance with local codes, API and IBC.

Container and water tanks shall be anchored.

All equipment, including piping and electrical equipment, shall be secured by base plates, supports, or other means, to withstand seismic or wind loads.

The Seller shall supply certified design data showing dimensions, loadings, locations and sizes of all steel members which will allow others to design concrete foundations, inserts, and anchor bolts to receive Seller's equipment.

All stairs, ladders, platforms and walkways shall be supplied by the Supplier.







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11. Painting Requirements

All exterior metallic surfaces shall be primed and painted / coated with a suitable polyurethane, or epoxy product capable of withstanding the noted site conditions, especially temperature variations without cracking chipping or peeling.

All interior carbon steel surfaces shall be primed and painted / coated or lined, with a suitable polyurethane, or epoxy product, and shall be in accordance with NSF61.

Painting shall not be required for parts of equipment that are manufactured of or coated with corrosion resistant materials that are machine finished or normally left unpainted.

Machine finished parts that are not manufactured of corrosion resistant materials and are not painted, shall be given a heavy coat of rust-inhibiting compound that can be easily removed at installation by the use of solvents and hand wiping.

12. Regulations, Standards, and Codes

The International System (SI) will be used for all design calculations and on all drawings.

The equipment shall comply with the latest version of all appropriate regulations, standards and codes, including, but not limited to, those listed below:

Table 13-1: Applicable Regulations, Standards and Codes

Number / Acronym	Title	
AWWA	American Water Works Association	
IBC	International Building Codes	
Nunavut Waters and Nunavut Surface Rights Tribunal Act, SC 2002, c 10		
Northwest Territories Water Act		
Northwest Territories Water Regulations (SOR/93-303)		
Canadian Fisheries Act		
Canadian Environmental Protection Act (1999)		
CCME Water Quality Guidelines for the Protection of Aquatic Life		
Ontario Guidelines for Sewage Works 2008		
CCME Guidelines for Compost Quality		
Canadian Guidelines for Domestic Reclaimed Water for Use in Toilet and Urinal Flushing		
NSF	National Sanitation Foundation	
OSHA	Occupational Safety and Health Administration	

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13. Health, Safety, Environment and Community Requirements

Protection designed for the valid codes and standards shall be installed in order to avoid operator injury. Minimum required protection as follows:

- Operation point protection.
- Moving parts protection.
- Power transmission and gyratory parts protection.
- Hot spots protection.
- Dust emission protection.
- Tools protection.
- Collision detection system (between machines).
- Fire protection and detection system.

14. Assembly and Testing

14.1 Critical Dimensions

All critical dimensions shall be checked prior to shipment. All ancillaries shall be assembled and all motions tested in accordance with manufacturers standard procedures. Prior to disassembly all components shall be match marked, where practical, for ease of field assembly. The Seller shall describe the extent of field assembly required.

14.2 Equipment Assembly

All equipment shall be shipped assembled to the maximum extent possible consistent with shipping limitations indicated below. The Owner shall be consulted prior to the shipment of large components.

14.3 Pre-Assembly

All pre-piped and pre-assembled lube oil and hydraulic oil systems shall be tested for their output pressures and motions to the maximum extent possible.

14.4 Specific Testing Requirements

Tanks to be hydrostatically tested, or other approved equivalent.

14.5 Control System Components

At the Owner's option, Seller-furnished control systems components shall be subject to Owner-witnessed Factory Acceptance Test (FAT) in accordance with test procedures that shall be submitted by the Seller and reviewed by the Owner. All input / output signals and control







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functions shall be simulated. If required, the Seller-furnished components may be subject to integration testing with the main project PCS system.

The Seller shall submit a Site Acceptance Test procedure that will be subject to the Owner's review and permission to proceed. Items such as proper equipment grounding, powering up, checking for correct software installed, etc. shall be included in the procedure.

Wherever possible instruments shall be pre-wired and pre-installed to controller.

15. Shipping, Construction, Commissioning and Operator Training

15.1 Shipping

The equipment will be shipped to an assembly site in the largest feasible sections that allow transportation by gravel road. Protective coatings and coverings shall be applied to ensure that the equipment is not damaged during shipment. The Seller shall provide match-marking of all parts to facilitate field assembly and shall provide shipping dimensions and weights of all components and assemblies.

15.2 Construction Supervision, Testing and Commissioning

The Seller shall make available qualified personnel to advise and assist with on-site supervision of construction and assist with testing and commissioning. The Seller's expense policy shall be outlined in the bid document. The Owner, and / or his representative and any Authorities having jurisdiction over the equipment shall witness all tests.

15.3 Operator Training

If requested, the Seller shall train operators and supervisors in the operation of the supplied equipment. Such training shall include:

- Training lectures and lecture notes.
- On-the-job training during commissioning and plant operation.

The Seller will supply rates and terms for such training.

16. Spare Parts

The Seller shall supply lists of critical spare parts.

17. Quality Assurance

The Seller shall prepare a quality assurance and inspection/ test plan and submit for Owner's approval. No changes to the plan will be allowed during implementation without prior consent from the Owner. Refer to Section S01 43 00 – Quality Management for the requirements of this plan.

END OF SECTION







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1. Introduction

1.1 This specification is for incinerators to be installed as part of the Mary River Iron Ore Project for Baffinland Iron Mines Corporation, located on North Baffin Island, in the Qikiqtani Region of Nunavut, Canada.

2. Regulations, Standards and Codes

- 2.1 The International System (SI) will be used for all design calculations and on all drawings.
- 2.2 The equipment shall comply with all applicable Canadian and territorial standards, codes and regulation as appropriate to project location.
- 2.3 The equipment shall comply with all appropriate standards, codes and regulation, including, but not limited to, those listed below:

Number/Acronym	Title	Revision
Department of the Environment,	Guideline: Burning and Incineration of	October, 2010
Government of Nunavut	Solid Waste	
IFC/World Bank Environmental, Health &	Guidelines for Waste Management	December 10,
Safety Guidelines	Facilities	2007
IFC/World Bank General Environmental,	Air Emissions and Ambient Air Quality	December 10,
Health & Safety Guidelines		2007

2.4 The equipment manufacturer shall comply with all appropriate certifications, including, but not limited to, those listed below, in addition to all the ones listed in the standard specifications and specification index:

Number/Acronym	Title	Revision
IFC/World Bank Environmental, Health &	Guidelines for Waste Management	December 10,
Safety Guidelines	Facilities	2007
IFC/World Bank General Environmental,	Air Emissions and Ambient Air Quality	December 10,
Health & Safety Guidelines		2007
IFC/World Bank Performance Standard 3:	EHS Guidelines: Environmental Waste	April 30, 2007
Pollution Prevention & Abatement	Management	

- 2.5 Bidder must provide documentation to prove under expected operating conditions that the unit will perform in accordance with section 2.2, 2.3 and 2.4.
- 2.6 All test method details, timing, sampling protocols and procedures and tolerances shall be developed by the Seller, submitted with the bid package and agreed upon with the Owner before issue of a purchase order.







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3. Design Requirements

3.1 General

- 3.1.1 For design requirements and conditions, refer to the Specification Index and Summary of Work attached with this specification. Additional specific requirements are provided below.
- 3.1.2 All incinerators performance and design must comply with H337697-4060-07-109-0001 Design Basis for Incinerator.
- 3.1.3 Equipment and components shall be the Contractors standard design for the service and conditions specified, with readily available replacement parts. No new technology shall be applied to the design of the equipment without examples of operating equipment using the technology in similar design conditions.
- 3.1.4 The equipment shall be designed considering exposure and operating under the following:
 - Extremely low temperatures in arctic climate conditions. The climate conditions are listed in H337697-0000-10-107-0001 – Site Conditions Data Sheet, and reach temperatures of -50 degrees C in winter.
- 3.1.5 All incinerator equipment shall be housed in a vendor provided enclosure as necessary for operation of system and its associated activities. Permanent buildings shall comply with architectural requirements stated herein and all buildings shall comply with all applicable codes and regulations.
- 3.1.6 Vendor must meet and/or specify all requirements listed in section D118219 Technical Data Sheet. Vendor must provide completed copy of Technical Data Sheet, in native format, on bid submittal.

3.2 Conformance with the Mary River Environmental Impact Statement

- 3.2.1 To comply with the owners Environmental Impact Statement the equipment type and configuration shall be similar to and shall achieve performance equivalent or superior to the incinerator system as shown in drawings:
 - E337697-PM406-50-042-0001 Milne Port Incinerator General Arrangement Plan & Elevations ECO1.0TN1P Incinerator
 - E337697-PM406-50-042-0002 Milne Port Incinerator General Arrangement Sections ECO1.0TN1P Incinerator







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3.3 Equipment Vendors

Hatch recommends that the following vendors be evaluated by the Supplier for incinerator equipment:

- Eco Waste Solutions Inc.
- Ketek Manufacturing

3.4 Operational Requirements

- 3.4.1 Incinerator units shall have the capacity to process 2.40kg (2.00kg + 20% contingency) of waste per person per day at site (e.g. Mary River, Milne Inlet and Steensby Inlet) in addition to all dewatered sewage sludge cake produced at the co-located site sewage treatment plants.
- 3.4.2 Incinerators must be able to achieve greater or equal to 90% volume reduction after process completion.
- 3.4.3 Waste will include food waste, hydrocarbon and solvent contaminated waste and dewatered sewage treatment sludge.
- 3.4.4 Bidder to assume estimated densities for waste streams at 160-240kg/m³.
- 3.4.5 The units must be designed with an appropriate secondary combustion design and emission controls to ensure off-gas emissions meet Canadian and Nunavut requirements and the IFC's General EHS Guidelines for air emission standards for all waste streams listed in 3.2.3 and 3.2.4 above. The Contractor will be required to provide a letter confirming that the unit will meet those standards under normal operating conditions for this environment.
- 3.4.6 Incinerators are to be diesel operated with the option of recycled oil from the maintenance shop being added into the fuel stream. Vendors are to provide operating efficiency and performance information for both options (diesel fuel only or diesel fuel plus recycled oil) and provide diesel to oil ratios where appropriate.
- 3.4.7 Incinerator units must include a vendor supplied fuel tank and waste oil tank to supply the unit for 5 days minimum.
- 3.4.8 Bidder to provide specifications on power requirements and tie-in requirements.
- 3.4.9 Bidder to provide price breakdowns for units sized for project and specific site needs.
- 3.4.10 Bidder to provide layout and elevation drawings for each unit proposed.
- 3.4.11 Wastes will be sorted by others prior to loading of the units.







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3.5 Site Conditions

- 3.5.1 See attached Site Conditions Data Sheet, H337697-0000-10-107-0001.
- 3.5.2 The enclosures shall be designed for seismic and wind conditions, in accordance with International Building Code (IBC) and shall have attachments for anchor bolts; anchors by others.

3.6 Duty

- 3.6.1 The equipment shall be designed for continuous service under the specified process and operating conditions.
- 3.6.2 The equipment will be designed to operate as batch units operating at full load, 360 days per year without requiring excessive maintenance.
- 3.6.3 Design all equipment components such that corrosion and wear are minimized.

3.7 Material Characteristics

- 3.7.1 The Bidder shall fabricate the equipment using only new materials of first grade quality, free from defects impairing strength, durability and appearance.
- 3.7.2 After the Purchase Order is issued, the Contractor shall not substitute materials after the bid has been accepted, without prior written approval from the Buyer.
- 3.7.3 Materials of construction shall be suitable for the specified duty and operating conditions.
- 3.7.4 Use the lowest material density for volumetric capacity calculations. Use this volume and the highest material density for power calculations.

3.8 Mechanical Requirements

3.8.1 General

- 3.8.1.1 All equipment and all components shall be the Contractor's standard heavy-duty design and fabrication suitable for the climatic and operating conditions, and shall have been proven effective and reliable under similar operation. No new or unproven design is acceptable.
- 3.8.1.2 Not all parts and materials are specified in this specification. For those that are not specified, the Contractor shall use their standard parts and materials suitable for the specified conditions, which will be subject to the approval of the Buyer.
- 3.8.1.3 The Contractor shall notify the Buyer if any specific requested component is unsuitable for the required service and present alternatives, along with the technical justifications.
- 3.8.1.4 The Seller shall notify the Owner if any specific requested component is unsuitable for the required service and present alternatives, along with the technical justifications.







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3.8.2 Materials

- 3.8.2.1 A certificate of material compliance is required where special alloys other than carbon steel are used.
- 3.8.2.2 The incinerator assembly shall be made of carbon steel plate and adequately reinforced with structural steel members.
- 3.8.2.3 Heat resistant type paint shall be used for all parts to be painted.
- 3.8.2.4 For sheet steel hot dip galvanised coating to ASTM B852-94 and for irregular shaped articles 380 g/m² zinc coating to CSA G164 standard shall be applied.

3.8.3 Fabrication

- 3.8.3.1 The entire incineration system with its components shall be fabricated and packaged in the Vendor's shop as much as possible to minimize field work.
- 3.8.3.2 Vendor shall fabricate and layout the whole system within the maximum dimensions permissible for transportation. The system shall be ready for start-up with minimal field assembly, except for interfacing with the required site facilities.
- 3.8.3.3 Equipment shall be built square, true, straight and accurate to required size, with joints closely fitted (weather-tight) and properly secured.
- 3.8.3.4 Exposed welds shall be continuous for length of each joint, welding shall be in accordance with CSA W59 and welds shall be filed or ground to give a smooth finish.
- 3.8.3.5 The primary and secondary chambers shall be seal welded completely to prevent the inclusion of incoming air.
- 3.8.3.6 The design and construction of the incinerator and all associated components shall be such that, in service, they will not crack, warp, or otherwise fail structurally so as to permit flame passage or emission of combustion gases or sparks into the building.
- 3.8.3.7 Explosion relief shall be provided as per National Fire Protection Association NFPA 82.

3.8.4 Spark Arrester

3.8.4.1 Spark arrester shall be installed on incinerator stack. Exceptions shall be as per NFPA 82.

3.8.5 Access for Inspection and Maintenance

- 3.8.5.1 Primary and secondary chambers shall be provided with adequate access doors for waste loading, inspection, maintenance and ash discharge.
- 3.8.5.2 Door assembly shall include a sealing device adequate to stand the internal temperature of the chambers and to prevent air leakage from outside. The door assembly shall be designed to hold a minimum of 12.5mm (0.5 inch) water negative pressure.







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3.8.5.3 Vendor shall provide adequate ladder and platform for easy access and personal safety guards to perform regular operations, inspection and maintenance of incinerator and ancillary equipment.

3.8.6 Sampling Ports

3.8.6.1 The incinerator stack design shall incorporate appropriate sampling ports (with caps where necessary) at appropriate locations to allow for stack testing to be undertaken when required during incinerator operation.

3.8.7 Refractories

- 3.8.7.1 The calculated cold face temperature of the exterior surface of the casing shall not be more than 82°C based on ambient temperature outdoors.
- 3.8.7.2 The castable refractory shall be secured to the inside of the steel casing with anchors made of stainless steel.

3.8.8 Waste Loading and Ash Removal Facilities

- 3.8.9 Vendor shall provide incinerator units with an efficient method to measure waste prior to unit loading.
- 3.8.9.1 Vendor shall provide a system with related facilities to ensure the operation can be carried out efficiently and safely with minimum involvement of the operator. A complete description of the ash removal system including operator requirements shall be included in the bid.
- 3.8.9.2 Vendor shall design such that ash removal from the primary chamber will be initiated automatically or manually at the end of the cool-down cycle.

3.8.10 Stack and Breeching

- 3.8.10.1 Vendor shall design, fabricate and supply a stack, to conform with CSA and local code requirements. The stack shall be self-supporting securely fixed with the port of the incinerator, independent of building structure, be properly braced for wind resistance, accommodate expansion and contraction, and provide a weather-tight juncture.
- 3.8.10.2 Outer shell shall be of galvanized sheet steel formed to required thickness and diameter with appropriate heat resistant paint suitable for galvanized steel. Vendor shall include an option to supply stainless steel shell.
- 3.8.10.3 Spark-arrester screen shall be provided at top of stack with 2.9 mm steel wire in 12 mm mesh, formed around 10 mm diameter reinforced bar frame. Galvanized finish shall be applied after fabrication.
- 3.8.10.4 A stack sampling station shall be included.







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3.8.11 Specific Mechanical Requirements

3.8.11.1 Insulation is to be provided in accordance with all applicable health, safety and environmental standards as appropriate to buyers needs and are to be included to isolate personnel from heat produced by the incineration process.

4. Electrical Requirements

- 4.1 Electrical design shall comply with the following:
 - Section S26 00 50 Electrical Requirements for Packaged Equipment
- 4.2 Vendor package will be fed at 600V, resistance grounded.
- 4.3 Vendor to identify the ampacity and number of required feeds.
- 4.4 Vendor is responsible for all downstream electrical equipment including MCCs, motor feeders, lighting and auxiliary transformers and panels, lighting fixtures, heaters welding outlets, etc.
- 4.4.1 Vendor shall provide complete Burner Management Package (BMP) for fuels used. BMP shall monitor pilots, main burners, fans, fuel supplies, combustion chambers, stack and all other required control parameters. BMP shall also shutdown the incinerator upon a system failure and/or detection of a hazardous condition.
- 4.4.2 Temperature control shall be segmented per burner gallery. Temperature control of the stack shall be included in the control scheme, as required to meet waste incineration requirements.
- 4.4.3 Other control parameters to be considered are:
 - Burn time
 - Residence time in secondary chamber.
- 4.4.4 Vendor shall provide the power requirement details for the operation of the incinerator as well as all ancillary facilities.

5. Instrumentation and Controls Requirements

5.1 General

- 5.1.1 The Contractor must supply a fully integrated and functional system for the optimal, safe and reliable operation of all equipment.
- 5.1.2 Instrumentation and controls design shall comply with the following:
 - Section S25 00 50 Instrumentation Requirements for Packaged Equipment.
- 5.1.3 Local control panel shall include, but not limited to, switches, pushbuttons, local indication, indicator lights, and main disconnect switch.







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- 5.1.4 All control wiring within the battery limits shall be provided by the Contractor.
- 5.1.5 Generally, the control system will integrated by the Buyer. The Contractor shall list any exceptions if necessary for the proper operation of supplied equipment.
- 5.1.6 The Contractor shall supply a detailed functional description complete with loop narratives for each equipment system and sub-systems to allow the system integrator to configure the plant control system.
- 5.1.7 The Buyer must approve all exceptions or deviations from these requirements.

5.2 Specific Instrumentation Requirements

- 5.3 The Contractor shall provide a list of signals (alarms, monitoring and interlocks) to be monitored and/or controlled from the Buyer's Plant Control System.
- The Buyer shall provide a written narrative functional description of all process control requirements that will allow the Buyer to develop software for the Plant Control System.

6. Structural Requirements

- 6.1 Structural design shall comply with the following:
 - H337697-0000-10-107-0001- Site Conditions Data Sheet (for geographical, climatic and seismic design requirements.)
 - H337697-0000-35-109-0001- Structural Design Criteria.
- 6.2 The Vendor shall supply certified design data showing dimensions, loadings, locations and sizes of all steel members which will allow others to design concrete foundations, inserts, and anchor bolts to receive Vendor's equipment.
- 6.3 All incinerator systems shall be housed in enclosures provided by the vendor that are heated, ventilated, insulated, watertight. The enclosure shall be provided complete with lighting system, smoke alarm system, and lockable doors.
- The enclosure shall be shall include all fire protection system as required by code and any hoist or crane required for vendor provided equipment maintenance.
- 6.5 All stairs, ladders, platforms and walkways shall be supplied by the Vendor.

7. Sound Level and Vibration Requirements

7.1 Sound levels and vibration shall comply with all applicable Standards and Regulations listed in section 2 of this document.







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8. Painting

- 8.1 All exterior metallic surfaces of equipment shall be prepared and painted according to buyers use. In the case of Contractor standard items, the Contractor may propose the manufacturer's standard paint system with justification, subject to approval by the Buyer.
- Painting shall not be required for parts of equipment that are manufactured of or coated with corrosion resistant materials, that are machine finished or normally left unpainted.
- 8.3 Machine finished parts that are not manufactured of corrosion resistant materials and are not painted, shall be given a heavy coat of rust-inhibiting compound that can be easily removed at installation by the use of solvents and hand wiping.

9. HSEC Requirements

9.1 General

- 9.1.1 Protection designed for the valid codes and standards must be installed in order to avoid operator injury. Minimum required protection as follows:
 - Operation point protection
 - C22.1-09 Canadian Electrical Code, Part 1 with hazard classification where required
 - CSA-S432-04 Safequarding of Machinery
 - Hot spots protection
 - Dust emission protection
 - Tools protection
 - Collision detection system (between machines)
 - Fire protection and detection system as per National Fire Protection Association (NFPA)
 82 Standard on Incinerators and Waste and Linen Handling Systems and Equipment
 - Incinerator to be provided with explosion vents as required by NFPA 82

9.2 Specific Requirements

- 9.2.1 Must comply with all applicable Canadian and Territorial regulations and guidelines.
- 9.2.2 Must comply with the IFC/World Bank EHS Guidelines for Waste Management.







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10. Performance Requirements

10.1 Guarantees

- 10.1.1 The Contractor shall provide a written Guarantee that:
 - All equipment is designed and supplied to meet the duties and conditions specified
 - All equipment will, in plant operation as outlined in the equipment data sheets, perform to the requirements specified herein and on the equipment data sheets.
- 10.1.2 Instrument and systems (Boiler Management System) certification to comply with Section S25 00 50 Instrumentation Requirements for Packaged Equipment.

10.2 Warranty

10.2.1 The Contractor shall warrant the equipment in accordance with the requirements of the Buyer's Terms and Conditions, attached, Document number DOC-GCCP-03-2006.11

10.3 Test Methods and Procedures

- 10.3.1 Standard emissions testing protocols or Buyer agreed upon equal.
- 10.3.2 All test method details, timing, sampling protocols and procedures and tolerances shall be developed by the Contractor, submitted with the bid package and agreed upon with the Buyer before issue of a purchase order.

11. Assembly and Testing

11.1 Critical Dimensions

11.1.1 All critical dimensions shall be checked prior to shipment. All ancillaries shall be assembled and all motions tested in accordance with manufacturers standard procedures. Prior to disassembly all components shall be match marked, where practical, for ease of field assembly. The Vendor shall describe the extent of field assembly required.

11.2 Equipment Assembly

11.2.1 All equipment shall be shipped assembled to the maximum extent possible consistent with shipping limitations indicated below. The Buyer shall be consulted prior to the shipment of large components.

11.3 Pre-Assembly

11.3.1 All pre-piped and pre-assembled lube oil and hydraulic oil systems shall be tested for their output pressures and motions to the maximum extent possible







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11.4 Specific Testing Requirements

- 11.4.1 Instrumentation systems testing to comply with Section S25 00 50 Instrumentation Requirements for Packaged Equipment.
- 11.4.2 Complete incinerators shall be tested for operation under simulated service conditions to verify temperature monitoring, status indication, alarm and operating functions.

11.5 Control System Components

- 11.5.1 At the Buyer's option, Contractor-furnished control systems components shall be subject to Buyer-witnessed Factory Acceptance Test (FAT) in accordance with test procedures that shall be submitted by the Vendor and reviewed by the Buyer. All input/output signals and control functions shall be simulated. If required, the Vendor-furnished components may be subject to integration testing with the main project PCS system.
- 11.5.2 The Contractor shall submit a Site Acceptance Test procedure that will be subject to the Buyer's review and permission to proceed. Items such as proper equipment grounding, powering up, checking for correct software installed, etc. shall be included in the procedure.

12. Shipping, Construction, Commissioning and Operator Training

12.1 Shipping

12.1.1 The equipment will be shipped to an assembly site in the largest feasible sections that allow transportation by road and water. Protective coatings and coverings shall be applied to ensure that the equipment is not damaged during shipment. The Contractor shall provide matchmarking of all parts to facilitate field assembly and shall provide shipping dimensions and weights of all components and assemblies.

12.2 Construction Supervision, Testing and Commissioning

12.2.1 The Contractor shall make available qualified personnel to advise and assist with on-site supervision of construction and assist with testing and commissioning. The Contractor's expense policy must be outlined in the bid document. The Buyer, and/or his representative and any Authorities having jurisdiction over the equipment shall witness all tests.

12.3 Operator Training

- 12.3.1 If requested, the Contractor shall train operators and supervisors in the operation of the supplied equipment. Such training shall include:
 - Training lectures and lecture notes
 - On-the-job training during commissioning and plant operation.
- 12.3.2 The Contractor will supply rates and terms for such training.







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13. Spare Parts

- This specification details the required information that the Contractor shall supply as part of its bid, a detailed list of the following recommended types of spare parts:
- Spare Parts Recommended for Installation, Commissioning And Start-Up: Spares required specifically due to initial high wear and which may fail due to abnormal operating conditions during start-up, commissioning, but are not considered normal operating spares.
- 13.3 Spare Parts Recommended for 2 Year Continuous Operation: Spares required during first two years of operation due to normal wear and tear, and / or parts which may fail due to abnormal operating conditions.
- Capital Spare Parts: These are major replacement components that would be required as spares on hand when undertaking a periodic major refit operation, or are required to be on hand to avoid a major production stoppage in the event of an unexpected failure or damage to a critical component.
- 13.5 Consumables And Special Tools. These are as follows:
 - These lubricants, i.e., specific type of graphite blocks, grease, oils, hydraulic fluids and etc. cleaning fluids, specials wearing surfaces for seals
 - Replaceable wearing components for such as brake linings, rotating seal linings, or customized gaskets
 - lig, tools, and other specialized devices required to install spares / parts
 - Lifting gear or support jigs and specialized tools required to service the units.

14. Quality Assurance

- 14.1 The equipment will be subject to Quality Surveillance Level 1 as indicated Section S01 43 00 Quality Management.
- The Contractor must prepare a quality assurance and inspection/ test plan and submit for Buyer's approval. No changes to the plan will be allowed during implementation without prior consent from the Buyer. Refer to Section S01 43 00 Quality Management for the requirements of this plan.

END OF SECTION



DOC. NO. H337697-CA702-D460713



EQUIPMENT DATA SHEET



Packaged Potable Water Treatment Plant Item Rev Title Notes **UOM Project Design Data** Supplier Data **Operation Data** IDENTIFICATION Packaged Potable Water Treatment A1 Equipment Type text Plant **A2** Type of Plant text Vendor to specify **A3** Equipment Number text N/A Serial Number A4 N/A text REFERENCE DOCUMENTS B1 Standard text R2 Specification text Arrangement/Detail Drawing **B**3 text N/A **B4** P&ID text N/A **B5** PFD N/A text GENERAI Bidder company name C1 text Vendor to specify Technical quotation number C2 text Vendor to specify **C**3 Manufacturer name text Vendor to specify C4 Model text Vendor to specify Overall dimensions (footprint) **C**5 Vendor to specify mm Shipping Weight Vendor to specify C6 kσ **C**7 Operating Weight kg Vendor to specify Lift - heaviest at install **C8** kg Vendor to specify Vendor to specify **C9** Lift - heaviest at maintenance kg C10 Turndown Capacity % Vendor to specify PROCESS PARAMETERS D1 **Design Flow** See appropriate section of the bid D2 Average m³/h specification See appropriate section of the bid **D**3 Peak m³/h specification See appropriate section of the bid D4 Influent Quality specification See appropriate section of the bid **D**5 Effluent Quality specification FEED PUMP E1 Feed Pump **E**2 Type of Pump Vendor to specify text E3 Manufacturer Vendor to specify Materials of Construction **E4** Vendor to specify text (wetted parts) **E**5 Vendor to specify Flowrate - Operating m³/h Pressure - Operating E6 kPag Vendor to specify **E**7 Dead head Pressure kPag Vendor to specify E8 Motor Size kW Vendor to specify NEMA Motor Enclosure Designation Vendor to specify E9 text E10 Motor Temperature Code text Vendor to specify Power Supply E11 Vendor to specify text (voltage/phase/frequency) CHEMICAL TREATMENT **Coagulant Addition** Type of Coagulant F2 text Vendor to specify (Alum, FeCl3, etc.) F3 Dosing Pump Type text Vendor to specify F4 Manufacturer text Vendor to specify F5 Motor Size kW Vendor to specify F6 Mixing Method text Vendor to specify F7 Chemical Dosage mg/L Vendor to specify F8 Pulsation Dampener Included Vendor to specify ves/no F9 Relief Valve Included yes/no Vendor to specify F10 Suction Strainer Included yes/no Vendor to specify Flowrate - Operating F11 Lph Vendor to specify Pressure - Operating F12 Vendor to specify bar Materials of Construction F13 Vendor to specify text (wetted parts) F14 Inlet Valve (material, type) text Vendor to specify Vendor to specify F15 Outlet Valve (material, type) text

DOC. NO. H337697-CA702-D460713

■ HATCH*



		ATCH	Packaged Potable Water Treatment Plant			Baffinland Iron Mines Corporation		
Item	Rev	Title	Notes	UOM	Project Design Data	Supplier Data	Operation Data	
F16		Mounting (tank mounted, stand mounted, etc.)		text	Vendor to specify			
FILTRAT	ION							
G1	1011	Media Filter						
G2		Type of Media		text	Vendor to specify		†	
G3		Media Depth (coarse and fine media)		text	Vendor to specify			
G4		Freeboard		%	Vendor to specify			
G5		Backwash Flowrate		m/h	Vendor to specify			
G6 G7		Service Flowrate Backwash Duration		m/h min	Vendor to specify Vendor to specify	+	+	
G8		Inlet Distributor Type		text	Vendor to specify Vendor to specify		<u> </u>	
G9		Bottom Collector Type		text	Vendor to specify			
G10		Vessel Material of Construction		text	Vendor to specify		†	
G11		Surface Finish, lining, thickness (external and internal)		text	Vendor to specify			
G12		Maximum Operating Pressure		kPag	Vendor to specify			
G13		Vessel Design Pressure Rating		kPag	Vendor to specify			
G14		Relief Valve Included (yes/no) and type (thermal, full flow PRV)		yes/no	Vendor to specify			
G15		Provision for air scour included		yes/no	Vendor to specify		+	
G16 G17		Air Scour Flowrate Average Waste Flowrate		m/h m3/hr	Vendor to specify Vendor to specify			
G17		Peak Waste Flowrate		m3/hr	Vendor to specify Vendor to specify		1	
G19		Waste Suspended Solids Concentration		mg/L	Vendor to specify			
G20		Backwash Pump						
G21		Type of Pump		text	Vendor to specify			
G22		Manufacturer		text	Vendor to specify			
G23		Materials of Construction (wetted parts)		text	Vendor to specify			
G24		Flowrate - Operating		m³/h	Vendor to specify			
G25		Pressure - Operating		kPag	Vendor to specify			
G26		Dead head Pressure		kPag	Vendor to specify			
G27		Motor Size		kW	Vendor to specify			
G28		NEMA Motor Enclosure Designation		text	Vendor to specify			
G29		Motor Temperature Code		text	Vendor to specify			
G30		Power Supply (voltage/phase/frequency)		text	Vendor to specify			
DISINFE	CTION							
H1	CHOIL	Chlorination (if applicable)						
H2		Туре		text	Vendor to specify			
Н3		Materials of Construction (wetted parts)		text	Vendor to specify			
H4		Contact Tank Length		mm	Vendor to specify			
H5		Contact Tank Width		mm	Vendor to specify			
Н6		Contact Tank Depth		mm	Vendor to specify			
H7		Useable Volume		m ³	Vendor to specify			
H8		Manufacturer name		text	Vendor to specify			
H9		Model		text	Vendor to specify			
H10 H11		Design Parameters Sodium Hypochlorite Dosage		text mg/L	Vendor to specify Vendor to specify		+	
H12		Contact Time		min	30 minute minimum			
H13		Sodium Bisulfite Dosage		mg/L	minimum of 1.65 mg/L per mg/L of Cl2			
H14		Ultraviolet Irradiation (if applicable)			per mg/E of CIZ		+	
H15		Type of Lamp		text	Low pressure/low intensity; Low pressure/high intensity; Medium pressure/high intensity			
H16		Germicidal UV Output per Lamp		W	Vendor to specify			
H17		Effective Lamp Life		Hrs	Vendor to specify			
H18		Automatic Cleaning Mechanism		Included (yes/no)	Vendor to specify			
		Type of Ballast (electromagnetic, electronic)		text	Vendor to specify			
H19		l (ejectromagneric, ejectronic)						

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		IAICH	Packaged Potable Water Treatment Plant			Iron Mines Corporation		
Item	Rev	Title	Notes UOM		Project Design Data	Supplier Data	Operation Data	
H21		Reactor Type		text	Open Channel or Closed Channel			
H22		UV Dosage		(mW·s)/cm2	Vendor to specify			
H23		UV Housing Material of Construction		text	Vendor to specify			
CHEMIC	CAL CO	NSUMPTION						
l1		Chlorine (as Sodium Hypochlorite)		kg/d	Vendor to specify			
12		Coagulant (Alum, Ferric Chloride, etc.)		kg/d	Vendor to specify			
				-	<u> </u>			
13		Fresh Water (washing)		m3/d	Vendor to specify			
14		Other		kg/d	Vendor to specify			
	OLS AN	ID AUTOMATION						
J1		Local Operating Panel		44	V			
J2		Type (PLC) Components (e.g. pushbuttons,		text	Vendor to specify			
J3		switches)		text	Vendor to specify			
J4		Enclosure (NEMA 12)		text	Vendor to specify			
J5		Actuated Valves (indicate whether pneumatic or electric)		text	Vendor to specify			
J6	t	Instruments Make/Model		text	Vendor to specify			
J7					• •			
J8								
J9								
J10						Vendor to specify		
						render to speeny		
	Y CONS	UMPTION						
K1		List All Components		kWh/d	Vendor to specify			
K2 K3				+				
K4								
K5								
K6								
K7								
K8 K9								
K10								
K11								
K12		Total Energy Consumption		kWh/d	Vendor to specify			
K13				kWh/m³	Vendor to specify			
LECTR	ICAL RI	L EQUIREMENTS						
L1		List All Components		(V/Hz/Phase)	Vendor to specify			
L2 L3								
L3								
L5								
L6								
L7	-							
L8 L9	-							
L10								
AID DEC	Al liber	IENTS						
AIR REC	OIKEN	Instrument Air		Nm3/hr, kPag	Vendor to specify			
M2		Plant Air		Nm3/hr, kPag	Vendor to specify			
OUND N1	, <u> </u>	Equipment Sound Level		dBA	Vendor to specify			
NOTES 1								
2								
3 4	-							
Revi	sion	Issue Status	Prepar	ed By / Date	Checked By / Date	Approved By / Date	Client Approval / Date	
		Annual (F :	D V	dia 0/22/2011	A 71-4:- 0/00/0044	L Cl-1 1 0/00/0044		
A	١	Approved for Enquiry	к. Кара	dia 9/23/2011	A. Zlatic 9/23/2011	J. Cleland 9/23/2011		

DOC. NO. H337697-CA702-D460753



EQUIPMENT DATA SHEET



Packaged Sewage Treatment Plant Item | Rev **Title Notes UOM Project Design Data Supplier Data Operation Data** DENTIFICATION Equipment Type Packaged Sewage Treatment Plant text **A2** Type of Plant Vendor to Specify text Equipment Number **A3** text N/A Serial Number N/A **A4** text REFERENCE DOCUMENTS Standard text **B2** Specification text Arrangement/Detail Drawing **B**3 N/A text P&ID N/A **B4** text **B5** PFD text N/A GENERAL Vendor to specify **C1** Bidder company name text Vendor to specify **C2** Technical quotation number text Manufacturer name Vendor to specify $\mathbf{C3}$ text Vendor to specify C4 Model text **C5** Overall dimensions (footprint) Vendor to specify mm Shipping Weight **C6** kg Vendor to specify **C7** Operating Weight kg Vendor to specify **C8** Lift - heaviest at install kg Vendor to specify Lift - heaviest at maintenance **C9** kg Vendor to specify C10 Turndown Capacity % Vendor to specify PROCESS PARAMETERS **Design Flow** D1 **D2** Vendor to specify Average m^3/h D3Peak Vendor to specify m³/h D4 **Influent Quality D**5 BOD₅ mg/L See Spec **D6 TSS** mg/L See Spec. **D7** NH3-N mg/L See Spec **D8** TP mg/L See Spec. **D9** Effluent Quality D10 BOD₅ mg/L See Spec. D11 **TSS** mg/L See Spec **D12** Faecal Coliform CFU/100 ml See Spec Oil and Grease D13 mg/L See Spec D14 рΗ See Spec D15 **Toxicity** See Spec. **D16** NH3-N mg/L See Spec **D17** mg/L See Spec. **EQUALIZATION / PRIMARY TREATMENT E1** Equalization Chamber Type of Construction Vendor to specify **E2** text Tank Length **E**3 Vendor to specify **E4** Tank Width Vendor to specify mm Tank Depth **E**5 Vendor to specify mm Minimum Useable Volume **E6** m^3 Vendor to specify Vessel Material of Construction **E7** Vendor to specify text Surface Finish, lining, thickness Vendor to specify **E8** text (external and internal) **E9** Screen E10 Screen Type Vendor to specify text E11 Screen Opening mm Vendor to specify E12 **Aeration / Mixing** E13 Type (Coarse Bubble) text Vendor to specify E14 Air Flowrate Nm³/h Vendor to specify Pressure E15 bar Vendor to specify E16 Motor Size kW Vendor to specify E17 Transfer Pumps E18 Type of Pump (Submersible - Grinder) text Vendor to specify E19 Manufacturer text Vendor to specify Materials of Construction **E20** text Vendor to specify (wetted parts) E21 Flowrate - Operating m³/h Vendor to specify

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		IAICH	Packaged Sewage Treatment Plant			Iron Mines Corporation		
Item	Rev	Title	Notes	UOM	Project Design Data	Supplier Data	Operation Data	
E22		Pressure - Operating		kPag	Vendor to specify			
E23		Dead head Pressure		kPag	Vendor to specify			
E24		Motor Size		kW	Vendor to specify			
E25		Motor Enclosure (Explosion Proof - Class 1 Div 1)		text	Vendor to specify			
E26		Motor Temperature Code		text	Vendor to specify			
E27		Power Supply (voltage/phase/frequency)		text	Vendor to specify			
SECONI	DARY T	REATMENT						
F1		Primary Sedimentation						
F2		Type of Construction		text	Rectangular / Circular			
F3		Side Water Depth		m	Vendor to specify			
F4		Surface Overflow Rate for tank not receiving waste activated sludge		m3/(m2-d)	Vendor to specify			
F5		Surface Overflow Rate for tank receiving waste activated sludge		m3/(m2-d)	Vendor to specify			
F6		Inlet channel velocity		m/s	Vendor to specify			
F7		Weir Loading Rate		m3/(m-d)	Vendor to specify Vendor to specify			
F8		Trough velocity		m/s	Vendor to specify			
F9		Vertical to Horizontal slope of any submerged surface		V:H	Vendor to specify			
F10		Freeboard		mm	Vendor to specify			
F11		Vertical to Horizontal slope of sludge hopper		V:H	Vendor to specify			
F12		Sludge removal line velocity		m/s	Vendor to specify			
F13		Vessel Material of Construction		text	Vendor to specify			
F14		Surface Finish, lining, thickness		text	Vendor to specify			
F15		(external and internal) (OPTIONAL) Membrane Bioreactor						
					Submersed Membrane / External			
F16		Configuration			Membrane			
F17		Filtrate Flux		L/m2-hr	Vendor to specify			
F18		Type of Membrane		text	Vendor to specify			
F19		Total Number of Elements		Number	Vendor to specify			
F20		Element Dimensions		mm	Vendor to specify			
F21 F22		Membrane Virus Removal Membrane Bacteria Removal		% %	Vendor to specify Vendor to specify			
F23		Membrane TOC Reduction		/o %	Vendor to specify Vendor to specify			
F24		Membrane Polymer		text	Vendor to specify Vendor to specify			
F25		Nominal Molecular Weight Cut-off		Daltons	Vendor to specify			
F26		Cleaning Frequency / Duration		time	Vendor to specify			
F27		Disinfection Chemicals Used		text	Vendor to specify			
F28		Cleaning Chemicals Used		test	Vendor to specify			
F29		% O ₂ Transfer		%	Vendor to specify			
F30		$kg O_2$ required / $kg BOD$ reduced		kg O ₂ /kg BOD	Vendor to specify			
F31		Design F/M Ratio		d^{-1}	Vendor to specify			
F32		Operating MLVSS		mg/L	Vendor to specify			
F33		Hydraulic Retention Time (HRT)		h	Vendor to specify			
F34		Circulation Pump						
F35		Type of Pump		text	Vendor to specify			
F36 F37		Manufacturer Materials of Construction		text text	Vendor to specify Vendor to specify			
F38		(wetted parts) Flowrate - Operating		m ³ /h	Vendor to specify			
F39		Pressure - Operating		m°/h kPag	Vendor to specify Vendor to specify			
F40		Dead head Pressure		kPag	Vendor to specify			
F41		Motor Size		kW	Vendor to specify			
F42		NEMA Motor Enclosure Designation		text	Vendor to specify			
F43		Motor Temperature Code		text	Vendor to specify			
F44		Power Supply (voltage/phase/frequency)		text	Vendor to specify			
F45		Rotating Biological Contactor (IF APPLICABLE)						
F46		Total Media Surface Area		m2	Vendor to specify			
F47		Number of Stages / Banks		Number	Vendor to specify			

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			Packaged Sewage Treatment Plant			Iron Mines Corporation		
Item	Rev	Title	Notes	UOM	Project Design Data	Supplier Data	Operation Data	
F48		Unit Area in Each Stage Stage 1 Stage 2		m2	Vendor to specify			
F49		Rotational Speed		rpm	Vendor to specify			
F50		Sewage Flow: Parallel or		test	Vendor to specify			
F51		Perpendicular to Media Shaft Media Loading Rate		L/(m2-d)	Vendor to specify			
F52		RBC Tank Retention Time		min	Vendor to specify			
F53		Organic Loading to 1st Stage		kg BOD ₅ / (m2-d)	Vendor to specify			
F54		Operating MLVSS		mg/L	Vendor to specify			
F55		Total Media Submergence during normal operation		%	Vendor to specify			
F56		Aerobic Bioreactor						
F57		Type of Construction		text	Vendor to specify			
F58 F59		Tank Length Tank Width		mm	Vendor to specify Vendor to specify			
F60		Tank vylotn Tank Depth		mm	Vendor to specify Vendor to specify			
F61		Useable Volume		mm m ³	Vendor to specify Vendor to specify			
F62		Hydraulic Retention Time (HRT)		h	Vendor to specify Vendor to specify			
F63		Operating MLVSS		mg/L	Vendor to specify Vendor to specify			
F64		F/M Ratio		kgBOD/kgMLVSS.d	Vendor to specify			
F65		Rake		text	Vendor to specify			
F66		Vessel Material of Construction		text	Vendor to specify			
F67		Surface Finish, lining, thickness (external and internal)		text	Vendor to specify			
F68		Aeration						
F69		Type (Fine Bubble)		text	Vendor to specify			
F70		Air Flowrate		Nm³/h	Vendor to specify			
F71		Pressure		bar	Vendor to specify			
F72		Motor Size		kW	Vendor to specify			
F73		% O ₂ Transfer		%	Vendor to specify			
F74		kg O ₂ required / kg BOD reduced		kg O ₂ /kg BOD	Vendor to specify			
F75		Liquid/Solid Separation (Final Settling)			D () (C')			
F76 F77		Type of Construction Side Water Depth		text m	Rectangular / Circular Vendor to specify			
F78		Vertical to Horizontal slope of any submerged surface		V:H	Vendor to specify			
F79		Freeboard		mm	Vendor to specify			
F80		Inlet channel velocity		m/s	Vendor to specify			
F81		Diameter (IPT)		m	Vendor to specify			
F82		Hydraulic Retention Time (HRT)		h	Vendor to specify			
F83 F84		Overflow Rate Weir Loading Rate		$m^3/d/m^2$ $m^3/(m-d)$	Vendor to specify Vendor to specify			
F85		Vertical to Horizontal slope of sludge		V:H	Vendor to specify			
		hopper			· , ,			
F86 F87		Sludge removal line velocity Vessel Material of Construction		m/s text	Vendor to specify Vendor to specify			
F88		Surface Finish, lining, thickness (external and internal)		text	Vendor to specify			
F89		Media Filter						
F90		Type of Media		text	Vendor to specify			
F91		Media Depth (coarse and fine media)		text	Vendor to specify			
F92		Freeboard		%	Vendor to specify			
F93		Backwash Flowrate		m/h	Vendor to specify			
F94		Service Flowrate		m/h	Vendor to specify			
F95		Backwash Duration		min	Vendor to specify			
F96 F97		Inlet Distributor Type Bottom Lateral Type		text text	Vendor to specify Vendor to specify		+	
F98		Vessel Material of Construction		text	Vendor to specify Vendor to specify			
F99		Surface Finish, lining, thickness		text	Vendor to specify			
F100		(external and internal) Maximum Operating Pressure		kPag	Vendor to specify			
	I	maximum Operating Fressure	I	Krdg	vendor to specify		Ī	

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			Packaged Sewage Treatment Plant			Iron Mines Corporation	
Item	Rev	Title	Notes	UOM	Project Design Data	Supplier Data	Operation Data
F102		Relief Valve Included (yes/no) and		yes/no	Vendor to specify		
		type (thermal, full flow PRV)		,	. ,		+
F103 F104		Average Waste Flowrate Peak Waste Flowrate		m3/hr m3/hr	Vendor to specify Vendor to specify		
		Waste Suspended Solids					
F105		Concentration		mg/L	Vendor to specify		
F106		Provision for air scour included		yes/no	Vendor to specify		
F107		Air Scour Flowrate		m/h	Vendor to specify		
F108		Backwash Pump			V 1		
F109 F110		Type of Pump Manufacturer		text text	Vendor to specify Vendor to specify		
F111		Materials of Construction (wetted parts)		text	Vendor to specify		
F112		Flowrate - Operating		m³/h	Vendor to specify		
F113		Pressure - Operating		kPag	Vendor to specify		+
F114		Dead head Pressure		kPag	Vendor to specify		
F115		Motor Size		kW	Vendor to specify		
F116		NEMA Motor Enclosure Designation		text	Vendor to specify		
F117		Motor Temperature Code		text	Vendor to specify		
F118		Power Supply (voltage/phase/frequency)		text	Vendor to specify		
F119		Sludge Generation		1/-1 -1 1:-1-	V 1		
F120 F121		Waste Sludge Production (dry) Sludge % Solids Content		kg/d dry solids %	Vendor to specify Vendor to specify		+
		Waste Sludge Production (at specified			•		-
F122		%)		m³/d	Vendor to specify		
F123		RAS Pump					
F124		Type of Pump		text	Vendor to specify		
F125		Manufacturer		text	Vendor to specify		_
F126		Materials of Construction (wetted parts)		text	Vendor to specify		
F127		Flowrate - Operating		m³/h	Vendor to specify		
F128 F129		Pressure - Operating Dead head Pressure		kPag kPag	Vendor to specify Vendor to specify		
F130		Motor Size		kW	Vendor to specify Vendor to specify		+
F131		NEMA Motor Enclosure Designation		text	Vendor to specify		
F132		Motor Temperature Code		text	Vendor to specify		
F133		Power Supply (voltage/phase/frequency)		text	Vendor to specify		
DISINFECT G1	TION						
G2		Chlorination (if applicable) Type		text	Vendor to specify		+
G3		Tank Length		mm	Vendor to specify Vendor to specify		
G4		Tank Width		mm	Vendor to specify		
G5		Tank Depth		mm	Vendor to specify		
G6		Useable Volume		m ³	Vendor to specify		
G7		Manufacturer name Model		text	Vendor to specify		+
G8 G9		Design Parameters		text text	Vendor to specify Vendor to specify		+
G10		Sodium Hypochlorite Dosage		mg/L	Vendor to specify Vendor to specify		†
G11		Contact Time		min	Vendor to specify		<u> </u>
G12		Sodium Bisulfite Dosage		mg/L	Vendor to specify		
G13		Ultraviolet Irradiation (if applicable)			Low processed/low inter- 1		+
G14		Type of Lamp		text	Low pressure/low intensity; Low pressure/high intensity; Medium		
G15		Germicidal UV Output per Lamp		W	pressure/high intensity Vendor to specify		+
G16		Effective Lamp Life		Hrs	Vendor to specify		
G17		Automatic Cleaning Mechanism		Included (yes/no)	Vendor to specify		
G18		Type of Ballast (electromagnetic, electronic)		text	Vendor to specify		
G19		Ballast Cooling Mechanism		text	Vendor to specify		
G20		Reactor Type		text	Open Channel or Closed Channel		
G21		UV Dosage		(mW·s)/cm2	Vendor to specify		

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	MAIGH		Packaged Sewage Treatment Plant			Iron Mines Corporation		
Item	Rev	Title	Notes	UOM	Project Design Data	Supplier Data	Operation Data	
G22		UV Housing Material of Construction		text	Vendor to specify			
	E HAND	DLING & DIGESTION						
H1		(OPTIONAL) Aerobic Digestion						
H2		Type		text	Vendor to specify			
H3		Total Volume		m ³	Vendor to specify			
H4 H5		Number of Stages Side Water Depth		Number	Vendor to specify Vendor to specify			
H6		Freeboard		m mm	Vendor to specify			
H7		Solids Retention Time (SRT)		d	Vendor to specify			
H8		Air Supply		L/(m3·s)	Vendor to specify			
Н9		Air Flowrate		Nm³/h	Vendor to specify			
H10		Pressure		bar	Vendor to specify			
H11		Motor Size		kW	Vendor to specify			
H12		Volatile Suspended Solids (VSS) Reduction		%	Vendor to specify			
H13		Waste Sludge Production (dry)		kg/d dry solids	Vendor to specify			
H14		Stabilized Sludge % Solids Content		%	Vendor to specify			
H15		Sludge Thickening						
H16		Type (Centrifugation, sludge drying bed, filter press)		text	Vendor to specify			
H17		Conditioning Chemical Type (if applicable)		text	Vendor to specify			
H18		Conditioning Chemical Dosage		mg/L	Vendor to specify			
H19		Average Energy Requirement		kWh/dry tonne	Vendor to specify			
CHEMIC	CAL CO	NSUMPTION						
l1		Chlorine (as Sodium Hypochlorite)		kg/d	Vendor to specify			
12		Other		kg/d	Vendor to specify			
13		Fresh Water (washing)		m3/d	Vendor to specify			
CONTR	OLS AN	ID AUTOMATION						
J1		Local Operating Panel			Vendor to specify			
J2		Type (PLC)		text	Vendor to specify			
J3		Components (e.g. pushbuttons, switches)		text	Vendor to specify			
J4		Enclosure (NEMA 12)		text	Vendor to specify			
J5		Actuated Valves (indicate whether pneumatic or electric)		text	Vendor to specify			
J6		Instruments Make/Model		text	Vendor to specify			
J7								
J8								
J9 J10								
)10								
	CONS	UMPTION						
K1		List All Components		kWh/d	Vendor to specify			
K2 K3				 				
K3 K4				 				
K5				 				
K6								
K7								
K8								
K9								
K10								
K11 K12		Total Energy Consumption		kWh/d	Vendor to specify			
K12		Total Energy Consumption		kWh/m ³	Vendor to specify Vendor to specify			
K13				KVVN/M	v епиот to specify			
ELECTRI	CAL RE	QUIREMENTS						
L1		List All Components		(V/Hz/Phase)	Vendor to specify			
L2								
L3				 				
L4								

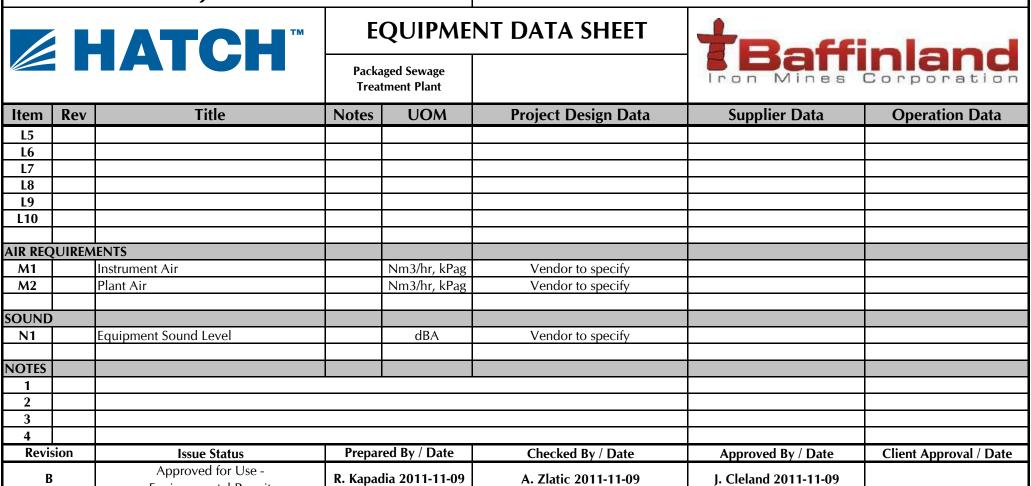
Environmental Permit

Approved for Enquiry

Α

DOC. NO. H337697-CA702-D460753

J. Cleland 2011-09-23



A. Zlatic 2011-09-23

R. Kapadia 2011-09-23

DOC. NO. H337697-CA702-D118219



	HATCH [™]	EQUIPM	MENT DATA SHEET	#Boffinland			
	IIAIOII	Pac	kaged Incinerator	Baffinland Iron Mines Corporation			
Item	Item	UOM	Notes	Supplier Data	Operation Data		
A.1	Warranty Quality Management - ISO 9001:2008	Years	Vendor Specified Vendor Specified				
A.2	Certified	Yes/No	IDENTIFICATIO	N.			
B.1	Equipment Name	-	Vendor Specified				
B.2	Type of Equipment	-	Vendor Specified				
B.3	Equipment Number	-	Vendor Specified CAPACITY and DESIGN SPE	 			
C.1	Total Capacity	tonnes/day	Vendor Specified				
C.2 C.3	Incinerator Type Camber Configuration	-	Batch Dual Chamber				
C.4	Secondary Chamber Temperature	°C	1000				
C.5	Secondary Chamber Residual Time	sec	2				
C.6 C.7	Skin Temperature Fuel Type	°C -	82 Diesel				
C.8	Incinerator bear CSA label	Yes/No	Not Specified				
C.9	Continuous Emission Monitoring System	Yes/No	Vendor Specified FREIGHT INFORMA	TION			
D.1	Primary Chamber Shipment Size	mm (L x W x H)	Vendor Specified				
D.2	Primary Chamber Shipment Weight	kg	Vendor Specified				
D.3 D.4	Secondary Chamber Shipment Size Secondary Chamber Shipment Weight	mm (L x W x H) kg	Vendor Specified Vendor Specified				
D.5	Additional Accessories Shipment Size	mm (L x W x H)	Vendor Specified				
D.6	Additional Accessories Shipment Weight	kg mm (L x W x H)	Vendor Specified				
D.7 D.8	Buidling Shipment Size Buidling Shipment Weight	mm (L x W x H)	Vendor Specified Vendor Specified				
D.9	Weigth of Heaviest Lift	kg	Vendor Specified				
D.10 D.11	Total weight of complete incinerator unit Total shipping volume per incinerator unit	kg m³	Vendor Specified Vendor Specified				
D.11	Total shipping volume per incinerator unit	111	SITE CONDITION	I NS			
E.1	Operable in General Site Conditions S003120	-	See General Site Conditions S003120				
			DESIGN AND OPERATING I	PARAMETERS			
F.1	Est. Waste Bulk Density in Bid Heating Value (as Fired)	kg/m³ MJ/kg	Assume 160-240m ³ Vendor Specified				
F.2 F.3	Primary Chamber Burn Rate	kg/h	Vendor Specified				
F.4	Batch Capacity	m ³	Vendor Specified				
F.5 F.6	No. of Batches/cycle Total Air Exchanges	- %	Vendor Specified Vendor Specified				
F. <i>7</i>	Primary Chamber Specific Heat Release	MJ/h/m ³	Vendor Specified				
F.8	Refactory Thickness Insulation Thickness	mm	Vendor Specified				
F.9 F.10	Outershell Thickness	mm mm	Vendor Specified Vendor Specified				
F.11	Refactory Anchor Material	Stainless Steel	Stainless Steel				
F.12	Off Time per Cycle Fuel Mixing Ratio with Waste Oil (if	hr	Vendor Specified				
F.13	applicable)	-	Vendor Specified				
F.14	Capability to burn waste oil with loading rate	l/hr	Vendor Specified				
F.15	Burner Efficiency Destruction Efficiency	%	Vendor Specified				
F.16 F.1 <i>7</i>	Stack Material Construction	-	Vendor Specified Galvanized				
F.18	Spark Arrester Open Area	m ²	Vendor Specified				
F.19 F.20	Spark Arrester Finish Burner System Type/Manufacturer	-	Galvanized Vendor Specified				
F.21	Valve Train	-	Vendor Specified				
F.22	Charging System	NI=4 D == 1	Vendor Specified				
F.23 F.24	Chargin Chute Size Top Loading	Not Required -	Not Required Vendor Specified				
F.25	Building Enclosure Type and Description	-	Vendor Specified				
			MATERIALS OF CONSTR	UCTION			
C 1	External Casing		Carbon steel plate and adequately reinforced with structural steel members.				
G.1 G.2	Spark Arrester	-	Vendor Specified				
G.3	Insulation in Primary Chamber (materials and thickness)	-	Vendor Specified				
	Insulation in Secondary Chamber (materials	-	Vendor Specified				
G.4	and thickness)	-	•				
G.5	Insulation in Stack (materials and thickness)	-	Vendor Specified				
G.6 G.7	Charging Chute Paint System Used	-	Not Required Heat resistant				
G.8	Dry Film Thickness of Paint	mm	Vendor Specified				
G.9 G.10	Primary Chamber Burner Rating Secondary Chamber Burner Rating	Gj/hr Gj/hr	Vendor Specified Vendor Specified				
U.10	occondary Chamber burner Rating		BLOWERS				
H.1	Blower Manufacturer	3 ,,	Vendor Specified				
H.2 H.3	Primary Chamber Blower Capacity Primary Blower Pressure	m³/hr kPag	Vendor Specified Vendor Specified				
H.4	Primary Chamber Blower HP/RPM	RPM	Vendor Specified				

				Г	1
H.5	Secondary Chamber Blow Capacity (m3/hr)	m³/hr	Vendor Specified		
	Secondary Blower Pressure (kPag)	kPag	Vendor Specified		
	Secondary Chamber Blower HP/ RPM	-	Vendor Specified Vendor Specified		
11.7	Secondary Chamber Blower Filly Refin		FOOTPRINTS AND WE	I	
	Primary Chamber Outside Dimensions (H x				
l.1	W x L)	m	Vendor Specified		
1.2	Primary Chamber Approx. Weight	kg	Vendor Specified		
	Secondary Chamber Outside Dimensions (H x		Vendor Specified		
	W x L)	m			
1.4	Secondary Chamber Approx. Weight	tonne	Vendor Specified		
1.5	Operating Weight (with avg building)	tonne	Vendor Specified		
	0 1	L / L / L	POWER AND FUEL REQUI	IREMENTS	
	Power Capacity	volts/cycle/phase	Vendor Specified		
J.2	Turndown Capacity	%	Vendor Specified		
	Diesel	L/h	Vendor Specified		
J.4	Fuel Tank Size	Litre	5 Days		
J.5	Waste Oil Tank Size	Litre	Vendor Specified		
1/ 1	Compustion Air (Tatal)	3/	SYSTEM PERFORMA	NUL TO THE PROPERTY OF THE PRO	
K.1	Combustion Air (Total)	sm³/min	Vendor Specified		
K.2	Air Emissions Exit	-	Secondary Chamber Outlet		
K.3	Primary Chamber Temperature	°C	Vendor Specified		
	Secondary Chamber Temperature		Vendor Specified		
	Secondary Chamber Residual Time	sec	Vendor Specified		
	Skin Temperature	°C	Vendor Specified		
K.7	Stack Inside Diameter	m	Vendor Specified		
	Stack Flow Rate	m³/min	Vendor Specified		
K.9	Velocity	m/s	Vendor Specified		
	Flue Gas Temperature (max)	°C	Vendor Specified		
	Flue Gas Flow Rate	sm³/min	Vendor Specified		
K.12	CO ₂ (dry basis)	% volume	Vendor Specified		
	O ₂ (dry basis)	% volume	Vendor Specified		
	Moisture (wet basis)	% volume	Vendor Specified		
K.15	Ash Generation	kg/d	Vendor Specified	INCINIEDATOR CHIRELINIES (2007)	
1.1	Particulate Matter (PM)		DRY COMPLIANCE (IFC WASTE FACILITY 70	INCINERATOR GUIDELINES, 2007)	
	Opacity	mg/dsm ³ %	10		
			20		
L.4	Sulphur Dioxide(SO ₂) Nitrogen Oxides (NOx)	ppmv	388		
	Hydrochloric Acid (HCl)	ppmv	62		
	Dioxin/Furan Level	ppmv ng TEQ/dsm³	0.41		
	Carbon Monoxide (CO)		157		
L.7 L.8	Carbon Monoxide (CO) Cadmium (Cd)	ppmv μg/dscm³	4		
L.6	Lead (Pb)	μg/ascm μg/dscm ³	40		
	Mercury (Hg)	μg/dscm μg/dsm³	470		
L. 10	inercury (rig/	дв/изп	PROCESS DESCRIPTION	ION	
M.1	Written Description of Process (500 words		PROCESS DESCRIPTI		
741.1	max.)				
		-	-		
Date	Rev	Status	Prepared by	Checked by	Approved by
			• •	•	
11/9/2011	В	Approved for Use Environmental Permit	A.Grzegorczyk	R. Kapadia	J.Cleland
9/26/2011	A	Approved for Enquiry	A.Grzegorczyk	R. Kapadia R. Kapadia	J.Cleland
J120/2011	Λ	Approved for Enquiry	A.OIZEGUICZYK	n. Kapaula	J.Cielanu