BACK RIVER PROJECT
Landfill and Waste Management Plan

October 2017

BACK RIVER PROJECT
LANDFILL AND WASTE MANAGEMENT PLAN

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Revision Log

Version	Date	Section	Page	Revision
1	October 2017	All	All	Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval

Acronyms

CCME	Canadian Council of Ministers of the Environment
GN	Government of Nunavut
HMMP	Hazardous Materials Management Plan
IMP	Incineration Management Plan
LWMP or Plan	Landfill and Waste Management Plan
MAD	Main Application Document
MLA	Marine Laydown Area
NWB	Nunavut Water Board
Project	Back River Project
Sabina	Sabina Gold & Silver Corp.
SOP	Standard Operating Procedures
STP	Sewage Treatment Plant
WIR	Winter Ice Road
WRSA	Waste Rock Storage Area
TSF	Tailings Storage Facility

1. Introduction

The Back River Project (the Project) is a proposed gold project owned by Sabina Gold & Silver Corp. (Sabina) within the West Kitikmeot region of southwestern Nunavut. It is situated approximately 400 kilometres (km) southwest of Cambridge Bay, 95 km southeast of the southern end of Bathurst Inlet, and 520 km northeast of Yellowknife, Northwest Territories. The Project is located predominantly within the Queen Maud Gulf Watershed (Nunavut Water Regulations, Schedule 4).

The Project is comprised of two main areas with interconnecting winter ice roads (WIR) (Main Application Document [MAD] Appendix A, base Figure 2): Goose Property (MAD Appendix A, base Figure 3) and the Marine Laydown Area (MLA) (MAD Appendix A, base Figure 4) situated along the western shore of southern Bathurst Inlet. The majority of annual resupply will be completed using the MLA, and an approximately 160 km long WIR will interconnect these sites. Refer to the MAD Appendix A, base Figures 1 to 5 for general site layout and locations. A detailed project description is provided in the MAD.

This Landfill and Waste Management Plan (LWMP or Plan) outlines the approach plan for managing waste materials at the Project including sewage effluent treatment and sludge disposal. The LWMP and other management plans are intended to support the Type A Water Licence Application for the Project.

The Plan was prepared following the requirements of the Supplementary Information Guidelines (SIG) for Mining and Milling MM3 and Water Works M1, issued by Nunavut Water Board (NWB 2010 a, b) and the Environmental Impact Statement Guidelines issued by the Nunavut Impact Review Board to Sabina (NIRB 2013) and in accordance with best management practices and in conformance with current Federal and Territorial statutory requirements (see Applicable legislation and Guidelines Section 3).

This plan is a living document to be updated upon changes in related regulatory requirements, management reviews, incident investigations, changes to facility operation or maintenance, and environmental monitoring results, best practice updates or other Project specific protocols once construction starts through to Project closure activities. Any updates will be filed with the Annual Report submitted under the Type A Water Licence.

The information presented herein is current as of September 2017. An update will be initiated prior to the start of construction. The Plan will be reviewed as needed for changes in operation and technology and as directed by the Nunavut Water Board (NWB) in the Type A Water Licence or other regulatory authorization where appropriate. Completion of the updated Plan will be documented through signatures of the personnel responsible for reviewing, updating, and approving the Plan.

A record will document all significant changes that have been incorporated in the Plan subsequent to the latest review. The record will include the names of the persons who made and approved the change, as well as the date of the approval.

Sabina will maintain a distribution list providing contact details for all parties to receive the Plan including key personnel, contractors, organizations, and external agencies.

2. Scope and Objectives

The Landfill and Waste Management Plan is one of the documents that forms part of Sabina's overall Waste Management Program for the Project. This plan has been written to meet requirements of a Type A Water Licence and applies to all Sabina projects in the Kitikmeot region.

This plan is divided into the following components:

- Applicable Legislation and Guidelines (Section 3);
- Planning and Implementation (Section 4);
- Roles and Responsibilities (Section 5);
- Waste Management Infrastructure (Section 6);
- Waste Management (Section 7);
- Environmental Protection Measures and Monitoring Program (Section 8);
- Environmental Reporting (Section 9);
- Adaptive Management (Section 10); and
- Reclamation (Section 11).

The LWMP provides information on waste material management including the development of systems and procedures for waste minimization, the proper handling and disposal of wastes, and to comply with all applicable legislation, regulations, authorizations, permits, and licenses for the duration of the Project. The overall objective of Sabina's LWMP is to minimize potential effects from the Project on the environment from its waste management activities. Sabina intends to use, generate, and dispose of waste materials as part of the development, Operations, and Closure phases of the Project.

Objectives of the Plan will be achieved by using proven strategies and applying the best fit technological developments to ensure that materials are used efficiently when brought to the Project sites and then disposed of in an environmentally acceptable manner. The scope of the LWMP includes non-hazardous waste, recyclables, and treated sewage, at the MLA and Goose Property. Separate waste management strategies will be prepared for the various mineral wastes (waste rock and tailings) as well as any hazardous waste products which may be produced through different components of the Project.

2.1 RELATED DOCUMENTS

Documents within the Application for the Type A Water Licence, which support this plan include the following:

- Risk Management and Emergency Response Plan (Supporting Document [SD]-15);
- Environmental Management and Protection Plan (SD-20);
- Incineration Management Plan (SD-11);
- Hazardous Materials Management Plan (SD-13);
- Landfarm Management Plan (SD-12);
- Tailings Management Plan (SD-09);

- Mine Waste Rock Management Plan (SD-08);
- Fuel Management Plan (SD-16); and
- Water Management Plan (SD-05).

3. Applicable Legislation and Guidelines

Specific legislation, regulations and guidelines related to waste management in Canada, and specifically within Nunavut, are summarized in Table 3-1. Waste management in Nunavut is regulated under:

- *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (2002);
- Nunavut's *Public Health Act* (1988);
- *Nunavut Environmental Protection Act* (1988);
- *Canadian Environmental Protection Act* (1999); and
- *Federal Transportation of Dangerous Goods Act*, 1992 (TDG 1992).

Sabina will also be bound by the terms and conditions of its land use permits to be issued by Indigenous and Northern Affairs Canada for Crown Lands and the Kitikmeot Inuit Association for Inuit Owned Land, and its Type A Water Licence to be issued by the NWB.

In addition to the mandatory requirements, a number of waste management guidelines have been considered in the preparation of this plan, and/or will be considered in the design and operations of Project waste management facilities:

- The Mackenzie Valley Land and Water Board's (2011) guidelines for developing a waste management plan.
- Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories (Ferguson Simek Clark 2003).
- Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories (Government of the Northwest Territories Department of Municipal and Community Affairs 1996).
- Mine closure guidelines developed by the Department of Indigenous and Northern Affairs Canada (AANDC 2013) were followed regarding specific landfill design and mitigation for potential impacts pertaining to waste.
- *Environment Canada's Technical Document for Batch Waste Incineration* (EC 2010)

Table 3-1. Applicable Legislation to Waste Management in Nunavut

Acts	Regulations	Guidelines
Federal		
Canadian Environmental Protection Act (CEPA; 1999)	Schedule 1: List of Toxic Substances Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2002-301)	Environment and Climate Change Canada Technical Document for Batch Waste Incineration (EC 2010) Canada-Wide Standards for Petroleum Hydrocarbons in Soil (CCME 2001).
Transportation of Dangerous Goods Act, 1992 (1992) and Regulations	Regulations Amending the Transportation of Dangerous Goods Regulation (SOR/2012-245)	
Nunavut Waters and Nunavut Surface Rights Tribunal Act (2002)	Nunavut Water Regulations (2013)	
Territorial Lands Act (1985)	Territorial Land Use Regulations (CRC, c.1524) Northwest Territories and Nunavut Mining Regulations (CRC, c.1516)	Implications of Global Warming and the Precautionary Principle in Northern Mine Design and Closure (BGC 2003)
Hazardous Products Act (1985)	Controlled Products Regulations	Workplace Hazardous Materials Information System
Territorial – Nunavut		
Nunavut *Environmental Protection Act* (1988)	Spill Contingency Planning and Reporting Regulations (NWT Reg (Nu) 068-93) Used Oil and Waste Fuel Management Regulations (NWT Reg 064-2003) The removal of hazardous materials will require the registration with the Government of Nunavut, Department of Environment as a waste generator as well as carrier (if applicable) prior to transport	Government of Nunavut (GN) Environmental Guidelines for the Management of: o General Management of Hazardous Waste in Nunavut (GN 2010a) o Waste Paint (GN 2010b) o Mercury-Containing Products and Waste Mercury (GN 2010c) o Industrial Waste Discharges into Municipal Solid Waste and Sewage Disposal Facilities (GN 2011a) o Waste Batteries (GN 2011b) o Waste Solvent (GN 2011c) o Waste Antifreeze (GN 2011d) o Used Oil and Waste Fuel (GN 2012) o Biomedical and Pharmaceutical Waste (GN 2014) Canada-Wide Standards for Petroleum Hydrocarbons In Soil (CCME 2008)
Public Health Act (RSNWT (Nu) 1988, c.P12)	Camp Sanitation Regulations (RRNWT (Nu) 1990, c.P-12)	
Mine Health and Safety Act (SNWT (Nu) 1994, c.25)	Mine Health and Safety Regulations (NWT Reg (Nu) 125-95)	
Fire Prevention Act (RSNWT (Nu) 1988, c.F-6)	Fire Prevention Regulations (RRNWT (Nu) 1990, c.F-12)	

4. Planning and Implementation

The LWMP considers existing (baseline) conditions, assessed potential impacts of the Project, developed conceptual mitigation strategies, and developed specific mitigation measures to execute these strategies. Conceptual strategies and plans will continue to be elaborated and executed throughout the Construction, Operations, and Closure phases of the Project.

Monitoring will be the principal mechanism used to provide feedback to continually gauge the effectiveness of environmental performance. Operational control is facilitated through the contractor job-specific standard operating procedures (SOPs) work instructions, on-the-job instruction, tailgate meetings where required, contract requirements, and service agreements. The effectiveness of physical operational control will be reviewed according to preventative maintenance and review procedures and schedules.

Responsible waste management begins by keeping all waste materials that can be economically recycled out of the waste stream destined for landfill or incineration. Sabina is committed to undertaking waste collection, storage, transport and disposal in a safe, efficient and environmentally compliant manner, by actively encouraging and implementing the four 'R's of waste management: waste Reduction, Reuse, Recycling, and Recovery, as illustrated in Image 4-1.

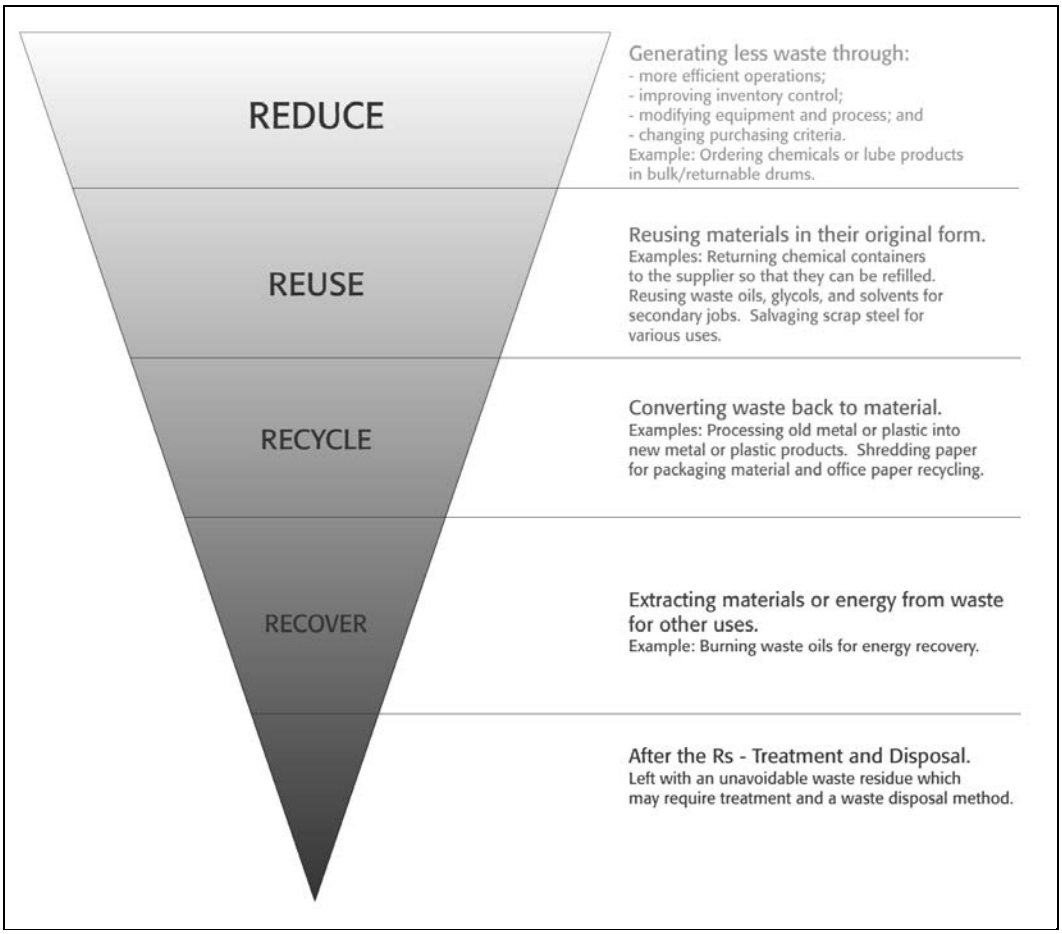


Image 4-1. Basic Principles of Waste Management

The basic principles of waste management hierarchy presented in Image 4-1 are consistent with the waste management hierarchy adopted (from the MVLWB 2011). These basic principles of the waste management hierarchy will be executed throughout the Construction, Operations, Closure, and Post-Closure phases of mining.

Sabina embraces source reduction as a key means of minimizing the quantities of wastes to be generated. Reducing the amount of waste produced is an environmentally responsible business principle. Team Leaders will be empowered to ensure that each area of operations uses materials in an efficient manner and to take the necessary steps to address these waste management principles.

Operating procedures at the mine will be developed to maximize the volume of materials that can be recycled or reused. The basic implementation of this strategy includes eliminating the use of disposable material in everyday use, encouraging the use of personal drink containers, stainless steel cutlery and reusable lunch boxes.

The waste reduction principles described above will be achieved by implementing the following strategies:

- **Proactive Procurement Policy**: Any tender documents will notify prospective bidders of the environmental sensitivity of the applicable Project site and solicit the use of the most environmentally suitable materials, equipment and products. Other options may include placing the onus of management of the waste materials from the Construction Phase on the contractor, thus limiting disposal options on-site. Including this type of agreement in new construction clauses that require all uncontaminated materials from a construction project to be taken off-site by the contractor will provide opportunities for waste reduction to occur during the Project. Whereas some leeway may be provided for materials which are recyclable or can be burned, limiting waste disposal for contractors at the Site is a common practice for many construction projects and encourages waste minimization by contractors.
- **Pollution Prevention**: Pollution prevention methods to eliminate the generation of waste will continuously be evaluated and where feasible, appropriate improved methods will be implemented. This will be achieved by applying the reduction and minimization, substitution, segregation, reuse, recycling and recovery approaches discussed as follows.
- **Strategic Material Substitution**: At the purchasing stage, the possibility of material substitution with less polluting products will be assessed - in particular for materials that are hazardous to handle, generate hazardous waste, or create environmental problems. For example, choosing single sheet paper towel dispensers for paper towels in bathrooms and kitchens instead of rolls of paper towels or installing efficient high velocity hand dryers and promotion of re-usable personal mugs for personnel.
- **Strategic Chemical Substitution**: A policy of using chemicals that are cost effective, and accomplish the same results as the original chemicals employed, without or with less hazardous wastes generation in the process, will be adopted.
- **Waste Segregation**: Segregation of all waste streams by type or category will avoid potentially undesirable combined effects and will facilitate the reuse, recycling, recovery and/or disposal of the various wastes. All waste categories will be evaluated and the principals of the following four ‘R’s applied:
  - **Reduction and Minimization Initiatives**: Reducing the raw material consumption is the first step to reduce waste generation. To practice this principle, all processes and material used will be evaluated on the basis of possible reduction in raw material usage.

  - **Reuse Initiatives**: Reuse of the material in other applications and /or by other parties is routinely examined by using the waste materials exchange.
  - **Recycling Initiatives**: Recycling is the next option considered for the successful management of the waste streams.
  - **Recovery Initiatives**: Recovery of usable material or energy as a by-product is a part of the four 'R's of the waste minimization process. For example, redistributing waste heat from generators to heat buildings is a process of recovery of energy from waste.
- **Disposal**: Disposal is the final option when the four 'R's are no longer applicable or practical.

4.1 ALTERNATIVES

Alternatives for the disposal of solid waste are limited in Arctic conditions due to technical feasibility, operational needs, costs, and environmental considerations. The LWMP was developed based on the application of the 4 'R's of waste management adopted by the MVLWB (2011): Reduce, Reuse, Recycle, and Recover.

Final treatment and disposal is undertaken once the 4 'R's have been applied (exhausted). The most applicable and favourable waste management strategy for the Project is to reduce the waste coming to site. Reuse will be undertaken opportunistically (e.g., reusing old haul truck tires for traffic barriers). Recycling of select waste streams will be undertaken based on economic viability. Hazardous wastes will be recycled or disposed of off-site at licensed facilities, as no other technically feasible and economically viable options exist. Recovery rather than recycling will be employed for the disposal of waste oil, by using the oil to contribute to space heating of on-site buildings using approved burners.

The option for the burning of landfill gas was considered. This is only possible for large mixed solid waste landfills in the south that have been operating for a number of years and have accumulated a buildup of methane within the waste.

The remaining non-hazardous solid waste will be disposed of by one or a combination of on-site landfilling, on-site incineration, and off-site landfilling and/or incineration.

Off-site disposal presents a number of challenges discussed below that limits its viability for most wastes generated by the Project, however off-site disposal will be utilized as appropriate. Off-site disposal of waste from Project sites would require on-site storage until the waste could be transported over the WIR to the MLA and then stored before being shipped the following open water season. Hence, waste could be more than a year in transport and staging before arriving at a licensed waste disposal facility in southern Canada. The cost of off-site disposal would be high and the waste would represent an attractant to wildlife.

Wastes that cannot be incinerated will be landfilled (refer to Incineration Management Plan [IMP]; SD-11). Landfilling is an acceptable and/or preferred option used to evaluate alternatives. By combining landfilling with incineration, mainly inert materials will require landfilling which reduces the environmental impact of this waste disposal method.

It is noteworthy that neither incineration nor the use of an on-site inert landfilling received negative feedback from local communities during engagement sessions.

Options for landfill locations considered were within waste rock storage areas (WRSAs), within or adjacent to the Goose Plant Site footprint, and along select site service roads. For ease of closure and water management, the landfill was located within the Umwelt and Tailings Storage Facility (TSF) WRSAs.

5. Roles and Responsibilities

The General Manager is ultimately responsible for the success of this plan and approves all relevant policies and documents, auditing, action planning, and the verification process.

The Environmental Superintendent along with his/her direct reports are responsible for the implementation of this plan including overall management of the Plan and internal reporting, as well as for auditing Project performance to ensure compliance and adaptive management.

All other Project personnel involved with waste management activities will be responsible for the effective implementation of this plan including: completion of required training, and maintaining compliance with training requirements as set out by this plan or by Sabina's SOPs and Best Management Practices. All employees are to work in compliance with Health and Safety Laws and Regulations.

5.1 TRAINING

As part of orientation, all on-site personnel, including Sabina Personnel and contractors, will receive basic environmental and waste management training, including:

- Reducing water use;
- Managing food wastes to minimize wildlife attraction;
- Reducing waste; and
- Separating waste (recyclables, dry-cell batteries, food waste, and hazardous waste).

The Sabina Sustainable Development Policy will be communicated to all on-site personnel during orientation and it will be emphasized that it is everyone's responsibility to properly dispose of waste, including the sorting of waste that can be reused and recycled.

Operation and maintenance manuals will be developed for the Sewage Treatment Plant (STP) and waste disposal facilities, in accordance with the applicable guidelines identified in Section 3. Project personnel responsible for the handling of wastes will be fully trained in safe work and sorting procedures, and the identification of misdirected waste. Personnel working with waste materials will undertake formal training to ensure compliance with applicable legislation and Sabina's SOPs.

Safe handling procedures will be developed for all wastes at the Site and employees will be trained in how to follow these procedures and Best Management Practices. Personal protective equipment will be recommended by manufactures and described in detailed SOP for the safe handling of waste materials.

All personnel involved in the handling of hazardous wastes will receive Workplace Hazardous Materials Information System, Personal Safety and Protection and Emergency Response training. Where applicable, personnel will receive Transportation of Dangerous Goods training.

Site-specific training will be provided by Sabina and renewed as required according to SOPs, legislative requirements, and as needed. Contractors may be requested to provide copies of safety certificates, including First Aid, Workplace Hazardous Materials Information System, and Transportation of Dangerous Goods.

Sabina will manage and update training logs to ensure that all on-site staff are in compliance, and have been suitably trained for their respective tasks.

6. Waste Management Infrastructure

Wastes remaining after application of the waste minimization techniques discussed in Section 4 will be managed in a practical and environmentally responsible manner utilizing methods appropriate for each waste type generated. The following methods will be applied at the site:

- Waste sorting at all generation points;
- Incineration of non-hazardous combustible wastes;
- Open burning in a regulated burn pit of untreated wood and cardboard;
- Landfilling of inert non-combustible wastes;
- Temporary storage and off-site shipping of hazardous and recyclable waste materials; and
- On-site treatment for contaminated soil and oily water from hydrocarbon spills in landfarms.

The waste management infrastructure at the MLA will include:

- an incinerator for the disposal of acceptable combustible wastes;
- a lined landfarm for the treatment of contaminated soils and snow; and
- a lined hazardous waste storage area.

The proposed locations of these facilities are shown in Figure A-03.

The waste management infrastructure at the Goose Property will include:

- a STP;
- an incinerator for the disposal of acceptable combustible wastes;
- a lined landfarm for the treatment of contaminated soils and snow;
- a waste sorting facility;
- a landfill for disposal of non-hazardous solid wastes located in the Umwelt and TSF WRSAs; and
- a lined hazardous materials storage area.

The proposed locations of these facilities are shown in Figure A-04.

No infrastructure, including waste management facilities, currently exist at the MLA. The waste management facilities at the MLA will be commissioned as early as possible during the Construction Phase. These facilities will be used through the Construction and Operations phases until near the end of the Active Closure Phase.

During all Project phases, efforts will be made to maximize backhaul capacity to remove hazardous wastes and recyclables to minimize on-site inventories.

During the initial Construction Phase, Goose Exploration Camp facilities will be used and/or waste will be temporarily stored in containers or totes while Operations Phase waste management facilities are constructed (i.e., waste sorting facility, incinerator, landfill, hazardous material storage, landfarms,

STP). The Operations Phase waste management facilities will be commissioned as early as possible during the Construction Phase. During Active Closure, there will be a migration back to exploration phase type waste management facilities once the main mine facilities are decommissioned. Toward the end of Active Closure, a small closure landfill and camp incinerator will remain, and a landfarm will likely be in use as part of final closure activities. These facilities will be used through the Passive Closure Phase as well.

6.1 INCINERATORS

Incinerators selected for the Project will incorporate technologies capable of satisfying the criteria set forth in *Environment Canada's Technical Document for Batch Waste Incineration* (EC 2010). Details of incinerator operation, maintenance, and agency requirements associated with incinerator emissions are outlined in the IMP (SD-11). Complete stack emissions testing for all incinerators will occur upon commission to ensure achievement of the Canada-wide Standards for Dioxins and Furans and the Canada-wide Standards for Mercury (CCME 2000, 2001a). The IMP (SD-11) was developed in conjunction with the LWMP and discusses environmental protection and monitoring programs developed in consideration of the overall waste segregation program. Additional information can be found in the IMP (SD-11).

6.2 DESIGNATED OPEN BURNING AREA

An open burning area will be established to burn cardboard packaging and non-treated wood waste such as pallets. Open burning procedures will be consistent with authorized open burning practices currently employed at the Goose Exploration Camp under the NWB 2BE-GOO1520 water licence.

6.3 LANDFILL

A landfill will be required during Construction, Operations, and Closure of the Project for the disposal of non-hazardous, solid industrial wastes that cannot be reused, recycled, or recovered (or incinerated) as per the waste management hierarchy (Section 4), as well as for disposal of ash from the incinerators. The landfills will be operated as industrial dry waste landfills and not as municipal solid waste landfills. Inert waste material intended for disposal in the landfills includes unburnable plastics, treated wood, fiberglass insulation, roofing, asphalt, concrete, ceramics, small rubber items, clothing, glass, small appliances, ash, bricks, and waste asbestos (according to GN guidelines), and vehicles (liquids, grease, and electronics removed).

6.3.1 Landfill Location

Landfill sites will be developed at the Goose Property to serve the Construction and Operations phases of the Project. The landfills will be located within the Umwelt and TSF WRSAs (Figure A-01 and Figure A-02, respectively). Consideration when siting the landfill included distances to sensitive receptors and consideration of transport routes. Water management monitoring criteria are applied to the WRSA, and therefore seepage from the landfills will be managed as part of the overall Water Management Plan (SD-05). Refer to Section 7.4.1 for leachate management criteria. Additional water management detail can be found in Sections 7.4.1 and 7.4.2.

Throughout the Project life, additional industrial dry waste landfills may be established. The other WRSAs are logical candidate locations since there is road access, adequate cover material available, and since the runoff from these facilities will already be managed and monitored. Non-hazardous waste generated at the MLA that is not suitable for incineration will be stored in containers that will be transported to the landfill at the Goose Property during each WIR season or backhauled off-site.

6.3.2 Landfill Design Considerations

A landfill design report will be submitted to the NWB for approval at least 60 days prior to construction, as required by the Water Licence. It is anticipated that the landfill at Umwelt will be constructed in Year -2 and the landfill at TSF WRSA will be constructed in Year 4. A detailed Project implementation schedule is provided in the Main Application Document Section 6.3.

It is anticipated that the landfill sites will be developed using the area fill method as detailed in Ferguson, Simek, Clark (2003). The area fill method is the preferred design method where permafrost and geological rock conditions inhibit the development of trenches. The design employed at EKATI allows for the landfill to become fully aggraded into the permafrost over time. Each of the landfill sites will be designed to minimize the area of surface disturbance, stabilize disturbed land surfaces against erosion, and return the land to a post-mining use that is consistent with past traditional pursuits and wildlife habitat.

The total waste volume generated over the life of the mine will dictate the ultimate dimensions of each landfill. Anticipated waste volumes based on predicted waste tonnages during each phase of the Project (Construction, Operations, and Closure) were used to assist in the design of the landfill cells. The designs will allow flexibility to accommodate layout extension or contraction within the confines of each respective WRSA.

Each of the landfills will be capped and progressively closed as final elevations are achieved. Final grades of the landfill will be graded to a slope of 5% or greater, to minimize ponding and infiltration through the cover, and thus minimize cover damage and leachate generation.

The landfills will be monitored both during Operations and Post-Closure to conform their performance. For details on landfill operation and maintenance refer to Section 7.4.

6.4 TEMPORARY WASTE STORAGE FACILITIES

6.4.1 Non-hazardous Waste Storage

Recyclable non-hazardous, non-combustible waste will be stored in dedicated waste storage facilities located at each of the Project sites. Specific waste storage locations have been conceptually identified at this time. Material will be safely stored until it is transported to an appropriate recycling or disposal facility. Each site will have both indoor and outdoor storage, and waste will be segregated according to its susceptibility to exposure to the elements.

Sewage sludge will be transported directly from the STP to the incinerator.

Indoor storage for beverage containers will be used to avoid attracting wildlife. The majority of other items will be stored in the laydown yard outdoors, or in shipping containers where appropriate. This includes recyclables such as tires, electronics and electrical materials, and scrap metal.

Combustible wastes will be temporarily stored in dedicated bins within the waste incineration building or in proximity to the incinerators until they are ready to be incinerated. Ash from incineration will be contained in drums and stored, until testing results are obtained and reviewed.

6.4.2 Hazardous Waste Storage

All hazardous materials will be packaged for shipment to licensed waste management facilities located off-site for subsequent treatment, recycling, and/or disposal. Hazardous waste will be stored inside or within lined containment facilities at the Goose Property and MLA to minimize potential leaching to the environment. The management and handling of hazardous waste is further detailed in the Hazardous Materials Management Plan (HMMP; SD-13).

6.5 SEWAGE TREATMENT AND SLUDGE DISPOSAL FACILITIES

Treated effluent (sewage and greywater) at the Goose Property, during Construction, will be discharged to a designated area in the terrestrial environment (MAD Appendix A, base Figure 3). Once the TSF becomes available for use, treated effluent will be discharged to the active tailings facility for the operational period. If during Operations, STP effluent meets discharge requirements, Sabina may choose to discharge on land consistent with Construction Phase STP effluent management. Sewage sludge removed from the STP will be incinerated or may be added to the landfarm as nutrient amendment on an as needed basis. Confirmation of acceptance to the Incinerator of sludges associated with sewage treatment system is provided in the IMP, Appendix C (SD-11). Sludge may also be used for revegetation research and reclamation where appropriate.

At the MLA, greywater and sewage will be kept separated at their sources and managed independently. Greywater will run through an oil-water separator before being discharged to the tundra (MAD Appendix A, base Figure 4). The greywater discharge line at the MLA will outlet north of the construction laydown area approximately 1.5 km away from the marine aquatic receiving environment. Non-toxic and low-sodium cleansing products will be selected to mitigate harm to the receiving environment. Sewage waste will be collected from Pacto toilets and be incinerated.

7. Waste Management

This section provides general guidance for the management of non-hazardous waste, recyclable materials, and treated sewage at the Project) including the Goose Property and the MLA. Appendix B contains water management tables which identify waste types, sources, potential effects, management hierarchy, and management strategies.

The management of each classification of waste at the Goose Property and the MLA should consider the type of waste produced, waste storage, waste handling, waste separation and final destination. A waste composition and lifecycle assessment will be completed to determine the most feasible management options for the various wastes, based on-site operations, site resources and the waste hierarchy (i.e., reduce, reuse, recycle, recovery, residuals disposal).

7.1 WASTE TYPES

The types of waste[1] anticipated to be generated at the proposed Project can be classified into the following general categories:

- Non-combustible solid waste
  - Burnable solid waste material (e.g., cardboard, non-treated wood);
  - Combustible solid waste;
  - Sewage sludge;
  - Organics (i.e., food waste);
  - Ash from the incinerator;
  - Recyclable material; and
  - Hazardous waste.

The Project operations that will generate the different types of waste include the following major areas:

- Residential areas;
- Kitchen and cafeteria;
- Administration area;
- Plant area;
- MLA; and
- Construction areas.

The composition of tonnages of each waste classification must be understood in the context of each of the phases of the Project (i.e., Construction, Operations, and Closure). Refer to Section 7.3.

[1] Tailings, waste rock, and overburden are also considered waste materials. The Mine Waste Rock Management Plan (SD-08) and Tailings Management Plan (SD-09) provides details on these wastes.

7.1.1 Combustible, Non-hazardous Waste

Typical combustible non-hazardous wastes include discarded materials in a solid, liquid, or semi-solid form that can be safely incinerated, landfilled, or recycled. Such wastes do not pose a risk to human or environmental health. The types of waste generated within this category include:

- Domestic food wastes;
- Cardboard and paper;
- (Unpainted or untreated) lumber scraps;
- Domestic non-organic waste refuse; and
- Damaged bulk containers (non-hazardous).

7.1.2 Non-combustible, Non-hazardous Waste

Typical non-combustible, non-hazardous wastes include discarded materials in a solid, liquid, or semi-solid form that cannot be burned or recycled. Such wastes do not pose a risk to human or environmental health. The types of waste generated within this category include bulky items such as mattresses, waste concrete, and other construction wastes (or demolition waste) such as steel, wire, roofing, concrete, and asphalt**.** Non-hazardous waste items will be checked and cleaned of any hydrocarbon contamination, electronics removed, and disposed of in the landfill or stored in bulk piles (e.g., some larger scrap metal).

7.1.3 Recyclable Waste

The typical types of waste generated within this category include:

- Beverage containers (plastic, aluminum, glass, tetra packs);
- Tires;
- Electronics and electrical wastes;
- Dry cell batteries for domestic use (e.g., AAA to D cells, 6 and 9 volt batteries); and
- Higher value metals (e.g., copper, aluminum).

7.1.4 Treated Sewage Waste and Greywater

Treated sewage effluent discharged by the Project will meet the discharge limits in Table 7.1-1. Distinct criteria are presented for land discharges (ultimately reporting to freshwater), discharges to the active tailings facility, and discharges to the tundra prior to entering the marine environment. Analysis has shown that predicted STP effluent nitrite concentrations are not expected to present toxicity to soil dwelling organisms.

Table 7.1-1: Treated Sewage Effluent Criteria

Parameter	Land Discharges – Freshwater Environment MAC[1] (mg/L)	Discharges to Tailings Facilities MAC[1] (mg/L)	Land Discharges – Marine Environment MAC[1] (mg/L)
BOD_5	30	100	100
Total Suspended Solids (TSS)	35	120	120
Fecal Coliform (CFU/100 mL)	1,000	10,000	10,000
Ammonia (NH_3-N)	4[1], 8[2]	Not applicable[3]	--
Phosphorus	4[1], 8[2]		--
Oil and Grease	No visible sheen		No visible sheen
pH	between 6.0 - 9.5		between 6.0 - 9.5
Toxicity	Not acutely toxic		Not acutely toxic

1) MAC – Maximum Average Concentration.
2) Maximum Grab Concentration.
3) At the breach date of each tailings facility, the discharge will need to meet Metal Mine Effluent Regulation (MMER) discharge limits.

7.1.4.1 Goose Property Sewage Treatment and Disposal

Sewage at the Goose Property will be treated using a package STP, such as a membrane bioreactor (see Appendix A for typical drawing), or similar. The STP will be located in the Plant Site area and, during the Construction Phase, treated sewage effluent will be discharged to the tundra south of the Plant Site, as presented in the MAD Appendix A, base Figure 3. Treated effluent discharge volumes are estimated to be at least 170 m^3/day. The volume of water discharged will vary on an annual basis based on the excess water generated. The STP has sufficient treatment capacity to address spills, accidents and malfunctions; technical specifications for the STP are found in Appendix C. It will be land discharged to maximize attenuation distance prior to entering an outflow watercourse from Fox Lake and ultimately entering Goose Lake. Off-specification treated sewage during upset conditions will be discharged to the closest collection pond. Any discharges of sewage effluent from the collection pond will meet the applicable discharge criteria. In-pond treatment by coagulation can be applied if required as a contingency.

During Operations, effluent will be discharged to the active tailings management facility; the ammonia loadings from this STP effluent discharge has been accounted for in the water and load balance. Analysis has confirmed that ammonia concentrations associated with STP effluent is not acutely toxic. If during Operations, STP effluent meets discharge requirements, Sabina may choose to discharge on land consistent with Construction Phase STP effluent management.

During Closure and Post-Closure, the Goose Camp will convert to Pacto or incinerating toilets and effluent discharge will not be necessary. Sludge will be incinerated or landfilled.

7.1.4.2 Marine Laydown Area (MLA) Sewage Management

There will be no direct discharge of treated sewage effluent or camp greywater to the marine environment. The MLA camp will employ Pacto or incinerating toilets for all Project phases to avoid the need for a sewage treatment facility.

Greywater from domestic use will be pumped through an oil and grease separator prior to discharge to the tundra. Greywater discharge volumes are estimated to be 9 m^3/day. The volume of water discharged will vary on an annual basis based on the excess water generated. This water will be discharged through a designated pipeline to a relatively flat, non-channelized area on the tundra, north of the Laydown Area

(MAD Appendix A, base Figure 5) and will ultimately flow into Bathurst Inlet. Water management at the MLA will consist of the following:

- Greywater will be discharged in an area of low slope to minimize velocities, encourage sheet flow, and minimize channelization.
- The discharge will be directed towards gravel beds or rock to reduce water velocities as appropriate.
- To maximize attenuation, the expected flow path to the nearest receiving environment (Bathurst Inlet) is greater than 1.5 km. This is due to the gently sloping topography extending to the west and north of the discharge location.

Greywater will meet the ocean disposal criteria identified in 7.1-1.

7.1.5 Hazardous Waste

Hazardous material waste management is discussed in detail in Sabina's HMMP (SD-13).

7.1.6 Other Wastes

In addition to the wastes identified in the preceding sections, Sabina has identified additional waste products to be managed. The other waste categories include:

- Medical waste: Waste generated in the first aid or health room will require special handling. Waste products will be put in single use medical waste containers. The management of biomedical waste is described further in the HMMP (SD-13).
- Used oil and waste fuels: Used oil and waste fuels will be directed to incinerators or waste oil burners as appropriate. The management of used oil and waste fuels is described further in the HMMP (SD-13).
- Incinerator ash: Subject to *Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities* (GN 2011b) to confirm ash removed from the incinerator is classified as non-hazardous waste, the ash will be landfilled, as per Sabina's IMP (SD-11). If shown to be hazardous, the incinerator ash will be handled as a hazardous waste and will be disposed of off-site in accordance with the HMMP (SD-13).

7.2 WASTE HANDLING AND SEPARATION

Standard operating procedures will be developed for the handling of each type of waste. A ticket system will be developed to track the volumes of waste and recycling materials collected at each collection station and delivered to its final destination.

The waste handling system will include appropriate bins at designated collection areas to promote separation of materials in the residences, administration and plant buildings, and other facilities where waste is produced. This will include organics, paper/cardboard, combustible solid waste, non-combustible and bulky waste and recyclable materials. Collection and management of recyclable materials, including cardboard, aluminum cans and metals, will be introduced once off-site recycling options are confirmed, which will be determined based on the available markets and economic considerations. Recyclable materials will be baled and stored in a designated area until a sufficient volume is obtained to for transport.

End-of-life vehicles and equipment are to be stored in the designated 'bone-yard' area pending reuse or to be salvaged for parts. Discarded large tires (e.g., those for ore trucks) will be used as roadside barriers.

Organics will be collected in wildlife-proof containers designed to minimize odour emissions. The installation of a de-watering system will be considered in the kitchens, to reduce water content of kitchen waste prior to incineration.

The handling of medical waste generated from the health centre and sharps collected in the residential, plant and administrative bathrooms is considered biomedical waste and will be managed in accordance with applicable territorial and federal guidelines.

7.3 TOTAL VOLUME OF WASTE

The total volume of combustible solid waste generated at a given time during the life of the Project will be dependent on the activities and number of personnel at that time. An inventory of the estimated annual quantities of combustible solid waste that will be generated during the various phases of the Project is presented in Table 7.3-1 and Table 7.3-2 for the Goose Property and MLA, respectively. Note ash from the MLA will be transported south to the Goose landfill; these volumes are included in the Goose annual waste quantifies.

Table 7.3-1. Estimated Waste Quantities Generated at the Goose Property

Project Phase	Annual Waste Quantities (tonnes)	
	Goose Property Incinerator	Goose Property Landfill
Construction (3 years)	310	430
Operations (10 years)	240	330
Closure - Active Stage (2 years)	125	170
Closure – Passive Stage (6 years)	10	15
Life of Mine Totals (tonnes)	3640	5020

Table 7.3-2. Estimated Waste Quantities Generated at the Marine Laydown Area

Project Phase	Annual Waste Quantities (tonnes)	
	MLA Incinerator	Ash
Construction (2 years)	20	6
Operations (10 years)	20	6
Closure - Active Stage (2 years) (Note no Passive Stage)	5	2
Life of Mine Totals (tonnes)	250	76

The estimated waste generation presented above is based on the following assumptions:

- kg/person/day (1 tonnes/year/person) total (incinerator and landfill) of solid non-hazardous waste (Environment Canada's 'State of the Environment InfoBase', Environmental Indicator Series 2003).
- Assumes that 50% of the waste is landfilled and 50% of the waste is incinerated.
- Assumes incineration reduces mass by 70%.

- The MLA is occupied only half of each year (annual quantities are halved).
- MLA ash and waste generated that's incinerated is included in the Goose landfill quantities.
- Life of Mine totals are based on 3 years of Construction (Year -3 to Year -1), 10 years of Operations (Year 1 to Year 10), a Closure Phase (divided into Active and Passive stages of 2 years and 6 years, respectively). Note the MLA will only require a 2 year Active Closure stage; no Passive Closure will be necessary.
- Assume Active Closure waste is estimated at 5 times the volume per person.
- Quantities have been rounded upward.

7.4 LANDFILL OPERATION AND MAINTENANCE

Landfill operation will be performed under the guidelines referenced in Section 3. The landfill will be operated by trained personnel who will carry out regular inspections and monitoring of the facility. An O&M manual approved under the water licence will be used to direct landfill operations. This manual will include:

- Location of the landfill and proximity to receiving waters;
- A general description of how the landfill is to be operated and maintained, including acceptable and unacceptable waste, periods of operation;
- A proposed schedule for when specific operating and maintenance activities are to be conducted (i.e., seasonal surface water sampling, routine visual inspection, berm inspections, etc.);
- A list of who is responsible for completing each item scheduled;
- A description of waste placement, compaction and covering operations;
- A description of the cover material to be used as well as the source of the material;
- Runoff and drainage control within and around the landfill, including erosion and sediment control and proposed restoration measures for erosion which occurs;
- Prevention of windblown debris; and
- Method and frequency of site maintenance.

The landfill operator shall inspect all incoming waste and ensure that only permitted waste is deposited in the landfill. Permitted wastes listed in Section 7 of the Plan include non-combustible waste, incinerator ash, and waste asbestos. The landfill operator shall maintain all tickets relating to incoming waste as described in the below section detailing records management.

The landfill is to be operated as an area-fill landfill, in general accordance with Figure A-01 and A-02. Non-combustible waste is to be deposited in lifts no greater than 1 m prior to compaction. Ash meeting the testing requirements for disposal at the landfill should be placed within its' container.

Compaction and covering of the waste will occur each day that waste is deposited at the landfill. Waste placement should be undertaken in a limited area minimizing the size of the working face. Compaction is to be undertaken using 4 to 6 passes of a suitably sized bulldozer over the active area of the landfill, prior to the placement of a minimum of 300 mm of cover. Prior to placing additional lifts of waste, existing intermediate cover can be set aside and reused, where practical. Care is to be taken during compaction to ensure that containers of ash are not ruptured and that areas containing waste asbestos are not disturbed.

Asbestos may be deposited in the landfill according to the regulations outlined in the LWMP; however, prior to acceptance of asbestos at the landfill the Government of Nunavut is to be notified. The waste asbestos is to be placed in labelled bags and burial is to occur immediately, using a minimum of 500 mm of cover material and temporary signage placed to ensure it is not disturbed. Records are to be maintained detailing the location of the asbestos burial and shall include coordinates, photographs and volume. Permanent signage is to be placed in the area of the landfill to ensure it remains undisturbed.

Annual surveys will be undertaken to determine the volume of material placed within the landfill and assist in future planning of landfill cells during operation of the facility.

Landfill SOP will be created for each phase of operation of the landfill and waste facilities and updated as needed to reflect changes in operation (i.e., project phase) and/or technology. These changes will be submitted within the Annual Report as addendum to the LWMP as needed.

7.4.1 Leachate Management

The leachate from the landfill is anticipated to be of very low ionic strength (dilute) due to controls on materials to be placed in the landfill, and, as a result, site-specific landfill leachate management is not considered necessary.

In the event there is leachate from the landfill during periods of heavy rainfall or spring freshet, the runoff will be collected and, if necessary, treated to meet the discharge criteria presented in Table 7.4-1 before release to the receiving environment.

Table 7.4-1. Proposed Landfill Seepage Monitoring Water Quality Criteria

Parameters	Maximum Average Concentration (mg/L)
pH	6.0 - 9.5
As	0.5
Cu	0.3
Pb	0.2
Ni	0.5
Zn	0.5
Total Suspended Solids	15
Oil and Grease	No visible sheen

However, in the event that greater volumes of leachate or leachate with high ionic strength are found coming from the landfill, an investigation would immediately be undertaken to determine the cause. This could lead to changes in the configuration and/or management of the landfill to further limit water coming in contact with landfill materials and/or modify water management strategy in this area.

The WRSA will have an annual seep survey complete during freshet, and if required, samples of water found ponding on the natural ground below the landfill will be collected and analysed. The collection of samples, their analysis and reporting of results are anticipated to be part of the Water Licence for the mine.

Because the landfill will be located in an area covered by permafrost, deep groundwater contamination from landfill potential leachate is not anticipated.

7.4.2 Surface Water and Erosion Control

The slopes of the landfill will be constructed of waste rock and should not be subject to erosion. Should it prove necessary, surface water and erosion control will be incorporated into the landfill design. Final grades of the landfill will be graded to a slope of 5% or greater, to minimize ponding and infiltration through the cover, and thus minimize cover damage and leachate generation.

7.4.3 Waste Acceptable for Placement in Landfill

The following materials will be acceptable for disposal in the proposed landfill:

- plastic;
- steel, copper, aluminum, iron;
- white goods;
- wire;
- wood;
- fiberglass insulation;
- fiberglass;
- roofing;
- asphalt;
- concrete;
- carpet;
- bricks;
- ceramics;
- household alkaline and carbon zinc batteries;
- rubber;
- empty caulking tubes;
- hardened caulk;
- clothing;
- glass, including light bulbs (fluorescent bulbs will require special handling, see below for more details);
- waste Asbestos (see below for more details);
- small appliances (with batteries removed);
- gyproc;
- ash, provided it has cooled to 60 degrees Celsius or less;
- vehicles and machinery provided all liquids, grease, batteries, and electronics have been removed; and
- treated soils from landfarm.

7.4.3.1 Waste Asbestos[2]

Waste asbestos includes any type of material with greater than 1 % asbestos by weight (GN 2011b). Asbestos that has been immersed or fixed in a natural or artificial binder or included in a manufactured product is not considered waste asbestos; it is considered a hazardous waste and will be disposed of accordingly. Waste asbestos can either be backhauled off-site for disposal in an approved facility or it can be landfilled. The following are guidelines for landfilling waste asbestos:

- immediate burial and cover with 0.5 m of cover material;
- bury where it will not be disturbed; and
- the location should be maintained on a map or diagram for future reference.

[2] It is unlikely that asbestos waste will result from mine operations. Sabina will avoid using asbestos wherever possible.

In addition to following the *Environmental Guideline for the General Management of Hazardous Waste* (GN 2010a), Sabina will adhere to the GN's *Environmental Guideline for Waste Asbestos* (GN 2011b). Before landfilling waste asbestos, Sabina will review the steps in this guideline with the GN.

All Government of Nunavut environmental guidelines publicly available and can be accessed online at http://env.gov.nu.ca/programareas/environmentprotection/legislation.

7.4.4 Waste Unacceptable for Placement in Landfill

Materials not listed in the previous section will be unacceptable for placement in the landfill, unless approved in writing by the Sabina Environment Department. These materials include the following:

- organic matter, including food, sludge from the STP, dead animals, paper, cardboard;
- food containers and wrappings, unless cleaned;
- hazardous wastes including mercury, batteries, solvents, glues, ethylene glycol antifreeze, adhesives (except empty caulking tubes);
- electronics;
- materials that can economically be recycled;
- petroleum products, including materials contaminated with petroleum products; and
- expanded polystyrene.

In particular, organic matter will not be accepted in the landfill, thus eliminating the attraction to small mammals, carnivores, and/or raptors. This will be accomplished by requiring all personnel to dispose of domestic waste in designated receptacles and by sending all collected domestic waste (e.g., from kitchen, offices, and living quarters) to the site incinerator.

7.4.4.1 Fluorescent Lamp Tubes

Fluorescent tubes contain mercury phosphorus powder and traces of lead and cadmium, which are considered environmental contaminants under the Nunavut *Environmental Protection Act* (GN 2010b). The only disposal method for fluorescent tubes is through an approved hazardous waste recycling or disposal facility (GN 2003). Sabina followed the Government of Nunavut guidelines on *Mercury-Containing Products and Waste Mercury* (GN 2010b) and E*nvironmental Guideline for the General Management of Hazardous Waste* (GN 2010a). Waste having mercury will be sent to a certified waste management company for treatment, recycling, and/or disposal.

7.4.4.2 Ozone Depleting Substances

Ozone depleting substances include chlorofluorocarbons or halons. Common sources include refrigeration equipment, air conditioning equipment, motor vehicle air conditioners, and fire extinguishing equipment (GN 2011c). These materials are hazardous in nature; consequently, all disposal of ozone depleting substances will take place at an approved facility.

Any non-salvageable equipment containing ozone depleting substances will have the ozone depleting substances removed by a certified technician prior to disposal in the proposed landfill. The *Environmental Guideline for Ozone Depleting Substances* was followed by Sabina.

7.4.5 Maintenance

Waste material control tickets will be utilized as a material management tool and will be recorded for all material accepted at the final destination.

Waste will be directed to its final destination as follows.

- Recycling: all non-hazardous materials designated for shipment off-site for recycling;
- Hazardous Waste: all hazardous materials designated for shipment off-site for recycling or disposal;
- Landfill: non-combustible solid waste material, ash from the incinerator, asbestos;
- Designated open burning area: non-treated wood and cardboard only;
- Incinerator: combustible material, sewage sludge, organics; and
- Sewage treatment facility: sewage.

Management of hazardous waste, sewage and the incinerator are described in the HMMP (SD-13), LWMP, and IMP (SD-11).

The ticket will include information including the material type quantity and designated storage or disposal location of the material where it is delivered.

Regular maintenance is required of the following:

- Storage containers/areas;
- Equipment;
- Buildings;
- Fencing; and
- Service road to the landfill.

Regular inspections of the facilities shall be carried out as per the LWMP and shall include waste collection, storage, processing, and final destination facilities.

Waste material logs will be completed to track the volume, material type, and material source for all materials that pass through the waste segregation and waste management process. The segregation of waste and transportation to each of the waste management facilities on-site will be tracked and recorded. Material tracking logs will be stored digitally and available for review by on-site personnel and inspectors on an as-needed basis.

Details of record keeping for the incinerator, including the updating of a maintenance log and collection of incinerator operational data is provided in detail in the IMP (SD-11). The testing and disposal of incinerator ash will be recorded and made available to the inspectors upon request.

8. Environmental Protection Measures and Monitoring Program

Sabina has an ongoing commitment to implementing environmental protection measures for all components of its operations. As previously indicated, Sabina is committed to undertaking waste collection, storage, transportation and disposal in a safe, efficient and environmentally compliant manner, by actively encouraging and implementing the four 'R's of waste management: waste reduction, reuse, recycling and recovery.

Sabina is committed to general monitoring of any facility designed for the treatment of waste and or disposal of waste. A summary of general monitoring requirement is provided in the EMPP (SD-20).

In addition, Sabina is also committed to implementing appropriate waste and runoff monitoring programs to satisfy regulatory requirements and achieve environmental protection. Waste and runoff monitoring requirements will be prescribed in the Type A Water Licence for the Project and will likely include the following:

- Visual inspections, as applicable, of the integrity landfill cover, the effectiveness of containment/storage systems, the presence of litter and the appropriate separation of waste categories.
- Inventory of quantity (weight) and type of materials directed to each of the waste management facilities.
- Record of location of asbestos waste disposed of in the landfill.
- Collection of samples and analysis of runoff quality (surface runoff or shallow groundwater seepage, as appropriate) downstream of the landfill.
- Testing of incinerator ash at an accredited off-sire laboratory to determine if it is suitable for landfilling.
- Inspections of the landfarm, records of soil and water management activities, and laboratory testing of soils and contact water.
- Testing of treated sewage effluent quality from the STP.

A Spill Prevention and Contingency Plan for the Site will be created to provide Sabina with and approach that complies with applicable regulations for preventing and reducing the occurrence of spills, and for eliminating and ameliorating adverse effects to human health and the environment that may result from spills.

Sabina will implement a series of Quality Assurance and Quality Control plans and programs at all levels of the waste management and landfill operation. Quality Control procedures implemented as part of the LWMP will be variable and program-specific. Quality Assurance and Quality Control procedures will be implemented immediately and updated as necessary based on findings of the year-end reporting.

Internal audits and inspections will be conducted as required by permit and other regulatory requirements on all components related to the LWMP. Qualified personnel will perform regular inspections of the storage areas, landfarms and landfills to ensure that waste segregation and inventory are being documented correctly.

9. Environmental Reporting

It is expected that execution of this plan (subject to ongoing updates) will be a condition of Sabina's Type A Water Licence for the Project. As such, the Water Licence will prescribe the required record keeping and reporting with respect to waste disposal. Such environmental reporting is expected to include:

- Filing of updates to the Waste Management Plan to the NWB;
- Submission of design and as-built reports for waste management facilities; and
- Monthly and annual reporting of waste management activities and monitoring results, as prescribed in the water licence.

The NWB will be notified of any modification associated with any planned changes to waste facilities as needed.

10. Adaptive Management

The Plan will be updated again prior to Construction if instructed to do so by the NWB during the licensing process. The Plan will be reviewed on a regular basis to incorporate any lessons learned, major changes to facility Operations or maintenance, and environmental monitoring results. Any updates to the LWMP will be filed with the Annual Report submitted under the Type A Water Licence.

All employees will be informed of relevant updates and the updated LWMP will be located in a designated area at each site.

Sabina will retain all raw data records and annual reporting for at least two years in digital format. The updated LWMP, raw data, and annual reporting will be made available by Sabina at all times for review by the lands and waters inspectors, the NWB, and Environment and Climate Change Canada.

This plan represents an adaptive approach to understanding the effects of the Project on the landscape and the species that live there. In this context, the Plan is part of a continually evolving process that relies not only on the efficacy of data collection and analytical results, but is also dependent on feedback from the communities, government, Aboriginal groups, and the public. Having an adaptive and flexible program allows for appropriate and necessary changes to the design of monitoring studies, and the mitigation and monitoring plans. Some changes may come about through the observation of unanticipated effects or inadequacies in the sampling methods to detect measurable effects. Other changes may result from ecological knowledge acquired through working with Aboriginal community members and discussions with Elders, both in the field and through workshops.

Sabina is committed to considering and incorporating Traditional Knowledge into the Plan. The incorporation of Traditional Knowledge will occur throughout all stages of the Plan, including identification of mitigation measures, monitoring study design, data collection, and follow-up programs to obtain feedback.

11. Reclamation

Final closure of the landfill sites will be undertaken once they are no longer needed, or when the mine closes as part of mine Closure activities. Landfills established at the Goose Property during the Construction and Operations phases will also be used as closure landfills. Final closure of landfills will consist of applying a 5 m cover of NPAG waste rock to facilitate aggradation and encapsulation in permafrost. Additional details pertaining to landfill closure, are provided in Sabina's Interim Closure and Reclamation Plan (SD-26).

12. References

1985. *Hazardous Products Act*, RSC. C. H-3.

1985. *Territorial Lands Act*, RSC. C. T-7.

1988. *Environmental Protection Act*, RSNWT. C. E-7.

1988. *Environmental Protection Act*, RSNWT (Nu). C. E-7.

1988. *Public Health Act*, RSNWT (Nu). C. P-11.

1992. *Transportation of Dangerous Goods Act*, 1992, SC. C. 34.

1999. *Canadian Environmental Protection Act*, SC. C. 33.

Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulations, SOR/2002-301.

Northwest Territories and Nunavut Mining Regulations, CRC, c.1516.

Territorial Land Use Regulations, CRC, C.1524.

Transportation of Dangerous Goods Regulation, SOR/2012-245.

Used Oil and Waste Fuel Management Regulations, NWT Reg. 064-2003.

AANDC (Aboriginal Affairs and Northern Development Canada). 2013. *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*.

BGC. 2003. Implications of Global Warming and the Precautionary Principle in Northern Mine Design and Closure. Prepared for Indian and Northern Affairs Canada by BGC Engineering Incorporated: Calgary, AB.

Canadian Council of Ministers of the Environment (CCME). 2000. Canada-Wide Standards for Mercury.

Canadian Council of Ministers of the Environment (CCME). 2001a. Canada-Wide Standards for Dioxins and Furans.EC (Environment Canada). 2003. State of the Environment InfoBase, Environmental Indicator Series 2003. Available online: http://www.ec.gc.ca.

EC. 2010. Technical Document for Batch Waste Incineration. http://www.ec.gc.ca/gddmw/default.asp?lang=En&n=F53EDE13-1.

Ferguson Simek Clark Engineers and Architects. 2003. *Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the NWT*. Report prepared for the Department of Municipal and Community Affairs, Government of Northwest Territories, April 2003.

Government of the Northwest Territories. 1996. *Guidelines for the Preparation of and Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories.* Prepared by Diep Duong and Ron Kent, for the Department of Municipal and Community Affairs. October 1996.

GN. 2010a. *Environmental Guideline for General Management of Hazardous Waste*. Government of Nunavut, Department of Environment, Environmental Protection Service. http://www.nwb-oen.ca/sites/default/files/cms_uploads/techguides/Guideline%20-%20General%20Management%20of%20Hazardous%20Waste%20%28revised%20Oct%202010%29.pdf

GN. 2011a. *Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities*. Government of Nunavut, Department of Environment,

Environmental Protection Service. http://env.gov.nu.ca/sites/default/files/industrial_waste_discharges_2011.pdf.

GN. 2011b. *Environmental Guideline for Waste Asbestos. Nunavut Department of Environment, Environmental Protection Service*. http://env.gov.nu.ca/sites/default/files/waste_asbestos_2011.pdf.

GN. 2011c. *Environmental Guideline for Ozone Depleting Substances. Nunavut Department of Environment, Environmental Protection Service*. http://env.gov.nu.ca/sites/default/files/ozone_depleting_substances_2011.pdf.

GN. 2012. *Environmental Guideline for the Burning and Incineration of Solid Waste*. Government of Nunavut, Department of Environment, Environmental Protection Service. http://env.gov.nu.ca/sites/default/files/guideline_burning_and_incineration_of_solid_waste_2012.pdf.

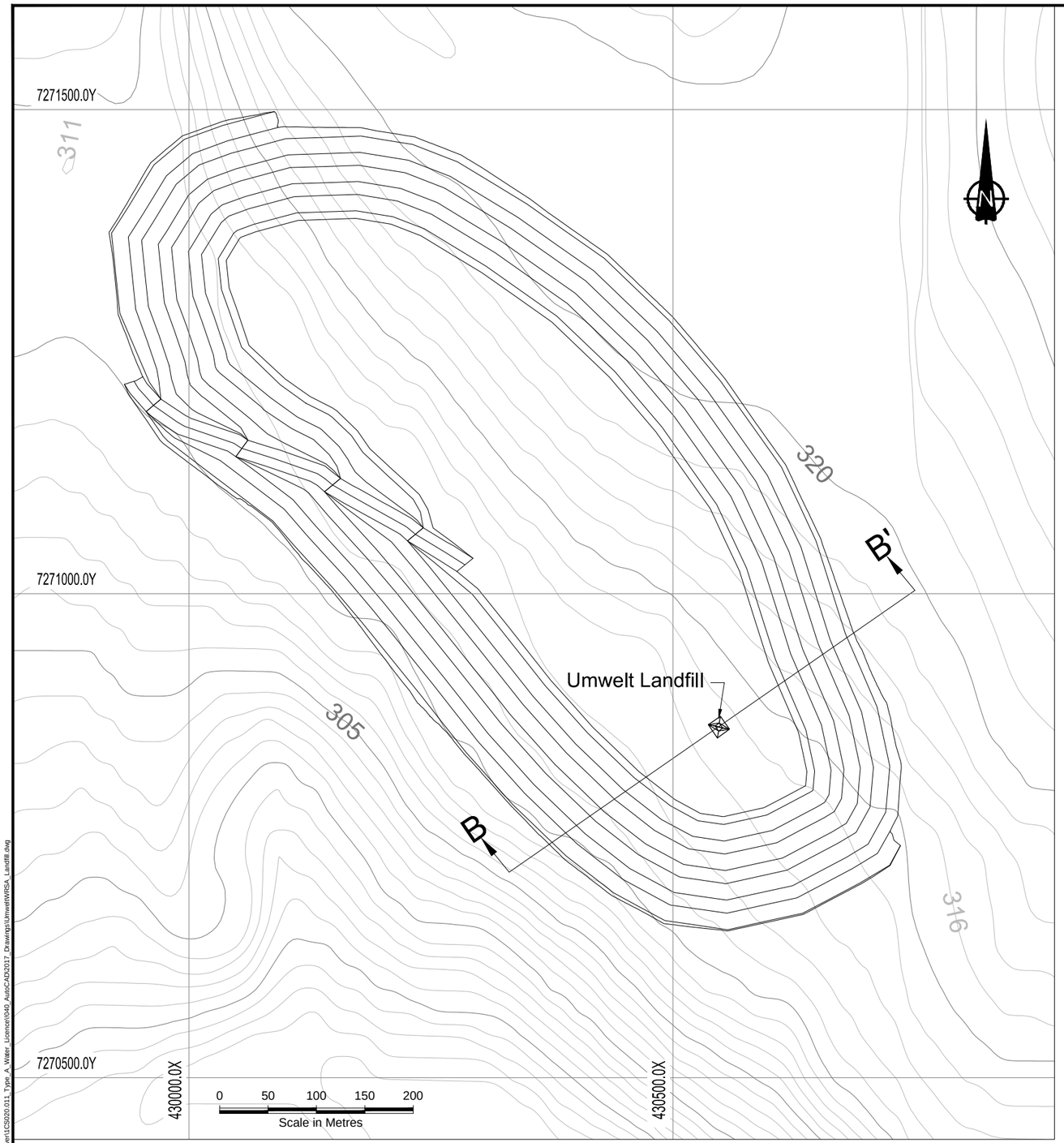
MVLWB (Mackenzie Valley Land and Water Board). 2011. *Guidelines for Developing a Waste Management Plan*. March 31, 2011. Available at: http://mvlwb.com/sites/default/files/documents/MVLWB-Guidelines-for-Developing-a-Waste-Management-Plan-Mar-31_11-JCWG.pdf.

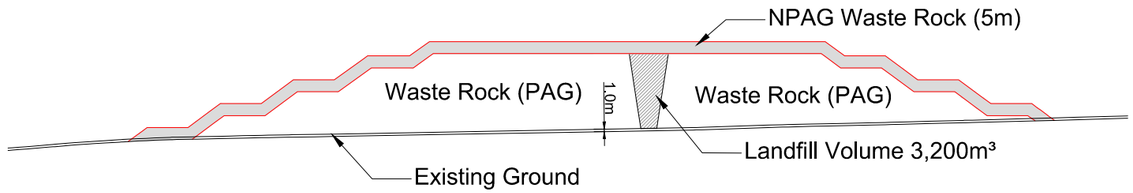
Nunavut Impact Review Board (NIRB). 2013. Guidelines for the Preparation of an Environmental Impact Statement for Sabina Gold & Silver Corp.'s Back River Project. NIRB File No. 12MN036).

NWB (Nunavut Water Board). 2010a. Mining and Milling Supplemental Information Guideline (SIG) for Mine Development (MM3). February 2010.

NWB. 2010b. Miscellaneous Supplemental Information Guideline (SIG) for General Water Works (including crossings, flood control, diversions, and flow alterations) (M1). February 2010.

Appendix A. Figures





SECTION B-B'

0 25 50 75 100
Scale in Metres

PLANVIEW

DRAWING NO.	DRAWING TITLE
A–02	TSF WRSA Landfill

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
–	–			

NO.	DESCRIPTION	CHK'D	APP'D	DATE
B	ISSUED FOR PERMIT	CP	EMR	17/08/30
A	ISSUED FOR PERMIT	CP	EMR	16/05/31

REVISIONS

Original Drawings
Stamped and
Signed by Engineer

This drawing is uncontrolled when printed unless stamped and signed with original ink and recorded on a Distribution Register.

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
MM	DMC	EMR
CHECKED:	APPROVED:	DATE:
		2017/08/30

FILE NAME: UmweltWRSA_Landfill.dwg

Sabina GOLD & SILVER CORP

BACK RIVER PROJECT

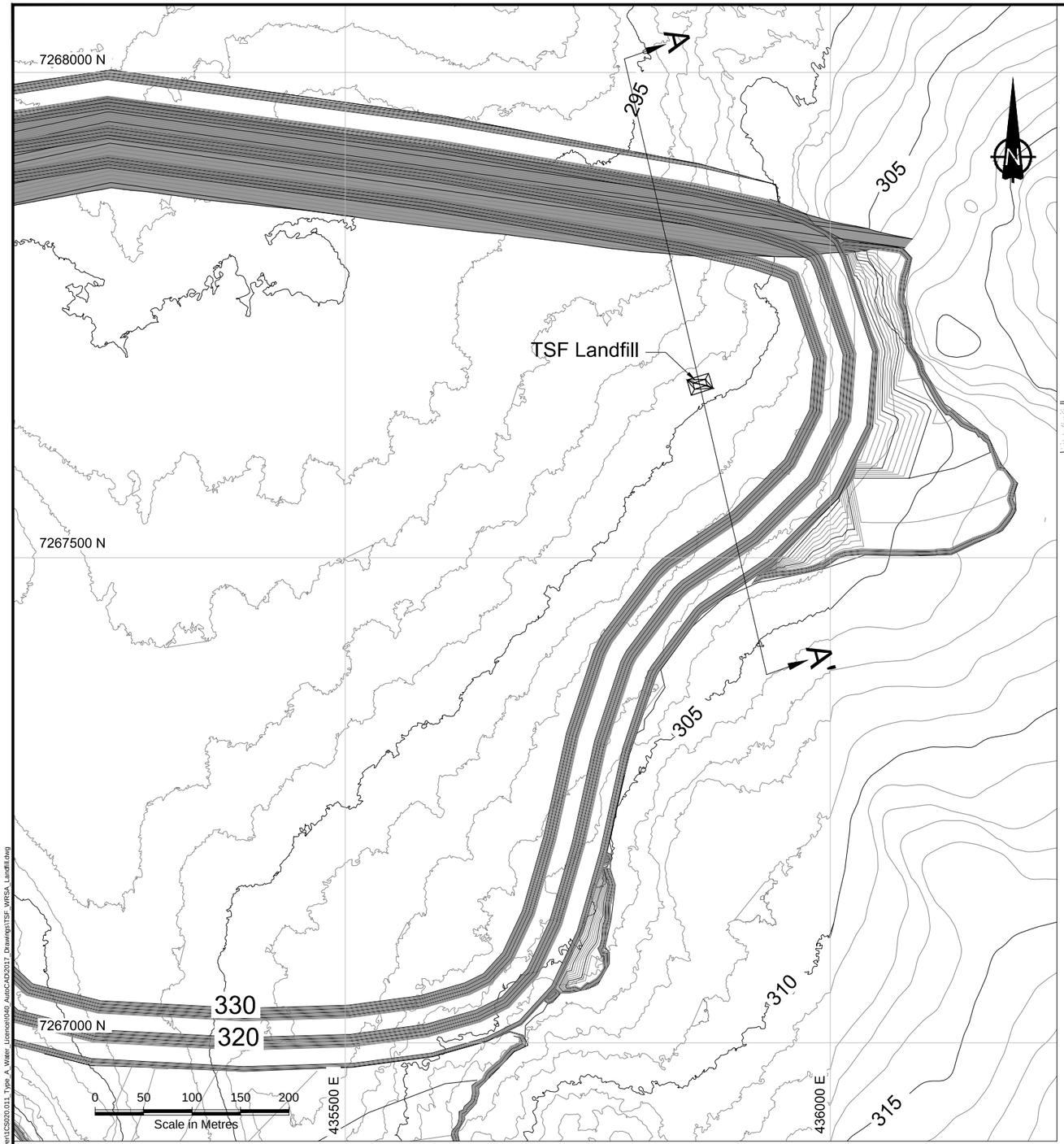
SRK JOB NO.: 1CS020.011, Task 500

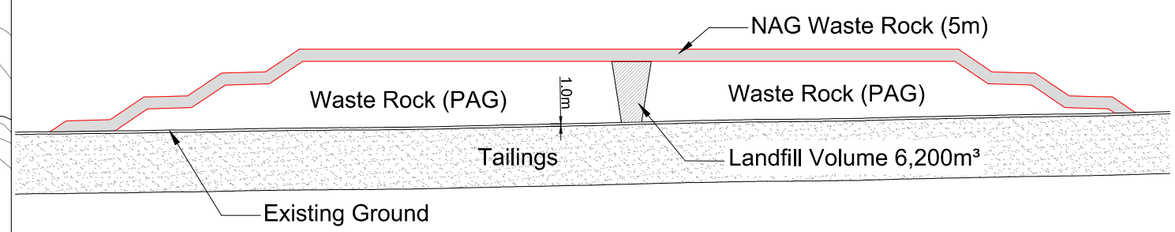
LANDFILL AND WASTE MANAGEMENT PLAN

DRAWING TITLE:

Umwelt WRSA Landfill

REVISION NO.	SHEET	DRAWING NO.
B	1 OF 2	A-01





SECTION A-A'

0 25 50 75 100
Scale in Metres

PLANVIEW

DRAWING NO.	DRAWING TITLE
A–01	Umwelt WRSA Landfill

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
–	–			

NO.	DESCRIPTION	CHK'D	APP'D	DATE
B	ISSUED FOR PERMIT	CP	EMR	17/08/30
A	ISSUED FOR PERMIT	CP	EMR	16/05/31

REVISIONS

Original Drawings Stamped and Signed by Engineer

This drawing is uncontrolled when printed unless stamped and signed with original ink and recorded on a Distribution Register.

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
MM	DMC	EMR
CHECKED:	APPROVED:	DATE:
		2017/08/30

FILE NAME: TSF_WRSA_Landfill.dwg

Sabina GOLD & SILVER CORP

BACK RIVER PROJECT

SRK JOB NO.: 1CS020.011, Task 500

LANDFILL AND WASTE MANAGEMENT PLAN

DRAWING TITLE: TSF WRSA Landfill

REVISION NO.	SHEET	DRAWING NO.
B	2 OF 2	A-02

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W:\BackRiver\04_Exploration\BackRiverRegion\GIS_Products_FEIS\ESRI_MXDs\Water Permitting _Back Up Figures and MXDs\BackRiverRegion Water_Permitting\BR_NA_tab_LMP_MLAWasteManagement_WL_A.mxd

GIS # BR_NA_tab_LWMP_MLAWasteManagement_WL_A

September 25 2017

381000

7395000

7394000

N

Main Map

Marine Laydown Area

Kilogiktok (Bathurst Inlet, Southern Arm)

BIPR Winter Road Connector

Goose Property Area

5

10

15

20

25

30

LINED HAZARDOUS MATERIALS MGMT. AREA

LANDFARM

INCINERATOR

FUEL STORAGE AREA

Kilogiktok (Bathurst Inlet, Southern Arm)

Marine Laydown Area

Marine Laydown Area PDA = 653 ha
Marine Laydown Area Infrastructure Footprint = 20 ha

Waste Management

1:7,500

0.15 0.075 0 0.15 Km

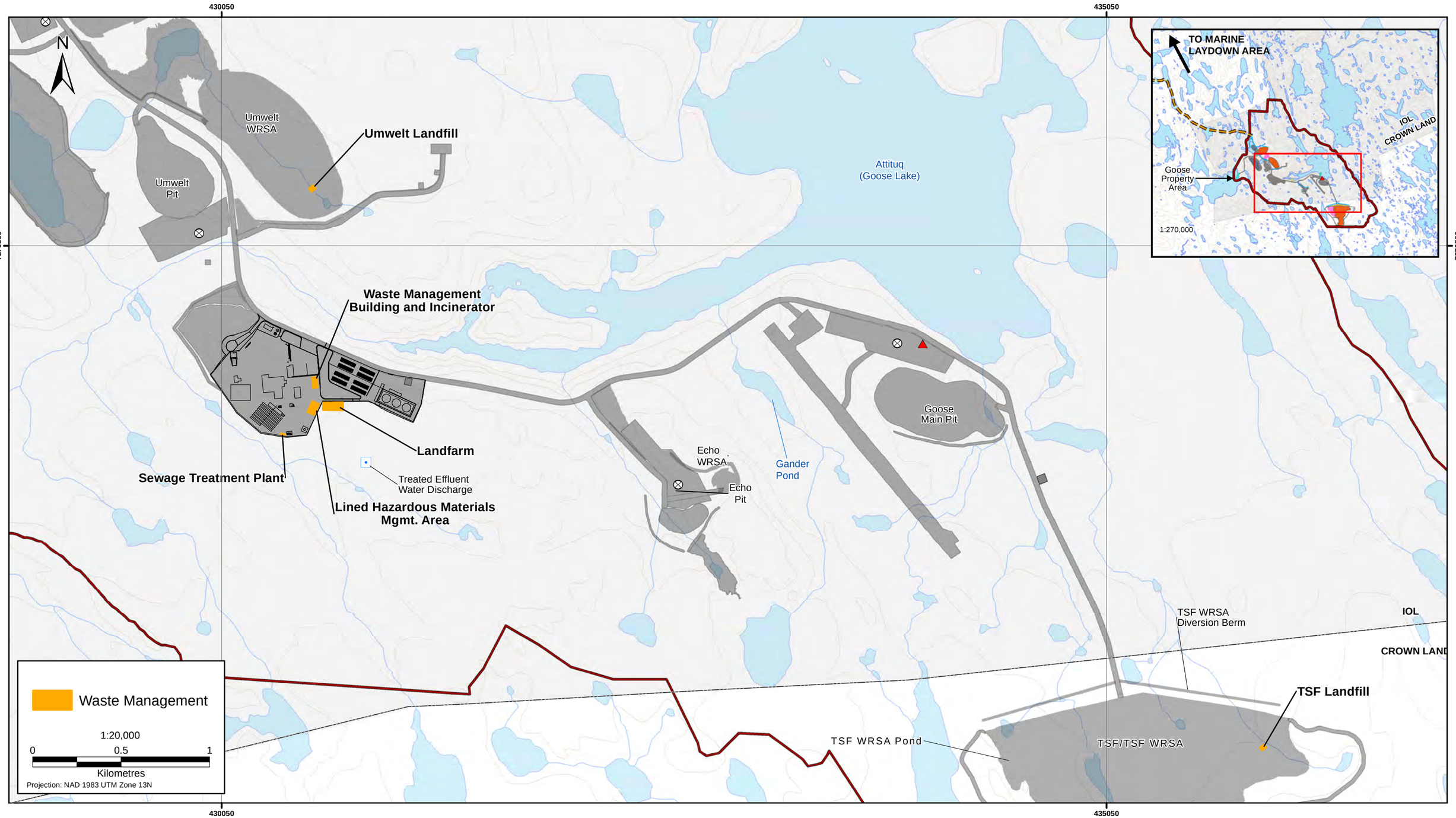
Projection: NAD 1983 UTM Zone 13N

381000

Sabina GOLD & SILVER CORP.

Marine Laydown Area
Waste Management Infrastructure
Type A Water License

Figure A-03



Sabina
GOLD & SILVER CORP.

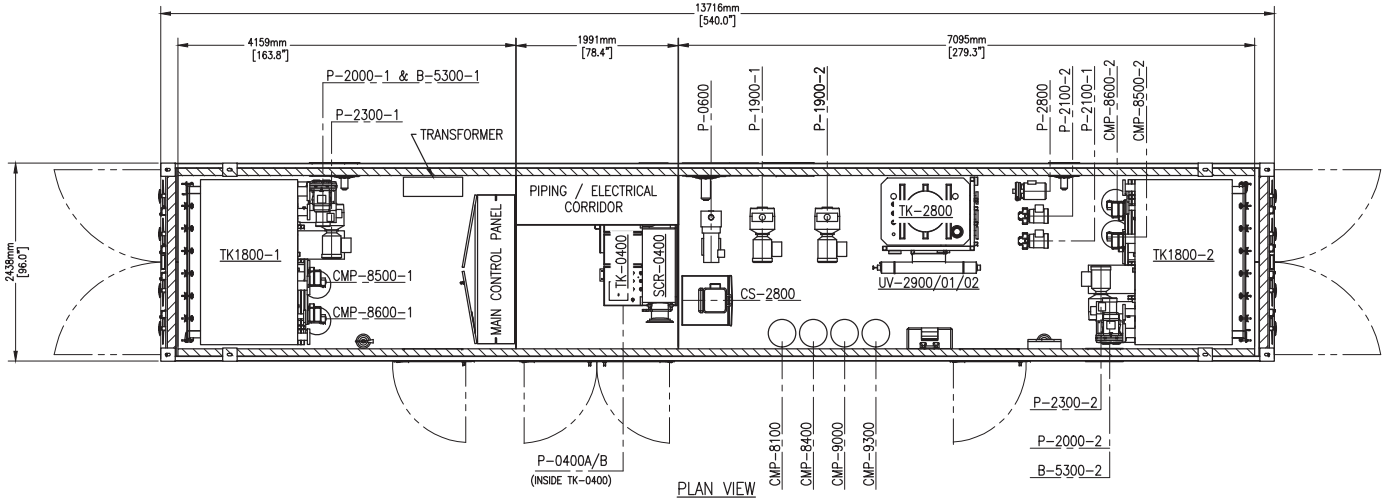
Goose Property Area
Waste Management Infrastructure
Type A Water Licence

Figure A-04

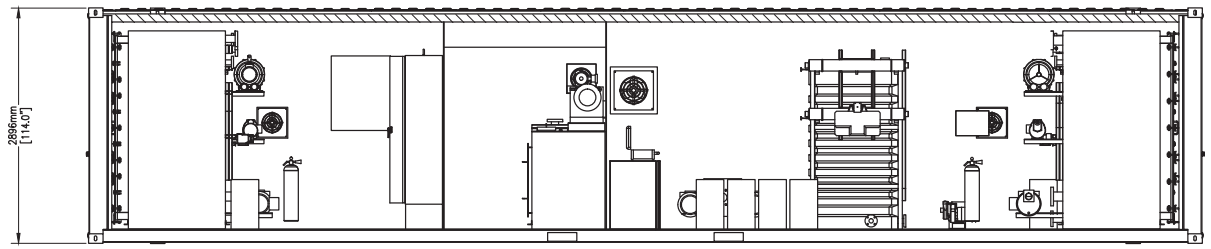
EQUIPMENT LIST		
EQUIP. No.	DESCRIPTION	STANDARD OR OPTIONAL
P-0400A/B	INFLUENT PUMP	STANDARD
SCR-0400	INFLUENT SCREEN/COMPACTOR	STANDARD
TK-0040	INFLUENT TANK	STANDARD
P-0600	EQ TRANSFER PUMP	STANDARD
TK-1800-1/2	MEMBRANE TANK	STANDARD
P-1900-1/2	MEMBRANE FEED PUMP	STANDARD
P-2000-1/2	PERMEATE PUMP	STANDARD
P-2300-1/2	RAS PUMP	STANDARD

EQUIPMENT LIST		
EQUIP. No.	DESCRIPTION	STANDARD OR OPTIONAL
B-5300-1/2	MEMBRANE BLOWER	STANDARD
TK-2800	EFFLUENT TANK	STANDARD
P-2800	EFFLUENT PUMP	STANDARD
P-2100-1/2	BACKPULSE PUMP	STANDARD
UV-2900/01/02	UV STERILIZER	OPTION D1
CS-2800	EFFLUENT COMPOSITE SAMPLER	OPTION E2
CMP-8100	ALUM DOSING PKG.	OPTION C2
CMP-8400	ANTI FOAM DOSING PKG.	OPTION C4

EQUIPMENT LIST		
EQUIP. No.	DESCRIPTION	STANDARD OR OPTIONAL
CMP-8500-1/2	CITRIC ACID DOSING PKG.	OPTION C1
CMP-8600-1/2	SODIUM HYPOCHLORITE DOSING PKG.	STANDARD
CMP-9000	SODIUM HYPOCHLORITE DOSING PKG.	OPTION D2
CMP-9300	SODA ASH DOSING PKG.	OPTION C3
-	SAFETY EQUIPMENT	OPTION S1
-	TRANSFORMER	STANDARD
-	MAIN CONTROL PANEL	STANDARD



PLAN VIEW



ELEVATION VIEW
(WALL OMITTED FOR CLARITY)

FilterBoxx™ REVIEW

- APPROVED
- REVISE & RESUBMIT. WORK MAY PROCEED UPON INCORPORATION OF MARK-UPS
- STOP WORK. SEE ATTACHED INSTRUCTIONS
- FOR INFORMATION ONLY

ENGINEERING: DATE:

ENGINEERING: Sean Clements DATE:

BUILDING WALL / INSULATION

PRELIMINARY
NOT FOR
CONSTRUCTION

REV.	Y	M	D	DESCRIPTION	BY	CHK.	ENG.	APP.
0	15	04	15	ISSUED FOR INFORMATION	KA	SC	GC	GC

EQUIPMENT GENERAL ARRANGEMENT
STANDARD WWTP 03
WASTEWATER TREATMENT BUILDING

PLANT AREA

SCALE NTS

DRAWN BY	CHECKED BY	REVIEWED BY	APPROVED BY
KA	SC	GC	GC

SHEET	DRAWING NO.	REV.
1 OF 3	WWTP03-B06-001	0

DRAWING NO. WWTP03-B06-001

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Appendix B. Waste Types, Sources, and Management Structure Tables

Table B1. Waste Types, Sources, and Management Structure

Type	Source	Potential Environmental Effects	Waste Management Hierarchy	Waste Management Strategies
Combustible Non-hazardous Waste				
Kitchen and Food Waste	Food scraps Kitchen grease Wrappings contaminated with food Bagged lunches	Improper storage, handling and disposal can lead to the attraction and subsequent habituation of carnivores and scavengers Potential for litter	Train kitchen staff on waste reduction Use bulk food containers whenever possible	Designated wildlife-proof food waste containers will be located at all remote sites and underground lunchrooms Collected daily Stored inside the waste storage facility prior to incineration / landfilling Regular incineration
Corrugated Cardboard	Packaging of supplies/ materials	Potential for litter	Order products in bulk to minimize packaging Monitor and reduce, where possible, the amount of packaging shipped to the sites Reuse corrugated cardboard on-site to package materials being sent off-site	Stored inside the storage facility prior to incineration Regular collection and incineration
Domestic Refuse	Refuse from offices and camp rooms (e.g., paper, plastic wrapping, fabrics, etc.)	Improper storage, handling and disposal can lead to the attraction and subsequent habituation of carnivores and scavengers Potential for litter	Domestic waste will be reduced through employee education programs, including proper separation of waste Double-sided printing and photocopying will be encouraged	Educate employees about separating recycling and hazardous items from personal waste items Use clear garbage bags so that cleaning staff can monitor waste sorting habits Periodically assess domestic refuse to ensure that waste streams are being separated Regular collection and incineration / landfilling
Damaged Sacks (Super Sacks)	Used for the transportation of bulk materials and explosives	Potential for litter	Sacks will be used to ship explosives from the manufacturer to site, and undamaged sacks will be returned to the manufacturer for reuse. Only damaged sacks will be disposed.	Damaged sacks will be incinerated.

Table B1. Waste Types, Sources, and Management Structure

Type	Source	Potential Environmental Effects	Waste Management Hierarchy	Waste Management Strategies
Recyclable Wastes				
Beverage Containers (plastic, aluminum, glass, tetra packs)	Camp staff drinking bottled beverages	Improper storage, handling and disposal can lead to the attraction and subsequent habituation of carnivores and scavengers Potential for litter	The camp will not provide individually packaged beverages (e.g., cans of pop or juice, bottled water, etc.), rather the camp will promote the use of bulk beverages, available from a beverage dispenser	Basic waste management training, including recycling training, and waste reduction for all personnel on-site Designated recycling bins for beverage containers Used beverage containers will be stored in wildlife-proof containers Stored in the waste storage facility prior to shipping off-site
Electronics and Electrical Materials	Electrical devices that cannot be repaired and cannot be recycled	May contain mercury, lead, arsenic, cadmium, brominated flame retardants (BFRs), and polyvinyl chloride (PVC) that could enter ecosystem	Electrical devices will be repaired when possible	Sabina's environment staff will determine the risk of electronic devices and classify them as recyclables, hazardous or non-hazardous waste and investigate the possibility of recycling the electronics and/or appropriate methods for waste disposal
Dry cell batteries (AAA to D cell, 6 and 9 volt, and watch batteries)	Personal electronics (e.g., flashlights)	New domestic dry cell batteries do not contain mercury. Older batteries may contain small amounts of lead, cadmium, and mercury. Other battery compounds like silver, zinc, and nickel may also be present.		There will be designated collection bins for dry cell batteries in the employee facilities at each of the three project sites Dry cell batteries will be shipped off-site for recycling / disposal as appropriate.

Table B1. Waste Types, Sources, and Management Structure

Type	Source	Potential Environmental Effects	Waste Management Hierarchy	Waste Management Strategies
Sewage and Greywater				
Sewage effluent and greywater	Human waste Janitorial services Vehicle washing bay Kitchen sinks and dishwashers Showers Laundry	Increased concentration of nutrients and toxic contaminants Aquatic oxygen depletion and reduced water clarity Risks to human health from consumption of contaminated water Taste and odour problems in water Reduced aesthetic of water and shores and impaired recreational use Increase in ambient water temperature Changes in ecosystem species composition, abundance, and diversity Increased submerged weed growth Sedimentation (Environment Canada, as cited in CCME 2006).	Sabina and its contractors will reduce the amount of greywater produced by using water-efficient fixtures and appliances Sabina will educate employees and contractors about the importance of water conservation The bioreactor system recycles sludge as part of its system which reduces the amount of sludge created	Greywater and sewage effluent will be treated by biological reactor sewage treatment plant at the Goose Property. Greywater at the MLA will be passed through an oil-water separator and then land discharged away from waterbodies in accordance with land use regulations.
Sewage Sludge	Periodically sludge needs to be removed from the bioreactor sewage treatment system (Goose Property) or Pacto incinerating toilets (MLA).	This nutrient-rich product can act as a fertilizer if exposed to land or water May cause odours that can attract wildlife	No opportunity to limit the input of sewage waste on-site. Encourage staff to reduce greywater through education programs Water-efficient appliances will be used Use low phosphorus detergents The bioreactor system reuses sludge to reduce the output of sludge	Waste transported directly from the bioreactor system to the incineration building for same-day incineration.

Appendix C. Goose STP – Technical Specifications

The enclosed technical specifications from the Sabina June 2015 Feasibility Study includes water treatment plants for different purposes, multiple locations, and camp sizes. The specifications applicable to, and put forward with, this Type A Water Licence Application are the Goose Property STP Specifications, herein called, the Waste Water Treatment Building (WWTP) 03. This WWTP is for a Goose Property based on a camp population of 700 people.

Sabina Gold & Silver Corp.
Back River Feasibility Study

H347084 – PM059 – Potable Water Treatment Plants
H347084 – PM060 – Sewage Water Treatment Plants
H347084 – PM062 – Reverse Osmosis Water Treatment Plants

Proposal #150220
Rev 00

February 20, 2015

Prepared for:
HATCH
1066 West Hastings Street
Vancouver, British Columbia, V6E 3X2
Attention: Mike Kaplan

Prepared by:
FilterBoxx Packaged Water Solutions
5716 Burbank Road SE
Calgary Alberta, T2H 1Z4
(403) 203-4747
www.filterboxx.com

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- Any special features particular to this design and information gained as a result of this document shall be treated as confidential and shall be the property of FilterBoxx and will not be incorporated in whole or in part in other projects unless recipient obtains written permission from FilterBoxx to do so;
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Table of Contents

1 Company Overview

Ownership: Privately held; in business since 2001
Head Office: Calgary, Alberta
Regional Offices: Oakville, Ontario; Spruce Grove, Alberta; Grand Prairie, Alberta
Markets Served: Oil & Gas (upstream & downstream); Power; Food & Beverage; Heavy Industry; Mining; Remote Workforce Camps

Complete Solutions

- **Custom-built** water and wastewater treatment systems to meet customer specifications
- **Pre-engineered**, plug and play water and wastewater systems to meet your project budget and schedule
- **Containerization/ Modularization**: lower your site installation cost and risk; we'll build and test your entire system in the factory
- **Expertise**: Best Available Technologies are used to ensure robust, reliable solutions that are easy to operate
- **World class field service** team to ensure smooth system commissioning and thorough training for your plant operators
- **Flexible contract structures**: capital sale; build-own-operate; rent/lease to own; rental from our fleet of water and wastewater assets
- Long-term **O&M contracts**; largest team of industrial plant operators in Western Canada
- **Aftermarket**: parts and service to keep your system operating at peak performance for years to come
- **Quality**: ISO 9001 certified
- **Safety**: Certificate of Recognition from the Province of Alberta for exemplary safety record

2 Experience

FilterBoxx has an impressive list of customers that we have worked with since the inception of the company, including Irving, ATCO Power, Shell, Suncor, Goldcorp, Cenovus, MEG Energy, Xstrata, Devon, Husky, ConocoPhillips, BHP, CNRL, Rothsay, Hatch, SNC Lavalin, WorleyParsons, Stantec, and Bantrel. Many of our treatment solutions begin with plant audits and/or engineering contracts to evaluate technologies and develop the optimal solution for our customers. FilterBoxx's scope of supply for previous projects has included process water, potable water, and wastewater solutions on a capital or rental basis, with site installation and plant O&M services included in many cases. All of these systems were engineered in-house.

FilterBoxx has developed significant engineering expertise in two particular areas that will benefit the Sabina Gold & Silver Corp. Back River project:

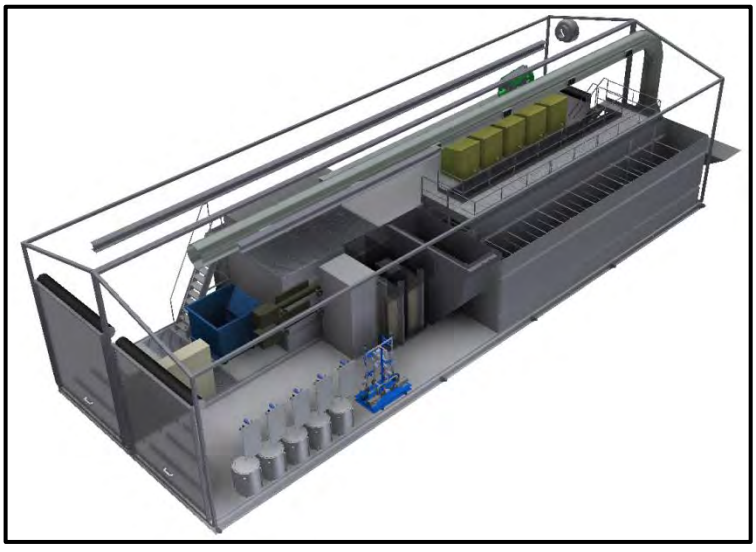
1. MEMBRANE TECHNOLOGIES – Over the last 20 years membrane technologies have evolved to the point where water pretreatment, demineralization and final polishing can all be achieved reliably and cost effectively using membranes. Membranes operate continuously, delivering consistent, high quality product water without the need for bulk chemicals, batch regenerations, and strong regenerant wastes that require neutralization. FilterBoxx has developed significant expertise in this area.

2. MODULARIZATION – Our philosophy has always been to design our systems so they can be factory-built and tested in structural steel modular buildings or ISO containers. Building systems in the factory minimizes the amount of field labour and civil/ structural infrastructure required at site. This lowers the overall capital cost of the project in almost every case. Factory testing ensures that all of the manufactured components, instruments and control system are operating correctly so that site commissioning can occur quickly and smoothly.

The FilterBoxx engineering team is very experienced in a wide variety of water technologies and building them to meet customer specifications. We also have our own specifications that can be applied where appropriate.

FilterBoxx is a family comprised of many individuals rich in project experience, with backgrounds that offer considerable experience in industries including the following:

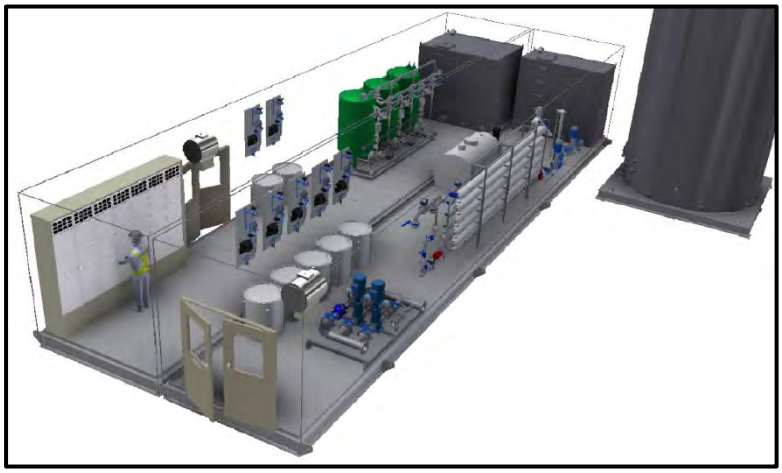
- Oil & Gas
- Heavy Industry
- Power
- Semiconductor
- Pharmaceutical
- Nuclear
- Mining
- Automotive
- Food & Beverage
- Municipal



The requirements in each of these markets are unique and yet there are considerable areas of overlap in terms of process design, material specification, and component selection.

The application knowledge is even more diverse than the market knowledge, including areas such as:

- Microfiltration, ultrafiltration, nanofiltration and reverse osmosis
- Ion exchange and electrodeionization
- Media filtration, pressure filtration
- High strength biological treatment
- High dissolved solids separation
- Hydrocarbon capture and removal
- Organic stripping / separation
- Plant water recycle and reuse
- Ultrapure water production, storage and distribution
- Heavy metals precipitation and removal



The FilterBoxx team has a few hundred work years of unique project experience available for application to this project.

The following pages describe a few highlights of recent FilterBoxx projects.

Goldcorp – Musselwhite Mine

FilterBoxx provided two C-180 Wastewater Treatment plants for Goldcorp's operating mine at Musselwhite, located near the Ring of Fire in Northern Ontario. The plants have the capacity to treat up 360 m^3/day of combined wastewater from the mining operations. The wastewater treatment plant is equipped with an advanced membrane bioreactor (MBR) treatment system providing an effluent quality which exceeds current environment discharge requirements. Due to the remoteness of this site and the fly-in requirements for staff and personnel, the selected system had to be robust, effective and simple to operate.

Irving Shipbuilding – Heavy Metals Removal from Wastewater

Ship repair and maintenance activities generate wastewaters elevated in suspended solids and heavy metals. Heavy metals are derived from coatings and cathodic protection materials used on ship hulls being refurbished in dry dock. The concentrations of these heavy metals exceed regulation requirements for direct ocean and sanitary sewer discharge.

New environmental and government contract compliance requirements imposed strict discharge standards, requiring Irving Shipbuilding to install a treatment process to remove Copper, Zinc and TSS.

Due to site rehabilitation work and potential hindrance to multiple site construction crews it was beneficial to completely manufacture the plant offsite. The prefabricated wastewater treatment plant simplified construction, shortened the project delivery time, made site installation easy, and minimized disturbance to the flow of work at the shipyard.

Application: Heavy Metals Wastewater Treatment

Capacity: 750 gpm (4,100 m3/day)

Dimensions: 22 ft. W x 50 ft. L x 18 ft. H (6.7m W x 15.2m L x 5.5m H)

Logistics: Fabricated offsite and shipped in three loads; erected on site installed and started up in two weeks

Parameters	Units	Influent	Effluent
Temperature	°C	1-35	1-40
pH		5.0 - 7.5	6 - 9.5
TSS	mg/L	>500	< 300
Copper	mg/L	5.6	< 1
Zinc	mg/L	7.8	< 2

Suncor Firebag Permanent Wastewater Treatment Plant - 2000 persons

The Suncor Firebag Construction Camp is located four hours north of Fort McMurray. FilterBoxx provided a Wastewater Treatment Plant and a Potable Water Treatment plant, both commissioned and completed in early 2011.

The S-class Wastewater process equipment was assembled inside five (5) large skid-mounted buildings measuring 85 feet long by 16 feet wide by 18 feet high. Each skid-mounted building houses different components of the system. The system is capable of accommodating flows from 2000 people.

Black Sands Camp – 600 persons

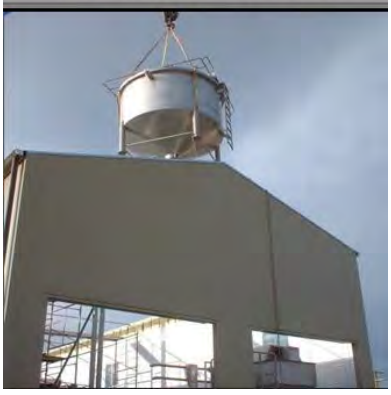
FilterBoxx provided a C-Class 600 person Wastewater Treatment plant for an oil sands camp expansion in the Conklin, Alberta area. The C Class (compact) MBR wastewater treatment plant is equipped with an advanced reinforced hollow fiber membrane (MBR) treatment system resulting in effluent quality which exceeds current Alberta Environment discharge requirements. FilterBoxx is also currently operating the plant and continues to surpass environmental regulations.

Petro-Canada Mackay River Oil Sands Project

The Wastewater treatment system is an S-Class Activated Sludge Treatment system comprised of fine screening, flow equalization, extended aeration activated sludge and tertiary filtration for treatment of high strength domestic wastewater from a remote construction/operations camp for a major oil sands development project. The system was designed and constructed as a complete facility installed within two industrial trailer units to allow for rapid installation and start-up of the system. The treatment plant achieved discharge compliance within 7 days of start-up.

Activated Sludge Plant

Clarifier/Clamshell Building



Potable Water

Suncor Central Potable Water Treatment – 300 m³/day

The Suncor Central 1200 person Water Treatment plant is currently undergoing the final stages of commissioning. The plant took FilterBoxx just over eight months to design, construct and ship to the client's site. This plant was constructed of stainless steel and aluminum piping and is enclosed in an 80x23ft Clam-Shell style building. During the installation and commissioning stages of this project FilterBoxx was awarded 17 safety flags for zero safety incidents on site.

Cenovus Potable Water Treatment Plant – 800 persons

FilterBoxx devised a process scheme to treat the raw feed water for potable use by means of:

- Chemical Pre-Treatment and Contacting System (CPCS) by means of Oxidation,
- Greensand Media Filtration (GSMF),
- Treated Water Storage
- Softener Media Filtration System (SMFS) and the Potable Plant were mounted on one (1) totally enclosed steel girder system skid.
- Skid Approx. Dimensions 1 x 90' (L) x 14' (W) x 12' (H)

The total construction period was approximately five (5) months; this plant was delivered to site in early 2011 and is currently in operation. Combo Energy Services currently operates the plant, as well as provides all reporting data to AENV.

Canadian Armed Forces Base – 350 m³/day

Complete 350 m3/d potable water plant including pre-treatment, Nanofiltration, and storage for Canadian Armed Forces Base in Kandahar, Afghanistan. System designed and built for air transport in C-130 Hercules Heavy Cargo air Transport.

3 Introduction

FilterBoxx is pleased to provide the following proposal in response to HATCH's request for the supply of the following treatment plants:

H347084 – PM059 – Potable Water Treatment Plants
700 Person Goose Potable Water Treatment Plant
150 Person George Potable Water Treatment Plant

H347084 – PM060 – Sewage Water Treatment Plants
700 Person Goose Sewage Treatment Plant
150 Person George Sewage Treatment Plant
75 Person MLA Sewage Treatment Plant

H347084 – PM062 – Reverse Osmosis Water Treatment Plants
3 m³/h MLA Port Desalination and Potable Water Treatment Plant
MLA Port Desalination Feed/Dilution Pump Skid (Containerized)

Note: The 45.42 m³/h Goose Underground Mine Water Treatment Plant Reverse Osmosis Water Treatment Plant will follow in the next proposal.

FilterBoxx has utilized proven technology, selected for reliability, effluent quality and cost of operation.

The main treatment steps proposed for the **Potable Water Treatment Plants** are as follows:

- Multimedia filtration (MMF) for suspended solids removal
- Activated carbon filtration (ACF) for organics removal
- UV for primary disinfection
- Chlorination for secondary disinfection

The main treatment steps proposed for the **Sewage Water Treatment Plants** are as follows:

- 2 mm fine screen, with automatic spray wash system, and including screenings washing, compaction and screenings bagging system
- Flow equalization, sized for approximately 8 hours of hydraulic retention at the design average flow – this tank will provide attenuation of the peak wastewater flows typically observed in the mornings and evenings
- Activated sludge system for biological treatment of the wastewater, including bioreactor tank with fine bubble-diffused aeration system
- Membrane filtration system for separation of the treated water from the mixed liquor, including blower for membrane aeration and chemical dosing systems for membrane cleaning
- Treated water holding tank and effluent pumping system, providing a small storage volume and pressurized feed of effluent water for in-plant use, as well as providing a pressurized treated water effluent discharge
- UV disinfection for inactivation of any microorganisms that may exist in the treated effluent

The main treatment steps proposed for the **MLA Port Desalination and Potable Water Treatment Plant** are as follows:

- Multimedia filtration (MMF) for suspended solids removal
- Seawater Reverse Osmosis for removal of chlorides and total dissolved solids
- UV primary disinfection
- Chlorination for secondary disinfection

The proposed treatment systems are robust, reliable design with a compact footprint. Minimal site work will be required since all equipment is factory-assembled and installed into modified ISO container buildings prior to shipping to site

These are some of the design features FilterBoxx has included; please refer to the following sections for further detail on each of the proposed systems.

4 Design Basis – Potable Water Treatment Plants

4.1 Design Treatment Capacity

The capacity upon which the proposed potable water treatment system has been designed is summarized in the following table.

Site	Population	Average Day Flowrate
Goose	700 people	192.5 m³/day
George	150 people	41.25 m³/day

Notes:

1. The average flowrates are based on 275 L/person/day
2. The average flows will be generated within 22 hours. FilterBoxx has oversized the treatment system equipment slightly, in order to be able to provide the required capacity within 22 hours or less each day. This design approach will allow a minimum of 2 hours per day that may be used for automatic backwashing of the filters, when required.

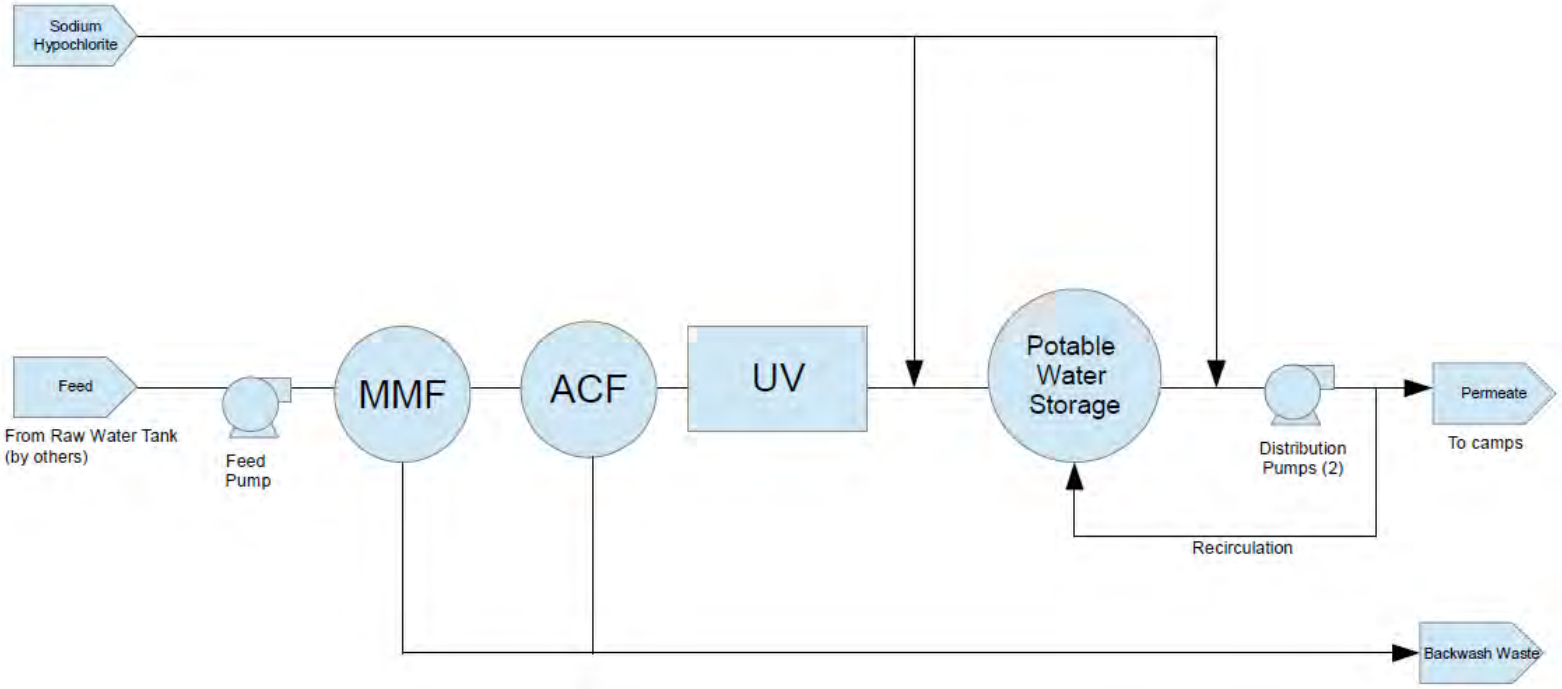
4.2 Influent Water Quality

The proposed treatment system is based on the Goose Source Water Quality Data provided (See Appendix A)

4.3 Effluent Water Quality

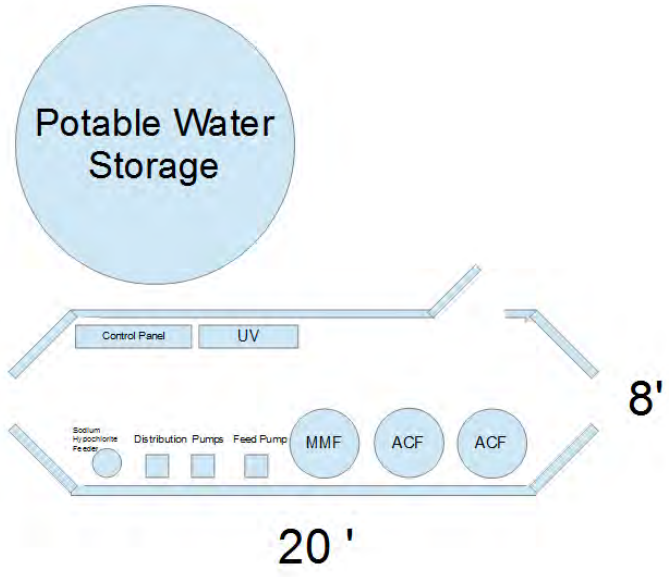
The final treated water quality will conform to the Guidelines for Canadian Drinking Water Quality (GCDWQ) based on the provision of influent water quality assumptions described in the previous section.

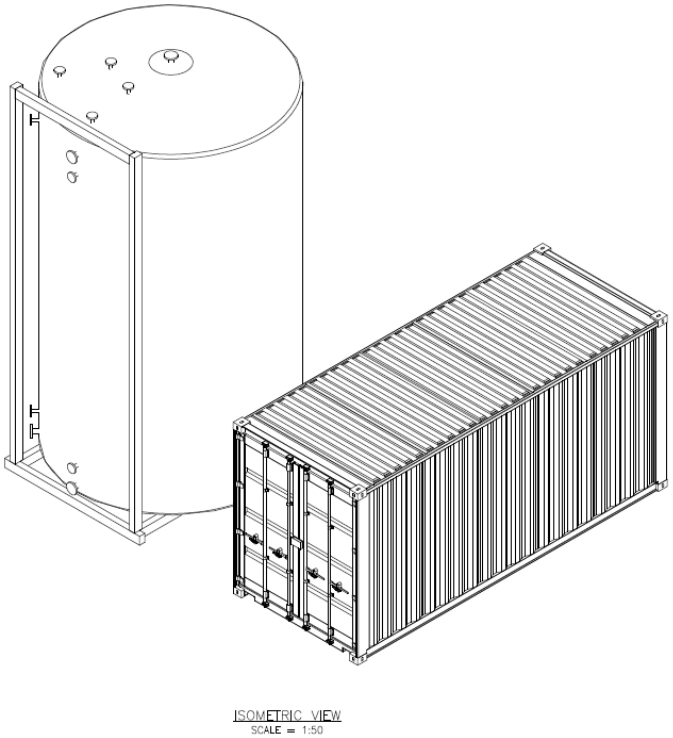
4.4 Process Flow Diagram



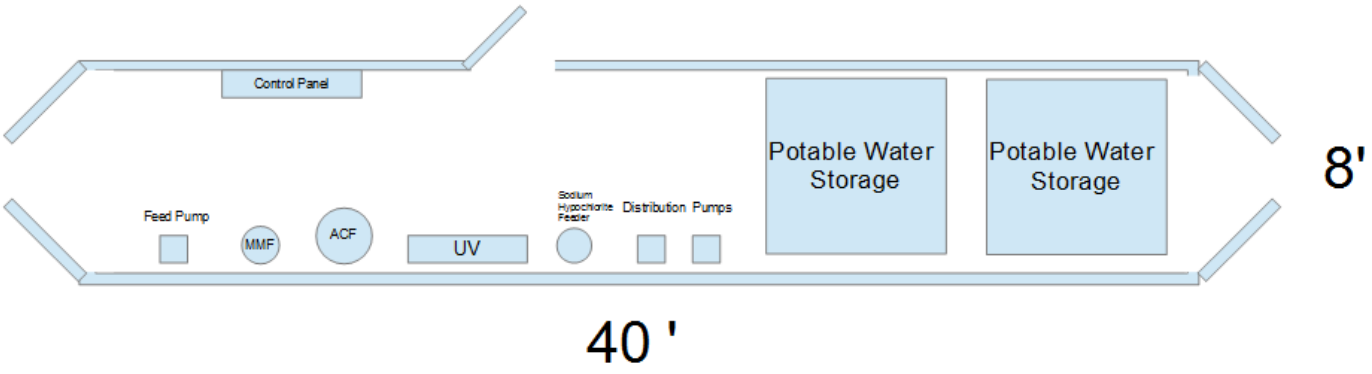
4.5 General Arrangement Drawings

Goose





George


Control Panel
Potable Water Storage
Potable Water Storage
8'
Feed Pump
MMF
ACF
UV
Sodium Hypochlorite Feeder
Distribution Pumps
40 '

5 Design Basis – Waste Water Treatment Plants

5.1 Design Treatment Capacity

The influent wastewater flow rate upon which the proposed treatment system has been designed is summarized in the following table.

Site	Population	Average Day Flowrate
Goose	700 people	192.5 m³/day
George	150 people	41.25 m³/day
MLA	75 people	20.63 m³/day

Note:
1. The average day flowrates are based on 275 L/person/day over a 24-hour period

5.2 Influent Wastewater Quality

The proposed treatment system is designed on the wastewater quality summarized in the following table.

Parameter	Value
BOD_5	280 mg/L
TSS	327 mg/L
TKN[1]	45 mg/L
NH_3-N[1]	36 mg/L
TP[1]	12 mg/L
Minimum Temperature[1]	10 °C
Alkalinity[2]	N/A

Notes:
1. Values are assumed
2. FilterBoxx assumes that sufficient influent alkalinity is available to ensure proper performance of the biological system. If influent alkalinity level is not sufficient, chemical addition will be required (by others).

5.3 Effluent Water Quality

The following treated effluent water quality is anticipated following equipment start-up and stabilization of the biological treatment system, and depending on the influent wastewater flow and quality provided in the previous sections

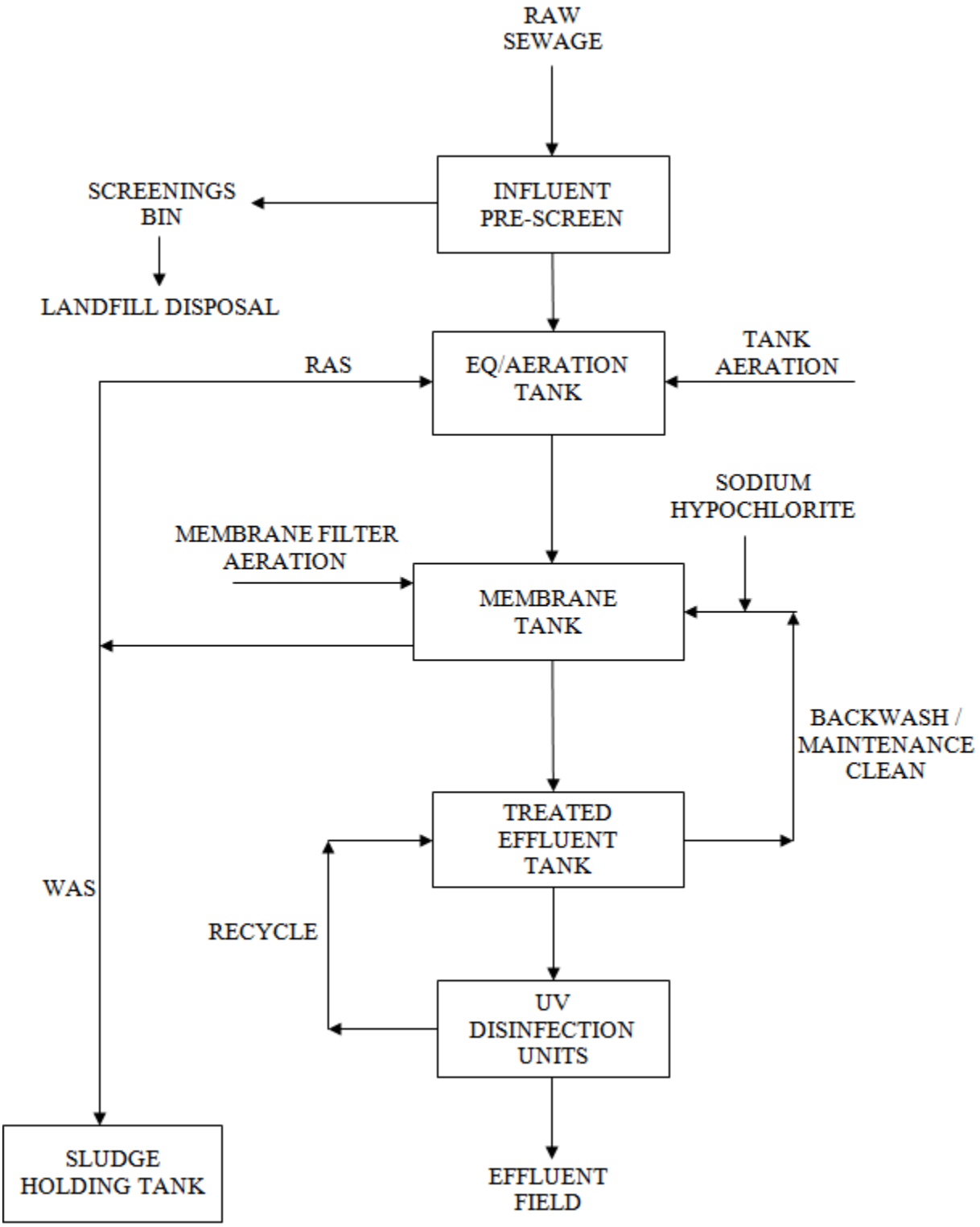
Parameter	Value
BOD_5	≤ 10 mg/L
TSS	≤ 10 mg/L
Turbidity	≤ 1 NTU

5.4 Influent Variability

Flows or loads in excess of the design criteria must be equalized prior to the MBR system. In the event that the influent exceeds the specifications used for the design basis, or the source of influent changes, the ability of the treatment system to produce the designed treated water quality and/or quantity may be impaired.

For robustness, the FilterBoxx system includes approximately 8 hours of flow equalization. This provides the downstream biological treatment process with a more consistent wastewater flow and loading and helps eliminate upsets.

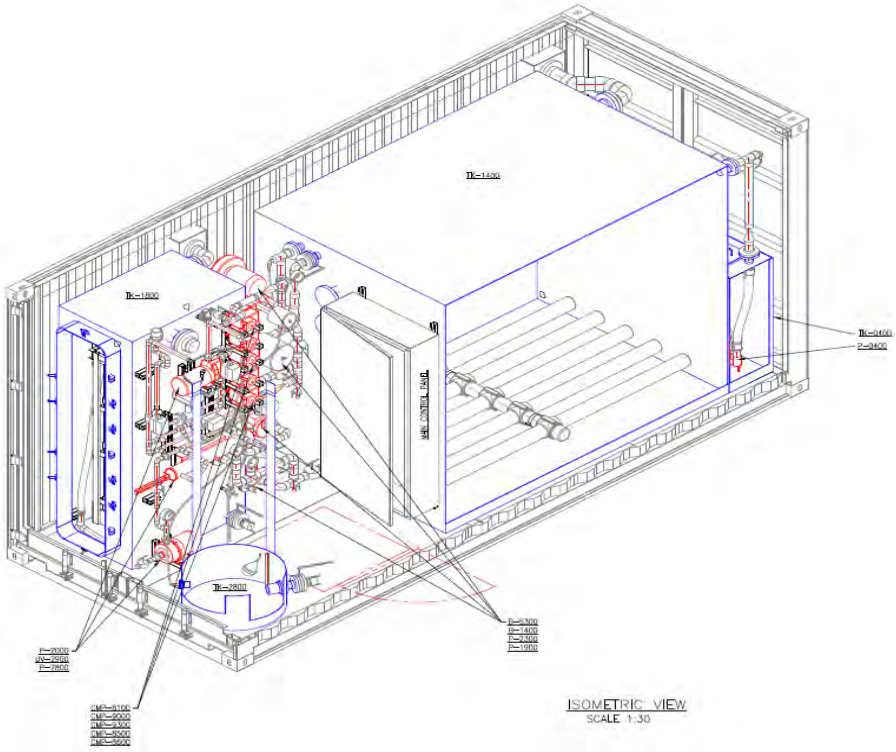
5.5 Process Flow Diagram



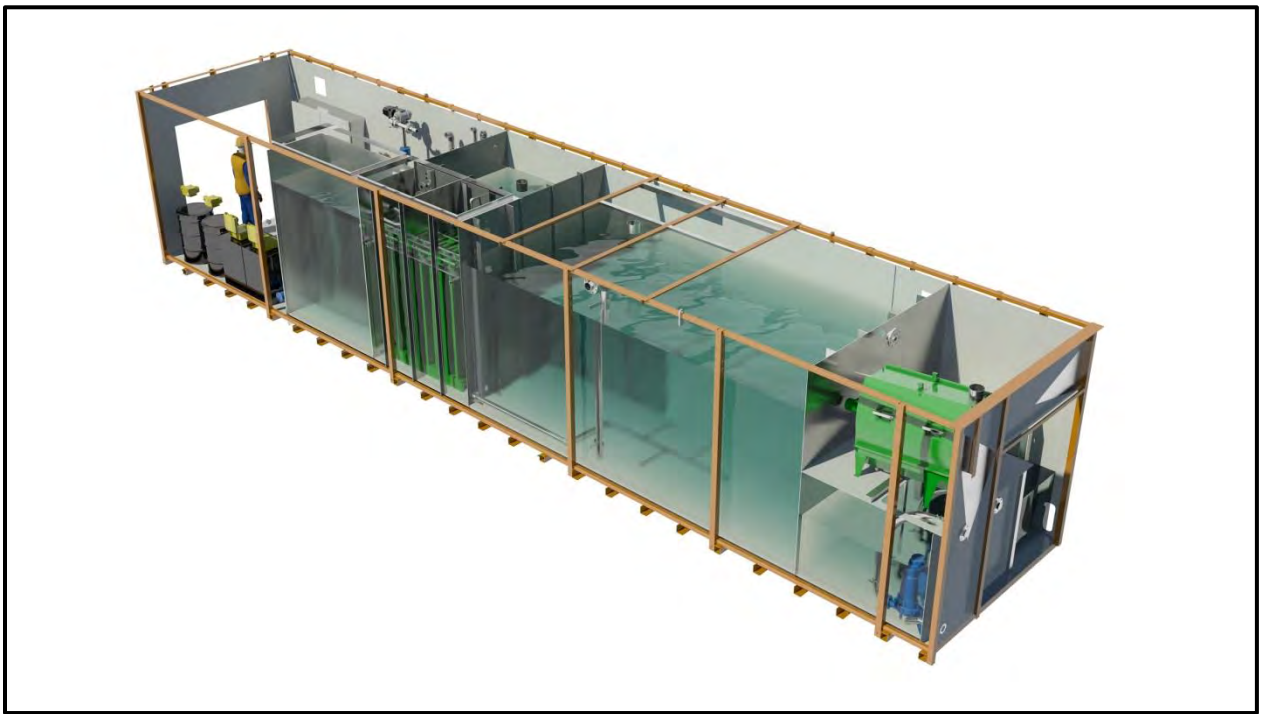
5

5.6 General Arrangement Drawing

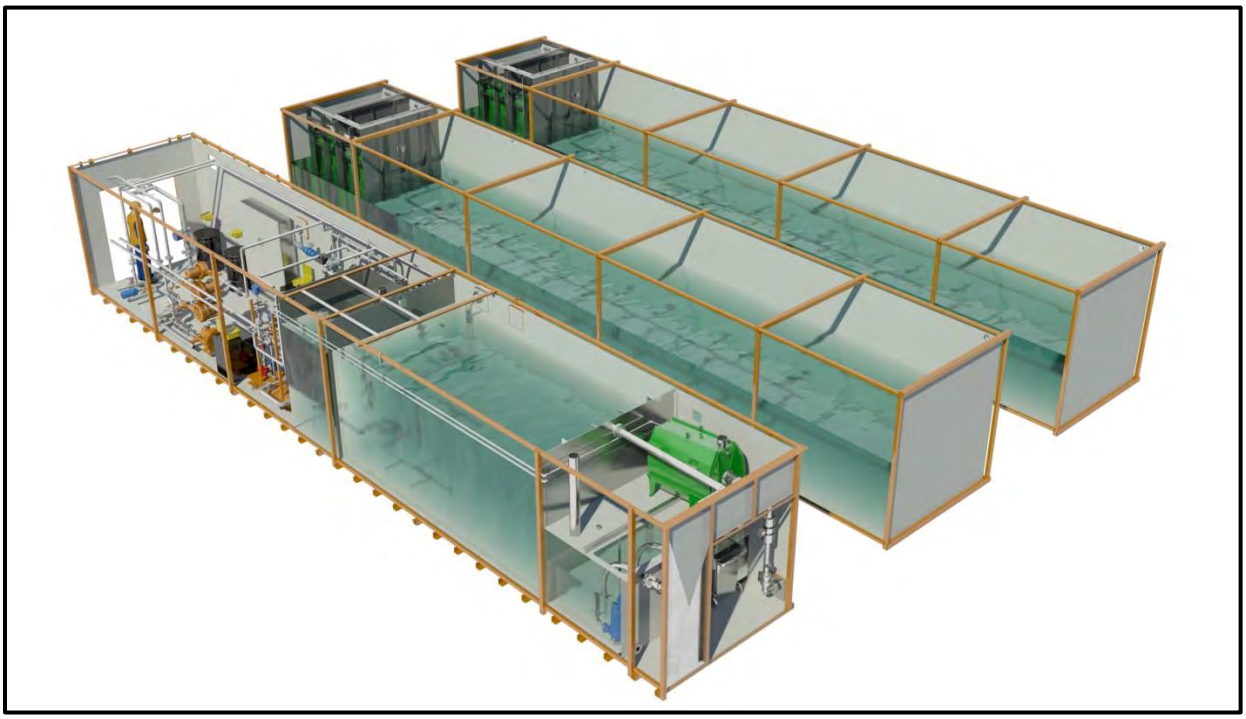
MLA Sewage Treatment Plant – 75 People



George Sewage Treatment Plant – 150 People



George Sewage Treatment Plant – 700 People



6 Design Basis – MLA Port Desalination and Potable Water Treatment Plant

6.1 Design Treatment Capacity

The proposed MLA Port Desalination and Potable Water Treatment Plant has been designed based on a flowrate of 2 m³/h for the potable water portion and 1 m³/h for fire water.

6.2 Influent Water Quality

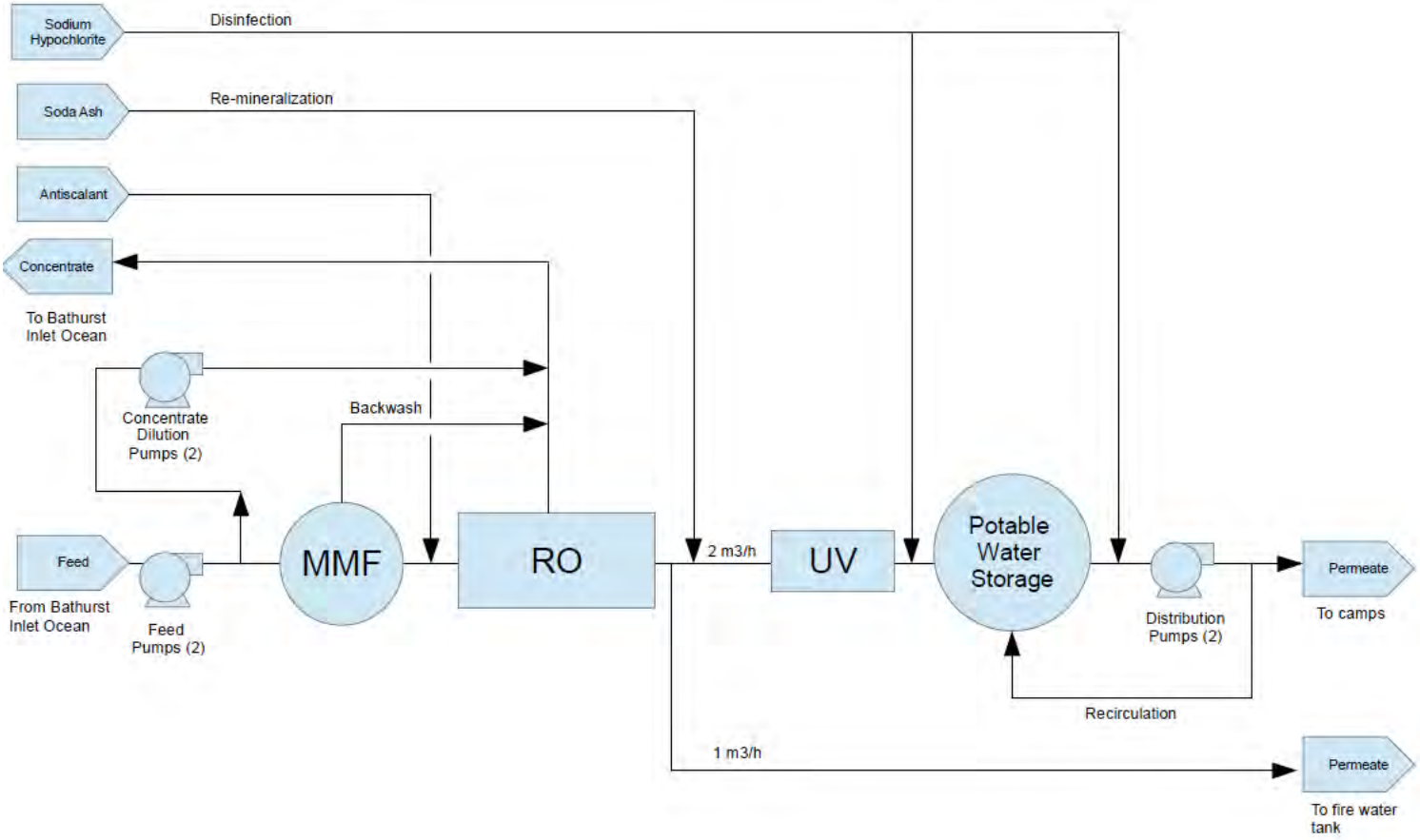
The proposed treatment system is based on Bathurst Inlet Ocean with a salinity of 26.8 ppt. As a water analysis was not provided FilterBoxx has assumed the following composition:

Parameter	Value
Chloride	18.980 mg/L as Cl
Sodium	10,556 mg/L as Na
Sulfate	2,649 mg/L as SO_4
Magnesium	1,262 mg/L as Mg
Calcium	400 mg/L as Ca
Potassium	380 mg/L as K
Bicarbonate	140 mg/L as HCO_3

6.3 Effluent Water Quality

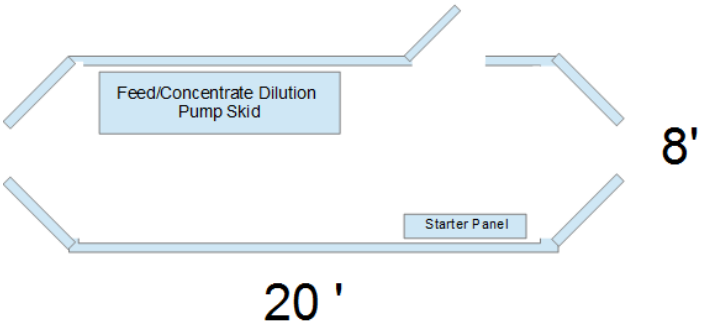
The final treated water quality will conform to the Guidelines for Canadian Drinking Water Quality (GCDWQ) based on the provision of influent water quality assumptions described in the previous section.

6.4 Process Flow Diagram

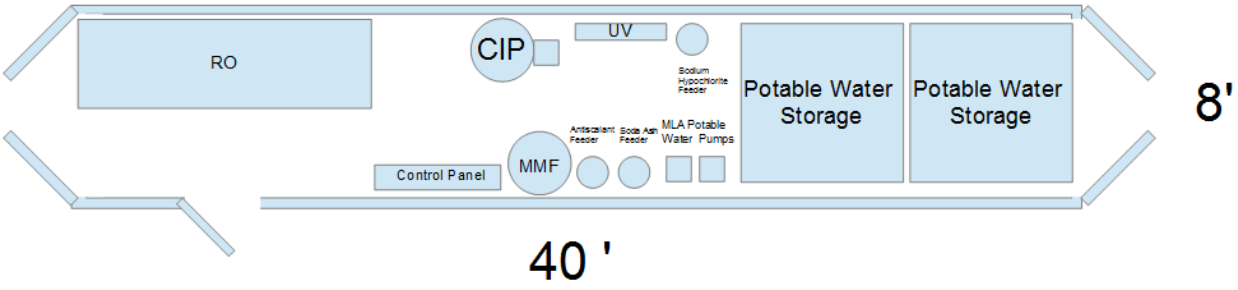


6.5 General Arrangement Drawing

MLA Port Desalination Feed/Dilution Pump Skid



MLA Port Desalination and Potable Water Treatment Plant



7 Scope of Supply by FilterBoxx

7.1 Design and Documentation

- Complete system process design and Process Flow Diagram (PFD)
- Process and Instrumentation Diagrams (P&ID)
- General Arrangement (GA) and layout drawings
- Building enclosure design
- Electrical drawings (Panel, etc)
- CSA/CEC approved installation
- Operation and Maintenance (O&M) Manuals
    - Process control documentation
    - Alerts / alarms listing
    - Control Sequencing Chart
    - Control Narrative
    - Equipment vendor data
    - Spare parts listing
    - Bill of Materials
    - Commissioning procedures
    - PLC control drawings

Note:
Two (2) hard and electronic copies of each piece of documentation are included with the supplied system.

7.2 Equipment - Potable Water Treatment Plants

Goose Potable Water Treatment Plant
The following equipment will be housed in one (1) 20 foot modified ISO container (20ft L x 8ft W x 9.5ft H) which includes insulation, heating, lighting, ventilation, double doors on each end, and one man door.

- Filter feed pump
- One (1x100%) multimedia filter:
    - 36” diameter
    - FRP vessels
    - 150psi maximum operating pressure
    - Media
    - Solid state microprocessor with front panel display
    - Time clock delayed backwash – controlled remotely by the central PLC
    - Inlet and outlet pressure gauges
    - Inlet flow transmitter
- Two (2x50%) activated carbon filters:
    - 36” diameter
    - FRP vessels
    - 150psi maximum operating pressure
    - Granular activated carbon media
    - Solid state microprocessor with front panel display
    - Time clock delayed backwash – controlled remotely by the central PLC
    - Inlet and outlet pressure gauges

    - Inlet flow transmitter
- UV disinfection system with 5 x25%Hallett 30 modules and isolation valves
- Chlorine disinfection system with two dosing locations
- Potable water distribution system including the following:
    - Two (2) distribution pumps
    - Free chlorine and pH analyzer
    - Pressure transmitter
    - Flow transmitter
    - Recirculation line with PRV
- Central control panel enclosure with PLC, HMI, and motor starters
- Power distribution/transformer panel
- Lighting panel

Note: System is design for a general purpose area classification. All electrical components and installation are NEMA 4.

An external potable water storage tank is also included:

- 400 BBL
- Insulated
- Natural Gas Heating
- Complete with L-skid

George Potable Water Treatment Plant

The following equipment will be housed in one (1) 40 foot modified ISO container (40ft L x 8ft W x 9.5ft H) which includes insulation, heating, lighting, ventilation, double doors on each end, and one man door.

- Filter feed pump
- One (1x100%) multimedia filter:
    - 16” diameter
    - FRP vessels
    - 150psi maximum operating pressure
    - Media
    - Solid state microprocessor with front panel display
    - Time clock delayed backwash – controlled remotely by the central PLC
    - Inlet and outlet pressure gauges
    - Inlet flow transmitter
- One (1x100%) activated carbon filters:
    - 24” diameter
    - FRP vessels
    - 150psi maximum operating pressure
    - Granular activated carbon media
    - Solid state microprocessor with front panel display
    - Time clock delayed backwash – controlled remotely by the central PLC
    - Inlet and outlet pressure gauges
    - Inlet flow transmitter
- UV disinfection system with 2x100%Hallett 30 modules and isolation valves
- Chlorine disinfection system with two dosing locations
- Potable water distribution system including the following:

  - Two (2) distribution pumps
  - Free chlorine and pH analyzer
  - Pressure transmitter
  - Flow transmitter
  - Recirculation line with PRV
- Potable water storage tanks
- Central control panel enclosure with PLC, HMI, and motor starters
- Power distribution/transformer panel
- Lighting panel

Note: System is design for a general purpose area classification. All electrical components and installation are NEMA 4

7.3 Equipment - Waste Water Treatment Plants

Goose Sewage Treatment Plant
The following equipment will be housed in three (1) 45 foot modified ISO container (45ft L x 8ft W x 9.5ft H) which includes insulation, heating, lighting, ventilation, double doors on each end, and one man door.

- Influent screening
  - 2mm
  - 304SS construction
  - Flow instrumentation and monitoring equipment
  - Transfer pumps
  - Screenings washing, compaction, bagging system
- Equalization/Bioreactor Tank
  - Flow, pressure and level control instrumentation
  - Aeration System
    - Regenerative blower with all required valves
    - Fine bubble air diffusers and distribution grid for bioreactor tank
- Membrane System
  - Submerged PVDF hollow fiber membrane
  - Aeration blower
  - Permeate pump
  - Backwash pump
  - Mixed liquor recirculation pump
  - Flow and pressure control/monitoring instrumentation
  - Chemical dosing system
    - Citric acid
    - Sodium hypochlorite
- Treated Water Effluent Storage / UF Backwash Tank
  - Level and flow control/monitoring instrumentation
  - Effluent distribution pump
- UV disinfection system (2x100% units), including isolation and bypass
- Central control panel enclosure with PLC, HMI, and motor starters
- Power distribution/transformer panel
- Lighting panel

Note: System is design for a general purpose area classification. All electrical components and installation are NEMA 4.

George Sewage Treatment Plant
The following equipment will be housed in one (1) 40 foot modified ISO container (40ft L x 8ft W x 9.5ft H) which includes insulation, heating, lighting, ventilation, double doors on each end, and one man door.

- Influent screening
  - 2mm
  - 304SS construction
  - Flow instrumentation and monitoring equipment
  - Transfer pumps
  - Screenings washing, compaction, bagging system
- Equalization/Bioreactor Tank
  - Flow, pressure and level control instrumentation
  - Aeration System
    - Regenerative blower with all required valves
    - Fine bubble air diffusers and distribution grid for bioreactor tank
- Membrane System
  - Submerged PVDF hollow fiber membrane
  - Aeration blower
  - Permeate pump
  - Backwash pump
  - Mixed liquor recirculation pump
  - Flow and pressure control/monitoring instrumentation
  - Chemical dosing system
    - Citric acid
    - Sodium hypochlorite
- Treated Water Effluent Storage / UF Backwash Tank
  - Level and flow control/monitoring instrumentation
  - Effluent distribution pump
- UV disinfection system (2x100% units), including isolation and bypass
- Central control panel enclosure with PLC, HMI, and motor starters
- Power distribution/transformer panel
- Lighting panel

Note: System is design for a general purpose area classification. All electrical components and installation are NEMA 4.

MLA Sewage Treatment Plant
The following equipment will be housed in one (1) 20 foot modified ISO container (20ft L x 8ft W x 9.5ft H) which includes insulation, heating, lighting, ventilation, double doors on each end, and one man door.

- Influent screening
  - 2mm
  - 304SS construction
  - Flow instrumentation and monitoring equipment
  - Transfer pumps

    - Screenings washing, compaction, bagging system
- Equalization/Bioreactor Tank
    - Flow, pressure and level control instrumentation
    - Aeration System
        - Regenerative blower with all required valves
        - Fine bubble air diffusers and distribution grid for bioreactor tank
- Membrane System
    - Submerged PVDF hollow fiber membrane
    - Aeration blower
    - Permeate pump
    - Backwash pump
    - Mixed liquor recirculation pump
    - Flow and pressure control/monitoring instrumentation
    - Chemical dosing system
        - Citric acid
        - Sodium hypochlorite
- Treated Water Effluent Storage / UF Backwash Tank
    - Level and flow control/monitoring instrumentation
    - Effluent distribution pump
- UV disinfection system (2x100% units), including isolation and bypass
- Central control panel enclosure with PLC, HMI, and motor starters
- Power distribution/transformer panel
- Lighting panel

Note: System is design for a general purpose area classification. All electrical components and installation are NEMA 4.

7.4 Equipment – MLA Port Desalination and Potable Water Treatment Plant

MLA Port Desalination Feed/Dilution Pump Skid
The following equipment will be housed in one (1) 20 foot modified ISO container (20ft L x 8ft W x 9.5ft H) which includes insulation, heating, lighting, ventilation, double doors on each end, and one man door.

- One Epoxy Painted, Structural Carbon Steel Skid & Frame containing the following:
    - Two (2x100%) MLA Desalination feed pumps each complete with inlet and discharge isolation valves, discharge check valve and pressure indicator
    - Two (2x100%) MLA Concentrate Dilution pumps each complete with inlet and discharge isolation valves, discharge check valve and pressure indicator
- Motor starter panel
- Power distribution/transformer panel
- Lighting panel

Note: System is design for a general purpose area classification. All electrical components and installation are NEMA 4.

MLA Port Desalination and Potable Water Treatment Plant

The following equipment will be housed in one (1) 40 foot modified ISO container (40ft L x 8ft W x 9.5ft H) which includes insulation, heating, lighting, ventilation, double doors on each end, and one man door.

- One (1x100%) multimedia filter:
  - 30" diameter
  - FRP vessels
  - 150psi maximum operating pressure
  - Media
  - Solid state microprocessor with front panel display
  - Time clock delayed backwash – controlled remotely by the central PLC
  - Inlet and outlet pressure gauges
  - Inlet flow transmitter
- Antiscalant feed system
- Seawater Reverse Osmosis skid consisting of the following items:
  - Three (3) 8" diameter membrane housings, each with three (3) SWRO membrane elements
  - 1-micron cartridge filter
  - High pressure booster pump complete with inlet and discharge isolation valves and discharge check valve
  - Epoxy Painted, Structural Carbon Steel Skid & Frame
  - Schedule 80 PVC Low Pressure Piping
  - Duplex Stainless Steel High Pressure Piping
  - Instrumentation:
    - Permeate and concentrate flow transmitters
    - Pump inlet and outlet pressure switches
    - Pressure gauges for measuring pre-filter, post-filter, NF feed, NF permeate, and NF concentrate pressures
    - Permeate conductivity analyzer with temperature element
- RO CIP system consisting of the following:
  - Recirculation pump
  - HDPE Tank
  - Immersion heater
  - Level switch
  - Manual CIP chemical addition
- Soda ash feed system for re-mineralization
- UV disinfection system with 2x100%Hallett 30 modules and isolation valves
- Chlorine disinfection system with two dosing locations
- Potable water distribution system including the following:
  - Two (2) distribution pumps
  - Free chlorine and pH analyzer
  - Pressure transmitter
  - Flow transmitter
  - Recirculation line with PRV
- Potable water storage tanks
- Central control panel enclosure with PLC, HMI, and motor starters
- Power distribution/transformer panel
- Lighting panel

Note: System is design for a general purpose area classification. All electrical components and installation are NEMA 4

7.5 General Safety Equipment

The system will be equipped with the following safety equipment:

- Fire extinguisher(s)
- Emergency lighting
- Exit sign(s)
- Labeling
    - Hazards
    - Equipment
    - Vessels
    - Plumbing
    - Electrical

7.6 In-Building Installation

All equipment provided by FilterBoxx is pre-installed within modified ISO container buildings and includes the following:

- Electrical terminations
- Mechanical installations
- Interconnecting piping (Schedule 80 PVC)
- PLC and HMI programming
- Shop testing

7.7 On-Site Services

FilterBoxx will provide personnel for installation assistance, start-up, commissioning, operator training and performance testing on a per diem basis. Time on site will be charged at FilterBoxx standard rates with travel, living expenses charged at cost plus 20%.

7.8 Remote Monitoring

Remote monitoring is included with each FilterBoxx system.

- Reduces the Operations Staff response times when there are process, mechanical and/or electrical issues
- Reduces FilterBoxx Process Services and Support response time when there are process, mechanical and/or electrical issues
- Reduces travel expenses when requiring system programming changes
- Provides additional security and support to the system Operations Staff
- Improves troubleshooting ability from Operations Staff and FilterBoxx Process Services and Support staff

Note:
Ethernet connection(s) and internet connection must be provided by owner

8 Consumables

H347084 – PM059 – Potable Water Treatment Plants

700 Person Goose Potable Water Treatment Plant

12.5% Sodium Hypochlorite	1500 L/year

150 Person George Potable Water Treatment Plant

12.5% Sodium Hypochlorite	322 L/year

H347084 – PM060 – Sewage Water Treatment Plants

700 Person Goose Sewage Treatment Plant

12.5% Sodium Hypochlorite	624 L/year
50% Citric Acid	60 L/year

150 Person George Sewage Treatment Plant

12.5% Sodium Hypochlorite	208 L/year
50% Citric Acid	20 L/year

75 Person MLA Sewage Treatment Plant

12.5% Sodium Hypochlorite	104 L/year
50% Citric Acid	10 L/year

H347084 – PM062 – Reverse Osmosis Water Treatment Plants

3 m^3/h MLA Port Desalination and Potable Water Treatment Plant

Soda Ash	110 lbs/year
Vitec 2000 Antiscalant (Avista Technologies)	135 lbs/year
12.5% Sodium Hypochlorite	375 L/year

9 Manpower Requirements

Operator attention is typically required approximately 1 hour per day per plant, up to approximately 10 hours per week, to complete typical maintenance, log sheets, operational checks, etc.

10 Scope of Supply by Others

All required items or services not specifically listed in the FilterBoxx scope of supply are included in the Customer's scope. Specifically, the following items are the responsibility of the customer.

Equipment – Potable Water Treatment Plants

- Raw water storage tank with level transmitter and and/or level switches

Equipment – Waste Water Treatment Plants

- Waste water collection sumps and/or wet wells
- Waste water collection transfer pumps
- Grease interceptors

Shipping and Logistics

- Shipping to site with crane services for off-loading and placement at site
- Storage of equipment (if required)
- Disposal of packing materials

Site Installation

- Supervision of off-loading upon arrival to site
- Exterior piping, heat traced and insulated
- Electrical and connections
    - Local electrical connections from the customer's main distribution panel
    - System 600 VAC power supply by the client; client is responsible to ensure FilterBoxx is provided the loads and voltage required.
    - Separate generator and uninterruptable power supply (UPS)
    - Grounding ring for buildings
    - Sprinkler systems
    - Telecommunications and security alarm systems.
- Site preparation including but not limited to:
    - Ground works and civil work of any kind including but not limited to engineering, design, drawings or documentation
    - Site excavation and/or backfilling, hot fill
    - Clearing of site debris
    - Snow removal
    - Final grading on site
    - Free and unrestricted access to the site for commissioning
    - All site surveys, drawings and documents required based on owner supplied benchmarks; labour and survey equipment, provision of all site as-built drawings and documents, and on-going of same as required by the Owner through the duration of the site construction contract
    - Site lighting
- Foundation
    - Compacted gravel base, rig mats or concrete foundation
    - If required, considerations can be made for the installation of the modular buildings on piles, supplied by others
    - Exterior platforms and ramps (if required)

  - Scaffolding (if required)
  - Equipment for reaching above arms reach (if required)
- Supply of heavy equipment if required
  - Zoom boom
  - Forklifts
  - Loaders
  - Man lifts

Hauling and/or Disposal

- Water for start-up, pre-commissioning and hydro-testing of tanks on site, final commissioning, and /or continual operation
- Wastewater hauling
- Sludge hauling

Consumables

- All consumables are the responsibility of the client.
- Secondary containment of chemical tanks/systems, if required

Permitting

- FilterBoxx has not included any permit costs, including but not limited to environmental, occupancy and building construction permits.
- FilterBoxx will assist the client in obtaining permits by supplying information that is applicable to the FilterBoxx scope of supply.

Water Sampling and Analysis

The client is to make arrangements for lab testing during the following stages:

- System start-up, commissioning, performance testing
- Normal operation

Site Safety

- FilterBoxx pricing does not include the provision of a dedicated site safety lead. These duties will be performed by the site manager with support from FilterBoxx HSE Personnel

Room and Board

- Accommodations for any FilterBoxx personnel while on site completing services for the project
- Meals for any FilterBoxx personnel while on site completing services for the project

11 Commercial Offer

11.1 Pricing

H347084 – PM059 – Potable Water Treatment Plants

700 Person Goose Potable Water Treatment Plant	$395,900 CAD
150 Person George Potable Water Treatment Plant	$328,600 CAD

H347084 – PM060 – Sewage Water Treatment Plants

700 Person Goose Sewage Treatment Plant	$885,000 CAD
150 Person George Sewage Treatment Plant	$546,000 CAD
75 Person MLA Sewage Treatment Plant	$399,000 CAD

- **Sludge dewatering system and sludge drying system installed in 40' ISO container building with each sewage treatment plant**

$ 380,000 CAD each

H347084 – PM062 – Reverse Osmosis Water Treatment Plants

MLA Port Desalination Feed/Dilution Pump Skid	$188,600 CAD
3 m³/h MLA Port Desalination and Potable Water Treatment Plant	$475,000 CAD
45.42 m³/h Goose Underground Mine Water Treatment Plant Reverse Osmosis Water Treatment Plant	To follow in next proposal

Notes:

- Pricing is quoted in Canadian dollars.
- Pricing is net, taxes are not included.
- Prices are budgetary only and do not constitute an offer of sale.
- No allowances have been included in the pricing for bonds of any kind.
- Installation assistance, start-up, commissioning, operator training, and performance testing are not included in this price. If required, this time would be charged at FilterBoxx Standard Rates. Travel and living expenses would also be charged at cost +20%.
- FilterBoxx has not included a provision for engineering meetings with the client or the Client's engineer. If required, this time would be charged at FilterBoxx Standard Rates. Travel and living expenses would also be charged at cost +20%.
- Pricing is based on the use of FilterBoxx-standard design, equipment, engineering submittals, materials of construction, and QA/QC procedures and documentation.
- Engineering deliverables are anticipated to be submitted as Issued for Information only, as the proposed treatment systems are standard, pre-engineered systems.

11.2 Payment Schedule

The following payment terms are provided for negotiation and mutual agreement:

- Upon Issue of Purchase Order 15%
- Upon Drawing Submission 25%
- Upon Commencement of Equipment Installation/Piping 25%
- Upon Notice of Equipment Ready to Ship 25%
- Upon Delivery of Equipment to Job Site 5%
- Upon Successful Commissioning of the System Provided 5%

11.3 Cancellation Schedule

Cancellation fee is determined by multiplying the "Purchase Price" indicated above by the percentage in the table below. In order to avail itself of the right to cancel the Equipment Package Order, the cancellation payment must be received within 5 business days after the Client provides the cancellation notice:

- Prior to Equipment Order 10%
- After Major Equipment Order – Prior to Equipment Delivery 25%
- After Major Equipment Order – After Equipment Delivery 50%
- Prior to Commencement of Equipment Installation/Piping 90%
- After Commencement of Equipment Installation/Piping 95%
- After Commencement of Fabrication (100% of Work in Progress) 100%

11.4 Delivery Schedule

Based on committed projects and production schedules at this time, the proposed equipment can be ready to be delivered to site approximately 20-24 weeks after receipt of order.

11.5 Shipping

Shipping is FCA (Incoterms 2010) FilterBoxx fabrication shop.

11.6 Terms and Conditions

This proposal is issued based on the use of FilterBoxx standard Terms and Conditions of Sale. Should this proposal be considered favorable, FilterBoxx and the client shall review the terms and conditions to arrive at a mutually-beneficial set of contract T&C's; specific comments regarding the terms and conditions provided with the revised Request for Proposal have not been included in this proposal.

11.7 Warranty

FilterBoxx will, at its option, repair or replace any defects in materials or workmanship in any Product(s) manufactured or supplied by FilterBoxx which appear within the earlier of twelve (12) months from the date of Substantial Mechanical Completion acceptance of the Company's Product(s) by the Buyer or eighteen (18) months from the date of shipment of the Company's

Product(s). Package plants not immediately commissioned require the Buyer to purchase a preservation plan to insure manufacturers warranties remain in effect until the Package Plant is commissioned. Mechanical Substantial Completion sign-off denotes the beginning of the Warranty Period. All costs of dismantling, reinstallation, freight and the time and expenses of the Company's personnel and representatives for site travel and diagnosis under this warranty clause shall be borne by the Buyer unless accepted in writing by the Company. Modifications or equipment changes requested by the client will be considered by FilterBoxx provided the client agrees to the cost and schedule impacts. Any notice, disclosure or other communication required or permitted to be given by either Party to the other must be in writing, and must be delivered by hand delivery, courier, mail (if mailed from within Canada), facsimile, or email to the respective address, facsimile number or email address.

Warranty Exclusions
FilterBoxx does not warrant the performance of any Product(s) and/or Services provided by it to the extent that the actual operating or other conditions differ from the specifications, information, representation of operating conditions or other data supplied by the Buyer for the purpose of the selection or design of the Product(s) and/or Services to be provided by FilterBoxx. Consumables are excluded. This limited warranty shall not apply to any repair or replacement of Product(s) caused by abuse, accidental damage, unauthorized modifications, misuse, improper installation, use of unauthorized parts, unsuitable power sources or environmental conditions, improper application, normal wear and tear, corrosion or inadequate or improper preventative maintenance of the Product(s) during the warranty period;

THE WARRANTIES AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE. EXCEPT AS EXPRESSLY PROVIDED HEREIN, THERE ARE NO OTHER REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTIBILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO THE PRODUCT(S), OR SERVICES.

11.8 Limitation of Remedy and Liability

FilterBoxx shall not be liable for damages caused by delay in performance. The remedies of the Buyer set forth in this agreement are exclusive. In no event, regardless of the form of the claim or cause of action (whether based in contract, infringement, negligence, strict liability, other tort or otherwise), shall the Company's liability to the Buyer and/or its customers exceed the price to the Buyer of the specific Product(s) and/or Services provided by the Company giving rise to the claim or cause of action. The Buyer agrees that in no event shall the Company's liability to the Buyer and/or its customers extend to include incidental, consequential or punitive damages. The term "consequential damages" shall include, but not be limited to, loss of anticipated profits, revenue or use and costs incurred including without limitation for capital, fuel and power, and claims of the buyer.

Appendix A – Goose Source Water Quality

Goose Source Water Quality Data

Sample ID			GOOSE LAKE CENTRAL (1M)	GOOSE FW FDUP 3	GOOSE LAKE NECK (1M)	GOOSE LAKE TAIL (1M)	GOOSE LAKE TAIL (5.5M)	FIELD BLANK GOOSE FW
Date Sampled			04/11/2012	04/11/2012	04/11/2012	04/11/2012	04/11/2012	04/11/2012
Physical Tests								
Conductivity	COND-L	uS/cm	65.7	61.8	68.9	66.7	69.9	<2.0
Hardness (as CaCO3)	HARD	mg/L	22.4	22.1	25.2	25	26	<0.50
pH	PH-L	pH unit	6.82	8.05	8.06	8.09	8.06	5.65
Total Suspended Solids	TSS	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	TDS	mg/L	48	45	46	45	41	<10
Turbidity	TURB	NTU	0.31	0.29	0.51	0.27	0.40	<0.10
Anions and Nutrients								
Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Bica	mg/L	7.4	6.6	7.3	8.1	8.9	<2.0
Alkalinity, Carbonate (as CaCO3)	ALK-C	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as CaCO3)	Alkalinity, Hyd	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as CaCO3)	ALKT	mg/L	7.4	6.6	7.3	8.1	8.9	<2.0
Ammonia, Total (as N)	N-NH3	mg/L	0.0205	0.0220	0.0184	0.0225	0.0185	<0.0050
Bromide (Br)	BR-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	CL-D	mg/L	8.44	7.98	8.87	8.24	8.50	<0.50
Fluoride (F)	F-D	mg/L	0.028	0.026	0.026	0.026	0.022	<0.020
Nitrate (as N)	N-NO3	mg/L	0.0109	0.0089	0.0166	0.0097	0.0161	<0.0050
Nitrite (as N)	N-NO2	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	N-KJ	mg/L	0.266	0.245	0.249	0.234	0.285	<0.050
Orthophosphate-Dissolved (as P)	PO4-ORTHO	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	PO4-T	mg/L	0.0032	0.0033	0.0051	0.0045	0.0040	<0.0020
Sulfate (SO4)	SO4-D	mg/L	8.93	8.53	9.11	8.85	9.06	<0.50
Cyanides								
Cyanide, Total	CN-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon								
Total Organic Carbon	TOC	mg/L	4.87	4.85	5.55	5.40	5.39	<0.50
Total Metals								
Aluminum (Al)-Total	AL-T	mg/L	0.0237	0.0259	0.0703	0.0237	0.0219	<0.0030
Antimony (Sb)-Total	SB-T	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Arsenic (As)-Total	AS-T	mg/L	0.000272	0.000243	0.000288	0.000286	0.000256	<0.000030
Barium (Ba)-Total	BA-T	mg/L	0.0106	0.0105	0.0131	0.0123	0.0137	<0.000050
Beryllium (Be)-Total	BE-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Bismuth (Bi)-Total	BI-T	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	B-T	mg/L	0.0059	0.0064	0.0066	0.0062	0.0063	<0.0050
Cadmium (Cd)-Total	CD-T	mg/L	0.000011	<0.000010	0.000012	0.000010	0.000011	<0.000010
Calcium (Ca)-Total	CA-T	mg/L	5.27	5.21	5.86	5.62	6.08	<0.020
Chromium (Cr)-Total	CR-T	mg/L	0.00021	0.00020	0.00028	0.00021	0.00020	<0.00010
Cobalt (Co)-Total	CO-T	mg/L	0.00029	0.00031	0.00031	0.00021	0.00028	<0.00010
Copper (Cu)-Total	CU-T	mg/L	0.00230	0.00229	0.00267	0.00254	0.00361	<0.00050
Iron (Fe)-Total	FE-T	mg/L	0.010	<0.010	0.062	0.014	0.025	<0.010
Lead (Pb)-Total	PB-T	mg/L	0.000693	0.000400	0.000160	0.000098	0.000068	<0.000050
Lithium (Li)-Total	LI-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	MG-T	mg/L	2.57	2.54	2.76	2.74	2.84	<0.0050
Manganese (Mn)-Total	MN-T	mg/L	0.00428	0.00435	0.00440	0.00579	0.00903	<0.000050
Mercury (Hg)-Total	HG-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	MO-T	mg/L	<0.000050	0.000053	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	NI-T	mg/L	0.00744	0.00745	0.00864	0.00761	0.00796	<0.00010
Phosphorus (P)-Total	P-T	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	K-T	mg/L	0.509	0.502	0.556	0.570	0.585	<0.050

Goose Source Water Quality Data

Sample ID			GOOSE LAKE CENTRAL (1M)	GOOSE FW FDUP 3	GOOSE LAKE NECK (1M)	GOOSE LAKE TAIL (1M)	GOOSE LAKE TAIL (5.5M)	FIELD BLANK GOOSE FW
Date Sampled			04/11/2012	04/11/2012	04/11/2012	04/11/2012	04/11/2012	04/11/2012
Selenium (Se)-Total	SE-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010
Silicon (Si)-Total	SI-T	mg/L	0.968	0.960	1.10	0.993	1.06	<0.050
Silver (Ag)-Total	AG-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	NA-T	mg/L	1.13	1.12	1.26	1.26	1.28	<0.010
Strontium (Sr)-Total	SR-T	mg/L	0.0245	0.0245	0.0271	0.0274	0.0295	<0.00010
Thallium (Tl)-Total	TL-T	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)-Total	SN-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	TI-T	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	U-T	mg/L	0.000011	0.000011	0.000015	0.000011	<0.000010	<0.000010
Vanadium (V)-Total	V-T	mg/L	<0.000050	<0.000050	0.000128	<0.000050	<0.000050	<0.000050
Zinc (Zn)-Total	ZN-T	mg/L	0.0032	0.0031	0.0043	0.0031	0.0044	<0.0030
Dissolved Metals								
Dissolved Metals Filtration Location	Dissolved Me	(blank)	-	-	-	-	-	-
Aluminum (Al)-Dissolved	AL-D	mg/L	0.0209	0.0211	0.0219	0.0201	0.0198	<0.0030
Antimony (Sb)-Dissolved	SB-D	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Arsenic (As)-Dissolved	AS-D	mg/L	0.000237	0.000254	0.000278	0.000259	0.000226	<0.000030
Barium (Ba)-Dissolved	BA-D	mg/L	0.0102	0.0101	0.0126	0.0122	0.0134	<0.000050
Beryllium (Be)-Dissolved	BE-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Bismuth (Bi)-Dissolved	BI-D	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	B-D	mg/L	0.0051	0.0056	0.0061	0.0053	0.0052	<0.0050
Cadmium (Cd)-Dissolved	CD-D	mg/L	0.000011	<0.000010	0.000013	<0.000010	0.000012	<0.000010
Calcium (Ca)-Dissolved	CA-D	mg/L	4.95	4.86	5.65	5.57	5.82	<0.020
Chromium (Cr)-Dissolved	CR-D	mg/L	0.00017	0.00018	0.00020	0.00017	0.00016	<0.00010
Cobalt (Co)-Dissolved	CO-D	mg/L	0.00022	0.00022	0.00026	0.00018	0.00026	<0.00010
Copper (Cu)-Dissolved	CU-D	mg/L	0.00209	0.00205	0.00234	0.00217	0.00209	<0.00050
Iron (Fe)-Dissolved	FE-D	mg/L	<0.010	<0.010	<0.010	<0.010	0.010	<0.010
Lead (Pb)-Dissolved	PB-D	mg/L	0.000307	0.000210	0.000123	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	LI-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	MG-D	mg/L	2.44	2.41	2.69	2.70	2.79	<0.0050
Manganese (Mn)-Dissolved	MN-D	mg/L	0.00298	0.00309	0.00388	0.00523	0.00830	<0.000050
Mercury (Hg)-Dissolved	HG-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	MO-D	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	NI-D	mg/L	0.00710	0.00715	0.00831	0.00740	0.00769	<0.00010
Phosphorus (P)-Dissolved	P-D	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	K-D	mg/L	0.492	0.478	0.542	0.565	0.577	<0.050
Selenium (Se)-Dissolved	SE-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	SI-D	mg/L	0.913	0.901	1.02	0.974	1.04	<0.050
Silver (Ag)-Dissolved	AG-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	NA-D	mg/L	1.07	1.06	1.22	1.24	1.28	<0.010
Strontium (Sr)-Dissolved	SR-D	mg/L	0.0233	0.0228	0.0264	0.0271	0.0281	<0.00010
Thallium (Tl)-Dissolved	TL-D	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)-Dissolved	SN-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	TI-D	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	U-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	V-D	mg/L	<0.000050	<0.000050	0.000053	<0.000050	<0.000050	<0.000050
Zinc (Zn)-Dissolved	ZN-D	mg/L	<0.0030	<0.0030	0.0037	<0.0030	<0.0030	<0.0030

Appendix B – Technical Data Sheet/Questionnaires

Item	Rev	Title	Unit	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Notes
				Goose Potable Water Treatment Plant (2290-XM-012)		George Potable Water Treatment Plant (3360-XM-XXX)		
SECTION A - PROCESS / DESIGN CRITERIA								
A01		*Throughput:*						
A01.1		Flowrate / Person / Day, Design	l/person/day	275		275		
A01.2		Number of people system services	-	700		150		
A01.3		Throughput, Nominal	m^3/hr	8.02		1.72		
A01.4		Throughput, Design	m^3/hr	9.22		1.98		
A01.5		Throughput, Peak	m^3/hr	80.21		17.19		
A01.6		Peak Throughput Duration	minutes	90, 2 times/ day		90, 2 times/ day		
A02		Fresh Water Quality Data		See attached document entitled: "Goose Source Water Quality Data"		Not Available, Use "Goose Source Water Quality Data"		See Note 2
A03		Fresh Water Minimum Temperature	Deg. C.	2		2		
A04		Potable Water Quality Requirements		per latest Health Canada Guidelines for Canadian Drinking Water Quality.		per latest Health Canada Guidelines for Canadian Drinking Water Quality.		
A05		*Available Electrical Power:*						
A05.1		Low Voltage Power	V/PH/Hz	600/3/60		600/3/60		See Note 1
A06		*Operating Conditions:*						
A06.1		Location	mm	Outside				
A06.2		Extreme Operating Temperature (Min/ Max)	Deg. C.	See document H347084-S003120		See document H347084-S003120		
A7		Duty		24 hours per day/ 7 days per week Operation	Yes	24 hours per day/ 7 days per week Operation	Yes	
SECTION B - TECHNICAL								
B01		Treatment Type			MMF>ACF>UV>Cl		MMF>ACF>UV>Cl	
B01.1		Disinfection System	-	UV & Chlorination	Yes	UV & Chlorination	Yes	
B01.2		Chlorine type	-		12.5% sodium hypochlorite		12.5% sodium hypochlorite	
B02		Installed Standbys for Critical Equipment (eg. pumps)	yes/ no	yes	no	yes	no	
B03		Total connected nameplate power	hp		20		15	
B04		Enclosure Type (eg. container)	-		container		container	
B05		Number of Modules	-		1 (+ tank)		1	
B06		Safety Systems for Reagent Handling (eg. safety shower/ eyewash)						

Item	Rev	Title	Unit	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Notes
				Goose Potable Water Treatment Plant (2290-XM-012)		George Potable Water Treatment Plant (3360-XM-XXX)		
SECTION C- Installation Weights and Dimensions								
C01		*Heaviest Installation Lift:*						
C01.1		Item	-					
C01.2		Weight	kg		12,000		18,000	
C01.3		Dimensions, L x W x H	m		6.1 x 2.4 x 2.9		12.2 x 2.4 x 2.9	
SECTION D- System Description								
Potable water is required at two separate mine sites for all consumptive and domestic uses including food preparation, clean-up, toilets, urinals, showers, faucets, laundry, safety shower stations, eye wash stations and laboratory use. Fresh water will be pumped to each plant from a fresh water tank (by others). Back wash water will be supplied from the Potable Water Storage Tank, while spent back wash water will be discharged via a drain to the sewer system or process water tank (by others).								
NOTES								
1		Low Voltage power will be supplied to motors less than 250 hp (500 hp with a VFD)						
2		Attachment(s): a. Goose Source Water Quality Data						

END OF SECTION

Item	Rev	Title	Unit	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Notes
				Goose Sewage Treatment Plant (3160-XM-XXX)		George Sewage Treatment Plant (3360-XM-XXX)		MLA Sewage Treatment Plant (7160-XM-XXX)		
SECTION A - PROCESS / DESIGN CRITERIA										
A01		*Throughput:*								
A01.1		Flowrate / Person / Day, Design	l/person/day	275		275		275		
A01.2		Number of people system services	-	700		150		75		
A01.3		Throughput, Nominal	m^3/hr	8.02		1.72		0.86		
A01.4		Throughput, Design	m^3/hr	9.22		1.98		0.99		
A01.5		Throughput, Peak	m^3/hr	80.21		17.19		8.59		
A01.6		Peak Throughput Duration	minutes	90, 2 times/ day		90, 2 times/ day		90, 2 times/ day		
A02		Fresh Water Source for Process		Site Fresh/ Fire Water Storage Tank		Site Fresh/ Fire Water Storage Tank		Site Fresh/ Fire Water Storage Tank		
A03		*Sewage Input Parameters:*								
A03.1		BOD_5	kg/capita/day	0.077		0.077		0.077		
A03.2		TSS	kg/capita/day	0.09		0.09		0.09		
A03		*Treated Effluent Quality*								
A03.1		Un-ionized Ammonia (as nitrogen)	mg-N/L	< 1.25		< 1.25		< 1.25		
A03.2		BOD_5 (5-day biochemical oxygen demand)	mg/L	30	≤ 10	30	≤ 10	30	≤ 10	
A03.4		CBOD (Carbonaceous biochemical oxygen demand)	mg/L	≤ 25		≤ 25		≤ 25		
A03.5		COD (Chemical oxygen demand)	mg/L	125		125		125		
A03.6		Residual Chlorine	mg/L	0.02		0.02		0.02		
A03.7		E. Coli	MPN/100mL	200		200		200		
A03.8		Total Coliform	MPN/100mL	400		400		400		
A03.9		Nitrogen (total)	mg/L	10		10		10		
A03.10		Oil and grease	mg/L	5 (non visible)		5 (non visible)		5 (non visible)		
A03.11		Phosphorus (total)	mg/L	TBD		TBD		TBD		
A03.13		pH	-	6-9		6-9		6-9		
A03.14		Total Suspended Solids	mg/L	≤ 25	≤ 10	≤ 25	≤ 10	≤ 25	≤ 10	
A04		*Available Electrical Power:*								
A04.1		Low Voltage Power	V/PH/Hz	600/3/60		600/3/60		600/3/60		1
A05		*Operating Conditions:*								
A05.1		Location	mm	Outside		Outside		Outside		
A05.2		Extreme Operating Temperature (Min/ Max)	Deg. C.	See document H347084-S003120		See document H347084-S003120		See document H347084-S003120		
A6		Duty		24 hours per day/ 7 days per week Operation	YES	24 hours per day/ 7 days per week Operation	YES	24 hours per day/ 7 days per week Operation	YES	
SECTION B - TECHNICAL										
B01		Treatment Type		Membrane	MBR	Membrane	MBR	Membrane	MBR	
B02		Installed Standbys for Critical Equipment (eg. pumps)	yes/ no	yes		yes		yes		
B03		Total connected nameplate power	hp		22		18		14	
B04		Enclosure Type (eg. container)	-		container		container		container	
B05		Number of Modules	-		3		1		1	
SECTION C- Installation Weights and Dimensions										
C01		*Heaviest Installation Lift:*								
C01.1		Item	-							

Item	Rev	Title	Unit	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Notes
				Goose Sewage Treatment Plant (3160-XM-XXX)		George Sewage Treatment Plant (3360-XM-XXX)		MLA Sewage Treatment Plant (7160-XM-XXX)		
C01.2		Weight	kg		18,000 x 3		18,000		12,000	
C01.3		Dimensions, L x W x H	m		(13.7 x 2.4 x 2.9) x 3		12.2 x 2.4 x 2.9		6.1 x 2.4 x 2.9	

Item	Rev	Title	Unit	Project Design Data / Vendor Data Goose Sewage Treatment Plant (3160-XM-XXX)	Project Design Data / Vendor Data George Sewage Treatment Plant (3360-XM-XXX)	Project Design Data / Vendor Data MLA Sewage Treatment Plant (7160-XM-XXX)	Notes
SECTION D- System Description							
Each sewage treatment plant receives raw sewage from lift stations (by Others). Raw sewage comes from the mine complexes which include construction/ contractor and permanent accommodation facilities. Sources include all domestic sewage, showers, sinks, kitchen and laundry facilities. The sewage will not contain any industrial effluent of storm-water runoff. Compacted screenings and dewatered sludge will be transported in bins and disposed of in an incinerator (by Others).							
NOTES							
1		Low Voltage power will be supplied to motors less than 250 hp (500 hp with a VFD)					

END OF SECTION

Item	Rev	Title	Unit	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Notes
				Goose Underground Mine Water Treatment Plant (1620-XM-XXX)		MLA Port Desalination Plant (7160-XM-XXX)		
SECTION A - PROCESS / DESIGN CRITERIA								
A01		*Throughput:*						
A01.3		Throughput, Nominal	m^3/hr	20.90		2.00		
A01.4		Throughput, Design	m^3/hr	45.42		3.00		
A01.5		Throughput, Peak	m^3/hr	37.48		3.00		
A02		*Influent Water Quality Data:*						
A02.1		TSS	mg/L	50 to 100		Bathurst Inlet Ocean Water Salinity: 26.8 ppt, mean winter at 5 meter depth		
A02.2		TDS	mg/L	71000				
A02.3		Total Hardness	mg/L $CaCO_3$	45000				
A02.4		Alkalinity	mg/L $CaCO_3$	13				
A02.5		Ammonia-Nitrogen	mg/L	50				
A02.6		Chloride	mg/L	44000				
A02.7		Sulphate	mg/L	50				
A02.8		Barium, Total	mg/L	6				
A02.9		Boron, Total	mg/L	4				
A02.10		Calcium, Total	mg/L	16000				
A02.11		Iron, Total	mg/L	3.8				
A02.12		Lithium, Total	mg/L	7				
A02.13		Magnesium, Total	mg/L	1000				
A02.14		Manganese, Total	mg/L	2.9				
A02.15		Nitrate-Nitrogen	mg/L	50				
A02.16		Nitrite-Nitrogen	mg/L	10				
A02.17		Phosphorus, Total	mg/L	3.3				
A02.18		Potassium, Total	mg/L	250				
A02.19		Silicon, Total	mg/L	0.6				
A02.20		Sodium, Total	mg/L	6700				
A02.21		Strontium	mg/L	330				
A02.22		Zinc, Total	mg/L	0.3				
A02.23		Oil and Grease		Trace		None		
A03		Influent Water Minimum Temperature	Deg. C.	0-2		2		
A04		*Effluent Quality & Flow Data:*						
		Allowable Discharge Concentration (assuming 10x dilution). **NOTE: Effluent will be tested per MMER including toxicity.**						
A04.1		Aluminum, Total	-	0.8				
A04.2		Ammonia - Nitrogen	-	0.03				
A04.3		Arsenic, Total	-	0.05				
A04.4		Boron, Total	-	15				
A04.5		Cadmium, Total	-	0.0001				
A04.6		Chloride, Total	-	500				

Item	Rev	Title	Unit	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Notes
				Goose Underground Mine Water Treatment Plant (1620-XM-XXX)		MLA Port Desalination Plant (7160-XM-XXX)		
A04.7		Chrome, Total		0.008		Desalinated water suitable for carbon steel tank storage & use in fire water & potable water treatment system (Vendor to Specify)		
A04.8		Copper, Total	-	0.01				
A04.9		Free Cyanide	-	0.03				
A04.10		Fluoride, Total	-	1				
A04.11		Iron, Total	-	3				
A04.12		Lead, Total	-	0.008				
A04.13		Mercury, Total	-	0.0001				
A04.14		Molybdenum, Total	-	0.7				
A04.15		Nickel, Total	-	0.2				
A04.16		Nitrate-Nitrogen	-	130				
A04.17		Nitrite-Nitrogen	-	0.6				
A04.18		Selenium, Total	-	0.009				
A04.19		Silver, Total	-	0.0005				
A04.20		Thallium, Total	-	0.007				
A04.21		Uranium, Total	-	0.1				
A04.22		Zinc, Total	-	0.2				
A04.23		pH	-	6-9				
A04.24		Flow Rate, Permeate	m^3/hr					
A04.25		Flow Rate, Concentrate (Brine)	m^3/hr					
A04.26		Concentrate (Brine) Salinity	ppt					
A04.27		Concentrate (Brine) Salinity after dilution	ppt	not applicable		30		
A05		*Available Electrical Power:*						
A05.1		Low Voltage Power	V/PH/Hz	600/3/60		600/3/60		See Note 1
A06		*Operating Conditions:*						
A06.1		Location	mm	Outside		Outside		
A06.2		Extreme Operating Temperature (Min/ Max)	Deg. C.	See document H347084-S003120		See document H347084-S003120		
SECTION B - TECHNICAL								
B01		Process:					MMF>SWRO>UV	
B01.1		Pre-treatment	-	Suspended solid removal via multi-media filtration/ measures to prevent membrane scaling (antiscalent, hardness removal)/ Activated Charcoal filtration for trace oils		Suspended solid removal/ measures to prevent membrane scaling (antiscalent, hardness removal)	MMF + Antiscalant	
B01.2		Desalination	-	Reverse Osmosis		Reverse Osmosis	SWRO	
B02		Train Qty	-	1		1	1	
B03		Capacity per Train	m^3/hr	45.4		3		

Item	Rev	Title	Unit	Project Design Data	Vendor Data	Project Design Data	Vendor Data	Notes
				Goose Underground Mine Water Treatment Plant (1620-XM-XXX)		MLA Port Desalination Plant (7160-XM-XXX)		
B04		Turndown Capability	-	4 : 1		4 : 1		
B05		Installed Standbys for Critical Equipment (eg. pumps)	yes/ no	yes		yes	no	
B06		Pumps:	hp					
B06.1		Feed Pumps Name Plate Power	hp/pump				10	
B06.2		Feed Pumps Size	mm x mm					
B06.3		MLA Desalination Concentrate Dilution Pumps	hp/pump	not applicable			7.5	
B06.4		MLA Desalination Concentrate Dilution Pumps	mm x mm	not applicable				
B06.5		MLA Potable Water Pumps	hp/pump	not applicable			5	
B06.6		MLA Potable Water Pumps	mm x mm	not applicable				
B07		Enclosure Type (eg. container)	-				container	
B08		Number of Modules	-				2 (1 SWRO building, 1 feed/dilution pump building)	
B09		*Goose Underground Mine Water Treatment Surge Tank:*						
B09.1		Size (dia. x height)	m			not applicable		
B09.2		Capacity	m^3	100		not applicable		
B10		*MLA Potable Water Stoarge Tank:*						
B10.1		Size (dia. x height)	m	not applicable			Two x 2 m dia 2 m h	
B10.2		Capacity	m^3	not applicable			14 m3	
B11		Safety Systems for Reagent Handling (eg. safety shower/ eyewash)						
SECTION C- Installation Weights and Dimensions								
C01		*Heaviest Installation Lift:*						
C01.1		Item	-					
C01.2		Weight	kg				18,000	
C01.3		Dimensions, L x W x H	m				12.2 x 2.4 x 2.9	
NOTES								
1		Low Voltage power will be supplied to motors less than 250 hp (500 hp with a VFD)						

END OF SECTION

Appendix C – Budgetary Pricing Proposal Forms

Budgetary Pricing Proposal Form

Table of Contents

This Form must be returned with the Supplier's budgetary pricing Proposal. Supplier must fill out all required fields.

1. Identification

Identification Section	
Name of Supplier:	FilterBoxx Packaged Water Solutions
Address:	5716 Burbank Road S.E. Calgary, Alberta, Canada T2H 1Z4
Telephone Number:	1.403.203.4747
E-mail address:	Renee.Beaucage@filterboxx.com
Supplier's Proposal No.	20150220
Signature:	
Name:	RENEE BEAUCAGE
Title:	SALES MANAGER
Date:	2/20/2015

2. Budgetary Pricing

2.1 General

The total Budgetary Price as detailed in the section 2.2 is ***$ 724,500*** in ***CAD***, based on the FCA (Incoterms 2010) Supplier's facility.

The level of accuracy for the submitted budgetary price is ***+/- 10 %***

2.2 Budgetary Price breakdown

Item No.	Tagg No.	Description	Qty	Unit	Unit Price	Extended Price / Currency
1	***2290-XM-012***	***Goose Potable Water Treatment Plant***	1	ea	$ 395,900	$ 395,900 CAD
1.1	2290-TK-013	Potable Water Tank	1	ea	Unit Price	Amount

Item No.	Tagg No.	Description	Qty	Unit	Unit Price	Extended Price / Currency
1.2	2290-PP-014	Potable Water Pump No. 1	1	ea	Unit Price	Amount
1.3	2290-PP-015	Potable Water Pump No. 2 (standby)				
2	***3360-XM-XXX***	***George Potable Water Treatment Plant***	1	ea	$ 328,600	$ 328,600 CAD
2.1	3360-TK-XXX	Potable Water Tank	1	ea	Unit Price	Amount
2.2	3360-PP-XXX	Potable Water Pump No. 1	1	ea	Unit Price	Amount
2.3	3360-PP-XXX	Potable Water Pump No. 2 (standby)	1	ea	Unit Price	Amount
		GRAND TOTAL – BUDGETARY PRICE ***FCA Supplier's Facility***				**$ 724,500 CAD**

2.3 Optional prices

Item	Description	Qty	Unit	Unit Price	Extended Price / Currency
A	Recommended spare parts for one year continuous operation. The Spare parts list shall include normal service and replacement spares.	1	Lot	$ 25,000	$ 25,000 CAD
B	Recommended special tools and startup spares for commissioning	1	Lot	Unit Price	Amount
C	Recommended Capital Insurance Spares	1	Lot	Unit Price	Amount
D	<Enter description or delete line>	Qty	Unit	Unit Price	Amount
E	<Enter description or delete line>	Qty	Unit	Unit Price	Amount
F	<Enter description or delete line>	Qty	Unit	Unit Price	Amount

2.4 Supplier's site assistance

Item No	Description	Estimated number of days	Daily Rate	Extended Price / Currency
1	Supervision of the Installation	5	1600	$ 8,000 CAD
2	Pre-commissioning, commissioning and start-up:	10	1600	$ 16,000 CAD

3. Delivery Information

Item No	Description	Number of weeks
1	Submittal of drawings for review upon receipt of Purchase Order	4 - 6
2	Manufacturing Lead time upon receipt of accepted drawings	16 - 20

4. Technical Documentation and Data

The Supplier must fill out the Equipment Data Sheet provided as part of this request and provide all information requested in the technical documents.

Information provided ☒

5. Engineering Location

The Supplier's engineering will be performed at: Calgary Canada

6. Manufacturing Location

The Supplier must identify key manufacturing locations

Equipment/Material Item or component item	Manufacturing Location
ISO CONTAINER BUILDINGS	Edmonton, Canada
Equipment Description	City, Country
Equipment Description	City, Country
Equipment Description	City, Country

7. Freight Information

The supplier must identify, for each shipping point, the estimated value of all required information in the below table.

Shipping Point No.	Shipping point	Total Volume (m3)	Total Weight (Kg)	Largest piece Volume (m3)	Heaviest Lift Weight (kg)
1	Edmonton, Canada – George PWTP	84.2	18,000	Volume	Weight
2	City, Country	Volume	Weight	Volume	Weight
3	City, Country	Volume	Weight	Volume	Weight
4	City, Country	Volume	Weight	Volume	Weight

In case of dimension exceeding 2.4 m x 2.4 m x 12 m (std. shipping container) and/or weight exceeding 20 metric tons, the supplier must fill out the table below for each nominated piece by shipping point.

Shipping Point No.	Qty	Description	Length (mm)	Width (mm)	Height (mm)	Weight (Kg)
1	1	Goose PWTP	6,096	2,438	2,896	12,000
2	1	Goose PW storage tank – 400 bbl	Lenght	3,657	6,700	6,100
3	Qty	Description	Lenght	Width	Height	Weight
4	Qty	Description	Lenght	Width	Height	Weight

Note: Supporting document can be attached if necessary.

End of document

Budgetary Pricing Proposal Form

Table of Contents

This Form must be returned with the Supplier's budgetary pricing Proposal. Supplier must fill out all required fields.

1. Identification

Identification Section	
Name of Supplier:	FilterBoxx Packaged Water Solutions
Address:	5716 Burbank Road S.E. Calgary, Alberta, Canada T2H 1Z4
Telephone Number:	1.403.203.4747
E-mail address:	Renee.Beaucage@filterboxx.com
Supplier's Proposal No.	20150220
Signature:	
Name:	RENEE BEAUCAGE
Title:	SALES MANAGER
Date:	2/20/2015

2. Budgetary Pricing

2.1 General

The total Budgetary Price as detailed in the section 2.2 is ***$ 1,830,000*** in ***CAD***, based on the FCA (Incoterms 2010) Supplier's facility.

The level of accuracy for the submitted budgetary price is ***+/- 10 %***

2.2 Budgetary Price breakdown

Item No.	Tagg No.	Description	Qty	Unit	Unit Price	Extended Price / Currency
1	***3160-XM-XXX***	***Goose Sewage Treatment Plant***	1	ea	$ 885,000	$ 885,000 CAD
1.1	3160-TK-XXX	STP Inlet Surge Tank	1	ea	Unit Price	Amount
1.2	3160-PP-XXX	STP Effluent Discharge Pump No. 1	1	ea	Unit Price	Amount

Item No.	Tagg No.	Description	Qty	Unit	Unit Price	Extended Price / Currency
1.3	3160-PP-XXX	STP Effluent Discharge Pump No. 2				
2	***3360-XM-XXX***	***George Sewage Treatment Plant***	1	ea	$ 546,000	$ 546,000 CAD
2.1	3360-TK-XXX	STP Inlet Surge Tank	1	ea	Unit Price	Amount
2.2	3360-PP-XXX	STP Effluent Discharge Pump No. 1	1	ea	Unit Price	Amount
2.3	3360-PP-XXX	STP Effluent Discharge Pump No. 2	1	ea	Unit Price	Amount
3	***7160-XM-XXX***	***MLA Sewage Treatment Plant***	1	ea	$ 399,000	$ 399,000 CAD
3.1	7160-TK-XXX	STP Inlet Surge Tank	1	ea	Unit Price	Amount
3.2	7160-PP-XXX	STP Effluent Discharge Pump No. 1	1	ea	Unit Price	Amount
3.3	7160-PP-XXX	STP Effluent Discharge Pump No. 2	1	ea	Unit Price	Amount
		GRAND TOTAL – BUDGETARY PRICE ***FCA Supplier's Facility***				**$ 1,830,000 CAD**

2.3 Optional prices

Item	Description	Qty	Unit	Unit Price	Extended Price / Currency
A	Recommended spare parts for one year continuous operation. The Spare parts list shall include normal service and replacement spares.	1	Lot	$ 64,000	$ 64,000 CAD
B	Recommended special tools and startup spares for commissioning	1	Lot	Unit Price	Amount
C	Recommended Capital Insurance Spares	1	Lot	Unit Price	Amount
D	<Enter description or delete line>	Qty	Unit	Unit Price	Amount
E	<Enter description or delete line>	Qty	Unit	Unit Price	Amount
F	<Enter description or delete line>	Qty	Unit	Unit Price	Amount

2.4 Supplier's site assistance

Item No	Description	Estimated number of days	Daily Rate	Extended Price / Currency
1	Supervision of the Installation	10	1600	$ 16,000 CAD
2	Pre-commissioning, commissioning and start-up:	21	1600	$ 33,600 CAD

3. Delivery Information

Item No	Description	Number of weeks
1	Submittal of drawings for review upon receipt of Purchase Order	4 - 6
2	Manufacturing Lead time upon receipt of accepted drawings	16 - 20

4. Technical Documentation and Data

The Supplier must fill out the Equipment Data Sheet provided as part of this request and provide all information requested in the technical documents.

Information provided ☒

5. Engineering Location

The Supplier's engineering will be performed at: Calgary Canada

6. Manufacturing Location

The Supplier must identify key manufacturing locations

Equipment/Material Item or component item	Manufacturing Location
ISO CONTAINER BUILDINGS	Edmonton, Canada
TANKS	Edmonton, Canada
Equipment Description	City, Country
Equipment Description	City, Country

7. Freight Information

The supplier must identify, for each shipping point, the estimated value of all required information in the below table.

Shipping Point No.	Shipping point	Total Volume (m3)	Total Weight (Kg)	Largest piece Volume (m3)	Heaviest Lift Weight (kg)
1	EDMONTON, CANADA - GEORGE WWTP	84.2	18,000	Volume	Weight
2	City, Country	Volume	Weight	Volume	Weight
3	City, Country	Volume	Weight	Volume	Weight
4	City, Country	Volume	Weight	Volume	Weight

In case of dimension exceeding 2.4 m x 2.4 m x 12 m (std. shipping container) and/or weight exceeding 20 metric tons, the supplier must fill out the table below for each nominated piece by shipping point.

Shipping Point No.	Qty	Description	Length (mm)	Width (mm)	Height (mm)	Weight (Kg)
1	3	GOOSE SEWAGE SYSTEM	13,716	2,438	2,896	18,000
2	Qty	MLA SEWAGE SYSTEM	6,096	2,438	2,896	12,000
3	Qty	Description	Lenght	Width	Height	Weight
4	Qty	Description	Lenght	Width	Height	Weight

Note: Supporting document can be attached if necessary.

End of document

Budgetary Pricing Proposal Form

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Name of Supplier:	FilterBoxx Packaged Water Solutions
Address:	5716 Burbank Road S.E. Calgary, Alberta, Canada T2H 1Z4
Telephone Number:	1.403.203.4747
E-mail address:	Renee.Beaucage@filterboxx.com
Supplier's Proposal No.	20150220
Signature:	
Name:	RENEE BEAUCAGE
Title:	SALES MANAGER
Date:	2/20/2015

2. Budgetary Pricing

2.1 General

The total Budgetary Price as detailed in the section 2.2 is ***$ 663,000*** in ***CAD***, based on the FCA (Incoterms 2010) Supplier's facility.

The level of accuracy for the submitted budgetary price is ***+/- 10 %***

2.2 Budgetary Price breakdown

Item No.	Tagg No.	Description	Qty	Unit	Unit Price	Extended Price / Currency
1	**1620-XM-XXX**	**Goose Underground Mine Water Treatment Plant**	1	ea	Unit Price	Amount
1.1	1620-TK-XXX	Goose Underground Mine Water	1	ea	Unit Price	Amount

Item No.	Tagg No.	Description	Qty	Unit	Unit Price	Extended Price / Currency
		Treatment Surge Tank				
1.2	1620-PP-XXX	Goose Underground Mine Water Treatment Feed Pump No. 1	1	ea	Unit Price	Amount
1.3	1620-PP-XXX	Goose Underground Mine Water Treatment Feed Pump No. 2 (Standby)		ea	Unit Price	Amount
2		**MLA Port Desalination Feed/ Dilution Pump Skid (Sea Water Supply Pumps)**	1	ea	$ 188,000	$ 188,000 CAD
2.1	7160-PP-XXX	MLA Desalination Feed Pump No. 1	1	ea	Unit Price	Amount
2.2	7160-PP-XXX	MLA Desalination Feed Pump No. 2 (Standby)	1	ea	Unit Price	Amount
2.3	7160-PP-XXX	MLA Desalination Concentrate Dilution Pump No. 1	1	ea	Unit Price	Amount
2.4	7160-PP-XXX	MLA Desalination Concentrate Dilution Pump No. 2 (standby)	1	ea	Unit Price	Amount
3	**7160-XM-XXX**	**MLA Port Desalination and Potable Water Treatment Plant**	1	ea	$ 475,000	$ 475,000 CAD
3.1	7160-TK-XXX	MLA Potable Water Storage Tank	1	ea	Unit Price	Amount
3.2	7160-PP-XXX	MLA Potable Water Pump No. 1	1	ea	Unit Price	Amount
3.3	7160-PP-XXX	MLA Potable Water Pump No. 2 (Standby)	1	ea	Unit Price	Amount
		GRAND TOTAL – BUDGETARY PRICE ***FCA Supplier's Facility***				**$ 663,000 CAD**

2.3 Optional prices

Item	Description	Qty	Unit	Unit Price	Extended Price / Currency
A	Recommended spare parts for one year continuous operation. The Spare parts list shall include normal service and replacement spares.	1	Lot	$ 20,000	$ 20,000 CAD
B	Recommended special tools and startup spares for commissioning	1	Lot	Unit Price	Amount
C	Recommended Capital Insurance Spares	1	Lot	Unit Price	Amount
D	<Enter description or delete line>	Qty	Unit	Unit Price	Amount
E	<Enter description or delete line>	Qty	Unit	Unit Price	Amount
F	<Enter description or delete line>	Qty	Unit	Unit Price	Amount

2.4 Supplier's site assistance

Item No	Description	Estimated number of days	Daily Rate	Extended Price / Currency
1	Supervision of the Installation	5	1600	$ 8,000
2	Pre-commissioning, commissioning and start-up:	10	1600	$ 16,000 CAD

3. Delivery Information

Item No	Description	Number of weeks
1	Submittal of drawings for review upon receipt of Purchase Order	4 - 6
2	Manufacturing Lead time upon receipt of accepted drawings	16 - 20

4. Technical Documentation and Data

The Supplier must fill out the Equipment Data Sheet provided as part of this request and provide all information requested in the technical documents.

Information provided ☒

5. Engineering Location

The Supplier's engineering will be performed at: Calgary Canada

6. Manufacturing Location

The Supplier must identify key manufacturing locations

Equipment/Material Item or component item	Manufacturing Location
ISO CONTAINER BUILDING	Edmonton, Canada
Equipment Description	City, Country
Equipment Description	City, Country
Equipment Description	City, Country

7. Freight Information

The supplier must identify, for each shipping point, the estimated value of all required information in the below table.

Shipping Point No.	Shipping point	Total Volume (m3)	Total Weight (Kg)	Largest piece Volume (m3)	Heaviest Lift Weight (kg)
1	Edmonton, Canada – MLA PWTP	84.2	18,000	Volume	Weight
2	City, Country	Volume	Weight	Volume	Weight
3	City, Country	Volume	Weight	Volume	Weight
4	City, Country	Volume	Weight	Volume	Weight

In case of dimension exceeding 2.4 m x 2.4 m x 12 m (std. shipping container) and/or weight exceeding 20 metric tons, the supplier must fill out the table below for each nominated piece by shipping point.

Shipping Point No.	Qty	Description	Length (mm)	Width (mm)	Height (mm)	Weight (Kg)
1	1	MLA PWTP	6,096	2,438	2,896	12,000
2	Qty	Description	Lenght	Width	Height	Weight
3	Qty	Description	Lenght	Width	Height	Weight
4	Qty	Description	Lenght	Width	Height	Weight

Note: Supporting document can be attached if necessary.

End of document