NORTHWEST TERRITORIES POWER CORPORATION

Empowering Communities

WASTE MANAGEMENT PLAN

TALTSON HYDROELECTRIC FACILITY
PLANT #129
TALTSON RIVER, NORTHWEST TERRITORIES

Issue Date: April 2022

Document Maintenance and Control

The Director, Health, Safety & Environment is responsible for the distribution, maintenance and updating of the Waste Management Plan. This Waste Management Plan will be updated:

i. Annually, taking into account changes in the law, environmental factors, NTPC policies, and Facility characteristics; and/or
ii. Addition/deletion of wastes used at the site.

Changes in phone numbers, names of individuals, etc. that do not affect the intent of the plan are to be made on a regular basis. Plan updates will be issued as per the Waste Management Plan distribution list. The Waste Management Plan holder is responsible for adding new and/or removing obsolete pages upon receipt of updates.

DOCUMENT HISTORY				
Revision #	**Revised Section(s)**	**Description of Revision**	**Prepared by**	**Issue Date**
01	All	Review and update	NTPC	June 2015
02	All	Review and update	NTPC	August 2016
03	All	Review and update	NTPC	August 2017
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05	Appendix H	Added appendix to cover waste management for the Taltson Winter Road.	NTPC	April 2019
06	Appendix H	Revised Appendix I in accordance with MVLWB WL and LUP conditions (Part E, conditions 4 & 31)	NTPC	August 2019
07	All	Site description, site figures, Appendix I and J	NTPC	March 2021

08	2.2.2, 2.2.2.1 2.2.6, Table 2-1, Table 2-2	Revised to include Hydro Refurbishment info per conformity table	NTPC	May 2021
09	Figure 2-1 and 2-2 Sections 2.2.2.1 2.2.5, 2.2.6 Table 2-1 and 2-2 Appendix K	Revised to include updated hazardous and fuel storage locations, lagoon location, revised berm dimensions, updated construction schedule and Appendix K updated to include updated drawings	NTPC	April 2022

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1 INTRODUCTION

1.1 INTRODUCTION

The Northwest Territories Power Corporation (NTPC) has prepared this Waste Management Plan (WMP) for the Taltson Hydroelectric Facility (the Facility) located on the Taltson River, Northwest Territories. The Facility is a remote hydroelectric power generating facility located 56 km northeast of Fort Smith (refer to Figure 1.1). The nearest community is Fort Smith. The facility operates under the MVLWB Type A Water Licence MV2011L4-0002. The facility is a fly in access only using the airstrip or landing on the Twin Gorges Reservoir. In the winter of 2019/2020 a historical winter road from Fort Smith was reconstructed that will be operated for the duration of the overhaul under MVLWB Type B Water Licence MV2019L8-0008 and Type A Land Use Permit MV2019F0015.

The Taltson facility consists of a hydroelectric plant, substation and surge tower situated on the east side of the Taltson River 250m southwest of the main dam. The headgate house sits on the upstream side of the dam in the forebay. Support facilities include two staff houses, camp accommodations building, and a garage located east of the plant. The 800m airstrip is located 3km southeast of the plant with a storage shed and fuel storage building at its western end. The facility also includes a backup diesel generator, waste incinerator, two septic fields, temporary sewage lagoon and fuel storage areas.

The Facility layout including the locations of the plant, main buildings, crew accommodations, key facility infrastructure, waste incinerator, septic fields, temporary sewage lagoon, hazardous material storage areas and surrounding water bodies are shown on Figure 2.1 and 2.2.

The production of waste material as a result of electricity generation and other activities is a normal result of ongoing activities. NTPC generates/handles waste materials at its power generation facilities and has a responsibility to protect and conserve the environment. Proper management of waste, sewage and hazardous materials is important for the protection of the health and safety of employees, the public and the environment.

1.2 PURPOSE

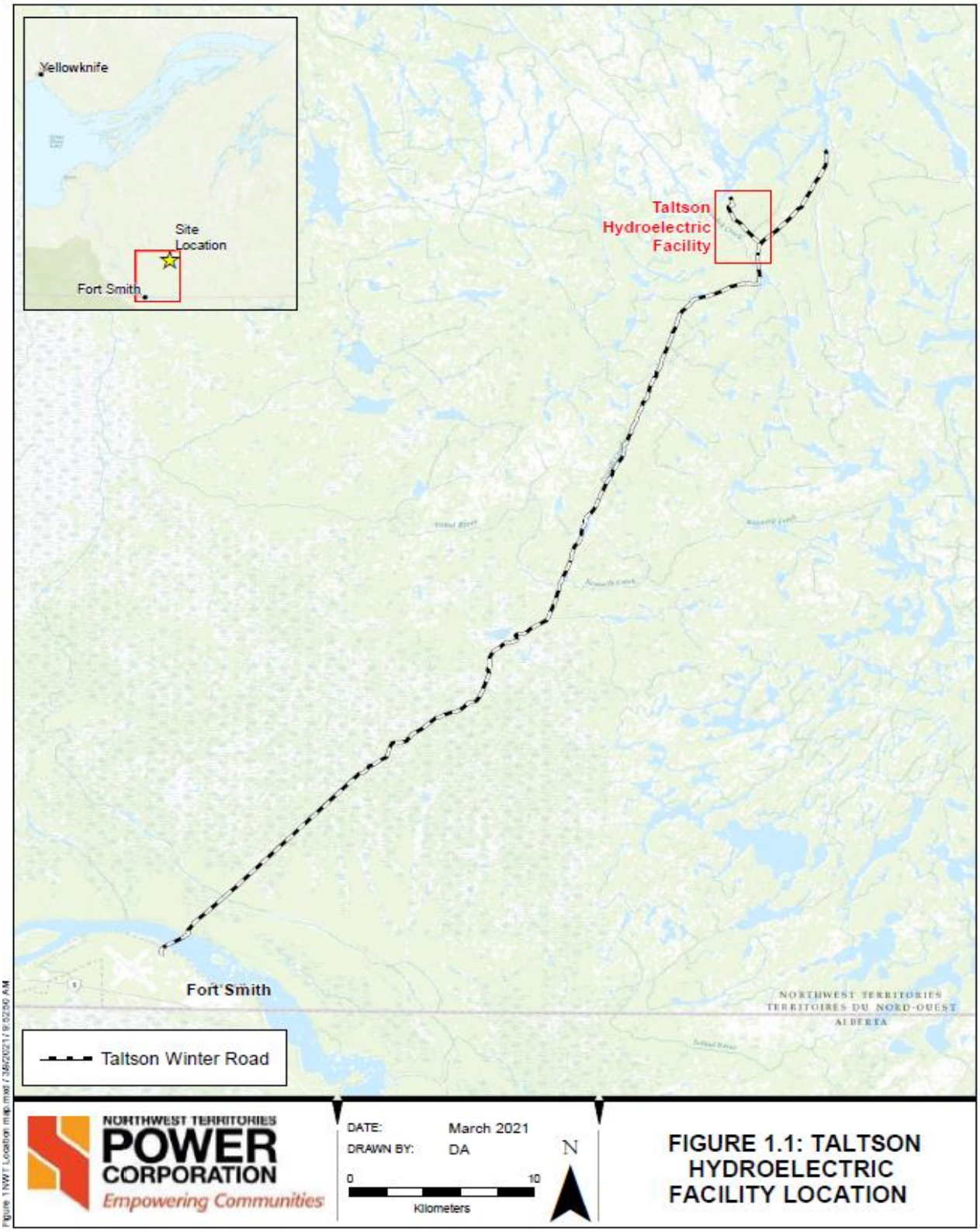
The purpose of the WMP is to provide a consolidated source of information on the safe and environmentally sound transportation, storage, and handling of the waste, sewage and hazardous products used and generated at the Taltson Hydroelectric Facility. A hazardous material is one that, as a result of its physical, chemical or other properties, poses a hazard to human health or the environment when improperly handled, used, stored, disposed of, or otherwise managed.

NTPC is committed to preventing, to the greatest extent possible, both inadvertent releases of these substances to the environment and accidents resulting from a mishandling or mishap. NTPC develops programs for employee training, facility inspection, periodic drills to test systems, and procedural review to address deficiencies, accountability, and continuous improvement objectives. NTPC will actively work

towards minimizing the generation of wastes by investigating alternatives to the use of hazardous materials, by recycling products and containers whenever feasible and by treating wastes using state-of-the-art technologies before any release to the environment.

The WMP will form a component of the Environmental Management System (EMS). As such, it is a working document that will be reviewed and updated on a regular basis.

Figure 1.1: Taltson Hydroelectric Facility Location



The WMP is based on the following principles of best management practice for hazardous materials/waste:

- Identify and prepare materials and waste inventories.
- Characterize potential environmental hazards posed by those materials.
- Allocate clear responsibility for management hazardous materials.
- Describe methods for transport, storage, handling and use.
- Identify means of long-term storage and disposal.
- Prepare contingency and emergency response plans.
- Ensure training for management, workers and contractors whose responsibilities include handling hazardous materials.
- Maintain and review records of hazardous material consumption and incidents in order to anticipate and avoid impacts on personal health and the environment.

1.3 SCOPE

This WMP covers nonhazardous waste, sewage and hazardous materials used and generated at the Taltson Hydroelectric Facility to ensure they will be stored, handled and transported on-site in compliance with all applicable federal and territorial regulations. For the purpose of this WMP, hazardous wastes generated at the Facility are included in the definition of hazardous materials. The WMP is specific to the Facility and is intended to supplement the NTPC Hazardous Waste Management Plan (HWMP) which addresses the specific requirements around disposal of hazardous wastes at NTPC facilities.

The WMP applies to all casual, permanent, part-time, and full-time employees and contractors who conduct work or provide services at the Facility. This WMP covers activities and operations conducted at the Facility.

1.4 ENVIRONMENTAL PROTECTION POLICY

Policy

NTPC is committed to protecting the environment for existing and future generations by meeting, if not exceeding, environmental regulations. Our environmental principles are based on the fundamental values of responsibility, accountability, and open communication. We will strive for continuous improvement in environmental performance and will manage our operations in an environmentally responsible manner.

Guidelines

NTPC will:

- Comply with all applicable environmental legislation and guidelines;
- Maintain an Environmental Management System;
- Incorporate environmental planning in the design phase of projects;
- Reduce waste and use resources as efficiently as possible;
- Take reasonable measures to prevent and reduce pollution to air, water, and soil;

- Manage hazardous waste in a manner that minimizes risk to the environment;
- Report all hazardous materials spills released to water, regardless of size;
- Report all hazardous materials spills greater than 5 L to ground or floor;
- Clean up all hazardous materials spills to meet applicable environmental criteria;
- Promote the efficient use of energy to customers;
- Provide employees with the appropriate training and education to help them fulfill their environmental responsibilities;
- Communicate regularly with indigenous groups, government, regulators, industry, community groups, and the public regarding NTPC activities; and
- Respect the heritages of the people and communities that we serve.

NTPC recognizes that incorporating proper hazardous material management into other environmental management plans and systems leads to risk reduction, improved process control, and cost savings. This WMP will form a component of the Facility's Environmental Management System (EMS). As such, it is a working document that will be reviewed and updated on a regular basis. At a minimum the WMP will be reviewed and updated annually. Training is provided on the following NTPC policies, procedures, and information sources, which are available at the Facility and/or on the NTPC Intranet PowerLine:

- Spill Contingency Plan
- Emergency Response Plan
- Hazardous Waste Management Plan
- Fuel Transfer Safe Work Practice
- Operator Training Manual
- Plant Operating Manual
- Safety Handbook

The WMP is presented to all employees and contractors during their on-site orientation sessions.

1.5 APPLICABLE LEGISLATION

Both federal and territorial legislation regulate the management of hazardous materials and hazardous wastes in the Northwest Territories. Management and safety personnel will provide an overview of the applicable regulations to all employees as part of their orientation and ongoing training. The acts, regulations and guidelines pertinent to hazardous products that will be used at the Taltson Hydroelectric Facility are listed in Appendix B.

The federal Transportation of Dangerous Goods Act classifies hazardous materials into nine main classes according to an internationally recognized system, as follows:

Class 1 – Explosives

Class 2 – Compressed Gases

Class 3 – Flammable or Combustible Liquids

Class 4 – Flammable Solids

Class 5 – Oxidizing Substances

Class 6 – Poisonous and Infectious Substances

Class 7 – Nuclear Substances

Class 8 – Corrosives

Class 9 – Miscellaneous

The materials addressed in this document are also identified by class.

1.6 RESPONSIBILITIES

All employees will be expected to comply with all applicable precautions and handling procedures with regard to hazardous materials. Employees are also expected to report any concerns to their supervisors, the Plant Operator, the Joint Occupational Health and Safety Committee, or site management. Contractor employees working on the site will be expected to report any concerns to the Plant Operator. All staff are encouraged to bring forward suggestions for improvements that can be incorporated into procedure revisions as appropriate.

Onsite NTPC Employees

- Ensure worksite and personnel safety.
- Ensure hazardous materials are stored in their appropriate designated storage area.
- Know the location of designated storage areas, spill response materials, first aid stations, emergency and safety equipment, Safety Data Sheets (SDS), emergency exits, and muster stations.
- Wear appropriate personal protective equipment (PPE).
- Know the handling, storage and spill prevention requirements.
- Comply with all NTPC and Facility policies and procedures when performing duties.

Plant Operator

- Ensure the safety of all personnel and the site.
- Ensure all new site personnel and contractors are oriented and have access to all the required documentation.
- Organize inspections of site hazardous material/waste management practices and storage areas and ensure that appropriate records are maintained.
- Ensure all NTPC employees and contractors adhere to the requirements of the HWMP.

- Participate in annual reviews of the HWMP with the Manager, Health, Safety and Environment.

Project Manager/Monitors

- Ensure the safety of all project personnel and the project areas.
- Ensure all new construction personnel and contractors are oriented and have access to all the required documentation.
- Organize inspections of site hazardous material/waste management practices and storage areas and ensure that appropriate records are maintained.
- Ensure all construction employees, contractors and sub-contractors adhere to the requirements of the WMP.

Stores Person (Logistics Officer or Stock Keeper)

- Ensure that all received hazardous materials/wastes are stored, transported and disposed of according to the requirements of the WMP and HWMP
- Maintain appropriate records.

Manager, Plant Operations

- Ensure that the Plant Operator has the available resources to effectively implement the WMP.

Director, Health, Safety & Environment

- Maintain and complete the annual review of the WMP.
- Ensure that all WMP documentation remains up-to-date and the updated versions are distributed out to the personnel on site, external agencies and organizations.
- Periodically audit hazardous materials management at the Facility to support continuous improvement.
- In coordination with the Plant Operator, prepare and submit any formal reports to regulators and NTPC management regarding the management of hazardous materials.

Third Party Contractors and Suppliers

- Ensure worksite and personnel safety.
- Ensure hazardous materials are stored in their appropriate designated storage area.
- Know the location of the designated storage areas, spill response materials, first aid stations, emergency and safety equipment, Safety Data Sheets (SDS), emergency exits, and Muster Points.
- Wear appropriate personal protective equipment (PPE).
- Know the handling, storage and spill prevention requirements.
- Comply with all NTPC and Facility policies and procedures when performing duties.

1.7 MAINTENANCE OF PLAN

The Director, Health, Safety & Environment will maintain the WMP. The Plan will be reviewed annually, but may also be reviewed more frequently as required (e.g. due to a new or amended legislation or the addition/deletion of a hazardous material or waste to/from Taltson Hydroelectric Facility use).

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

1.8 ACCESS TO ADDITIONAL COPIES

Additional copies of the plan can be obtained by contacting the Director, Health, Safety & Environment at (867) 874-5327.

1.9 SAFETY DATA SHEETS (SDS)

NTPC maintains Safety Data Sheets (SDS) for all controlled products that are used, stored, and handled at NTPC work sites

3E Online, a web-based program, is used to maintain and update the SDS for NTPC. All NTPC employees with computer access can view current SDS for NTPC products by visiting the following website:

https://www.3eonline.com/

In order to login to the site, the following username and password must be entered:

Username: ntpc
Password: msds

If employees cannot locate SDS on the website for products in use at NTPC sites, or if obsolete products are noted on the site, please advise the Manager, Logistics via phone or email using the following contact information:

Thess Cruzpe, Phone: (867) 874-5222, tcruzpe@ntpc.com

All NTPC thermal and hydro sites also require current SDS binders (paper copy) to be maintained and kept up to date (i.e., updated every three years). It is the responsibility of the employee to request up to date SDS binders. To acquire an up to date SDS binder please contact the Environmental Analyst at (867) 874-5306.

1.10 GENERAL EMERGENCY RESPONSE

NTPC maintains procedures for responding to emergency situations and accidents, including any specific procedures that are required by environmental legislation. A summary is presented below:

Site Specific Emergency Response Plan

NTPC maintains a Site-Specific Emergency Response Plan that documents how to deal with incidents and emergency situations. The most common emergency situations or accidents that can occur at NTPC are spills and fires. For minor spills and fires that are safe to respond to, spill response materials and fire extinguishers are available in all NTPC buildings.

Spill Contingency Plan

In the NWT, under the *Environmental Protection Act*, the Spill Response Planning and Reporting Regulations set the standard for reporting spills of contaminants and preparing Spill Contingency Plans. A Spill Contingency Plan is required if contaminants are stored above ground in excess of 20,000 kg or 20,000 L, or below ground in excess of 4,000 kg or 4,000 L. A copy of the Spill Contingency Plan must be filed with the Chief Environmental Protection Officer. Although NTPC does not have below ground storage facilities, contaminants (e.g., fuel oil) are stored in excess of 20,000 L and therefore Spill Contingency Plans for all NTPC power plant sites have been established and registered with the Chief Environmental Protection Officer.

Emergency Response Assistance Plan

A person who offers for transport or imports a consignment of dangerous goods must have an approved emergency response assistance plan when the quantity of dangerous goods exceeds the Emergency Response Assistance Plan (ERAP) limit (Transportation of Dangerous Goods (TDG) Regulations sections 7.1, 7.4, and column 7 of Schedule 1). The ERAP is to be filed and approved by the Director General.

Currently no dangerous goods offered for transport or imported by NTPC require an ERAP.

Reporting of Spills

The procedures for reporting spills at the Facility are presented in the Taltson Hydroelectric Facility Spill Contingency Plan.

A summary of reporting and response requirements for spills of dangerous goods during transport (as defined under TDG Regulations) and spills of hazardous materials (as defined in the NWT Environmental Protection Act and associated regulations) is presented in the NTPC HWMP.

NWT Spill Reporting

The minimum quantities for reporting of spills to the environment are specified in the Spill Contingency Planning and Reporting Regulations. NTPC has adopted a policy of reporting all spills of hazardous

materials over 5 L, and spills of any size that reach water, to the 24-Hour Spill Report Line at (867) 920-8130 unless the minimum quantity specified in the regulation is more stringent (i.e. less than 5 L).

1.11 DISTRIBUTION LIST

The WMP and the most recent revisions are distributed internally to:

i. Health, Safety & Environment Department, Taltson Hydroelectric Facility/NTPC (control copy)
ii. Manager, Plant Operations, Taltson Hydroelectric Facility
iii. Plant Operator, Taltson Hydroelectric Facility
iv. Manager, System Control, Hydro Region
v. Central Control Room, NTPC
vi. NTPC Intranet PowerLine

The Director Health, Safety, and Environment is responsible for distribution of the WMP to outside third-party stakeholders.

2 OVERVIEW OF HAZARDOUS MATERIALS

2.1 INTRODUCTION

Diesel fuel is the main hazardous material used and stored at the Facility. However, other materials and wastes such as gasoline, propane, acetylene, used oil, jet fuel and glycol are also stored, and used and/or generated on-site. The primary and designated storage locations for hazardous materials, hazardous wastes and fuel are shown on Figure 2.1. Storage areas are identified on the figure according to the nature of material stored as follows:

FS = Fuel Storage Area
HM = Hazardous Material Storage Area
HW = Hazardous Waste Storage Area

Fuel storage areas (FS) include storage areas where diesel is stored. Hazardous materials storage areas (HM) include storage areas containing hazardous materials used to support the hydroelectric operation, other than bulk fuels storage. Hazardous waste storage areas (HW) include locations and facilities at which spent or unwanted hazardous materials are stored pending off-site transportation for recycling, treatment or disposal.

The main hazardous materials storage areas include:

- Temporary 90,000 L Diesel Above Ground Storage Tank (AST) x4 (FS-1)
- Emergency 500kw Generator, 1,500L Day Tank (FS-2)
- Gasoline Tote, 1000 L with pump (AST)(FS-3)
- Existing 350Kw Diesel Generator with 1,000 L diesel storage tank (FS-4)
- Diesel Incinerator, 1000 L (FS-5)
- Diesel Fuel Storage 10,000 L (FS-6)
- Backup Genset 1,000 L Diesel Day Tank (FS-7) (located inside the plant);
- Steel Berm Drum Storage Building #1 (HM/HW-1) (located at the Facility's airstrip);
- Steel Berm Drum Storage Building #2 (HM/HW-2) (located at the Facility's boneyard;
- The Maintenance Garage/Workshop (HM-3)
- Containment Berm (located at the airstrip)

In addition to the above specific storage areas, there is a waste facility storage area, two septic fields (one for the staff facilities and one for the new camp), temporary sewage lagoon and additional storage areas A and B (Shown on Figures 2.1 and 2.2)

Figure 2.1: Proposed Facilities Site Plan

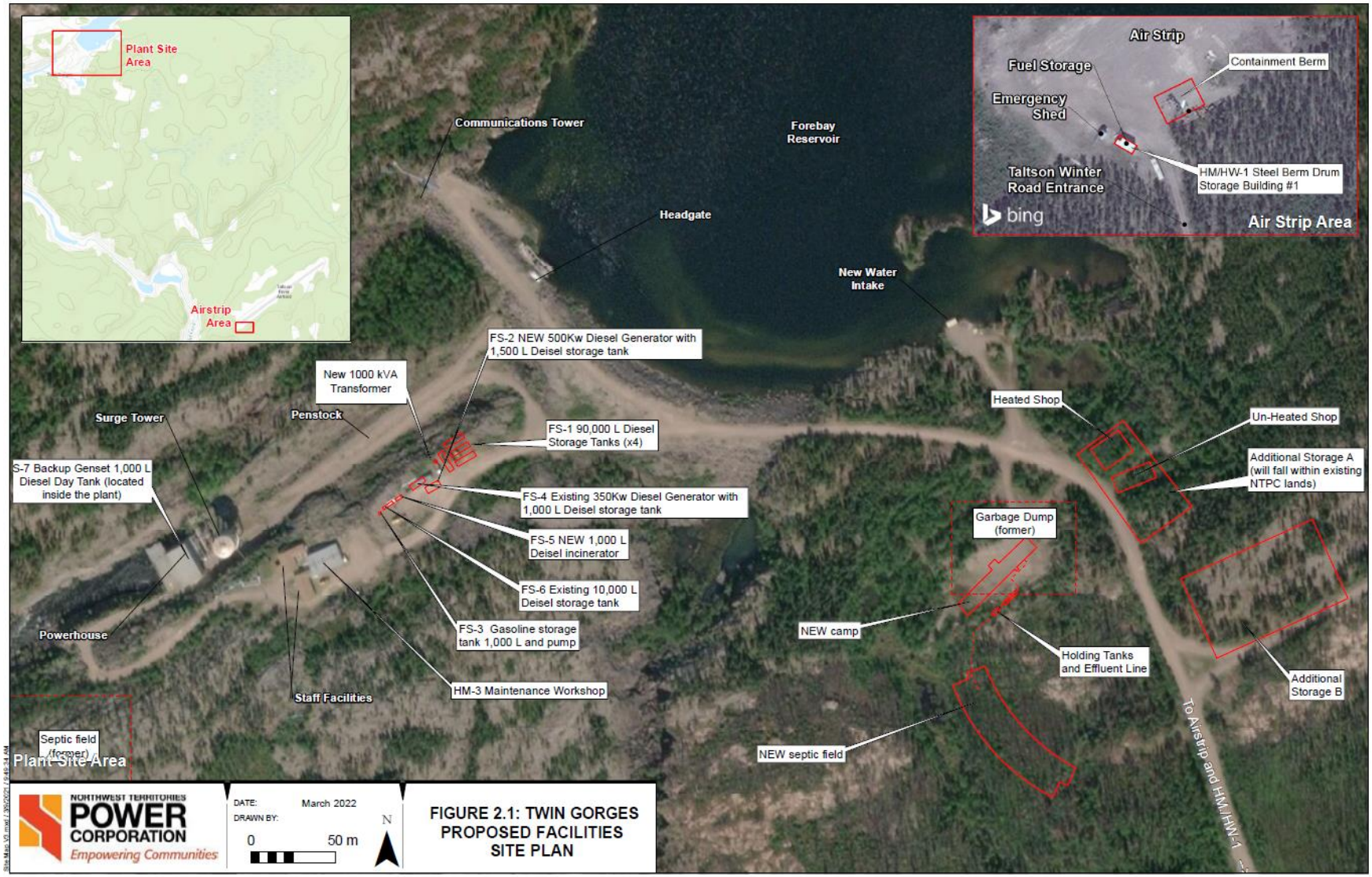


Figure 2.2: Proposed Facilities Overview

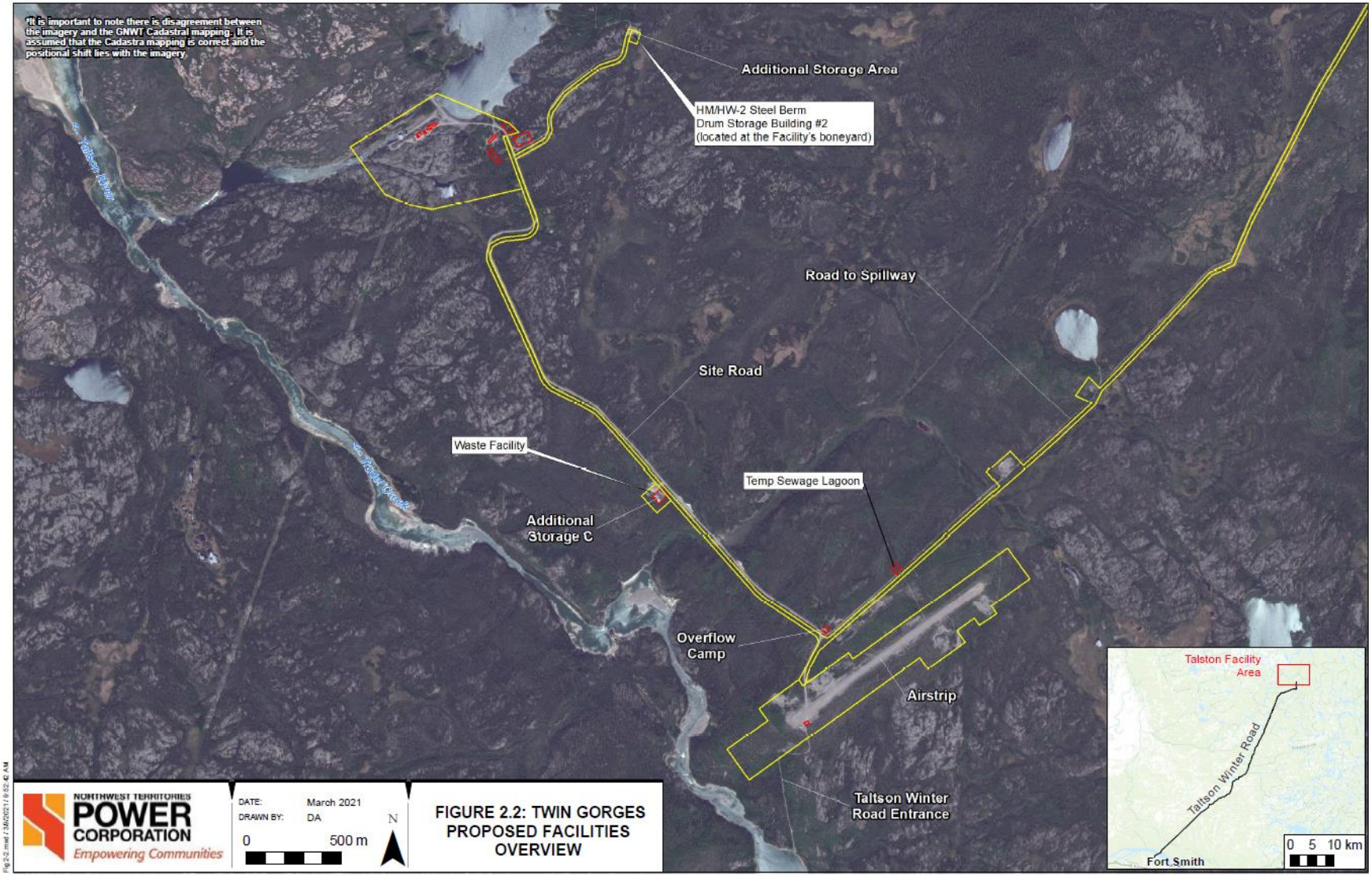


Table 2-1 presents general information on the location of the main fuel, hazardous materials and hazardous waste storage areas. Estimated minimum and maximum quantities of hazardous materials are presented in Table 2-2.

Table 2-1: Fuel, Hazardous Material and Hazardous Waste Storage Facilities at the Taltson Hydroelectric Facility

Storage Area	General Description	Location
FS-1 (Diesel Fuel Storage)	Four 90,000 L, double-walled AST containing diesel.	Four located northeast of the plant.
FS-2 (Diesel Fuel Storage)	500kw Genset with 1,500 L day tank containing diesel.	Located northeast of the plant near the 90 000 L diesel AST, inside the 500KW Genset Module.
FS-3 (Gasoline Storage)	Gasoline Tote, 1,000 L with pump (AST)	Located just east of the maintenance shop
FS-4 (Diesel Fuel Storage)	Existing 350Kw Diesel Generator with 1,000 L tank containing diesel	Located between the 4 90,000 L storage tanks and the staff accommodations
FS-5 (Diesel Fuel Storage)	Incinerator, 1,000 L day tank containing diesel	Located between the new 500kw genset and the new incinerator
FS-6 (Diesel Fuel Storage)	Fuel Storage 10,000 L tank (AST) containing diesel	Located between the maintenance shop and the incinerator
FS-7 (Diesel Fuel Storage)	One 1,000 L Day Tank containing diesel.	Located inside the plant.
HM/HW-1 (Steel Bermed Drum Storage Building #1)	205 L drums of waste oil, waste diesel and waste gasoline. Also contains 205 L drums of unused gasoline and jet fuel.	Located next to the Facility's airstrip.
HM/HW-2 (Steel Bermed Drum Storage Building #2)	Mainly 205 L drums of turbine and governor oil. 20 L pails of transmission oil and degreaser. Also contains propane, oxygen and nitrogen cylinders.	Located at the Facility's boneyard.
HM-3 (Maintenance Garage/Workshop)	Minimal hazardous material storage e.g., 205 L drum of diesel, 20 L pail of lube oil, acetylene cylinder, oxygen cylinder.	Located next to crew accommodations, northeast of the plant.
Hazardous waste storage berm (30m x 20m x 0.75m) - to be constructed in 2022	Mainly 205 L drums of hazardous waste stored to be transported offsite for treatment/disposal.	Located are the Facility's airstrip.

Table 2-2: List of Main Hazardous Materials On-Site

Material	Storage Container	Normally On-Site	Maximum On-Site	Storage Location (see Figure 2.1)
Diesel	90,000 L Horizontal AST	4 x 90,000L (4 AST)	360,000 L (4 AST	Located in the Fuel storage area NE of the Powerhouse within the dam site.
	1,500 L vertical, inside day tank	1,500 L (1 vertical tank)	1,500 L (1 vertical tank)	Located beside the new 500Kw Genset Module.
	1,000 L vertical, inside day tank	1,000 L (1 vertical tank)	1,000 L (1 vertical tank)	Located beside the new 350Kw Genset Module.
	1,000 L tank	1,000 L (1 AST)	1,000 L (1 AST)	Located at the new incinerator and will be used to run incinerator.
	10,000 L Horizontal AST	10,000 L (1 AST)	10,000 L	Located in the SW corner of the fuel storage area beside the new incinerator.
	1,000 L vertical, inside day tank	1,000 L (1 vertical tank)	1,000 L (1 vertical tank)	Located inside the plant.
	205 L drum	4 x 205L	4x 205L	Located at temporary camp facilities within secondary containment.
Gasoline	1000 L storage tank	1,000 L tank	1,000 L tank	Located in the SW corner of the fuel storage area. Used to dispense fuel
	205 L drum	20 drums	20 drums	Stored in the steel bermed drum storage building next to the Facility's airstrip or two 10' x 10' x1' L-bracket berms or a lined hazardous waste storage berm.
Jet Fuel	205 L drum	20 drums	20 drums	Stored in the steel bermed drum storage building next to the Facility's airstrip.
Lubricating Oil	205 L drum	10 drums	10 drums	Stored in the steel bermed drum storage building next to the Facility's boneyard or two 10' x 10' x1' L-bracket berms or a lined hazardous waste storage berm.
Transformer Oil	2,200 L (1 transformer)	2,200 L (1 transformer)	2,200 L (1 transformer)	Located between the 90 000 L diesel AST and existing 350KW Diesel Generator.
	4,100 L (4 transformers)	4,100 L (4 transformers)	4,100 L (4 transformers)	Located in the substation.
	8,500 L (1 transformer)	8,500 L (1 transformer)	8,500 L (1 transformer)	Located in the substation
	360 L (1 transformer)	360 L (1 transformer)	360 L (1 transformer)	Located inside the plant.

Material	Storage Container	Normally On-Site	Maximum On-Site	Storage Location (see Figure 2.1)
Propane	80 lb and 20 lb tank	80 lb tank (3) and 20 lb tank (5)	80 lb tank (3) and 20 lb tank (5)	Stored in the steel bermed drum storage building next to the Facility's boneyard or in the Maintenance Garage.
Acetylene	100 lb tank	100 lb tank (1)	100 lb tank (1)	Maintenance Garage.
Oxygen	100 lb tank	100 lb tank (3)	100 lb tank (3)	Stored in the steel bermed drum storage building next to the Facility's boneyard or in the Maintenance Garage.
Nitrogen	100 lb tank	100 lb tank (10)	100 lb tank (10)	Stored in the steel bermed drum storage building next to the Facility's boneyard or in the Plant.

2.2 CAMP WASTE

NTPC maintains two staff houses, with a maximum capacity of 11 people and a new camp accommodation building at the Taltson Hydroelectric Facility. The maximum capacity of the new camp building is 20 people. The new camp consists of a building with 20 individual bedrooms, a galley, rec room, kitchen, fitness room, utility and office space. The kitchen is an industrial kitchen which is capable of handling catering for around 20 people.

Domestic waste from the camp is segregated for disposal using a new on-site diesel incinerator and camp sewage is treated in a new sewage treatment and disposal system with a septic field south of the new camp building (see Appendix I).

2.2.1 Waste Segregation and Storage Methods

Only non-hazardous solid waste materials that meet those in Class I/II and III in accordance with Environment Canada's 2010 Technical Document for Batch Waste Incineration (provided in Appendix G) are incinerated. These materials are segregated at the source and are placed in specifically identified waste containers fitted with transparent bags and located throughout the Facility. These wastes include:

- food waste;
- food packaging, kitchen waste, and other food-contaminated waste;
- paper;
- cardboard; and,
- untreated wood

See Section 2.2.3 for information on operation of the onsite incinerator.

All non-hazardous waste that cannot be incinerated will be sent to the Taltson waste facility area for staging to be shipped offsite, burning or burying. Materials will be sorted into the following categories:

- Untreated Lumber, Brush and Cardboard (burn pile)
- Plastics and Rubber
- Concrete, Bricks, Ceramics
- Pressure Treated Lumber
- Old Boilers and Appliances
- Scrap Metal
- General - Waste that does not fall into another category

See Appendix J for the Taltson Waste Disposal Standard Operating Procedure.

2.2.2 Human Domestic Waste Handling and Disposal

The Facility treats waste sewage and grey water using septic fields. During operation, waste liquid moves into septic tanks and is then pumped into a septic field. For specifics on the Taltson Camp sewage treatment and disposal system design see Appendix I.

2.2.2.1 Temporary Sewage Lagoon

A temporary sewage lagoon will be constructed on the site road to the South Valley Spillway. This lagoon will be used for the sewage from 4 portable toilets that will be placed outside the plant during the overhaul. The temporary sewage lagoon is proposed for the waste from the 4 portable toilets to minimize risk to the septic system for the accommodation buildings during the temporary staffing peaks. It is estimated that 12 people would be using the sewage lagoon. The Residential Water Use (RWU) per capita for facilities where trucked water and sewage services will be used is provided as 90 liters per person per day. Based on this the estimated wastewater generated per day is 90.25 L/d. Allowing for 0.35 liters per day per person sludge volume, the estimated storage volume is 90.6 liters per day per person.

The temporary lagoon will be sized accordingly including a factor of safety for precipitation storage and marked for safety. Sewage from the portable toilets will be collected with a vacuum pump skid and disposed into the temporary sewage lagoon. The lagoon will remain in operation for one season from April 2023 to October 2023, after which time it will be capped and abandoned. The lagoon system has been sized to accommodate storage of wastewater, and precipitation for a period of 12-months. Storage calculations have taken into account for sludge and ice accumulation and resulting reduction in storage volume. Temporary sewage lagoon drawings attached as Appendix K. The main features that dictate the design of a wastewater lagoon are:

- A 1 m freeboard
- A generation rate of 0.35 L/person/day of sludge accumulation

• Single treatment stage lagoon i.e., sedimentation/coagulation of solids

• 1 m separation between lagoon and seasonal high groundwater level

The temporary sewage lagoon will be permanently capped and abandoned in 2024, after 2023 construction activities are completed. At the end of each phase the lagoon will be capped with a 1 m thick clay cap over a layer of lime. A reinforced geomembrane layer will separate the wastewater surface from the clay cap. Abandoning and capping is standard practice and is likely less risky than transporting sewage from Taltson to Fort Smith on the ice roads.

2.2.3 On-site Incinerator

The incinerator at the site is a CY-2050-FA cyclonator incinerator manufactured by Westland Environmental with a maximum batch capacity of 75 kg/hr. The Facility operator has been trained in the use of the incinerator and only authorized personnel are allowed to operate this equipment.

The incinerator is located at Taltson Camp; all non-hazardous solid waste materials meeting the Class I/II and III criteria are transported to this area for incineration. The segregated waste streams that are incinerated include only those wastes identified in Section 2.2.1 Waste Segregation and Storage Methods.

Prior to loading the incinerator, the feed material is inspected by the incinerator operator to ensure it does not contain inappropriate waste materials. General classes of **inappropriate wastes** include, but are not limited to:

- Hazardous Wastes (refer to the NTPC Hazardous Waste Management Plan)
- Mercury containing materials / waste (e.g. fluorescent lamps, thermometers, thermostats, dental amalgam, batteries). Limiting the quantity of mercury placed in the incinerator is the most effective way to limit mercury emissions
- Metal and glass. These materials absorb energy from the furnace and increase the wear and tear on various incinerator components
- Materials / wastes containing heavy metals (e.g. mercury-containing wastes, pressure or chemically treated wood (i.e. Chromated Copper Arsenate [CCA] or creosote), lead painted materials
- Asbestos waste
- Liquid wastes including petroleum hydrocarbons and sewage.
- Uncontaminated plastics, including chlorinated plastics
- Inert materials such as concrete, bricks, ceramics, ash
- Bulky materials such as machinery parts or large metal goods such as appliances
- Radioactive materials such as smoke detectors
- Potentially explosive materials such as propane tanks, other pressurized vessels, unused or ineffective explosives

- Other hazardous materials such as organic chemicals (PCBs, pesticides), other toxics (arsenic, cyanide)
- Electronics
- Batteries
- Drywall
- Fluorescent light bulbs
- Tires
- Oily rags

When identified, inappropriate waste material will be removed from the incinerator feed. If the inappropriate waste is too intermixed with the desired incinerator feed, then the batch will be rejected and not incinerated. Removed inappropriate wastes and rejected batches will be stored and handled in accordance with the NTPC Hazardous Waste Management Plan.

The incinerator is designed with a maximum batch capacity of 1.4 m^3 and 75 kg/hr. The incinerator will not be loaded over the maximum capacity. The incinerator is operated in accordance with the Environment Canada (EC) Technical Document for Batch Waste Incineration (2010; Appendix G).

The incinerator will be operated according to the Operation and Maintenance Manual. When the incinerator is loaded with the appropriate mix and quantity of waste, the door is closed and locked and the burn cycle is started. The incinerator operator observes the burn for at least 15 minutes after ignition. When satisfied that the burn is proceeding in a controlled manner, the incinerator operator may leave the incinerator area while the equipment completes the burn cycle.

The burn cycle will not be interrupted by opening the charging door until after the burn is complete and the unit has cooled down. No additional waste is allowed to be added to the primary chamber while in operation.

When the burn is complete and the unit has cooled, the incinerator operator will open the door only when wearing protective equipment (see Section 4.1).

The incinerator operator removes the ash from the previous burn cycle before reloading the incinerator. Any unburned combustible materials found in the ash will be reloaded into the incinerator after the operator has cleaned the airports, and before putting a fresh charge into the incinerator. Waste ash is disposed of at the Taltson waste facility area.

According to the Canada-wide Standards for Dioxins and Furans (adopted by the Canadian Council of Ministers of Environment [CCME] in 2001), facilities incinerate less than 26 tonnes of waste are not required to confirm stack test concentrations of 80 pg I-TEC / m^3 or less through annual testing but must make determined efforts to achieve this stack test concentration. The Taltson Hydroelectric Facility incinerates significantly less than 26 tonnes of waste each year and NTPC does not currently undergo stack testing due to the small amount of waste that is incinerated at the Facility.

2.2.4 Other Waste

Untreated wood and scrap lumber are open burned. Scrap metal will be stockpiled at the waste facility area.

Hazardous materials are not incinerated and are discussed specifically in Sections 2.3 and 3.1.3. All hazardous waste will be stored, handled and disposed of in accordance with NTPC's *Hazardous Waste Management Plan*.

All domestic camp wastes that cannot be incinerated, unburned combustible materials, non-combustible materials (e.g. metal pieces), and residual waste / incinerator ash will be disposed of at the waste facility area.

2.2.5 Waste Container and Storage / Staging Locations

Prior to removal from the site, sealed waste containers are stored at the Taltson Hydroelectric Facility airstrip which is located more than 100 meters (m) from the high-water mark.

To ensure proper capacity for increased amounts of hazardous waste two portable 10' x 10' x 1' L-bracket berms will be sent to the Facility, as well as a lined hazardous waste berm storage area will be constructed at the airstrip. The berm will be approximately 15m x 15m with a 0.75m berm around the storage around with a gate for trucks to drive in/out.

2.2.6 Taltson Overhaul Hazardous Building Materials

Old camp and garage will not be removed until 2027, old turbine and generator will be removed in summer 2023; hazardous materials testing of the turbine and generator was completed in summer of 2021 during the annual shut down. Hazardous materials testing determined there was no lead or asbestos present in the building's stator wedges and testing of the transformer oil confirmed total PCB levels are below Environment Canada's lowest current regulatory limit (2.0 mg/kg) for non-sensitive areas.

2.3 GENERAL HAZARDOUS MATERIAL STORAGE GUIDELINES

NTPC is committed to the safe and appropriate storage of fuels, hazardous materials and hazardous wastes. The following sections outline NTPC's general guidelines for storing hazardous materials and hazardous wastes.

2.3.1 General Precautions

General precautions for handling hazardous materials include:

- No person should handle a substance unless that person is familiar with the hazards.
- No person should use a substance unless that person is familiar with the proper use.
- Hazardous materials from different classes should never be mixed in the same container.

2.3.2 General Guidelines for Storage Drums/Containers

Hazardous materials/waste shall be stored in drums/containers according to the following guidelines:

- In the original containers, where possible or in containers manufactured for the purpose of storing the material or use good quality 16 gauge or lower steel or plastic 205 L drums.
- Containers of hazardous materials shall be returned to their designated storage area at the end of each shift or when no longer in use.
- Reused steel or plastic drums must have an internal volume greater than or equal to 150 L to handle, offer for transport or transport dangerous goods that are liquid and are included in Class 3, 4, 5, 6.1, 8 or 9 (Section 5.12(2), TDGR 2001-286)
- Storage containers shall be in good condition, sealable and not damaged or leaking.
- Drums containing hazardous materials/wastes expected to be in storage for more than six months shall be placed on pallets or on a well-drained storage area to prevent rusting.
- Each container shall be clearly labelled to identify the substance being stored according to the requirements of the Workplace Hazardous Materials Information System (WHMIS) or the Safety Act or the relevant Transport Authority, if transport is planned.
- Containers shall be kept secure and closed except when adding or removing product.
- Containers with product shall be kept in the upright position; empty drums can be placed horizontally.
- Containers shall be arranged to prevent damage from falling or dislodging.
- Containers shall be arranged to allow for easy access and inspections.
- Dispensing a container to another shall only be carried out within an area provided with drip / spill containment.

2.3.3 General Guidelines for Storage Areas

To assist in the safe and secure storage of fuels, hazardous materials and hazardous wastes, the following general guidelines for storage areas/facilities will be considered:

- Design of storage areas shall be in compliance with the National Fire Code, where appropriate.
- Drainage into and from storage areas shall be controlled in order to prevent leaks or spills from migrating off-site and to avoid run-off from entering the storage areas.
- Storage areas shall have controlled access. Only authorized and trained personnel shall have access to storage areas.

- Leaking or deteriorated containers shall be removed, and their contents transferred to a sound container.
- Storage areas shall be adequately signed indicating that there is to be no smoking, no sparks or flames and hazardous materials/wastes are stored therein.
- Storage locations shall be clearly defined and marked to prevent damage of storage drums and containers in the event they are covered by snow.
- Incompatible materials shall be segregated by chemical compatibility within the storage area to prevent contact between materials in the event of a release
- Storage areas shall be located at least 30 metres from surface water and on a low-permeability area, where possible.
- Storage areas shall be readily accessible for fire fighting and other emergency procedures.
- Storage areas shall be adequately ventilated to prevent the build up of noxious or toxic vapours.
- Secondary containment or an adequate spill collection system shall be installed to allow for the containment of at least 110% of the largest container or tank volume within the contained area, plus 10% of the aggregate capacity of all other containers or tanks.
- Secondary containment shall be kept free of debris, water accumulation and snow.
- Storage areas and associated secondary containment shall be protected from the elements, where possible. In case this is not feasible, the secondary containment's volume shall be large enough to allow for any precipitation (rain, snow, and storm water run-on) that may enter containment systems located outdoors, in addition to the required containment volume for stored materials. In addition, sufficient capacity to handle sprinkler water and other water from fire protection efforts will be provided.
- Storage areas shall be constructed, or provided with barriers, to protect containers from the environment and physical damage.
- Adequate spill and emergency response equipment shall be installed at each storage area (i.e. spill control, fire protection, etc.). A list of spill control equipment is provided in the Spill Contingency Plan.
- The site shall not be used for long-term storage of hazardous waste.

3 HAZARDOUS WASTE MANAGEMENT PLAN

3.1 LIFE CYCLE MANAGEMENT

"Life cycle management" implies the assessment of a particular product over its entire life – from the time a material is needed to the time the product is fully consumed or disposed of as waste. It covers product supply, transportation, storage, handling, recycling, and waste disposal. NTPC is committed to ensuring proper life cycle management of all products used including hazardous materials. It will be handled in accordance with relevant legislation (e.g. Environmental Protection Act (EPA), Transportation of Dangerous Goods Act and Regulations (TDGA)). NTPC and its contractors will deal only with reputable, certified suppliers, transporters, and expediters.

3.1.1 Delivery

Hazardous materials will be delivered to the Facility by commercial carriers either by ice road or fixed-wing aircraft with the appropriate transport authority: TDGA or International Civil Aviation Organization (ICAO). Carriers will be licensed and subject to inspections as required by the NWT Department of Transportation. All required permits, licenses, training and certificates of compliance will be obtained.

All shipments must be properly identified and labelled. Shipping papers must be accessible and include information describing the substance, immediate health hazards, fire and explosion risks, immediate precautions, fire-fighting information, procedures for handling leaks or spills, first aid measures and emergency response telephone numbers.

Each commercial carrier is required to develop a spill prevention, control, and countermeasures plan to address the materials they are importing. In the event of a release during transport, the commercial transportation company is responsible for first response and cleanup. NTPC will periodically verify the qualifications of commercial carrier, their personnel and the existence of their spill prevention, control and countermeasures plan.

NTPC's registered waste generator, carrier, and receiver numbers are NTG000008, NTC000002, and NTR000007 respectively. The Taltson Hydroelectric Facility is a generator of hazardous waste; however, it does not act as a carrier (transporter) or receiver of hazardous waste.

3.1.2 On-Site Handling

Once dangerous materials are received at the workplace, additional regulations apply. The federal Workplace Hazardous Materials Information System (WHMIS) calls for the proper labelling of products, the availability of product information in the form of the Safety Data Sheets (SDS), and employee education on how to identify and handle hazardous materials. NTPC will establish procedures for obtaining SDS with

new product deliveries, maintaining the SDS current (i.e. no older than 3 years), and maintaining a system of hardcopy or electronic SDS that are readily accessible by all employees.

All employees with computer access can view the current SDS for NTPC products by visiting the website:

http://3eonline.com

In order to login to the site, the following username and password must be entered:

Username: ntpc
Password: msds

Hazardous materials are to be stored in secured areas to prevent access by unauthorized personnel or any tampering. Tanks used for the storage of hazardous materials are double-walled or installed in secondary containment areas sized to hold at least 110% of the volume of the largest tank, plus 10% of the aggregate capacity of all other containers or tanks. Additional guidelines for the storage of hazardous materials are provided in Section 2.

In support of pollution prevention, NTPC will establish procedures for the regular inspection of storage containers/drums, tanks and the storage areas. If deficient conditions are identified, appropriate corrective actions will be taken and documented. Additional details for inspection of storage areas are provided in Section 5.

Emergency response procedures for spilled chemical substances are provided in the Spill Contingency Plan. These procedures outline the response to accidental spills or releases of hazardous materials to minimize health risks and environmental effects. Included are procedures for evacuating personnel, maintaining safety, cleanup activities, emergency contacts, internal and external notifications to regulatory authorities and incident documentation.

3.1.3 Storage and Final Disposal

Prior to removal from the site, sealed waste containers are stored at the Taltson Hydroelectric Facility airstrip which is located more than 100 meters (m) from the high-water mark.

To ensure proper capacity for increased amounts of hazardous waste two portable 10’ x 10’ x 1’ L-bracket berms will be sent to the Facility, as well as a lined hazardous waste berm storage area will be constructed at the airstrip. The berm will be approximately 15m x 15m with a 0.75m berm around the storage around with a gate for trucks to drive in/out.

Hazardous wastes will be shipped offsite either by winter road or fixed-wing aircraft and sent for treatment or disposal, in accordance with NTPC's *Hazardous Waste Management Plan* and Section 5 of the *Taltson Hydro Waste Management Plan*.

3.1.4 Hazardous Wastes

NTPC's *Hazardous Waste Management Plan* (HWMP) presents detailed information with respect to the management of hazardous wastes at all NTPC facilities, including the Taltson Hydroelectric Facility. The reader is directed to the HWMP for specific information relating to the management of hazardous wastes. General information with respect to the management of hazardous waste is provided below.

Hazardous wastes are typically generated through operations involving the use or clean-up of chemicals or other hazardous materials/substances (waste oils, waste fuels, batteries, solvents, etc.). On becoming wastes, hazardous materials will be stored and/or disposed of in accordance with specific government legislation, regulations and guidelines. A hazardous waste inventory is recorded on the Hazardous Waste Storage Inventory Log (Appendix E).

As a waste generator, NTPC is ultimately responsible for ensuring hazardous waste will be properly managed from the time they are generated to final disposal. Waste must be properly identified, labelled, stored, transported, treated and disposed of. Contractors are responsible for handling and disposal of the hazardous wastes they generate through their work, unless alternate arrangements have been made with NTPC in advance.

Hazardous wastes must not be mixed or diluted with any substance or divided into smaller quantities to avoid meeting the definition of a hazardous waste. Incompatible hazardous wastes should be segregated by the TDG class to ensure safety. Open burning of hazardous waste is not acceptable.

It is NTPC practice to remove hazardous waste from all sites at least once per year. No NTPC site should maintain quantities of waste for a period of time sufficient to necessitate registration as a storage facility. If hazardous waste is stored for a period of 180 days or more, and the quantities to be stored exceed the quantities set out in the Guideline for the General Management of Hazardous Waste in the NWT Schedule 1: Registered Volumes for individual waste classes or if the aggregate quantity for all classes of waste stored exceeds 5,000 kg/L, the facility must be registered with the NWT Department of Environment and Natural Resources. The storage facility can be a building, locker, compound, or area used to store hazardous waste.

In cases where hazardous wastes are to be transported off-site for treatment or disposal, NTPC will only use hazardous waste management facilities registered with the appropriate provincial or territorial authorities having jurisdiction. Prior to selecting and engaging such companies, NTPC will verify their "approved" status as a waste facility with the appropriate provincial or territorial authorities having jurisdiction. A review of their "approved" status will be conducted at least annually. NTPC will employ only registered waste carriers to transport waste to registered waste receivers.

The NWT Environmental Protection and Waste Management Division, Department of Environment, Environment and Natural Resources (ENR) monitor the movement of hazardous waste, from the generator to final disposal through use of a tracking document known as a Waste Manifest. Accordingly, a completed Waste Manifest will accompany all movements of hazardous waste from the Taltson Hydroelectric Facility. NTPC is registered with the ENR as a waste generator and our waste generator number is NTG000008.

4 PRIMARY HAZARDOUS MATERIAL

4.1 PRODUCT DESCRIPTION

One particular product –diesel fuel – will be used in relatively large quantities at the Facility. Detailed procedures have been developed to ensure that diesel is handled and used with no adverse effect on people or the environment. The other hazardous materials used on site are present in relatively small quantities. Products such as gasoline, glycol, compressed gases, lubricants, and cutting oils are widely used in the North. These products meet vital needs for power generation, heating and vehicle operation.

The transportation, storage and handling of these petroleum and related products are strictly regulated by both federal and territorial legislation. NTPC will ensure that all such requirements are met. Standard procedures are discussed in Section 2 of this document. NTPC will emphasize the need for regular inspections of all storage and distribution facilities on site to assure mechanical soundness and to prevent leaks or any other uncontained release of fuel products.

Material categories, site handling and storage requirements, and PPE recommended by manufacturers in SDS are summarized in Tables 4.1 to 4.3 (also see the SCP). The primary hazardous material and waste storages areas at the Facility are identified on Figure 2.1 and described in Table 2.1.

Table 4.1 Fuel Products – Hazard Classes & Potential Impacts

Material	TDGA Class	Potential Environmental Impact
Diesel	3	Water & soil contamination
Gasoline	3	Water & soil contamination
Jet Fuel	3	Water & soil contamination
Lube Oil / Motor Oil	Not regulated	Water & soil contamination
Glycol	Not regulated	Toxic by ingestion, could potentially be consumed by wildlife
Propane	2	Fire/explosion
Acetylene	2	Fire/explosion
Oxygen	2	Fire/explosion
Nitrogen	2	Fire/explosion

Table 4.2 Fuel Products – Safe Handling Procedures

Product	Handling Procedures
Diesel	Do not get in eyes, on skin or on clothing. Avoid breathing vapours, mist, fume or dust. Do not swallow. May be aspirated into lungs. Wear PPE and/or garments if exposure conditions warrant. Wash thoroughly after handling. Launder contaminated clothing before reuse. Eliminate all ignition sources. Store in a well-ventilated area. Store in a closed container. Bond and ground during transfer.
Gasoline	See diesel procedures above.
Jet Fuel	See diesel procedures above.
Lube Oil / Motor Oil	Wear protective clothing and impervious gloves when working with used motor oils. To be handled generally consistent with other petroleum hydrocarbons.
Glycol	Ensure adequate ventilation. Wear protective gloves and chemical safety goggles. Keep in tightly closed containers.
Propane	Secure cylinders to a wall, rack or other solid structure in an upright position. Keep valves closed and protective cap in place on cylinder when not in use. Do not handle with oily hands. Protect from heat. Protect against electrostatic charges. Pressurized container: protect from sunlight, store in a cool location and do not expose to temperatures exceeding 50°C. Empty containers may have product residue. Do not pressurize, cut, heat or weld empty containers. Store in a cool, dry and well-ventilated building. Eliminate all ignition sources. Keep product out of direct sunlight and away from incompatible or combustible materials.
Acetylene	See propane procedures above.
Oxygen	See propane procedures above.
Nitrogen	See propane procedures above.

Table 4.3 Fuel Products – Personal Protective Equipment

Product	Personal Protective Equipment		
	Eyes	Skin	Respiration
Diesel	Chemical goggles	Neoprene or nitrile gloves, protective garments	Under normal handling, none usually required.
Gasoline	Chemical goggles	Neoprene or nitrile gloves, protective garments	Under normal handling, none usually required. Ensure adequate ventilation.
Jet Fuel	Chemical goggles	Neoprene or nitrile gloves, protective garments	Under normal handling, none usually required. Ensure adequate ventilation.
Lube Oil / Motor Oil	Chemical goggles	Neoprene or nitrile gloves, protective garments.	Under normal handling, none usually required.
Glycol	Chemical goggles	Neoprene or nitrile gloves, protective garments	Under normal handling, none usually required.
Propane	Chemical goggles	Neoprene or nitrile gloves, protective garments. Insulated gloves suitable for low temperatures where liquid propane is involved.	Under normal handling, none usually required.
Acetylene	Chemical goggles	Neoprene or nitrile gloves, protective garments.	Respirator – see MSDS.
Oxygen	Chemical goggles	Neoprene or nitrile gloves, protective garments.	Respirator – see MSDS.
Nitrogen	Chemical goggles	Neoprene or nitrile gloves, protective garments.	Respirator – see MSDS.

4.2 DELIVERY TO SITE

With the exception of diesel fuel, most petroleum fuel and lubricant products will be delivered to site and stored in the original packaging container from the manufacturer/supplier. These types of containers include a variety of sealed drums (205 L), pails, cans, tubes and boxes. Supplies of diesel are brought primarily by fixed-wing aircraft in 205 L drums.

Upon arriving on site, the fuel is delivered to a designated storage area and then transferred to the diesel aboveground storage tanks by the Plant Operator. The small quantity hazardous materials contained within their original packaging will be delivered directly to their designated storage area by the Plant Operator.

All fuel transfer and storage facilities will be designed and operated in accordance with the National Fire Code, the Canadian Council of Ministers for the Environment (CCME, 2003) Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum, and the (CCME, 2008) Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

Appropriate measures will be in place to minimize impacts to surface water, groundwater and soils from potential vehicle accidents when transporting hazardous materials across the site. Details of spill responses are presented in the SCP.

4.3 FUEL TRANSFER PROCEDURES

Bulk transfer of diesel fuel is to follow NTPC's Fuel Transfer Safe Work Practice (Appendix C). General procedures to be followed are listed below.

Before fuel transfers, verify that:

- All employees are wearing personal protective equipment as may be necessary to protect themselves from the hazards involved.
- Emergency equipment including fire extinguishers and spill kits are available and have been inspected.
- All fuel transfer hoses have been connected properly and couplings are tight.
- Transfer hoses are not damaged.
- All fuel transfer personnel are familiar with the general procedures at the site and of the product being transferred.
- Personnel can manually shut off the flow of fuel in the event of a system failure, fault, leak or fire.
- If a high liquid level shutoff device is installed at the delivery tank, verify that the shutoff is operating correctly each time it is used.

In the event that onsite personnel must leave the immediate transfer area, the transfer shall stop, and the transfer point locked. If an employee, while involved with a fuel transfer process, leaves the site during the process, the employee will be dismissed, except in extenuating circumstances.

Transfer points will be kept locked at all times except during the transfer process.

Any accidents or spills must be reported immediately to the Plant Operator and in writing to regulators and NTPC management. Notification and response procedures are detailed in the SCP.

4.4 CONTAMINATED SOILS AND SPILLS

Contaminated soils resulting from the accidental release of hazardous products will be salvaged at the time such impacts are identified, and put into drums, labelled and shipped off-site to an approved disposal facility.

A suitable absorbent will be used to cleanup spillage on impermeable floor surfaces and will be handled similarly to contaminated soil as described above. Internal and external notification requirements, record keeping, and response procedures are detailed in the SCP. If required, the assessment and remediation of contaminated soil will be carried out in accordance with The *Environmental Guideline for Contaminated Site Remediation*.

4.5 USED PETROLEUM AND OTHER WASTE PRODUCTS

Used oil, solvents or glycol that are no longer suitable for their intended use are classified as a hazardous waste and drummed and stored as appropriate. The discharge of used oil, solvents or glycol into the environment, including but not limited to storage areas, septic systems and water bodies is prohibited. Used oil will not be incinerated on site. Used oil will not be applied as a dust suppressant on site. Waste oil and fuel will be shipped to Fort Smith by ice road or fixed-wing aircraft to be burned in a local contractor's waste oil furnace. Other hazardous wastes (e.g., solvents and glycol) are also shipped by ice road or fixed-wing aircraft to Fort Smith and transported via truck to Hay River for disposal.

These materials will be managed in accordance with requirements of the *Used Oil and Waste Fuel Management Regulations, the Guideline for the Management of Waste Solvents and the Guideline for the Management of Waste Antifreeze.*

5 INVENTORY, INSPECTION & RECORDS

5.1 GENERAL

A contract expediting company will arrange all deliveries from Fort Smith to the Taltson Hydroelectric Facility. This will include the hazardous materials discussed in this plan. The Plant Operator will have ultimate responsibility for supervising the receipt, inspection and recording of all material inventories on site. The Manager, Plant Operations will reconcile total amounts received against amounts ordered.

5.2 FUELS & LUBRICANTS

5.2.1 Inventory Management

Fuels, lubricants and other petroleum products (including wastes) in storage areas will be inventoried monthly. Inventory records will be maintained on site.

5.2.2 Inspection

The Plant Operator will coordinate the inspection of all fuel and lubricant storage sites areas. The inspection schedule and procedure to be followed are summarized in Table 5.1. All inspections will be logged with the date and time of inspection, area inspected and the name of the person making the inspection.

Drum / Container Storage Areas

The condition of hazardous materials storage areas will be checked on a regular basis. Observations on their condition will be logged, dated and kept near the corresponding storage area. Drums/containers will be inspected for the presence and legibility of symbols, words or other marks identifying the contents, signs of deterioration or damage such as corrosion, rust, leaks at seams or signs that the drum/container is under pressure such as bulging and swelling, spillage or discoloration on the top or sides of the drum/container. If leaks or deterioration is encountered, it will be noted and addressed in a timely manner.

The hazardous materials area's secondary containment will be inspected, and the condition of the secondary containment will be noted. Arrangements will be made for repairs if necessary. If precipitation (water or snow) is present within the secondary containment, it will be removed from the secondary containment area in a timely manner to prevent overflow or damage to the containment system due to large ponding.

The availability of suitable and suitable quantity of spill response materials will be verified during the inspections. Additional spill response materials will be provided as required.

Petroleum Storage Tanks and Tank Storage Facilities

Inspection of petroleum storage tanks and petroleum storage tank facilities will be in conformance with the requirements of the *National Fire Code* and the *CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum*.

Visual inspection of storage tank facilities (used for dispensing fuels) to ensure that there has not been a leak or deterioration of the facility that could result in a leak will be conducted and documented each day the facility is in operation.

Visual inspection of a storage tank facility to ensure that there has not been a leak or equipment failure shall be conducted weekly and documented for the following where applicable:

- foundations, tank walls, roof, and tank attachments;
- dyke capacity, condition of the dyke wall and floor, and water removal systems;
- pumps and product-handling equipment;
- tank gauging equipment;
- mechanical and automatic electronic leak detection equipment;
- dispenser sumps and spill containment devices; and
- overfill protection devices.

Inspection and performance testing in conformance with the manufacturer's requirements and procedures to ensure satisfactory equipment performance and operation of a storage tank facility will be conducted annually and documented where applicable for:

- automatic tank gauges and monitoring systems;
- high-technology sensors;
- electronic or mechanical leak detection equipment;
- corrosion protection equipment;
- pressurized piping emergency valves;
- emergency shut-down devices;
- containment sumps including dispenser, turbine and transition containment devices; and
- overfill protection devices.

Vertical tanks will also undergo periodic testing as per API 653 / API 653-01 as required.

Table 5.1 Inspection of Petroleum and Hazardous Materials Storage Sites

90,000 and 10,000 L horizontal, double-walled AST	Schedule: Weekly by the Plant Operator or designate; Procedure: Repair leaks and report promptly. Inspections will be reported annually and filed with the Plant Operator or designate.
1,000 and 1,500 L vertical, inside day tank	Schedule: Weekly by the Plant Operator or designate; Procedure: Repair leaks and report promptly. Inspections will be reported annually and filed with the Plant Operator or designate.
Other Hazardous Material Storage Areas	Schedule: Monthly by Plant Operator or designate when materials are on site. Procedure: Inspections will be reported annually and filed as above.
Spill Kits	Schedule: Weekly/Monthly as part of inspection schedule as per above by Plant Operator or designate.

Any accidental damage to containment structures will be inspected immediately and appropriate repairs undertaken. The extent of damage will be reported in writing to the Plant Operator or alternate. The report will identify any remedial repairs that may be made, the date of any repairs and the need for any follow-up inspection. The Safety Inspection Report, which includes inspection of the Hazardous Materials Storage Area, can be found in Appendix F.

5.2.3 Records

Records pertaining to storage, use, and loss of fuels and lubricants are required by CCME and the Fire Marshal (under the *National Fire Code*). The following records will be prepared and maintained for fuel and hazardous materials storage areas under the supervision of the Plant Operator:

- Receiver registration number
- Carrier registration number
- Waste generator registration number
- Waste manifests
- Waste accumulation log
- Safety Inspection Report (Hazardous Waste Storage)
- Weekly use summaries
- Inspections and maintenance records
- Any alterations to the systems
- Reports of leaks or losses
- Reports of spill responses
- Records of training

Specific to storage tanks, the following records are also required, where applicable:

- Inventory data;
- Inspections and maintenance records;
- Overfill alarm tests
- Cathodic protection monitoring;
- Precision leak detection tests;
- Maintenance and repairs;
- Construction, alterations, or upgrades;
- As-built drawings; and
- Excavation or nearby construction that could affect the integrity of the storage tank system.

The records will be maintained on-site for at least seven years.

6 TRAINING

6.1 GENERAL

As outlined in the NTPC's Health and Safety Management System, all employees and contractors at the Taltson Hydroelectric Facility will receive the following training:

- WHMIS
- Emergency and spill response training (see also the SCP and ERP)
- Operations overview

Employees will receive additional training specific to their area of work and duties, including safe operation practices, safe handling and storage of chemicals, and use of PPE. This training will be the responsibility of NTPC.

Periodically, NTPC staff will carry out fire or other emergency drills. The drills will test emergency response procedures and will be scheduled so as not to disrupt work. The results of the drills will be recorded and forwarded to the Plant Operator, JOHSC and NTPC. The results may indicate that additional or refresher training is required Safety committee recommendations will be enacted expeditiously.

6.2 FUEL & LUBRICANTS HANDLERS

Personnel who handle fuel and lubricants will be expected to be conversant with relevant SDS information. As well, these personnel will be given training in the following:

- Transportation of Dangerous Goods (TDG)
- NTPC's fuel handling procedures (outlined in Section 4.3)
- Spill response and cleanup procedures for petroleum hydrocarbons (see the SCP)
- Emergency response procedures (see the ERP)

The attendants and persons involved in inspections of fuel storage locations will be trained in fuel inventory and inspection procedures to support leak prevention and early detection.

6.3 PLANT EMPLOYEES

Plant employees may receive TDG training, if appropriate. All plant employees will be trained in spill and emergency response procedures. Emergency response procedures for spilled chemical substances are provided in the SCP.

For more information on employee training and safety guidelines, see NTPC's Health and Safety Management System, SCP and ERP.

6.4 THIRD PARTY CONTRACTORS

It is expected that third party contractors receive adequate and comprehensive training to conduct their work tasks from their employer. NTPC intends to review the general qualifications of third-party contractors prior to having them work at the site. In addition, the contractor companies may also be requested to confirm the qualifications of specific individuals that they may have working at the site.

Third party contractors working on the site will be expected to participate in and complete a site-specific health and safety training session. The training session is valid for a period of one year, after which time the contractor may be required to complete the training again or attend a refresher. The training session will outline site specific hazardous and response procedures that they should be aware of in the course of conducting their work on site. The training session will cover hazardous materials management.

7 PLAN EVALUATION, AUDIT & IMPROVEMENT

7.1 GENERAL

NTPC's goal is to audit all aspects of the WMP for effectiveness. Environmental management procedures will be modified and updated to address changes in policy, regulations and technology advances. The primary purpose will be continued compliance with legislative requirements. The WMP will be reviewed and audited every two years at a minimum but may also be reviewed and audited more frequently as required to identify any components that need to be corrected, adjusted, upgraded, or otherwise modified. Aspects of the plan that affect the safety of employees at the facility and of the general public will be most important.

Formal evaluations of the plan will be documented, deficiencies will be noted, and progress in addressing deficiencies will be tracked in writing. Individual responsibilities and accountabilities will be assigned, and deadlines will be set for addressing the required changes. The Director, Health, Safety and Environmental will assume overall responsibility for the process.

In line with the NTPC's goal of continuous improvement in all health and safety matters, all employees will be encouraged to offer suggestions for more efficient and safer materials handling procedures.

APPENDIX A

GLOSSARY

A

- **Accredited** (accreditation):

A term used by analytical laboratories. Those that have been tested and evaluated by the Standards Council of Canada and Canadian Standards Association, and that have met certain standards, are assigned an accreditation number. Only Accredited Laboratories may be used to obtain analytical results required for legislative compliance.

B

- **None**

C

- **CAEAL**:

Canadian Association of Environmental Analytical Laboratories. In cooperation with the Standards Council of Canada (see below), this Association governs the standards for and admission to the association of laboratories that have met all CAEAL standards to become accredited (see above).

- **Carrier:**

Any person engaged in the transport of hazardous waste whether or not for hire or reward.

- **Commissioner's Lands:**

Lands in the Northwest Territories that have been transferred by Order-Land in-Council to the Government of the Northwest Territories. This includes highways, block land transfers, and most lands within municipalities.

- **Consignee (Receiver):**

A site or facility that is licensed to accept certain subject wastes for disposal.

- **Consignor (Generator):**

A person who offers a consignment of hazardous waste for transport.

- **Contaminant:**

Any noise, heat, vibration or substance including such other substances as the Minister may prescribe that, where discharged into the environment:

(a) endangers the health, safety or welfare of persons,
(b) interferes or is likely to interfere with normal enjoyment of life or property,
(c) endangers the health of animal life, or
(d) causes or is likely to cause damage to plant life or property.

D

- **Dangerous Goods**

Any product, substance, or organism included by its nature or by the Transportation of Dangerous Goods Regulations (TDGR) in any of the classes listed in the schedule provided in the Transportation of Dangerous Goods Act (TDGA).

E

- **Empty Container**

A container that has been emptied, to the greatest extent possible, using regular handling procedures, the contents of which shall not exceed 1% of the container's original capacity or 2 litres, whichever is less. This does not include containers which previously contained mercury or class 2.3, 5.1, or 6.1 materials of TDGR.

- **Environmental Protection Service (EPS):**

Environmental Protection Service (EPS) of the Department of Environment and Natural Resources (ENR) is the Government of the Northwest Territories' (GNWT) agency responsible for initiatives which control the discharge of contaminants and their impact on the natural environment.

F

- None

G

- **Generator**

The owner or person in charge, management, or control of a hazardous waste at the time it is generated, or a facility that generates hazardous waste.

H

- **Hazardous Waste:**

A contaminant which is a dangerous good that is no longer used for its original purpose and is intended for recycling, treatment, disposal, or storage. A hazardous waste does not include a contaminant that is:

(a) household in origin;
(b) included in class 1, Explosives or class 7, Radioactive materials of TDGR;
(c) exempted as a small quantity;
(d) an empty container; or
(e) intended for disposal in a sewage system or by landfilling that meet the applicable standards set out in schedules I, III, or IV of the Guideline for Industrial Waste Discharges in the NWT.

- **Hazardous Waste Management Facility:**

A facility which is used for the collection, storage, treatment, recycling, or disposal of hazardous waste.

I

- Incompatible Waste:

Hazardous wastes which, when in contact with one another or other substances under normal conditions of storage or transportation, could react to produce heat, gas, fire, explosion, corrosive substances, or toxic substances.

J

- None

K

- None

L

- Landfilling:

The deposit of waste on land, as described in the GNWT Department of Municipal and Community Affairs' document Guidelines for the Planning, Design, Operation & Maintenance of Solid Waste Modified Landfill Sites in the Northwest Territories.

- **Licensed Waste Disposal Facility:**

A facility or site that is authorized to accept and dispose of predetermined wastes.

- **Long Term Storage:**

The storage of hazardous waste for a period of 180 days or more and in excess of the minimum quantities, not including materials in transit.

M

- **Manifest (Waste Manifest):**

A six-part, colour-coded, and uniquely numbered document issued by the government to licensed waste generators/carriers that must be completed and carried with/filed for shipments of waste (certain exemptions are allowed). The Manifest consists of three Sections (Consignor, Carrier, and Consignee) each of which must be completed by the party in control of the waste at the time the Section is completed.

- **Manage:**

To handle, transport, store, recycle, treat, destroy, or dispose of hazardous waste.

N

- **None**

O

- **None**

P

- **None**

Q

- **None**

R

- **Receiver (Consignee):**

A person to whom a quantity of hazardous waste is being or is intended to be transported to.

S

- **Sewage System:**

A system for the collection, transmission, treatment or disposal of any liquid waste containing animal, vegetable, mineral, human or chemical matter in solution or in suspension.

- **Small Quantity:**

Hazardous waste that is generated in an amount that is less than 5 kilograms per month if a solid or 5 litres per month if a liquid, and where the total quantity accumulated at any one time does not exceed 5 kilograms or 5 litres. This does not apply to wastes that are mercury or in classes 2.3, 5.1, or 6.1 of TDGR. These wastes must be generated in an amount less than 1 kilogram per month if a solid or 1 litre per month if a liquid; and where the total quantity accumulated at any one time does not exceed 1 kilogram or 1 litre.

T

- **Toxicity Characteristic Leaching Procedure (TCLP):**

Laboratory test method developed by the USEPA for determining the leaching potential of contaminates.

- **Transport Authority:**

The regulations controlling the management of hazardous waste under that mode of transport. These include:

  - Road and rail - Transportation of Dangerous Goods Act (TDGA) and Regulations (TDGR).
  - Air - International Civil Aviation Organization Technical Instructions (ICAO).
  - Marine - International Maritime Dangerous Goods Code (IMDG).

- **TDGA/TDGR:**

The Transportation of Dangerous Goods Act and Regulations (Canada).

- **Treatment or Treat:**

The handling or processing of a hazardous waste in such a manner as to change the physical, chemical or biological character or composition of the hazardous waste in order to eliminate or reduce:

(a) one or more environmental hazards of the waste; and/or
(b) the volume.

U

- **None**

V

- **None**

W

- **Waste:**

Any material that is to be disposed of by any individual/company that is not considered to be inert.

- **Waste Dangerous Goods:**

Subject wastes that are also regulated by the terms and conditions contained in the Transportation of Dangerous Goods Regulations under the Transportation of Dangerous Goods Act (federal).

- **Waste Data Sheets:**

The pages in Tab 5 of this manual that describe the legislated requirements for managing the various wastes in accordance with the Transportation of Dangerous Goods Regulations, if applicable.

X

- **None**

Y

- **None**

Z

- **None**

APPENDIX B

LEGISLATIVE REQUIREMENTS

Federal Legislation

A summary of the relevant federal legislation and applicable sections that cover the collection, handling, transportation, and disposal of hazardous wastes in Canada is presented in Table B1.

Table B1 – Summary of Federal Legislation

FEDERAL LEGISLATION		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
Federal Transportation of Dangerous Goods Act	Waste Dangerous Goods	- Section 3 - Application of Act The Act applies to the Transportation of all dangerous goods in Canada. Dangerous goods are the following: Class 1 - Explosives Class 2 - Compressed gases Class 3 - Flammable or combustible liquids Class 4 - Flammable solids Class 5 - Oxidizing substances Class 6 - Poisonous and infectious substances Class 7 - Nuclear substances Class 8 - Corrosives Class 9 - Miscellaneous - Section 5 - Safety Requirements, Standards and Marks No person shall handle, offer for transport, transport, or import dangerous goods unless they comply with all safety requirements, have the means of containment and transport for the material, and can display the prescribed safety marks. - Section 7 - Emergency Response Assistance Plans The person offering for transport or importing certain dangerous goods must have a Minister-approved ERAP prior to transport. - Section 8 - Means of Containment Containment must display all the necessary safety marks prior to being sold, delivered, distributed, imported, or otherwise transported. - Section 15 - Monitoring Compliance An inspector can inspect any vehicle transporting dangerous goods to ensure compliance to this Act. - Section 18 - Duty to Respond If there is an accidental release of a dangerous good in excess of the prescribed amount as outlined in the TDG Regulations, the person in charge of the material at the time of discharge has the responsibility to immediately report the incident to the 24-Hour Spill Report Line at (867) 920-8130. The person responsible for making the report shall take all reasonable emergency measures to reduce or eliminate any danger to public safety that may occur as a result of the release.

Table B1 – Summary of Federal Legislation (continued)

Federal Transportation of Dangerous Goods Regulations SOR/DORS/2001-286	Waste Dangerous Goods	- Part 2 – Classification The consignor is responsible for determining the classification of dangerous goods. Classification includes, as applicable, the shipping name, primary class, compatibility group, subsidiary class, UN number, packing group and risk group of dangerous goods. - Part 3 – Documentation Before allowing a carrier to take possession of dangerous goods for transport, the consignor must prepare and give to that carrier a shipping document or, if the carrier agrees, an electronic copy of the shipping document. The information required on a shipping document must be easy to identify and legible. Information that must be included on a shipping document is outlined in Part 3.5 of the Regulations. - Part 4 – Dangerous Goods Safety Marks A person must not offer for transport, transport or import a means of containment that contains dangerous goods unless each dangerous goods safety mark required by this Part is displayed in accordance with this section. - Part 5 – Containment A person must not handle, offer for transport, transport or import dangerous goods in a means of containment unless the means of containment is required or permitted by this Part to be used for the transportation of the dangerous goods. - Part 6 – Training A person who handles, offers for transport or transports dangerous goods must either be adequately trained and hold a training certificate in accordance with this Part or perform those activities in the presence and under the direct supervision of a person who is adequately trained and who holds a training certificate in accordance with this Part. Adequate training is described in Part 6.2 of the Regulation. - Part 7 – Emergency Response Assistance Plan It is the responsibility of the person offering for transport or importing dangerous goods for which an emergency response assistance plan (ERAP) is required to establish such a plan and to have that plan approved by Transport Canada. - Part 8 – Accidental Release and Imminent Accidental Release Report Requirements In the event of an accidental release of dangerous goods from a means of containment, a person who has possession of the dangerous goods at the time of the accidental release must make an immediate report if the accidental release consists of a quantity of dangerous goods or an emission of radiation that is greater than a determined quantity or emission level. If an immediate report was required to be made for an accidental release, a follow-up report must be made by the employer of the person who had possession of the dangerous goods at the time of the accidental release within 30 days of the initial report. - Schedule 1 – Classes 1 to 9

Table B1 – Summary of Federal Legislation (continued)

FEDERAL LEGISLATION		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
		Schedule 1 is a chart of all dangerous goods indicating UN numbers, Shipping Names and descriptions and other important information that must be addressed when handling or shipping dangerous goods. - Schedule 2 – Special Provisions This schedule provides extra requirements for certain dangerous goods that are not provided in Schedule 1. - Schedule 3 – Alphabetical Index This schedule is provided to quickly determine the UN number and class of a dangerous good using an alphabetized list.
National Fire Code	Waste Oily Rags	- Waste oily rags are to be kept in non-combustible receptacles with a melting point of no less than 650oC without openings on the sides or bottom. The container must have a self-closing tightly fitting cover.
Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations	Waste diesel fuel and waste lube oil	The owner or operator of the storage tank system must ensure that: - all liquids and sludge are removed and disposed of; - if a tank is being withdrawn from service, the tank is purged of vapours to less than 10% of the lower flammability limit and the presence of vapours is checked with a combustible gas meter; and - the withdrawal is done in such a way that there will be no immediate or long-term harmful effect on the environment, and it will not constitute a danger to human life or health.
Canadian Environmental Protection Act – National Strategy for the Management of Post-Use Preservative Treated Industrial Wood	Preservative treated wood (e.g., creosote treated power poles)	The preferable option for treated wood poles is reuse as posts, braces, stubs or anchors. The following uses of treated wood are prohibited: - Fuel (e.g., open-burning, furnace, etc.) - Construction material in water (e.g., docks, walls, etc.) - Construction material with which people come into direct and frequent contact (e.g., playgrounds, garden, etc.) Post-use treated wood is not classified as a hazardous waste and can be sent to Class I or II landfills for disposal. The landfill Operator shall be made aware of the waste type so that the treated wood is buried and not open burned.

Northwest Territories Legislation/Guidelines

A summary of the relevant legislation and guidelines and applicable sections that cover the collection, handling, transportation and disposal of wastes in the Northwest Territories (NWT) enacted under the NWT Environmental Protection Act is presented in Table B2.

Table B1 – Summary of Federal Legislation (continued)

The Department of Environment and Natural Resources (ENR) is the NWT government agency responsible for initiatives which control the discharge of contaminants and their impact on the natural environment, including the disposal of hazardous wastes.

Table B2 – Summary of Northwest Territories Legislation/Guidelines

NORTHWEST TERRITORIES LEGISLATION/GUIDELINES		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
Environmental Protection Act (EPA)	All hazardous wastes (i.e. contaminants that can enter the environment)	- Section 4 - Environmental Protection 4 (1) The chief Environmental Protection Officer may require that the storage facility have on hand at all times the equipment and the material necessary to alleviate the effect of any discharge of contaminants that may be specified in the order. - Section 5 - Discharge of Contaminants 5 (1) - No person shall discharge or permit the discharge of a contaminant into the natural environment without a permit. If there is a discharge to the environment, the person in charge of the contaminant prior to the discharge must: Report the discharge to the 24-Hour Spill Line (867) 920-8130; Stop the discharge if possible; and Make a reasonable effort to notify everyone who may be adversely affected by the discharge. - Section 9 - Unsightly Land If the inspector believes that the land is unsightly when compared to lands used for a similar purpose, the Chief Environmental Protection Officer may issue a written order to improve condition of the land.
Guideline for Industrial Waste Discharges in the NWT	Various Wastes	- Addresses discharge of effluent and process residuals from industrial operations. - Covers only waste for which there is not already a guideline or regulation in place. - Provides standards for discharge to municipal landfills and sewage systems.
Guideline for Ozone Depleting Substances (ODSs)	CFCs, HCFCs and Halons (used in heat pumps, air conditioning equipment, refrigeration equipment, motor vehicle air conditioners, and portable fire extinguishers)	- ODSs are found in certain air conditioners, refrigeration devices, and fire extinguishers. - A waste manifest must accompany waste ODS if moved for storage, recycling or disposal. - ODS should be removed from equipment by a certified technician prior to equipment disposal. - Any release of ODS from a compressed gas vessel (Class 2, TDG) with a capacity greater than 100 L must be reported to the 24-Hour Spill Report Line (867) 920-8130. - A release of 5 L or more of an ODS classified as a poisonous substance (Class 6, TDG) must be reported to the 24-Hour Spill Report Line (867) 920-8130. - Any ODS-containing equipment that requires disposal should be serviced by a technician to remove the CFCs or HCFCs and marked with the date of service, the certified technician and company name, and an indication that the equipment no longer contains refrigerant. After servicing the equipment can be recycled or landfilled. - If it is a remote community and a technician is not available, contact ENR for a plan to manage ODS equipment in remote areas at (867) 873-7654.

Guideline for the General Management of Hazardous Waste in the NWT	All hazardous wastes	- Complements existing acts and regulations regarding hazardous wastes. - Should be consulted in conjunction with applicable specific hazardous waste guidelines - The generator is responsible for the identification, labelling, and storage of the hazardous waste from the time of generation to the time of disposal (from the "cradle to the grave"). - Generators, carriers, and receivers must all be registered with ENR. The office of the Fire Marshal has authority over the storage of flammable, combustible, and hazardous materials under the National Fire Code. - Storage of Hazardous Waste: a) Stored in original containers or other containers manufactured for the purpose of storing hazardous waste. Containers must be sound, sealable and not damaged or leaking. b) Clearly labelled according to WHMIS if transport is planned. c) Bulked into 16 gauge or equivalent metal or plastic drums, as appropriate. d) Containers should be sealed or closed at all times unless in use. - Requirements for storage facilities: a) Drainage into and from the site is controlled to prevent spills from leaving the site. b) Incompatible wastes are segregated by chemical compatibility to ensure safety. c) A secure area with controlled access to trained persons only. d) Regular inspections of containers are performed and recorded. e) A record is maintained of the type and amount of waste being stored. f) Emergency response equipment is available on site. g) If the site stores over 1,000 L/kg of any one waste class or a total of over 5,000 L/kg of all waste classes combined for over 180 days, the site must be registered with ENR. - The company name, address, phone number and contact person including position, the location and description of the facility, the expected types, quantities, and method of hazardous waste storage, and the required approvals to occupy the land for the purpose of hazardous waste storage must be provided to the EPA and the local fire chief for emergency planning purposes. h) Storage site must meet local zoning and by-law requirements. - A completed Waste Manifest must accompany all shipments of hazardous waste. Waste Manifests are available from ENR. - Transportation is regulated by TDGR by road, International Civil Aviation Organization (ICAO) by air, and International Maritime Dangerous Goods Code (IMDG) by water. - Treated hazardous waste may be directed to a landfill or to a municipal sewage system if it meets the Guideline for Industrial Waste Discharges in the NWT and the municipal authority and facility water license are consulted. - Hazardous waste containers must be triple rinsed and punctured so they are rendered unusable or returned to distributor for recycling.

NORTHWEST TERRITORIES LEGISLATION/GUIDELINES		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
		* *Waste oil being transported from generator to receiver in the NWT does not require manifesting (e.g., by waste oil burners under the NTPC Waste Oil Agreement).*
Guideline for the Management of Waste Antifreeze	Antifreeze (ethylene glycol, propylene glycol)	- Waste Antifreeze is a contaminant under the NWT EPA and must be managed as a hazardous waste. - It shall not be landfilled or poured down any drain as it is toxic by ingestion and can easily contaminate the environment. - Both ethylene glycol (used in cooling systems) and propylene glycol (used in heating systems) are considered hazardous despite toxicity differences. - Waste Antifreeze has the potential to contain heavy metals, which are toxic in the natural environment. - Waste antifreeze can be recycled by registered companies or on-site using special equipment. Additives and filters can also be used to extend the life of antifreeze. - Store waste antifreeze as described in the Guideline for the General Management of Hazardous Waste in the NWT. - When transporting waste antifreeze use the following shipping information: WASTE TOXIC LIQUID, ORGANIC, N.O.S. (Waste Propylene/Ethylene Glycol) Class: 6.1 PIN: UN2810 Packing Group: I, II or III Special Provisions: 16 for I, 16 or 23 for II and III - The type of glycol must also be added to the shipping name (propylene or ethylene). - Transport the containers to a registered recycling or disposal facility. Do not landfill antifreeze, especially in landfills, which employ a permafrost protective barrier. Do not pour antifreeze into sewers or drains because it can destroy the bacteria that treat sewage.
Guideline for the Management of Waste Asbestos	Fibrous asbestos	- Waste asbestos is a contaminant under the NWT EPA and must be managed as a hazardous waste. - Store waste asbestos as described in the Guideline for the General Management of Hazardous Waste in the NWT. - When transporting waste asbestos use the following shipping information: ASBESTOS WHITE / BLUE / BROWN PIN: UN2590 / UN2212 / UN2212 Classification: 9 Packing Group: III / II / II - The removal of asbestos materials requires a thorough understanding of potential hazards and measures available to

NORTHWEST TERRITORIES LEGISLATION/GUIDELINES		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
		prevent worker, public and environmental exposure to asbestos fibres. - The Asbestos Safety Regulations require that employers conducting an asbestos removal project provide proper training to workers likely to come in contact with asbestos. - Asbestos can be landfilled if 0.5 m of cover is placed on the waste immediately. It must be buried where it will not be disturbed and mapped for future reference. - An asbestos abatement expert can be contracted to remove the material.

Guideline for the Management of Waste Batteries	Batteries (lead acid, potassium hydroxide, nickel cadmium)
	
	*Does not include dry cell batteries
		- Waste batteries are a contaminant under the NWT EPA and must be managed as a hazardous waste.
		- Store waste batteries as described in the Guideline for the General Management of Hazardous Waste in the NWT.
		- Transport of waste batteries (ensure no leakage):
		  - in sealed, upright drums with adsorbent material, cardboard, or plywood between battery layers, or
		  - on a good, solid pallet lined with a large piece of polyethylene plastic (if pallet is rough or has protruding nails cover it with plywood first to protect the plastic); place cardboard or plywood between battery layers, fold the poly over top of the package to seal it, and secure with banding.
		- When transporting waste batteries use the applicable shipping information as follows:
		
		WASTE BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage
		PIN: UN3028
		Classification: 8
		Packing Group: III
		
		WASTE BATTERIES, WET, FILLED WITH ACID, electric storage
		PIN: UN2794
		Classification: 8
		Packing Group: III
		Explosive Limit: 5
		
		WASTE BATTERIES, WET, FILLED WITH ALKALI, electric storage
		PIN: UN2795
		Classification: 8
		Packing Group: III
		Explosive Limit: 5
		
		WASTE BATTERIES, WET, NON-SPILLABLE, electric storage
		PIN: UN2800
		Classification: 8
		Packing Group: III
		Special Provisions: 39
		Explosive Limit: 5

NORTHWEST TERRITORIES LEGISLATION/GUIDELINES		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
		- Batteries should be shipped to a registered recycler or disposal facility.
Guideline for the Management of Waste Lead and Lead Paint	Lead paint	- Leaded paint is a contaminant under the NWT EPA and must be managed as a hazardous waste. - Products containing lead in excess of 600 ppm (0.06%) are considered hazardous waste. - Painted steel structures should be sampled for confirmation of lead amended paint and lead concentration prior to sandblasting or other maintenance activities. - Regardless of removal method, total containment of the leaded paint and abrasive debris or paint strippers is required under the EPA. - Store lead compounds in leak proof containers to prevent release into the environment. - When transporting waste lead paint use the following shipping information: WASTE LEAD COMPOUND, SOLUBLE, N.O.S. (Waste Lead Paint) or (Sandblasting Residue) PIN: UN2291 Classification: 6.1 Packing Group: III Special Provisions: 24 Explosive Limit: 5 - Leaded paint and sandblast residue should be transported to a registered hazardous waste disposal facility or a lead or metals foundry.
Guideline for the Management of Waste Paint	Alkyd paint (oil-based paint) Latex paint (water-based paint)	- Waste paint is a contaminant under the NWT EPA and must be managed as a hazardous waste. - Paint: includes lacquer, enamel, stain, shellac, varnish, polish, liquid filler, and liquid lacquer base. - Paint related material includes paint thinning or reducing compounds. - Latex paint wastes are not a hazardous waste and can be disposed of into most sewage systems and landfills – municipal approval may be required. - Specialty paints are a mix between a base and a hardener (e.g. epoxy coatings). Consult individual MSDS for disposal instructions. - Store waste latex and alkyd paint separately as described in the Guideline for the General Management of Hazardous Waste in the NWT. - When transporting most waste paint (flammable liquids) use the following shipping information: WASTE PAINT (or Waste Paint Related Materials) PIN: UN1263 Classification: 3 Packing Group I, II or III Special Provision 59 for I, 59 or 83 for II and III

NORTHWEST TERRITORIES LEGISLATION/GUIDELINES		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
		- When transporting certain specialty paints (corrosive) use the following shipping information: WASTE PAINT (or Waste Paint Related Materials) PIN: UN3066 Classification: 8 Packing Group II or III Special Provision 59 - Less than 5 L of alkyd paint can be allowed to fully dry and be taken to landfill. - Fully dried latex paint may be taken to landfill in any quantity. - Liquid paint should be shipped to a registered recycling or disposal facility.
Guideline for the Management of Waste Solvents	Alcohol or petroleum-based liquids capable of dissolving another substance (e.g. Varsol, paint thinner)	- Waste solvents are a contaminant under the NWT EPA and must be managed as a hazardous waste. - Store waste solvents separately as described in the Guideline for the General Management of Hazardous Waste in the NWT. - Bulk drums must be grounded to avoid sparks. - When transporting waste solvents use the following shipping information (with Varsol as an example): WASTE PETROLEUM DISTILLATES, N.O.S. (Waste Varsol) PIN: UN1268 Classification: 3 Packing Group: I, II, III Special Provisions: 16 - Bulk containers should be shipped to a registered recycling or disposal facility.
Used Oil and Waste Fuel Management Regulations	Fuel (diesel fuel, gasoline, aviation fuel, kerosene, naphtha) Oil (transmission fluid, hydraulic fluid, crankcase oil, gear lube oil, lube oil) Grease	- Used oil and waste fuel are contaminants under the NWT EPA and must be managed as hazardous waste. - Used oil has the potential to contain heavy metals that are toxic in the natural environment. - Used oil and waste fuel should be bulked in containers as described in the Guideline for the General Management of Hazardous Waste in the NWT. - Used oil and waste fuel should be shipped to a registered recycler. - Waste oil can be burned in a CSA approved oil heating furnace and can be shipped without a waste manifest in the NWT in this special case. - When transporting waste fuel use the following shipping information: WASTE FLAMMABLE LIQUID, N.O.S. (Waste Fuel Oïl) PIN: UN1993 Classification: 3 Packing Group: I, II, III Special Provisions: 16 - When transporting waste oil use the following shipping information:

NORTHWEST TERRITORIES LEGISLATION/GUIDELINES		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
		WASTE OIL (Waste Lube Oil) PIN: NA Classification: NA Packing Group: NA
	Used oil filters	- Used oil filters must be punctured/crushed and drained of their contents for 24 hours prior to disposal. - Used oil filters do not have to be managed as hazardous waste if properly drained. - All used oil in filters must be drained for 24-hrs into bulk used oil containers. The filters can then be recycled by a registered facility or sent to landfill. - Used oil filters can be crushed using a filter crusher, where available, and then recycled or sent to landfill. - When transporting waste oil filters use the following shipping information: WASTE FILTERS (Fuel Oil or Lube Oil) PIN: NA Classification: NA Packing Group: NA
	Oily Rags	- Oily rags or sorbents must be drummed and disposed of at a registered facility. - Some landfarms accept oily rags. - When transporting waste oily rags/sorbents use the following shipping information: WASTE OILY RAGS PIN: NA Classification: NA Packing Group: NA
Environmental Guideline for Contaminated Site Remediation	Contaminated Soil	- When transporting hydrocarbon impacted soil with a flashpoint that is unknown or below 610C use the following shipping information: WASTE SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S. (Gasoline or Diesel, as appropriate) PIN: UN3175 Classification: 4.1 Packing Group: II Special Provisions: 16, 56 - When transporting glycol impacted soil or hydrocarbon impacted soil with a flashpoint higher than 610C use the following shipping information: WASTE SOIL (Gasoline, glycol, diesel or oil) PIN: NA Classification: NA Packing Group: NA Special Provisions: NA

NORTHWEST TERRITORIES LEGISLATION/GUIDELINES		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
		- All contaminated soil should be analyzed for flashpoint prior to transport so that it can be transported as waste soil rather than Class 4.1.
NWT Disposal Guideline for Fluorescent Lamp Tubes	Waste fluorescent tubes	- Fluorescent tubes are a contaminant under the NWT EPA and must be managed as a hazardous waste. - Fluorescent tubes contain mercury phosphor powder and traces of lead and cadmium. Compliance with the Canada Wide Standards for Mercury is necessary. - Waste fluorescent tubes should be shipped to a registered recycling/disposal service. - If tubes are not broken and are packaged in their original shipping box, transport as a hazardous waste is not necessary. It is recommended to obtain boxes from the manufacturer if not already on hand. - If tubes are broken compliance with the Guideline for the General Management of Hazardous Waste in the NWT and TDG Regulations is required. - As an alternative to shipping waste bulbs for disposal the ENR Environmental Protection Service (EPS) owns a fluorescent bulb crusher which crushes the bulbs and separates the glass from the contaminants. Contact the EPS for more information.
	Waste mercury vapour bulbs	- Mercury vapour lights are a contaminant under the NWT EPA and must be managed as a hazardous waste. - Mercury vapour bulbs contain mercury. Compliance with the Canada Wide Standards for Mercury is necessary. - Waste mercury vapour lights should be shipped to a registered recycling/disposal facility. - If bulbs are not broken and are packaged in their original shipping box, transport as a hazardous waste is not necessary. It is recommended to obtain boxes from the manufacturer if not already on hand. - If tubes are broken compliance with the Guideline for the General Management of Hazardous Waste in the NWT and TDG Regulations is required.
Spill Contingency and Reporting Regulations (under EPA)	All spills	- Section 3 - Spill Contingency Plan A spill contingency plan must be implemented and filed with the Chief Environmental Protection Officer for facilities with above ground storage of 20,000 L or 20,000 kg or with a below ground storage of 4,000 L or 4,000 kg. If the facility has less than the above storage, a spill contingency plan should be in place, but does not have to be filed with the Officer. - Section 4 The owner or operator of the facility is responsible for the spill contingency plan. It must include: a) the name, address and job title of the person in charge of the facility b) the name, job titles and 24-hour phone number of the person in charge of activating the spill contingency plan c) a description of the facility including location, size and storage capacity d) a description of the type and amount of contaminants stored at the facility

NORTHWEST TERRITORIES LEGISLATION/GUIDELINES		
Legislation	**Hazardous Waste**	**Relevant Details in Legislation**
		e) a site map of the location described in (c) f) the steps to be taken to report, contain, cleanup and dispose of contaminants in case of spill g) inventory and location of available response and cleanup equipment h) the date the plan was prepared. When a review is completed the plan shall be updated and the Officer shall be alerted. - Section 9 Spills shall be reported when the amount spilled is equal to or exceeds that described in schedule B. Report spills to the 24-Hour Spill Report Line at (867) 920-8130. The following details should be provided regarding the spill: date and time of spill, spill location, direction spill is moving, name and number of contact person close to spill, type and amount of contaminant spilled, cause of spill, whether spill is continuing or has been stopped, description of existing containment, action taken to contain, recover, cleanup and dispose of spilled material, name, address and phone number of person reporting spill, and name of person in charge of contaminants at time of spill.
Consolidation of Pesticide Act Chapter P-2 Pesticide Regulations	Pesticides	- Section 4 - Consolidation of Pesticide Act 1988 No person shall dispose of a pesticide or a container that contained a pesticide in any way except at a site or in the manner that is prescribed in regulations. - Pesticide Regulations: report spills to the 24-Hour Spill Report Line (867) 920-8130.
Guideline for Industrial Waste Discharge in the NWT	Ash	- Each 205L drum of ash collected from an incinerator must be sampled independently and sent to a registered laboratory for analysis before it can be discarded at a sanitary landfill or registered disposal facility. - Residues of incinerator ash must pass the leachate extraction test described in the Guideline for Industrial Waste Discharges in the NWT, Schedule IV before it can be sent to a sanitary landfill. - Ash residues that fail the leachate extraction test must be handled as a Hazardous Waste accordingly and sent to a registered disposal facility.
PCB Regulations under the Canadian Environmental Protection Act, 1999	Streetlight ballasts (capacitors) manufactured before 1979	- Many capacitors found inside fluorescent streetlight ballasts manufactured before 1979 contain high levels of PCB (Polychlorinated Biphenyls). - Check the date code on the ballasts to determine the year it was manufactured. - If the ballast was manufactured before 1979 the ballast must be shipped as a hazardous waste to a registered treatment facility for disposal. POLYCHLORINATED BIPHENYLS (PCB) PIN: UN2315 Classification: 9 Packing Group: III

APPENDIX C

SAFE WORK PRACTICE 2.04 – FUEL AND BULK PRODUCT TRANSFER

1 Purpose	To outline the safety requirements for conducting fuel and bulk product transfers.
2 Application	Applies to all NTPC workers and contractors who are involved in fuel and bulk product transfers, custody transfers and the loading or unloading of tanker trucks, barges and ships used for the movement of these products.
3 Definitions	**Worker** An NTPC employee or any employee of a contractor or subcontractor working on an NTPC owned project or site. **Static Electricity** Static is the electricity produced on dissimilar materials through physical contact and separation. A spark generated by it can ignite flammable vapour. A static electrical charge can build up during refuelling when the fuel moves through a pipe.
4 References	• Nil
5 Equipment	• Spill Kit • Fire Extinguisher • Approved grounding devices • Hoses and hardware
6 PPE	• High-visibility vest • Work gloves • CSA-approved safety glasses • CSA-approved foot protection
7 Training	• On-the-job training • Spill Response Training
8 Work Practice	• Before the start of any work a Tailboard Meeting shall be conducted with all individuals involved in the transfer process and documented on Form 2.3: Tailboard Meeting. • The Worker responsible for the transfer process shall notify the person in charge of the site (e.g., Plant Operator, Plant Superintendent, Manager, etc.) to receive approval to begin the transfer. The Worker shall also notify the person in charge of the site after the transfer is complete. The date, start time and end time of the transfer shall be recorded in the Plant Log Book. • The Worker responsible for the transfer process shall remain onsite throughout the process.

	• The Worker shall immediately shut down the transfer process in the event of a system failure, fault, leak, spill or fire.
	• In the event that the Worker responsible for the transfer process must leave the immediate transfer area, the transfer process shall be stopped and the transfer point shall be locked.
	• If the Worker responsible for the transfer process leaves the site during a transfer without stopping the transfer and locking the transfer point, the Worker shall be subject to discipline up to and including dismissal.
	• Transfer points shall be locked at all times except during the transfer process.
	• Prior to refuelling the refuelling system must be inspected to ensure it is properly grounded and bonded. Grounding devices shall be installed to safeguard against the build-up of static electricity.
	• Emergency equipment including fire extinguishers and spill kits shall be available throughout the transfer process and shall be inspected prior to each transfer.
	• The local transfer procedure specific to the site and product shall be followed. This includes:
	  ○ Properly calculating the amount of fuel to be transferred and documenting the volume on Form 2.3: Tailboard Meeting
	  ○ Flow rates
	  ○ Emergency shutdown procedures
	  ○ Emergency and spill response procedures
	• After completion of the fuel transfer all hoses shall be disconnected, drained into an appropriate container and securely blanked.

9 Documentation	• Plant Log Book • Form 2.3: Tailboard Meeting

Development		
Name	**Position**	**Date**
Prepared by: Paul Pascoe	Pozniak Safety Associates	July 15, 2014
Reviewed by: Joshua Clark	Environmental Analyst	July 30, 2014
Approved by: Eddie Smith	Director Health, Safety & Environment	Aug 15, 2014

Revision History					
#	**Revised Sections**	**Description of Revisions**	**Revised by** (name, position)	**Approved by** (name, position)	**Issue Date**
01					
02					
03					
04					
05					
06					
07					

APPENDIX D

WASTE ACCUMULATION LOG

Environmental Protection

Submit

EV-01-02

WASTE ACCUMULATION LOG

Page ___ of ___

Year			Plant					
		Working drum ID (plant - unique drum # - year, e.g.,120-01-10)						
Month	Day	Oil	Glycol	Varsol	Other (specify drum ID and waste type)	Litres in Drum		Initials
						Added	Total	

Please fax to Environment Department at month end (1-888-371-9433)

APPENDIX E

HAZARDOUS MATERIALS / WASTE STORAGE INVENTORY LOG

Submit

WASTE STORAGE INVENTORY

Year				Drum ID (plant - unique drum # - year, e.g.,120-01-10)	# of Drums		
Plant					Full	Empty	Initials
Month		Oil	Shipped				
			Stored				
		Glycol	Shipped				
			Stored				
		Other (Specify)	Shipped				
			Stored				
		Oil	Shipped				
			Stored				
		Glycol	Shipped				
			Stored				
		Other (Specify)	Shipped				
			Stored				
		Oil	Shipped				
			Stored				
		Glycol	Shipped				
			Stored				
		Other (Specify)	Shipped				
			Stored				
		Oil	Shipped				
			Stored				
		Glycol	Shipped				
			Stored				
		Other (Specify)	Shipped				
			Stored				

APPENDIX F

SAFETY INSPECTION REPORT

Inspection Details	
Location:	Plant:
Inspected by:	Date:

#	Inspection Item	Y/N/NA	Notes
1.0	**Housekeeping**		
1.1	Are all buildings clean & organized inside?		
1.2	Is the yard clean & organized with no vegetation control required?		
1.3	Is the transformer storage platform: solid and well-organized?		
1.4	Is the pole storage rack solid and well-organized?		
1.5	Are garbage cans fire resistant with self-closing lids? Are they emptied at the end of each day?		
1.6	Are all spills and leaks cleaned up?		
1.7	Are floors clean and tidy and free of slippery substances (e.g., water, oil, grease)?		
1.8	Are floors level and well maintained with no projecting surfaces and no tripping hazards?		
1.9	Are windows clean, both inside and outside, and kept obstruction free?		
1.10	Is ventilation equipment clean, obstruction free, well maintained, functions correctly?		
2.0	**Storage**		
2.1	Are tools and materials properly stored in racks, shelves, and bins wherever possible?		
2.2	Are commonly used and heavy items stored between mid-thigh and shoulder height?		
2.3	Are floors around racks, shelves, pallets, etc. clear?		
2.4	Are racks, shelves, pallets, etc. kept in good condition?		
2.5	Are storage areas safe from falling objects?		

#	Inspection Item	Y/N/NA	Notes
2.6	Are storage racks, shelves, etc. free of sharp edges?		
2.7	Is there a safe means of accessing high shelves?		
3.0	**Tools & Equipment**		
3.1	Are tools & equipment maintained in good condition, clean, and suitable for intended use?		
3.2	Are all necessary machine guards in place?		
3.3	Are spill pads, drip trays, and crankcase vent containers emptied or replaced as required?		
3.4	Are batteries free of leaks with terminals clean and protective covers in place?		
3.5	Are line & electrical tools available, properly stored, certified, and in good condition?		
3.6	Is rigging & lifting equipment available, properly stored, certified, and in good condition?		
3.7	Are compressed gas cylinders undamaged, stored upright, and secured?		
3.8	Are pipes leak-free, colour coded, and properly painted?		
4.0	**Personal Protective Equipment (PPE)**		
4.1	Is all PPE available onsite?		
4.2	Is all PPE properly stored?		
4.3	Is all PPE clean?		
4.4	Is all PPE in good condition?		
4.5	Is all PPE correctly used?		
5.0	**Emergency Equipment**		
5.1	Is the Emergency Response Plan available onsite and current?		
5.2	Is the Spill Response Plan available onsite and current?		
5.3	Is the Hazardous Waste Management Plan available onsite and current?		

#	Inspection Item	Y/N/NA	Notes
5.4	Are the NWT Safety Act and General Regulations available onsite?		
5.5	Are emergency phone numbers posted and up-to-date?		
5.6	Are emergency lights functional for a 30 second test?		
5.7	Are eyewash stations available and functional with the solution changed every 6 months?		
5.8	Are fire extinguishers available, charged, and inspected monthly?		
5.9	Are fire extinguishers secured on the wall and not free standing?		
5.10	Is access to fire extinguishers free and unobstructed?		
5.11	Are first aid kits available, fully stocked, and inspected monthly?		
5.12	Are exits clearly marked with exit signs?		
5.13	Are exits functional and free from obstructions?		
6.0	**Chemicals**		
6.1	Are MSDS available and up-to-date within the last 3 years?		
6.2	Are all chemicals properly labelled and stored in proper containers (WHMIS)?		
6.3	Are all flammable products stored in proper containers in kept in a flammable cabinet?		
6.4	Are unused or unnecessary substances disposed of in a safe manner?		
6.5	Are all chemical containers and drums leak free?		
7.0	**Building**		
7.1	Are buildings in good condition on the inside with no repairs required?		
7.2	Are buildings in good condition on the outside with no repairs required?		
7.3	Are floors level and well maintained with no projecting surfaces and no tripping hazards?		

#	Inspection Item	Y/N/NA	Notes
7.4	Are windows clean, both inside and outside, and kept obstruction free?		
7.5	Is ventilation equipment clean, obstruction free, well maintained, functions correctly?		
7.6	Is the air temperature comfortable?		
7.7	Are all inside & outside lights functional?		
7.8	Do existing lights provide adequate lighting?		
7.9	Are all necessary warning signs in place with no new or additional signs required?		
7.10	Are signs and notices in good condition?		
7.11	Are employee facilities (e.g., washrooms, lockers, crew trailers) clean, tidy, maintained, and adequate?		
8.0	**Security**		
8.1	Are all fences in good condition with barbwire intact?		
8.2	Are all gates and doors kept locked when unattended?		
8.3	Are all locks in working order?		
9.0	**Electrical**		
9.1	Are ground connections present and in good working condition?		
9.2	Are electrical boxes & breakers properly covered?		
9.3	Are all plugs and switches in good condition?		
9.4	Are all cords in good condition?		
9.5	Are all power tools in good condition?		
9.6	Is all temporary wiring properly routed?		

#	Inspection Item	Y/N/NA	Notes
10.0	**Work Protection**		
10.1	Are sufficient Work Protection tags and forms available onsite?		
10.2	Is the Work Protection Log book available and up-to-date?		
10.3	Are all Single Line Diagrams posted and up-to-date?		
11.0	**Hazardous Waste Storage Area**		
11.1	Are all wastes properly separated to ensure no mixing of wastes?		
11.2	Are all waste storage containers in good condition with lids securely in place and no leaks?		
11.3	Are all waste containers labelled clearly and accurately?		
11.4	Are spill response materials available onsite (e.g., spill kits, sorbents, hand tools, PPE)?		
11.5	Are all sources of ignition kept away from the waste storage area?		
11.6	Is a fire extinguisher kept close to the waste storage area? Is it inspected monthly and charged?		
11.7	Does the storage area have proper drainage to prevent leaks or spills from leaving the site?		
11.8	Is the *Waste Accumulation Log* up-to-date?		
11.9	Is the *Waste Storage Inventory Log* up-to-date?		

Provide completed form to manager.

Corrective Actions (to be assigned by manager and followed up until completed)		
Manager:	Signature:	Date:

#	Corrective Action	Responsible Party	Due Date	Completed
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
12				
13				

APPENDIX G

ENVIRONMENT CANADA TECHNICAL DOCUMENT FOR BATCH WASTE INCINERATION

Environment Canada Environnement Canada

Technical Document for Batch Waste Incineration:

Executive Summary and Overview of the Six-Step Process for Batch Waste Incineration

January 2010

Canada

Acknowledgements:
Environment Canada would like to acknowledge the work of A.J. Chandler & Associates Ltd. in the preparation of this technical document.

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Aussi disponible en français.

EXECUTIVE SUMMARY

Incineration is recognized as an effective and environmentally sound disposal method for a wide range of wastes, and is used in facilities and jurisdictions across Canada. Waste generators located in remote areas may have limited options for cost-effective and environmentally sound waste management, and incineration may therefore be considered an appropriate waste management option. Remote commercial activities, such as exploration and development of natural resources, can create large volumes and varieties of wastes that must be managed appropriately. Residual wastes from industry, research activities, and the health care sector may require thermal treatment as an environmentally sound method to control the spread of disease from plants, animals or humans. Furthermore, there are certain locations in Canada where incinerating waste is an important means of avoiding potentially dangerous interactions between humans and wildlife. In all cases, reduction and diversion should be the primary waste management objectives, prior to considering any disposal option.

There are, however, some important potential environmental concerns associated with waste incineration that must be addressed through proper equipment selection, operation, maintenance and record keeping. These include potential releases of mercury, as well as dioxins and furans (PCDD/F), which are persistent organic pollutants (POPs). Mercury and POPs bio-accumulate in the environment and may cause adverse effects to human health and the environment. They can also be transported over long ranges; data from measurements in the North reveal concentrations far greater than what might be explained by local production. Dioxins/furans can be generated when inadequate incineration technology is used or when an incinerator is improperly operated. Mercury is not created in an incineration system; emissions are directly related to the presence of mercury in certain waste materials. Therefore, the best method to control mercury emissions is to limit the quantity of mercury in the waste fed to the incinerator.

The *Stockholm Convention on Persistent Organic Pollutants (POPs)* (which entered into force in May 2004 and to which Canada is a Party), identifies incineration as a potential source of POPs, and establishes a range of measures to reduce and, where feasible, eliminate their release. It also requires that the best available techniques (BAT) and best environmental practices (BEP) be applied for both new and substantially modified sources of POPs. Additionally, the Canadian Council of Ministers of the Environment (CCME) adopted the Canada-wide Standards for Dioxins and Furans in 2001, identifying incineration for action to reduce emissions, and adopting specific air emission standards. The CCME also adopted the Canada-wide Standards for Mercury Emissions in 2000 which include limits on mercury emissions from incinerators. Both mercury and dioxins/furans are on the List of Toxic Substances in Schedule 1 of the *Canadian Environmental Protection Act, 1999* (CEPA 1999).

The Technical Document for Batch Waste Incineration was developed to provide guidance for owners and operators on proper system selection, operation, maintenance and record keeping, with the goals of achieving the intent of the Canada-wide Standards for dioxins/furans and mercury, and reducing releases of other toxic substances. The document includes:

- A discussion of the importance of reducing, reusing and recycling to divert wastes from disposal;
- Methods for the selection of appropriate incineration technologies to meet specific waste management requirements;
- Operational requirements that should allow batch incinerators to meet the intent of the Canada-wide Standards for dioxins/furans and mercury, and to reduce the release of other toxic substances; and

- Recommendations on record keeping and reporting.

This Technical Document focuses on minimizing dioxins/furans and mercury emissions from batch waste incinerator systems ranging in size from 50 kg to 3000 kg of waste/batch, the latter representing the largest batch incinerator currently in use in Canada. Batch waste incinerators are those that operate in a non-continuous manner (i.e. they are charged with waste prior to the initiation of the burn cycle, and the door remains closed until the ash has cooled inside the primary chamber). Air emission testing completed by Environment Canada in 2002 using a modern Canadian-built batch waste incinerator demonstrated that, when properly operated and maintained, these systems are capable of meeting the Canada-wide Standards for dioxins/furans (80 pg I-TEQ/Rm^3 @ 11% O_2) and mercury (20 µg/Rm^3 @ 11% O_2). Stack testing can be carried out as required by the regulatory authorities (e.g. federal, provincial/territorial) to verify that these standards are met.

The Technical Document recommends and describes a six-step process for batch waste incineration:

Step 1 – Understand Your Waste Stream
Step 2 – Select the Appropriate Incinerator (or Evaluate the Existing System)
Step 3 – Properly Equip and Install the Incinerator
Step 4 – Operate the Incinerator for Optimum Combustion
Step 5 – Safely Handle and Dispose of Incinerator Residues
Step 6 – Maintain Records and Report

This process will assist owners and operators of batch waste incinerators to achieve the intent of the Canada-wide Standards for dioxins/furans and mercury, and reduce the potential for releases of other toxic substances to the environment.

OVERVIEW OF THE SIX-STEP PROCESS FOR BATCH WASTE INCINERATION

Step 1: Understand Your Waste Stream

The first step in managing waste is to understand the quantity and composition of the waste that is generated. A waste audit should be completed, where practical, to:

- Determine the quantity of waste generated in the various parts of an operation;
- Characterize the waste from each type of operation;
- Examine the waste stream to determine what opportunities exist for:
    - Reducing the quantity of waste generated;
    - Reusing materials; and
    - Recycling as much as possible before considering disposal.

Where waste audits are not practical, it is still necessary to develop an estimate of the waste quantities and characteristics before a strategy for waste diversion and disposal can be completed. Owners should investigate waste generation and diversion data from similar operations/facilities in order to estimate the waste types and quantities that will be generated at their own facilities. Sources of such information may include industry associations, waste industry consultants, provincial/territorial authorities and other regulatory bodies.

Based on the results of the waste audit/characterization, an assessment of appropriate disposal options should be undertaken. Where possible, disposal alternatives (other than incineration) for the residual waste stream (i.e. post 3Rs – Reduce, Reuse, Recycle) should be examined. When assessing disposal options, it is important to note that waste should neither be open-burned nor burned in a barrel. In both cases, the appropriate temperatures for a clean burn will not be achieved, and toxic contaminants, in particular dioxins and furans, will be released.

Step 2: Select the Appropriate Incinerator (or Evaluate the Existing System)

The characteristics of the residual waste stream destined for incineration should be incorporated into a call for proposals from incinerator manufacturers. Specifying the quantity and composition of the waste stream will ensure that proposals include suitable incinerators. It should be noted that incinerators built for a specific waste stream, such as animal carcasses, liquid wastes and hazardous wastes, are available and should be used as required.

For facilities with existing incinerators, owners/operators should reassess the suitability of the existing system to manage the current waste stream.

For facilities incinerating **more than 26 tonnes of waste per year,** dual chamber controlled air incinerators are the recommended configuration. These systems are capable of incinerating a wide range of wastes and, when properly maintained and operated, will achieve emissions of PCDD/F and mercury below the level of the Canada-wide Standards. These systems should be equipped with a large secondary chamber sized to provide a residence time of at least one second at a temperature higher than $1000^{O}C$, to ensure complete combustion and minimize PCDD/F emissions.

For facilities incinerating **less than 26 tonnes of waste per year**, “determined efforts”

as defined in the Canada-wide Standards for dioxins and furans[1] should be undertaken. Should circumstances restrict the ability to use a dual-chamber incinerator with a large secondary chamber, a single chamber incinerator with an afterburner should be used. It should be noted that such systems are less likely to be able to meet the emission standards than dual chamber incinerators.

Step 3: Properly Equip and Install the Incinerator

Building Considerations

- Incinerators should be installed inside a building to protect the equipment and the operators from weather conditions.
- In designing the installation site, care should be taken to maximize clearance between incinerator components, including the stack, and combustible construction materials.
- Insulation should be used to protect combustible building materials.
- The building should be equipped with sufficient fresh air inlet capacity for the incinerator. Both combustion air and dilution air for the barometric damper are required. Care should be taken to introduce air in a manner that does not lead to low-temperature operating problems.

Equipment Considerations

The incinerator system should come complete with the following equipment to monitor and record performance parameters:

- A scale to measure the weight of all materials charged to the incinerator; and
- A computerized process control and data acquisition system to store operating data from the incinerator.

Operational data should be collected and stored, at a minimum, every minute that the system is operating. The intent is to be able to summarize operating parameters during start-up, operation and cool-down for every cycle. If the required operating conditions are not achieved these data will allow the operators, the manufacturers and the regulator to identify the contributing factors for the failure. From this information, operating procedures can be adjusted to improve performance. Provisions should be made for the manufacturers to be able to remotely access and review the operating data for trouble shooting purposes.

It is highly recommended that batch incinerators not be equipped with heat recovery devices. The temperature of the stack gases in heat recovery systems will be lower than in systems without heat recovery, and may be in a temperature range that can lead to the formation of greater quantities of PCDD/F. Similarly, air pollution control systems are not recommended for batch waste incineration systems to control PCDD/F emissions. Stack gases should be released directly to the atmosphere at temperatures higher than 700^{O}C to reduce the chances of the inadvertent formation of PCDD/F through the *de novo* synthesis process.

If it is necessary to introduce additional waste to the incinerator during the burn cycle, the incinerator should be equipped with a ram charge system to limit the disruption of combustion in the primary chamber during the waste charging process.

[1] Available on-line at: http://www.ccme.ca/ourwork/air.html?category_id=97

Step 4: Operate the Incinerator for Optimum Combustion

Operational Considerations

Wastes received at the incinerator building should be separated according to their heating value characteristics: wet or low-energy wastes (e.g. food waste); mixed wastes with average energy values; and other materials with high energy values, such as oily waste materials. To facilitate this separation, all waste should be collected in transparent bags. To further assist with separation, wastes could be collected in coloured-coded bags.

Batch incinerators are designed to accept wastes within a specified range of energy (i.e. calorific) values. The operator should select waste from each category and mix it to achieve the manufacturer's specified input calorific value. Each bag should be weighed, its source should be noted, and the total weight of each category should be tallied before completing the loading. This information should be recorded by the computerized data acquisition equipment installed with the incinerator. (Refer to step 6 for further record keeping requirements).

Batch incinerator systems have limited charging capacity (both in terms of waste quantity and the calorific value of the waste charge). To assist the operator with the charging task, particularly for smaller incinerators, several batches could be weighed and placed in their own containers prior to loading the incinerator. The same weighing and logging procedures should be used for each batch and, once recorded, the batch can be charged when appropriate.

When the incinerator is charged with the appropriate mix and quantity of waste, the operator should close the door, ensure all interlocks are engaged, and start the burn cycle. The operator should observe the burn for at least 15 minutes after ignition of the primary chamber burner to ensure the volatility of the waste charged is not creating too much gas for the secondary chamber to handle. The rate of combustion can be slowed by reducing the quantity of under-fired air. The primary chamber should be operated in the temperature range specified by the manufacturer (typically $500^{O}C$ to $800^{O}C$).

When satisfied that the burn is proceeding in a controlled manner, the operator may leave the incinerator area while the equipment completes the burn cycle.

The burn cycle should not be interrupted by opening the charging door until after the burn is complete and the unit has cooled down. No additional waste should be added to the primary chamber unless the incinerator is equipped with an appropriate ram feed device.

When the burn is complete and the unit has cooled, the operator should open the door only when wearing protective equipment such as gloves, dust mask, face shield and goggles.

The operator should remove the ash from the previous burn cycle before reloading the incinerator. Any unburned materials found in the ash should be recharged to the primary chamber after the operator has cleaned the air ports, and before putting a fresh charge into the incinerator.

Training Considerations

Operators should be properly trained by the incinerator manufacturer. The training course should include, as a minimum, the following elements:

- System safety including identification of hazards that the operator should recognize;
- Waste characterisation and how waste composition can affect operation;
- Loading limitations, including materials that should NOT be charged to the incinerator, and the allowable quantities of different types of wastes that can be charged;
- Start-up procedures for the incinerator and the normal operation cycle;
- Operation and adjustment of the incinerator to maximise performance;
- Clean out procedures at the end of the cycle;
- Troubleshooting procedures;
- Maintenance schedule; and
- Record keeping and reporting.

Managers should be involved in the training session so that continuity can be maintained with different operators.

Step 5: Safely Handle and Dispose of Incinerator Residues

Ash from the primary chamber of the incinerator can contain materials deleterious to the operator's health and the environment. Operators should use personal protective equipment when handling this material. The material should be carefully removed from the hearth and placed in covered metal containers suitable for transporting the ash to an approved disposal site. The operator should weigh, and maintain records of, the quantity of ash produced.

Step 6: Maintain Records and Report

To demonstrate appropriate operation and maintenance of the incinerator, the facility should maintain records and prepare an annual report containing at least the following information:

- A list of all staff who have been trained to operate the incinerator; type of training conducted and by whom; dates of the training; dates of any refresher courses;
- All preventative maintenance activities undertaken on the equipment;
- Records of operation of the incinerator - in electronic format with full data backup;
- Summarized annual auxiliary fuel usage;
- A list of all shipments of incinerator residues, including the weight transported and disposed of by type if necessary, and the location of the disposal site;
- Results of any emissions measurements or any ash sampling data collected during the period.

All raw data records from the operation of the incinerator should be retained for inspection by the appropriate authorities for the period designated by those authorities, or for at least 2 years. The owner should work with the incinerator manufacturer or supplier and the regulators to determine the appropriate level of summary data that should be sent to the regulatory body (e.g. federal, provincial/territorial). The reports should be approved by the facility's senior management before submission.

APPENDIX H

TALTSON WINTER ROAD

1 INTRODUCTION

The Northwest Territories Power Corporation (NTPC) has prepared this appendix to the Taltson Facility Waste Management Plan (WMP) for the Taltson Winter Road (WR), between Fort Smith and the Taltson Hydroelectric Facility (the Facility) located on the Taltson River, Northwest Territories. The Taltson WR is required to support upgrade and maintenance activities at the Facility and is tentatively scheduled for construction and operation for three to five seasons, beginning in January 2020.

This appendix outlines the waste management procedures and guidelines for contractors and companies operating on the Taltson WR and complements the waste management procedures, guidelines, and information provided in the WMP. For the purposes of waste management contingency planning and the scope of this appendix, the Taltson WR comprises the marshalling/laydown area in Fort Smith and the WR corridor between Fort Smith and the Taltson Facility. This corridor includes the WR plus any pullouts, turnaround areas, rest areas, parking areas and other support areas that are constructed and maintained as part of the Taltson WR.

This appendix demonstrates that NTPC has appropriate measures in place to effectively manage waste on the Taltson WR. This appendix documents NTPC's local and regional waste management capabilities, presenting information specific to the Taltson WR. This appendix is not a standalone document and it must be read in conjunction with the Facility WMP. Copies of the WMP with this appendix should be provided to all third-party contractors and suppliers operating on the WR so that their personnel (e.g. equipment operators and drivers) are familiar with its contents and understand their responsibilities with respect to managing waste on the WR.

1.1 PURPOSE

The purpose of this appendix is to expand the scope of the Facility WMP to include information on the safe and environmentally sound transportation, storage, and handling of the waste, sewage, and hazardous products used and generated on the Taltson WR.

1.2 SCOPE

This appendix applies to the solid waste, sewage, and hazardous materials generated and transported during construction and operation of the Taltson WR, to ensure they will be handled and transported in compliance with all applicable Federal and Territorial regulations.

1.3 GENERAL RESPONSIBILITIES

Same as described in Section 1.6 of the WMP with the following additions.

1.3.1 NTPC Employees

- Comply with all NTPC policies and procedures when performing duties on the WR, including not disposing of waste on the WR.

1.3.2 Plant Operator

- Responsible for dispatching vehicles travelling on the WR from the Facility to Fort Smith

1.3.3 Project Manager, Engineering

- Responsible for dispatching vehicles travelling on the WR from Fort Smith to the Facility (ensure only one diesel-containing vehicle travelling on the WR per day).
- Ensure that any vehicles transporting hazardous materials arrive loaded at the marshalling area near the start point of the WR.
- Organize inspections of vehicles leaving Fort Smith and carrying waste or hazardous material (i.e. diesel) and ensure that appropriate records are maintained.
- Ensure all construction employees, contractors and sub-contractors adhere to the requirements of the WMP, including not disposing of waste on the WR.
- Ensure that all received hazardous materials/wastes are transported on the WR according to the requirements of the WMP.

1.3.4 Director, Health, Safety & Environment

- In coordination with the Plant Operator, prepare and submit any formal reports to regulators and NTPC management regarding the management of hazardous materials on the WR.

1.3.5 Third Party Contractors and Suppliers

- Ensure that contractors and carriers working on the WR adhere to the requirements of the WMP. This includes not disposing of waste on the WR, and proper handling and spill prevention for hazardous materials (i.e. diesel) being transported on the WR.

1.4 ADDITIONAL PLANS AND RESOURCES

This appendix is to be used in conjunction with the following references:

- Taltson Winter Road Waste Management Plan
- Taltson Hydroelectric Facility Spill Contingency Plan
- Taltson Hydroelectric Facility Operations and Maintenance Plan

2 TALTSON WINTER ROAD

2.1 PROJECT DESCRIPTION

The Taltson WR is approximately 56 km long, and the start point is a temporary laydown/marshalling area at the northeast corner of the Fort Smith airport. The end point is a temporary laydown area at the southern end of the airfield at the Taltson Facility. The Taltson WR consists of 10 sections over land (portages) and 9 sections over ice (lakes/rivers). The total length of portages is approximately 45.7 km (81%) and the total length of lakes/rivers is 10.5 km (19%). The WR alignment is shown on Figure G-1.

2.2 WASTES AND HAZARDOUS MATERIALS

2.2.1 Waste

There will be no temporary facilities (washrooms, fuel storage, or accommodations) established at any of the rest areas or pullouts along the Taltson WR.

Any brush or trees removed from the WR corridor prior to or during WR construction will be moved to the edge of the WR corridor and left to naturally decompose. Small quantities of fuels (Jet A or gasoline), oils, lubricants, and hydraulic fluids will be shipped to support upgrade project at the Taltson Dam.

Any contaminated soil encountered onsite will be packed and sealed in salvage drums and backhauled to Ft. Smith for disposal with a registered hazardous waste material company.

Sand/gravel used for traction control on the portage on/off ramps, will be scraped off and left on a flat area on each portage a minimum of 10 m above the high-water mark at the end of each WR season, so that it is not washed into the lakes and streams during the spring freshet and create sedimentation issues. A relatively small amount of sand/gravel will be used over the three WR seasons. It is estimated that less than 1 m^3 of sand/gravel will deposited on each portage on/off ramp each season. The sand/gravel deposited on the portage will be left there when the WR is closed and abandoned.

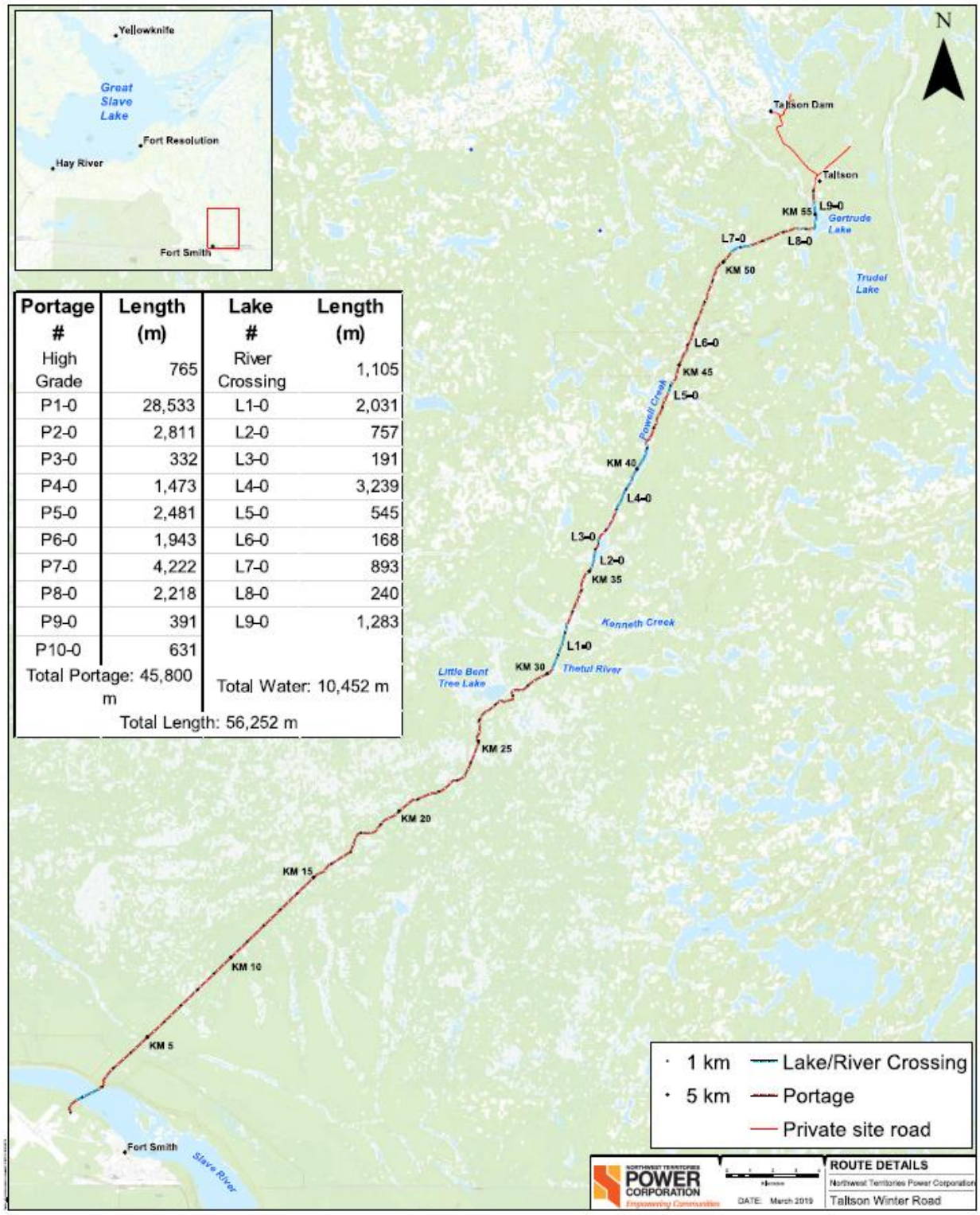
Refuse generated during construction and operation of the WR by contractors and material carriers will not be left on the WR and will be disposed of offsite.

2.2.2 Hazardous Materials

There will be no hazardous material stored on the Taltson WR. There will be no fuel storage or cross-loading on the WR. The only hazardous material being shipped in large quantities to the Facility on the WR is bulk diesel. The largest volume of bulk diesel shipment is 42,000L, and will be transported by a Super B tanker. Restrictions will be in place to allow one diesel-carrying Super B tanker per day on the WR.

Any vehicles transporting hazardous materials will arrive loaded at the marshalling area near the start point of the WR. All fuel offloading (bulk or drums) will occur at the Facility. Any spills caused by third party contractors and suppliers prior to arrival at the WR marshalling area are the responsibility of the third party and are outside of the scope of this appendix.

Figure G-1: Taltson Winter Road Map



Portage #	Length (m)	Lake #	Length (m)
High Grade	765	River Crossing	1,105
P1-0	28,533	L1-0	2,031
P2-0	2,811	L2-0	757
P3-0	332	L3-0	191
P4-0	1,473	L4-0	3,239
P5-0	2,481	L5-0	545
P6-0	1,943	L6-0	168
P7-0	4,222	L7-0	893
P8-0	2,218	L8-0	240
P9-0	391	L9-0	1,283
P10-0	631		
Total Portage: 45,800 m		Total Water: 10,452 m	
Total Length: 56,252 m			

3 INSPECTION AND RECORDS

In addition to the inspection procedures detailed in Section 3, inspections of diesel carriers on the WR will be conducted. The Project Manager, Engineering will be responsible for organizing inspections of vehicles leaving Fort Smith and carrying waste or hazardous material (i.e. diesel), to ensure that proper containment is in place.

All inspections will be logged with the date and time of inspection, vehicle inspected, and the name of the person conducting the inspection.

4 TRAINING

As outlined in the NTPC's Health and Safety Management System, all employees and contractors working on the Taltson WR are required to have the following training:

- Workplace Hazardous Materials Information System (WHMIS);
- Orientation, including emergency and spill response procedures (see also the Spill Contingency Plan and Emergency Response Plan); and
- Operations overview.

APPENDIX I

ONSITE SEWAGE AND RAW WATER SYSTEM

April 17, 2020

NTPC TALTSON RIVER WORK CAMP

ONSITE SEWAGE SYSTEM & RAW WATER SYSTEM SUPPLY DESIGN REPORT

BLOCK 75 D/6, LOT 1003, NORTHWEST TERRITORIES

Client: Northwest Territories Power Corporation

L&M Project No.: 1702-01

L&M ENGINEERING LIMITED

1210 Fourth Avenue, Prince George, BC V2L 3J4

Phone: (250) 562-1977

Table of Contents

1.0 INTRODUCTION

L&M Engineering Limited (L&M) has been engaged to complete the design for the civil works associated with a new 25 person work camp including domestic water servicing, onsite sewerage system and related earthwork and site grading. The camp is intended to be used to its full capacity for the operating season (approximately 8 months) for the first couple of years and moves to significantly reduced occupancy outside of scheduled shutdowns for the remainder of its operation.

1.1. Project Site Description

The property owned by Northwest Territories Power Corporation (NTPC) is located on the south-end of Taltson River, Northwest Territories. The property has existing infrastructure including accommodation, workshop, and generation plant. The proposed work camp site is proposed to be located near the existing active site off of access road from Taltson Airport. Much of the topography surrounding the project site has exposed rock with significant or vertical slopes with soils conditions consisting of either silty and clay over bedrock or peat over bedrock. This poses significant constraints for onsite sewage disposal from an environmental and public health perspective.

The closest permanent flowing body of water is the Taltson River/Reservoir, approximately 80m north from the proposed work camp. The general topography of the site slopes at 1-2% from east to the west with significant slopes at the west and south boundaries of the site development area.

The existing infrastructure is serviced by an existing septic treatment tank and subsurface disposal system and raw water intake for the domestic water supply off of the existing penstock servicing the generation facility.

1.2. Regulatory Requirements

Land development in the Northwest Territories is regulated by The Mackenzie Valley Land and Water Boards (MVLWB) through the issuance of land use permits (LUPs) in accordance with the Mackenzie Valley Resource Management Act (MVRMA), the Mackenzie Valley Land Use Regulations (MVLUR), and various Territorial Acts. This report addresses the method of onsite sewage management and raw water supply for the proposed 25 person work camp. This report and design will be included in an application for a land-use permit from the MVLWB that will regulate the construction of the camp and other replacement facilities.

1.2.1. Design Standards and Resources

The design methodology, principles, and standards for the water supply and onsite sewage treatment and disposal system are based on the following resources and our extensive experience with remote work camp infrastructure:

- Waters Act – S.N.W.T. 2014
- Public Health Act – General Sanitation Regulations – R.R.N.W.T. 1990
- Northern Land Use Guidelines – Camp and Support Facilities
- Interim Code of Practice: End-of-pipe fish protection screens for small water intakes in fresh water – Fisheries and Oceans Canada
- Alberta Private Sewage Systems Standard of Practice 2015 – Edition 3
- B.C. Sewerage System Standard Practice Manual - Version 3
- Municipal Wastewater Regulation of B.C. – 2012
- Wastewater Engineering Fifth Edition – Metcalf & Eddy

2.0 SITE INVESTIGATION

L&M completed a limited topographic survey and onsite soil assessment of the property on November 19, 2019. A total of two test pits were excavated at the proposed work camp location to a depth of approximately 1.5m below the existing ground. Two permeameter tests were also completed at varying depth to establish the hydraulic conductivity of the native soil. Refer to Drawing C001 in Appendix A for the location of the test pits and permeameter tests. After completing the onsite investigation and moving through design options, the client has decided to relocate the field further from the camp to establish more distance between the active facilities and sewage disposal. Further evaluation of the soils in the new proposed disposal area will be required before moving to construction to verify the suitability and rate for disposal.

2.1. Soil Profile Characteristics

Each of the test pits and drill holes performed onsite demonstrated a similar soil profile, structure, and consistence. The soil observed is primarily silty clay with a moist/friable structure. The top 0.4m of both test pits was comprised of silty clay with a fair structure. A massive layer of clay was noted from both test pits at depths below 0.4m. No groundwater seepage or indication of mottles was present in any of the test pits, suggesting that the water table would not rise to within 1.5m of the surface. Table 2 demonstrates the soil profile observed onsite in further detail and Figure 1 and Figure 2 provide visual representations.

Table 2 – Soil Profile Summary						
Test Pit Number	**Total Depth (m)**	**Soil Profile (m)**				**Groundwater Conditions**
		0-0.4	**0.4-1.5m**	**Below 1.5m**	**-**	
1	1.5	Blocky Silty Clay	Massive Clay	Massive Clay	-	none
2	1.5	Blocky Silty Clay	Massive Clay	Massive Clay	-	none
The soil at the proposed infiltrative surface is blocky with moderate structure and in friable consistence						

Figure 1_Test Pit #1

Figure 2_Test Pit #2

2.2. Soil Permeability

Permeability testing was performed on the site at depths ranging from 0.3m to 0.6m using 7.5cm diameter Edelman auger to assess the hydraulic capacity of the soil for sewage disposal. The infiltration rates selected based on the permeameter tests resulted in an average field saturated of 148 mm/day.

Table 3 – Soil Permeability Summary

Permeameter Test Number	Depth of Auger Hole (m)	Stable Rate of Fall (mm/min)	Soil Factor	KFS Value (mm/day)
1	0.3	4.8	34.9	167
2	0.6	3.7	34.9	129

2.3. Set Backs

The minimum setbacks for onsite sewerage systems vary between sewerage regulations. Most regulations are similar and require that all sewage collection, treatment, and disposal systems maintain minimum setbacks from various constraints. Applicable setbacks are summarized in Table 4 based on the SPM V3.

Table 4– Set Back Requirements (m)				
Constraint	**Requirement**		**Provision**	
	Tanks	**Field**	**Tanks**	**Field**
Water Supply Source	15	30	>300	>300
Water Well	30	30	n/a	n/a
Pressurized Water Main	3	3	>3	>3
Water Body	10	30	>100	>100
Intermittent Water Body	10	15	>15	>15
Water Cistern (Above Ground)	1	1	>15	>15
Structure or Dwelling	1	1	>5	>30
Another Disposal Field	3	6	n/a	n/a
Slope Breakout Point	-	7.5	>7.5	>7.5
Buried utility Services	1	1	>1	>1
Property Lines	1	3	n/a	n/a

2.4 Site Investigation Summary

Table 5 provides a summary of the site constraints identified and evaluated in the field along with a classification indicating the severity of the constraint.

Table 5– Site Investigation Summary		
Constraint	**Description**	**Classification**
Soil Structure/Consistency	Blocky/Firm	Slight
Soil Texture	Silty Clay	Severe
Field Saturated Soil Permeability (kfs)	<75 to <150 mm/day	Severe
Depth of Native Soil Above Restrictive Layer or High Water Table	<0.3m	Severe
Land Slope	1 – 2%	Slight
Setback Requirements	Breakout Slope	Moderate
Coarse Gavel Content	< 10%	Slight

3.0 SEWAGE SYSTEM DESIGN CRITERIA

Based on the identified constraints and the operational requirements provided for the work camp, a Type 1 wastewater treatment system with disposal to a sand mound pressure distribution with timed micro-dosing is recommended. This method of treatment will minimize the field area required for in-ground disposal and the application of timed micro-dosing will take better advantage of soil conditions for in-ground treatment and infiltration capacity. A minimum of 600 mm of approved mound sand will provide a higher quality of treatment prior to effluent contact with the native silt and clay soils. A sand mantel will be installed as part of each mound section to mitigate potential breakout and seasonal ground saturation conditions which may be prevalent in this region.

The recommended treatment and disposal system is supported by the Standard Practice Manual Version 3 (SPM.V3) as indicated in Table II-7 on page II-17. This sewage system has been designed to collect, treat, and dispose of sewage waste for up to 7,600 L/day.

3.1. Sewage Flows

The sewage flows for the Taltson Camp have been established based on historical flow data, Table 2.2.2.2.B. of the Alberta Private SSTP, and various sewer design resources such as Metcalf and Eddy. The design daily flow (DDF) estimated for the camp residents is expected to be 300 L/p/d with 220 L/d/p generated by the dorms and 80 L/d/p generated by the kitchen facility assuming two warm meals and a bag lunch. The peak occupancy for the camp's maximum operating window each year is expected to be 20 people staying in the dorms and a total of 40 people using the kitchen services. This results in a maximum expected DDF of 7,600L/d and an average daily flow (ADF) of 3,800 L/d (DDF/2) expected at the disposal field for any given 30-day window. The field loading is based on the average daily flow being delivered to the field for any 30-day window as supported by the SPM.V3.

- 20 camp residents @ 220L/d/p DDF dorm waste 4,400L/d
- 40 camp residents @ 80L/d/p DDF kitchen waste 3,200L/d

  Total Daily Design Flow 7,600L/d
- 20 camp residents @ 110L/d/p ADF dorm waste 2,200L/d
- 40 camp residents @ 40L/d/p ADF kitchen waste 1,600L/d

  Total Average Daily Flow *Over a 30-day window 3,800L/d

3.2. Wastewater Quality

The quality of a sewage treatment system is defined by the type of effluent achieved after treatment. The effluent types are established by the regulatory body. The required treatment type for a system is primarily based on site constraints and disposal methods. The pertinent wastewater quality parameters are the five-day Biological Oxygen Demand (BOD_5) and Total Suspended Solids (TSS). For these parameters, typical domestic levels are 290 to 560 mg/L and 175 – 500 mg/L for BOD_5 and TSS respectively. Typically camps tend to generate sewage with elevated BOD_5 and TSS levels as a result of commercial kitchen/cafeteria services and therefore a combination of kitchen waste pre-treatment and increased primary treatment capacity is recommended to facilitate higher concentration waste from the kitchen during peak operation.

The Ministry of Health classifies effluent quality from treatment as Type 1, Type 2, and Type 3. The different treatment classes are defined as follows:

- **Type 1**: Septic holding treatment resulting in an effluent quality of 150-300 mg/L BOD5 and 50-80 mg/L TSS. Further reduction to 100-150 mg/L BOD5 and 20-55 mg/L TSS is possible with and added septic tank effluent filter;
- **Type 2**: Septic holding and activated sludge (MBR) treatment or disposal to sand filter resulting in an effluent quality of <45/45 mg/L for BOD5 and TSS respectively;
- **Type 3**: Septic holding, activated sludge, and disinfection resulting in an effluent quality of <10/10 mg/L for BOD5 and TSS respectively as well as a significant reduction in pathogens prior to disposal.

3.3. Wastewater Loading Rate

3.3.1. Hydraulic Loading Rate (HLR)

The effluent loading rate is the amount of effluent that can be applied each day over a basal (bottom) area of the infiltrative surface without compromising the permeability or conductive capacity of the soil. The SPM.V3 indicates that the soil texture and structure must be used to evaluate the conductive capacity of the soil along with the standard percolation test or a hydraulic conductivity test using a permeameter.

Based on the soil profile and characteristics identified in the field and the average soil conductivity of the native soils the loading rate identified in Table II-22 of the SPM.V3 is a maximum of 12 L/d/m^2. With the addition of

a minimum 600mm thick sand filter mound, the loading rate can be applied to the top surface of the sand mound is 50 L/d/m^2 which produces a Type 2 effluent at the native soils resulting in a permitted basal loading rate of 15 L/d/m^2. Due to the significant site constraints, this design reduces the basal loading rate to the native soils to approximately 10 L/d/m^2 to mitigate risk associated to effluent breakout.

3.3.2. Lineal Loading Rate (LLR)

Based on the identified site constraints and soil characteristics, the SPM.V3 Table II-27 (Pg. II-39) recommends a maximum linear loading rate of 35 L/d/m. As site area and length are restricted on this site, the use of a sand mantel downslope of the sand mound disposal system will be implemented to manage potential breakout risk, provide additional treatment, and allow an LLR of 50L/d/m to be applied. The minimum lineal length recommended is therefore 152m (7,600 L/d ÷ 50L/d/m = 152m). The total proposed design lateral length is 160m which results in an actual lineal loading rate of 47.5 L/d/m. To further mitigate the risk of breakout associated with the site constraints the system is being designed to load the native soils at less than 10% of the water holding capacity and micro-dosing application.

3.3.3. Sand Loading Rate

The SPM.V3 Table II-24, Page II-37 indicates that the maximum loading rate for Type 1 effluent to sand filter coarse sand is 50 L/d/m^2. Existing reports and field sampling suggest a suitable source is available at the landing strip. The selected sand should meet the sieve specifications shown below. A material sieve should be provided prior to use in this application.

Sieve Size	Percent Passing
9.5mm	100
4.75mm	95-100
2.36mm	80-100
1.18mm	45-85
0.600mm	15-60
0.300mm	3-15
0.150mm	< 2
0.075	< 1

4.0 SEWAGE TREATMENT

Treatment of sewage from a commercial kitchen typically requires pre-treatment which consists of grease catchment and potentially pre-treatment to lower the BOD_5 and TSS to that of typical residential waste concentrations prior to entering primary treatment facilities. As this system will not sustain peak capacity consistently for long term operations, oversized grease trap and dedicated kitchen treatment with dual filtration combined with an increase in the primary treatment tank has been recommended to provide better treatment under periods of higher loading. This has also been implemented to provide additional solids waste storage within the tanks as the site is very isolated and maintenance during peak operation will be limited to once annually and during long term operation, it will be very limited.

The recommended treatment design for the camp facility consists of the following:

- Dedicated Kitchen Treatment
    - 4,000L (1,100 USGal) single chamber grease trap tank
    - Zable A-100 1.5 mm (1/16") effluent filter
    - 1,800L (475 USGal) single chamber pre-filtration tank
    - Zable A-100 1.5 mm (1/16") effluent filter

*This treatment provides treatment for kitchen waste only

- Primary Treatment
    - 19,000 Liter (5,000 USgal) two-chamber septic tank
    - Zabel A-100 1.5 mm (1/16") effluent filter

*This provides treatment for combined kitchen and dorm waste

4.1. Grease Trap Tank, Filtration Tank, Effluent Filter, and Smart Alarm

The grease trap tank, filtration tank, and effluent filtration function as a dedicated treatment process to reduce commercial kitchen waste concentrations to that of typical residential waste before entering the primary treatment tank. For a camp application of this nature, we would typically provide a minimum grease treatment volume of three times the average daily flow or approximately 4,800L. Due to the reduced maintenance capacity at this remote site, we have recommended the minimum treatment size to be 5,800L (3.6*ADF). This increase in size across two tanks will help facilitate a higher level of treatment during peak operations and provide greater storage volume of solids to reduce maintenance requirements to every year during peak operation and every 5 years during long term operations depending on kitchen usage.

Most sewage regulation recommends that an effluent filter be installed at the outlet tee that filters particles greater than 3mm. For this application, we recommended the use of a Zabel A-100 effluent filter with 1.5mm (1/16") filtration to further improve effluent quality on both the grease trap tank and the filtration tank. Additionally, a high-level alarm panel for both filters is also recommended and must meet the flowing specifications:

- Rhombus Tank Alert XT liquid level alarm or approved equivalent
- Must be CSA approved
- Power LED display indicator
- Installation on a separate circuit from pumps or other infrastructure
- NEMA 3X enclosure for indoor/outdoor mounting
- Audible & visual alarm, automatic alarm reset, silence switch, and test switch

4.2. Septic Tank, Effluent Filter, and Smart Alarm

The septic tank functions as a primary treatment process and produces a Type 1 effluent. The minimum septic tank size varies across different design standards. For a camp application of this nature, we would typically provide a minimum tank volume of two times the daily design flow or approximately 15,200L. Due to the commercial kitchen application and reduce maintenance capacity we have recommended the minimum tank size to be 19,000L (2.5*DDF). This increase in size will help facilitate a higher level of treatment during peak operations and provide greater storage volume of solids to reduce maintenance requirements to every 3 years during peak operation and every 15 years during long term operations.

Most sewage regulation recommends that an effluent filter be installed at the outlet tee that filters particles greater than 3mm. For this application, we recommended the use of a Zabel A-100 effluent filter with 1.5mm (1/16") filtration to further improve effluent quality. Additionally, a septic tank high-level alarm panel is also recommended and must meet the flowing specifications:

- Rhombus Tank Alert XT liquid level alarm or approved equivalent
- Must be CSA approved
- Power LED display indicator
- Installation on a separate circuit from pumps or other infrastructure
- NEMA 3X enclosure for indoor/outdoor mounting
- Audible & visual alarm, automatic alarm reset, silence switch, and test switch

5.0 SEWAGE DISPOSAL

Sewage treatment and disposal for this design requires pressure distribution as a result of the site constraints and facility operations. Refer to Appendix B for the pressure distribution design spreadsheet and to Appendix A for the detailed design drawings.

The proposed disposal system has been designed for a maximum daily design flow of 7,600 L/d at a maximum hydraulic loading rate (HLR) of 15 L/d/m^2 at the basal surface. This results in a required minimum total basal area of 507m^2. With a maximum LLR of 50 L/d/m (supported by sand mantle) the required minimum contour length is 160m.

Based on the above loading constraints, the use of two hydraulically separate sand filter coarse sand mound disposal fields is recommended. The two separate fields can be alternated or used together depending on the camps specific operating conditions. Due to length restrictions, two separate mounds will be constructed, each with a length of 80m and 10m horizontal speration to establish an overall lineal length of 160m. Each sand filter mound consists of of four header supply pipes from a dedicated effluent pump servicing eight perforated disposal laterals.

This arrangement results in a total sand mound loading area of 160m^2 and a total basal loading area of 640m^2. As a result, the actual HLR for the disposal fields is 11.8 L/d/m^2 and an actual LLR is 47.5 L/d/m. The sand mantle will be positioned downslope of each sand filter mound for a minimum distance of 7.5m to manage risk of lineal mounding and breakout

5.1. Dosing Frequency and Instantaneous Loading

Reducing both the daily and instantaneous hydraulic loading rates and providing uniform distribution over the infiltration surface can help maintain lower soil moisture levels. Lower soil moisture results in longer wastewater restoration times in the soil and causes the wastewater to flow through the smaller soil pores in the unsaturated zone, both of which enhance treatment and mitigate risk of breakout or excessive organic loading under unexpected increased daily flows.

It is optimum when the instantaneous volume per does is between 1/24th and 1/8th of the average daily wastewater volume. Frequent and uniform dosing (12 times or more per day) in coarser soil (or sand filter) maximizes the effects of biological, chemical, and physical treatment mechanisms. Micro dosing has been applied to this design with a maximum of 24 doses per field per day or an approximate instantaneous loading of approximately 1/48th of the daily design flow.

The detailed pressure design considers the orifice placement, volume of effluent delivered under pressure, and the hydraulic application rate (HAR) at the disposal surface. Given the nature of the native soils, this system has been design with a maximum HAR of 2.0 mm/dose which is equivalent to less than 10% of the estimated water holding capacity of the native soil with 72% of the effluent delivered to the field under pressure each dose.

In order to achieve uniform distribution across each of the disposal fields the density of orifices should be as high as possible without generating excessive pumping requirements. Typical orifice spacing varies between 0.6m and 1.2 m depending on the field arrangement with a maximum dose area per orifice of 0.56 m^2. For this type of system, small 3 mm (1/8”) diameter orifices spaced at a maximum of 0.625m is recommended resulting in a dose area per orifice of 0.56 m^2.

5.2. Pump Chamber, Pump and Control

Following the septic tank treatment system, effluent flows into a pump chamber that is designed to provide the necessary dosing volume to the field with adequate distribution, surge volume, and emergency storage volume after pump alarm sounds. The recommended 8,500L (2,250 USgal) tank provides volume in excess of the daily design flow for the camp to allow for unexpected peak flows or emergency storage as required.

The proposed pump for each field is a MYERS ME100 1.0HP effluent pump (or approved equivalent) complete with 4 floats, weather-proof sealed junction box, and simplex timed dose control panel. Each pump shall include the following:

- 6m of power cord
- 50mm dia. (2in) SCH 80 discharge
- 50mm (2in) SCH 80 check valve
- 50mm (2in) PVC union.

The floats shall have 6m of cord and shall include:

- FS#1 Pump redundant off
- FS#2 Timer activate
- FS#3 High level alarm
- FS#4 Timer override
- FS#5 High level filter alarm (located in septic tank)

Each pump requires its own pump control panel shall be CSA Approved and supplied with the following features:

- Simplex Control Panel
- NEMA 4X enclosure rated for indoor or outdoor mounting
- Power LED display indicator
- Pump disconnect circuit breaker
- Pump run light
- Pump run time meter
- Pump run counter
- Hand-off-automatic selector switch (H.O.A.)
- Float level indication lights
- High level alarm light and beeper with reset
- Dosing timer

5.3. Timed Dosing and Distribution

For the design of this system, the two MYERS ME100 1.0HP pumps will each dose 3,800 L/d over 24 doses to their respective field. This results in a total volume per dose to each field of 158L. The system laterals will drain out into the field after each dose and the pressurized supply line and headers should drain back to the pump tank in less than 1 hour to prevent freezing.

This dosing schedule results in a pump flow rate of 66.7 Igal/min to each field. Each pump will operate for 57 seconds and have an off time of 59 minutes each dose cycle before dosing the field again.

The design pump operating flow rate is 85USgpm with an expected operating head and squirt height of 11.9m (39ft) and 3.2m (10.4ft) respectively.

5.4. Sewage Collection System

The sewage collection system for the camp should consist of 100mm diameter SDR 28 PVC for all underground installation between the camp infrastructure and the septic treatment tank. Cleanouts are to be provided every 15m, change in horizontal alignment, or vertical grade as required. The minimum pipe slope is to be 1.0% but is preferred at a minimum 2.0% slope.

5.5. Disposal Field Supply Pipe

The disposal field supply pipes consist of 50mm diameter SCH.40 PVC pipe from the pump tank outlets to the disposal field headers. The supply pipes are intended to

drain back to the pump tank after each dose and require a minimum 0.5% pipe slope towards the pump tank discharge. The configuration chosen for the field has resulted in no need for distribution valves. Refer to Appendix A for the pressure field details.

5.6. Header Pipe

The header pipe delivers flow from the supply pipe to the disposal laterals and consists of 50mm diameter SCH.40 PVC. The header pipe is to be sloped such that it drains back to the pump tank or out into the disposal laterals. Headers are to be complete with cleanouts and insulated covers at finished grade.

5.7. Disposal Laterals

Each header distributes flow through two perforated 10m long 25mm diameter SCH.40 PVC lateral pipes. Perforations are to be 1/8" in diameter and set at a maximum distance of 0.625m on center with the first and last being 0.3m from the ends of the lateral. Each lateral is to be equipped with a cleanout at the end of the lateral run c/w insulated cover to the finished grade of the mound. Ensure all orifices are facing down except for the first and last orifice. Provide orifice shields for all downward facing laterals. See drawing details in Appendix A for field lateral details.

5.8. Infiltrator Chambers

Quick4 Equalizer Standard infiltrators have been recommended (34"W x 48"L x 12"H). A potential alternative to infiltrators would be a minimum of 150mm of drain rock base and filter fabric over the installed distribution pipe. Provide perforated inspection pipes inside of the chambers to allow monitoring from the surface. Refer to Appendix A for infiltrator and alternative infiltration trench installation details.

6.0 SEWAGE SYSTEM CONSTRUCTION PROCEDURE

6.1. Septic Tank and Pump Chamber

Install level as per the manufacturer's guidelines for the approved depth range. Before the septic system is approved, a leakage test must be performed on the tank. The tank shall be completed filled with a minimum of 50mm of water into all tank risers. This is to ensure that a watertight connection has been made between the riser and the tank. A leakage test must be performed by the system's installer prior to the engineer's construction inspection. Once the test has been passed by the installer, the leakage test will be witnessed for one hour on the day of the construction inspection by the engineer.

6.2. Disposal Field Supply Pipe

Install the disposal field infrastructure in accordance with the manufacturer's guidelines at a minimum 0.5% grade towards the pump tank. Insulated pipe cover is recommended for areas where snow clearing and vehicle traffic are expected over the supply pipe. A minimum of 0.9m of cover is recommended where vehicle loading is expected.

6.3. Header Pipe

Install header pipe in accordance with manufacturer's guidelines at a minimum 0.5% slope back to the force main supply pipe or into the disposal field laterals.

6.4. Disposal Field Construction

1. The field area shall be cleared with any stumps removed. Any organics are to be removed but as much of the native mineral soil profile is to be left in place as possible. If fill is required beneath the proposed sand mound disposal field, utilize a material meeting the sand mound specification or approved alternative import fill.
2. Prior to placing sand mound media, scarify the native soil surface to a depth of 150mm to create a binding layer between the treatment media and the native soils. The basal area for the sand mound should be sloped at a minimum of 0.5% towards the boundary of the site development.
3. A minimum 600mm thick layer of sand treatment media is be placed un-compacted on the scarified native soil. The top of the sand mound is to be installed level with less than 0.5% slope. The site is designed with a 1% grade along the length of the fields. In order to avoid excessive sand placement, step the field down for each header zone as required given site conditions. It is important to ensure sand treatment media remains clean and free of native soil contaminants.
4. The laterals piping shall be placed level with no more than 0.5% slope back towards the supply header and force main. Each lateral is to be equipped with a lateral inspection pipe inserted into the infiltrator and a lateral cleanout at the end of each lateral section. All cleanout riser sleeves are to be filled with insulation chips and provided with an insulated cover.
5. Prior to the pressure testing procedure open up all lateral and header cleanouts to flush the system of debris. Orifice shields are required on all downwards

facing orifices. The infiltrators shall be placed over the pressure laterals with the laterals strapped to the top of the chambers using nylon tie straps.

6. The trenches shall be backfilled with un-compacted sandy loam backfill or a material meeting the sand mound soils specification.
7. The top of the field area surface shall be sloped at a minimum 2% grade to encourage surface water shedding. The entire area shall be seeded with grass and small shrubs or decorative landscaping.

7.0 RAW WATER SUPPLY SYSTEM DESIGN

The water demand for the work camp supply system considers the same peak daily design flow as the onsite sewerage system as it is not expected that a considerable volume of water will be used for outside of the domestic potable use. The maximum daily demand for the work camp is estimated at 7,600 L/d and the associated methodology for that estimate is provided in earlier sections. As described in the earlier sections of this report, the site poses significant subsurface soil restrictions such as bedrock for deep utility installation. The selected method for water supply to the work camp will be above grade insulation jacketed water supply line from a submersible pump in the Talston River/Reservoir with an automatic recirculation system to mitigate freezing.

7.1. Proposed Camp Facility Water System

The proposed camp facility water system is being provided by the camp manufacturer but is understood to consist of a UV disinfection system and approximately 6,000L (1,600 USgal) in treated potable water storage followed by a booster pump distribution system. To meet the estimated maximum daily demand for the work camp the raw water supply must be able to provide a minimum of 1 USgpm (3.9 L/min). We have recommended a minimum raw water supply rate for this system of 6 USgpm.

7.2. Water Intake Design

Due to ground conditions, concerns for environmental impact, and seasonal temperatures the chosen water intake methodology for this site will be a submersible pump encased in an exposed stainless steel casing mounted to the concrete inlet structure of the penstock feed to the hydroelectric facility. The submersible pump is to be set approximately 4.5m below the service platform of the inlet structure such that the pump discharge is a minimum of 1m below the low water level for the reservoir. The steel casing is to be provided with a screened

intake for the submersible pump that ensures that water intake moves across the motor. The minimum effective screen area to be provided is 0.02m^2 with a maximum design opening of not more than 2.5mm as indicated by the Fisheries and Oceans Canada Interim Code of Practice for end-of-pipe fish protection screens for small water intakes in freshwater. The base of the casing is to be perforated with maximum 2.5mm diameter perforations.

7.3. Raw Water Supply Pump Design

The estimated length of water supply service from the water intake to the proposed camp facility is 450m with approximately 14m of elevation difference. Based on the selected supply service being a 25mm diameter PEX pipe we have recommended a Grundfos 10S05-6 0.5hp 230V 60hz submersible pump with an expected supply rate of approximately 8USgpm at 140ft of head. This pump should achieve the maximum daily demand with a total daily pump run time of approximately 200 minutes.

7.4. Raw Water Supply Service

The chosen material of water supply conveyance for this work camp is Urecon Dual PEX-Flex 2 x 1” insulation jacketed supply and return pipe. This system allows for the recirculation of the supply water to mitigate freezing for the exposed pipe in colder temperatures. The insulation jacket houses two 26.2mm inside diameter PEX pipes for the supply and return. This pipe network will work with the submersible raw water supply pump and dual recirculating pumps to maintain a constant flow in the service line while domestic water is in use and when it is not. This service will be installed above grade and within culvert sleeves at road crossings from the submersible pump at the reservoir intake to the work camp facilities potable water and recirculating system.

7.5. Raw Water Recirculating System

To reduce the risk of freezing for the above-grade raw water supply system, recirculating pumps and a recirculation line will continuously move water from the camp to the submersible raw water supply pump and back to the work camp. Recirculation will remain operational during the supply pump operation. This will utilize dual Grundfos CR 3-6 A-FGJ-A-E-HQQE 1.5hp 230V 60Hz vertical multistage centrifugal pumps. The pumps will be in duplex for redundancy to further mitigate the risk of freezing of the water supply line to the facility. Each pump connection to the raw water supply/recirculation system will require a check valve out the discharge end along with isolation valves and unions on the inlet and outlet for full isolation and maintenance as indicated on the design drawings.

7.6. Water Supply Operating Logic

The operating logic for the water supply and recirculation system will utilize a pressure switch, float controlled electrically actuated valve, and flow switch. When the potable water cistern calls for water the electronically actuated valve will open, dropping water pressure in the system causing the submersible raw water supply pump to deliver flows. When the potable water cistern is full the float will activate the electronic valve to close, resulting in increased pressure in the supply system and the raw water supply pump to shut down. The recirculating pumps will be turned on and off manually as required by the seasonal temperatures. A flow switch on the incoming feed to the pumps will be provided as a redundant off control to ensure they do not operate without water in the system.

8.0 WATER SYSTEM CONSTRUCTION PROCEDURE

8.1. Proposed Camp Facility Water System

The connection of the raw water supply to the camp facility water system should occur directly after the recirculating pumps. Manual and electrical isolation valves are required at this connection to control the delivery of water to the potable water cistern. The camp facility water treatment and distribution system are provided by others.

8.2. Water Intake Structure

The casing for the submersible water supply pump should be 4.6m in length and installed level with the elevation of the service platform of the inlet structure for the penstock supply to the hydroelectric facility. This casing is recommended as a 200mm diameter galvanized stainless steel spool piece complete with perforated endcap for the pump to rest on and an intake screen with an effective screen area of $0.02m^2$. The intake screen openings should have a maximum dimension of 2.5mm. A torque arrestor is recommended to secure the pump from rotating during start-up. The casing is to be fixed to the concrete inlet structure between the high water level and the top of the concrete structure. Engineered shop drawings are to be submitted for approval prior to construction for the mounting methodology. The casing will contain the dual PEX-Flex piping complete with jacket to within 150mm of the submersible pump discharge along with a redundant off float for the submersible pump and submersible electrical and pump communication wiring.

8.3. Raw Water Supply Pump

The raw water supply pump is to be a submersible Grundfos 10S05-6 0.5hp 230V 60hz installed within the proposed casing. The pump is to be equipped with a check valve at the discharge prior to connection to the insulation jacketed Dual PEX-Flex water supply and recirculation loop. The submersible pump will be controlled by a pressure switch at the work camp facility domestic supply system and a redundant shut off float set at the top of the pump discharge. It is important to maintain the recirculation loop and insulated jacket too as close to the pump discharge as possible.

8.4. Raw Water Supply Pump

The raw water supply pump is to be a submersible Grundfos 10S05-6 0.5hp 230V 60hz installed within the proposed casing. The pump is to be equipped with a check valve at the discharge prior to connection to the insulation jacketed Dual PEX-Flex water supply and recirculation loop. The submersible pump will be controlled by a pressure switch at the work camp facility domestic supply system and a redundant shut off float set at the top of the pump discharge. It is important to maintain the recirculation loop and insulated jacket too as close to the pump discharge as possible.

8.5. Raw Water Supply Service

The raw water supply/recirculation system piping is to be installed as per the manufacturer's guidelines for the jacketed Dual PEX-Flex 2 x 1 system. It is critical that the integrity of the insulated jacket is maintained across the length of the system including fittings between the connection to the raw water supply pump and the camp facility. Minimum 300mm diameter CSP culverts are to be provided at all road crossings to ensure pipe protection. Due to the extreme temperatures at this location, heat tracing is recommended for the length of the supply run to assist the recirculation system to mitigate freezing. The line is to be installed such that high/low points are eliminated wherever possible. An air release valve is recommended as the services enter the work camp facility.

8.6. Raw Water Recirculating System

The raw water recirculating system is to be installed with full redundancy (duplex pumps installed in parallel). The pumps are to be Grundfos CR 3-6 A-FGJ-A-E-HQQE 1.5hp 230V 60Hz or approved equivalent. Each pump is to be equipped with discharge check valves completed with isolation valves and unions on the supply and

discharge line to allow isolation and maintenance as required. The pumps are to be equipped with independent controls including flow switch activated redundant off and audible alarm indicating pump failure. An air release valve is recommended on the recirculating line prior to exiting the work camp facility.

9.0 EARTHWORKS

The proposed earthworks are based on a combination of digital elevation model data (assumed at UTM) and GPS site survey completed at a local coordinate system. These surfaces were combined and used as the basis for the grading design and volume analysis.

9.1. Site Grading

The site grading plan intends to achieve a minimum 0.5% slope across the entire site, with the primary grading occurring from the existing access to the proposed site to the south at the end of the sewage disposal fields. Grading beneath the sewage sand mound disposal fields should achieve a 0.5% slope across the basal width of the sand mound towards the boundary of the site development to promote drainage. Grading in areas that will support the camp and accessory buildings shall be completed in such a way as to minimize fill under the structures. Grading in areas that have the sand mound should be completed in such a way as to minimize cut in the basal area of the sand mound. The subgrade must have no low points or areas for water to become trapped beneath the capping structure.

9.2. Site Access

The existing access to the proposed work camp location is to be graded such that is transitions into the proposed site grading with a maximum 8% grade and a minimum vertical curve transition length of 8m. The site access and all areas of the proposed site, excluding the basal area of the sewage disposal fields, are to be capped with a minimum 150mm thick layer of SGSB gravels or approved equivalent granular soils.

9.3. Volume Analysis

The depth and consistency of the native clay soils in the proposed development area is relatively unknown, with soils in the area consisting of both clay and rock. The analysis assumes that all cut volumes can be used as fill. If the cut material is deemed unusable as fill, approved imported fill is to be used in place of unsuitable material. Import or embankment fill shall be placed and compacted in lifts not exceeding 300mm. Any import fill that is to be placed beneath the sand mound

disposal field shall match the sand mound specification or approved equivalent granular soil. The approximate earthwork volumes are:

- Native Soil Cut: 600 cu.m Source: onsite
- Native Soil Embankment Fill: 600 cu.m Source: onsite
- Surfacing Aggregate Import: 420 cu.m Source: Pit V or Pit W
- Sand Mound Import: 220 cu.m Source: Pit C
- Sand Mound Cover Import: 300 cu.m Source: Organics or Pit C

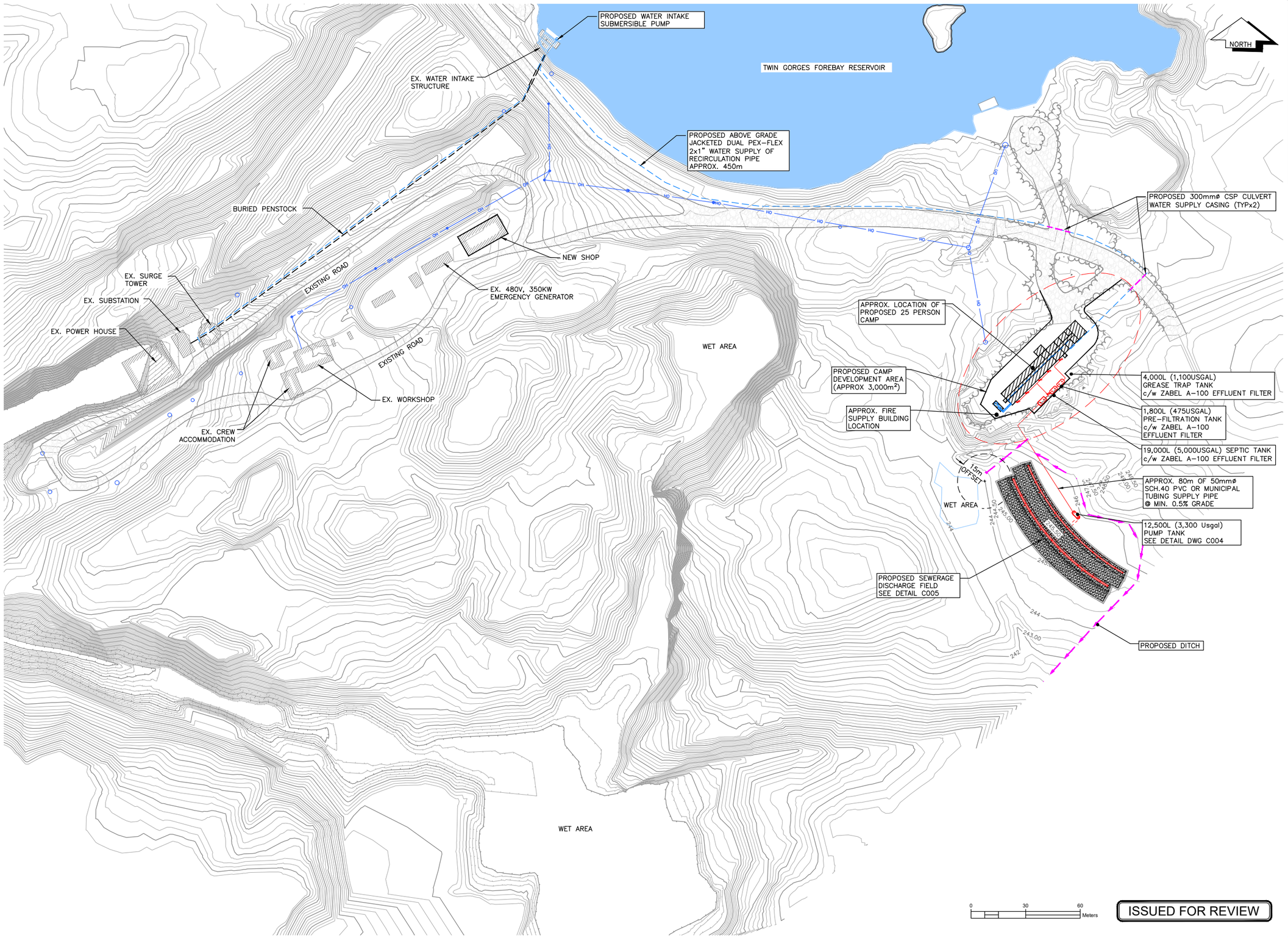
If you have any questions regarding the contents of this report, please feel free to contact the undersigned directly.

L&M ENGINEERING LIMITED

Prepared by:

Jamie Schenkeveld, P.Eng

Associate



LEGEND

EXISTING

- EX. TEST PIT & DRILL HOLE
- EX. BENCHMARK & SURVEY HUBS
- EX. IP's & ISM's
- EX. LEGAL LINE
- EX. LEGAL R.O.W. & EASEMENT
- EX. SANITARY & MANHOLE
- EX. SANITARY FORCE MAIN
- EX. STORM & MANHOLE
- EX. SINGLE & DOUBLE CATCHBASIN c/w CB LEADS
- EX. CATCHBASIN MANHOLE
- EX. CULVERT
- EX. FIRE HYDRANT & VALVE ASSEMBLY
- EX. WATERMAIN & VALVE
- EX. BLOW-OFF ASSEMBLY
- EX. CURB STOP
- EX. ROAD & SIDEWALK
- EX. ROAD SIGN(s)
- EX. SHOULDER
- EX. TOP OF SLOPE
- EX. TOE OF SLOPE
- EX. DITCH or SWALE
- EX. FENCE
- EX. OVERHEAD LINES
- EX. UNDERGROUND LINES
- EX. POWER POLE & ANCHOR
- EX. GAS MAIN

PROPOSED

- PR. LEGAL LINE
- PR. LEGAL R.O.W. & EASEMENT
- PR. SANITARY & MANHOLE
- PR. STORM & MANHOLE
- PR. SINGLE & DOUBLE CATCHBASIN c/w CB LEADS
- PR. CATCHBASIN MANHOLE
- PR. CULVERT
- PR. DITCH or SWALE
- PR. FIRE HYDRANT & VALVE ASSEMBLY
- PR. WATERMAIN & VALVE
- PR. GRAVEL SHOULDER
- PR. ASPHALT
- PR. CURB & SIDEWALK
- PR. ROAD SIGN(s)

NO.	DATE	REVISION	DR.

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DRAWING FILE:	C3D20 1702-01.dwg
CORRESPONDENCE:	
GRID:	
DATE:	JAN 2020
SCALES:	FULL: 1:1000 HALF 1:2000

NWT POWER CORPORATION
WORK CAMP
ONSITE SEWERAGE SYSTEM
OVERALL SITE PLAN

CONSULTANTS PROJECT No.
1702-01

DRAWING No.
C000

SHEET No.	REV. No.
1 OF 8	0

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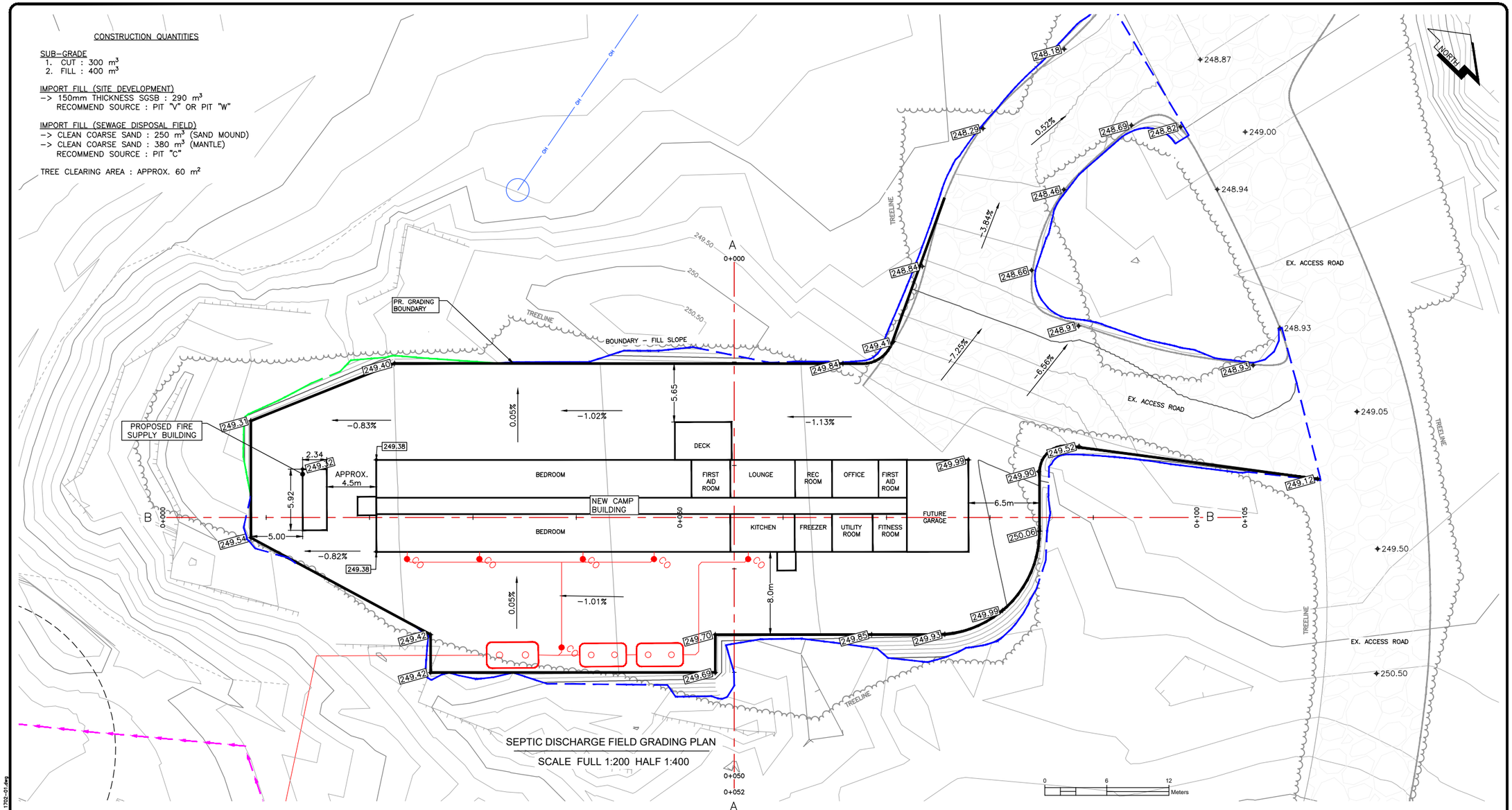
CONSTRUCTION QUANTITIES

SUB-GRADE
1. CUT : 300 m^3
2. FILL : 400 m^3

IMPORT FILL (SITE DEVELOPMENT)
-> 150mm THICKNESS SGSB : 290 m^3
RECOMMEND SOURCE : PIT "V" OR PIT "W"

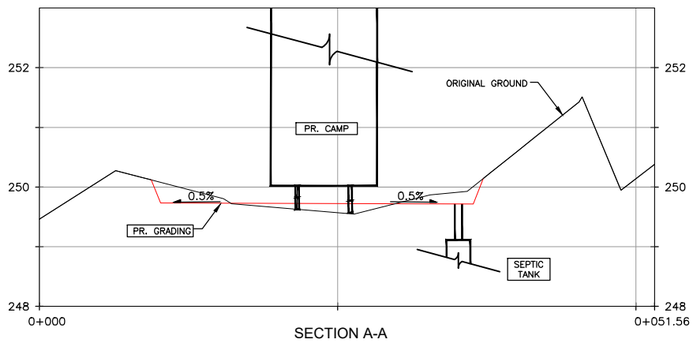
IMPORT FILL (SEWAGE DISPOSAL FIELD)
-> CLEAN COARSE SAND : 250 m^3 (SAND MOUND)
-> CLEAN COARSE SAND : 380 m^3 (MANTLE)
RECOMMEND SOURCE : PIT "C"

TREE CLEARING AREA : APPROX. 60 m^2

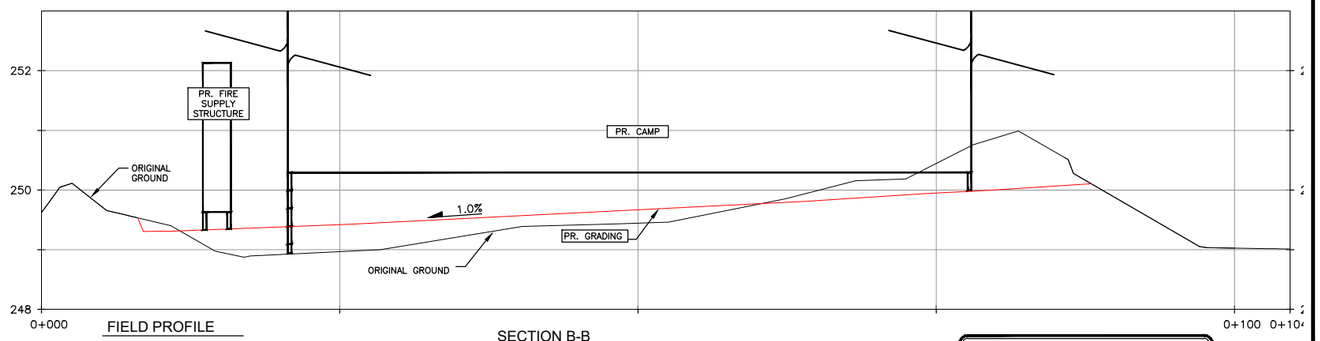


SEPTIC DISCHARGE FIELD GRADING PLAN

SCALE FULL 1:200 HALF 1:400



SECTION A-A



FIELD PROFILE

HORZ 1:250 VERT:5:1

SECTION B-B

ISSUED FOR REVIEW

XXX.XX PR. ELEVATION

XXX.XX EX. ELEVATION

NO.	DATE	REVISION	DR.

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DRAWING FILE:	C3D20 1702-01.dwg
CORRESPONDENCE:	
GRID:	
DATE:	27/FEB/2020
SCALES:	AS NOTED

NWT POWER CORPORATION
WORK CAMP
ONSITE SEWERAGE SYSTEM
SITE GRADING PLAN

CONSULTANTS PROJECT No.
1702-01
DRAWING No.
C001

SHEET No.	REV. No.
2 OF 8	0

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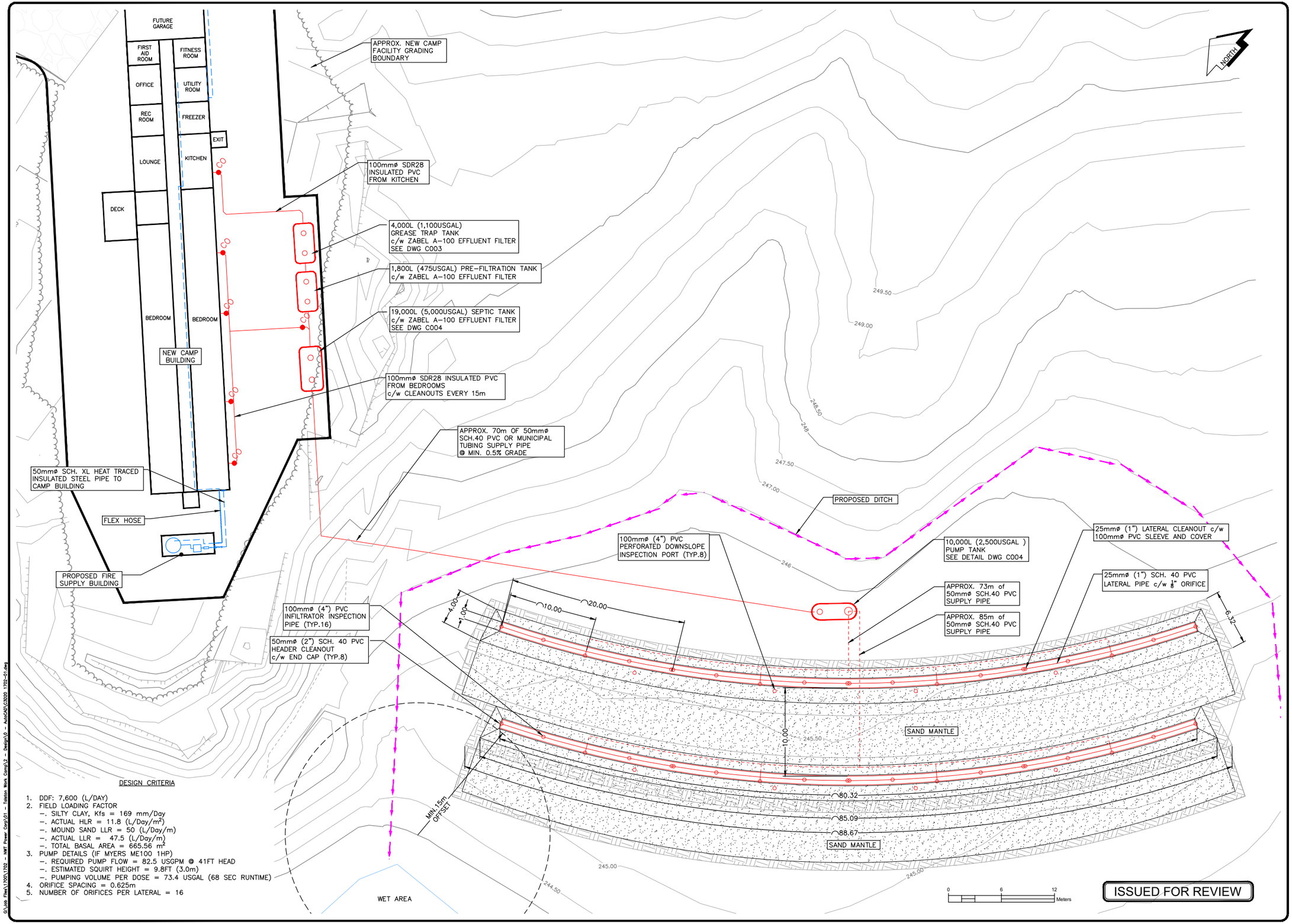

DESIGN CRITERIA

1. DDF: 7,600 (L/DAY)
2. FIELD LOADING FACTOR
   - -. SILTY CLAY, Kfs = 169 mm/Day
   - -. ACTUAL HLR = 11.8 (L/Day/m^2)
   - -. MOUND SAND LLR = 50 (L/Day/m)
   - -. ACTUAL LLR = 47.5 (L/Day/m)
   - -. TOTAL BASAL AREA = 665.56 m^2
3. PUMP DETAILS (IF MYERS ME100 1HP)
   - -. REQUIRED PUMP FLOW = 82.5 USGPM @ 41FT HEAD
   - -. ESTIMATED SQUIRT HEIGHT = 9.8FT (3.0m)
   - -. PUMPING VOLUME PER DOSE = 73.4 USGAL (68 SEC RUNTIME)
4. ORIFICE SPACING = 0.625m
5. NUMBER OF ORIFICES PER LATERAL = 16

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DRAWING FILE:	C3D20 1702-01.dwg
CORRESPONDENCE:	
GRID:	
DATE:	JAN 2020
SCALES:	FULL 1:200 HALF 1:400

NWT POWER CORPORATION
WORK CAMP
ONSITE SEWERAGE SYSTEM
DETAILED DISCHARGE SITE PLAN

CONSULTANTS PROJECT No.
1702-01
DRAWING No.
C002

SHEET No.	REV. No.
3 OF 8	0

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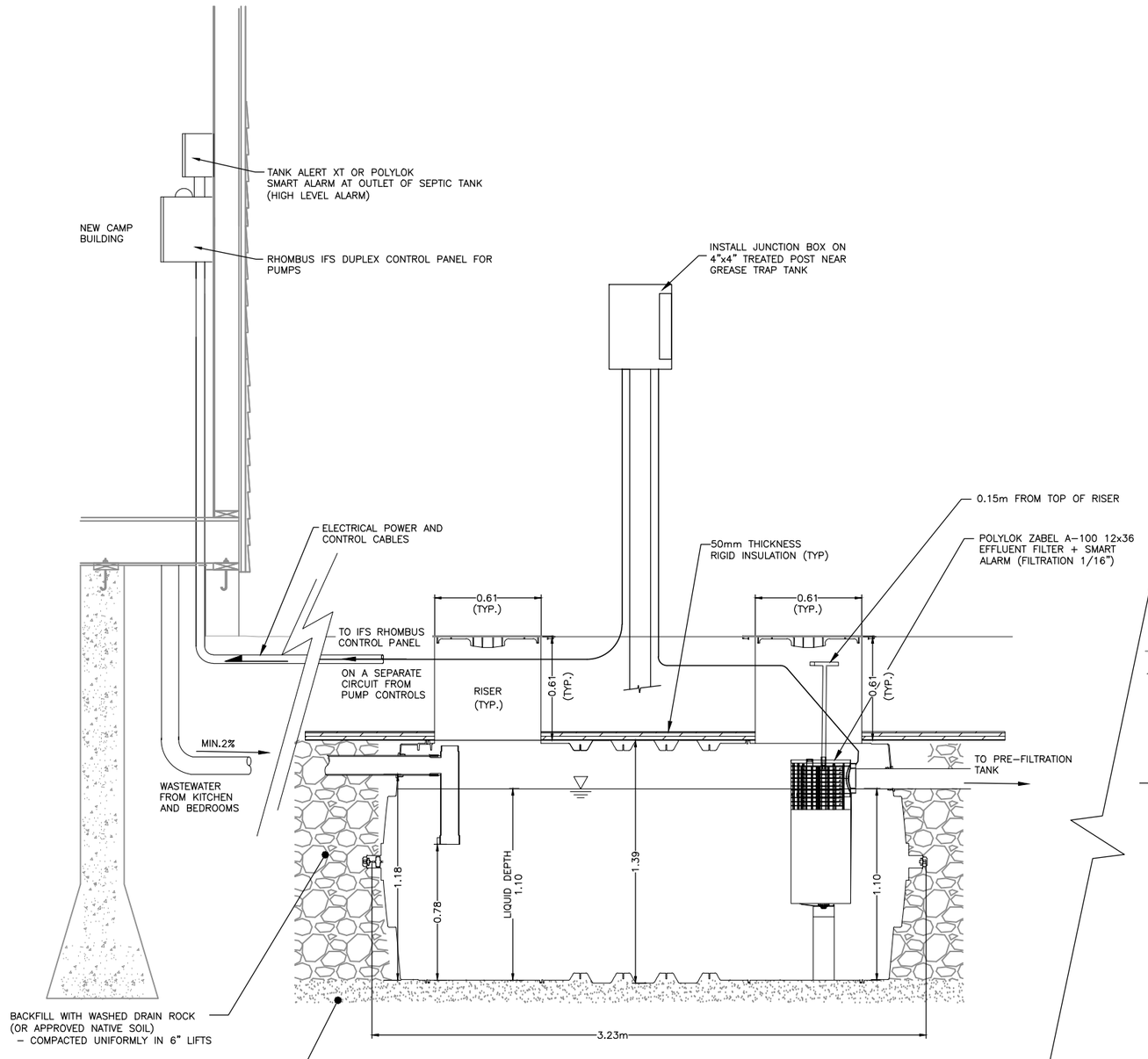

SINGLE-CHAMBER GREASE TRAP TANK 4,000L (1,100Usgal)
SCALE: NTS

SINGLE-CHAMBER PRE-FILTRATION TANK 1,800L (475 Usgal)
SCALE: NTS

ISSUED FOR REVIEW

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DATE:	JAN 2020
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NWT POWER CORPORATION
WORK CAMP
ONSITE SEWERAGE SYSTEM
SEPTIC & PUMP TANK DETAIL

CONSULTANTS PROJECT No.
1702–01
DRAWING No.
C003

SHEET No.	REV. No.
4 OF 8	0

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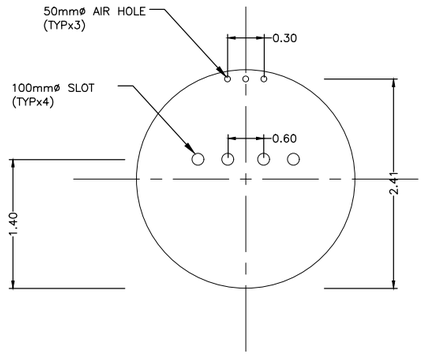

SEPTIC TANK BAFFLE DETAIL

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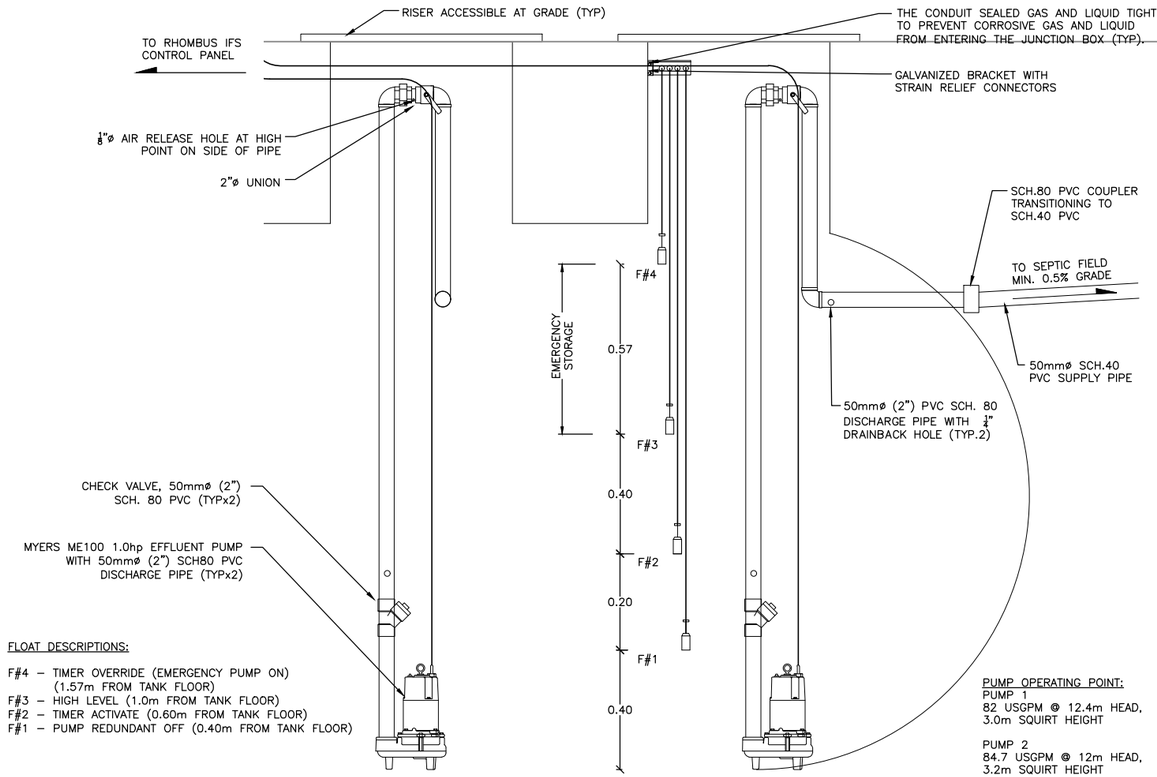

PUMP DETAIL

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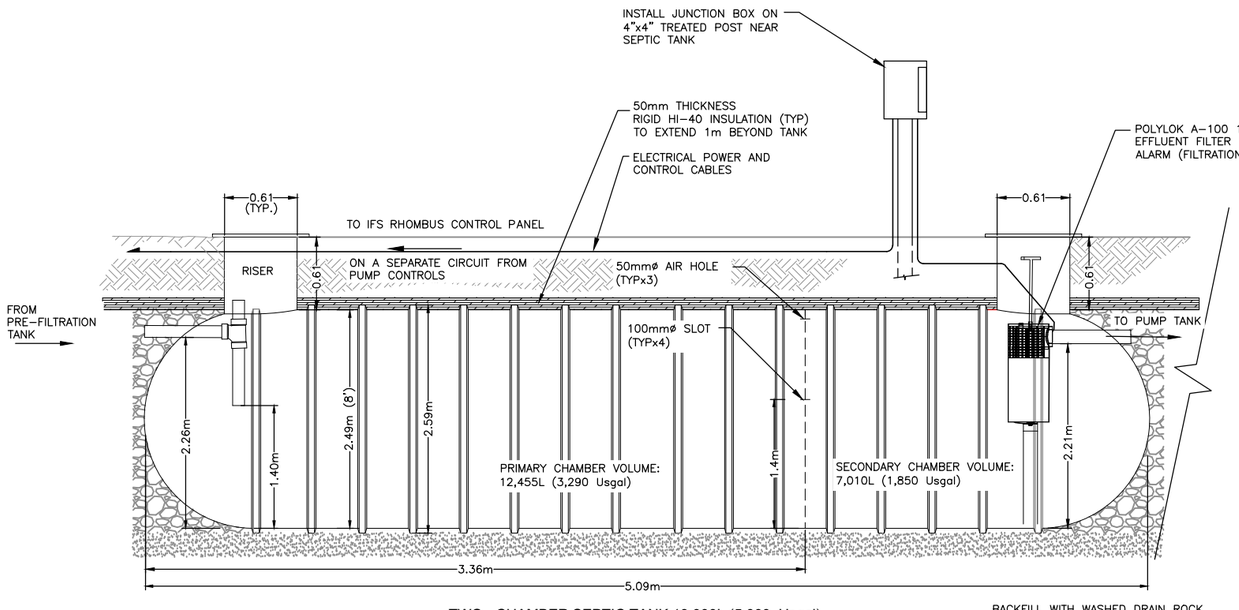
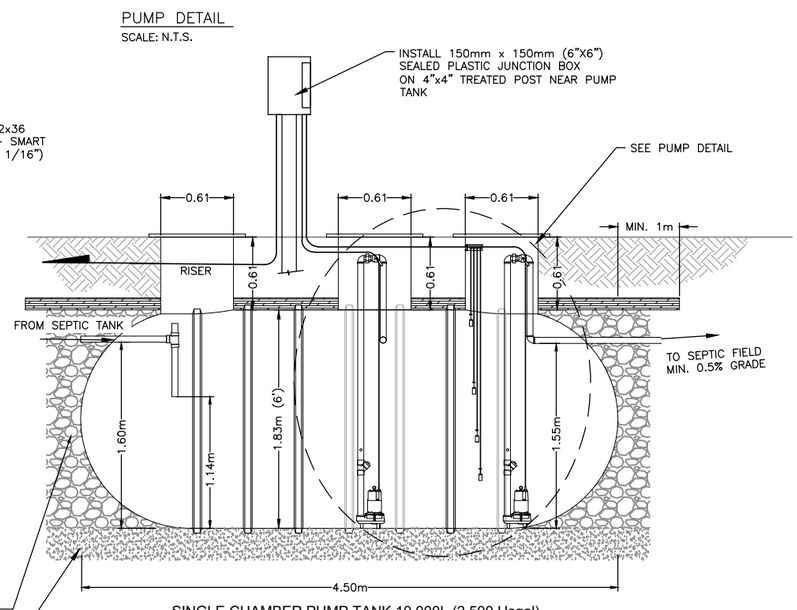


TWO - CHAMBER SEPTIC TANK 19,000L (5,000 Usgal)

SCALE: NTS



SINGLE CHAMBER PUMP TANK 10,000L (2,500 Usgal)

SCALE: NTS

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ENGINEER:	JSS
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DRAWING FILE:	C3D20 1702-01.dwg
CORRESPONDENCE:	
GRID:	
DATE:	JAN 2020
SCALES:	AS NOTED

NWT POWER CORPORATION
WORK CAMP
ONSITE SEWERAGE SYSTEM
SEPTIC & PUMP TANK DETAIL

CONSULTANTS PROJECT No.
1702-01
DRAWING No.
C004

SHEET No.	REV. No.
5 OF 8	0

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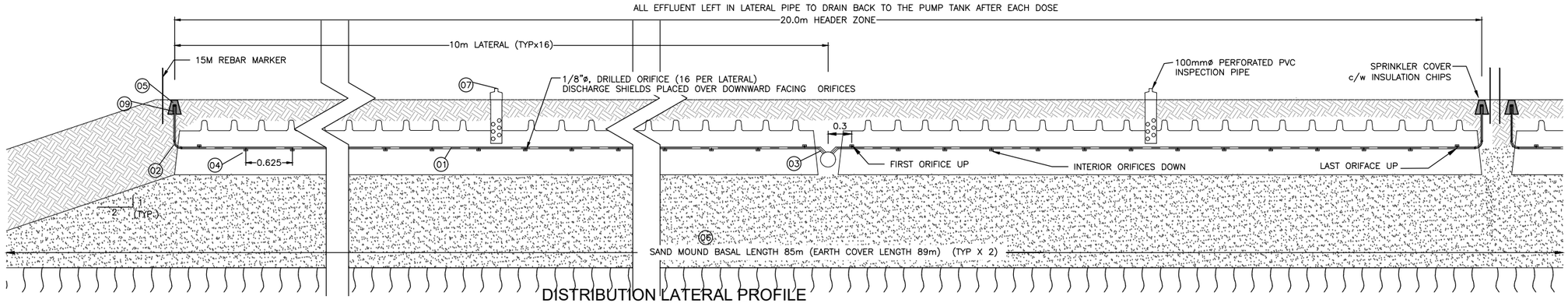

DISTRIBUTION LATERAL PROFILE

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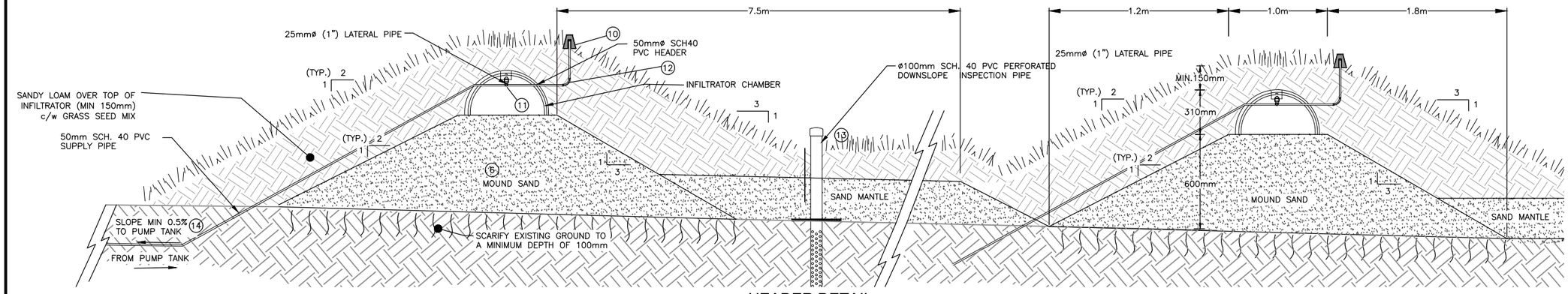

HEADER DETAIL

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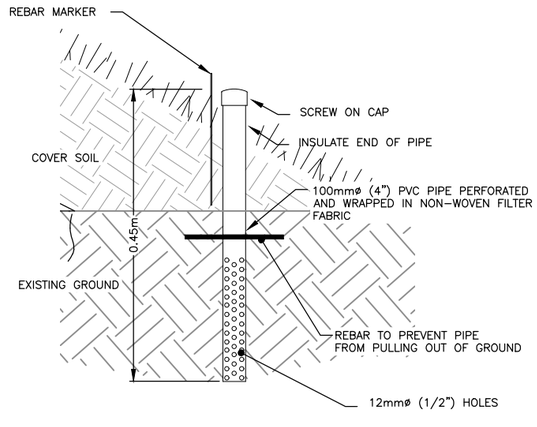
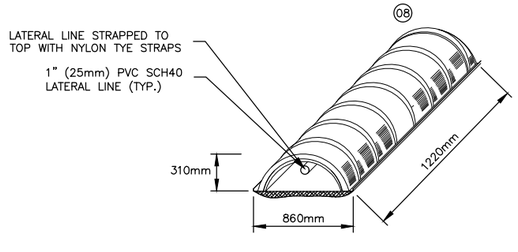


DOWNSLOPE INSPECTION PIPE DETAIL

N.T.S.



QUICK4 STANDARD INFILTRATION CHAMBER DETAILS

N.T.S.

ESTIMATE OF MATERIALS (TOTAL)			
ITEM	QTY.	SIZE	DESCRIPTION
01	160m	1"	PIPE, SCH. 40 PVC
02	16	1"	90° L.R. ELBOW, SCH. 40 PVC
03	8	1.0"x1.0"x1.0"	CROSS OR TEE, SCH. 40 PVC
04	256	N/A	ORIFICE SHIELDS
05	16	4"	SPRINKLER COVERS FOR END CAPS
06	250m³	FINE	MOUND SAND
07	16	4"	PERFORATED PVC LATERAL INSPECTION PIPE
08	160m	STANDARD	INFILTRATOR CHAMBER
09	16	1"	SCH.40 LATERAL CLEANOUTS W/ ENDCAP
10	8	2"	SCH.40 HEADER CLEANOUTS W/ ENDCAP
11	8	2"x1"x1"	CROSS OR TEE, SCH. 40 PVC
12	8	2"	90° L.R. ELBOW, SCH. 40 PVC
13	8	4"	PERFORATED PVC DOWNSLOPE INSPECTION PIPE
14	160m	2"	SCH 40. PVC SUPPLY PIPE

ISSUED FOR REVIEW

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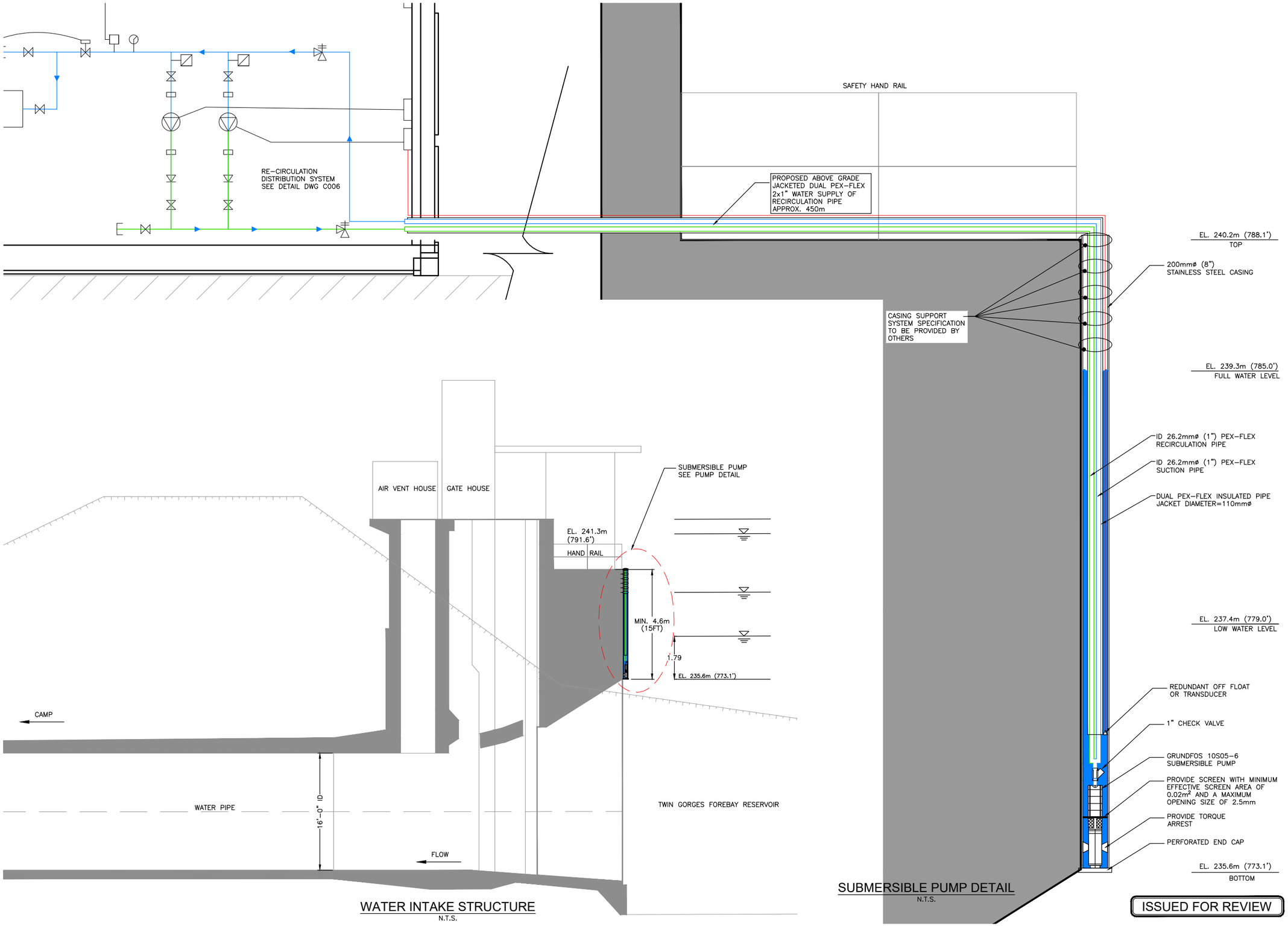
FAX (250) 562-1967

DRAWN:	SJ
CHECKED:	JSS
ENGINEER:	JSS
SURVEY FILE:	
DRAWING FILE:	C3D20 1702-01.dwg
CORRESPONDENCE:	
GRID:	
DATE:	JAN 2020
SCALES:	

NWT POWER CORPORATION
WORK CAMP
ONSITE SEWERAGE SYSTEM
DETAILED DISCHARGE SITE PLAN

CONSULTANTS PROJECT No.
1702-01
DRAWING No.
C005

SHEET No.	REV. No.
6 OF 8	0



WATER INTAKE STRUCTURE
N.T.S.

SUBMERSIBLE PUMP DETAIL
N.T.S.

ISSUED FOR REVIEW

NO.	DATE	REVISION	DR.

L&M ENGINEERING LIMITED
1210 FOURTH AVENUE
PRINCE GEORGE, B.C.
V2L 3J4
TEL. (250) 562-1977
FAX (250) 562-1967

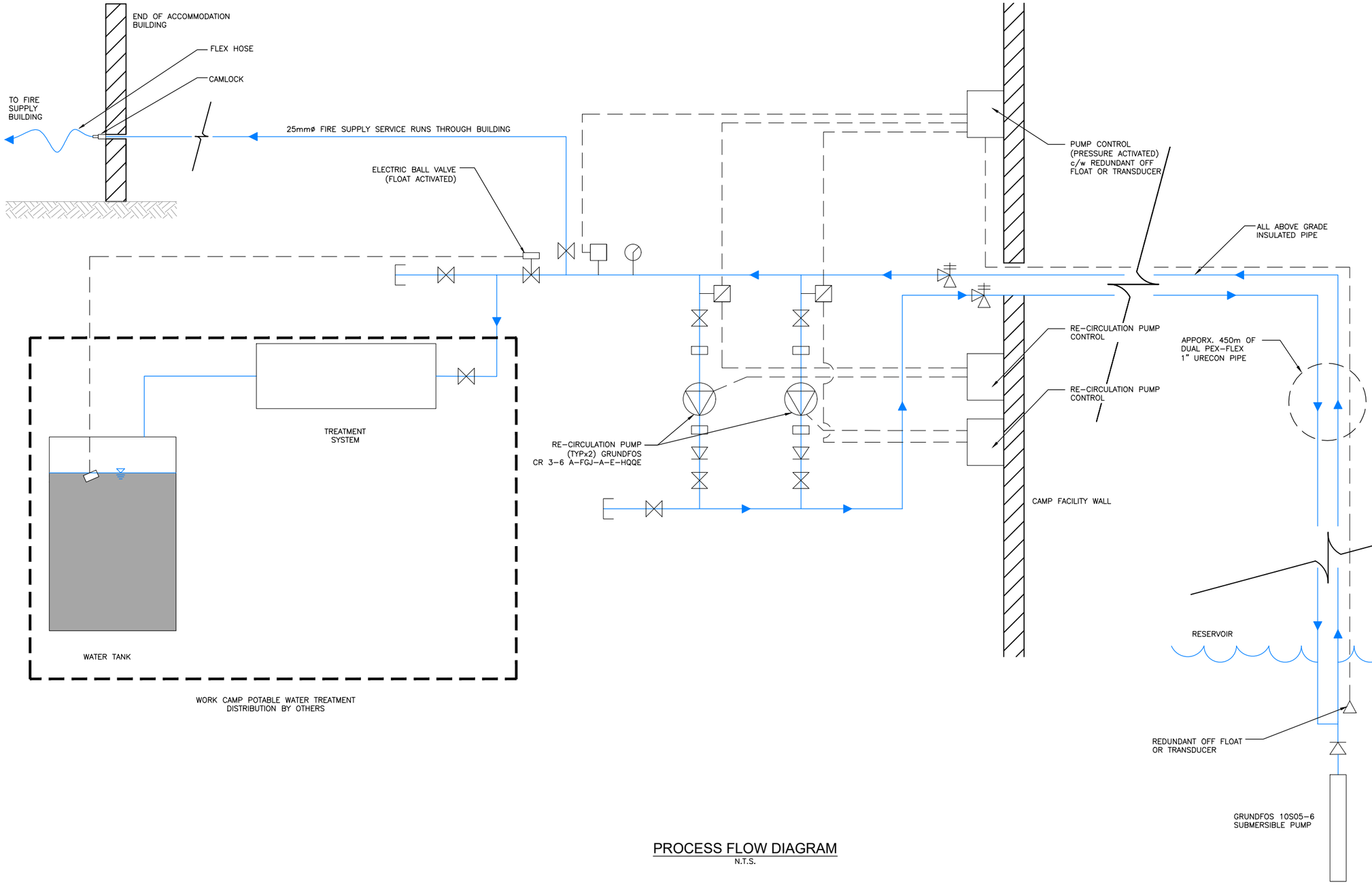
DRAWN:	SJ
CHECKED:	JSS
ENGINEER:	JSS
SURVEY FILE:	
DRAWING FILE:	C3D20 1702-01.dwg
CORRESPONDENCE:	
GRID:	
DATE:	JAN 2020
SCALES:	

NWT POWER CORPORATION
WORK CAMP
ONSITE SEWERAGE SYSTEM
WATER INTAKE SYSTEM

CONSULTANTS PROJECT No.
1702-01
DRAWING No.
C006

SHEET No.	REV. No.
7 OF 8	0

G:\Job Files\1700\1702 - NWT Power Corp\01 - Taiston Work Camp\2 - Design\10 - AutoCAD\C3D20 1702-01.dwg



PROCESS FLOW DIAGRAM
N.T.S.

ISSUED FOR REVIEW

BALL VALVE
ELECTRIC VALVE
RE-CIRCULATION PUMP
CHECK VALVE
UNION
PRESSURE SWITCH
FLOW SWITCH
PRESSURE GAUGE
AIR RELEASE VALVE
ELECTRIC LINE
WATER LINE

NO.	DATE	REVISION	DR.

L&M ENGINEERING LIMITED
1210 FOURTH AVENUE
PRINCE GEORGE, B.C.
V2L 3J4
TEL. (250) 562-1977
FAX (250) 562-1967

DRAWN:	SJ
CHECKED:	JSS
ENGINEER:	JSS
SURVEY FILE:	
DRAWING FILE:	C3020 1702-01.dwg
CORRESPONDENCE:	
GRID:	
DATE:	JAN 2020
SCALES:	

NWT POWER CORPORATION
WORK CAMP
ONSITE SEWERAGE SYSTEM
WATER INTAKE SYSTEM
SCHEMATIC DIAGRAM

CONSULTANTS PROJECT No.
1702-01
DRAWING No.
C007

SHEET No.	REV. No.
8 OF 8	0

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APPENDIX J

TALTSON WASTE DISPOSAL STANDARD OPERATING PROCEDURE

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

October, 2020

Taltson Hydro Waste Disposal Standard Operating Procedure

In accordance with the requirements of MVLWB Land Use Permit MV2020X0004 for the Taltson Overhaul the waste faciliy at the Taltson Hydro Facility has been upgraded. The disposal site has been subdivided into seven segregated areas based on the type of material being discarded. The layout of the disposal area is presented in Figure 1. The seven categories of waste are:

1. **Old Boilers, Tanks and Appliances**
2. **Plastics and Rubber**
3. **General- Waste that does not fall into another category**
4. **Scrap Metal**
5. **Old Power Poles and Pressure Treated Lumber**
6. **Concrete, Bricks, Ceramics**
7. **Untreated Lumber, Brush and Cardboard (burn pile)**

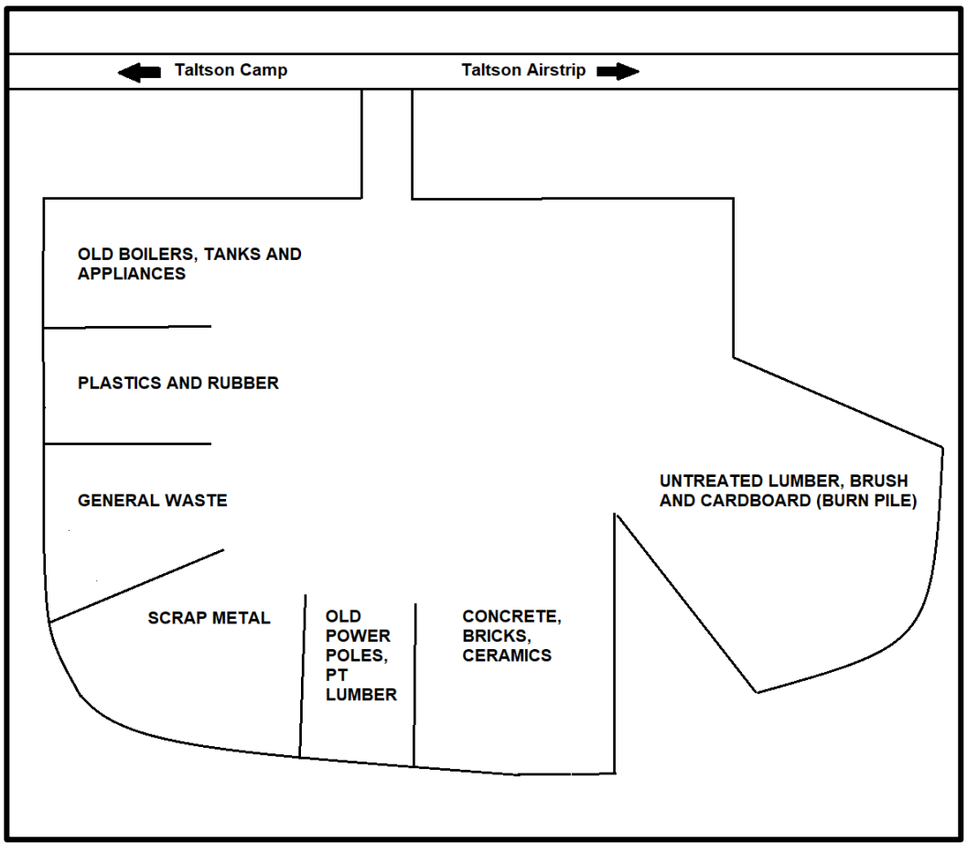


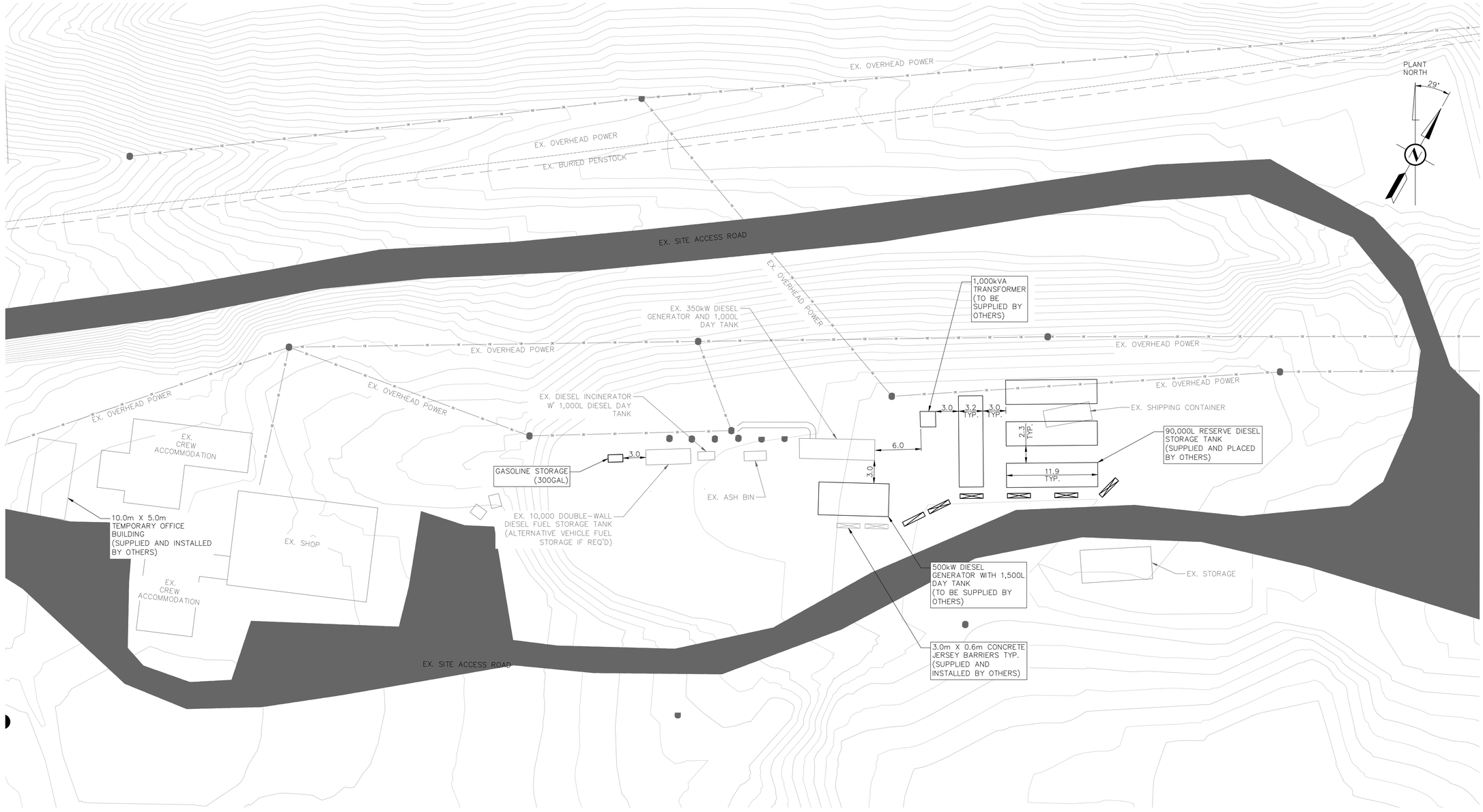
Figure 1- Layout of the Taltson Disposal Site

- This Standard Operating Procedure is to be used in addition to all waste management practices outlined in the *Taltson Hydroelectric Facility and Winter Road- Waste Management Plan*
- All waste going into the disposal site needs to be sorted as per this procedure and posted signage
    - Do not put all waste into the General location; this is only for waste that does not fall into another category
- All hazardous materials must be disposed of as per the *Taltson Hydroelectric Facility and Winter Road- Waste Management Plan* and not enter the disposal site
- Specialized Material must be disposed of as per specific departmental procedures and not enter the disposal site
- Inert metals and concrete can be buried when approved by ENR
    - Do not bury waste without ENR approval
- **The burn pile the only pile that is burned**
    - This should be done in winter months

Figure 2- Photo of the Taltson Disposal Site

APPENDIX K

FUEL STORAGE AREAS, HAZARDOUS WASTE CONTAINMENT, TEMPORARY LAGOON PLAN DRAWINGS



GENERAL NOTES:

1. SURVEY TO SET MARKER STAKES TO ESTABLISH SITE CONTROL IN UNIVERSAL TRANSVERSE MERCATOR COORDINATES ZONE 12, CENTRAL MERIDIAN 111° WEST (NAD83).
2. ALL DIMENSIONS ARE IN SI METRIC UNITS, UNLESS OTHERWISE NOTED.
3. ALL EXISTING UTILITIES MUST BE INDEPENDENTLY VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND OTHER SITE SPECIFIC FEATURES THAT ARE REQUIRED TO REMAIN INTACT DURING THE COURSE OF CONSTRUCTION.
5. THE CONTRACTOR IS RESPONSIBLE TO RESTORE SITE CONDITIONS, NOT ALTERED BY FINAL CONSTRUCTION, TO THE ORIGINAL OR BETTER CONDITION. AS APPROVED BY NTPC OR IT'S AGENT.
6. ALL ELEVATIONS SHOWN ARE EXISTING GROUND CONDITIONS.

FUEL STORAGE AREA - SITE PLAN

1:250

CIVIL GRADING LEGEND

(238.49) EXISTING ELEVATION

242.0 EXISTING GROUND CONTOUR

ID	DRAWING NO.	TITLE
01	–	–

REFERENCE DRAWINGS

REVISION LETTER	REVISION	WORK ORDER	NAME	DATE	CHECKED BY	DESIGNED BY	STATUS OF DRAWING	DATE
			DRAWN BY					
E	REVISE EXISTING LAYOUT PER SURVEY	–	SDM	28JAN22	–	–	–	–
D	ISSUED FOR REFERENCE	–	DJW	13MAY21	DC/CB	DC	TENDER	13MAY21
C	ISSUED FOR LAND USE PERMITTING	–	KMP	03MAY21	DC	DC	TENDER	23APR21
B	ISSUED FOR REFERENCE	–	DJW	23APR21	DC/CB	DC	TENDER	23APR21
A	ISSUED FOR REFERENCE	–	DJW	21JAN21	DC/CB	DC	TENDER	21JAN21
0	ORIGINAL – ISSUED FOR TENDER REVIEW	–	DJW	11JAN21	DC / DP	DC	DRAFT	11JAN21

PROFESSIONAL STAMP

PERMIT STAMP

LOCATION
TALTSON, NWT

NORTHWEST TERRITORIES POWER CORPORATION

TITLE
TALTSON REHABILITATION PROJECT
2021 CONSTRUCTION – TBD1
FUEL STORAGE AREA
SITE PLAN

SCALE 1:250 | SHEET 1 OF 1 | DRAWING NO. P109-51776-C900(A) | REV. E

AUTOCAD FILE: Z:\PROGRAPH SOLUTIONS\JOBS\086 – NTPC\086-026 – TALSTON DRAFTING CT5482\P109-51776-C900A.DWG

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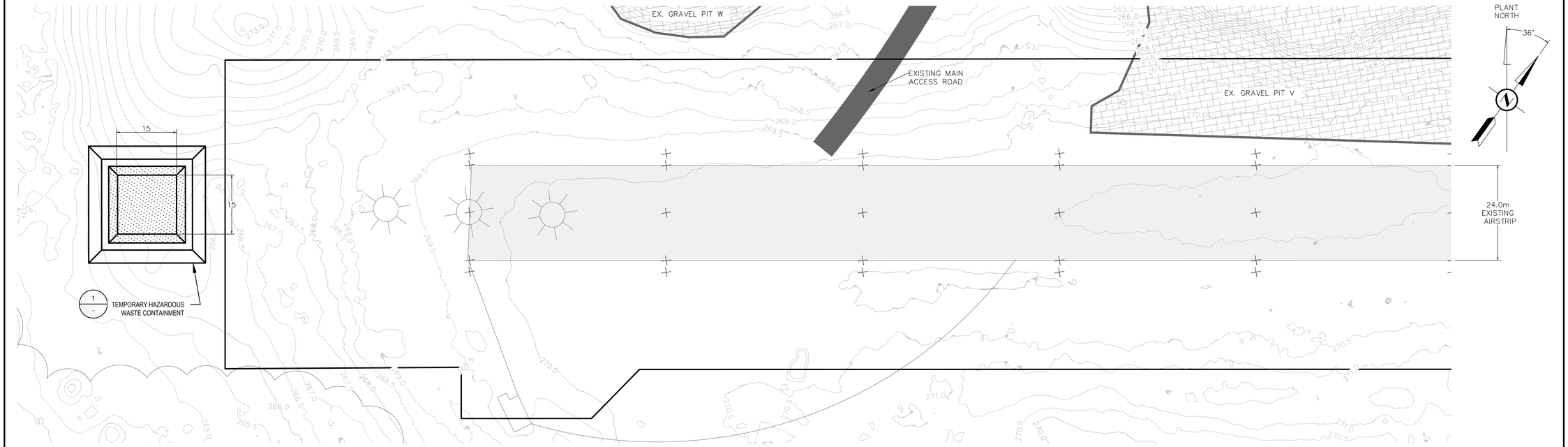
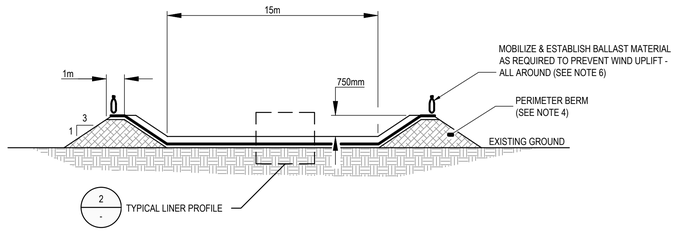


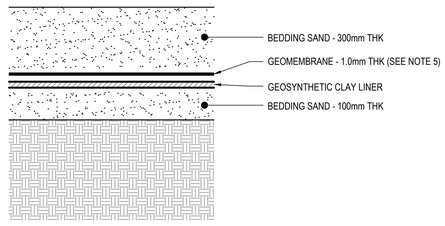
HAZARDOUS WASTE CONTAINMENT - PLAN

1:500



1 DETAIL - TYPICAL SECTION OF TEMPORARY HAZARDOUS WASTE CONTAINMENT

HORIZ. 1:200
VERT. 1:100



2 DETAIL - TYPICAL LINER PROFILE

NTS

CIVIL LEGEND

242.0 EXISTING GROUND CONTOUR

EXISTING GRAVEL PIT

CIVIL SITE NOTES:

1. REFER TO GENERAL NOTES ON SHEET P109-51776-C1000(C)
2. EXISTING CONTOURS SHOWN ARE FROM OPEN SOURCE DATA AND AERODOM PRE-FEASIBILITY STUDY SUPPLIED INFORMATION. ELEVATIONS CRITICAL TO THE DESIGN WILL BE CONFIRMED WITH SURVEY IN THE SPRING OF 2021.
3. ALL DIMENSIONS ARE IN SI METRIC UNITS, UNLESS OTHERWISE NOTED.
4. PERIMETER BERM TO BE CONSTRUCTED USING ON-SITE SOURCED MATERIAL PREFERABLY FINE-GRAINED SOIL PLACED IN THIN LIFTS (300mm MAX. LOOSE THICKNESS) AND COMPACTED TO MIN. 95% SMDD IN ACCORDANCE WITH ASTM D698.
5. GEOMEMBRANE TO BE NILEX XR5 REINFORCED GEOMEMBRANE OR APPROVED EQUAL.
6. BALLAST MATERIAL TO BE SAND BAGS, RUBBER TIRES, PRECAST CONCRETE BLOCK, OR APPROVED EQUAL.
7. BERM CONTAINMENT CAPACITY SHALL ALLOW FOR 140 PALLETS WITH 4 DRUMS PER PALLET

ID	DRAWING NO.	TITLE
01	–	–

REVISION LETTER	REVISION	WORK ORDER	DRAWN BY NAME	DRAWN BY DATE	CHECKED BY	DESIGNED BY	STATUS OF DRAWING	DATE
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B	ISSUED FOR TENDER	–	BJB	23APR21	DC/DP	DC	TENDER	23APR21
A	ISSUED FOR TENDER (NOT TENDERED)	–	DJW	21JAN21	DC/DP	DC	TENDER	21JAN21
0	ORIGINAL – ISSUED FOR TENDER REVIEW	–	AK	11JAN21	DC / DP	DC	DRAFT	11JAN21

REFERENCE DRAWINGS

PROFESSIONAL STAMP

PERMIT STAMP

LOCATION
TALTSON, NWT

NORTHWEST TERRITORIES POWER CORPORATION

TITLE
TALTSON REHABILITATION PROJECT
2021 CONSTRUCTION – TBD3
HAZARDOUS WASTE CONTAINMENT
PLAN AND DETAILS

SCALE	SHEET	DRAWING NO.	REV.
AS SHOWN	2 OF 4	P109-51776-C905	C

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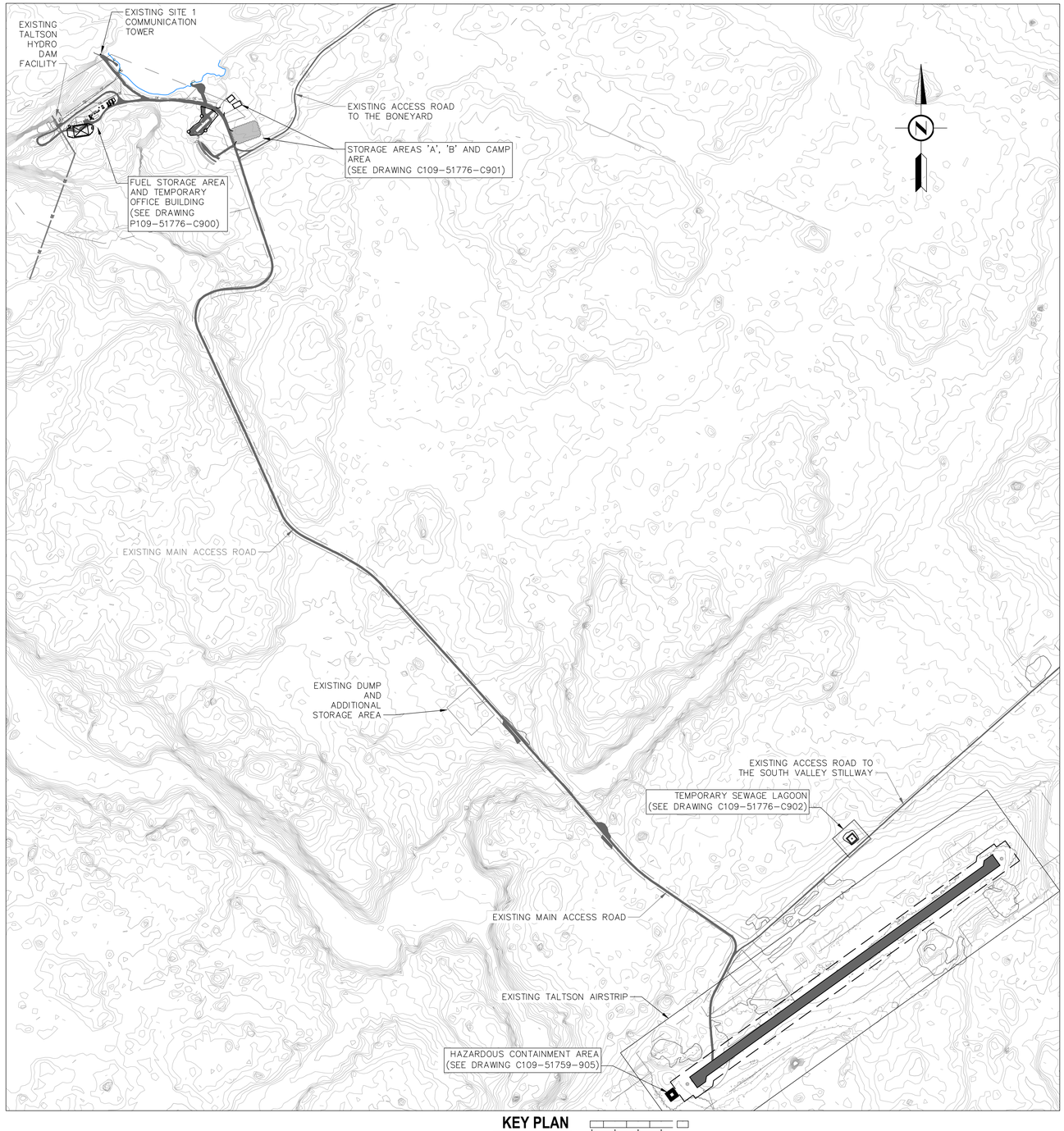

KEY PLAN
1:7,500

CIVIL LEGEND (EXISTING CONDITIONS)

- WATER EDGE
- EXISTING PROPERTY LINE
- EXISTING TREELINE
- EXISTING GRAVEL ROAD
- EXISTING OVERHEAD POWER
- EXISTING UNDERGROUND POWER
- EXISTING UTILITY POLE
- EXISTING WATER PIPE
- EXISTING SANITARY LINE
- EXISTING PENSTOCK
- EXISTING AIRSTRIP LIGHTING
- EXISTING TELECOMMUNICATION TOWER

CIVIL LEGEND (PROPOSED)

- PROPOSED EASEMENT
- PROPOSED CLEARING AREA
- PROPOSED BEAR PROOF SECURITY FENCE
- PROPOSED BEAR PROOF SECURITY GATE
- EDGE OF GRAVEL

GENERAL NOTES:

1. SURVEY TO SET MARKER STAKES TO ESTABLISH SITE CONTROL IN UNIVERSAL TRANSVERSE MERCATOR COORDINATES ZONE 12, CENTRAL MERIDIAN 111° WEST (NAD83).
2. CONTOURS SHOWN ARE FROM OPEN SOURCE DATA. ELEVATIONS CRITICAL TO THE DESIGN WILL BE CONFIRMED WITH SURVEY IN THE SPRING OF 2021.
3. ALL DIMENSIONS ARE IN SI METRIC UNITS, UNLESS OTHERWISE NOTED.
4. ALL EXISTING UTILITIES MUST BE INDEPENDENTLY VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND OTHER SITE SPECIFIC FEATURES THAT ARE REQUIRED TO REMAIN INTACT DURING THE COURSE OF CONSTRUCTION.
6. THE CONTRACTOR IS RESPONSIBLE TO RESTORE SITE CONDITIONS, NOT ALTERED BY FINAL CONSTRUCTION, TO THE ORIGINAL OR BETTER CONDITION. AS APPROVED BY NTPC OR IT'S AGENT.
7. ALL GRANULAR MATERIAL WILL BE SPECIFIED AND SUPPLIED FROM ONSITE SOURCES.
8. OPTIMAL LOCATION OF BERM TO BE DETERMINED BY NTPC ON SITE

ID	DRAWING NO.	TITLE
01	–	–

REVISION LETTER	REVISION	WORK ORDER	NAME	DATE	CHECKED BY	DESIGNED BY	STATUS OF DRAWING	DATE
			DRAWN BY					
C	ISSUED FOR LAND USE PERMITTING	–	KMP	03MAY21	DC	DC	TENDER	23APR21
B	ISSUED FOR REFERENCE	–	BJB	23APR21		DC	TENDER	23APR21
A	ISSUED FOR REFERENCE	–	DJW	21JAN21	DC / DP	DC	TENDER	21JAN21
0	ORIGINAL – ISSUED FOR TENDER REVIEW	–	DJW	11JAN21	DC / DP	DC	DRAFT	11JAN21

REFERENCE DRAWINGS

PROFESSIONAL STAMP

PERMIT STAMP

LOCATION
TALTSON, NWT

NORTHWEST TERRITORIES POWER CORPORATION

TITLE
TALTSON REHABILITATION PROJECT
2021 CONSTRUCTION – TBD3
CIVIL KEY PLAN, LEGEND AND GENERAL NOTES

SCALE 1:7500 | SHEET 1 OF 1 | DRAWING NO. P109-51776-C1000(C) | REV. C

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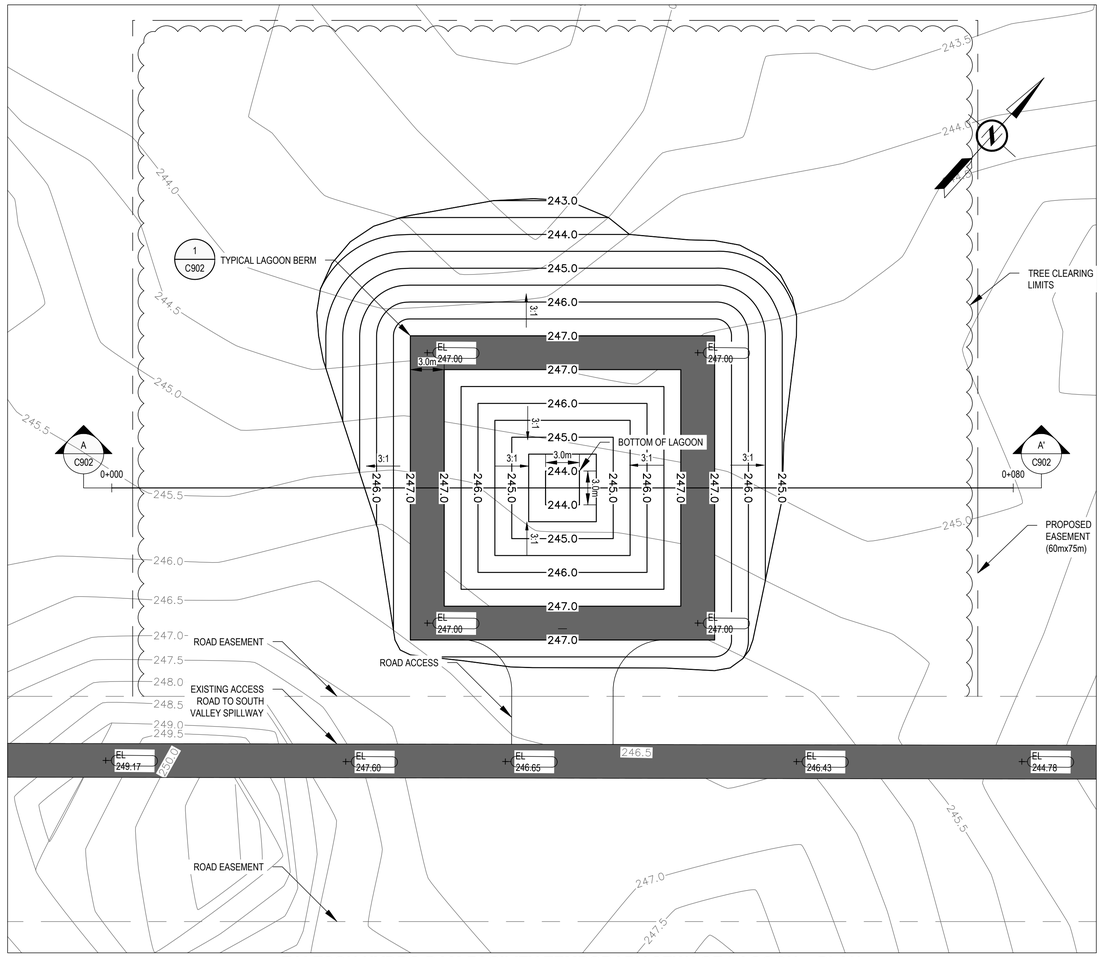
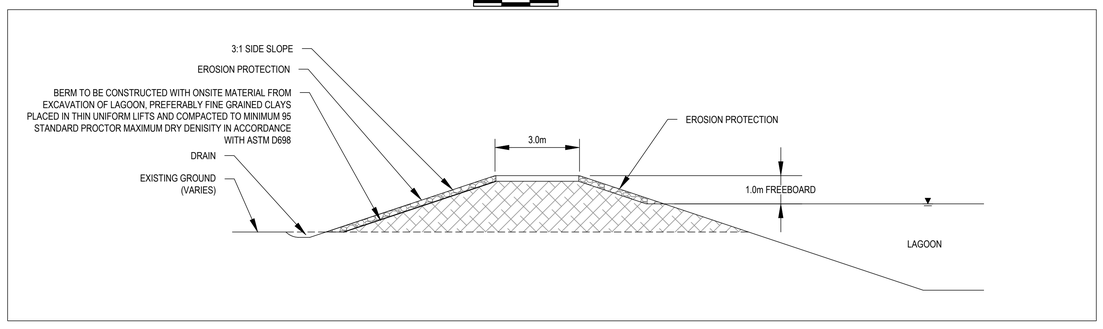


TALTSON HYDRO DAM FACILITY TEMPORARY SEWAGE LAGOON - PLAN

1:250



1 C902 **DETAIL - TYPICAL LAGOON BERM**

NTS

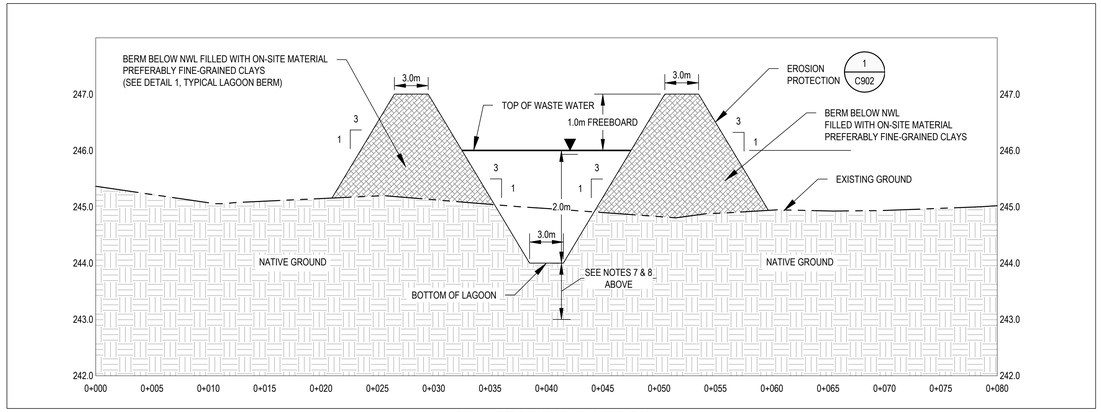
CIVIL GRADING LEGEND

242.0 EXISTING GROUND CONTOUR

242.0 PROPOSED GROUND CONTOUR

CIVIL SITE NOTES:

1. REFER TO GENERAL NOTES ON SHEET P109-51776-C1000(C)
2. EXISTING CONTOURS SHOWN ARE FROM OPEN SOURCE DATA. ELEVATIONS CRITICAL TO THE DESIGN WILL BE CONFIRMED WITH SURVEY IN THE SPRING OF 2021.
3. ALL DIMENSIONS ARE IN SI METRIC UNITS, UNLESS OTHERWISE NOTED.
4. A GEOTECHNICAL INVESTIGATION WILL BE DONE IN THE SPRING OF 2021.
5. DESIGN DETAILS AND LAYOUT FOR THE TEMPORARY SEWAGE LAGOON AND ACCESS ROAD WILL BE PROVIDED PRIOR TO CONSTRUCTION STARTUP UPON THE REVIEW OF THE SURVEY AND GEOTECHINCAL REPORT.
6. ALL GRANULAR MATERIAL WILL BE SPECIFIED AND SUPPLIED FROM ONSITE SOURCES.
7. SEWAGE LAGOON DESIGN IS BASED ON A BASE SIZE OF 6m X 18m X 2m DEEP.
8. THE ASSUMPTION OF A RELATIVELY PERMEABLE SOIL (SAND/SILTY SAND) AND A KSAT OF 4E-05 CM/SEC AT LEAST 1m THICK ACROSS THE FOOTPRINT OF THE LAGOON WILL REQUIRED FOR THE LAGOON TO ACT AS AN INFILTRATION POND.
9. BEDROCK IS ASSUMED TO BE 5m DEEP ACROSS THE FOOTPRINT.



A-A' C902 **SECTION - LAGOON**

5H:1V 1:250

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REFERENCE DRAWINGS

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B	ISSUED FOR TENDER	–	BJB	23APR21	DC/DP	DC	TENDER	23APR21
A	ISSUED FOR TENDER (NOT TENDERED)	–	DJW	21JAN21	DC/DP	DC	TENDER	21JAN21
0	ORIGINAL – ISSUED FOR TENDER REVIEW	–	SH	11JAN21	HG / DP	HG	DRAFT	11JAN21

PROFESSIONAL STAMP

PERMIT STAMP

LOCATION: TALTSON, NWT

NORTHWEST TERRITORIES POWER CORPORATION

TITLE: TALTSON REHABILITATION PROJECT
2021 CONSTRUCTION – TBD3
TEMPORARY SEWAGE LAGOON
PLAN, SECTIONS AND DETAIL

SCALE	SHEET	DRAWING NO.	REV.
AS SHOWN	1 OF 1	P109-51776-C902	D

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