

Appendix C

Waste Management Plan

Waste Management Plan

Monitoring Well Installation – Various Communities

Norman Wells, NT

Colville Lake, NT

Fort Good Hope, NT

Tulita, NT

Tsiigehtchic, NT

Fort McPherson, NT

*Prepared for: Department of Municipal and Community Affairs,
Government of the Northwest Territories*

Prepared by: Dillon Consulting Limited

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1 INTRODUCTION

The Government of Northwest Territories Department of Municipal and Community Affairs (MACA) has prepared this Waste Management Plan for monitoring well installation activities being undertaken in the vicinity of active, decommissioned and/or closed landfills and sewage lagoon facilities. These facilities are located in the communities of Norman Wells, Colville Lake, Fort Good Hope, Tulita, Tsiigehtchic, and Fort McPherson, Northwest Territories.

1.1 Company Name, Location and Mailing Address

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1.2 Site Names and Locations:

Well installation sites are in the vicinity of active, decommissioned and/or closed landfills and sewage lagoon facilities. Communities within the jurisdiction of the MVLWB are Norman Wells (5 wells), Colville Lake (13 wells), Fort Good Hope (13 wells), Tulita (8 wells), Tsiigehtchic (13 wells), Fort McPherson (8 wells). The number of wells installed may be slightly modified prior to installation depending on site conditions. Coordinates for each site are listed below:

Norman Wells Landfill – 65°17'45.93"N, 126°43'50.87"W
Colville Lake Sewage Lagoon – 67° 1'5.45"N, 126° 3'51.88"W
Colville Lake Landfill – 67° 1'5.68"N, 126° 3'45.57"W
Colville Lake Landfill – 67° 2'17.27"N, 126° 4'0.58"W
Fort Good Hope Sewage Lagoon – 66°16'54.72"N, 128°36'31.49"W
Fort Good Hope Landfill – 66°16'51.90"N, 128°36'35.82"W
Fort Good Hope Landfill – 66°16'5.07"N, 128°36'30.64"W
Tulita Sewage Lagoon – 64°54'40.79"N, 125°31'58.08"W
Tulita Landfill – 64°54'24.98"N, 125°31'32.76"W
Tsiigehtchic Sewage Lagoon – 67°26'39.89"N, 133°42'29.73"W
Tsiigehtchic Landfill – 67°26'44.15"N, 133°42'48.90"W
Tsiigehtchic Landfill – 67°26'44.18"N, 133°44'17.56"W
Fort McPherson Sewage Lagoon – 67°27'7.19"N, 134°48'50.13"W
Fort McPherson Landfill – 67°27'7.95"N, 134°48'38.31"W

1.3 Effective Date of Waste Management Plan

January 2018 – March 2019

1.4 MACA Environmental Procedures

MACA is committed to the concept of sustainable development and protection of the environment and human health. MACA's environmental, health and safety procedures are to:

- Protect employees, the public, and the environment
- Fully comply with all applicable legislation, regulations, and authorizations
- Work proactively with federal, territorial and Aboriginal governments, other relevant organizations, and the general public, on all aspects of environmental protection including waste management
- Anticipate future waste management requirements and make provision for them
- Keep employees, contractors, Inspectors, Land and Water Boards, appropriate governments (Aboriginal, federal and territorial), and the public informed of any changes at the site or with project activities.

The plan will be presented to all staff during their on-site orientation sessions. All employees and contractors will be aware of the locations of the plan on the site at each community and in the MACA office in Yellowknife.

1.5 Purpose and Scope

The Waste Management Plan outlines the activities and methods of waste management from waste generation to final disposal throughout the life-cycle of the project. The Waste Management Plan details procedures that will help to minimize any potential detrimental environmental or social impacts that could arise as a result of project waste. There are no anticipated negative social or environmental impacts resulting from this project.

The Waste Management Plan is a component of, and included in, the Mackenzie Valley Land and Water Board Land Use Permit (LUP) Application process. A Type A Land Use Permit is required in order to complete the project described below.

1.6 Project Description

Monitoring wells are to be installed in the vicinity of active, decommissioned and/or closed landfill and sewage lagoon facilities in various communities in the Northwest Territories. Communities within the jurisdiction of the MVLWB, which require a Land Use Permit (LUP), are Norman Wells (5 wells), Colville Lake (13 wells), Fort Good Hope (13 wells), Tulita (8 wells), Tsiigehtchic (13 wells), Fort McPherson (8 wells). The number of wells may be slightly modified during the installation program depending on site conditions. The purpose of the work is to monitor groundwater within the vicinity of sewage and solid waste sites for environmental contaminants. The work also includes design of a long-term monitoring program after the wells have been installed, such that the Government of the Northwest Territories can continue to monitor these sites. Lockable vehicle gates will also be installed at the facilities so that communities have the option to limit public access to the sites. The project will include borehole drilling, installation of monitoring wells, gate installation, monitoring well development and surveying, and groundwater sampling. Following well installation, a post-installation report and sampling results report will be provided to the GNWT and a long-term sampling plan and sampling procedures manual will be developed. Depending on site conditions, surface water samples may also be collected if deemed appropriate for the site.

1.7 Site Description

The proposed location for all waste management activities is on-site where monitoring well installation occurs. At each location waste generated will be collected by the drilling company onsite. Where possible, waste generated on-site will be disposed at the active community landfills present in the vicinity of the work. MACA will obtain approval from each community prior to disposing of waste in community landfills. If disposal is not possible in local community landfills waste material will be collected and shipped to an appropriate waste disposal facility.

1.7.1 *Norman Wells*

The Norman Wells landfill site is located northeast of the Town centre and can be accessed from the main road. Distance of the landfill site to the Town centre via this main road is approximately 6.6 km. The direct distance of this landfill site is approximately 5.0 km northeast of the Town centre. Distance of this landfill to the airport is approximately 3.5 km. There is a quarry area adjacent to the landfill site. The landfill receives municipal solid waste which includes residential, commercial, institutional, and construction and demolition wastes. In addition, the landfill also receives industrial wastes. See attached maps for locations.

1.7.2 *Colville Lake*

In Colville Lake, sewage and solid waste sites are located approximately 2.7 km southeast of the community. Distance of the sewage and solid waste to the community centre via the main road is 3.8 km. See attached maps for locations.

1.7.3 *Fort Good Hope*

The existing Fort Good Hope sewage and solid waste site is located west of Rabbit Skin Road, 3.5 m from the community. Pumpout sewage is trucked to the 240 m x 375 m waste management area located on a flat gravel esker. Gravel layers up to 12 m thick cause liquid to quickly percolate from the trench. Solid waste is trucked to the same management facility as the sewage waste. Bulky wastes are stored adjacent to the site in designated areas. Wastes accepted at the site include white goods, waste wood, waste automobile batteries, tires, small engines/snowmobile parts, waste steel, and brush and sticks. See attached maps for locations.

1.7.4 *Tulita*

The Tulita sewage lagoon is 5 hectares in size and located 3 km northeast of the community. The solid waste facility is located approximately 2.2 km northeast of the community. The solid waste facility was commissioned in 1983 and has been in use since that time. The facility accepts hazardous waste, active and inactive household domestic waste, vehicles and bulky wastes (i.e. vehicles, fuel tanks, and other waste metal). Except for a recycling program for aluminum beverage containers, the Hamlet of Tulita does not employ any waste diversion. The solid waste facility does not have an engineered containment system, except for a portion of the Hazardous Waste Area. See attached maps for locations.

1.7.5 *Tsiigehtchic*

The Tsiigehtchic solid waste site is located approximately 1.5 km east of the community centre. The site is located immediately west of the sewage lagoon. The active portion of the disposal area covers an area of approximately 0.8 hectares with additional solid waste related areas to the south. A bulky waste site is also south of the main site. The solid waste disposal site includes a municipal solid waste area, a household hazardous waste disposal area, a bagged sewage disposal area, and a bulky waste disposal area. See attached maps for locations.

1.7.6 Fort McPherson

The Hamlet of Fort McPherson operates waste management systems for the treatment and disposal of sanitary sewage, and the disposal of solid waste. The sanitary sewage treatment and disposal system is comprised of the trucked sewage system, and a piped sewage system. The trucked sewage system consists of a lagoon in an abandoned shale borrow pit approximately 4 km northeast of the community centre. The piped sewage system consists of a lake discharge (“Sewage Lake”) immediately to the northwest of the developed community boundary. The solid waste disposal system operates in several areas adjacent to the trucked sewage lagoon. The areas provide discrete sites for the disposal of municipal solid waste, household hazardous waste, carcasses, bulky waste, tires and honey bag waste. See attached maps for locations.

1.8 Description of site physical, surface, and subsurface characteristics, site water management (i.e., flow/drainage patterns), and geotechnical characteristics.

An intention of this project is to characterize the sites’ physical, surface, and subsurface characteristics and site water management. The project will include borehole drilling, design and installation of monitoring wells, vehicle gate installation, monitoring well development and surveying, and groundwater sampling. Following well installation, a post-installation report and sampling results report will be provided to the GNWT and a long-term sampling plan and sampling procedures manual will be developed.

Current knowledge of site physical, surface and subsurface characteristics is limited. These parameters will be assessed during the site work and information collected will be documented in the post-installation report.

1.9 Identification of Waste Types

The types of waste that may be generated throughout the life-cycle of this project are listed in Table 1.

Table 1: Waste types that may be generated during the project.

*Quantities are subject to change depending on site conditions.

Waste Type	Description of Characteristics	Source of Generation	Estimation of volume/mass to be produced	Potential Environmental Effects
Oils, fuels (Hazardous or potentially hazardous)	Not readily biodegradable and has potential for bioaccumulation.	Drill Rig or fuel containers on support truck	None anticipated. See Project Spill Contingency Plan for further information.	None anticipated. See Project Spill Contingency Plan for further information.
Drill Cuttings (Mineral waste)	Broken pieces of solid material removed from a borehole.	Drill Rig operations	~0.2 m3 per monitoring well installation. = ~7.4 m3 total	None anticipated.
Brush (Non-Mineral waste)	Woody debris, biodegradable	Minor brush clearing may be required to access sites.	Dependent on site conditions.	None anticipated.
Domestic refuse (Non-Mineral waste)	Used sampling equipment (gloves, tubing, pipe cuttings, etc.)	Monitoring well installation	1 garbage bag/community = 4 garbage bags total	None anticipated.
Contaminated groundwater (Hazardous or potentially hazardous)	Groundwater potentially contaminated with leachate from solid waste facilities/lagoons.	Monitoring well development and sampling	Dependent on site conditions.	None anticipated.

2 MANAGEMENT OF EACH WASTE TYPE

A description of the activities involved in the management of project waste from generation to disposal and the rationale for the methods employed are provided in Table 2. Following the *Guidelines for Developing a Waste Management Plan* (2011) Waste Management Hierarchy, waste source reduction will occur where possible.

Table 2: Waste Management Methods

Waste Type	Management Activities	Rationale
Oils, Fuels (Hazardous or potentially hazardous)	None anticipated. See Project Spill Contingency Plan.	See Project Spill Contingency Plan.
Drill Cuttings (Mineral waste)	To be collected by drilling contractor, placed in barrels, and shipped to an appropriate waste disposal facility.	Dispose of drill cuttings generated on-site using an appropriate facility. Potential for impacted cuttings due to drilling operations.
Brush (Non-Mineral waste)	Sites will be selected to minimize brush needing to be cleared. Any minor brush cleared will be collected by drilling contractor and will be disposed of at local landfill sites.	Minimize brush clearing to ensure source reduction where possible. If required, dispose of cleared brush in appropriate facility.
Domestic refuse (Non-Mineral waste)	To be placed into a waste receptacle and be disposed of at local landfill sites.	Dispose of any garbage generated on-site using an appropriate facility.
Contaminated groundwater	Water that is suspected to be impacted will be collected, stored in barrels and shipped to an appropriate facility off-site for treatment.	Potential for impacted groundwater to be discovered due to proximity to landfill sites and sewage lagoons.

2.1 Infrastructure Required for Waste Management

The project waste management methods outlined in Table 2 require the use of pre-existing active waste disposal facilities. At each site any waste generated will be collected by the drilling contractor. Where possible, waste generated on-site will be disposed of in the active landfills present in the vicinity of the work. MACA will obtain the appropriate approvals prior to disposing of waste in community landfills. If disposal is not possible in local community landfills, waste material will be shipped to an appropriate disposal facility elsewhere.

The following sections do not apply to this project:

- Landfarms
- Waste Storage/Disposal Facilities
- Sumps
- Tailings Containment Area
- Waste Rock Disposal Area
- Sewage Disposal Facility
- Combustion Equipment
- Discharge Facilities

3 REFERENCES

Mackenzie Valley Land and Water Board (MVLWB). (2011). *Guidelines for Developing a Waste Management Plan*. Retrieved October 2016, from <https://mvlwb.com/resources/policy-and-guidelines>