



CITY OF IQALUIT

# **Environmental Protection Plan - Operations, Closure and Post-Closure Phases (Revised Final)**

**Landfill and Waste Transfer Station**

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## 1.0 Introduction

### 1.1 Purpose of This Document

This Environmental Protection Plan (EPP) has been prepared as part of an overarching Environmental Management Plan (EMP) and describes the environmental protection measures to be implemented during the **Operations, Closure, and Post-Closure Phases** of the City of Iqaluit's (the City's) proposed Waste Transfer Station (WTS) and Landfill. The purpose of the EPP is to be a resource for the City to utilize to avoid or mitigate potential adverse environmental effects to various receptors. This EPP is based on a desktop review of publically available records and site assessments conducted for the Landfill and Transfer Station locations, completed by EXP Services Inc. (Delvin, 2018a; Delvin 2018b; EXP, 2018).

This EPP outlines environmental protection measures, as they relate to facility activities, and provides a reference for environmental inspection staff to support decision-making **during the Operations, Closure, and Post-Closure Phases of the project**.

Key project contacts (as of January 2020) are provided in **Appendix A**.

### 1.2 Regulatory Context

The environmental regulatory framework that the project falls under includes:

1. *Fisheries Act*;
2. *Species at Risk Act*;
3. *Canadian Environmental Protection Act*;
4. *Nunavut Wildlife Act*;
5. *Nunavut Environmental Protection Act*; and
6. *Nunavut Waters and Nunavut Surface Rights Tribunal Act*.

## 2.0 Project Roles and Responsibilities

The following section outlines the roles and responsibilities of the City. These responsibilities include reporting, notifications, guidelines on documentation and incident reporting.

### **City of Iqaluit - Owner**

As the Operator of the Landfill and Transfer Station, the City will be responsible for ensuring that employees are made aware of the EPP and associated plans and that the commitments contained therein are implemented. The City is responsible for ensuring that associated regulations are met, and providing guidance and technical support to on-site personnel with respect to environmental compliance.

## 3.0 Environmental Considerations

The environmental setting of the project areas (**Figure 3-1**) was assessed using a desktop review of publically-available records and site assessments completed by EXP Services Inc. (Delvin, 2018a; Delvin 2018b; EXP, 2018). The two sites are located in the Meta Incognita Peninsula Ecoregion, which is characterized by rock outcroppings interspersed with sandy morainal veneers and frozen organic deposits, static cryosols with turbic and organic cryosol soils, and continuous permafrost with mainly medium ice content (Ecological Framework of Canada, 2019).

The Landfill site is approximately 22 ha in size, consisting predominantly of rolling hills with some bedrock outcrops in the south central region, small glacio-fluvial terraces in the northwest region, and boulder fields in the northwest and central portions of the site (EXP, 2018). The Transfer Station location is an industrial site, within the City, and is approximately 2.4 ha in size, covered by fill consisting of sand and gravel with boulders and cobbles (Delvin, 2018a; Delvin 2018b).

### 3.1 Vegetation

The landscape of the Meta Incognita Peninsula Ecoregion is dominated by tundra shrub vegetation, consisting of Dwarf Birch (*Betula nana*), Willow (*Salix spp.*), Labrador Tea (*Ledum spp.*), *Dryas spp.* and *Vaccinium spp.* (Ecological Framework of Canada, 2019). The nearby landscape, as characterized by Sylvia Grinnell Territorial Park reports, contains shallow, low-nutrient soils and continuous dwarf vegetation, meaning that vegetation growth is generally less than 30 cm tall (Nunavut Parks, 2019). Traditionally-important plant species found nearby include Mountain Sorrel (*Oxyria digyna*), Crowberry (*Empetrum spp.*), Blueberry (*Vaccinium spp.*), Mountain Cranberry (*Vaccinium spp.*), Arctic Willow (*Salix arctic*), Arctic Cotton (*Eriophorum callitrix*) and Labrador Tea (*Ledum spp.*). Other vegetation includes rock lichens, drought-tolerant vegetation, sedge grasses and the official flower of Nunavut - the Purple Mountain Saxifrage (*Saxifraga oppositifolia*).

#### Landfill

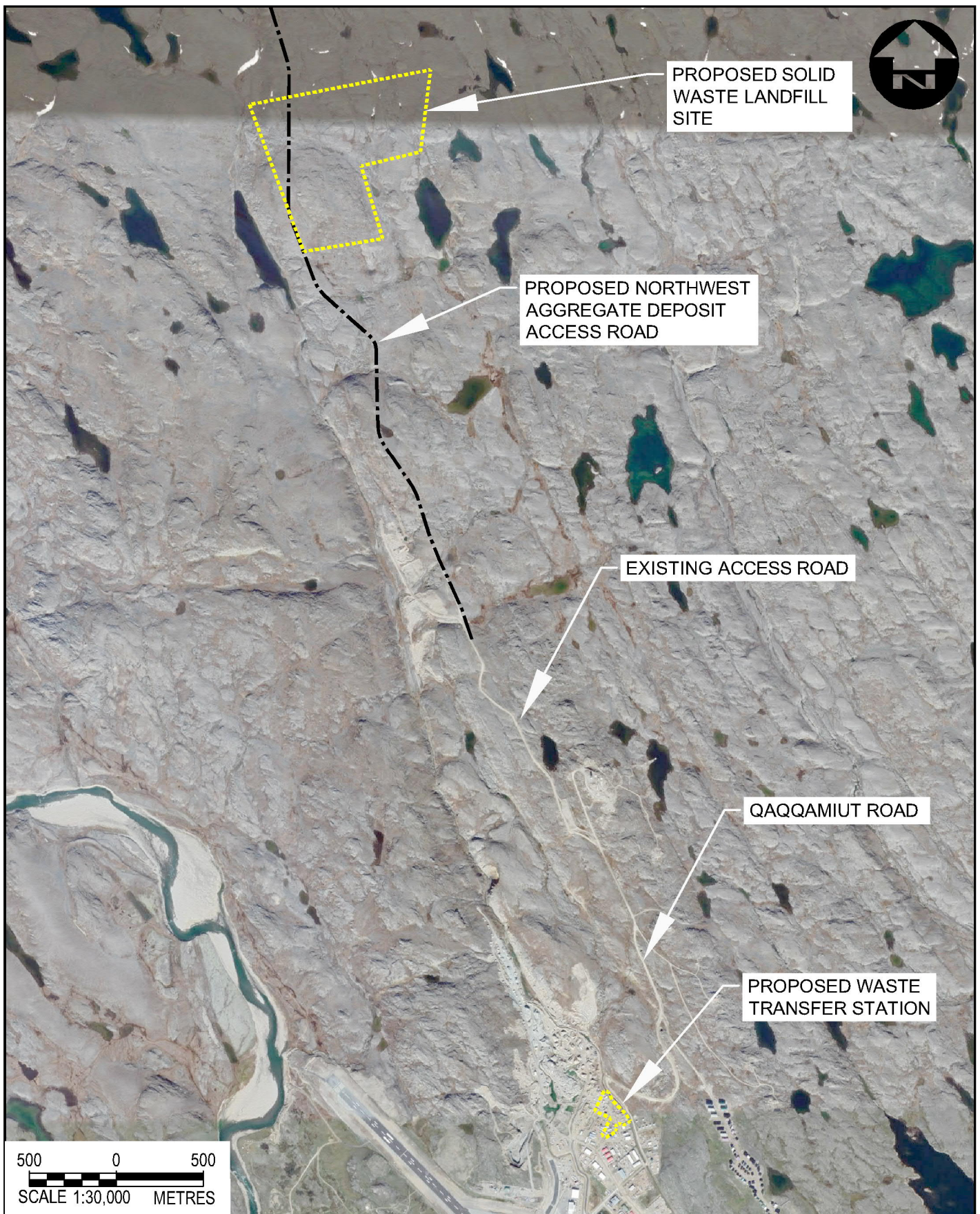
Twenty-three plant species were observed at the site location, none of which are protected under the federal *Species at Risk Act* (SARA) (EXP, 2018). The dominant and sub-dominant plant species observed included Arctic Willow (*Salix arctica*), Net-vein Willow (*Salix reticulata*), Bog Bilberry (*Vaccinium uliginosum*), Arctic Bell Heather (*Cassiope tetragona*) and Reindeer Lichen (*Cladina spp.*) (EXP, 2018).

#### Waste Transfer Station

The site is predominately covered with fill but some vegetation, such as grasses, exist along the northern perimeter and along the creek adjacent to the north site boundary (Delvin, 2018a).



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DATE

**JANUARY 2020**

PROJECT **IQALUIT LANDFILL & WASTE TRANSFER STATION  
ENVIRONMENTAL PROTECTION PLAN  
OPERATIONS, CLOSURE & POST-CLOSURE PHASES**

TITLE

**SITE LOCATIONS**

PROJECT NO.

**19-9543**

FIGURE NO.

**3-1**



### 3.2 Wetlands and Watercourses

#### Landfill

There are a number of small ephemeral drainages that cross the site and discharge into a small pond and lake southeast of the site boundary (EXP, 2018). The pond and lake drain into Carney Creek, approximately 200 m west of the site, before discharging into the Koojesse Inlet of Frobisher Bay (EXP, 2018).

#### Waste Transfer Station

There are no waterbodies reported on the site location; however, there are a few small bodies of water 30 m west of the site, as well as a stream contained within a road ditch located along the north eastern boundary (Delvin, 2018a; Delvin, 2018b). The stream drains into Koojesse Inlet, which is located approximately 2 km southeast of the site.

### 3.3 Wildlife and Wildlife Habitat

Wildlife that frequent the region, as characterized by species found in Sylvia Grinnell Territorial Park, include Caribou (*Rangifer tarandus*), Arctic Foxes (*Vulpes lagopus*), Arctic Hares (*Lepus arcticus*), other small mammals; and although infrequent; Polar Bears (*Ursus maritimus*) (Nunavut Parks, 2019). Migratory bird species known to occur within the region include the Common Ringed Plover (*Charadrius hiaticula*), Lapland Longspur (*Calcarius lapponicus*), Snow Bunting (*Plectrophenax nivalis*), Northern Wheatear (*Oenanthe oenanthe*), Red-Throated Loon (*Gavia stellate*), Peregrine Falcon (*Falco peregrinus*), Gyrfalcon (*Falco rusticolus*), Lesser Golden Plover (*Pluvialis dominica*), Semipalmated Sandpiper (*Calidris pusilla*) and Horned Lark (*Eremophila alpestris*) (Nunavut Parks, 2019).

#### Landfill

Eleven wildlife species were observed at the site location – three mammals, five birds and three insects – but none are protected under SARA legislation (EXP, 2018). The wildlife species observed at the site included: Lemming (*Lemmus trimucronatus*), Fox (*Vulpes sp.*), Caribou (*Rangifer tarandus*), Savannah Sparrow (*Passerculus trimucronatus*), Red-throated Loon (*Gavia stellate*), Common Raven (*Corvus corax*), Falcon (*Falco sp.*), American Pipit (*Anthus rubescens*), American Copper (*Lycaena phlaeas*), Forest Bumblebee (*Bombus sylvicola*) and Wolf Spider (*Hogna lenta*).

#### Waste Transfer Station

No reports were found that indicated wildlife populations or wildlife habitat are present within the site boundary.

### 3.4 Fish and Fish Habitat

#### Landfill

The waterbodies within the site boundary are unlikely to be accessible to fish; however, the stream that collects surface drainage from the Landfill site contributes to Carney Creek, which connects to a small lake west of the site reportedly providing habitat for Arctic Char (EXP, 2018).



**Waste Transfer Station**

No reports were found that indicated fish populations or fish habitat are present within the site boundary.

**3.5 Species at Risk or Species of Special Status**

The following Species at Risk (SAR) or species of special status (see **Table 3-1**) have the potential to be impacted by the proposed project:

**Table 3-1: Wildlife Species at Risk**

Common Name	Scientific Name	COSEWIC Status	SARA Status	Schedule 1
Caribou (barren-ground population)	<i>Rangifer tarandus</i>	Threatened	No Status	No
Harlequin Duck	<i>Histrionicus histrionicus</i>	Special Concern	Special Concern	Yes
Polar Bear	<i>Ursus maritimus</i>	Special Concern	Special Concern	Yes
Red Knot (rufa subspecies)	<i>Calidris canutus rufa</i>	Endangered	Endangered	Yes
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Special Concern	No Status	No
Ross's Gull	<i>Rhodostethia rosea</i>	Threatened	Threatened	Yes
Wolverine	<i>Gulo gulo</i>	Special Concern	Special Concern	Yes

While not all of the listed species were identified at the time the surveys were conducted at the sites, these species are known to live in the area, and could be present or visit the sites during the lifespan of this project.

**3.6 Heritage and Cultural Resources****Landfill**

There are no known designated cultural heritage or archaeological/paleontological features identified within the site boundary; however, the proposed site and adjacent landscape is used for outdoor recreational and traditional activities (EXP, 2018). These reported activities include hunting, fishing, berry picking, camping, winter skiing, picnicking and dog walking (EXP, 2018).

**Waste Transfer Station**

No reports were found that indicated cultural heritage or archaeological/paleontological features are present within the site boundary.

## 4.0

## Environmental Protection Measures

The purpose of this section is to provide specific mitigation measures for the City to implement or confirm implementations, in order to avoid or reduce potential environmental impacts. The mitigation measures outlined in **Table 4-1** are to be implemented in the operations, closure and post-closure phases of the project. The operations phase describes the time from when normal operations begin, following construction, until the closure and decommissioning begins. Mitigation measures for the City to implement during the operations phase of the project are outlined in **Table 4-2** below. The mitigation measures to implement during the closure phase of the project, which describes the point in time when normal operations cease until when the closure and decommissioning activities end, are outlined in **Table 4-3**. The mitigation measures to implement during the post-closure phase are outlined in **Table 4-4**. Within each table, the mitigation measures are sorted by issue/activity. Revisions of specific mitigation measures outlined in the EPP may be required to address unforeseen site-specific conditions or as a result of ongoing operations.

Applicable Orders, Permits and Licenses for the project are provided in **Appendix B**.

**Table 4-1: Mitigation Measures for Post-Construction Phases**

Issue/Activity	Mitigation Measures
<b>Work Progress Schedule</b>	<ol style="list-style-type: none"> <li>1. Works must be conducted according to regulatory approvals, permits and licenses obtained for the work. These documents shall be displayed at each work site.</li> <li>2. Adhere to planned project scheduling as outlined in the applicable regulatory permits and approvals.</li> <li>3. Schedule and conduct activities to adhere to applicable timing windows and avoid restricted activity periods, where feasible.</li> <li>4. A copy of this EPP and its included plans, regulatory approvals, permits, and/or licenses will be available on-site at all times.</li> </ol>
<b>Documentation</b>	<ol style="list-style-type: none"> <li>5. Maintain an up-to-date documentation record of all site activities related to monitoring, site inspections, maintenance, repairs and remedial actions.</li> <li>6. Document all incidences of nuisance activity, including illegal dumping, nuisance animals and fires.</li> <li>7. Document complaints received from individuals, public agencies and project staff.</li> </ol>
<b>Nuisance Control</b>	<ol style="list-style-type: none"> <li>8. Report incidences of illegal dumping to the Manager of Solid Waste and the appropriate legal personnel.</li> <li>9. Report incidences of nuisance animals to the Manager of Solid Waste and take the appropriate avoidance/deterrence measures.</li> <li>10. Report incidences of fires on-site to the Manager of Solid Waste and contact the appropriate emergency services</li> </ol>
<b>Discipline</b>	<ol style="list-style-type: none"> <li>11. Workers who show careless or wanton neglect of the environment or disregards requirements put forward in the EPP will be identified, the incident recorded and the Manager of Solid Waste will take appropriate action.</li> </ol>
<b>Environmental Training</b>	<ol style="list-style-type: none"> <li>12. Environmental training will be provided to facility staff, as part of the site orientation, prior to starting work.</li> </ol>

Table 4-2: Mitigations Measures for Site Operations

Issue/Activity	Mitigation Measures
<b>Work Areas</b>	1. Project activities must occur within the approved workspace.
<b>Drainage Control</b>	2. Ensure operation activities do not obstruct natural drainage, where possible. If avoidance is not possible, facilitate drainage around the work area. 3. Interceptor ditches and sumps are to be maintained free of accumulated sediment. Inspections are to be carried out regularly; cleaning to occur as required.
<b>Erosion and Sediment Control*</b>	4. Erosion and sediment controls shall be installed prior to activities in areas susceptible to erosion. 5. If activities involve ground disturbance within 100 m of any watercourse or wetland, erosion control structures must be installed between the natural areas and the work areas to create separation of the work area, as required. 6. Erosion and sediment control measures are to be left in place, where feasible until all work is complete and the site has been stabilized. 7. Erosion and sediment control measures are to be routinely inspected and maintained in proper working order. 8. Erosion and sediment control measures are not static and may need to be upgraded and/or amended as directed by the Regulators, as site conditions change. 9. The City shall repair failed erosion and sediment control measures as soon as possible.
<b>*: see Appendix C</b>	10. If drifting soils or topsoil loss is evident in areas prone to wind erosion, conduct the following, as appropriate: <ul style="list-style-type: none"> <li>• Suspend topsoil stripping operations during high winds;</li> <li>• Apply a tackifier to the stripped topsoil pile; and/or</li> <li>• Install wind barriers.</li> </ul> 11. Topsoil handling will be suspended during high winds when soil erosion is evident and during heavy rains, if soil becomes saturated. Topsoil will not be handled until winds have decreased and/or topsoil has drained and dried.
<b>Fuel and Hazardous Material Storage</b>	12. Hazardous materials must be labelled, stored, and handled according to Workplace Hazardous Materials Information System (WHMIS) regulations. 13. Fuel storage containers and tanks will be appropriately labelled. 14. Adequate spill response materials are available and accessible at the site. 15. Fuel containers and filters must be stored in secondary containment. 16. Jerry cans and other mobile fuel containers must always be stored in secondary containment while being used and returned to the storage area, as soon as feasible following use. 17. Refuelling points and fuel storage tanks, including secondary containment and gas cans, will be inspected regularly. All leaks must be repaired immediately.
<b>Equipment Refueling and Servicing</b>	18. Regularly inspect and maintain all heavy equipment and vehicles used during site operation, including fuel transfer hoses and fuel/oil lines, to ensure that the systems are in good condition and free of leaks. Equipment or vehicles with deficiencies will be taken out of service and repaired. 19. Refuelling equipment will be attended at all times while refuelling. 20. Refuelling of equipment will not take place within 30 m of any wetland or watercourse. 21. Drip trays are to be in place while refuelling occurs to contain overfilling, drips and spills. 22. All vehicle servicing with the potential for accidental spills shall take place above an impervious tarp, and servicing will not take place within 30 m of wetlands or watercourses.

Issue/Activity	Mitigation Measures
<b>Spill Response, Reporting and Notification</b>	23. Spill kits should be accessible while refuelling.
	24. Spill mats and/or drip pans/trays will be placed under all mobile fueling containers.
	25. Staff will notify the Facility Supervisor, as soon possible, following the discovery of a spill of any volume. The Facility Supervisor will subsequently contact the Manager of Solid Waste with the information.
	26. The Manager of Solid Waste will notify regulatory agencies and community liaisons, where required, to notify them of the spill.
	27. A written spill report must be submitted to the Manager of Solid Waste within 24 hours of any spill. Inspect hydraulic, fuel and lubrication systems of equipment on a regular basis to ensure that the systems are in good condition and free of leaks.
	28. All fuel containers or filters must be stored in secondary containment.
	29. Refuelling equipment will be attended at all times while refuelling.
	30. Refuelling of equipment will not take place within 30 m of any wetland or watercourse.
	31. Drip trays are to be in place while refuelling occurs to contain overfilling, drips and spills.
	32. All vehicle servicing with the potential for accidental spills shall take place above an impervious tarp, and servicing will not take place within 30 m of wetlands or watercourses.
	33. Spill kits should be accessible while refuelling.
	34. Regular inspection and maintenance will be conducted for all heavy equipment and vehicles used for the project, including fuel transfer hoses and fuel/oil lines. Equipment or vehicles with deficiencies will be taken out of service and repaired.
	35. Hazardous materials must be labelled, stored and handled according to WHMIS regulations.
	36. Spill mats and/or drip pans/trays will be placed under all mobile fueling containers, equipment, and vehicles, when not in use or parked for longer than two hours.
<b>Air Emissions</b>	37. Ensure equipment and vehicles are well maintained.
	38. Notify the Manager of Solid Waste of any odour complaints that may be received by project personnel, public agencies or individuals.
<b>Noise</b>	39. Ensure equipment and vehicles are in good working order with proper noise abatement equipment (i.e., mufflers or enclosures).
<b>Light Emissions</b>	40. Lighting will be restricted to the minimum required to complete the works safely.
	41. Lighting will be directed to the work area to reduce light pollution during dark hours to the extent feasible.
	42. Feeding or harassing wildlife is prohibited.
	43. Travel within posted speed limits and yield to wildlife.
<b>Wildlife Encounters and Sightings</b>	44. Report incidents of collisions or close calls with wildlife to the Manager of Solid Waste.
	45. Notify the Manager of Solid Waste of the following wildlife sightings: <ul style="list-style-type: none"> <li>Any suspected species at risk or suspected species of special status, which are listed in <b>Table 3-1</b>;</li> <li>Any dead or sick/diseased wildlife; and</li> <li>Any food caches, dens, or nests found within or close to the site.</li> </ul>
	46. The Government of Nunavut will be notified of wildlife encounters by the Manager of Solid Waste when required.
	47. If previously unidentified listed or sensitive wildlife species or their site-specific habitat (e.g., dens, nests) are identified during operation, report the sighting to the

Issue/Activity	Mitigation Measures
	Manager of Solid Waste and implement the Wildlife Species of Concern Discovery Contingency Plan ( <b>Section 6.2</b> ).
<b>Water Management</b>	<p>48. Water taking/withdrawal can only be carried out while personnel are on-site or nearby, allowing for regular inspection and maintenance of the pumping and discharge system.</p> <p>49. Prior to discharging any water to the environment, the water must be inspected for any signs of contaminants. If signs of contaminants are present the water must be collected and hauled to a disposal facility or sampled and analyzed to determine if the water meets Canadian Council of Ministers of the Environment water quality guidelines for the protection of aquatic life.</p> <p>50. Water is to be discharged using pumps that will be directed to sediment removal materials (i.e., filter bag) or water settlement areas, in low-lying, vegetated areas at least 30 m away from a watercourse or wetland. At no time shall water be discharged directly into a watercourse or wetland. Dewatering volumes are to be monitored and recorded daily.</p> <p>51. Where possible, discharge locations should be chosen that are near the dewatered area to maintain the local water table elevation.</p> <p>52. Suitable discharge locations will be reviewed and confirmed by the Manager of Solid Waste.</p> <p>53. Install effective erosion control and sediment control measures before starting work near a waterbody.</p> <p>54. Wash, refuel, and service machinery, and store fuel and other materials for the machinery in such a way that prevent any deleterious substances from entering the water.</p> <p>55. Schedule work to avoid wet, windy, and rainy periods that may cause erosion and sedimentation.</p> <p>56. Notify the Manager of Solid Waste if any suspected contamination is discovered in or near a waterbody, who will initiate the applicable investigation and sampling to be completed to confirm suspect soil or water:</p>
<b>Watercourse Protection</b>	<ul style="list-style-type: none"> <li>• Soil or slurry material should be considered contaminated if any of the following are found: <ul style="list-style-type: none"> <li>○ Oil residue;</li> <li>○ Gaseous odour;</li> <li>○ Discoloured soil; and/or</li> <li>○ Sheen on water.</li> </ul> </li> <li>• Upon discovery of potential impacted soil or water, staff will consult with the Manager of Solid Waste to determine proper sampling requirements.</li> <li>• If required, the Manager of Solid Waste will notify the applicable regulators of the newly discovered impacts.</li> <li>• Contaminated materials will be disposed of in accordance with the Waste Management Plan.</li> </ul>
<b>Leachate Management</b>	57. Complete leachate management activities in accordance with the Operations and Maintenance Manual (under separate cover).
<b>Landfill Gas Management</b>	58. Complete landfill gas management activities in accordance with the Operations and Maintenance Manual (under separate cover).
<b>Waste Handling and Disposal</b>	<p>59. Appropriate waste disposal facilities for each waste type to be produced by the project must be identified by the Manager of Solid Waste.</p> <p>60. All waste leaving the site must be accompanied with an appropriate waybill, bill of</p>



Issue/Activity	Mitigation Measures
	<p>lading or waste manifest. Consult with the Manager of Solid Waste to determine what type of paperwork is required.</p> <p>61. Notify waste disposal facilities of waste shipments prior to leaving the site and determine if any there are facility sampling requirements.</p> <p>62. All sewage and solid waste will be contained and sealed in watertight containers.</p> <p>63. Tanks used for transporting greywater will be watertight and will be regularly and properly inspected and maintained by the operator.</p>
Transportation	<p>64. Vehicle use on public roads and project access routes will be in accordance with applicable laws and road use agreements (e.g., load restrictions).</p> <p>65. Regularly inspect and maintain vehicles to keep them in proper working order.</p> <p>66. Drivers must maintain an up-to-date transportation documentation system and carry the appropriate transportation documents (e.g., drivers licence, bill of lading, waybill, log book, etc.).</p> <p>67. Vehicles will not exceed speed limits established for the area and will lower speeds in specific conditions such as areas of high erosion hazard.</p> <p>68. Vehicles must yield to wildlife.</p> <p>69. Personnel will avoid unnecessary wheel spin when travelling or operating on soil.</p> <p>70. Do not necessarily idle vehicles or equipment.</p> <p>71. Secure all loads with the appropriate tie-down equipment or load covers, and inspect the load immediately prior to commencing driving and once arriving at the destination.</p> <p>72. If the load becomes unstable, immediately cease driving and re-secure the load</p> <p>73. If a loss-of-load occurs, report the incident to the Manager of Solid Waste and seek guidance about the appropriate procedures moving forward.</p> <p>74. If a vehicle or equipment breaks down during transportation, report the incident to the Manager of Solid Waste and seek assistance to fix the broken machinery. Do not operate the broken vehicle or equipment until it is in proper working order again.</p> <p>75. If a vehicle or equipment get into an accident or encounters an accident during transportation, immediately contact the appropriate emergency services and report the incident to the Manager of Solid Waste.</p> <p>76. Notify the Manager of Solid Waste of any noise complaints that may be received by project personnel, public agencies, or individuals.</p>

Table 4-3: Mitigation Measures for Closure

Issue/Activity	Mitigation Measures
Work Areas	1. Project activities must occur within the approved workspace.
Work Schedule	2. Schedule closure and decommissioning activities to reduce interference with migratory bird restrictions and fish habitat timing restriction, as much as practical.
Reclamation	3. Complete reclamation of the work areas in accordance with the Closure and Decommissioning Plan (under separate cover).
Debris Removal	4. Restore any trails used by traditional land users that were impacted by the project.
	5. Remove all debris and bins from the work area.
Drainage Control	6. Ensure activities do not obstruct natural drainage, where possible. If avoidance is not possible, facilitate drainage around the work area.
	7. Grade to establish a minimum slope of 3% across the top of the waste fill area to allow surface water drainage off-site and to discourage infiltration, leachate production, and erosion.

Issue/Activity	Mitigation Measures
<b>Erosion and Sediment Control*</b>  <i>*: noted as a low potential activity of concern given local soil conditions.</i>	<ol style="list-style-type: none"> <li>8. Soil disturbance will only occur within the designated areas of the project.</li> <li>9. Erosion and sediment control measures shall be installed prior to commencing excavations or work in areas susceptible to erosion.</li> <li>10. If activities involve ground disturbance within 100 m of any watercourse or wetland, erosion control structures must be installed between the natural areas and the work areas to create separation of the work area, as required.</li> <li>11. Erosion and sediment control measures are to be left in place, where feasible until all work is complete and the site has been stabilized.</li> <li>12. Erosion and sediment control measures are to be routinely inspected and maintained in proper working order.</li> <li>13. The City shall repair failed erosion and sediment control measures, as soon as possible.</li> <li>14. Erosion and sediment control measures are not static and may need to be upgraded and/or amended, as directed by the Regulators, as site conditions change.</li> <li>15. Topsoil handling will be suspended during high winds when soil and erosion is evident, and during heavy rains, if soil becomes saturated. Topsoil will not be handled until winds have decreased and/or topsoil has drained and dried.</li> <li>16. If drifting soils or topsoil loss is evident in areas prone to wind erosion, conducting the following, as appropriate: <ul style="list-style-type: none"> <li>• Suspend topsoil disturbing activities during high winds;</li> <li>• Apply a tackifier to the disturbed topsoil; and/or</li> <li>• Install wind barriers.</li> </ul> </li> </ol>
<b>Fuel and Hazardous Material Storage</b>	<ol style="list-style-type: none"> <li>17. Hazardous materials must be labelled, stored, and handled according to WHMIS regulations.</li> <li>18. Fuel storage containers and tanks will be appropriately labelled.</li> <li>19. Adequate spill response materials are available and accessible at the site.</li> <li>20. Fuel containers and filters must be stored in secondary containment.</li> <li>21. Jerry cans and other mobile fuel containers must always be stored in secondary containment while being used and returned to the storage area, as soon as feasible following use.</li> <li>22. Refuelling points and fuel storage tanks, including secondary containment and gas cans, will be inspected regularly. All leaks must be repaired immediately.</li> </ol>
<b>Equipment Refueling and Servicing</b>	<ol style="list-style-type: none"> <li>23. Regularly inspect and maintain all heavy equipment and vehicles used during site operations, including fuel transfer hoses and fuel/oil lines, to ensure that the systems are in good condition and free of leaks. Equipment or vehicles with deficiencies will be taken out of service and repaired.</li> <li>24. Refuelling equipment will be attended at all times while refuelling.</li> <li>25. Refuelling of equipment will not take place within 30 m of any wetland or watercourse.</li> <li>26. Drip trays are to be in place while refuelling occurs to contain overfilling, drips and spills.</li> <li>27. All vehicle servicing with the potential for accidental spills shall take place above an impervious tarp, and servicing will not take place within 30 m of wetlands or watercourses.</li> <li>28. Spill kits should be accessible while refuelling.</li> <li>29. Spill mats and/or drip pans/trays will be placed under all mobile fueling containers.</li> </ol>
<b>Spill Response, Reporting and Notification</b>	<ol style="list-style-type: none"> <li>30. Staff will notify the Facility Supervisor, as soon possible, following the discovery of a spill of any volume.</li> <li>31. The Manager of Solid Waste will notify regulatory agencies and community liaisons</li> </ol>

Issue/Activity	Mitigation Measures
	<p>where required to notify them of the spill.</p> <p>32. A written spill report must be submitted to the Manager of Solid Waste within 24 hours of any spill. Inspect hydraulic, fuel and lubrication systems of equipment on a regular basis to ensure that the systems are in good condition and free of leaks.</p> <p>33. All fuel containers or filters must be stored in secondary containment.</p> <p>34. Refuelling equipment will be attended at all times while refuelling.</p> <p>35. Refuelling of equipment will not take place within 30 m of any wetland or watercourse.</p> <p>36. Drip trays are to be in place while refuelling occurs to contain overfilling, drips and spills.</p> <p>37. All vehicle servicing with the potential for accidental spills shall take place above an impervious tarp, and servicing will not take place within 30 m of wetlands or watercourses.</p> <p>38. Spill kits should be accessible while refuelling.</p> <p>39. Regular inspection and maintenance will be conducted for all heavy equipment and vehicles used for the project, including fuel transfer hoses and fuel/oil lines. Equipment or vehicles with deficiencies will be taken out of service and repaired.</p> <p>40. Hazardous materials must be labelled, stored, and handled according to WHMIS regulations.</p> <p>41. Spill mats and/or drip pans/trays will be placed under all mobile fueling containers and under equipment and vehicles when not in use or parked for longer than two hours.</p>
<b>Air Emissions</b>	<p>42. Do not unnecessarily idle vehicles or equipment.</p> <p>43. Ensure equipment is well maintained.</p> <p>44. Notify the Manager of Solid Waste of any odour complaints that may be received by project personnel, public agencies, or individuals.</p>
<b>Noise</b>	<p>45. Ensure equipment and machinery is in good working order with proper noise abatement equipment (i.e. mufflers or enclosures).</p>
<b>Light Emissions</b>	<p>46. Lighting will be restricted to the minimum required to complete the works safely.</p> <p>47. Lighting will be directed to the work area to reduce light pollution during dark hours to the extent feasible.</p>
<b>Wildlife Encounters and Sightings</b>	<p>48. Feeding or harassing wildlife is prohibited.</p> <p>49. Travel within posted speed limits and yield to wildlife.</p> <p>50. Report incidents of collisions or close calls with wildlife to the Manager of Solid Waste.</p> <p>51. Notify the Manager of Solid Waste of the following wildlife sightings:</p> <ul style="list-style-type: none"> <li>Any suspected species at risk or suspected species of special status, which are listed in <b>Table 3-1</b>;</li> <li>Any dead or sick/diseased wildlife; and</li> <li>Any food caches, dens, or nests found within or close to site.</li> </ul> <p>52. The Government of Nunavut will be notified of wildlife encounters by the Manager of Solid Waste when required.</p> <p>53. If previously unidentified listed or sensitive wildlife species or their site-specific habitat (e.g., dens, nests) are identified during operation, report the sighting to the Manager of Solid Waste and implement the Wildlife Species of Concern Discovery Contingency Plan (<b>Section 6.2</b>).</p>
<b>Transportation</b>	<p>54. Vehicle use on public roads and project access routes will be in accordance with applicable laws and road use agreements (e.g., load restrictions).</p>

Issue/Activity	Mitigation Measures
	<p>55. Drivers must maintain an up-to-date transportation documentation system and carry the appropriate transportation documents (e.g., drivers licence, bill of lading, waybill, log book, etc.).</p> <p>56. Vehicles will not exceed speed limits established for the area and will lower speeds in specific conditions such as areas of high erosion hazard.</p> <p>57. Personnel will avoid unnecessary wheel spin when travelling or operating on soil.</p> <p>58. Do not necessarily idle vehicles or equipment.</p> <p>59. Ensure equipment and machinery is in good working order.</p> <p>60. Secure all loads with the appropriate tie-down equipment or load covers, and inspect the load immediately prior to commencing driving and once arriving at the destination.</p> <p>61. If the load becomes unstable, immediately cease driving and re-secure the load</p> <p>62. If a loss-of-load occurs, report the incident to the Manager of Solid Waste and seek guidance about the appropriate procedures moving forward.</p> <p>63. If a vehicle or equipment breaks down during transportation, report the incident to the Manager of Solid Waste and seek assistance to fix the broken machinery. Do not operate the broken vehicle or equipment until it is in proper working order again.</p> <p>64. If a vehicle or equipment get into an accident or encounters an accident during transportation, immediately contact the appropriate emergency services and report the incident to the Manager of Solid Waste.</p> <p>65. Notify the Manager of Solid Waste of any noise complaints that may be received by project personnel, public agencies, or individuals.</p>
<b>Leachate Management</b>	<p>66. Monitor and maintain the leachate collection and treatment systems regularly.</p> <p>67. Implement appropriate system updates/upgrades, as necessary.</p>
<b>Gas Management</b>	<p>68. Monitor and maintain landfill gas collection and controls regularly.</p> <p>69. Implement appropriate system updates/upgrades, as necessary.</p>
<b>Waste Handling and Disposal</b>	<p>70. Appropriate waste disposal facilities for each waste type to be produced by the project must be identified by the Manager of Solid Waste.</p> <p>71. All waste leaving the site must be accompanied with an appropriate waybill, bill of lading or waste manifest. Consult with the Manager of Solid Waste to determine what type of paperwork is required.</p> <p>72. Notify waste disposal facilities of waste shipments prior to leaving the site and determine if any there are facility sampling requirements.</p> <p>73. All sewage and solid waste will be contained and sealed in watertight containers.</p> <p>74. Tanks used for transporting greywater will be watertight and will be regularly and properly inspected and maintained by the operator.</p>
<b>Vegetation</b>	<p>75. Prepare the site in such a manner as to facilitate natural vegetation establishment.</p>
<b>Hazardous Material Monitoring</b>	<p>76. Before final grading and the installation of the site cover occurs, conduct a hazardous material assessment to determine if there is contamination on-site. The assessment should include air, soil, surface water and groundwater sampling.</p> <p>77. Report any contamination to the Manager of Solid Waste and in the report describe the type, extent, degree, and approximate volume of the contamination.</p> <p>78. Wear the appropriate personal protective equipment (PPE) while conducting hazardous material assessment.</p>

Table 4-4: Mitigation Measures for Post-Closure

Issue/Activity	Mitigation Measures
<b>Drainage Control</b>	1. Monitor the final cover integrity and make repairs/additions, as appropriate. 2. Monitor the site for low areas resulting from soil settlement or subsidence of the site. Fill these areas with soil to restore the desired site topography, where appropriate.
<b>Erosion and Sediment Control</b>	3. Monitor for erosion of topsoils and implement erosion control measures, where appropriate. 4. Monitor long-term erosion and sediment control structures and make repairs, as necessary.
<b>Leachate Management</b>	5. Monitor and maintain the leachate collection and treatment systems regularly. 6. Implement appropriate system updates/upgrades, as necessary.
<b>Gas Management</b>	7. Monitor and maintain landfill gas collection and controls regularly. 8. Implement appropriate system updates/upgrades, as necessary.
<b>Vegetation</b>	9. Maintain site vegetation and implement vegetation additions, removals, and cutting activities, where appropriate.
<b>Hazardous Material Monitoring</b>	10. Monitor surface water annually and report all incidences of contamination to the Manager of Solid Waste. 11. Monitor groundwater (active layer) for leachate and site contamination. Report all incidences of contamination to the Manager of Solid Waste. 12. Wear the appropriate PPE while conducting the site monitoring activities.



## 5.0 Monitoring and Inspection

As a responsibility of the City of Iqaluit, and consistent with regulatory approval requirements, monitoring and inspection activities are to be conducted during the operations, closure, and post-closure phases of the project to assess any impacts to the surrounding environment and habitat. It is imperative that spills and other incidents, which negatively impact the environment and wildlife, are reported immediately. If a site characteristic is deemed problematic, appropriate mitigation measures will be implemented. There may be a need to revise specific monitoring and inspection activities outlined below to address unforeseen site-specific conditions or as a result of ongoing operations.

## 6.0 Contingency and Emergency Response Plan

### 6.1 Spill Response Plan

The following sections contain spill response plans for small and large spills. Mitigation measures pertaining to Fuel and Hazardous Material Storage, Equipment Refueling and Servicing and Spill Response, Reporting, and Notification is found in **Section 4.0 - Environmental Protection Measures**.

#### 6.1.1 Small Spills/Leaks

Spills or leaks less than 20 L are considered small spills and the following procedure must be followed:

1. The first observer will check the immediate area for any affected or injured personnel and will inform the Manager of Solid Waste as soon as possible.
2. The Manager of Solid Waste will:
  - a. Ensure activity in the area is restricted to guarantee the safety of the personnel cleaning up the spill;
  - b. Direct staff to take appropriate emergency environmental protection measures such as placing booms, barrier, or absorbent pads around the spill to prevent liquid escape into the environment or into surface waterbodies;
  - c. Shovel the spilled material and clean-up debris into a drum, bin, or bag;
  - d. Label the container(s) as "Spill Material" along with the spilled substance and date. Place it in a safe storage area;
  - e. Notify the Department of Environment for the Government of Nunavut and take their direction as appropriate;
  - f. Complete a *Spill Report Form* detailing the following:
    - i. Amount of product spilled;
    - ii. Name of material spilled if known. If the material is unknown, indicate as such in the log;
    - iii. The person who discovered the spill;
    - iv. Date and time of the spill;
    - v. Estimated volume of spill clean-up material used; and
    - vi. Any other relevant details.
  - g. Forward the incident report/memo to the supervisor for review; and
  - h. Attempt to determine the cause of the release, if risk to further release exists, and if feasible, mitigate the cause to prevent further releases.

#### 6.1.2 Large Spills/Leaks

Spills or leaks greater than 20 L are considered large spills. For a large spill, the following procedure must be followed:

1. The first observer will check the immediate area for any affected or injured personnel and will inform the Emergency Coordinator as soon as possible.
2. The Manager of Solid Waste will take control of the emergency and complete the remaining steps:
  - a. Clear all personnel out of the area;

- b. Notify the Department of Environment for the Government of Nunavut and take direction from the Department or their designated authority;
  - c. If over 100 L of fuel is spilled, or the spill volume is unknown, by law it must be reported to the Government of Nunavut. Report a spill in one of the following two ways:
    - i. Call the 24-Hour Spill Report Line at 867-920-8130, or
    - ii. Complete the *Spill Report Form* from the Nunavut Government in **Appendix E** and then fax it to 867-873-6924 or email it to spills@gov.nt.ca.
3. For other Schedule B Contaminants (NWT Reg., 2006), if greater than the reference amount of contaminant was spilled or you are unaware of how much was spilled, by law it must be reported to the Government of Nunavut. To report a spill of Schedule B Contaminants, phone the 24-Hour spill Report Line at 867-920-8130. A list of Schedule B Contaminants and the reference spill volumes (NWT Reg., 2006) are presented in **Table 6-1**.

**Table 6-1: Schedule B Contaminant Reference Spill Amounts**

TDGA Class	Description of Contaminant	Amount Spilled
1	Explosives	Any amount
2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity greater than 100 L
2.2	Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
2.3	Compressed gas (toxic)	Any amount
2.4	Compressed gas (corrosive)	Any amount
3.1, 3.2, 3.3	Flammable liquid	100 L
4.1	Flammable solid	25 kg
4.2	Spontaneously combustible solids	25 kg
4.3	Water reactant solids	25 kg
5.1	Oxidizing substances	50 L or 50 kg
5.2	Organic peroxides	1 L or 1 kg
6.1	Poisonous substances	5 L or 5 kg

4. Use appropriate personal protective equipment (PPE) for proper handling of material.
5. If there is danger due to exposure, fire, explosion, or if public safety, the Manager of Solid Waste will suspend operation. All personnel should evacuate to the Emergency Muster Area. If the Emergency Muster Area is an unsafe area due to the conditions, personnel must proceed to an Alternative Muster Area:
  - a. The Facility Manager should take attendance from preprinted list; and
  - b. Phone and seek guidance from the 24-Hour Spill Report Line at (867-920-8130).
6. If the chemical spill is too dangerous or toxic to handle with equipment on-site or if it appears to be dangerous, reactive, or unknown, contact the 24-Hour Spill Report Line (867-920-8130) for guidance and assistance.

7. If safe to do so, direct staff to take appropriate emergency environmental protection measures such as placing booms, barrier, or absorbent pads around the spill to prevent liquid escape into the environment or into surface water bodies. If necessary, create a ditch around the area of the spill or leak, or build a berm to minimize the movement of the spilled product.
8. Shut off all valves to utilities in the area, if they pose a potential risk to the spill clean-up personnel.
9. Block any sewers or drains in the area if they pose a potential risk to the spill clean-up personnel.
10. Place the spill clean-up material into an open-top drum or lugger bin, including disposable PPE used in the spill clean-up.
11. Complete a *Spill Report Form* detailing the following:
  - a. Amount of product spilled;
  - b. Name of material spilled if it is known; if the material is unknown, indicate that it is unknown in the log;
  - c. The person who noted the spill;
  - d. Date and time of the spill;
  - e. Estimated volume of spill clean-up material use; and
  - f. Any other relevant details.
12. Forward the incident report/memo to the Manager of Solid Waste for review.
13. The Manager of Solid Waste will make arrangements for proper disposal of spill and spill clean-up material.
14. Attempt to determine the cause of the release and if there is a risk of a future release.
15. Assess and potentially upgrade the level of emergency, if necessary.

## 6.2 Incidental Discovery of Sensitive or Protected Species Contingency Plan

In the event that wildlife species of concern or their specific habitat are discovered on-site during operations, closure or post-closure, the following mitigation steps will occur:

1. Suspend work immediately in the vicinity of the newly discovered wildlife species of concern. Work may not resume until the measures below are complete.
2. Notify the Manager of Solid Waste, who will notify the Director of Engineering and Public Works.
3. The Manager of Solid Waste, engaging specialist advice as necessary, will assess the potential discovery and either allow operations to resume or proceed by notifying:
  - a. Applicable government agencies, as required; and
  - b. Wildlife Consultants.
4. The wildlife consultant may deem it necessary to visit the site to develop an appropriate mitigation plan. The mitigation measures available may include:
  - Abiding by seasonal timing constraints within the recommended set back distances;
  - Abiding by daily timing restrictions on-site activities;
  - Narrowing the proposed area of disturbance, and protect the site using fencing and signage;
  - Altering or delaying site activities to avoid sensory disturbance (e.g., avoid burning, loud noises, bright lights, etc.);
  - Extending road or watercourse bores to avoid or minimize site-specific effect;
  - Informing all users of access restrictions in the fenced sites;

- Altering the route to avoid the site;
- Installing nest boxes/platforms and/or replace/enhance habitat during reclamation or restoration; and
- Relocating nests, habitat features, or individuals if practical and monitor response.

The wildlife or wildlife habitat will be assessed based on the following criteria:

1. The location of the wildlife or wildlife habitat with respect to the proposed site.
2. The presence of topographic features or vegetation to effectively screen the wildlife or habitat from the site activities.
3. The species critical timing restraints in relation to the timing of the site activity.
4. The potential to alter activities to minimize or avoid sensory disturbance.



## 7.0

## References

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- Ecological Framework of Canada. 2019. Ecoregions of Canada – Meta Incognita Peninsula. Retrieved from <http://ecozones.ca/english/region/28.html> (accessed 08.05.2019).
- EXP Services Inc. (EXP). 2018. Physical and Biological Assessment, Proposed New Landfill Site, Iqaluit, NU. Prepared for City of Iqaluit, Project: New Landfill Site, OTT-00248813-A0 by EXP Services Inc.
- Northwest Territories Regulations (Nunavut) (NWT Reg.). 2006. Spill Contingency Planning and Reporting Regulations, NWT Reg. (Nu) 068-93, Retrieved from <https://www.canlii.org/en/nu/laws/regu/nwt-reg-nu-068-93/latest/nwt-reg-nu-068-93.html> (accessed 08.05.2019).
- Nunavut Parks. 2019. Sylvia Grinnell Territorial Park. Retrieved from <https://nunavutparks.com/parks-special-places/sylvia-grinnell-territorial-park/> (accessed 08.05.2019).

## Appendix A

### *Project Contact List*

**CITY OF IQALUIT – LANDFILL AND WASTE TRANSFER STATION**  
**Project Contacts List**

**JANUARY 2020**

<b>CITY OF IQALUIT</b>			
<b>CONTACT</b>	<b>PAGER #</b>	<b>WORK #</b>	<b>CELL #</b>
Dispatch	N/A	979-5650	-
Chief Administrative Officer	N/A	979-5666	222-2953
Director of Public Works and Engineering	N/A	975-8509	222-2965
Operations Superintendent, Public Works	N/A	979-5631	222-2956
Manager of Engineering (Vacant)	-	-	-
Utilidor Manager	N/A	979-5632	222-2966
Utilidor On-Call	32	N/A	222-3243
Garage/Roads Foreman	N/A	979-5668	N/A
Trucked Services Foreman	N/A	979-5612	222-2947
Owner's Third Party Representative- Dillon Consulting Limited, Calgary, AB (Keith Barnes)	-	(403) 215-8885 ext. 4310	(403) 827-6299

<b>EMERGENCY SERVICES</b>		
<b>CONTACT</b>	<b>WORK #</b>	<b>CELL #</b>
Dispatch	979-5650	-
Duty Officer (Fire/Ambulance)	979-4422	-
Fire Chief	979-5657	222-5073
Deputy Fire Chief	979-5650	222-2955
Deputy Fire Chief	979-5650	222-3981
Chief Municipal Enforcement Officer	979-5670	222-5521
RCMP	979-1111 979-0123	

<b>GOVERNMENT RESOURCES- SPILL LINE</b>		
24-Hour Spill Line	Telephone #	<b>(867) 920-8130</b>

<b>EXTERNAL ASSISTANCE- GOVERNMENT RESOURCES</b>	
<b>DEPARTMENT</b>	<b>CONTACT #</b>
Environmental Protection, Government of Nunavut	975-5900
Indian and Northern Affairs Canada, Nunavut District Manager	975-4295
Indian and Northern Affairs, Baffin Sub-District	975-4295
Environment and Climate Change Canada, Iqaluit	975-4636
Department of Fisheries and Oceans, Iqaluit	979-8000
Regional Public Health Officer, Government of Nunavut	979-7652

<b>CONTRACTORS</b>	<b>CONTACT #</b>
Baffin Building Systems	979-5903
Kudlik Construction Ltd	979-1166
Nunavut Excavating Ltd	975-3320

CONTRACTORS	CONTACT #
RL Hanson	979-6004
Tower Arctic Ltd.	979-6465
Qikiqtaaluk Environmental, Brossard, QC	(514) 940-3332
Nunatta Environmental	979-1488

## Appendix B

***Orders, Permits and Licenses  
(to be added when available)***



## Appendix C

### *Erosion and Sediment Control Plan*



CITY OF IQALUIT

# Erosion and Sediment Control Plan

Landfill and Waste Transfer Station

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## 1.0

# Introduction

The City of Iqaluit (City) retained Dillon Consulting Limited (Dillon) to develop an Erosion and Sediment Control (ESC) Plan as a component of the Landfill and Waste Transfer Station Project (the Project). The Project involves the construction and subsequent operation of two new waste management facilities to serve municipal solid waste generators within the City; a Waste Transfer Station (WTS) and a Landfill. The construction component of the Project is scheduled to commence in 2020 with completion and facility commissioning in 2022. The two facilities are being developed with an anticipated 75 year operational life.

Consistent with the Nunavut geological context, it is acknowledged that site surficial soils and selected construction materials for the Project are primarily sands and gravels; thus, the potential for significant issues associated with sediment-laden runoff is limited. As a result, measures relevant to the soil conditions in Nunavut (versus locations with fine grained surficial soils) are highlighted in this document.

## 1.1

## Purpose and Goal

Within the context of overlying EMP and EPP documents for the Project, the purpose of this ESC Plan is to provide recommendations for erosion and sediment control measures to be implemented by the City of Iqaluit during both the construction and operations/closure/post-closure phases of the Project.

The goal of the ESC Plan (a supporting component of both the construction and operations/closure/post-closure EPPs) is to reduce the risk of sediment (from wind and water erosion) being transported off-site or into nearby water bodies, including the Sylvia Grinnell River.

## 1.2

## Limitations

In recognition of the uncertainties related to soil types, water movement or weather that may be encountered during construction and operations/closure/post-closure activities, the Erosion and Sediment Control (ESC) Plan may change based on the observations of:

### Construction Phase

- Construction Manager or Environmental Inspector (EI) and in consultation with the Project Environmental Lead.

### Operations, Closure and Post-Closure Phase

- The City's Facility Manager in consultation with the Manager of Solid Waste and the Director of Public Works.

## 2.0

## Project Components

**Figure 2-1** identifies the location of the two Project areas. The WTS and Landfill sites are shown in greater detail in **Figures 2-2** and **2-3** and are described in the following subsections.

## 2.1

### Transfer Station

The WTS is located at the end of Kakivak Court in Iqaluit. The site occupies an area of approximately 2.4 ha and includes a fenced yard, transfer station, scale house, site office and exterior storage areas.

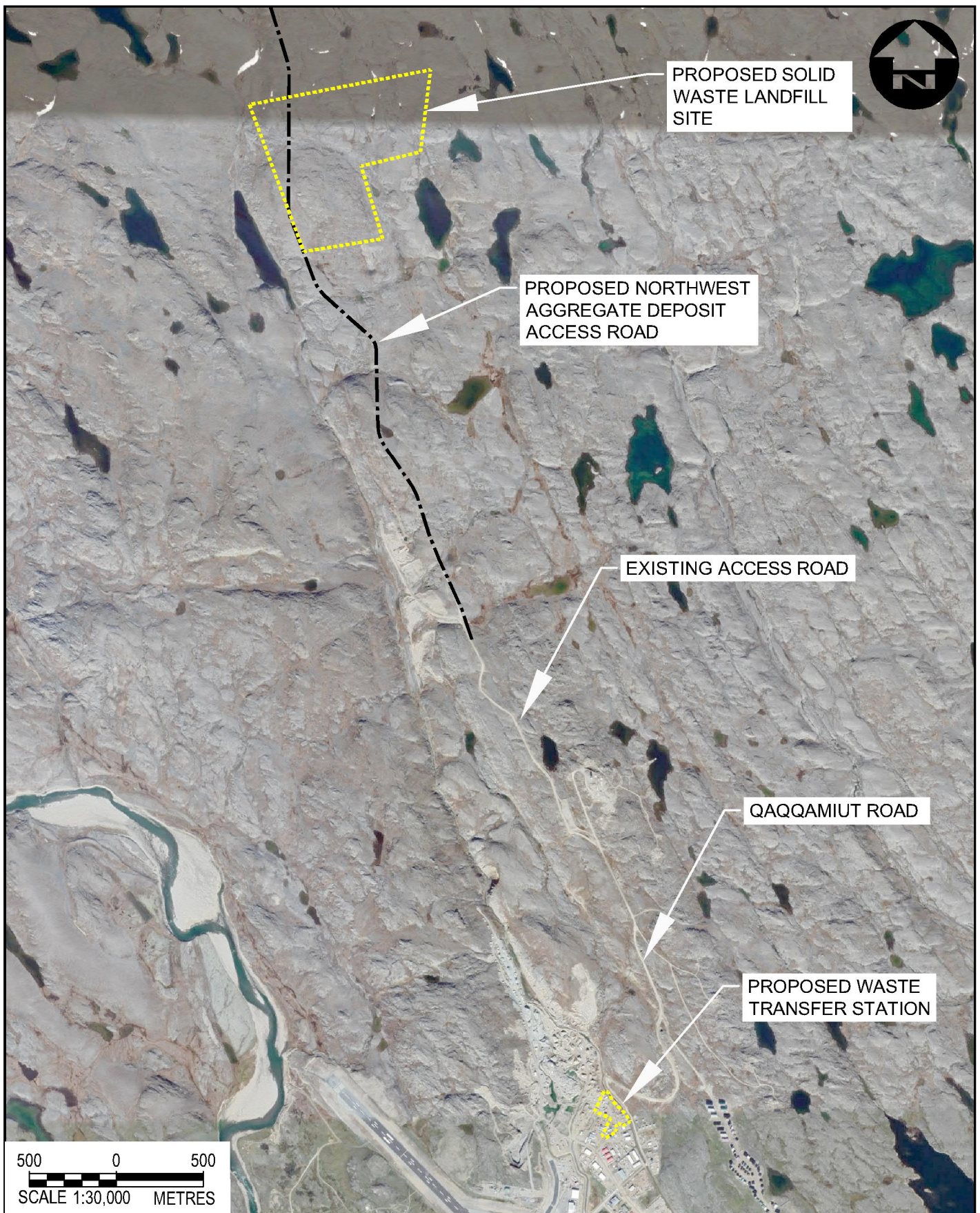
## 2.2


### Landfill

The Landfill site is located approximately six kilometres northwest of the Iqaluit and occupies an approximate area of 22 ha. The landfill is comprised of site access roads, 12 lined waste disposal cells (developed in sequence), leachate collection and treatment infrastructure as well as an Attendant's Trailer.

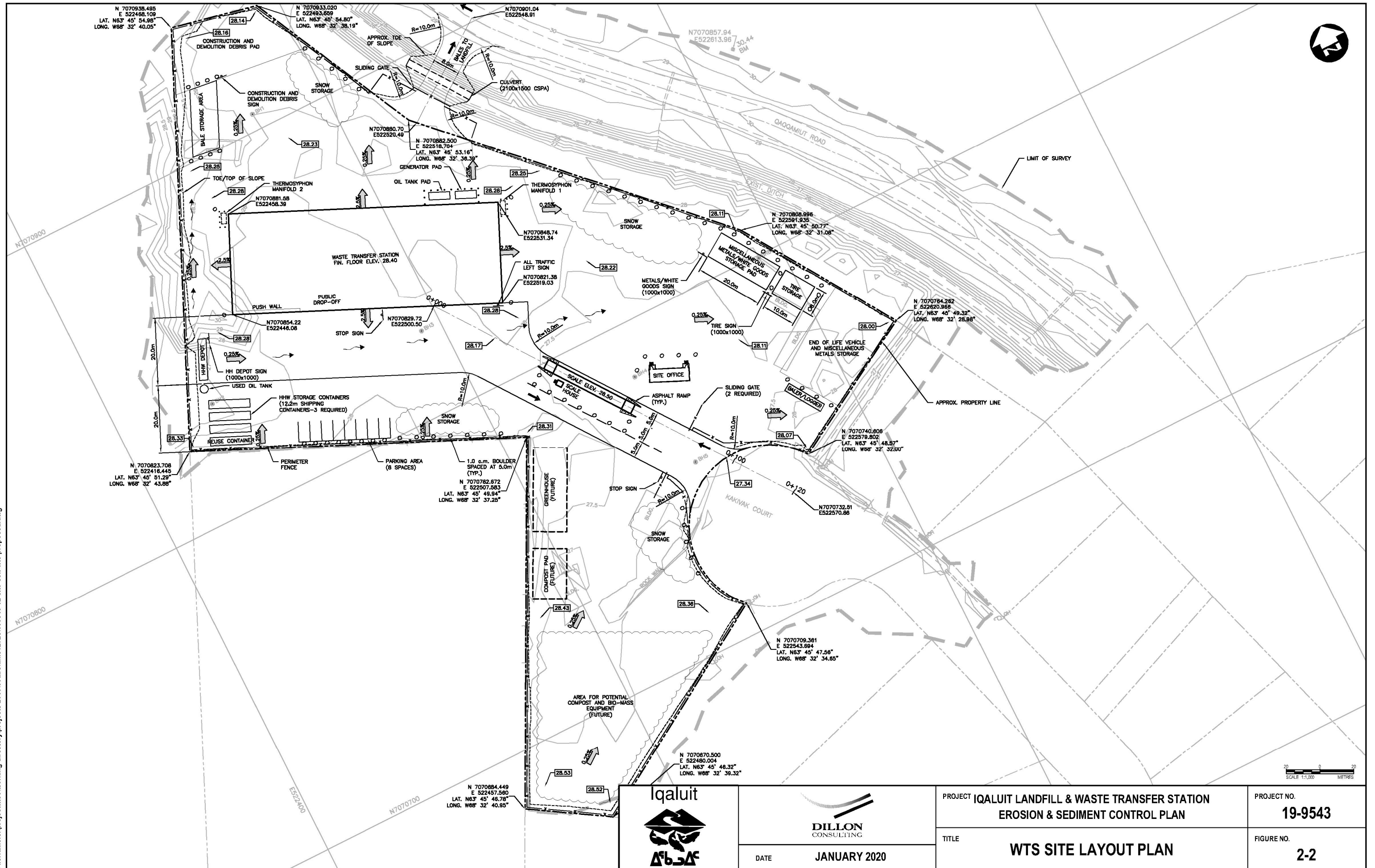


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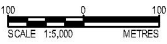
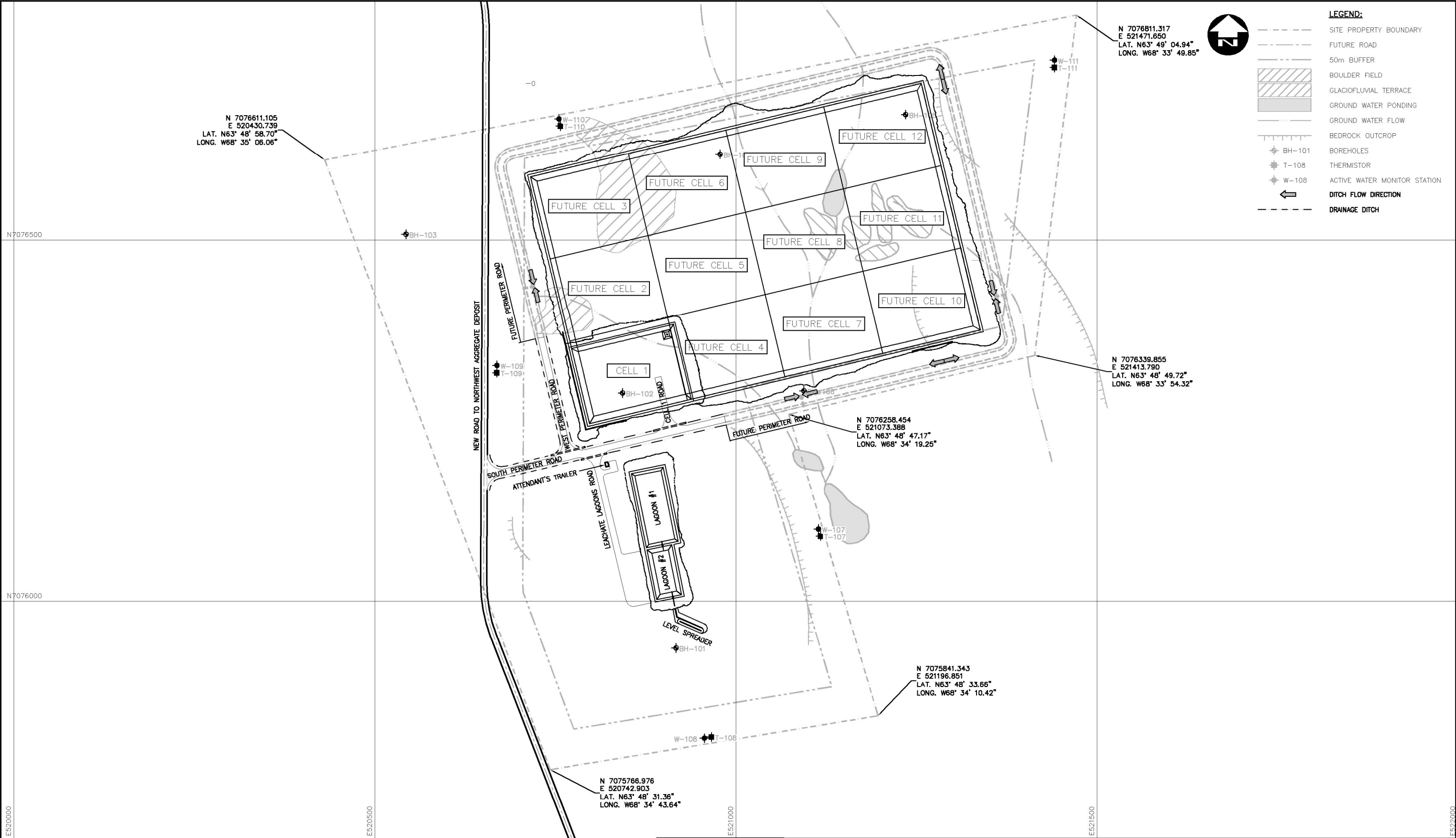


 <b>DILLON</b> CONSULTING	PROJECT <b>IQALUIT LANDFILL &amp; WASTE TRANSFER STATION EROSION &amp; SEDIMENT CONTROL PLAN</b>	PROJECT NO. <b>19-9543</b>
	TITLE <b>SITE LOCATIONS</b>	FIGURE NO. <b>2-1</b>
DATE <b>JANUARY 2020</b>		





File Name: c:\project\working directory\projects 2019\50db\cdms\27272-199543-02-site-con-proposed.dwg



DATE JANUARY 2020

PROJECT IQUALUIT LANDFILL & WASTE TRANSFER STATION  
EROSION & SEDIMENT CONTROL PLAN

TITLE LANDFILL LAYOUT PLAN

PROJECT NO.  
19-9543

FIGURE NO.  
2-3



## Areas Susceptible to Erosion and Sedimentation

Areas susceptible to erosion expected throughout the Project area consist of slopes within and along site boundaries, areas stripped of vegetation, banks of water bodies, drainage swales and areas which require ground disturbance beyond basic grading (e.g., excavations) and constructed berms. Specific areas in which extra caution and care are required to minimize the potential for erosion are outlined below.

### Waste Transfer Station

- Areas adjacent to the drainage ditch between the eastern property boundary and Qaqqamiut Road.

### Landfill

- Existing streams, drainage swales and shallow ponds (flowing north to south), with discharge to Carney Creek.
- Constructed berms for the landfill and leachate treatment infrastructure.
- Capped surfaces of completed portions of the landfill.

Mitigation measures and guidelines described in the sections below are intended to address these areas with a greater risk of erosion and sedimentation.

## 4.0 Site Specific Mitigation Measures

### 4.1 Erosion and Sediment Control Best Management Practices

As detailed in their respective EPPs, a range of best management practices (BMPs) can be implemented to minimize erosion and the mobilization of sediments during both Construction and Operations, Closure and Post-Closure Phases. The use of adequate erosion and sediment control measures will prevent or reduce the potential of sediment transport both on- and off-site. The key to controlling potential erosion and sedimentation caused by site activities is to stabilize surfaces and control site runoff of surface waters. A wide variety of sediment control devices can be used on site with a selection of options being described in this section.

An additional reference for potential use to mitigate erosion impacts associated with the Iqaluit solid waste management project is *Government of the Northwest Territories Department of Transportation – Erosion and Sediment Control Manual* (January 2013). This manual provides guidelines for analysis, design, construction, and maintenance of erosion and sediment control systems for transportation construction projects in the Northwest Territories (NWT), but can be selectively applied (acknowledging the “Arctic Lowland” soils context of the project site) to construction and related activities in Nunavut. Notably, the manual includes a number of Best Management Practice (BMP) summary sheets, incorporating concise descriptions of construction and maintenance requirements as well as installation details.

### 4.2 Erosion and Sediment Control Feature Installation Locations – Construction Phase

Recommended locations for specific erosion and sediment control features to be established during the initial Construction Phase to establish the Landfill and WTS are presented on two sheets included on the original project tendering package; LF-C03 and WTS-C03. Potentially, at the discretion of the City and depending on observed site conditions, a selection of these management feature locations could be maintained going forward into the Operations Phase. Further, depending on future site conditions and the details of required decommissioning activities, erosion and sediment control practices presented in this document could be incorporated into Closure and Post-Closure activities.

### 4.3 Surface Water Mitigation Measures and Best Management Practices

To prevent impacts to surface water resources at both the Landfill and WTS sites during the Project activities, the following BMPs should be implemented:

- Should there be overlap between site waterbodies and proposed work or access areas, retain existing riparian habitat along the waterbody where possible;
- Implement proven surface water management procedures at areas deemed susceptible to erosion, including:
  - Controlled collection/direction of surface runoff.
  - Minimization of exposed areas.

- Project activity timing (e.g., avoidance of storm events).
- Application of surficial stabilization measures.
- Surface roughening.
- Granular material stockpile control (e.g., limiting extend/number and maintain setback distance from sensitive receptors).
- Implement dust control measures to reduce the potential for dust accumulation in and around surface waters. The Project Authority (consistent with the applicable EPP as well as the Facility Operations and Maintenance Manual) should recommend the implementation of dust control measures, should it be observed that dry conditions are resulting in the airborne mobilization of fine soil particles.

The recommended BMPs that are to be employed as part of this ESC Plan include those that will be used to control surface flows from rain events and/or snowmelt which have the potential to result in erosion and ultimately sediment transport. A combination of BMPs, structural or procedural, will be implemented at each of the sites to provide the necessary level of erosion and sediment control.

Design considerations, guidelines, and procedures for the installation or implementation of BMPs are summarized below. For ease of reference, the recommended BMPs are separated into erosion control and sediment control measures.

#### 4.4 Erosion Control Practices

Erosion prevention (source control) is essential and is the most effective method in protecting downstream/receiving aquatic habitat during the construction and operational activities. Erosion control typically includes two categories of action:

- Source Control practices.
  - Protection of exposed surfaces using cover materials
- Runoff Control practices.
  - Modification of slope surfaces
  - Reduction of slope gradients
  - Control of flow velocity
  - Flow diversion
  - Upstream runoff storage

##### 4.4.1 Source Control Practices

Riprap Armouring

- Typical for channel lining with a geotextile underlay.
- Effective for high velocities and flows.

#### Rolled Erosion Control Products (RECP)

- Provides a protective covering over bare surfaces.
- Not suitable for rocky surfaces.

#### 4.4.2 Runoff Control

##### Slope Texturing\*

- Contouring/roughening of slope using tracked equipment.
- Reduces runoff velocity and increases infiltration.

\*: *generally not suitable for permafrost areas.*

##### Offtake Ditch

- Collects and diverts sheet flow at the top of a slope to mitigated downslope erosion.

##### Energy Dissipater

- Reduces runoff velocity and dissipates flow energy allowing the collection of sediment.

##### Slope Drains

- Direction of runoff into a pipe or lined channel.

##### Gabions

- Durable, suitable for resisting high flow velocities.

##### Rock Check Dams

- Permanent flow drop structure providing a degree sediment filtering.

##### Synthetic Permeable Barriers

- Reusable barriers that reduce flow velocities and provide a degree sediment filtering.

##### Fibre Rolls

- Effective in sheet flow conditions to reduce flow velocities.

#### 4.5 Sediment Control Measures

Sediment control measures reduce off-site sedimentation by promoting the release of suspended soil particles from runoff prior to discharge from the construction or operational area. Sediment control typically includes two categories of action:

- Filter and Entrapment Practices.\*
  - Filtering through a porous media
  - Entrapment using silt fences or coarse-material check dams
- Impoundment Practices.\*
  - Sediment basins or traps
  - Temporary impoundment barriers

\*: *Permanent basins and traps should be avoided in areas of permafrost as ponding of water will contribute to increased rates of permafrost melt or degradation.*

#### 4.5.1 Filter and Entrapment

##### Fibre Rolls

- Good performance in freeze/thaw conditions.

**Silt Bags**

- Typically applicable in emergency situations only.

**Silt Fence**

- Effective in settling out coarse grained sediments.

**Berm Interceptor**

- Basic construction requirements.

**Gabions**

- Durable, suitable for resisting high flow velocities.

**Rock Check Dam**

- Permanent flow drop structure providing a degree sediment filtering.

**Synthetic Permeable Barriers**

- Reusable barriers that reduce flow velocities and provide a degree sediment filtering.

**4.5.2 Impoundment****Sediment Traps/Basins**

- Can be constructed from a range of materials, typically requires a large construction area and significant maintenance requirements.

**5.0 Monitoring**

Monitoring of erosion and sediment controls at work sites will be conducted once every two days during construction and clean-up to ensure controls are effective and are maintained in working order. It is anticipated that monitoring efforts will be increased to daily during periods of precipitation and that ESC measures will be repaired in a timely manner as needed to ensure the proper function of controls. Failed erosion and sediment control measures will be repaired as soon as possible. Erosion and sediment control measures are not static and may need to be upgraded and/or amended as site conditions change, as directed by the Construction Manager upon the recommendation of the EI.

Erosion and sediment controls left in place following the completion of construction and clean-up activities will be monitored via landfill staff conducted every two weeks. Failed erosion and sediment control measures will be repaired as soon as possible.