DILLON CONSULTING

CITY OF IQALUIT

Environmental Protection Plan - Operations, Closure and Post-Closure Phases

Landfill and Waste Transfer Station

October 2020 | 19-9543

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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 concerning 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

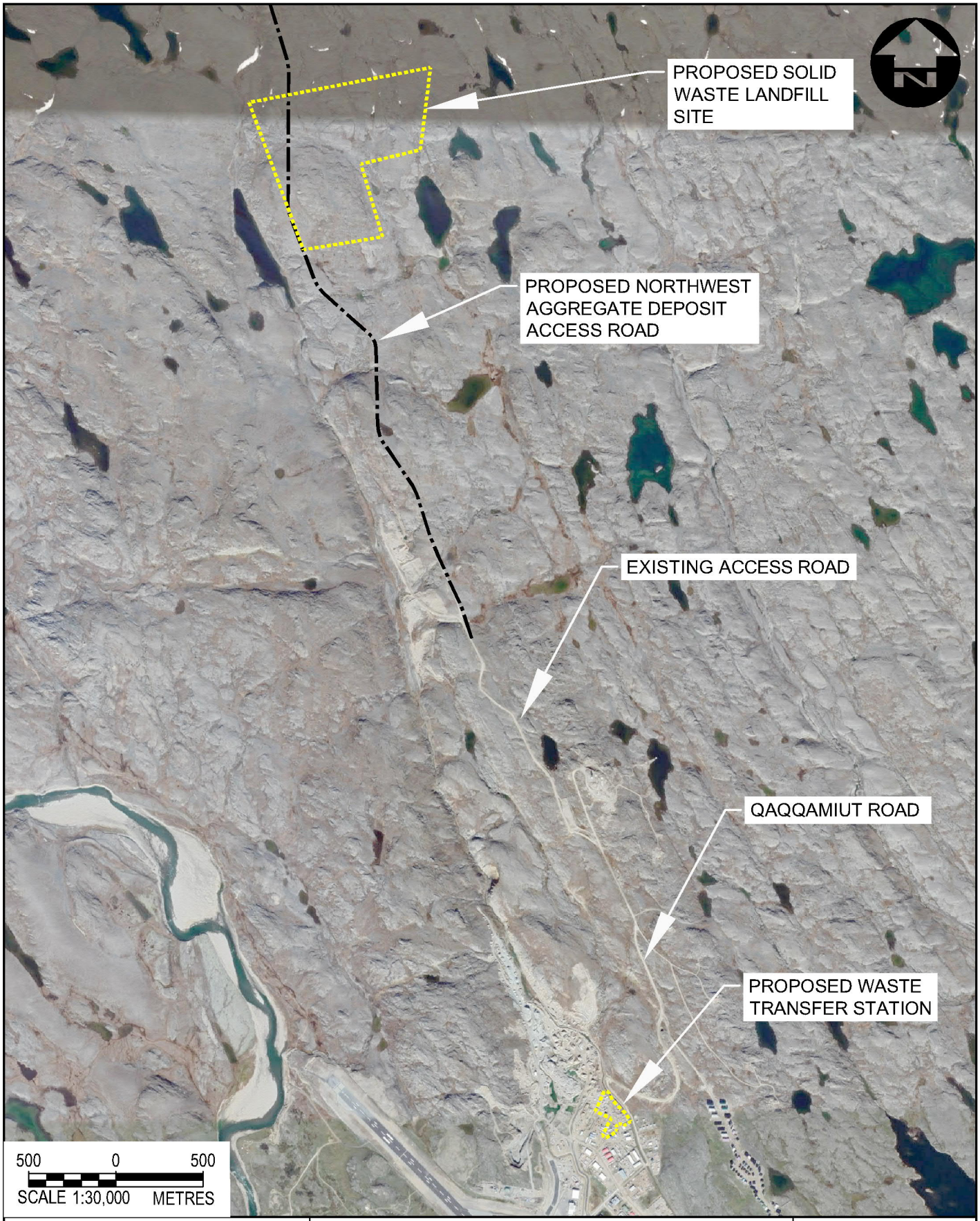
The landscape of the Meta Incognita Peninsula Ecoregion is dominated by tundra shrub vegetation, consisting of Dwarf Birch (*Betula nana)*, Willow (*Salix spp.*), Labrador Tea (*Ledum spp.)*, *Dryas spp.* and *Vaccinium spp* (Ecological Framework of Canada, 2019). The nearby landscape, as characterized 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 the creek adjacent to the north site boundary (Delvin, 2018a).



DILLON CONSULTING

DATE OCTOBER 2020

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

PROJECT NO. 19-9543

TITLE SITE LOCATIONS

FIGURE NO. 3-1

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3.2 Wetlands and Watercourses

Landfill

Several small ephemeral drainages 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)	*Rangifer tarandus*	Threatened	No Status	No
Harlequin Duck	*Histrionicus histrionicus*	Special Concern	Special Concern	Yes
Polar Bear	*Ursus maritimus*	Special Concern	Special Concern	Yes
Red Knot (rufa subspecies)	*Calidris canutus rufa*	Endangered	Endangered	Yes
Red-necked Phalarope	*Phalaropus lobatus*	Special Concern	No Status	No
Ross's Gull	*Rhodostethia rosea*	Threatened	Threatened	Yes
Wolverine	*Gulo gulo*	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, 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
Work Progress Schedule	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. 2. Adhere to planned project scheduling as outlined in the applicable regulatory permits and approvals. 3. Schedule and conduct activities to adhere to applicable timing windows and avoid restricted activity periods, where feasible. 4. A copy of this EPP and its included plans, regulatory approvals, permits, and/or licenses will be available on-site at all times.
Documentation	5. Maintain an up-to-date documentation record of all site activities related to monitoring, site inspections, maintenance, repairs and remedial actions. 6. Document all incidences of nuisance activity, including illegal dumping, nuisance animals and fires. 7. Document complaints received from individuals, public agencies and project staff.
Nuisance Control	8. Report incidences of illegal dumping to the Manager of Solid Waste and the appropriate legal personnel. 9. Report incidences of nuisance animals to the Manager of Solid Waste and take the appropriate avoidance/deterrence measures. 10. Report incidences of fires on-site to the Manager of Solid Waste and contact the appropriate emergency services
Discipline	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.
Environmental Training	12. Environmental training will be provided to facility staff, as part of the site orientation, before starting work.

Table 4-2: Mitigations Measures for Site Operations

Issue/Activity	Mitigation Measures
Work Areas	1. Project activities must occur within the approved workspace.
Drainage Control	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.
Erosion and Sediment Control* ***: see Appendix C**	4. Erosion and sediment control activities shall be conducted in accordance with the Erosion and Sediment Control Plan (Appendix C) 5. Erosion and sediment controls shall be installed before activities in areas susceptible to erosion. 6. 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. 7. Erosion and sediment control measures are to be left in place, where feasible until all work is complete and the site has been stabilized. 8. Erosion and sediment control measures are to be routinely inspected and maintained in proper working order. 9. 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. 10. The City shall repair failed erosion and sediment control measures as soon as possible. 11. If drifting soils or topsoil loss is evident in areas prone to wind erosion, conduct the following, as appropriate: • Suspend topsoil stripping operations during high winds; • Apply a tackifier to the stripped topsoil pile; and/or • Install wind barriers. 12. 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.
Fuel and Hazardous Material Storage	13. Hazardous materials must be labelled, stored, and handled according to Workplace Hazardous Materials Information System (WHMIS) regulations. 14. Fuel storage containers and tanks will be appropriately labelled. 15. Adequate spill response materials are available and accessible at the site. 16. Fuel containers and filters must be stored in secondary containment. 17. 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. 18. Refuelling points and fuel storage tanks, including secondary containment and gas cans, will be inspected regularly. All leaks must be repaired immediately.
Equipment Refueling and Servicing	19. 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. 20. Refuelling equipment will be attended at all times while refuelling. 21. Refuelling of equipment will not take place within 30 m of any wetland or watercourse. 22. Drip trays are to be in place while refuelling occurs to contain overfilling, drips and spills. 23. All vehicle servicing with the potential for accidental spills shall take place above an

Issue/Activity	Mitigation Measures
	impervious tarp, and servicing will not take place within 30 m of wetlands or watercourses. 24. Spill kits should be accessible while refuelling. 25. Spill mats and/or drip pans/trays will be placed under all mobile fueling containers.
Spill Response, Reporting and Notification	26. 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. 27. The Manager of Solid Waste will notify regulatory agencies and community liaisons, where required, to notify them of the spill. 28. 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 regularly to ensure that the systems are in good condition and free of leaks. 29. All fuel containers or filters must be stored in secondary containment. 30. Refuelling equipment will be attended at all times while refuelling. 31. Refuelling of equipment will not take place within 30 m of any wetland or watercourse. 32. Drip trays are to be in place while refuelling occurs to contain overfilling, drips and spills. 33. 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. 34. Spill kits should be accessible while refuelling. 35. 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. 36. Hazardous materials must be labelled, stored and handled according to WHMIS regulations. 37. 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.
Air Emissions	38. Ensure equipment and vehicles are well maintained. 39. Notify the Manager of Solid Waste of any odour complaints that may be received by project personnel, public agencies or individuals.
Noise	40. Ensure equipment and vehicles are in good working order with proper noise abatement equipment (i.e., mufflers or enclosures).
Light Emissions	41. Lighting will be restricted to the minimum required to complete the works safely. 42. Lighting will be directed to the work area to reduce light pollution during dark hours to the extent feasible.
Wildlife Encounters and Sightings	43. Feeding or harassing wildlife is prohibited. 44. Travel within posted speed limits and yield to wildlife. 45. Report incidents of collisions or close calls with wildlife to the Manager of Solid Waste. 46. Notify the Manager of Solid Waste of the following wildlife sightings: • Any suspected species at risk or suspected species of special status, which are listed in **Table 3-1**; • Any dead or sick/diseased wildlife; and • Any food caches, dens, or nests found within or close to the site. 47. The Government of Nunavut will be notified of wildlife encounters by the Manager of Solid Waste when required.

Issue/Activity	Mitigation Measures
	48. 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 (**Section 6.2**).
Water Management	49. 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. 50. Before 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. 51. 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. 52. Where possible, discharge locations should be chosen that are near the dewatered area to maintain the local water table elevation. 53. Suitable discharge locations will be reviewed and confirmed by the Manager of Solid Waste.

Watercourse Protection	54. Install effective erosion control and sediment control measures before starting work near a waterbody.
	55. 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.
	56. Schedule work to avoid wet, windy, and rainy periods that may cause erosion and sedimentation.
	57. 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:
	• Soil or slurry material should be considered contaminated if any of the following are found:
	  ○ Oil residue;
	  ○ Gaseous odour;
	  ○ Discoloured soil; and/or
	  ○ Sheen on water.
	• Upon discovery of potential impacted soil or water, staff will consult with the Manager of Solid Waste to determine proper sampling requirements.
	• If required, the Manager of Solid Waste will notify the applicable regulators of the newly discovered impacts.
	• Contaminated materials will be disposed of in accordance with the Waste Management Plan.

Leachate Management	58. Complete leachate management activities per the Operations and Maintenance Manual (under separate cover).
Landfill Gas Management	59. Complete landfill gas management activities per the Operations and Maintenance Manual (under separate cover).
Waste Handling and	60. Appropriate waste disposal facilities for each waste type to be produced by the

Issue/Activity	Mitigation Measures
Disposal	project must be identified by the Manager of Solid Waste. 61. 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. 62. Notify waste disposal facilities of waste shipments before leaving the site and determine if any there are facility sampling requirements. 63. All sewage and solid waste will be contained and sealed in watertight containers. 64. Tanks used for transporting greywater will be watertight and will be regularly and properly inspected and maintained by the operator.
Transportation	65. Vehicle use on public roads and project access routes will be in accordance with applicable laws and road use agreements (e.g., load restrictions). 66. Regularly inspect and maintain vehicles to keep them in proper working order. 67. 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.). 68. Vehicles will not exceed speed limits established for the area and will lower speeds in specific conditions such as areas of high erosion hazard. 69. Vehicles must yield to wildlife. 70. Personnel will avoid unnecessary wheel spin when travelling or operating on soil. 71. Do not necessarily idle vehicles or equipment. 72. Secure all loads with the appropriate tie-down equipment or load covers, and inspect the load immediately before commencing driving and once arriving at the destination. 73. If the load becomes unstable, immediately cease driving and re-secure the load 74. If a loss-of-load occurs, report the incident to the Manager of Solid Waste and seek guidance about the appropriate procedures moving forward. 75. 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. 76. 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. 77. Notify the Manager of Solid Waste of any noise complaints that may be received by project personnel, public agencies, or individuals.

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 per the Closure and Decommissioning Plan (under separate cover). 4. Restore any trails used by traditional land users that were impacted by the project.
Debris Removal	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

Issue/Activity	Mitigation Measures
Erosion and Sediment Control* ***: noted as a low potential activity of concern given local soil conditions.**	allow surface water drainage off-site and to discourage infiltration, leachate production, and erosion. 8. Erosion and sediment control activities shall be conducted in accordance with the Erosion and Sediment Control Plan (Appendix C). 9. Soil disturbance will only occur within the designated areas of the project. 10. Erosion and sediment control measures shall be installed before commencing excavations or work in areas susceptible to erosion. 11. 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. 12. Erosion and sediment control measures are to be left in place, where feasible until all work is complete and the site has been stabilized. 13. Erosion and sediment control measures are to be routinely inspected and maintained in proper working order. 14. The City shall repair failed erosion and sediment control measures, as soon as possible. 15. 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. 16. 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. 17. If drifting soils or topsoil loss is evident in areas prone to wind erosion, conducting the following, as appropriate: • Suspend topsoil disturbing activities during high winds; • Apply a tackifier to the disturbed topsoil; and/or • Install wind barriers.
Fuel and Hazardous Material Storage	18. Hazardous materials must be labelled, stored, and handled according to WHMIS regulations. 19. Fuel storage containers and tanks will be appropriately labelled. 20. Adequate spill response materials are available and accessible at the site. 21. Fuel containers and filters must be stored in secondary containment. 22. 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. 23. Refuelling points and fuel storage tanks, including secondary containment and gas cans, will be inspected regularly. All leaks must be repaired immediately.
Equipment Refueling and Servicing	24. 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. 25. Refuelling equipment will be attended at all times while refuelling. 26. Refuelling of equipment will not take place within 30 m of any wetland or watercourse. 27. Drip trays are to be in place while refuelling occurs to contain overfilling, drips and spills. 28. 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. 29. Spill kits should be accessible while refuelling.

Issue/Activity	Mitigation Measures
	30. Spill mats and/or drip pans/trays will be placed under all mobile fueling containers.
Spill Response, Reporting and Notification	31. Staff will notify the Facility Supervisor, as soon possible, following the discovery of a spill of any volume. 32. The Manager of Solid Waste will notify regulatory agencies and community liaisons where required to notify them of the spill. 33. 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 regularly to ensure that the systems are in good condition and free of leaks. 34. All fuel containers or filters must be stored in secondary containment. 35. Refuelling equipment will be attended at all times while refuelling. 36. Refuelling of equipment will not take place within 30 m of any wetland or watercourse. 37. Drip trays are to be in place while refuelling occurs to contain overfilling, drips and spills. 38. 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. 39. Spill kits should be accessible while refuelling. 40. 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. 41. Hazardous materials must be labelled, stored, and handled according to WHMIS regulations. 42. Spill mats and/or drip pans/trays will be placed under all mobile fueling containers and equipment and vehicles when not in use or parked for longer than two hours.
Air Emissions	43. Do not unnecessarily idle vehicles or equipment. 44. Ensure equipment is well maintained. 45. Notify the Manager of Solid Waste of any odour complaints that may be received by project personnel, public agencies, or individuals.
Noise	46. Ensure equipment and machinery is in good working order with proper noise abatement equipment (i.e. mufflers or enclosures).
Light Emissions	47. Lighting will be restricted to the minimum required to complete the works safely. 48. Lighting will be directed to the work area to reduce light pollution during dark hours to the extent feasible.
Wildlife Encounters and Sightings	49. Feeding or harassing wildlife is prohibited. 50. Travel within posted speed limits and yield to wildlife. 51. Report incidents of collisions or close calls with wildlife to the Manager of Solid Waste. 52. Notify the Manager of Solid Waste of the following wildlife sightings: • Any suspected species at risk or suspected species of special status, which are listed in **Table 3-1**; • Any dead or sick/diseased wildlife; and • Any food caches, dens, or nests found within or close to site. 53. The Government of Nunavut will be notified of wildlife encounters by the Manager of Solid Waste when required. 54. 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

Issue/Activity	Mitigation Measures
Transportation	Contingency Plan (**Section 6.2**). 55. Vehicle use on public roads and project access routes will be in accordance with applicable laws and road use agreements (e.g., load restrictions). 56. 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.). 57. Vehicles will not exceed speed limits established for the area and will lower speeds in specific conditions such as areas of high erosion hazard. 58. Personnel will avoid unnecessary wheel spin when travelling or operating on soil. 59. Do not necessarily idle vehicles or equipment. 60. Ensure equipment and machinery is in good working order. 61. Secure all loads with the appropriate tie-down equipment or load covers, and inspect the load immediately before commencing driving and once arriving at the destination. 62. If the load becomes unstable, immediately cease driving and re-secure the load 63. If a loss-of-load occurs, report the incident to the Manager of Solid Waste and seek guidance about the appropriate procedures moving forward. 64. 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. 65. 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. 66. Notify the Manager of Solid Waste of any noise complaints that may be received by project personnel, public agencies, or individuals.
Leachate Management	67. Monitor and maintain the leachate collection and treatment systems regularly. 68. Implement appropriate system updates/upgrades, as necessary.
Gas Management	69. Monitor and maintain landfill gas collection and controls regularly. 70. Implement appropriate system updates/upgrades, as necessary.
Waste Handling and Disposal	71. Appropriate waste disposal facilities for each waste type to be produced by the project must be identified by the Manager of Solid Waste. 72. 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. 73. Notify waste disposal facilities of waste shipments before leaving the site and determine if any there are facility sampling requirements. 74. All sewage and solid waste will be contained and sealed in watertight containers. 75. Tanks used for transporting greywater will be watertight and will be regularly and properly inspected and maintained by the operator.
Vegetation	76. Prepare the site in such a manner as to facilitate natural vegetation establishment.
Hazardous Material Monitoring	77. 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. 78. Report any contamination to the Manager of Solid Waste and in the report describe the type, extent, degree, and approximate volume of the contamination. 79. Wear the appropriate personal protective equipment (PPE) while conducting hazardous material assessment.

Table 4-4: Mitigation Measures for Post-Closure

Issue/Activity	Mitigation Measures
Drainage Control	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.
Erosion and Sediment Control	3. Erosion and sediment control activities shall be conducted in accordance with the Erosion and Sediment Control Plan (Appendix C). 4. Monitor for erosion of topsoils and implement erosion control measures, where appropriate. 5. Monitor long-term erosion and sediment control structures and make repairs, as necessary.
Leachate Management	6. Monitor and maintain the leachate collection and treatment systems regularly. 7. Implement appropriate system updates/upgrades, as necessary.
Gas Management	8. Monitor and maintain landfill gas collection and controls regularly. 9. Implement appropriate system updates/upgrades, as necessary.
Vegetation	10. Maintain site vegetation and implement vegetation additions, removals, and cutting activities, where appropriate.
Hazardous Material Monitoring	11. Monitor surface water annually and report all incidences of contamination to the Manager of Solid Waste. 12. Monitor groundwater (active layer) for leachate and site contamination. Report all incidences of contamination to the Manager of Solid Waste. 13. 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 site activities and incidents that negatively impact the environment and wildlife are reported immediately and appropriate mitigation measures are implemented.

As outlined in the Facility Monitoring Plan (FMP) there are three identified stages during landfill operation: construction, operation and maintenance, and post-closure. Monitoring programs will differ in frequency and focus depending on the stage of the landfill. The monitoring program contained herein is intended for the operation and maintenance stage of the landfill. Long-Term Monitoring (LTM) that will take place during the post-closure stage will include an emphasis on Visual Monitoring and Seepage Monitoring of the landfill isolation cover.

Field procedures and methodologies should be conducted in accordance with industry standards and/or best practices (e.g., the Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment by the CCME, 2016).

The following section identifies the key items recommended in the Facility Monitoring Plan (FMP) developed for the operation and maintenance phase of the landfill The complete FMP should be referred to when implementing the FMP activities, and the section below is only intended to act as a summary of the program. There may be a need to revise specific monitoring and inspection activities outlined in the FMP to address unforeseen site-specific conditions or as a result of ongoing operations.

The following operational monitoring activities are recommended during the operation and maintenance phase of the landfill:

- Visual Monitoring will inspect the condition of daily cover, associated berms, culverts, site activities (changes from year to year) and site drainage using recorded observations and documented with photographs;
- Soil Temperature Monitoring will document changes in climatic conditions that may impact the integrity of the facility regarding permafrost depth and active layer variable thickness;
- Seepage Monitoring will identify potential seepage locations along berms, whether containment measures are sufficient, and if corrective action is required through visual inspection;
- Soil Sampling will occur on an as-needed basis in the event that a suspected seepage is observed at the landfill;
- Surface Water Monitoring will document water quality parameters at pre-determined surface water sampling locations in proximity to the landfill to identify potential down-gradient impacts to surface water bodies;

- Sediment Sampling may occur upon site closure or if surface water monitoring results warrant further investigation;
- Active Layer Groundwater Monitoring will document water quality parameters at pre-determined groundwater sampling locations in proximity to the landfill; and,
- Natural Environmental Monitoring will document observations of animal usage at the site (e.g., direct observations, tracks, and feces) and discussions with locals knowledgeable with the site regarding site usage by animals.

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 surface water bodies;
    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 a 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 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

If 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.

6.3 Suspected Groundwater Contamination Response Measures

Should the groundwater monitoring program results indicate the possibility of the migration of contaminants from the landfill into the groundwater, the following actions are to be completed:

1. Conduct a review of the laboratory results with a comparison to previous data to assess the potential for an anomalous result/analysis error (e.g., continuation of a trend versus a sudden significant variation).
2. In the instance of a sudden significant variation, resample locations with the identified groundwater quality changes to validate results. Inspect the area surrounding the monitoring wells to assess the potential for surface water intrusion, taking mitigatory actions (e.g., regrading the area surrounding the well and/or resealing the well head casing).
3. If the groundwater monitoring results are validated (having ruled out field collection, surface water intrusion and/or laboratory errors), conduct an assessment to determine if the potential contaminant source is related to site operations, including:
    a. Bales/waste being placed over the liner anchor trench allowing for migration of leachate under the liner.
    b. Mishandling of leachate at the storage ponds (e.g., discharge outside the lined perimeter of the ponds).
    c. Vandalism (e.g., intentional contamination of wells).
4. If operational sources are ruled out and it is suspected that the source of contaminant migration into the groundwater is a breach in the liner system (acknowledging the impracticality of attempting to identify/access the specific location of the breach to execute a repair), and in collaboration with the regulatory authorities, conduct an Ecological and/or Human Health Risk Assessment to evaluate the risk associated with potential chemicals of concern.
5. If the Risk Assessment identifies an unacceptable risk to human health and/or the environment from identified potential chemicals of concern, prepare a Remedial Action Plan (RAP) to provide appropriate levels of mitigation. Depending on the details of the specific situation, Risk Assessment results and evaluation of feasible remedial options, candidate RAP components could include:
    a. Establishment of a groundwater interceptor trench/drain to collect and direct impacted water to storage/treatment works.
    b. Establishment of groundwater recovery wells to capture impacted groundwater and discharge it to storage/treatment works.

To provide a more thorough understanding of the potential impacts of groundwater contamination associated with the development and operation of the landfill, modelling, using previously collected site information including groundwater flow direction, area receptors and baseline quality data, could be conducted for a range of scenarios.

7.0 References

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Appendix A

Project Contact List

Appendix B

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

Appendix C

Erosion and Sediment Control Plan

Appendix D

Facility Monitoring Plan (under separate cover)