AGNICO-EAGLE MEADOWBANK
555 Burrard Street, Suite 375
Box 209, Two Bentall Centre
Vancouver, British Columbia V7X 1M8
Tel. 604.608.2557 Fax. 604.608.2559

agnico-eagle.com

October 10, 2008

Via email and Xpresspost

Mr. Richard Dwyer
Licensing Administrator
Nunavut Water Board
PO Box 119
Gjoa Haven, NU X0B 1J0
Phone: (867) 360-6338

Dear Mr. Dwyer,

Re: Meadowbank Water License 2AM-MEA0815: Document Submission

As per Water license 2AM-MEA0815, please find the following document enclosed with this letter:

- Part F, Item 12: Landfarm Design and Management Plan.

Should you have any questions regarding this submission, please contact me directly at 604-622-6527 or via email at rgould@agnico-eagle.com.

Regards,

RL Gould

Rachel Lee Gould, M.Sc.
Project Manager, Environmental Permitting and Compliance Monitoring
Encl (1)

MEADOWBANK GOLD PROJECT

Landfarm Design and Management Plan

In Accordance with Water License 2AM-MEA0815

Prepared by:
Agnico-Eagle Mines Limited – Meadowbank Division

Version 1
October 2008

EXECUTIVE SUMMARY

This Landfarm Design and Management Plan (Plan) outlines the detailed design and operation of a landfarm for contaminated snow and soil, as part of the Agnico-Eagle Mines Limited (AEM) Meadowbank Gold Project in Nunavut. This Plan has been developed in support of the requirements under Part F, Item 12 of Type-A Water Licence 2AM-MEA0815 from the Nunavut Water Board (NWB).

The landfarm is required for the treatment of petroleum hydrocarbon-contaminated soil and snow/ice that may be generated by mining activities and operations. The landfarm is to be located immediately east of the plant site fuel storage area. The landfarm will have a maximum holding capacity of 2,100 m^3 for contaminated soil and 500 m^3 for contaminated snow/ice.

The leachate from the landfarm will be captured in sumps and pumped out regularly. The leachate will be treated in the plant site oil-water separator and the effluent will either be used in the plant circuit or discharged to the Tailings Reclaim Pond. Non-aqueous phase liquids (NAPL) will be skimmed or pumped from the separator and collected in 205 L drums. The drums will be stored within a specified hazardous materials storage area until the contents are incinerated or shipped off-site for recycling or disposal at a licensed facility. At the end of mine life and/or once all the soils have reached an acceptable level of treatment (based on the remediation guidelines from the Government of Nunavut (GN) and the Canadian Council of Ministers of the Environment (CCME)), the soils will be removed from the landfarm and the landfarm area will be reclaimed. The remediated soils will be available for progressive closure activities on site.

IMPLEMENTATION SCHEDULE

As required by Water License 2AM-MEA0815, Part B, Item 16, the proposed implementation schedule for this Plan is outlined below.

This Plan will be immediately implemented (October 2008) subject to any modifications proposed by the NWB as a result of the review and approval process**.**

DISTRIBUTION LIST

AEM – General Mine Manager

AEM – Environment Superintendent

AEM – Senior Environmental Coordinator

DOCUMENT CONTROL

Version	Date (YMD)	Section	Page	Revision
1	08/10/08	2		Remediation guidelines used and the parameters measured
		7		Details on storage and treatment options for metals, solvents, glycol and heavy oils; Measures to prevent damage to the liner during mechanical operation
		4		Contingency plans for exceedances in the amounts of contaminated soil and/or snow/ice
		5		Details describing the design components/specifications of the spillway
		8		Contingency planning and monitoring of sump volumes during the snowmelt period

Prepared By: _____
Rachel Lee Gould, M.Sc.
Project Manager: Environmental Permitting and Compliance Monitoring

Approved by: _____
Larry Connell, P.Eng.
Regional Manager: Environment, Social and Government Affairs

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SECTION 1 • INTRODUCTION

1.1 PROJECT OVERVIEW

This Landfarm Design and Management Plan (Plan) outlines the detailed design and operation of an onsite landfarm for the treatment of petroleum hydrocarbon contaminated snow and soil, as part of the Agnico-Eagle Mines Limited (AEM) Meadowbank Gold Project (Project) in Nunavut. The Project is an open pit gold mine located on Inuit-owned land in the Kivalliq Region of Nunavut, approximately 70 km north of the hamlet of Baker Lake.

The landfarm is required for the disposal of petroleum hydrocarbon-contaminated snow and soil that may be generated by mining activities and operations. This Plan is a component of the Meadowbank Environmental Management System. The objectives of this Plan are summarized as follows:

1. To define the location, design and operating procedures to be used in the landfarm treatment of petroleum hydrocarbon contaminated soils and snow/ice generated at the Meadowbank Mine;

2. To define acceptable/non-acceptable types of petroleum hydrocarbon contaminated soils and snow/ice to be placed in the Meadowbank landfarm; and

3. To define operating and monitoring requirements for the landfarm.

The original Landfarm Design and Management Plan was submitted to the Nunavut Water Board in August of 2007 as a component of the Type A Water License application for the Meadowbank Project. Part F - Item 12 (page 17/18) of this water license requires the following updates of the August 2007 Plan:

> *The Licensee shall submit to the Board for review, within three (3) months of License approval, a revised Landfarm Design and Management Plan to include:*
> *a. The remediation guidelines used for hydrocarbon contaminated soil, how the guidelines will be used and what parameters will be measured;*
> *b. Details on storage and treatment options for metals, solvent, glycol, and heavy oils that may find their way into the Landfarm;*
> *c. Contingency plans, should contaminated soil and/or snow/ice exceed expected volumes;*
> *d. Details describing the design components/specifications of the spillway;*
> *e. Contingency planning and monitoring to ensure sump volumes are not exceeded during the snow melt period; and*
> *f. Measures to prevent damage to the liner during mechanical operation of the Landfarm.*

This updated version of the Plan was developed by Agnico-Eagle Mines Limited – Meadowbank Division staff in September of 2008 in concordance with the above water license requirement. It is under review pending approval by the Nunavut Water Board.

An assessment of the applicability of landfarming in arctic areas, the landfarm citing options considered for the site, and the corresponding environmental overview approach are described in the technical memorandum entitled “Landfarm Option Analysis, Meadowbank Gold Project, Nunavut,” dated August 23, 2007 (Golder, 2007a; Doc. 498).

The overall site plan for the Meadowbank Gold Project is shown in Drawing (DWG) 1. The proposed location for the landfarm is east of the plant site fuel facilities, with construction scheduled for summer 2009 (DWG 2). The Meadowbank mine is designed to minimize the areas of surface disturbance, stabilize disturbed land surfaces against erosion, and return the land to a post-mining use for traditional pursuits and wildlife habitat (MMC, 2007a; Doc. 511).

1.2 PURPOSE AND SCOPE OF THE LANDFARM DESIGN AND MANAGEMENT PLAN

The primary purpose of this report is to provide the design details and a management plan for the operation of the on-site landfarm which will treat and/or hold petroleum hydrocarbon-contaminated soil and snow/ice that may be generated during mining and operational activities.

SECTION 2 • REMEDIATION GUIDELINES

In assessing the remediation success on hydrocarbon contaminated soils being treated at the facility, AEM will use the Government of Nunavut (GN) Department of Environment, Environmental Guideline for Site Remediation (January 2002) standards to determine if the soil has been suitably treated for removal from the landfarm and use in site reclamation. A copy of this document has been included in Appendix I.

The GN remediation guidelines are characterized using four land use categories: agricultural, residential/parkland, commercial and industrial. For the Meadowbank Gold Project, the remediated soil will be used for progressive reclamation purposes, with the goal of stabilizing disturbed land surfaces against erosion, and returning the land to suitable conditions for post-mining uses such as traditional pursuits and wildlife habitat. Parkland is defined by the Government of Nunavut as all land uses in which the primary activity is recreational in nature (i.e. traditional hunting) and requires the natural or human designed capability of the land to sustain that activity. Consequently, residential/parkland is the appropriate remediation guideline land use for soils used for reclamation purposes. Should the remediated soil not be used for reclamation purposes, and be placed at a minimum of 1.5 m below ground level, then industrial land use remediation guidelines will apply.

The following parameters will be measured and compared with the GN residential/parkland remediation guidelines in order to determine whether soil has been adequately remediated:

- Total Petroleum Hydrocarbons (TPH);
- BTEX (benzene, toluene, ethylbenzene and xylene); and
- Lead.

Analysis for polychlorinated biphenyls (PCBs) will not be conducted as this contaminant will not be present at the mine site. Table 2.1 presents the applicable guidelines for residential/parkland and industrial land uses.

In the event that the contaminant source is unknown and soil characterization is required, soil samples will be tested for suspected soil contaminants; contaminants not in the GN list above will be compared to the Canadian Council of Ministers of the Environment (CCME), Canadian Soil Quality Guidelines. These additional measured parameters could include total metals, oil and grease, and volatile organic compounds.

Table 2.1: Summary of GN Soil Remediation Guidelines

Parameter	Guideline Residential/Parkland Land Use *	Guideline Industrial Land Use *
Benzene	0.5	5
Toluene	0.8	0.8
Ethylbenzene	1.2	20
Xylene	1	20
Total Petroleum Hydrocarbons (TPH)	500**	2500**
Lead	140	400

Note: All values are in µg/g or parts per million (ppm)

* Total petroleum hydrocarbons (includes total purgeable and total extractable hydrocarbons).
** The TPH guidelines were developed by the Government of the Northwest Territories (GNWT).

SECTION 3 • PHYSICAL CONDITIONS

3.1 LOCATION AND SUBSURFACE CONDITIONS

The landfarm location is situated approximately 350 m east of Third Portage Lake (DWG 1). The relief is gentle, with a slight slope towards the northeast (DWG 2). The ground surface elevation at the facility location ranges from 142 m to 148 m above mean sea level (masl) (DWG 3).

Based on borehole data collected in 2003 from approximately 450 m northwest of the landfarm location, it is expected that the subsurface conditions in the vicinity of the proposed landfarm will consist of a 0.3 to 3 m thick layer of cobble and coarse angular gravel overlying bedrock (Golder, 2007b; Doc. 449 Vol. 2).

3.2 PERMAFROST

The Project area is located within the zone of continuous permafrost. Permafrost depths are estimated to be between 450 and 550 m, depending on proximity to lakes, slope aspect, and other site-specific conditions. The measured active layer depth ranges from about 1.3 m in areas of shallow surficial material (till) and away from lakes, up to 4.0 m adjacent to lakes, and up to 6.5 m beneath the outlets connecting Third Portage and Second Portage lakes. Results from a geotechnical investigation at the tank farm facility indicate that the ground thaws to a depth of 1.5 m below ground surface (bgs) in this area.

3.2.1 Seismicity

The Meadowbank Project is located in an area of low seismicity (Golder, 2007b; Doc. 449 Vol. 1).

3.3 CLIMATIC CONDITIONS

The Meadowbank Gold Project is situated within an Arctic ecoclimate described as one of the coldest and driest regions of Canada. Arctic winter conditions occur from October through May, with temperatures ranging from +5° C to -40° C. Summer temperatures range from -5° C to +25° C with isolated rainfall increasing through September (MMC, 2007d; Doc. 500).

The long-term mean annual air temperature for the Meadowbank area is estimated to be approximately -11.1°C. The mean annual precipitation totals for rain and snow are respectively 142.5 mm, and 146.8 mm, for a total of 289.2 mm (MMC, 2007d, Doc. 500). Average temperatures for June to September are above freezing, therefore it is anticipated that bioremediation will be feasible during these months.

SECTION 4 • ESTIMATED VOLUMES OF MATERIAL TO BE TREATED AT THE LANDFARM FACILITY

The landfarm facility is designed with two cells: a soil remediation cell, and a snow/ice remediation cell (DWG 2). The design volume of each cell is based on allowances for the materials to be treated, potential precipitation inflows corresponding to the average annual snowfall plus the 1 in 100-year 24 hour rainfall event, and freeboard.

It is estimated that the Project may generate approximately 300 m^3 to 400 m^3 of petroleum hydrocarbon contaminated soil per summer season (average 350 m^3). It is further estimated that soils contaminated with light end petroleum hydrocarbons (i.e., diesel) will require three full summer seasons for bioremediation and heavier end petroleum hydrocarbons (i.e., motor oil) will require six full summer seasons (Miramar, 2007). Using a conservative approach and allowing for six seasons for all soil remediation, the annual capacity for contaminated soils will be approximately 2,100 m^3.

The soil remediation portion of the landfarm will have a useful area (footprint available for remediation) of approximately 98 m by 75 m for a total of 7,350 m^2. At maximum capacity, it is anticipated that it will be possible to store contaminated soil for treatment in an even or continuous layer of up to 30 cm thick. Assuming an allowance for a 25 m pie-shaped area around the sump that will not be filled with soil (DWG 2), the potential storage volume will be approximately 2,100 m^3 within the bermed area of the soil remediation cell (Table 4.1).

The average annual snow precipitation is approximately 147 mm (water equivalent) and the precipitation from a 100 year 24 hour rainfall event is approximately 59 mm. The anticipated design volume for precipitation inflows to a soil remediation cell with a catchment area of 9,480 m^2 (the useful area plus the berm area) gives a volume of approximately 1,950 m^3.

The snow/ice remediation portion of the proposed landfarm will have a useful area of approximately 68 m by 12 m for a total area of 816 m^2. A 0.50 m ± 0.2 m thick layer of contaminated snow/ice in the useable area would give a volume of approximately 500 m^3. The catchment area for the snow/ice cell is 2,500 m^2, which will correspond to some 500 m^3 of precipitation inflow for the design condition (Table 4.1).

An allowance of 25 cm of freeboard has been included throughout the internal perimeter of the landfarm facility. The freeboard allowance, contaminated soil (or snow/ice) allowance and precipitation inflow allowances were used to determine the height and therefore elevation for the lower and upper berm in each cell.

Table 4.1: Calculated Volumetric Capacity Requirements For The Soil And Snow/Ice Cells

Remediation Cell	Volume (m^3)	Capacity Description
Soil	1,950	Precipitation Capacity(1)
	2,100	Remediation Capacity
	4,050	Net Capacity
Snow /Ice	500	Precipitation Capacity(1)
	500	Remediation Capacity
	1,000	Net Capacity

(1) Considering 147 mm of snow precipitation and 59 mm from 1:100 year 24 hour rainfall

In the event of a large spill in the summer, contaminated soils can be temporarily stored in the snow/ice cell. If the soil and snow/ice cells do not have sufficient capacity to accommodate a large spill, a temporary stockpile area could be set up adjacent to the landfarm. The soil would then be placed in the landfarm as soon as practical. Further, if the on-going operation requires more capacity to manage contaminated soils, a second landfarm cell could be constructed adjacent to Landfarm #1.

Following the construction of the first landfarm, AEM will use the practical experience gained in terms of construction time, personnel, equipment and material requirements to prepare a general contingency plan to ensure the resources are available to build a second landfarm, should it be required in the future.

SECTION 5 • WATER MANAGEMENT

The landfarm facility is separated from the remainder of the site by lined perimeter berms. Surface runoff will drain to a sump within both the soil and snow/ice cells. These sumps will be pumped out on an as-needed basis, once a trigger level of 75 cm of water in the sump is noted.

Considering the collection area for each cell, as presented in Section 4.0, the storage requirement volumes of precipitation runoff expected to be collected within the landfarm facility based on a 100 year 24-hour rainfall event runoff of 59 mm are provided in Table 5.1.

Table 5.1: Storage Requirements of Landfarm Cells Based On 1:100 Year Storm Event

Remediation Cell	Catchment Area (m^2)	Storm Event (years)	Volume (m^3)
Snow/Ice	2,500	1:100	148
Soil	9,480	1:100	560

The required pumping capacity for the landfarm will be dictated by the average year snow melt volume pumped over a three week snow melt period. Any additional precipitation falling on the landfarm catchment area during this period will be stored within the cells up to the 100-year 24-hour rainfall event, and the pumping period will be extended as required. Monitoring of the landfarm will be conducted to monitor sump volumes to prevent overtopping of containment by water (see Section 8.2.3). Provisions for an emergency overflow (a spillway) from the landfarm, if required, will be included in the construction drawings for the facility based on the site contact water management system. It is anticipated that a spillway will not be required. However, if a spillway is deemed necessary, it will be located along the north-eastern berm of the snow/ice remediation cell, and will likely consist of a pair of culverts buried at elevation within the berm wall. In the unlikely event that the spillway is activated, water released from the landfarm will drain naturally (via surface gravity flow) towards downstream contact water collection points located adjacent to existing haul roads, or alternatively to the Portage Pit or the site stormwater collection pond via culverts installed beneath the haul road. The water will not be released to Second Portage or Third Portage lakes. A spillway release will be handled in accordance with the Spill Contingency Plan for the project. Spilled water would be collected, treated using an oil-water separator system and pumped to the Reclaim Pond. Any soils that become contaminated as a result of a spill would be sent to the landfarm for remediation.

The pumping volume requirements for melting snow within the landfarm area are noted on Table 5.2. As noted above, the volumes presented consider an average year spring runoff of 147 mm (water equivalent) and assumes that the water is pumped over a three week period (anticipated snow melt period).

Table 5.2: Pumping Requirements of Landfarm Cells

Remediation Cell	Collection Area (m^2)	Melt (m^3)	Total/day (m^3/day)
Snow/Ice Cell	2,500	368	17.5
Soil Cell	9,480	1,394	66.4

The operation for the landfarm will employ a vacuum truck to remove the water for treatment. The vacuum truck will require adequate capacity to manage the noted volumes of water. The above pumping rates are intended to keep sump levels low so that the soil undergoing remediation does not become saturated within the landfarm (remediation is not effective when the soil is saturated since aeration is prevented). It is noted that the rate of the snow melt will control the required pumping from the landfarm.

SECTION 6 • LANDFARM CONSTRUCTION

The location of the landfarm is shown on DWG 2. The landfarm will be comprised of two cells separated by a lined rock berm (DWG 3). The estimated capacity for contaminated snow/ice is 500 m^3, while the estimated capacity for contaminated soil is 2,100 m^3.

6.1 DESIGN CRITERIA

The base of the landfarm will be developed with a 100 to 600 mm minus well graded gravel or processed pit-run sand and gravel material, where fills more than 1 m thick are required. This material will be overlain by a 0.5 m thick layer of 100 mm minus well graded sand and gravel (Type B fill - Appendix I). A 0.3 m thick layer of 25 mm minus sand and gravel (Type A fill) will be placed over top of the Type B fill. A low permeable liner system, consisting of HDPE or LLDPE geomembrane sandwiched between a non-woven geotextile will be placed over top of the Type A fill. The liner system will be covered by 0.3 m of Type A material. A marker layer such as a geotextile or geosynthetic snow fence will be placed over the Type A material. A 0.3 m thick layer of the Type B material will be placed over the marker layer. The contaminated material will be placed on this layer. When the remediated material is removed, the marker layer will serve to 'protect' the liner. Refer to DWGs 3 to 5 for the detailed design drawings and refer to Appendix II for the material specifications.

The base of the cells will be sloped at 5% towards the north, to allow the leachate/surface runoff water to drain to a collection sump (two sumps total, one per cell) (DWG 3). The water will be pumped or vacuumed into a tank truck, and transported to the mine site oil-water separator for treatment as required.

Based on the topography and the berm slope, a 1.8 m to 3.5 m high perimeter berm will form the external boundaries of the landfarm structure. Another 1.5 m to 2.5 m high internal berm will partition the structure into the two cells (DWG 4). The side slope for both the perimeter berm and the internal berm will be 2:1 (H:V).

SECTION 7 • LANDFARM OPERATION

The following presents the Operation Plan for the Landfarm. AEM will be responsible for managing and implementing the Operation Plan. Operation of the landfarm will come under the responsibility of the Site Superintendent. Monitoring of the landfarm water management and soil remediation efficiency will be the responsibility of the Environmental Superintendent.

7.1 OPERATIONS PLAN

The landfarm will treat PHC contaminated soils generated through mine-related activities at the Meadowbank Gold Project. Material from other sites will not be accepted without approval from the Nunavut Water Board (NWB) and the KIA.

PHC contaminated snow and ice will be stored in a separate cell within the landfarm facility. The snow and ice will not be treated per se, but rather, once melted, hydrocarbons will be recovered to the maximum extent possible using adsorbent media and then the contaminated water will be collected and transported in a vacuum truck to the plant site oil-water separator for treatment as required.

The following products will be used on-site that, if spilled may be treated in the landfarm:

- Diesel fuel;
- Aviation fuel (Jet B);
- Hydraulic oils; and
- Gasoline.

Metals, solvents, glycol and heavy oils will not bioremediate in a landfarm, and soil or snow/ice containing these contaminants should not be introduced into the landfarm. Soil containing these specific contaminants will be collected in drums at the point of release. The drums will be stored within the specified hazardous materials storage area until they are shipped off-site for disposal at a licensed facility. Snow/ice with these specific contaminants will be collected and delivered to an alternate collection area such as the fuel tank containment area. AEM will obtain consent from the NWB and the Kivalliq Inuit Association (KIA) prior to using the alternate facility. The snow/ice will be melted and, depending on the contaminant, the resultant water will be treated (using oil adsorbent pads and the oil water separator),

Should soils contaminated with metals, solvents, glycol and/or heavy oils inadvertently be taken to the landfarm, soil testing during the landfarm process will determine this. These soils will be removed from the landfarm and stored in drums within the specified hazardous materials storage area until shipped off-site for disposal at a licensed facility. Should snow/ice contaminated with metals, solvents, glycol and/or heavy metals be inadvertently taken to the landfarm, all resultant water from

the landfarm will be treated if possible (using the oil water separator), or transferred to the tailings containment area.

7.2 PROCEDURES FOLLOWING A SPILL

As set out in the Spill Contingency Plan (MMC, 2007b; Doc. 483), all PHC product spills associated with the mine operation and closure activities will require a written report documenting the release, and an investigation to assess the nature and extent of the impacted area resulting from the spill. Remediation of the spilled material will be subject to the investigation results.

Initial actions for spills include ensuring personnel and site safety, identifying and containing spill materials, reporting the spills to the On-site Coordinator, notifying government agencies, and recording the incident (MMC, 2007b; Doc. 483). The Spill Contingency Plan documents the action plan for all spills.

7.3 LANDFARM OPERATIONAL PROCEDURES

PHC contaminated soil or snow/ice will be excavated from the source and transported to the landfarm facility in dump trucks. Care will be exercised to ensure that none of the contaminated material is lost during transport. As a precautionary measure, to protect the liner during operation, a rockfill pad will be placed at the entry to the landfarm where the dump trucks access the area. If the soil has not been characterized, it will be placed in the temporary cell or snow/ice remediation cell (used to store contaminated soil and ice in the winter months) for temporary storage until the chemical quality of the soil is determined. Once that quality is known, the soil should be uniformly spread in layers within the soil remediation cell, starting at the opposite (south) end away from the sump, to minimize unnecessary compaction of treated soil. Depending on the quality of the new soil, it will either be segregated from, or partially blended with existing remediating soil.

A record will be kept by the on-site Environmental Coordinator of the amount of contaminated soil and snow placed in the landfarm and the location of each batch of contaminated soil within the landfarm by contaminant type and length of remediation.

7.3.1 Aeration and Moisture

To ensure proper aeration, soils will be tilled monthly from June through to September by experienced operators using a roto-tiller or a rubber-tire backhoe. As a precautionary measure, to protect the liner from damage during tilling, an additional layer of soil, approximately 1 m thick, will be placed on top of the marker layer. , Moisture levels will be monitored and maintained within the optimal range for bio-remediation at approximately 12% to 30% moisture by weight (AMEC, 2006).

7.3.2 Nutrient Addition

Nutrients will be blended into the soil in the early summer months to promote bioremediation. The nutrients applied will have an approximate nutrient ratio of carbon: nitrogen: phosphorous (C: N: P)

ratio of 100: 7.5: 0.5 (Golder, 2007a, Doc. 498). The quantity and frequency of adding nutrients will be assessed by the Environmental Coordinator, based on the performance of the bioremediation cell.

7.3.3 Leachate

Leachate and/or melted snow from both cells in the landfarm will be collected in sumps. Sumps will be monitored regularly during periods of discharge (see Section 8.2.3); water quality that meets the effluent criteria will be discharged onto the land. Water quality that exceeds the criteria will be transported as required to the oil-water separator using a sump pump or vacuum truck for treatment. The discharge from the oil-water separator will include:

1) non-aqueous phase and

2) aqueous phase liquids.

Non-aqueous phase liquids (NAPL) will be skimmed or pumped from the separator and collected in drums. The drums will be stored within a specified hazardous materials storage area until the contents are incinerated or shipped off-site for recycling or disposal at a licensed disposal facility. Aqueous phase liquids will be either used in the plant circuit to help satisfy process water makeup requirements, or will be discharged to the Reclaim Pond.

Given the low annual precipitation amounts typical of the site, it is not anticipated that the landfarm will need to be covered with a tarp. To minimize leachate generation, uncontaminated snow may be removed from the landfarm using small equipment such as a bobcat.

7.3.4 Remediated Soils

Soils that have reached accepted levels for on-site disposal will be stockpiled and used for progressive reclamation.

7.3.5 Landfarm Inspections and Control Measures

Inspections will be performed by the Environmental Coordinator on a weekly basis to verify compliance with the permit and the conceptual closure plan for the facility (Section 8). During periods of high melt and freshet runoff (approximately from mid-May through June) sump volumes will be measured daily (refer to Section 8.2.3). During the inspections, the Environmental Coordinator will note the condition of the landfarm including any areas in need of repair. Repairs will be carried out promptly. The Environmental Coordinator will assess if dust control measures need to be taken, such as adding moisture or if required, covering the soil with tarping.

During the inspection, the Environmental Coordinator will ensure that no contaminated soils have spilled on to the surrounding land. If a spill has occurred, remedial action will be taken promptly to move the spilled soils into the landfarm facility.

The Environmental Coordinator will also note if significant levels of hydrocarbon vapours are observed during the inspection, and will document any wildlife activities that are occurring in or close to the Landfarm facility. Remedial measures may be necessary if wildlife is entering the facility.

7.3.6 Staffing and Equipment

The landfarm will require dump trucks for hauling contaminated soil and/or snow and ice. A rubber tired machine will be used to spread and level the materials. A roto-till or rubber tire back hoe will be employed to aerate the soil. Nutrient addition and soil sampling tasks will be facilitated with the use of a rubber tire back hoe. A vacuum truck will be used to drain leachate and melted snow from the sumps. As all of these activities are periodic, the landfarm will not require a full-time attendant.

SECTION 8 • PERFORMANCE AND ENVIRONMENTAL MONITORING PROGRAM

The following presents the Performance and Environmental Monitoring Program for the landfarm facility. AEM will be responsible for managing and implementing the program.

8.1 PERFORMANCE MONITORING

Representative soil samples from the remediating soil materials within the landfarm facility will be analyzed for the contaminants of concern (COC) outlined in Section 2, including total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene and xylene (BTEX) and lead. Soils will be tested biannually, once at the beginning of the summer and once in the early fall, to assess the effectiveness of the remediation system and until soils reach an acceptable quality, as per the applicable remediation guidelines (presented in Section 2). As discussed in Section 4.0, the soil biocell will have inner dimensions of approximately 98 m length, 75 m width and a useable height of 0.3 m, for a total volume of 2,100 m^3. For soil sampling purposes, a grid will be created with cells of approximately 230 m^3 (on grid lines 33 m by 25 m). The grid cell will be divided into five sub-cells and a composite sample consisting of a representative aliquot from each of the five sub-cells would be homogenized to represent the 230 m^3 grid cell.

8.2 ENVIRONMENTAL MONITORING

8.2.1 Soil

Once annually, in addition to the COCs presented in Section 8.1, representative soil samples will also be tested for total metals and oil and grease to ensure non-biodegradable contaminated materials are not entering the landfarm.

8.2.2 Water Quality And Quantity Monitoring

All water derived from melting of snow or ice in the snow/ice remediation cell and from runoff and seepage in the soil remediation cell will be monitored in the sumps (refer to DWG 3). The water will be monitored for water quality parameters and water quantity, in accordance with the requirements of the Type A water license and the *Water Quality and Flow Monitoring Plan* (MMC, 2007c; refer to this plan for further details). Water quality parameters to be measured include: benzene, toluene, ethylbenzene, lead and oil and grease. During periods of water discharge, water quality monitoring will occur weekly. Water quantity will be monitored daily during periods of discharge.

Water quality that meets the effluent criteria stipulated in Part F, Item 6 of the Type A water license will be discharged onto the land. Water quality that exceeds this criteria will be transported to the oil-water separator using a sump pump or vacuum truck for treatment (see Section 7.3.3). The discharge from the oil-water separator will include:

1) a non-aqueous phase liquid for incineration or offsite recycle or disposal at a licensed facility; and

2) an aqueous phase liquid that will be either used in the plant circuit or discharged to the Reclaim Pond.

The remediation cells and sumps are sized to accommodate expected contaminated snow and ice volumes and soil volumes as well as preciititation and runoff from the 100 year storm in addition to the maximum storage volume for the average year climate conditions. To accommodate the potential of unanticipated storm events and in order to maintain capacity in the ponds and sumps, water will be periodically discharged onto the land or pumped from the sumps and transported to the oil-water separator for treatment, in order to maintain the water level in the cell below a 0.25 m freeboard . In addition, the sumps will be drained at the end of each ice-free season to provide maximum storage volume for:

1) contaminated snow and ice during the winter months; and

2) melting and runoff during the spring freshet.

In the unlikely event of a large volume of contaminated snow being generated that would overwhelm the planned landfarm, then the snow would be moved to an alternate containment area such as the bulk fuel containment facility where the snowmelt can be contained and treated as above. AEM will obtain consent from the NWB and the KIA prior to using the alternate facility.

Water volumes in the cells and sumps will be measured by use of a calibrated staff installed within the cell or sump area, a painted scale on the sump wall, or an automated water level monitoring device.

SECTION 9 • LANDFARM MANAGEMENT

The landfarm will be managed to ensure safety and environmental responsibility. This will be achieved by having the facility security overseen by the Meadowbank security team and managed under the direction of the Site Superintendent with monitoring assistance from the site's Environmental Co-ordinator. Only trained personnel will be permitted access to the landfarm facility.

9.1 HEALTH AND SAFETY

The health and safety planning for the works carried out at the landfarm facility will be consistent with the Meadowbank Gold Project's standard procedures. This landfarm design and management plan describes the landfarm facility and covers a description of the works.

Key hazards associated with working with chemical substances, including PHC, and around heavy equipment, such as haulage trucks and excavators are:

- Inhalation of chemical substances;
- Ingestion of chemical substances;
- Contact with or absorption of chemical substances; and
- Limited vision of equipment operators.

The use of appropriate personal protective equipment (PPE) will minimize or eliminate the exposure pathways for the chemical substances. Material Safety Data Sheets (MSDS) for the PHC used at the mine site will be provided for all personnel who will be working at the landfarm facility. In addition, personnel working in the landfarm around heavy equipment should take precautionary measures to ensure their safely. These include, but are not limited to:

- Approaching the equipment only once the operator is aware of your presence, eye contact is made and your desire to approach is conveyed (through signals or by radio);
- Standing at a location outside the maximum reach of the equipment; and
- Ensuring the operator is aware of the tasks involved and departing the work areas once your task is complete.

Suggested PPE for working in the landfarm facility are:

- Steel toe and chemically resistant safety boots;
- Hard Hat;
- High visibility safety vest when working around heavy equipment;

- Hearing protection when working around heavy equipment;
- Eye protection – safety glasses or goggles;
- Chemically resistant gloves (i.e., nitrile);
- Air purifying respirators; and
- Air monitoring equipment, such as a photo ionization detector (PID), and associated action levels to stop work to preserve personal health and safety.

9.2 CONCEPTUAL CLOSURE PLAN

At the end of mine life and/or once all the contaminated soils have reached an acceptable level of treatment, the remediated soils will be removed from the landfarm and the landfarm area will be reclaimed. Remediated soils will be stockpiled and used for progressive reclamation purposes. Any residually contaminated soils and the underlying fill material (Fill A) in the cells will be buried within the Tailings Storage Facility (TSF), which will be covered with 2 m of ultramafic rock (MMC, 2007a, Doc. 511; MMC, 2007d, Doc. 500). It is anticipated that materials buried within the TSF will become encapsulated within permafrost (MMC, 2007d, Doc. 500). The HDPE liner will be disposed of in the demolition landfill (Landfill #2; Golder, 2007c, Doc. 458). The Type B fill (coarse rockfill) and berm walls will be sampled for the contaminants of concern on closure and removal of the geomembrane. If the soil quality meets the applicable standards, the rockfill will be stockpiled and used for reclamation purposes; otherwise it will be buried within the TSF.

The landfarm site will be reclaimed with the aim of returning the land back to productive use. The Meadowbank mine including the landfarm facility is designed to minimize the areas of surface disturbance, stabilize disturbed land surfaces against erosion, and return the land to a post-mining use for traditional pursuits and wildlife habitat (MMC, 2007a, Doc. 511).

SECTION 10 • PLAN REVIEW AND CONTINUAL IMPROVEMENT

The Landfarm Design and Management Plan will be reviewed annually by the Meadowbank Environmental Superintendent in consultation with the Mine General Manager, and updated at least every two years of operation. Improvements suggested through these reviews will be implemented in consultation with the Nunavut Water Board.

SECTION 11 • REFERENCES

AMEC Americas Limited, 2006. "*Snap Lake Project, Landfarm for Hydrocarbon Contaminated Soils," Project No. 142222, Revision 01*, submitted to Mackenzie Valley Land and Water Board on behalf of DeBeers Canada Inc., dated August 3, 2006.

Environmental Protection Service, 2002. Environmental Guideline for Site Remediation, Department of Sustainable Development, Government of the Nunavut, dated January, 2002.

Golder (Golder Associates Ltd.), 2007a. Landfarm Option Analysis, Meadowbank Gold Project, Nunavut, *Project 07-1413-0047-2000, Revision 0*, submitted to Agnico-Eagle Mines Limited, dated August 23, 2007.

Golder (Golder Associates Ltd.), 2007b. Final Report On Pit Slope Design Criteria for Portage and Goose Island Deposits, Meadowbank Gold Project Nunavut, *Project 06-1413-089/5000, Doc. No. 449, Revision 0,,* submitted to Meadowbank Mining Corporation, dated April 5, 2007.

Golder (Golder Associates Ltd.), 2007c. Final Report On Landfill Design and Management Plan, Meadowbank Gold Project Nunavut, *Project 06-1413-089/9000, Doc. No. 458, Revision 0,,* submitted to Meadowbank Mining Corporation, dated August 27, 2007.

Government of NWT, Environmental Protection Division, Department of Renewable Resources, 1995. The Generic Plans and Operating Procedures of a Remediation Facility for Hydrocarbon Contaminated Materials in the NWT, dated August 1995.

Miramar Hope Bay Ltd., 2007. Landfarm Management Plan, dated April, 2007.

MMC (Meadowbank Mining Corporation), 2007a. Meadowbank Gold Project Preliminary Closure & Reclamation Plan. August 2007.

MMC (Meadowbank Mining Corporation), 2007b. Meadowbank Gold Project Spill Contingency Plan. August 2007.

MMC (Meadowbank Mining Corporation), 2007c. Water Quality and Flow Monitoring Plan. Final Report August 2007; revised August 2008.

MMC (Meadowbank Mining Corporation), 2007d. Meadowbank Gold Project Mine Waste and Water Management. August 2007.

FIGURES

DETAILED DESIGN NOT FOR CONSTRUCTION

[redacted]

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A1-131395-100-C-0001	AMEC AMERICAS LTD. MEADOWBANK FEASIBILITY STUDY, APRIL 2005.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
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PROJECT

AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE

LANDFARM DETAILED DESIGN OVERALL SITE PLAN

PROJECT No. 07-1413-0047			FILE No.	–
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CADD	SRR	27NOV07		
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REVIEW				

Golder Associates

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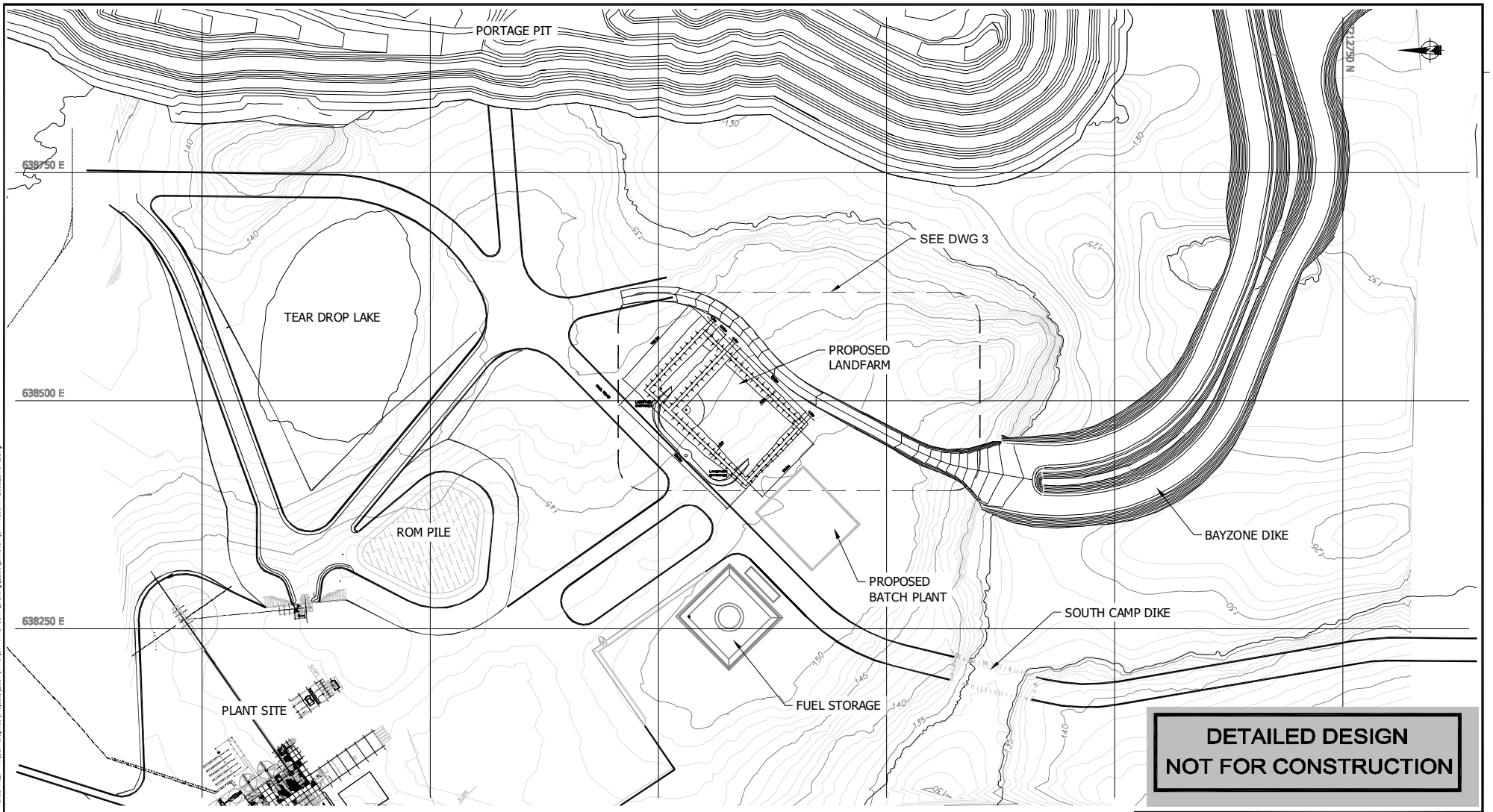

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PROJECT: AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE: MEADOWBANK GOLD PROJECT
LANDFARM
LOCATION PLAN

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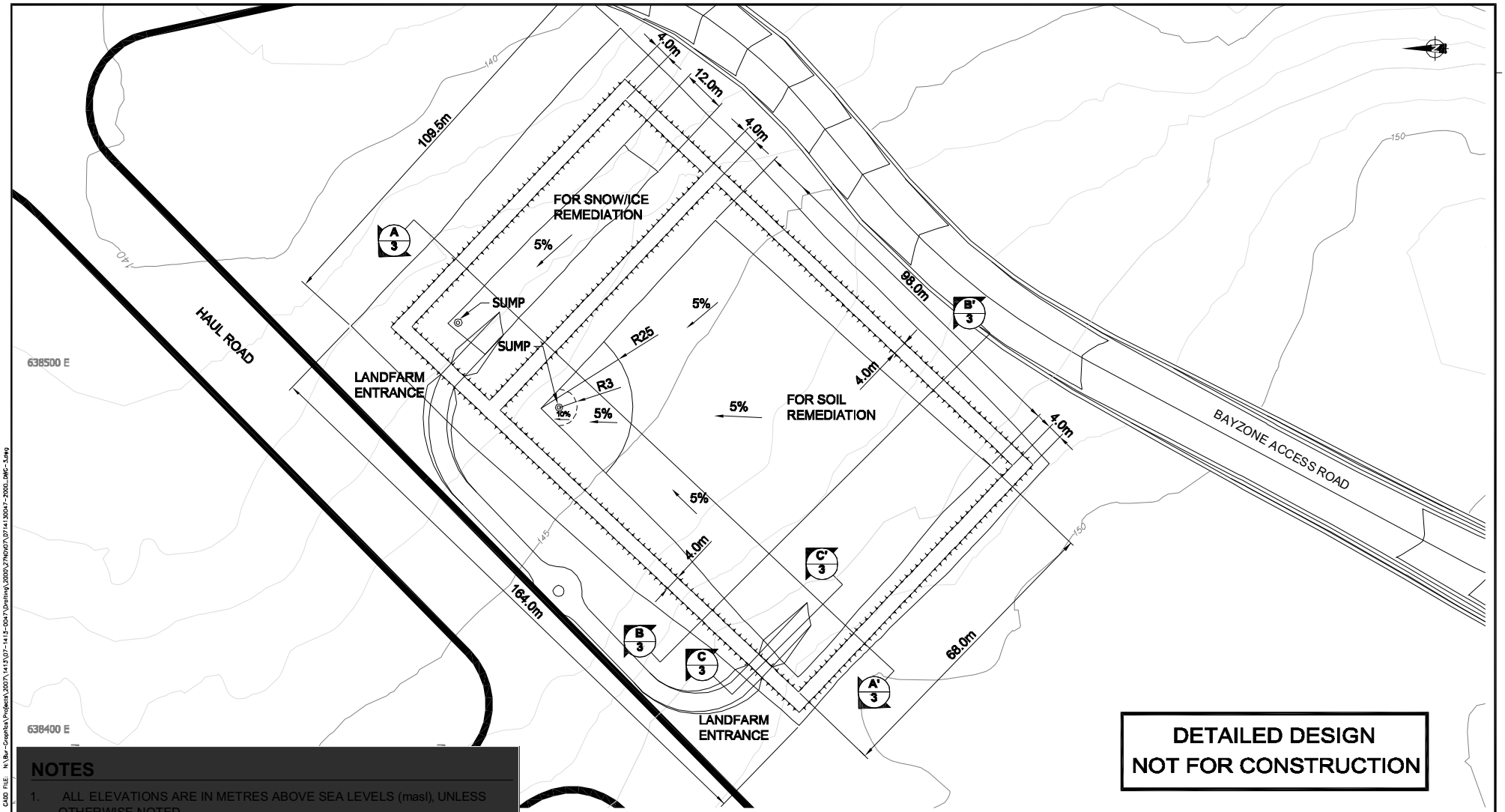

NOTES

1. ALL ELEVATIONS ARE IN METRES ABOVE SEA LEVELS (masl), UNLESS OTHERWISE NOTED.
2. GRID REFERENCE: NAD 83, UTM ZONE 14.

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NOT FOR CONSTRUCTION

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Scale in Metres

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A	27NOV07	JV	DETAILED DESIGN	MJH		

DRAWING NO. | REFERENCES

PROJECT: AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE: MEADOWBANK GOLD PROJECT
LANDFARM
PLAN VIEW

Golder Associates

PROJECT No.	07-1413-0047	FILE No.	-
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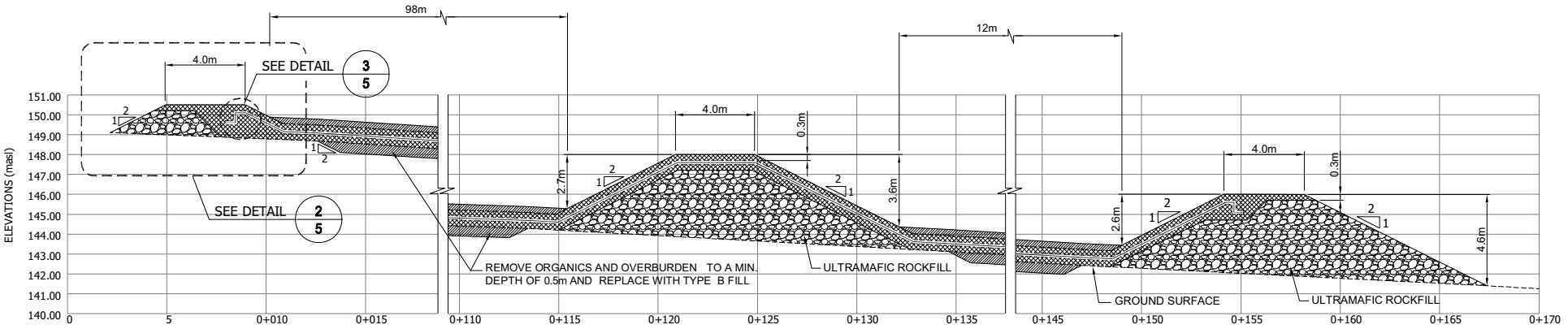

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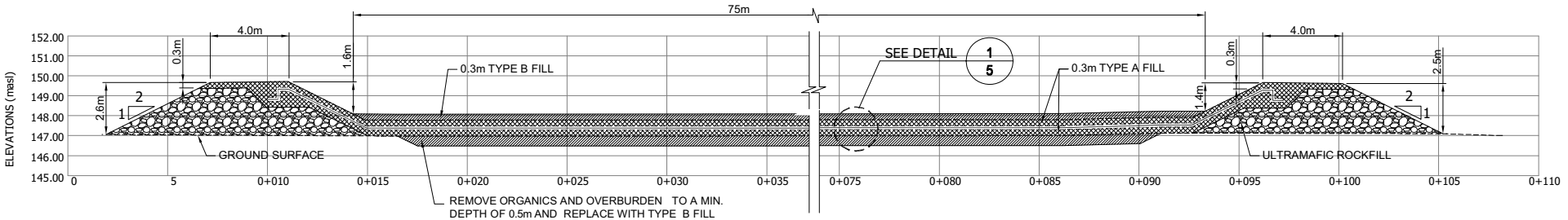

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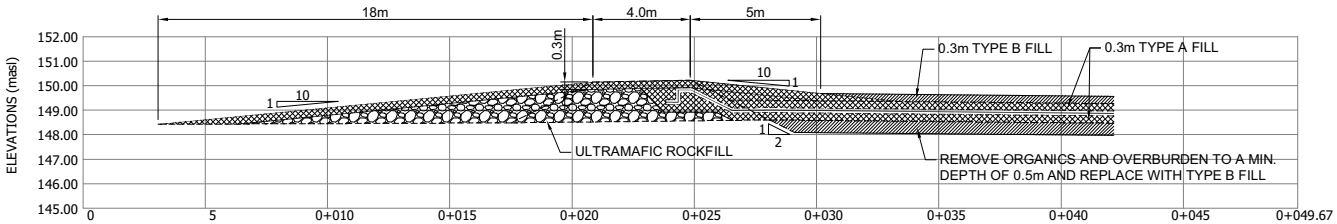

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PROJECT: AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE: MEADOWBANK GOLD PROJECT
LANDFARM DETAILED DESIGN SECTIONS

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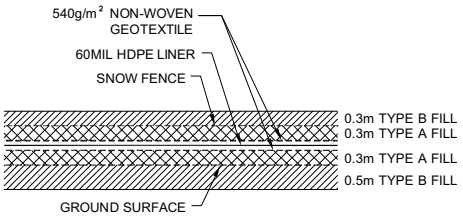

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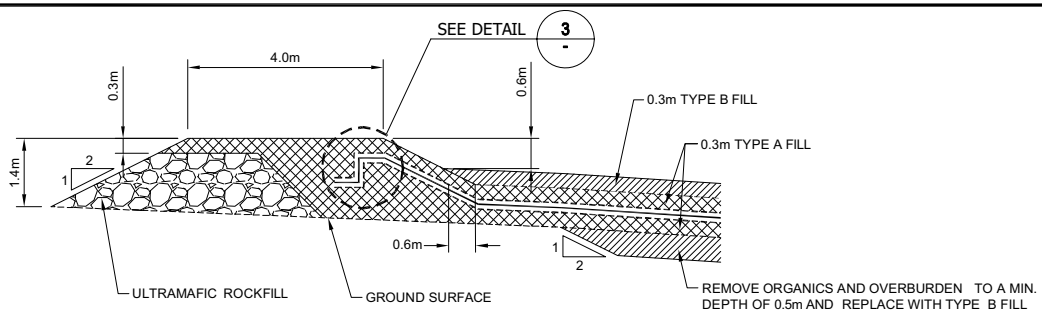

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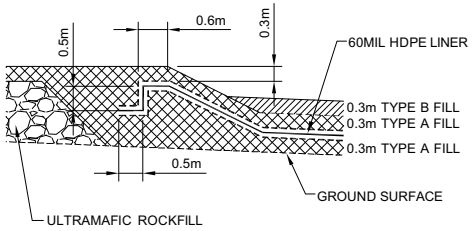

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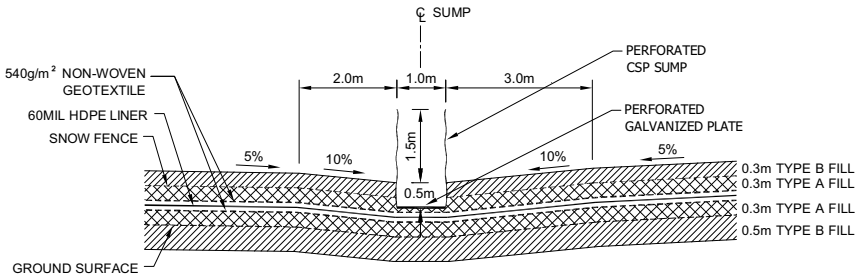

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PROJECT
AEM
AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE
MEADOWBANK GOLD PROJECT
LANDFARM DETAILED DESIGN DETAILS

Golder Associates

PROJECT No.	07-1413-0047	FILE No.	-
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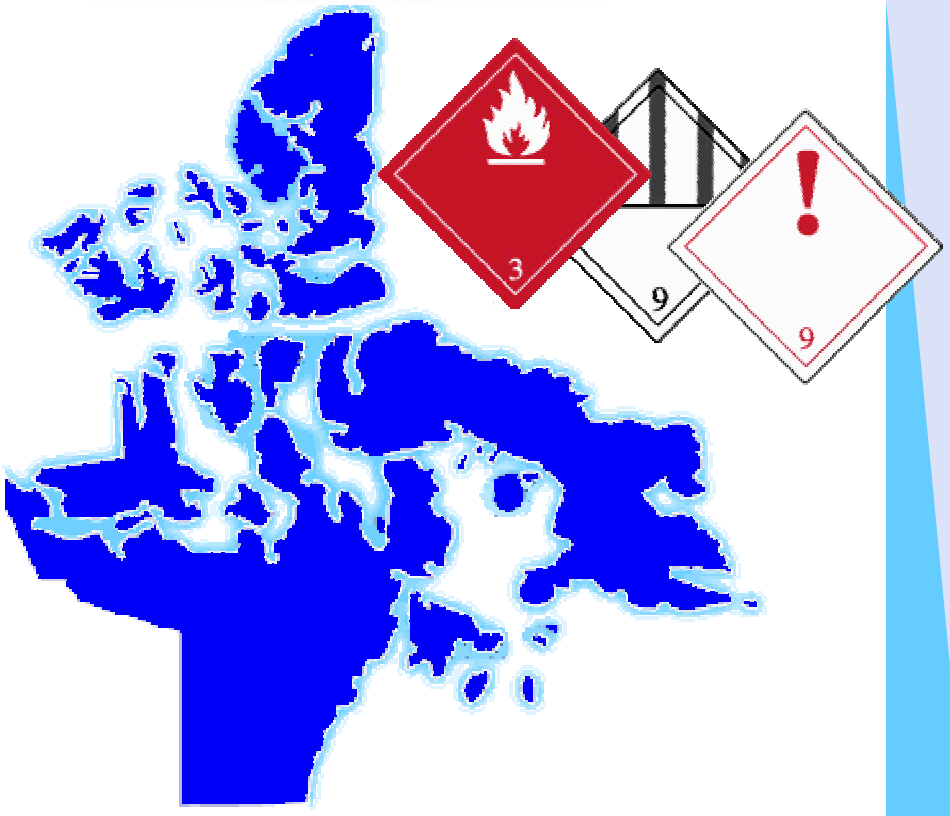
APPENDIX I

REMEDIATION GUIDELINES

ENVIRONMENTAL GUIDELINE FOR Site remediation



Department of Sustainable Development
Environmental Protection Service

Nunavut

GUIDELINE: CONTAMINATED SITE REMEDIATION

AS AMENDED BY:

USE OF GUIDELINE

A guideline is not law and is therefore not enforceable. It does however, assist an inspector to determine what action(s) may be required of him. Paragraph 2.2(c) of the Environmental Protection Act allows the Minister to develop, co-ordinate and administer guidelines. The Act [subsection 5(1)] makes it an offence to discharge a contaminant into the environment, subject to some exceptions [subsection 5(3)]. When a discharge occurs and it is inconsistent with the guidelines, the discharge is considered an unacceptable risk. The inspector may then consider issuing an order or laying an information.

A guideline allows for some leniency in applying the law. A court would probably be inclined to consider the application of a guideline favorably because the public is aware of the standards they are expected to meet.

This Consolidation is not Law.
It is prepared by Environmental Protection Service,
Department of Sustainable Development
Government of the Nunavut

January, 2002

Guideline for Contaminated Site Redemption

January, 2002

GUIDELINE FOR CONTAMINATED SITE REMEDIATION

1 Introduction

The purpose of this guideline is to help you solve a contamination problem on your property by setting standards for site remediation. This guideline will focus on hydrocarbons because they are the most common type of contaminant in Nunavut. However, the principles outlined here can be applied to other types of site contamination. Section 2.2 of the *Environmental Protection Act* gives the Minister of Sustainable Development the authority to develop, co-ordinate and administer these guidelines (see Appendix).

1.1 Definitions

CCME Canadian Council of Ministers of the Environment (CCME) is the major intergovernmental forum in Canada for discussion and joint action on environmental issues of national, international and global concern. The 13 member governments work as partners in developing nationally consistent environmental standards, practices and legislation.

Commissioner's Lands Lands in Nunavut that have been transferred by Order-in-Council to the Government of Nunavut. This includes highways, block land transfers and most lands within municipalities.

Contaminant Any noise, heat, vibration or substance and includes such other substances as the Minister may prescribe that, where discharged into the environment,
(a) endangers the health, safety or welfare of persons,
(b) interferes or is likely to interfere with normal enjoyment of life or property,
(c) endangers the health of animal life, or
(d) causes or is likely to cause damage to plant life or to property.

Contaminated Site Areas of land, water, ground water, or sediments that have levels of contaminants exceeding the remediation criteria. Contaminant sources can include on-site burial of wastes, non-point chemical releases (small, frequent drips and spills), stockpiling and storage of materials, major spills, and releases during fires. Contamination may also be due to illegal dumping of contaminated soil. Contaminated sites may have short or long-term consequences to people or the environment.

Remediation The management of the contaminant at a site so as to prevent, minimize, or mitigate damage to human health, property, or the environment. Remediation is a broader term then clean-up in that remediation options can include physical actions such as removal, destruction, and containment, as well as the use of institutional control such as zoning designations or orders.

T.P.H. Total petroleum hydrocarbons, (includes total purgable and total extractable hydrocarbons).

1.2 Roles and Responsibilities

The Department of Sustainable Development, Environmental Protection Service (EPS), is the main contact concerning remediation of contaminated sites on Commissioner's Land, EPS determines the required level of remediation using the remediation criteria cited in these guidelines. EPS also reviews your remediation plan and monitors the progress of the project. It is your responsibility to remediate the site to acceptable levels. As there may be health or safety concerns to consider, we recommend you also contact the Department of Health, the Office of the Fire Marshal, the municipality and the landowner.

> ***EPS will provide advice on remediation measures, but it is the sole responsibility of the polluter and land owner to provide adequate site remediation.***
> ***(See Environmental Protection Act in Appendix)***

2 Defining The Problem

If you think you have contamination on your property, the first step is to do a thorough site investigation. A thorough investigation may avert unnecessary remediation costs. Depending on the degree and complexity of the contamination, you may require the assistance of a qualified environmental consultant or engineer.

Ask yourself the following questions:

2.1 What is the History of the Site*?*

Thorough historical research will aid in identifying and locating the contaminant(s). It may also aid in assessing responsibility for the contamination. Consider the following:

- Is the site near an existing tank farm, fuel storage area or other contaminant storage site?
- Is it near where a tank farm or fuel storage site previously existed?
- Has there ever been a spill on or near the property?

2.2 What is the Contaminant?

It is essential to identify the contaminant, in order to determine suitable remediation options.

- Common contaminants in Nunavut are diesel fuel, turbo, fuel, gasoline and used oil.
- You should take representative samples with the assistance of an accredited laboratory.

2.3 What is the Degree of Contamination?

Consider the following:

- What is the length, width and depth of the contaminated area?
- What is the soil type?
- Where is the surface and ground water?
- What is the type of permafrost, if any? Is it saturated, unsaturated, continuous or discontinuous permafrost?

2.4 What are the Possible Impacts*?*

Remember that this contaminated site may affect many people and other living organisms. Determine both the pathway of contamination and all possible receptors of contamination.

Consider the following:

- How did the contamination enter the site?
- Did it enter the ground water?
- Will it affect people through either toxic vapors or soil contamination?
- Could there be any effects on vegetation, wildlife or domestic animals?
- How will the contamination affect adjacent sites?
- What will the site be used for in the future?
- Are there any special factors relating to public use of the area?
- Is it commercial, agricultural or residential land? (Section 2.4.1)

2.4.1 Land Use

Identifying the type of land use will help you assess the extent of human and ecological exposure to contaminants in the soil, and is essential for planning practical remediation programs. The specified land uses considered in this guideline are: agricultural, residential/parkland and commercial/industrial.

Agricultural	All uses of land where the activity is primarily related to the productive capability of the land or facility (e.g. greenhouse) and is agricultural in nature, or is related to the feeding and housing of animals such as livestock.
Residential/ Parkland	Residential: all uses of land in which dwelling on a permanent, temporary or seasonal basis is the primary activity. Institutions, hospitals, schools, daycare and playgrounds are also indicated under this land use. Residential/Parkland is often readily accessible to the public. Parkland: all land uses in which the primary activity is recreational in nature and requires the natural or human designed capability of the land to sustain that activity.
Commercial	All uses of land in which the primary activity is related to the buying, selling or trading of merchandise or services.
Industrial	All land uses in which the primary activity is related to the production, manufacture or storage of materials. The public does not usually have uncontrolled access to this type of land. This does not include institutions

(e.g. schools, hospitals, playgrounds).

Always confirm the required level of remediation with EPS. The type of land found adjacent to the contaminated site may affect the remediation criteria levels that you have to follow.

3 Remediation

Once the problem has been defined (section 2), you can decide on the appropriate remediation options. If you have hired a qualified contractor, they may recommend remediation options to you. General remediation categories include:

On-site/Off-site	Will your remediation be on or off-site? Techniques will vary accordingly.
On-site treatment	The soil must meet the remediation criteria (section 4).
Off-site treatment	Merely moving the spill to a landfill facility is not acceptable. After moving the soil to an acceptable location, you must contain the contaminants, and then treat the soil or water to reduce the contamination to an acceptable level (section 4).
Groundwater	Contaminated groundwater may require treatment. A qualified contractor can advise you on the available options.

3.1 Remediation Guidelines

Remediation in Nunavut is guideline based. The required degree of remediation is determined by CCME 1991 Interim Criteria, CCME 1997 Recommended Canadian Soil Quality Guidelines and the Environmental Protection Service.

Remediation Guidelines for Soil

	Agricultural	Residential/ Parkland	Commercial	Industrial
Benzene	0.05	0.5	5	5
Toluene	0.1	0.8	0.8	0.8
Ethylbenzene	0.1	1.2	20	20
Xylene	0.1	1	17	20
Total Petroleum Hydrocarbons (TPH)*	-	500**	2500**	2500**
Lead	70	140	260	400
Polychlorinated biphenyl	0.5***	5***	50***	50***

Note: All values are in µg/g or parts per million (ppm). These are the more commonly required parameters. The type of contamination at the site may require analysis for additional CCME parameters.

* Total petroleum hydrocarbons (includes total purgeable and total extractable hydrocarbons).
** The TPH guidelines were developed by the Government of the Northwest Territories (GNWT)
*** CCME 1991 Interim Criteria (note: 1998 PCB Soil Quality Guidelines are currently under development).

The chart below may help you to visualize the amount of contaminant it would take to create a level of 1000 PPM. Remember that 1000 PPM is a much greater level than many of the acceptable remediation criteria levels listed above.

Amount of Soil and Gasoline Creating a Level of 1000 PPM	
Volume of Soil	***Volume of Gasoline***
5g (typical amount used for chemical analysis)/1 tsp.	.005 ml/ 1/1000 tsp.
4.5 litres/1 gallon bucket	7.5 ml /1.5 tsp.
205 litres/45 gallon drum	400 ml /1 3/4 cups
18,5976 kg/410,000lb (or 140 yd^3, enough to fill a living room that is 10 x 19 x 19 ft.)	205 litres/45 gallon drum

3.2 Decision Considerations

The following should be considered when making your final decision:

Guidelines (section 3.1).

Permission You must obtain permission from the local municipality or landlord before using any of their facilities, such as the landfill site or the sewage lagoon.

Time required How long will the remediation take?

Cost Is your remediation plan cost effective?

Aesthetics Does your plan restore the area to an acceptable level of aesthetic quality?

Technology How effective is the technology being considered?

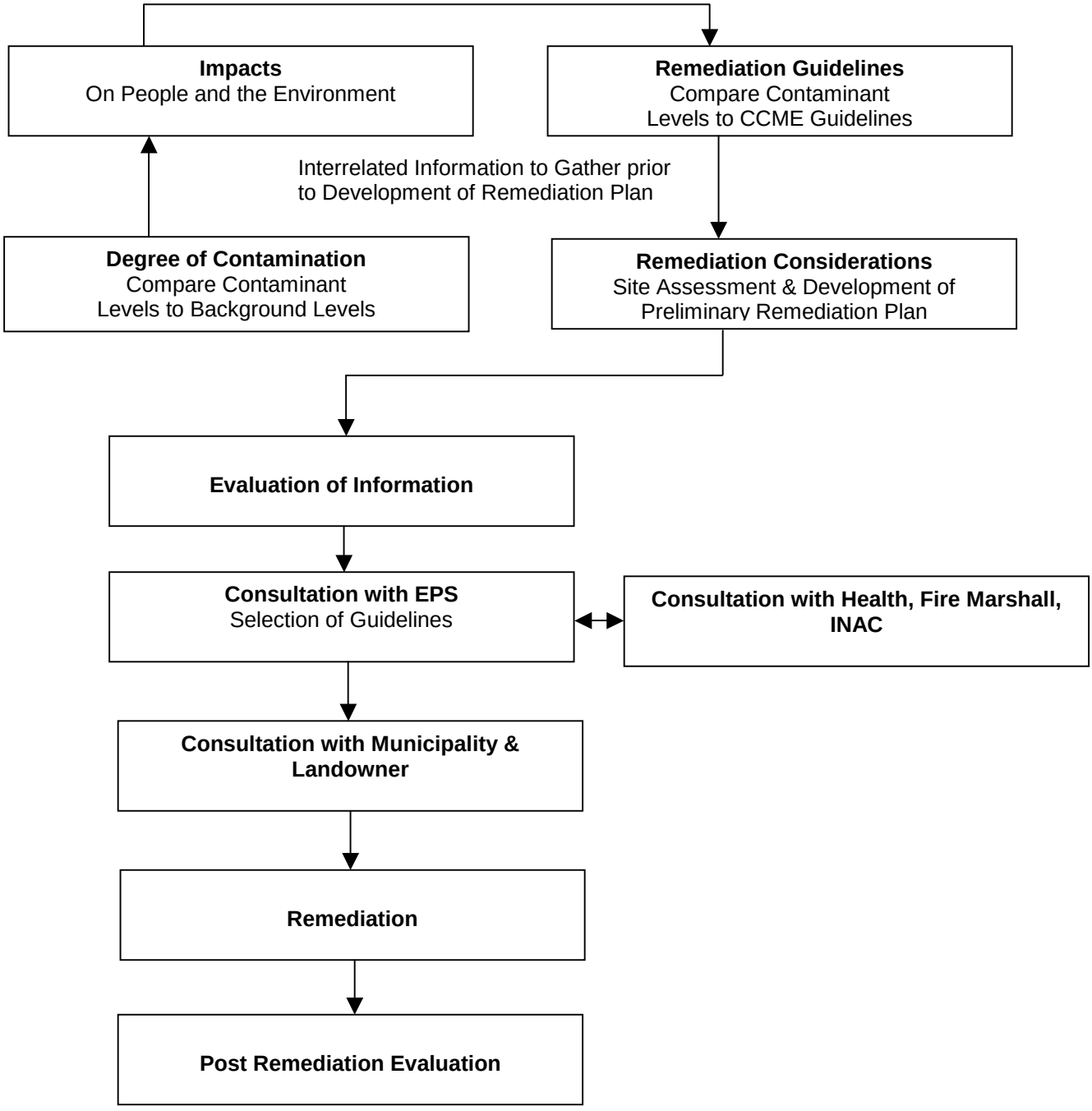


Figure 1: Steps Used in Site Remediation

4 Conclusion

This is a brief introduction to the process of contaminated site remediation.

For more information:

1) Read CCME 1997 Recommended Canadian Soil Quality Guidelines report (see References).

2) Contact the Environmental Protection Service
   Department of Sustainable Development
   P.O. Box 1000, Station 1195
   Iqaluit, Nunavut, X0A 0H0
   Phone: (867) 975-5900; Fax: (867) 975-5990

   Remember that this document is intended to inform you about some of the basic issues involved in contaminated site remediation. Once you have read this document and verified that you have a contaminated site, you must contact the Environmental Protection Service. You should work with EPS before proceeding through the site remediation process.

5 Bibliography

CCME (Canadian Council of Ministers of the Environment). 1991 Interim Canadian Environmental Quality Criteria for Contaminated Sites . The National Contaminated Sites Remediation Program, Report No. CCME EPC-CS34. Winnipeg, Manitoba.

CCME (Canadian Council of Ministers of the Environment). 1997 Recommended Canadian Soil Quality Guidelines. ISBN 1-895-925-92-4. Winnipeg, Manitoba.

APPENDIX
Environmental Protection Act

The following is a subset of the *Environmental Protection Act*. The complete act can be obtained from any office of the Department of Sustainable Development.

1. In this Act,

"Contaminant" means any noise, heat, vibration or substance and includes such other substances as the Minister may prescribe that, where discharged into the environment,

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

"Discharge" includes, but not so as to limit the meaning, any pumping, pouring, throwing, dumping, emitting, burning, spraying, spreading, leaking, spilling, or escaping.

"Environment" means the components of the Earth and includes:

(a) air, land and water,
(b) all layers of the atmosphere,
(c) all organic and inorganic matter and living organisms, and
(d) the interacting natural systems that include components referred to in paragraphs (a) to (c).

2.2 The Minister may

(a) establish, operate and maintain stations to monitor the quality of the environment in the Territories;
(b) conduct research studies, conferences and training programs relating to contaminants and to the preservation, protection or enhancement of the environment;
(c) develop, co-ordinate and administer policies, standards, guidelines and codes of practice relating to the preservation, protection or enhancement of the environment.

5. (1) Subject to subsection (3), no person shall discharge or permit the discharge of a contaminant into the environment.

(2) REPEALED, R.S.N.W.T. 1988, c. 117 (Supp.), s. 8

(3) Subsection (1) does not apply where the person who discharged the contaminant or permitted the discharge of the contaminant establishes that:

(a) the discharge is authorized by this Act or the regulations or by an order issued under this Act or the regulations;
(b) the contaminant has been used solely for domestic purposes and was discharged from within a dwelling-house;
(c) the contaminant was discharged from the exhaust system of a vehicle;
(d) the discharge of the contaminant resulted from the burning leaves, foliage, wood, crops or stubble for domestic or agricultural purposes;

(e) the discharge of the contaminant resulted from burring for land clearing or land grading;
(f) the discharge of the contaminant resulted from a fire set by a public official for habitat management of silviculture purposes;
(g) the contaminant was discharged for the purposes of combating a forest fire;
(h) the contaminant is a soil particle or grit discharged in the course of agriculture or horticulture; or
(i) the contaminant is a pesticide classified and labeled as domestic under the *Pest Control Products Regulations* (Canada).

(4) The exceptions set out in subsection (3) do not apply where a person discharges a contaminant that the inspector has reasonable grounds to believe is not usually associated with a discharge from the excepted activity. R.S.N.W.T. 1988, c. 75 (Supp.) S. 5; c. 117 (Supp.), s. 8.

5.1 Where a discharge of a contaminant into the environment in contravention of this Act or the regulations or the provisions of a permit or license issued under the Act or the regulations occurs or a reasonable likelihood of such a discharge exists, every person causing or contributing to the discharge or increasing the likelihood of such a discharge, and the owner or the person in charge, management or control of the contaminant before its discharge or likely discharge, shall immediately:

(a) subject to any regulations, report the discharge or likely discharge to the person or office designated by the regulations;
(b) take all reasonable measures consistent with public safety to stop the discharge, repair any damage caused by the discharge and prevent or eliminate any danger to life, health, property or the environment that results or may be reasonably expected to result from the discharge or likely discharge; and
(c) make a reasonable effort to notify every member of the public who may be adversely affected by the discharge or likely discharge. R.S.N.W.T. 1988, c. 75 (Supp.), s. 5; c. 117 (Supp.), s. 9.

6. (1) Where an inspector believes on reasonable grounds that a discharge of a contaminant in contravention of this Act or the regulations or a provision of a permit or license issued under this Act or the regulations has occured or is occurring, the inspector may issue an order requiring any person causing or contributing to the discharge or the owner or the person in charge, management or control of the contaminant to stop the discharge by the date named in the order.

7. (1) Notwithstanding section 6, where a person discharges or permits the discharge of a contaminant into the environment, an inspector may order that person to repair or remedy an injury or damage to the environment that results from the discharge.

(2) Where a person fails or neglects to repair or remedy any injury or damage to the environment in accordance with an order made under subsection (1) or where immediate remedial measures are required to protect the environment, the Chief Environmental Protection Officer may cause to be carried out the measures that he or she considers necessary to repair or remedy an injury or damage to the environment that results from any discharge.

If you would like to be placed on a mailing list to receive guideline amendments or for public consultation on Environmental Protection Service legislation please fill this out and mail or fax to:

Environmental Protection Service
Department of Sustainable Development
P.O. Box 1000, Station 1195
Iqaluit, Nunavut, X0A 0H0
Fax: (867) 979-5990

Users of this guide are encouraged to report any errors, misspellings, etc. contained within, to EPS at the above address

Mailing List for Environmental Protection Service Information

Name: _____

Title: _____

Address : _____

_____

Phone / Fax Number: _____

APPENDIX II

MATERIAL SPECIFICATIONS

MATERIALS

Materials in general will be developed from non-acid generating and non-metal leaching quarry bedrock sources to be located on-site. In addition, the rockfill sources for this project will include run-of-mine material, blasted bedrock and quarried bedrock.

The Landfarm will be constructed with four types of materials; described in the following sections.

Where appropriate, a sieve analysis should be completed to confirm gradations prior to supply.

Type A Fill

Type A fill shall be free from undesirable quantities of soft or flaky particles, loam, organic or deleterious material. The gradation limits for Type A are shown in Table I.

Table I: Gradation Limits for Type A Fill

U.S. Standard Sieve	Metric Size, mm	% Passing
1"	25	100
1/2"	12.5	75 - 100
3/8"	9.5	60 - 90
# 4	4.75	40 - 70
# 8	2.36	27 - 55
# 20	0.850	10 - 35
# 48	0.300	5 - 20
# 200	0.075	0 - 5

Type B Fill

Type B fill shall be free from undesirable quantities of soft or flaky particles, loam, organic or deleterious material. The gradation limits for Type B are shown in Table II.

Table II: Gradation Limits for Type B Fill

U.S. Standard Sieve	Metric Size, mm	% Passing
4"	100	100
2"	50	70 - 100
1"	25	50 - 100
# 4	4.75	25 - 100
# 10	2.0	10 - 80
# 200	0.075	0 - 5

Ultramafic Rockfill

Ultramafic (UM) Rockfill shall consist of fragments of hard, durable rock, screened to remove all particles in excess of the maximum particle size and meeting the following gradation specifications presented in Table III.

Table III: Gradation Limits for UM Rockfill

Metric Size, mm	% Passing
600	100
300	85 - 100
100	60 -100
25	45 - 90
4.75	25 - 70
0.850	10 - 30
0.425	5 -20
0.180	0 - 10
0.075	0 - 5

CONSTRUCTION SPECIFICATIONS

HDPE or LLDPE Geomembrane Liner

The liner base shall be maintained in dry condition. Liner panels to be placed in maximum widths and lengths to minimize seams. Panels shall be oriented parallel to the line of maximum slope. Seams across the slope are to be avoided and approval must be obtained from the Site Engineer. Seams are not permitted in corners and base seams shall not be closer than two meters from toe of slope.

Panels shall be placed incorporating sufficient slack to allow for thermal movement. The amount of slack shall be determined by the contractor. The panels shall be placed straight with the least amount of curls or waves.

The liner panels shall be temporarily held in place with sandbags to prevent movement.

The liner edge shall be anchored as indicated on the drawings. The anchor trench shall be backfilled as indicated on the drawings and as per specifications.

A 540g/m^2 (16oz/yd^2) non-woven geotextile shall be used for the landfarm as specified on the design drawings (DWG 4 and 5).

Liner Base

The area to be lined including side slopes and dike top shall be compacted to 95% of Standard Proctor Density (ASTM D-698). Locations subject to static loading from equipment or stockpiles shall be compacted to 95% Standard Proctor Density (SPD).

The contractor shall maintain the liner base in the specified condition immediately prior to placement of the liner and any damage by surface erosion shall be filled and compacted to specifications.

Liner Anchorage

The HDPE liner, sandwiched between two layers of geotextile, shall be anchored as per supplier recommendations.

The anchor trench as shown on the drawings shall be free of sharp stones and debris. The trench shall be backfilled in lifts of 100 mm maximum and compacted to 95% of Standard Proctor Density (ASTM D-698).

Special care shall be taken when compacting backfill in trenches to ensure that the liner is not damaged.

Liner Cover

Prior to placement of the Type A fill material for the liner cover, a 540g/m^2 (16oz/yd^2) non-woven geotextile shall be placed on top of the HDPE geomembrane liner.

A minimum 300 mm thick, Type A fill cover material shall be placed over the low permeability liner system by dumping rather than blading so that no tensile shear forces are transmitted to the liner. Piles of dumped material shall be no more than 0.8 m high and should be levelled to the specified thickness using low ground pressure equipment. Equipment shall not be permitted on the liner without sufficient cover to protect it from damage. Activity on the liner and protective base course shall be kept to a minimum.

Compaction of material shall be as indicated on the drawings and accomplished utilizing low ground pressure equipment.

All granular fill materials including the rockfill should be placed in loose lifts not exceeding 0.3 m in thickness, unless otherwise noted and all granular fills should be moisture conditioned, if required, prior to compaction. Ultramafic Rockfill shall be placed in loose lifts not exceeding 600 mm thickness. Water should be added to adjust the in-situ moisture content within 2 per cent of the optimum moisture content, as determined by the Proctor density – moisture relationship. All lifts shall be uniformly compacted using a smooth drum 10 tonne vibratory roller to the following in-situ density:

- Type A Fill: Granular base shall be compacted to 95% of the Standard Proctor maximum dry density, as determined by ASTM Test Method D698-70.

- Type B Fill: Select granular sub-base shall be compacted to 95% of the Standard Proctor maximum dry density and to 100% within 0.3 m of finished sub-grade, as determined by ASTM Test Method D698-70.

- Ultramafic Rockfill: Rockfill shall be compacted by a minimum of 6 complete passes of a smooth drum 10 to 15 tonne vibratory roller, or equivalent.