Notice of Alteration Form

Manitoba

File No. : 3851.00	Environment Act Licence No. : 2177 E R5

Legal name of the Licencee: Waste Connections of Canada Inc.

Name of the development: Integrated Waste Management Facility

Category and Type of development per Classes of Development Regulation:

Waste Treatment and Storage — Class 1 Waste Disposal Grounds

Licencee Contact Person: Barry Blue

Mailing address of the Licencee: 375 Oak Point Highway, PO Box 1590

City: Winnipeg Province: MB Postal Code: R2R 1T

Phone Number: (204) 792-3389 Fax: Email: barry.blue@wasteconnections.com

Name of proponent contact person for purposes of the environmental assessment (e.g. consultant):

Fabiano Gondim, M.Eng., P.Eng.

Phone: (647) 355-7484	Mailing address:
Fax:	600-6925 Century Avenue, Mississauga, ON L5N 7K2

Email address: fabiano.gondim@wsp.com

Short Description of Alteration *(max 90 characters):*

A Humanitarian Search Project is proposed as per attached Design & Operations Report.

Alteration fee attached: Yes: ☑ No: ☐

If No, please explain:

Date: 2024-06-04	Signature: [redacted]
	Printed name:

A complete Notice of Alteration **(NoA)** consists of the following components:

- ☑ **Cover letter**
- ☑ **Notice of Alteration Form**
- ☑ **1 hard copy and 1 electronic copy of the NoA detailed report** (see "Information Bulletin - Alteration to Developments with Environment Act Licences")
- ☑ **$500 Application fee, if applicable** (Cheque, payable to the Minister of Finance)

Submit the complete NoA to:
Director, Environmental Approvals Branch
Manitoba Environment and Climate
14 Fultz Blvd
Winnipeg, Manitoba R3Y 0L6
EABDirector@gov.mb.ca

For more information:
Phone: (204) 945-8321 Fax: (204) 945-5229
https://www.gov.mb.ca/sd/permits_licenses_approvals/eal/licence/index.html

Note: Per Section 14(3) of the Environment Act, Major Notices of Alteration must be filed through submission of an Environment Act Proposal Form (see "Information Bulletin – Environment Act Proposal Report Guidelines")

Reset Print

June 4, 2024

Agnes Wittmann
Director, Environmental Approvals Branch
Department of Environment and Climate Change
14 Fultz Boulevard, Box 35
Winnipeg, MB
R3Y 0L6

Re: WASTE CONNECTIONS OF CANADA INC.
PRAIRE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
NOTICE OF ALTERATION FOR ENVIRONMENT ACT LICENCE NO. 2177 E R5 (FILE NO. 3851.00) – HUMANITARIAN SEARCH PROJECT

Dear Agnes Wittmann,

Waste Connections of Canada Inc. (WCC) is pleased to submit the required documentation pertaining to a Notice of Alteration application under the existing Environment Act Licence No. # 2177 E R5, in relation to the Humanitarian Search Project at the Prairie Green Integrated Waste Management Facility, located in the Rural Municipality of Rosser. As part of this application, we are providing the following documents:

a) Executed Notice of Alteration Form
b) Final Design and Operations Report (D&O)
c) Table with WCC responses to Environmental Approvals Branch comments provided to the Draft D&O report.

We trust the above meets with your approval. Please do not hesitate to contact the undersigned if you require any additional information or clarification. We appreciate your attention to this submission and look forward to your prompt review and acceptance.

Sincerely,

[redacted]

Chris Visser, P.Eng.
Region Engineering Manager, Waste Connections of Canada

Attachments: Notice of Alteration Form
Design and Operations Report, prepared by WSP
WCC responses to Environmental Approvals Branch comments

cc. Barry Blue, District Manager, Waste Connections of Canada

HUMANITARIAN SEARCH PROJECT DESIGN AND OPERATIONS REPORT

PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY

Submitted to:

Waste Connections of Canada

375 Oak Point Highway
Winnipeg, MB R2R 1T9

Submitted by:

WSP Canada Inc.

6925 Century Avenue, Suite 600, Mississauga, ON L5N 7K2

905-567-4444

CA0029573.2620

June 4, 2024

Distribution List

1 e-Copy: Waste Connections of Canada Inc.

1 e-Copy: Manitoba Environment and Climate Change

1 e-Copy: WSP Canada Inc.

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DRAWINGS

APPENDICES

Definitions*

Excavation Area	The approximate 2 hectare excavation area located on portions of Cells 11, 13, and 15 and identified as the possible location where victims are deposited in the landfill.
Healing Space	A prefabricated building that provides communal space where the victims' families and friends may feel safe and connect with each other, where Indigenous Elders, Healers, and Knowledge Keepers gather to support the families needs.
Humanitarian Search Project	All proposed activities to support the humanitarian search project, including excavation of existing material in the Excavation Area and construction of the Seach Facility Area, Search Facility, Temporary Support Facilities, Healing Space, and access roads.
Phase I	The current active area of the landfill that has been fully developed and used for material disposal operations.
Phase II	The approved area for future development and use for material disposal operations.
Search Facility	A temporary prefabricated fabric covered building within the Seach Facility Area. The building will have a designated area for receiving search material at one end, a sorting operation in the core, and a post-search material shipping area at the opposite end.
Search Facility Area	The area designated for the humanitarian search, with an engineered base (Search Facility Area Pad) and perimeter compacted clay berms. This area includes the Search Facility.
Search Facility Area Pad	The base of the Search Facility Area. The Search Facility Area Pad is an engineered design that includes a compacted clay liner to contain leachate.
Search Facility Area Pond	A pond to collect and hold stormwater generated in the Search Facility Area. Two Search Facility Area Ponds will be constructed, i.e., one to the south (Search Facility Area Pond 1) and another to the north (Search Facility Area Pond 2) of the Search Facility Area.
Temporary Support Buildings	Buildings similar to construction trailers that are part of the Temporary Support Facilities and will include administrative office space, forensic anthropologist space, washrooms, warehouse area, health and safety space, lunch/break room and equipment, cold storage, and maintenance space.
Temporary Support Facilities	Facilities that will be constructed adjacent to the Search Facility Area to support workers and humanitarian search activities. That includes Search Facility Area Ponds, parking lots, and Temporary Support Buildings.

* Refer to the attached Drawings for the visualization of the physical location of the defined terms.

1 INTRODUCTION

1.1 Background

Waste Connections of Canada Inc. (Waste Connections) owns and operates the Prairie Green Integrated Waste Management Facility (IWMF, or Site), located on Section 14 and the north half of Section 11, Township 12, Range 2 East in the Rural Municipality of Rosser, approximately 1.6 km north of the City of Winnipeg, Manitoba.

The Site has been in operation since 1996 and is licensed under the revised Environment Act License (Licence) No. 2177 E R5 for the disposal of solid, residential, commercial, and institutional material. The Site also has a recycling facility, materials recovery facility, petroleum contaminated soil treatment facility, and a composting facility.

The Site was approved with two separate material disposal areas, known as Phase I and Phase II (**Drawing 1**). Phase I has been fully constructed and has a remaining disposal capacity of approximately 3.3 million m^3 capacity and service life of approximately eight (8) years.

A Humanitarian Search Project is proposed to be completed at the IWMF. It will involve excavation of existing material from Phase I, hauling excavated material to a proposed Search Facility Area located within the approved Phase II area, to be processed for human remains search. Following search of the material, cleared material will be hauled to the active working face of Phase I of the IWMF for landfilling.

The Final Report of the Technical Subcommittee of the Landfill Search Feasibility Study Committee, published by the Assembly of Manitoba Chiefs (AMC, 2023), outlined the feasibility to search for the remains of two victims believed to have been deposited in an area that spans Cells 11, 13 and 15 of the IWMF. The AMC, 2023 Final Report established the context in which the Winnipeg Police Service believes that these victims were deposited in the IWMF on May 16, 2022. The report further details that on June 20, 2022, the IWMF ceased operations in the area of interest based on information provided by the Winnipeg Police Service. As a result, the report concludes that there were 34 days of material deposition in the cells of interest between the time of possible deposition and ceasing operations in the area that spans Cells 11, 13 and 15 (i.e., from May 16, 2022 to June 20, 2022).

Based on subsequent work completed by Waste Connections, the estimated search area was identified as approximately 2 hectares and a maximum material depth of approximately 10 metres (m) across Cells 11, 13, and 15 (**Drawing 1 and 2**). The volume of materials deposited between topographical surveys dated May 8, 2021 and June 4, 2022 was estimated as 72,000 cubic metres (m^3). A topographical survey completed on May 5, 2023, shows a minor volume change in the cells of interest between June 4, 2022 and May 5, 2023. Since topographic survey for the waste fill area is only completed annually, the available surveys that capture the area and timeframe of interest are May 8, 2021 and June 4, 2022. In addition, Waste Connections has confirmed that no material was deposited in the cells of interest between May 8, 2021, and approximately April 10, 2022. Consequently, it has been determined the 72,000 m^3 of material of interest pertains to the approximate period from April 11, 2022, to June 4, 2022.

1.2 Purpose and Objectives

This Design and Operations Report (D&O Report) has been prepared in support of Waste Connections' proposal to amend the Licence No.2177 E R5 to permit the excavation of material from Cells 11, 13, and 15, development and operation of a Search Facility Area, and the relocation and landfilling of the searched material at the active working face of Phase I of the IWMF.

The primary objective of this D&O Report is to establish the preliminary design and operations for the various components of the Humanitarian Search Project and propose mitigation measures for potential environmental impacts and nuisances. These include, but are not limited to, addressing leachate, odours, hazardous materials, hazardous chemicals, biohazards, and health and safety aspects. Additionally, the D&O Report outlines the approach to accomplish a Notice of Alteration (NOA) approval.

2 PROPOSED SITE LAYOUT

2.1 Existing Conditions

As mentioned above, the Site was designed with two separate disposal areas, known as Phase I and Phase II. The Phase I has been fully developed and is the current active waste disposal area of the Site. Phase II is planned for future development. The Phase II area is currently used for agricultural purposes. The Excavation Area is located at the southwest end of Phase I within a portion of Cells 11, 13, and 15 (**Drawing 1**).

2.2 Proposed Activities

For defined terms used throughout this report, refer to the Definitions at the beginning of the report. A Search Facility Area, Temporary Support Facilities (including Search Facility Area Ponds, parking lots, and Temporary Support Buildings), access roads, and a Healing Space are proposed to be constructed and operated to support the search activities. The proposed Search Facility Area is located at the northeast end of Phase II, within the future Cells 1 and 2 (**Drawing 1**). Two ponds (i.e., Search Facility Area Ponds 1 and 2) will be constructed to the south and north sides of the Search Facility Area, respectively, for surface water management purposes.

The excavated material will be hauled from the Excavation Area within Cells 11, 13 and 15 to the Search Facility Area, using the existing access roads and two proposed access roads located on the west, north and east sides of the Search Facility Area. Parking lots and Temporary Support Buildings to be used by workers during the operational period will be located on the west side of the proposed west access road (**Drawing 1**).

The proposed Healing Space is located to the south of the future Phase II Cell 9, and is located approximately 810 m from the Phase I material fill limit. The Healing Space will have a separate controlled entrance from Prairie Green Road and consist of a prefabricated building, with a kitchen, communal space, and private space. The Healing Space will not have overnight accommodations. The intention is to have the Healing Space available for the victims' families, Indigenous Elders and other community members to gather during operating hours.

3 HUMANITARIAN SEARCH PROJECT DESIGN

Excavated materials that are not pre-separated at the Excavation Area will be hauled to the Search Facility Area. To enhance traffic flow, two new access roads are proposed, connecting the existing roads to the Search Facility Area, allowing access from both the east and west directions (**Drawing 1**). This arrangement simplifies the operation by allowing inbound and outbound roads.

A plan view and cross-section of the proposed Search Facility Area is shown in **Drawings 6 and 7**, respectively. The design of the Search Facility Area, Temporary Support Facilities, and Healing Space is described below.

3.1 Excavation Area

3.1.1 Excavation Volume

Drawing 1 shows the location of the Excavation Area. **Drawings 2 and 3** show the isometric view of the Phase I ground conditions on May 11,2024 and the area that was filled between May 8, 2021 and June 4, 2022 in Cells 11, 13 and 15.

Drawing 4 shows cross-sections of the area of interest with a green background, i.e., the area between the May 8, 2021 and June 4, 2022 topographical surveys as well as the ground surface on May 5, 2023 and May 11, 2024. The volume of materials deposited between May 8, 2021 and June 4, 2022 topographical surveys was estimated as 72,000 m^3. The depth of material to be excavated is up to approximately 10 m.

3.1.2 Excavation Approach

The excavation is planned to be completed in a staged approach while maintaining stable side slopes and mitigating environmental impacts. **Drawing 5** shows a general sequence of activities to be completed during the excavation of the area of interest. The proposed sequence of the excavation activities are labeled as Stages 1 to 27 for illustrative purposes; however, the actual sequence of activities and number of Stages may change to suit Site conditions and sorting operations. The operational details of the proposed excavation stages are presented in Section 5.3.

3.1.3 Surface Water Management

Precipitation that falls within the Excavation Area will be contained by stormwater control berms (Drawing 5, Stage Item 1) and directed to infiltration pits or infiltration trenches (Drawing 5, Stage Item 3, 5, 9, 13). Subsequently, surface water will infiltrate into the existing landfilled material, and either be absorbed by material that has field capacity or eventually flow into the existing leachate collection system at the bottom of the material and will be managed as leachate.

3.1.4 Leachate Management

The landfill cells in the Phase I area have a continuous liner and underdrain leachate collection system that was designed, approved and constructed to collect leachate from landfilled material. Leachate removed from the Phase I area is hauled to the existing on-Site leachate evaporation pond for treatment, or to the City of Winnipeg Wastewater Treatment Plant under an existing disposal agreement.

Precipitation that falls within the Excavation Area that comes into contact with waste material will be managed as leachate as described under Section 3.1.3. Perched leachate encountered during excavation will be managed similarly, or pumped into a tanker truck and hauled to the existing on-Site leachate evaporation pond or the City of Winnipeg Wastewater Treatment Plant for treatment.

3.1.5 Geotechnical Considerations

The 2(H):1(V) design slopes proposed for the waste excavation are considered stable. This design is based on WSP experience with previous landfill material excavation projects, supported by Case Study: Deformations of a Steep Slope Excavated in a Municipal Solid Waste Landfill conference paper (**Appendix A**), where WSP (previously Golder Associates Limited) designed and monitored 2(H):1(V) and 1(H):1(V) slopes successfully excavated for the Barrie Landfill mining project in Ontario. The Barrie Landfill mining project had slopes up to 30 metres high at 2(H):1(V), which is 3 times higher than the approximately 10 m maximum height for the proposed project slopes. This design assumes the waste is not saturated and will be monitored by an experienced geotechnical engineer during excavation.

Notwithstanding, the following basic slope stability monitoring program is proposed to be implemented during excavation:

- Visual Monitoring - Daily visual inspections of all work area slopes by a qualified person to identify slope stability concerns (i.e., tension cracks, bulging, leachate seeps, etc.); and
- Survey Slope Stability Monitoring – Installation of survey stakes along the crest of the excavation slopes to monitor potential horizontal and vertical slope movement during excavation.

3.1.6 Landfill Liner and Leachate Collection System Protection

The approximately 8 m minimum vertical separation that exists between the bottom of the Excavation Area and the top of the leachate collection system (**Drawing 4**) will be maintained during excavation. Survey control measures will be implemented and monitored to confirm that the excavation aligns with the proposed plan and does not extend below the target elevations. The survey control measures will be sufficient to maintain a safe separation from the excavation limit to the existing leachate collection system and bottom liner.

3.2 Search Facility Area

The Search Facility Area is the area designated for the humanitarian search, with an engineered base (Search Facility Area Pad) and perimeter compacted clay berms. This area includes the Search Facility (**Drawing 1**). The preliminary design of the Seach Facility Area is outlined below.

3.2.1 Base Design

The Search Facility Area Pad will have a central ridge running in a west-east direction designed at a higher elevation that will provide a water drainage divide. The Search Facility Area Pad will be graded at 1% from the central ridge toward the low-lying area to the north and south ends of the Search Facility Area Pad.

The base of the Search Facility Area Pad will consist, from bottom to top, of underlying low permeability native clay, a compacted clay subgrade leveling layer, a 600 mm thick compacted clay liner, and a granular layer. This design provides an adequate liner as discussed above and a working surface for operations and water drainage (**Drawing 7**).

The base will be designed with ridges and valleys (sawtooth design) to allow crossfalls graded at 2% to more efficiently direct stormwater and leachate (if any) to the perforated tubing and allow a thicker cover above the tubing. This granular layer will have a thickness ranging from 800 mm at the ridges to 950 mm at the valleys.

An asphalt floor will be placed on top of the granular layer inside the Search Facility.

Where necessary for worker's health and safety, rubber mats or an equivalent, will be placed at working areas on top of the asphalt floor. These rubber mats will provide a working surface for workers standing on the Search Facility Area and may be relocated as needed.

3.2.2 Leachate Containment and Seepage Control

Leachate generation within the Search Facility Area will be minimized as material will be placed and searched under a prefabricated fabric covered building (Search Facility) to be provided with an asphalt floor for enhanced leachate seepage control. Precipitation that falls within the Search Facility Area will therefore have limited exposure to waste material and will be collected by the Search Facility Area Ponds.

Leachate generated inside the Search Facility during the material search or from washing/decontamination activities will be contained inside the building. Leachate will be directed to a temporary concrete sump or holding tank from where the leachate will be collected and hauled to the City of Winnipeg Wastewater Treatment Plant.

A 600 mm thick compacted clay liner underneath the Search Facility Area provides a containment redundancy to mitigate leachate seepage in case there is a leachate leakage through asphalt surface cracks, floor drains or holding tank(s). The compacted clay liner will be constructed with clay material with a hydraulic conductivity lower than 1×10^{-7} cm/s. This liner design provides travel time (i.e., a barrier with no leakage) for approximately 7.5 years [0.6 m thick liner / [1.0 gradient x 1×10^{-9} m/s hydraulic conductivity (/ 0.4 porosity) x 3600 s/h x 24 h/d x 365 d/y)], i.e., it will provide an effective barrier for a period of time significantly longer than the expected operational period for the Search Facility Area. The actual travel time will be longer because leachate is not continuously present above the liner. For additional context, the bottom of the Search Facility Area will be constructed above the native upper clay layer, maintaining its existing 1 m to 1.2 m thickness, which will also provide some level of containment, although not considered in the travel time calculation above.

The compacted clay liner will be overlain by an 800 mm to 950 mm thick granular layer, which will include drainage perforated tubing to drain stormwater to the Search Facility Area Ponds. The perforated tubing will be corrugated high density polyethylene (HDPE) tubing wrapped with nonwoven geotextile filter. This design meets the minimum 600 mm cover required by the tubing manufacturer. In addition, the proposed asphalt floor inside the Search Facility will provide additional seepage control and leachate containment.

3.2.3 Drainage Control

The Search Facility Area Pad will be graded at 1% from the central ridge toward the low-lying area to the north and south ends of the Search Facility Area Pad. This design allows runoff from the Search Facility Area Pad to flow away from the central ridge and towards low-lying areas and then be directed to the Search Facility Area Ponds.

Perforated HDPE tubing (100 mm diameter) wrapped with nonwoven geotextile will be placed approximately every 15 m on top of the compacted clay liner (i.e., bottom of granular layer) to improve drainage. Perforated drainage tubing will also be placed along the toe of the stormwater diversion berms to direct water (or any accidental leachate) to the Search Facility Area Ponds (**Drawing 6**).

3.3 Search Facility

The approximate location of the Search Facility is shown on **Drawing 1**. The exact size and location of the Search Facility will be determined at detailed design stage.

The complete details of the Search Facility have not been finalized. However, it is recognized that the Search Facility will be comprised of a temporary prefabricated fabric covered building within the Search Facility Area Pad. The details of the lined pad are described above, and will include the addition of an asphalt floor to be placed on top of the granular layer inside the Search Facility for enhanced drainage and seepage control. The foundation of the prefabricated fabric covered building will be designed to not compromise the integrity of the compacted clay liner and perforated HDPE tubing.

The building will have a designated area for receiving search material at one end, a sorting operation in the core, and a post-search material shipping area at the opposite end. Additionally, there will be a staging area for forensic screening within the Search Facility.

The temporary prefabricated fabric covered building will be serviced with required electrical and mechanical services to allow a safe working environment.

Emergency showers and eyewash stations will be located in the Search Facility and may discharge water directly to the asphalt surface inside the building and directed to a sump or temporary holding tank.

Washing and decontamination of equipment can also be undertaken inside the building, and water will be directed to a sump or temporary holding tank.

3.4 Search Facility Area Ponds

The base of the Search Facility Area Ponds will be excavated to the bottom of the existing silt, to have the proposed compacted clay liner keyed in with the native lower clay soil. A 600 mm thick compacted clay liner overlaid by a 500 mm compacted clay layer is proposed to mitigate potential leachate impacted stormwater seepage (in case of leakage outside the Search Facility Pad). The 500 mm compacted clay layer will serve a protective layer to the compacted clay liner. The Search Facility Area Ponds will have compacted clay perimeter berms to contain stormwater and leachate from the search operations.

Search Facility Area Pond 1 has a design storage capacity of 8,168 m^3 below the 0.3 m freeboard. This volume is sufficient to contain two 1:100 year rainfall runoff events assuming this pond is completely empty at the start of the rainfall event.

Search Facility Area Pond 2 has a design storage capacity of 6,682 m^3 below the 0.3 m freeboard. This volume is sufficient to contain two 1:100 year rainfall runoff events assuming this pond is completely empty at the start of the rainfall event.

It is assumed the contents of the Search Facility Area Ponds will be impacted by leachate, unless determined otherwise through laboratory analysis. Water collected at the Search Facility Area Ponds will be temporarily stored to allow evaporation unless pond target or maximum levels are reached.

The water level in the Search Facility Area Ponds will be monitored and maintained at a target level up to half the storage capacity and up no more than the maximum level of 0.3 m below the crest of the pond perimeter berms. When water level reaches the target or maximum levels described above, water shall be hauled to the City of Winnipeg Wastewater Treatment Plant if determined through laboratory analysis that the water has been impacted by leachate.

Refer to the attached Stormwater Management Ponds Assessment Technical Memorandum (**Appendix B**) for additional details.

3.5 Temporary Support Buildings

Temporary Support Buildings, similar to construction trailers, will be established adjacent to the Search Facility. The Temporary Support Buildings will be located within the area identified in **Drawing 1** as “Limit of Search Facility Area and Temporary Support Facilities”. The exact number, size, and location of the Temporary Support Buildings will be determined during detailed design at a later stage. These buildings will provide the following:

- Administrative Office Space;
- Forensic Anthropologist Space, i.e. a secure and restricted space to complete material specific identification;
- Washroom Facilities with a built-in or underground holding tank;

- Decontamination facilities (i.e., secure shower rooms), lockers, and change rooms;
- Personal Protective Equipment (PPE) warehouse area;
- Health, Safety and First Aid space;
- Lunch / break room space; and
- Equipment / Cold Storage / Maintenance Space.

3.6 Healing Space

The Healing Space is proposed to support the humanitarian search operations. The Healing Space would be a designated building for communal gathering of the family, friends, community members, Elders, Healers and Knowledge Keepers to gather as the humanitarian search proceeds. This space would be established to provide a safe gathering space to facilitate any guidance, administration of ceremony or Elder counseling to family and / or search team members. The Healing Space will be a prefabricated building, with a kitchen, communal space, and private space, but will not have overnight accommodations.

The Healing Space will be located on the south limit of the Prairie Green IWMF property and will have a separate entrance and parking area off the Prairie Green Road (**Drawing 1**). The Healing Space will be fully fenced to prevent unauthorized access into the IWMF, and access from Prairie Green Road will be controlled with a lockable gate.

3.6.1 Setback Requirements

Policy Number PO-18-1926-14 (Construction of Buildings on or within 400 m of a Landfill) was issued by Manitoba's Environmental Approvals Branch (Policy) with a June 19, 2023 revision date. The Policy restricts the construction of buildings that do not support landfill operations and maintenance on or within 400 m of a landfill. The purpose of the Policy is to provide a land use control mechanism while protecting the public from potential landfill impacts.

The proposed Healing Space will be separated from Phase I, (i.e., the approved material disposal area that has been developed), by approximately 810 m. The Healing Space will also be separated from the Search Facility Area by approximately 450 m. Therefore, although the Healing Space would be located within the property boundaries of an active landfill, it will maintain a separation distance of more than 400 m from any material disposal or handling area.

A Technical Memorandum issued by WSP requesting a variance to the Policy was submitted to the Environmental Approvals Branch on May 16, 2024 (**Appendix C**). The variance request was approved on May 22, 2024 (**Appendix D**).

4 OPERATIONS

4.1 Hours of Operation

The operating hours for the Search Facility Area will coincide with or will be within the hours of the Site operation, which is from 5:30 AM to 5:00 PM, Monday to Friday, and from 6:00 AM to 1:00 PM on Saturdays, except for New Year's Day, Remembrance Day, and Christmas Day. The hours and days of operation are posted at the Site entrance.

4.2 Access and Security

Access to the Excavation Area and Search Facility Area will be via the Site main entrance and on-Site roadways.

Traffic in the vicinity of the Excavation Area and Search Facility Area will be limited to the trucks and equipment related to its operation. The humanitarian search operations are anticipated to occur on a year-round basis. As such, all-weather access roads will be provided to the Search Facility Area.

The existing access roadways accommodate passenger cars, commercial material hauling vehicles and walking floor trailers, and therefore are suitable for the traffic related to the humanitarian search operations. The access road to the Excavation Area may be re-routed as the excavation activities develop.

The Site is operated and maintained in a secure manner. The Site is fully fenced and secured to prevent unauthorized access. The main entrance gate is locked when the Site is not attended and/or in use. Access from the Healing Centre into the IWMF will be by returning to the Prairie Green Road, and entering the IWMF through the existing main entrance gate.

The hours and days of operation are posted and visible before entering the Site. All visitors to the Search Facility Area must present themselves to the scale house operator upon entering the Site, who controls access to the Site areas including the Search Facility Area.

4.3 Material Excavation

As mentioned above, the excavation is planned to be completed in a staged approach while maintaining stable side slopes and mitigating environmental impacts (**Drawing 5**). The proposed activities are labeled as Stages 1 to 27 for illustration purposes; however, the actual sequence of activities and number of Stages may change to suit Site conditions.

Prior to excavation, a temporary stormwater control berm will be constructed with compacted clay on the crest of the existing side slopes, to contain stormwater and leachate runoff (Stage 1). Subsequently, the existing cover will be progressively removed and stockpiled for reuse (Stage 2), and the excavation of material will be initiated and proceed until an infiltration trench or pit is established at low points (Stage 3). Following progressive removal of existing cover, the excavation of the Stage 4 area will then proceed to form a minimum 2% slope at the bottom toward the existing infiltration trench or pit. After that, Stage 5 will be completed to form a new infiltration trench or pit before starting the excavation of the next stage. Stage 6 will proceed to form a minimum 2% slope at the bottom toward the existing infiltration trench or pit. The existing temporary stormwater control berm (completed under Stage 1) and material underneath it will not be removed until the west slope of the Stage 6 area is completed to act as a new temporary berm. This process of forming a new infiltration trench pit on the low end and a temporary berm on the upper end of each excavation phase will contain stormwater and leachate runoff. Additional existing cover will be removed (Stage 7) prior to material excavation (Stage 8). This sequence of activities will repeat until the excavation reaches the bottom of the area of interest or the humanitarian search objectives are achieved.

The excavated material will be hauled from the Excavation Area within Cells 11, 13 and 15 to the Search Facility Area, using the existing and proposed new access roads. Following the completion of the humanitarian search activities, the cleared material will be hauled to the active working face of Phase I.

4.3.1 Large Materials Separation

Large materials such as carpet rolls, mattresses and pieces of furniture may be separated at the Excavation Area and hauled to the active working area after search and clearance as necessary, i.e., large materials may be separated, properly searched and by-pass the Search Facility Area.

4.3.2 Asbestos Management

The IWMF accepts for disposal asbestos containing materials (ACM) generated from site remediation projects. In accordance with Condition 34 of the Approval, the Site does not accept unbagged asbestos waste and all ACM must be contained and transported in accordance with all applicable Provincial rules and regulations. The Excavation Area will include ACM that had been contained in designated yellow bags to prevent the release of asbestos fibres and asbestos containing dust. The Site-specific procedure established for ACM handling in the IWMF (**Appendix E**) needs to be followed for asbestos management during the excavation.

Only trained and properly equipped personnel will handle ACM, and all non-essential personnel will be required to evacuate the area until the ACM has been safely removed. The operators of the material handling machines will ensure that the equipment are upwind from the ACM at all times.

The IWMF does not accept ACM without applicable containment, but general construction and demolition debris containing trace elements of asbestos may be potentially present in the waste stream. Therefore, extra precaution will be taken, and construction and demolition debris identified during excavation will be managed as having the potential to contain ACM. These materials will be segregated and wetted down by a water truck available at the Excavation Area to prevent dust particles becoming airborne.

No ACM bags found in the Excavation Area will be transported to the Search Facility Area. If ACM bags are found or identified by equipment operators in the Excavation Area, all operations will immediately stop. Non-essential personnel and equipment will be required to evacuate to a pre-determined upwind location. Once the Excavation Area has been safely setup (i.e., water truck in-place, equipment staged upwind, etc.), the ACM will be directly loaded and hauled to a designated disposal area for ACM. This area will be located more than approximately 46 m (150 feet) from the commercial tipping floor and downwind to prevent airborne particles from posing a risk to workers.

If any ACM bags are punctured during excavation, a water truck will be available to the Excavation Area to wet down the ACM and prevent dust particles from becoming airborne. Additionally, provisions will be made for personnel to decontaminate in case of spills or other circumstances resulting in contamination of their work clothing or person. A portable vacuum that contains a HEPA filter will be kept near the Excavation Area for operator use to collect airborne asbestos particles.

Equipment in accidental contact with ACM will be thoroughly wetted to prevent ACM from becoming airborne in the vicinity of the disturbance area.

4.3.3 Daily Cover

At the end of each working day, daily cover will be applied to material exposed by the excavation activities. Daily cover material includes native soil or alternative daily cover such as straw, automobile shredder residue (ASR), or retractable tarps. Retractable tarps may be preferred to minimize excavation volumes.

4.4 Material Receipt and Handling at the Search Facility

Excavated materials that are not pre-separated at the Excavation Area will be hauled to the Search Facility Area through the existing and proposed access roads. As mentioned above, there will be two separate accesses to the Search Facility Area to allow efficient inbound and outbound traffic flow. The material will be temporarily stored under the Search Facility before and after the search process. This will minimize the amount of generated leachate from the stored material as any precipitation will be shed by the Seach Facility.

The sorting operation will be completed in the Search Facility. The operation may be manual, mechanical or a combination of both methods.

Once material is searched and cleared, it will be hauled back to the active working face of the IWMF. Regular landfill operation procedures will then apply to the post-search material.

4.5 Solid and Liquid Waste Management at the Search Facility Area, Temporary Support Buildings and Healing Space

Domestic solid and liquid waste will be generated in the Search Facility Area, Temporary Support Buildings and Healing Space. Therefore, waste management is required for those areas.

Water will be required in the Search Facility Area for routine washing of the area and equipment designated for humanitarian search activities to control odours and vectors. A separate water storage will be available for emergency shower and eye wash stations. The wash water will be directly discharged to a temporary concrete sump or holding tank from where the leachate will be collected and hauled to the City of Winnipeg Wastewater Treatment Plant.

Potable water required in the Temporary Support Buildings and Healing Space will be supplied from potable water storage tanks. Gray and black wastewater from these facilities will be stored in built-in or underground holding tanks and periodically removed by a licenced liquid waste hauler for disposal off-site at a licenced facility. The holding tanks will be located in close proximity to the Temporary Support Buildings and Healing Space. The exact need and location will be determined during detailed design and project implementation.

Domestic solid waste generated in the Search Facility Area, Temporary Support Buildings and Healing Space will be disposed of at the working face of the IWMF on a regular basis.

4.6 Health and Safety

A project-specific exposure control plan (ECP) will be developed and implemented prior to commencement of the proposed operations.

To mitigate the exposure to workers, health and safety training and appropriate PPE will be required for all search technicians and staff on site. Training may include Hazmat, PPE, Emergency First Aid, and other applicable Health and Safety topics.

5 CONTROLS AND CONTINGENCIES

5.1 Dust

Dust from humanitarian search activities may be generated by vehicles travelling on gravel haul roads located on-Site, material handling, and wind erosion of cover material and stockpiles. Provided that Search Area

housekeeping and maintenance procedures are followed, the likelihood of nuisance dust generated from the search operations is anticipated to be low.

The existing dust control program for the Site will be extended to the search operations. To minimize the potential for dust, internal access roadways will be watered as required.

Site personnel will be responsible for monitoring for nuisance dust and implementing measures to alleviate concerns, if identified.

5.2 Noise

The maintenance of a buffer zone between the Search Facility Area and adjacent receptors will help to restrict any additional noise at the Site resulting from additional equipment operations.

To minimize the potential for nuisance noise due to the search operations, preventative measures may include the following:

- Proper maintenance of all equipment used for humanitarian search operation;
- Staggering the use of equipment with higher noise ratings operating in other areas of the Site and the use of equipment with higher noise ratings needed for humanitarian search operations; and
- Maintenance of buffering features at the Site, including berms and vegetation.

5.3 Odour

It is anticipated that odour will be generated from the humanitarian search activities. The existing odour management program implemented at the Site will therefore be extended to the Excavation Area and will include but not be limited to:

- Maintaining a small waste excavation area, limited to one day's volume of search material;
- Covering the excavation area at the end of each working day with soil or other suitable and approved on-Site daily cover material; and
- Utilizing odour neutralizer product delivered through a dry-vapour (i.e., waterless) based systems.

An odour mitigation system is being proposed for the Search Facility, which will be the only area to receive and process excavated waste material. These types of systems utilize non-toxic and biodegradable odour neutralizing compounds, delivered through water-soluble or dry-vapour (i.e., waterless) systems. An all-natural and non-chemical dry-vapour system is being proposed for the Search Facility and will not contribute to leachate generation and allows for year-round use including during cold winter conditions. Employees can also be provided with a portable dispensing system to release a non-toxic odour neutralizer on equipment or material, as required. Reference material for an example of the type of odour mitigation system proposed for the facility is attached in **Appendix F**.

Maintaining good housekeeping practices will further support the minimization of odour emissions from the Search Facility Area. To minimize the potential for odour emissions from the humanitarian search operations, preventative measures may include the following:

- Routine housekeeping, including the sweeping and removal of material and other debris from the Search Facility Area;
- Routine maintenance of the Search Facility Area Pad, repairing divots, and other low-lying areas that may lead to ponding water, and ensuring adequate drainage is maintained; and

- Routine wash and disinfection of the Search Facility and search equipment.

Site personnel will be responsible for monitoring for nuisance odour and implementing measures to alleviate concerns, if identified. Days exhibiting high humidity, warm temperatures, and little or no air movement shall require careful odour observation and odour management.

5.3.1 Odour Monitoring

Daily odour surveys will be conducted around the Excavation Area and Seach Facility to detect and verify odour intensity. To detect potential off-Site odour impacts, periodic odour surveys will be undertaken daily at the Site boundary downwind of the prevailing wind, including the following locations:

- Northeast corner (Road 69N and CP Rail Intersection);
- Northwest corner (Provincial Trunk Highway 7 and Road 69N Intersection);
- Western Boundary (opposite Adesa Business on Provincial Trunk Highway 7);
- Southwest corner (Provincial Trunk Highway 7 and Road 68N Intersection);
- Healing Centre; and
- Southeast corner (Road 69N and CP Rail Intersection).

If specific odours are detected due to the excavation and/or the Search Facility, odour mitigation measures will be implemented. This could also include the suspension of operations until odours can be mitigated or a change in weather occurs to provide more favourable site conditions.

5.4 Litter

Litter resulting from the humanitarian search activities will be monitored as part of the routine general housekeeping practices. It is anticipated that litter control measures, including increased frequency of inspections and increased resources to complete collection, will be augmented due to the nature of the search activities. Existing procedures and methods employed at the Site for the control of windblown litter will be adhered to as part of the humanitarian search operations. A litter control program is continually in operation at the Site and includes daily monitoring for litter, both on-Site, on the access road to the Site, and along the Site perimeter and Provincial Trunk Highway 7.

To minimize the potential for blowing litter from to the humanitarian search operations, preventative measures may include the following:

- Maintaining existing Search Facility Area features, including perimeter berms and prefabricated fabric covered building, to trap litter before it leaves the Search Facility Area; and
- Routine housekeeping, including the sweeping and removal of material and other debris from the Search Facility Area.

In addition, litter fencing (i.e., portable windscreens) will be placed along the Excavation Area and could also be provided along the Search Facility Area perimeter berm, if required. The location of the litter fencing will be moved as required for effective litter control.

Any collected litter will be stored within a covered container, which is removed for disposal in the landfill component of the Site as necessary, or at the end of each operating day.

5.5 Vectors and Vermin

Provided that Search Facility Area housekeeping and maintenance procedures are followed, the likelihood of the Search Facility Area attracting vectors and vermin is anticipated to be low.

Continued implementation of the Site's Gull Control Program will help to minimize the attraction of gulls to the Search Facility Area and the risk of potential hazard to aircraft using the Winnipeg International Airport.

To minimize the potential for vectors and vermin at the Search Facility Area, preventative measures may include the following:

- Ongoing housekeeping measures, such as litter pick up;
- Routine wash and disinfection of the Search Facility and search equipment; and
- Routine maintenance of the Search Facility Area to prevent ponded water.

Should vectors and/or vermin become a concern at the Search Facility Area, the same control measures developed for the Site will be employed for the Search Facility Area. Site equipment operators are trained in the use of approved deterrent devices for birds (e.g., pyrotechnics). A licenced pest control contractor can provide the necessary services to control pest should it become a concern.

5.6 Complaints Response Program

The Complaints Response Program developed for the Site will apply to the Humanitarian Search Project. Complaints will be recorded separately for the Humanitarian Search Project and should include details, where available, as to the nature of the complaint, applicable environmental conditions (e.g., wind direction, etc.), the name and address of the complainant, the date and time of the compliant, investigative/ corrective actions taken, and a determination of what follow up, if any, is requested and in what form (i.e., email, phone call, etc.). Complaints will be communicated to the Community Liaison Committee in accordance with the pre-established complaints response procedures for the Site.

If at least five (5) written noise or odour complaints are received within a 90 day period from five (5) different individuals who do not live in the same household, the events will trigger a "noise or odour nuisance".

Any operation or construction that results in a "noise or odour nuisance" should be mitigated.

Whenever an odour or noise complaint is received, the assigned Environment Officer from Manitoba Environment and Climate Change should be informed within 48 hours and be provided with a summary on the incident, including details on what actions are taken to resolve the concerns.

5.7 Environmental Monitoring

A comprehensive groundwater monitoring program is currently approved for the Site and is completed annually, serving as an early detection system for any unacceptable discharges of contaminants from the property. Monitoring is completed annually for a comprehensive list of parameters, including organics, inorganics, nutrients, metals, and petroleum hydrocarbons, including BTEX components. A detailed description of the groundwater monitoring well system at the Site is provided in the annual monitoring reports. At this point, no changes to the monitoring program as a result of the proposed Humanitarian Search Project are proposed.

5.8 Emergency Response Program

In the event of an emergency incident, including personal injury, fire, spills, and inclement weather, the humanitarian search will operate in accordance with the emergency response program developed for the Site.

The signage posted at the Site entrance includes the emergency contact number for use in the event an emergency outside of regular Site operating hours.

Smoking will not be permitted at the Search Facility Area, and will only be permitted in the currently designated areas. Water needed for possible fire control may be pumped directly from the existing Stormwater Management Ponds. Furthermore, heavy equipment and proposed facilities (if required) will be equipped with appropriate fire extinguishers.

6 DOCUMENTATION

6.1 Records

The hauling vehicles will not be required to cross the weight scales before and after the search process. The number of truckloads and daily amount of waste hauled from the Search Facility Area to the active working area in the landfill will be recorded. Periodic surveys of the excavation area will further be used to determine material volumes processed.

Additional records to be maintained for the Search Facility Area will include:

- Volume of leachate hauled from the Search Facility Area Ponds for treatment;
- Public complaints and actions taken to address complaints; and
- Inspection and odour survey reports.

6.2 Reporting

A report of the humanitarian search activities will be prepared annually. The report will be separate from the Site annual report and will have different reporting requirements. The report will include the excavation volume, number of truckloads and daily amount of waste hauled from the Search Facility Area to the active working area in the landfill, findings of the search process, volume of the leachate hauled for treatment, inspection reports, complaints received, and actions taken in response to complaints.

7 PROPOSED SCHEDULE

The Humanitarian Search Project is anticipated to be initiated in the summer of 2024. The duration of the project will be dependent on the volume of waste material to be searched, which is to be confirmed. Details will be shared with Environment and Climate Change when they become available.

8 SEARCH FACILITY CLOSURE AND DECOMMISSIONING PLAN

Once the humanitarian search activities are completed, any remaining material in the Search Facility will be removed. The temporary buildings, Search Facility and contents associated with the Humanitarian Search Project will be removed. The Search Facility Area is proposed to be repurposed and reused as a composting facility in accordance with an existing NOA application under review by Manitoba Environment and Climate Change, avoiding the need to decommission this area, (i.e., perimeter berms and granular pad will remain in place). The contents of the Search Facility Area Ponds may be removed if deemed necessary prior to the reuse for future composting operations. The asphalt pavement condition will be assessed, and a determination will be made if it will remain in place for reuse or removed and recycled,

The Manitoba Environment and Climate Change's Environmental Approvals Branch will be notified before removal of the Healing Space as required by the Variance Approval letter (**Appendix D**).

Signature Page

WSP Canada Inc.

[redacted]

Darren Keam, M.Sc., P.Ag.
Group Manager, Earth & Environment

[redacted]

Fabiano Gondim, M.Eng., P.Eng.
Senior Waste Engineer

Frank Barone, Ph.D., P.Eng. (ON)
Senior Geo-Environmental Engineer

DK/MZ/FRG/FSB/al

https://wsponlinecan.sharepoint.com/sites/ca-ca00295732620/shared documents/05. technical/3.0 design & operations report/ca0029473.2620_rpt_rev0_designoperationreport_04jun2024 - rev on 10jun2024.docx

[redacted]

Drawings

LEGEND

- PROPERTY LIMITS
- APPROVED SITE BOUNDART
- APPROVED LIMITS OF WASTE
- CELL DIVIDE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- EXISTING RAILWAY (CPR)
- EXISTING FENCING
- EXISTING DRAINAGE DITCH
- EXISTING WATER BODY
- EXISTING TREE LINE
- EXISTING MONITORING WELL LOCATION (GOLDER ASSOCIATES, 1994)
- EXISTING GROUND SURFACE CONTOUR (INTERVAL 1.0 masl)
- FUTURE ROAD
- PROPOSED HYDRO POLE
- 1 PHASE I AND II CELL ID

NOTE(S)

1. PROJECTION IS LOCAL SITE COORDINATE SYSTEM.

REFERENCE(S)

1. EXISTING GROUND SURFACE, DATED MAY 11, 2024 BY CANADIAN UAV SURVEY.
2. GROUND FEATURES DATED MAY 08, 2021 BY THE BASE MAPPING CO. LTD.

0 200 400
1:8,000 METRES

NOT FOR CONSTRUCTION

FINAL

CLIENT
WASTE CONNECTIONS OF CANADA INC.

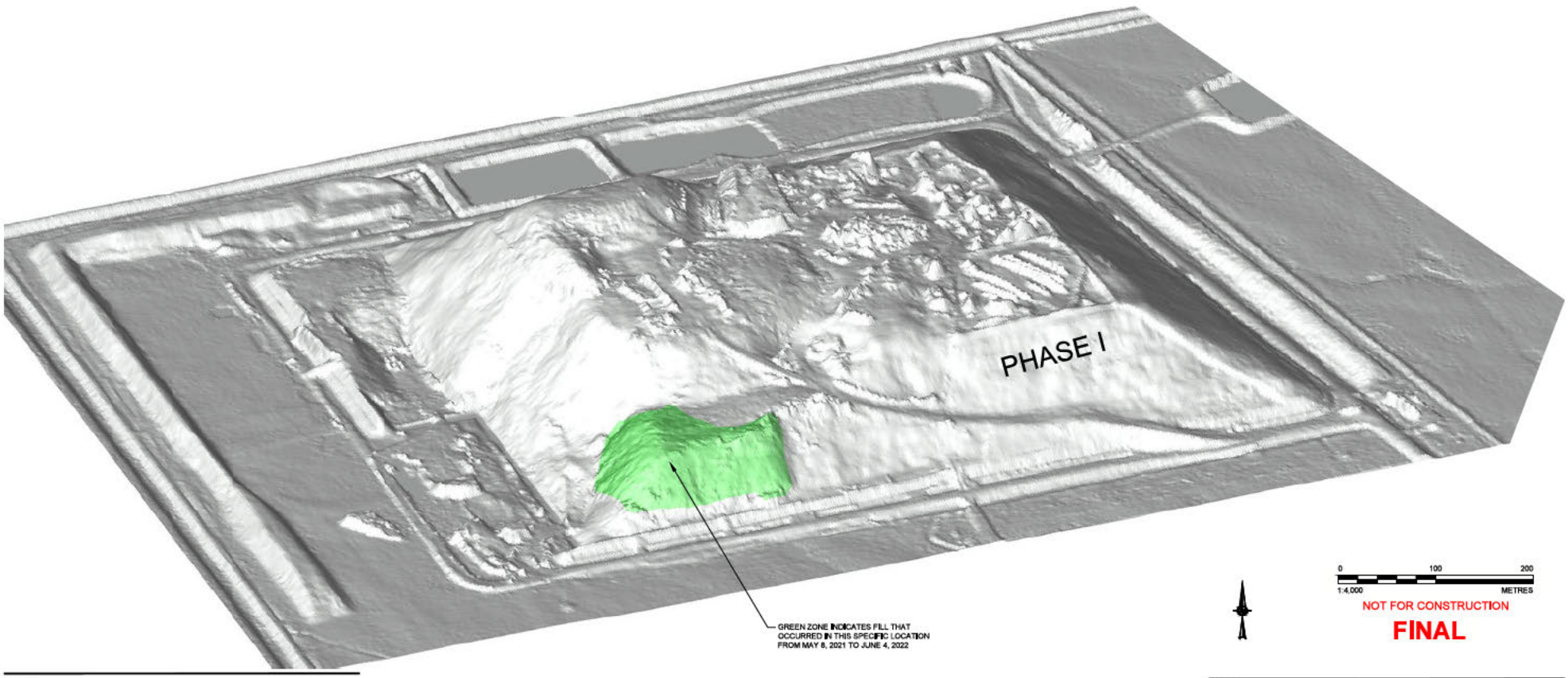
PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
GENERAL SITE PLAN

CONSULTANT
wsp

YYYY-MM-DD	2024-05-24
DESIGNED	FRG
PREPARED	AZ
REVIEWED	FSB
APPROVED	FRG

PROJECT NO.	CONTROL	REV.	DRAWING
CA0029573.2620	0001	A	1



0 100 200
1:4,000 METRES

NOT FOR CONSTRUCTION

FINAL

NOTE(S)

1. PROJECTION IS LOCAL SITE COORDINATE SYSTEM.
2. 4 TIMES VERTICAL EXAGGERATION ISOMETRIC VIEW.

REFERENCE(S)

1. EXISTING GROUND SURFACE, DATED JUNE 04, 2022 BY VOLATUS AEROSPACE CORP.

CLIENT
WASTE CONNECTIONS OF CANADA INC.

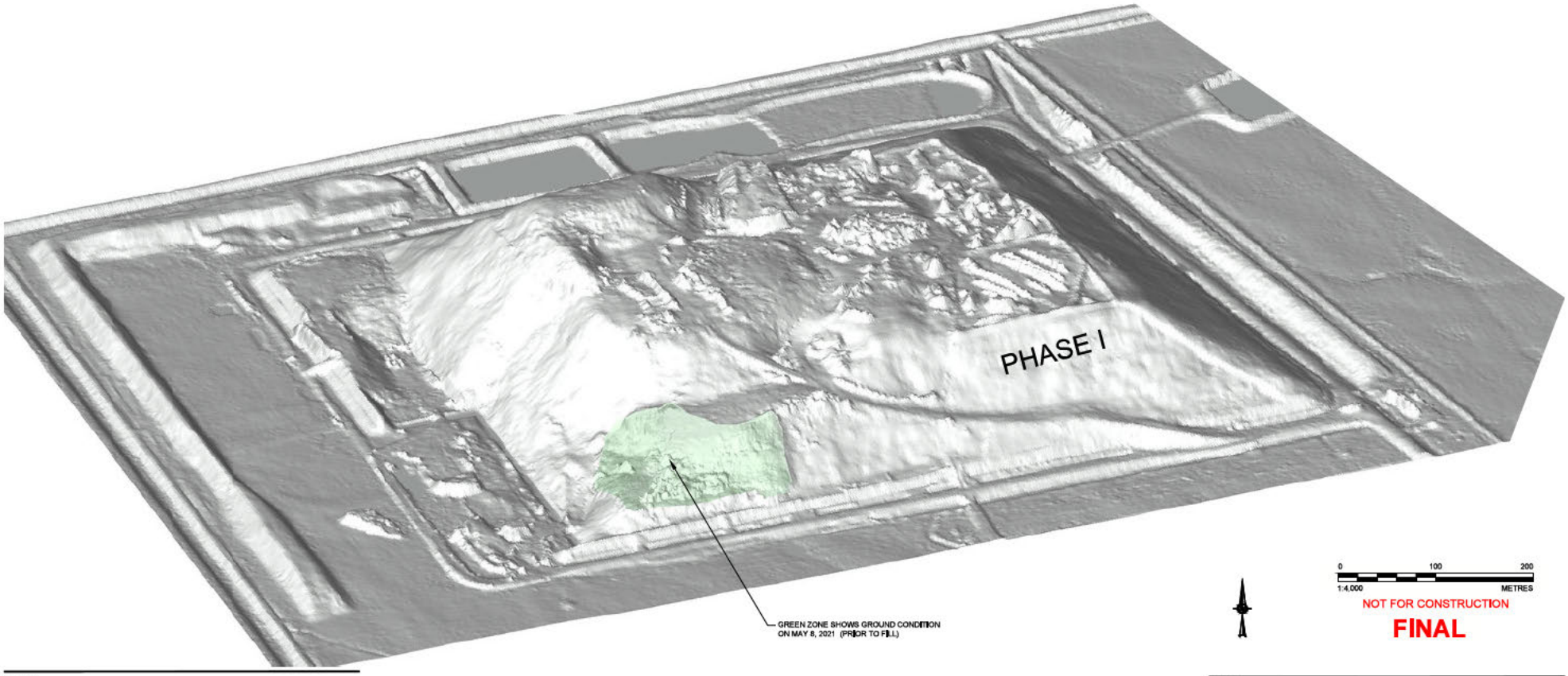
PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
ISOMETRIC VIEW WITH CHANGES FROM MAY 8, 2021 TO JUNE 4, 2022 MAPPINGS

CONSULTANT

YYYY-MM-DD	2024-05-24
DESIGNED	FRG
PREPARED	AZ
REVIEWED	FSB
APPROVED	FRG

PROJECT NO.	CONTROL	REV.	DRAWING
CA0029573.2620	0001	A	2



0 100 200
1:4,000 METRES

NOT FOR CONSTRUCTION

FINAL

NOTE(S)

1. PROJECTION IS LOCAL SITE COORDINATE SYSTEM.
2. 4 TIMES VERTICAL EXAGGERATION ISOMETRIC VIEW.

REFERENCE(S)

1. EXISTING GROUND SURFACE, DATED JUNE 04, 2022 BY VOLATUS AEROSPACE CORP.

CLIENT
WASTE CONNECTIONS OF CANADA INC.

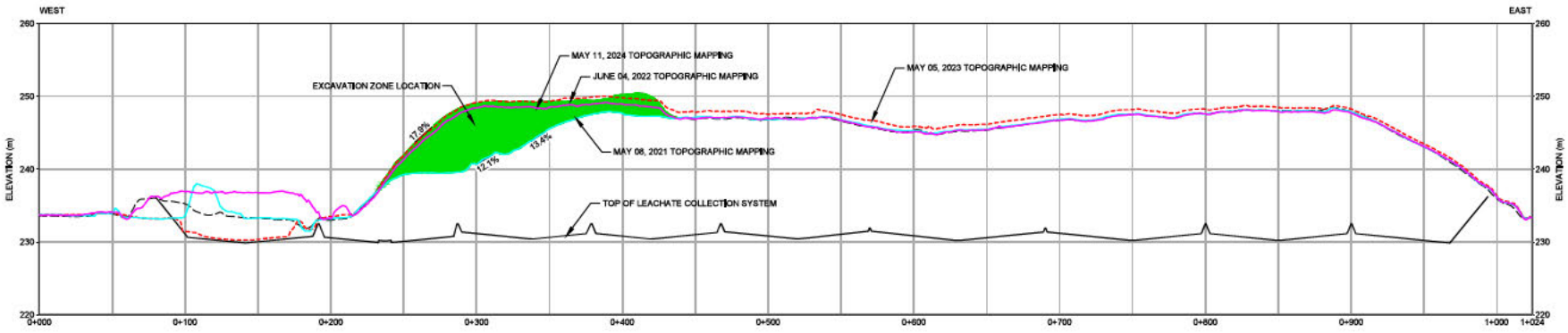
PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
ISOMETRIC VIEW WITH CHANGES FROM MAY 8, 2021 TO JUNE 4, 2022 MAPPINGS (PRIOR TO FILL)

CONSULTANT

YYYY-MM-DD	2024-05-24
DESIGNED	FRG
PREPARED	AZ
REVIEWED	FSB
APPROVED	FRG

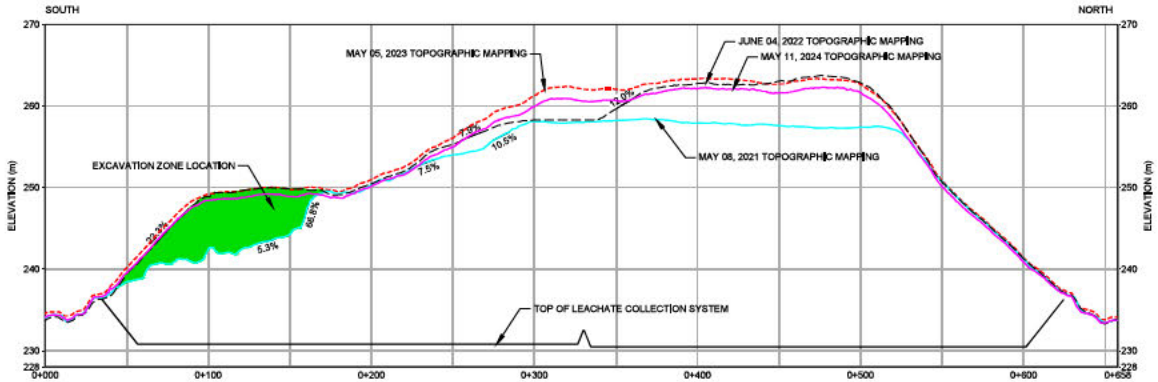
PROJECT NO.	CONTROL	REV.	DRAWING
CA0029573.2620	0001	A	3



SCALE 1:3000 m
V.E. = 5x

A
1

PHASE I SECTION A-A'



SCALE 1:3000 m
V.E. = 5x

B
1

PHASE I SECTION B-B'

NOTE(S)

1. PROJECTION IS LOCAL SITE COORDINATE SYSTEM.
2. VOLUME OF EXCAVATION ZONE BETWEEN JUNE 4, 2022 AND MAY 8, 2021 SURFACES: 72,000 m³.

0 50 100
1:3,000 METRES

NOT FOR CONSTRUCTION

FINAL

CLIENT
WASTE CONNECTIONS OF CANADA INC.

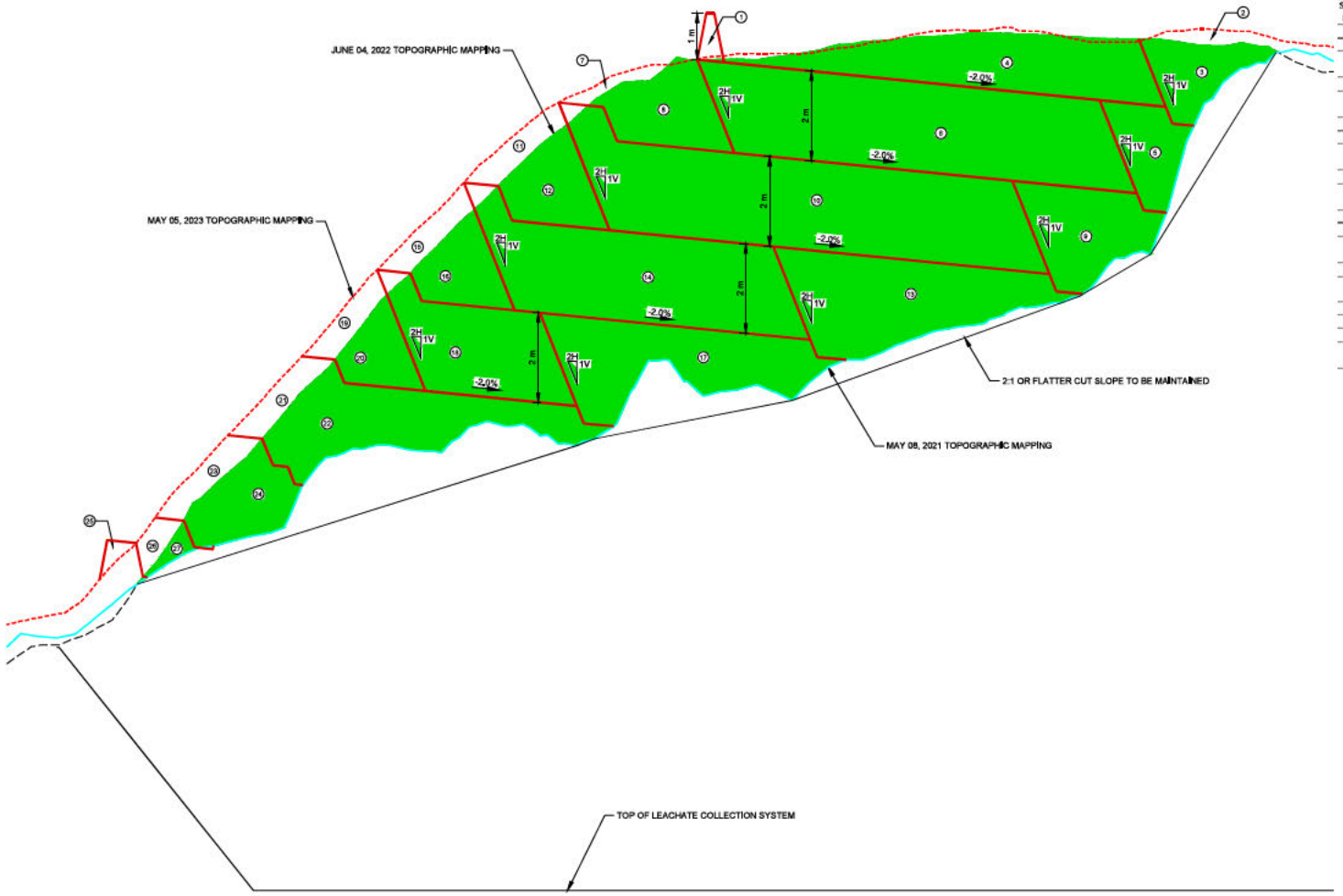
PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
SECTIONS A-A' AND B-B'

CONSULTANT

YYYY-MM-DD	2024-05-24
DESIGNED	FRG
PREPARED	AZ
REVIEWED	FSB
APPROVED	FRG

PROJECT NO.	CONTROL	REV.	DRAWING
CA0029573.2620	0001	A	4



GENERAL SEQUENCE OF ACTIVITIES REQUIRED FOR WASTE EXCAVATION

STAGE ITEM	DESCRIPTION
1	CONSTRUCT TEMPORARY STORMWATER CONTROL BERM PRIOR TO REMOVAL OF EXISTING COVER
2	REMOVE EXISTING COVER PRIOR TO WASTE EXCAVATION
3	EXCAVATE WASTE TO FORM AN INFILTRATION PIT OR INFILTRATION TRENCH AT LOW POINTS
4	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
5	EXCAVATE WASTE TO FORM AN INFILTRATION PIT OR INFILTRATION TRENCH AT LOW POINTS
6	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
7	REMOVE EXISTING COVER PRIOR TO WASTE EXCAVATION
8	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
9	EXCAVATE WASTE TO FORM AN INFILTRATION PIT OR INFILTRATION TRENCH AT LOW POINTS
10	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
11	REMOVE EXISTING COVER PRIOR TO WASTE EXCAVATION
12	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
13	EXCAVATE WASTE TO FORM AN INFILTRATION PIT OR INFILTRATION TRENCH AT LOW POINTS
14	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
15	REMOVE EXISTING COVER PRIOR TO WASTE EXCAVATION
16	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
17	EXCAVATE WASTE TO FORM AN INFILTRATION PIT OR INFILTRATION TRENCH AT LOW POINTS
18	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
19	REMOVE EXISTING COVER PRIOR TO WASTE EXCAVATION
20	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO THE INFILTRATION PIT/TRENCH
21	REMOVE EXISTING COVER PRIOR TO WASTE EXCAVATION
22	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO INFILTRATION PIT/TRENCH
23	REMOVE EXISTING COVER PRIOR TO WASTE EXCAVATION
24	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO INFILTRATION PIT/TRENCH
25	CONSTRUCT TEMPORARY STORMWATER CONTROL BERM PRIOR TO REMOVAL OF EXISTING COVER
26	REMOVE EXISTING COVER PRIOR TO WASTE EXCAVATION
27	EXCAVATE WASTE WITH BOTTOM GRADED AT MIN. 2% TO INFILTRATION PIT/TRENCH

NOTE(S)
1. DAILY COVER IS NOT SHOWN IN THE DRAWING. APPROVED DAILY COVER SHALL BE APPLIED TO EXPOSED WASTE BEFORE THE END OF EACH OPERATING DAY.
2. WASTE EXCAVATION DEPTH MAY VARY TO SUIT SITE CONDITIONS AND OPERATIONS EFFICIENCY.

SCALE 1:3000 m / V.E. = 5x — B / 1 — PHASE I SECTION B-B'

NOTE(S)
1. PROJECTION IS LOCAL SITE COORDINATE SYSTEM.

0 50 100
1:3,000 METRES

NOT FOR CONSTRUCTION

FINAL

CLIENT
WASTE CONNECTIONS OF CANADA INC.

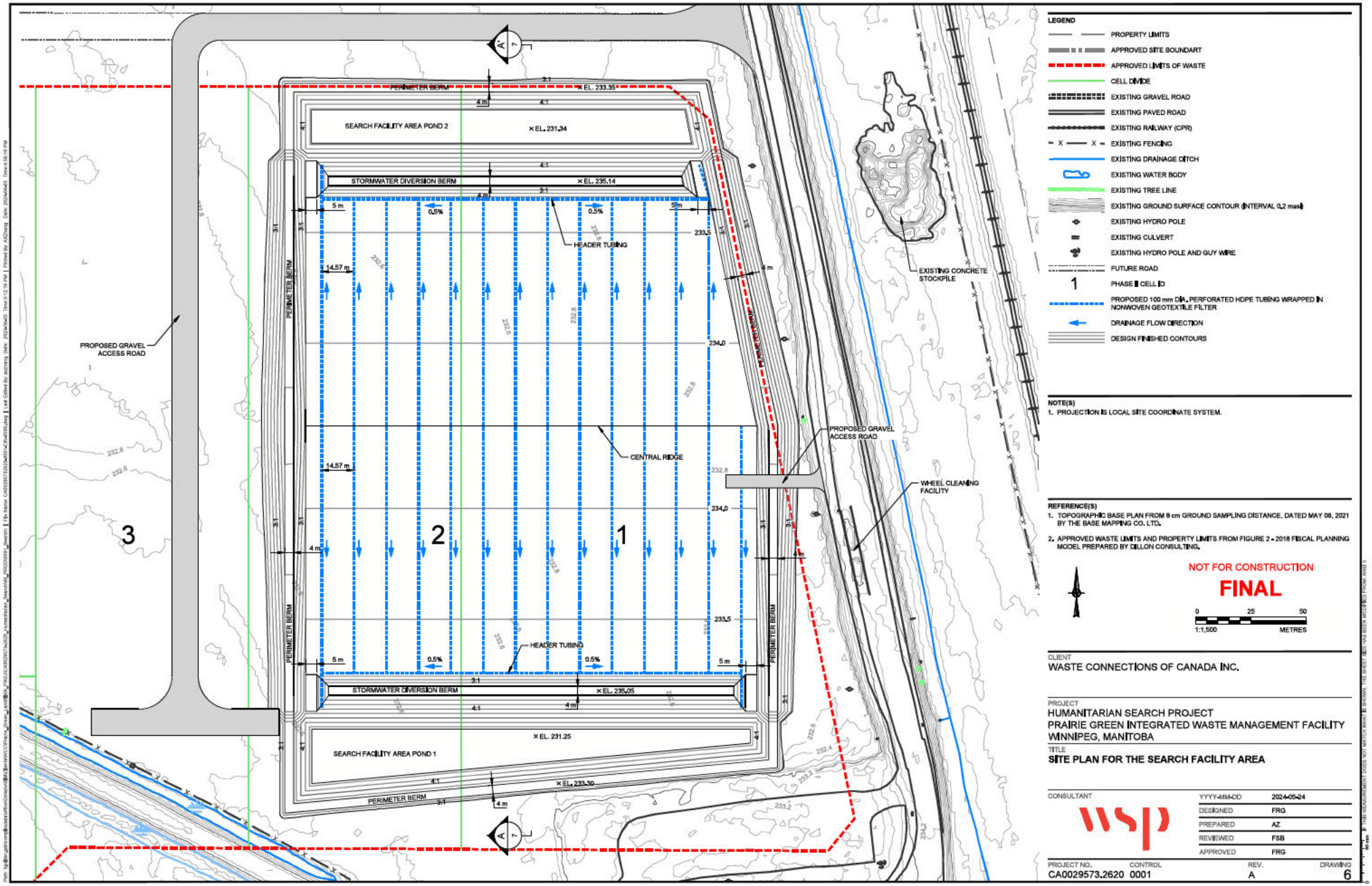
PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
TYPICAL WASTE EXCAVATION SEQUENCE

CONSULTANT
wsp

YYYY-MM-DD	2024-05-24
DESIGNED	FRG
PREPARED	AZ
REVIEWED	FSB
APPROVED	FRG

PROJECT NO. CA0029573.2620 | CONTROL 0001 | REV. A | DRAWING 5



LEGEND

- PROPERTY LIMITS
- APPROVED SITE BOUNDART
- APPROVED LIMITS OF WASTE
- CELL DIVIDE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- EXISTING RAILWAY (CPR)
- EXISTING FENCING
- EXISTING DRAINAGE DITCH
- EXISTING WATER BODY
- EXISTING TREE LINE
- EXISTING GROUND SURFACE CONTOUR (INTERVAL 0.2 mas)
- EXISTING HYDRO POLE
- EXISTING CULVERT
- EXISTING HYDRO POLE AND GUY WIRE
- FUTURE ROAD
- 1 PHASE II CELL ID
- PROPOSED 100 mm DIA. PERFORATED HDPE TUBING WRAPPED IN NONWOVEN GEOTEXTILE FILTER
- DRAINAGE FLOW DIRECTION
- DESIGN FINISHED CONTOURS

NOTE(S)

1. PROJECTION IS LOCAL SITE COORDINATE SYSTEM.

REFERENCE(S)

1. TOPOGRAPHIC BASE PLAN FROM 9 cm GROUND SAMPLING DISTANCE, DATED MAY 08, 2021 BY THE BASE MAPPING CO. LTD.
2. APPROVED WASTE LIMITS AND PROPERTY LIMITS FROM FIGURE 2 - 2018 FISCAL PLANNING MODEL PREPARED BY DILLON CONSULTING.

NOT FOR CONSTRUCTION

FINAL

0 25 50
1:1,500 METRES

CLIENT
WASTE CONNECTIONS OF CANADA INC.

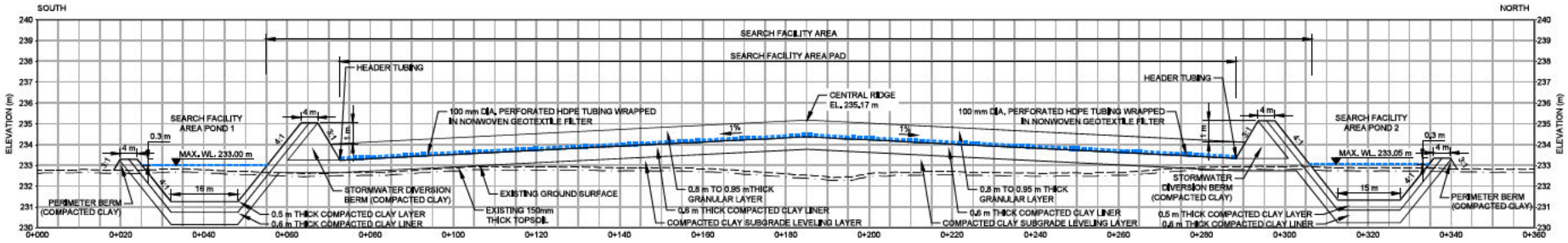
PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
SITE PLAN FOR THE SEARCH FACILITY AREA

CONSULTANT
wsp

YYYY-MM-DD	2024-05-24
DESIGNED	FRG
PREPARED	AZ
REVIEWED	FSB
APPROVED	FRG

PROJECT NO.	CONTROL	REV.	DRAWING
CA0029573.2620	0001	A	6



SCALE 1:1,000m V, E.=5X — A/6 — SECTION A-A'

NOT FOR CONSTRUCTION

FINAL

H. SCALE 1:1,000 — 0 20 40 METRES

V. SCALE 1:200 — 0 5 10 METRES

CLIENT
WASTE CONNECTIONS OF CANADA INC.

CONSULTANT
wsp

YYYY-MM-DD	2024-05-24
DESIGNED	FRG
PREPARED	AZ
REVIEWED	FSB
APPROVED	FRG

PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
SECTION A-A' FOR THE SEARCH FACILITY AREA

PROJECT NO.	CONTROL	REV.	DRAWING
CA0029573.2620	0001	A	7

APPENDIX A

Conference Paper Supporting 2:1 Excavation Slopes

Case study: deformations of a steep slope excavated in a municipal solid waste landfill

I.R.Fleming, M.K. Singh
University of Saskatchewan, Saskatoon, Canada
P.J Dewaele, F.S. Barone
Golder Associates Ltd., Barrie and Mississauga, Ontario.

ABSTRACT
Commencing in autumn 2007, a full scale pilot of landfill mining and reclamation was carried out at the Barrie Municipal Landfill in Barrie, Ontario. This landfill has been in operation for several decades and currently holds in excess of 2 million tonnes of waste. In order to mitigate environmental impacts and provide secure waste disposal for the City, the site is to be "re-engineered", which will involve excavation of approximately 1.5 million m^3 of waste, and screening to segregate fines (largely excess sand that had been used as daily and interim cover). Fines will be stockpiled for use as daily cover for the remainder of the site's operating life. As each area of the landfill is progressively excavated, a base liner and leachate collection system will be installed and the area re-filled with waste. A significant challenge for this project is the lack of space within which to work. According to requirements of the provincial Environment Ministry, temporary slopes are to be no steeper than 3H:1V. Using such grading, however, there would be insufficient space for over 400,000 m^3 of waste during years 2 to 4 of the anticipated 8 years of the project. Accordingly, as part of a full-scale pilot of the landfill mining and segregation process, instrumentation (pneumatic piezometers and inclinometer casings) were installed in an existing 4H:1V slope which was then progressively cut up to 1H:1V as approved by the MOE. Ongoing measurements of lateral displacements and pore pressure were made during steepening of the slope. The displacements were found to be at the low end of the range predicted by a numerical simulation and the slope in this part of the site was determined to be stable.

RÉSUMÉ
En automne 2007, une projet de demonstration ont été effectuées au site d'enfuissment municipal à Barrie, Ontario. Ce projet concerne l'excavation et la segregation des residus et remblai avec compaction pour effectuer un densité supérieur. Le site d'enfuissment a été en fonction pendant plusieurs décennies et se tient actuellement au-dessus de 2 millions de tonnes. Afin atténuer les effets sur l'environnement et pour fournir securité de gestion des déchets, la ville vont effuctuer l'excavation d'approximativement 1.5 million de tonnes avec segregation par écran pour séparer des fines que se compose le sable qui avait été employé comme couverture intérimaire. Des fines seront stockées pour l'usage comme couverture quotidienne pour la durée de fonctionnement de l'enfuissment. Car chaque secteur est progressivement excavé, une barriere et un couche de drainage de lixiviat sera installé et le secteur sera rempli. Un défi significatif pour ce projet est le manque de l'espace dans lequel pour travailler. Selon des conditions du ministère provincial d'environnement, les pentes provisoires sont de n'être pas plus raides que 3H : 1V. En ce cas, il y aurait l'espace insuffisant pour plus de 400.000 m3 des residus pendant les années 2 4 des 8 années prévues du projet. En conséquence, l'instrumentation ont été installées que se compose des piézomètres et inclinomètre dans un pente à 4H:1V qui a été progressivement coupée jusqu'à 1H:1V. Des mesures des déplacements et de la pression d'eau ont été faites pendant l'augmentation de la pente. Les déplacements se sont avérés au bas de gamme de la gamme prévue par une simulation numérique et la pente raide s'est avérée stable.

1 INTRODUCTION

The City of Barrie carried out a Pilot Reclamation and Re-Engineering project at the Barrie (Sandy Hollow) Landfill Site, in order to provide information to assess the costs and issues related to full scale Reclamation and Re-Engineering of the Site. It had previously been determined (GAL, 2007) that excavation of the waste with interim slopes of at least 2(H):1(V) will be necessary in order to open up sufficiently large areas to construct lined landfill cells for the reclaimed materials. This required 2:1 slope is steeper than the 3:1 allowed under the current Certificate of Approval (C of A) issued for the site by the provincial Ministry of the Environment (MOE).

In order to support excavation of the waste to steeper slopes than currently allowed in the C of A, a trial excavation was included as part of the Pilot Reclamation, which was carried out from November 2007 to February 2008, approved by the MOE This paper presents the results of real time field monitoring of deformations and pore pressures as the 20 m high south slope of this landfill was progressively steepened by excavating material from the surface of the slope. Figure 1 shows the progress of excavation and Figure 2 shows an excavated portion of the slope cut to an inclination of 1H:1V. The measured deformations are verified with the results of numerical modelling. Additionally, stability analyses were carried out using the shear strength models provided by various researchers to assess the stability of this cut slope.

2 LITERATURE SURVEY OF SHEAR STRENGTH OF MUNICIPAL SOLID WASTE (MSW)

Comprehensive literature reviews of published values of the shear strength parameters for MSW have been reported by Gharabaghi et al (2008) and Dixon & Jones (2005). From these reviews, three sets of shear strength parameters were selected as representing reasonable values for engineering design and analysis of slopes in Municipal Solid Waste (MSW).

Figure 1. Excavation in progress at the south slope of Barrie landfill.

Figure 2. Slope steepened to 1H:1V

A bi-linear shear strength envelope was proposed by Kavazanjian et al. (1995) and depends on the magnitude of applied normal stresses (σ'). This was determined from back-analysis of existing stable landfill slopes (assumed Factor of Safety, FS = 1.2), together with published data from laboratory testing of recompacted samples. The authors suggest that:

i) for $\sigma' < 30$ kPa, MSW behaves as a purely cohesive material with c' approx. 24 kPa.
ii) for $\sigma' > 30$ kPa, MSW behaves as a purely frictional material with ϕ' approx. 33°.

This model suggests that at the toe of waste slope, "cohesion" associated by interlocking and the presence of tensile reinforcement (associated with fibrous and sheet-like materials) may be a significant factor in contributing to shear strength of MSW, but when normal stress exceeds 30 kPa, cohesion is negligible and the angle of internal friction is approximately 33°. This model is generally considered to be inherently conservative, given that stable slopes were assumed to have a FS of 1.2.

A similar but tri-linear shear strength envelope proposed by Manassero et al. (1996) suggests that:

i) for $\sigma' \leq 26$ kPa, MSW behaves as a purely cohesive material with $c' = 20$ kPa.
ii) for $26 < \sigma' \leq 60$ kPa, MSW is considered a purely frictional material with $\phi' = 38°$.
iii) for $\sigma' > 60$ kPa, it is suggested that $c' = 20$ kPa and $\phi' = 24°$.

A third simple linear failure criteria, (Eid et al, 2000) proposes that c'=40 kPa and ϕ'=35°. This model was developed from large direct shear tests as well as the back-analysis of a failed slope. Relative to Kavazanjian et al. (1995) strength model, this simple linear model predicts higher strength, which is not surprising since it is based, in part, on Limit Equilibrium Analysis of a large failed slope.

Table 1, presents a summary of published shear strength parameters. It is evident that there is considerable scatter in these values. The average of the minimum and maximum reported values are, however, reasonably consistent with the three models discussed above. The "cohesion intercept" c' (associated mostly with the reinforcing effect of fibrous and sheet-like reinforcing materials) may be characterized by averages of the minimum and maximum values = 22 and 25 kPa respectively. Similarly, for the angle of shearing resistance, ϕ', the average of the minimum and maximum values are 29 and 35°.

3 APPROACH

3.1 Field monitoring

Two boreholes (BH-1 and BH-2) were drilled at the anticipated location of the crest of the planned excavation in order to obtain information regarding waste depth, character and leachate pore pressure. Inclinometer casing and pneumatic piezometers were installed in these boreholes. The piezometers were placed at depths selected on the basis of observations made during drilling (saturated zones, etc). Deformations were measured by using a RST digital inclinometer system which is comprised of a digital inclinometer probe, cable system, reel with a battery power and a window pocket PC that functions as a readout, analysis and data storage device. Continuous measurements of pore pressures and deformations were recorded over the period from November 2007 to February 2008.

3.2 Numerical modelling

The pre-failure stress-deformation behaviour of MSW has been modelled using a non-linear elastic hyperbolic constitutive model (Singh et al. 2008). This model has been used in this study to verify deformations observed during real-time monitoring of the cut slope using a finite element software SIGMA/W of GeoStudio 2007(GeoSlope International). The parameters of this model are specific to MSW and have been discussed in detail by Singh et al. (2008). The lower and upper bounds of these parameters were used to obtain range of anticipated lateral deformation at this site as the slope was steepened.

Table 1: Shear strength parameters of MSW from published literature

Reference	Strength Parameter c' (kPa)	Strength Parameter ϕ'(°)	Method of estimation
Cowland et al. (1993)	10	25	Back analysis of deep trench cut in waste
Caicedo et al. (2002)	67	23	Large DS, pressure phicometer
Edincliler et al. (1996)	27	42	DS
Eid et al. (2000)	25	35	Large DS and also back calculation from four failed slopes
Gabr & Valero (1995)	17	34	Small CU triaxial (values at 20% axial strain
Grisolia et al. (1995)	2-3	15-20	Large Triaxial (at 10-15% axial strain)
	10	30-40	
Harris et al. (2006)	9-14	20-29	DSS, DS, Large CU triax
Houston et al. (1995)	5	33-35	Large DS on undisturbed samples
Jessberger and Kockel (1995)	0	31-49	Both large and small Triaxial
Kavazanjian et al. (1995)	24	0	For normal stress < 30 kPa
	0	30	For normal stress > 30 kPa
Landva & Clark (1990)	0-23	24-41	DS
Landva & Clark (1986)	10-23	24-42	DS on waste from various canadian landfills
Mahler & De Lamare Netto (2003)	2.5-4	21-36	DS
Mazzucato et al. (1999)	43	31	Large DS
Pelkey et al. (2001)	0	26-29	Large DS
Siegel et al. (1990)	0	39-53	DS. At 10 % shear disp. and cohesion assumed zero
Stoll (1971)	0	24-42	Small triaxial
Vilar & Carvalho (2002)	39.2	29	At natural water content
	60.7	23	Saturated sample
Whitian et al. (1995)	10	30	Large DS
Zekkos et al. (2007)		36-41	CU
Zwanenburg et al. (2007)		35-37	Large Triaxial
Average (low-high)	**22-25 kPa**	**29-35°**	

Note: DS- Direct Shear test, CU- Consolidated undrained triaxial test

Published data on the unit weight of MSW indicate a non-linear relationship between the unit weight and the effective confining stress (Zekkos et al., 2006, Kavazanjian et al. 1999). However, for simplicity the stress-deformation analyses conducted in this study considers a constant unit weight of 12.5 kN/cum for MSW, which is typical of most landfills with average compaction. The Young's modulus of elasticity has also been observed to increase with depth and increasing confining stress (Singh and Fleming 2008, Beaven and Powrie 1995). Accordingly, a power function first proposed by Janbu (1963) for a wide range of geo-materials is used which is given by:

$$E = KP_a\left[\frac{\sigma_3'}{P_a}\right]^n \quad (1)$$

where E is Young's modulus of elasticity, P_a is the atmospheric pressure used for normalization of above equation, σ_3' is effective confining stress and K and n are the model parameters for a non-linear elastic hyperbolic model of MSW.

A maximum horizontal displacement of the waste slope on the order of 150 mm was expected, as the slope was steepened from 4H:1V to 1H:1V, based upon the results of a Finite Element analyses of the cut slope using parameters shown in Table 2. Significant deviation in displacement (as observed from inclinometer data) from this expected behaviour would represent a trigger to cease steepening of the slope. The slope stability analyses were based on Mohr-Coulomb failure criterion.

Table 2. Parameter of hyperbolic model of MSW used in finite element analysis of cut slope

	K	*n*	*Rf*
Upper bound	58	0.88	0.82
Lower bound	36	0.61	0.65

4 RESULTS & DISCUSSION

Real-time monitoring was conducted using inclinometers placed at the crest of the slope of existing landfill and deformations were monitored as the slope was steepened by cutting. No significant lateral movement was observed and the slope remained stable even at 1H: 1V. A maximum horizontal displacement of 50 mm was observed in the waste slope. This was less than the expected deformation (130 to 250 mm) based upon the results of Finite Element analyses of the cut slope. Such small deformations likely reflect the effect of large proportion of granular sandy material in the waste, which would tend to make the material stiffer.

Figures 3 and 4 show the results for selected monitoring at BH-1 and BH-2. The apparent movement below 20 m depth in Figures 3 and 4 likely reflects a combination of error (at low displacements corresponding to the precision of the monitoring system) and some small movement of the inclinometer casing within the borehole, which had been drilled to a larger diameter, leaving an open annular space which had partially squeezed or sloughed in, thus precluding backfilling. This effect can be seen by the apparent upslope deformation at approximately 20 m depth (the location of the toe of the slope). This is attributable to the fact that the

inclinometer casing itself has some bending stiffness and that immediately below the lowest zone of downslope movement, the casing would tend to bend up-slope, particularly given the presence of a gap between the borehole wall and the outside of the inclinometer casing. Notwithstanding this, it is evident that consistent, but minor downslope movement may be seen from approximately 17 m depth to surface.

The potential presence of a weak zone, which might control the stability of the cut slope and reduce the global FS was considered possible and would also have been detected through monitoring of the inclinometers. Rather than a reasonably "smooth" or C-shaped deformation pattern shown by the inclinometer data (with small but measurable horizontal deformations), the presence of a zone or layer of weaker material would manifest itself as a "kink" in the inclinometer traces as evident from figures 3 and 4. Such weaker zones are consistently less stiff, as has been shown by Singh et al. (2007a) in a parametric study of a four-component model of MSW.

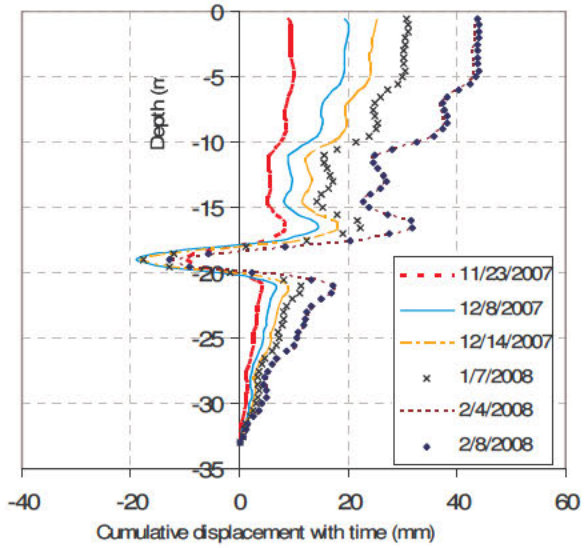


Figure 3. Lateral displacements measured at BH-1

An evaluation of waste slope stability (Limit Equilibrium Analyses) of this cut slope was carried out using Slope/W software of GeoStudio 2007 (GSI, 2007). The conservatively low shear strength parameters of Kavazanjian et al, (1995) provided a lower bound estimate of the factor of safety (as these parameters are based upon stable slopes), whereas the shear strength parameters proposed by Eid et al, (2000), which are based on an actual failure, provided the highest estimates for the factor of safety for this cut slope (Table 3).

Based upon the studies cited above, as well as recent work from University of Saskatchewan, including waste samples from Toronto's Brock West Landfill (Singh et al. 2007) and Saskatoon's Spadina Landfill (Singh et al 2008), a reasonable, although conservative estimate for the shear strength parameters of MSW is c′=20 kPa, ϕ′=32°. Based on the stability analysis noted above, the estimated factor of safety under such an assumption is 1.58 for a slope 20 m high at 1H: 1V with no pore pressure.

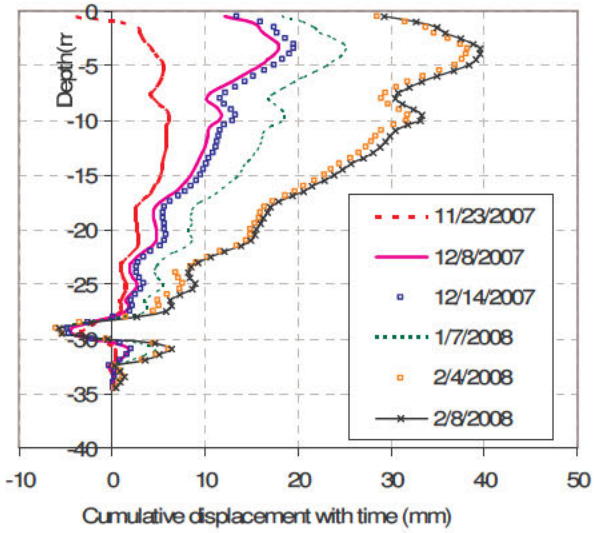


Figure 4: Lateral displacements measured at BH-2

Table 3. Estimated FS of cut slope

Shear strength model	Estimated FS
Kavazanjian et al.(1995) c' = 24 kPa, ϕ' = 0 (for σ' < 30 kPa) c' = 0, ϕ' = 33° (for σ' > 30 kPa)	FS = 1.00
Manassero et al. (1996) c' = 20 kPa, ϕ' = 0 (for σ' < 26 kPa) c' = 0, ϕ' = 38° (for 26 kPa <σ' < 60 kPa) c' = 20 kPa, ϕ' = 24° (for σ' > 60 kPa)	FS = 1.24
Eid et al. (2000) c' = 40 kPa, ϕ' = 35°	FS = 2.15
Values selected on the basis of Table 2 c' = 20 kPa, ϕ' = 32°	FS = 1.58

5 CONCLUSIONS

The review of the current literature regarding the strength of waste and the stability of waste slopes was carried out and it was concluded that MSW is stable at steeper slopes than 3:1, up to as much as 1:1. This was verified at the Barrie Landfill in the course of a carefully planned and executed temporary steepening of an instrumented section of the south slope of the Barrie Landfill.

The low magnitude of observed displacements confirms that only a small portion of the shearing resistance of the waste had been mobilized (i.e. high FS) pointing towards the existence of high angle of shearing resistance of MSW. This observation is well substantiated

with the results of slope stability analysis as well as physical evidence of cut slope observed in this study.

The assessment of slope stability in waste is site specific owing to the heterogeneous and changing characteristics of waste during decomposition. It is cautioned that a qualified engineer should assess the stability of waste slopes on the basis of experience, judgment and observation of local waste characteristics.

ACKNOWLEDGEMENTS

The writers would like to acknowledge City of Barrie and Golder Associates for their contribution in this paper.

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APPENDIX B

Stormwater Management Ponds Assessment Technical Memorandum

TECHNICAL MEMORANDUM

DATE June 4, 2024 **Project No.** CA0029573.2620

TO Asit (Ash) Dey, P.Eng., Engineering Manager, Land Use, Waste Management and Energy
Department of Environment and Climate Change, Environmental Approvals Branch

FROM Harshil Gajjar and Douglas Kerr, P.Eng. and Fabiano Gondim, M.Eng., P.Eng. **EMAIL douglas.kerr@wsp.com**

PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY, HUMANITARIAN SEARCH PROJECT, SEACH FACILITY AREA PONDS ASSESSMENT, WINNIPEG, MANITOBA

1.0 BACKGROUND

This memorandum has been prepared on behalf of Waste Connections of Canada Inc. (Waste Connections) to assess the capacity of the stormwater management ponds (Ponds) associated the with Search Facility Area at the Prairie Green Landfill located in Winnipeg, Manitoba.

Waste Connections owns and operates the Prairie Green IWMF, located on Section 14 and the north half of Section 11, Township 12, Range 2 East in the Rural Municipality of Rosser, approximately 1.6 km north of the City of Winnipeg, Manitoba.

The Site has been in operation since 1996 and is licensed under the revised Environment Act License (Licence) No. 2177 E R5 for the disposal of solid, residential, commercial, and institutional waste. The Site also has a recycling facility, materials recovery facility, petroleum contaminated soil treatment facility, and a composting facility.

The Site was approved with two separate waste disposal areas, known as Phase I and Phase II (**Drawing 1**). Phase I has been fully constructed and has a remaining capacity of approximately 3.3 million m^3 of waste disposal capacity and a service life of approximately eight (8) years.

A humanitarian search project is proposed to be completed at the Prairie Green IWMF. This project involves excavation of existing waste from Phase 1, hauling excavated waste to a proposed Search Facility Area located within the approved waste fill area of Phase II to be processed for a human remains search and hauling cleared waste to the active working face of Phase I (Drawing 1).

The Search Facility Area will consist of a granular pad overlaying a compacted clay liner. The granular pad will slope towards two Ponds where stormwater runoff (and possibly leachate in case of asphalt pad or holding tank leakage) will mix and be collected and held. The subgrade for the pads will be compacted silty-clay soils that will be shaped in a sawtooth pattern to direct any infiltrated water to the low points where perforated tubing will collect the water and direct it to the two Ponds. The water will remain in the Ponds for evaporation and may be pumped to the existing stormwater ponds following laboratory analysis confirming the water is not impacted by leachate or hauled to the City of Winnipeg Wastewater Treatment Plant for treatment if the water is impacted by leachate, as required from time to time based on the accumulated volumes and remaining storage capacity.

The assessment below is completed to help assess how often the Ponds would need to have accumulated water removed.

2.0 POND CAPACITY ASSESSMENT

The catchment areas of Ponds 1 and 2 will be 3.67 ha and 3.20 ha, respectively. For the purposes of this capacity assessment, it is assumed that all precipitation will enter the Ponds directly via surface runoff/leachate accidental infiltration and/or indirectly via the perforated subdrain system. It is also assumed that leachate and wastewater/wash water will be managed separately, i.e., collected by dedicated sumps or holding tanks and hauled to the City of Winnipeg Wastewater Treatment Plant.

2.1 RUNOFF VOLUME CALCULATIONS

The runoff calculations summarizing the various drainage areas of the site and runoff coefficients are noted in the table below. As mentioned above, due to the subdrainage system to collect any infiltration/precipitation and direct it to the ponds, we have assumed that 100% of the precipitation is directed to the Ponds during the period of the precipitation event.

Below are summarized runoff volumes for the two Ponds.

Table 1: Estimated Runoff Volumes for Pond 1

Drainage Area	1:5 Year Event	1:25 Year Event	1:100 Year Event
Pond Surface Area (ha)	0.7	0.7	0.7
Pad Area (ha)	2.97	2.97	2.97
Runoff Coefficient	1.00	1.00	1.00
Intensity, I, (24-hour duration) (mm/hr)	2.65	3.60	4.34
Runoff Volume (m^3)	**2,334 m^3**	**3,170 m^3**	**3,823 m^3**

Table 2: Estimated Runoff Volumes for Pond 2

Drainage Area	1:5 Year Event	1:25 Year Event	1:100 Year Event
Pond Surface Area (ha)	0.59	0.59	0.59
Pad Area (ha)	2.61	2.61	2.61
Runoff Coefficient	1.00	1.00	1.00
Intensity, I, (24-hour duration) (mm/hr)	2.65	3.60	4.34
Runoff Volume (m^3)	**2,035 m^3**	**2,539 m^3**	**3,333 m^3**

In the calculations above, the 24-hour, 1:100 year rainfall intensities are taken from the Winnipeg Airport station with rainfall data from 1944 to 2021). The 1:100 year 24-hour duration event includes 104mm or rainfall. Additionally, we considered monthly data from the Canadian Climate Normals (Environment and Natural Resources website). The month of June has the highest average monthly precipitation (90mm per month) based on 1981 to 2010 data from the weather station at the Richardson International Airport. Since the monthly maximum is less than the predicted 1:100 year amount (104.2mm), we used 1:100 year event for the analysis.

The two consecutive months with greatest average monthly precipitation are June and July, with a total average precipitation amount of 169.5mm.

2.2 POND ASSESSMENT

The Ponds have been designed to have capacities as listed below. These volumes exclude capacity within the upper 0.3 m of the pond, to be considered a freeboard space.

Pond 1 – 8,168 m^3 capacity.

Pond 2 – 6,682 m^3 capacity.

For Pond 1, the capacity is sufficient to contain over 2-1:100 year events without surcharging into the freeboard allowance. The average runoff expected in the Pond over the two wettest months (i.e., June and July) is approximately 6,220 m^3 and therefore could also be fully contained in Pond 1. This assessment also assumes no inter-event evaporation from the pond, which is conservative.

Similarly for Pond 2, the capacity is sufficient to contain over 2-1:100 year events without surcharging into the free-board allowance. The average runoff expected in the pond over the two wettest months (i.e., June and July) is approximately 5,424 m^3 and therefore could also be fully contained in Pond 2. This assessment also assumes no inter-event evaporation from the pond, which is conservative.

Based on the above, it would be prudent to maintain the ponds at approximately half capacity to be able to accommodate runoff volumes from a 1:100 year event, especially during the anticipated wetter months during the summer.

3.0 CLOSING

We trust this memorandum satisfies your current needs. If you have any questions regarding this memorandum, please contact the undersigned.

WSP Canada Inc.

[redacted]

Harshil Gajjar
Water Resources Specialist

Douglas Kerr
Senior Civil Engineer

[redacted]

Fabiano Gondim, M.Eng., P.Eng.
Senior Waste Engineer

HG/DVK/FRG/mp

https://wsponlinecan.sharepoint.com/sites/ca-ca00295732620/shared documents/05. technical/3.0 design & operations report/stormwater memo/ca0029573.2620_mem_swmp asses_4jun2024.docx

APPENDIX C

Policy Number PO-15-1926-14 Variance Request for the Construction of a Healing Space Technical Memorandum

TECHNICAL MEMORANDUM

DATE May 16, 2024 **Project No.** CA0029573.2620

TO Asit (Ash) Dey, P.Eng., Engineering Manager, Land Use, Waste Management and Energy
Department of Environment and Climate Change, Environmental Approvals Branch

FROM Fabiano Gondim, M.Eng., P.Eng. and Frank Barone, Ph.D., P.Eng. [redacted]

PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY, POLICY NUMBER PO-18-1926-14 VARIANCE REQUEST FOR THE CONSTRUCTION OF A HEALING SPACE R.M. ROSSER, MANITOBA

This memorandum has been prepared on behalf of Waste Connections of Canada Inc. (Waste Connections) to support a request for a variance to Policy Number PO-18-1926-14 (Construction of Buildings on or within 400 m of a Landfill) relating to the construction of the proposed Healing Space at the Prairie Green Integrated Waste Management Facility (Prairie Green IWMF).

1.0 BACKGROUND

Waste Connections owns and operates the Prairie Green IWMF, located on Section 14 and the north half of Section 11, Township 12, Range 2 East in the Rural Municipality of Rosser, approximately 1.6 km north of the City of Winnipeg, Manitoba.

The Site has been in operation since 1996 and is licensed under the revised Environment Act License (Licence) No. 2177 E R5 for the disposal of solid, residential, commercial, and institutional waste. The Site also has a recycling facility, materials recovery facility, petroleum contaminated soil treatment facility, and a composting facility.

The Site was approved with two separate waste disposal areas, known as Phase I and Phase II (**Drawing 1**). Phase I has been fully constructed and has a remaining capacity of approximately 3.3 million m^3 of waste disposal capacity and a service life of approximately eight (8) years.

A humanitarian search project is proposed to be completed at the Prairie Green IWMF. This project involves excavation of existing waste from Phase 1, hauling excavated waste to a proposed Search Area located within the approved waste fill area of Phase II to be processed for human remains search and hauling cleared waste to the active working face of Phase I (Drawing 1). A Healing Space is proposed to support this humanitarian search operation. The Healing Space will be a ready-to-move building, with a kitchen, communal space, and private space. It is not anticipated that the Healing Space would have overnight accommodations. The intention is to have the Healing Space for the victim's families, Indigenous Elders and other community members to gather. The Healing Space would be located on the south limit of the Prairie Green IWMF property and would have a separate entrance off the Prairie Green Road.

2.0 POLICY PO-18-1926-14 REQUIREMENT AND VARIANCE REQUEST

Policy Number PO-18-1926-14 (Construction of Buildings on or within 400 m of a Landfill) was issued by the Manitoba's Environmental Approvals Branch (Policy) with a June 19, 2023 revision date. The Policy restricts the

construction of buildings that are not used to support the landfill operations and maintenance on or within 400 metres (m) of a landfill. The purpose of the Policy is to provide a land use control mechanism while protecting the public from potential landfill impacts.

Based on recent discussions, it is the Manitoba Environmental Approvals Branch (EAB)'s understanding that the Policy applies to the proposed Healing Space. Therefore, this memorandum was prepared to support a request for variance to the Policy.

3.0 SUBSURFACE INVESTIGATION FOR PRESENCE OF WASTE

The land where the Healing Space site is proposed has been historically used for crop production. The Healing Space is separated from Phase I, i.e., the approved waste disposal area that has been developed, by approximately 810 m. Based on WSP review and site visit, there is no evidence of ground disturbance related to other activities, including historical waste disposal.

To confirm the absence of waste at the Healing Space site, nine (9) test pits were excavated along the perimeter of the site at the locations shown on Figure 1 to a depth of approximately 2 m below ground surface. A representative of WSP's geotechnical team was present during the test pit excavation to confirm and record the subsurface conditions. The test pits confirmed that the subsurface conditions at the Healing Space site are consistent with the records of extensive subsurface investigations completed at the Prairie Green IWMF to date, i.e., a layer of topsoil overlain by an upper clay layer and a silt layer to a depth of 2 m below ground surface. As expected, no waste was encountered at the Healing Space site. Refer to Figures A1 to A9 for Test Pit Logs.

It should be noted that test pits directly within the footprint of the Healing Space were not proposed and are not recommended to avoid disturbing the soil where on grade foundation blocks will be placed to support the structure of the Healing Space.

4.0 LANDFILL GAS MIGRATION ASSESSMENT

A desktop landfill gas (LFG) subsurface migration assessment was completed by WSP as described below. LFG monitoring is not required due to the documented historical land use, controlled waste disposal activities inherent to modern landfills, subsurface conditions, large separation distance from the waste fill area and type of building proposed, i.e., on grade foundation wood cribs, supporting an above grade structure.

At landfill sites, the potential for lateral subsurface migration of LFG and associated potential explosion hazard of methane (should it migrate and collect in confined spaces) is commonly assessed. Methane gas is lighter than air, it is explosive when present at a concentration of between 5 and 15 percent by volume in air, and it migrates under both concentration and pressure gradients.

As LFG is generated within the landfill waste mass, a low pressure builds up and slowly pushes the gas through the pore spaces of waste or soil before it is released to the atmosphere. The gas moves through the path of least resistance. Permeability is a measure of how well gases or liquids flow through pore spaces. Dry, sandy soils have relatively high permeability (larger interconnected pore spaces available for gas to travel through) and would be a preferential gas pathway. On the other hand, clay has low permeability, i.e., it has small pore spaces and for this reason it inhibits the subsurface movement of landfill gas. If the soil is saturated (i.e., the pore spaces are filled with groundwater), landfill gas will not displace water in the pore spaces because the gas pressure does not have enough driving force to push the water through the soil pore spaces. In a site with a high groundwater elevation, the gas migration is limited to only the unsaturated pore spaces above the water table. A low permeability engineered liner

serves as a physical barrier to landfill gas migration. A perimeter ditch around the landfill would also serve as a physical barrier to subsurface landfill gas migration since it would create a discontinuity in the gas pathway through the unsaturated soil zone.

LFG lateral subsurface migration potential is influenced by various site-specific factors such as type of native soil, groundwater elevation, landfill containment system design, and active LFG collection system. Methane gas explosion potential of migrated LFG depends on factors specific to the receptors, such as separation distance between the waste disposal areas and the receptor buildings, and construction characteristics and engineering controls at the receptor sites.

Based on the physical site setting of the Prairie Green IWMF, potential lateral migration of LFG through the subsurface is expected to be very limited. The native clay and silty soil is about 15 metres deep, is generally homogeneous and has a low permeability. In addition, the groundwater level is relatively shallow, i.e. it generally fluctuates from about 1 to 2 m below ground surface. These two site conditions are natural limiting factors for potential subsurface lateral migration of LFG between the waste disposal areas and potential receptors.

It is noted that the Phase I base was constructed with a composite liner system comprised by a high density polyethylene (HDPE) geomembrane and either a compacted clay liner or a geosynthetic clay liner. This composite liner system provides a low permeability barrier to potential migration of both leachate and LFG and surrounds the perimeter of the waste disposal area. As well, there is 810-metre wide buffer between the existing landfill footprint area and the Healing Space; there are also perimeter ditches that limit LFG lateral migration in the unlikely event that it has migrated away from the landfill through the thin unsaturated zone.

In light of the physical site setting and the engineered perimeter barrier systems around the landfill, the potential for lateral migration at this site is negligible even for nearby structures. In the case of the Healing Space, the 810 m separation from the footprint of the existing waste fill area is more than enough to mitigate LFG concerns. In the unlikely event of LFG migration, the proposed Healing Space will not have a basement or floor slab in direct contact with the soil, i.e., the building will be an elevated structure on a foundation such as wooden crib blocks or another similar system that will not channelize or provide a preferential pathway to LFG. In addition, Waste Connections committed to installing a methane detection and alarm system in the Healing Space.

5.0 CLOSING

We trust this memorandum satisfies your current needs. If you have any questions regarding this memorandum, please contact the undersigned.

WSP Canada Inc.

Fabiano Gondim, M.Eng., P.Eng.
Senior Waste Engineer

Frank Barone, Ph.D., P.Eng.
Principal, Senior Geo-Environmental Engineer

FRG/FSB/al

Attachments: Drawing 1: General Site Plan
Figure 1: Healing Space Geotechnical Investigation
Test Pit Logs

https://wsponlinecan.sharepoint.com/sites/ca-ca00295732620/shared documents/05. technical/6.0 healing space/ca0029573.2620_mem_lfg_assessment_16may2024.docx

Drawings

LEGEND

- PROPERTY LIMITS
- APPROVED SITE BOUNDART
- APPROVED LIMITS OF WASTE
- CELL DIVIDE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- EXISTING RAILWAY (CPR)
- EXISTING FENCING
- EXISTING DRAINAGE DITCH
- EXISTING WATER BODY
- EXISTING TREE LINE
- EXISTING MONITORING WELL LOCATION (GOLDER ASSOCIATES, 1994)
- EXISTING GROUND SURFACE CONTOUR (INTERVAL 1.0 masl)
- FUTURE ROAD
- PROPOSED HYDRO POLE
- 1 PHASE I AND II CELL ID

NOTE(S)

1. PROJECTION IS LOCAL SITE COORDINATE SYSTEM.

REFERENCE(S)

1. EXISTING GROUND SURFACE, DATED MAY 5, 2023 BY VOLATUS AEROSPACE CORP.
2. GROUND FEATURES DATED MAY 08, 2021 BY THE BASE MAPPING CO. LTD.

0 200 400
1:8,000 METRES

NOT FOR CONSTRUCTION

DRAFT

CLIENT
WASTE CONNECTIONS OF CANADA INC.

PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
GENERAL SITE PLAN

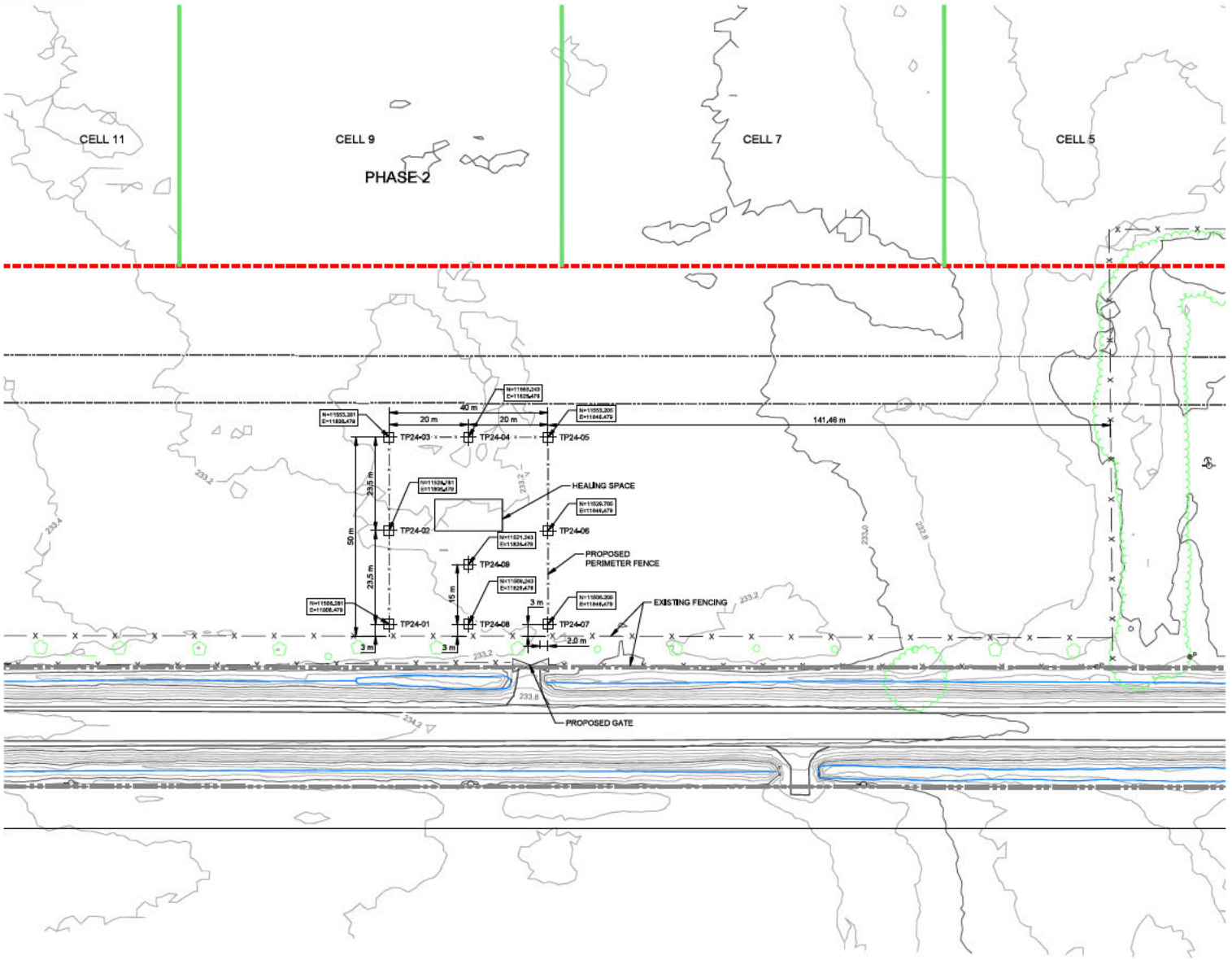
CONSULTANT

wsp

YYYY-MM-DD	2024-05-08
DESIGNED	FRG
PREPARED	AZ
REVIEWED	FSB
APPROVED	FRG

PROJECT NO.	CONTROL	REV.	DRAWING
CA0029573.2620	0001	A	1

Figures



LEGEND

- PROPERTY LIMITS
- APPROVED SITE BOUNDART
- APPROVED LIMITS OF WASTE
- CELL DIVIDE
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- EXISTING RAILWAY (CPR)
- EXISTING FENCING
- EXISTING DRAINAGE DITCH
- EXISTING WATER BODY
- EXISTING TREE LINE
- EXISTING GROUND SURFACE CONTOUR (INTERVAL 0.2 mas)
- FUTURE ROAD
- TP24-01 COMPLETED 2.1m DEEP TEST PITS

NOTE(S)

1. PROJECTION IS LOCAL SITE COORDINATE SYSTEM.

REFERENCE(S)

1. EXISTING GROUND SURFACE, DATED MAY 08, 2021 BY THE BASE MAPPING CO. LTD.
2. GROUND FEATURES DATED MAY 08, 2021 BY THE BASE MAPPING CO. LTD.

0 20 40
1:1,000 METRES

NOT FOR CONSTRUCTION

FINAL

CLIENT
WASTE CONNECTIONS OF CANADA INC.

PROJECT
HUMANITARIAN SEARCH PROJECT
PRAIRIE GREEN INTEGRATED WASTE MANAGEMENT FACILITY
WINNIPEG, MANITOBA

TITLE
HEALING SPACE GEOTECHNICAL INVESTIGATION

CONSULTANT

wsp

YYYY-MM-DD	2024-05-08
DESIGNED	FRG
PREPARED	AZ
REVIEWED	DK
APPROVED	FRG

PROJECT NO.	CONTROL	REV.	FIGURE
CA0029573.2620	0002	A	1

Test Pit Logs

EXPLANATION OF TERMS AND SYMBOLS

The terms and symbols used on the borehole logs to summarize the results of field investigation and subsequent laboratory testing are described in these pages.

It should be noted that materials, boundaries and conditions have been established only at the borehole locations at the time of investigation and are not necessarily representative of subsurface conditions elsewhere across the site.

TEST DATA

Data obtained during the field investigation and from laboratory testing are shown at the appropriate depth interval.

Abbreviations, graphic symbols, and relevant test method designations are as follows:

*C	Consolidation test	*ST	Swelling test
D_R	Relative density	TV	Torvane shear strength
*k	Permeability coefficient	VS	Vane shear strength
*MA	Mechanical grain size analysis	w	Natural Moisture Content (ASTM D2216)
	and hydrometer test	w_l	Liquid limit (ASTM D 423)
N	Standard Penetration Test (CSA A119.1-60)	w_p	Plastic Limit (ASTM D 424)
N_d	Dynamic cone penetration test	E_f	Unit strain at failure
NP	Non plastic soil	γ	Unit weight of soil or rock
pp	Pocket penetrometer strength	γ_d	Dry unit weight of soil or rock
*q	Triaxial compression test	ρ	Density of soil or rock
q_u	Unconfined compressive strength	ρ_d	Dry Density of soil or rock
*SB	Shearbox test	C_u	Undrained shear strength
SO_4	Concentration of water-soluble sulphate	→	Seepage
		▼	Observed water level

* The results of these tests are usually reported separately

Soils are classified and described according to their engineering properties and behaviour.

The soil of each stratum is described using the Unified Soil Classification System[1] modified slightly so that an inorganic clay of "medium plasticity" is recognized.

The modifying adjectives used to define the actual or estimated percentage range by weight of minor components are consistent with the Canadian Foundation Engineering Manual[2].

Relative Density and Consistency:

Cohesionless Soils

Relative Density	SPT (N) Value
Very Loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

Cohesive Soils

Consistency	Undrained Shear Strength c_u (kPa)	Approximate SPT (N) Value
Very Soft	0-12	0-2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

Standard Penetration Resistance ("N" value)
The number of blows by a 63.6kg hammer dropped 760 mm to drive a 50 mm diameter open sampler attached to "A" drill rods for a distance of 300 mm after an initial penetration of 150 mm.

[1] "Unified Soil Classification System", Technical Memorandum 36-357 prepared by Waterways Experiment Station, Vicksburg, Mississippi, Corps of Engineers, U.S. Army. Vol. 1 March 1953.

[2] "Canadian Foundation Engineering Manual", 3rd Edition, Canadian Geotechnical Society, 1992.

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISIONS			SYMBOLS: USCS	SYMBOLS: GRAPH	SYMBOLS: COLOUR	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 75um)	GRAVELS MORE THAN HALF THE COARSE FRACTION LARGER THAN 4.75mm	CLEAN GRAVELS (TRACE OR NO FINES)	GW		RED	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_u=D_{60}/D_{10}>4$; $C_c=(D_{30})^2/(D_{10}xD_{60}) = 1$ to 3
			GP		RED	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY GRAVELS (WITH SOME OR MORE FINES)	GM		YELLOW	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR PI LESS THAN 4
			GC		YELLOW	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE AND PI MORE THAN 7
	SANDS MORE THAN HALF THE COARSE FRACTION SMALLER THAN 4.75mm	CLEAN SANDS (TRACE OR NO FINES)	SW		RED	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u=D_{60}/D_{10}>6$; $C_c=(D_{30})^2/(D_{10}xD_{60}) = 1$ to 3
			SP		RED	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY SANDS (WITH SOME OR MORE FINES)	SM		YELLOW	SILTY SANDS, SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR PI LESS THAN 4
			SC		YELLOW	CLAYEY SANDS, SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE AND PI MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT SMALLER THAN 75um)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	$W_L < 50\%$	ML		GREEN	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)
		$W_L > 50\%$	MH		BLUE	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SAND OR SILTY SOILS	
	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	$W_L < 30\%$	CL		GREEN	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS	
		$30\% < W_L < 50\%$	CI		GREEN-BLUE	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	
		$W_L > 50\%$	CH		BLUE	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	ORGANIC SILTS & CLAYS BELOW "A" LINE	$W_L < 50\%$	OL		GREEN	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINES CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F", E.G. SF IS A MIXTURE OF SAND WITH SILT OR CLAY
		$W_L > 50\%$	OH		BLUE	ORGANIC CLAYS OF HIGH PLASTICITY	
HIGHLY ORGANIC SOILS			PT		ORANGE	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE

SPECIAL SYMBOLS

LIMESTONE		OILSAND	
SANDSTONE		SHALE	
SILTSTONE		FILL (UNDIFFERENTIATED)	

SOIL COMPONENTS

FRACTION	U.S. STANDARD METRIC SIEVE SIZE		DEFINING RANGES OF PERCENT BY WEIGHT OF MINOR COMPONENTS	
GRAVEL	PASSING	RETAINED	PERCENT	DESCRIPTOR
COARSE	76mm	19mm		
FINE	19mm	4.75mm	35 - 50	AND
SAND				
COARSE	4.75mm	2.00mm	30 - 35	Y / EY
MEDIUM	2.00mm	425µm	10 - 20	SOME
FINE	425µm	75µm		
FINES (SILT OR CLAY BASED ON PLASTICITY)	75µm		1 - 10	TRACE

OVERSIZED MATERIAL

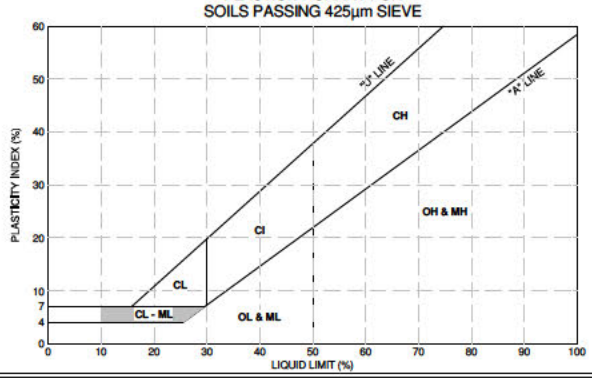
ROUNDED OR SUBROUNDED:

COBBLES 76mm to 200mm
BOULDERS > 200mm

NOT ROUNDED:

ROCK FRAGMENTS ? 76mm
ROCKS > 0.76 CUBIC METRE IN VOLUME

PLASTICITY CHART FOR SOILS PASSING 425µm SIEVE



NOTES:

1. ALL SIEVE SIZES MENTIONED ARE U.S. STANDARD ASTM E.11.
2. COARSE GRAINED SOILS WITH TRACE TO SOME FINES GIVEN COMBINED GROUP SYMBOLS, E.G. GW-GC IS A WELL GRADED GRAVEL SAND MIXTURE WITH TRACE TO SOME CLAY.
3. DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

WSP E&I Canada Limited

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-01**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540728 E627633	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, firm, dark brown to black, trace rootlets		1			0
			SILT - trace clay, low plastic, very moist, soft, tan-brown		2			
1		ML			3			1
2		CH	CLAY - silty, high plastic, moist, very stiff, brown		4			2
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE					
3			Notes: - Slouging was observed below 0.5 m during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.0 m with no water accumulated prior to backfilling.					3
4								4
5								5
6								6
7								7
8								8
9								9
10								

CA0029573.2620 - PRAIRIE GREEN LANDFILL.GPJ 24/05/14 08:37 AM (WPG - GEOTECH LOG 4)

WSP E&I Canada Limited

LOGGED BY: JB	COMPLETION DEPTH: 2.1 m
REVIEWED BY: GC	COMPLETION DATE: May 9, 2024
Figure No. A1	Sheet 1 of 1

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-02**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540752 E627632	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, firm, dark brown to black, trace rootlets		1			0
			SILT - trace clay, low plastic, moist, firm, tan-brown		2			
1		ML			3			1
2		CH	CLAY - silty, high plastic, moist, very stiff, brown, occasional silt inclusions		4			2
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE					
			Notes: - No sloughing was observed during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.1 m with no water accumulated prior to backfilling.					
3								3
4								4
5								5
6								6
7								7
8								8
9								9
10								

CA0029573.2620 - PRAIRIE GREEN LANDFILL.GPJ 24/05/14 08:37 AM (WPG - GEOTECH LOG 4)

WSP E&I Canada Limited

LOGGED BY: JB	COMPLETION DEPTH: 2.1 m
REVIEWED BY: GC	COMPLETION DATE: May 13, 2024
Figure No. A2	Sheet 1 of 1

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-03**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540777 E627635	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube | No Recovery | SPT (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Drill Cuttings | Grout | Slough | Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, soft, dark brown to black, trace rootlets		1			0
			SILT - trace clay, low plastic, moist, soft to firm, tan-brown		2			
1		ML						1
			- below 1.4m, firm		3			
2					4			2
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE Notes: - No sloughing was observed during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.1 m with no water accumulated prior to backfilling.					
3								3
4								4
5								5
6								6
7								7
8								8
9								9
10								

WSP E&I Canada Limited

LOGGED BY: JB	COMPLETION DEPTH: 2.1 m
REVIEWED BY: GC	COMPLETION DATE: May 13, 2024
Figure No. A3	Sheet 1 of 1

CA0029573.2620 - PRAIRIE GREEN LANDFILL.GPJ 24/05/14 08:37 AM (WPG - GEOTECH LOG 4)

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-04**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540780 E627623	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube | No Recovery | SPT (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Drill Cuttings | Grout | Slough | Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, soft, dark brown to black, trace rootlets		1			0
			SILT - trace clay, low plastic, moist, soft to firm, tan-brown		2			
1		ML			3			1
2		CH	CLAY - silty, high plastic, moist, very stiff, brown, occasional silt inclusions		4			2
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE					
			Notes: - Sloughing was observed between 0.6 m and 1.8 m during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.0 m with no water accumulated prior to backfilling.					
3								3
4								4
5								5
6								6
7								7
8								8
9								9
10								

CA0029573.2620 - PRAIRIE GREEN LANDFILL.GPJ 24/05/14 08:37 AM (WPG - GEOTECH LOG 4)

WSP E&I Canada Limited

LOGGED BY: JB	COMPLETION DEPTH: 2.1 m
REVIEWED BY: GC	COMPLETION DATE: May 13, 2024
Figure No. A4	Sheet 1 of 1

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-05**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540779 E627675	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, firm, dark brown to black, trace rootlets		1			0
1		ML	SILT - trace clay, low plastic, moist, soft to firm, tan-brown		2			1
2		CH	CLAY - silty, high plastic, moist, very stiff, brown, occasional silt inclusions		3			2
					4			
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE Notes: - No sloughing was observed during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.1 m with no water accumulated prior to backfilling.					
3								3
4								4
5								5
6								6
7								7
8								8
9								9
10								

WSP E&I Canada Limited

LOGGED BY: JB	COMPLETION DEPTH: 2.1 m
REVIEWED BY: GC	COMPLETION DATE: May 13, 2024
Figure No. A5	Sheet 1 of 1

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-06**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540752 E627676	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube | No Recovery | SPT (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Drill Cuttings | Grout | Slough | Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, firm to stiff, dark brown to black, trace roots		1			0
			SILT - trace clay, low plastic, moist, firm, tan-brown		2			
1		ML						1
			- below 1.4m, very moist, soft to firm		3			
			CLAY - silty, high plastic, moist, very stiff, brown		4			
2		CH	- below 2.0m, stiff		5			2
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE					
3			Notes: - Sloughing was observed between 0.6 m and 1.7 m during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.1 m with no water accumulated prior to backfilling.					3
4								4
5								5
6								6
7								7
8								8
9								9
10								

WSP E&I Canada Limited

LOGGED BY: JB | COMPLETION DEPTH: 2.1 m

REVIEWED BY: GC | COMPLETION DATE: May 13, 2024

Figure No. A6 | Sheet 1 of 1

CA0029573.2620 - PRAIRIE GREEN LANDFILL.GPJ 24/05/14 08:37 AM (WPG - GEOTECH LOG 4)

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-07**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540729 E627675	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube | No Recovery | SPT (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Drill Cuttings | Grout | Slough | Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, soft, dark brown to black, trace roots		1			0
			SILT - trace clay, low plastic, very moist, soft, tan-brown		2			
1		ML			3			1
2		CH	CLAY - silty, high plastic, moist, firm, brown - below 2.0m, very stiff		4 5			2
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE Notes: - Sloughing was observed between 0.5 m and 1.8 m during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.1 m with no water accumulated prior to backfilling.					
3								3
4								4
5								5
6								6
7								7
8								8
9								9
10								

CA0029573.2620 - PRAIRIE GREEN LANDFILL.GPJ 24/05/14 08:37 AM (WPG - GEOTECH LOG 4)

WSP E&I Canada Limited

LOGGED BY: JB	COMPLETION DEPTH: 2.1 m
REVIEWED BY: GC	COMPLETION DATE: May 9, 2024
Figure No. A7	Sheet 1 of 1

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-08**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540730 E627653	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, firm, dark brown to black, trace roots and rootlets		1			0
1		ML	SILT - trace clay, low plastic, very moist, soft, tan-brown		2			1
					3			
2		CH	CLAY - silty, high plastic, moist, very stiff, brown		4			2
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE Notes: - Sloughing was observed between 0.5 m and 1.7 m during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.0 m with no water accumulated prior to backfilling.					
3								3
4								4
5								5
6								6
7								7
8								8
9								9
10								

CA0029573.2620 - PRAIRIE GREEN LANDFILL.GPJ 24/05/14 08:37 AM (WPG - GEOTECH LOG 4)

WSP E&I Canada Limited

LOGGED BY: JB	COMPLETION DEPTH: 2.1 m
REVIEWED BY: GC	COMPLETION DATE: May 9, 2024
Figure No. A8	Sheet 1 of 1

PROJECT: Praire Green Landfill - MSP	DRILLER: Prairie Green Landfill	TEST HOLE ID: **TP24-09**
CLIENT: WSP Canada Inc.	DRILL RIG: CAT 430 Backhoe	PROJECT No: CA0029573.2620
LOCATION: N5540745 E627656	DRILL METHOD: Excavation	ELEVATION: Not Surveyed

SAMPLE TYPE: Shelby Tube | No Recovery | SPT (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Drill Cuttings | Grout | Slough | Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

☒ POCKET PENETROMETER (kPa) ☒ 100 200 300 400

★ TORVANE (kPa) ★ 50 100 150 200

PLASTIC M.C. LIQUID 20 40 60 80

DEPTH (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	DEPTH (m)
0		OH	Organic Clay - silty, high plastic, moist, firm to stiff, dark brown to black, trace rootlets		1			0
		ML	SILT - trace clay, low plastic, moist, firm, tan-brown		2			
1		CH	CLAY - silty, high plastic, moist, very stiff, brown		3			1
					6			
			- below 1.4m, occasional silt inclusions		4			
2					5			2
			TEST PIT TERMINATED AT 2.1 m BELOW EXISTING GRADE					
3			Notes: - Sloughing was observed between 0.5 m and 1.1 m during excavating. - No seepage was observed during excavating. - Test pit remained open to 2.0 m with no water accumulated prior to backfilling.					3
4								4
5								5
6								6
7								7
8								8
9								9
10								

CA0029573.2620 - PRAIRIE GREEN LANDFILL.GPJ 24/05/14 08:37 AM (WPG - GEOTECH LOG 4)

WSP E&I Canada Limited

LOGGED BY: JB	COMPLETION DEPTH: 2.1 m
REVIEWED BY: GC	COMPLETION DATE: May 13, 2024
Figure No. A9	Sheet 1 of 1

APPENDIX D

Variance Approval Letter

Manitoba
Environment and Climate Change
Environmental Approvals Branch
Box 35, 14 Fultz Boulevard
Winnipeg MB R3Y 0L6
T 204 945-8321 F 204 945-5229
EABDirector@gov.mb.ca

File Number: 3851.00

May 22, 2024

Barry Blue
District Manager
Waste Connections of Cannada Inc.
Prairie Green Landfill
Rosser MB R3C 2E6
barry.blue@wasteconnections.com

Dear Barry Blue:

Re: Approval to locate a temporary building within Prairie Green Integrated Waste Management Facility – Environment Act Licence No. 2177 ER5

Thank you for your submission dated May 16, 2024. The department understands you wish to locate a temporary building within the Prairie Green Integrated Waste Management Facility (landfill). The landfill is located on Section 14 and N ½ of Section 11-12-2 EPM, in the Rural Municipality of Rosser.

I approve the request per Section 45 of the Waste Management Facilities Regulation to locate the building as identified in Schedule A of this letter. In executing this work, the licensee must:

a) notify the department before removing the building;
b) secure the landfill so that the gates are kept locked when an attendant is not on duty or the landfill is closed; and
c) follow all applicable federal, provincial, and municipal regulations and by-laws.

This approval is granted without prejudice to future environmental or public health legislation that may come into force, that would be applicable and may be cancelled accordingly.

…2

If the building is generating wastewater, an onsite wastewater permit will be needed. For more information about the onsite wastewater permit and if you have any questions about this approval, please contact Sonja Bridges, Acting Regional Supervisor, Environmental Compliance and Enforcement Branch at envcewinnipeg@gov.mb.ca or 204-918-4271.

Sincerely,

[redacted]

Agnes Wittmann
Director
The Environment Act

c. Izzie Abrams - Waste Connections of Canada
Fabiano Gondim - WSP
Frank Barone - WSP
Sonja Bridges - Environmental Compliance and Enforcement

Schedule A

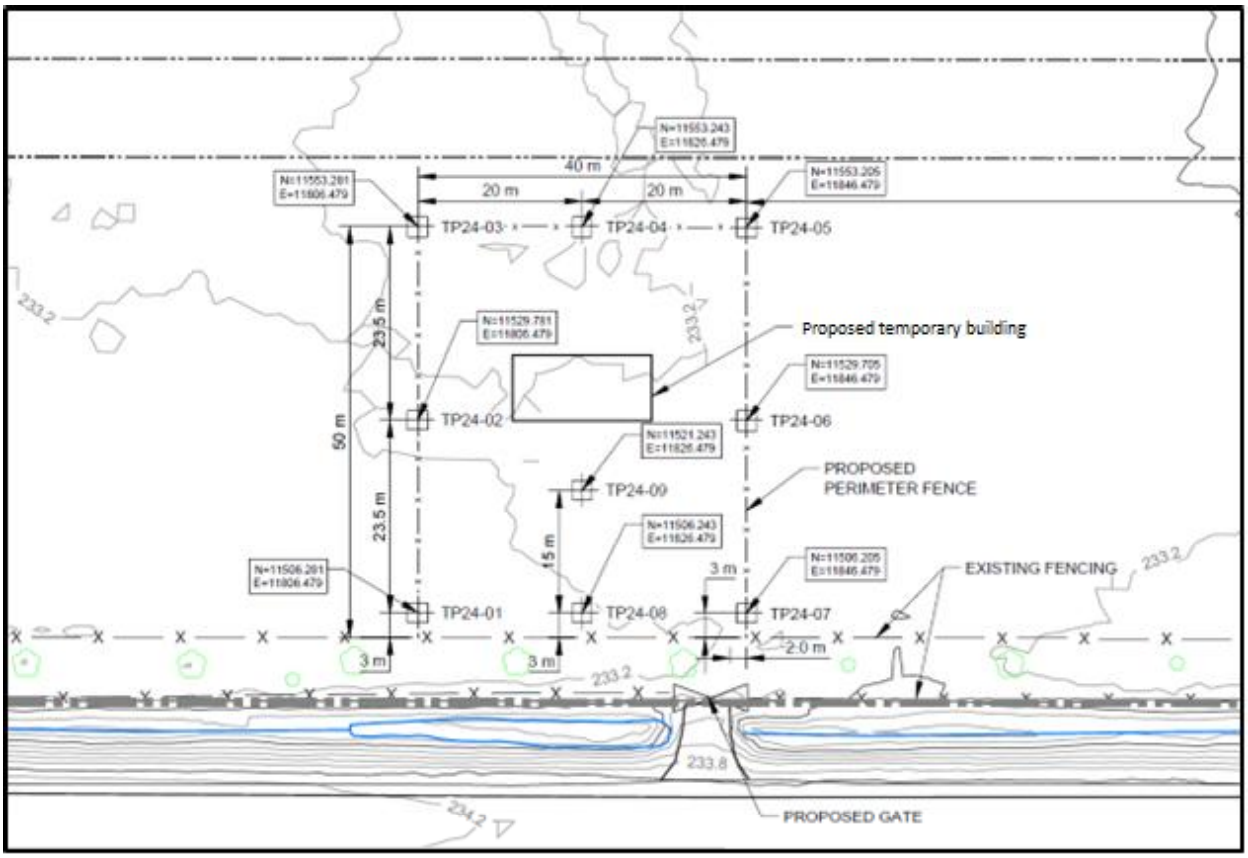


Figure 1: Layout of the proposed temporary building

APPENDIX E

Asbestos Containing Materials - Training Literature and Handling Procedures

WASTE CONNECTIONS OF CANADA

ASBESTOS CONTAINING MATERIALS

TRAINING LITERATURE AND HANDLING PROCEDURES

PRAIRIE GREEN IWMF

ASBESTOS

Asbestos is a hazardous material that is regulated by the Federal Transportation of Dangerous Goods Act and several provincial Acts. Asbestos is considered a hazardous waste in the province of Manitoba. Exposure to asbestos fibers and dust can cause asbestosis in humans and as such, procedures are required to prevent such exposure. Only properly trained WCC personnel using properly equipped vehicles will handle Asbestos Containing Material. (ACM)

PURPOSE

The primary safety objective in handling asbestos waste is preventing the release of asbestos fibers and asbestos containing dust. The potential human health effects associated with exposure to asbestos require strict compliance with this procedure.

SCOPE

This procedure applies to all WCC employees required to handle asbestos waste and is specific to Prairie Green IWMF.

DEFINITIONS

"Asbestos Containing Materials" include:

Any **friable** material that contains more than .1% asbestos by weight or area, depending on whether it is a bulk or sheet material. It can be crumbled, pulverized, or reduced to powder by the pressure of an ordinary human hand, causing fibers to become airborne.

Any **non-friable** material that contains more than 1% asbestos, but cannot be pulverized under hand pressure. Any asbestos containing material can become friable. When non friable asbestos becomes friable, it is not the asbestos itself that crumbles, but the building materials in which it was used. As clay or other minerals age and wear, they break down and release the more durable asbestos fibers. Burning any ACM, such as wallboard, asbestos papers, or ceiling tiles also releases asbestos fibers and changes the classification to friable and regulated. Cutting or drilling them, especially with power tools, will also release fibers. Anything done to building materials that may raise dust will cause dangers if the materials contain asbestos. Once released, the asbestos fibers are light enough to hang suspended in the air for extended periods of time.

Vermiculite insulation that contains asbestos.

Types of Asbestos Fibers

Chrysotile (white asbestos) is the most commonly used form of asbestos. It can be found today in the roofs, ceilings, walls and floors of homes and businesses. Manufacturers also used chrysotile asbestos in automobile brake linings, gaskets and boiler seals, and insulation for pipes, ducts and appliances.

Figure 1 Chrysotile

Amosite (brown asbestos) was used most frequently in cement sheets and pipe insulation. It can also be found in insulating board, ceiling tiles and thermal insulation products.

Figure 2 Amosite

Crocidolite (blue asbestos) was commonly used to insulate steam engines. It was also used in some spray-on coatings, pipe insulation, plastics and cement products.

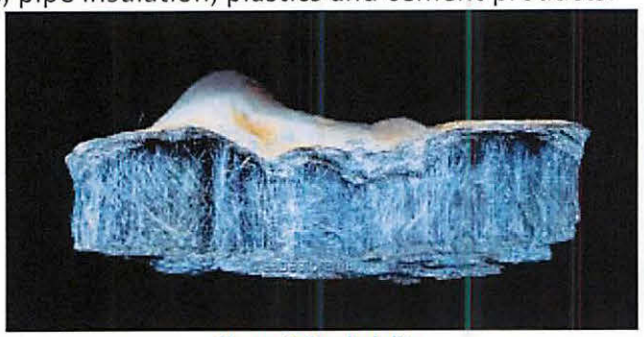


Figure 3 Crociodolite

Anthophyllite was used in limited quantities for insulation products and construction materials. It also occurs as a contaminant in chrysotile asbestos, vermiculite and talc. It may have a grey, dull green or white color.

Figure 4 Anthophyllite

Tremolite and actinolite are not used commercially, but they can be found as contaminants in chrysotile asbestos, vermiculite and talc. These two chemically similar minerals can be brown, white, green, gray or transparent.

Examples of asbestos containing materials include:

- **Insulation** (Pipe, boiler, corrugated air-cell, breaching, and block insulation; HVAC duct insulation; sprayed-in insulation; blown-in insulation; thermal paper products; electrical wiring insulation)

- **Fireproofing/Acoustical Texture Products** (includes acoustical plaster, decorative plaster, textured paint or coatings, fire blankets, fire curtains, fire doors)
- **Textile and Cloth Products** (includes blankets, protective cloth coverings, garments, asbestos gloves, threads, cords, yarns, braids)
- **Spackling, Patching & Taping Compounds** (includes caulking, putties, joint compounds, adhesives, tapes, thermal taping compounds)
- **Gaskets and Packings** (includes high temperature gaskets, packings for industrial products, high pressure packing, asbestos packing reinforced with steel or copper wire)
- **Asbestos-cement Pipe and Sheet Material**
- **Tiles, Wallboard, Siding and Roofing** (includes roofing shingles, roofing felt, base flashing, cement wallboard, cement siding, ceiling tiles and lay-in panels, asphalt floor tile, vinyl floor tile, vinyl sheet flooring, flooring backing, vinyl wall coverings)
- **Friction Materials** (automotive and railroad brakes and clutches)
- **Vermiculite** (used in some horticultural potting mixes, brake pads, acoustic tiles, insulation)
- **Laboratory hoods and table tops**

Figure 5 Floor Tile

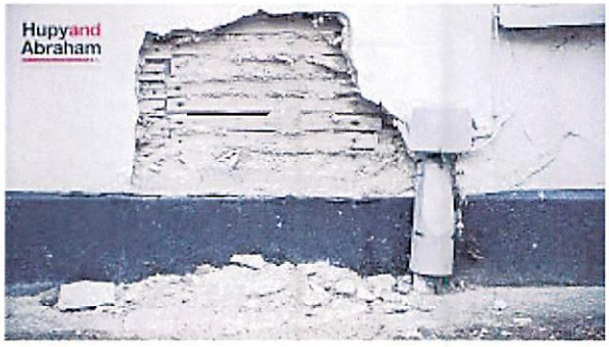


Figure 6 Cement board/stucco

Figure 7 Corrugated panel

Figure 8 Vermiculite Insulation

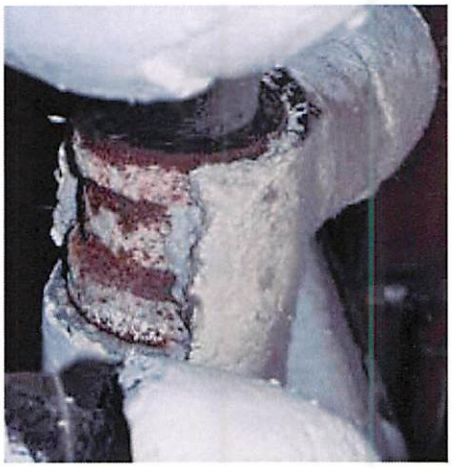


Figure 9 Pipe coating

Figure 10 drywall compound

Figure 11 Textured coatings

PLEASE NOTE:

All general construction and demolition debris has the potential to contain ACM. This debris must be segregated from the MSW working face and must be wetted down when it arrives for disposal. The water truck must be available to the disposal area if further moisture is required to prevent dust particles from becoming airborne. Items to watch for include but are not limited to; stucco, drywall, flooring and insulation. If any load may contain suspect materials, it is deemed to contain asbestos and should be handled accordingly.

REQUIREMENTS

Only Trained and Properly Equipped WCC Personnel will handle Asbestos waste. Training must be completed prior to first assignment of asbestos waste handling and will consist of the following:

1) A thorough knowledge based review of the application of all elements of the Asbestos waste handling procedures as outlined in these procedures. The procedure will be reviewed on an annual basis after the initial training.
2) Initial and annual review of the use, care and storage of personal protective equipment.
3) Respirator Fit Testing annual.
4) Personal hygiene precautions to be taken.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Waste handling machines at the landfill have sealed cabs and purpose-built cab filtration, therefore an operator is not required to use PPE when inside the cab. However, the operator must ensure that the machine is upwind from the ACM at all times. In the event that the operator must exit the cab, (i.e. a spill), the following personal protective equipment is provided for each operator. This personal protective equipment must be worn at all times when handling asbestos waste.

1) Tyvek or comparable disposable zippered suit, either with elastic around the wrists and ankles or using tape to seal between the suit and gloves/boots.
2) Tyvek or comparable bonnets and shoe covers.
3) Air purifying cartridge-type respirator with P100 cartridges approved for use with asbestos.
4) Cotton gloves.

PERSONAL HYGIENE

All PPE used in the management of asbestos or a spill of asbestos must be removed at the asbestos disposal site and the used products must be bagged as ACM and disposed at the asbestos disposal area. Prior to managing any further asbestos material, operators must ensure that the PPE supply is replenished including new P100 filter cartridges, and respirators have been washed.

Provisions must be made for personnel to decontaminate in the event that a spill or other circumstance results in contamination of their work clothing or person. A portable vacuum that contains a HEPA filter will be kept near the disposal area for operator use.

RESPONSIBILITY

District Manager/Operations Manager

The District Manager will ensure that:

1) The Asbestos Procedure is communicated, trained and implemented within the district for all personnel who may be required to manage asbestos or an asbestos spill.
2) All necessary training required by this procedure is completed by all personnel who may be required to manage asbestos or an asbestos spill.
3) There is an adequate supply of PPE required for safe asbestos waste management is maintained.
4) All aspects of the Asbestos Procedure are enforced.

Employees

Employees must:

1) Participate in the required training associated with the Asbestos procedure and apply the knowledge learned.
2) Use all safety precautions associated with this program.
3) Use all PPE required by this procedure.
4) Immediately report all potential exposure situations to his/her immediate supervisor and cease all operations in the event of potential exposure to friable asbestos until the problem has been rectified.
5) Follow spill procedures in accordance with this procedure.

Disposal

Landfill Responsibility

The landfill must provide a disposal area for ACM that is a minimum 150 feet from the commercial tipping pad, and is downwind to ensure that no airborne particles can pose a risk to others in the landfill area.

1) The disposal area must be a depression or excavation in a waste lift that is accessible from either the top or bottom of the lift.
2) The area must be clearly designated to prevent unauthorized entry.
3) A stockpile of material must be next to the area to completely cover the ACM after disposal to a depth of 20-25 centimeters as soon as possible, and; covered to a minimum depth specified (at least 1 meter) by the end of a working day.
4) The operator must take care to not puncture any bags of ACM when placing them in the depression, or when covering the ACM with regular waste.
5) The operator must ensure that no one is within the restricted area when handling the ACM, and take care to monitor any changes in wind direction.

Special Wastes

The landfill receives several waste streams which can be categorized as special waste. Some of these streams, such as processing plant "cakes" must be handled according to the physical characteristics they present. These materials will be handled in the same manner as asbestos.

1) A designated area will be created for the material that is a minimum of 150 feet from the commercial tipping floor.
2) The area will be a depression or excavation in a waste lift, designed to minimize handling of the waste.
3) After the cake material has been dumped, a load of regular waste will be placed against it for ease in pushing the waste into the lift.
4) Landfill operators must take care to ensure that equipment has minimal contact with the cake material to prevent it from being tracked across the tipping floor into areas that other customers could be walking.
5) The cake material must be thoroughly covered with other wastes or soil material to eliminate odors.

APPENDIX F

Odour Control Solutions Brochure

It's Time to Upgrade Your Odour Control Products!

Fogging

BIN BALLS
Granular

Industry unique, light-weight, absorbing spheres infused with true odour neutralizing technology and a scent release formula that activates on contact with liquids.

ODOR-KEY
Odour Neutralizer Concentrates

All natural multi-component odour neutralizing concentrates available in formulations for fogging and waterless vapour generators

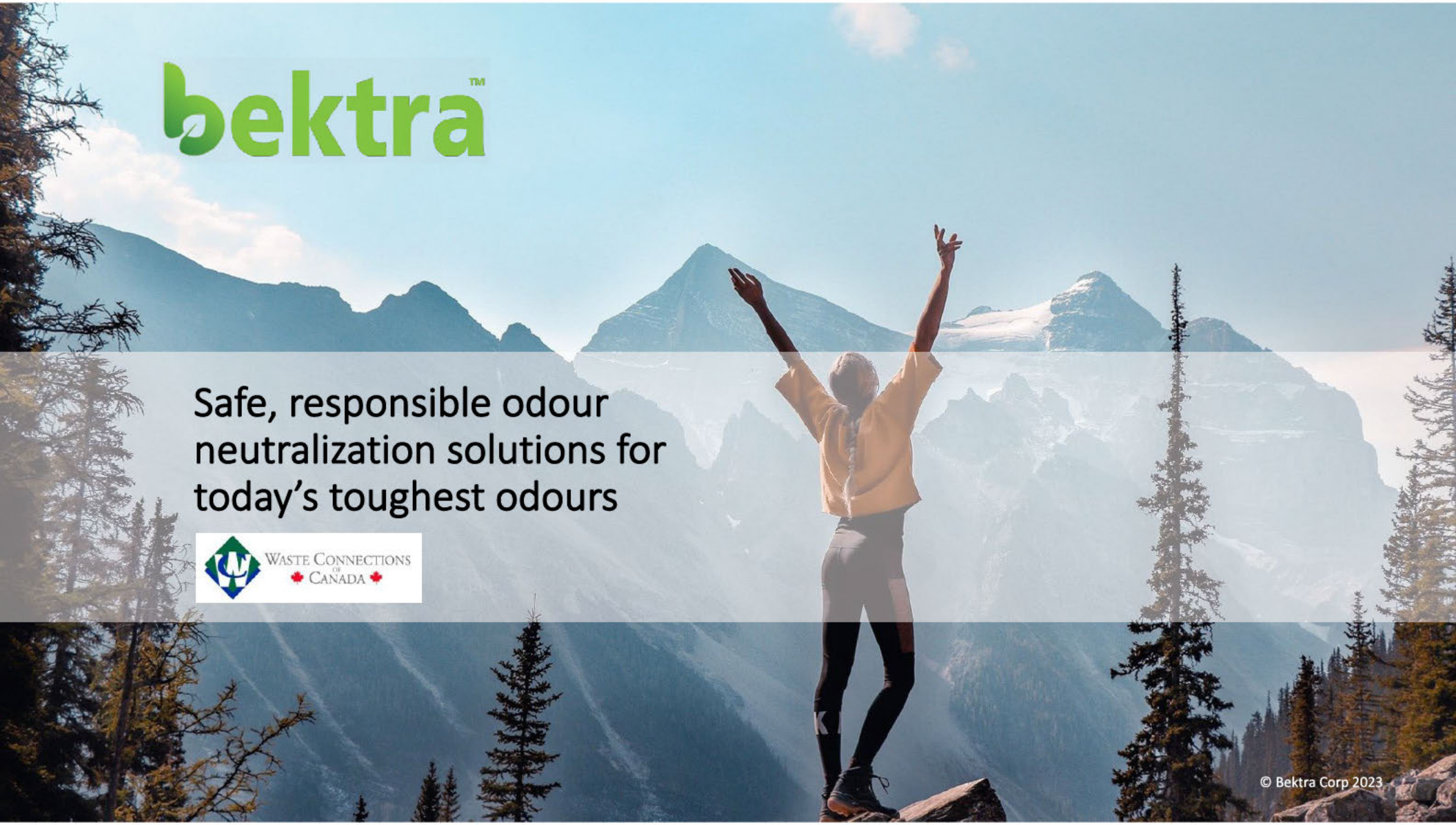
Waterless Vapour

VAPOR-TEC
Air Treatment Systems

Self contained odour control generators used to deliver a waterless odour counteractant in the form of dry vapour.

bektra™

220 Bayview Drive Unit 7
Barrie, ON L4N 4Y8
(705) 734-2422
bektra.com


bektra™
Safe, responsible odour neutralization solutions for today's toughest odours
Waste Connections of Canada
© Bektra Corp 2023

bektra™

- Proudly Canadian designer, manufacturer and distributor of **odour neutralization products** and the **systems that deploy them**
- Industry-leading **environmental safety profiles** and **operational performance**
- Proven experience in **solid waste** odour management
- Embraces the **power of partnership** through constructive alliances

Waste Connections of Canada

- **Preferred pricing** across Canada
- **Advanced portfolio** in solid waste odour mitigation technology
- **Easy** ordering and **favorable** terms

Neutralize today's toughest odours with Bektra's next-generation solutions

Bektra's superior **solutions** for transfer stations, waste and recycling service bin services, and trash rooms **neutralize odours and help keep pests away**

BIN BALLS

Granular

Industry-unique light weight absorbent spheres infused with odour neutralizing technology and a scent release formula that activates on contact with liquids.

BIO-KEY

Foam

Penetrating foam odour neutralizing concentrate that cleans and prevents offensive odours in one easy step. Simply spray and walk away.

ODOR-KEY VP

Waterless

Waterless odour neutralizing concentrates for use in Bektra's Vapor-Tec ultra-dry vapor generating technology.

ODOR-KEY

Fogging

Water-soluble odour neutralizing concentrates for use in air treatment as atomized solution through fogging nozzles.

bektra

Bektra VAPOR-TEC LVE & ODOR-KEY VP Waterless Odour Neutralizer

- **Diffused.** Vapor-Tec converts Odor-Key VP into sub-micron vapour
- **Air-operated.** No water required, vapour blown through diffuser pipe
- **Powerful.** Concentrated multi-component blend of natural odour neutralizing compounds
- **Targeted.** Industry-specific formulations
- **Cost-effective.** No water consumption and low solution rates (e.g. 4L/month/door)
- **Year-round.** No freezing or winterization
- **Responsible.** Environmentally sustainable
- **Flexible.** Rugged, easy to install

bektra

Bektra VAPOR-TEC/ODOR-KEY VP Waterless Odour Neutralizer

- **How to use Vapor-Tec/Odor-Key:**
  - Install Bektra Vapor-Tec stations and diffuser pipe
  - Connect to low-psi, low-flow, clean and dry compressed air
  - Fill reservoir with ODOR-KEY VP
- **Where to use Vapor-Tec/Odor-Key:**
  - Transfer station doors and floors
  - Garbage rooms and chutes
  - Material recovery processing
  - Food waste handling and disposal
- **Vapor-Tec vapor generator**
  - 2-year warranty
  - Purchase outright or lease to own
  - Vapor-Tec Flow Management Controller (FMC): [redacted]
  - Vapor-Tec RV5: [redacted]
- **Odor-Key VP available in:**
  - 4 x 4L bottle cases at [redacted] + shipping
  - 20L pails at [redacted] + shipping (approximately [redacted]/month)

bektra

Bektra VAPOR-TEC/ODOR-KEY VP Waterless Odour Neutralizer

A complete VAPOR-TEC odour neutralization system for transfer stations

Bektra ODOR-KEY Water-Soluble Concentrated Odour Neutralization

- **Powerful.** Concentrated odour neutralizing compounds for treating airborne odours
- **Compatible.** Works with all fogging systems
- **Targeted.** Industry-specific formulations
- **Economical.** High dilution capability for large multi-nozzle fogging applications
- **Responsible.** Non-toxic and biodegradable

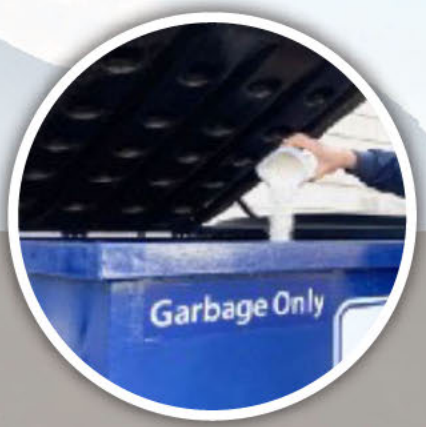
bektra

Bektra ODOR-KEY Water-Soluble Concentrated Odour Neutralization

- **How to use Odor-Key:**
  - Dilute with water and pressurize to create fine atomization at nozzles
- **Where to use Odor-Key:**
  - Transfer station doors and floors
  - Landfills
- **Available in:**
  - 20L pails at [redacted] + shipping

Increase waste and recycling bin service revenue

Add easy odour neutralization products and services to your customer portfolio. Protect your brand, increase revenue and keep customer bins smelling clean and fresh



BIN BALLS

Granular

Industry-unique light weight absorbent spheres infused with odour neutralizing technology and a scent release formula that activates on contact with liquids.

VAPOR-TEC PSE100

Waterless Vapor

Easily-installed battery or USB powered self-contained vapour generator with Bluetooth programmability. Opportunity for monthly refill service revenue.

bektra

Bektra BIO-KEY Foaming Cleaner and Odour Neutralizer

- **Powerful.** Potent detergent and deodorizer that penetrates soils, oil and grease to tackle the source of odours
- **Natural.** Bio-stimulants breakdown organic compounds and inhibit production of nuisance odours
- **Effective.** Immediate results and long-lasting odour neutralization
- **Easy.** Easy to use - spray and walk away
- **Safe.** Completely bio-degradable and non-toxic

bektra

Bektra BIO-KEY Foaming Cleaner and Odour Neutralizer

- **How to use Bio-Key:**
  - Apply using a hose-end foam applicator or pump-up sprayer
  - Spray and walk away, no need to rinse
- **Where to use Bio-Key:**
  - Trash room floors
  - Bins and chutes
  - Trash tipping floors
  - Landfills
- **Available in:**
  - 4 x 4L bottle cases at [redacted] + shipping
  - 20L pails at [redacted] + shipping
  - 200L drums at [redacted] + shipping

bektra

bektra™

www.bektra.com

+1(705) 734-2422

info@bektra.com

https://www.linkedin.com/company/bektra-corp/

https://www.facebook.com/BektraCorp

https://www.instagram.com/bektra_corp

Ontario Made.

Great things are made right here.

Natural odour neutralization products that make **SENSE** not just scent

bektra™

Performance Advantages

The highly concentrated Odor-Key VP 980 provides low use rates and small solution reservoir footprints. It is not diluted with water and can be used in cold weather environments.

ODOR-KEY VP 980 Yukon Green

Waterless Odor Neutralizer for Vapor Applications

Odor-Key VP 980 is a concentrated, multi-component, blend of naturally occurring plant extracts and proprietary non-aldehyde odor management technology. The formula is designed to target, and permanently remove, airborne sulfur-based compounds and amines commonly associated with decomposing organics.

SPECIFICATIONS:

Appearance: Clear to slightly opaque liquid
Odor: Slight with product specific key notes
Flash Point (CC): 60°C / 140°F
Freezing Point (°C): -20°C / -4°F

DIRECTION FOR USE:

Odor-Key VP 980 is a **ready-to-use** concentrated liquid designed for use in forced air evaporators and dry vapor generating systems with particle size production not exceeding 5 microns. A Bektra Manufacturer's Representative should be consulted to review application protocol and dosage rates to maximize treatment performance.

PACKAGING:

OKV980-0016	4X4L	(4 x 1.06 gal)	17kg.	(38 lbs.)
OKV980-0020	20L	(5.3 gal pail)	22kg.	(48 lbs.)
OKV980-0200	200L	(53 gal drums)	216kg.	(476 lbs.)

STORAGE & HANDLING:

Keep out of reach of children. Product is intended for industrial use only. Keep container closed when not in use. Wear protective goggles and gloves when transferring or handling product.
Do not store in areas of high temperature or direct sunlight.

COMMON AREAS OF USE:

- Transfer stations & landfills
- Garbage rooms & chutes
- Wastewater
- Compactors and recycling bins
- Kitchen exhaust
- Food waste handling and disposal

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