December 23, 2015

Manitoba Conservation & Water Stewardship
Environmental Approvals Branch
Attn: Tracey Braun. Director
Ste. 160, 123 Main Street R3C 1A5

Dear Ms. Braun,

Notice of Alteration – R.M. of Ritchot Waste Disposal Ground,
Environment Act Licence No. 2482R

This Notice of Alteration is being submitted on behalf of MidCanada Environmental Services and the Rural Municipality of Ritchot, pursuant to Section 14(1) of the Environment Act, in regard to a provision of Licence No. 2482R issued to the R.M. of Ritchot for the construction and operation of a Class 1 waste disposal ground. The proposed alteration is described as follows:

> It is being proposed to increase the landfill cell finished heights from the current 8 metres to 12 metres above prairie grade. This would apply to all cells that have been closed to date. This includes Cells 1 to 5 as shown on Figure 1.

Background and further details on the proposed alteration are provided in the following sections.

1. Background to Proposed Alteration

1.1 Original Design

The original waste disposal ground design drawings, dated August 2000 and submitted as part of the Environment Act Proposal, included exterior berms surrounding each cell built up to a height 6 metres above prairie grade. The decision on the cell height resulted from a recommendation from the Ritchot council, based primarily on aesthetic considerations. Section 18 of Environment Licence 2482R states that the Development is to be constructed in accordance with the design drawings, dated August, 2000, which included the 6 metre berm height. Furthermore, Section 31 of Licence 2482R requires that the finished elevation of the landfill cells, including final cover not exceed 8 metres. The additional 2 metres above the berm height would accommodate the addition of the final cap material and the required contour of the cap.

MidCanada Environmental staff has recently discussed the original berm height stipulation with the R.M of Ritchot and the current council is agreeable with increasing the finished height of the landfill cells, both for the completed cells and for future cell construction.

1.2 Rationale for Proposed Alteration

The Ritchot landfill is situated adjacent to a soil treatment facility operated by MidCanada Environmental Services. After impacted soil has been remediated to industrial soil quality guidelines, it is used as intermediate cover at the landfill. A large volume of soil from an industrial site remediation project was brought to the MidCanada facility in 2008 and 2009. As this soil was treated and transferred to the landfill in subsequent years, in addition to the soil from other projects, the cumulative volumes were found to be greater than the demand for intermediate cover in the landfill operation. The surplus soil was stockpiled on top of the closed landfill cells. Over time it has become apparent that the volume of stockpiled soil will not all be required as intermediate cover during the projected life of the landfill.

Since the treated soil meets the criteria specified by Manitoba Conservation and Water Stewardship in the guideline titled Criteria for Acceptance of Contaminated Soil at Licensed Waste Disposal Grounds, it is proposed that the surplus soil be left in its current location and be incorporated as an additional waste layer into the final configuration of Cells 1 to 5 (the subject area).

2. Proposed Alteration Design Details

The treated soil has been distributed over the entire footprint of the subject area, with the exception of drainage ditches and the roadway leading through the centre of the landfill facility. As of the spring of 2015, the average elevation of the subject area, including the soil stockpile, varied between 10 and 11 metres above prairie grade. It is proposed that this area be leveled and contoured and that the final compacted clay cap and vegetation be placed over the entire area of the five closed cells.

The existing soil stockpile will be graded to conform to the elevation contours shown in Figure 1. Sufficient space will be left to add the final cap without exceeding the proposed 12 metre elevation. The surface contours will direct drainage to the north and south perimeters of the subject area. A small percentage of surface run-off will be picked up by the drainage ditch along the main access road going through the approximate centre of the area. On the south side of the subject area run-off will enter a municipal drainage ditch on the north side of the road adjacent to the Seine River Diversion. The majority of run-off entering the ditch will flow east and enter the Diversion via a culvert under the road. Due to the design of the ditch, a smaller volume of run-off will flow west and enter the Diversion near the south-west corner of the closed Class 2 waste disposal ground.

Run-off from the area north of the access road will flow north into a drainage channel on the north boundary of the landfill site. This water will flow west into the water storage area. Discharge of the water storage area will be performed, as necessary, in accordance with the provisions of Licence 2482R.

An approximate 15:1 slope will be maintained over the majority of the subject area to direct run-off as described in the previous paragraph. AMEC Foster Wheeler was engaged to conduct a slope stability analysis to ensure that the weight of the additional soil at the increased final elevation will not compromise the stability of the original berms. The report prepared by the consultant, included as Attachment 1, states that the Factor of Safety of the existing slope will still exceed the original 1.50 standard when the additional height is factored in.

Once the soil stockpile contours have been completed, the final clay cap will be installed as shown in Figure 2. The final cap will consist of a minimum depth of 0.5 m. of clean high plastic clay compacted in maximum 200 mm thick lifts to a density of 95% SPMDD using a heavy sheepsfoot compactor. When compaction tests confirm that the required density has been achieved, a 150 mm layer of topsoil will be applied over the subject area. The area will be seeded with a mix of drought-resistant native grasses.

3. Environmental Impact of Proposed Alteration

The alteration only affects the finished design height of the area under consideration. The clay liners and leachate collection systems within the cells will continue to meet the standards specified in the original design documents and in Licence 2482R. Since the environmental protection features associated with the landfill cell construction remain unchanged, no additional environmental impacts are anticipated in regard to water or air quality as a result of the proposed alteration.

Increasing the height of the cells without appropriate mitigation could result in increased erosion of the side slopes resulting from the higher flow speed of run-off water from the top of the area. This could, in turn, result in increased suspended solids in the run-off. It is proposed that this risk be mitigated by incorporating a bench along the side slopes at the top of the original cell berms to slow the flow of water and by adding vegetation to the side slopes to stabilize the underlying soil layer. The configuration is shown on the cross section view in Figure 2.

4. Regulatory Issues

The primary impact of the proposed alteration on the current regulatory provisions is that the finished height in the subject area would increase to 12 metres above prairie grade, which exceeds the maximum 8 metre elevation stipulated in Section 31 of Licence 2482R.

As stated above, the requirement to increase the finished height on the subject area has resulted from excess volumes of treated soil from the adjacent soil treatment facility being stockpiled in this location. Since the soil quality meets the criteria specified in Manitoba Conservation and Water Stewardship guidelines, there do not appear to be any provisions in the licences for the landfill or soil treatment facility which would not allow the treated soil to be accepted as a waste material and be incorporated into the landfill cells before final cover is applied

For future operations, MidCanada is proposing to limit the stockpile volume of treated soil to a six month supply for intermediate landfill cover. Soil volumes in excess of this stockpile limit would be incorporated into subsequent cells, either with other wastes or as a separate upper layer, similar to what is proposed for Cells 1 to 5. Based on the experience with the large soil treatment project commenced in 2008, MidCanada proposes to develop a treated soil management plan for any future treatment projects in excess of 40,000 tonnes.

D. Ediger Consulting Services is submitting this Notice of Alteration on behalf of the Rural Municipality of Ritchot, the designated licensee for Environment Act Licence 2482R, and MidCanada Environmental Services, pursuant to Section 14(1) of the Environment Act and requests that Manitoba Conservation and Water Stewardship review the notice and advise the involved parties of the Department's decision on this matter.

Thank you for your consideration. Any additional information required on this matter can be requested through the undersigned or through Stephen McCabe at MidCanada Environmental Services.

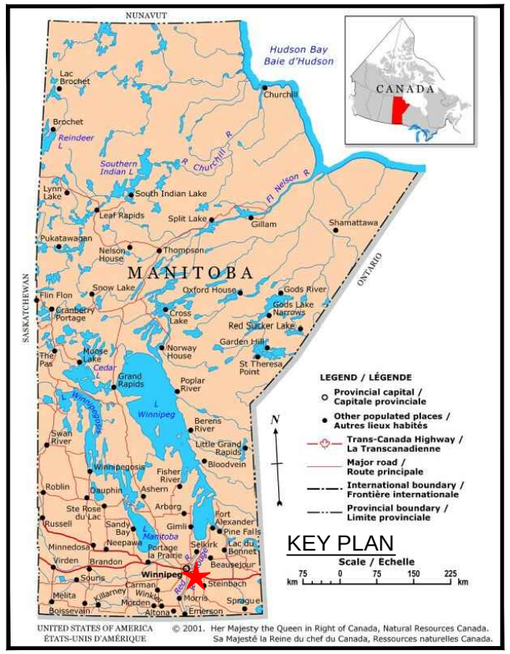
Sincerely,

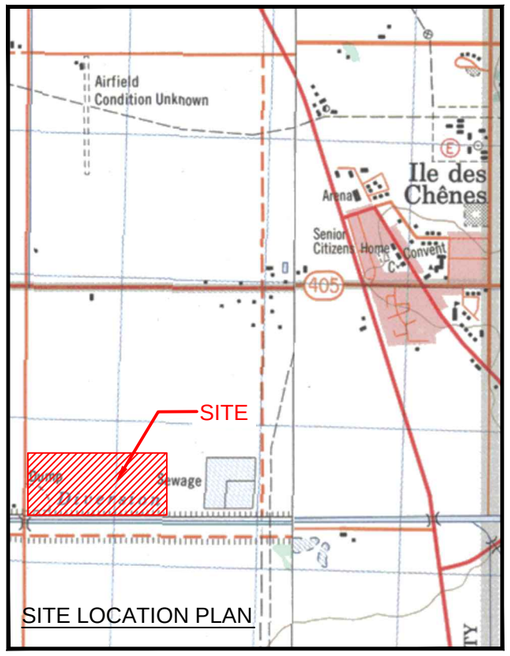
David Ediger, P.Eng.

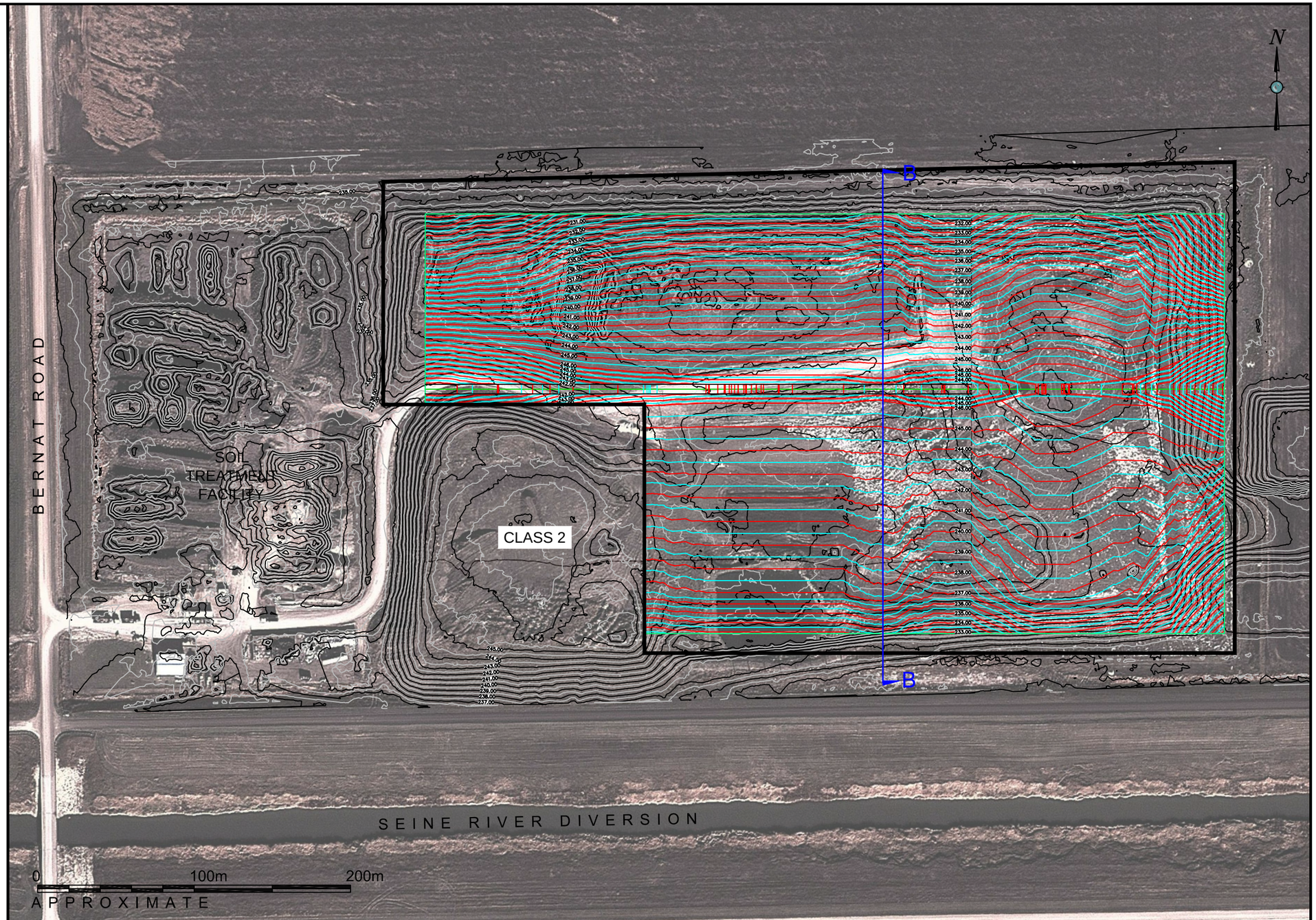
c. MidCanada Environmental Services
Rural Municipality of Ritchot

Attach.

FIGURES







P:\JOBS\4000'S\4690\DRAWINGS\UAV SURVEY\TEMP FILES\MIDCANADA LAND FILL DESIGN.DWG

LEGEND:

CLIENT LOGO

CLIENT:
MIDCANADA ENVIRONMENTAL SERVICES LIMITED

Amec Foster Wheeler
Environment & Infrastructure
440 DOVERCOURT DRIVE
WINNIPEG, MANITOBA R3Y 1N4
PHONE: 204.488.2997 FAX:204.489.8261

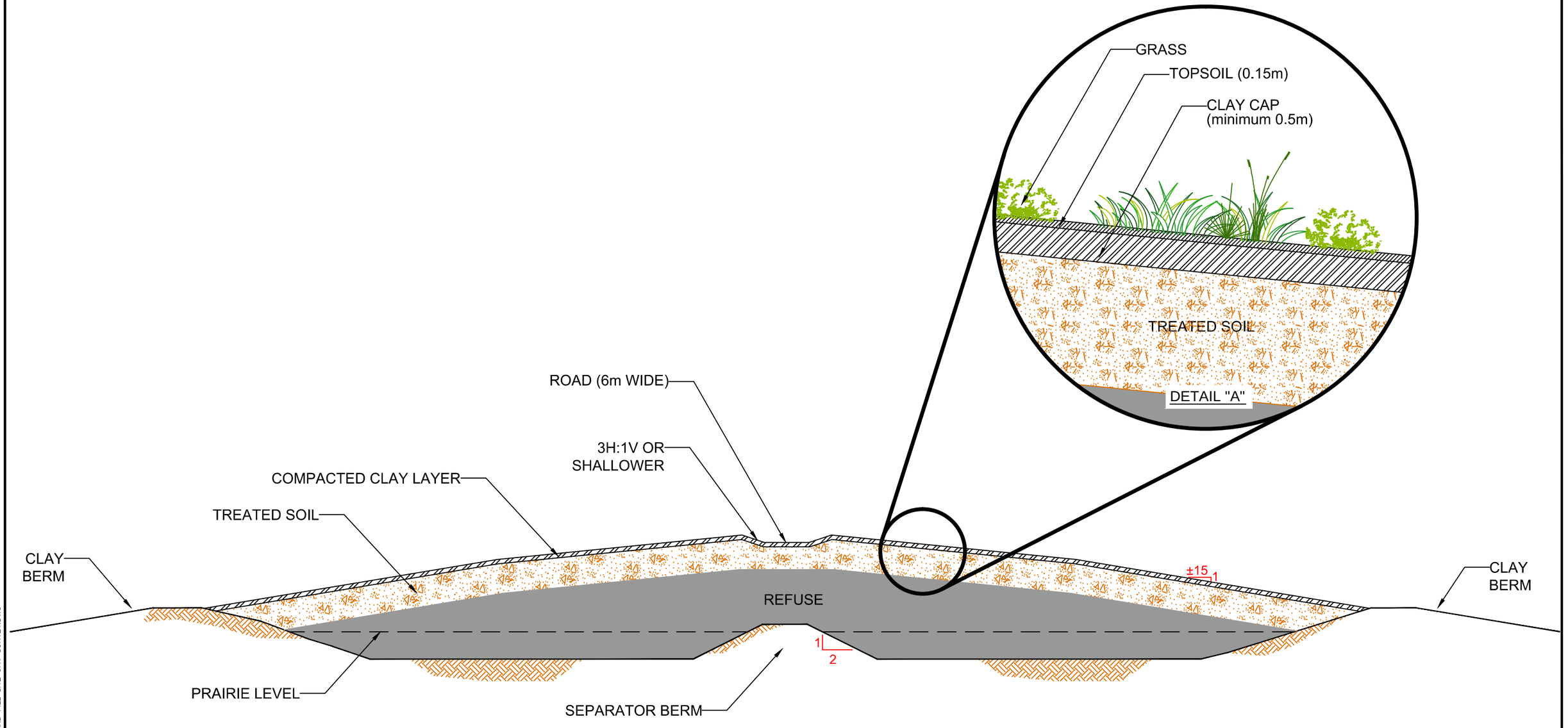
amec foster wheeler

DWN BY:	MD
CHK'D BY:	HP
DATUM:	NAD83
PROJECTION:	UTM Zone 14 U
SCALE:	AS SHOWN

FINAL CLOSURE - CELLS 1 TO 5
CLASS 1 WDG
1373 BERNAT ROAD
RM OF RICHOT, MANITOBA

LANDFILL PLAN VIEW WITH CONTOUR LINES

DATE:	DECEMBER 2015
PROJECT NO:	WX0469014
REV. NO.:	A
FIGURE NO:	FIGURE 1



NOTE:
1. Compacted clay liner will be constructed from new clay excavated from cell construction.
2. Treated soil meets CCME EQG for industrial land use and originates from the soil treatment facility.

P:\JOBS\4000'S\4690\DRAWINGS\UAV SURVEY\MIDCANADA LAND FILL SITE UAV SURVEY.DWG

LEGEND:

CLIENT LOGO

CLIENT:
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PHONE: 204.488.2997 FAX:204.489.8261

DWN BY: MD
CHK'D BY: HP
DATUM: NAD83
PROJECTION: UTM Zone 14 U
SCALE: NOT TO SCALE

FINAL CLOSURE - CELL 1 TO 5
CLASS 1 WDG
1373 BERNOT ROAD
RM OF RICHOT, MANITOBA

CROSS SECTION - TYPICAL

DATE: DECEMBER 2015
PROJECT NO: WX0469014
REV. NO.: A
FIGURE NO: FIGURE 2

ATTACHMENT 1

30 November 2015

Amec Foster Wheeler Project No. WX04690

MidCanada Environmental Services Ltd.
1090 Kenaston Boulevard
Winnipeg, Manitoba

Attention: Mr. Stephen McCabe

Slope Stability Analysis
Proposed Cell Height Increase
MidCanada Environmental
Ile Des Chenes , Manitoba

1.0 INTRODUCTION

As requested, Amec Foster Wheeler Environment and Infrastructure, a division of Amec Foster Wheeler Americas Ltd. (Amec Foster Wheeler), is pleased to provide geotechnical analyses for the existing cell slopes at the MidCanada Waste Disposal Grounds located in Ile Des Chenes, Manitoba. The geotechnical analyses were required to evaluate the stability impacts of the proposed raise in overall cell height to 12 m from the previous maximum height of 8 m.

2.0 EXISTING INFORMATION

Topographic data utilized in the analysis of the existing berms was based on data obtained during an Unmanned Aerial Vehicle (UAV) survey of the overall landfill facility completed in December 2014. Two cross sections (cross sections A-A and B-B) taken through the highest sections of the Class I area were evaluated, the locations of which are shown on Figure 1. In general, berm slopes of 7H:1V and 4.5H:1V were observed on the west and east sides of cross section A-A, respectively. Existing side slopes of 5H:1V and 5.5H:1V were observed on the north and south sides of cross section B-B. It should be noted that extension of the landfill to the east is likely to be undertaken and as a result the existing slope at the east side of Cross Section A-A is not considered a final layout. Details of each existing cross section are shown on Figure 2. As can be seen in the Figure 2, the maximum berm height within this area is relatively undulating, however for the purposes of the analysis, the top of cell was assumed to be approximately level, with a slight slope to the exterior. Re-shaping of the top of the cells is understood to be undertaken on site, however given that the slope analyses were related specifically to the exterior slopes this re-shaping was not considered for the analysis. Furthermore, re-grading of the exterior slopes such that a final slope configuration is 4H:1V is achieved will be undertaken.

3.0 SLOPE ANALYSIS

The existing soil and groundwater conditions within the refuse cell and surrounding berms were analyzed using SlopeW, a limit equilibrium component of the GeoStudio software package, which is commercially available for geotechnical slope analysis.

Amec Foster Wheeler completed several analyses related to refuse cell and berm stability at the MidCanada facility as part of the original design in 2001. As well, a number of follow up assessments have been completed based on observed conditions. Accordingly, the soil parameters for the refuse and berm material, as shown in Table 1, have been previously established and confirmed to be realistic based on observations over 15 years of operation. It should be noted that native clay and clay fill materials (within the berms) have been assigned the same parameters. This is based on the assumption that clay fill has generally been excavated from the MidCanada site (i.e. little to no fill has been imported) and that clay fill has been compacted to a minimum 95% Standard Proctor Moisture Dry Density (SPMDD). It has further been assumed that treated soil has been placed above the refuse and lightly compacted for cover and thus, given lower strength parameters.

Table 1: Soil Parameters

Soil Layer	Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (Degrees)
High Plastic Clay (Native or Fill)	18.5	5 (Long Term)	18 (Long Term)
		30 (Short Term)	N/A (Short Term)
Refuse	10	2	20
Treated Soil	16	3	15

Groundwater conditions for all analyses were assumed to extend along prairie grade through the clay berm and into the refuse. Given the presence of the leachate collection system within the cells and the highly permeable nature of the refuse, this condition is considered to be highly conservative.

Based on current assessments of optimal landfill height, berms were assumed to be a maximum of 12 m above prairie grade, with the base of the cell extending to a total of 6 m below prairie grade, with a 1 m thick compacted clay liner at the cell bottom. Analyses of the existing slopes along Cross Sections A-A and B-B were undertaken assuming the groundwater conditions noted above. Further to the above, an analysis of a 4H:1V slope was undertaken to represent the final configuration of Cells 1 to 5 after re-grading is completed.

The analysis targeted a long term Factor of Safety of 1.5 for exterior berms. Based on observations made during Amec Foster Wheeler's site visits as well as information provided by MidCanada, it was assumed that once the original clay berms and refuse were placed in the

existing cells, treated soil was placed above the refuse extending from approximately 6 m to 11 m above prairie grade, with a 1 m clay cap placed above the treated soil.

4.0 RESULTS

Results of the analyses of the existing exterior slopes at each location along Cross Sections A-A and B-B, as well as the final 4H:1V slope configuration, are provided in Table 2, below.

Table 2: Factor of Safety

	Cross Section	FS
Existing Cell Configurations	A-A West Side (long term conditions)	2.069
	A-A East Side (long term conditions)	1.574
	B-B North Side (long term conditions)	1.610
	B-B South Side (long term conditions)	2.084
Final Cell Configuration	4H:1V Slope	1.663

Plots showing the results of each of the above analyses can be found on Figure 3 and Figure 4. It should be noted that the small undulations in the surfaces of the existing slopes as shown on Figure 2 were ignored, and in this regard the analyses were undertaken assuming that removal of these small undulations such that a relatively smooth slope would be provided would be completed.

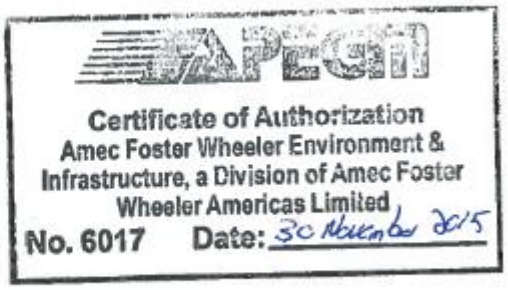
5.0 DISCUSSION

As shown, the existing slopes are considered stable for long term conditions at their current height, however this is contingent groundwater within the cell and adjacent berms remaining at or below prairie grade. Given the leachate removal system that is currently in place, groundwater conditions above prairie grade are unlikely to occur, and have not been observed to occur in the past. Furthermore, should groundwater in the cell and adjacent berms be higher than prairie grade, only minor instability would be expected.

6.0 CLOSURE

Amec Foster Wheeler trusts that the forgoing is sufficient for your present requirements. Should you require additional information, please contact the undersigned.

Sincerely,
Amec Foster Wheeler
Environment and Infrastructure



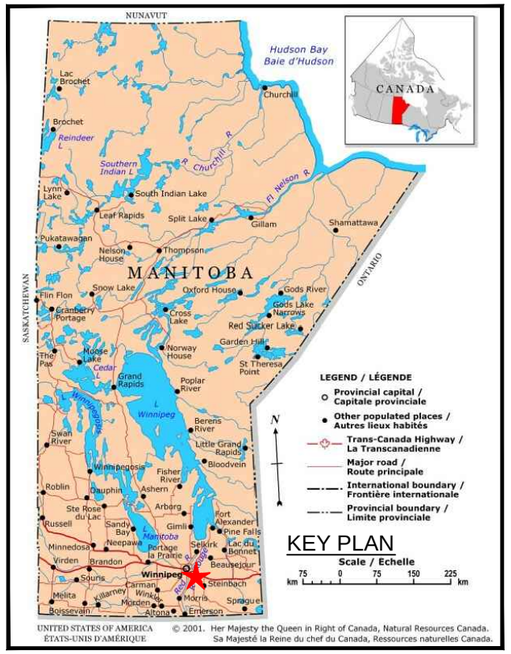
Caolan McEvoy, CET, EIT
Geotechnical Engineer-In-Training

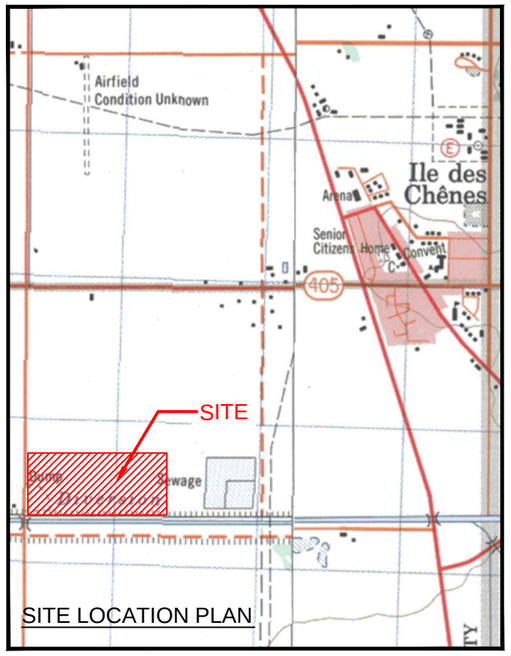
Jorden Wiwcharyk, P.Eng.
Geotechnical Engineer

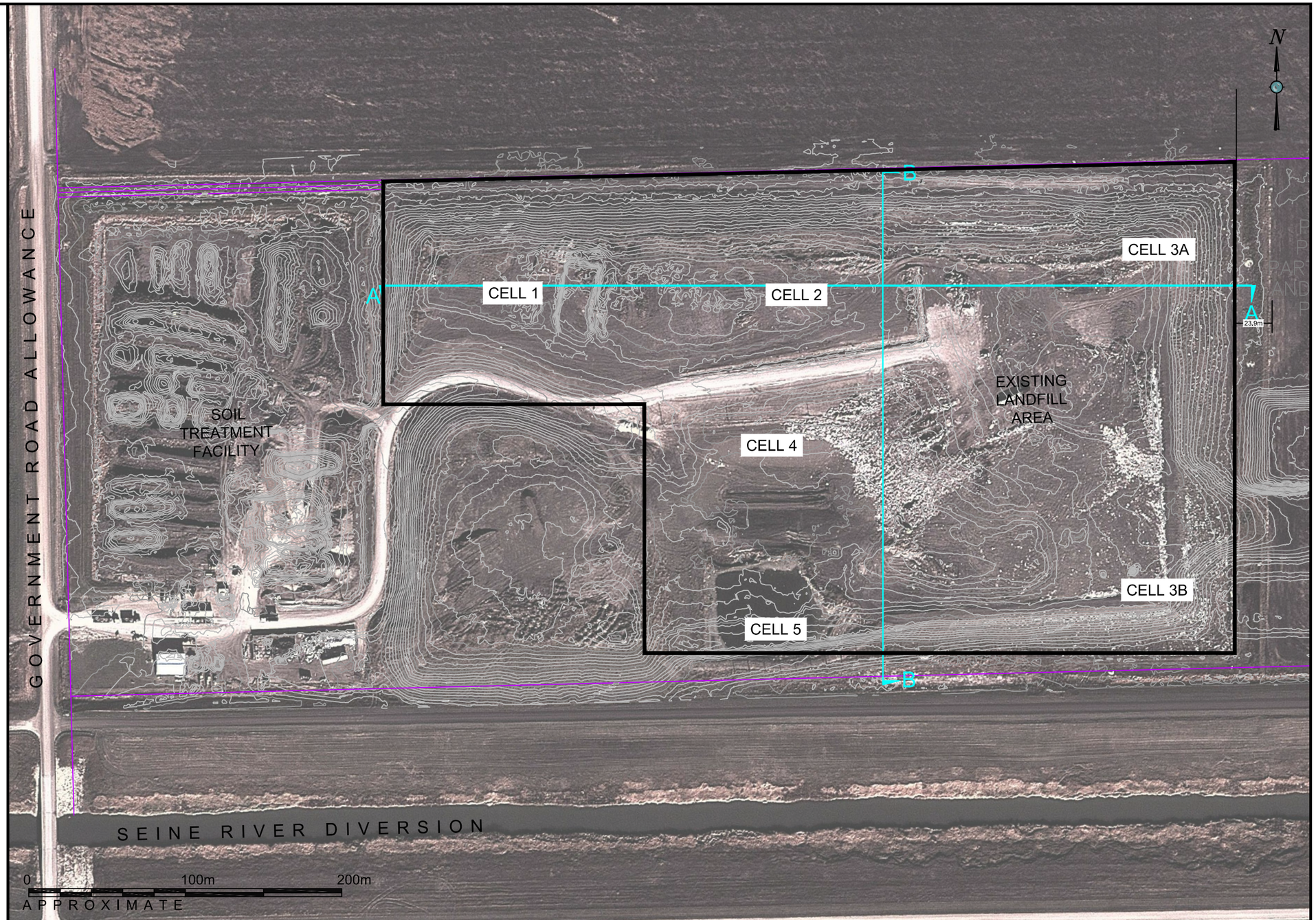
Reviewed by:
Harley Pankratz, P. Eng.
Vice President; East Prairies / Northern Alberta

Attachments:

Figure 1: Cell Location Plan
Figure 2: Existing Cross Section Topography
Figure 3: Existing Cross Section Slope Stability Results
Figure 4: Final 4H:1V Configuration Slope Stability Results







LEGEND:

CLIENT LOGO

CLIENT:

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DWN BY:	MD
CHK'D BY:	HP
DATUM:	NAD83
PROJECTION:	UTM Zone 14 U
SCALE:	AS SHOWN

EXISTING CELL STABILITY
CLASS 1 WDG
1373 BERNAT ROAD
RM OF RICHOT, MANITOBA

CELL LOCATION PLAN

DATE:	NOVEMBER 2015
PROJECT NO:	WX0469014
REV. NO.:	A
FIGURE NO:	FIGURE 1

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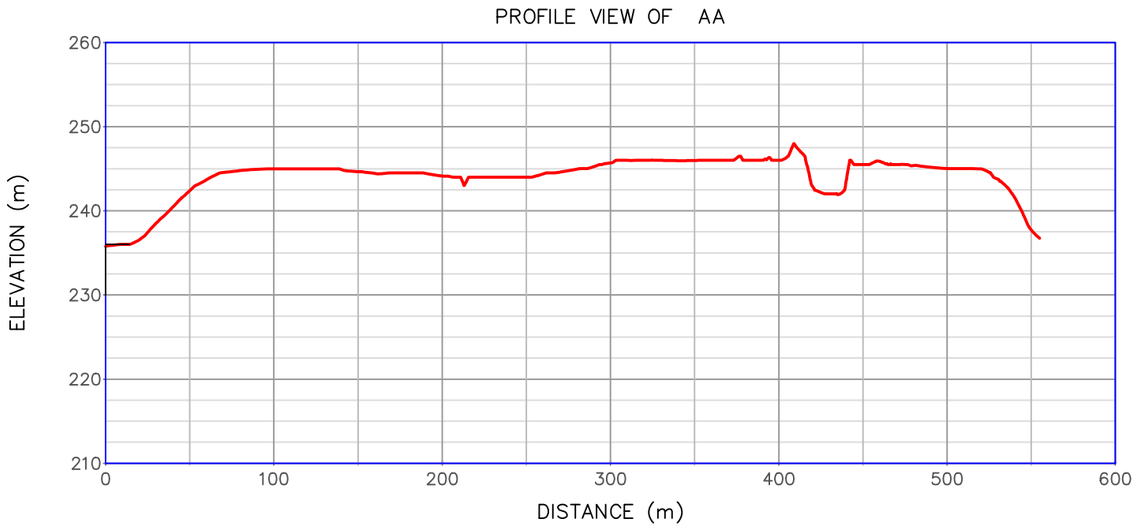

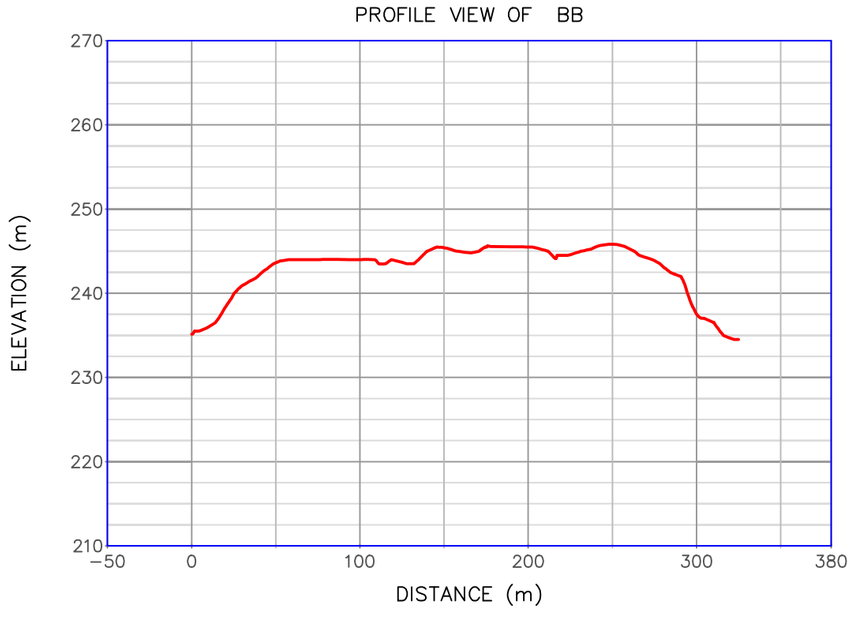

NOTE:
- ELEVATION EXAGGERATED BY 5.

LEGEND:
GROUND SURFACE

CLIENT LOGO

CLIENT:
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DWN BY: MD
CHK'D BY: HP
DATUM: NAD83
PROJECTION: UTM Zone 14 U
SCALE: AS SHOWN

EXISTING CELL STABILITY
CLASS 1 WDG
1373 BERNAT ROAD
RM OF RICHOT, MANITOBA

CROSS SECTIONS

DATE: NOVEMBER 2015
PROJECT NO: WX0469014
REV. NO.: A
FIGURE NO: FIGURE 2

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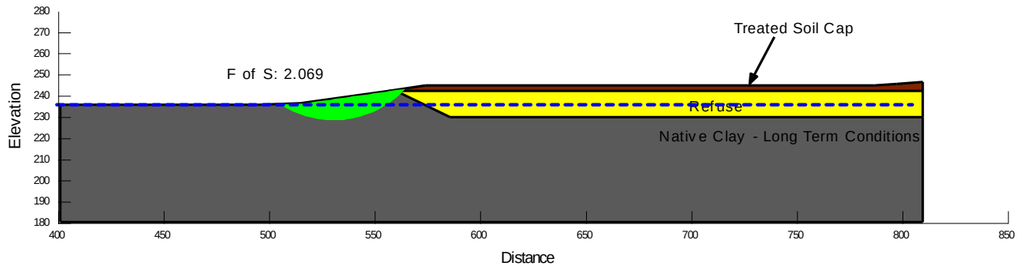
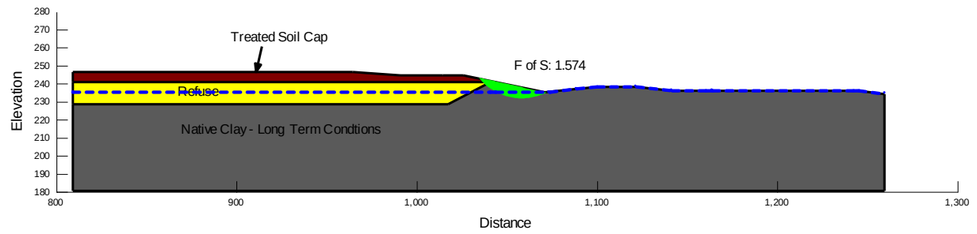
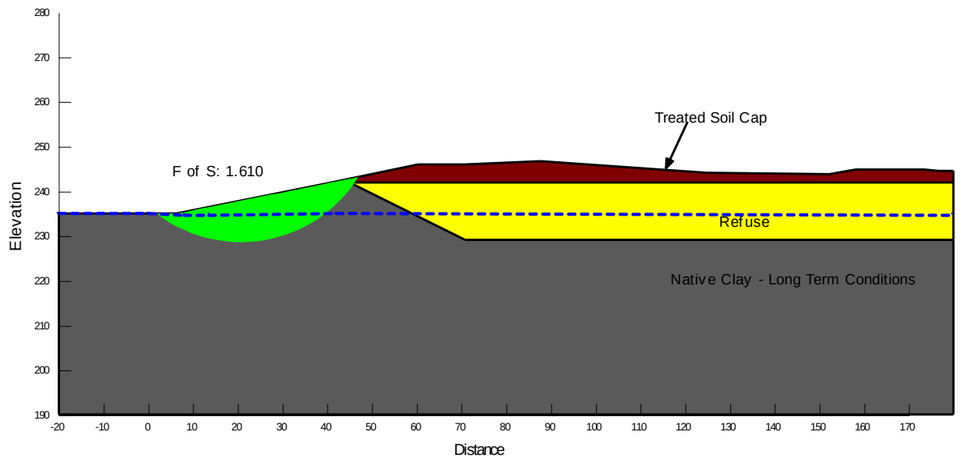


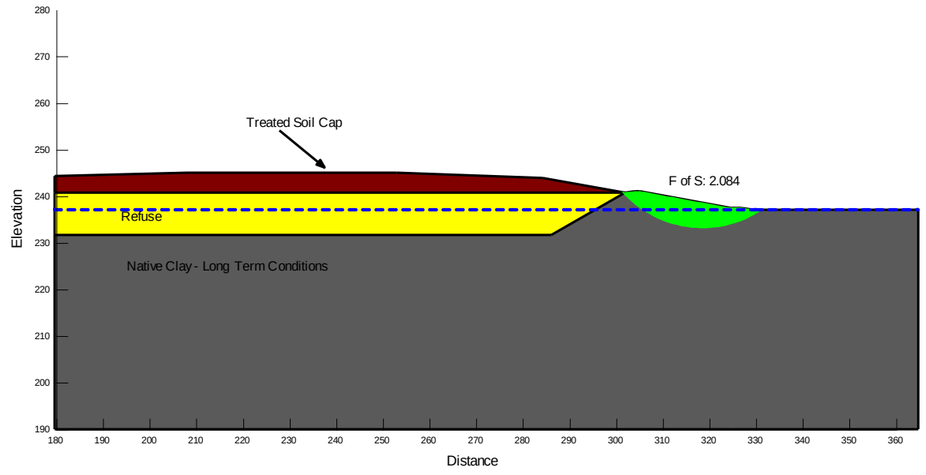
Cross Section A-A, West Side – Existing 7H:1V Slope



Cross Section A-A, East Side – Existing 4.5H:1V Slope



Cross Section B-B, North Side – Existing 5H:1V Slope



Cross Section B-B, South Side – Existing 5.5H:1V Slope

AMEC Foster Wheeler
Environment and Infrastructure

A division of AMEC Foster Wheeler Americas Ltd.

MID CANADA ENVIRONMENTAL SERVICES LIMITED

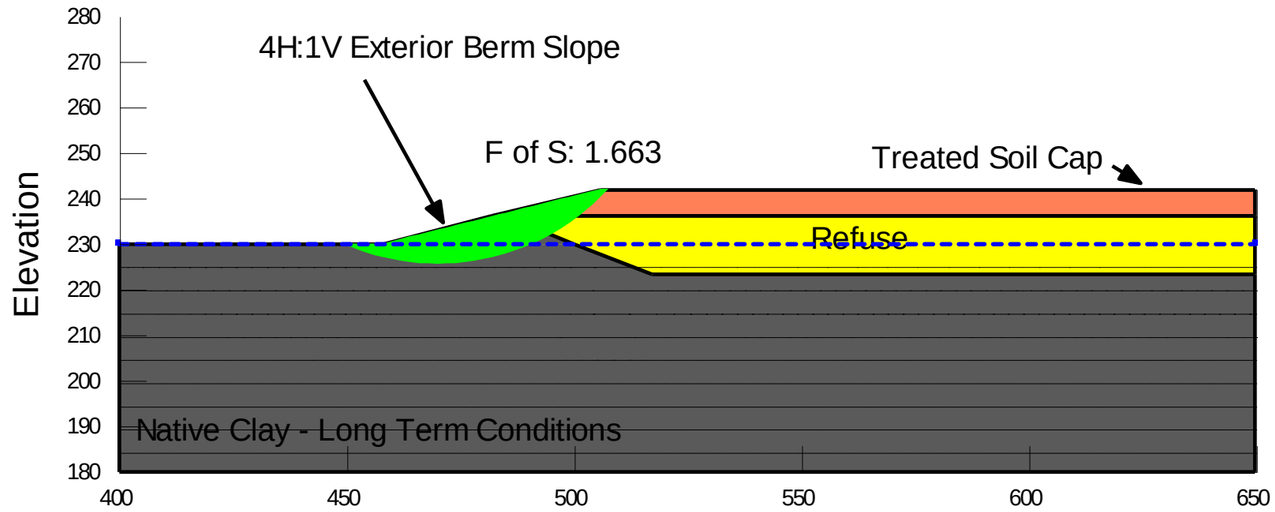
STABILITY ANALYSIS RESULTS

12m BERM HEIGHT
CELLS 1 to 5

MID CANADA WASTE DISPOSAL GROUND

ILE DES CHENES, MANITOBA

Drawn by: JW	Scale: N/A	Date: 30 November 2015	Project #: WX0469014	Figure: 3



Future Cell Construction – 4:1V Exterior Cell Slope
Long Term Conditions – Fully Developed Cell

amec foster wheeler *AMEC Foster Wheeler Environment and Infrastructure* *A division of AMEC Foster Wheeler Americas Ltd.*		**MID CANADA ENVIRONMENTAL SERVICES LIMITED**			**STABILITY ANALYSIS RESULTS** **FINAL 4H:1V CELL CONFIGURATION** **12m BERM HEIGHT** **MID CANADA WASTE DISPOSAL GROUND** **ILE DES CHENES, MANITOBA**
Drawn by: JW	Scale: N/A	Date: 30 November 2015	Project #: WX0469014	Figure: 4	