

APPENDIX D

Financial Assurance Evaluation

March 13, 2020

Project No. 18111331 (4000)

Director

Client Services and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, Floor 1
Toronto, Ontario M4V 1P5

**APPENDIX D – FINANCIAL ASSURANCE ESTIMATE
LANDFILL EXPANSION
RIDGE LANDFILL, BLENHEIM, ONTARIO
ENVIRONMENTAL COMPLIANCE APPROVAL NO. A021601**

Golder Associates Ltd. (Golder) has prepared this letter to provide an estimate of the Financial Assurance (FA) requirements for the proposed expansion of the Ridge Landfill located at 20262 Erieau Road, Blenheim, Ontario in accordance with Condition 2.1 of Environmental Compliance Approval (ECA) Number A021601 consolidated and re-issued on December 20, 2019. There is currently a FA amount payment schedule stipulated by Condition 2.5 of the ECA from 2019 to 2021. The reason this FA estimate is being submitted is to support an application to amend the ECA for the proposed landfill expansion. The ECA amendment application proposes to increase the Ridge Landfill capacity by 28,889,000 m³. The proposed expansion will increase the total approved capacity from 25,483,000 m³ to 54,372,000 m³. The total approved capacity of 25,483,000 m³ comprises 4,483,000 m³ capacity for the Old Landfill and 21,000,000 m³ capacity for the West and South Landfills.

The FA estimate for the proposed landfill expansion considers the increase of the various parameters that form the basis of the FA evaluation. The methodology used for this FA estimate is based on the Ministry of Environment, Parks and Recreation (MECP)'s Financial Assurance Guideline F-15 issued in June 2011 and amended by subsequent addenda. This section of Guideline F-15 follows the same method given in Ontario Regulation 232/98 for new or expanding landfill sites. In particular, this FA estimate considered the following:

- The Site's expected closure cost and post-closure care costs. The closure costs are provided in Table 1 (attached) and the post-closure costs are provided in Table 2 (attached). When applicable, explanatory or reference footnotes are provided in Tables 1 and 2.
- A total of 18,005,435 tonnes of waste was in place on December 31, 2018. This in place waste tonnage is comprised of 3,300,000 tonnes in the Old Landfill as reported in previous FA estimates, 13,890,442 tonnes for the West and South Landfills reported in the 2018 Annual Report up to May 1, 2018, and 814,993 tonnes from May 2 to December 31, 2018 for the West and South Landfills based on weigh scale records provided by the Ridge Landfill personnel.
- The projected annual waste filling rate is the maximum allowed by the ECA, i.e., 1,300,000 tonnes per year including materials accepted for daily cover.
- A total of 19,305,435 tonnes of waste was estimated for December 31, 2019 based on the projected annual landfilling rate described above.

- A contaminating life span of 100 years from closure is assumed in the FA calculation. This contaminating life span is consistent with the current FA estimate prior to landfill expansion, which coincides with the service life period of 100 years for the leachate collection system of the West and South Landfills.
- Updated inflation rate of 2.56% per year and discount rate of 2.57% per year provided by the MECP based on 10-year average from 2010 to 2019.
- The inflation rate of 2.56% was used to project closure and post-closure care costs into the future in accordance with MECP Guideline F-15.
- The discount rate of 2.57% provided by MECP, was used to discount future costs in accordance with MECP Guideline F-15.
- Post-closure contingency cost amounts relative to the amount of waste in place were calculated in accordance with MECP Guideline F-15 and the MECP Landfill Standards based on the most recent Annual Average Non-Residential Building Construction Price Index for Toronto of 108.7 (reference year 2017 = 100) and the 1997 index of 50.2.
- Table 3 summarizes the steps used to estimate the FA balance amount. The total amount of FA required for closure and post-closure care and contingency for the proposed landfill expansion is given in the last column of Table 3. For 2020, the amount of FA to be in place considering the proposed landfill expansion is calculated as \$50,203,607. This amount represents an increase of \$5,845,386 from the current FA amount of \$44,358,221 for 2020 required by ECA Condition 2.5(2)b.

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

Golder Associates Ltd.



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[https://golderassociates.sharepoint.com/sites/34627g/deliverables/financial assurance report/fa expansion 2020/final/ridge landfill expansion - financial assurance 2020mar13.docx](https://golderassociates.sharepoint.com/sites/34627g/deliverables/financial%20assurance%20report/fa%20expansion%202020/final/ridge%20landfill%20expansion%20-%20financial%20assurance%202020mar13.docx)

Attachments: Table 1: Waste Disposal Site Closure Cost (2020 Dollars)
Table 2: Annual Post-Closure Cost (2020 Dollars)
Table 3: Calculation of Financial Assurance Requirements

ATTACHMENTS

Tables

**TABLE 1
WASTE DISPOSAL SITE CLOSURE COSTS (2020 Dollars)
RIDGE LANDFILL**

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
Demolition of Structures¹				
Two Maintenance Buildings (21 m x 23 m x 7 m each)				
Demolition above grade mixed construction	6,796	m ³	\$ 14.37	\$ 97,658.52
Floor Demolition	966	m ²	\$ 11.50	\$ 11,109.00
Foundation Wall	320	m ²	\$ 13.69	\$ 4,380.80
Footing Demolition	177	m	\$ 45.91	\$ 8,126.07
Old Maintenance Building (20 m x 30 m x 5 m)				
Demolition above grade mixed construction	3,002	m ³	\$ 14.37	\$ 43,138.74
Floor Demolition	600	m ²	\$ 11.50	\$ 6,900.00
Foundation Wall	180	m ²	\$ 13.69	\$ 2,464.20
Footing Demolition	101	m	\$ 45.91	\$ 4,636.91
Administration Building (8.5 m x 11 m x 3.5 m)				
Demolition above grade mixed construction	330	m ³	\$ 14.37	\$ 4,742.10
Floor Demolition	94	m ²	\$ 11.50	\$ 1,081.00
Foundation Wall	70	m ²	\$ 13.69	\$ 958.30
Footing Demolition	40	m	\$ 45.91	\$ 1,836.40
Scale House (5 m x 4 m x 3 m)				
Demolition above grade mixed construction	60	m ³	\$ 14.37	\$ 862.20
Floor Demolition	20	m ²	\$ 11.50	\$ 230.00
Foundation Wall	33	m ²	\$ 13.69	\$ 451.77
Footing Demolition	18	m	\$ 45.91	\$ 826.38
Landfill Closure				
Clay Final Cover Application ²	90,100	m ³	\$ 4.03	\$ 363,242.66
Topsoil Application and Seeding ²	106,000	m ²	\$ 0.89	\$ 94,605.00
Gas Extraction Wells ³	32	each	\$ 41,437.07	\$ 1,317,698.83
New Entrance Signs (4 m ²) ⁴	4	m ²	\$ 827.64	\$ 3,310.56
Removal of Above Ground Fuel Storage Tank ⁵	1	each	\$ 7,000.00	\$ 7,000.00
Contingency	1	%	15%	\$ 296,288.91
Engineering				
Preparation of Closure Report ⁵	1	each	\$ 40,000.00	\$ 40,000.00
Site Supervision ⁶	1	L.S.	\$ 75,000.00	\$ 75,000.00
Total (excluding HST):				\$ 2,386,548.35

Notes:

m: metre m²: square metre m³: cubic metre L.S.: lump sum %: percent

¹Includes demolition of maintenance buildings, old maintenance building, administration building, and scale house. Demolition includes above grade mixed construction, floor, foundation wall, and foot demolition. Source: 2017 RS Means Costworks - Windsor Union Pricing, including 20% profit and overhead + CPI.

²2019 costs based on actual Cell 5B&6 construction tender. The final cover consists of a 0.85 m thick clay cover and a 0.15 m layer of topsoil over the last remaining Cell (10.6 hectares).

³Three (3) landfill gas extraction wells per hectare, consistent with current design. Forlam bid for 21 wells (2018) + CPI.

⁴One 4 m² sign at entrance gate "closed site". Source: 2009 RS Means Costworks - Windsor Union Pricing, including 20% profit and overhead + CPI.

⁵Consultant's estimate in 2020

⁶It is assumed that WCC will undertake engineering costs associated with supervising closure works for 2020.

Prepared by: SR
Reviewed by: FRG

**TABLE 2
ANNUAL POST-CLOSURE COSTS (2020 DOLLARS)
RIDGE LANDFILL**

Groundwater, Leachate and Surface Water Monitoring/Reporting

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
Preparation of Monitoring Report ¹⁰	1	ea.	\$25,000.00	\$25,000.00
Preparation of Monitoring Report (reduced effort) ¹	1	ea.	\$15,000.00	\$15,000.00
Sampling and Analysis of groundwater, leachate, surface water, and residential wells ²	1	ea.	\$107,247.17	\$107,247.17
Sampling and Analysis of groundwater, leachate, surface water, and residential wells (reduced effort) ¹	1	ea.	\$53,623.59	\$53,623.59

Leachate Treatment

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
Leachate Treatment Annual Cost (Post-Closure Years) ³	285,300,000	L	\$0.0022	\$627,660.00

Leachate System Maintenance

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL ANNUALIZED COST
Leachate Collection System Flushing (every 2 years) ⁴	1	L.S.	\$38,616.51	\$19,308.26
Leachate Pumps Maintenance (annual) ⁵	1	L.S.	\$1,646.67	\$1,646.67
Leachate Pumps Maintenance (every 5 years except the last one) ⁵	19	ea.	\$9,221.33	\$1,752.05
Leachate Pump Replacement (every 20 years except the last one) ⁵	4	ea.	\$82,333.33	\$3,293.33
Sub-Total Annual Cost (excluding HST):				\$26,000.31

Landfill Gas Management System (30 years post-closure)

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL ANNUALIZED COST
Landfill Gas Operations and Maintenance (PC Years 1-4) ⁶	1	L.S.	\$212,714.88	\$212,714.88
Landfill Gas Operations and Maintenance (PC Years 5-11) ⁶	1	L.S.	\$176,313.28	\$176,313.28
Landfill Gas Operations and Maintenance (PC Years 12-30) ⁶	1	L.S.	\$139,911.68	\$139,911.68

Final Cover/Road/Ditch Maintenance

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL ANNUALIZED COST
Annual Inspection and Inspection Report ¹⁰	1	ea.	\$3,500.00	\$3,500.00
Minor Road Maintenance ¹⁰	1	yr.	\$1,500.00	\$1,500.00
Final Cover Maintenance ¹¹	185.7	ha	\$19.00	\$3,528.30
Grass Cutting ⁷	185.7	ha	\$86.80	\$16,118.76
Ditch Maintenance (every 5 years with no maintenance the last year) ¹⁰	19	ea.	\$15,000.00	\$2,850.00
Sub-Total Annual Cost (excluding HST):				\$27,497.06

**TABLE 2
ANNUAL POST-CLOSURE COSTS (2020 DOLLARS)
RIDGE LANDFILL**

Fencing and Municipal Drain Maintenance

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL ANNUALIZED COST
Perimeter Fence Maintenance ¹¹	1	yr.	\$1,000.00	\$1,000.00
Municipal Drain Maintenance (every 5 years with no maintenance the last year) ^{8,11}	19	ea.	\$11,000.00	\$2,090.00
Sub-Total Annual Cost (excluding HST):				\$3,090.00

Well Maintenance & Repair (Every 4 years)

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL ANNUALIZED COST
Replace Wells ⁹	24	ea.	\$4,069.80	\$976.75
Sub-Total Annual Cost (excluding HST):				\$976.75

Finger Drain Replacement Cost (Installation in 2026 and Replacement in 2056, 2086 and 2116)

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
Finger Drain (see breakdown below)	1	L.S.	\$ 1,289,986.50	\$1,289,986.50

Unit Cost Breakdown for Finger Drain Installation

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
Topsoil stripping ¹⁴	495	m ³	\$ 3.95	\$ 1,955.25
Final Cover Excavation ¹⁴	3300	m ³	\$ 3.95	\$ 13,035.00
Waste Excavation ¹⁰	12210	m ³	\$ 7.00	\$ 85,470.00
Geotextile ¹⁴	3300	m ²	\$ 3.95	\$ 13,035.00
Clear Stone ¹⁴	12210	m ³	\$ 90.00	\$ 1,098,900.00
Waste Backfill ¹⁰	12210	m ³	\$ 5.00	\$ 61,050.00
Final Cover Reinstatement ¹⁴	3300	m ³	\$ 3.95	\$ 13,035.00
Topsoil Reinstatement ¹⁴	495	m ³	\$ 3.95	\$ 1,955.25
Reseeding ¹⁴	3300	m ²	\$ 0.47	\$ 1,551.00
Total				\$ 1,289,986.50

Toe Drain Installation (One Time Cost in CLS Year 100)

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
Toe Drain (see breakdown below)	9800	m	\$325.66	\$3,191,456.24

TABLE 2
ANNUAL POST-CLOSURE COSTS (2020 DOLLARS)
RIDGE LANDFILL

Unit Cost Breakdown for Toe Drain Installation

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
Topsoil Stripping ¹²	1	m ²	\$ 3.18	\$ 3.18
Final Cover Excavation ¹³	1.5	m ³	\$ 3.89	\$ 5.83
Waste Excavation ¹⁰	2	m ³	\$ 7.00	\$ 14.00
Geonet ¹⁰	3	m ²	\$ 9.00	\$ 27.00
Geotextile ¹³	3	m ²	\$ 3.38	\$ 10.14
200 mm HDPE Perforated Pipe ¹³	1	m	\$ 174.72	\$ 174.72
Clear Stone ¹³	1	m ³	\$ 79.04	\$ 79.04
Waste Backfill ¹⁰	1	m ³	\$ 5.00	\$ 5.00
Final Cover Reinstatement ¹³	1.5	m ³	\$ 3.89	\$ 5.83
Topsoil Reinstatement ¹³	0.15	m ²	\$ 3.02	\$ 0.45
Reseeding ¹³	1	m ²	\$ 0.46	\$ 0.46
Total Price per metre				\$ 325.66

Notes:

m: metre L.S.: lump sum ea.: each yr.: per year

Annual or annualized costs are rounded to the nearest \$100.

¹Based on Consultant's estimate. Reduced monitoring requirements and sampling frequency are assumed starting Post-Closure Year 11 (reduced by 40% for the reporting and 50% for sampling/analysis).

²Sampling cost based on Golder quote P19133412 for monitoring of 53 wells in 2020. Analysis cost based on BV (formerly called Maxxam Analytics) quote B95319 for 53 wells in 2020. Expansion sampling and analysis cost assuming 71 wells.

³Leachate quantities based on HELP model. Treatment unit cost based on contract with the Blenheim municipal treatment plant (currently at 1 cent per imperial gallon).

⁴Allowance for leachate collection line flushing for the expansion.

⁵Allowance for leachate pumps maintenance / replacement for the expansion.

⁶Allowance for gas collection system operation and maintenance for the expansion based on February 27, 2009 SCS Engineers cost estimate.

⁷Estimate based on 155 hectares required to be cut once per year. Rate based on December 2007 Winnipeg Invoice from Ervin Dieter.

⁸Allowance for a five year period.

⁹Based on one well requiring replacement every four years, including mobilization and demobilization, with no replacement the last year. 2012 All-Terrain Installation Price for the Ridge Landfill.

¹⁰Based on Consultant's estimate for 2020.

¹¹Based on WCC estimate for 2020 from Site experience.

¹²Murphy 2017 tender for Cell 5A.

¹³Murphy 2018 tender for Cell 5B/6

¹⁴Murphy 2020 price for the Infill cell.

Prepared by: SR
Checked by: FRG

TABLE 3
CALCULATION OF FINANCIAL ASSURANCE REQUIREMENTS
RIDGE LANDFILL

Table with 20 columns (A-L) and multiple rows. Columns include CLOSURE & POST-CLOSURE COSTS (D-E-12), UNDISCOUNTED CLOSURE AND POST-CLOSURE EXPENDITURES (F), DISCOUNTED CLOSURE AND POST-CLOSURE EXPENDITURES (G), ESTIMATED WASTE TO BE LANDFILLED (H), CUMULATIVE WASTE TONNAGE (I), FA BALANCE REQUIRED (J), FA REQUIRED FOR CONTINGENCY COSTS (K), and TOTAL FA BALANCE (L).



TABLE 3
CALCULATION OF FINANCIAL ASSURANCE REQUIREMENTS
RIDGE LANDFILL

Table with columns: Rows, CLS Year, Year, Number of Years for Discounting, Operation Mode, Closure Expenditures, Monitoring/Reporting (PC Years 1 to 10), Monitoring/Reporting (PC Years 11 to 100), Leachate Treatment, Leachate System Maintenance, Landfill Gas System Management (PC Years 1 - 4), Landfill Gas System Management (PC Years 5 - 11), Landfill Gas System Management (PC Years 12 - 30), Final Cover/Road/Ditch Maintenance, Fencing and Municipal Drain Maintenance, Well Maintenance & Repair, Finger Drain Replacement, Toe Drain Installation, Undiscounted Closure and Post-Closure Expenditures, Discounted Closure and Post-Closure Expenditures (2042\$), Estimated Waste to be Landfilled (tonnes), Cumulative Waste Tonnage in Landfill (tonnes), FA Balance Required for Closure/Post Closure Care Until Closure, FA Required for Contingency Costs, Total FA Balance.

Notes: Inflation Rate (i_m): 2.56% Provided by MECP (Source: https://www.ontario.ca/page/financial-assurance-environmental-protection, Accessed on March 4, 2020), based on 10-year (2010-2019) Average of Non-Residential Building Construction Price Index (NRBCPI) for Toronto and Ottawa
Discount Rate (i_disc : Until Post-Closure Year 30): 2.57% Provided by MECP(Source: https://www.ontario.ca/page/financial-assurance-environmental-protection, Accessed on March 4, 2020), based on 10-year (2010-2019) Average of annual average long-term Government of Canada bond yields from the Bank of Canada
Discount Rate (i_disc : Starting Post-Closure Year 31): 5.56% Provided by MECP (Source: https://www.ontario.ca/page/financial-assurance-environmental-protection, Accessed on March 4, 2020), for ≥ 31 years from closure i_m+ 3%
2019 Annual Average Non-Residential Building Construction Price Index for Toronto (I): 108.7 Provided by MECP (Source: https://www.ontario.ca/page/financial-assurance-environmental-protection, Accessed on March 4, 2020), based on Toronto NRBCPI, using 2017= 100 as reference year.
1997 Annual Average Non-Residential Building Construction Price Index for Toronto (I): 50.2 Provided by MECP (Source: https://www.ontario.ca/page/financial-assurance-environmental-protection, Accessed on March 4, 2020), based on Toronto NRBCPI, using 2017= 100 as reference year.

Bold and Shaded Values were used as part of the Undiscounted Closure and Post-Closure Expenditures (Column F)
OP = Operating Period
PC = Post Closure Period
CLS = Contaminating Life Span

Waste Tonnes and Landfill Capacity
Total Site Capacity (cubic metres): 54,372,000 (4,483,000 m³ for the Old Landfill, 21,000,000 m³ for the West and South Landfills, and 28,889,000 m³ for the proposed expansion)
Airspace Consumed as of December 31, 2018 (cubic metres): 22,277,126
Tonnes in Place as of December 31, 2018 (tonnes): 18,005,435
Remaining Airspace as of December 31, 2018 (cubic metres): 32,094,874
Remaining Capacity as of December 31, 2018 (tonnes, assuming 0.85 tonnes/cubic metres): 27,280,643
Projected Annual Filling Rate (tonnes/year): 1,300,000