2022 Landfill Closure and Post-Closure Care Liability Estimates

Chapman and Croft Waste Disposal Sites
Magnetawan, Ontario

Prepared for:

Municipality of Magnetawan
4304 Highway 520
Magnetawan, Ontario P0A 1P0

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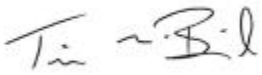

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1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by the Municipality of Magnetawan (Municipality) to complete an estimate of liabilities for the closure and post-closure care for two municipal solid waste landfill Sites for the year 2022. The solid waste landfill Sites and their status are as follows:

1. Chapman Waste Disposal Site (active waste disposal site); and
2. Croft Waste Disposal Site (active waste disposal site).

Pinchin has assessed the annual liabilities for each Site in accordance with accounting standards set out by the Public Sector Accounting Board (PSAB) Section PS 3280 Asset Retirement Obligations.

The reporting period is up to December 31, 2022, and the base year is 2023 (i.e., time zero for present value calculation is January 1, 2023).

1.1 Scope of Work

The updated liability estimates include the following activities:

- Obtain updated and/or additional information required to estimate the closure and post-closure care liability;
- Estimate the closure, post-closure care, and contingency expenditures using the reporting format and assumptions from previous year; and
- Provide additional information required by the Municipality for its financial statements.

2.0 BACKGROUND

A general description of the solid waste landfill Sites is provided in the following paragraphs, and a summary of the main features is provided in the attached Table 1 (all tables are provided in Appendix I).

2.1 Chapman Waste Disposal Site

The Chapman Waste Disposal Site is located on Lot 108, Concession A within the Municipality of Magnetawan, District of Parry Sound, Ontario and is located approximately 5.5 kilometres (km) northeast of the Township of Magnetawan, Ontario. The Site operates in accordance with the Site Certificate of Approval ((CofA) now referred to as Environmental Compliance Approval (ECA)) Number **A521202** for the disposal of municipal solid waste generated within the Municipality. The Site consists of 1.2 hectares (ha) of approved landfilling area within 41 ha of Municipality property. A road with a locked gate is located northwest of the Site which provides access to the Site from the southeast side of Rocky Road approximately 200 m east of the intersection of Rocky Road and Nipissing Road North. Landfilling began

at the Site prior to 1980 and the active landfilling area is currently located within the central portion of the Site.

Pinchin was retained to complete a Waste Capacity Review of the Chapman Waste Disposal Site in the fall of 2021. The Waste Capacity Review was completed as a follow-up investigation to the topographic survey work completed in the summer of 2019 and the fall of 2021.

Based on the results of the topographic data, published in the Pinchin report entitled *"'Waste Capacity Study, Chapman Waste Disposal Site, Magnetawan, Ontario*", dated September 24, 2019, it was Pinchin's opinion that the current remaining volume of the Site was 38,268 cubic meters (m^3), equating to an approximate remaining Site lifespan of 15 years. Another topographic survey of the Site was completed by Pinchin using an Unmanned Aerial Vehicle (UAV) in 2021 and was utilized for the purpose of calculating the remaining waste capacity and remaining lifespan for the Site. In comparing the 2019 and 2021 topographic surveys, it was estimated that approximately 4,750 m^3 of waste was deposited at the Site, resulting in a remaining capacity of approximately 33,518 m^3 as of 2021. As a result, if based on the 2021 remaining capacity of 33,518 m^3 and an estimated annual fill rate of 2,375 m^3/year, the current remaining Site life is approximately 12 years as of 2023.

It should be noted that this estimate was based on limited data; in the absence of scales, more frequent topographic surveys were recommended to confirm annual disposal rates.

2.2 Croft Waste Disposal Site

The Croft Waste Disposal Site is located in Lot 26, Concession 11 within the Municipality of Magnetawan, District of Parry Sound, Ontario and is located approximately 12 km east-northeast of the Township of Magnetawan, Ontario. The Site operates in accordance with the Site CofA (now referred to as an ECA) Number **A7034002** for the disposal of municipal solid waste generated within the Municipality. The Site consists of 2.5 ha of approved landfilling area within 33.7 ha of Municipality property. A road with a locked gate is located east of the Site which provides access to the Site from the west side of 25th and 26th Side Road, approximately 1 km north of the intersection of 25th and 26th Side Road and Highway 520.

The active landfilling area is currently located within the northern portion of the Site. A site capacity survey was completed by D.M. Wills on November 1, 2018, which resulted in an estimated remaining capacity of approximately 23,565 cubic metres (m^3) and an approximate remaining life expectancy of 39 years (assuming a theoretical capacity of 138,850 m^3).

A topographic survey of the Site was completed by Pinchin using an Unmanned Aerial Vehicle (UAV) in June 2019 and was utilized for the purpose of calculating the remaining waste capacity and remaining lifespan for the Site. In comparing the 2018 and 2019 topographic surveys, it was estimated that

approximately 300 m^3 of waste was deposited at the Site, resulting in an estimated annual fill rate of 605 m^3/year.

In contrast to the D.M. Wills waste capacity calculations, Pinchin's review of the 2019 survey data, it is estimated that thein-place volume was approximately 32,395 m^3 as of 2019 which would result in a current total in-place volume of approximately 34,815 m^3 as of 2023, based on the annual fill rate of 605 m^3. Additionally, based on the approved waste disposal footprint of 2.5 ha (Assuming some clearing would and utilizing the MECP landfill design standards, it is estimated that total maximum capacity of the Site is approximately 141,874 m^3. Therefore, the remaining waste capacity at the Site is approximately 107,059 m^3 as of 2023.

It is anticipated that the annual fill rate will remain at 605 m^3/year for the next 12 years, but would be increased to approximately 3,000 m^3/year following the closure of the Chapman Site which would result in another 33 years of Site life (for a total remaining Site life of 45 years).

It should be noted that this estimate was based on limited data; in the absence of scales, more frequent topographic surveys were recommended to confirm annual disposal rates.

3.0 COLLECTION AND REVIEW OF CURRENT INFORMATION

The following information was used to calculate the liability estimates:

1. The remaining landfill capacity for the Chapman and Croft Waste Disposal Sites (active) were updated by using the most recent data available from previous investigations (2019 Waste Capacity Review).
2. Monitoring/reporting costs are estimated using the unit prices provided in the proposed Pinchin contract entitled *"Proposal for Waste Management Environmental Consulting Services, 2023-2025 Annual Monitoring and Reporting – Chapman and Croft Landfills, Municipality of Magnetawan, Ontario, Pinchin File: 225335.007"* issued March 6, 2023.
3. The contingency amount was estimated using the following equation:

$$F = \$0.50 \times W \times I_2/I_1$$

Where:

F = the amount of financial assurance

W = the number of tonnes of waste that have been deposited in the landfilling site at the time the amount of financial assurance is calculated.

I_1 = the 2017 Annual Average Non-residential Building Construction Price Index for Ontario (based on Toronto and Ottawa-Gatineau (Ontario part) data), as published by Statistics Canada under the authority of the Statistics Act (Canada).

I_2 = the most recent Annual Average Non-residential Building Construction Price Index for Ontario (based on Toronto and Ottawa-Gatineau (Ontario part) data) available at the time the amount of financial assurance is calculated, as published by Statistics Canada under the authority of the Statistics Act (Canada).

This is identical to the method of calculation Financial Assurance for contingency plans described in the MECP Landfill Standards Guideline, with the exception of using average Ontario Non-residential Building Construction Price indices instead of Toronto only indices.

The Non-residential Building Construction Price Index data for Ontario (based on the average of Toronto and Ottawa-Gatineau (Ontario part)) is summarized as follows:

2022 Quarter	Average Non-residential Building Construction Price Index (NRBCPI) for Toronto, Ontario	Average Non-residential Building Construction Price Index (NRBCPI) for Ottawa-Gatineau, Ontario Part
First	134.2	137.8
Second	140.9	143.1
Third	144.5	146.1
Annual Average	139.9	142.3
2017 Base Value	100	100
Ontario Average	141.1	

Notes: the base year for the 2020 NRBCPI values published by Statistics Canada was 2017 (i.e., 2017 = 100).

4.0 INFLATION AND DISCOUNT RATES

4.1 Inflation Rate

The unit costs were updated to 2022 costs by applying an average inflation rate of 3.27% (ten-year average of the Core Consumer Price Index – 2012 to 2021). These rates were published by the MECP for financial assurance funds (found at https://www.ontario.ca/page/financial-assurance-ministry-environment-and-climate-change).

4.2 Discount Rate

A discount rate of – 1.10% was used to complete the cost estimate calculations for Sites expected to close within 30 years. A discount rate of 3.00% was used to complete the cost estimate calculations for Sites expected to close after 30 years. These rates were published by the MECP for financial assurance funds.

5.0 CHANGE IN LIABILITY AND ANNUAL EXPENDITURES

The change in liability was calculated using the equation presented below:

$$G = (A \times E) - F$$

Where:

G = Change in Liability

A = Estimated Total Expenditure

E = Capacity Factor

F = Expenditures Previously Recognized

For each landfill, the change in liability associated with the Estimated Total Expenditure was determined by applying a capacity factor for the estimated fraction of the total landfill capacity used to date (i.e., for closed sites the factor is 1.0). Assumptions used to estimate the capacity factors are noted in the Tables 2 through 5, provided in Appendix I.

The estimated liability amounts for 2023 are provided in the following Table:

Site	2022 Liability Estimate (F) ($)	2023 Liability Estimate (A X E) ($)	Change in Liability (G) ($)
Chapman Waste Disposal Site	-	$324,675.32	$324,675.32
Croft Waste Disposal Site	$273,879	$129,315.01	- $144,563.99
Total	**$273,879.00**	**$453,990.33**	**$180,111.33**

6.0 ADDITIONAL INFORMATION

The notes to the financial statements require the information included in the following Table:

Information Required	Comment
1. The nature and source of landfill closure and post-closure care requirements.	The information sources and assumptions are noted in the attached Tables in Appendix I.
2. The basis of recognition and measurement of the liability for closure and post-closure care.	The method used to determine the liability is presented in the attached Tables in Appendix I.
3. The remaining capacity of the landfill and the estimated remaining landfill life in years.	The remaining landfill capacity and the estimated remaining landfill life, including the basis for this estimation, are noted in the attached Tables in Appendix I.
4. How any requirements for closure and post-closure care financial assurance are being met.	See item 5.
5. The amount of any assets designated for settling closure and post-closure care liabilities.	The following assets were identified by the Municipality for closure and post-closure care liabilities: • The Municipality has a landfill rehabilitation reserve of $538,710; and • The Municipality has a landfill closure reserve of $273,879.
6. The estimated length of time needed for post-closure care.	The minimum period for post-closure monitoring required by the MECP is 25 years. A 25 year period was assumed for post-closure care activities.

APPENDIX I

Tables

TABLE 1
Summary of Site Features
2022 Closure and Post-Closure Care Cost Estimate

Site (status)	Surface Area	Type of Cover	Leachate Management System Components	No. of Groundwater Monitoring Wells	Surface Water Controls	In-place Volume (m^3)	Permitted Volume (m^3)
Croft Waste Disposal Site	2.5 ha	Soil	Monitored Natural Attenuation	11	Three surface water monitoring locations	34,815	138,850
Chapman Waste Disposal Site	1.2 ha	Soil	Monitored Natural Attenuation	13	Three surface water monitoring locations	28,850	60,000

TABLE 2
Croft Waste Disposal Site
2022 Closure Cost Estimate

Item	Unit	Quantity	Unit Cost 2022 $	Unit Cost 2023 $	Cost 2023 $	Expected Closure Year	Present Value Factor	Present Value Cost	Comment (source)
Closure Costs									
Final Cover and Vegetation									
Grading of Waste Cells	m²	25,000	$ 8.22	$ 8.49	$212,220	2068	0.26	$ 56,119.13	2.5 ha landfill footprint
Levelling Layer	m²	25,000	$ 7.52	$ 7.77	$194,148	2068	0.26	$ 51,340.12	150 mm thick sand layer
Landfill Cap and Vegetation	m²	25,000	$ 36.07	$ 37.25	$931,237	2068	0.26	$ 246,255.09	600 mm thick low permeability cap, plus a 150 mm vegetative layer
Leachate Monitoring Facilities Completion									
Monitoring Wells	each	0	See comment					$ -	Monitoring well network established.
Water Quality Monitoring Facilities Completion									
Monitoring Wells	each	0	See comment					$ -	Monitoring well network established.
Other									
Roads	m	0	See comment					$ -	Construction/maintenance costs associated with ongoing landfill operation.
Fencing/Gate	m	0	See comment					$ -	Existing gate, assume no new fencing.
Subtotal Closure Costs					$ 1,337,604.68			$ 353,714.34	
15% Contingency					$ 200,640.70			$ 53,057.15	
Total Closure Costs					**$ 1,538,245.38**			**$ 406,771.49**	

TABLE 3
Croft Waste Disposal Site
2022 Post-Closure Care Cost Estimate

Item	Unit	Quantity	Unit Cost	Cost (Annual) 2022$	Cost (Annual) 2023 $	Year Starting	Year Ending	PV Factor Equal Payments	PV Factor Single Payment	Present Value Cost	Comment (source)
Post-Closure Costs											
Final Cover and Vegetation Inspection and Maintenance	-	Allowance	-	$ 7,500.00	$ 7,745.25	2068	2093	17.4	0.26	$ 35,665	2023 annual allowance based on assumed 1% of estimated capital cost for 2.5 ha cap at approximately $300,000/ha
Roads Inspection and Maintenance	-	Allowance	-	$ 1,500.00	$ 1,549.05	2068	2093	17.4	0.26	$ 7,133	2023 annual allowance based on assumed 5% estimated capital cost for 200 m at approximately $150/m
Fencing/Gate Inspection/Maintenance	-	Allowance	-	-	-	-	-	-	-	-	Included in roads inspection/maintenance.
Water Quality Monitoring Facilities Inspection/Maintenance	-	Allowance	-	$ 70.00	$ 72.29	2068	2093	17.4	0.26	$ 333	2023 annual allowance based on assumed 1% of estimated capital cost for replacement of 2 wells at approximately $3,500/well
Monitoring/Reporting Program	-	Allowance	-	$ 13,573.00	$ 13,573.00	2068	2093	17.4	0.26	$ 62,500	Based on costs contractually submitted by Pinchin from 2023 to 2025
Contingency (e.g. future impacts to surface water/groundwater, acquisition of additional buffer lands, etc)	-	Allowance	-	-	-	-	-	-	-	$ 14,568	Calculated using Landfill Standards Guideline for Financial Assurance for Contingency Plans (117,705 m^3 x 0.5931t/m^3x$0.50/t*inflation adjustment of 141.1/100)
Total Post-Closure Costs					**$ 22,939.59**					**$ 120,197.84**	
									ESTIMATED TOTAL EXPENDITURE	**$ 526,969.33**	A - Sum of discounted future closure and post-closure costs
									TOTAL ESTIMATED SITE CAPACITY (M^3)	**141,874**	B - Based on the theoretical capacity associated with a 2.5 ha landfill footprint
									REMAINING CAPACITY (M^3)	**107,059**	C - Remaining capacity
									CUMULATIVE CAPACITY USED (M^3)	**34,815**	D = B - C
									CAPACITY FACTOR	**0.2453938**	E = D / B
									FACTORED EXPENDITURES	**$ 129,315.01**	A X E
									EXPENDITURES PREVIOUSLY REALIZED	**$ 273,879.00**	F
									CHANGE IN LIABILITY	**$ (144,563.99)**	G = A X E - F

Notes:

Inflation Rate	3.27%
Discount Rate	3.00%
Base Year	2023
Closure Year	2068
Remaining Landfill Life (years)	45
Period of Post-Closure Care (years remaining)	25

Other Comments:

2023 Costs include $13,573 monitoring and reporting
Inflation Rate of 3.27% found at https://www.ontario.ca/page/financial-assurance-ministry-environment-and-climate-change

TABLE 4
Chapman Waste Disposal Site
2022 Closure Cost Estimate

Item	Unit	Quantity	Unit Cost 2021 $	Unit Cost 2022 $	Cost 2022 $	Expected Closure Year	Present Value Factor	Present Value Cost	Comment (source)
Closure Costs									
Final Cover and Vegetation									
Grading of Waste Cells	m²	12,000	$ 8.22	$ 8.49	$101,866	2035	1.14	$ 116,324.65	1.2 ha landfill footprint
Levelling Layer	m²	12,000	$ 7.52	$ 7.77	$93,191	2035	1.14	$ 106,418.65	150 mm thick sand layer
Landfill Cap and Vegetation	m²	12,000	$ 36.07	$ 37.25	$446,994	2035	1.14	$ 510,441.61	600 mm thick low permeability cap, plus a 150 mm vegetative layer
Leachate Monitoring Facilities Completion									
Monitoring Wells	each	0	See comment					$ -	Monitoring well network established.
Water Quality Monitoring Facilities Completion									
Monitoring Wells	each	0	See comment					$ -	Monitoring well network established.
Other									
Roads	m	0	See comment					$ -	Construction/maintenance costs associated with ongoing landfill operation.
Fencing/Gate	m	0	See comment					$ -	Existing gate, assume no new fencing.
Subtotal Closure Costs					$ 642,050.24			$ 733,184.91	
15% Contingency					$ 96,307.54			$ 109,977.74	
Total Closure Costs					**$ 738,357.78**			**$ 843,162.64**	

TABLE 5
Chapman Waste Disposal Site
2022 Post-Closure Care Cost Estimate

Item	Unit	Quantity	Unit Cost	Cost (Annual) 2022$	Cost (Annual) 2023 $	Year Starting	Year Ending	PV Factor Equal Payments	PV Factor Single Payment	Present Value Cost	Comment (source)
Post-Closure Costs											
Final Cover and Vegetation Inspection and Maintenance	-	Allowance	-	$ 3,600.00	$ 3,717.72	2035	2060	29.0	1.14	$ 122,939	2023 annual allowance based on assumed 1% of estimated capital cost for 1.2 ha cap at approximately $300,000/ha
Roads Inspection and Maintenance	-	Allowance	-	$ 375.00	$ 387.26	2035	2060	29.0	1.14	$ 12,806	2023 annual allowance based on assumed 5% estimated capital cost for 50 m at approximately $150/m
Fencing/Gate Inspection/Maintenance	-	Allowance	-	-	-	-	-	-	-	-	Included in roads inspection/maintenance.
Water Quality Monitoring Facilities Inspection/Maintenance	-	Allowance	-	$ 70.00	$ 72.29	2035	2060	29.0	1.14	$ 2,390	2023 annual allowance based on assumed 1% of estimated capital cost for replacement of 2 wells at approximately $3,500/well
Monitoring/Reporting Program	-	Allowance	-	$ 15,877.00	$ 15,877.00	2035	2060	29.0	1.14	$ 525,027	Based on costs contractually submitted by Pinchin from 2023 to 2025
Contingency (e.g. future impacts to surface water/groundwater, acquisition of additional buffer lands, etc)	-	Allowance	-	-	-	-	-	-	-	$ 12,072	Calculated using Landfill Standards Guideline for Financial Assurance for Contingency Plans (28,850 m^3 x 0.5931t/m^3x$0.50/t*inflation adjustment of 141.1/100)
Total Post-Closure Costs					**$ 20,054.27**					**$ 675,234.63**	
									ESTIMATED TOTAL EXPENDITURE	**$ 675,234.63**	A - Sum of discounted future closure and post-closure costs
									TOTAL ESTIMATED SITE CAPACITY (M^3)	**60,000**	B - Based on the theoretical capacity of a 1.2 ha footprint
									REMAINING CAPACITY (M^3)	**31,150**	C - Remaining capacity
									CUMULATIVE CAPACITY USED (M^3)	**28,850**	D = B - C
									CAPACITY FACTOR	**0.480833333**	E = D / B
									FACTORED EXPENDITURES	**$ 324,675.32**	A X E
									EXPENDITURES PREVIOUSLY REALIZED	**$ -**	F
									CHANGE IN LIABILITY	**$ 324,675.32**	G = A X E - F

Notes:

Inflation Rate	3.27%
Discount Rate	-1.10%
Base Year	2023
Closure Year	2035
Remaining Landfill Life (years)	12
Period of Post-Closure Care (years remaining)	25

Other Comments:

2022 Costs include $15,877 monitoring and reporting
Inflation Rate of 3.27% found at https://www.ontario.ca/page/financial-assurance-ministry-environment-and-climate-change