Clean Harbors Canada, Inc.
Lambton Facility
4090 Telfer Road R.R. #1
Corunna, ON
N0N 1G0

2019 Annual Landfill Report

Executive Summary

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1. INTRODUCTION

1.1 Background and Scope

Clean Harbors Canada, Inc. operates a hazardous waste management complex on a 140 hectare parcel of land in St. Clair Township, Lambton County, called the Lambton Facility. The location of the Lambton Facility and major site features are shown in **Figure 1.** Site Location Plan and **Figure 2.** Site Works and Development Plan, respectively.

The Lambton Facility encompasses an analytical laboratory, a transportation depot, a high temperature incinerator, associated pretreatment processes, as well as a landfill.

The landfill is operated in accordance with Environmental Compliance Approval (ECA) No. **A031806** dated September 5, 1997, as amended by subsequent Notices up to, and including, Notice 12 dated August 1, 2019. Copies of the ECA and amendment Notices are provided in **Appendix A**.

1.2 Site Inspection, Monitoring and Reporting Requirements

Condition 15 of the ECA requires that the Annual Landfill Report be submitted by April 1st of each year and include the following information.

a. The results and an interpretive analysis of the results of all Site monitoring programs, including an assessment of the need to amend the monitoring programs;
b. A summary of any drilling programs, geotechnical monitoring programs, and the results of any soil testing;
c. An assessment of the operation and performance of all Major Works, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
d. Site plans showing the existing contours of the Site; areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; any encountered gravel or sand lenses, the progress of final cover, vegetative cover, and any intermediate cover application; facilities existing, added or removed during the reporting period; and Site preparations and facilities planned for installation during the next reporting period;
e. Calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
f. A calculation of the remaining capacity of the Site and an estimate of the remaining Site life;
g. A summary of the monthly, maximum daily and total annual quantity (tonnes) of waste received at the Site for landfilling and pretreatment, including types and origin;
h. Any Unused Tonnage applied to the current year;
i. A summary of any complaints received and the responses made;
j. A discussion of any operational problems encountered at the Site and corrective action taken;
k. Any changes to the Design and Operations Report and the Closure Plan that have been approved by the Director since the last Annual Report;

l. A report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
m. Site plan showing the location of the storage for the unacceptable waste;
n. A list of all rejected loads, including reasons for any rejection;
o. A summary of quantities and types of wastes temporarily stored and transferred from the Site; and
p. Any other information with respect to the Site which the District Manager may require from time to time.
q. **For QC Results:** a summary of all quality control sampling in accordance with the quality assurance/quality control plans for the Major Works, including interpretation and discussion of compliance with those plans.
r. **For LDR**: a detailed monthly summary of the type (by waste class and characteristic) and quantity of waste received at the Site for LDR and at the Processing Facility for LDR and landfill pretreatment system, total amount and type of reagents used in the process, and the total amount and destination of all outgoing wastes from the Processing Facility; and
s. **For LDR**: a descriptive summary of upgrades conducted during the previous calendar year.

This annual report, which covers the period from **January 1, 2019 to December 31, 2019,** presents the requested information.

1.3 Report Organization

This report is subdivided into two parts:

- The Executive Summary outlines the various site monitoring activities and reporting requirements, as set out in the ECA.
- The Appendices contain supporting information, reports and technical data submitted by consultants responsible for the various environmental monitoring programs conducted at the Lambton Facility.

Figure 1. Site Location Plan

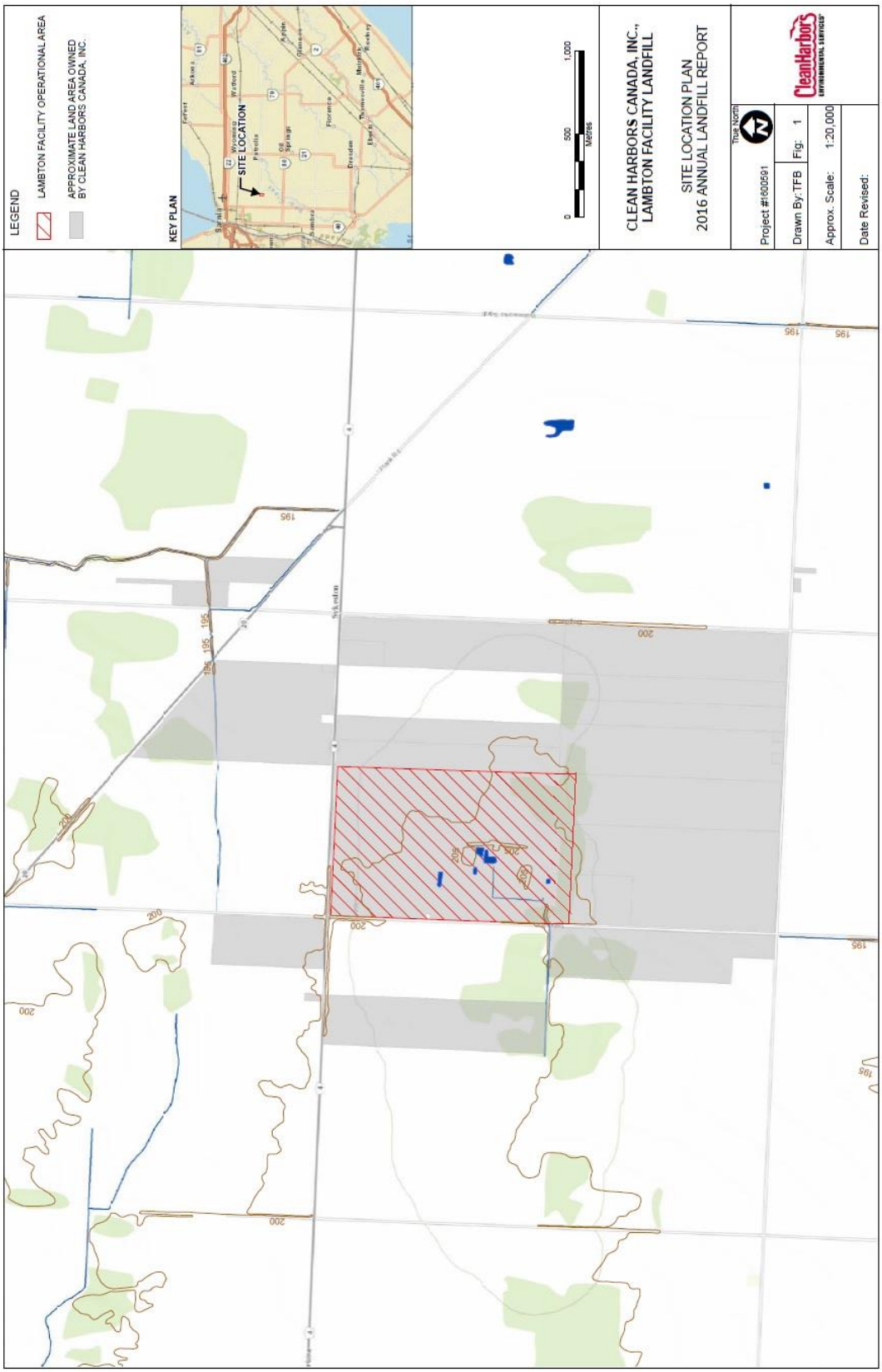
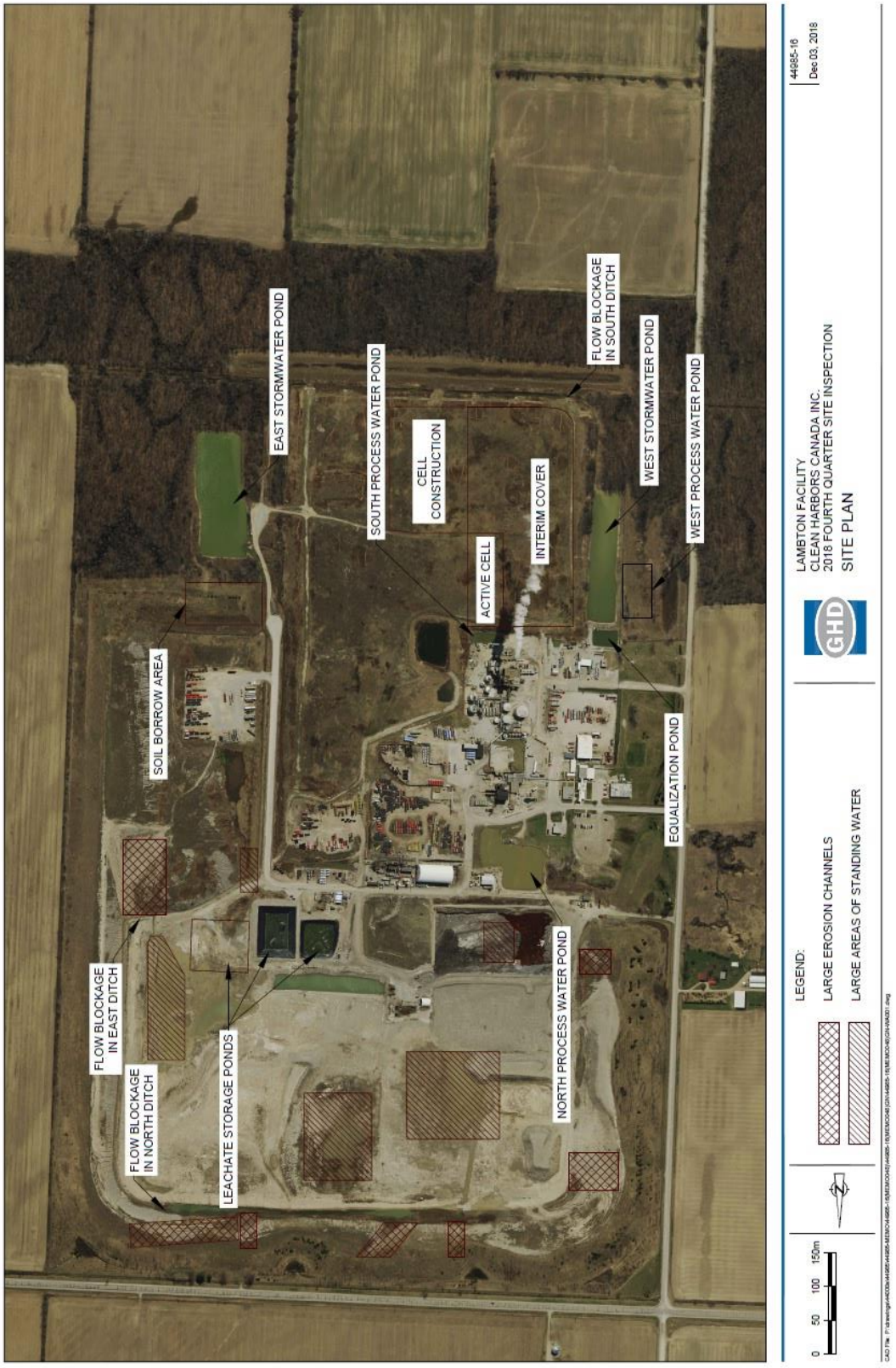


Figure 2. Site Works and Development Plan



Following is a brief description of the contents:

EXECUTIVE SUMMARY	
Section 1: Introduction	Provides background of on-site operations and monitoring activities
Section 2: Facility Operations	Overview of site operations and description of the waste received
Section 3: Waste Types and Quantities	Summary of waste types and quantities received, processed and landfilled; remaining landfill capacity
Section 4: Site Inspection Activities	Summary of quarterly site inspection reports, landfill cap compaction, geotechnical inspection and monitoring, and Sub-Cell 3 mitigation works
Section 5: Environmental Monitoring	Summary of groundwater, surface water, air quality and biomonitoring activities
Section 6: Recommendations	Summary of recommendations contained within each of the technical reports
APPENDICES	
Appendix A: Environmental Compliance Approvals	ECA **#A031806** dated September 5, 1997 as amended by subsequent Notices up to, and including, Notice 12 dated August 1, 2019.
Appendix B: Previous Year Annual Landfill Report Correspondence	Review comments concerning Clean Harbors previous year Annual Landfill Report and Clean Harbors responses.
Appendix C: Waste Material Codes and Descriptions	Description of material codes applied by Clean Harbors Canada, Inc. to characterize waste streams.
Appendix D: Waste Load Rejection Summary	List of rejected waste loads and basis for rejection.
Appendix E: Community Liaison & Advisory Committee Meeting Minutes	Copy of the minutes from the scheduled Community Liaison & Advisory Committee meetings.
Appendix F: Summary of Quarterly Site Inspection Reports	Summary of quarterly site inspection results undertaken by GHD.
Appendix G: Groundwater Monitoring Report	Technical report prepared by GHD.
Appendix H: Surface Water Quality Monitoring Report	Annual surface water technical report prepared by GHD.
Appendix I: Air Quality Monitoring Report	Technical report prepared by ORTECH Canada Ltd.
Appendix J: Biomonitoring Report	Technical report prepared by Stantec Consulting Limited
Appendix K: EA Annual Report	EA Annual Report

1.4 Review of 2018 Annual Landfill Report

It has been the historic practice for the Ministry of the Environment, Conservation and Parks (MECP) to provide comments on the facility's annual landfill reports. The comments typically relate to requests for clarification and, on occasion, reflect a difference in opinion on data interpretation. With respect to issues pertaining to environmental monitoring, Clean Harbors Canada, Inc. confers closely with its independent consultants in reviewing the MECP comments and providing a written response. The responses can include, but are not limited to, modifications of reporting procedures and direct correspondence to the MECP providing further detailed explanations. Comments were received from the MECP for the 2018 Annual Landfill Report in December 2019. A copy of the comments is enclosed in **Appendix B**.

No comments on the 2018 Annual Report were received from Aamjiwnaang First Nation (AFN) or Walpole Island First Nation (WIFN).

2. REVIEW OF SITE DEVELOPMENT AND OPERATIONS

2.1 Landfill Development Activities

The Lambton Landfill expansion was approved in 2015 and will involve the vertical expansion of the landfill, mainly over previously filled areas of the existing landfill. Construction of the landfill expansion was initiated in Fall 2015 based on the Design and Operations Plan as approved by MOECC on October 19, 2015. Landfill development activities undertaken in 2019 include the following:

- Construction of Sub-Cells 19-2B-1 to 19-2B-7.
- Interim cap placement on Cell 19-2A, and on portions of 19-2B1 and 19-2B2.
- Final cover installation commenced on Cell 19-1.

Major development or construction activities planned for the landfill in 2020 include:

- Installation of the perimeter leachate collection trench, and leachate pumping well 5 to support development of Cell 19-2.
- Continue final cover of Cell 19-1.
- Construction of the revised stormwater management system.

Major features of the site are shown in **Figure 2.** Site Works and Development Plan.

2.2 LDR Pretreatment Activities

No upgrades were conducted to LDR during the reporting period.

2.3 Assessment of Major Works

The following engineered design elements of the Lambton Landfill are considered to be Major Works:

- Interim clay cap
- Hydraulic control layer
- Final cover including HDPE liner, geosynthetic liner and geocomposite
- Perimeter leachate control trench

All Major Works operated as expected in 2019. No issues were identified that require an amendment to the design of the Major Works.

2.4 Summary of Complaints

During the reporting period, two off-site complaints were received by Clean Harbors. A complaint was received from a site neighbour regarding odour on their property. The incinerator supervisor and an incinerator operator went to the neighbour's residence to assess. The Clean Harbors' employees noted an agricultural odour at the residence. The odour could be detected at the residence but not at the facility. Similarly, another complaint was received from a site neighbor regarding odour on their property. The incinerator supervisor went to the residence to assess and could not detect an odour. Upon discussing with the neighbor who had

called in the complaint, the neighbour said it may have been the surrounding fields because they had been sprayed the day before. Both odour complaints were found to be unsubstantiated.

2.5 Community Liaison & Advisory Committee (CLAC)

The Community Liaison & Advisory Committee (CLAC) meets regularly during the year to discuss the Lambton Landfill facility operations, updates and potential issues. The Committee is made up of local community members, St. Clair Township Councillors, Walpole Island First Nation, Aamjiwnaang First Nation, a representative of the Ministry of Environment, Conservation and Parks, and Clean Harbors employees. Minutes from the meetings held during the reporting period are included in **Appendix E**.

3. WASTE TYPES AND QUANTITIES

3.1 Pretreatment and Waste Processing

The ECA requires that Clean Harbors provide to the MECP each year:

a) **For LDR**: a detailed monthly summary of the type (by waste class and characteristic) and quantity of waste received at the Site for LDR and at the Processing Facility for LDR and landfill pretreatment system, total amount and type of reagents used in the process, and the total amount and destination of all outgoing wastes from the Processing Facility; and
b) **For LDR**: a descriptive summary of upgrades conducted during the previous calendar year.

Table 1 provides a summary of the information for the pretreatment process (stabilization).

Table 1. Waste Pre-treatment (Stabilization) - January 2019 – December 2019

Month	Waste Class	Weight	REAGENT WEIGHTS (TNE)								Weight Landfilled
		(Tonnes)	CKD	FA	PC	W	F	D	TSP	FCL	(Tonnes)
Jan-19	146T	130	325	0	65	47	0.7	15.2	4.9	0	403.4
	122C	1.7	0	0	0	1	1	0	0	0	3.7
	146A	21.5	0	0	2.2	2	0	0	0	0	25.7
	N/A	1059	0	0	124.4	237.9	16	0	0	0	1437.3
Feb-19	143H	44.2	0	0	2.1	10	0	0	0	0	56.3
	146T	245	500	0	110	47.8	0	2	33	0	931.5
	N/A	655.6	0	0	75.7	133.5	12	0	0	0	876.8
Mar-19	131T	16	0	0	2.4	2	0	0	0	0	20.4
	143H	105	0	0	8.2	22.5	0	0	0	0	135.7
	146T	220.3	340	0	74.2	53	0	1.2	19.5	0	708.2
	N/A	814.9	0	0	82.9	199	16	0	0	0	1112.8
Apr-19	143H	24.5	0	0	3.7	8.4	0	0	0	0	36.6
	146T	380.8	0	110	170.9	111.1	0	3.2	47.7	0	823.7
	N/A	970.8	0	0	74.9	227.2	15	0	0	0	1287.9
May-19	131H	17.8	0	0	5.3	3	0.2	0	0	0	26.3
	143H	26.1	0	0	3.9	8	0	0	0	0	38
	146T	409.2	0	0	144.3	102	0	5.2	36	0	696.7
	N/A	955.1	0	0	87.1	252.5	15	0	0	0	1309.7
Jun-19	131T	7.3	0	0	1.1	1	0	0	0	0	9.4
	143H	17.5	0	0	2.6	6	0	0	0	0	26.1
	146T	449.6	0	0	129.5	102.2	5	6.2	30	0	722.5
	N/A	1058	0	0	97.5	204	13	0	0	0	1372.5
Jul-19	143H	98.1	0	0	7.4	26	0	0	0	0	131.5
	146H	25.1	0	0	2.5	4	1.3	1.3	0	0	34.2
	146T	317.5	0	0	76.6	73	0	4	18	0	489.1
	N/A	939.3	0	0	112.9	242.2	15	0	0	0	1310.4
Aug-19	131T	9.4	0	0	1.4	0	0	0	0	0	10.8
	143H	20.2	0	0	1	6	0	0	0	0	27.2
	143T	2.5	0	0	1	2	0.1	0.1	0	0	5.7
	146H	6	0	0	0.6	0	1	0	0	0	7.6
	146T	270.6	0	0	50.1	75.7	0	0.4	6	0	370.8
	N/A	1150.6	0	0	107.7	287.6	20	0	0	0	1565.9
Sep-19	131T	6.9	0	0	1.3	1	0	0	0	0	9.2
	143H	72.6	0	0	4.2	17	0	0	0	0	93.8
	146H	1.9	0	0	0.7	0.3	0.4	0	0	0	3.3
	146T	297.1	0	0	46.5	81.1	0	0.4	6	0	431.1
	N/A	1211.9	0	0	70.4	267	14	0	0	0	1563.3
Oct-19	143H	29.3	0	0	2	7	0	0	0	0	38.3
	146T	342	0	0	37.9	113.5	0.1	0.1	0	0	493.6
	N/A	1298.2	0	0	207.1	406.3	24	0	0	0	1935.6
Nov-19	131H	5.4	0	0	2	2	0	0	0	0	9.4
	143H	66.9	0	0	4	14	0	0	0	0	84.9
	146H	12.3	0	0	1.2	1	0.6	0.6	0	0	15.7
	146T	284.9	0	0	45	115	0	0	0.4	0	445.3
	N/A	910	0	0	204.9	256.9	13	0	0	0	1384.8
Dec-19	131T	6	0	0	1.2	0	0	0	0	0	7.2
	143H	50.5	0	0	2.5	10	0	0	0	0	63
	146T	273.2	0	0	34.5	122	0	0	0	0	429.7
	N/A	1047.7	0	0	189.1	289	18	0	0	0	1543.8

Note: *N/A refers to in-house generated waste which includes the incinerator burner ash and the thermal desorber ash.*

Reagents: *Cement Kiln Dust (CKD), Flyash (FA), Portland Cement (PC), Water (W), Ferrous Sulphate (F), Sodium Sulfide (D), Trisodium Phosphate (TSP), Ferric Chloride (FCL)*

Following the stabilization process (performed in the LDR processing building) or the solidification process (performed in exterior mixing pit), all wastes are loaded into an articulating hauler and transported to the landfill for final disposal.

Table 2 and Table 3 below provide summaries of the quantities of waste processed via solidification and macro-encapsulation pre-treatment processes, respectively, during the reporting period. **Table 4** provides a summary of the quantity of waste processed at the TDU during the reporting period.

Table 2. Waste Pre-treatment (Solidification) – January 2019 – December 2019

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2019	32.5	Jul 2019	20.7
Feb 2019	34.2	Aug 2019	0
Mar 2019	23.7	Sep 2019	0.8
Apr 2019	37.5	Oct 2019	2.3
May 2019	34.9	Nov 2019	18.2
Jun 2019	0.9	Dec 2019	0

Table 3. Waste Pre-treatment (Macro-encapsulation) – January 2019 – December 2019

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2019	86.5	Jul 2019	164.3
Feb 2019	292.0	Aug 2019	210.0
Mar 2019	214.5	Sep 2019	231.5
Apr 2019	219.0	Oct 2019	373.2
May 2019	240.6	Nov 2019	313.8
Jun 2019	144.0	Dec 2019	229.1

Table 4. Waste Processed at the TDU – January 2019 – December 2019

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2019	1270	Jul 2019	1335
Feb 2019	766	Aug 2019	2017
Mar 2019	1476	Sep 2019	1751
Apr 2019	1266	Oct 2019	2971
May 2019	1513	Nov 2019	1486
Jun 2019	1275	Dec 2019	1342

3.2 Waste Quantities and Landfill Capacity

3.2.1 Waste Quantities

Conditions 4 and 5 of the ECA identify the waste streams that are acceptable for landfill at the Lambton Facility. A description of the material classification codes used by the facility to describe landfill-destined wastes is provided in **Appendix C**.

The waste classification codes used in this report reflect the implementation of Clean Harbors' corporate computer business platform used internally across North America. The waste codes provide a description of the wastes to be received. As per Condition 8 of the ECA, daily records are maintained at the facility, identifying the quantities and types of wastes received, origin of the waste, results of analyses performed and the location of placement in the cell. Associated information (i.e., description of the quantities of waste received and their origin), and an estimate of the remaining capacity are summarized on an annual basis per Condition 15 (b).

In the period from January 1, 2019 through to December 31, 2019, Clean Harbors Lambton Facility received 72,171.0 tonnes of solid waste, not including 4,821.3 tonnes of ash generated on-site from the incinerator. A summary of the waste types and quantities received at the facility is provided in **Table 5**. A detailed monthly breakdown for the three categories of generator location is provided in **Table** 6**,**

Clean Harbors Waste Codes	Generator Location: Ontario												Total
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
CA1&2	20.5	0	0	0	0	20.4	0	9.4	7	0	18.2	0	75.5
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	0	0	0	0	19.5	53.1	0	0	0	0	0	72.6
CBP	205.6	84.4	135.1	116.9	388.3	533.1	286.9	409.9	824.6	239.8	319.3	637.9	4181.8
CBPR	17.4	74	0	1273.2	0	8.8	0	0	13.1	0	0	83.4	1469.9
CBPS	18.6	30.3	0.09	37.5	35.4	23.5	17	0	0.8	0	11	0	174.19
CCRT	138.7	134.7	559.7	435	260.9	205.2	698.4	166.5	193.5	992.6	145	201.3	4131.5
CCS	41.2	75.7	255.1	127.7	197.9	296	308.1	275.9	265.6	363.4	353	314.9	2874.5
CCSF	0	0	0	0	0	0	0	0	0	0	0	0	0
CCSM	6.2	87.8	175	139.7	155.7	17.2	99.2	143.8	152.3	155.2	203.6	119.8	1455.5
CCSMA	1781.6	2410.5	2833.3	1974.7	2531.1	1661.7	1727.3	1222.8	1330.7	1447.5	1418	1752.1	22091.3
CCSS	0	7.3	0	0	0	0	0	0	3.4	0	0	0	10.7
CNIA	9	4.8	0	111.2	0.08	0	0.04	0	8.8	241.7	380.5	318.8	1074.92
CNO	364.4	198.6	265.5	409.2	270.8	558.5	419.6	400.3	673	526.6	853.7	660.3	5600.5
TOTAL	2603.2	3108.1	4223.79	4625.1	3840.18	3343.9	3609.64	2628.6	3472.8	3966.8	3702.3	4088.5	43212.91

Table 7 and **Table** 8.

Table 5. Waste Quantity (tonnes) by Waste Types, January 1, 2019 to December 31, 2019

Clean Harbors Waste Codes	Generator Location			Total
	Ontario	Other Provinces	United States	
CA1 & CA2	75.5	129.4	75.1	280.0
CANL	0.0	0.0	0.0	0.0
CATRI & CATRN	72.6	406.0	14.9	493.5
CBP	4,181.8	3,167.8	420.1	7,769.7
CBPR	1,469.9	157.4	752.3	2,379.6
CBPS	174.2	0.0	17.7	191.9
CCRT	4,131.5	0.0	10,391.8	14,523.3
CCS	2,874.5	39.6	254.1	3,168.2
CCSF	0.0	0.0	325.2	325.2
CCSM	1,455.5	128.1	210.8	1,794.4
CCSMA	22,091.3	10,946.5	1,021.3	34,059.1
CCSS	10.7	0.7	0.0	11.4
CNIA	1,074.9	41.0	0.0	1,115.9
CNO	5,600.5	458.3	0.0	6,058.8
Incinerator ash	4,821.3	0.0	0.0	4,821.3
TOTAL	48,034.2	15,474.8	13,483.3	76,992.3
Percent of Total	62.4%	20.1%	17.5%	100.0%

Table 6. Waste Quantity (tonnes) by Waste Types, Ontario Generators

Clean Harbors Waste Codes	Generator Location: Ontario												Total
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
CA1&2	20.5	0	0	0	0	20.4	0	9.4	7	0	18.2	0	75.5
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	0	0	0	0	19.5	53.1	0	0	0	0	0	72.6
CBP	205.6	84.4	135.1	116.9	388.3	533.1	286.9	409.9	824.6	239.8	319.3	637.9	4181.8
CBPR	17.4	74	0	1273.2	0	8.8	0	0	13.1	0	0	83.4	1469.9
CBPS	18.6	30.3	0.09	37.5	35.4	23.5	17	0	0.8	0	11	0	174.19
CCRT	138.7	134.7	559.7	435	260.9	205.2	698.4	166.5	193.5	992.6	145	201.3	4131.5
CCS	41.2	75.7	255.1	127.7	197.9	296	308.1	275.9	265.6	363.4	353	314.9	2874.5
CCSF	0	0	0	0	0	0	0	0	0	0	0	0	0
CCSM	6.2	87.8	175	139.7	155.7	17.2	99.2	143.8	152.3	155.2	203.6	119.8	1455.5
CCSMA	1781.6	2410.5	2833.3	1974.7	2531.1	1661.7	1727.3	1222.8	1330.7	1447.5	1418	1752.1	22091.3
CCSS	0	7.3	0	0	0	0	0	0	3.4	0	0	0	10.7
CNIA	9	4.8	0	111.2	0.08	0	0.04	0	8.8	241.7	380.5	318.8	1074.92
CNO	364.4	198.6	265.5	409.2	270.8	558.5	419.6	400.3	673	526.6	853.7	660.3	5600.5
TOTAL	2603.2	3108.1	4223.79	4625.1	3840.18	3343.9	3609.64	2628.6	3472.8	3966.8	3702.3	4088.5	43212.91

Table 7. Waste Quantity (tonnes) by Waste Types, Other Provinces Generators

Clean Harbors Waste Codes	Generator Location: Other Provinces												Total
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
CA1&2	57.1	72.3	0	0	0	0	0	0	0	0	0	0	129.4
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	0	0	0	35.4	0	0	0	197.3	173.3	0	0	406
CBP	48.5	109	34.3	123.6	52	59.6	72.7	1471.2	271	151.1	603.3	171.5	3167.8
CBPR	9.9	17.6	0	17	10.7	22.7	0	36.7	0	36.7	6.1	0	157.4
CBPS	0	0	0	0	0	0	0	0	0	0	0	0	0
CCRT	0	0	0	0	0	0	0	0	0	0	0	0	0
CCS	0	0	22	0	1.1	0	4	2.5	0	1.8	0	8.2	39.6
CCSF	0	0	0	0	0	0	0	0	0	0	0	0	0
CCSM	7.7	0	7.7	0	22.4	33.5	0.8	9.3	0	8.7	18.8	19.2	128.1
CCSMA	721.6	532.9	693.4	558.2	888.7	834.3	1043.5	856.1	1429	1566.2	1122.4	700.2	10946.5
CCSS	0	0	0	0	0	0	0	0	0	0.5	0	0.2	0.7
CNIA	0	8.5	0	5.5	10.5	0	0	0	0	0	16.5	0	41
CNO	9.2	0	0	0	0	0	0	41.4	76.6	117.2	143	70.9	458.3
TOTAL	854	740.3	757.4	704.3	1020.8	950.1	1121	2417.2	1973.9	2055.5	1910.1	970.2	15474.8

Table 8. Waste Quantity (tonnes) by Waste Types, United States Generators

Clean Harbors Waste Codes	Generator Location: United States												Total
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
CA1&2	0	9.9	0	14.8	0	10.9	0	13	12.6	0	13.9	0	75.1
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	0	0	0	0	14.9	0	0	0	0	0	0	14.9
CBP	23.7	0	9.7	12.7	0.7	70.5	7.6	24.1	22.1	228.3	11.1	9.6	420.1
CBPR	106.1	41.6	95.8	49.6	27.6	0	14.1	57.5	109.3	82.8	114.6	53.3	752.3
CBPS	0	0	0	0	0	0	0	0	0	0	17.7	0	17.7
CCRT	1059.2	594.3	742.3	851.8	967.2	772.9	553.4	758	796.8	1333.3	1223.9	738.7	10391.8
CCS	19.9	48.3	24.5	12.6	10.1	0	22.9	0	73.7	10.5	31.6	0	254.1
CCSF	16.8	16.5	0	1.7	0	45.2	36.1	6.1	46	38.6	86.4	31.8	325.2
CCSM	36.9	29	24.6	10.8	18.3	12.7	5.1	23.5	5.8	30.4	9	4.7	210.8
CCSMA	34	39.1	2.8	6.7	12.2	38.2	73.4	56.9	561.7	98.3	66	32	1021.3
CCSS	0	0	0	0	0	0	0	0	0	0	0	0	0
CNIA	0	0	0	0	0	0	0	0	0	0	0	0	0
CNO	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1296.6	778.7	899.7	960.7	1036.1	965.3	712.6	939.1	1628	1822.2	1574.2	870.1	13483.3

For the reporting period, the total quantity of waste received at the Lambton landfill by point of origin is summarized in **Table 9**.

Table 9. Total Waste Receipts by Source (tonnes)

Source	Quantity Received (tonnes)	% Total Quantity
Ontario	43,212.9	59.9
Other Provinces	15,474.8	21.4
United States	13,483.3	18.7
Total	**72,171.0**	**100**

During the reporting period, the maximum daily quantity of waste received for pretreatment and landfilling was 707 tonnes on October 9, 2019.

No wastes were temporarily stored and then transferred from the site during the reporting period.

Condition 29 (i) of the ECA specifies that the maximum rate at which the Site may accept waste is 200,000 tonnes per calendar year. No Unused Tonnage was applied to the reporting year.

3.3 Landfill Capacity

The vertical landfill expansion was approved in 2015 with a permitted capacity of 3,870,000 m^3. Filling within the expansion landfill began in Subcell 19-1 in early 2016. As of December 31, 2019, the remaining capacity of landfill was 3,657,469 m^3 (212,531 m^3 or 5.5% of capacity used).

Based on current projections using 2019 volumes, the landfill expansion is expected to have a site life of 68 years.

3.4 Waste Load Rejection Summary

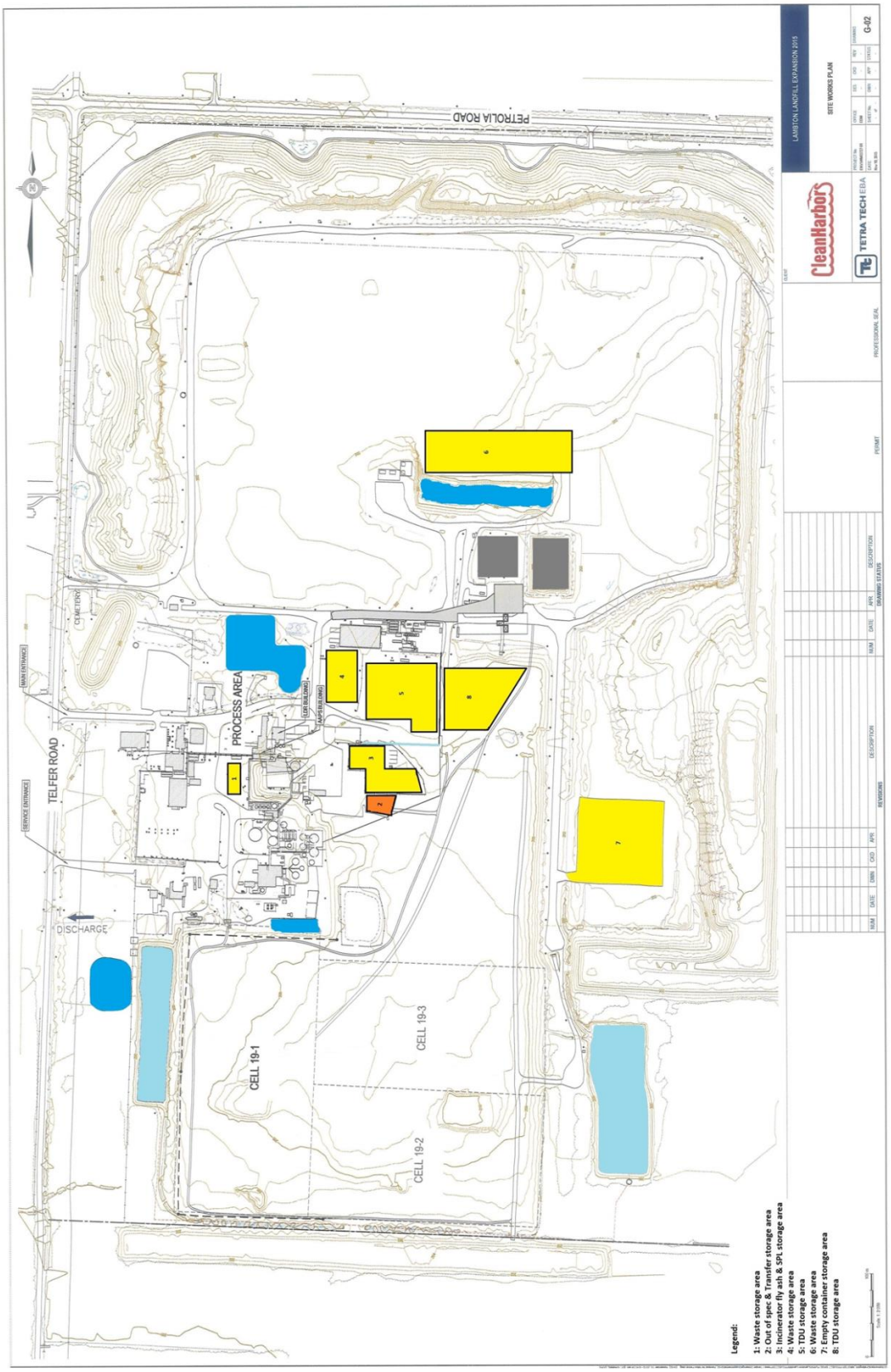
Clean Harbors Canada, Inc. is required under Condition 15 (b) (xiv) of the ECA to provide the MOECC with a list of all rejected waste loads (i.e., vehicle shipments) together with the reasons for rejection.

During the reporting period covered by this report, 41 individual loads of waste were rejected by the Lambton Facility (for both the incinerator and the landfill side) for failing to meet the site's acceptance criteria. The reasons for rejection included:

- Material too thick to pump – eleven (11) loads
- Failed TVO – nine (9) loads
- Failed LEL – one (1) load
- Non-Conforming – eighteen (18) loads
- Too dusty – one (1) load
- Load not scheduled into facility – one (1) load

A summary of all waste loads rejected and related reasoning is presented in **Appendix D**. Rejected loads are stored within the Out of Spec and Transfer Storage Area. No processing or co-mingling with other waste will take place – containers will stay in this storage area untouched until it is determined that they will be shipped to another disposal location or returned to the customer. Containers will be shipped out of the site as they have been received. Once moved to the Out of Spec and Transfer Storage Area the container will be marked up in such a way as to make it discernible from the Transfer containers stored within the same area. This will be achieved by the use of marking items such as caution tape. Transfer containers will not have any such markings, which will differentiate them from the Out of Spec containers. **Figure 3.** On-Site Waste Storage Areas provides a site plan showing the various storage areas on site and location of out-of-spec material.

Figure 3. On-Site Waste Storage Areas



4. SITE INSPECTION ACTIVITIES

4.1 Quarterly Site Inspections

Clean Harbors conducts quarterly site inspections of the facility by an independent third party consultant. The inspections provide a review of the landfill operations including landfill cell development, construction and capping, perimeter screening berms, surface water management system, process water management system, leachate management system, and waste processing operations. This summary is compiled from the results of the site inspections conducted during the reporting year. The inspection program provides independent confirmation that the site is being developed in accordance with the provisions set forth in the Design and Operations Report.

The Quarterly Site Inspections were completed on the following dates:

First Quarter 2019 – March 20, 2019
Second Quarter 2019 – June 18, 2019
Third Quarter 2019 – September 10, 2019
Fourth Quarter 2019 – November 25, 2019

The site inspections consisted of a visual assessment of the landfill operations including the active waste fill area, cell development area, the landfill cap, perimeter screening berms and the various water management systems. The site inspections are documented in interim reports included in **Appendix F**.

4.1.1 Cell Development

4.1.1.1 Construction Activities

Landfilling activities occurred within Cell 19-2A, 19-2B1, 19-2B2 and 19-2B3. Construction of Cell 19-2B occurred in 2019. Installation of the final cover on cell 19-1 was initiated in 2019 and is expected to be completed in 2020.

4.1.1.2 Landfill Cell Advancement

Landfilling activities occurred within Cell 19-2A, 19-2B1, 19-2B2 and 19-2B3 during the reporting year. Initially waste was placed within the southern portion of 19-2A. By the end of the year waste filling had transitioned into the south east portion of 19-2, specifically into cell 19-2B3.

4.1.2 Active Waste Fill Area

A description of the active tipping face location and waste placement is presented in the site inspection reports contained in **Appendix F**. The haul route utilized from the unloading area to the active tipping face is also described in each quarterly report.

4.1.3 Landfill Cap Construction and Conditions

As part of each quarterly site inspection, visual observations are made of any cap placement work and the condition of the interim and final already in place.

With the approval of the vertical expansion of the landfill, previously capped areas of the landfill are considered to be interim, since a portion of the cap will be removed and additional waste placed in these areas. Construction of an interim cap over Cell 19-2A and on portions of 19-2B1 and 19-2B2 was completed in 2019.

The interim cap was observed to be in good condition throughout the reporting period, with some noted minor erosion channels. Minor ponding was identified in several areas requiring minor grading improvements to promote drainage to the perimeter ditches.

Final cover installation over Cell 19-1 was started in 2019 and is anticipated to be completed in 2020.

4.1.4 Perimeter Screening Berms

The geometry of the perimeter berms surrounding the landfill is unchanged. Erosion of the perimeter screening berm was observed to occur in a number of locations on the interior or landfill side of the berm. This ranged from minor channels to more significant channeling in select areas of the site. The erosion channels are a result of the interior side walls being unvegetated. The erosion has resulted in some sedimentation occurring in the perimeter storm water ditching.

4.1.5 Surface Water Management System

The surface water management system at the Lambton Facility is comprised of a network of drainage ditches, and two surface water ponds located in the East and West portions of the site. Surface water runoff from undeveloped portions of the site, perimeter berms, capped and closed landfill cells is directed through this network of drainage ditches and reservoirs to the on-site surface water treatment facility. Treated effluent from the surface water treatment facility is discharged to, and retained in the Equalization Reservoir before being discharged via a channel to the municipal drainage swale located along Telfer Sideroad.

Inspection of the perimeter ditches and surface water ponds established that their side-slopes were stable with only minor evidence of erosion. Some ponding on the site and within the ditches at locations was observed throughout the year due to rainfall events, low or impeded flow due to sedimentation, vegetation and limited elevation differences.

During the reporting period, water levels in the surface water ponds were moderate to low at the start of the year and then high for the remainder of the year due to the large amount of precipitation during the year. Water levels within the equalization pond were also generally at normal operating levels during the year. The Equalization Pond provides for the adequate retention of the treated storm water. The exposed, concrete-lined side-slopes appear to be stable, although cracks and spalling of the concrete were observed, consistent with previous observations.

Detailed observations of the surface water management system are presented in the site inspections contained in **Appendix F**.

4.1.6 Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. Impacted and potentially impacted runoff from the operational areas and active landfill sub-cells is directed to the three ponds. The North Process Water Pond is located immediately west of the TDU, the South Process Water Pond is located immediately south of the incinerator, and the West Process Water Pond is located adjacent to the West Storm Water Pond. Water retained in the Process Water Management System is used as quench water for the site incineration operations.

Detailed observations of the process water management system are presented in the site inspections contained in **Appendix F**.

4.1.7 Leachate Management System

The leachate reservoirs are designed to receive leachate from the active fill area and process areas. Leachate transferred from the active fill area is detained within the leachate reservoirs prior to transfer to the incinerator for disposal.

The Leachate Storage Tank was in operation serving as the feed tank to the incinerator.

Detailed observations of the leachate management system are presented in the site inspections contained in **Appendix F**.

5. ENVIRONMENTAL MONITORING

5.1 Groundwater and Landfill Performance Monitoring Program

The 2019 groundwater and landfill performance monitoring program undertaken at the Lambton Facility was based on the document "Final Draft – Groundwater and Landfill Performance Monitoring Programs" prepared by RWDI (December 9, 2015).

The Groundwater Monitoring Program is subdivided into three programs:

1) Groundwater Monitoring Along Perimeter of Facility
2) Sub-cell 3 remedial Performance Monitoring
3) Performance Monitoring of Engineered Landfill System

The goals of the various monitoring programs are to provide for the early detection of changes in groundwater quality at the site and to demonstrate that engineering systems are functioning as intended. To address this goal, monitoring wells have been installed along the perimeter of the Facility property in the two hydraulically active water-bearing zones, which are the primary pathways along which contaminants could travel. These are referred to as the Active Aquitard and the Interface Aquifer.

The Active Aquitard is the near surface weathered portion of the clay-silt overburden that is present at the Site. Weathering including summer desiccation and winter frost action has fractured the clay materials to a depth on the order of 3 m to 4 m. Groundwater movement through the fractures is potentially rapid in comparison with movement through unfractured overburden materials.

The Interface Aquifer is located at the contact between the overburden and bedrock, and is characterized by a thin, discontinuous layer of granular material overlying fractured bedrock. This aquifer has been capable of satisfying residential water requirements albeit the yield and quality has been problematic.

The 2019 Annual Monitoring Program report is appended (**Appendix G**). The reviewer should refer to this report for descriptions of each of the monitoring programs. The following discussion focuses strictly on the major findings of the programs and recommendations that have emerged.

5.1.1 Monitoring Results

The following is a summary of the key monitoring results for the current monitoring period. Detailed discussions are provided in **Appendix G** of this document.

The objective of the perimeter groundwater and sampling program is to assess the vertical and horizontal gradients and detect the extent and magnitude of potential contamination to groundwater (if any), in the three hydrostatic units monitored (Active Aquitard, Interface Aquitard, and Shale Aquitard).

Based on the 2019 groundwater monitoring and sampling events completed on Site, the following conclusions are presented:

Perimeter Groundwater Monitoring Program

- Groundwater is mounded in the Active Aquitard within and beneath the northern berm. This groundwater mounding induces an inward hydraulic gradient from the berm to the landfill footprint. Groundwater along the outside of the northern berm remains stable compared to historical measurements.
- Groundwater contours of the Interface Aquifer illustrate a potentiometric high in the northwest portion of the property consistent with historical groundwater patterns.
- Samples from the Active Aquitard and Interface Aquifer had exceedances of the ODWS for TDS, alkalinity, barium, chloride, iron, sulfate, and/or sodium. These exceedances are likely attributed to characteristics of the local geology and are not likely resultant of landfill impacts.
- Active Aquitard samples exceeded the PWQO for boron, chromium, iron, nickel, and zinc. Concentrations were generally consistent with historical results.
- Statistical analysis was performed on indicator parameters for all wells in the Active Aquitard and Interface Aquifer to determine if detections exhibited statistically significant trends. The majority of monitoring locations showed no trend or decreasing trends for indicator parameters. The majority of monitoring locations with increasing trends had concentrations below the ODWS and within historical ranges. It is anticipated that elevated concentrations and/or increasing trends of multiple indicator parameters would be evident if groundwater quality was impacted from the landfill. It is unlikely increasing trends are the result of landfill impacts.

Sub-Cell 3 Remedial Performance Monitoring Program

- Water levels within the HCL gradually increased throughout 2019, such than upward gradients were not maintained from the Interface Aquifer to the HCL within Sub-Cell 3. The Sub-Cell 3 groundwater extraction system was not operating as intended in 2019.
- Groundwater quality within the HCL and the Interface Aquifer was consistent with previous years and did not show leachate impact. The increasing water levels within the HCL did not have an impact on groundwater quality.
- Leachate from the surrounding landfill cells do not appear to be infiltrating the HCL.

Performance of Engineered Landfill System

- Water levels indicated that an inward gradient towards the LCS was not maintained throughout 2019. Water levels at LCS sumps were higher than wells along the southwest property boundary and at the southern berm.
- Groundwater quality within the Active Aquifer appeared to be unaffected by the high water levels within the LCS.
- By December 2019, the inward gradient towards the LCS was restored, as observed with lower water levels within the LCS compared to the Active Aquitard.

5.2 Surface Water Monitoring

The surface water management system directs all stormwater generated from non-operational areas via a series of ditches and reservoirs to a water treatment plant located within the main

processing area of the Lambton Facility. The surface water treatment plant is operated when the live surface water storage across the site is increased, often due to precipitation events and seasonal periods of high water runoff. The plant operates in recirculation mode until the effluent criteria established under the ECA are met. Once the effluent from the treatment plant is in compliance with the ECA criteria, the treated water is discharged to the Equalization Pond. Before discharge is permitted, surface waters from this Equalization Pond are analyzed and verified to meet the discharge criteria. When the conditions are satisfied the Equalization Pond is discharged to a ditch along Telfer Road. A revised surface water monitoring program for the Facility was approved by the MOECC in March 2016.

During discharge the treated surface water is monitored daily for continual acceptance against the discharge criteria. Samples are collected and analyzed for pH, specific conductivity, phenols, chloride, solvent extractables (oil and grease), and total suspended solids. Monthly discharge monitoring conducted on-site during discharge includes general chemistry, total metals, volatile organic compounds, semi-volatile organic compounds, toxicity, and the presence/absence of fish in the Equalization Pond. Off-site surface water monitoring is conducted seasonally.

In 2019, there were six distinct periods during which daily discharge monitoring was completed. Monthly discharge monitoring, including toxicity and visual observations, were also undertaken for these six time periods. The detailed surface water monitoring program results are included in **Appendix H**.

5.2.1 Daily Discharge Monitoring

Daily discharge monitoring was completed during discharge from the Equalization Pond during three distinct time periods. No exceedances of monitoring parameters were recorded. The discharge periods are as follows:

- Period 1: January 1 to 29, 2019
- Period 2: March 21 to April 3, 2019
- Period 3: May 30 to June 27, 2019
- Period 4: July 16 to 19, 2019
- Period 5: August 20 to September 17, 2019
- Period 6: November 4 to December 12, 2019

The daily discharge monitoring results are provided in **Appendix H**.

5.2.2 Monthly Discharge Monitoring

A monthly monitoring sampling event was followed during each of the six discharge periods. When compared to the Provincial Water Quality Objectives (PWQO), the analytical results were generally below the PWQO with the following noted exceedances, based on the parameter and number of occurrences.

- Total phenolics – during Periods 1 to 6
- Phosphorus – during Periods 1 to 6
- Unionized ammonia – during Periods 2 and 3
- Aluminum – during Periods 1, 2, 5 and 6

- Cadmium – during Period 2
- Cobalt – during Period 2
- Iron – during Periods 1 and 2
- Molybdenum – during Periods 1 to 6
- Thallium – during Periods 2, 3 and 4

The off-site up-stream sample location, STN6, provides the general surface water quality in the area. The Site has a clayey overburden and as such the surface water is impacted by the natural materials that present within the overburden. Comparison of the background sample results provided in Table 10 indicates that of the 9 parameters for the EQ Pond results noted to have an exceedance of the PWQOs, the background location also has exceedances for total phenolics, phosphorus, aluminum, and iron that are higher than the EQ Pond. Cobalt is elevated over the PWQO for only one of the eight results. Unionized ammonia and cadmium are elevated over the PWQO for only two of the eight results. Iron and thallium are elevated over the PWQO for only three of the eight results.

The monthly discharge monitoring results are provided in **Appendix H**.

5.2.3 Toxicity Testing

Toxicity testing of the Equalization Pond was completed eight times during the reporting period. All samples were within specified limits to characterize the samples as being non-toxic.

The toxicity test results are provided in **Appendix H**.

5.2.4 Visual Observation

Quarterly visual Site inspections were undertaken by GHD on March 20, June 18, September 10, and November 25, 2019 including of the surface water management system. The presence of live fish in the Equalization Pond was confirmed during the second and third quarterly inspections. No fish were observed in the equalization pond at the time of the first or fourth quarterly inspections. Water levels in the Equalization Pond were noted to be moderate to high during the first inspection and high during the second, third, and fourth quarterly inspections. The water is often murky at the time of the quarterly inspections, making it difficult to observe fish if they are in the deeper water. It is also likely that the fish were near the bottom of the pond given the colder temperatures at the time of inspection.

5.2.5 Off-Site Monitoring

Supplementary chemical monitoring of the background (STN6) and downstream (STN6A) off-Site monitoring locations for general chemistry, metals, VOCs, and sVOCs was undertaken for STN6A on June 18, 2018 and for both STN6 and STN6A on November 25, 2019. When compared to the PWQO, the analytical results for both sampling locations were below the PWQO with the exception of total phenolics, phosphorus, aluminum, and iron. The analytical results for all parameters analyzed are on approximately the same order of magnitude for both sampling locations.

The off-site water quality is representative of a clay overburden environment with regard to the metal components and the phosphorus levels are representative of agricultural impacts.

The off-site monitoring results are provided in **Appendix H**.

5.2.6 Surface Water Characterization

Supplementary monitoring of the East and West Ponds for general chemistry, metals, VOCs, and SVOCs was undertaken on February 22, April 23, August 28, November 7, November 19, and December 17, 2018. Comparison of the on-site surface water data indicates that the surface water quality improves as the water moves from the East Pond to the West Pond and then through the treatment plant and Equalization Pond. Comparison of the on-site data to the off-site background indicates that the water is similar and is generally reflective of clay overburden (surface) water chemistry.

The detailed on-site surface water characterization results are provided in **Appendix H**.

5.3 Air Quality Monitoring

Clean Harbors has been conducting an annual ambient air fenceline monitoring program spanning more than twenty years at the Lambton Facility. The objective of the program is to ensure that potential contaminant releases from the facility's ongoing operations are within accepted regulatory limits. The monitoring program includes a series of measurements for a number of speciated vapor and particulate constituents in accordance with a monitoring plan prepared in 2015.

A total of twelve pairs of simultaneous north/south fixed location speciated VOC measurements were conducted by sampling for 24-hour periods. Sampling was initiated at midnight (eastern standard time) following the twelve-day NAPS cycle adjusted to ensure no samples were taken on days where the Facility was not in operation. Sampling occurred from late May through early October 2019. Similarly, 24-hour samples were also collected for subsequent analysis of TSP and selected elemental constituents. Generally, particulates were collected on the same day as VOCs; however, due to equipment issues in the field, two additional sample days for VOCs only or Particulates only were needed. Additionally, due to a power outage at the South site during the last sample day (September 30th), the South site TSP and mercury samples (VOC sampling does not require power) were run on October 2nd, separate from the North site which was unimpacted. Combined, the total of fifteen (15) sample days resulted in twelve (12) sets of VOC and Particulate samples. Four sample sets of speciated carbonyls and airborne mercury were collected; one in each of July, two in August, and one in September/October (see previous comment about split due to power outage), concurrent with the VOC and TSP measurements. The levels of all constituents measured were compared with any applicable O. Reg. 419 Schedule 3 standards, or where no standard exists, the relevant guideline or AAQC.

Meteorological data indicated that two of the fifteen monitoring days had significant numbers (≥50%) of hours with winds blowing from the southwest to southeast quadrant where the north and south monitors would be aligned downwind and upwind respectively.

Most measured VOC concentrations were less than 1% of the schedule 3 standards, guidelines or AAQCs. The highest percentage was reported for benzene at 2.1 $\mu g/m^3$ (89.1% of the 2.3 $\mu g/m^3$ 24-hour AAQC) on July 26th at the North site. Benzene has historically been the compound measured at the highest percentage during the monitoring program. All measured VOC concentrations were below applicable 24-hour AAQCs, standards, and guidelines. Measured

concentrations of total particulate and speciated particulates were all less than their respective standard, guideline, or AAQC. Of the speciated components, iron was measured at the highest percentage of its limit, at 36.7%.

Of the speciated carbonyl measurements, only propanal was detected, and was detected in all but one sample at a fairly consistent range of 2-3 $\mu g/m^3$. Propanal does not have an AAQC, standard, or guideline. Particulate mercury was measured in small quantities, while vapour mercury was not detected in any of the samples. Total mercury was measured in concentrations of well below (<0.1%) its schedule 3 standard in all samples.

Air Quality monitoring data are provided in **Appendix I**.

5.4 Biomonitoring Program

The Biomonitoring Program is one of the Lambton Facility's ongoing monitoring programs, which are required under condition 9 of the Facility's Environmental Compliance Approval No. A031806 dated September 5, 1997 and as amended. The Biomonitoring Program provides an indication of trends, through time, in the concentration of analytes in several environmental media at a network of test sites located within approximately 1.5 km of the Lambton Facility boundary. Each year, samples from up to four environmental media (soil, drainage ditch sediment, natural vegetation and agricultural crops) from each site are collected and submitted to the analytical laboratory to determine the concentration of selected metals, pesticides, chlorinated phenols, and dioxins and furans. In 2018, 13 test sites were monitored.

The review and comparison of the 2018 data relative to the upper control limits (UL18)1 for each Site and on a Site-wide basis was completed for inorganic analytes. The concentrations of 20 inorganic analytes (15 Group 12 analytes (i.e., barium, boron, calcium, chloride, chromium, cobalt, iron, magnesium, manganese, molybdenum, phosphorus, potassium, silicon, strontium and sulfur) and five Group 2 analytes3 (i.e., aluminum, lead, mercury, vanadium and zinc)) exceeded their respective Site-specific UL18 while one Group 1 analyte (i.e., manganese) exceeded the Site-wide UL18.

Within the 15 Group 1 analytes which exceeded the Site-specific UL18, the concentrations of two Group 1 analytes in soil collected in 2018 also exceeded the O. Reg. 153/04 Table 1 Site Condition Standards (SCS) and/or the Ontario Typical Ranges for Rural Parkland Soil (OTR98) (Ministry of Environment, Conservation and Parks (MECP), 2011). The concentration of one Group 1 analyte in sediment also exceeded the O. Reg. 153/04 Table 1 SCS and/or the Provincial Sediment Quality Guidelines (PSQG) (MECP, 2008). Concentrations of three of inorganic chemicals in natural grasses also exceeded the rural Upper Limit of Normal (ULN) (MECP, 1989). No criteria were available for comparison of UL18 exceedances identified in crops. The exceedances of the Group 1 analytes do not warrant additional investigation at this time.

The concentrations of Group 2 analytes in soil and sediment collected in 2018 which exceeded the Site-specific UL18 were below the O.Reg.153/04 Table 1 SCS. The concentration of one Group 2 analyte in natural grasses exceeded the ULN. The exceedances of the Group 2 analytes do not warrant additional investigation at this time.

Group 3 organic analytes were not detected at concentrations representative of concern for ecological health during the 2018 Field Year.

Organochlorine pesticides (OCP) analytes were measured at concentrations greater than their applicable reporting detection limits (RDL)5. However, detected concentrations of OCPs were less than their respective guidelines, where available for comparison. There are no standards available for comparison of vegetation. Monitoring should continue but no additional investigation is proposed.

The concentrations of polychlorinated biphenyls (PCBs) were measured greater than their applicable RDLs. Detected concentrations of PCBs were below their respective guidelines, where available for comparison. There are no standards available for comparison of vegetation. Monitoring should continue but no additional investigation is proposed.

Pentachlorophenols (PCPs) were not identified at concentrations greater than their respective RDLs. Monitoring should continue but no additional investigation is proposed.

Dioxins/furans (PCDD/DF) were not reported at concentrations greater than the SCS or OTR98 in the 2018 Field Year, with the exception of hexachlorodibenzo-p-dioxin in soil at Site E6. The upper and lower bound PCDD/DF TEQ was below the OTR98 TEQ at Site E6. No criteria were available for comparison of PCDD/DF concentrations in natural grasses. Monitoring should continue but no additional investigation is proposed.

Of the 55 statistically significant ($p<0.003$) linear regressions, 17 showed decreasing trends and 38 showed increasing trends. Approximately 8% of the analytes with increasing trends had measured concentrations greater than their applicable guidelines.

Bio-monitoring data are provided in **Appendix J**.