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

2018 Annual Landfill Report

Executive Summary

Table of Contents

FIGURES

TABLES

APPENDICES

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 11 dated September 22, 2017. 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, 2018 to December 31, 2018,** 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

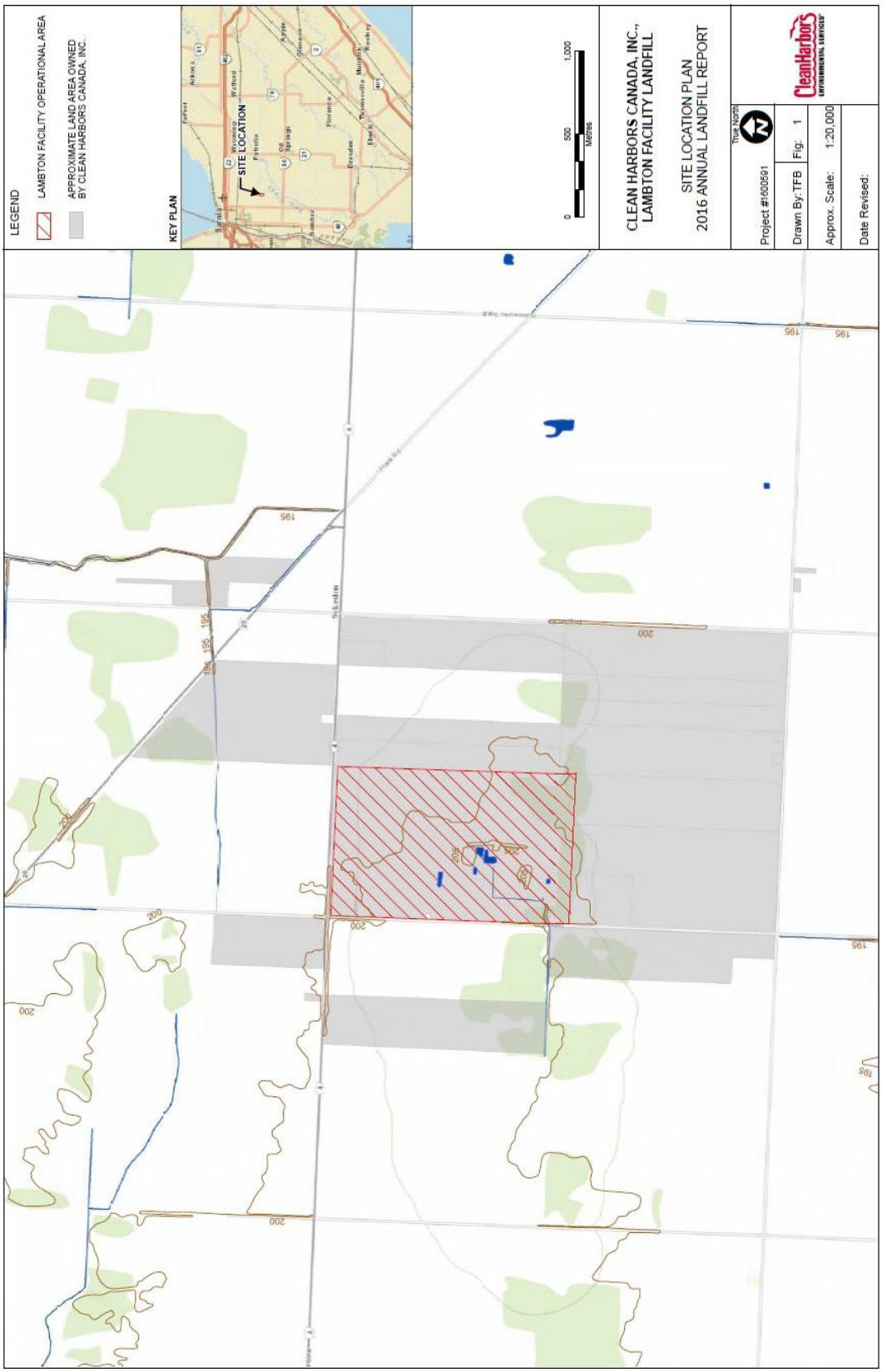
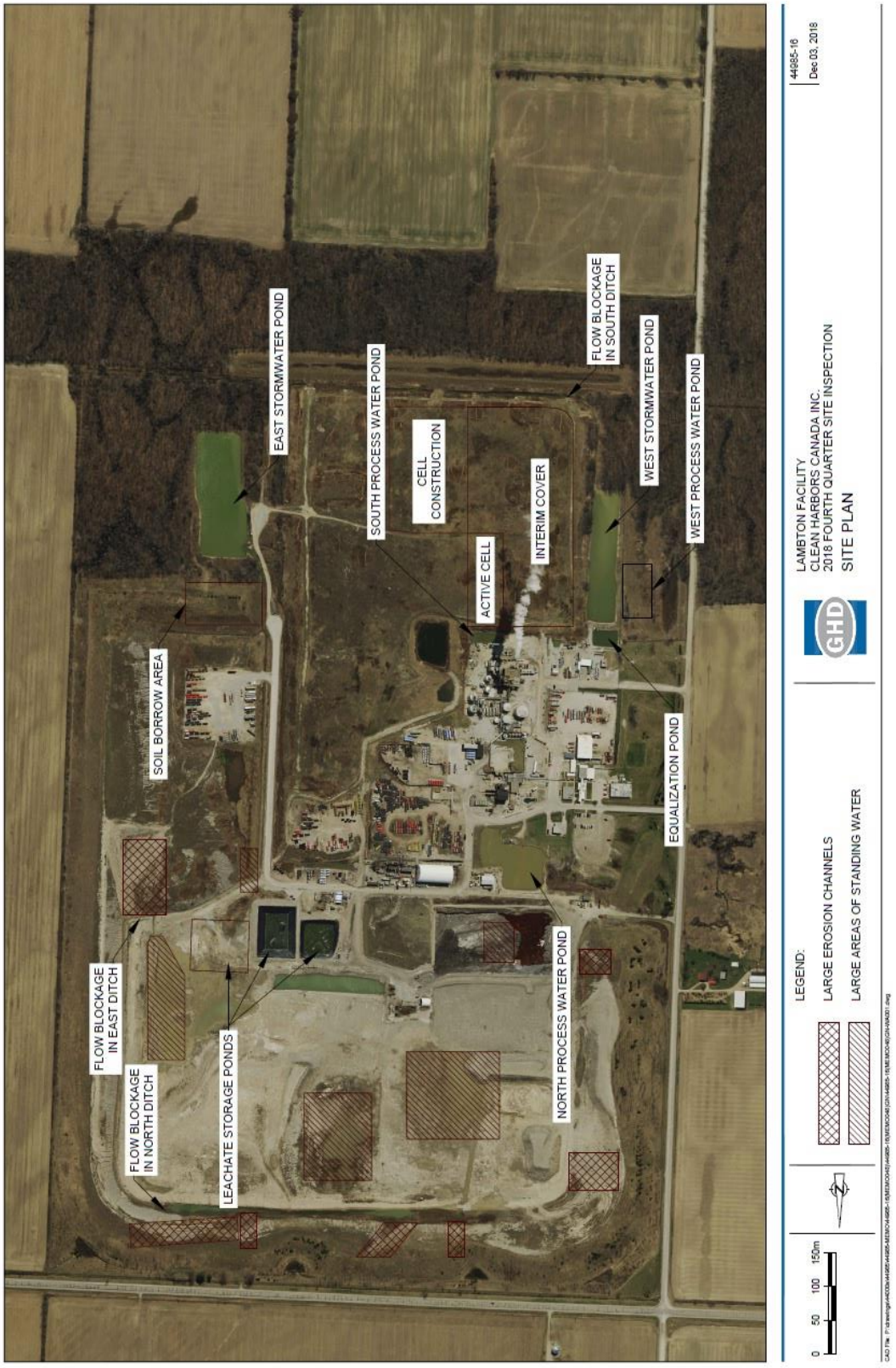


Figure 2. Site Works and Development Plan



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 11 dated September 22, 2017.
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 RWDI Air, Inc.
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

1.4 Review of 2017 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 2017 Annual Landfill Report in February 2019. A copy of the comments is enclosed in **Appendix B**. A response to the comments will be provided in the 2019 Annual Landfill Report.

No comments on the 2017 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 2018 include the following:

- Construction of Cell 19-1-3A, 19-1-3-B and 19-2-A.
- Interim cap placement on Cells 19-1-2, 19-1-3B and 19-1-3C.

Major development or construction activities planned for the landfill in 2019 include:

- Installation of the perimeter leachate collection trench, and leachate pumping well 5 to support development of Cell 19-2.
- Final cover of Cell 19-1.

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 2018. No issues were identified that require an amendment to the design of the Major Works.

2.4 Summary of Complaints

During the reporting period, one off-site complaint was received by Clean Harbors. A complaint was received from a site neighbour regarding odour on their property. The complaint was called into the facility late on a Sunday night, and was received by a non-Clean Harbors security guard. The security guard failed to adequately pass on the information in a timely manner to the Incinerator Shift Supervisor on site at the time, which resulted in the facility employees arriving at the site to investigate 2 hours after the call had been received. No odours were detected at that time. The Incinerator General Manager contacted the neighbour the following morning to discuss the issue with him. The facility implemented corrective actions to ensure management is notified immediately once a complaint is received.

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 and Climate Change, 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 2018 – December 2018

Month	Waste Class	Weight (Tonnes)	REAGENT WEIGHTS (TNE)								Weight Landfilled (Tonnes)
			CKD	FA	PC	W	F	D	TSP	FCL	
Jan 2018	143H	194.4	0	0	39.6	47.1	4.0	0	0	0	285.1
	146A	18.8	0	0	1.9	4.0	0	0	0	0	24.7
	146T	19.5	0	0	2.0	4.0	0	0	0	0	25.5
Feb 2018	112C	18.4	0	0	3.7	5.0	0	0	0	0	27.1
	146A	255.5	0	0	47.1	34.6	0	0	0	0	341.4
	146H	11.5	0	0	1.1	2.0	1.0	0.6	0	0	16.2
	146T	155.3	0	0	16.5	27.1	3.0	0	0	0	189.4
Mar 2018	143H	84.8	0	0	25.5	20.0	6.0	0	0	0	136.3
	146A	260.6	0	0	52.3	34.5	0	0	0	0	347.4
	146T	34.8	0	0	3.5	1.0	0	0	0	0	39.3
Apr 2018	112C	10.1	0	0	2.0	2.5	0	0	0	0	14.6
	131H	15.8	0	0	4.7	0	0.2	0	0	0	20.7
	143H	207.0	0	0	46.7	49.0	6.0	0	0	0	308.7
	146A	132.8	0	0	26.5	17.7	0	0	0	0	177.0
	146H	8.8	0	0	0.9	0	1.0	0	0	0	10.7
	146T	52.8	0	0	10.6	0	0.2	0	0	0	63.6
May 2018	131T	7.8	0	0	1.2	0	0	0	0	0	9.0
	143H	61.8	0	0	18.5	20.0	3.0	0	0	0	103.3
	146A	193.5	0	0	37.8	25.5	0	0	0	0	256.8
Jun 2018	143H	66.8	0	0	20.0	22.0	4.0	0	0	0	112.8
Jul 2018	143H	131.8	0	0	29.1	37.0	3.0	0	0	0	200.9
	146A	45.0	0	0	9.0	13.0	0	0	0	0	67.0
	146T	78.4	0	0	15.7	9.0	0	0	0	0	103.1
Aug 2018	143H	220.9	0	0	57.7	56.5	7.0	0	0	0	342.1
	146H	1.8	0	0	0.2	0	0	0	0	0	2.0
	146T	60.9	0	0	11.4	4.0	7.1	0	0	0	83.9
Sep 2018	131H	13.7	0	0	4.1	2.0	0.1	0	0	0	19.9
	131T	8.6	0	0	1.7	0	0	0	0	0	10.3
	143H	188.6	0	0	35.5	34.4	5.0	0	0	0	263.5
	146A	291.7	0	0	58.0	39.6	0	0	0	0	389.3
	146H	24.8	0	0	2.5	0	1.0	0.8	0	0	29.1
	146T	115.4	0	0	13.4	13.0	3.0	0	0	0	144.8
Oct 2018	143H	83.4	0	0	11.6	15.0	1.0	0	0	0	111.0
	146A	51.5	0	0	5.2	3.0	0	0	0	0	59.7
	146T	51.7	50.0	0	24.7	15.8	0	0.2	3.0	0	145.4

Nov 2018	131T	7.1	0	0	1.1	1.5	0	0	0	0	9.7
	143H	48.3	0	0	2.4	9.0	0	0	0	0	59.7
	146A	270	0	0	50.5	38.7	0	0	0	0	359.2
	146H	1.6	0	0	0.2	2.0	0	0	0	0	3.8
	146T	178.0	150.0	0	48.2	33.5	0	0.6	9.0	0	419.3
Dec 2018	146A	59.2	0	0	9.6	6.0	0	0	0	0	74.8
Total:		**3743.2**	**200.0**	**0**	**753.9**	**649.0**	**55.6**	**2.2**	**12.0**	**0**	**5408.11**

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 2018 – December 2018

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2018	15	Jul 2018	29
Feb 2018	10	Aug 2018	148
Mar 2018	122	Sep 2018	150
Apr 2018	0	Oct 2018	53
May 2018	12	Nov 2018	0
Jun 2018	5	Dec 2018	66

Table 3. Waste Pre-treatment (Macro-encapsulation) – January 2018 – December 2018

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2018	181	Jul 2018	184
Feb 2018	202	Aug 2018	191
Mar 2018	114	Sep 2018	490
Apr 2018	188	Oct 2018	224
May 2018	198	Nov 2018	198
Jun 2018	196	Dec 2018	117

Table 4. Waste Processed at the TDU – January 2018 – December 2018

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2018	1447	Jul 2018	1153
Feb 2018	1110	Aug 2018	1764
Mar 2018	1040	Sep 2018	1603
Apr 2018	1164	Oct 2018	1623
May 2018	1306	Nov 2018	1241
Jun 2018	1532	Dec 2018	1666

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, 2018 through to December 31, 2018, Clean Harbors Lambton Facility received 65,751.4 tonnes of solid waste, not including 4,294 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 **Tables Table** 6**,**
Table 7 **and Table** 8.

Table 5. Waste Quantity (tonnes) by Waste Types, January 1, 2018 to December 31, 2018

Clean Harbors Waste Codes	Material Type	Generator Location			Total
		Ontario	Other Provinces	United States	
CA1 & CA2	Solids contaminated with cyanides	81	1985	62	2128
CANL	Spent pot liner	0	0.2	0	0.2
CATR	Catalyst for disposal	319	61	608	988
CBP	Non hazardous	5564	1932	72	7568
CBPR	RCRA solids	901	143	1176	2220
CBPS	Semi-solids	359	41	6	406
CCRT	Thermal desorber	4292	11	11993	16296
CCS	Inorganic solids	4416	905	3888	9209
CCSF	F-Listed for stabilization	0	0	30.3	30.3
CCSM	Debris for Micro	64.3	213	881.4	1158.7
CCSMA	Debris for Macro	21325	9921	1150	32396
CCSS	Characteristic semi-solids	34	9	28	71
CNIA	Non RCRA asbestos	59.3	104.6	0	163.9
CNO	Non RCRA solids	2894	64	0	2958
	Incinerator ash	4294	0	0	4294
	TOTAL	**44,602.6**	**15,389.8**	**19,894.7**	**79,887.1**
	Percent of Total	55.8	19.3	24.9	100

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

Clean Harbors Waste Codes	Generator Location: Ontario												Total
	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
CA1&2	6	11	8	0	21	0	8	12	0	7	0	8	81
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	0	8	0	167	9	0	135	0	0	0	0	319
CBP	328	267	141	309	485	533	449	382	249	824	889	708	5564
CBPR	559	0	34	59	96	0	121	20	0	0	12	0	901
CBPS	0	10	122	0	0	9	0	124	0	28	32	34	359
CCRT	341	185	203	157	177	387	529	274	430	884	453	272	4292
CCS	281	134	199	153	281	1852	466	332	314	187	168	49	4416
CCSF	0	0	0	0	0	0	0	0	0	0	0	0	0
CCSM	5	11	2	13	0.3	3	6	0	6	2	15	1	64.3
CCSMA	1940	1009	1443	1598	3120	2074	1449	1840	1534	1964	1880	1474	21325
CCSS	12	0	22	0	0	0	0	0	0	0	0	0	34
CNIA	0	0.5	0.5	5	0	0	27	0.3	0	0	2	24	59.3
CNO	255	433	231	279	160	192	208	189	180	392	192	183	2894
TOTAL	3727	2060.5	2413.5	2573	4507.3	5059	3263	3308.3	2713	4288	3643	2753	40308.6

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

Clean Harbors Waste Codes	Generator Location: Other Provinces												Total
	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
CA1&2	168	143	349	156	237	145	106	69	179	136	234	63	1985
CANL	0	0	0.2	0	0	0	0	0	0	0	0	0	0.2
CATR	0	0	0	0	0	6	0	0	55	0	0	0	61
CBP	253	154	159	99	181	123	44	47	249	212	228	183	1932
CBPR	35	47	0	0	19	14	0	0	0	28	0	0	143
CBPS	0	0	0	0	0	0	41	0	0	0	0	0	41
CCRT	0	0	0	0	0	0	0	0	0	11	0	0	11
CCS	0	16	49	108	79	149	111	171	73	124	25	0	905
CCSF	0	0	0	0	0	0	0	0	0	0	0	0	0
CCSM	11	10	34	0	30	24	10	6	0	13	54	21	213
CCSMA	720	752	926	723	940	836	972	761	801	772	1054	664	9921
CCSS	0.2	0.4	0	0	6	0.3	0.2	0.5	0.2	0	0.2	1	9
CNIA	0.6	15	14	17	0	0	10	11	14	13	0	10	104.6
CNO	0	0	0	0	10	0	17	0	37	0	0	0	64
TOTAL	1187.8	1137.4	1531.2	1103	1502	1297.3	1311.2	1065.5	1408.2	1309	1595.2	942	15389.8

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

Clean Harbors Waste Codes	Generator Location: United States												Total
	January	February	March	April	May	June	July	August	September	October	November	December	
CA1&2	0	0	8	6	0	9	0	16	6	0	7	10	62
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	17	160	0	145	198	64	0	0	24	0	0	608
CBP	0	0	0	0	31	10	0	0	0	0	3	28	72
CBPR	98	73	190	198	122	85	104	103	46	76	65	16	1176
CBPS	3	0	0	0	0	0	0	0	3	0	0	0	6
CCRT	772	621	555	669	985	1082	723	855	1008	2518	1352	853	11993
CCS	19	352	127	18	0	9	0	50	1040	1935	323	15	3888
CCSF	4	0	0	5	0	0	2	17	0	2	0	0.3	30.3
CCSM	135	303	42	80	70	10	0.4	9	24	53	77	78	881.4
CCSMA	29	9	4	16	14	11	29	74	170	59	465	270	1150
CCSS	0	0	0	0	0	0	0	6	0	22	0	0	28
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	1060	1375	1086	992	1367	1414	922.4	1130	2297	4689	2292	1270.3	19894.7

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	40,308.6	53.3
Other Provinces	15,389.8	20.4
United States	19,894.7	26.3
Total	**75,593.1**	**100**

During the reporting period, the maximum daily quantity of waste received for pretreatment and landfilling was 771 tonnes on June 5, 2018.

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 3,467,000 m^3. Filling within the expansion landfill began in Subcell 19-1 in early 2016. As of December 31, 2018, the remaining capacity of landfill was 3,684,838 m^3 (185,162 m^3 or 4.8% of capacity used).

Based on current projections using 2018 volumes, the landfill expansion is expected to have a site life of 60 years.

3.4 Waste Load Rejection Summary

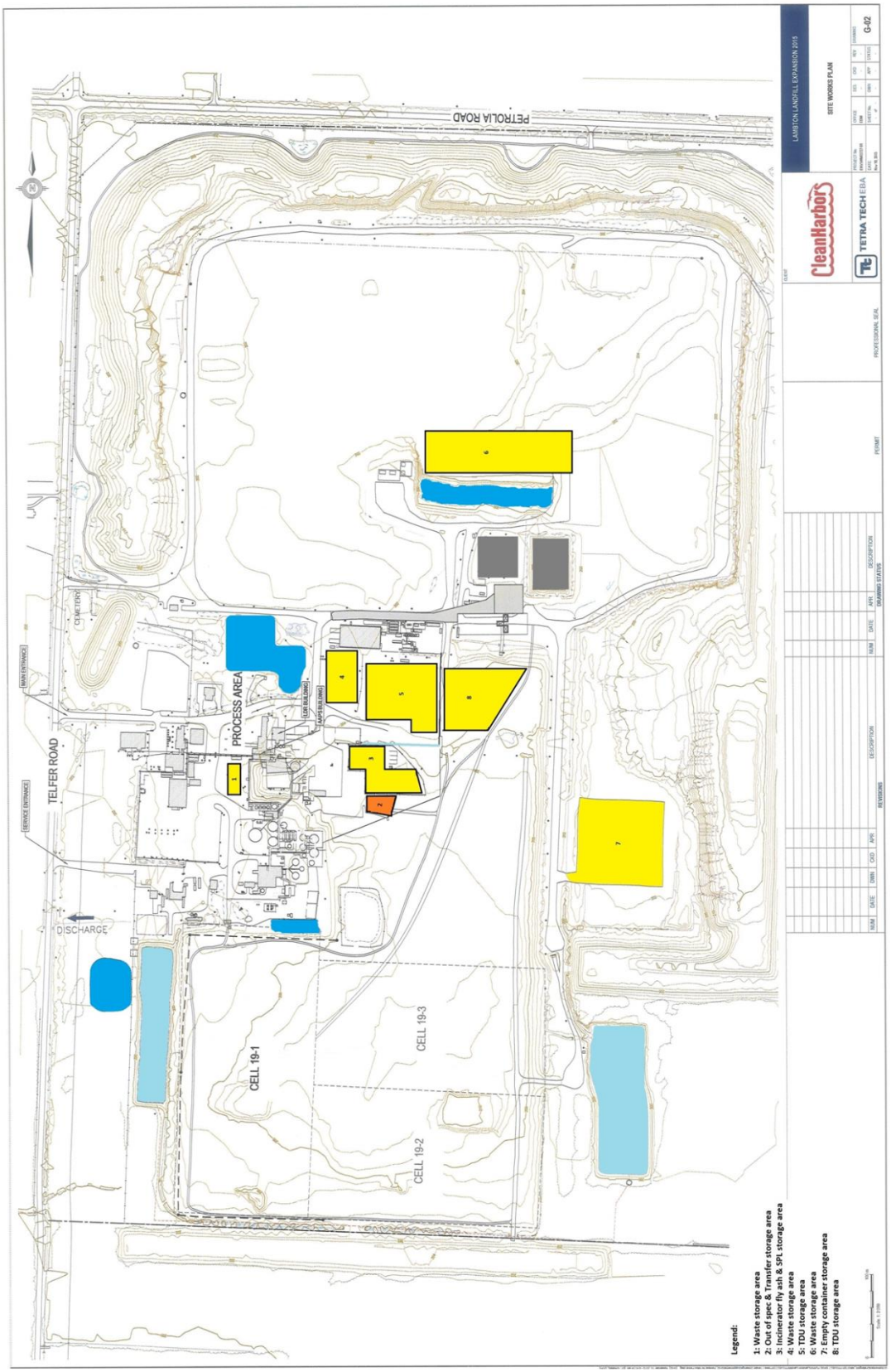
Clean Harbors Canada, Inc. is required under Condition 15 (b) (xiv) of the ECA to provide the MOECC with a list of all rejected waste loads (i.e., vehicle shipments) together with the reasons for rejection.

During the reporting period covered by this report, 17 individual loads of waste were rejected by the Lambton Facility for failing to meet the site's acceptance criteria. The reasons for rejection included:

- Material too thick to pump – one (1) load
- Failed TVO – three (3) loads
- Failed VHC – three (3) loads
- Non-Conforming – three (3) loads
- Unable to offload – two (1) loads
- Not permitted – one (1) load
- High H_2S – one (1) load
- Low pH – one (1) load
- Unable to treat – two (2) loads

A summary of all waste loads rejected and related reasoning is presented in **Appendix D**. Rejected loads are contained 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 2018 – March 21, 2018
Second Quarter 2018 – June 4, 2018
Third Quarter 2018 – September 24, 2018
Fourth Quarter 2018 – November 26, 2018

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 19-1 Subcell 3. Construction of Cell 19-2A was initiated in Fall 2018. The location of the active Cell (19-1-3) and the under construction Cell (19-2A) are shown on **Figure 2.** Site Works and Development Plan.

4.1.1.2 Landfill Cell Advancement

Landfilling activities occurred within Cell 19-1-3 and 19-2A during the reporting year. Initially waste was placed within the southern portion of 19-1-3. By the end of the year waste filling had transitioned into the northern portion of 19-1-3 and into cell 19-2A. Landfilling progressed south to north within Cell 19-1-3.

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 the southern portion of Cell 19-1-3 was completed in 2018.

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.

No areas of the landfill have received final cover.

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 sideslopes 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 sideslopes 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.

Levels in the three process water ponds were low during the first portion of the year and the levels got very high in the Fourth Quarter.

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 South, East and New Leachate Reservoirs operated throughout the year.

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 2018 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 2018 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 Section 4 of **Appendix G** of this document (2018 Annual Monitoring Report).

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 2018 groundwater monitoring and sampling events completed on Site, the following conclusions are presented:

Perimeter Groundwater Monitoring Program

- Groundwater is mounded in the northern berm fill and beneath the northern berm. These groundwater elevations induce 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.
- 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.
- The PWQO for boron, chromium, iron and nickel were exceeded at various locations screened in the Active Aquitard. Detections of boron and/or nickel above the PWQO were within historical ranges. Iron exceeded the PWQO in the groundwater sampled collected from TW57-11S in spring 2018. Historically, iron concentrations for TW57-11S have been below the laboratory detection limit. TW57-11S is located off-Site and the elevated concentration is not related to landfilling. The exceedances for chromium are fairly consistent across the monitoring well network including at locations located off the Facility property. On the basis of the pattern of chromium exceedances observed, the landfill is not considered to be a likely source of chromium reported in Active Aquitard monitoring well groundwater samples.

Sub-Cell 3 Remedial Performance Monitoring Program

- The operation of the remedial system is effectively managing an upward gradient from the Interface Aquifer to the Hydraulic Control Layer within Sub-Cell 3.
- No statistically significant increasing trends of leachate indicator parameters were identified from the spring and fall 2018 groundwater samples collected within the HCL.
- Statistically significant decreasing trends were identified for leachate indicated parameters including chloride, sulfate, potassium, sodium, and fluoride from monitoring wells within the HCL.
- Leachate from the surrounding Cells does not appear to be infiltrating the HCL.

Performance of Engineered Landfill System

- The groundwater elevations in TW64-16-IV located within the Active Aquitard at the toe of Cell 19 were above the monitored leachate levels identified in leachate collection sumps PTS-01 and PTS-02 and leachate collection trench standpipe LCSOW2-15 for 2018, with the exception of a period between August 8 and 9, and on August 18 and 21,

2018. An inward gradient from the Active Aquitard at the location of the southern berm was maintained for the majority of 2018.

- The groundwater elevations in TW48-16S located within the Active Aquitard along the western property boundary were above the monitored leachate levels. An inwards gradient was maintained within the transect throughout 2018 from the Site property boundary to the toe of the Landfill.
- Groundwater at TW52-02A and TW52-02B along the southern property boundary are being drawn down by the leachate collection system sumps and PTS-04.
- The leachate system indicates an inward gradient from the Active Aquitard and is maintaining control of the leachate at the perimeter of the landfill. Historic issues with leachate migration along the southern perimeter of the waste disposal are controlled by the leachate collection system and historical impacts are decreasing as noted by decreasing trends in chloride, sulfate, and fluoride in the south berm monitoring wells.
- Based on the current and historical groundwater elevations, the groundwater mounding is effective along the western portion of the Southern Berm, and appears to be less pronounced along the central portion of the Southern Berm and was not mounded along the eastern portion of the Southern Berm in 2018.

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 needs to be increased, often due to precipitation events and seasonal periods of high water run off. 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 2018, there were three distinct periods during which daily discharge monitoring was completed. Monthly discharge monitoring, including toxicity and visual observations, were also undertaken for these three 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: February 22 to May 10, 2018
- Period 2: August 27 to September 16, 2018
- Period 3: November 7 to December 21, 2018

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 three 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.

- Hexavalent chromium VI – during Period 3
- Total phenolics – during Period 3
- Phosphorus – during Periods 1, 2 and 3
- Aluminum – during Periods 1, 2 and 3
- Boron – during Period 2
- Iron – during Periods 1 and 3
- Molybdenum – during Periods 2 and 3

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 7 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. Boron and hexavalent chromium VI are elevated over the PWQO for only one of the six results. Total phenolics are elevated over the PWQO for only two of the six results. Molybdenum is elevated over the PWQO for only three of the six results.

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

5.2.3 Toxicity Testing

Toxicity testing of the Equalization Pond was completed six times during the reporting period, between February 26th and December 17th, 2018. 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 21, June 4, September 24, and November 26, 2018 including of the surface water management system. The presence of live fish in the Equalization Pond was confirmed during the second quarterly inspection. No fish were observed in the equalization pond at the time of the first, third, or fourth quarterly inspection. Water levels in the Equalization Pond were noted to be moderate during the first quarterly inspection and high during the 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 February 22, 2018 and for both STN6 and STN6A on November 20, 2018.When compared to the PWQO, the analytical results for both sampling locations were below the PWQO with the exception of total phenolics, phosphorus, aluminum, cobalt, copper, iron, and vanadium. 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, initiated at midnight (Eastern

Standard Time) on the twelve day NAPS cycle, during May through September 2018. Similarly, 24-hour samples were collected on the same occasions for subsequent analysis of total suspended particulate matter (TSP) and selected elemental constituents along with the acquisition of local meteorological data for these time-frames. Three samples of speciated carbonyls and airborne mercury were collected; one in each of June, July and August concurrent with the VOC and TSP measurements. The level of all constituents measured were compared with the applicable O. Reg. 419 Schedule 3 standards, or where no standard exists, the relevant guideline or AAQC.

Meteorological data indicated that five of the twelve monitoring days had significant numbers 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 2-Propenenitrile (132% of the 0.6 µg/m3 Sch. 3 standard) on June 19th at the South site. This value, which is less than 2 times the method detection limit, appears to be anomalous since the compound was not detected in any of the other samples collected during the 2018 program or in any year since the EPA TO-15 method was implemented in 2012.

The compound measured at the second highest percentage of a standard, guideline, or AAQC was benzene, which was found in concentrations up to 34.8 % of its 24 hour AAQC. Benzene has historically been the compound measured at the highest percentage during the monitoring program.

Measured concentrations of total particulate and speciated particulates were all less than their respective standard, guideline, or AAQC, with the exception of one (1) exceedance of 126% of the sch.3 standard for total particulate on May 29th at the South site. As noted previously it is expected that agricultural work conducted on the fields adjacent to both of the monitoring sites impacted these results, and relatively high concentrations measured that day at the North monitor mean that the Facility's contribution to this concentration was well below the standard. Total particulate was generally measured in concentrations less than 35% the 24-hour standard. Of the speciated components, iron was measured at the highest percentage of its limit, at 55%.

Of the speciated carbonyl measurements, only formaldehyde was detected on all occasions at both sites, although formaldehyde concentrations were generally low in comparison to the standard, there was one measurement where a concentration of 73% of the standard was found. However, the monitoring site was not downwind of the Facility on this day. Propanal was detected on one sample day at a maximum of 2.3 µg/m3. 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 2017, 14 test sites were monitored.

The review and comparison of the 2017 data relative to the upper control limits (UL15)1 for each site and on a site-wide basis was completed for inorganic analytes. The concentrations of 11 inorganic analytes (ten Group 12 analytes (i.e., beryllium, calcium, chloride, iron, magnesium, manganese, molybdenum, phosphorus, strontium and sulfur) and one Group 2 analyte3 (i.e., mercury)) exceeded their respective site-specific UL15 while one Group 1 analyte (i.e., manganese) exceeded the site-wide UL15.

Concentrations of a limited number of Group 1 analytes in soil collected in 2017 also exceeded the Ontario Typical Ranges for Rural Parkland Soil (rural parkland OTR98) (Ministry of Environment, Conservation and Parks (MECP), 2011). The identified exceedances of the rural parkland OTR98 are likely attributed to fertilizer application. Concentrations of a limited number of inorganic chemicals in natural grasses also exceeded the rural Upper Limit of Normal (ULN) (MECP, 1989). No criteria were available for comparison of UL15 exceedances identified in soybean. The exceedances of the Group 1 analytes do not warrant additional investigation at this time.

Mercury, a Group 2 analyte, was identified in soil to exceed the site-specific UL15. However, the concentrations of this analytes were below the MECP O.Reg.153/04 Table 1 Site Condition Standard (SCS). Consequently, continued monitoring is recommended but additional investigation is not justified at this time.

Group 3 organic analytes4 were not detected at concentrations representative of concern for ecological health during the 2017 Field Year.

A select number of organochlorine pesticides (OCP) analytes were measured at concentrations above their applicable reporting detection limit (RDL)5. However, all detected concentrations of OCPs were below the MECP 153/04 Table 1 SCS and rural parkland OTR98 and, where available for comparison. There are no standards available for comparison of vegetation. Monitoring should continue but no additional examination is proposed.

Polychlorinated biphenyls (PCBs) and pentachlorophenols (PCPs) were not identified at concentrations greater than their respective RDLs. Monitoring should continue but no additional examination is proposed.

Dioxins/furans (PCDD/DF) were not reported at concentrations greater than the Table 1 SCS in the 2017 Field Year. No criteria were available for comparison of PCDD/DF concentrations in

natural grasses. The concentrations of octachlorodibenzodioxin (OCDD) measured in field corn and soybeans were within the range of the typical levels for vegetables (Ontario tomatoes, potatoes) (Birmingham *et al.*, 1989).

An update to the upper and lower limits (UL18 and LL18) for inorganic and organic analytes incorporating data from 1991-2017 was undertaken to comply with the three-year update cycle. The LLs and ULs were developed when at least six years of data for a given analyte-matrix pair (site-wide or site-specific) were available. UL18 and LL18 were not calculated for organics in the present report because only five years of organic data (2013 – 2017) are available that incorporate the more sensitive detection limits since the change in analytical laboratory from ALS Edmonton to ALS Burlington in the 2013 Field Year. UL18 and LL18 values for inorganic analytes will be used to represent the 'typical range' of concentrations specific to the local environment for the next three years. These UL18 and LL18 values were also compared to their corresponding UL15 and LL15 values with respect to relative percent difference (RPD).

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

6. RECOMMENDATIONS

The following recommendations are provided with respect to the above observations and conclusions.

6.1 Site Inspections

The following recommendations are provided based on the observations of the most recent site inspection (November 26, 2018):

- Interim cover work has been completed in the northern area of the Site. As such, the former stockpile area and other areas in the north that have periodic standing water are scheduled to be assessed and re-graded to promote drainage.
- Maintenance of the perimeter ditches is required to remove areas where sediment has accumulated and is restricting flow of water. Maintenance of the perimeter ditches is a key component to minimize standing water on the interim cover and promote transfer of water to surface water ponds. It is recommended that perimeter ditch maintenance be undertaken to remove blockages as noted. The maintenance work should minimize the potential for flooding during storm events.
- Portions of the interior side of the perimeter screening berms have significant erosion. These areas should be assessed and corrected to minimize erosion into the perimeter ditches. Installation of reinforced ditches from the top of berm to the perimeter ditches may be a solution for these areas, as well as vegetation of the internal berm slopes.

6.2 Groundwater Monitoring Program

6.2.1 Perimeter Groundwater Monitoring Program

- Redevelop monitoring well TW45-99D to assess if the screen and sandpack can be rehabilitated in 2019.
- Conduct static groundwater level monitoring of OW32-90D, TW22-99D, TW41-99D, TW43-99D, TW45-99D, TW47-00D, TW55-09D, TW56-11D,TW57-11D, TW59-13D, and TW60-13D prior to the spring and fall pre-purging activities to properly assess horizontal and vertical gradients utilizing static water levels.
- Consideration should be given to instrumenting TW60-13 D or TW22-99D with a transducer in order to understand the well recharge patterns and static groundwater conditions within the Interface Aquifer to the west of the northern berm in this area.
- In consideration of pending changes to the Site's surface water management and leachate collection systems, it is recommended that the groundwater monitoring program be rationalized in 2019 to ensure that the Site's environmental performance is properly monitored and reported.

6.2.2 Sub-Cell 3 Remedial Performance Monitoring Program

- Development of a Sub-Cell 3 groundwater remedial system operational and maintenance procedure and developing an inspection checklist to be completed in tandem with groundwater monitoring events.

6.2.3 Performance of Engineered Landfill System

- To properly assess potential changes to leachate conditions over time for the Site, the collection and submission of leachate samples for analytical testing starting in the spring of 2019 from the leachate pumping station is recommended. The analytical data will be used to assess the current state of the leachate within the perimeter leachate collection system, identify potential seasonal variability, and reassess the current leachate indicator parameters. The recommend sampling and analysis plan for leachate samples from the leachate collection system is based on the parameters and frequency of the Active Aquitards sampling and analysis plan.
- Install a water level monitoring station with a pressure transducer within the west surface water pond and incorporate the water level data in the transect assessment. The installation of the transducer should coincide with the proposed amendments to the surface water management system that is currently before the MECP.
- Transducers LCSOW03-15 and LCSOW04-15 should be instrumented at the bottom of these standpipes. The transducer direct read cables for LCSOW01-15, LCSOW03-15, and LCSOW04-15 and the transducers for LCSOW01-15 and the Barometric Pressure Logger should be replaced.
- Transducers should be installed in groundwater monitoring wells TW50-02A/B and TW51-02A/B to continually monitor the horizontal gradient along the southern portion of the Site to assess the effect of the leachate collection sumps PTS-03 and PTS-04 on the Active Aquitard groundwater elevations near the south Site boundary.

6.3 Surface Water Quality Monitoring

- The monitoring programs detailed within this report and completed in accordance with the requirements of the MECP-approved Surface Water Monitoring Program and Surface Water Characterization Program should continue in subsequent years.
- The Clean Harbors Compliance Manager should review the monitoring program requirements with the Clean Harbors sample staff on an annual basis to ensure that the sampling staff understands the surface water program and sample needs. This will ensure that surface water samples are not missed.

6.4 Air Quality Monitoring

The compliance based monitoring programs detailed within the Air Quality Monitoring Report (**Appendix I**) and completed in accordance with the requirements of the ECA should continue in subsequent years. No additional recommendations have been identified at this time.

6.5 Biomonitoring Program

Based on the findings of the report, there are a number of methods of data analysis and reporting that should continue or require change. These methods are outlined below:

- Monitoring of changes in the RDLs during the program should continue and impacts on the results should be reported where applicable.
- When assessing the results for the Biomonitoring Program the greatest weight should be given to comparisons within and between sites monitored in the program versus comparisons with the Table 1 SCS, Ontario ULN and rural parkland OTR98 which are representative of aging databases.
- Discussion of recurring findings should continue annually so that previous discussions are compiled and either confirmed or revised based on new results.

The MECP approved a number of modifications to the Biomonitoring Program to streamline the program and accommodate the Landfill Expansion currently underway at the Lambton Facility. Upon the completion of its review the MECP approved changes to the Biomonitoring Plan outlined in the "Bio-Monitoring Program Lambton Facility, Corunna, Ontario" dated November 26, 2015 and amendments dated September 6, 2016 and April 20, 2017. The MECP letter approving proposed changes is provided
In the Biomonitoring Report (**Appendix J**).

The concentrations of the identified chemicals were generally within the expected range in comparison with baseline levels, with exceptions/qualifications discussed herein. The range of results indicates that the Biomonitoring Program continues to effectively meet its specific objectives of monitoring environmental concentrations and identifying the trends in concentrations over time.