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

2020 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 pre-treatment 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 14 dated November 30, 2020.

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, 2020 to December 31, 2020,** 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

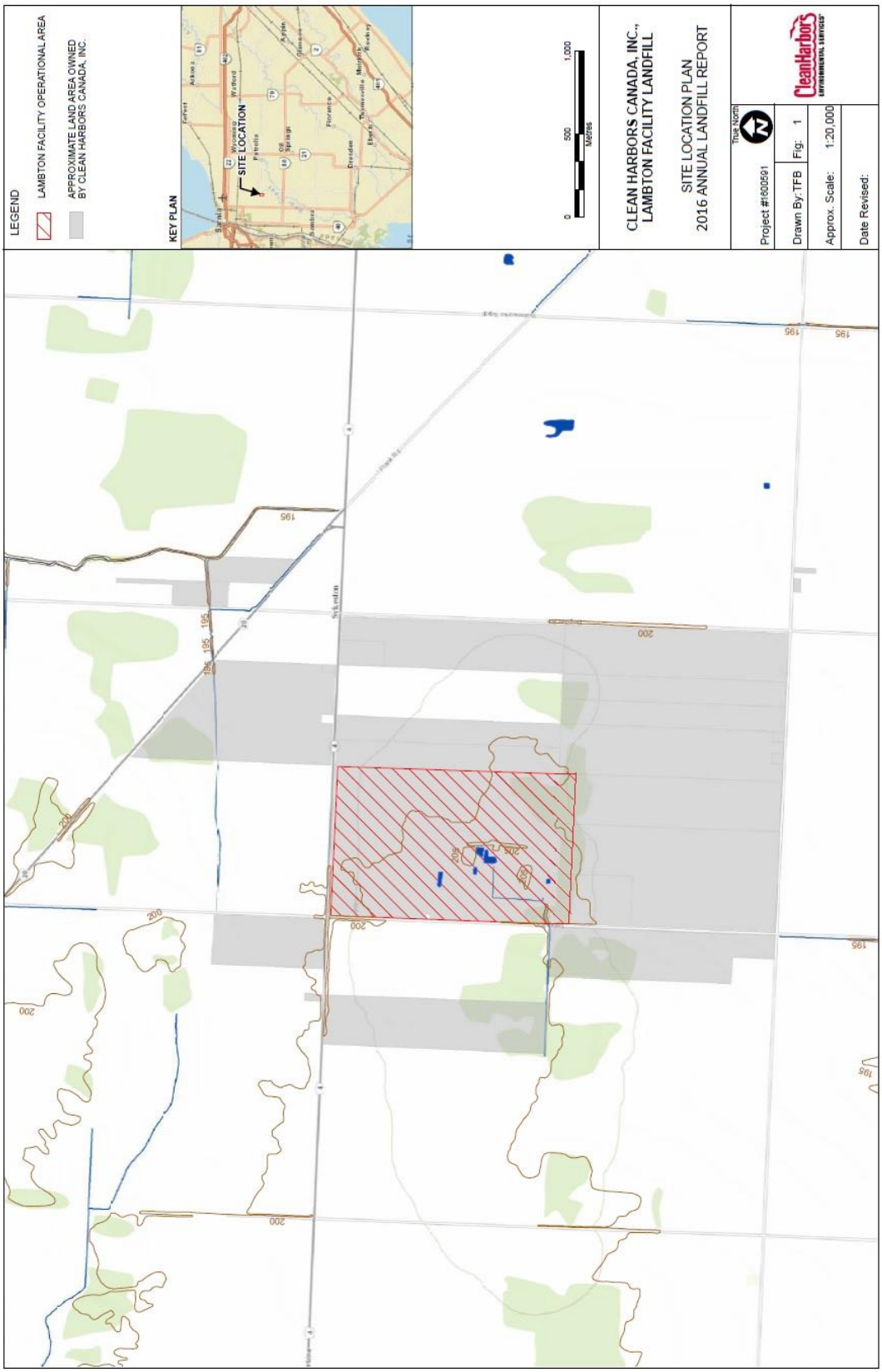


Figure 2. Site Works and Development Plan

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: Previous Year Annual Landfill Report Correspondence	Review comments concerning Clean Harbors previous year Annual Landfill Report and Clean Harbors responses.
Appendix B: Waste Material Codes and Descriptions	Description of material codes applied by Clean Harbors Canada, Inc. to characterize waste streams.
Appendix C: Waste Load Rejection Summary	List of rejected waste loads and basis for rejection.
Appendix D: Community Liaison & Advisory Committee Meeting Minutes	Copy of the minutes from the scheduled Community Liaison & Advisory Committee meetings.
Appendix E: Summary of Quarterly Site Inspection Reports	Summary of quarterly site inspection results undertaken by GHD.
Appendix F: Groundwater Monitoring Report	Technical report prepared by GHD.
Appendix G: Surface Water Quality Monitoring Report	Annual surface water technical report prepared by GHD.
Appendix H: Air Quality Monitoring Report	Technical report prepared by ORTECH Canada Ltd.
Appendix I: Biomonitoring Report	Technical report prepared by Stantec Consulting Limited
Appendix J: EA Annual Report	EA Annual Report

1.4 Review of 2019 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 2019 Annual Landfill Report in May 2020 (regarding the surface water quality monitoring report) and July 2020 (regarding the groundwater monitoring report). A copy of the comments is enclosed in **Appendix A**.

No comments on the 2019 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 MECP on October 19, 2015. Landfill development activities undertaken in 2020 include the following:

- Construction of Sub-Cells of cell 19-3.
- Interim cap placement on Cell 19-2.
- Final cover installation completed on Cell 19-1.
- Extension of perimeter leachate collection trench and installation of leachate pumping well 5.
- Construction of surface water management ponds.
- Decommissioning of old University research wells installed in the construction area of the surface water management pond. The wells had been utilized in the past for University student research purposes which were by then completed. Approval from the MECP Sarnia District Manager was received to decommission the wells, and they were decommissioned in accordance with O.Reg. 903. The following wells were decommissioned as part of the surface water pond construction project:
    - Wells A89-1A to A90-10
    - Wells C89-1 to C89-9
    - Wells CH-1A to CH-7

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

- Construction of Cell 20-1.

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 2020. 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 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 no odour at the residence when they arrived. The Clean Harbors' employees had noticed another neighbor burning material on Rockeby Line, and this odour could be detected about 100 meters from the complainant's residence. No odours from the facility could be detected around the complainant's residence and surrounding area. The odour complaint was found to be unsubstantiated. The complaint was reported forthwith to the Ministry of the Environment, Conservation and Parks.

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.

During 2020 only one in-person meeting was conducted due to the COVID-19 pandemic. In lieu of in-person meetings the facility provided emailed updates to the committee members.

Minutes from the meeting held and copies of the email correspondence during the reporting period are included in **Appendix D**.

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 pre-treatment process (stabilization).

Table 1. Waste Pre-treatment (Stabilization) - January 2020 – December 2020

Month	Waste Class	Weight	Reagent Weights (Tonnes)								Weight Landfilled (Tonnes)
		(Tonnes)	CKD	FA	PC	W	F	D	TSP	FCL	
Jan-20	131T	8.5	0	0	2	1	0	0	0	0	11.5
	146H	16.6	0	0	4	1	1	0	0	0	22.6
	146T	297.2	0	0	38	134	0	0	0	0	469.2
	N/A	1,040.2	0	0	132.2	238.4	18	0	0	0	1,428.8
Feb-20	114H	12	0	0	10	6	0	0	0	0	28
	131T	12.2	0	0	3	1	0	0	0	0	16.2
	146T	256.3	0	0	30.8	111.5	0	0	0	0	398.6
	N/A	617.1	0	0	58.6	142	24.5	0	0	0	842.2
Mar-20	143H	79.9	0	0	15.6	10	1.3	1	0	0	107.8
	146H	13.8	0	0	2.8	0	0.4	0	0	0	17
	146T	282.1	0	0	29.2	125.4	0	0	0	0	436.7
	N/A	992	0	0	207.8	310.7	26.5	0	0	0	1537
Apr-20	143H	111.7	0	0	17.9	14	3	0	0	0	146.6
	146T	348	0	0	48.5	167.4	0.6	0	0	0	564.5
	N/A	1,068.2	0	0	194.3	312	20	0	0	0	1,594.5
May-20	131T	6.4	0	0	1	2	0	0	0	0	9.4
	143H	77.6	0	0	15.6	9	2	0	0	0	104.2
	146H	1	0	0	0.1	0	0.1	0	0	0	1.2
	146T	260.8	0	0	40.8	139.6	0.4	0	0	0	441.6
	N/A	1,202.3	0	0	266.6	352.2	26.6	0	0	0	1,847.7
Jun-20	131H	3.3	0	0	1	1	0	0	0	0	5.3
	143H	79.5	0	0	4	14	0	0	0	0	97.5
	146H	18.1	0	0	1.8	1	0.9	0.7	0	0	22.5
	146T	250.6	0	0	56	75.6	4.2	0.2	0.2	0	386.8

	N/A	948.6	0	0	193.8	251	23.2	0	0	0	1,416.6
Jul-20	131T	7	0	0	1.1	2	0	0	0	0	10.1
	143H	99.6	0	0	11.2	17	2	0	0	0	129.8
	146C	40.1	0	0	15.8	6.5	0	0	0	0	62.4
	146T	217.1	0	0	50.6	32	4.5	0	0	0	304.2
	N/A	836.3	0	0	161.5	211.7	19	0	0	0	1,228.5
Aug-20	143H	12.3	0	0	2.5	2	0.4	0	0	0	17.2
	146C	150.5	0	0	56.8	12	0	0	0	0	219.3
	146T	29	0	0	10.2	13	0	0	0	0	52.2
	N/A	1,044	0	0	153.5	263.1	21.3	0	0	0	1,481.9
Sep-20	131T	5.6	0	0	0.8	1.1	0	0	0	0	7.5
	143H	22.1	0	0	4.4	1	1	0	0	0	28.5
	146C	37.2	0	0	0	16	5	0	0	0	58.2
	N/A	307.8	0	0	53.2	83	7	0	0	0	451
Oct-20	143H	89.3	0	0	16.5	7.5	3.2	0	0	0	116.5
	146C	221.8	0	0	0	112.5	7	0	0	0	341.3
	146T	111.1	0	0	17.5	49	0	0	0	0	177.6
	N/A	1,032.1	0	0	136.9	265.4	17	0	0	0	1,451.4
Nov-20	143H	107.1	0	0	21.3	17	4	0	0	0	149.4
	146T	44.4	0	0	4.5	27	0	0	0	0	75.9
	N/A	835.4	0	0	109.4	220	9	0	0	0	1,173.8
Dec-20	146C	41.1	0	0	0	15	5	0	0	0	61.1
	146H	5.9	0	0	0.6	1	0.3	0	0	0	7.8
	146T	98.3	0	0	16.5	32	0	0	0	0	146.8
	N/A	836.6	0	0	148.8	246.5	16	0	0	0	1,247.9

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 2020 – December 2020

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2020	0	Jul 2020	20.5
Feb 2020	2.1	Aug 2020	0
Mar 2020	19.7	Sep 2020	0
Apr 2020	2.1	Oct 2020	30.6
May 2020	16.5	Nov 2020	14.7
Jun 2020	0	Dec 2020	85.5

Table 3. Waste Pre-treatment (Macro-encapsulation) – January 2020 – December 2020

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2020	310.2	Jul 2020	358.0
Feb 2020	447.9	Aug 2020	232.7
Mar 2020	368.3	Sep 2020	303.5
Apr 2020	69.9	Oct 2020	300.1
May 2020	23.7	Nov 2020	224.3
Jun 2020	234.6	Dec 2020	1,148.1

Table 4. Waste Processed at the TDU – January 2020 – December 2020

Month	Waste Processed (tonnes)	Month	Waste Processed (tonnes)
Jan 2020	1,630	Jul 2020	781
Feb 2020	846	Aug 2020	2,017
Mar 2020	1,916	Sep 2020	1,317
Apr 2020	1,330	Oct 2020	1,420
May 2020	1,278	Nov 2020	855
Jun 2020	1,252	Dec 2020	1,828

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 B**.

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, 2020 through to December 31, 2020, Clean Harbors Lambton Facility received 78,442 tonnes of solid waste, not including 5,205 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	13	7	0	6	14	0	7	0	6	13	7	0	73
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	172	255	46	0	0	0	0	0	0	118	0	591
CBP	355	671	263	808	796	124	253	485	90	117	217	197	4,376
CBPR	0	0	108	379	0	0	307	0	0	0	0	0	794
CBPS	0	2	0	2	0	0	1	0	0	4	0	1	10
CCRT	174	384	123	169	120	298	141	159	253	375	376	253	2,825
CCS	292	258	384	405	368	349	264	45	102	260	172	102	3,001
CCSF	0	0	0	0	0	0	0	0	0	0	0	0	0
CCSM	214	185	147	21	14	118	241	158	161	174	159	72	1,664
CCSMA	1,797	1,868	2,011	1,387	876	937	1,614	1,483	1,682	2,430	2,703	2,884	21,672
CCSS	0	0	0	0	0	0	9	0	0	0	0	0	9
CNIA	133	0	0	0	106	0	0	9	4	0	0	5	257
CNO	514	366	555	386	501	682	578	557	675	616	619	515	6,564
TOTAL	3,492	3,913	3,846	3,609	2,795	2,508	3,415	2,896	2,973	3,989	4,371	4,029	41,836

Table 7 and **Table 8**.

Table 5. Waste Quantity (tonnes) by Waste Types, January 1, 2020 to December 31, 2020

Clean Harbors Waste Codes	Generator Location			
	Ontario	Other Provinces	United States	Total
CA1 & CA2	73	0	82	155
CANL	0	5,409	0	5,409
CATRI & CATRN	591	36	8	635
CBP	4,376	1,264	690	6,330
CBPR	794	6,530	750	8,074
CBPS	10	0	172	182
CCRT	2,825	0	10,501	13,326
CCS	3,001	73	1,269	4,343
CCSF	0	0	294	294
CCSM	1,664	117	493	2,274
CCSMA	21,672	7,077	386	29,135
CCSS	9	0	7	16
CNIA	257	29	3	289
CNO	6,564	1,383	33	7,980
Incinerator ash	5,205	0	0	5,205
TOTAL	47,041	21,918	14,688	83,647
Percent of Total	56.2%	26.2%	17.6%	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	13	7	0	6	14	0	7	0	6	13	7	0	73
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	172	255	46	0	0	0	0	0	0	118	0	591
CBP	355	671	263	808	796	124	253	485	90	117	217	197	4,376
CBPR	0	0	108	379	0	0	307	0	0	0	0	0	794
CBPS	0	2	0	2	0	0	1	0	0	4	0	1	10
CCRT	174	384	123	169	120	298	141	159	253	375	376	253	2,825
CCS	292	258	384	405	368	349	264	45	102	260	172	102	3,001
CCSF	0	0	0	0	0	0	0	0	0	0	0	0	0
CCSM	214	185	147	21	14	118	241	158	161	174	159	72	1,664
CCSMA	1,797	1,868	2,011	1,387	876	937	1,614	1,483	1,682	2,430	2,703	2,884	21,672
CCSS	0	0	0	0	0	0	9	0	0	0	0	0	9
CNIA	133	0	0	0	106	0	0	9	4	0	0	5	257
CNO	514	366	555	386	501	682	578	557	675	616	619	515	6,564
TOTAL	3,492	3,913	3,846	3,609	2,795	2,508	3,415	2,896	2,973	3,989	4,371	4,029	41,836

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	0	0	0	0	0	0	0	0	0	0	0	0	0
CANL	0	0	0	0	0	24	100	696	1,441	1,564	1,066	518	5,409
CATR	0	0	0	29	7	0	0	0	0	0	0	0	36
CBP	33	3	0	0	25	535	37	558	38	35	0	0	1,264
CBPR	0	7	0	0	0	14	0	433	2,523	3,108	445	0	6,530
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	29	0	0	0	15	0	0	29	0	0	0	73
CCSF	0	0	0	0	0	0	0	0	0	0	0	0	0
CCSM	12	16	0	1	9	50	3	0	19	0	7	0	117
CCSMA	695	423	706	554	424	582	544	462	578	580	811	718	7,077
CCSS	0	0	0	0	0	0	0	0	0	0	0	0	0
CNIA	0	23	0	0	0	0	0	6	0	0	0	0	29
CNO	83	69	16	91	314	19	193	233	163	68	41	93	1,383
TOTAL	823	570	722	675	779	1,239	877	2,388	4,791	5,355	2,370	1,329	21,918

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	7	7	0	0	15	0	13	0	14	12	14	0	82
CANL	0	0	0	0	0	0	0	0	0	0	0	0	0
CATR	0	0	8	0	0	0	0	0	0	0	0	0	8
CBP	0	0	0	0	0	0	0	0	17	275	316	82	690
CBPR	45	77	57	86	46	16	61	70	24	93	117	58	750
CBPS	0	0	46	0	16	0	11	0	0	30	0	69	172
CCRT	1,515	1,124	438	798	720	1,018	625	794	966	715	744	1,044	10,501
CCS	15	19	94	0	11	50	65	147	206	180	217	265	1,269
CCSF	43	34	46	17	25	28	36	47	2	0	12	4	294
CCSM	29	12	27	21	14	62	93	38	32	122	34	9	493
CCSMA	51	2	36	40	15	19	43	41	72	5	18	44	386
CCSS	0	0	0	0	0	0	0	0	0	0	0	7	7
CNIA	0	0	0	0	0	0	0	0	0	0	0	3	3
CNO	12	0	0	0	0	0	0	0	0	0	0	21	33
TOTAL	1,717	1,275	752	962	862	1,193	947	1,137	1,333	1,432	1,472	1,606	14,688

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	41,836	53.3
Other Provinces	21,918	27.9
United States	14,688	18.7
Total	**78,442**	**100**

During the reporting period, the maximum daily quantity of waste received for pretreatment and landfilling was 720 tonnes on October 29, 2020.

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, 2020, the remaining capacity of landfill was 3,545,070 m^3 (324,930 m^3 or 8.4% of capacity used).

Based on current projections using 2020 volumes, the landfill expansion is expected to have a site life of 42 years.

3.4 Waste Load Rejection Summary

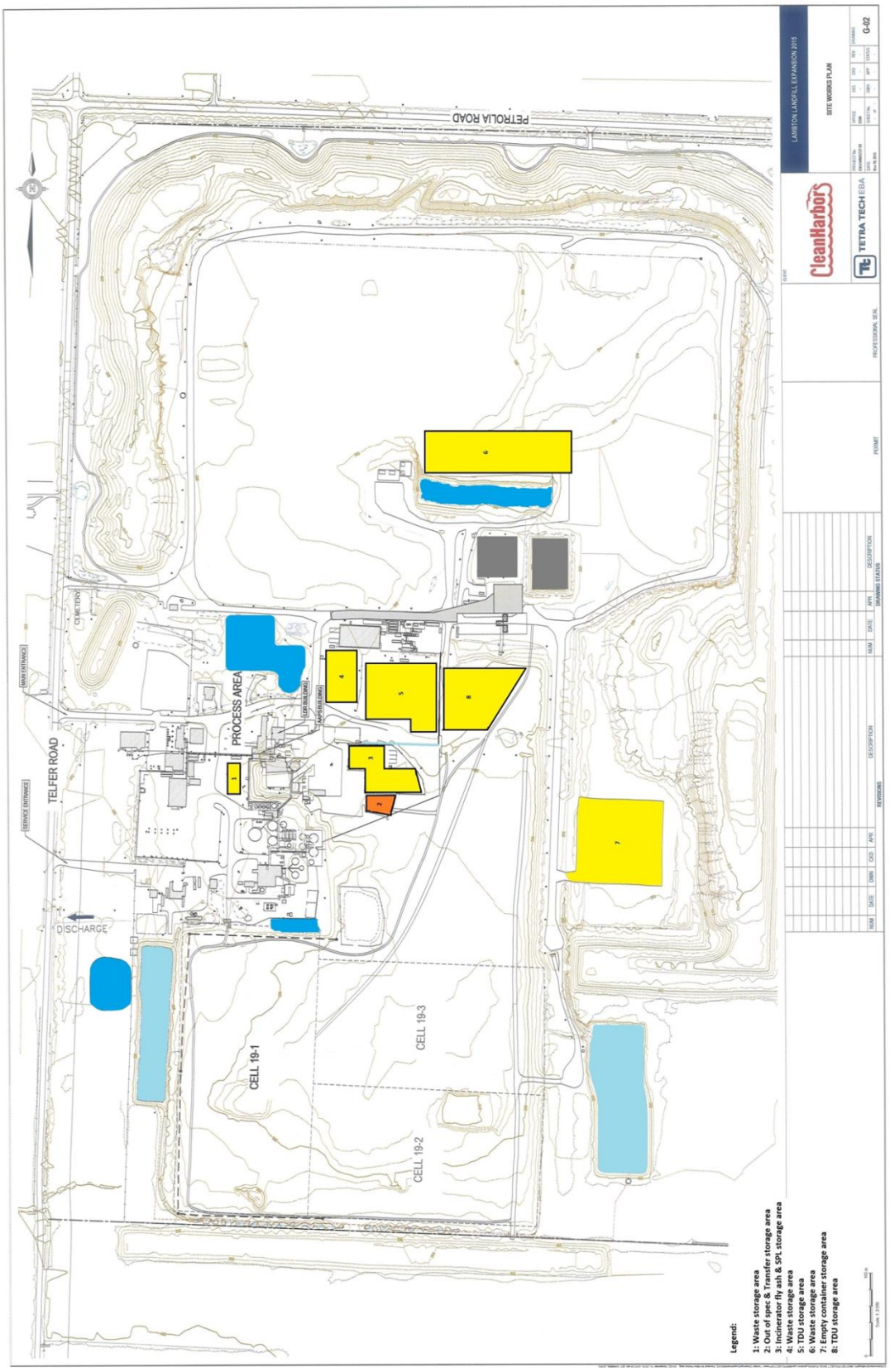
Clean Harbors Canada, Inc. is required under Condition 15 (b) (xiv) of the ECA to provide the MECP with a list of all rejected waste loads (i.e., vehicle shipments) together with the reasons for rejection.

During the reporting period covered by this report, 29 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 – three (3) loads
- Failed TVO – twelve (12) loads
- Non-Conforming – fourteen (14) loads

A summary of all waste loads rejected and related reasoning is presented in **Appendix B**. 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 2020 – March 16, 2020
Second Quarter 2020 – June 5, 2020
Third Quarter 2020 – September 16, 2020
Fourth Quarter 2020 – November 23, 2020

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 E**.

4.1.1 Cell Development

4.1.1.1 Construction Activities

Landfilling activities occurred within Cell 19-2B. Interim cap was placed on cell 19-2 in 2020. Construction of cell 19-3 occurred in 2020. Installation of the final cover on cell 19-1 was initiated in 2019 and was completed in 2020.

In 2020 the perimeter leachate collection trench was extended along the east side of cell 19-2, and leachate pumping well was installed.

During 2020 surface water management ponds were constructed along the south side of the facility.

Re-grading of the northern portion of the facility was conducted in 2020, to reduce the pooling of rainwater in the area and promote drainage to the perimeter ditches.

4.1.1.2 Landfill Cell Advancement

Landfilling activities occurred within cell 19-2 during the reporting year. Waste placement within cell 19-3 commenced towards the end of the fourth quarter of the reporting year.

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 E**. 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. Interim cap cover was installed over the majority of Cell 19-2 in 2020, with the exception of cells 19-2D and 19-2G.

The interim cap was observed to be in good condition throughout the reporting period, with some noted minor erosion channels. Minor ponding in several areas of the northern portion of the facility received grading improvements in 2020 to promote drainage to the perimeter ditches.

Final cover installation over Cell 19-1 was completed and vegetated 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 until early 2020 of two surface water ponds located in the East and West portions of the site. The construction of the revised surface water management system commenced in 2020 and was completed by October 30, 2020. The revised surface water management system is shown on Figure 2. 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.

Water levels within the equalization pond were 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 E**.

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 E**.

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 E**.

5. ENVIRONMENTAL MONITORING

5.1 Groundwater and Landfill Performance Monitoring Program

The 2020 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 2020 Annual Monitoring Program report is appended (**Appendix F**). 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 F** 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 2020 groundwater monitoring and sampling events completed, the following conclusions are presented:

Perimeter 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, chloride, sulfate, and/or sodium. Interface Aquifer wells also had exceedances for iron, barium, and benzene. These exceedances are likely attributed to characteristics of the local geology and are not likely resultant of landfill impacts. These exceedances are consistent with historical monitoring results.
- Active Aquitard samples exceeded the PWQO for boron, chromium, and nickel. Concentrations were generally consistent with historical results.
- Active Aquitard samples exceeded the RUC for sulfate and fluoride. Interface Aquifer samples exceeded the RUC for fluoride, barium, and boron. These exceedances are consistent with historical monitoring 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

- Upward gradients from the Interface Aquifer to the HCL within Sub-Cell 3 were not maintained throughout all of 2020. During certain times in 2020, water levels within the HCL increased due to operational issues with the system. Accordingly, Sub-Cell 3 groundwater extraction system was not operating as intended in portions of 2020. The water levels decreased after Clean Harbors performed maintenance work on the Sub-Cell 3 groundwater extraction system.
- 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 does not appear to be infiltrating the HCL.

Performance of Engineered Landfill System

- Groundwater and Leachate elevations indicated that an inward gradient towards the LCS was not maintained during three brief periods in early 2020 due to operational

issues with the LCS. Clean Harbors re-established normal operations with the LCS in March 2020. An inward gradient was maintained through the rest of 2020.

- Groundwater quality within the Active Aquifer appeared to be unaffected by the high water levels within the LCS in early 2020.

The groundwater monitoring data is provided in **Appendix F**.

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 MECP 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 2020, 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 G**.

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

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

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.

- Total phenolics – during Periods 1 and 2
- Phosphorus – during Periods 1 and 2
- Aluminum – during Periods 1, 2 and 3
- Iron – during Periods 1 and 3
- Molybdenum – during Periods 1, 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. No samples were collected from STN6 and/or STN6A during the reporting period. The spring discharge period was shorter than expected due to dry conditions on-Site. Dry conditions persisted into fall 2020, and as such, there was no discharge from the Site after June 2, 2020.

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

5.2.3 Toxicity Testing

Toxicity testing of the Equalization Pond was completed four 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 G**.

5.2.4 Visual Observation

Quarterly visual Site inspections were undertaken by GHD on March 16, June 5, September 16, and November 23, 2020 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 during the first inspection and low during the fourth inspection. The status of the water levels during the second and third quarterly inspections was not noted. 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

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. No samples were collected from STN6 and/or STN6A during the reporting period. The spring discharge period was shorter than expected due

to dry conditions on-Site. Dry conditions persisted into fall 2020, and as such, there was no discharge from the Site after June 2, 2020.

5.2.6 Surface Water Characterization

Supplementary monitoring of the East and West Ponds for general chemistry, metals, VOCs, and SVOCs was undertaken on January 13, February 17, and April 13, 2020. The East Pond was also sampled on June 1, 2020. The West Pond was not sampled on June 1, 2020 since the pond had been dewatered for construction of the new surface water pond. Note, the sampling of the East and West Ponds will eventually be replaced by sampling Ponds A and D, respectively, under the revised stormwater management system. Comparison of the on-site surface water data indicates that the surface water quality is the same or slightly 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 G**.

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 thirteen 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 May through September 2020. 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, one set of particulate samples was collected on a different day. Combined, the total of fourteen (14) sample days resulted in thirteen (13) sets of VOC and Particulate samples. Four sample sets of speciated carbonyls and airborne mercury were collected; one in each of June, July, August, and September. The levels of all compounds measured were compared with any applicable 24-hour limits found in the MECP's ACB or Ontario's AAQCs.

Meteorological data indicated that five of the fourteen 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 carbon tetrachloride at 1.6 µg/m3 (67%of the 2.3 µg/m3 24-hour AAQC), on September 12th in equal concentration at both monitors under

predominantly ESE winds. The wind direction and similarity of the results at both monitors would seem to indicate an offsite source for this contaminant on that day. Benzene, which has historically been the contaminant present at the highest percentage of an available limit, was observed at a maximum concentration of 0.86 µg/m3 (37% of the 2.3 µg/m3 limit) on July 14th at the North monitor under predominantly SSE winds. 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 14%.

Of the speciated carbonyl measurements, only formaldehyde was detected, and was detected in only one sample at the North monitor at a concentration of 64 µg/m3 (99% of the 24-hour limit of 65 µg/m3) on August 7th under predominantly NE winds. The wind direction as well as the south monitor not detecting any Formaldehyde on that day would seem to indicate an offsite source.

Particulate mercury was measured in small quantities, while vapour mercury was not detected in any of the samples. The highest total mercury concentration was measured at 1.3% of the applicable limit.

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

5.4 Biomonitoring Program

In 1991, Laidlaw Environmental Services Inc. initiated an annual Biomonitoring Program near their hazardous waste landfill and liquid-injection incinerator (the Lambton Facility) located on Lot 9, Concession 10, St. Clair Township in Lambton County, Ontario. The Lambton Facility is a hazardous waste management complex which includes a high temperature incinerator and a secure landfill and is currently owned and operated by Clean Harbors Canada Inc. (Clean Harbors).

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. The locations of test Sites were selected based on wind directions at the Lambton Facility. In 2015, the test Sites were evaluated based on a wind rose generated using meteorological data collected from the Lambton Facility from July 2015 to June 2015. The wind rose indicated that the dominant wind direction came from the south and southwest and blew to lesser degree from the north and west. Sites N2, N4 and N5 in the north and Sites E1, E2, E5 in the east of the Lambton Facility were situated in the maximum deposition areas to the north and east of the Lambton incinerator. Site E6 was established within the Lambton Facility perimeter, east of the incinerator. Sites S1, S2 and S4 were situated to the south of the Lambton Facility to cover potential deposition areas due to the wind blowing to a lesser degree from the north of the Lambton incinerator. Sites W2 and W4 were situated in locations opposite from the predominant

wind directions. In the 2019 Field Year, a new Site E7 was added to the northeast of the Lambton Facility based on dominant wind direction towards the northeast of the incinerator.

The annual Biomonitoring Program includes the collection of samples from up to four environmental media (soil, drainage ditch sediment, natural vegetation and agricultural crops) from each Site which are submitted to the analytical laboratory to determine the concentration of selected metals, pesticides, chlorinated phenols, and dioxins and furans. For the 2019 Field Year, a total of 13 test Sites were monitored.

The review and comparison of the 2019 data relative to the upper control limits (UL18)1 for each Site and on a Site-wide basis was completed for inorganic analytes present in soil, sediment, natural grasses and fresh corn samples collected at the sites. The concentrations of 16 inorganic analytes (13 Group 12 analytes (i.e., boron, calcium, chloride, cobalt, magnesium, manganese, molybdenum, nickel, phosphorus, potassium, silicon, strontium and sulfur) and three Group 2 analytes3 (i.e., cadmium, lead and zinc)) exceeded their respective Site-specific UL18 while two Group 1 analytes (i.e., magnesium and phosphorus) and two Group 2 analytes (i.e., cadmium and lead) exceeded the Site-wide UL18.

Within the 13 Group 1 analytes which exceeded the Site-specific UL18, the concentrations of one Group 1 analyte (i.e., sulfur) in soil collected in 2019 exceeded the Ontario Typical Range for Rural Parkland Soil (OTR98) (Ministry of Environment, Conservation and Parks (MECP), 2011). Concentrations of one Group 1 analyte (i.e., manganese) 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.

Within the 3 Group 2 analytes which exceeded their respective Site-specific UL18, the concentrations of two analytes (i.e., cadmium and zinc) in natural grasses exceeded the Upper Limit Normal (ULN) whereas concentrations of one analyte (i.e., cadmium) in soybeans and one analyte (i.e., lead) in natural grasses only exceeded the Site-specific UL18. The concentrations of Group 2 analytes in soil collected in 2019 were below the Site-specific UL18 and the Ontario Regulation (O. Reg). 153/04 Table 1 Site Condition Standards (SCS). The concentration of Group 2 analytes in sediment were below the Site-specific UL18 but exceeded the O.Reg. 153/04 Table 1 SCS. 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 2019 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.

Individual compounds of Dioxins/furans (PCDD/DF) were reported at concentrations greater than the OTR98, however, concentrations of total PCD/DF were reported below the Table 1 SCS in the 2019 Field Year. No criteria were available for comparison of PCDD/DF concentrations in natural grasses. Monitoring should continue but no additional investigation is proposed.

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