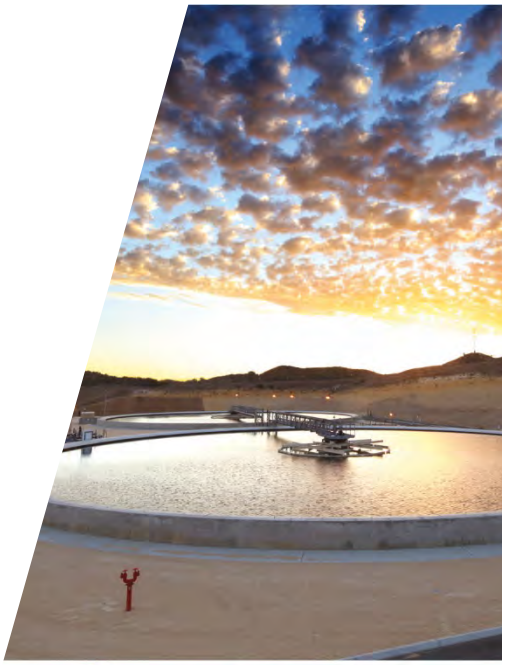


2019 Quarterly Site Inspections

Clean Harbors Lambton Facility
4090 Telfer Road, Corunna, Ontario

Clean Harbors Canada, Inc.

Executive Summary

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report and Environmental Compliance Approval No. A031806, GHD conducted quarterly Site Inspections of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario during 2019. The individual 2019 inspection reports are provided in Appendices A through D.

Appendix Index

- Appendix A: 2019 First Quarter Site Inspection
- Appendix B: 2019 Second Quarter Site Inspection
- Appendix C: 2019 Third Quarter Site Inspection
- Appendix D: 2019 Fourth Quarter Site Inspection

Appendices

Appendix A
2019 First Quarter Site Inspection

Memorandum

April 3, 2019

To:	Erica Carabott/Clean Harbors Mike Parker/Clean Harbors	Ref. No.:	044985
From:	Jim Yardley/Neil Shannick/mg/53	Tel:	519-340-4265

Subject: **2019 First Quarter Site Inspection**

1. Introduction

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report, GHD conducted the 2019 first quarter Site Inspection (Inspection) of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario. The Inspection was conducted on March 20, 2019 by Neil Shannick.

The Inspection consisted of a walk around the Site. The Inspection focused primarily on the active landfill and waste disposal operations, including an inspection of each of the surface water, leachate, and process water ponds.

1.1 Weather and Site Conditions

At the time of the Inspection, the temperature was 0°C. Weather conditions at the Site were a mixture of sun and cloud. The wind was blowing from south to north. During the week preceding the Inspection, the Site experienced 9.5 mm of total precipitation, and a mean temperature of 2.8°C. During the Inspection, the Site was very wet. Standing water was noted in low, flat areas and high water levels were noted in the majority of ditches and ponds. Figure 1 provides a Site plan showing features referenced herein, as well as any notes related to specific issues noted in this memorandum. Figure 2 provides the Landfill Expansion Subcell Fill Progression Plan, identifying the cell locations, as presented in the "*Design and Operations Report - Lambton Landfill Expansion, Clean Harbors Canada, Inc.*", as prepared by Tetra Tech WEI Inc., dated October 8, 2015.

2. Landfill Operations

The Inspection was focused on landfill and waste disposal operations including Cell development, active disposal, waste hauling, and landfill capping efforts.

2.1 Landfill Cell Development

The following provides a description of the status of the Landfill Cell Development, including active waste disposal operations and internal waste transport routes:

- The active waste tipping face is located in Cell 19-2A. Waste placement is generally occurring from north to south, as shown in Photo 1. Odour was noted in the immediate vicinity of the active landfilling area.
- Construction of Cell 19-2A is complete, with tie-in to previously landfilled area at higher elevation.
- Waste Transport Route: Site waste haulers are directed around the east side of the Process Area and enter Cell 19-2A from the east side, located at the centrally within the active landfilling area, on a dedicated haul road from the Waste Receiving Area.

2.2 Landfill Cap

The following provides a description of the status of the Landfill Cap, including cap placement during the first quarter, and the condition of the interim and final cap. With the recent approval of the vertical expansion, the previous capped areas are considered to be interim, since a portion of the cap will be removed and additional waste placed in these areas.

2.2.1 Interim and Final Cap Placement in Quarter

- The majority of the Site has received an interim cap, with the exception of the active landfilling area (Cell 19-2A).
- Cell 19-1 has received interim cap, as shown in Photo 2.

2.2.2 Interim Cap Conditions

- The interim cap was noted to be in good condition, with minor erosion channels observed.
- Interim cover material is available for placement on Cell 19-2A, currently stockpiled on Cell 19-1-3.
- Large areas of standing water were identified in several areas as described in Section 4. The interim cap requires minor grading to promote drainage to the perimeter ditches from these areas.
- Erosion channels should be addressed through additional clay placement and grading.

2.2.3 Final Cap Conditions

- Per Environmental Compliance Approval No. A031806, Notice No. 9 (dated October 19, 2015), no areas of the Site are considered to have received final capping. Per approval of the landfill expansion, all areas, as noted in Section 2.2.1, are considered to have received interim capping at this time.
- No areas have received topsoil. Natural vegetation is present in the northeast and southern (non-active) portions of the Site.

3. Perimeter Screening Berms

The following provides a description of the status of the Perimeter Screening Berms:

- Significant berm erosion was identified immediately west of proposed Cell 21-1. The erosion occurred on the landfill side of the berm, as identified on Figure 1 (previously identified in quarterly reports).
- Multiple larger erosion channels were identified on the landfill side of the north perimeter screening berm, as identified on Figure 1 (previously identified in quarterly reports).
- Minor erosion channels were noted throughout the Perimeter Screening Berms. These channels are prevalent throughout the un-vegetated internal sidewalls of the western and eastern perimeter screening berms.
- Several large erosion channels were noted on the elevated areas immediately northwest and southeast of the northern portion of the landfill. The erosion channels are located on plateaus/ramps within the screening berm. The erosion channels in the southeast corner extends into the east perimeter ditch.
- Note that all erosion channels within the Perimeter Screening Berms are on the internal sidewalls. The external sidewalls are in good condition and vegetated. As such, erosion channels do not create any external issues. The issue related to internal erosion is potential sedimentation of the perimeter ditches.

4. Surface Water Management System

The following provides a description of the status of the Surface Water Management System, including the ditches, swales, and surface water ponds.

4.1 Ditches and Swales

The following provides a description of the status of the surface water ditches and swales:

- Shallow standing water was identified within the southwest corner of the Original Landfill Area (OLA).
- Water levels were very high within the southern perimeter ditch of the OLA, with a portion covered by ice. Pumping was not active during the Inspection.
- A large area of standing water was identified within the northwest corner of the OLA, as shown on Figure 1 and Photo 3. The area has been graded to drain to the north ditch with an internal swale. The internal swale was full, with no observed flow during the Inspection.
- A large area of standing water was noted in the northwest portion of proposed Cell 21-3 (i.e., located centrally in the northern portion of the Site), as shown in Photo 4. The two drainage paths were under water during the Inspection, with no observed flow.
- Water levels continue to be high in the central portion of the north ditch, nearly full and covered with ice, as shown in Photo 5. High water levels in the north ditch have the potential to prohibit surface drainage from the OLA during wetter periods.

- There was minimal standing water in the perimeter ditch in the northeast corner of the Site (i.e., at the location of the former perimeter screening berm access road).
- Flow from the north ditch to the eastern ditch is impeded by sedimentation in the northeast corner of the Site, likely brought on by dense wetland vegetation within the ditch and sedimentation, as shown in Photo 6 and Figure 1.
- Sedimentation is occurring in the east ditch as a result of erosion of the perimeter screening berm, along the entire length of the OLA, resulting in fluctuations in grade and flow breaks. Erosion channels range from minor to large. Standing water was observed along the entire length of the ditch, with limited flow observed.
- Significant erosion was identified in the southeast corner of the OLA, resulting in sedimentation of the perimeter ditch and limited water flow, as shown in Photo 7 and Figure 1. Water levels were sufficient to overtop the sedimentation, resulting in limited flow. Standing water was observed in the internal swale and low-lying area to the north, as shown in Photo 8 and Figure 1.
- It was noted during previous Inspections that there was limited elevation difference available within the northeast corner of the perimeter ditch. As such, there is minimal ability to lower the base of ditch and maintain flow to the East Surface Water Pond.
- Moderate water levels were noted in the east perimeter ditch between the OLA and the Clean Bin Storage Area. Water levels were very high further south toward the East Surface Water Pond, extending laterally into low lying areas, including the west end of the soil borrow area.
- The previously noted flow break in the south ditch (the result of wildlife activity - specifically beavers), located at the Gate 6 access bridge, has been removed. Sedimentation remains beneath the bridge. As shown in Photo 9, water levels were low to moderate, with limited observed flow, primarily due to ice cover east of the bridge.
- Higher water levels were identified in the central portion of the south ditch with ice cover. Sedimentation and accumulation of loose vegetation in the southwest corner of the perimeter ditch remains in place, impeding flow of water toward the West Surface Water Pond. A clear picture of the blockage could not be obtained due to dense vegetation.
- A previously identified seep in the southern portion of future Cell 19-2 was observed during the Inspection, outside of the active landfilling area. The seep contained orange and black staining and was observed. Cell construction is complete within this area, containing this liquid within the landfill.

4.2 East Surface Water Pond

The following provides a description of the status of the East Surface Water Pond (Photo 10):

- Water levels within the East Surface Water Pond were very high.
- No flow was observed entering the East Surface Water Pond due to ice cover.
- The pump at the East Surface Water Pond was not in operation at the time of Inspection.

4.3 West Surface Water Pond

The following provides a description of the status of the West Surface Water Pond (Photo 11):

- Water levels within the West Surface Water Pond were moderate to high, with the majority of the pond covered by ice.
- No flow was observed entering the West Surface Water Pond.
- The pump at the West Surface Water Pond was in operation at the time of Inspection.

4.4 Equalization Pond

The following provides a description of the status of the Equalization Pond (Photo 12):

- Water levels within the Equalization Pond were moderate to high. Flow was not observed entering the Equalization Pond at the time of Inspection.
- Cracking and sloughing of the concrete side walls of the Equalization Pond was observed during the Inspection.
- Fish were not observed within the Equalization Pond.

5. Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. The North Process Water Pond is located immediately west of the TDU area, the South Process Water Pond is located immediately south of the Incinerator, and the West Process Water Pond is located adjacent to the West Surface Water Pond. Water retained in the Process Water Management System is used as quench water for Site incineration operations.

5.1 Process Water Ditches and Swales

The following provides a description of the status of the process water ditches and swales:

- The process water ditch adjacent to the TDU area exhibited a high water level at the time of Inspection. This ditch was not being pumped at the time of Inspection. Erosion channels previously observed immediately to the west, along the shoulder of the Landfill Container Compound access road, appear to have been repaired.
- High water levels were noted in the ditches adjacent to the Household Hazardous Waste Depot. The ditches feeding the North Process Water Pond directly exhibited moderate water levels, as shown in Photo 13. Prior inspections identified sedimentation and culvert damage in these ditches, impeding flow and resulting in standing water within the ditches. It is recommended that sediment be removed and culvert(s) be repaired as necessary to promote drainage.
- Moderate water levels were observed in the small ditches near the South Process Water Pond at the time of the Inspection.

5.2 North Process Water Pond

The following provides a description of the status of the North Process Water Pond (Photo 14):

- The water level within the North Process Water Pond was high, level with the base of the inlet ditch.
- The pump at the North Process Water Pond was running at the time of the Inspection.
- During previous inspections, a significant washout was observed in the southeast corner of the North Process Water Pond. This washout was not visible at the time of inspection, due to high water levels.

5.3 South Process Water Pond

The following provides a description of the status of the South Process Water Pond (Photo 15):

- The water level within the South Process Water Pond was medium to low.
- The South Process Water Pond also receives runoff from east of the active landfill area. No standing or flowing water was observed in this area during the inspection.

5.4 West Process Water Pond

The following provides a description of the status of the West Process Water Pond, which is used for process water storage:

- The water level within the West Process Water Pond was moderate to high, mostly covered by ice.

6. 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.

6.1 South Leachate Reservoir

The following provides a description of the status of the South Leachate Reservoir (Photo 16):

- The South Leachate Reservoir is equipped with a permanent floating cover. The South Reservoir is currently being used for leachate storage, with leachate pumped from the New Leachate Reservoir. The South Leachate Reservoir was full.
- Clean Harbors maintains a record of the volume of leachate within the South Leachate Reservoir.

6.2 East Leachate Reservoir

The following provides a description of the status of the East Leachate Reservoir (Photo 17):

- The East Leachate Reservoir is equipped with a permanent floating cover. The East Reservoir is currently being used for leachate storage, but is not currently actively receiving leachate. The East Reservoir was full.
- Clean Harbors maintains a record of the volume of leachate within the East Leachate Reservoir.

6.3 New Leachate Reservoir

The following provides a description of the status of the New Leachate Reservoir (Photo 18):

- The new Leachate Reservoir has been constructed immediately east of the East Leachate Reservoir and is equipped with a permanent floating cover. The new Leachate Reservoir is currently operational and is being used for leachate storage, based on observation of the cover. Leachate is being pumped from this Reservoir to the South Leachate Reservoir as required. The new Leachate Reservoir is full.
- Clean Harbors maintains a record of the volume of leachate within the New Leachate Reservoir.
- The pump at adjacent Leachate Building No. 3 appeared to be in operation at the time of the inspection.

6.4 Leachate Storage Tank and Pumping System

The following provides a description of the status of the Leachate Storage Tank and Pumping System:

- The Leachate Storage Tank is in operation, serving as the feed tank to the incinerator.

7. Waste Processing Operations

The following provides a description of the Waste Processing Operations:

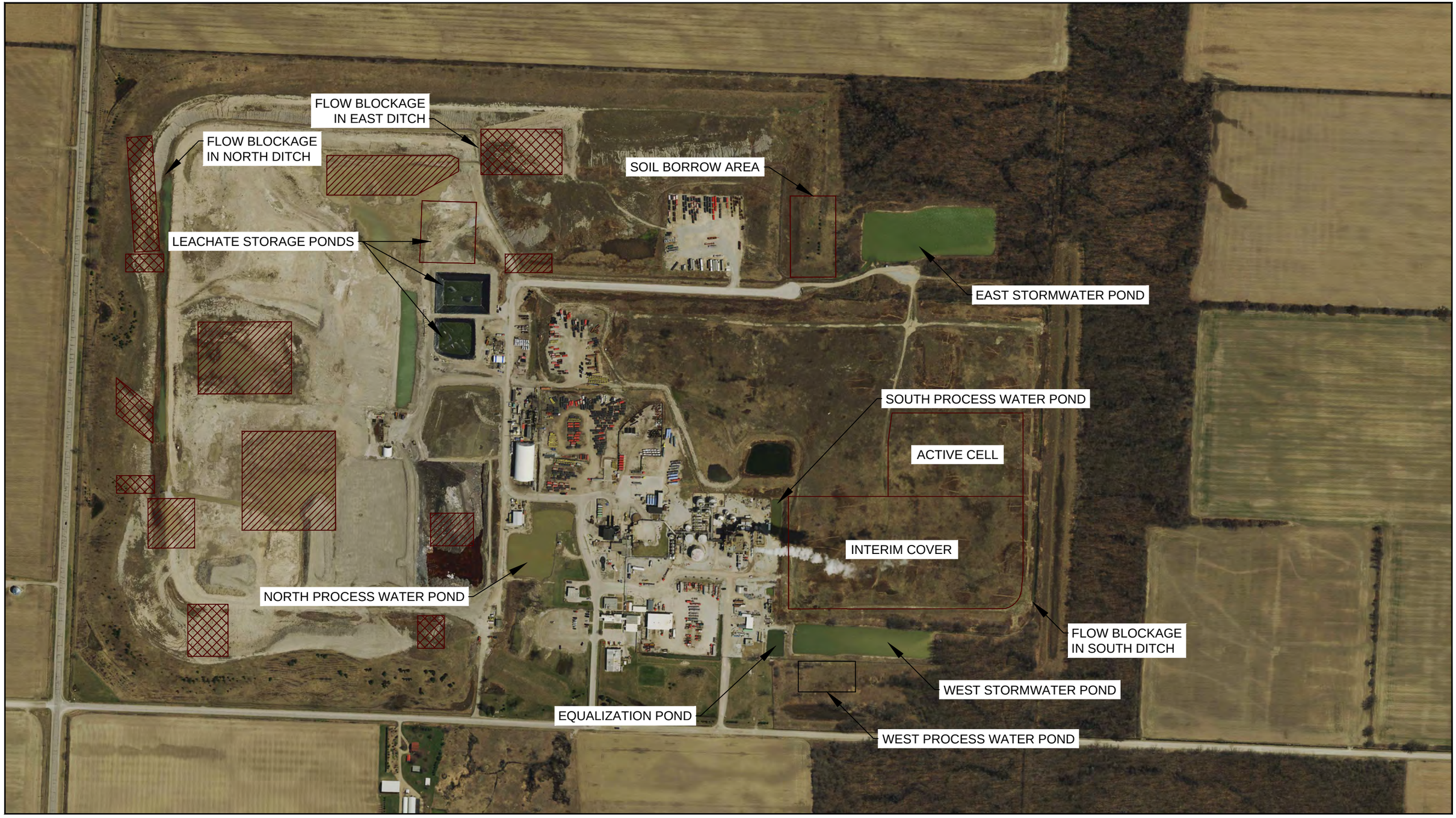
- Odour was noted in the vicinity of the incinerator and the active landfilling operations in Cell 19-2A, likely originating from the active landfilling area.
- A slight odour was noted within the TDU area and immediately north of the leachate reservoirs.
- Identified odours were not identified beyond Site boundaries.

8. Conclusions and Recommendations

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.



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LEGEND:

LARGE EROSION CHANNELS

LARGE AREAS OF STANDING WATER

LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2019 FIRST QUARTER SITE INSPECTION

SITE PLAN

44985-16

MAR 28, 2019

FIGURE 1

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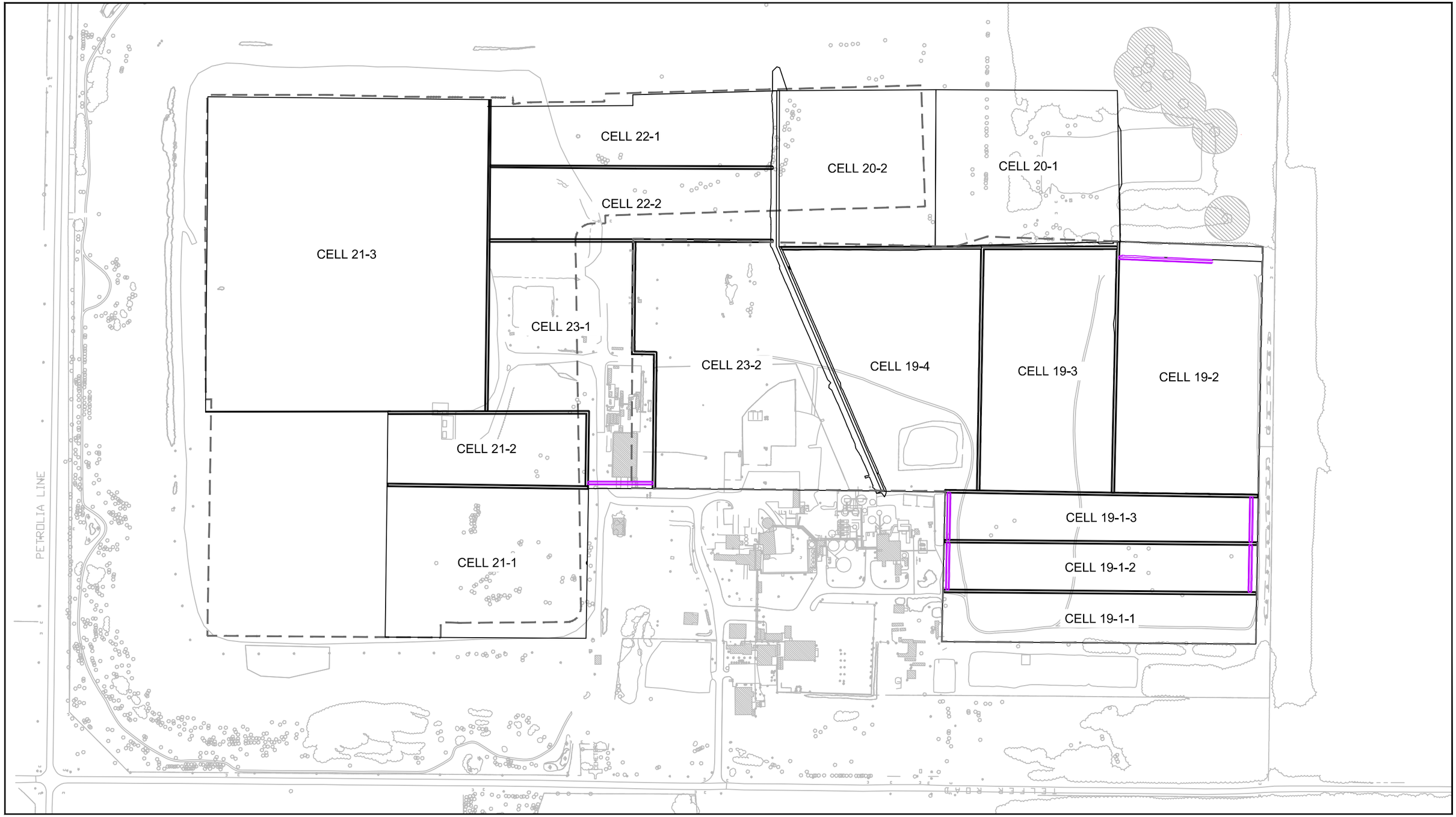

Source: DESIGN AND OPERATIONS REPORT - LAMBTON LANDFILL EXPANSION, CLEAN HARBORS CANADA, INC. PREPARED BY TETRA TECH WEI INC. DATED OCTOBER 8, 2015

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LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2019 FIRST QUARTER SITE INSPECTION

LANDFILL EXPANSION SUBCELL FILL EXPANSION PLAN

44985-16

MAR 28, 2019

FIGURE 2

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Attachment 1
Photographic Log

Photo 1 - Active landfilling cell, Cell 19-2A

Photo 2 - Interim cap placement, Cell 19-1

Photo 3 - Standing water in northwest corner of Site

Photo 4 - Standing water in northern, central portion of Site

Photo 5 - High water levels in central portion of north perimeter ditch, ice cover

Photo 6 - North ditch, surface water blockage

Photo 7 - North landfill area, southeast ditch, partial surface water blockage

Photo 8 - Standing water in southeast corner of north landfill area

Photo 9 - South ditch, surface water blockage removed

Photo 10 - East Surface Water Pond

Photo 11 - West Surface Water Pond

Photo 12 - Equalization Pond

Photo 13 - North Process Water Pond ditch

Photo 14 - North Process Water Pond

Photo 15 - South Process Water Pond

Photo 16 - South Leachate Reservoir

Photo 17 - East Leachate Reservoir

Photo 18 - New Leachate Reservoir

Appendix B
2019 Second Quarter Site Inspection

Memorandum

July 10, 2019

To:	Erica Carabott/Clean Harbors Mike Parker/Clean Harbors	Ref. No.:	044985
From:	Jim Yardley/Neil Shannick/mg/55	Tel:	519-340-4265
Subject:	**2019 Second Quarter Site Inspection**		

1. Introduction

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report, GHD conducted the 2019 second quarter Site Inspection (Inspection) of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario. The Inspection was conducted on June 18, 2019 by Neil Shannick.

The Inspection consisted of a walk around the Site. The Inspection focused primarily on the active landfill and waste disposal operations, including an inspection of each of the surface water, leachate, and process water ponds.

1.1 Weather and Site Conditions

At the time of the Inspection, the temperature was 15°C. Weather conditions at the Site ranged from overcast to sunny. Wind was minimal during the Inspection. During the week preceding the Inspection, the Site experienced 26.2 mm of total precipitation, and a mean temperature of 15.3°C. During the Inspection, the Site was very wet. Standing water was noted in low, flat areas and high water levels were noted in the majority of ditches and ponds. Figure 1 provides a Site plan showing features referenced herein, as well as any notes related to specific issues noted in this memorandum. Figure 2 provides the Landfill Expansion Subcell Fill Progression Plan, identifying the cell locations, as presented in the "*Design and Operations Report - Lambton Landfill Expansion, Clean Harbors Canada, Inc.*", as prepared by Tetra Tech WEI Inc., dated October 8, 2015.

2. Landfill Operations

The Inspection was focused on landfill and waste disposal operations including Cell development, active disposal, waste hauling, and landfill capping efforts.

2.1 Landfill Cell Development

The following provides a description of the status of the Landfill Cell Development, including active waste disposal operations and internal waste transport routes:

- The active waste tipping face is located in Cell 19-2A. Waste placement is generally occurring from north to south, as shown in Photo 1. Odour was noted in the immediate vicinity of the active landfilling area.
- Construction of Cell 19-2A is complete.
- Waste Transport Route: Site waste haulers are directed around the east side of the Process Area and enter Cell 19-2A from the east side, located centrally within the active landfilling area, on a dedicated haul road from the Waste Receiving Area.

2.2 Landfill Cap

The following provides a description of the status of the Landfill Cap, including cap placement during the second quarter, and the condition of the interim and final cap. With the recent approval of the vertical expansion, the previous capped areas are considered to be interim, since a portion of the cap will be removed and additional waste placed in these areas.

2.2.1 Interim and Final Cap Placement in Quarter

- The majority of the Site has received an interim cap, with the exception of the active landfilling area (Cell 19-2A).
- Cell 19-1 has received interim cap, as shown in Photo 2.

2.2.2 Interim Cap Conditions

- The interim cap was noted to be in good condition, with minor erosion channels observed.
- Interim cover material is available for placement on Cell 19-2A, currently stockpiled on Cell 19-1-3.
- Large areas of standing water were identified in several areas as described in Section 4. The interim cap requires minor grading to promote drainage to the perimeter ditches from these areas.
- Erosion channels should be addressed through additional clay placement and grading.

2.2.3 Final Cap Conditions

- Per Environmental Compliance Approval No. A031806, Notice No. 9 (dated October 19, 2015), no areas of the Site are considered to have received final capping. Per approval of the landfill expansion, all areas, as noted in Section 2.2.1, are considered to have received interim capping at this time.
- No areas have received topsoil. Natural vegetation is present in the northeast and southern (non-active) portions of the Site.

3. Perimeter Screening Berms

The following provides a description of the status of the Perimeter Screening Berms:

- Significant berm erosion was identified immediately west of proposed Cell 21-1. The erosion occurred on the landfill side of the berm, as identified on Figure 1 (previously identified in quarterly reports).
- Multiple larger erosion channels were identified on the landfill side of the north perimeter screening berm and at the north end of the east berm, as identified on Figure 1 (previously identified in quarterly reports).
- Minor erosion channels were noted throughout the Perimeter Screening Berms. These channels are prevalent throughout the un-vegetated internal sidewalls of the western and eastern perimeter screening berms.
- Several large erosion channels were noted on the elevated areas immediately northwest and southeast of the northern portion of the landfill. The erosion channels are located on plateaus/ramps within the screening berm. The erosion channels in the southeast corner extends into the east perimeter ditch.
- Note that all erosion channels within the Perimeter Screening Berms are on the internal sidewalls. The external sidewalls are in good condition and vegetated. As such, erosion channels do not create any external issues. The issue related to internal erosion is potential sedimentation of the perimeter ditches.

4. Surface Water Management System

The following provides a description of the status of the Surface Water Management System, including the ditches, swales, and surface water ponds.

4.1 Ditches and Swales

The following provides a description of the status of the surface water ditches and swales:

- Shallow standing water was identified within the southwest corner of the Original Landfill Area (OLA).
- Water levels were very high within the southern perimeter ditch of the OLA. Pumping was not active during the Inspection.
- A large area of standing water was identified within the northwest corner of the OLA, as shown on Figure 1 and Photo 3. The area has been graded to drain to the north ditch with an internal swale. The internal swale was full, with no observed flow during the Inspection.
- A large area of standing water was noted in the northwest portion of proposed Cell 21-3 (i.e., located centrally in the northern portion of the Site), as shown in Photo 4. The two drainage paths were under water during the Inspection, with no observed flow.
- Water levels continue to be high in the central portion of the north ditch, as shown in Photo 5. High water levels in the north ditch have the potential to prohibit surface drainage from the OLA during wetter periods.

- Standing water was not observed in the perimeter ditch in the northeast corner of the Site (i.e., at the location of the former perimeter screening berm access road).
- Flow from the north ditch to the eastern ditch is impeded in the northeast corner of the Site, likely brought on by dense wetland vegetation within the ditch and sedimentation, as shown in Photo 6 and Figure 1.
- Sedimentation is occurring in the east ditch as a result of erosion of the perimeter screening berm, along the entire length of the OLA, resulting in fluctuations in grade and flow breaks. Erosion channels range from minor to large. The east ditch was noted as damp, with dense wetland vegetation observed.
- Significant erosion was identified in the southeast corner of the OLA, resulting in sedimentation of the perimeter ditch and limited water flow, as shown in Photo 7 and Figure 1. This portion of ditch was generally damp, with minimal standing water noted and dense wetland vegetation. Standing water was observed in the internal swale and low-lying area to the north, as shown in Photo 8 and Figure 1.
- It was noted during previous Inspections that there was limited elevation difference available within the northeast corner of the perimeter ditch. As such, there is minimal ability to lower the base of ditch and maintain flow to the East Surface Water Pond.
- Damp conditions to low water levels were observed in the east perimeter ditch between the OLA and the Clean Bin Storage Area was damp. Moderate to high water levels were observed further south toward the East Surface Water Pond, extending laterally into the west end of the soil borrow area.
- The south ditch is currently undergoing remediation activities as per Provincial Officer's Order No. 2681-BCPKUJ, as shown in Photo 9 and Figure 1. A temporary berm has been established to divert clean water from the Pre-1986 area to the East Surface Water Pond. The east section of south ditch has been filled as per the remediation plan with a ditch drain the water eastward.
- A portion of the south ditch remains, isolated from discharging to the West Surface Water Pond. Water contained within this ditch is to receive treatment prior to discharge. This area is also shown in Photo 9.

4.2 East Surface Water Pond

The following provides a description of the status of the East Surface Water Pond (Photo 10):

- Water levels within the East Surface Water Pond were very high.
- No flow was observed entering the East Surface Water Pond from the north. Minimal flow was observed from the south.
- The pump at the East Surface Water Pond was in operation at the time of Inspection. As part of south ditch remediation efforts, water was pumped directly from the East Surface Water Pond to the West Surface Water Pond via piping.

4.3 West Surface Water Pond

The following provides a description of the status of the West Surface Water Pond (Photo 11):

- Water levels within the West Surface Water Pond were moderate.

- Water was observed entering the West Surface Water Pond, resulting from pumping efforts at the East Surface Water Pond and West Process Water Pond.
- The pump at the West Surface Water Pond was in operation at the time of Inspection.

4.4 Equalization Pond

The following provides a description of the status of the Equalization Pond (Photo 12):

- Water levels within the Equalization Pond were very high. Flow was not observed entering the Equalization Pond at the time of Inspection.
- Cracking and sloughing of the concrete side walls of the Equalization Pond was observed during the Inspection.
- Fish were observed within the Equalization Pond.

5. Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. The North Process Water Pond is located immediately west of the TDU area, the South Process Water Pond is located immediately south of the Incinerator, and the West Process Water Pond is located adjacent to the West Surface Water Pond. Water retained in the Process Water Management System is used as quench water for Site incineration operations.

5.1 Process Water Ditches and Swales

The following provides a description of the status of the process water ditches and swales:

- The process water ditch adjacent to the TDU area exhibited a moderate water level at the time of Inspection. This ditch was not being pumped at the time of Inspection.
- Very high water levels were noted in the ditches adjacent to the Household Hazardous Waste Depot. The ditches feeding the North Process Water Pond directly exhibited high water levels, as shown in Photo 13. Prior inspections identified sedimentation and culvert damage in these ditches, impeding flow and resulting in standing water within the ditches. It is recommended that sediment be removed and culvert(s) be repaired as necessary to promote drainage.

5.2 North Process Water Pond

The following provides a description of the status of the North Process Water Pond (Photo 14):

- The water level within the North Process Water Pond was very high, above the base of the inlet ditch.
- The pump at the North Process Water Pond was running at the time of the Inspection.
- During previous inspections, a significant washout was observed in the southeast corner of the North Process Water Pond. This washout was not visible at the time of inspection, due to high water levels.

5.3 South Process Water Pond

The following provides a description of the status of the South Process Water Pond (Photo 15):

- The water level within the South Process Water Pond was very high.
- The South Process Water Pond previously received runoff from areas adjacent to the active landfill area. Flow from this area was blocked by a small berm at the time of inspection.

5.4 West Process Water Pond

The following provides a description of the status of the West Process Water Pond, which is used for process water storage:

- The water level within the West Process Water Pond was very low. This pond was being pumped into the West Surface Water Pond at the time of inspection.

6. 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.

6.1 South Leachate Reservoir

The following provides a description of the status of the South Leachate Reservoir (Photo 16):

- The South Leachate Reservoir is equipped with a permanent floating cover. The floating cover was repaired during the second quarter via installation of a new polyethylene layer on the existing cover. The South Reservoir is currently being used for leachate storage, with leachate pumped from the New Leachate Reservoir. The South Leachate Reservoir was full.
- Clean Harbors maintains a record of the volume of leachate within the South Leachate Reservoir.

6.2 East Leachate Reservoir

The following provides a description of the status of the East Leachate Reservoir (Photo 17):

- The East Leachate Reservoir is equipped with a permanent floating cover. The East Reservoir is currently being used for leachate storage, but is not currently actively receiving leachate. The East Reservoir was full.
- Clean Harbors maintains a record of the volume of leachate within the East Leachate Reservoir.

6.3 New Leachate Reservoir

The following provides a description of the status of the New Leachate Reservoir (Photo 18):

- The new Leachate Reservoir has been constructed immediately east of the East Leachate Reservoir and is equipped with a permanent floating cover. The new Leachate Reservoir is currently operational and is being used for leachate storage. Leachate is being pumped from this Reservoir to the South Leachate

Reservoir as required. The new Leachate Reservoir is full. A large air pocket was observed in the floating cover.

- Clean Harbors maintains a record of the volume of leachate within the New Leachate Reservoir.
- The pump at adjacent Leachate Building No. 3 did not appear to be in operation at the time of the inspection.

6.4 Leachate Storage Tank and Pumping System

The following provides a description of the status of the Leachate Storage Tank and Pumping System:

- The Leachate Storage Tank is in operation, serving as the feed tank to the incinerator.

7. Waste Processing Operations

The following provides a description of the Waste Processing Operations:

- Odour was noted in the vicinity of the incinerator and the active landfilling operations in Cell 19-2A, likely originating from the active landfilling area.
- A slight odour was noted within the TDU processing area.
- Identified odours were not identified beyond Site boundaries.

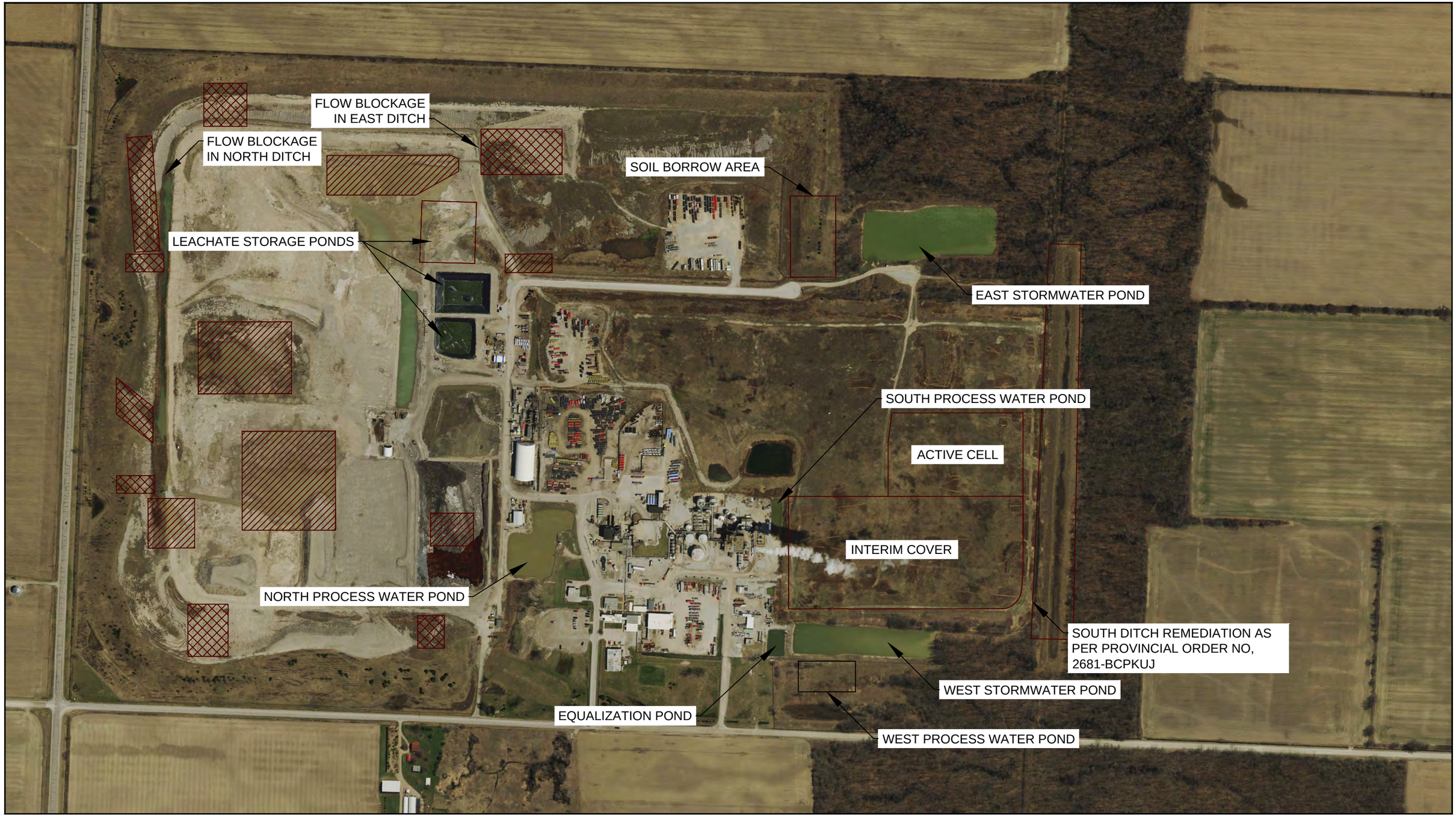
8. Conclusions and Recommendations

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.

Remediation works are being undertaken along the south ditch, in accordance with Provincial Officer's Order No. 2681-BCPKUJ. During these works, water is being pumped directly from the East Surface Water Pond to the West Surface Water Pond, bypassing the south ditch entirely. Water from the former south ditch is being treated and if acceptable, will be discharged to the West Surface Water Pond.



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LEGEND:

LARGE EROSION CHANNELS

LARGE AREAS OF STANDING WATER

LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2019 SECOND QUARTER SITE INSPECTION

SITE PLAN

44985-16

JUL 04, 2019

FIGURE 1

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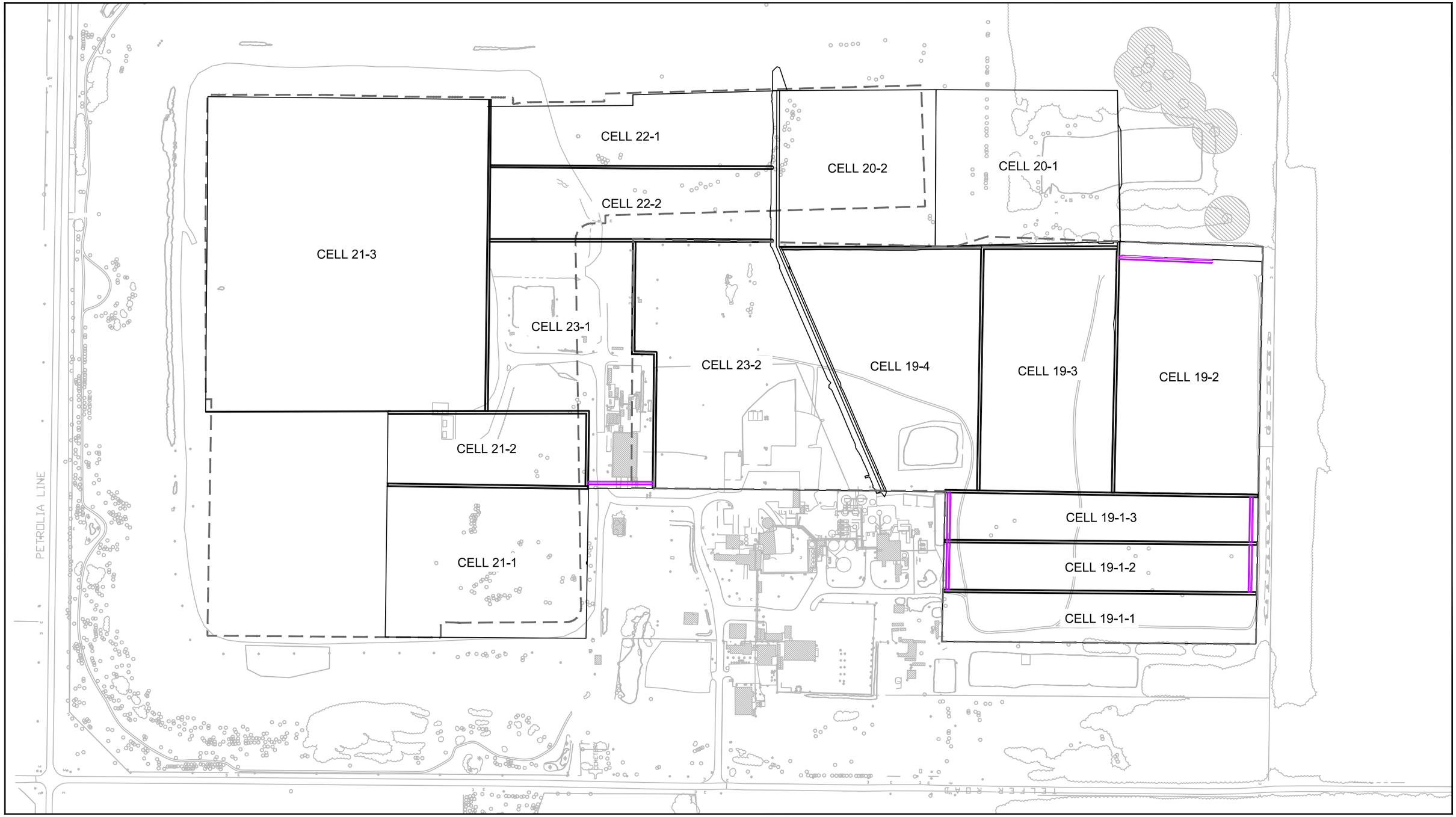

Source: DESIGN AND OPERATIONS REPORT - LAMBTON LANDFILL EXPANSION, CLEAN HARBORS CANADA, INC. PREPARED BY TETRA TECH WEI INC. DATED OCTOBER 8, 2015

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LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2019 SECOND QUARTER SITE INSPECTION

LANDFILL EXPANSION SUBCELL FILL EXPANSION PLAN

44985-16

JUL 04, 2019

FIGURE 2

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Attachment 1
Photographic Log

Photo 1 - Active landfilling cell, Cell 19-2A

Photo 2 - Interim cap placement, Cell 19-1

Photo 3 - Standing water in northwest corner of Site

Photo 4 - Standing water in northern, central portion of Site

Photo 5 - High water levels in central portion of north perimeter ditch

Photo 6 - North ditch, surface water blockage

Photo 7 - North landfill area, southeast ditch, partial surface water blockage

Photo 8 - Standing water in southeast corner of north landfill area

Photo 9 - South ditch remediation

Photo 10 - East Surface Water Pond

Photo 11 - West Surface Water Pond

Photo 12 - Equalization Pond

Photo 13 - North Process Water Pond ditch

Photo 14 - North Process Water Pond

Photo 15 - South Process Water Pond

Photo 16 - South Leachate Reservoir

Photo 17 - East Leachate Reservoir

Photo 18 - New Leachate Reservoir

Appendix C
2019 Third Quarter Site Inspection

Memorandum

October 4, 2019

To:	Erica Carabott/Clean Harbors Mike Parker/Clean Harbors	Ref. No.:	044985
From:	Jim Yardley/Neil Shannick/mg/58	Tel:	519-340-4265

Subject: 2019 Third Quarter Site Inspection

1. Introduction

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report, GHD conducted the 2019 third quarter Site Inspection (Inspection) of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario. The Inspection was conducted on September 10, 2019 by Neil Shannick.

The Inspection consisted of a walk around the Site. The Inspection focused primarily on the active landfill and waste disposal operations, including an inspection of each of the surface water, leachate, and process water ponds.

1.1 Weather and Site Conditions

At the time of the Inspection, the temperature was 20°C. Weather conditions at the Site were generally cloudy. Wind conditions ranged from minimal to moderate during the Inspection, generally from south to north. During the week preceding the Inspection, the Site experienced 3.4 mm of total precipitation, and a mean temperature of 16.2°C. During the Inspection, the Site was very wet. Standing water was noted in low, flat areas and high water levels were noted in the majority of ditches and ponds. Figure 1 provides a Site plan showing features referenced herein, as well as any notes related to specific issues noted in this memorandum. Figure 2 provides the Landfill Expansion Subcell Fill Progression Plan, identifying the cell locations, as presented in the "*Design and Operations Report - Lambton Landfill Expansion, Clean Harbors Canada, Inc.*", as prepared by Tetra Tech WEI Inc., dated October 8, 2015.

2. Landfill Operations

The Inspection was focused on landfill and waste disposal operations including Cell development, active disposal, waste hauling, and landfill capping efforts.

2.1 Landfill Cell Development

The following provides a description of the status of the Landfill Cell Development, including active waste disposal operations and internal waste transport routes:

- The active waste tipping face is located in the western portion of Cell 19-2. Waste placement is generally occurring from west to east, as shown in Photo 1.
- The eastern portion of Cell 19-2 is currently under construction, as shown in Photo 1.
- Waste Transport Route: Site waste haulers are directed around the east side of the Process Area and enter Cell 19-2 from the north side, located centrally within the active landfilling area, on a dedicated haul road from the Waste Receiving Area.

2.2 Landfill Cap

The following provides a description of the status of the Landfill Cap, including cap placement during the third quarter, and the condition of the interim and final cap. With the recent approval of the vertical expansion, the previous capped areas are considered to be interim, since a portion of the cap will be removed and additional waste placed in these areas.

2.2.1 Interim and Final Cap Placement in Quarter

- The majority of the Site has received an interim cap, with the exception of the active landfilling area (Cell 19-2).
- Cell 19-1 has received interim cap, as shown in Photo 2.
- Installation of final cap over Cell 19-1 has commenced in the third quarter, as shown in Photo 2.

2.2.2 Interim Cap Conditions

- The interim cap was noted to be in good condition, with minor erosion channels observed.
- Interim cover material is available for placement on Cell 19-2, currently stockpiled on Cell 19-1.
- Large areas of standing water were identified in several areas as described in Section 4. The interim cap requires minor grading to promote drainage to the perimeter ditches from these areas.
- Erosion channels should be addressed through additional clay placement and grading.

2.2.3 Final Cap Conditions

- Final cap installation has commenced in Cell 19-1, commencing in the southwest corner and progressing to the north and east.
- Per Environmental Compliance Approval No. A031806, Notice No. 9 (dated October 19, 2015), no previously capped areas of the Site are considered to have received final capping. Per approval of the landfill expansion, all areas, as noted in Section 2.2.1, are considered to have received interim capping.
- No areas have received topsoil. Natural vegetation is present in the northeast and southern (non-active) portions of the Site.

3. Perimeter Screening Berms

The following provides a description of the status of the Perimeter Screening Berms:

- Significant berm erosion was identified immediately west of proposed Cell 21-1. The erosion occurred on the landfill side of the berm, as identified on Figure 1 (previously identified in quarterly reports).
- Multiple larger erosion channels were identified on the landfill side of the north perimeter screening berm and at the north end of the east berm, as identified on Figure 1 (previously identified in quarterly reports).
- Minor erosion channels were noted throughout the Perimeter Screening Berms. These channels are prevalent throughout the un-vegetated internal sidewalls of the western and eastern perimeter screening berms.
- Several large erosion channels were noted on the elevated areas immediately northwest and southeast of the northern portion of the landfill. The erosion channels are located on plateaus/ramps within the screening berm. The erosion channels in the southeast corner extends into the east perimeter ditch.
- Note that all erosion channels within the Perimeter Screening Berms are on the internal sidewalls. The external sidewalls are in good condition and vegetated. As such, erosion channels do not create any external issues. The issue related to internal erosion is potential sedimentation of the perimeter ditches.

4. Surface Water Management System

The following provides a description of the status of the Surface Water Management System, including the ditches, swales, and surface water ponds.

4.1 Ditches and Swales

The following provides a description of the status of the surface water ditches and swales:

- Shallow standing water was identified within the southwest corner of the Original Landfill Area (OLA).
- Water levels were very high within the southern perimeter ditch of the OLA. Pumping was active during the Inspection.
- A large area of standing water was identified within the northwest corner of the OLA, as shown on Figure 1 and Photo 3. The area has been graded to drain to the north ditch with an internal swale. The internal swale was full, with no observed flow during the Inspection.
- A large area of standing water was noted in the northwest portion of proposed Cell 21-3 (i.e., located centrally in the northern portion of the Site), as shown in Photo 4. The two drainage paths were under water during the Inspection, with no observed flow.
- Water levels continue to be high in the central portion of the north ditch, as shown in Photo 5. High water levels in the north ditch have the potential to prohibit surface drainage from the OLA during wetter periods.

- Standing water was not observed in the perimeter ditch in the northeast corner of the Site (i.e., at the location of the former perimeter screening berm access road).
- Flow from the north ditch to the eastern ditch is impeded in the northeast corner of the Site, likely brought on by dense wetland vegetation within the ditch and sedimentation, as shown in Photo 6 and Figure 1.
- Sedimentation is occurring in the east ditch as a result of erosion of the perimeter screening berm, along the entire length of the OLA, resulting in fluctuations in grade and flow breaks. Erosion channels range from minor to large. The east ditch was noted as damp, with dense wetland vegetation observed. Minimal standing water was noted in sections of the ditch, with no observed flow.
- Significant erosion was identified in the southeast corner of the OLA, resulting in sedimentation of the perimeter ditch and limited water flow, as shown in Photo 7 and Figure 1. This portion of ditch was generally damp, with minimal standing water noted and dense wetland vegetation. Standing water was observed in the internal swale and low-lying area to the north, as shown in Photo 8 and Figure 1.
- It was noted during previous Inspections that there was limited elevation difference available within the northeast corner of the perimeter ditch. As such, there is minimal ability to lower the base of ditch and maintain flow to the East Surface Water Pond.
- Damp conditions were observed in the east perimeter ditch between the OLA and the East Surface Water Pond.
- The south ditch is currently undergoing remediation activities as per Provincial Officer's Order No. 2681-BCPKUJ, as shown in Photo 9 and Figure 1. A temporary berm has been established to divert clean water from the Pre-1986 area to the East Surface Water Pond. The east section of south ditch has been filled as per the remediation plan with a ditch to drain the water eastward.
- A portion of the south ditch remains, isolated from discharging to the West Surface Water Pond, as shown in Photo 9. Water contained within this ditch is to receive treatment prior to discharge. This area is progressively being remediated and filled, moving east to west. Remediation is nearing completion.

4.2 East Surface Water Pond

The following provides a description of the status of the East Surface Water Pond (Photo 10):

- Water levels within the East Surface Water Pond were moderate.
- No flow was observed entering the East Surface Water Pond from the north or the south.
- The pump at the East Surface Water Pond was not in operation at the time of Inspection. As part of south ditch remediation efforts and on an as-needed basis, water is pumped directly from the East Surface Water Pond to the West Surface Water Pond via piping.

4.3 West Surface Water Pond

The following provides a description of the status of the West Surface Water Pond (Photo 11):

- Water levels within the West Surface Water Pond were high, at the baseline of vegetation.

- Water was not observed entering the West Surface Water Pond, as no pumping efforts were noted at the East Surface Water Pond or West Process Water Pond.
- The pump at the West Surface Water Pond was in operation at the time of Inspection.

4.4 Equalization Pond

The following provides a description of the status of the Equalization Pond (Photo 12):

- Water levels within the Equalization Pond were high. Flow was not observed entering the Equalization Pond at the time of Inspection.
- Cracking and sloughing of the concrete side walls of the Equalization Pond was observed during the Inspection.
- Fish were observed within the Equalization Pond.

5. Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. The North Process Water Pond is located immediately west of the TDU area, the South Process Water Pond is located immediately south of the Incinerator, and the West Process Water Pond is located adjacent to the West Surface Water Pond. Water retained in the Process Water Management System is used as quench water for Site incineration operations.

5.1 Process Water Ditches and Swales

The following provides a description of the status of the process water ditches and swales:

- The process water ditch adjacent to the TDU area exhibited a moderate water level at the time of Inspection. This ditch was not being pumped at the time of Inspection.
- The ditches adjacent to the Household Hazardous Waste Depot were damp, with standing water noted in the ditch immediately east, as shown in Photo 13. The ditch feeding the North Process Water Pond directly exhibited minimal standing water. Prior inspections identified sedimentation and culvert damage in these ditches, impeding flow and resulting in standing water within the ditches. It is recommended that sediment be removed and culvert(s) be repaired as necessary to promote drainage.

5.2 North Process Water Pond

The following provides a description of the status of the North Process Water Pond (Photo 14):

- The water level within the North Process Water Pond was low, well below the base of the inlet ditch.
- The pump at the North Process Water Pond was running at the time of the Inspection.
- During previous inspections, a significant washout was observed in the southeast corner of the North Process Water Pond. Large rip rap was observed in the washout, placed to stabilize the slope.

5.3 South Process Water Pond

The following provides a description of the status of the South Process Water Pond (Photo 15):

- The water level within the South Process Water Pond was moderate.
- The South Process Water Pond previously received runoff from areas adjacent to the active landfill area. Flow from this area appeared to be blocked by interim capping and grading of Cell 19-1.

5.4 West Process Water Pond

The following provides a description of the status of the West Process Water Pond, which is used for process water storage:

- The West Process Water Pond was empty at the time of inspection.

6. 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.

6.1 South Leachate Reservoir

The following provides a description of the status of the South Leachate Reservoir (Photo 16):

- The South Leachate Reservoir is equipped with a permanent floating cover. The South Reservoir is currently being used for leachate storage, with leachate pumped from the New Leachate Reservoir. The South Leachate Reservoir was full.
- Clean Harbors maintains a record of the volume of leachate within the South Leachate Reservoir.

6.2 East Leachate Reservoir

The following provides a description of the status of the East Leachate Reservoir (Photo 17):

- The East Leachate Reservoir is equipped with a permanent floating cover. The East Reservoir is currently being used for leachate storage, but is not currently actively receiving leachate. The East Reservoir was full.
- Clean Harbors maintains a record of the volume of leachate within the East Leachate Reservoir.

6.3 New Leachate Reservoir

The following provides a description of the status of the New Leachate Reservoir (Photo 18):

- The new Leachate Reservoir has been constructed immediately east of the East Leachate Reservoir and is equipped with a permanent floating cover. The new Leachate Reservoir is currently operational and is being used for leachate storage. Leachate is being pumped from this Reservoir to the South Leachate Reservoir as required. The new Leachate Reservoir is full.

- Clean Harbors maintains a record of the volume of leachate within the New Leachate Reservoir.
- The pump at adjacent Leachate Building No. 3 did not appear to be in operation at the time of the inspection.

6.4 Leachate Storage Tank and Pumping System

The following provides a description of the status of the Leachate Storage Tank and Pumping System:

- The Leachate Storage Tank is in operation, serving as the feed tank to the incinerator.

7. Waste Processing Operations

The following provides a description of the Waste Processing Operations:

- Odour was noted in the vicinity of the North Process Water Pond and the leachate reservoirs.
- Identified odours were not identified beyond Site boundaries.

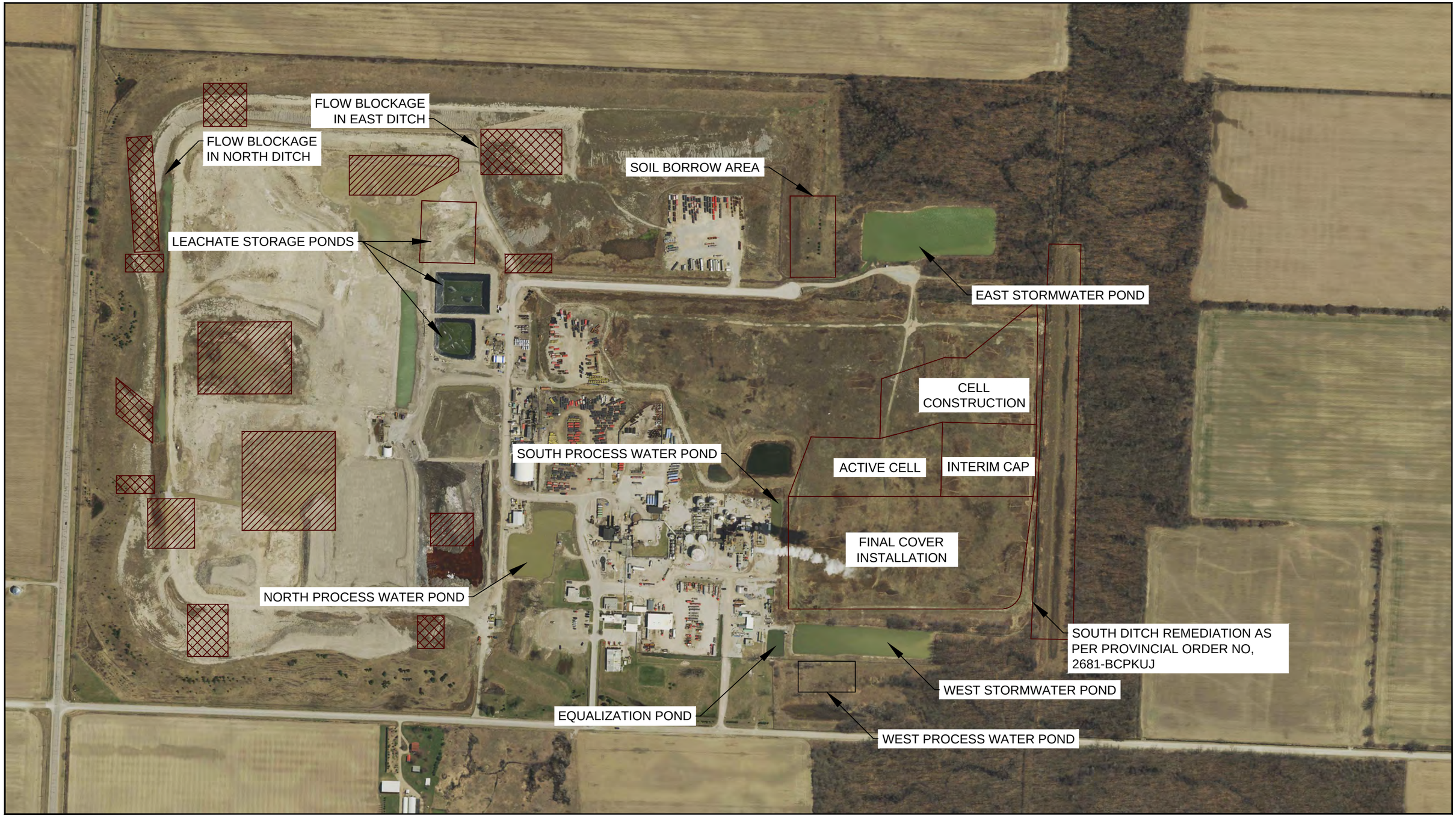
8. Conclusions and Recommendations

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.

Remediation works are being undertaken along the south ditch, in accordance with Provincial Officer's Order No. 2681-BCPKUJ. During these works, water is being pumped directly from the East Surface Water Pond to the West Surface Water Pond, bypassing the south ditch entirely. Water from the former south ditch is being treated and if acceptable, will be discharged to the West Surface Water Pond.



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LEGEND:

LARGE EROSION CHANNELS

LARGE AREAS OF STANDING WATER

LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2019 THIRD QUARTER SITE INSPECTION

SITE PLAN

44985-16

OCT 04, 2019

FIGURE 1

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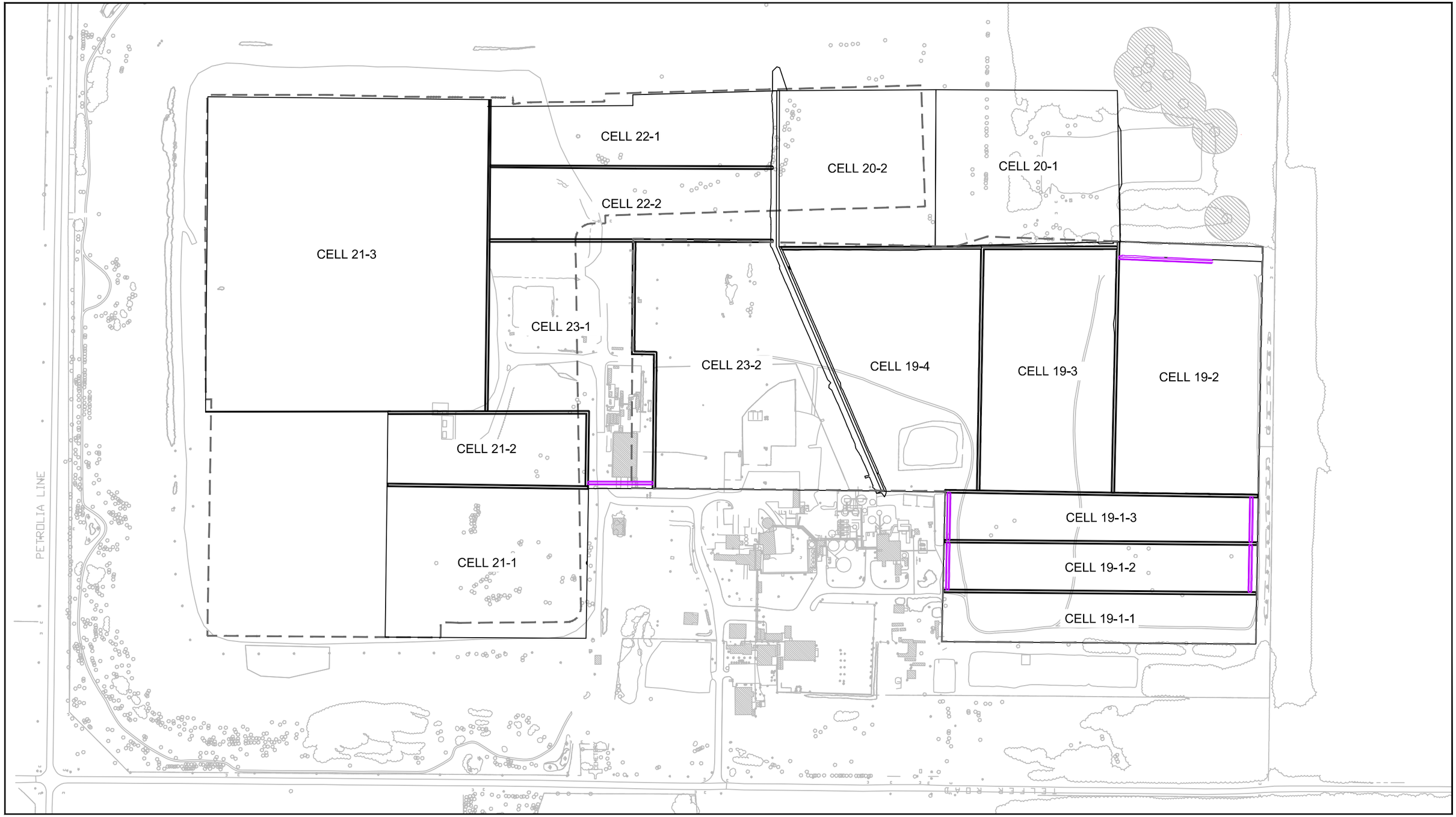

Source: DESIGN AND OPERATIONS REPORT - LAMBTON LANDFILL EXPANSION, CLEAN HARBORS CANADA, INC. PREPARED BY TETRA TECH WEI INC. DATED OCTOBER 8, 2015

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LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2019 THIRD QUARTER SITE INSPECTION

LANDFILL EXPANSION SUBCELL FILL EXPANSION PLAN

44985-16

OCT 04, 2019

FIGURE 2

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Attachment 1
Photographic Log

Photo 1 - Active landfilling cell and cell construction, Cell 19-2

Photo 2 - Interim and final cap placement, Cell 19-1

Photo 3 - Standing water in northwest corner of Site

Photo 4 - Standing water in northern, central portion of Site

Photo 5 - High water levels in central portion of north perimeter ditch

Photo 6 - North ditch, surface water blockage

Photo 7 - Original Landfill Area, southeast ditch, partial surface water blockage

Photo 8 - Standing water in southeast corner of Original Landfill Area

Photo 9 - South ditch remediation

Photo 10 - East Surface Water Pond

Photo 11 - West Surface Water Pond

Photo 12 - Equalization Pond

Photo 13 - North Process Water Pond ditch

Photo 14 - North Process Water Pond

Photo 15 - South Process Water Pond

Photo 16 - South Leachate Reservoir

Photo 17 - East Leachate Reservoir

Photo 18 - New Leachate Reservoir

Appendix D
2019 Fourth Quarter Site Inspection

Memorandum

December 17, 2019

To:	Erica Carabott/Clean Harbors Mike Parker/Clean Harbors	Ref. No.:	044985
From:	Jim Yardley/Kal Dhaliwal/mg/61	Tel:	519-340-4265
Subject:	**2019 Fourth Quarter Site Inspection**		

1. Introduction

In accordance with requirements outlined in Section 8.1 of the Design and Operations Report, GHD conducted the 2019 Fourth Quarter Site Inspection (Inspection) of the Clean Harbors Canada, Inc. (Clean Harbors) Lambton Facility (Site) in Corunna, Ontario. The Inspection was conducted on November 25, 2019 by Kal Dhaliwal.

The Inspection consisted of a walk around the Site. The Inspection focused primarily on the active landfill and waste disposal operations, including an inspection of each of the surface water, leachate, and process water ponds.

1.1 Weather and Site Conditions

At the time of the Inspection, the temperature was 5°C. Weather conditions at the Site were generally cloudy. Wind conditions ranged from minimal to moderate during the Inspection, generally from southeast to northwest. During the week preceding the Inspection, the Site experienced 14.7 mm of total precipitation, and a mean temperature of 12.9°C. During the Inspection, the Site was wet. Standing water was noted in low, flat areas and high water levels were noted in the majority of ditches and ponds. Figure 1 provides a Site plan showing features referenced herein, as well as any notes related to specific issues noted in this memorandum. Figure 2 provides the Landfill Expansion Subcell Fill Progression Plan, identifying the cell locations, as presented in the "*Design and Operations Report - Lambton Landfill Expansion, Clean Harbors Canada, Inc.*", as prepared by Tetra Tech WEI Inc., dated October 8, 2015.

2. Landfill Operations

The Inspection was focused on landfill and waste disposal operations including Cell development, active disposal, waste hauling, and landfill capping efforts.

2.1 Landfill Cell Development

The following provides a description of the status of the Landfill Cell Development, including active waste disposal operations and internal waste transport routes:

- The active waste tipping face is located in the south western portion of Cell 19-2. Waste placement is generally occurring from west to east, as shown in Photo 1. At the time of the inspection the fill operations were located along the southern limit of waste disposal.
- The eastern portion of Cell 19-2 construction has been completed, as shown in Photos 2 through 5.
- Waste Transport Route: Site waste haulers are directed around the east side of the Process Area and enter Cell 19-2 from the north side, located centrally within the active landfilling area, on a dedicated haul road from the Waste Receiving Area.

2.2 Landfill Cover

The following provides a description of the status of the Landfill Cover, including cover placement during the fourth quarter, and the condition of the interim and final cover. With the recent approval of the vertical expansion, the previously covered areas are considered to be interim, since a portion of the existing cover will be removed and additional waste placed in these areas.

2.2.1 Interim and Final Cover Placement in Quarter

- The majority of the Site has received an interim cover. The active landfilling area (Cell 19-2) has received interim cover in areas where final waste contours have been achieved.
- Installation of final cover over Cell 19-1 was installed in the third and fourth quarter. The final cover consists of a Geosynthetic Clay Liner, HDPE Geomembrane, drainage layer, and protective soil cover. The status of the final cover installation is shown in Photo 6.
- The protective soil cover portion of the final cover is being installed as weather conditions permit.

2.2.2 Interim Cover Conditions

- The interim cover was noted to be in good condition, with minor erosion channels observed.
- Material stockpile for interim cover is currently available for the active landfilling area (Cell 19-2). The stockpile is located on the portion of Cell 19-2 that has received interim cover.
- Large areas of standing water were identified in several areas as described in Section 4. The interim cover requires minor grading to promote drainage to the perimeter ditches from these areas.
- Erosion channels should be addressed through additional clay placement and grading.

2.2.3 Final Cover Conditions

- Final cover installation has continued in Cell 19-1, with the protective layer being placed west to east along the south portion of 19-1.

- Per Environmental Compliance Approval No. A031806, Notice No. 9 (dated October 19, 2015), no previously covered areas of the Site are considered to have received final cover. Per approval of the landfill expansion, all areas, as noted in Section 2.2.1, are considered to have received interim cover.
- No areas have received topsoil. Natural vegetation is present in the northeast and southern (non-active) portions of the Site.

3. Perimeter Screening Berms

The following provides a description of the status of the Perimeter Screening Berms:

- Significant berm erosion was identified immediately west of proposed Cell 21-1. The erosion occurred on the landfill side of the berm, as identified on Figure 1 (previously identified in quarterly reports).
- Multiple larger erosion channels were identified on the landfill side of the north perimeter screening berm and at the north end of the east berm, as identified on Figure 1 (previously identified in quarterly reports).
- Minor erosion channels were noted throughout the Perimeter Screening Berms. These channels are prevalent throughout the un-vegetated internal sidewalls of the western and eastern perimeter screening berms.
- Several large erosion channels were noted on the elevated areas immediately northwest and southeast of the northern portion of the landfill. The erosion channels are located on plateaus/ramps within the screening berm. The erosion channels in the southeast corner extends into the east perimeter ditch.
- Note that all erosion channels within the Perimeter Screening Berms are on the internal sidewalls. The external sidewalls are in good condition and vegetated. As such, erosion channels do not create any external issues. The issue related to internal erosion is potential sedimentation of the perimeter ditches.

4. Surface Water Management System

The following provides a description of the status of the Surface Water Management System, including the ditches, swales, and surface water ponds.

4.1 Ditches and Swales

The following provides a description of the status of the surface water ditches and swales:

- Shallow standing water was identified within the southwest corner of the Original Landfill Area (OLA).
- Water levels were very high within the southern perimeter ditch of the OLA. Pumping was active during the Inspection.
- A large area of standing water was identified within the northwest corner of the OLA, as shown on Figure 1 and Photo 7. The area has been graded to drain to the north ditch with an internal swale. The internal swale was full, with no observed flow during the Inspection.

- A large area of standing water was noted in the northwest portion of proposed Cell 21-3 (i.e., located centrally in the northern portion of the Site), as shown in Photo 8. The two drainage paths were under water during the Inspection, with no observed flow.
- Water levels continue to be high in the central portion of the north ditch, as shown in Photo 9. High water levels in the north ditch have the potential to prohibit surface drainage from the OLA during wetter periods.
- Standing water was not observed in the perimeter ditch in the northeast corner of the Site (i.e., at the location of the former perimeter screening berm access road).
- Dense wetland vegetation and sedimentation within the northeastern ditch has recently been cleared, large amounts of standing water was present with no notable flow, as shown in Photo 10 and Figure 1.
- Sedimentation is occurring in the east ditch as a result of erosion of the perimeter screening berm, along the entire length of the OLA, resulting in fluctuations in grade and flow breaks. Erosion channels range from minor to large.
- Significant erosion was identified in the southeast corner of the OLA, resulting in sedimentation of the perimeter ditch and limited water flow, as shown in Photo 11 and Figure 1. This portion of ditch was wet, with standing water noted and dense wetland vegetation. Standing water was observed in the internal swale and low-lying area to the north, as shown in Photo 12 and Figure 1.
- It was noted during previous Inspections that there was limited elevation difference available within the northeast corner of the perimeter ditch. As such, there is minimal ability to lower the base of ditch and maintain flow to the East Surface Water Pond.
- Damp conditions were observed in the east perimeter ditch between the OLA and the East Surface Water Pond.
- Remediation of the south ditch has been completed as per Provincial Officer's Order No. 2681-BCPKUJ, as shown in Photo 13 and Figure 1, standing water was noted south of cell 19-1 and cell 19-2 as shown in Photo 14 and Figure 1.
- One of two culverts running under the access ramp to the soil borrow area is partially buried, as shown in Photo 15 and Figure 1.

4.2 East Surface Water Pond

The following provides a description of the status of the East Surface Water Pond (Photo 16):

- Water levels within the East Surface Water Pond were moderate.
- No flow was observed entering the East Surface Water Pond from the north or the south.
- The pump at the East Surface Water Pond was in operation at the time of Inspection. Water is pumped directly from the East Surface Water Pond to the West Surface Water Pond via piping.

4.3 West Surface Water Pond

The following provides a description of the status of the West Surface Water Pond (Photo 17):

- Water levels within the West Surface Water Pond were high, at the baseline of vegetation.
- The pump at the West Surface Water Pond was in operation at the time of Inspection.

4.4 Equalization Pond

The following provides a description of the status of the Equalization Pond (Photo 18):

- Water levels within the Equalization Pond were high. Flow was not observed entering the Equalization Pond at the time of Inspection.
- Cracking and sloughing of the concrete side walls of the Equalization Pond was observed during the Inspection.
- No fish were observed within the Equalization Pond.

5. Process Water Management System

The Process Water Management System consists of three ponds and a series of ditches and swales. The North Process Water Pond is located immediately west of the TDU area, the South Process Water Pond is located immediately south of the Incinerator, and the West Process Water Pond is located adjacent to the West Surface Water Pond. Water retained in the Process Water Management System is used as quench water for Site incineration operations.

5.1 Process Water Ditches and Swales

The following provides a description of the status of the process water ditches and swales:

- The process water ditch adjacent to the TDU area exhibited a moderate water level at the time of Inspection. This ditch was not being pumped at the time of Inspection.
- The ditches adjacent to the Household Hazardous Waste Depot were damp, with standing water noted in the ditch immediately east, as shown in Photo 19. The ditch feeding the North Process Water Pond directly exhibited significant standing water. Prior inspections identified sedimentation and culvert damage in these ditches, impeding flow and resulting in standing water within the ditches. It is recommended that sediment be removed and culvert(s) be repaired as necessary to promote drainage.

5.2 North Process Water Pond

The following provides a description of the status of the North Process Water Pond (Photo 20):

- The water level within the North Process Water Pond was low, well below the base of the inlet ditch.
- The pump at the North Process Water Pond was running at the time of the Inspection.
- During previous inspections, a significant washout was observed in the southeast corner of the North Process Water Pond. Large rip rap was observed in the washout, placed to stabilize the slope.

5.3 South Process Water Pond

The following provides a description of the status of the South Process Water Pond:

- The water level within the South Process Water Pond was moderate.
- The South Process Water Pond previously received runoff from areas adjacent to the active landfill area. Flow from this area appeared to be blocked by interim cover and grading of Cell 19-1.

5.4 West Process Water Pond

The following provides a description of the status of the West Process Water Pond, which is used for process water storage:

- Very low water levels were observed in the West Process Water Pond..
- The West Process Water Pond is currently storing water from the south ditch remediation work.

6. 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.

6.1 South Leachate Reservoir

The following provides a description of the status of the South Leachate Reservoir (Photo 21):

- The South Leachate Reservoir is equipped with a permanent floating cover. The South Reservoir is currently being used for leachate storage, with leachate pumped from the New Leachate Reservoir. The South Leachate Reservoir was full.
- Clean Harbors maintains a record of the volume of leachate within the South Leachate Reservoir.

6.2 East Leachate Reservoir

The following provides a description of the status of the East Leachate Reservoir (Photo 22):

- The East Leachate Reservoir is equipped with a permanent floating cover. The East Reservoir is currently being used for leachate storage, but is not currently actively receiving leachate. The East Reservoir was full.
- Clean Harbors maintains a record of the volume of leachate within the East Leachate Reservoir.

6.3 New Leachate Reservoir

The following provides a description of the status of the New Leachate Reservoir (Photo 23):

- The new Leachate Reservoir has been constructed immediately east of the East Leachate Reservoir and is equipped with a permanent floating cover. The new Leachate Reservoir is currently operational and is

being used for leachate storage. Leachate is being pumped from this Reservoir to the South Leachate Reservoir as required. The new Leachate Reservoir is full.

- Clean Harbors maintains a record of the volume of leachate within the New Leachate Reservoir.
- The pump at adjacent Leachate Building No. 3 was not in operation at the time of the inspection.

6.4 Leachate Storage Tank and Pumping System

The following provides a description of the status of the Leachate Storage Tank and Pumping System:

- The Leachate Storage Tank is in operation, serving as the feed tank to the incinerator.

7. Waste Processing Operations

The following provides a description of the Waste Processing Operations:

- Odour was noted in the vicinity of the North Process Water Pond, the leachate reservoirs, the West Surface Water Pond, and the northwest portion of the perimeter screening berm.
- Identified odours were not identified beyond Site boundaries.

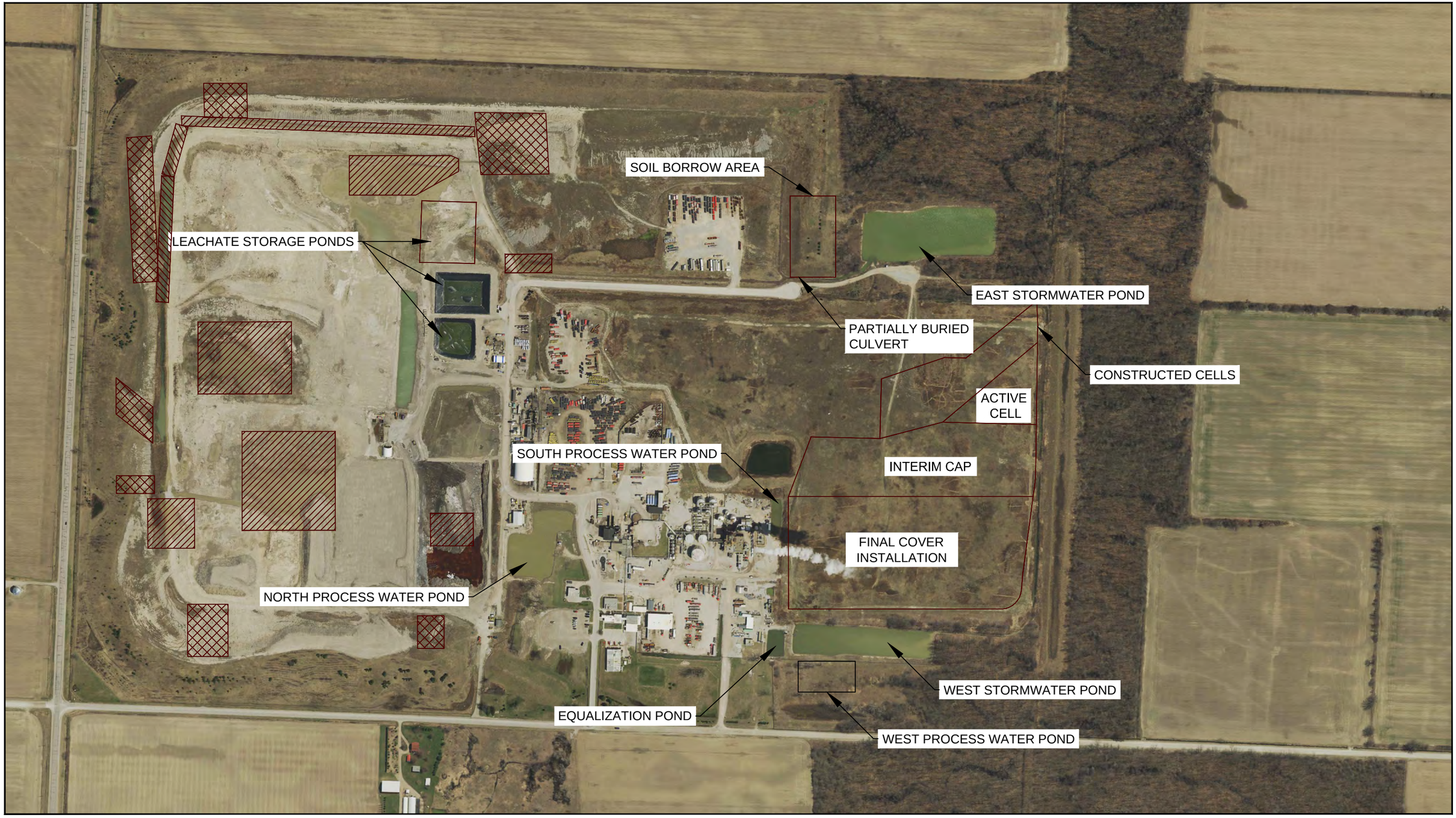
8. Conclusions and Recommendations

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.

Remediation works have been completed along the south ditch, in accordance with Provincial Officer's Order No. 2681-BCPKUJ. Grading or ditching south of cell 19-1 and 19-2 can minimize standing water.



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LEGEND:

LARGE EROSION CHANNELS

LARGE AREAS OF STANDING WATER

LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2019 FOURTH QUARTER SITE INSPECTION

SITE PLAN

44985-16

DEC 05, 2019

FIGURE 1

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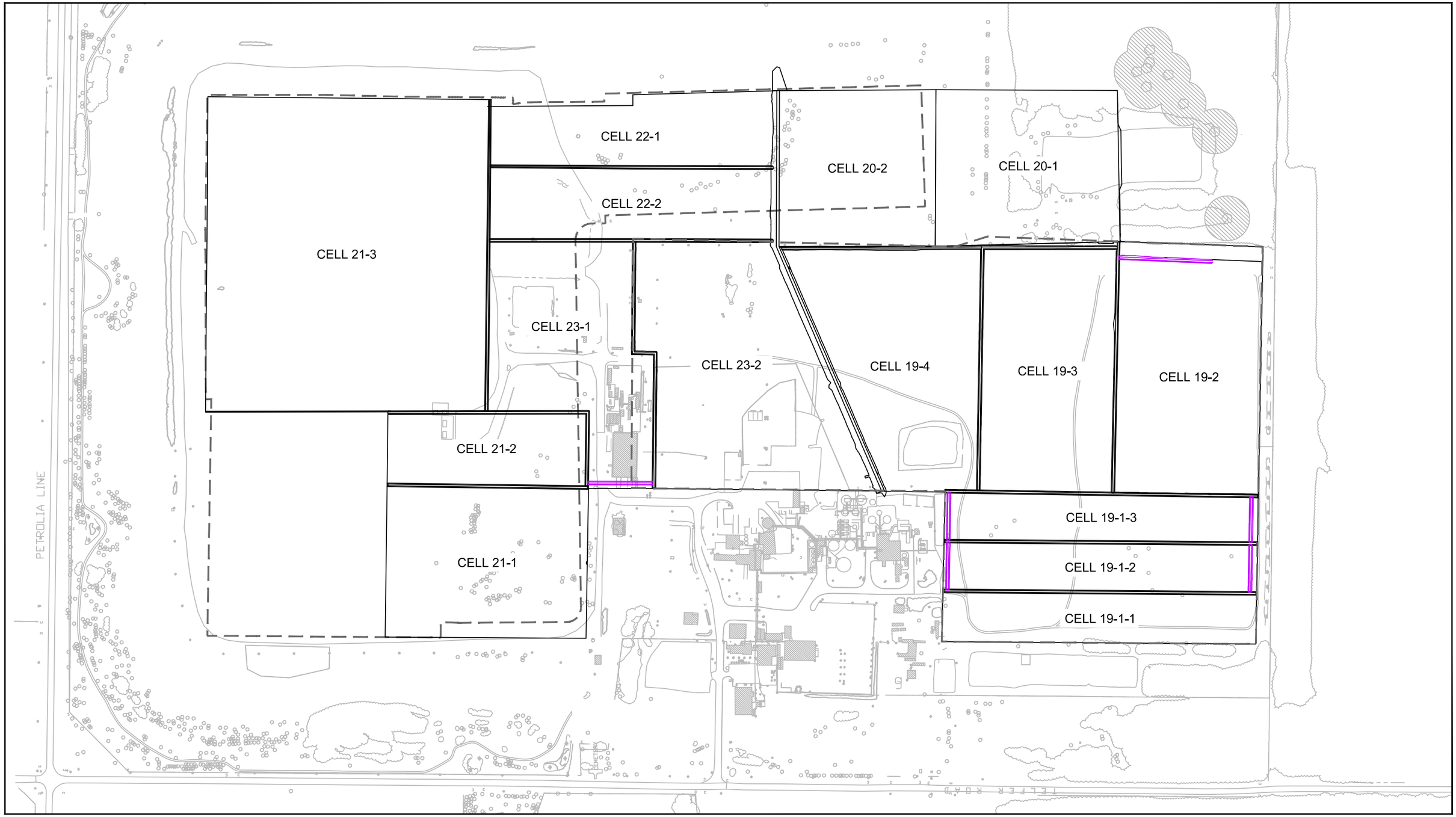

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LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2019 FOURTH QUARTER SITE INSPECTION

LANDFILL EXPANSION SUBCELL FILL EXPANSION PLAN

44985-16

DEC 05, 2019

FIGURE 2

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Attachment 1
Photographic Log

Photo 1 - Active landfilling cell, Cell 19-2

Photo 2 – Completed sub-cells, Cell 19-2

Photo 3 - Completed sub-cells, Cell 19-2

Photo 4 - Completed sub-cells, Cell 19-2

Photo 5 - Completed sub-cells, Cell 19-2

Photo 6 - Final landfill cover placement, Cell 19-1

Photo 7 - Standing water in northwest corner of Site

Photo 8 - Standing water in northern, central portion of Site

Photo 9 - High water levels in central portion of north perimeter ditch

Photo 10 - North ditch, sitting surface water

Photo 11 - Original Landfill Area, southeast ditch, sitting surface water

Photo 12 - Standing water in southeast corner of Original Landfill Area

Photo 13 – Completed south ditch remediation

Photo 14 – Sitting water south of cell 19-1 and 19-2

Photo 15 – Partially buried culver at barrow area entrance

Photo 16 - East Surface Water Pond

Photo 17 - West Surface Water Pond

Photo 18 - Equalization Pond

Photo 199 - North Process Water Pond ditch

Photo 20 - North Process Water Pond

Photo 21 - South Leachate Reservoir

Photo 22 - East Leachate Reservoir

Photo 23 - New Leachate Reservoir

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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