APPENDIX B

2015 Annual Landfill Report Correspondence

Clean Harbors Canada, Inc.

2016 Annual Landfill Report

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NEEGAN BURNSIDE

August 5, 2016

Via: Email

Mr. Dean Jacobs
Consultation Manager
Walpole Island Heritage Centre
RR 3
Wallaceburg ON N8A 4K9

Dear Mr. Jacobs:

Re: Review of 2015 Annual Landfill Report
Clean Harbors Lambton Facility
Project No.: FEN020264.1601

Neegan Burnside Ltd. (Neegan Burnside) was retained by Walpole Island First Nation (WIFN) to provide a technical review of the Annual Landfill Report (ALR) completed on behalf of Clean Harbors Environmental Services (CH) for their Lambton Facility. The report covers a period from September 1, 2014 to December 31, 2016. Our previous review of the 2013/2014 ALR was dated June 25, 2015. This review is based on the following documents:

- 2014/2015 Annual Landfill Report for the CH Lambton Facility, which includes appendices related to site operations, inspections and construction, as well as monitoring of groundwater, surface water, air quality and biomonitoring.
- Letter from RWDI entitled "*Neegan Burnside Ltd. Review – 2013/2014 Annual Landfill Report (June 25, 2015)*" dated July 28, 2015 (but received by Neegan Burnside on March 21, 2016).
- Report from RWDI (attached to July 28 letter) entitled: "*Evaluation of the Potential Source of Elevated Sulphate Concentrations at TW42-99S*" dated July 20, 2015.

The following documents were also provided by Clean Harbors:

- Application for Amendment and Consolidation of Incinerator Tank Farm ECAs
- Application for Amendment to ECA - Landfill sub-cells
- Application for Amendment to ECA - SPL
- Condition 37 (a) (i) - Air monitoring program
- Condition 9 (a) (i) - Biomonitoring program
- Condition 9 (a) (i) - Surface water monitoring program
- Condition 9 (a) (iii) - Gas assessment program
- Conditions 9 (a) (i), 9 (g) and 35 - Groundwater monitoring program, Trench performance monitoring program, Sub-cell 3 monitoring program

These did not undergo an interactive formal review process, as Clean Harbors indicated that funding would only be provided for review of the ALR (refer to letter from Neegan Burnside to Walpole Island First Nations and forwarded to Clean Harbors dated May 4 for a discussion on the funding of the review of EPA documents). The assumption is made that through the ongoing review of the ALR, issues with the monitoring program, if present, will be identified and addressed. During this review it was noted that referral to these documents was necessary to fully understand the ALR and the documents were therefore cross checked without affecting the ALR review budget.

As per discussions with the First Nation groups, a separate review letter is being developed for Aamjiwnaang First Nations. It is recognized that although both Nations have similar concerns, there are enough unique interests that separate reviews are considered warranted. We have tried to keep the review inclusive enough to cover technical issues for both parties. As comments are received from the First Nations and Clean Harbors, individual responses or correspondence may be warranted depending on the needs.

1.0 Period of Review

CH has indicated that the intention is to align the review dates with the calendar years to make the reviews easier to follow. Although we note that CH has strived to do this, there are still some areas where the reviews do not line up. These are as follows:

- The Surface water monitoring included in the ALR does not include fall 2015 data or discussion. The last sample data reported is from May 2015. It is not clear whether the data was omitted from the report, or the work was not done due to lack of surface water. Efforts should be made to ensure that the data is aligned with the calendar year, or explanations included in the report to state why not.
- The Biomonitoring data is reported as being from the 2014 Field Year. This seems like a lengthy unnecessary lag between data collection and reporting. Since the data is not current, it may be difficult to correlate to activities going on at the site. We suggest that a double reporting year covering both 2015 and 2016 be included in the 2016 Annual Monitoring Report and data from then on be aligned to match the remainder of the reports.

2.0 Overall Discussion of Operations

2.1 Leachate Seepage

During the third quarter of 2014, there were at least 4 leachate seeps observed in the northern region of Sub-cells 9 through 11. We understand that these seeps were repaired by Clean Harbors the day after they were observed. We are pleased to see a quick response.

We also understand the area was inspected in the fourth quarter and the seeps were not observed. It is not mentioned during the remaining regular site visits whether the areas were inspected. We recommend that continued site monitoring includes an inspection of these areas or areas with similar cover so that it can be determined if seepage is occurring. We would like to see future reports include a specific comment on whether seeps are present or not.

The report did not include a satisfactory explanation of the cause of the seeps.

It is generally our experience that plugging the seep with clay is not effective, as the overlying causes of the seep are not addressed (e.g., leachate head is elevated in the cell, and is not migrating downwards, obstructions preventing the downward flow of leachate, etc.). We suggest that if seeps occur in the future, that a more robust assessment be undertaken to minimize the potential that it will occur again.

2.2 Status of Pumping Wells

Due to over excavation of the cell, extraction wells EW1a-01 and EW2a-01 are actively pumped as a mitigation feature to ensure an upward hydraulic gradient between the HCL and the underlying Interface Aquifer. Over four years of effort, pump operation has improved and now it appears as though the pumps are not offline for periods extending longer than a few days. However the pumps still continue to frequently go down. We understand this is due to power interruptions. We suggest that improvement is still needed, as this issue will only continue to escalate as more and more mitigation systems come on line.

2.3 Ponded Surface Water

Ponded surface water appeared to be a continuing problem during the first half of the reporting period. In March 2015, there were substantial areas of ponded surface water on site, as shown on the Site Plans. It is noted that in the last half of 2015 there was not as much ponded water. However, generally, there was not as much water on the site as a whole and therefore it is unlikely that the lack of any surface water is indicative of any improvements. We understand that the surface water system is to be improved as part of the ongoing site development. We have previously requested a schedule on when this work will be done, as the site as a whole would benefit if many of the mitigation features were installed sooner rather than later. This schedule has not been provided to date.

2.4 Construction Summary

The Construction Summary (Appendix G) is missing from the version of the report provided by Clean Harbors, as well as the online version of the report.

3.0 Hydrogeology

3.1 Issues Raised in the 2013/2014 Review

3.1.1 Cross-Sections

Our previous review suggested additional cross-sections to assist with site understanding. The response to our comment stated that these would be considered in future landfill reports. We recommend these be included in the 2016 report.

3.1.2 VOC impacts at TW22-99D

The report provides information on packer testing that took place during the reporting period. This was an attempt to determine if the casing above the well screen was leaking (possible source of TCE). The results were inconclusive because of restrictions in the well casing.

The report suggested that the well screen could be filled with bentonite (to prevent water from the interface aquifer entering the well) and the testing repeated. Table 14 reported that TCE is still present in TW22-99D at 3.3 to 5.2 ug/L, but remains undetected in TW60-13D. **We strongly disagree with placing bentonite in the well**, as the well would not be suitable for continued sampling. If concentrations increase, it may be necessary to investigate further, including installation of wells in the sand seams noted between 29 to 36 m at TW60-13D.

While no TCE was detected in TW60-13D, BTEX was reported in 2014 and 2015. The benzene concentration was as high as 9.5 ug/L in March 2015. RWDI has stated that the source is the Kettle Point shale. We note that benzene was detected in an off-site background well (TW57-11D) at 6.9 ug/L. Therefore, we concur that it is possible that the BTEX is from the shale. Continued assessment and monitoring of TW60-13D and TW57-11D is recommended.

3.1.3 Chloride Concentration at TW45-99S

Previous investigations by CH concluded that the increasing chloride levels at this well were facility related, although not necessarily landfill related. We note that in 2014/2015, the concentration of chloride at this well declined. We understand this well, plus TW62-13S and TW63-13S are to continue to be sampled. We are satisfied with the approach to date, but recommended continued assessment during each ALR. If concentrations increase, remedial action may be necessary.

3.1.4 Chloride Concentrations at TW40-99D, TW45-99D, and TW47-00D.

Our last review noted that chloride concentrations in perimeter wells TW40-99D, TW45-99D, and TW47-00D had been rising rapidly over the years. Chloride at TW47-00D had increased from below 1,000 mg/L to above 3,000 mg/L since 2009. TW22-99D and TW 60-13D also had elevated chloride concentrations. TW39-99D, the only other well in the northwest corner, had remained lower.

RWDI responded that the chloride is derived from the Kettle Point shale and have therefore added three wells screened in the Kettle Point shale to the monitoring program (every 2 years). We agree with this approach, as these wells will provide background data on water quality in the Kettle Point shale. We noted that the concentrations of chloride and sodium, in the perimeter wells in question, levelled or declined in 2014/2015.

As a side note regarding the calculation of vertical gradients, TW21-94-II and TW47-99D are too far apart (at 95 m) to be used to compare vertical gradients.

3.1.5 Berm Impacts (Elevated Sulphate at TW42-99S)

Our review of the 2012/2013 Annual Report noted that the sulphate concentration at TW42-99S had risen from approximately 200 mg/L in 1999 to approximately 1,600 mg/L in 2013. The report suggests this is the result of either soil weathering from berm construction to the north or field cultivation to the south. CH carried out investigations in 2014/2015 that included sampling surface water, soil and well construction materials. No definite source of sulphate was identified. The report recommends continued monitoring to determine if the current Pre-1986 area reconstruction alters the water quality. Additional investigation may be needed if the sulphate concentration remains elevated. At this time, we have no additional comments.

3.2 Other Comments

1) Several items in Appendix H in the electronic version of the report were missing (listed below). Neegan Burnside found some of the missing information from other sources, so that we could complete our review. However, the electronic version is not a completed record of the report. The following data was missing:

   - H-2.1 Monitoring Network - Well Logs
   - H-2.4 Well Decommissioning Records 2015
   - H-2.5 Well Installation Records 2015
   - H-3.4 Groundwater Sampling Field Notes
   - H-4.6 Statistical Analysis Results
   - H-5.1 Evaluation of the Potential Source of Elevated Sulphate Concentrations at TW42-99S
   - H-5.2 Redevelopment of TW46-99D
   - H-5.3 Ongoing Investigation of TCE Contaminants at TW22-99D

2) Pumping from the Sub-cell 3 Hydraulic Control Layer is based on cycle counts and a measured cycle volume. Changes to pumps (including wear) or discharge lines can change the cycle volume. Please confirm that the cycle volume is calibrated periodically, and if not this calibration should be incorporated into the regular site maintenance.

3) South Berm water levels – The shallow groundwater level under the south berm is reported to be mounded due to infiltration of precipitation. The water level in the stormwater ditch is reported to be lower than the groundwater level below the berms. Therefore, the shallow groundwater should flow inward from the berm toward the ditches. This system is meant to prevent contaminant movement beyond the berm.

   However, the water level hydrographs for the wells in the berm show seasonal variations of 2 to 3 m, possibly dependent on the amount of spring snowmelt and infiltration. If infiltration into the berm is not maintained (i.e., dry conditions with lower precipitation) the water level below the berm will decline. In September 2014, the water level at TW50B in the berm was 199.53 m while the water level at TW50A at the toe of the berm was higher at 199.87 m. This would have created a short term outward groundwater flow.

   In addition, significant storm events or the use of the stormwater ditches as water storage facilities would result in higher water levels in the ditches. This could create flow from the ditch toward the toe of the berm.

   Therefore, a wet spring could result in contaminant movement from the ditch to the toe of the berm. A dry summer could result in contaminant movement from the toe to below the berm. While this is not indicative of mass movement of contaminated water below the berm (water movement is slow in the low permeable soil), it does show that simple seasonal changes in water levels currently influence groundwater movement in this area. Continued monitoring and assessment of the water levels (in the waste, the surface water ditch and the berm) is required to evaluate the effect of the construction of the vertical expansion and leachate collection trench on water movement in the area of the south berm.

4) Shallow water levels and agricultural tile drainage – Several times in discussing shallow groundwater flow direction, the report notes that the "groundwater flow direction is unknown

but could be influenced by field tile". This is unlikely unless the field tile is unusually deep or the water table is very shallow (less than 1 m). The purpose of systematic field tile is to speed drying of the topsoil for tillage. Therefore, the tile is normally installed in the unsaturated zone above the water table. Most installations are less than 1 m below surface. While they can affect infiltration, they will not alter water movement below the water table. This statement should be reconsidered if there are no data on field tile depth in comparison to the water table depth in the area being discussed.

5) The report states that all wells in the interface aquifer are being instrumented with low flow or discrete interval samplers. Changing sampling methods can affect concentrations of some parameters. Please provide any comparisons completed for the current and new test methods.

4.0 Air Quality

1) Section 3.4, paragraph 2 says *"Concentrations levels measured at both the north and south sites did not exceed the Ontario daily standard of 120 µg/m³ on any of the twelve sample days. On July 29th winds were predominately from the south-southwest to southwest and resulted in alignment of the north and south sites with dusty gravel roads to the south of the monitoring sites. Concentrations of 174 and 112 µg/m³ were measured at the north and south sites, respectively. However, the Ontario 24-hour standard (120 µg/m³) was not exceeded on this day with consideration of both the north and south concentrations (downwind and upwind of the facility). TSP levels measured on the remaining eleven days were well below the 24-hour standard at both of the monitoring locations."*

   In the text, does "consideration" mean subtracting south from north so the facility is not out of compliance despite the concentration being above acceptable levels? This explanation could be more clear.

2) The explanation for high formaldehyde concentrations at the south monitoring location is *"Formaldehyde levels at the south site were consistently high irrespective of the prevailing wind directions which could indicate a nearby source. The maximum concentration of 64.4 µg/m³ was 99% of its 24-hour standard. The Fencing Company adjacent to the south monitoring location is a possible source of this parameter as they cut various wood products to fabricate fencing and deck components."*

   Examining the wind roses provided for all three days on which samples were taken (Jun 23, Jul 29 and Sep 3) shows a substantial fraction of the wind on all three days from the north easterly direction which is the approximate direction of the Clean Harbors facility.

   The government of Australia website "https://www.nicnas.gov.au/communications/publications/information-sheets/existing-chemical-info-sheets/formaldehyde-in-pressed-wood-products-safety-factsheet" indicates that the formaldehyde in wood products is from the resin used to hold together pressed wood products (chip board and plywood). In my experience, pressed wood products are not typically used for fences and decks, as they have poor resistance to water.

   By contrast, if you assume that the Clean Harbors facility is a substantial source of formaldehyde so that wind blowing from the site for a few hours would result in a significant

measured concentration, the wind roses and measured concentrations could support that argument.

The data in the report does not seem to support the conclusions provided. Please provide a better justification for why Clean Harbors is not the source of the formaldehyde measured at the south site.

3) More than 3 samples a year should be considered for future years.

5.0 Surface Water

The sampling program for surface water does not provide any clear direction indicating which criteria the data are going to be compared to. We had previously recommended and continue to recommend that the criteria be specified and trigger levels for action be defined.

We note that the toxicity testing has been discontinued. We have no issue with this modification, as it is consistent with what other sites are required to do.

The frequency of sampling has increased, which we agree with and we concur with other modifications to the sampling program.

The report states the following: "*During the current monitoring period, it is understood from Clean Harbors representatives that supplementary surface water sampling was not completed as sparse discharge occurring events did not align with planned semi-annual sampling events and as a result of the persistently low water levels in the Equalization Reservoir precluding the need for discharge from April 27, 2015 through December 31, 2015.*"

However, the lack of discharge should not affect all the surface water sampling from the site. The equalization basin could still be sampled and baseline data could have been collected from the downgradient sampling points (SNT6 and STN6A) regardless of whether there is discharge or not (it should be clarified if these sampling points were dry).

6.0 Biomonitoring Report Review

6.1 General Comments

6.1.1 Timing

We note that there was a substantial lag between the collection of data, and its submission, as previously mentioned. As the report is dated Nov. 2015, we presume a significant delay (>1 year) is encountered during the report preparation. Efforts should be made to correlate the submission timeline, so that the field data can be submitted alongside the ALR for the field year.

6.1.2 Inclusion of Control Charts

We note that the control graphs were not included for the measurements, although previous versions of the report have included control charts. We request inclusion of the control charts in future versions. As previously indicated, we suggest that other control chart parameters (such

as a number of consecutive increases/decreases) also be included in addition to comparison to the upper and lower limits.

6.1.3 UL/LL Format

We note that the assessment of datasets for normality and lognormality was completed by Stantec. This effort is appreciated, as it assists in ensuring relevance of reported data. We presume that the trendlines, when next updated, will be adjusted to reflect the correct distributions where applicable.

6.2 Specific Results

6.2.1 Iron

At sampling location N2, Iron was detected at 28,600 mg/kg, which is approximately 40% of the difference between the LEL and SEL (20,000 and 40,000 mg/kg respectively). Concentrations should be re-examined in subsequent years, and vegetation should be examined for potential impacts. As mature winter wheat was present at site N2, indication of leaf damage may be difficult to observe versus other crops.

6.2.2 2015 LL/UL Updates

Overall the LL/UL updates were reasonable given the ongoing monitoring framework. We did note however that Aluminum and Molybdenum both have substantial increases in their Upper Limits. Both of these metals have been researched in the past as a result of exceedances (Al in 2010, and Mo this year (2014)). We recognize that additional data presents better opportunities to determine the true characteristics of the background concentrations, but think some discussion of the validity of these changes would be beneficial for documentation. This may be best conducted during the next review of the trend line data.

6.3 Recommendations

6.3.1 Exceedance Tracking

There were 64 exceedances reported versus 84 last year. It would be beneficial from a reporting standpoint to include a table referencing the number of exceedances and amount of historical samples for each parameter, as it would assist in tracking reoccurring exceedances. We note a reference to this type of information in the response to previous comments on the monitoring program and assume that the data is available.

We also note that the exceedances in 2015 will be compared against updated UL and LL's, and so a comparison of trends may be difficult as a result.

We trust this review meets your current requirements. If you have any questions, please contact the undersigned.

Yours truly,

Neegan Burnside Ltd.

Kent Hunter, P.Eng.
Senior Project Engineer
KH:js

Joy Rutherford, P.Geo.
Project Hydrogeologist

cc: Mr. Jared Macbeth, Walpole Island First Nation (Via: Email)
Mr. Michael Parker, Clean Harbors (Via: Email)

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October 7, 2016

Mr. Kent Hunter
Senior Project Manager
Neegan Burnside Ltd.
17345 Leslie Street, Suite 200
Newmarket, Ontario, L3Y 0A4

Dear Mr. Hunter:

Re: Review of 2015 Annual Landfill Report - Clean Harbors Lambton Facility

The purpose of this letter is to provide responses to the 2015 Annual Landfill Report comments provided to Clean Harbors by Neegan Burnside Ltd. (Neegan Burnside) on behalf of Walpole Island First Nation (WIFN).

Comment:
These did not undergo an interactive formal review process, as Clean Harbors indicated that funding would only be provided for review of the ALR (refer to letter from Neegan Burnside to Walpole Island First Nations and forwarded to Clean Harbors dated May 4 for a discussion on the funding of the review of EPA documents). The assumption is made that through the ongoing review of the ALR, issues with the monitoring program, if present, will be identified and addressed. During this review it was noted that referral to these documents was necessary to fully understand the ALR and the documents were therefore cross checked without affecting the ALR review budget.

Response:
The company approved the budget set forth by Neegan Burnside for the review of the ALR. The other documents provided to Neegan Burnside were presented to provide both First Nations with detailed information regarding the applications that had been submitted by the company and details of the monitoring programs requested by MOECC within the landfill permit amendment of October 2015. The approved budget to review the ALR was not meant to cover the review of these other documents, but for the review of the 2015 ALR by Neegan Burnside.

The company is of the opinion that covering the cost of the review of the other documents proposed by Neegan Burnside is not warranted since the Ministry of the Environment and Climate Change had considered your comments prior the issuance of landfill approval.

Comment:
As per discussions with the First Nation groups, a separate review letter is being developed for Aamjiwnaang First Nations. It is recognized that although both Nations have similar concerns, there are

enough unique interests that separate reviews are considered warranted. We have tried to keep the review inclusive enough to cover technical issues for both parties. As comments are received from the First Nations and Clean Harbors, individual responses or correspondence may be warranted depending on the needs.

Response:
The separate review letter for Aamjiwnaang First Nations has not been received by the company.

1.0 Period of Review

CH has indicated that the intention is to align the review dates with the calendar years to make the reviews easier to follow. Although we note that CH has strived to do this, there are still some areas where the reviews do not line up. These are as follows:

Comment:
The Surface water monitoring included in the ALR does not include fall 2015 data or discussion. The last sample data reported is from May 2015. It is not clear whether the data was omitted from the report, or the work was not done due to lack of surface water. Efforts should be made to ensure that the data is aligned with the calendar year, or explanations included in the report to state why not.

Response:
April 26, 2015 was the last discharge date for the reporting period of the 2015 ALR. Persistently low water levels at the facility precluded the need to discharge between April 27, 2015 and December 31, 2015. Thus, no surface water monitoring was conducted during this period of time.

Contrary to what is suggested by the comments, the Surface Water Monitoring Report found within the 2015 ALR makes reference to this repeatedly:

1. Section 1.3.1.3, last paragraph.
2. Section 3.1, second paragraph.
3. Section 3.1.1, second paragraph.
4. Section 3.2, last paragraph.
5. Section 3.3, first paragraph.
6. Section 4.1.2, first paragraph.
7. Section 4.1.3, second paragraph.

Comment:
The Biomonitoring data is reported as being from the 2014 Field Year. This seems like a lengthy unnecessary lag between data collection and reporting. Since the data is not current, it may be difficult to correlate to activities going on at the site. We suggest that a double reporting year covering both 2015 and 2016 be included in the 2016 Annual Monitoring Report and data from then on be aligned to match the remainder of the reports.

Response:
Refer to comments for 6.1.1 below.

2.0 Overall Discussion of Operations

2.1 Leachate Seepage

Comment:
During the third quarter of 2014, there were at least 4 leachate seeps observed in the northern region of Sub-cells 9 through 11. We understand that these seeps were repaired by Clean Harbors the day after they were observed. We are pleased to see a quick response. We also understand the area was inspected in the fourth quarter and the seeps were not observed. It is not mentioned during the remaining regular site visits whether the areas were inspected. We recommend that continued site monitoring includes an inspection of these areas or areas with similar cover so that it can be determined if seepage is occurring. We would like to see future reports include a specific comment on whether seeps are present or not. The report did not include a satisfactory explanation of the cause of the seeps.

It is generally our experience that plugging the seep with clay is not effective, as the overlying causes of the seep are not addressed (e.g., leachate head is elevated in the cell, and is not migrating downwards, obstructions preventing the downward flow of leachate, etc.). We suggest that if seeps occur in the future, that a more robust assessment be undertaken to minimize the potential that it will occur again.

Response:
In this case it appears that plugging the seep with clay was successful since the seepage has not returned. We agree that in the event the seepage returns a more robust assessment can be conducted.

2.2 Status of Pumping Wells

Comment:
Due to over excavation of the cell, extraction wells EW1a-01 and EW2a-01 are actively pumped as a mitigation feature to ensure an upward hydraulic gradient between the HCL and the underlying Interface Aquifer. Over four years of effort, pump operation has improved and now it appears as though the pumps are not offline for periods extending longer than a few days. However the pumps still continue to frequently go down. We understand this is due to power interruptions. We suggest that improvement is still needed, as this issue will only continue to escalate as more and more mitigation systems come on line.

Response:
Clean Harbors personnel currently conduct monthly physical inspections of the pumping equipment. Other measures implemented include the installation of an indicator light as a visual indication if a power outage has occurred. This light is monitored by Clean Harbors' staff and the MOECC Provincial Officer at a minimum on a weekly basis. In addition, a high level indicator is to be installed in each pumping well to indicate if water levels have recovered over a trigger elevation as a further measure to increase the reliability of the system. This work is to be scheduled in the fall 2016 or spring of 2017.

2.3 Ponded Surface Water

Comment:

Ponded surface water appeared to be a continuing problem during the first half of the reporting period. In March 2015, there were substantial areas of ponded surface water on site, as shown on the Site Plans. It is noted that in the last half of 2015 there was not as much ponded water. However, generally, there was not as much water on the site as a whole and therefore it is unlikely that the lack of any surface water is indicative of any improvements. We understand that the surface water system is to be improved as part of the ongoing site development. We have previously requested a schedule on when this work will be done, as the site as a whole would benefit if many of the mitigation features were installed sooner rather than later. This schedule has not been provided to date.

Response:

Top soil from the pre-1986 landfill area was stripped as part of pre-construction of the new landfill during the Fall of 2015, and transferred over to the north east corner of the facility (subcells 10, 11 and 12). The area was graded to allow proper flow of surface water, and has successfully removed ponding at this area. The top soil contained seed from the vegetation originally growing on pre-1986, which has resulted with the vegetation of the north-east corner.

During late Spring 2016/early Summer 2016, the company dug-out the sediment out of the surface water ditches located at the North and North East corner of the facility, which has corrected the movement of water from the ponded areas to the North of the facility.

The company has retained the services of a new engineering consulting company to help re-design the surface water system at the facility. The consulting company will also provide the company with a course of action to remove the ponded areas situated at the North of the facility, and the company will provide this schedule once it is completed.

2.4 Construction Summary

Comment:

The Construction Summary (Appendix G) is missing from the version of the report provided by Clean Harbors, as well as the online version of the report.

Response:

No construction activities were completed during the reporting year related to Cell 18. Activities related to the expansion will be reported in the 2016 ALR.

3.0 Hydrogeology

3.1 Issues Raised in the 2013/2014 Review

3.1.1 Cross-Sections

Comment:

Our previous review suggested additional cross-sections to assist with site understanding. The response to our comment stated that these would be considered in future landfill reports. We recommend these be included in the 2016 report.

Response:
As outlined in Section 4.4.2 (Compliance Triggers) of the "*Final Draft Groundwater and Landfill Performance Monitoring Program*", Lambton Facility Landfill Expansion, Clean Harbors Canada, Inc., December 9, 2015, as part of the performance evaluation of the LCS to be conducted on a quarterly frequency, cross sections that present the water level data along transects are to be prepared. These cross-sections will be included in future annual reports. An additional transect through Cell 19-1 to TW48-00D will be included in the 2016 Annual Groundwater Monitoring Report.

3.1.2 VOC impacts at TW22-99D

Comment:
The report provides information on packer testing that took place during the reporting period. This was an attempt to determine if the casing above the well screen was leaking (possible source of TCE). The results were inconclusive because of restrictions in the well casing. The report suggested that the well screen could be filled with bentonite (to prevent water from the interface aquifer entering the well) and the testing repeated. Table 14 reported that TCE is still present in TW22-99D at 3.3 to 5.2 ug/L, but remains undetected in TW60-13D. **We strongly disagree with placing bentonite in the well**, as the well would not be suitable for continued sampling. If concentrations increase, it may be necessary to investigate further, including installation of wells in the sand seams noted between 29 to 36 m at TW60-13D. While no TCE was detected in TW60-13D, BTEX was reported in 2014 and 2015. The benzene concentration was as high as 9.5 ug/L in March 2015. RWDI has stated that the source is the Kettle Point shale. We note that benzene was detected in an off-site background well (TW57-11D) at 6.9 ug/L. Therefore, we concur that it is possible that the BTEX is from the shale. Continued assessment and monitoring of TW60-13D and TW57-11D is recommended.

Response:
Clean Harbors will continue to monitor TW22-99D for VOCs on a semi-annual basis to coincide with the routine groundwater monitoring events. As such, any changes in chemistry at this well will be documented and assessed as part of subsequent annual monitoring reports.

3.1.3 Chloride Concentration at TW45-99S

Comment:
Previous investigations by CH concluded that the increasing chloride levels at this well were facility related, although not necessarily landfill related. We note that in 2014/2015, the concentration of chloride at this well declined. We understand this well, plus TW62-13S and TW63-13S are to continue to be sampled. We are satisfied with the approach to date, but recommended continued assessment during each ALR. If concentrations increase, remedial action may be necessary.

Response:
Acknowledged. No response necessary.

3.1.4 Chloride Concentrations at TW40-99D, TW45-99D, and TW47-00D.

Comment:

Our last review noted that chloride concentrations in perimeter wells TW40-99D, TW45-99D, and TW47-00D had been rising rapidly over the years. Chloride at TW47-00D had increased from below 1,000 mg/L to above 3,000 mg/L since 2009. TW22-99D and TW 60-13D also had elevated chloride concentrations. TW39-99D, the only other well in the northwest corner, had remained lower. RWDI responded that the chloride is derived from the Kettle Point shale and have therefore added three wells screened in the Kettle Point shale to the monitoring program (every 2 years). We agree with this approach, as these wells will provide background data on water quality in the Kettle Point shale. We noted that the concentrations of chloride and sodium, in the perimeter wells in question, levelled or declined in 2014/2015. As a side note regarding the calculation of vertical gradients, TW21-94-II and TW47-99D are too far apart (at 95 m) to be used to compare vertical gradients.

Response:

Acknowledged. No response necessary.

3.1.5 Berm Impacts (Elevated Sulphate at TW42-99S)

Comment:

Our review of the 2012/2013 Annual Report noted that the sulphate concentration at TW42-99S had risen from approximately 200 mg/L in 1999 to approximately 1,600 mg/L in 2013. The report suggests this is the result of either soil weathering from berm construction to the north or field cultivation to the south. CH carried out investigations in 2014/2015 that included sampling surface water, soil and well construction materials. No definite source of sulphate was identified. The report recommends continued monitoring to determine if the current Pre-1986 area reconstruction alters the water quality. Additional investigation may be needed if the sulphate concentration remains elevated. At this time, we have no additional comments.

Response:

Acknowledged. No response necessary.

3.2 Other Comments

Comment:

1) Several items in Appendix H in the electronic version of the report were missing (listed below). Neegan Burnside found some of the missing information from other sources, so that we could complete our review. However, the electronic version is not a completed record of the report. The following data was missing:

- H-2.1 Monitoring Network - Well Logs
- H-2.4 Well Decommissioning Records 2015
- H-2.5 Well Installation Records 2015
- H-3.4 Groundwater Sampling Field Notes
- H-4.6 Statistical Analysis Results
- H-5.1 Evaluation of the Potential Source of Elevated Sulphate Concentrations at TW42-99S
- H-5.2 Redevelopment of TW46-99D
- H-5.3 Ongoing Investigation of TCE Contaminants at TW22-99D

Response:
It appears that Neegan Burnside received an early draft of the appendices. The final draft will be provided with a complete electronic copy of the report appendices.

Comment:
2) Pumping from the Sub-cell 3 Hydraulic Control Layer is based on cycle counts and a measured cycle volume. Changes to pumps (including wear) or discharge lines can change the cycle volume. Please confirm that the cycle volume is calibrated periodically, and if not this calibration should be incorporated into the regular site maintenance.

Response:
Pump discharge volumes are checked on a semi-annual basis as part of routine maintenance of the Subcell 3 system. This is accomplished by collecting the effluent from each pump into a calibrated bucket and comparing the volume obtained with the 'pump stroke volume' provided by the manufacturer (QED). In addition, the pumps are removed from each well and inspected/cleaned once every three years, or as necessary if necessary between inspections.

Comment:
3) South Berm water levels – The shallow groundwater level under the south berm is reported to be mounded due to infiltration of precipitation. The water level in the stormwater ditch is reported to be lower than the groundwater level below the berms. Therefore, the shallow groundwater should flow inward from the berm toward the ditches. This system is meant to prevent contaminant movement beyond the berm.

However, the water level hydrographs for the wells in the berm show seasonal variations of 2 to 3 m, possibly dependent on the amount of spring snowmelt and infiltration. If infiltration into the berm is not maintained (i.e., dry conditions with lower precipitation) the water level below the berm will decline. In September 2014, the water level at TW50B in the berm was 199.53 m while the water level at TW50A at the toe of the berm was higher at 199.87 m. This would have created a short term outward groundwater flow.

In addition, significant storm events or the use of the stormwater ditches as water storage facilities would result in higher water levels in the ditches. This could create flow from the ditch toward the toe of the berm.

Therefore, a wet spring could result in contaminant movement from the ditch to the toe of the berm. A dry summer could result in contaminant movement from the toe to below the berm. While this is not indicative of mass movement of contaminated water below the berm (water movement is slow in the low permeable soil), it does show that simple seasonal changes in water levels currently influence groundwater movement in this area. Continued monitoring and assessment of the water levels (in the waste, the surface water ditch and the berm) is required to evaluate the effect of the construction of the vertical expansion and leachate collection trench on water movement in the area of the south berm.

Response:
Monitoring of the South Berm wells has been expanded as part of the Engineered Landfill System Monitoring Program. As such, the six wells installed within and at the toe of the South Berm will be sampled and submitted for the parameters monitored as part of the groundwater monitoring program. It should be further noted that the perimeter leachate collection system (LCS) was installed and commissioned along the southern boundary of the property in late 2015, eliminating the need for the South Berm. The LCS is located between the waste in the Pre-1986 landfill and the southern perimeter surface water ditch. The terminal depth of the LCS is below the base of the perimeter ditch. Leachate levels are to be maintained between 196.5 mASL and 195.5 mASL inducing an inward hydraulic gradient towards the LCS. Groundwater levels in the vicinity of the LCS will be monitored through a series of monitoring well transects the first of which has been constructed in the vicinity of TW48-00D. An additional transect will be installed through TW52-02A, TW52-02B, TW42-99S and TW49-00D as part of construction of Cell 19-2.

Comment:
4) Shallow water levels and agricultural tile drainage – Several times in discussing shallow groundwater flow direction, the report notes that the "groundwater flow direction is unknown but could be influenced by field tile". This is unlikely unless the field tile is unusually deep or the water table is very shallow (less than 1 m). The purpose of systematic field tile is to speed drying of the topsoil for tillage. Therefore, the tile is normally installed in the unsaturated zone above the water table. Most installations are less than 1 m below surface. While they can affect infiltration, they will not alter water movement below the water table. This statement should be reconsidered if there are no data on field tile depth in comparison to the water table depth in the area being discussed.

Response:
It should be noted that the properties surrounding the Lambton Facility Landfill are generally flat with no apparent drainage relief. The water table is located within the weather zone of the clayey silt till overburden through which groundwater would travel relatively slowly. It has been presumed that the drainage tile is located above the clayey silt till, but under the tilled topsoil. Any infiltration is expected to preferentially flow along the path of least resistance. Under this condition, the tiles will provide the only mode of drainage and as such, exert a significant influence on shallow flow in the vicinity of the site.

Comment:
5) The report states that all wells in the interface aquifer are being instrumented with low flow or discrete interval samplers. Changing sampling methods can affect concentrations of some parameters. Please provide any comparisons completed for the current and new test methods.

Response:
It is recognized that the change in sampling methodology could result in a change in concentration of some parameters. As such a discussion of the potential impacts will be included in the 2016 Annual Landfill Report.

4.0 Air Quality

Comment:

1) Section 3.4, paragraph 2 says *"Concentrations levels measured at both the north and south sites did not exceed the Ontario daily standard of 120 µg/m³ on any of the twelve sample days. On July 29th winds were predominately from the south-southwest to southwest and resulted in alignment of the north and south sites with dusty gravel roads to the south of the monitoring sites. Concentrations of 174 and 112 µg/m³ were measured at the north and south sites, respectively. However, the Ontario 24-hour standard (120 µg/m³) was not exceeded on this day with consideration of both the north and south concentrations (downwind and upwind of the facility). TSP levels measured on the remaining eleven days were well below the 24-hour standard at both of the monitoring locations."*

In the text, does "consideration" mean subtracting south from north so the facility is not out of compliance despite the concentration being above acceptable levels? This explanation could be more clear.

> Response:
> The reviewer is correct in their interpretation. The facility was not out of compliance on July 29, 2015, since the concentration recorded on the north site was in part caused by the alignment of the north and south sites with dusty gravel roads to the south of the monitoring sites.

Comment:

2) The explanation for high formaldehyde concentrations at the south monitoring location is *"Formaldehyde levels at the south site were consistently high irrespective of the prevailing wind directions which could indicate a nearby source. The maximum concentration of 64.4 µg/m³ was 99% of its 24-hour standard. The Fencing Company adjacent to the south monitoring location is a possible source of this parameter as they cut various wood products to fabricate fencing and deck components."*

Examining the wind roses provided for all three days on which samples were taken (Jun 23, Jul 29 and Sep 3) shows a substantial fraction of the wind on all three days from the north easterly direction which is the approximate direction of the Clean Harbors facility.

The government of Australia website "https://www.nicnas.gov.au/communications/publications/information-sheets/existingchemical-info-sheets/formaldehyde-in-pressed-wood-products-safety-factsheet" indicates that the formaldehyde in wood products is from the resin used to hold together pressed wood products (chip board and plywood). In my experience, pressed wood products are not typically used for fences and decks, as they have poor resistance to water.

By contrast, if you assume that the Clean Harbors facility is a substantial source of formaldehyde so that wind blowing from the site for a few hours would result in a significant measured concentration, the wind roses and measured concentrations could support that argument.

The data in the report does not seem to support the conclusions provided. Please provide a better justification for why Clean Harbors is not the source of the formaldehyde measured at the south site.

Response:
The company acknowledges that a higher concentration of formaldehyde was observed at the south site station, whilst the north site was consistently lower. The wind direction for the three sampling event days last year show different prevailing winds for all three sampling days, yet the south site was always consistently higher than the north site. This suggests a localized outside source impacting the south site station, not the facility. This information has been provided to the Ministry of Environment and Climate Change for further investigation into the off-site source of formaldehyde.

Comment:
3) More than 3 samples a year should be considered for future years.

Response:
This measurement frequency and scheduling was recommended and approved by the MOECC in their pre-2011 program review.

5.0 Surface Water

Comment:
The sampling program for surface water does not provide any clear direction indicating which criteria the data are going to be compared to. We had previously recommended and continue to recommend that the criteria be specified and trigger levels for action be defined.

Response:
The company is following the program as approved by the MOECC.

Comment:
The report states the following: "*During the current monitoring period, it is understood from Clean Harbors representatives that supplementary surface water sampling was not completed as sparse discharge occurring events did not align with planned semi-annual sampling events and as a result of the persistently low water levels in the Equalization Reservoir precluding the need for discharge from April 27, 2015 through December 31, 2015.*"

However, the lack of discharge should not affect all the surface water sampling from the site. The equalization basin could still be sampled and baseline data could have been collected from the downgradient sampling points (SNT6 and STN6A) regardless of whether there is discharge or not (it should be clarified if these sampling points were dry).

Response:
As per the surface water monitoring plan approved by the MOECC, the facility only conducts sampling if it is discharging outside of the site, since the monitoring program is assessing any impacts the site's surface water could potentially have off-site. 2015 was an unusually dry year that resulted in a very small off-site discharge window; in 2015 onsite water was used for

quenching of the incinerator, until the ponds were completely reduced and the facility had to purchase potable water for the a number of months.

Plenty of precipitation in 2016 has avoided this scenario, and the facility has conducted both spring and fall events.

6.0 Biomonitoring Report Review

6.1 General Comments

6.1.1 Timing

Comment:

We note that there was a substantial lag between the collection of data, and its submission, as previously mentioned. As the report is dated Nov. 2015, we presume a significant delay (>1 year) is encountered during the report preparation. Efforts should be made to correlate the submission timeline, so that the field data can be submitted alongside the ALR for the field year.

Response:

We recognize the lag time between sample collection and reporting time; however, it is the only available option given the timing of sample collection relative to the reporting cycle. Specifically, the agricultural crops required to be monitored in the Biomonitoring Program are collected near harvest time which for most crops is typically in mid-October. Laboratory analysis for the inorganic and organic parameters in the Biomonitoring Program typically require a few months as the analysis requested are completed in specialized analytical facilities which can achieve the low detection limits required for most of the chemicals of interest, in particular for the organic analysis. Given the large amount of data generated for the Biomonitoring Program (30 inorganic analytes and four types of organic analytes, each collected at up to four environmental media at 14 sites) the data interpretation including statistical analysis requires several months. As the reviewer is aware, the Annual Landfill Report has to be submitted by April of the following year; however, given the time required for both laboratory analysis and data interpretation, the Biomonitoring Report is not available at this time. This approach was discussed and approved by the MOECC at the inception of the Biomonitoring Program.

6.1.2 Inclusion of Control Charts

Comment:

We note that the control graphs were not included for the measurements, although previous versions of the report have included control charts. We request inclusion of the control charts in future versions. As previously indicated, we suggest that other control chart parameters (such as a number of consecutive increases/decreases) also be included in addition to comparison to the upper and lower limits.

Response:

Control chart graphs were excluded to reduce the size of the report since exceedances of upper limits are presented annually in tabular form and discussed in the report. However, control chart graphs for parameters exceeding their applicable upper limits could be included in the next cycle of control chart updates. We agree that the number of consecutive increases would provide valuable insight and this will be included in future reports.

6.1.3 UL/LL Format

Comment:

We note that the assessment of datasets for normality and lognormality was completed by Stantec. This effort is appreciated, as it assists in ensuring relevance of reported data. We presume that the trendlines, when next updated, will be adjusted to reflect the correct distributions where applicable.

Response:

This presumption is correct; trendlines in the 2016 Annual Landfill Report will be adjusted to reflect correct distributions.

6.2 Specific Results

6.2.1 Iron

Comment:

At sampling location N2, Iron was detected at 28,600 mg/kg, which is approximately 40% of the difference between the LEL and SEL (20,000 and 40,000 mg/kg respectively). Concentrations should be re-examined in subsequent years, and vegetation should be examined for potential impacts. As mature winter wheat was present at site N2, indication of leaf damage may be difficult to observe versus other crops.

Response:

The Provincial Sediment Quality Guidelines (PSQG) Lowest Effect Level (LEL) and Severe Effect Level (SEL) guidelines are based on toxicity to benthic organisms. For this reason, benthic health is a better indicator of potential impacts of iron toxicity in sediment than vegetation health. A benthic study was conducted at Site N5 in the 2014 Field Year in response to concentrations of iron in sediment (29,700 to 41,800 mg/kg between 2011 and 2013 Field Years) above the PSQG LEL (20,000 mg/kg). The benthic study indicated that even with the exceedance of iron in sediment, water and habitat quality at Site N5 may be better than in the reference area (similar habitat outside of Clean Harbors' influence). It was concluded in the 2014 Annual Biomonitoring report that monitoring should continue, but no further investigation was required. Considering that the concentration of iron in sediment at Site N2 is below those investigated in the 2014 benthic study potential impacts at Site N2 are not expected. Monitoring of iron in sediment at Site N2 will continue including a review of site-specific trends to be conducted in the 2016 Annual Landfill Report.

6.2.2 2015 LL/UL Updates

Comment:

Overall the LL/UL updates were reasonable given the ongoing monitoring framework. We did note however that Aluminum and Molybdenum both have substantial increases in their Upper Limits. Both of these metals have been researched in the past as a result of exceedances (Al in 2010, and Mo this year (2014)). We recognize that additional data presents better opportunities to determine the true characteristics of the background concentrations, but think some discussion of the validity of these changes would be beneficial for documentation. This may be best conducted during the next review of the trend line data.

Response:
We agree with the reviewer comment and the increases in Aluminum and Molybdenum UL12 vs UL15 will be discussed with respect to the site-specific inorganic trendlines in the 2016 Annual Biomonitoring Report.

We trust this response meets your requirements. If you have any questions, please feel free to contact the undersigned.

Sincerely,

Erica Carabott
Senior Compliance Manager
Clean Harbors Canada, Inc.

cc: Mr. Dean Jacobs, Walpole Island First Nation (Via: Mail)
Mr. Jared Macbeth, Walpole Island First Nation (Via: Mail)
Mr. Michael Parker, Clean Harbors (Via: Email)