



Essex-Windsor Solid Waste Authority Regular Board Meeting Agenda

Meeting Date: Wednesday, September 14, 2022

Time: 4:00 PM

Location: Essex County Civic Centre
Council Chambers, 2nd Floor
360 Fairview Avenue West
Essex, Ontario N8M 1Y6

Meeting will be held in-person for Board Members and staff. Media representatives and interested members of the general public are invited to attend in-person.

LIST OF BUSINESS

PAGE NUMBERS

1. Call to Order

2. Roll Call of Board Members Present

Marc Bondy
Fabio Costante
Aldo DiCarlo
Gary Kaschak
Hilda MacDonald
Kieran McKenzie
Gary McNamara
Jim Morrison
Ed Sleiman

3. Declaration of Pecuniary Interest

4. Approval of the Minutes

A. August 10, 2022 Regular Meeting Minutes

1-12

5. Business Arising from the Minutes

6. Delegations

There are no delegations for September 14, 2022.

7. Waste Disposal

- A. Regional Landfill Leachate Management 13-47

8. Waste Diversion

- A. Organics Survey Update 48-52
B. Blue Box Recyclable Material Commodity Prices Update 53-55
C. Blue Box Update (Verbal report)

9. Finance & Administration

- A. Thank you to Board members

10. Other Items

11. By-Laws

- A. By-Law 14-2022 56
Being a By-Law to Confirm the Proceedings of the Meeting of the
Board of the Essex-Windsor Solid Waste Authority for September 14, 2022

12. Future Meeting Dates

To be determined.

13. Adjournment



Essex-Windsor Solid Waste Authority Regular Board Meeting MINUTES

Meeting Date: **Wednesday, August 10, 2022**

Time: **In-Camera Meeting 3:00 p.m.
Regular Session Immediately following In-Camera
Session**

Location: **Meeting Room C (2nd Floor)
Essex County Civic & Education Centre
360 Fairview Ave. West
Essex, Ontario N8M 1Y6**

Attendance

Board Members:

Gary Kaschak – Chair	City of Windsor
Fabio Costante	City of Windsor
Jim Morrison	City of Windsor
Ed Sleiman	City of Windsor
Aldo DiCarlo – Vice Chair	County of Essex
Hilda MacDonald	County of Essex
Marc Bondy	County of Essex
Gary McNamara	County of Essex (Ex-Officio)

EWSWA Staff:

Michelle Bishop	General Manager
Steffan Brisebois	Manager of Finance & Administration
Cathy Copot-Nepszy	Manager of Waste Diversion
Tom Marentette	Manager of Waste Disposal
Teresa Policella	Executive Assistant

City of Windsor Staff:

Anne Marie Albidone	Manager of Environmental Services
Tony Ardovini	Deputy Treasurer Financial Planning
Cindy Becker	Financial Planning Administrator

County of Essex Staff:

Mary Birch	Director of Council & Community Services/Clerk
Mike Galloway	County of Essex CAO
Sandra Zwiers	Director of Financial Services/Treasurer

Absent:

Board Members:

Drew Dilkens	City of Windsor (Ex-Officio)
Kieran McKenzie	City of Windsor
Shawna Boakes	Executive Director of Operations
Chris Nepszy	City Engineer/Commissioner of Infrastructure Services

1. Closed Meeting

The Chair called the meeting to order at 3:08 p.m.

Moved by Aldo DiCarlo

Seconded by Ed Sleiman

THAT the Board move into closed meeting pursuant to Section 239 (2) (i) of the Municipal Act, 2001, as amended for the following reason:

- (i) a trade secret or scientific, technical, commercial, financial or labour relations information, supplied in confidence to the municipality or local board, which, if disclosed, could reasonably be expected to prejudice significantly with the contractual or other negotiations of a person, group of persons, or organization.

**71-2022
Carried**

Moved by Gary McNamara

Seconded by Marc Bondy

THAT the EWSWA Board rise from the Closed Meeting at 5:37 p.m.

**74-2022
Carried**

2. Call to Order

The Chair called the Regular Board meeting to order at 5:37 p.m.

3. Roll Call of Board Members Present

Marc Bondy – Present
Fabio Costante – Present
Aldo DiCarlo – Present
Gary Kaschak - Present
Hilda MacDonald – Present
Kieran McKenzie – not present
Gary McNamara – Present
Jim Morrison - Present
Ed Sleiman - Present

4. Declaration of Pecuniary Interest

The Chair called for any declarations of pecuniary interest and none were noted. He further expressed that should a conflict of a pecuniary nature or other arise at any time during the course of the meeting that it would be noted at that time.

5. Approval of the Minutes

A. July 5, 2022 Regular Meeting Minutes

Moved by Marc Bondy

Seconded by Aldo DiCarlo

THAT the minutes from the Essex-Windsor Solid Waste Authority Regular Meeting, dated July 5, 2022, be approved and adopted.

**75-2022
Carried**

6. Business Arising from the Minutes

No items were raised for discussion.

7. Delegations

There were no delegations for August 10, 2022.

8. Waste Diversion

A. RFP Processing of Source Separated Organics

The Chair requested that the Board members advise Administration if there were any questions regarding the report.

Mr. McNamara noted concerns regarding complaints regarding an anerobic digester located in Tecumseh that receives material from Seacliff Energy Corp. (Seacliff). He believes that this is a concern and a discussion needs to be had with Seacliff. He would like to know what Seacliff is going to do with the organics.

The General Manager stated that in the RFP proponents were asked how odours were addressed. Reference checks were completed and Seacliff received very good references. She noted that perhaps the issue with the odour in Tecumseh is from material from other sources. She stated that Seacliff satisfied the RFP requirements and received the highest score.

Mrs. MacDonald stated that she spoke with Mr. Tiessen from Seacliff and they do not send material to the location described by Mr. McNamara. She further noted that they used to have odour issues but since have rectified the issue.

Mrs. MacDonald noted that Seaciff are experts in this field. She noted that she asked Seaciff if they can handle the tonnage from this area. Seaciff stated that they would give up tonnages from other areas to handle the Essex-Windsor area.

Moved by Aldo DiCarlo

Seconded by Hilda MacDonald

1. **THAT** the Authority Board award the Request for Proposals (RFP) for the Provision of Processing of Source Separated Organic Waste to Seaciff Energy Corp.
2. THAT the Authority Board authorize the Chair and General Manager to execute the Contract to engage Seaciff Energy Corp. for a five (5) year term commencing in Spring 2025 with the option to renew the contract for three (3) additional, one-year extensions or portions of a year thereof at the absolute unfettered discretion of the Authority, and such extensions shall be under the same terms and conditions contained within the executed Contract.

**76-2022
Carried**

B. Extension of Newspaper Sourcing to ReMM

The Manager of Waste Diversion explained that the Authority markets newsprint collected through the Red Box collection. The current contract with Recyclable Materials Marketing (ReMM) expires November 30, 2022. The two one-year extension clauses have been utilized. The recommendation is to extend the current contract with ReMM for the period of December 1, 2022 to August 28, 2024.

ReMM approached the Authority indicating that were interested in extending the contract and they would increase their contract by \$5.00 USD. Due to the upcoming Blue Box transition to Extended Producer Responsibility, extending the contract with ReMM is recommended. It is estimated that approximately 8,000 tonnes will be marketed during the term of this extension which will generate \$44,000 in additional revenue.

Moved by Marc Bondy

Seconded by Ed Sleiman

THAT the Board extend the contract for the sale of recyclable newsprint from the Blue Box Program to Recyclable Materials Marketing (ReMM) for the period December 1, 2022 – August 28, 2024 under the same terms and conditions of the current contract plus an adjustment premium of \$20 USD Per Ton for recycled newsprint, as mutually agreed upon by both parties.

**77-2022
Carried**

C. Zero Waste Event Update

The Manager of Waste Diversion provided an update regarding the City of Windsor's Zero Waste Depot at the opening ceremony for the Can-Am Police-Fire Games on July 26, 2022 held at Windsor's Festival Plaza.

Authority Administration were asked to support the event and worked with City of Windsor staff at the event.

There were 2,000 people in attendance at this event and only one 35-gallon cart of garbage was collected at the end of the event. She also noted the following was collected and diverted: 4 – 95-gallon carts of organic waste, 8 – 95-gallon carts of red box materials and 7 – 95-gallon carts of blue box material.

Due to the success of this Zero Waste Event, the Authority will be looking into created a zero-waste guide to be posted on the Authority's website for event organizers to utilize. This will help educate Essex-Windsor residents on the upcoming organics program. She noted that no other municipalities have a zero-waste policy and the Authority could provide support. There were no financial implications.

Mr. Morrison stated that he attended the event and it was an excellent event.

Mr. Kaschak stated that possibly other events in the area will have zero-waste events.

Moved by Jim Morrison

Seconded by Fabio Costante

THAT the Board receive this report as information.

**78-2022
Carried**

9. Waste Disposal

A. Large Volume Waste Customer Agreement

The Manager of Finance and Administration explained that Waste Connections current three-year 5,001 tonne per year contract with the Authority expires on August 31, 2022. Waste Connections advised the Authority that they would like to enter into a new 30,001 tonne per year contract for the period of September 1, 2022 to August 31, 2024 with an option to extend the contract for one (1) additional year upon mutual agreement.

If the Authority enters into this agreement with Waste Connections, it is anticipated that the Authority would guarantee approximately \$1,020,000 per contract year in tipping fee revenue. There would be no financial implications

as Waste Connections has exceeded their current contract for both years. The revenue from this contract will form part of the 2022 projection, 2023 and 2024 budget.

Moved by Hilda MacDonald
Seconded by Gary McNamara

THAT the Authority approve the execution of the contract with Waste Connections of Canada Inc. to deliver a minimum of 30,001 tonnes of refuse per year. The term of this contract will be September 1, 2022 – August 31, 2024 with an option to extend the contract for one (1) additional year upon mutual agreement. The rate for refuse delivered to the Regional Landfill will be \$34/tonne for the term of the contract.

**79-2022
Carried**

10. Finance & Administration

A. Restricted Acts of the Board

Moved by Gary McNamara
Seconded by Aldo DiCarlo

THAT the Board of the Essex-Windsor Solid Waste Authority, provisional upon City of Windsor Council, Essex County Council or the Board of the Essex-Windsor Solid Waste Authority being subject to the restricted acts of Council set out in Section 275 (3) of the Municipal Act, 2001, S.O. 2001 c. 25, following nomination day, delegate approval authority to the General Manager for the period August 19, 2022 to the date of first meeting of the newly appointed Board, to approve unbudgeted expenditures or liabilities exceeding \$50,000.

And further that the General Manager report to the Essex-Windsor Solid Waste Authority Board any use of this delegated authority at the first scheduled meeting of the Board.

**80-2022
Carried**

B. Amendment to Order and Proceedings Policy EW-001

The General Manager stated that at the May 3, 2022 meeting, the Board approved amendments to the Policy to allow for members of the Board in certain circumstances to attend and participate electronically in meetings that were otherwise scheduled to be held in person.

On June 7, 2022, Board Member Costante brought forward a Notice of Motion to request that the exceptions be expanded to those who want to attend the meeting virtually for other circumstances.

The General Manager described the current County of Essex and City of Windsor policies pertaining to electronic participation at Council and other Committee meetings.

Mr. Costante asked if operationally would it be difficult to conduct a hybrid meeting.

The General Manager stated that would depend on which meeting room is being utilized. Audio visual equipment is only available in Council Chambers. A Zoom meeting could be conducted in Council Chambers if the room was not being utilized by County Council, as was the case for today's meeting. A teleconference could be conducted in meeting rooms without audio visual equipment. Advance notice would be required to reserve the conference phone. In most situations it could be accommodated as long as advance notice was provided.

Mr. Costante motioned to move to a hybrid option.

Mr. Morrison seconded.

Mr. Morrison stated that he likes the County policy and would encourage people to be in-person as much as possible. He proposed a friendly amendment and asked Mr. Costante if he would be open to a limit of participating electronically 3 times per year.

Mr. Costante stated he would be okay with language stating a preference to attend meetings in-person but would like to provide flexibility to those who work full-time or have child care responsibilities. He does not really see a need to set a limit.

Mr. Kaschak asked if there were any other comments on the motion.

Mr. Costante asked for a seconder on the motion

Mr. Kaschak believed Mr. Morrison seconded the motion but asked again for a seconder.

Mr. Sleiman seconded the motion.

Discussion took place in order to clarify the motion wording as it pertained to the number of times per year a Board member could participate virtually and if a member could participate from outside of Canada.

Mr. Costante stated that the Board has to consider people that do not have the privilege to attend meetings in person and they might otherwise if they have the option to participate virtually with technology. Mr. Costante stated that he stands by his motion of a hybrid option.

Mr. Kaschak proposed a friendly amendment of attending 4 meetings virtually.

Mr. Costante maintains his motion of a hybrid option.

There was further discussion on how different Boards and Councils handle virtual meetings.

Mr. Kaschak asked if there were any other comments regarding the motion.

Mr. Kaschak called for a vote. The vote was tied and the motion did not carry.

Mr. Morrison proposed a friendly amendment to adopt the County's policy and remove the outside of Canada portion.

The General Manager explained the County's policy. She stated that we cannot say that we are going to adopt the County's policy. She believes that we would need to keep the wording on the bottom of page 36 of the agenda and add another paragraph stating other circumstances and a certain number of times per year. She noted that would more appropriately fit the Authority's by-laws.

Further discussion took place regarding the language on the number of times a member could attend virtually and providing accommodation to members.

Mr. Costante suggested limiting the number could be scrutinized as a human rights issue.

Mr. McNamara stated there are accommodations for those issues.

Mr. Morrison stated that he takes his motion off the floor.

Mrs. MacDonald stated that her concern is that a person will only participate via Zoom. There is an expectation to show up to meetings to the best of their ability.

Mr. DiCarlo stated that he appreciated Mr. Costante's position. Anyone that requires an accommodation should be accommodated but still thinks there is an understanding going in as a Board member to participate in-person.

Mr. Costante suggested that individuals with reasons under the human rights code would submit a request to the Board.

The General Manager agreed with Mr. Costante and further stated the motion was defeated and that the by-law remains the same.

Moved by Fabio Costante

Seconded by Jim Morrison

THAT the Board receive this report as information.

THAT the Board discuss the considerations for member participation in meetings, and determine what, if any, parameters to establish, to permit or limit participation remotely.

**81-2022
Carried**

Moved by Fabio Costante
Seconded by Ed Sleiman

THAT the Board expand the exceptions to those who want to attend the meeting virtually for other circumstances with no limitations.

**82-2022
Defeated**

C. January to June 2022 – 6 Month Financial Review

The Manager of Finance presented a six-month financial review of the operating costs and revenue comparing estimated results for the period of January to June 2022 to the 2022 budget.

The Manager of Finance highlighted some of the larger variances as follows:

- A favourable revenue variance of \$636,900 for ICI Refused Landfilled Tipping Fees. This pertains to the larger volumes of refuse and greenhouse material waste.
- A significant favourable revenue variance of \$1,249,500 in revenue from the sale of Recyclable Goods. This is a result of positive global market conditions due to low market supply which results in escalating commodity prices. In July, sales figures were starting to come down.
- A favourable revenue variance of \$147,700 in Product Stewardship Funding.
- An unfavourable variance of \$237,500 in Regional Landfill operating expenditures.
- An unfavourable variance of \$108,000 in Regional Landfill Compensation.

The favourable operating variance for January to June 2022 is approximately \$1,744,200 compared to the approved budget.

These projections will form the 2022 Projection as part of the 2023 Operating Plan and Budget.

Moved by Marc Bondy
Seconded by Hilda MacDonald

THAT the Board receive this report as information.

83-2022
Carried

11. Other Items

No other items were raised for discussion.

12. By-Laws

A. By-Law 10-2022

Moved by Gary McNamara

Seconded by Ed Sleiman

THAT By-Law 10-2022, being a By-law to Authorize the Execution of an Agreement between the Essex-Windsor Solid Waste Authority and Seacliff Energy Corp. for the Provision of Processing Source Separated Organic Waste.

84-2022
Carried

B. By-Law 11-2022

Moved by Ed Sleiman

Seconded by Marc Bondy

THAT By-Law 11-2022, being a By-law to Authorize the Extension of the Contract between the Essex-Windsor Solid Waste Authority and Recyclable Materials Marketing (ReMM) for the Sale of Recyclable Newsprint from the Blue Box Program.

85-2022
Carried

C. By-Law 12-2022

Moved by Hilda MacDonald

Seconded by Gary McNamara

THAT By-Law 12-2022, being a By-law to Authorize the Execution of an Agreement between the Essex-Windsor Solid Waste Authority and Waste Connections Canada Inc. for a Set Volume Put-or-Pay Contract for Waste Disposal.

86-2022
Carried

D. By-Law 13-2022

Moved by Marc Bondy

Seconded by Aldo DiCarlo

THAT By-Law 13-2022, being a By-law to Confirm the Proceedings of the Board of the Essex-Windsor Solid Waste Authority be given three readings and be adopted this 10th day of August, 2022.

**87-2022
Carried**

13. Future Meeting Dates

Wednesday – September 14, 2022

Tuesday – October 4, 2022

Tuesday – November 1, 2022

Tuesday – December 6, 2022

14. Adjournment

Moved by Jim Morrison

Seconded by Fabio Costante

THAT the Board stand adjourned at 6:47 p.m.

**88-2022
Carried**

All of which is respectfully submitted.

Gary Kaschak
Chair

Michelle Bishop
General Manager



Essex-Windsor Solid Waste Authority Administrative Report

September 7, 2022

To: The Chair and Board of the Essex-Windsor Solid Waste Authority

From: Tom Marentette, Manager of Waste Disposal

Meeting Date: Wednesday, September 14, 2022

Subject: Regional Landfill Leachate Management

Purpose

The purpose of this report is to provide the Board with information regarding the management of leachate and effects of increasing demands on the collection system and further to inform the Board that Administration will be engaging with the Town of Essex and their Consulting Engineer (Stantec) to study available treatment plant capacity and to explore the possibility of accepting leachate from the Regional Landfill at the Essex Pollution Control Plant (Essex PCP).

Background

The management of leachate at the Regional Landfill is comprised of several key components; collection, conveyance, retention, trucking and treatment. Following the excavation of a cell, a clay liner is placed and compacted throughout the floor of the cell. Next, a series of perforated collection pipes overlain by filter cloth and a layer of clear stone provides protection and filtration for leachate passing through to the collection pipes which is then pumped to retention ponds where the leachate is loaded into tanker trucks and transported to the Lou Romano Pollution Control Plant in Windsor for treatment.

It is also important to note that the Authority has been irrigating grasslands on site since the landfill opened in 1997 in an effort to reduce offsite trucking and treatment. In general, approximately 4% of all leachate produced from the Regional Landfill is applied to grow grass each year, thereby reducing operational costs to the Authority.

In recent years, a number of factors have contributed to an increase in leachate generation:

1. Change in waste stream (e.g. greenhouse vine-based waste material which has a high moisture content, and increases leachate generation);
2. Waste settlement has increased due to the decayable nature of the greenhouse vine-based waste material leading to the need for more frequent airspace recovery operations; and
3. Increase in waste footprint area (e.g. more area to capture precipitation, which increases leachate generation).

Leachate Generation Study - RWDI

In May 2022, the Manager and Supervisor of Waste Disposal contacted Mr. Brent Langille, Senior Technical Director and Principal with RWDI AIR Inc. (a Consulting Engineering company), to provide assistance with evaluating leachate generation at the Regional Landfill over time with a focus on the main cause or causes in an effort to understand and potentially reduce volumes. RWDI's report dated August 25, 2022 is attached to this report.

As presented in the report prepared by RWDI, there are various ways to evaluate data patterns as it pertains to leachate generation. Generally, when calculating leachate generation, the most common method is to calculate the percentage of leachate generated in consideration of the volume of precipitation that lands on a waste footprint in a given year. When considering this approach, it is expected that approximately 10 to 15% of the annual precipitation volume becomes leachate. This approach is used in the Authority's Annual Monitoring Reports (AMRs).

From the data presented in the AMRs, the average annual leachate volume generated from 2012 through 2016 (before receipt of vines) was 29,011 cubic metres (m³), which represented approximately 13% of the total precipitation volume to land on the waste footprint. Meanwhile from 2017 through 2021 (after receipt of vines) an annual average leachate volume generated was 74,110 m³, which represented approximately 27% of the total precipitation volume to land on the waste footprint. This change in total leachate volume generated represents a 109% increase between the two timeframes. Although the annual leachate volume is expected to increase as the landfill develops, the 109% increase between the two 5-year timeframes is not expected for a solid non-hazardous waste landfill. The expected increase in the average annual leachate volume generated at the Regional Landfill should have reflected the increase in waste footprint area of 34.5 ha to 44 ha. This waste footprint area increase of 27%,

should have generated an average annual leachate volume increase of 27%, as appose to the noted 109% increase in average annual leachate volume.

Discussion

At the December 16, 2021 Authority Board meeting, Administration provided an overview of the findings of the consulting firm WSP Canada Inc. (WSP) regarding Contaminating Lifespan Evaluations for closed Landfill No. 2 in the Town of Kingsville and closed Landfill No. 3 in the Municipality of Lakeshore to evaluate and estimate the potential active lifespan of closed landfills where leachate continues to be generated and require treatment.

The end of the Contaminating Lifespan Evaluations as identified by WSP in that report were estimated to be 2125 (103 years) for Landfill 2 and 2100 (78 years) for Landfill 3. It was stated in the report that the estimates are generally comparable to other Southwest Ontario closed landfill sites with similar waste and leachate characteristics and landfill size/waste volumes.

The Contaminating Lifespan Evaluations for these sites forecast significant financial burden to the Authority for ongoing site and infrastructure maintenance, leachate transportation and treatment. Similarly, the Regional Landfill will most likely yield very similar or perhaps even longer perpetual care impacts as it will remain an active landfill site into 2040.

Over the past year, Administration has been reviewing leachate volumes as part of normal operations and budget projections and also investigating trends with respect to major factors that contribute to leachate. One of the most obvious factors is precipitation as there is a direct correlation to leachate generation. Perhaps less obvious, but arguably even more impactful is the ongoing and increasing intensification of the greenhouse industry and that industry's need for regular disposal of vines and spent growing media. Sampling of typical vine loads indicates an approximate water content of up to 95% water.

Although it is estimated that it will take between 5 & 10 years for the water content to be fully released, assuming a worse case scenario of 1 year for full water release the below example is provided for budgetary considerations;

Given the volume of vines disposed in 2021 (101,862 tonnes), the tonnage of leachate water that would be released from those vines if they were to fully decay in one year would be:

101,862 tonnes of vines x 95% (water content) = **96,768.90** tonnes of leachate

Leachate Trucking and Treatment Costs;

Trucking = **\$5.26** per tonne (2022) + Treatment = **\$2.42** per tonne (2022)

Total Leachate Trucking and Treatment Costs = **\$7.68** per tonne

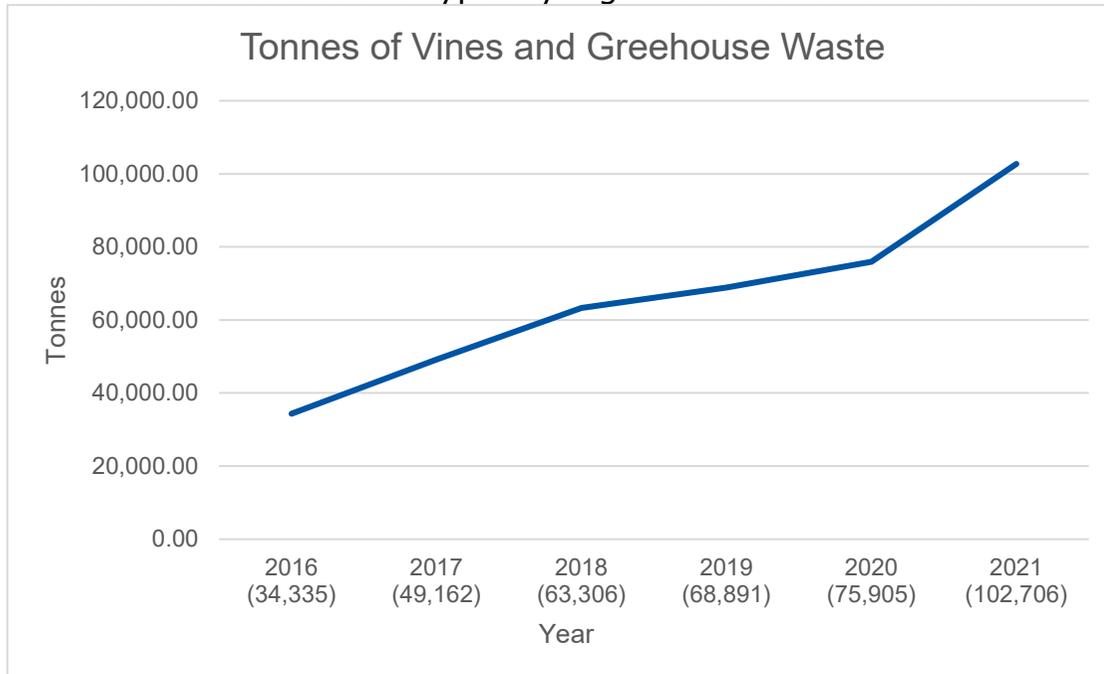
Therefore, total cost = **96,768.90** tonnes x **\$7.68** per tonne = **\$743,185.15** (2022)

Therefore, continuing with this worse-case scenario example, assuming 1 year for full water release, the vines deposited at the landfill in 2021 would impact the leachate budget in 2022.

Notwithstanding the above worse-case scenario example, due to time for the vegetable mass to decay and for the percolation time of the leachate through the waste mass, generally, we can assume that a large percentage of water content is released in year one and lessens until approximately year ten.

Although the above assumes a worst-case scenario whereby the leachate is generated in 1 year, as presented at the August 10 Board meeting, the six-month financial report identified an unfavourable leachate management variance compared to the 2022 budget. Administration is currently in the process of calculating the full 2022 leachate cost financial projection and 2023 budget figures. These figures will be reported as part of the 2023 Operational Plan and Budget.

Figure 1a. below illustrates the increasing tonnages of vine and greenhouse waste that constitute this typically high-water content waste.

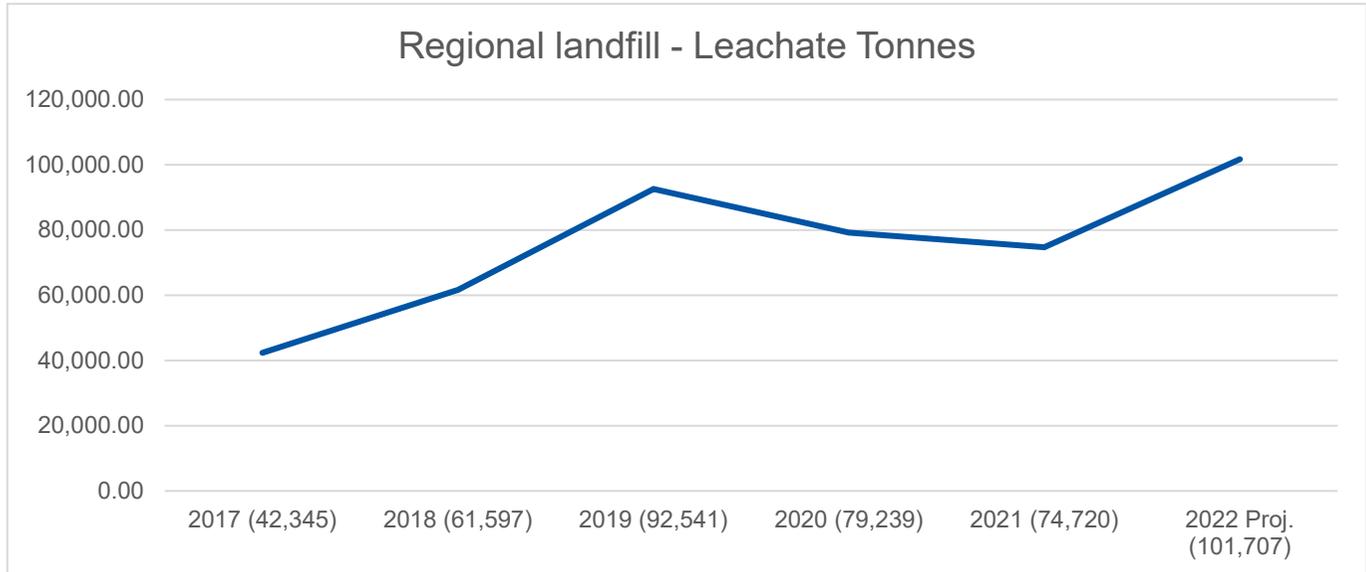


(Note: 2022 – year to date 55,956 tonnes)

Short-term and long-term operational leachate management considerations are summarized below.

- Increase in leachate trucking and disposal costs due to increased volume.
- Possible difficulties for waste water treatment plants to treat the volume and/or strength of leachate generated.
- Biofouling of the leachate collection and conveyance system and possible cleaning (requiring increased flushing frequencies, and chemical washes).
- Leachate seeps along side slopes (e.g. perched leachate underlying clay capped areas or decaying material plugging which may be plugging waste pores).
- Expected continued growth of this agricultural sector will ultimately result in further increases in leachate generation.

Below is the five (5) year history of leachate tonnes trucked from the Regional Landfill to the Lou Romano Pollution Control Plant



Current Leachate Hauling Contract

The term of the current leachate hauling contract started on July 2, 2020 and ends on June 30, 2027 with an option to extend the contract for a 1-year period under the same terms and conditions.

Due to the complexity of any long-term leachate management program and the possible lengthy timeline of initiating such projects, consideration of alternative programs such as a supplemental treatment facility or alternative method of transport should be reviewed without delay to coincide with the hauling contract end date.

Forcemain Concept to the Town of Essex Pollution Control Plant

In December 2021, the Manager of Waste Disposal on behalf of the Authority engaged in high level discussions with Administration staff from the Town of Essex regarding the potential for treatment of leachate from the Regional Landfill. The purpose was to confirm available plant capacity, interest and to facilitate the Board with information.

According to the preliminary response received from Town of Essex Administration in early 2022, they had consulted the Consulting Engineer for the Essex PCP

(Stantec) and the following study is recommended to explore the possibility of accepting leachate from the Regional Landfill at the Essex PCP:

- A review of current quantity and quality data for the leachate from the Regional Landfill,
- A desktop analysis, using a BioWin model of the Essex PCP, to assess the impacts of receiving leachate from the Regional Landfill on the performance of the Essex PCP and on the quality of the biosolids destined for land application,
- Review the findings of the desktop analysis, and determine whether treatability investigations are needed prior to accepting the leachate for treatment,
- Preparation of a Technical Memorandum to be prepared by Stantec.

Financial Implications

The estimated cost to engage with the Town of Essex and their Consulting Engineer (Stantec) for a study to explore the possibility of accepting leachate from the Regional Landfill at the Essex Pollution Control Plant is estimated to be approximated \$30,000.

Administration intends to utilize \$10,000 of existing leachate management funds included in the 2022 approved Budget for this study and the remaining \$20,000 will be included in the 2023 Operational Plan and Budget to be presented to the new Authority Board for approval.

In addition, Administration is also preparing cost estimates for the placement of additional clay capping on the landfill as there are significant areas of waste not covered with final cap as a result of various factors including airspace recovery efforts due to settlement and side slope improvement efforts (as noted in the RWDI report). Should budget considerations allow, some of this capping work may be completed in 2022 with additional and on-going clay capping work included in the 2023 Operational Plan and Budget.

Recommendation

1. That the Board receive this report for information.
2. That the Board receive the report as attached by RWDI as information.

Submitted By

A handwritten signature in black ink, appearing to read "Tom Marentette". The signature is fluid and cursive, with a large initial "T" and "M".

Tom Marentette, Manager of Waste Disposal

Attachment: RWDI Leachate Generation Study

ESSEX-WINDSOR SOLID WASTE AUTHORITY

ESSEX, ONTARIO

LEACHATE GENERATION STUDY

RWDI # 2205332

August 25, 2022

SUBMITTED TO

Tom Marentette, P.Eng.
Manager, Waste Disposal
tomemarentette@ewswa.org

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Figure 1: Landfill Cell Expansion Plan

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Appendix A: Leachate Time Concentration Graphs



VERSION HISTORY

Index	Date	Pages	Author
1	June 10, 2022	All	BJL
2	June 26, 2022	All	BJL
3	July 12, 2022	All	BJL
4	August 25, 2022	All	BJL



1 PURPOSE

The purpose of this undertaking was to evaluate leachate generation over the past ten (10) years in an effort to assist the Essex-Windsor Solid Waste Authority (the Authority) in evaluating the cause, or causes, of increased leachate volumes generated since 2017 at the Authority's Regional Landfill. The overarching approach of the study was from a high-level assessment such that the Authority can focus on the main cause, or causes, of the increased leachate generation in an effort to reduce the leachate generated, if warranted.

2 INTRODUCTION

A desk top study was completed of data available from the 2017/2018 and the *2019/2020 Biennial Monitoring Program Reports for the Essex-Windsor Regional Landfill Site* prepared by WSP in May 2019 and May 2021, respectively (AMRs), as well as from the 2019 and 2020 *Annual Monitoring Reports for Leachate Management Program Essex-Windsor Regional Landfill Site* prepared by WSP in May 2019 and May 2021, respectively (LMPs). Additionally, select data were provided by the Authority to RWDI. Data provided to RWDI was not verified for accuracy and was interpreted to be reliable for the purposes of this undertaking.

To evaluate for differences pre and post 2017, the pre-2017 period considered 2012 through 2016, while the post-2017 period considered 2017 through 2021.

3 ASSESSMENT

3.1 Leachate Generation Patterns

There are various ways to evaluate data patterns as it pertains to leachate generation. The most prevalent data pattern evaluation approach is to calculate the percentage of leachate generated in consideration of the volume of precipitation that lands on a waste footprint in a given year. This approach is used in the Authority's AMRs, as presented in Table 17. From the data presented in Table 17 of the AMRs, as well as from 2021 data provided by the Authority, the average annual leachate volume generated from 2012 through 2016 was 29,011 cubic metres (m³), while from 2017 through 2021 an annual average leachate volume generated was 74,110 m³. This change in total leachate generated represents an 109% increase between the two timeframes. Although the annual leachate volume is expected to increase as a landfill develops, the 109% increase between the two 5-year timeframes is not expected for a solid non-hazardous landfill. Moreover, the annual average percentage of leachate generated compared to the volume of precipitation landing on the waste footprint also showed a similarly large increase of 98% from the 2012 through 2016 period compared to the 2017 through 2021 period.



The function of evaluating the annual percentage of leachate generated compared to the volume of precipitation landing on the waste footprint is a common approach that enables a quick assessment if there are corrective actions needed to reduce causes of leachate generation. There are various factors that affect leachate generations, which are discussed below.

3.1.1 Main Causes of Leachate Generation Summary

The typical main causes of leachate generation for a solid non-hazardous landfill are presented below, in decreasing significance.

- Annual precipitation received
- Progressive increase of landfill footprint area over time (eg progressive increase to 100% of design)
- Area of waste not covered with any soil cover eg. (active tip face)
- Area of waste with only daily cover (eg. clayey silt to silty clay for the Regional Landfill)
- Waste Settlement (eg. increase sideslope angles promotes runoff to surface water to drainage ditches)
- Area of waste with only interim cover eg. (increased soil thickness limits precipitation infiltration)
- Waste stream(s) (eg. wetter waste such as vegetable waste)
- Area with final vegetated cover (eg. thicker cap and vegetation further limit precipitation infiltration).
- Climate considerations with respect to number of heating/cooling days and wind (drying events) (eg. drier days or precipitation patterns)

3.1.2 Main Causes of Leachate Generation Assessed

As there was a significant increase in average annual leachate generation from the 2012 through 2016 period to the 2017 through 2021 period, each of the aforementioned typical main causes of leachate generation were assessed.

- The **average annual precipitation** decreased by 9% from the 2012 through 2016 period to the 2017 through 2021 period, which would decrease the amount of leachate generated per square metre of waste footprint.
- The **waste footprint area increased** from the 2012 (35 hectares (ha)) through 2021 (44.5 ha), with a roughly estimated amount by RWDI to be 27%, which would increase the waste footprint area for precipitation to land and generate leachate. Refer to Figure 1 for the waste footprint prior to 2012 compared to the total waste footprint at the end of 2021.
- The **area of waste not covered or covered** with daily, interim, or final cap could not be compared over the 10-year evaluation timeframe. However, based on observations by RWDI during 2022, there is a significant area of waste not covered with final cap, which is a result of various factors including airspace recovery efforts and sideslope improvement efforts. The implementation of these efforts appears to be slowed due to personnel redirection to several tasks at once (eg. daily cover equipment/personnel are also repairing leachate seeps and recovering airspace as well as improving sideslope). Of note, additional to personnel redirection, the implementation of these task is also slowed due to personnel shortages pervasive in each industry since the onset of COVID-19.



- Sideslope optimization to promote precipitation runoff is needed and is likely an ongoing need due to **waste settlement** effects from the decayable nature of the greenhouse vine-based waste material. The magnitude of waste settlement of the decaying greenhouse vine-based waste material is significant. As an example, for the approximate 100,000 T of greenhouse vine-based waste material landfilled in 2021, which as discussed below is dominantly water, was placed across the 5-hectare waste footprint of Cell 3S, a settlement of this material of approximately 1.5 to 2.0 metres over time is very likely.
- Since 2016, there has been a **change in waste material coming** to the landfill site, with the amount of greenhouse vine-based waste material increasing substantially each year. Beginning in 2016 greenhouse vine-based waste material represented 34,335 metric tonnes (T) of the annual waste tonnage received. While in 2021 of the total tonnage received, 101,862 T was greenhouse vine-based waste material. This change represents an 197% increase in greenhouse vine-based waste material from 2016 through 2021. It is RWDI's understanding that prior to 2016 the annual mass of greenhouse vine-based waste material received at the Regional Landfill was substantially less than the 2016 tonnage. Greenhouse vine-based waste material is dominantly water, as discussed in more detail below.
- **Climatic factors** have also changed over the 10-year study timeframe with a pattern of increased number of hot days and rain events occurring over shorter durations but with greater intensity than seen prior to 2012. The combination of these two factors should actually decrease leachate generation potential. With short duration and high intensity rain events there is actually more runoff of precipitation than infiltration of precipitation. An exact assessment of this change is not warranted as their cumulative effect to decrease leachate generation would have an influence of approximately 2 to 3%, but not likely more than 5%.

In consideration of the above initial assessment observations, it is evident that the three main likely potential causes of increased leachate generation, in decreasing significance, are:

1. change in waste stream (eg. greenhouse vine-based waste material has a high moisture content, which increases leachate generation);
2. waste settlement due to decayable nature of the greenhouse vine-based waste material leading to airspace recovery needs and clayey soil cover, as well as sideslope grading optimization (eg. steeper side slopes promote increased runoff to reduce precipitation infiltration that would become leachate); and
3. increase in waste footprint area (eg. more area to capture precipitation, which increases leachate generation).

The change in waste stream since 2016, with a significant increase in greenhouse vine-based waste material mass is the most prevalent change at the Regional Landfill during the 10-year study period and therefore, would require a greater depth of analysis to understand its impact on leachate generation. The cover removal efforts for airspace recovery is larger than normal for a traditional non-hazardous solid waste landfill and is dominantly attributable to settlement of the highly decayable greenhouse vine-based waste material. The increase in waste footprint being an inevitable part of landfill development also contributes to an increase in annual leachate generation.

4 ANALYSIS

4.1 Leachate Generation From Precipitation Infiltration

When considering the assessment findings for the study timeframe, the increase in waste footprint, despite the decrease in average annual precipitation, would cause a net increase in leachate generation (via precipitation infiltration). This is calculated in consideration of the below input factors.

- The MECP standard of 0.1 m of infiltration per year for a final cap of 0.6m of soil and 0.15m of topsoil. However, RWDI's experience is that final cover typically permits less than 0.1 m of infiltration and more commonly could be 0.075 m of precipitation infiltration annually.
- Interim clayey soil cover typically permits 0.1 to 0.125 m of infiltration annually.
- Daily clayey soil cover typically permits 25% of the annual precipitation to infiltrate annually.
- Waste without cover typically permits 50% of the annual precipitation to infiltrate annually.

When estimating the annual leachate generation at the Regional Landfill it is assumed there is 34.6 ha with final cover, 3.3 ha with interim cover, 3.3 ha with daily cover, and 3.3 ha with no cover. Focusing on the 2017 through 2021 period and considering the above discussion and an average precipitation of 658 mm/year (available data for 2017 through 2020), the leachate generation breakdown for only the post-2016 period waste footprint would be as noted below.

- Interim cover: $3.3 \text{ ha} \times 0.1 \text{ m} = 3,300 \text{ m}^3$.
- Daily cover: $3.3 \text{ ha} \times 0.16 \text{ m} = 5,280 \text{ m}^3$.
- No cover: $3.3 \text{ ha} \times 0.33 \text{ m} = 10,560 \text{ m}^3$.
- Total: $= 19,140 \text{ m}^3$.

Therefore, as calculated above, in consideration of the areas with interim, daily, and no cover, as well as an average annual precipitation of 658 mm/yr, the area of waste developed post 2016 contributes 19,140 m³ more leachate per year by the end of 2021 than observed pre-2017. In another perspective, considering the combined cost of \$7.68/T to truck and treat leachate (\$5.26/T for trucking and \$2.42/T for disposal), this calculates to \$146,995 per year to truck and treat 19,140 m³ of leachate (costing does not account for annual increases such as consumer price index increases or fuel surcharges).

From 2012 through 2016, the total leachate generated with respect to percentage of annual precipitation was relatively consistent with the previous 10-year period (2001 through 2011) average, despite an approximate 5 ha waste footprint increase in 2012 (Cell 3 North). However, a large spike in leachate generation with respect to percentage of annual precipitation was observed to begin in 2017. With the knowledge that landfilling operations, as it pertains to waste placement and soil cover application remained relative consistent over the years, then it could be presumed that another site change was likely the cause of the sudden increase in leachate generation with respect to percentage of annual precipitation.

4.2 Leachate Generation From Waste

As discussed, beginning in 2016 the Authority began taking in significantly larger amounts of greenhouse vine-based waste material than prior to 2016. As it is commonly understood, organics rapidly decompose. For example, our household vegetable scraps nicely decompose in backyard composters to a beneficial by-product: compost. However, those same composters have other organics added to them that materially differ from greenhouse vine-based wastes.

From a leachate generation perspective, municipal solid waste (MSW), as well as industrial, commercial, & institutional (IC&I) waste as averaged together can have a moisture content of 25%, with the ability to hold around 40 to 50% moisture when saturated at a compacted state (porosity filled). Therefore, traditional MSW and IC&I waste can act as a sponge until saturated. Once the waste becomes saturated, the waste no longer has the capacity to absorb water and a flow through situation develops, which results in leachate becoming directed to the leachate collection underdrain system for eventual off-site treatment and disposal.

To evaluate the differences between traditional waste (MSW and IC&I) and the greenhouse vine-based wastes, three distinct samples of waste were collected from the Regional Landfill to evaluate moisture and density/volume of the materials. The samples were: 1) MSW/IC&I; 2) vines (cucumber); and 3) waste vegetable (mixture of cucumber, tomatoes, and peppers). It is noted that at the time of sampling there was a significant precipitation event occurring and as such, the measured moisture of the MSW/IC&I sample is skewed higher than it would normally come into the landfill. By nature of their make-up, the vine and vegetable material samples did not absorb any significant amounts of the precipitation and therefore, the precipitation is interpreted to have a negligible influence on the results.

Moisture Analysis Results

- MSW/IC&I waste: 57%
- Vines waste: 95%
- Vegetables waste: 95%

As can be seen above, as a result of the precipitation, the moisture content of the MSW/IC&I sample was skewed above the expected 25% moisture for incoming waste. Both the vine and vegetable material samples were equivalent at 95% moisture. Most of the mass of greenhouse waste stream is dominantly vines or vegetables, with the other component comprising of putrescible (easily decayable) materials (eg. cardboard). The sum of these materials can reasonably represent approximately 100% putrescible waste from a high-level assessment perspective.

It is important to rediscuss the point that as precipitation works its way (percolates) through waste, or as wetter waste leaches, the drier waste (MSW/IC&I) material absorbs the liquid until it is saturated. Once the waste is saturated a flow through situation develops and the percolating liquid from the waste mound flows to the leachate collection system at the base of the landfill. A residence time of 1 month to several months can be expected for



drier waste (MSW/IC&I) material to become saturated and then begin to release (flow through situation) the liquid as leachate.

5 INTERPRETATION

5.1 Airspace Utilization

The fundamental practice for landfill waste filling optimization, or otherwise referred to as airspace utilization, is to place as much waste into a given volume as possible. This fundamental practice was considered when evaluating the waste streams received at the Regional Landfill with respect to leachate generation.

5.1.1 Industry Understood (Norm)

From an industry norm, a waste density of 850 kg/m³ can be expected for MSW/IC&I waste once compacted. Actual compacted waste densities may vary depending on various items, such as but not limited to, waste stream makeup, waste filling practices, decomposition over time, and the overall column (thickness) of waste. However, 850 kg/m³ is a reasonable air space utilization to expect for a solid nonhazardous landfill such as the Regional Landfill. This essentially means that for every 0.85 T of MSW/IC&I waste received and compacted, 1 m³ of air space is utilized in perpetuity. It is noted that although there is settlement and decomposition of components of this typical waste stream, the extent of these effects generally yields the structural mass of 850 kg/m³ over time.

5.1.2 Industry Research

For the greenhouse vine and vegetable waste, however, there are **no solid nonhazardous landfills in Ontario that receive this scale/mass of greenhouse vine-based waste material annually** whereby to draw upon real-world experiences. As such, there is not an industry norm to rely upon for waste density for material of this makeup. However, the moisture results show that 95% of the deposited waste material is water. With the eventual removal of this water from within the greenhouse vine and vegetable waste material during the compaction and decomposition of this material, the resultant material is not large in volume and would be expected to settle to 5% of its original placed volume. In other words, this material can be expected to settle by as much as 95%. In comparison to the aforementioned example, for every 0.85 T of greenhouse vine-based waste material received and compacted, 0.04 m³ of air space is utilized in perpetuity. For a vertical visualization perspective, for every 1 metre of thickness of greenhouse vine and vegetable waste material placed, up to 0.95 m of settlement could be expected. This change over time is a significant amount of airspace to recover or need to reenter areas over time to correct for waste settlement, and/or cap area to repair to prevent areas that would promote precipitation infiltration.



Shown below is a summary of vine/vegetable mass received from 2016 through 2021, as well as a comparison to the leachate expected to be generated and the resultant solid mass left to consume airspace.

Year	Vines/Vegetable (T)	Water/Leachate @ 95% (T)	Solids (T)
2016	34,335	32,618	1,717
2017	49,162	46,704	2,458
2018	63,306	60,141	3,165
2019	68,891	65,446	3,445
2020	75,905	72,110	3,795
2021	101,862	96,769	5,093

With the understanding that the vine/vegetable components of the greenhouse waste stream releases significant amounts of water beginning at placement (eg. visualize squeezing a fresh tomato or any rotten vegetable), but would then take a longer period of time to fully decompose along with the other putrescible wastes (eg. cardboard). It is estimated that over a 5 to 10 year period for the water from the greenhouse waste stream to fully release and become leachate. This time frame could be even shorter (less than 5 to 10 years) depending on where the waste is being placed/deposited and the amount of on-going compactive effort being exerted on the waste (eg. If the waste is placed and landfill compactor continually drives over it). This decomposition rate is an estimate and should not be considered factual and is presented only for discussion purposes. Formalized studies would be needed to understand the actual rates of decay in the uncovered waste areas where traditional aerobic decomposition can occur, and deeper (0.5 m below surface) waste areas covered with clayey soil or waste in an anoxic environment. This estimation approach and lack of anecdotal data is mostly attributed to the unique incoming waste stream that is accepted for disposal at the Essex-Windsor Regional Landfill with respect to the increasing higher organic waste (vines and greenhouse waste) percentage compared to MSW and IC&I waste.

As discussed above, the magnitude of waste settlement of the decaying greenhouse vine-based waste material is significant. As an example, for the approximate 100,000 T of greenhouse vine-based waste material landfilled in 2021, which as discussed is dominantly water, that was placed across the 5-hectare waste footprint of Cell 3S, a settlement of this material of approximately 1.5 to 2.0 metres over time is very likely. Considering landfilling of this material remains in a given cell for the estimated 10-year period for settlement, then a cumulative settlement effect would occur over time and **could represent as a multiple metre settlement per year** as time progresses over the 10-year period.

5.2 Operational Challenges

The rapid settlement of the greenhouse vine-based material also creates other operational challenges as it relates to: waste filling along the sideslopes; leachate management; and landfill gas management.

The rapid settlement of waste along the sideslopes creates an operational challenge in that a previously interim or final capped area may visually appear to a landfill operator that that area was never filled to waste grades in a matter of a few seasons (less than 1 year). Seeing a settled area would indicate to the operator that waste filling is

required at that location and they'd then push waste into that area and inadvertently pushing waste over the capped area. In this instance, the clay will act as an impermeable lens to preclude precipitation flow down through the waste column to the collector system. The build of leachate on this lens will typically causes leachate seeps along the side slopes. These leachate seeps require attention of heavy equipment to correct, which would need to be sourced from other routine operational activities (eg. daily cover application).

The process of the decaying waste causes another underlying problem beyond the physical attributes related to settlement, which is the eventual plugging of the pore space in the underlying waste. As the smaller particles of solids (decayed organic material) move down through the waste column with the flow and percolating precipitation (leachate) they will eventually build-up in the pore space. This buildup of material will reduce the rate leachate and landfill gas can move through the pore space within the waste column. As an example, visualize an air filter on a house HVAC-system becoming plugged with dust over time and restricting the air flow rate through that HVAC-system. Unlike a HVAC_system air filter, the waste cannot be changed out and would require corrective action to prevent leachate sideslope seeps such that leachate can flow down to the under-drain collection system.

Similarly, the plugging of the pore spaces would also limit the rate landfill gas can flow through the waste for collection. Notwithstanding this reduction in gas flow through plugged pore spaces, the amount of landfill gas generated from the decay of the greenhouse vine-based waste is much greater than expected for a traditional MSW/IC&I landfill. This creates an operational challenge as the modelling used to determine the number and spacing of landfill gas collection wells likely did not account for this larger than normal landfill gas volume generation. Aside from landfill gas bypassing the collection system and escaping to the atmosphere and negatively affecting our climate, there would be greater pressures within the waste mound which means that it will affect the movement of leachate and landfill gas. As the landfill gas pressure builds up the gas will go to areas of lower pressure, which typically is the gas collection system. If the landfill gas collection system cannot collect the gas fast enough, the gas will escape through weak points in the landfill cap. Escaping landfill gas can also cause leachate to seep out in the same area, specifically in areas where leachate is perched on an impermeable lens near a sideslope.

It is noted that excessive landfill gas and leachate volumes will heat up the waste mound, and potentially to temperatures that can cause other operational challenges, such as but not limited to, deforming/melting of leachate and landfill gas collection piping (vertical or horizontal); or as severe as fires.

5.3 Leachate Generated 2021 Example

From a high-level perspective example, for the 2021 year, of the 74,920 T of leachate generated, the component interpreted to come from the greenhouse vine-based waste material is 21,180 T, or approximately 1/3 (33%) of all leachate generated. The remaining 50,000 T is comprised of:

- a) 19,140 T from 9.9 ha waste area post-2016; and
- b) 34,600 T from the 34.6 ha waste area pre-2016 (this area is interpreted to be completed with final or interim cover material).

For a visual perspective on the volume that these leachate values represent, 1 T of leachate is equal to 1 m³ of leachate, or 1,000 litres, or equivalent to 1,000 cartons of milk. Each leachate tanker truck sent to Lou Romano



wastewater treatment plant (WWTP) holds 40 m³, or 40,000 L of leachate (or could hold a lot of milk carton's worth of liquid). To expand on this visualization, the 21,180 T of leachate generated from the greenhouse Vine-based material, which is equal to 530 trips of leachate tankers to Lou Romano WWTP, for a total of 21,180,000 L of liquid (or many milk carton's worth of liquid).

It is noted that for a solid nonhazardous landfill of this size (44.5 ha), an average annual leachate generation of 40,000 to 50,000 T is a reasonable volume/mass to expect which would represent approximately 53% to 67% of the leachate volume/mass generated at the Essex-Windsor Regional Landfill in 2021. From a purely cost perspective, the annual operational budget needs to account for this increased leachate volume to truck and dispose.

5.4 Revenue Analysis

Although significant water is released to become leachate, the airspace can be recaptured for resale for other incoming waste. From a revenue perspective, this reusable/resalable airspace may seem beneficial, as shown below for the 2021 period. However, **there are various factors discussed further herein that detract from the revenue benefits of accepting greenhouse vine-based waste material, some of them being significant.** These factors include, but are not limited to, operational inefficiencies, environmental nuisances related to the re-exposure of previously landfilled and covered waste areas, as well as leachate disposal challenges.

2021	Gross Revenue ¹	Expense ²	Net Revenue
Vines/Vegetable (T)			
101,862	\$3,565,170	-	\$2,821,984
Water/Leachate (T)			
96,769	-	\$743,186	

Notes: 1) Gross revenue denotes material charged at \$35.00/T.
 2) Expense considers leachate trucking (\$5.26/T) and disposal (\$2.42/T) rates are held for the roughly 10 year period for the water to release from the material. No consideration was given to operational expenses as it relates to placement and compaction of greenhouse vine-based waste material. Also, no consideration was given to the expense of recapturing airspace (equipment/labour cost/road construction for new area), difficulties in estimating waste overbuild to account for predicted settlement after final cap placement; or leachate disposal challenges/restrictions.

6 FUTURE DIRECT CONSIDERATIONS

Direct short-term and long-term, leachate management considerations are required and are summarized below.

- Increase in leachate trucking and disposal from a volume perspective.
- Increase in leachate trucking costs from a logistics perspective as the trucking industry is significantly impacted by personnel availability.
- Increase leachate trucking costs due to fuel costs and inflation.
- Increased leachate treatment costs based on volume.



- Possible difficulties for waste water treatment plants to treat the volume and/or strength of leachate generated.
- Biofouling of the leachate collection and conveyance system and possible cleaning (increased flushing frequencies, and chemical washes).
- Leachate seeps along sideslopes (eg. perched leachate on buried capped areas or decaying material plugging of waste pores).

6.1 Trucking Considerations

The cost projections related to trucking cannot be discussed in too great of detail except to note that with increased leachate volume there will be increased trucking required. Modelling can be completed to understand this budget consideration more accurately moving forward, other than discussed herein.

The logistics perspective for trucking availability right now is a significant problem in Ontario, as well as in beyond geographies. Sarnia Paving Stone (SPS) is an excellent company, but discussions with SPS for increased trucking availability should be held to outline the need for an estimate of 80,000 to 90,000 T annually for the Regional Landfill, in addition to what they manage for the closed Landfill Site No. 3 in the Town of Lakeshore. A similar concern exists for fuel supply costs, as well as the beginning of significant global shortages of diesel exhaust fuel (DEF) both dominantly brought on by labour shortages, global COVID recovery efforts, and more pressingly the upheaval in Eastern Europe.

6.2 Leachate Treatment Considerations

Leachate Volume

With the increase in leachate volume generated there is a possible limitation whereby waste water treatment plants may not be able to manage the increased volume and more concerningly in the future. At this current leachate generation pace and with the continued acceptance of greenhouse vine-based waste material, leachate volume disposal restrictions is considered a significant potential concern as there must be a location to send the leachate such that it does not accumulate in the landfill.

Leachate Chemical Strength

The chemical composition of leachate generated from landfill areas with vine-based waste material is elevated, or is beginning to elevate, in strength significantly for the primary parameters of concern for the operation of a WWTP. The noted chemicals of focus are specifically biological oxygen demand (BOD); chemical oxygen demand (COD); total dissolved solids (TDS); ammonia, potassium, and phosphorous. The two leachate sampling locations that represent leachate from cells that contain greenhouse vine-based waste material are Pumping Station 1 (PS1) and PS2. PS2, which collects leachate from Cell 4 North; and PS1 which collects leachate from Cell 1, Cell 2, and Cell 3 North. Both PS1 and PS3 have significantly elevated concentrations of these parameters when compared to PS3, which collects leachate from the old West Cell. Refer to Figure 1 for the locations of PS1, PS2, and PS3.



It is noted that PS3 does not collect leachate from a waste source that has greenhouse vine-based waste material of any significant quantity (<5% greenhouse vine-based waste material). PS2 collects leachate from a waste source that has roughly 50% greenhouse vine-based waste material compared to traditional MSW and IC&I waste. PS1 collects leachate from a waste source that has roughly 25% greenhouse vine-based waste material compared to traditional MSW and IC&I waste.

PS1's leachate strength is weaker than PS2's for the aforementioned parameters as the make-up of leachate within PS1 has a lesser volumetric input of leachate derived from greenhouse vine-based material than that of PS2. PS3 leachate does not show influences of greenhouse vine-based waste material. The data for the above-noted leachate chemical strength discussion is presented in Table B-3, Appendix B of the 2020 LMP.

Refer to the figures within **Appendix A**, which show the time concentration graphs for the above noted pumping stations and parameters of focus for WWTPs. As the graphs show, the concentrations of BOD, COD, TDS, ammonia, potassium, and phosphorous sharply increase in concentration within the leachate collected from PS1 and PS2 since 2016, which is when the greenhouse vine-based waste material began being managed for final disposal at the Regional Landfill.

As the aforementioned parameters are the primary parameters of focus for a WWTP, and the concentrations are currently elevated and very likely will become more elevated as the 393,461 T of greenhouse vine-based waste material received from 2016 through 2021 continues to decompose and release its 95% water mass over the next 5 to 10 years (approximately).

If greenhouse vine-based waste material were to immediately stop today, it is expected that the leachate will continue to increase in volume and strength (short increase then decrease) over the coming 5 to 10 years. If the greenhouse vine-based waste material does not stop being deposited at the Regional Landfill, then both leachate volume and strength will increase over time, proportionate to the volume/mass of this agricultural waste deposited annually. Leachate of this nature may become problematic for waste water treatment plants to manage at the volumes needed due to potential restrictions based on chemical strength.

7 FUTURE INDIRECT CONSIDERATIONS

Indirect short-term and long-term leachate management considerations should be evaluated and are summarized below.

- Potential effects to the Site's contaminating lifespan (CLS) and the associated long-term Landfill Liability expense the County of Essex and the City of Windsor are required to carry in their respective annual budgets.
- Biodigesters at greenhouses are currently managing some component of their vegetable waste as the decaying nature of the material generates methane, which is used as renewable natural gas.
- Waste stream management considerations with respect to *The Food and Organic Waste Policy Statement* (Ministry of Environment and Climate Change, April 30, 2018).
- Government of Canada's and Ontario's policies and objectives (eg. Net-Zero by 2050);



- Conflicts, perceived or real, between operational practices to accept the greenhouse vine-based waste material as IC&I waste, which is completely permissible, and the principal objective of the Ontario Provincial Policy Statement to divert organics from landfill, as well as the *Organics and Biosolids Waste Management and Processing Project, Phase 1 – Consulting and Project Direction Analysis and Recommendations* (GHD, April 2021).
- Government of Canada's and Ontario's Climate Change Reduction Plans (eg. *Canadian Net-Zero Emissions Accountability Act*);.
- Potential need for Greenhouse Gas Reporting based on waste composition/management and methane emissions.
- Environmental, Social, and Governance (ESG) responsibilities that the Authority would want to implement in accordance your Mission Statement in an environmentally sound manner through processes, such as but not necessarily limited to reduction, reuse, recycling, composting, and landfilling.

For an example of the indirect effects of managing the greenhouse vine-based waste, the increased volume of trucks causes an increase in greenhouse gas generation, which could potentially be avoided with other management options. For 2021, an additional 21,500 T of leachate that was attributed to come from the greenhouse vine-based waste stream was managed by the Authority. For every truck that travels the roughly 70 km round trip to the Lou Romano WWTP, 8.5 kilograms of CO₂e (carbon dioxide equivalent) is released to the atmosphere. Each truck can haul 44 T of leachate. This calculates to roughly 4,200 T of CO₂ (1 Kg of CO₂e = 1 Kg CO₂) released to haul this additional volume of leachate. This amount of greenhouse gas is a very small fraction of the methane gas released during the decay process of the greenhouse vine-based waste stream. It is noted that methane is 25 times more damaging than CO₂ to the atmosphere.

The outcome of evaluating each of the above-noted future indirect considerations is extensive and could be discussed in greater detail from the perspective of the improvement continuance of the Authority's social responsibility (eg. capture of beneficial renewable natural gas (RNG)) and increased revenue (eg. still manage the greenhouse waste but in a manner that captures and sells the RNG), under separate cover. Notwithstanding the above discussion, the Authority should be commended for accepting and managing this greenhouse vine-based waste material in an environmentally sound manner for the agricultural industry in Essex County since approximately mid-2016 when other suitable disposal options for this material in the area became unavailable.

8 SUMMARY

The following are the main observations from the completion of this high-level leachate generation assessment.

- Leachate generation increased since 2016 due to an increasing annual tonnage of greenhouse vine-based waste material, which is approximately 95% water
- Leachate generation increased since 2016 due to air space recovery efforts, that are a result of significant vine-waste settlement.
- Increasing strength of leachate generated from the waste stream.



9 CLOSURE

We trust that this Leachate Generation Assessment for the Authority's Regional Landfill site is satisfactory for your current requirements. Please contact us with any questions you may have.

Yours very truly,

RWDI

A handwritten signature in blue ink, appearing to read 'Brent J. Langille', written over a horizontal line.

Brent J. Langille, B.Sc., P.Geo.
Senior Technical Director | Principal



10 STATEMENT OF LIMITATIONS

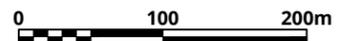
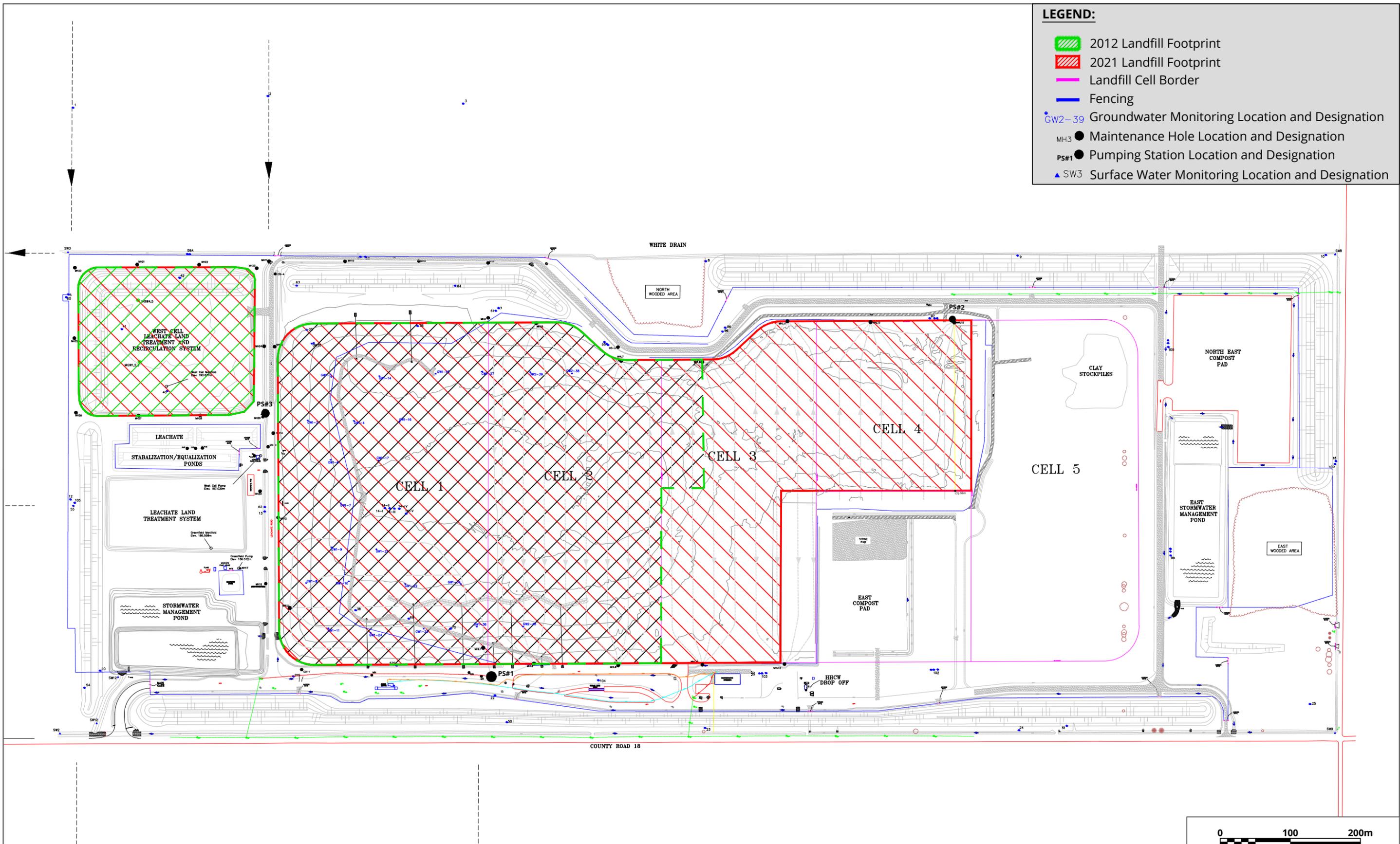
This report entitled Leachate Generation Study: Essex-Windsor Solid Waste Authority – Essex, ON: RWDI Project #2205332 was prepared by RWDI AIR Inc. (“RWDI”) for the Essex-Windsor Solid Waste Authority (“Client”). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein (“Project”). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

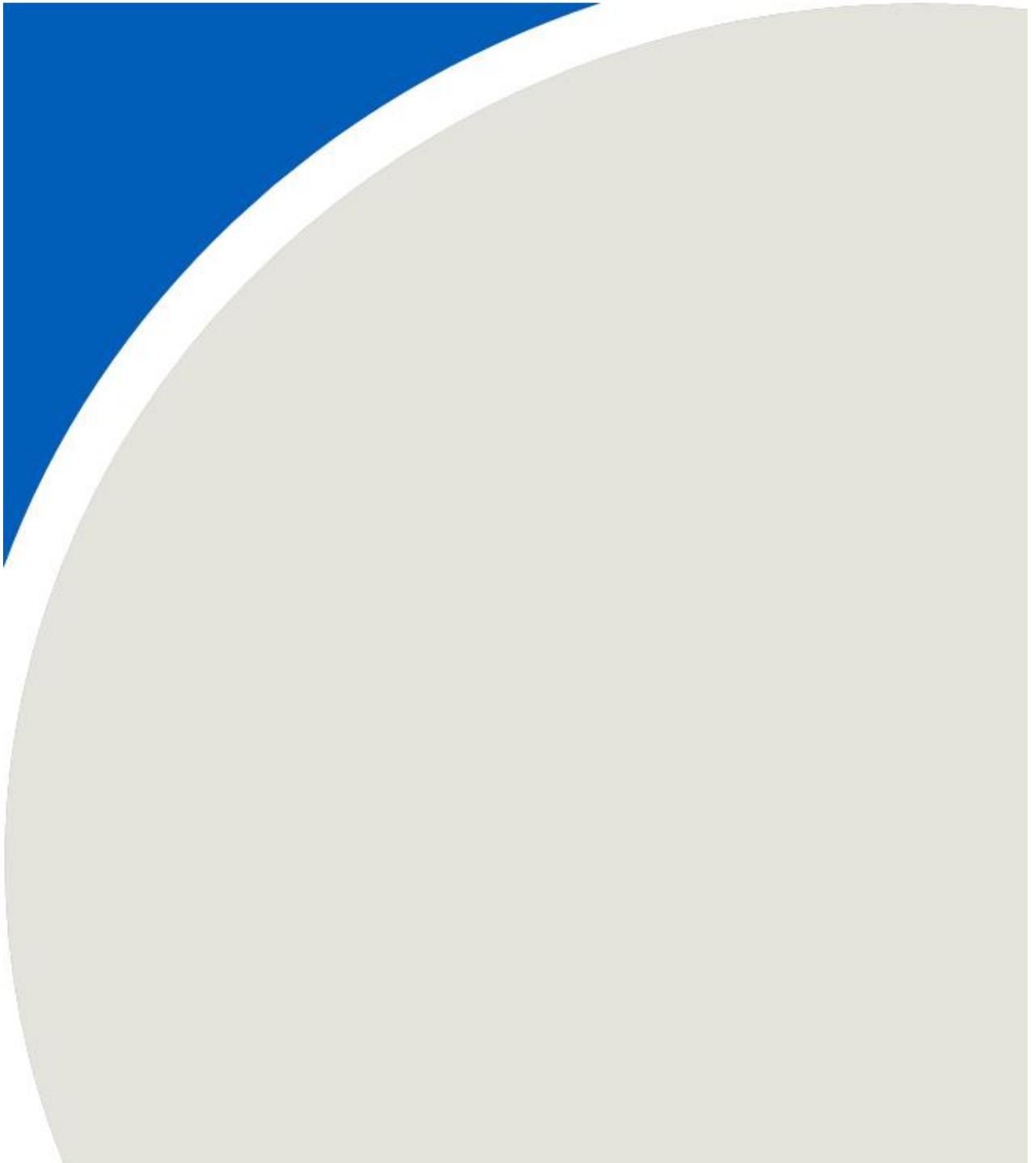
LEGEND:

-  2012 Landfill Footprint
-  2021 Landfill Footprint
-  Landfill Cell Border
-  Fencing
-  GW2-39 Groundwater Monitoring Location and Designation
-  MH3 Maintenance Hole Location and Designation
-  PS#1 Pumping Station Location and Designation
-  SW3 Surface Water Monitoring Location and Designation



<p>Landfill Cell Expansion Plan Essex County Regional Landfill</p> <p>Windsor Essex Solid Waste Authority</p>	<p>DRAFT</p>	<p>True North</p> 	<p>Drawn by: AUV Figure: 1</p> <p>Approx. Scale: 1:5000</p> <p>Date Revised: Jun. 27, 2022</p>	
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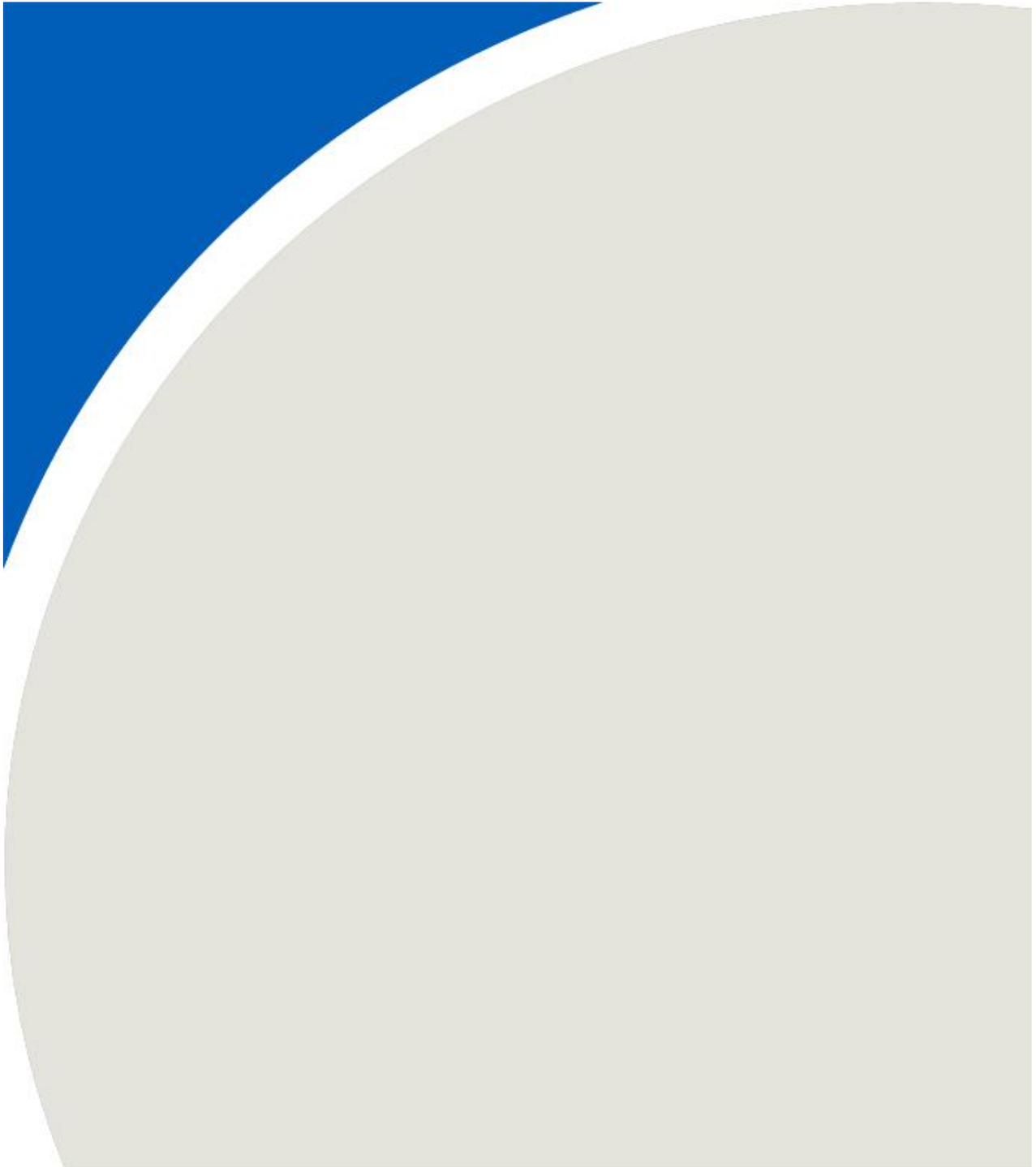
FIGURE



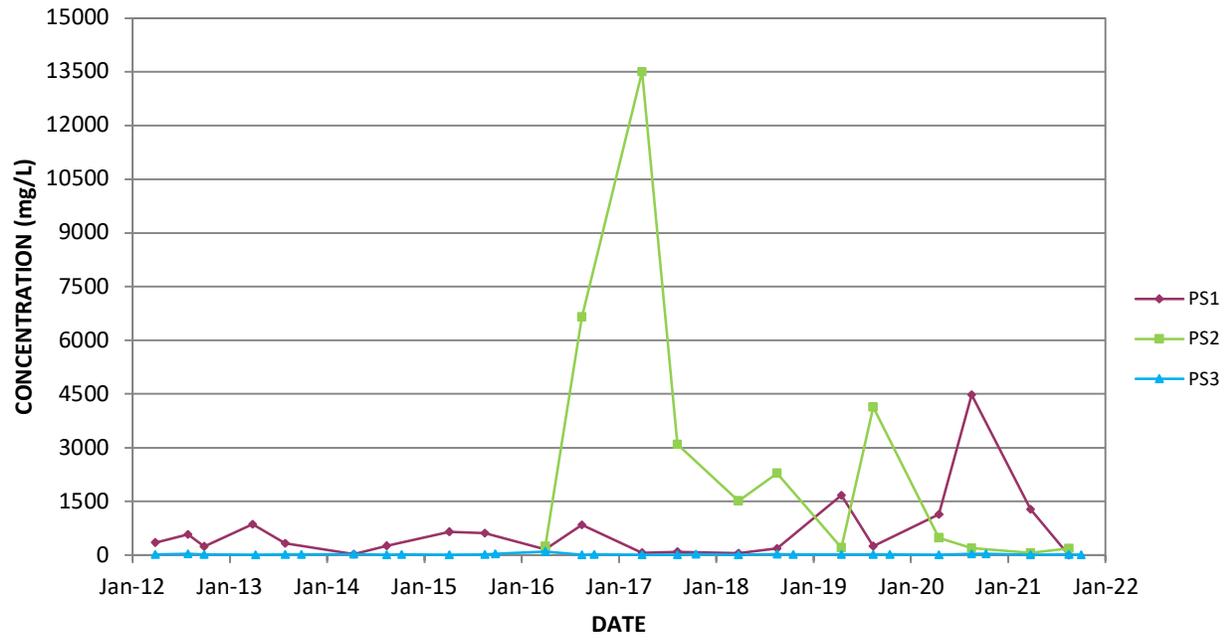
APPENDICES



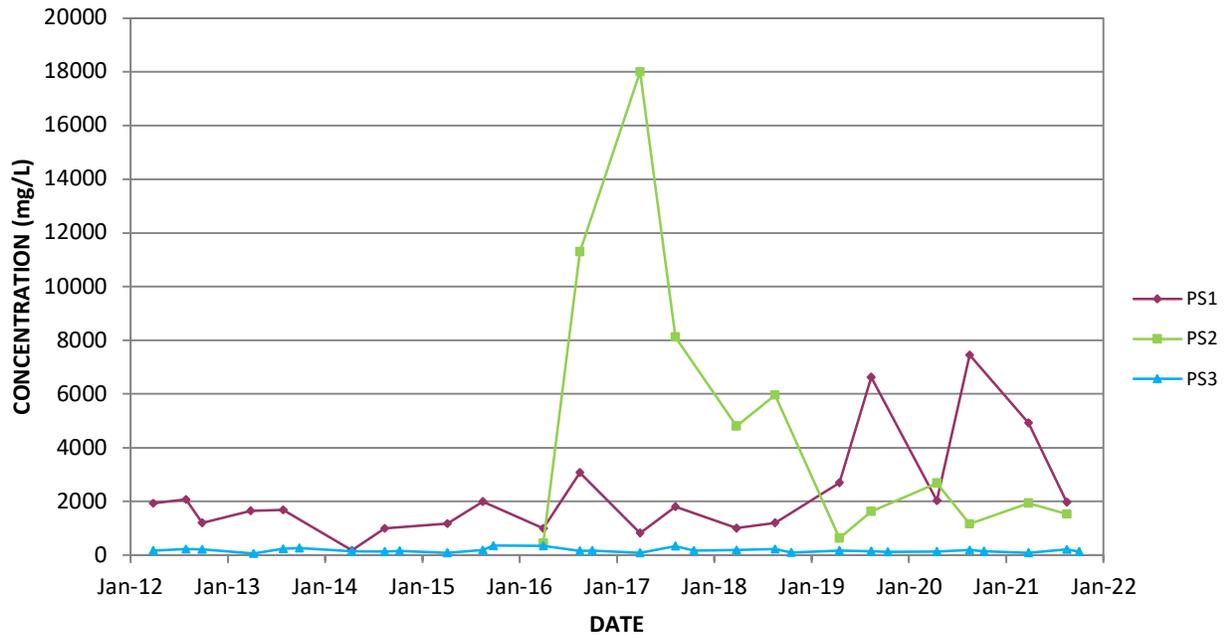
APPENDIX A



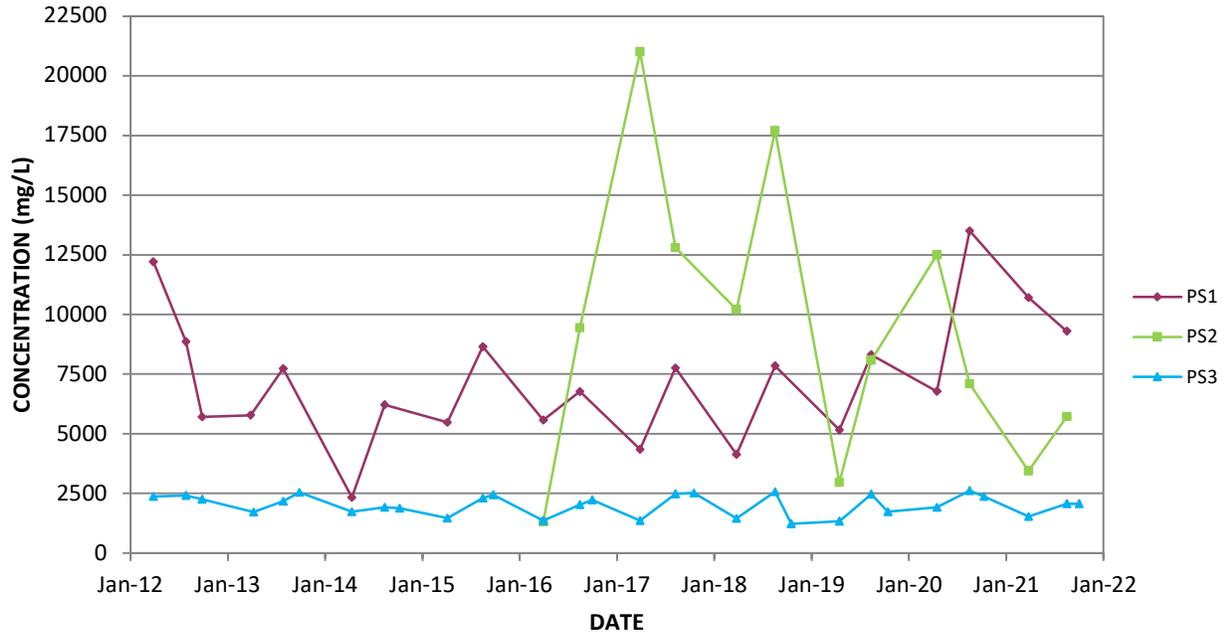
TIME CONCENTRATION GRAPH - Biological Oxygen Demand LEACHATE



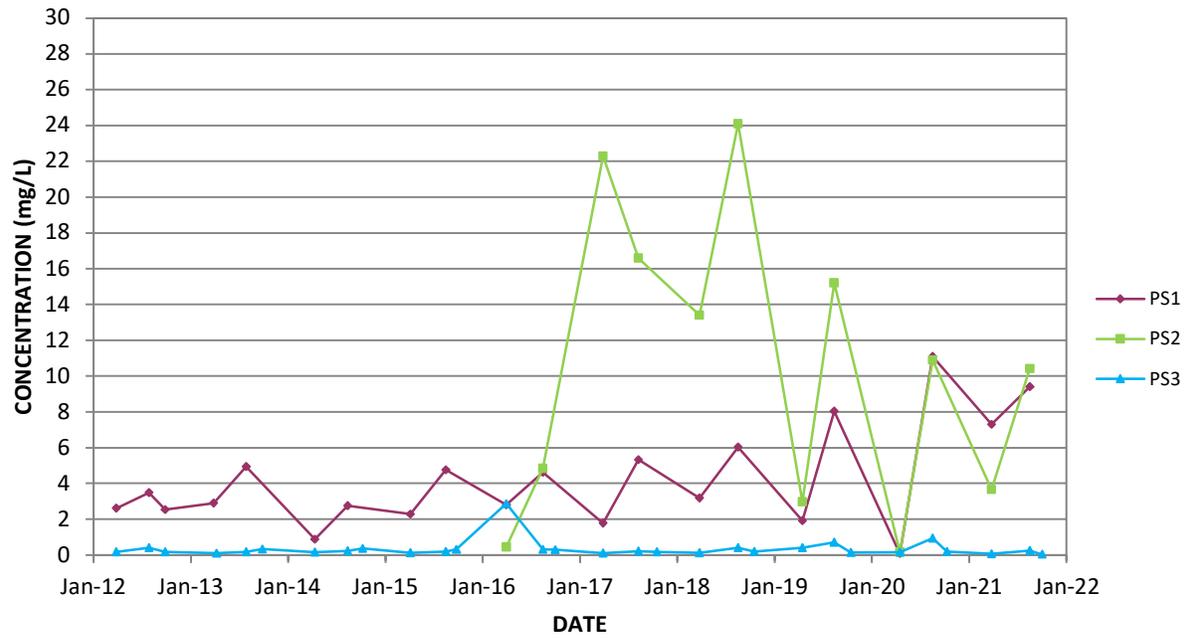
TIME CONCENTRATION GRAPH - Chemical Oxygen Demand LEACHATE



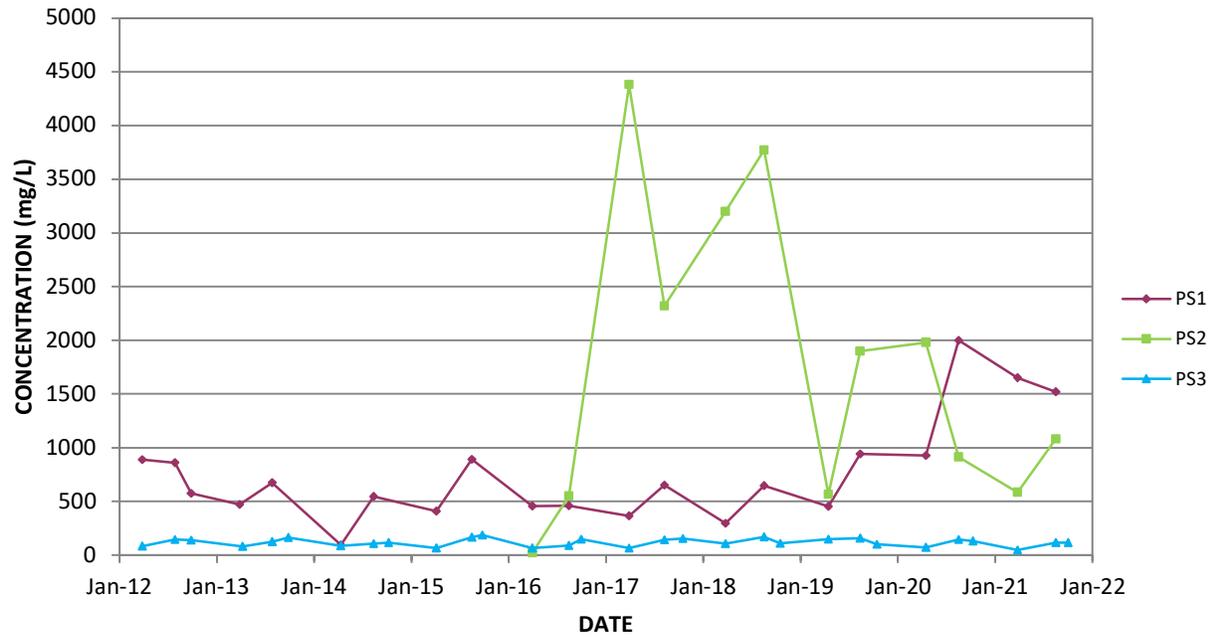
TIME CONCENTRATION GRAPH - Total Dissolved Solids LEACHATE



TIME CONCENTRATION GRAPH - Phosphorus LEACHATE



TIME CONCENTRATION GRAPH - Potassium LEACHATE





Essex-Windsor Solid Waste Authority

Administrative Report

September 6, 2022

To: The Chair and Board of the Essex-Windsor Solid Waste Authority

From: Catharine Copot-Nepszy, Manager of Waste Diversion

Meeting Date: Wednesday, September 14, 2022

Subject: Organics Survey Update

Purpose

To present the findings from the Organics Survey (Survey) that was issued in spring 2022.

Background

To comply with Ontario's Food and Organic Waste Policy Statement, which will require some municipalities in Essex-Windsor to achieve specific reduction and recovery target rates by 2025, the Region will be implementing a food and organic waste program that would divert organic waste away from our greatest asset, the Essex-Windsor Regional Landfill.

At the May 3, 2022 Board meeting, Administration shared that a public Survey was initiated by the Authority, the City of Windsor (City) and the County of Essex (County) to strategically receive public feedback and interest levels on key aspects of an organics program.

Discussion

The Survey launched on April 18, 2022 through Windsor's SurveyMonkey account, and closed on May 31, 2022. This Survey was launched just in time for the local Earth Day event to capitalize on high attendance numbers that are historically present at this annual event. It was promoted by all partners, as well as through the Authority's: EWSWA.org, e-newsletter, intranet to staff, and social

media accounts like Twitter, Facebook and Instagram. The Authority also shared the Survey with all of its municipal partners with the intention to reach more local residents through their municipal connections. Other organizations like Devonshire Mall, Essex-Windsor Conservation Authority (ERCA) and YQG Green also promoted this Survey. Finally, paid advertising through Facebook was done to boost overall participation.

The Survey was provided to participants at multiple green events such as: Earth Day, on-line Earth Day scavenger hunt via the Goose Chase App, Devonshire Mall clean-up day, and ERCA's tree planting event. Administration were pleased by the participation at the Authority tent at the Earth Day event, as well as, the interest from the public on what a new curbside organics program would look like. Specifically, there was much dialog around odour and collection frequency, and many discussions around 'why are you waiting so long to launch the organics program?'.

Results

Demographics

The Survey consisted of nine questions and attracted 2,534 residents (n=2,534 where n=number of participants) from across Essex-Windsor who gave their feedback on an organics program. Approximately 43% were residents of the County and 57% were residents of the City. From a County standpoint, participation among individual municipalities was quite evenly dispersed (an average of 5% participation by municipality).

The Survey attracted mainly residents who lived in a single-detached home (86%) and had one to three people that live in their household for at least six months of the year (67%).

Participation and Barriers

Over 75% of residents answered "yes" that they would participate in a curbside organics collection program and another 12% answered "maybe"; whereas, 10% responded with a "no" to participation. It's important to note that responses from all individual municipalities had 70% to 84% of residents state that they would "yes", participate in an organics program.

Of the 22% (n=540) that answered "maybe" or "no" to participating in an organics program, they identified these concerns as potential barriers to participation:

- 56% - It will smell
- 51% - Other (explained below)
- 36% - I have no space for another bin
- 35% - It will be inconvenient to separate the food waste
- 24% - I'm worried it will affect my taxes
- 14% - It will be confusing

Of the 273 respondents that answered "Other", they were given the opportunity to explain this further. As there were many responses on this open-ended question, the Authority staff sorted data into the following major categories:

- 39% - Already compost/manage food waste already (n=106)
- 38% - Attracts wildlife, rodents, rats, maggots
- 7% - Cost of the program to the resident (bins, taxes, liners)
- 4% - Don't have that much food
- 4% - Waste of time/don't care

Some other less reported concerns raised through the Survey were: not happy with current waste services, don't have the space (inside and out), don't have the time, concerned with collection frequency, the "yuck" factor, live in multi-residential and not sure how it would work.

Collection Strategies

Residents were asked if they would support any alternative garbage collection frequency (other than their current weekly collection) with a new organics program and the following feedback was received (n=2475):

- 42% - Would not support alternative garbage collection frequencies,
- 41% - Would support alternative garbage collection frequency (e.g., bi-weekly),
- 29% - Would like extra garbage collection following holidays, and
- 12% - Don't know/no opinion.

Values

When asked to rank by order of importance, the following six aspects of an organic program: *cost, convenience, diversion, energy, compost, and odour*, this is what residents said:

- 28% ranked diverting waste from the landfill and extending the life of the landfill as their first rank. The other top, first rank aspects of

- an organics program that were important were convenience(24%) and cost(18%).
- Program convenience (23%) and diversion (17%) were also second highest rank priorities along with the production of compost (19%).
 - Finally, the top, lowest rank priorities (6th) were: energy production (25%), cost (24%) and odour (19%).

It is worth noting that through the Survey, many positive comments were received such as:

- "Let's finally do this!"
- "Thrilled to hear something is in the works."
- "About time; it is way overdue."
- "Implement as soon as possible."
- "Please don't delay. It is paramount to reduce waste from landfills."

Recommendations

The Authority administration is thankful to all those who supported this Survey. Administration now has representative data to inform the development of the organics and food waste program that is driven by the feedback and values of Essex-Windsor residents. Some items the program should consider is: to address barriers and concerns noted, look for solutions for multi-residential homes, consider continuing the sale of compost to residents, minimize participant costs, and consider collection frequency concerns.

Financial Implications

There are no financial implications at this time.

Recommendation

THAT the Board receive this report as information.

Submitted By



Catharine Copot-Nepszy, Manager of Waste Diversion

Attachments:

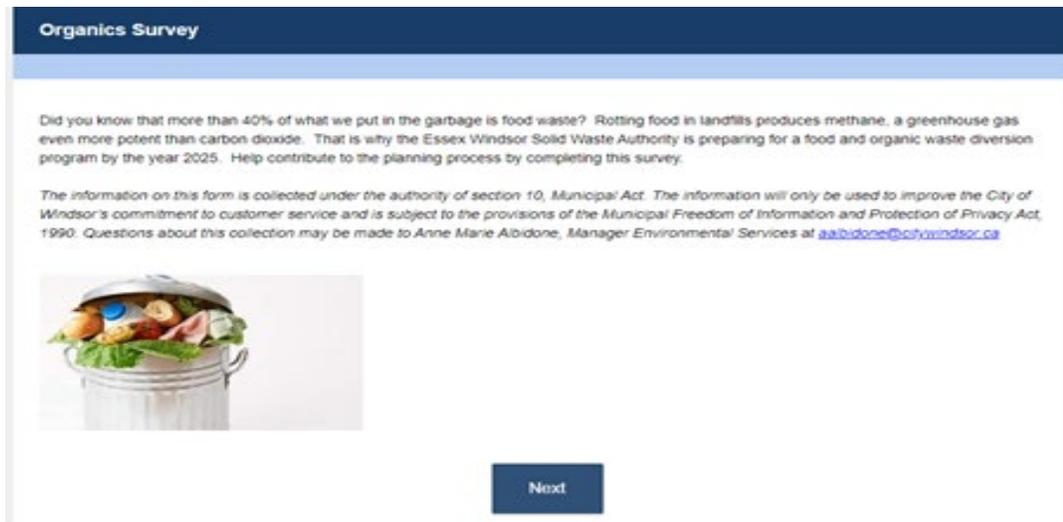


Figure 1. Screen image of the on-line Organics Survey

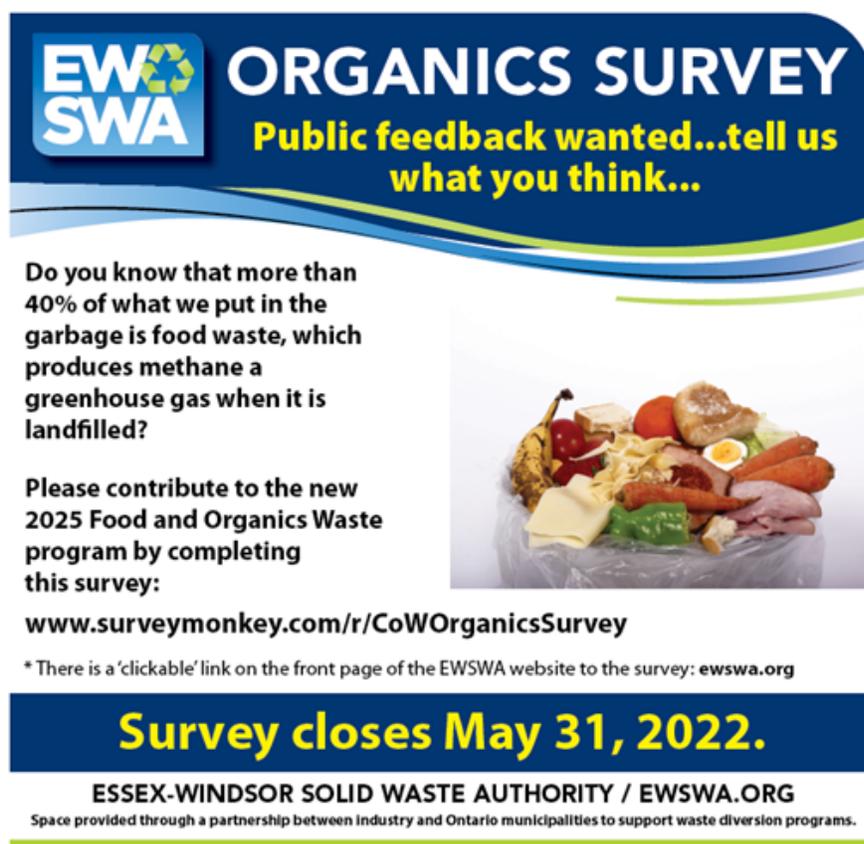


Figure 2. Ad that was posted on Facebook to promote the Organics Survey.



Essex-Windsor Solid Waste Authority

Administrative Report

September 6, 2022

To: The Chair and Board of the Essex-Windsor Solid Waste Authority

From: Catharine Copot-Nepszy, Manager of Waste Diversion

Meeting Date: Wednesday, September 14, 2022

Subject: Update on Blue Box Recyclable Material Commodity Prices

Purpose

To provide an update to the Board on the status of blue box recyclable material commodity prices.

Background

Due to the volatility of recycling markets and its related impact on the Authority's annual budget, the Authority staff provide ongoing pricing updates to the Authority Board. At the August Board meeting, Administration presented the Six-Month Operations Financial Report that included a \$1,249,500 favourable variance in revenue generated from the sale of recyclable material. The Board was further advised that during the month of July, commodity prices for some material types had begun to decline due to an oversaturation of material in various commodity markets.

Discussion

The majority of markets for the first 6 months saw exceptional pricing due to favourable supply/demand of these materials, which was unexpected for 2022. However, in July, the plastics market like HDPE and PET saw a drastic decrease in price due to high inventory levels and summer maintenance downtime in mills. August pricing has now stabilized at this new lower pricing level.

As for fibre materials like OCC, pricing dropped in August as a result of high inventory levels, mill downtime, a slower economy, and slow export movement for fibre materials. Similarly, OBB and mixed fibre followed suit as they typically do, and also dropped in price in August as these are lower grade fibre materials. It is expected that they will all decrease slightly in September until supply and demand is back in balance. There are no significant changes anticipated in the fibre market at this time.

Tin/steel and mixed metal prices for the first 7 months of 2022 were high due to a shortage of materials in the market, but have decreased as anticipated in August. At this time, it is anticipated that there will be no further significant changes to this market.

Aluminum pricing remained above the anticipated 2022 budget estimates due to supply chain issues and a shortage in aluminum. Again, there are no significant changes anticipated for the balance of 2022.

New Market Opportunities

New in spring 2022, as a result of market hardening the Authority was able to sell its container residue and low-grade mixed fibre materials (SRPN#54). This opportunity has allowed the Authority to divert more materials from the Essex-Regional Landfill, as well as, generate more revenue for the first half of 2022. While markets have softened, a favourable revenue was still generated in August and it is estimated that these new prices will not change significantly for the rest of the year.

The following graph contains the 2022 budget figures, year-to-date and current prices per tonne for each recyclable material.

Material	2022 Budget Price Per Tonne	January to July Average Price	August Actual Sales Price
SRPN#56 (Newspaper)	\$110	\$200	\$170
OCC (Cardboard)	\$151	\$231	\$206
OBB (Boxboard/Hardpack)	\$94	\$155	\$140
Clear Glass	\$20	\$0	\$0
Tin/Steel	\$302	\$447	\$282

Material	2022 Budget Price Per Tonne	January to July Average Price	August Actual Sales Price
Fine Paper	\$121	\$0	\$394
Aluminum	\$1,696	\$2,904	\$2,111
PET – Plastic	\$420	\$835	\$140
HDPE – Plastic	\$834	\$786	\$375
Polycoat	\$18	\$59	\$75
Mixed Plastics	\$139	\$241	\$85
Mixed Metals	\$243	\$399	\$322
SRPN#54 (Mixed Fibre)	\$40	\$109	\$62
Container Residue	\$0	\$24	\$5

Financial Implications

As presented in the Six-Month Operations Financial Report, average revenue from the sale of recyclables was significantly higher per tonne than that budgeted for the six-month period (\$289 vs. \$175). Similarly, overall blue box inbound material tonnage continues to exceed budget figures. Administration monitors commodity pricing on a regular basis and a full financial projection for 2022 will be finalized and form part of the 2023 Operational Plan and Budget and will be presented to the new Authority Board later in the fourth quarter.

Recommendation

THAT the Board receive this report as information.

Submitted By



Catharine Copot-Nepszy, Manager of Waste Diversion

Essex-Windsor Solid Waste Authority

By-Law Number 14-2022

Being a By-law to Confirm the Proceedings of the Meeting of the Board of the Essex-Windsor Solid Waste Authority

WHEREAS by Agreement dated 18 May 1994, made between the Corporation of the County of Essex and the Corporation of the City of Windsor, the Essex-Windsor Solid Waste Authority (The Authority) was created as a joint board of management pursuant to Sections 207.5 and 209.19 of the *Municipal Act, RSO 1990, Chapter M.45* and;

WHEREAS Subsection 5.(3) of the Municipal Act, RSO 2001, Chapter 25, provides that the powers of a municipality shall be exercised by By-Law and;

WHEREAS Section 1 of the Municipal Act RSO 1990, Chapter M 46 defines a municipality as including a board, commission or other local authority exercising any power with respect to municipal affairs or purposes and;

WHEREAS it is deemed expedient that the proceedings of the Authority at this meeting be confirmed and adopted by By-Law

NOW THEREFORE the members of the Authority enact as follows:

- 1) The action of the members of the Authority in respect to each recommendation contained in the Report/Reports of the Committees and each motion and resolution passed and other action taken by the members of the Authority at this meeting is hereby adopted and confirmed as if all such proceedings were expressly set out in this by-law.
- 2) The Chair and the proper officials of the Authority are hereby authorized and directed to do all things necessary to give effect to the action of the members of the Authority referred to in the preceding section hereof.
- 3) The Chair and the General Manager of the Authority are authorized and directed to execute all documents necessary in that behalf.

ESSEX-WINDSOR SOLID WASTE AUTHORITY

Gary Kaschak
EWSWA Board Chair

Michelle Bishop
General Manager

**Read a First, Second and Third Time, Enacted and Passed
This 14th Day of September, 2022.**