STRATHROY-CARADOC
URBAN OPPORTUNITY - RURAL HOSPITALITY

COUNCIL REPORT

Meeting Date:	June 2, 2025
Department:	**Engineering & Public Works**
Report No.:	EPW-2025-27
Prepared by:	Paul Zuberbuhler, Manager of Environmental Services
Submitted by:	Mark Ortiz, Director of Engineering and Public Works
Approved by:	Rob Browning, Chief Administrative Officer
SUBJECT:	**Caradoc Closed Landfill Update**

RECOMMENDATION: THAT: Council receive report EPW-2025-27 for information.

BACKGROUND:
The closed Caradoc Landfill is located at 22416 Mill Road within an approximate 13.7 ha site owned by the Municipality of Strathroy-Caradoc.

The southwesterly portion of the site had formerly been used for the disposal of waste and is currently being used as a Waste Transfer Station (WTS). The site is also the shared location of the Mount Brydges Wastewater Treatment Facility. Land uses surrounding the site includes agricultural and rural residential.

The Caradoc Landfill began operation in approximately 1967. By February 1999, landfilling operations had been discontinued. A Closure Plan was submitted to the MECP in November 2008, along with a revised closure plan to incorporate the construction of the Mt Brydges Wastewater Treatment Facility (MBWWTF).

During exploratory work for the Wastewater Treatment Facility that was constructed in 2012, some buried waste was discovered in the location of the proposed facility and was relocated to the northwest face of the landfill mound.

Contaminating Lifespan
The Certificate of Approval (C of A) requires the Municipality maintain “an updated estimate of the contaminating life span of the Site, based on the results of the monitoring program”.

A contaminating lifespan calculation was originally completed by the Municipality’s Landfill Engineer, BM Ross, as part of the closure plan. Based on their calculation, the contaminating lifespan was projected to be approximately 32 years from the year the site was closed – effectively through 2031.

BM Ross recently confirmed in their 2024 annual report the contaminating lifespan completed previously is still a reasonable estimate given the information that we have available.

Environmental Monitoring
Water resource monitoring at the Caradoc Landfill is a key requirement of the Certificate of Approval. The monitoring program includes gas monitoring, measuring groundwater levels and the collection and testing of groundwater and surface water samples from approved locations.

The results of the field and laboratory work are routinely evaluated to help understand and manage the environmental impacts at the Site.

Each year the Municipality completes and submits annual reporting on the status of the closed landfill along with the provision of the sampling results from that monitoring year.

The MECP has not historically provided significant comments or feedback to the Municipality. On March 4th 2025, the MECP provided an email to the Municipality including sample results of November 2024 noting presence of potential leachate seepage. The MECP followed up on April 28th with additional comments on site hydrogeology, flow patterns and groundwater quality, with recommendations for additional sampling, site visits and piezometers.

Ministry of Environment Conservation and Parks (MECP)

The following is a summary of recent communications with MECP and action taken by staff:

- **November 27th, 2024** - MECP attended the site and took surface water samples at two locations along the northern stream where they suspected potential leachate seepage. MECP advised staff of the visit however Municipal staff were not present during sampling.

- **March 4th, 2025** - MECP informed Staff that they had taken samples during their November visit and that one of the sampling points had high levels of contaminants.

- **March 20th, 2025** - Staff and BM Ross met virtually with the MECP to review the sample results and gain an understanding of the MECP's concerns and expectations for next steps. The MECP discussed the need for more data.

- **April 23rd, 2025** - BM Ross met with Staff on site to review the MECP's two sampling locations (Point 1 and Point 2) and walk the northern stream watercourse.

- **May 1st, 2025** - Staff met with BM Ross and the MECP on site to review locations of seepage and walk the watercourse. The MECP pointed out two additional points along the watercourse as well (Points 3 and 4).

- **May 9th, 2025** – Email from MECP noting they had spoken with neighbouring property owners and were planning to investigate and sample potential leachate seepage on the southern stream watercourse on private properties adjacent to the Landfill.

  Municipal staff requested to join the MECP walkthrough along with BM Ross, however the two adjacent Landowners advised they were being represented by their neighbour, Mr. Todd Powell, and the Municipality's request was denied.

- **May 15th, 2025** - Staff met with BM Ross on site to inspect the southern stream bank on municipal property in response to MECP's notification advising of potential leachate seepage. BM Ross also marked out new sampling locations for the development of a detailed stream and groundwater sampling program along both the north and southern streams.

  Municipal staff requested access to the two adjacent properties for the purpose of inspection and their request was again denied by the landowner's representative.

COMMENTS:

Historical Stream Sample Results (Surface Water)
The Municipality has been conducting annual sampling of four stream locations at the Caradoc Landfill since 2006 – these surface water sample points are used to monitor stream quality upstream and downstream of the landfill mound along the watercourse on both the north side and south side of the closed landfill mound.

Several parameters have historically been found to be elevated in the downstream surface water including iron, aluminum and phosphorus. Although these indicators suggest potential influence of the Caradoc Landfill on surface water, they are not believed to be having a significant adverse impact on the north and/or south watercourse.

It is important to note that upstream surface water monitoring results have routinely also shown elevated concentrations for these same parameters suggesting that iron, aluminum and phosphorus may be naturally present in the soils in this area. It is also possible that other sources (non-landfill related) are contributing to the elevated concentrations of these three parameters

It is also worth noting that as the MBWWTF discharges to the stream between SEG and ESR, impacts to the stream at ESR may be, at least in part, attributed to the facility.

MECP Landfill Seepage Sample Results (Groundwater)
During the MECP's November 2024 site visit, they collected groundwater samples from two locations along the north watercourse. Many of the measured parameters were shown to have elevated concentrations which exceeded their applicable Provincial Water Quality Objectives (PWQO).

The elevated parameters are an indication that the groundwater in these areas is being impacted by landfill leachate.

In most cases the concentrations decreased to within the PWQ Objectives by the time the stream water had reached the downstream sample point.

The decrease to within PWQ Objectives suggests there is likely not a large volume of groundwater impacted by landfill leachate discharging to the stream in proportion to normal stream flow rates.

Visual Findings and Landfill Impact

The following is a summary of key notes from various site visits of the Caradoc Landfill conducted on April 23rd, May 1st and May 15th:

April 23rd, 2025

Point 1

- Continues to be groundwater discharge occurring here.
- It appears to be coming a buried culvert or field tile in this location.
- The groundwater discharge rate was small estimated it at less than 1 L/s.

Point 2

- No groundwater discharge
- Evidence that groundwater has discharged here in the past (i.e. a sheen on some of the ponded water and reddish staining see picture below)

May 1st, 2025

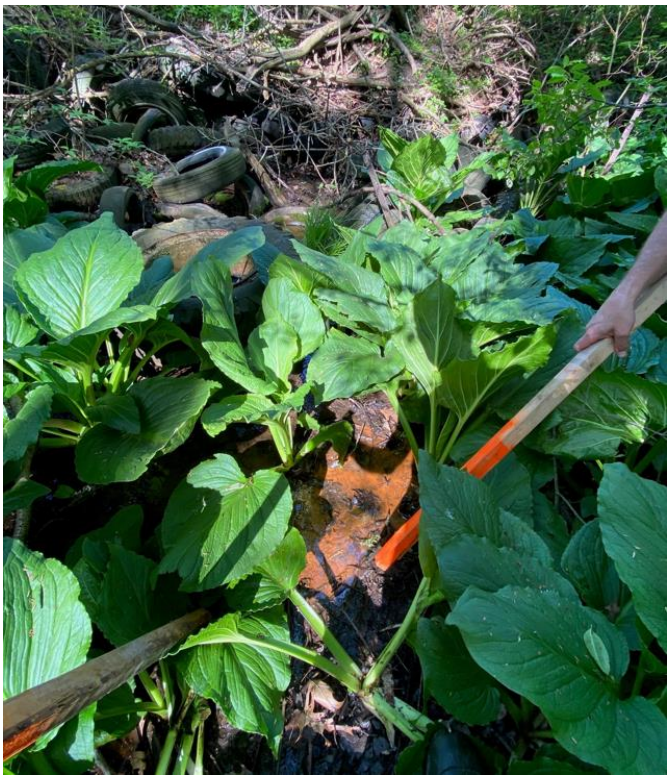
Point 3 and 4

- No visible flow at time of visit
- Previous elevated multi-meter readings and less vegetative cover in the identified area

May 15th, 2025

The north and south watercourses (on the landfill property) were walked, looking for additional potential seep locations or other unique findings. The attached report shows findings which include

- Waste in the embankment
- Vegetation present
- Potential groundwater seepage evidenced by iron soil staining



Caradoc Landfill Operations Implications

As the Caradoc Landfill is not an active landfill there are currently no impacts to operations. The Municipality continues to actively monitor site conditions and report annually to the MECP.

Should monitoring suggest the closed landfill is contributing to unacceptable adverse impacts on the watercourse, various mitigation and/or remediation options may need to be evaluated with the Municipality's Landfill Engineer and in consultation with the MECP.

Possible measures could include enhanced monitoring, construction of an interceptor trench to minimize groundwater movement, installation of a leachate management system or relocation of buried waste in certain areas.

At this time there is no data to suggest the Caradoc Landfill is contributing to unacceptable, adverse impacts on the watercourse or anything to suggest that additional mitigation measures are necessary.

However in response to recent visual observations and groundwater sampling data provided by the MECP, the Municipality has requested BM Ross to develop an enhanced sampling and monitoring program for a period of twelve (12) months to better assess any potential impact the Landfill may be having on the watercourse (Attachment #2).

Mt Brydges Wastewater Servicing Environmental Assessment

Results from the sampling and monitoring program will be used to inform the Mt. Brydges Wastewater Servicing Environmental Assessment (EA).

Any cumulative impacts to the water quality in the stream would be assessed and accounted for through the assimilative capacity study to be completed as part of the EA. The ultimate receiving capacity of the stream and necessary effluent treatment requirements of any potential capacity increase at MBWWTF will be determined through this process.

At this time there is no data to suggest that impact from the landfill would inhibit potential future capacity increases at the Mount Brydges Wastewater Treatment Facility, however this would need to be confirmed through the EA process and would consider the findings from the enhanced sampling and monitoring program at the closed landfill..

Response and Next Steps

Surface sampling data, historical stream data and groundwater monitoring data combined with visual evidence leads to the conclusion that some volume of landfill leachate is very likely entering the watercourse.

The net environmental impact of this is not fully clear, however historical water quality monitoring results suggests that the quantity of impacted groundwater reaching the stream is anticipated to be minimal, as evidenced by the relatively minor changes to the downstream water quality.

The impact of leachate on water quality is highly dependent on the concentration and total volume of leachate entering the watercourse.

Staff have requested BM Ross to develop an enhanced Sampling and Monitoring Program for a period of twelve (12) months to better assess both the concentration and volume of leachate that may be entering the watercourse and assess any potential impact of the Caradoc Landfill on surface water (Attachment #2).

The enhanced program includes sampling of both surface water from the stream and seepage from the Caradoc Landfill, visual monitoring of the site and streambanks and a general assessment of seepage volume. This will allow the Municipality to fully assess any potential environmental impact of the Caradoc Landfill and determine possible next steps in terms of mitigation or remediation.

Staff will continue to consult with the MECP prior to implementing the enhanced Sampling and Monitoring Program.

Landowner Site Access, Sampling & Monitoring Plans

As several historical and proposed surface water monitoring points are located on two adjacent properties, approval from the respective landowners is required in order to access the locations.

Both Landowners have indicated that they are to be represented by their neighbor, Mr. Todd Powell, in this matter.

To date, through their representative, the Landowners have denied access to the Municipality to conduct monitoring and sampling.

As such, BM Ross has developed two different proposed monitoring and sampling plans: one solely on Municipal Property (Sampling & Monitoring Plan #1) and the second with assumed access to adjacent properties (Sampling & Monitoring Plan #2).

Staff will continue to work with the Landowners and their representative to secure access to monitoring locations in an effort to enable the more comprehensive Sampling & Monitoring Plan, Plan #2.

Historically sampling was complete at nine (9) existing groundwater wells, four (4) stream sampling locations and the wastewater treatment facility sub drain.

Sampling & Monitoring Plan #1:

- Addition of four (4) new piezometer sample stations
- Addition of two (2) new stream sampling locations on north side of landfill
- Exclusion of four (4) existing groundwater monitoring wells on adjacent private property due to site access
- Relocation of three (3) historical stream sampling locations to within Municipal property due to site access

Sampling & Monitoring Plan #2:

- Addition of four (4) new piezometer sample stations
- Sampling of all nine (9) existing groundwater monitoring wells
- Continued sampling of three (3) historical stream sampling locations on private property
- Addition of two (2) new stream sampling locations on north side of landfill

CONSULTATION:

- Director of IT and Financial Services

FINANCIAL IMPLICATIONS:

Additional costs for sampling and Engineering Fees will be funded from the Solid Waste Operating Budget.

STRATEGIC PLAN ALIGNMENT:

This matter is in accord with the following strategic priorities:

- Local Infrastructure – Households and businesses in Strathroy-Caradoc are supported by reliable, financially responsible and well-maintained infrastructure networks

ATTACHMENTS:

- 1. Interim Report – BM Ross
- 2. Increased Monitoring Program
- 3. May 15, 2025 BM Ross Site Visit