Corporation of the County of Wellington

Solid Waste Services Committee

Minutes

November 12, 2024
County Administration Centre
Keith Room

Present:	Warden Andy Lennox Councillor Steve O'Neill (Chair) Councillor David Anderson Councillor Dave Turton Councillor Shawn Watters
Also Present:	Councillor Diane Ballantyne Councillor Matthew Bulmer Councillor Campbell Cork Councillor Gregg Davidson Councillor Jeff Duncan
Staff:	Jennifer Adams, County Clerk Simon Burgess, Operating Budget and Cash Manager Ken DeHart, County Treasurer Don Kudo, County Engineer Isabel Lopez, Budget and Accounting Coordinator Jackie Lee Macchiusi, Capital Budget and Accounting Manager Jackie Osti, Manager of Purchasing and Risk Management Services Das Soligo, Manager, Solid Waste Services Cathy Wiebe, Admin Supervisor Solid Waste Services Scott Wilson, CAO

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1. Call to Order

At 11:10 am, the Chair called the meeting to order.

2. Declaration of Pecuniary Interest

There were no declarations of pecuniary interest.

3. Financial Statements as of October 31, 2024

1/8/24

Moved by: Councillor Watters
Seconded by: Councillor Turton

That the Solid Waste Services Financial Statements as of October 31, 2024 be approved.

Carried

4. 2025 Solid Waste Services User Fees

2/8/24

Moved by: Councillor Anderson
Seconded by: Councillor Watters

That the 2025 User Fees and Charges for Solid Waste Services be approved.

Carried

5. Preliminary 2025-2034 Ten-Year Plan: Solid Waste Services

3/8/24

Moved by: Councillor Turton
Seconded by: Warden Lennox

That the preliminary 2025-2034 Solid Waste Services capital budget forecast and major operating budget impacts as set out in this report be endorsed and forwarded to the Administration, Finance and Human Resources Committee for inclusion in the County of Wellington's Preliminary Ten-Year Plan.

Carried

6. Tender Award for Elora Waste Facility Site Improvements

4/8/24

Moved by: Councillor Anderson
Seconded by: Councillor Watters

That County of Wellington Project No. CW2024-057 for the site improvements as specified at the Elora Waste Site in the Township of Centre Wellington as specified be awarded to Verly Construction Group Inc. of Mississauga, Ontario at the total tendered

amount of $2,890,507.61 exclusive of HST @ 13%; and

That the funding for this project be approved as set out in the Financial Summary; and

That the debt, principal and interest charges, and offsetting development charges required to finance the project be added to the County's 2025 Budget and 10-Year Plan; and

That staff be authorized to issue the Purchase Order for the contract; and

That the Warden and Clerk be authorized to sign the construction agreement.

Carried

7. Leachate Treatment Alternatives

5/8/24

Moved by: Councillor Turton
Seconded by: Councillor Watters

That the County of Wellington formally request that Wellington North Township enter negotiations with the County to accept leachate from the Riverstown landfill site, at its Mount Forest Waste Water Treatment Plant.

Carried

8. Future County Role in Providing Recycling Services

6/8/24

Moved by: Warden Lennox
Seconded by: Councillor Watters

That the County approve Proposal 1 - Downtown Collection Route, for inclusion in the 2025 budget and agreement with Waste Management Inc.

Carried

9. Adjournment

At 12:41 pm, the Chair adjourned the meeting until January 14, 2025 or at the call of the Chair.

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Steve O'Neill
Chair
Solid Waste Services Committee

COUNTY OF WELLINGTON

Committee Report

To: Chair and Members of the Solid Waste Services Committee
From: Ken DeHart, County Treasurer
Date: Tuesday, November 12, 2024
Subject: **Preliminary 2025-2034 Ten-Year Plan: Solid Waste Services**

Background:

This forecast provides a high-level view of major budget issues and planned capital investments and serves as a guide for departments in preparing their detailed current year operating and capital budgets. The preliminary corporate ten-year plan will be considered by the Administration, Finance and Human Resources Committee on November 19, 2024, and the forecast will be updated at the time the budget is approved early in the new year.

Major Operating Budget Impacts
Staff are in the process of compiling the detailed 2025 operating budgets for each department. Major items to be reflected in the 2025 Solid Waste Services Operating Budget include the following:

Blue Box Programme – Transition to Producer Responsibility
In accordance with Ontario Regulation 391/21, the current Blue Box Programme will transition to full producer responsibility on January 1, 2026. The County will begin this transition six months earlier as it exits the Blue Box Programme on July 1, 2025, which will result in significant changes to the Solid Waste Services budget in 2025/2026.

Staff have made the following adjustments to the 2025 Budget and 10-Year Plan as a result:

Revenues

- RPRA grant reduction of $1.85 million over 2025/2026. At this time staff have included in 2025 a one-time allocation of $92K for Producer compensation for waste facility drop-off service.
- Recycling sales revenue at sites has been reduced by $25K in 2025

Expenditures

- Processing recyclables cost reductions of $266K over 2025/2026
- Blue box collection contract reduction of $3.86 million over 2025/2026. This line item will contain $65K in 2025 and $130K thereafter to account for IC&I recycling collection for a commercial recycling programme to replace the loss of service for businesses following transition to Full Producer Responsibility (July 1st)
- In order to provide ongoing recycling services at the sites staff have included $187K over 2025/26 to account for processing costs for the continuation of recycling drop-off at waste facilities post transition

The net result of these changes is a decrease to the County tax levy of $2.1 million dollars between 2025 and 2026.

Other Major Operating Impacts

- Tipping fees have been largely maintained in 2025. The new minimum waste fee as approved by committee in September is forecasted to increase tipping fees by $100,000 in 2025. This is largely offset by a modest reduction in tipping fee revenue at various locations based on experience to date in 2024.
- User Pay Bag sales have been increased by $207,000 to reflect experience to date and to account for a full year of the higher bag prices implemented in July of 2024.
- As reported to committee in April, Solid Waste Services will be continuing the transition to adopt a Diversion Centre model for the current waste facilities. This will result in increased processing fees in order to divert additional materials at the sites. The anticipated cost to implement this change is $209K.
- Internal charges has been increased by just under $100K to reflect Roads staff taking over the maintenance for some of the vehicles and equipment.
- The Transfer to Reserves line is increasing by $300,000 in 2025 to provide sufficient funding for the capital projects identified in the 10-Year Plan. This includes an increase of $200,000 to the SWS Equipment Reserve and $100,000 to the SWS Capital Reserve.

Capital Budget Forecast

In accordance with the Budget Management Policy, the list of capital works includes those initiatives that have a long-term benefit to the corporation and whose capital cost is at least $25,000. Capital budgets are presented as inflated by 5% for 2025 and 3.5% for 2026-2034, where applicable. The inflation factor for 2025 represents the current non-residential building construction price index. Construction inflation is slowly starting a downward trend toward historical levels and the future forecast reflects this expectation.

Highlights of the Solid Waste Services capital forecast are as follows:

- A total of $13.9 million in expenditures are projected over the ten-year period.
- Equipment replacements total $8.4 million and are fully funded by the SWS Equipment Reserve.
- Future year pick-up truck replacements are budgeted to accommodate electric vehicle purchases and reflects preliminary Corporate Climate Change initiatives. The actual purchase will be dependent on the availability of this technology and charging infrastructure at the time of acquisition. Planning's Green Fleet Pilot, as approved by County Council in September 2024 will help inform these budget forecast items.
- Site improvements for roads (2028/2034) and buildings (2030) address lifecycle replacements and rehabilitations.
- New Projects:
  - Roll-Off Lugger for $350,000 in 2025 to replace the current back-up truck to reduce downtime and maintenance costs.
  - Belwood Retaining Wall Replacement scheduled in 2026 at $350,000 to maintain a safe environment by replacing the deteriorating retaining wall at the facility.

Riverstown landfill is the County's one remaining active landfill site with expected capacity through 2049. Staff are planning for future development of this site throughout the ten-year forecast and have included projects totalling $3.65 million, funded by the Solid Waste Services Capital Reserve. Projects for Phase II and III of the site include:

- Riverstown Cell Development continues throughout this forecast with pre-excavation work totalling $765,000 and cell development totalling $1.4 million.

- Riverstown North Pond Development scheduled in 2027 at $700,000. The project involves the construction of a required storm water retention pond to the north of the Phase II filling area.
- New Project: Riverstown Phase III Studies (2027/2028) for $800,000 will begin the process of initiating studies in support of applying for approvals for the future expansion of the facility.

The detailed 2025 operating budget and revised ten-year plan will be presented to the Committee in January. Attached to the report is the current proposed ten-year operating budget and ten-year capital budget for Solid Waste Services.

Strategic Action Plan:

This report relates to the following objectives and priorities in the County's Strategic Action Plan:

- Making the best decisions for the betterment of the Community

Recommendation:

That the preliminary 2025-2034 Solid Waste Services capital budget forecast and major operating budget impacts as set out in this report be endorsed and forwarded to the Administration, Finance and Human Resources Committee for inclusion in the County of Wellington's Preliminary Ten-Year Plan.

Respectfully submitted,

Ken DeHart, CPA, CGA
County Treasurer

In consultation with/approved by:
Das Soligo, Manager of Solid Waste Services
Don Kudo, County Engineer
Scott Wilson, CAO

COUNTY OF WELLINGTON

Committee Report

To: Chair and Members of the Solid Waste Services Committee
From: Jackie Osti, Manager of Purchasing and Risk Management Services
Date: Tuesday, November 12, 2024
Subject: **Tender Award for Elora Waste Facility Site Improvements**

Background:

Staff recently issued Project No. CW2024-057 a tender for site improvements at the Elora Waste facility located at 6549 Gerrie Road in Elora. A description of the work is provided below.

Following Council's decision to cancel the June 2024 tender, County staff and our consultant Associated Engineering evaluated design optimizations that might realize potential construction cost savings. This included reduction of the grade-separated bin wall height, and procuring the scale house as a prefabricated, modular structure.

Upon direction from the staff, the civil design was revised by reducing the height of a portion of the bin wall by approximately 0.6 m (i.e. equivalent to removing one course of lock blocks). This also resulted in the reduction of earthworks quantities on site.

Preliminary research was done regarding procuring a prefabricated scale house and it was determined that a rectangular building footprint lent itself to a prefabricated structure better than an irregular footprint, since a building with an irregular footprint would likely have to be assembled from several modules which would reduce the associated cost savings from modular construction. The Elora facility scale house design has an irregular footprint – the footprint shape has two 'bump outs' which house the scale operator workstations, provides staff with good sightlines of incoming and outgoing traffic. Staff expressed a preference for keeping the footprint configuration unchanged to facilitate scale operations at this busy facility. As such the option of simplifying the footprint shape to accommodate a modular structure at Elora was not pursued further.

Scope of Work

Construction of a new scale house, household hazardous waste building, two (2) new weigh scales, associated site improvements including removal of existing buildings and features, earth excavation and grading, concrete flatwork, installation of a new drop-off bin modular retaining wall, cast-in-place retaining walls, water service, and sanitary service.

The tender includes provisional pricing for dust and mud control, base and surface asphalt, unsuitable material sub-excavation and backfill, incidental granular materials, excess soil management and off-site disposal of materials per O.Reg. 406/19, temporary roadside protection measures and fencing, and utility management.

On Friday November 1, 2024, three (3) submissions were received from contractors who attended the mandatory site visit with pricing shown exclusive of HST @ 13%. A mandatory site meeting was held on October 10th at the site and fifteen (15) contractors attended.

COMPANY NAME	*Base Bid Price	Provisional Price	Total Bid Price
Verly Construction Group Inc., Mississauga	$2,401.182.20	$489,325.41	$2,890,507.61
Roubos Farm Service Ltd., Moorefield	$2,513,911.45	$658,779.00	$3,172,690.45
Kieswetter Excavating., St.Clements	$2,515,773.65	$710,227.00	$3,226,000.65

*Base Bid Price includes a contingency allowance of $250,000.00 for any extra/addition work ordered by the County which falls outside the contract.

The tender submissions were in order and staff are recommending awarding the contract as specified to Verly Construction Group Inc. of Mississauga, Ontario at the total tendered amounts of $2,890,507.61 excluding H.S.T. @13%.

Additional professional fees for contract administration, inspection and testing plus the price of two weigh scales are included in the financial summary.

Financial Implications
In accordance with current projections, there are not enough funds in the SWS Capital Reserve to accommodate this budget amendment as well as fund the capital projects identified in the SWS 10-Year Capital Plan. This means that the County will have to debt finance the funding adjustment required to move forward with this work.

As a result, the County will have to issue $685,000 in tax-supported debt, anticipated to be amortized over 10 years and an additional $835,000 (for a total of $1.635 million) in development charge supported debt, anticipated to be amortized over 15 years to accommodate cash flow in the development charges reserve.

The tax-supported debt is estimated to have an annual cost of approximately $83,400 (starting in 2026-27) and the DC-supported debt is anticipated cost of $148,300, to be recovered by development charges.

Strategic Action Plan:

This report relates to the following objectives and priorities in the County's Strategic Action Plan:

- Making the best decisions for the betterment of the Community

Recommendation:

That County of Wellington Project No. CW2024-057 for the site improvements as specified at the Elora Waste Site in the Township of Centre Wellington as specified be awarded to Verly Construction Group Inc. of Mississauga, Ontario at the total tendered amount of $2,890,507.61 exclusive of HST @ 13%; and

That the funding for this project be approved as set out in the attached Financial Summary; and

That the debt, principal and interest charges, and offsetting development charges required to finance the project be added to the County's 2025 Budget and 10-Year Plan; and

That staff be authorized to issue the Purchase Order for the contract; and

That the Warden and Clerk be authorized to sign the construction agreement.

Respectfully submitted,

Jackie Osti

Jackie Osti
Manager
Purchasing and Risk Management Services

In consultation with/approved by:
Don Kudo, County Engineer
Ken DeHart, County Treasurer
Scott Wilson, CAO

FINANCIAL SUMMARY

COUNTY OF WELLINGTON
CAPITAL PROJECT EXPENDITURE AND FINANCING SCHEDULE

Bid name: Improvements to Elora Transfer Station
Bid number: CW2024-057

Project name: Elora Waste Facility Upgrade
Project number : 21220031

PROJECT COSTS

	Total
Bid:	
Tendered Cost*	$2,445,000
Provisional Items*	$500,000
Weigh Scales**	$145,000
Professional fees*	
Actuals to date	$180,000
Additional fees	$400,000
Contingency*	$300,000
Bid to Award	$3,970,000

* includes net cost to County of HST

** to be awarded under separate bid

PROJECT BUDGET APPROVALS AND FINANCING

	Gross cost	Solid Waste Capital Reserve	Debentures - Tax	Development Charges - Solid Waste	Debentures - Development Charges
2023 Capital Budget	$ 1,950,000	$ 1,000,000		$ 550,000	$ 400,000
2024 Capital Budget	$ 500,000	$ 100,000			$ 400,000
Project Total	$ 2,450,000	$ 1,100,000		$ 550,000	$ 800,000
Project Funding Adjustment	$ 1,520,000		$ 685,000		$ 835,000
Revised cost and sources of funding	$ 3,970,000	$ 1,100,000	$ 685,000	$ 550,000	$ 1,635,000

COUNTY OF WELLINGTON

COMMITTEE REPORT

To: Chair and Members of the Solid Waste Services Committee
From: Das Soligo, Manager of Solid Waste Services
Date: Tuesday, November 12, 2024
Subject: **Leachate Treatment Alternatives**

Background:

Landfill sites generate leachate through the course of their normal operation. The generation of leachate is caused by rainwater percolating through waste deposited in a landfill. Once in contact with decomposing solid waste, the water that flows out of the waste material is considered leachate and can be impacted by chemicals or materials found in the waste.

Like many landfills, the County of Wellington's Riverstown landfill originally was operated as a natural attenuation landfill. This means that landfill leachate is attenuated or diluted in strength, as it enters the underlying groundwater table. As part of its Environmental Compliance Approval (ECA), the operating terms and conditions for the site, the Riverstown landfill has a robust network of groundwater monitoring wells which are sampled from, with results reported annually to the Ministry of the Environment, Conservation and Parks (MECP).

As per the ECA terms, if parameters found in the sampled groundwater are of a sufficient quality, there is no need for contingency measures to be taken, which could include a requirement for leachate collection and treatment. The Riverstown landfill has never needed to enact contingency measures as it operates within the terms and conditions of its ECA.

In 2022, a Phase II of the Riverstown landfill was commissioned and began accepting waste. Phase II operates as a distinct landfill mound on the property, and therefore is subject to the current terms and conditions of a modern sanitary landfill site. This includes a requirement to collect and treat landfill leachate.

As the County is in the process of selecting a method of leachate treatment, it has received approval from the MECP to apply interim on-site leachate management measures while a long-term solution is determined and developed.

Context:

As part of the Solid Waste Services Strategy, in June 2018 County Council identified an option of treating leachate at the Mount Forest Waste Water Treatment Plant (WWTP) as the most appropriate and cost effective method of leachate treatment. An analysis by the County's environmental engineering consultant for waste management matters recommended this alternative and suggested that conveying leachate to the Mount Forest WWTP would be most effectively done via a forcemain.

In working towards this Council direction and consultant recommendations, Solid Waste Services budgeted $2.35 million for the construction of a forcemain connection between the Riverstown landfill and the Mount Forest WWTP.

In 2021 a consulting agency completed an assessment of treating leachate at the Mount Forest WWTP and determined that the facility could treat the Riverstown landfill's leachate within the terms and conditions of its ECA. These findings were presented at Wellington North Council, which in turn made some information requests to the County.

While consultant reports were prepared as follow-up to the information requests, inflation and the cost of contracted labour and building materials began to increase dramatically. It was determined that the capital budget forecast of $2.35 would be insufficient to construct a forcemain and staff therefore requested that consultants prepare a refreshed full costing of leachate treatment and conveyance alternatives over a 25-year time period.

In the autumn of 2024 County officials attended Wellington North Township Council along with a representative from the engineering firm who produced these costs estimates and information requests, and these findings were presented to Township Council.

Staff recommend that the County of Wellington make a formal request to Wellington North Township to approve the receipt of landfill leachate from the Riverstown site, at its municipal WWTP in Mount Forest. A consultant report which provides supporting information to this preferred alternative is attached as Appendix A. A brief summary of this information is presented below.

Cost Analysis of Leachate Treatment and Conveyance Alternatives:

As discussed, staff requested an updated report assessing the cost impact of leachate treatment and conveyance alternatives after the capital budget allocation for the preferred option of a forcemain connection, was deemed to be insufficient following rapidly inflating construction costs in recent years.

While the attached consultant report describes some of the positive and negative considerations associated with the different alternatives for treating and/or conveying landfill leachate, this report will not summarize these considerations in detail. The findings of the attached consultant report reconfirm the proas and cons from the earlier Strategy report in June 2018.

Some of the alternatives have high capital costs upfront and lower long-term operating costs, while other alternatives have low capital costs but higher long-term operating costs. The below table shows the cost of several leachate treatment and conveyance options, with capital and operating costs combined over a 25-year period, to provide a more accurate long-term estimate of anticipated costs.

The alternative leachate treatment and/or conveyance options are;

- On-Site Treatment
- Mount Forest WWTP Treatment – Force Main Conveyance
- Mount Forest WWTP Treatment
    - Contracted Trucking
    - In-House Trucking
- Guelph WWTP Treatment
    - Contracted Trucking

- In-House Trucking

The below table presents the costing of various leachate treatment and conveyance alternatives. The one-time initial capital cost is displayed, the annual operation and maintenance costs and the 25-year combined capital and operations costs.

Leachate Treatment or Conveyance Alternative	Capital Costs	Annual Operating Costs	25 -Year Capital + Operating Costs
(1) On-Site Treatment	$5,865,000	$701,000	$21,374,003
(2) Off-Site Force Main	$4,810,000	$219,000	$9,662,000
(3a) Private Off-Site Trucking to Mount Forest Waste Water Treatment Plant	$623,000	$1,172,000	$23,845,000
(3b) Private Off-Site Trucking to Guelph Waste Water Treatment Plant	$623,000	$2,649,000	$52,319,000
(4a) In-House Off-Site Trucking to Mount Forest Waste Water Treatment Plant	$878,000 - $1,066,000	$523,000 - $750,000	$9,345,000 - $11,697,007
(4b) In-House Off-Site Trucking to Guelph Waste Water Treatment Plant	$2,132,000	$1,837,000	$37,958,000

As can be seen, there is a wide range in anticipated long-term costs over the 25-year period of analysis. If the Mount Forest WWTP is the end destination for Riverstown's landfill leachate, the costs range from $9.34 - $11.7 million depending on the selected method of conveyance, and the size of the truck that would be used to transport the leachate. The next lowest cost alternative is on-site treatment at $21.4 million in long-term costs, which essentially means the County would be building a small WWTP on-site. Beyond the technical complexities and requirements for specialized, trained staff, this option is approximately double the cost of utilizing the Mount Forest WWTP for leachate treatment.

Costs then increase significantly if the option of utilizing a WWTP in a different community, is selected. Guelph was selected as a hypothetical destination for illustrative purposes as Guelph is one of several neighbouring municipalities which treats landfill leachate at its WWTP, which are a similar distance or moderately further from Riverstown. The City of Guelph currently treats leachate from its closed landfill site at its WWTP but has not been approached to discuss whether it has capacity or ability to accept and treat leachate from the Riverstown landfill.

Conclusion:

Treating landfill leachate at a municipal WWTP is considered a best practice as this is a proven method of leachate treatment that is commonplace in Ontario. A feasibility study determined that the Mount Forest WWTP can treat landfill leachate and remain within its operating terms and conditions of its ECA. It is an environmentally responsible and cost-effective treatment method for the County, is the recommended approach from the County's environmental engineering consultant and is the preferred alternative from a staff perspective.

Other options will result in significantly higher long-term costs to the County and may involve more technically complex processes. Furthermore, an on-site treatment solution or discussions involving other municipalities outside of the County may be less timely. A more detailed description of some of the positive and negative considerations of the various options can be found in the attached consultant's report.

Staff recommend that the County of Wellington formally request approval from Wellington North Township, to enter negotiations with the County to accept leachate from the Riverstown landfill site, at its Mount Forest WWTP. If the Township is agreeable to this, there will presumably be a need to negotiate volumetric discharge rates for the leachate, as well as discussing potential capital works at the WWTP, depending on the method of leachate conveyance that is selected.

Strategic Action Plan:

This report relates to the following objectives and priorities in the County's Strategic Action Plan:

- Best services in place to service the County's residents and businesses
- Best infrastructure in place to meet the current and future needs of the community

Recommendation:

That the County of Wellington formally request that Wellington North Township enter negotiations with the County to accept leachate from the Riverstown landfill site, at its Mount Forest Waste Water Treatment Plant.

Respectfully submitted,

Das Soligo
Manager of Solid Waste Services

In consultation with/approved by:
Don Kudo, County Engineer
Scott Wilson, Chief Administrative Officer

AtkinsRéalis

MEMO

TO
Das Soligo, Manager of Solid Waste (County of Wellington)

DATE
September 25, 2024

CC
Fabienne Etienne, EP (AtkinsRéalis)

REF
128073

FROM
Darren Dickson, P. Eng. (AtkinsRéalis)

EMAIL
dass@weillington.ca

SUBJECT
Riverstown Waste Facility - Phase II Leachate Management Review

AtkinsRéalis was retained by the County of Wellington (the "County") to provide a preliminary engineering evaluation to explore the options to safely and cost-effectively treat or dispose of landfill leachate from the Riverstown Waste Facility (RWF) Phase II development.

One of the options under consideration by the County is to build an on-site facility that treats the landfill leachate from RWT Phase II development. This is as an alternative to off-site disposal of the leachate to the Mount Forest municipal wastewater treatment plant (WWTP) located about 10 km northwest of the site, which the County is also considering. For off-site disposal, two potential options exist: 1) piping the collected leachate through a force main connecting RWF Phase II to the WWTP, and 2) tanker-trucking the leachate to the WWTP. The option of trucking the material by tanker was further broken down into an assessment of the costs of completing the works internally (purchasing vehicles, hiring staff) and subcontracting the work out to a private firm.

The evaluation included herein was conducted, in part, using information from the previous work by SNC-Lavalin including the reports *Riverstown Phase II – Anticipated Leachate Strength and Volume* (SNC-Lavalin, 2018) and *Detailed Feasibility Assessment for Co-Treatment of Phase II Riverstown Waste Facility Leachate* (SNC-Lavalin, 2020). Quotations for major equipment components were obtained from suppliers to generate Class 5 Cost Estimates, as defined by Association of America Cost Engineers (ACCE), for the three leachate management options. Power (electricity) and chemical consumptions for the different options were also estimated to support Life Cycle Cost Analyses.

The findings presented in this technical memo should be considered preliminary in nature, and they intended to serve as a starting point for further investigations and to support decision making. Further investigations and negotiations with receiving municipalities would be required to arrive at a final recommended solution for managing leachate generated from RWF Phase II development.

1. Location, Site Information and Background

The RWF is at 7254 Sideroad 5 West in the Township of Wellington North (formerly Arthur Township). The RWF is located on the north side of Sideroad 5, approximately midway between Mount Forest and Kenilworth and about 500 m west of Highway 6. The total area of the facility is approximately 104.4 hectares (ha). The licensed filling area is 27.2 ha, of which about 5.5 ha has been used for waste disposal to date. The remaining site area consists of about 77.2 ha of buffer lands to the north, south and west of the RWF (Figures 1 and 2).

The facility is licensed under Amended Environmental Compliance Approval (ECA) No. A171101. The ECA is provided as Attachment A. The County assumed responsibility for the RWF in January 2001 from the local municipality.

The waste capacity of the Phase I area of the RWF was expended in August 2022 and has since been closed. The Phase I portion of the RWF operated as a natural attenuation site, whereby leachate is allowed to seep into the subsurface soils where it combines with background groundwater flows and moves downgradient away from the fill area undergoing various natural mechanisms which aid in reducing its strength. While a contingency system for the collection of leachate was considered and available during earlier portions of development of Phase I, it was never required as water quality triggers were not exceeded during development.

A leachate collection system was designed and installed for the Phase II area, with a conceptual design outlined in the report titled *Riverstown Landfill Site, Phase II Development, Development and Operations Report* (SNC-Lavalin, 2006). The design included a low permeability base using native fill for leachate containment and incorporated a leachate collection system (LCS) comprised of perforated pipe and clear stone for leachate extraction. During detailed design of Phase II, the LCS was enhanced by including a full granular bed, to supplement the perforated pipe and granular surround design.

Under the current design, a pump station, position adjacent to the western edge of the fill area and mid-way between the north and south fill limits, will receive the cumulative flow from the LCS. The design of the station will be completed once the ultimate receiver for the leachate is determined, but the current design concept consists of a manhole/sump structure and an at-grade holding tank. A sump at the base of the manhole allows for the collection and settlement of fine particles suspended in the leachate.

The Phase II portion of the RWF has a predicted waste capacity of 691,000 m^3. In the most recent annual monitoring report, it was estimated that the operational life of the Phase II area was on the order of 23 years (SNC-Lavalin, 2023); with closure on or about 2046, however, the operational life projection was based on limited data as the first cell is still being filled and future reports will refine the estimate as additional information and capacity utilization trends become available.

2. Current Conditions and Factors

The generation of leachate from landfills is dependent on several factors including precipitation rate, the types of the waste received, the landfill area and configuration, the landfills operating procedures, and the various stages and durations of landfill development. As a result, the volume and characteristics of landfill leachate varies significantly, not only from site to site, but also with time at any one facility as the site develops and the leachate ages. The analysis and prediction of the leachate volume and characteristics from the RWF Phase II development were described previously by SNC-Lavalin (2018, 2020). These reports, along with the anticipated discharge objectives after leachate treatment, served as the basis for the evaluations herein.

2.1 Leachate Volume to be Treated On-site or Disposed Off-site

The estimates for leachate volume generation rate range from as much as 100 m^3/day at the peak of landfill operations, dropping to 30 m^3/day or less following landfill closure. These estimates were initially generated based on the area's peak annual precipitation rate, and which was then distributed to each month over the entire year. This was then assumed to have an infiltration rate of 20% through any landfill cap and cover system. Significantly higher daily leachate generation rates are anticipated to be present for short periods, based on peak monthly precipitation rates or peak daily precipitation rates, potentially as high as 250 m^3/day and 1,480 m^3/day, respectively (SNC-Lavalin, 2020).

It is estimated that the granular bed system (0.3 m of clear stone) below the waste will provide at least 5,500 m^3 of storage volume, which will provide sufficient capacity to manage the hydraulic surge conditions resulting from severe, short-duration rainfall events and allow the resulting leachate to be managed over a more distributed period.

Considering each of the prior inputs, the receiving capacity of the treatment system in this evaluation is assumed to need to meet the aforementioned 100 m^3/day leachate generation rate. This is judged to be appropriately conservative over the span of landfill cell construction.

2.2 Anticipated Off-site Disposal Location for Leachate

For the two off-site leachate disposal options, the current preferred receiver is the Mount Forest WWTP located at 651 Martin Street in Mount Forest, Ontario. A second alternative for preliminary costing is assumed to be the Guelph WWTP facility for the purpose of generating comparable costing estimates for trucking as it is known that the Guelph WWTP currently treats leachate from the Eastview Landfill site.

If a force main is employed, the leachate collection pump station will discharge into the forcemain and be equipped with appropriate leachate pump stations along its length to ensure that leachate can be conveyed from the RWF Phase II facility to an existing sewage lift station on the south bank of the South Saugeen River near Murphy Street, along Highway 6. It is anticipated that leachate will then be managed by the town's sanitary system, allowing for some equilibration of quality as it flows to the WWTP in Mount Forest. The length of the force main required to reach from the site to the south lift station is estimated at about 9.4 km.

If leachate trucking is selected, it is assumed that the leachate will be hauled in tanker trucks directly from the RWF Phase II LCS, preferably to the same southern lift station, depending on any agreement with the Township. This is a driving distance of approximately 10 km, one-way. For the purposes of generating an approximate costing alternatives, haulage to the Guelph Wastewater Treatment Plant on Wellington Street West was also selected at an estimated one-way distance of 65 km. No discussions with the City have been initiated to further review the potential for this alternative, as it is intended to demonstrate only the additional costing implications of a further haul distance.

2.3 Leachate Characteristics

There is limited site-specific leachate data available for the Riverstown facility, the data that is available is representative of "new" or "young" leachate rather than the quality that would be likely to be generated over the majority of the operational and post-closure landfill life. As the County operates a source separated organics (SSO) diversion program, waste being landfilled at the site will have a lower organics component than other comparable municipal landfill sites that have historical waste predating their municipality's initiating SSO diversion. Similarly, the presence of a mature recycling system and better

understanding and management of household hazardous wastes (also known as municipal special wastes) will reduce the presence and concentrations of other contaminants in the RWF Phase II leachate in comparison to typical municipal landfill leachate. Therefore, the predicted leachate characteristics for the site presented in the SNC-Lavalin (2018, 2020) reports that will also be used in this preliminary evaluation, presented here in Table 1, that were generated from data for other active landfills in Ontario are considered to be conservative in nature and likely over-representative of actual parameter concentrations that would be received.

Table 1: Potential Leachate Parameter Concentrations (from SNC-Lavalin, 2018)

PARAMETER (mg/L)	Weak Leachate	Medium Strength Leachate	Large Site Leachate (Mature)		
			High	Low	Average
Alkalinity	736	3,730	3,530	800	2,672
Aluminium	0.0157	0.621	0.20	0.01	0.04
Ammonia Nitrogen	31	392	747	87	383
Arsenic	0.010	0.036	0.011	0.002	0.004
Barium	0.183	0.979	1.20	0.19	0.69
Biological Oxygen Demand	6	106	577	10	95
Boron	0.548	7.41	9.24	1.02	5.81
Calcium	135	402	213	96	156
Chloride	77	881	4,580	381	2,327
Chemical Oxygen Demand	58	710	1,680	114	949
Conductivity (µS/cm)	1,568	8,410	17,700	3,430	11,297
Copper	0.0012	0.10	0.042	0.003	0.010
Dissolved Organic Carbon	15	283	351	47	204
Fluoride	0.1	0.5	0.85	0.39	0.66
Hardness	613	1,670	-		
Iron	13.3	51.3	10.30	0.83	3.24
Lead	0.0017	0.0101	0.005	0.001	0.002
Magnesium	67	188	280	83	201
Manganese	0.42	2.89	1.16	0.14	0.45
Nickel	0.007	0.14	0.064	0.022	0.045
Nitrate Nitrogen	0.3	33	5.76	0.10	0.79
Nitrite Nitrogen	-	0.2	1.51	0.05	0.59
pH	7.36	8.58	8.17	7.34	7.85
Phenols	0.002	0.18	0.48	0.01	0.06
Phosphorous	0.05	0.05	3.86	0.48	2.15
Potassium	38	81	1,040	99	548
Sodium	56	356	1,950	304	1,223
Sulphate	69	112	393	41	141
Total Dissolved Solids	875	1,332	9,910	1,730	5,670
TKN	36	420	-		
Zinc	0.008	0.654	0.206	0.01	0.04558

Note: "-" indicates no data available for that parameter.

The Medium Strength Leachate was used for the evaluation of leachate treatment as this data was generated from other similarly sized, active landfills in Ontario. The estimated Biochemical Oxygen Demand (BOD) of the Medium Strength Leachate, at 106 mg/L, is lower than that generated from typical Ontario Landfills per GHD (2014). Their study indicated a more likely BOD for a "typical" medium-sized landfill ranged from 400 mg/L to 2,000 mg/L and averaged 1,000 mg/L. The GHD data are associated with sites that were landfilled prior to organics diversion programs becoming common as currently occurs at the County, and the presence of an active SSO is expected to reduce leachate BOD. The expected lower than "typical" BOD level in the leachate has a profound impact on the selection and configuration of the treatment process, as discussed in more detailed in Section 3.

3. Analysis of Alternative Solutions

The following alternatives currently being considered by the County for the long-term management of leachate at the RWF are as follows:

- Alternative 1 – On-site Leachate Treatment
- Alternative 2 – Off-site Leachate Disposal – Force Main Leachate Disposal
- Alternative 3 – Off-site Leachate Disposal – Leachate Trucking

  3a – Private Haulage Company

  3b – County Staffed Trucking Option

A detailed analysis of the alternatives is provided in the following sections. The 3b alternative would require the County to purchase and maintain its own haulage truck, obtain appropriate approvals to haul leachate and hire an appropriately trained operator to manage leachate transportation internally will have some non-cost related implications including public perception, and the County's direct exposure to liability in the event of a spill or accident during transport.

3.1 Alternative 1 – On-site Leachate Treatment

3.1.1 Preliminary On-site Treatment Objectives

Just as important as the leachate volume and characteristics, the treatment objectives, or discharge criteria, form the other aspect that is crucial to defining the required treatment levels and processes (technologies), and in turn the capital and operational costs of treatment. Like any other waste streams discharged to the environment, the discharge criteria for leachate treatment are mandated under provincial legislation, and approval from the MECP would be required before implementation. This approval process would also normally require an Environmental Impact Assessment (EIA) dealing with site-specific conditions, including considering natural attenuation processes.

Without this crucial step, only preliminary discharge criteria can be used for treatment evaluation purposes. These preliminary criteria, again, were developed in reference to similar landfill leachate treatment operations in Ontario, and AtkinsRéalis' experience and professional judgement. Among the criteria, one parameter – dissolved unionized ammonia at 20 mg/L-N, along with the interim Provincial Water Quality Objective for Nitrate of 13 mg/L (2.9 mg/L nitrate-nitrogen). was adopted based on the required concentration to protect cold water fisheries in surface water bodies. The receiving environment for the discharge from an on-site leachate treatment facility would likely be the adjacent, non-provincially significant kettle ponds. These ponds are physically segregated from each other, but hydraulically connected. When groundwater levels are high, groundwater discharges into the kettles, creating a temporary pond, typically present during spring and extending into the summer. When groundwater levels are lower, the ponds recharge the groundwater. The pond system is already designated as the receiver in the event of surface water overflow from the stormwater management system, although this has never occurred.

3.1.2 Basis of Design for On-site Treatment

The basis used for developing and defining the preliminary leachate treatment process for the RWF Phase II development is summarized in Table 2. Only the parameters contributing to significant preliminary design considerations for the treatment process development are presented, and their significances are discussed in Section 3.1.3.

Table 2: Tentative RWF Leachate Treatment Evaluation Basis

PARAMETER (Note 1)	RAW LEACHATE	TENTATIVE TREATMENT TARGET	REQUIRED REMOAL	SIGNIFICANCE FOR TREATMENT
Flow Rate, m^3/day	100			Impacts on design and operation
Alkalinity as $CaCO_3$	3,730			Required for Nitrification
Ammonia - N	392	< 1	> 99.7 %	Regulated; Potential toxicity
BOD	106	< 10	> 90.5%	Regulated; Carbon source for denitrification
COD	710			BOD/COD ratio for biodegradability
Hardness as $CaCO_3$	1,670			Impacts on design and operation
Iron	51.3			Impacts on design and operation
Nitrate - N	33	< 13	> 95.3% (Note 2)	Regulated
pH, IS	8.58	6 - 9		Regulated; Impacts on Nitrification and Denitrification
Temperature, °C	12			Impacts on design and operation
Total Boron	7.41	< 0.2	> 97.3%	Regulated
Total Phosphorous	0.05	0.3		Nutrient Required for Biological Process
TKN	420	< 50	> 88.1%	Regulated; Converted to Ammonia and then Nitrate

Note 1: All units in mg/L unless noted otherwise.
Note 2: Calculated with the consideration of conversion of TKN and Ammonia to Nitrate through the treatment process.

3.1.3 Design Considerations

The preliminary design basis presented in Table 2 may lead to the following considerations. Some of these are common for typical leachate treatment projects, whereas some are less common.

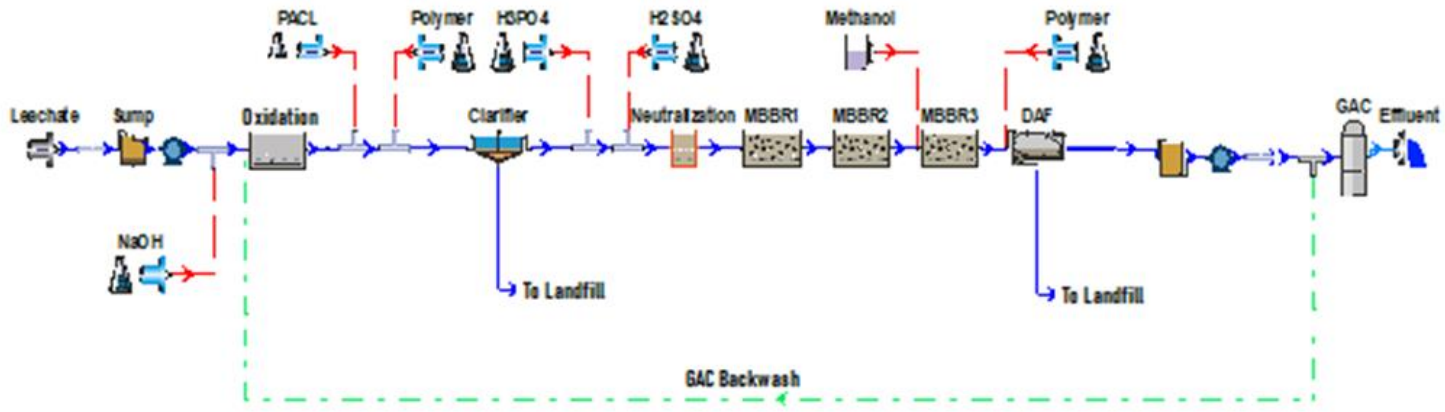
1. **Ammonia – N**: To obtain effluent concentrations of <1 mg/L-N, nitrification in the treatment process essentially needs to be complete. This is a common challenge for leachate treatment, as the microbial community responsible for nitrification is highly sensitive to the operating environment, such as toxic effects from common leachate constituents including heavy metals, phenols, sulfides, etc., as well as biological impacts from water pH and temperature.
2. **BOD**: While the required removal is more than 90%, the predicated leachate BOD concentration is relatively low as a young leachate. This would mainly result from the SSO program implemented in the region. Compared to predicted Ammonia-N and TKN levels in the leachate, which are 392 mg/L and 420 mg/L, respectively, and considering the fact that only a portion of the BOD is readily biodegradable, the leachate BOD will not likely be able to provide a sufficient carbon source for the denitrification process, as generally 4 parts readily biodegradable BOD are required to effectively denitrify 1 part of nitrogen. As a result, the denitrification in the treatment process will need to completely rely on an external carbon source, such as Methanol, MicroC or some other chemical addition. Moreover, this also suggests that there will be no advantage to employing pre-denitrification in the treatment process, which is intended to utilize readily biodegradable carbon sources in the influent and would normally be designed to take place in the anoxic reactor at the beginning of the treatment process. Instead, post-nitrification should be considered for the RWF Phase II treatment system.
3. **COD**: Although COD is not normally a regulated parameter for leachate treatment, the BOD/COD ratio is a valuable indicator of the general biodegradability of the leachate, with higher ratios being more treatable. Higher BOD/COD ratios, and therefore higher BOD treatability, are typical for young leachate, whereas the biodegradability of leachate normally decreases as the landfill ages. Based on Table 1, the BOD/COD for this leachate could be as low as 0.15, compared to a more typical reported typical leachate BOD/COD ratio in the range of 0.25 to 0.45 for other Ontario landfills. The lower ratio is expected to provide a reasonable reflection of the impact to the leachate characteristics from the SSO program on the leachate that will be generated, as the organics that are diverted via an SSO program

are the mostly readily biodegradable organics in waste if they are landfilled. As a result, the leachate treatment process should be designed to treat more biologically refractory constituents than for leachate from sites that have historically received waste with a higher organics percentage.

4. **Nitrate – N**: The required level of removal for nitrate-N needs to consider the conversion of ammonia and TKN to nitrate during the nitrification process. Based on the estimated leachate characteristics and the tentative treatment objectives, more than 95% removal would be required. At this level of remove, post nitrification with a sufficient external carbon source will be required through the denitrification process, regardless of whether pre-nitrification is employed or not.
5. **pH**: The predicted leachate pH of 8.58 is out of the optimal pH range for both nitrification and denitrification, which is near or less than pH 8. Particular to nitrification, the reaction rate reduces rapidly when the pH is >8. This, coupled with the requirement for nearly complete nitrification, suggests that pH adjustment (reduction) may be necessary. However, higher pH may provide opportunity to more-economically deal with the impacts of high hardness, along with heavy metals, anticipated in the leachate through chemical oxidation and precipitation, if they precede pH adjustment.
6. **Total Boron**: Biological treatment is generally not considered feasible for boron removal. Given the estimated total boron in the leachate at 7.41 mg/L, and a needed removal efficiency of more than 97% to reduce it to less than 0.2 mg/L, an additional treatment process, such as carbon adsorption, is likely required.
7. **TKN**: Once the treatment objectives for ammonia and nitrate are met, TKN in the effluent will be under control, and would not cause any regulatory concerns. However, TKN conversion to nitrate during the nitrification process must be accounted for in the design of the denitrification process.
8. **Alkalinity**: The anticipated alkalinity of 3,730 mg/L is more than sufficient to support complete nitrification, based on the theoretical alkalinity demand at 7.4 mg/L alkalinity as $CaCO_3$ per 1 mg/L ammonia-N to be nitrified. This indicates there would be no advantage to implementing pre-denitrification in the process for alkalinity recovery purposes.
9. **Hardness**: Not normally regulated, high hardness is a common issue for leachate treatment, as it causes operation and maintenance issues because of mineral scaling. This problem is exacerbated when fine bubble diffusers are employed for aeration in a biological treatment process. If not controlled, a Membrane Bioreactor (MBR) process is particularly vulnerable to high hardness, as the membrane flux will be rapidly reduced if the scale is formed on the membrane surface. Scale control is therefore key to successfully operating a MBR plant. Scale formation is also a concern for Moving Bed Biofilm Reactor (MBBR) process because scaling on the surface of biofilm media reduces the media's capability to support microbial growth.
10. **Iron**: Normally not a concern after biological treatment. Iron in the influent would need to be reduced to less than 0.5 mg/L, compared to the estimated 51.3 mg/L (> 99% removal) in the leachate, to prevent its precipitation on the surface of membrane if MBR process is employed. This would be accomplished through a chemical oxidation process.
11. **Temperature**: Not regulated for leachate treatment, the leachate temperature impacts design and sizing of a biological treatment system profoundly, especially if the process involves the requirement for high level nitrification. Biological reaction rates are faster at the higher temperature withing proper ranges, but slow done when the temperature decreases. Previous research has demonstrated that the reaction rate for nitrification at 10°C is only 20% to 25% of that at 25°C. Selecting a proper design temperature is crucial to ensure regulatory compliance for the system's effluent. Seasonal temperature variations, with seasonal precipitation recharge rate, should be considered in the design. It is noted that some treatment technologies, such as the MBBR process, are more capable of withstanding low temperature impacts and sustaining more stable and efficient nitrification during winter months, attributed to the biofilm growing on the media surface.
12. **Phosphorus**: Phosphorus is an essential nutrient required for any biological activities. Not a concern in the effluent from leachate treatment, it is normally present at concentrations too low to sustain biological treatment processes and must be amended with chemical additions.

3.1.4 Preliminary Treatment Process Configuration

Based on the aforementioned considerations, a preliminary treatment process was developed for the on-site RWF Phase II leachate treatment system, as illustrated in Drawing 1.



Drawing 1: Preliminary Treatment Process Schematics

At this point, MBBR technology would be recommended to serve as the cornerstone of the treatment process, mainly performing BOD reduction, and nitrification and denitrification functions. Partial removal of heavy metals and boron etc., are also expected to occur. Compared to other biological processes that have been employed for leachate treatment applications, such as conventional activated sludge (CAS), Sequential Batch Reactor (SBR), and Membrane Bioreactor (MBR), MBBR technology has demonstrated its advantages for the following:

- Stability and flexibility against changing leachate characteristics and operating conditions.
- Capability for effective nitrification-denitrification at low temperatures during the winter, which would enable the potential for some out-door installation and treatment processes and minimize the need for building structures.
- Resistance to presence of toxic substances in the leachate, which is crucial to ensure the required high level of ammonia removal.
- Easy operation because the sludge bulking issues are eliminated, and Sludge Residence Time (SRT) does not need to be calculated and controlled.
- Less maintenance due to the simplified process, without the need for sludge recycle pumping to maintain proper biomass inventory in the bioreactors.
- Higher capability to breakdown biologically refractory compounds that would become more prevalent in the leachate as the landfill ages, such as humic acids and fulvic acids. This efficiency is due to more diversified microbial communities in the biofilm, and longer biomass resident time that is de-coupled from the hydraulic loading of the treatment system.

Considering the anticipated leachate characteristics for the RWF Phase II development, it is recommended that any MBBR reactor be configured in three sequential stages. Each stage from Stage 1 to Stage 3, would be optimized for organic degradation (BOD reduction), nitrification, and denitrification, respectively. Phosphate will be supplied for the nutrient requirement for biological activity. An external carbon source (illustrated as methanol) will also be supplied at the last stage of the MBBR, to meet the denitrification requirement. The separation of biomass from biologically treated leachate will occur in the Dissolved Air Floatation (DAF) unit, where the nitrogen gas produced from denitrification is also stripped off. Polymer addition for better DAF performance would be employed. It is anticipated that the separated biomass can be disposed on-site in the landfill.

To ensure the treatment objectives are met, it is proposed that the treated leachate be polished with a granular activated carbon (GAC) filtration system operated in lead and lag mode. This is particularly important to deal with boron, which would require >97.3% removal and is not likely to be removed effectively by other treatment steps in this process.

To address the long-term scaling issues caused by high hardness in the leachate, and the potential corrosive and toxic sulfide formed as the landfill ages, the first step of the treatment before the biological process is leachate oxidation by aeration at an elevated pH. Caustic addition will be used to bring the leachate pH from 8.58 to at least 9 pH units. This step will also remove most of the iron in the leachate, as well as some other heavy metals. The resulting chemical sludge formed during this process will be separated from the leachate through a high-rate clarifier with coagulant (illustrated as PACL) and polymer addition and will be re-disposed in the landfill on-site in an inert form.

After the clarifier but before the biological process, the pH of the leachate would be adjusted down to be optimized for nitrification at 7.5, and this would be achieved in a neutralization unit upstream of the MBBR system, with addition of acid (illustrated as H_2SO_4).

3.1.5 Major Process Equipment and Treatment Facilities

Preliminary sizing of all major process equipment and treatment facilities has been completed based on the process calculation and the proposed treatment process. These are tabulated in Table 3 and Table 4, respectively.

Table 3: Major Process Equipment List for On-site Treatment

	Quantity	Capacity Each	Volume Each	Description
1 **Feed Pump**	2	5 m^3/h		VFD Equipped; One Duty One Standby
2 **Oxidation Tank**	1		10 m^3	Pneumatic Mixing; PE Construction
3 **Gravity Settler**	1	5 m^3/h		With Flocculator; SS Construction
4 **MBBR Package**		100 m^3/h		
Aerobic MBBR	2		100 m^3	Glass Fussed CS Construction; 45% Media Fill
Anoxic MBBR	1		100 m^3	Glass Fussed CS Construction; 45% Media Fill
Biofilm Media set	1		135 m^3	SSA 930 m^2/m^3 from Suez
Anoxic Mixer	2			Submersible Mechanical Mixer
Aeration Blower	3	300 Nm^3/h		Two Duty One Standby
H_3PO_4 Injection System	1	1 LPH		With Two Metering Pumps; One Duty One Standby
Methanol System	1	10 LPH		With Two Metering Pumps; One Duty One Standby
5 **DAF Package**				
DAF System	1	5 m^3/h		Coated CS Construction
Polymer Make Down	1	5 LPH		With Two Metering Pumps; One Duty One Standby
6 **GAC Package**				
GAC Feed/Back Wash Pump	2	5 m^3/h		One Duty One Standby
GAC Filter	2	5 m^3/h		Lead-Lage; 304 SS Construction
7 **Caustic Tank**	1		8 m^3	CS Construction

8	**Methanol Tank**	1		6 m^3	304 SS Construction
9	**GAC Feed Tank**	1		10 m^3	PE Construction
10	**NaOH Injection Skid**	1	25 LPH		With Two Metering Pumps; One Duty One Standby
11	**H_2SO_4 Injection Skid**	1	10 LPH		With Two Metering Pumps; One Duty One Standby
12	**PACL Injection Skid**	1	10 LPH		With Two Metering Pumps; One Duty One Standby

Table 4: Major Treatment Facility List

		Quantity	Size (m)	Description
1	**Feed Pump Station**	1	D 1.8 X 4.0 H	Prefabricated HDPE Underground Pump Station with Two Pumps
2	**Treatment Building**	1	18 X 9 X 12 H	With a 6 X 9 X 4 H Mezzanine

3.1.6 Risks and Uncertainties

Stand-alone landfill leachate treatment is considered technically challenging by treatment professionals due to the presence of a wide range of contaminants at potentially high concentrations. This, combined with fluctuating leachate characteristics at the same landfill, and differences in leachate quality from one landfill to another further complicates the development of the treatment process using simple data extrapolation. This is the reason that on-site pilot studies are often conducted for landfill leachate treatment projects before full-scale engineering and construction take place. For the RFW Phase II development, the lack of site-specific data, and the lack of established treatment objectives bring an even higher degree of uncertainty and potential risk to the project.

There are also risks and uncertainties brought about by changing regulatory requirements. If treatment objectives change, or new contaminants of concern emerge, treatment systems may require redesign and expansion, including new permitting.

As a result of the above, the proposed treatment process and the associated cost estimate herein should only be seen as preliminary for information purposes, and subject to further development.

3.1.7 Further Investigations

To further examine the feasibility of on-site leachate treatment options for the RWF Phase II development, discharge objectives need to be established in consultation with the MECP. This would require an EIA and possibly hydrology/hydrogeology investigations, although the fact that the suggested surface water receivers would be the kettle ponds which are not directly hydrologically connected to each other, or the ultimate receiving surface water system would presumably assist in developing achievable discharge criteria.

While obtaining actual leachate quality strengths for treatment would be advisable for use in developing realistic and cost-effective leachate management strategies, it is acknowledged that initial leachate quality is often diluted from precipitation falling on areas of the cell that have not received waste filling, and the waste initially degrades under aerobic, rather than anaerobic conditions, creating different parameter strengths and ranges. Notwithstanding this, collection of actual leachate quality data to develop an early period database is recommended.

Once estimates of anticipated leachate characteristics have been refined, clear definition of the treatment objectives and a subsequent on-site pilot study would be desirable to validate the treatment process if on-site treatment is preferred over off-site disposal for leachate management.

3.2 Alternative 2 – Off-site Leachate Disposal – Force Main Leachate Disposal

The preliminary design for this option includes an on-site pump station and a 100mm diameter HDPE DR17 force main (estimated to be 9,383 m in length). The pumping station would be equipped with two submersible pumps (one duty pump and one standby pump). The pumps, piping and fittings would be stainless steel. It is estimated that four air valve chambers and three pigging stations would be required along the length of the force main, between the RWF Phase II site and the sewage lift station on the south bank of the South Saugeen River near Murphy Street. The first pigging station would be located at the landfill, with a launching manifold only. The second station would be in the middle of the force main, with launching and receiving manifolds. The third station would be located near Murphy Street, before tie-in to the existing pump station.

It is assumed that the County would prefer and/or be required to utilize a forcemain that incorporated a leak detection system.

3.3 Alternative 3 – Off-site Leachate Disposal – Leachate Trucking

The leachate trucking option requires a pump station to be built to fill tanker trucks. The required pumps will be much smaller in terms of the horsepower compared with that for the force main option and were estimated to be 2.2 kW. Other than pump sizing, the pump station itself is assumed to follow the same design.

Depending on flow rates and the ability to fill trucks within an adequate time period, the County may need to invest in above ground storage tanks with heat tracers to prevent freezing or below ground storage tanks. For the purpose of a costing comparison, it is assumed that these will be required.

Other issues typically associated with trucking of leachate are the risks of spills, noise and/or disturbance along the trucking route, and the fact that limited operators have been identified in the vicinity, which could result in costing issues if they should cease operations.

A second off-site evaluation was also utilized that employed the use of County staff members and County owned vehicles. While not quantifiable, this would include a secondary benefit of having an additional paid staff member that could assist with on-site operations when haulage is not required. The County has previously identified savings that have been achieved in bringing other operations in-house, such as operation of roll-off vehicles that transport waste bins from transfer stations to the RFW for disposal.

4. Costs Evaluation

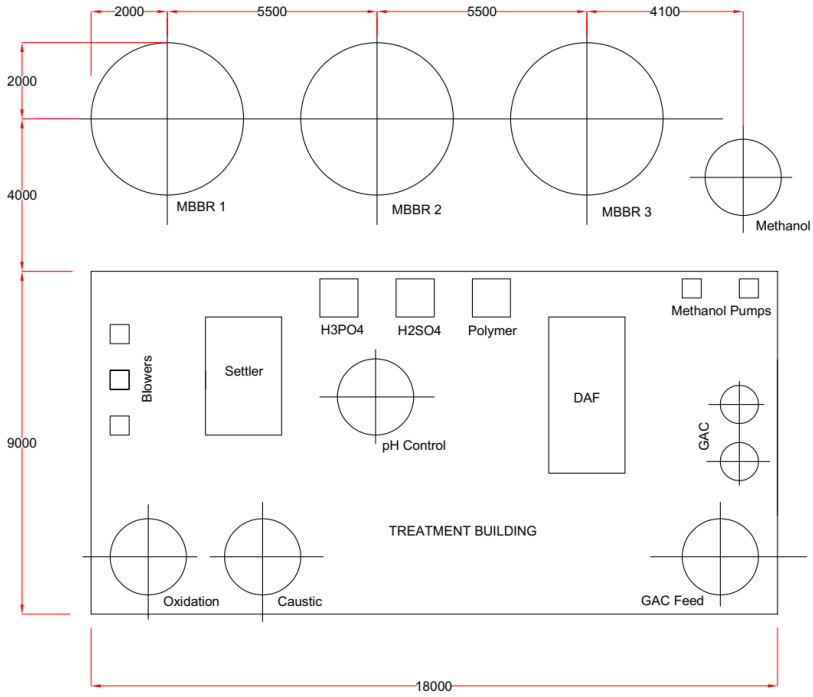
The net present value calculation is based on a 25-year assessment, under the assumption that all equipment would remain in working condition during this period, for both the water treatment system and the forcemain. The costs used were generated in 2022 and have been inflated and discounted to 2024 using the County's most recent inflation and discount

values for utilized in the annual landfill liabilities assessment. It is recommended that these costing estimates not be used for the purpose of budgeting for specific construction until they can be updated appropriately given the significant fluctuations in construction costing in recent years but are appropriate at a Class 5 costing estimate level for comparison of alternatives.

4.1 Alternative 1 – On-site Leachate Treatment

4.1.1 Preliminary Layout

To support the cost estimate, a preliminary layout of the on-site treatment system was developed and is illustrated on Drawing 2, although the Feed Pump Station is not included in the drawing.



Drawing 2: Preliminary Layout of the On-site Treatment System

4.1.2 Major Process Equipment and Prefabricated Feed Pump Station

Manufacturers and technology providers were engaged to solicit budgetary quotations for all major process equipment to support a capital cost estimate for the on-site treatment system. Budgetary quotations for the prefabricated feed pump station with two submersible pumps and its installation were also received.

Based on those quotations, and assuming 30% for equipment Piping and Installation, and 20% for Electrical and Controls, the estimated Equipment Capital Cost is $4,035,750, including the prefabricated pump station and its installation, but excluding the Treatment Building, HVAC and all Structure & Civil works. It should also be noted that no contingency and engineering costs were included in Table 5.

Table 5: Capital Cost Estimate for Major Process Equipment and Pump Station

Cost Items	Quantity	Price
Feed Pump Station (PS)	1	$125,000
PS Installation	1	$120,000
Gravity Settler	1	$125,000
MBBR Package Aerobic MBBR Anoxic MBBR Anoxic Mixer Aeration Blower H_3PO_4 System Methanol System	1	$1,750,000
DAF/GAC Package DAF System Polymer Make Down GAC Pump GAC Filter	1	$450,000
NaOH Injection Skid	1	$12,000
H_2SO_4 Injection Skid	1	$12,000
PACL Injection Skid	1	$12,000
Caustic Tank	1	$38,000
Methanol Tank	1	$28,500
Oxidation Tank	1	$9,000
GAC Feed Tank	1	$9,000
Eq. Sum		$2,690,500
Piping & Installation	30%	$807,150
Electrical and Control	20%	$538,100
Sub Total		**$4,035,750**

4.1.3 Building, HVAC Civil and Structure

A Treatment Building estimated 18 X 9 X 12 m (H) in size would be required to house most process equipment, as shown in Drawing 2. This build would have a mezzanine sized 6 X 9 X 4 m (H) for an office/lab/control room.

There will also be design and construction costs associated with the site Civil and Structure works and foundations for outdoor equipment, such as the MBBR reactors and the Methanol Storage Tank.

The cost estimate for the Treatment Building and outdoor equipment as noted above are estimated to be in the range of $200,000 but may vary depending on specific requirements to be included and site conditions. All designs must be is compliant with Building Code, Electrical Code and Fire Code requirements.

4.1.4 Annual Chemical Consumption and Cost Estimate

Budgetary quotations for required treatment chemicals were solicited for this project. Coupled with the calculated chemical consumption rate, the annual chemical costs under the preliminary design conditions were estimated and are presented in Table 6. There are no contingency costs included in Table 6.

Table 6: Annual Chemical Cost Estimate

Chemical	Quoted	Unit	Dosage/day	Dosage/year	Annual $
75% Phosphoric Acid	$2.06	kg	7.41	2,705	$5,572
25% Sodium Hydroxide	$0.69	kg	390.00	142,350	$98,222
30% PACL	$1.62	kg	33.30	12,155	$19,690
95% Sulfuric Acid	$0.91	kg	182.00	66,430	$60,451
Emulsion Polymer	$4.00	kg	16.67	6,085	$24,338
Methanol	$1.47	kg	159.00	58,035	$85,311
				Total Annual Cost	**$293,584**

As chemical prices tend to be highly volatile and the consumption rates will vary depending on the actual influent leachate flowrate, characteristics and treatment objectives, the above costs should be assumed to have a higher-than-normal degree of uncertainty.

4.1.5 Annual Power Consumption

Based on the process calculation and the equipment sizing, the power consumption under the design conditions can be estimated. Assuming an electricity rate at $0.18/kW-H, the annual electricity costs have been estimated, as indicated in Table 7.

Table 7: Annual Electricity Cost Estimate at $0.18/kW-H

Equipment	kW	kW-H/Year	Annual $
Feed Pump	0.75	6,570	$1,183
Gravity Settler	0.75	6,570	$1,183
Aeration Blower	25	219,000	$39,420
Anoxic Mixer	5	43,800	$7,884
DAF Unit	9	78,840	$14,191
GAC Feed Pump	3	26,280	$4,730
25% NaOH Pump	0.5	4,380	$788
95% H2SO4 Pump	0.15	1,314	$237
75% H3PO4 Pump	0.15	1,314	$237
Methanol Pump	0.15	1,314	$237
PACL Pump	0.15	1,314	$237
Polymer Pump	0.37	3,241	$583
Total Power	44.97	393,937	**$70,910**

4.1.6 Annual Personal Fees for Operation Maintenance

Operation and maintenance of a treatment system will require several full-time and trained staff. Since the system will operate 24/7, for 365 days a year, staff will be required on-site to operate and maintain the system during these same hours. Assuming the County hires a minimum of two staff or engages the Township or OCWA to run the facility, each with salaries of $80,000 per year, plus 35% for fringe and overhead, the estimated staff cost for O&M is $216,000 per year.

4.2 Alternative 2 - Force Main Leachate Disposal

For cost estimating purposes, the average depth from ground surface to the invert of the force main pipe is assumed to be 2.7 m, to ensure adequate frost cover. The minimum piping trench width is 0.75 m at its base. The preliminary base costs for the installation of the main ($/m length) are presented in Table 8.

Table 8: Force Main Installation Base Capital Cost ($/m)

Element	Quantity	Unit	Cost/Unit	Base Price
100 mm HDPE Pipe	1	m	$20.00	$20.00
Pipe Installation	1	m	$10.00	$10.00
Excavation	2.7	m^3/m	$7.50	$20.24
Bedding	0.464	m^3/m	$55.00	$25.52
Backfill	2.7	m^3/m	$7.00	$18.89
Dewatering	1	m	$15.00	$15.00
Surface Restoration	1	m	$50.00	$50.00
Fitting	1	m	$15.00	$15.00
		Sum		**$174.64**
		Sum (With Road Restoration)	$180.00	**$304.64**

For the total force main length of 9,383 m, approximately 1,500 m was estimated to be under road and the remaining 7,883 m would be installed outside of the paved area of the roadways. Two creek crossings and three road crossings were also anticipated. The total cost for this option, including the installation of the force main and the pump station is provided in Table 9, including an allowance for utility crossings.

The main operating costs for this option would be the discharge fees from the WWTP and the cost of electricity for operating the leachate pumps. The operating power of the pump is 11 kW based on pump sizing. Assuming $0.18/kW-H as an average rate covering the range of ultra-low to on-peak rates, the annual electricity cost for running the pump would be on the order of $17,345. Operating the pigging stations will also require 3.7 kw for the compressor, but this operation only occurs occasionally on an as needed basis. As a result, electrical cost for the pigging stations is minimal and has been ignored in this preliminary estimate. It is assumed that an electrical system upgrade may be required for this option. Actual construction costs may be impacted by requirements to manage and dispose of excess soils during construction of the forcemain. For the purpose of this assessment, volumes of contaminated soils that might be generated are assumed to be minimal and able to be managed at the RWDS.

Table 9: Force Main System Capital Cost Estimate

	Cost Item	Description	Quantity	Base Cost	Price
1	100 mm HDPE Dr 17	In the Field	7883	$175	$1,376,695
2	100 mm HDPE Dr 17	Under Road	1500	$305	$456,962
3	Pigging or cleanout	Three Pigging stations	3	$150,000	$450,000
4	Creek crossing	Assumed	2	$40,000	$80,000
5	Road crossing	Sideroad crossing	3	$35,000	$105,000
6	Utility crossing	Allowance			$100,000
7	Air Release Valve	Chamber	4	$12,000	$48,000
8	Tie-in to existing P.S		1	$20,000	$20,000
9	Pump Station	Package with SS upgrade	1	$143,000	$143,000
10	P.S Installation	Including excavation and backfill	1	$120,000	$120,000
11	Kiosks	Shells only	1	$25,000	$25,000
12	Leak Detection system	Assumed	1	$200,000	$200,000
13	Electrical Upgrades	Assumed	1	$350,000	$350,000
	Total				**$3,474,657**

4.3 Alternative 3 - Off-site Leachate Disposal – Leachate Trucking

While not part of the costing assessment, decision makers should be aware that trucking is considered the least environmentally sustainable option given that it is associated with significant diesel fuel usage for trucking, associated carbon and particulate emissions, additional wear on the roadways, and potential for spills along the haul route.

An assumed haulage rate on the order of $3.35/km to cover fuel and maintenance, but not staff time or vehicle rental has been utilized in this assessment.

4.3.1 Private Haulage to Mount Forest

The capital cost estimate for off-site leachate disposal via subcontracted haulage to Mount Forest using a private trucking firm, and assuming discharge into the southern pump station is presented in Table 10.

Table 10: Leachate Trucking Capital Cost Estimate

	Cost Item	Description	Quantity	Base Cost	Price
1	Pump Station	Package	1	$120,000	$120,000
2	P.S Installation	Including excavation and backfill	1	$125,000	$125,000
3	Kiosks	Shells only			
4	Storage Tanks	Including Installation	1	$25,000	$25,000
5	Tie-ins or improvements for discharge	Package at receiving point – allowance only	1 1	$50,000 $50,000	$50,000 $50,000
	Total				**$370,000**

The main operating costs for this option are the trucking costs, followed by the discharge fees from the WWTP, both of which would be significant. The electricity cost for operating the pumps should be fairly minor, at $3,469 per year, assuming $0.18/kW-H rate. An allowance for improvements at the trucking discharge point to the WWTP or the southern pump station has been included but the actual cost will vary based on the nature of improvements required/requested.

Actual trucking costs will be dependent on the rate of leachate production and as described in other documents, will vary over the construction of the landfill, particularly during the construction of the initial four cells. To allow a consistent assessment the 100 m^3/day rate will be utilized for the initial operational, 25-year period although 30 m^3/day would be more appropriate for post closure generation rates. Based on estimates provided by local service providers that are experienced with leachate haulage, during the higher generation rate periods, three round trips per day can be expected, with the daily fees ranging from $2,000 to $2,200 per day. Once leachate volumes had decreased, haulage costs could be expected to fall to the $900 per day range (if a minimum daily charge is not applied).

4.3.2 Private Haulage to the City of Guelph

To provide a preliminary estimate of alternate costs in the event that approval is not granted to utilize the Mount Forest WWTP to treat the RWF Phase II leachate, an assessment of trucking costs to the Guelph WWTP has been completed. The trucking costs with this option are increased due to the extra mileage, as well as anticipated overtime or additional trucking needs on a temporary basis due to higher flow periods. Assuming three round trips per day would be necessary, it is likely that if an hour for set up and loading and 30 minutes for discharge are required, plus approximately 1 hour and 30 minutes for a loaded truck to reach the site, and 1 hour and 15 minutes for an empty truck to return, the daily haul time would be on the order of 3 hours for loading, 1 ½ hours for unloading, 4 ½ hours for mobilization and 3 ¾ hours for demobilization, the total time would be just under 13 hours, compared to approximately 6 hours total for a Mount Forest haul time. This would assume 2 vehicles would be required on average at approximately $4,300 per day (including additional mileage charges).

4.3.3 In-House Haulage to Mount Forest

If the County were interested in purchasing their own tanker vehicle for haulage a smaller 10,000L (10 m^3) or 20,000 L (20 m^3) truck would be less expensive for purchase, require a lower level of licensing, and less impact in the event

of an accident or spill compared to a 30,000L full size tanker. This would however, require additional trips on a daily basis. Assuming 6 trips to Mount Forest per day for a ~10,000L capacity vehicle, and 20 minutes for loading and 10 minutes for discharge (due to the smaller tank), plus 20 minutes for mobilization and demobilization, it could take 10 hours per day of operations to manage the required volumes. At 70 hours per week, two full time staffers may be required on a split/shift basis. This would be subject to seasonality, and based on actual removal requirements, ultimately one staffer using a larger truck with a 20,000L capacity might prove capable of managing the typical volumes.

A ~10,000L capacity truck such as a Freightliner Business Class M2 106, costs approximately $230,000 CDN at current exchange rates, and would be expected to be driven 36,500 km per year. Annual maintenance and repairs may be as low as $7.500 per year with fuel costs expected to be in the range of $18,000 per year. It is assumed that the vehicle will require replacement after 10 years with little to no salvage value.

A 19,000L capacity truck such as a Peterbilt 567 industrial class tanker costs approximately $400,000 CDN at current exchange rates. Given that the truck would be expected to be driven on the order of 22,000 km per year, annual maintenance and repairs may be as low as $5,000 per year (or less) on average, with fuel costs in the likely range of $12,000 per year. It is assumed that the vehicle will require replacement after 10 years with little to no salvage value.

A full-time employee with appropriate driving training and licensing is estimated to earn $32.50/hour + benefits, on the order of $100,000 including periodic overtime needs.

The County would incur additional insurance costs to cover haulage of liquid waste in the event of a spill or accident. Specialty insurers cover the costs of general liability, waste in transit spills, contractor's pollution liability etc. Given that the County already has some insurance coverage for waste haulage of roll-off bins from Transfer Stations to the RWF for disposal, costs may be rolled into that package with associated savings, however it is likely that insurance costs may be as much as $20,000 per year per vehicle.

4.3.4 In-House Haulage to the City of Guelph

In the event that haulage to the City of Guelph were required, at least two vehicles and full-time staff may be necessary (given the additional travel time and additional trips due to an assumed smaller vehicle. For general estimates, it is assumed that the costs for the above options would therefore be approximately double that of transportation to Mount Forest, this includes the insurance costs as liability would be assumed to increase based on the distance the leachate was hauled. Similar to the prior assessment, vehicles are projected to require replacement after 10 years with no salvage value.

4.4 Leachate Treatment Discharge Fees

Discharge fees charged by the township for acceptance of the leachate will be dependent on the model of the agreement signed (cost recovery vs profit), although as the costs of leachate treatment will be partly assumed by the residents of the township, it is assumed it would be closer to the cost recovery side of the evaluation. Currently the Township of Wellington North budgets approximately $300,000 per year to operate the Mount Forest WWTP, with a rated capacity of 2,818 m^3/day. Actual volumes are somewhat lower, and the facility is expected to obtain a rated capacity of 3,500 m^3/day in the future. An operating cost of $300,000 per year is the equivalent of approximately $825 per day and a water treatment cost in the range of $0.30 to $0.40 per m^3. Assuming that the municipality may need to incur some additional costs due to accepting the leachate, and consistent with the normal practice of applying additional charges to discharge users, an initial estimate of $4.50/$m^3$ as a discharge fee has been estimated purely for comparison purposes. The actual value may be significantly less or be somewhat increased and will be determined at the outcome of discussions with the Township. This value applies equally to both the forcemain and trucking options, so only impacts the comparison to the on-site treatment option. It would

result in treatment fees of approximately $164,250 per year during the higher volume production periods and $32,850 per year during low leachate production periods.

For reference, should an agreement for co-treatment within the County's boundaries not prove possible, costs for treatment of dischargeable leachate for out of boundary receivers can range as high as of $17.00 to $27.00 per m^3 (as advertised for small discharge users) and potentially require changes to ECAs to allow acceptance of material from outside of their municipal boundaries (if another public WWTP is considered). This could raise the treatment discharge costs alone to approaching $1M per annum during the early, higher volume generation periods. For the purposes of this estimate, it is assumed that the City of Guelph may charge as much as $17.00 per m^3 to receive and treat the leachate, although no discussions have been initiated to evaluate actual costs that may be incurred.

5. Regulatory Approvals

5.1 Alternative 1 – On-site Leachate Treatment

This alternative will require approval under Section 53 of the Ontario Water Resources Act, the Conservation Authority Regulation 169/06 as well as a Municipal Class Environmental Assessment (Class EA). Historically, the MECP has approved numerous on-site leachate treatment facilities. Although this approval is feasible to obtain, it would be at a higher cost and with more effort to obtain than Alternative 2 due to the technical complexity.

5.2 Alternative 2 – Off-site Leachate Disposal – Force Main

This alternative will also require a Municipal Class Environmental Assessment (Class EA) involving comparison of the force main to the other alternative and would require public consultation. An amendment to both the Environmental Compliance Approval (ECA) and OWRA Certificates of Approval for the RWF and the receiving facility will also be required. The main commenting and approval agencies would be the MECP and the Ministry of Transportation (MTO).

5.3 Alternative 3 – Off-site Leachate Disposal – Leachate Trucking

5.3.1 Subcontracted Haulage

This alternative would provide the easiest solution from an approvals standpoint, although amendments to both the ECA and OWRA Certificates of Approval for the RWF and the receiving facility will be required. The main commenting and approval agencies would be the MECP.

5.3.2 In-House Haulage

In addition to the approvals needed to the ECA and OWRA approvals, the County would need to obtain licenses to haul liquid waste and maintain the haulage fleet.

6. Evaluation Criteria and Summary of Costs

Table 11 provides an overall summary of preliminary capital and annual O&M costs for each alternative as well as the pros and cons for each alternative as a basic evaluation of each. A 20% increase to the capital costs to allow for engineering design and approval fees has been applied to the On-site treatment and Forcemain options. A 20% engineering fees plus $100,000 in approval related costs has been applied to the capital portion of the trucking option.

Table 11: Leachate Management Cost Summary

Alternative	Prelim. Capital Costs	Prelim. Annual O&M Cost	Present Value Capital and O&M	Pros	Cons
(1) On-site Treatment	$5,865,000	$701,000	$21,374,003	Upsets due to leachate will be contained at the landfill treatment plant and have no impact on the township's ability to treat municipal wastewater. Process design will be purpose built to treat leachate and address all leachate variability. No risk of odour concerns at the WWTP due to leachate. No additional load on the WWTP. Corrosive nature of leachate will not affect municipal wastewater plants. Force main maintenance and potential leaks avoided.	Will require additional staff to operate and maintain facility. High capital costs. Significant additions of chemicals required to treat leachate. Enhanced electrical power supply requiring standby power and robust systems to ensure routine power glitches do not result in operator being on-site to reset the plant. Leachate plants have additional on-going reporting and testing requirements.

Alternative	Prelim. Capital Costs	Prelim. Annual O&M Cost	Present Value Capital and O&M	Pros	Cons
(2) Off-site Force Main	$4,810,000	$219,000	$9,662,000	Corrosive nature of leachate will be buffered by municipal wastewater. Power fluctuations will not be as critical at pumping station. Standby power will not be necessary given inherent on-site storage. Restart will be automatic when power supply resumes. Influent leachate will be mixed with municipal wastewater, making leachate easier to treat. Economies of scale by operating and maintaining one plant instead of two to treat the same wastewater. Temperature of leachate will be moderated by municipal sewer, reducing the temperature swings of the leachate, allowing for more consistent treatment efficiencies. No requirement for additional chemicals or nutrient loading to allow the biological process to operate.	Leachate pumping station will require sufficient communications and programming to enable leachate flow pacing to the inflow of the WWTP. May require WWTP process adjustments upon varying strength of leachate. Leachate pumping station and force main will require more maintenance than wastewater pumping station and force main due to nature of leachate. Requires the construction of a force main with potential risk of spills to the natural environment.
(3a) Private Off-site Trucking to Mount Forest	$623,000	$1,172,000	$23,845,00	Lowest preliminary capital cost. Low implementation time.	Public perception issues if accidents and spills occur. High annual costs. Dependent on hauling company and/or supply chain.

Alternative	Prelim. Capital Costs	Prelim. Annual O&M Cost	Present Value Capital and O&M	Pros	Cons
(3b) Private Off-site Trucking to Guelph	$623,000	$2,649,000	$52,319,00	Lowest preliminary capital cost. Low implementation time.	Public perception issues if accidents and spills occur. Very high annual costs. Dependent on hauling company and/or supply chain. No guarantee that Guelph could accept out of boundary leachate or would agree to.
(4a) In-house Off-site Trucking to Mount Forest (~10 m^3 capacity)	$878,000	$523,000	$11,697,007	Low preliminary capital cost. Low implementation time.	Environmental liability due to potential accidents and spills. Moderate annual costs. Additional staffing and fleet requirements Additional permitting and approvals requirements
(4b) In-house Off-site Trucking to Mount Forest (~20 m^3 capacity)	$1,066,000	$750,000	$9,345,000	Low preliminary capital cost. Low implementation time.	Environmental liability due to potential accidents and spills. Moderate annual costs. Additional staffing and fleet requirements Additional permitting and approvals requirements
(4c) In-house Off-site Trucking to Guelph (~20 m^3 capacity)	$2,132,000	$1,837,000	$37,958,000	Low preliminary capital cost. Low implementation time.	Environmental liability due to potential accidents and spills. Very high annual costs. Additional staffing and fleet requirements. Additional permitting and approvals requirements. No guarantee that Guelph could accept out of boundary leachate or would agree to.

Of the assorted options considered, the forcemain and the in-house trucking option (assuming a destination of Mount Forest and at least a 20 m3 capacity truck) are expected to have the lowest 25-year lifecycle costs by a significant margin. These two options have overall costs which are comparable, with a much lower initial capital cost assigned for the in-house trucking, and an expected lower annual cost for the forcemain operation.

Private off-site trucking to Mount Forest is in a similar cost range to an on-site leachate treatment system, with private haulage slightly worse overall. If the nearest receiver is changed from Mount Forest, for example to Guelph, which has a WWTP that already treats leachate, all haulage options, both internal and external become the most expensive by significant margins.

This assessment is particularly sensitive to the volume of leachate that will ultimately require pumping and treatment. The smaller that value during the operational period, the more that haulage to Mount Forest will become a preferred alternative, and the greater the volumes that require treatment, the more the evaluation tilts to the forcemain being the preferred alternative. Assuming a discharge agreement with the Township can be arranged the County may wish to consider initiating trucking (either internal or subcontracted temporarily) to evaluate the actual volumes that are required to be managed, to better refine the assessment.

Additional impacts to the overall cost estimates are WWTP discharge fees, and assumed staff salaries, although one or both of these options impact each alternative, so while the overall costs may change, the relative ranking will be unlikely to. The final impact would be if an alternative, and less costly on-site treatment system was determined to be practical and implementable. At this time, a proven system for on-site treatment has been utilized for costing, and it is unlikely that staffing or chemical costs inputs, or initial capital costs would change sufficiently to allow this to become the preferred financial option. Where this has been selected by other municipalities, it is typically the result of a significant distance between any receiving WWTP and the source, resulting in cost prohibitive estimates for haulage or forcemain construction.

7. Summary and Conclusions

The selection of a preferred alternative is dependent not only on the cost assessment provided herein, but potentially most importantly on whether a mutually acceptable agreement to allow discharge of the leachate at the Mount Forest WTTP can be arranged. Other considerations include environmental impact risks due to management and transportation of leachate, and socio-economical impact factors.

In the event that an arrangement to allow discharge to the Mount Forest WWTP is achieved, either a forcemain or County managed haulage utilizing an appropriately sized tanker truck are anticipated to result in the lowest net present value costs. While a forcemain is generally considered superior in terms of avoiding or minimizing the potential for significant environmental risks and no specific social or cultural concerns are identified with this option, the cost assessment is strongly influenced by the actual volumes of leachate that will be generated and require treatment, and if they are lower than the current estimates used in this evaluation, in-house haulage options would become more advantageous.

A larger tanker truck that would require fewer trips to the receiver appears to provide the best value, although this would also be dependent on the quantity of leachate that is generated.

In the event that no arrangement can be made with the Township with respect to discharge of leachate into the Mount Forest sanitary system, the County will likely need to consider an on-site treatment plant, as no financially feasible alternatives appear to be present based on the results of the review of potential costs from hauling to Guelph. If an alternate receiver that is closer to the RWF can be identified the assessment may need to be reconfirmed.

As no forcemain or on-site treatment system can be immediately implemented regardless, it is suggested that the information generated from haulage (internal or external) be used to refine the assessment included herein for a better understanding of actual volumes that will be generated and the related costs that may be incurred.

The private haulage alternative is best suited for interim or emergency use only, in the event that a forcemain or on-site treatment plant cannot be constructed in a timely manner, or a breakdown of a City owned haulage vehicle occurs.

8. Closure

Prepared by:

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Technical Director – Project Management

Environment Practice
Engineering Services

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COUNTY OF WELLINGTON

COMMITTEE REPORT

To: Chair and Members of the Solid Waste Services Committee
From: Das Soligo, Manager of Solid Waste Services
Date: Tuesday, November 12, 2024
Subject: **Future County Role in Providing Recycling Services**

Background:

On June 3, 2021, the Ministry of the Environment, Conservation and Parks (MECP) released the Blue Box regulation (Ontario Regulation 391/21) that transitions the current Blue Box Programme to full producer responsibility, a system where producers of printed paper and packaging (PPP) are responsible for managing and funding all aspects of recycling in the residential sector. Currently, up to 50% of the cost of municipal recycling programmes are funded by producers. Once a municipality's blue box programme has transitioned, the full cost of these programmes will be paid for by producers.

Producer Responsibility Organizations (PROs) are funded by producers and have been enlisted to assist producers of PPP in meeting their regulatory requirements under the Blue Box Programme. PROs are expected to provide collection, management and administrative services to producers to aid them in meeting their regulatory obligations.

As an attachment to the Blue Box regulation, the MECP released a transition schedule which indicates that all Ontario municipalities will transition between July 1, 2023 and December 31, 2025. The County of Wellington's blue box programme is scheduled to transition on July 1, 2025. As has been reported previously, when 100% of the costs of operating the County's residential recycling programme are compensated for, it is estimated that the transition will result in $1.8 - $2 million in annual savings for the County.

Full producer responsibility for recyclables was initially limited exclusively to materials generated in the residential sector. Following feedback from municipalities and waste management associations, the list of eligible sources was expanded to include;

- Schools
- Municipally or not-for-profit operated long-term care and retirement homes
- Parks and playgrounds
- Transit stations

Sources of recyclables that will be ineligible for services under the full producer responsibility regime include;

- Municipal buildings and facilities
- Industrial, commercial and institutional organizations, including Business Improvement Areas
- Places of worship
- Not-for-profit organizations

There will be potential service impacts for the industrial, commercial and institutional sector (IC&I) as these organizations will lose access to all recycling services, unless they pay for them on their own accord, or unless municipalities decide to continue to provide these services. The cost for an individual small business to hire a contractor to provide recycling services may be prohibitive, and the loss of recycling services will likely result in some organizations choosing to dispose of their recyclables in the waste stream.

Post transition, municipalities will no longer be required to provide any recycling services to residents or businesses. However, municipalities may choose to provide continuity in recycling services or amended services, at their own cost. This is especially important to municipalities who own an operational landfill site, as there is a vested interest in diverting materials from landfill, in order to preserve scarce capacity.

Context:

In April 2024 options were presented to the Solid Waste Servies (SWS) Committee and County Council, to maintain service continuity for those impacted by the transition to full producer responsibility. The recycling service options presented at that time were;

- **Allow residents to continue to use Depots for recycling disposal**
- **Allow businesses to continue to use Depots for recycling disposal**
- **Establish business recycling collection routes in downtown areas**

The first two options were approved, at a combined estimated annual cost of $207,000, although only half of this amount has been budgeted for in the draft 2025 budget, as the County's recycling programme does not transition until mid-year. The majority of these costs to the County will be recovered as the producers will compensate the County during the 6-month transition interval between July 1, 2025 and January 1, 2026. It is unclear whether further compensation will occur beginning in 2026, but the County's agreement with the producers allows for three one-year extensions at the same terms.

While Council approved continuing recycling drop-off services at County waste facilities, there was a desire to reconsider the option to provide a curbside collection recycling route for businesses and institutions in 14 selected downtown areas. Specifically, Council requested to know what the costs would be to provide continuity in recycling services for every business in the County. Council also wished to see an updated quotation for the downtown area recycling route. Some Councillors expressed that a 6am start time on Mondays is too early, and so a new quotation was requested for this route to be scheduled on either an alternate day of the week or for it to begin at an 8am starting time.

Proposals:

The County's curbside collection contractor, Waste Management Inc. (WM), provided three proposals at the request of SWS. These are;

1. Provide curbside recycling collection for businesses and institutions in 14 selected downtown areas across the County
2. Provide curbside recycling collection for businesses and institutions in the SWS's 56 identified urban areas throughout the County
3. Provide curbside recycling collection for all businesses and institutions in the County of Wellington

The below table presents the costs of providing curbside recycling continuity post-transition for some, or all businesses and institutions in the County.

Quotation #	Service Area	Annual Cost	One - Time Delivery Cost	Total Properties
1	Downtown Collection Route	$128,300	$6,700	558
2	All Businesses in Urban Areas	$455,000	$124,900	1,249
3	All Businesses in the County	$644,000	$170,500	1,705

It is important to appreciate that WM has contractual obligations to the County and other municipalities and businesses. Requests for additional works such as the above noted service options have to be scheduled and staffed within the capacity of the contractor to continue to meet other obligations. For these reasons, the operations and experience for businesses under quotations #2 and #3 will vary considerably from the proposal related to the downtown collection areas.

Proposal 1 – Downtown Collection Route

- All downtown areas collected weekly on Thursdays, with collection beginning as early as 6am
- Recyclables set out to the curb must be contained in 64-gallon, wheeled carts
- All recyclables (containers and paper products) will be commingled into a single stream
- The term of the agreement will be one year, with options to renew one-year at a time and with Consumer Price Index (CPI) adjustments applied annually
- The cost of the service will be $128,300, including all processing fees. Carts will be delivered to businesses for a one-time fee of $6,700

Proposals 2 and 3 – All Businesses in Urban Areas and All Businesses in the County

- Businesses to receive collection Monday – Friday, once per month. The service will be provided by both the Mount Forest and Waterloo Districts
- Recyclables must be placed in 4-yard bin, serviced by a front-end truck
- All recyclables (containers and paper products) will be commingled into a single stream
- The term will be for 5 years, with a fixed annual escalation of 3% applied annually on July 1st
- The cost of these service options ranges from $455,000 to $644,000 annually. Bins will be delivered to businesses for a one-time fee of $124,900 - $170,500 respectively

As can be seen, the cost and service terms of the three proposals vary significantly. Due to the complexity and geography of servicing every business in the County or every business in 56 identified “urban” areas, WM proposed to utilize larger containers which are serviced once per month, rather than weekly with smaller, wheeled carts, as can be seen in Proposal 1. These larger containers cannot be wheeled to roadside and are essentially stationary after they have been delivered.

When staff were directed to request new quotations the question was raised as to how many businesses that receive collection services today, would no longer have access to these services under Proposal 1. This information is not available, as every business on a public road has access to curbside recycling collection today, but there is no data available as to which of these businesses participates.

However anecdotally, staff observe very low participation in the blue box programme in the industrial parks and commercial strips around the County. Businesses in these or rural areas have the space for commercial bin servicing, similar to what is being proposed in Proposals 2 and 3. Where staff observe much greater utilization of recycling collection services is in the downtown areas of the County, where small businesses generate lower volumes of recycling to store and place at roadside. Small businesses operating in downtown areas in particular, will have no space for 4-yard recycling bins.

At the outset of planning for a potential post-transition role for the County in providing for recycling services, staff were focused on options that allowed for service continuity, not service expansion. Proposals 2 and 3 can be considered service expansions, as the County has never competed directly with private service providers to provide bin service to businesses. Many of the larger businesses in industrial parks, commercial strips and rural areas already have commercial bin-service arrangements and contracts. The County risks disrupting existing contracts and directing business to one service provider, while not meeting the needs of the small businesses who are the ones which are mostly using the County's recycling collection services today.

Staff recommend that Proposal 1 be selected. When comparing the cost of the options and considering who will use the services under the three proposals, Proposal 1 is the best value option. Proposal 1 provides continuity for many or most of the current users of the service. If Council decides to proceed with Proposal 1, businesses who currently use curbside collection services but are not located within the identified 14 downtown areas across the County, the waste facility network is available as a drop-off location for recyclables.

Strategic Action Plan:

This report relates to the following objectives and priorities in the County's Strategic Action Plan:

- Best services in place to service the County's residents and businesses

Recommendation:

That the County approve Proposal 1 - Downtown Collection Route, for inclusion in the 2025 budget and agreement with Waste Management Inc.

Respectfully submitted,

Das Soligo
Manager of Solid Waste Services

In consultation with/approved by:
Don Kudo, County Engineer
Scott Wilson, Chief Administrative Officer