



LANDFILL EXPANSION AND OPERATIONAL REVIEW

Municipality of Southwest Middlesex

January 2018 – **Final**

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[Appendix D: Environmental Compliance Approval and MOECC Inspection Report – Limerick Landfill](#)

EXECUTIVE SUMMARY

Archibald Engineering has been retained by the Municipality of Southwest Middlesex (SW Middlesex) to complete a landfill expansion and operational review of its two (2) operating landfills. Both the Trillium and Limerick Landfills have been operating for over 40 years with few conditions and limited oversight by the Ministry of Environment and Climate Change (MOECC).

Operations have historically met local needs at a relatively low cost. The landfill operating approvals (ECAs or Environmental Compliance Approvals) issued by the MOECC in the past for these two landfills did not require any environmental monitoring, site design or operating plan. This is a rare situation in 2018 even for small rural landfills. Most ECAs have numerous conditions governing the required design, operating practice, recordkeeping and environmental monitoring measures.

Over the past decade landfilling has proceeded with no overall guiding plan or strategy. Few records exist regarding the location and depth of waste placement. No regular environmental monitoring has taken place, so no conclusions can be drawn with respect to landfill impacts on local groundwater and surface water.

Both landfills have reached a stage where considerable volumes of waste have already been placed and physical space to continue operations is limited. The MOECC completed detailed inspections of both operating landfills in 2016 and found that existing conditions do not meet current requirements or industry standards. The MOECC amended the ECA for the larger Trillium Landfill in January 2018. SW Middlesex is now required to comply with several conditions related to site design, monitoring and operations consistent with standard industry practice. A similar ECA amendment for the relatively small Limerick Landfill should be expected in 2018. Amending older ECAs is standard practice for the MOECC and SW Middlesex has not been singled out.

Proposed Strategy for the Trillium Landfill

In order to continue operations at Trillium Landfill after November 2019, SW Middlesex is now required to develop and submit for approval a comprehensive Design and Operations Report and Environmental Monitoring Plan. The Trillium Landfill is bisected by a creek with current operations on one side, and a future expansion area across the creek.

Completing the necessary environmental investigations, as well as design and operational plans to expand the Trillium Landfill for a projected 30-40 year operating period are estimated to cost \$250,000. Limiting operations to the utilization of existing capacity in the current disposal area including closure within 5 years will still result in design and environmental monitoring costs of \$100,000. Closure prior to November 2019 would see design and monitoring costs reduced to approximately \$80,000. The estimated costs presented above represent environmental monitoring, design and approval related costs with construction activities not included.

It is typically a local Council decision whether to operate a municipal landfill site or export waste to other facilities. SW Middlesex owns a potential future expansion area at the Trillium Landfill which is a valuable asset if investigations confirm landfilling is suitable in that area. Given the recent MOECC requirements for the Trillium Landfill, SW Middlesex Council has three (3) primary options to choose from regarding future operations at the Trillium Landfill.

Option 1 – Close Trillium Landfill by November 2019

- \$80,000 design/monitoring cost (2018)
- Construction costs to cover/close existing disposal area (\$400,000 in 2020/2021)
- Ongoing groundwater monitoring and reporting costs (\$40,000/yr)

Option 2 – Close Trillium Landfill within 5 years

- \$100,000 design/monitoring cost (2018/2019)
- Construction costs to cover/close existing disposal area (\$400,000 in 2022/2023)
- Ongoing groundwater monitoring and reporting costs (\$40,000 yr)

Option 3 – Seek Approval to Expand Disposal Area at Trillium (30-40 year lifespan)

- \$250,000 design/monitoring/hydrogeologic investigation cost (2018/2019)
- Construction costs to cover/close existing disposal area (\$400,000 in 2022/2023)
- Ongoing groundwater monitoring and reporting costs (\$40,000/yr)
- Initial expansion area construction costs (\$200,000 in 2021)

All three proposed options are feasible, but 18 months is required to install groundwater monitoring wells, collect monitoring data, and develop design and operating plans suitable for submittal to the MOECC for approval by November 2019. Therefore, it is recommended that Council select which option to pursue by April 2018.

Proposed Strategy for the Limerick Landfill

The Limerick Landfill has limited disposal capacity and a very small user base. On average only 50 landfill customers utilize the site per month generating an average of \$500 per month in fee revenue. Annual operating costs are estimated at \$ 40,000, which is slightly less than the larger and better utilized Trillium Landfill.

Based on the information summarized above, it is concluded SW Middlesex would benefit from consolidating operations at the Trillium Landfill. Budgets currently spilt between two active sites could be combined to upgrade operations at Trillium with minimal customer service impacts given the low traffic count of 50 customers per month at Limerick Landfill. Closure of the Limerick Landfill is proposed for the end of 2018.

If Council chooses to close the Limerick Landfill, then it is recommended that current operating budgets be utilized to upgrade operations at the Trillium Landfill, or temporarily utilized to fund the estimated \$200,000 closure cost for the Site.

1.0 INTRODUCTION

1.1 Background

Archibald Engineering has been retained by the Municipality of Southwest Middlesex (SW Middlesex) to complete a landfill expansion and operational review of its two (2) operating landfills. Both the Trillium and Limerick Landfills have been operating for over 40 years with few conditions and limited oversight by the Ministry of Environment and Climate Change (MOECC).

Operations have historically met local needs at a relatively low cost. Over the past decade landfilling has proceeded with no overall guiding plan or strategy. Few records exist regarding the location and depth of waste placement. No regular environmental monitoring has taken place, so no conclusions can be drawn with respect to landfill impacts on local groundwater and surface water. Both landfills have reached a stage where considerable volumes of waste have already been placed and physical space to continue operations is limited.

The MOECC has recently issued an amended Environmental Compliance Approval (ECA) for the Trillium Landfill with conditions which require that comprehensive design, operating and environmental monitoring programs be implemented in 2018 with completion due by November 2019. A similar ECA amendment for the Limerick Landfill should be expected in 2018.

This report presents a proposed overall strategy for future operations at both landfill sites.

1.2 Scope of Landfill Expansion and Operational Review

The scope of this Landfill Expansion and Operational Review includes:

- Inspecting each landfill site;
- Reviewing available historical documentation;
- Comparing current operations to industry standards and best practices;
- Identifying opportunities for improvement and enhancements;
- Identifying operational changes needed to comply with newly issued ECA;
- Identifying options and alternatives to continue landfill operations;
- Proposing future strategies for both landfill sites; and
- Estimating future costs of implementing the proposed strategies.

This review does not offer an opinion or any implied guarantee on whether lands available for expansion at the Trillium Landfill will be approved by the MOECC following completion of the required studies. Given that the site has no groundwater monitoring program in place, it is not possible to currently assess the environmental impact of the existing landfill.

1.3 Existing Conditions – Trillium Landfill

The Trillium Landfill site was originally a 50-acre (22 ha) parcel bisected by a creek. A 7.5 acre parcel was severed from the northwest corner of the property in 1976 or shortly thereafter and is currently operated by a sportsman's club. There remain three distinct sections of the property as described below:

- Western Area utilized for waste disposal
- Central Area consisting of a creekbed and slopes up to the Western and Eastern Areas
- Eastern Area currently used for agricultural purposes

An aerial map of the Trillium Landfill located at 3945 Trillium Drive is provided in **Appendix A**. The Trillium Landfill (formerly known as the Ekfrid Landfill) has reportedly been in continuous operation since 1971 when the initial provincial approval was granted. Disposal operations have reportedly been limited to the Western Area of the property. The entire property is approved for waste disposal subject to conditions.

Some older documents indicate that the site was originally intended to operate using a trench disposal method. Trenches would have been dug approximately 15 feet (5m) deep, filled with waste and then covered with soil to match existing grade. While no documentation was found, at some point after filling all trenches, landfilling continued above grade as is the current practice.

No topographic surveys of the site have been completed and few records exist to document operations and actions since 1971. With no weigh scales and no topographic survey, estimates on the amount of waste previously placed are not available and can only be estimated in a very general way.

No groundwater monitoring wells exist so no conclusion can be drawn regarding environmental impact to the groundwater.

1.4 Existing Conditions – Limerick Landfill

The Limerick Landfill is a 15 acre (6 ha) triangular shaped parcel in a remote area of the municipality with no nearby residences. The Limerick Landfill (formerly known as the Mosa Landfill) is located at 724 Limerick Road. An aerial map of the site is provided in **Appendix B**. Few records are available documenting site activities since provincial approval was originally granted for landfill operations in 1975.

The site has low lying areas with ponding, treed areas that do not appear to have been landfilled, and previously landfilled areas that have reportedly been covered and reforested. A large volume of old asphalt shingles and carpet have been left uncovered for an extended period of time, which may exceed a decade. The reasoning behind creating these stockpiles has not been discovered in available documentation but it could have been established in hopes of

future recycling markets for these materials. No such markets exist today for these materials (as stockpiled) and final cover will be required.

While no formal design is in place, the site has limited remaining capacity after 40 years of operation.

1.5 Site Usage and Revenue Collected

The Trillium Landfill receives bulk truck loads of waste collected from the curbside garbage collection program as well as individual customers with smaller loads. As previously mentioned no weigh scales are utilized so no records of tonnage received exists. No topographic surveys have been completed so total or annual waste volumes can only be estimated in a very general way. In addition to the waste collected from the curbside collection program, the following is a summary of landfill customers utilizing the Site and fees collected. Data is provided by the Landfill Operator and municipal staff. No records exist regarding customers who drop off only recycling at no charge.

Typical Monthly Landfill Customer Count at Trillium :	100 +/-month
Typical Annual Landfill Fee Revenue:	\$19 - 20,000/year

The Limerick Landfill receives only small loads of waste from individuals. Again, no tonnage or volume records exist to estimate waste quantities received currently or in the past. The following is a summary of landfill customers utilizing the Limerick Landfill and fees collected. Data is provided by the Landfill Operator and municipal staff. No records exist regarding customers who drop off only recycling at no charge.

Typical Monthly Landfill Customer Count at Limerick :	< 50/month
Typical Annual Landfill Fee Revenue:	\$5 - 6,000/year

1.6 Status of MOECC Landfill Approvals

The landfill operating approvals (ECAs) issued by the MOECC in the past for these two landfills did not require any environmental monitoring, site design or operating plan. This is a rare situation in 2018 even for small rural landfills. Most ECAs have numerous conditions governing the required design, operating practice, recordkeeping and environmental monitoring measures.

The MOECC completed detailed inspections of both operating landfills in 2016 and found that existing conditions do not meet current requirements or industry standards. The MOECC amended the ECA for the larger Trillium Landfill in January 2018. A copy of the MOECC Inspection Report from the 2016 inspection, and recently amended ECA for the Trillium Landfill are included in **Appendix C**. Amending older ECAs is standard practice for the MOECC and SW Middlesex has not been singled out.

SW Middlesex is now required to comply with several conditions related to site design, monitoring and operations consistent with standard industry practice. A summary of MOECC mandated changes is outlined in Section 2.0 of this report.

A similar ECA amendment for the relatively small Limerick Landfill should be expected in 2018 after MOECC inspections in 2016 and January 2018. A copy of the current ECA for the Limerick Landfill and the inspection report from 2016 is included in **Appendix D**.

2.0 MOECC MANDATED CHANGES AT TRILLIUM LANDFILL

2.1 Actions Required to Continue Current Operations for 18 months

The new ECA for the Trillium Landfill is included in Appendix C. Actions and operational changes required in the near term to ensure compliance are listed below.

ECA Conditions 2.5/2.6: Each load must be inspected by site personnel according to a formal program to ensure only appropriate wastes are received.

ECA Condition 2.7: Windblown litter must be collected on a daily basis.

ECA Condition 3.2: Requirements for environmental investigations and monitoring, as well as detailed design and operating plans are outlined. (SW Middlesex must comply with this condition in its entirety if operations are to continue past November 2019). Less effort is required if closure is to occur by November 2019 although an obligation for the installation of wells, ongoing monitoring and closure plan will be required for the existing disposal area.

ECA Condition 3.4: A calculation of total estimated landfill capacity must be submitted to the MOECC by May 31, 2018.

ECA Conditions 3.7 to 3.12: The Site Operator must manage any asbestos received in accordance with the protocol outlined in these conditions.

ECA Condition 3.13 i): All waste must be covered by 6 inches (150mm) of soil at the end of each operating day.

ECA Condition 3.13 ii): Intermediate cover of 12 inches of soil (300mm) must be placed in areas where landfilling is temporarily discontinued for 6 months or more.

ECA Condition 3.13 iii): A three(3) foot (1 m) thickness of vegetated final cover must be constructed on all completed areas of the landfill.

ECA Condition 3.15: Signage must comply with requirements of this condition.

ECA Conditions 3.21/3.22: Domestic waste received from the public shall be placed in a steel bin with bins emptied at least weekly.

ECA Condition 4.1: Training requirements for site personnel are outlined.

ECA Conditions 5.1 to 5.3: Requirements for daily inspections and written daily log books are outlined. Each vehicle entering site must be recorded (license plate) with type and quantity of waste received.

ECA Condition 5.4: Requirements for written monthly records and log books are outlined.

ECA Condition 5.5/5.6: Requirements for monthly inspections and log books are outlined.

ECA Conditions 7.1 to 7.3: A formal procedure is outlined to address complaints.

ECA Conditions 8.1 to 8.3: Requirements for emergency preparedness and response are outlined.

ECA Conditions 9.1/9.2: Starting no later than March 31, 2019, SW Middlesex must submit to MOECC a comprehensive Annual Report for the previous calendar year documenting all aspects of site monitoring and performance.

ECA Conditions 10.1 to 10.5: A detailed site Closure Plan is required at least 2 years prior to closure.

2.2 Actions Required to Increase Landfill Footprint

The existing disposal area at the Trillium Landfill is nearing capacity. While there is no maximum design elevation (maximum height of waste) included in current approvals, a forecast of no more than five (5) years until maximum capacity is reached is a reasonable estimate at this time. Landfilling beyond this time period may cause side slopes to become too steep to properly cover and revegetate the property.

Vacant lands across the creek that bisect the property are currently used for agricultural purposes. These lands can be described as an expanded landfill “footprint” for the approved site. Gaining approval to increase the landfill footprint within the existing approved site is a far different process than attempting to gain landfill approvals on other property owned by SW Middlesex.

The MOECC has technically already approved the use of the vacant lands across the creek for landfilling subject to the submittal of technical reports confirming lands are environmentally suitable. In order to develop a new landfill sized for long-term municipal needs on property removed from the current Trillium site, an Individual Environmental Assessment(EA) and extensive public consultation and technical studies would be required. An initial budget for technical studies, design and public consultation would likely exceed \$1 million for even a relatively small site. Costs to gain approval for larger sites can range up to \$10 million or more.

In order to gain approval for the landfilling on the vacant lands across the creek, the following requirements and MOECC conditions must be satisfied. Completed technical reports must be submitted to MOECC by November 2019 for review and approval. Full requirements are detailed in ECA Condition 3.2 and are summarized below.

- Design and construction of a proper creek crossing and access road to the vacant lands (none currently exists);
- Installation of groundwater monitoring wells and exploratory boreholes on/near vacant lands;
- Sampling (2- 3 rounds) of wells and surface water and chemical analysis;
- Surface water management design and assessment;
- Landfill gas assessment;
- Hydrogeologic (groundwater) assessment;

- Detailed design for landfill and overall site;
- Capacity determination;
- Detailed Operations Plan; and
- Conceptual Closure Plan.

A suggested budget to provide a creek crossing and access to the vacant land is \$50,000 assuming the use of some municipal resources. The estimated cost for technical studies, monitoring well installations and all other tasks listed above and detailed in ECA Condition 3.2 is \$200,000. A total budget of \$250,000 is suggested for tasks associated with gaining approval for the new landfill footprint on the existing Trillium Landfill property.

Annual ongoing monitoring and reporting costs of \$40,000 are required beginning in 2019 in addition to the \$250,000 landfill footprint expansion budget outlined above.

2.3 Other Available Options for the Trillium Landfill

If SW Middlesex chooses not to pursue approval to increase the landfill footprint, and closes the landfill prior to November 2019, then monitoring and closure design requirements for the existing disposal area are estimated to cost \$80,000, plus \$40,000 per year on an ongoing basis for annual monitoring and reporting even after closure.

If SW Middlesex chooses not to pursue approval to increase the landfill footprint, and closes the landfill prior within 5 years, then monitoring and closure design requirements for the existing disposal area are estimated to cost \$100,000, plus \$40,000 per year on an ongoing basis for annual monitoring and reporting even after closure.

If closure proceeds, then the site could be converted to a waste transfer station. Under this future optional scenario, curbside garbage collection trucks would likely proceed directly to a private sector landfill in Watford. Wastes dropped by residents at the transfer station would be placed in 40 cubic yard bulk bins and also transferred to a suitable landfill once the 40 yard bin is full.

Prior to a final decision on closure at the Trillium Landfill, it would be of value to determine long-term costs and risks of exporting waste outside the municipality through a cost/benefit analysis.

3.0 LANDFILL OPERATIONAL PERFORMANCE

3.1 Trillium Landfill MOECC Inspection Report and Operational Performance

Based on recent inspections, MOECC Inspection Reports and aerial imagery, the primary current and historical concern at the site is the infrequent application of soil daily cover. Poor cover practices lead to potential other problems such as the creation of ponded leachate, windblown litter and vermin.

The industry standard and best practice is to spread and compact waste received each day, then cover all received materials with a 6-inch (150mm) thickness of soil cover. The concept of daily compaction and covering with soil has been an industry standard for decades.

The current operating contract between SW Middlesex and the private sector landfill operator specifies the following in Clause 6:

6. The Contractor shall move, compact and cover all household garbage and refuse within 24 hours of the Landfill Site being closed to the Public, weather permitting.

The activity described in Clause 6 requires the use of heavy equipment each operating day. Based on MOECC Inspection Reports, personal observation, aerial imagery and staff interviews, it is clear that soil cover is rarely applied to the waste and that at times weeks or months may pass before the waste is covered. Extensive waste surfaces remained exposed with no soil cover during a personal inspection in December 2017. Ponded leachate was present at the base of the exposed waste. The presence of ponded leachate poses a potential risk to the nearby creek.

Application of daily cover involves costs for equipment time, fuel and labour. Completion of these daily tasks would typically represent a major portion of contract costs. Failure to complete these tasks represents significant savings to the contractor, and poor value for money for SW Middlesex in addition to the potential environmental impacts.

A secondary concern is the occasional receipt of unapproved waste materials which must subsequently be removed from site. It is understood that loads are often not inspected prior to unloading. The new ECA for the Trillium Landfill requires the gate attendant to record each vehicle license plate, and inspect the load prior to unloading to ensure compliance.

It is recommended that SW Middlesex review contract requirements with the landfill operator and perform regular quality control inspections to document that daily cover is properly applied each operating day in accordance with the terms of the existing contract. It is also recommended that SW Middlesex and the landfill operator reach a common understanding in writing of required daily, weekly and monthly tasks as stipulated in the recently issued ECA and described in Section 2.1 of this report.

3.2 Limerick Landfill MOECC Inspection Report and Operational Performance

Issues of concern at the Limerick Landfill mirror those previously described for the Trillium Landfill. The Limerick Landfill is operated by the same private sector operator as the Trillium Landfill under virtually the same terms and conditions. Issues and impacts will not be repeated here for brevity.

New ECA Conditions at the Trillium Landfill have not yet been imposed at the Limerick Landfill.

Therefore, at this time it is recommended that SW Middlesex review contract requirements with the landfill operator and perform regular quality control inspections to document that daily cover is properly applied each operating day in accordance with the terms of the existing contract.

4.0 LONG-TERM POTENTIAL FOR LIMERICK LANDFILL

For any given municipality, having two (2) operating landfills will nearly double the ongoing costs of landfill operations for that municipality. Recent MOECC conditions at the Trillium Landfill requiring monitoring wells and detailed technical assessments are likely to also be required at the Limerick Landfill in coming years.

Given that only 50 landfill waste customers on average utilize the site per month, continued operation is difficult to justify based on either a customer service, or cost basis. The Trillium Landfill can easily accommodate the small waste volumes currently received at the Limerick Landfill with no appreciable impact on operations or costs. The recycling bins currently in place at the Limerick Landfill are only available two days per week, and could be relocated to public space in Glencoe, or another location in the municipality where hours of access would be more convenient for residents. It is understood that an arrangement exists with a municipal neighbour granting access to the Limerick Landfill. While the details of this arrangement are unclear, access could be granted to the Trillium Landfill with MOECC approval.

Most of the lands at the Limerick Landfill have already been landfilled and much of the area has been covered and reforested. The property is not best suited for modern landfilling as remaining areas are low lying with ponding.

There is limited long-term potential at the Limerick Landfill. Closure in the near future would permit current site budgets estimated at \$40,000 per year to be utilized for closure related activities and ultimately to fund ongoing operations at the Trillium Landfill once closure is complete.

5.0 CONCLUSIONS AND PROPOSED LANDFILL STRATEGY OPTIONS

5.1 Proposed Trillium Landfill Strategy

In order to continue operations at Trillium Landfill after November 2019, SW Middlesex is now required to develop and submit for approval a comprehensive Design and Operations Report and Environmental Monitoring Plan. The Trillium Landfill is bisected by a creek with current operations on one side, and a future expansion area across the creek.

It is typically a local Council decision whether to operate a municipal landfill site or export waste to other facilities. SW Middlesex owns a potential future expansion area at the Trillium Landfill which is a valuable asset if investigations confirm landfilling is suitable in that area. Given the recent MOECC requirements for the Trillium Landfill, SW Middlesex Council has three (3) primary options to choose from regarding future operations at the Trillium Landfill.

Option 1 – Close Trillium Landfill by November 2019

- \$80,000 design/monitoring cost (2018)
- Construction costs to cover/close existing disposal area (\$400,000 in 2020/2021)
- Ongoing groundwater monitoring and reporting costs (\$40,000/yr)

Option 2 – Close Trillium Landfill within 5 years

- \$100,000 design/monitoring cost (2018/2019)
- Construction costs to cover/close existing disposal area (\$400,000 in 2022/2023)
- Ongoing groundwater monitoring and reporting costs (\$40,000 yr)

Option 3 – Seek Approval to Expand Disposal Area at Trillium (30-40 year lifespan)

- \$250,000 design/monitoring/hydrogeologic investigation cost (2018/2019)
- Construction costs to cover/close existing disposal area (\$400,000 in 2022/2023)
- Ongoing groundwater monitoring and reporting costs (\$40,000/yr)
- Initial expansion area construction costs (\$200,000 in 2021)

All three proposed options are feasible, but 18 months is required to install groundwater monitoring wells, collect monitoring data, and develop design and operating plans suitable for submittal to the MOECC for approval by November 2019. Therefore, it is recommended that Council select which option to pursue by April 2018.

5.2 Proposed Limerick Landfill Strategy

The Limerick Landfill has limited disposal capacity and a very small user base. Based on the information presented within this report, it is concluded SW Middlesex would benefit from consolidating operations at the Trillium Landfill. Closure of the Limerick Landfill is proposed for the end of 2018.

If Council chooses to close the Limerick Landfill, then it is recommended that current operating budgets be utilized to upgrade operations at the Trillium Landfill, or temporarily utilized to fund the estimated \$200,000 closure cost for the Limerick Landfill.

6.0 IMPLEMENTATION PLAN FOR PROPOSED STRATEGY

Council can proceed with decision-making on each landfill site separately. There is no requirement to coordinate actions for both sites at the same time.

6.1 Implementation Plan for Trillium Landfill

Regardless of which option Council chooses for the Trillium Landfill, the MOECC now requires the installation of monitoring wells and development of a design and operating plan for the site. The cost for wells and technical reports increases as the lifespan of the site is extended and the scope of the landfill development increases. Estimated costs for technical reports and monitoring wells are as follows:

- Option 1: Close by November 2019 - \$80,000
- Option 2: Close within 5 Years - \$100,000.
- Option 3: Pursue Expansion Approval - \$250,000

In addition to the one-time costs noted above, it is estimated that annual mandatory reporting and monitoring costs will amount to \$40,000/yr beginning in 2019. If the site closes, these annual costs may be reduced to a range of \$20,000-\$30,000 per year indefinitely.

Construction related closure costs for the existing disposal area are again common to all three options and will be required within the next 5 years. \$400,000 is considered a reasonable budgetary value for this activity pending detailed design.

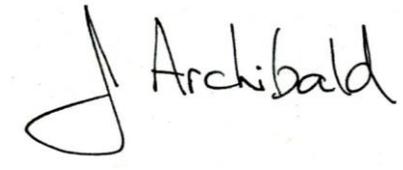
6.2 Implementation Plan for Limerick Landfill

If Council chooses to close the Limerick Landfill for public use at the end of 2018, the following budgets and actions will be required to implement that decision.

- Provide suitable notices to the public and site operator
- Provide alternative location for recycling drop off
- Review and update previous arrangement with neighbouring municipality
- Budget for land survey/closure plan/monitoring wells (\$40,000 in 2018)
- Budget for construction of final cover (\$160,000 in 2019)
- Budget for annual post closure monitoring and reporting (\$25,000/yr)

If Council chooses to keep Limerick Landfill operational, it is likely that costs for survey, closure plan and monitoring wells/ongoing monitoring will be required in the near future regardless as a result of an amended ECA.

Respectfully:

A handwritten signature in black ink that reads "James Archibald". The signature is written in a cursive style with a large, stylized initial "J" that loops around the first part of the name.

James Archibald P.Eng

Archibald Engineering