

November 2022

9.0 Potential Impacts, Mitigation Measures, and Net Effects

This section documents the detailed assessment of the preferred Alternative 3A. The detailed assessment includes the description of predicted effects, mitigation measures and net effects for the Preferred Alternative.

Construction, operation and closure of the landfill expansion are anticipated to affect the natural, cultural, social and built environments. Many of the predicted effects will be mitigated through the standard mitigation and operating procedures outlined in Table 7-2. The evaluation carried out in Section 7.0, identified several additional mitigation measures that will be required. A summary of all predicted effects and mitigation measures is provided in Table 9-1.

A comprehensive list of all standard and additional impacts and mitigation measures is provided in Table 9-1. Some of the impacts and mitigation measures identified in Section 7.0 have been updated based on the more detailed description of the Preferred Alternative, provided in Section 8.0.

Some of the mitigation identified is only required as a contingency if unexpected effects arise. For example, if a leachate seep occurs, the Adaptive Management framework will be triggered. Additional studies during detailed design as well as regular monitoring programs are key in identifying when Adaptive Management may be required. Additional details regarding the Adaptive Management Plan are provided in Section 11.3.

As part of the Environmental Protection Act approvals that will be sought after EA approval, some technical studies will be updated with additional detail as the design of the landfill expansion is finalized. Some technical studies and updates are at the request of GRT members and in response to comments raised (see Appendix F 'Comments with respect to the August 2021 EA Submission'). Other technical studies will be updated only if the landfill expansion extends beyond the existing Town property. A list of the additional studies the Town commits to undertake during the detailed design and approval phase are as follows:

- Updated Hydrogeological Study based on more detailed topographic mapping and landfill design details will be prepared and submitted to MECP and UTRCA. Any new information from new monitoring wells and the meltwater deposits will be incorporated into the design and mitigation measures. The study will also address interactions between the relocated SWM basins and groundwater.
- Re-model potential odour impacts based on the detailed design plans and update plans for additional mitigation, monitoring and contingency measures as required.
- Develop a detailed watercourse realignment plan reflecting principals of Natural Channel Design and relevant mitigation measures previously identified by DFO for approval by DFO and UTRCA.

November 2022

- Develop a Stormwater Management Plan for submission to MECP and UTRCA for review. Develop an Erosion and Sediment Control (ESC) Plan in consultation with UTRCA and MECP.
- The Town will update the existing Design and Operations report as part of the ECA application process with the information contained in this EA particularly the mitigative measures outlined in Table 9.1, the commitments in Table 11.1 as applicable and the updated monitoring program and adaptive management plan outlined in Sections 11.2 and 11.3.
- Prepare a Landscape Plan to include restoration and visual buffers.
- Update the Cultural Heritage Resources Assessment with a confirmation of impacts of the undertaking on cultural heritage resources identified within and/or adjacent to the study area. Identify and develop plans for additional mitigation, if required.

November 2022

Table 9-1: Effects, Mitigation Measures and Net Effects

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
Air Quality	Changes in air quality due to construction/ closure activities	<ul style="list-style-type: none"> Dust may increase during construction and closure. Any dust emissions are expected to be minor and within levels typically expected for construction. 	<ul style="list-style-type: none"> Apply dust suppressants, as required during construction/closure activities. 	<p>Minor net effects anticipated:</p> <p>M: Minor. All air emissions are within provincial guidelines</p> <p>F: Contaminants and dust will be emitted on an ongoing basis.</p> <p>D: Emissions are expected through the construction, operation and closure phases of the landfill.</p>	As part of site operations as defined by the Design and Operations report, staff will be aware of potential site operations issues that may result in nuisance effects. In addition, through the complaint system the Town will monitor off-site nuisance effects and report issues to MECP as part of Annual Monitoring Reports.	None
	Changes in air quality due to landfill operations	<ul style="list-style-type: none"> Air quality contaminant levels at the landfill boundary will be within provincial limits. 	<ul style="list-style-type: none"> Apply daily cover during operations to control landfill gas emissions. Should signs of significant LFG emission become apparent (e.g., significant odour may signify that higher-than-expected emissions are occurring), monitoring for LFG may become necessary. As a contingency measure to be addressed through Adaptive Management, an LFG monitoring program may be required. Subject to findings, additional measures, such as additional cover or LFG collection may be required. If necessary, this will be implemented during the operations phase of the landfill expansion. 	<p>R: Air quality effects are reversible but only after landfill closure.</p>	None	Town will report in Annual Monitoring Report if conditions warrant LFG monitoring and propose a monitoring program and how decisions with respect mitigation measures will be made.
Odour	Number of receptors potentially impacted by odour	<ul style="list-style-type: none"> 13 receptors may experience odour over 6 OU. 	<ul style="list-style-type: none"> Apply daily cover during operations to control odour. Re-model odour during detailed design. Implement any additional 	<p>Minor net effects anticipated:</p> <p>M: Minor – Effect is expected to be low and only slightly</p>		None

⁶⁵ Effects associated with air quality, odour and noise were not modelled for Alternative 3A but were assumed to be similar to Alternative 3 and they have approximately the same footprint, height and distance from receptors.

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
	Frequency of odour impacts	<ul style="list-style-type: none"> 11 of the receptors will experience odour less than 0.5% of the time. 2 of the receptors will experience odour less than 0.8% of the time. 	mitigation, monitoring and contingency measures identified as a result of re-modelling.	<p>higher than existing conditions.</p> <p>F: Infrequent – Odour effects are expected infrequently but potentially more often than other Alternatives at two receptors.</p> <p>D: Long-Term – Odour effects will be experienced over the life of the landfill.</p> <p>R: Reversible – Odour effects are reversible once the landfill has closed.</p>	As part of site operations as defined by the Design and Operations report, staff will be aware of potential site operations issues that may result in nuisance effects. In addition, through the complaint system the Town will monitor off-site nuisance effects and report issues to MECP as part of Annual Monitoring Reports.	None
Noise	Noise levels at receptors as a result of construction/ closure activities	<ul style="list-style-type: none"> Construction and closure-related noise will be higher than current operational noise but within typical expected levels for construction. 	<p>During construction and closure activities</p> <ul style="list-style-type: none"> Keep construction equipment well maintained and in good working order. Limit use of equipment to daytime hours and adhere the Town's Noise By-law. Require contractors to ensure construction activities conform to the criteria set out in Noise Pollution Control (NPC) 115 of 83 dB. 	<p>Minor net effects anticipated:</p> <p>M: Minor. All noise is within provincial guidelines at all receptors. However, small increases or decreases may be experienced at a small number of receptors.</p> <p>F: Noise will be ongoing during operational hours.</p> <p>D: Noise is expected through the construction, operation and closure phases of the landfill.</p> <p>R: Noise effects are reversible but only after landfill closure.</p>	As part of site operations as defined by the Design and Operations report, staff will be aware of potential site operations issues that may result in nuisance effects. In addition, through the complaint system the Town will monitor off-site nuisance effects and report issues to MECP as part of Annual Monitoring Reports.	None
	Number of receptors experiencing noise above provincial limit during landfill operations	<ul style="list-style-type: none"> 0 residences will experience sound levels above the provincial limit of 55 dBA during the operational phase of the landfill. Maximum noise impact at any receptor is 50 dBA which is significantly below the provincial limit. 	<ul style="list-style-type: none"> Limit use of equipment to daytime hours and adhere the Town's Noise By-law. 		As part of site operations as defined by the Design and Operations report, staff will be aware of potential site operations issues that may result in nuisance effects. In addition, through the complaint system the Town will monitor off-site nuisance effects and report issues to MECP as part of Annual Monitoring Reports.	None

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
	Number of receptors experiencing a change in noise level during landfill operations	<ul style="list-style-type: none"> Two receptors will experience a Significant (-10 and -9 dBA) reduction in noise levels. Three receptors will experience a Noticeable (+3, +3 and +4 dBA) increase in noise levels. One receptor will experience a Significant (+6 dBA) increase in noise levels over existing conditions. Regardless of these changes, the maximum noise impact at any receptor is 51 dBA which is noticeably below the provincial limit. 			As part of site operations as defined by the Design and Operations report, staff will be aware of potential site operations issues that may result in nuisance effects. In addition, through the complaint system the Town will monitor off-site nuisance effects and report issues to MECP as part of Annual Monitoring Reports.	None
Hydrogeology	<p>Risk of Increasing Leachate Generation and Strength</p> <p>Risk of impacting groundwater</p>	<ul style="list-style-type: none"> Moderate increase in footprint will generate moderate increase in leachate. New waste to be placed above existing landfill, potentially increasing leachate strength. Increased height over existing landfill area and therefore increased risk of leachate mounding or leachate seeps. Moderate increase in footprint, therefore, moderately sized area for leachate to interact with groundwater. Moderate risk of landfill leachate migrating through a meltwater deposit. 	<ul style="list-style-type: none"> During operations and post closure, maintain and operate a functional leachate control system (LCS) to capture leachate for treatment at the Town's wastewater treatment plant (WWTP). In the case of a temporary WWTP shut-down or short-term lack of capacity in the system, close the LCS discharge and hold leachate in the landfill until treatment can resume at the WWTP. During operations, regularly monitor the site for seepage due to leachate mounding. If a seep occurs that escapes the LCS, follow Spills/Leachate Seep Protocols (refer 	<p>Minor net effects anticipated:</p> <p>M: Minor increase in risk of effects after mitigation.</p> <p>D: Groundwater effects would persist for the contaminating lifespan of the site controlled by the continued operation of the LCS.</p> <p>F: Leachate generation and risk of groundwater impact is continuous over life of landfill.</p> <p>R: Effects to groundwater are reversible in the long-term as</p>	<ul style="list-style-type: none"> During Operations, maintain a network of groundwater and surface water monitoring wells/stations and report on findings in Annual Monitoring Reports. Implement Adaptive Management Plans based on monitoring results (refer to Section 11.3). During closure and post-closure, maintain a network of long-term groundwater and surface water monitoring wells/stations and reporting on findings in 	Annual monitoring to be reported in annual compliance monitoring report.

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
	Risk of altering groundwater flow	<ul style="list-style-type: none"> • Low potential for shift of groundwater flow due to the watercourse re-alignment. The small alignment may cause a minor shift in groundwater flow. 	<p>to Section 9.0 and 11.3), including patching seeps, closing outlets in SWM basins (where escaped leachate will collect) and directing contaminated water from the SWM basins to the LCS.</p> <ul style="list-style-type: none"> • During operation and post closure and as a contingency only, if effects from CKD are observed in the realigned watercourse through the Annual Monitoring Program, measures to separate the watercourse from the CKD will be required. This may include a barrier and collector pipe to trap CKD leachate and direct it to the LCS. • Prepare and carry out procedures during post closure including, but not limited to: <ul style="list-style-type: none"> – Operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; – Record keeping and reporting; – Complaint contact and response procedures; and, – Assessing the landfill's contaminating lifespan based on results of groundwater monitoring programs. 	leachate strength and quantity diminish when the landfill closes or when any leakages are resolved.	Annual Post-Operational Monitoring Reports. Implement Adaptive Management measures based on monitoring results (refer to Section 11.3).	

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
Surface Water Quality	Risk of contaminated runoff reaching surface water	<ul style="list-style-type: none"> • Low risk of runoff or precipitation contacting waste and exiting footprint to reach surface water. • SWM basins A and B will be removed. When valves are opened to release all of the water, there is some risk that contaminated water from the SWM basins could be released into the watercourse and subsequently to the Thames River downstream. 	<ul style="list-style-type: none"> • Install and maintain erosion and sediment control (ESC) measures prior to any earth works and until the site has been stabilized and then remove them. • Inspect ESC measures to confirm they are functioning and are maintained as required. If control measures are not functioning properly, limit work in the area until the problem is resolved. • Apply wet weather restrictions during site preparation and excavation. Avoid work near watercourses during periods of excessive precipitation and/or excessive snow melt. • Refuel and maintain construction equipment within designated areas only. • Handle hazardous materials used for construction in accordance with best practices and O. Reg. 347. 	Low risk of net effect anticipated: M: Low risk of effect with mitigation and monitoring D: Surface water effects would gradually change during construction/operation and decline through the contaminating lifespan. F: Risk of surface water impact is continuous over life of landfill. R: Effects to surface water are reversible in the long-term as leachate strength and quantity diminish when the landfill closes or when any leakages are resolved.	<ul style="list-style-type: none"> • During Operations, maintain a network of groundwater and surface water monitoring wells/stations and report on findings in Annual Monitoring Reports. Implement Adaptive Management Plans based on monitoring results (refer to Section 11.3). • During closure and post-closure, maintain a network of long-term groundwater and surface water monitoring wells/stations and reporting on findings in Annual Post-Operational Monitoring Reports. Implement Adaptive Management measures based on monitoring results (refer to Section 11.3). 	Annual monitoring to be reported in annual compliance monitoring report.
	Risk of leachate from seeps reaching surface water	<ul style="list-style-type: none"> • Increased height over existing landfill area and therefore increased risk of leachate mounding and seeping out of waste slopes to surface and then to surface water features. 				
	Risk of contaminants from CKD pile reaching surface water	<ul style="list-style-type: none"> • Low to moderate risk due to proximity of relatively short watercourse realignment closer to CKD pile and low potential to disturb CKD waste. 				

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
	<p>Risk of on-site surface water quality impacting Thames River</p>	<ul style="list-style-type: none"> • Surface water from the site eventually drains to the Thames River and there is a low to moderate risk to on-site surface water quality and therefore a low to moderate risk to the Thames River downstream. 	<ul style="list-style-type: none"> • Store stockpiled material at least 30 m from any waterway to prevent the discharge of deleterious substances into the water. • Immediately contain and clean up spills or depositions into watercourses in accordance with provincial regulatory requirements and the contingency plan. Keep a hydrocarbon spill response kit on-site at all times during construction. • Report spills to the Ontario Spills Action Centre at 1-800-268-6060. • Provide and maintain stormwater control measures to direct, slow and retain water, including: <ul style="list-style-type: none"> – Additional berms against the waste fill area. – Stormwater retention ponds/basins. – Flow control measures for stormwater management ditches (which may include rip-rap or vegetation). – Vegetated buffer areas along waterways. • As a contingency only, if effects from CKD are observed in the realigned watercourse through the Annual Monitoring Program, measures to separate the watercourse from the CKD will be required. This may include a barrier and collector pipe to trap CKD leachate and direct it to the LCS. 			

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
Surface Water Quantity	Changes to surface water flow	<ul style="list-style-type: none"> Watercourse relocation will alter the flow path for ~230 m through the landfill property. Quantity and location of surface water flow entering and leaving the On-Site Study Area will not change. 	<ul style="list-style-type: none"> Post-construction monitoring of the realigned watercourse will be carried out for 2 years. Any additional mitigation identified at that stage will be implemented, such as: additional bank protection measures, bank and riparian plantings, new substrates etc. as required, in consultation with UTRCA. 	No net effects.	Post construction monitoring of realigned watercourse for 2 years to ensure banks are stable and planted vegetation is surviving will be carried out.	Results of monitoring will be reported in Annual monitoring reports.
Terrestrial Ecology	Impacts to Significant Wildlife Habitats	<ul style="list-style-type: none"> No effects to Monarch butterfly habitat, terrestrial crayfish habitat or turtle overwintering areas are expected. 	<ul style="list-style-type: none"> No mitigation required. 	No net effects.	None	None

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
	Impacts to Habitat of Endangered and Threatened Species	<ul style="list-style-type: none"> A portion of regulated Eastern Meadowlark habitat will be removed. There is potential to create temporary habitats which may attract Bank Swallows which will subsequently be disturbed or destroyed. 	<ul style="list-style-type: none"> Compensate for the loss of Eastern Meadowlark habitat by creating of habitat elsewhere in accordance with the ESA Regulations, or a species conservation charge paid to the Species at Risk Conservation Trust (effective April 29, 2022). Clear vegetation in Eastern Meadowlark habitat outside of the bird nesting season, noted to be April 1 to August 31. Survey site for Bank Swallow habitat prior to any site alteration and contact SAROntario@ontario.ca for guidance under the <i>Endangered Species Act 2007</i> if Bank Swallow is found to be nesting on site. Should Bank Swallow be found nesting on-site, apply a 50 m buffer around the active nest. Avoid the creation of temporary vertical or near-vertical spoil piles within the landfill and compost pile that are prone to frequent disturbance from landfill construction and operations to reduce the chance of attracting nesting Bank Swallow. Following Best Management Practices for the Protection, Creation and Maintenance of Bank Swallow Habitat in Ontario (MNR, 2017). 	No net effects.	None	None

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
	Impact to other wildlife	<ul style="list-style-type: none"> Any amphibians and turtles present in the watercourse or SWM basins may be affected during construction and relocation of these features. 	<ul style="list-style-type: none"> Clear vegetation outside of the bird and bat nesting/roosting season, noted to be April 1 to September 31. Erect ESC fencing around work areas to prevent wildlife from entering work zones. Relocate wildlife from within work zones, if required. If a SAR species is encountered in a work zone, cease all work in the area and contact MECF for further instruction. Obtain necessary permitting to relocate salvaged wildlife prior to construction. Complete a Tree Inventory and Landscape Plan to include restoration and visual buffers. Replant trees at a 10:1 ratio for trees lost during construction. Conduct a wildlife salvage of the watercourse and SWM basins during dewatering. During closure, reseed grassed areas with native grasses and wildflowers, where possible. 	No net effects	None	None

November 2022

<p>Aquatic Ecology</p>	<p>Impact to aquatic habitat</p>	<ul style="list-style-type: none"> Habitat will be physically altered during watercourse realignment. Low-moderate risk of water quality effects due to potential watercourse/CKD pile interactions. 	<ul style="list-style-type: none"> Design the realigned watercourse using natural channel design principles with an overall result of improved habitat conditions. Naturalize all new and remaining riparian areas with tree, shrub and grass plantings to improve riparian habitat and stabilize stream banks. Avoid in-water work will occur during June and July. Capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas. Dewater gradually to reduce the potential for stranding fish Conduct in-water undertakings and activities during periods of low water levels Limit impacts on riparian vegetation to those approved for the project; <ul style="list-style-type: none"> Limit access to banks or areas adjacent to watercourse Construct access points and approaches perpendicular to the watercourse Re-vegetate the disturbed area with native species suitable for the site Restore stream geomorphology (i.e., restore the bed and banks, gradient and contour of the watercourse to its initial state or better; Avoid introducing sediments (e.g., silts, clays and sand) in the water; Develop and implement an erosion and sediment control plan to avoid or minimize the introduction of sediment into any waterbody during all phases 	<p>Minor net effects due to watercourse relocation. Low-moderate risk of net effects due to water quality impairment.</p> <p>M: Low risk of effect due to watercourse realignment with mitigation and monitoring/Low-moderate risk of water quality effect due to distance between watercourse and CKD pile.</p> <p>D: Habitat alterations will occur only once during watercourse realignment/Surface water effects would gradually change during construction/operation and decline through the contaminating lifespan.</p> <p>F: Habitat alterations will occur only once during watercourse realignment/Risk of surface water impact is continuous over life of landfill.</p> <p>R: Watercourse realignment is not reversible but will result in improved habitat Effects to surface water are reversible in the long-term as leachate strength and quantity diminish when the landfill closes or when any leakages are resolved.</p>	<p>None</p>	<p>None</p>
-------------------------------	----------------------------------	--	--	---	-------------	-------------

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
			<p>of the work, undertaking or activity; and</p> <ul style="list-style-type: none"> – Conduct all in-water works, undertakings or activities in isolation of open or flowing water to reduce the introduction of sediment into the watercourse – Monitor the watercourse to observe signs of sedimentation during all phases of the work, undertaking or activity and take corrective action <ul style="list-style-type: none"> • Develop and implement a response plan to avoid a spill of deleterious substances. • As a contingency only, if effects from CKD are observed in the realigned watercourse through the Annual Monitoring Program, measures to separate the watercourse from the CKD will be required. This may include a barrier and collector pipe to trap CKD leachate and direct it to the LCS. 			

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
<p>Built Heritage Resources and Cultural Heritage Landscapes</p>	<p>Impacts to Built Heritage Resources and Cultural Heritage Landscapes</p>	<ul style="list-style-type: none"> No BHLs or CHLs are located within the On-site Study Area and therefore no direct effects are expected but this needs to be confirmed. One BHR is located approximately 925m from the landfill site. 11 CHLs are located within 1km of the landfill site. No indirect effects are anticipated, given the distance between the resource and landfill and the existing landscape disturbance in between. This needs to be confirmed. 	<ul style="list-style-type: none"> Construction activities and staging should be suitably planned and undertaken to avoid effects to identified cultural heritage resources. Once the detailed design of the proposed work are available, the CHRA will be updated with a confirmation of effects of the undertaking on cultural heritage resources identified within and/or adjacent to the study area and will recommend appropriate mitigation measures. Mitigation measures may include, but are not limited to, completing a heritage impact assessment or documentation report, or employing suitable measures such as landscaping, buffering or other forms of mitigation, where appropriate. In this regard, provincial guidelines will be consulted for advice and further heritage assessment work should be undertaken as necessary. Should future work require an expansion of the study area then a qualified heritage consultant will be contacted in order to confirm the effects of the proposed work on potential heritage resources. 	<p>No net effects</p>	<p>None</p>	<p>None</p>

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
Archaeological Resources	Impacts to archaeological resources	<ul style="list-style-type: none"> The On-Site Study Area offers no archaeological potential, given its past and current disturbances. No effects anticipated; however, unexpected resources could be uncovered during excavations. 	<ul style="list-style-type: none"> Contact the Archaeology Program Unit and MHSTCI at archaeology@ontario.ca in the unexpected event that archaeological remains are found during construction activities. Indigenous communities will also be notified if the resources appear to pertain to Indigenous groups. Should the proposed work extend the current study area, then further Stage 1 Archaeological Assessment (and further assessments, if recommended) will be conducted by a licensed archaeologist as early as possible during detailed design and prior to ground disturbing activities 	No net effects	None	None
Local Transportation	Impacts to traffic on Water St. S.	<ul style="list-style-type: none"> The intersection at Water St. S. and the landfill entrance is sufficient to meet traffic demands through 2059 and beyond. No capacity improvements are needed to Water St. S. or the entrance intersection. Therefore, no effects on traffic are expected. 	<ul style="list-style-type: none"> During construction, monitor and repair site access roads and perimeter ditching as necessary. Manage construction traffic and waste collection vehicles to avoid traffic congestion and safety concerns at the landfill entrance on Water St. S. 	No net effects	None	None

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
Sensitive Land Use	Presence of sensitive lands within the study areas	<ul style="list-style-type: none"> • No sensitive land uses are present within the On-site Study Area. • Sensitive residential and agricultural land uses are present within Study Area Vicinity. Minor effects to sensitive land uses are predicted. • Landfilling will not occur any closer to sensitive land uses than occurs during existing operations, therefore, there is no change to effects experienced as a result of landfill expansion. • Trees between landfill and farmland to the south will be removed. 	<ul style="list-style-type: none"> • A new treeline will be planted along the southern property boundary. • Maintain, repair or re-install all existing visual barriers, such as berms or tree plantings to block sightlines after construction. 	No net effects	None	None
Aggregate Resources	Impacts to aggregate extraction and processing	<ul style="list-style-type: none"> • No work is required on SMC lands and no change to landfill operations are planned that would indirectly affect extractive land uses or processing operations. 	<ul style="list-style-type: none"> • No mitigation required. 	No net effects	None	None

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
Social Conditions	Potential impacts to enjoyment of life and private property associated with the residences along Water St. S.	<ul style="list-style-type: none"> Air quality, noise, litter and vermin-related effects will be minor and not significantly changed from current conditions. Odour may be experienced infrequently at a higher number of receptors than under current conditions. Very minor changes to the view from the south are expected as the existing line of trees along the southern boundary is removed (These trees are currently in a low-lying area and don't provide a significant visual block). 	<ul style="list-style-type: none"> During operations, apply daily cover to control landfill gas emissions, odour, dust, reduce blowing litter and control vermin. Continue to operate the landfill within daylight hours only. Odour will be re-modeled during detailed design. Any additional mitigation identified at that stage will be implemented. Plant a new treeline and visual buffer along the southern property boundary. Maintain, repair or re-install all existing visual barriers, such as berms or tree plantings to block sightlines after construction. Conduct regular inspections by landfill staff to observe, record any operational issues and implement corrective actions, including: <ul style="list-style-type: none"> Fence patrol and litter collection. Cover and vegetation inspections. Erect portable litter fencing. Continue the existing program to record, investigate, and respond to public complaints and take corrective actions. During operations, monitor cover placement (application quality and placement schedule) to minimize the attractiveness of the Site to vectors ⁶⁶ and vermin ⁶⁷ as well as larger animals. 	<p>Minor net effects anticipated:</p> <p>M: Minor – Odour effects are expected to be low and only slightly higher than existing conditions. Visual effect is minor as only the view from the south will be affected and the current treeline is topographically low-lying.</p> <p>F: Infrequent – Odour effects are expected infrequently but potentially more often than other Alternatives at two receptors. Existing visual break will be removed once.</p> <p>D: Long-Term – Odour effects will be experienced over the life of the landfill. The visual impact will be experienced short-term until the new trees have matured.</p> <p>R: Reversible – Odour effects are reversible once the landfill has closed. Changes to the view are reversible with a newly planted visual break.</p>	As part of site operations as defined by the Design and Operations report, staff will be aware of potential site operations issues that may result in nuisance effects. In addition, through the complaint system the Town will monitor off-site nuisance effects and report issues to MECP as part of Annual Monitoring Reports.	None

⁶⁶ A *vector* is an organism, such as a mosquito or tick, which carries disease-causing micro-organisms from one host to another.

⁶⁷ *Vermin* are various small animals or insects, such as rats, gulls or cockroaches, which are destructive, annoying, or injurious to health.

November 2022

Environmental Component	Indicators	Potential Effects ⁶⁵	Mitigation Measures	Net Effects	Commitments for Monitoring	EA Compliance Monitoring
<p>Indigenous Communities</p>	<p>Impacts to culturally or environmentally significant features</p>	<p>Surface water from the landfill eventually drains to the Thames River. There is a low to moderate risk of surface water contamination and, therefore, a low to moderate risk to the Thames River and aquatic habitats within it.</p>	<ul style="list-style-type: none"> • During operations and post closure and as a contingency only, if effects from CKD are observed in the realigned watercourse through the Annual Monitoring Program, measures to separate the watercourse from the CKD will be required. This may include a barrier and collector pipe to trap CKD leachate and direct it to the LCS. 	<p>Low risk of net effect anticipated:</p> <p>M: Low risk of effect with mitigation and monitoring</p> <p>D: Surface water effects would gradually change during construction/operation and decline through the contaminating lifespan.</p> <p>F: Risk of surface water impact is continuous over life of landfill.</p> <p>R: Effects to surface water are reversible in the long-term as leachate strength and quantity diminish when the landfill closes or when any leakages are resolved. Minor net effects due to watercourse relocation. Low-moderate risk of net effects due to water quality impairment.</p>	<ul style="list-style-type: none"> • During Operations, maintain a network of groundwater and surface water monitoring wells/stations and report on findings in Annual Monitoring Reports. Implement Adaptive Management Plans based on monitoring results (refer to Section 11.3). • During closure and post-closure, maintain a network of long-term groundwater and surface water monitoring wells/stations and reporting on findings in Annual Post-Operational Monitoring Reports. Implement Adaptive Management measures based on monitoring results (refer to Section 11.3). 	<p>Annual monitoring to be reported in annual compliance monitoring report.</p>

November 2022

9.1 Climate Change Considerations

The effect of the Preferred Alternative on climate change and the effect of climate change on the Preferred Alternative are discussed below with consideration of the MECP guidance document “Considering Climate Change in the Environmental Assessment Process” (MOECC, 2017).

On-going changes to the global climate related to increased emissions and concentrations of greenhouse gases in the atmosphere are addressed in the conceptual design for the landfill expansion. This section evaluates the effect of increased intensity of storm events, potential effects to leachate generation associated with higher temperatures and increased intensity of rainfall events and snowmelt.

9.1.1 Effect of the Undertaking on Climate Change

As noted in Section 7.4.1 (Air Quality), the landfill’s impact on climate change is most directly linked to the fugitive emissions of landfill gas (LFG). This is created by the decomposition of the waste in the landfill. LFG is roughly half carbon dioxide (CO₂) and half methane (CH₄) with a small amount of other gasses. LFG is a Greenhouse Gas that contributes to Climate Change (see Section 3.1.3.2). Ontario Regulation 232/98 under the Environmental Protection Act states that landfill sites containing 1.5 million cubic metres (1.5 Mm³) of landfill capacity or more are required to install an LFG capture and destruction system. The proposed total capacity of the St. Marys Landfill if the expansion is constructed will remain below this threshold. O.Reg 232/98 recognizes low LFG generation rates, generally associated with low rates of disposal, as a reason to avoid installation of an LFG management system even if the site capacity exceeds the 1.5 Mm³ threshold. The age of waste already contained within the St. Marys Landfill, the anticipated rate of fill, and thus the ultimate rate of LFG generation, is relatively low. Therefore, on both counts (total capacity and rate of fill), the site does not require an LFG management system.

Ontario’s annual emission rate for GHG’s is approximately 143,000,000 tonnes CO₂e with approximately 8,500,000 tonnes/year CO₂e coming from solid waste landfills⁶⁸. The Preferred Alternative for landfill expansion with 708,000 m³ estimated waste (over the 40-year EA Planning Period) will produce a total of approximately 79,000 tonnes CO₂e. Averaged over the site’s life, this represents approximately 2,000 tonnes CO₂e per year, or approximately 0.24% of Ontario’s annual solid waste related GHG emissions and approximately 0.001% of the total annual GHG emissions from Ontario.

⁶⁸ Environment and Climate Change Canada, report, National Inventory Report 1990-2014: Greenhouse Gas Sources and Sinks in Canada.

November 2022

The total GHG emission rate for Canada is approximately 732,000,000 tonnes/year CO₂e with approximately 56,000,000 tonnes/year CO₂e generated from solid waste and other sources. In the national context, the expanded landfill will contribute approximately 0.004% of Canada's annual solid waste related GHG emissions, or approximately 0.0003% of the country's total annual GHG emissions.

LFG emissions are expected to increase proportionally with the volume of waste landfilled. Based on the LandGEM model, which predicts LFG generated by a site, it is estimated that approximately 1,279 tonnes CO₂e from LFG was generated at the St. Marys Landfill in 2017. The model projects this will increase to about 2,183 tonnes CO₂e in 2057, following placement of the last loads of waste at the site. LFG will then begin decreasing again during the site's post-closure period. The progressive placement of the final, low-permeability cover will help control fugitive LFG releases.

There is also potential for methane production in the landfill to decrease over time as a result of the Province's proposed organics disposal ban under Bill 151, Waste-Free Ontario Act. While the Town will not be required to implement the organics ban it is likely that some organics will still be diverted. The current schedule for the proposed organics disposal ban to come into effect remains unknown. If this ban is implemented, the landfill will generate less LFG from the final cells decreasing the overall contribution of fugitive and combustion emissions.

Given recent discussions on greenhouse gases and their effects on Climate Change, there is a general drive in Ontario to lower emissions. In the long run, this may result in the Town installing an LFG system in the future. Such a system may be voluntarily installed based on beneficial economics, community recognition of benefit(s) or to mitigate a currently unanticipated LFG issue. Should signs of significant LFG emission become apparent at the landfill (e.g., significant odour may signify that higher-than-expected emissions are occurring), monitoring for LFG may become necessary. Subject to findings, additional measures, such as additional cover or LFG collection, may be required.

9.1.2 Effect of Climate Change on the Undertaking

Increased severity of storm events, more intense but less frequent rainfall events, and reduced snow cover are the most likely and relevant results of climate change on the design of the Undertaking. The potential effects are largely limited to the design of the SWM infrastructure requiring an increased capture volume for ditches and ponds, as well as additional erosion protection as more intense storm events result in higher flow velocities across the landfill cover, in ditches and swales and at discharge points.

November 2022

Climate Change and Water Management Infrastructure

The changes in extreme weather events due to climate change are particularly relevant in the design and surface water management infrastructure. Surface water design elements for the expansion need to address the requirement to divert or control surface water coming onto the site, control runoff discharging from the site, and to control external diversion channels, ditches, and conveyance structures. Generally, stormwater control facilities must be sized to accommodate the peak flow generated from the prevailing Regional Storm Event, as regulated by UTRCA.

The stormwater management system has been designed to meet the water quantity and quality requirements associated with both normal operations and operations under extreme weather events driven by climate change (see Section 8.2.6).

Climate Change and Slope Stability

Climate Change should also be considered in the site's design. It is anticipated that periods of dry weather followed by intense rainfall could result in slope stability issues and cover erosion. Ensuring the maximum slope is no greater than 25% (4 m run for every 1 m rise, or 4:1), as required by O. Reg. 232/98, will help to mitigate this Climate Change effect.

Climate Change and Leachate Generation

There may be changes in the precipitation patterns that result in less frequent yet more intense rain. If this occurs as expected, leachate generation could be reduced. Leachate is generated when precipitation infiltrates the landfill cover and the moisture mixes with the waste below. Infiltration is a function of the steady wetting of the cover and occurs slowly. Intense rain events result in more runoff than infiltration. Further, dry cover soils are more likely to initially resist infiltration, further reducing leachate generation.

Once the landfill reaches its approved capacity, it will be closed and capped in accordance with O. Reg. 232/98. This will further decrease infiltration of precipitation and the leachate volumes generated.

Climate Change and Landfill Fill Rates

As discussed in Section 3.1.3.2, severe weather events influenced by Climate Change can have a direct impact on landfill utilization. These events can result in increased property damages from excessive wind, precipitation or even fires. Subsequently, Climate Change results in an increase in the amount of materials being received at landfills in the form of food waste (i.e., from power outages), clean-up debris, construction and demolition debris and reconstruction scrap.

November 2022

In order to assess the potential for waste generation from the Town of St. Marys as a result of Climate Change related severe weather events, the U.S. Army Corps of Engineers debris model for a single Category 1 hurricane was incorporated. This is intended to represent the cumulative effect of more severe storms and resulting damages (disposal needs) that may occur due to Climate Change. Based on the model, approximately 5 months or 1% of additional capacity could be utilized in dealing with the storm debris.

9.2 Cumulative Effects

Environmental effects from specific projects do not occur in isolation: other projects and activities in an area may have effects that can combine to create a larger, more consequential effect, or cumulative effect, on those same environments. The following section assesses the potential for cumulative effects resulting from the landfill and other activities and land uses occurring in the Study Area Vicinity.

Methodology

Cumulative effects were assessed by:

- Identifying the net effects of the Undertaking;
- Describing existing and future land uses in the Study Area Vicinity;
- Assessing how the net effects of the project may combine with the effects of other development to create a cumulative impact; and
- Identifying additional mitigation measures to minimize cumulative effects.

Net effects of the Undertaking

The net effects of the Project, after mitigation is applied were summarized in Table 9-1. The assessment determined that most of the effects of the landfill expansion can be mitigated and minimized such that no net effects are expected. However, the following net effects may occur:

- Minor increase in air emissions and dust, within provincial limits;
- Minor increase in odour, only slightly higher than existing conditions;
- Minor increase and/or decrease in noise experienced at nearby sensitive receptors, all within provincial limits;
- Minor increase in the risk of groundwater contamination;
- Minor increase in the risk of surface water contamination;
- Minor risk to aquatic habitat, associated with watercourse realignment and the increased risk of surface water contamination;

November 2022

- Minor increase in effects to enjoyment of life and private property associated with the residences along Water St. S. This increase is associated with potential air quality, odour and noise effects; and,
- Minor risk of affecting features with cultural or environmental significance to Indigenous communities (i.e., the Thames River). Effects are associated with the increased risk of surface water contamination.

The land fill expansion is not expected to cause net effects with respect to surface water quantity, terrestrial ecology, built heritage resources and cultural heritage landscapes, archaeological resources, local transportation, sensitive land use or aggregate resources. These environmental components are not expected to change over baseline conditions. There is no net effect to combine with other effects occurring in the area. Therefore, these environmental components are not assessed in the cumulative effects assessment.

Existing and Future Land Use in the Study Area

Aggregate extraction associated with SMC has occurred historically, occurs currently and is expected to continue through the life of the landfill expansion to the north, northeast and west. Lands to the immediate south and east fall outside of the Town's limits but are designated as Licensed Quarry Pit/Limestone Resource and Agricultural Lands with a small amount of Natural Resources/Environment adjacent to the Thames River. Lands to south of the landfill are currently and have historically been used for agriculture. A small number of residences are located on the west side of Water St.S. and on the east side of Water St. S., immediately adjacent to the landfill.

The aggregate extraction and agricultural activities have the greatest potential to create conditions which may interact with the landfill and generate cumulative effects. The residential properties are not expected to cause environmental effects at a level that would cause a noticeable cumulative effect when considered in combination with the landfill. Future development or intensification of the residential lands to the west is not expected.

The cumulative effects assessment, therefore, only considers the effects of aggregate extraction and agricultural uses in combination with the landfill. The effects of traffic on Water St. S. were also considered.

The following is assumed with regard to the aggregate extraction activities:

- SMC operates two quarries in the Study Area Vicinity: the quarry and plant directly adjacent to the landfill and the Thomas Street Quarry west of Water St. S.
- SMC has historically dewatered both quarries. They have also used water supply wells on the plant site to provide processing water. Dewatering at the plant site quarry is expected to continue for the life of the landfill since the cement plant is

November 2022

located on the quarry floor. Communication with the SMC Environmental Coordinator in 2015 confirmed that there are no plans for future dewatering locations.

- Based on current resources and production assets, the estimated lifespan of the two quarries is approximately 60 years. As such, the quarries will be active during the landfill's entire 40-year operational period.
- Past and on-going operations by SMC have affected and continue to affect baseline conditions and therefore, were considered in the effects assessment contained herein.

The following is assumed with regard to agricultural activities:

- Several farms are located within the Study Area Vicinity. Most are producing cash crops. There is one small barn, approximately 400m to the west of the landfill on 3rd Line. It appears only a small number of animals are housed in this location. Other larger livestock facilities are present outside of the Study Area Vicinity and are not considered as part of this assessment.
- All farms in the Study Area Vicinity are located outside of the St. Marys town boundary and are not within any proposed future development or settlement area expansion. As such, they are expected to be maintained in agricultural use in the long-term. The only exception is the agricultural field directly south of the landfill which is designated as a Licensed Quarry Pit/Limestone Resource. There is potential that this could be converted to an aggregate extraction operation before the end of the landfill's lifespan.
- Past and on-going agricultural activities have affected and continue to affect baseline conditions and therefore, were considered in the effects assessment contained herein.

The following is assumed with respect to traffic on Water St. S.:

- Water St. S. is a two-lane arterial road, which has a posted speed of 80 km/hr in the landfill access area. Roughly 470 m north of the landfill entrance, the road becomes under the jurisdiction of St. Marys. The road has a posted speed of 50 km/hr.
- There are no new developments or planned road improvements in the Study Area that may significantly increase or decrease traffic on Water Street S. near the landfill.
- **The maximum noise from the current traffic conditions is 50 to 60 dBA.**

Cumulative Effects Assessment

To assess cumulative effects, the net effects of the landfill expansion, as summarized in Section 7.0 and Table 9-1, have been carried forward for consideration. As noted previously, environmental components with no net effects are not considered in this

November 2022

assessment. Potential effects from the existing and future aggregate extraction and agricultural activities were identified based on effects typically known to occur with similar land uses. The manner in which the potential net effects of the landfill could interact with the effects of the aggregate extraction, agricultural uses and traffic was then considered through a reasoned argument and qualitative analysis. A quantitative estimate of cumulative air emissions was modelled.

Potential cumulative effects summarized in the following sections.

9.2.1 Cumulative Effects to Air Quality

The net effects of the landfill expansion on air quality are minor and within provincial guidelines.

From adjacent land uses, the following additional effects to air quality are expected:

- Nearby aggregate extraction operations will emit products of combustion from the various extraction-related machinery and processing plant. In addition, it is expected that dust will be emitted.
- Agricultural activities will emit dust during ploughing/tilling and harvesting. Products of combustion from farm vehicle and equipment exhaust are expected to be minimal and limited in terms of their duration and frequency.
- Traffic on Water St. S. emits contaminants associated with vehicle exhaust.

An estimate of cumulative air quality conditions was made using background air quality conditions from the provincial air quality monitoring network station in London. This background provides a rough estimate of the effects of surrounding land uses, including agriculture and industry as well as typical traffic conditions. These background emissions were added to the landfill emissions modelled for the landfill expansion⁶⁹. When background conditions were included, all contaminants remained below 91% of the provincial criteria when combined. The only exception is with particulate matter. Particulate matter with a diameter of 10 microns or less (PM10) is expected to be 102.3% of the provincial criteria and total particulate matter may reach 113.7% of the provincial criteria. It is likely that the London monitoring station underrepresents the background dust in the Study Area Vicinity. This is because the SMC operations likely emit more dust than average industrial operations in the London area. Therefore, it is assumed that particulate matter (dust) in the Study Area Vicinity will be moderately to significantly higher than provincial limits as a result of the cumulative effects of the landfill, SMC operations and agricultural activities. It is noted, that when existing landfill emissions are combined with background air emissions, the cumulative existing condition for particulate matter is also above the provincial criteria. This modelling is

⁶⁹ Air quality was modelled for Alternative 3. Results are assumed to be similar for the Undertaking (Alternative 3A) because the height and distance from receptors is similar.

November 2022

described in greater detail in the Landfill Expansion Emission Summary and Dispersion Modelling Report provided in Volume III, Appendix A.

The summary of background air quality conditions in combination with landfill emissions is provided in Table 9-2.

The following mitigation measures were identified in Table 9-1 to minimize air and dust emissions:

- Apply dust suppressants, as required.
- Apply daily cover to control landfill gas emissions.
- Should signs of significant LFG emission become apparent (e.g., significant odour may signify that higher-than-expected emissions are occurring), monitoring for LFG may become necessary. As a contingency measure to be addressed through Adaptive Management, an LFG monitoring program may be required. Subject to findings, additional measures, such as additional cover or LFG collection may be required.
- Continue the existing program to record, investigate, and respond to public complaints (including complaints related to dust) and take corrective actions.

Given that the existing cumulative effects of dust in the area are higher than provincial criteria and relatively few complaints have been received in recent years, no additional mitigation is proposed. However, the Town will commit to reviewing dust suppressant procedures should dust concerns become apparent i.e., if complaints rise significantly.

November 2022

Table 9-2: Estimated Cumulative Air Quality Effects

Contaminant	Criteria (µg/m ³)	Averaging Period of Criterion	Regulation Schedule No. †	Background Air Quality at London Provincial Air Monitoring Station (µg/m ³)	Background Air Quality (% of Criteria)	Modelled Conditions Due to Landfill Expansion (µg/m ³) §	Cumulative Background Air Quality + Modelled Conditions Due to Landfill Expansion	Cumulative Percentage of Criteria (%)
PM10	50	24hrs	AAQC	27.78	55.6%	23.4	51.1	102.3%
PM2.5	27	24hrs	CAAQS 2020	15	55.6%	2.4	17.4	64.3%
PM2.5	8.8	1 year	CAAQS 2020	7.50	85.2%	0.4	7.9	89.5%
Odour	N/A	10 mins				86.6	86.6	
Methane	37330	24 hrs	SL-PA			8057.0	8057.0	21.6%
Vinyl chloride	1	24 hrs	AAQC	0.00438	0.4%	0.5	0.5	46.3%
Vinyl chloride	0.2	1 year	AAQC	0.0015	0.8%	0.0	0.0	18.0%
Dimethyl sulphide	30	10 mins	AAQC			2.6	2.6	8.7%
Dichlorofluoromethane	500	24 hrs	SL-JSL			0.3	0.3	0.1%
Chlorobenzene	4500	10 mins	AAQC	0.01	0.0%	0.2	0.2	0.0%
Chlorobenzene	3500	1 hr	AAQC	0.01	0.0%	0.1	0.1	0.0%
Carbon Dioxide	255800	24 hrs	SL-PA			22110.0	22110.0	8.6%
Carbon monoxide	36200	1 hr	AAQC	362	1.0%	268.1	630.1	1.7%
Carbon monoxide	15700	8 hrs	AAQC	362	2.3%	140.8	502.8	3.2%
Hydrogen sulphide	13	10 mins	AAQC			6.6	6.6	51.1%
Hydrogen sulphide	7	24 hrs	AAQC			1.2	1.2	17.6%
Nitrogen oxides	400	1 hr	AAQC	39.48	9.9%	32.1	71.6	17.9%
Nitrogen oxides	78.96	1 hr	CAAQS 2025	39.48	50.0%	32.1	71.6	90.6%
Nitrogen oxides	200	24 hrs	AAQC	36.58	18.3%	9.1	45.7	22.8%
Nitrogen oxides	22.56	1 year	CAAQS 2025	16.45	72.9%	0.8	17.2	76.4%
Total particulate matter	120	24 hrs	AAQC	50	41.7%	86.5	136.5	113.7%
Total particulate matter	60	1 year	AAQC	25	41.7%	13.8	38.8	64.6%

† Regulation Schedules:
 AAQC = Ontario's Ambient Air Quality Criteria
 CAAQS = Canadian Ambient Air Quality Standards
 SL-PA = Screening Level- Previously Approved
 SL-JSL = Screening level- Jurisdictional Screening Level

§ Alternative 3A was not modelled but is considered to be similar to Alternative 3 due to its similar footprint, height and distance to receptors.

November 2022

9.2.2 Cumulative Effects of Odour

The net effects of odour as a result of the landfill expansion are minor. Any effects are expected to be low and only slightly higher than existing conditions.

From adjacent land uses, the following additional effects to air quality are expected:

- There are no significant odour effects associated with aggregate extraction operations.
- From agricultural processes, odour may be produced from the spread of fertilizers and pesticides. These odours will be experienced infrequently only when fertilizers and pesticides are in use. The small barnyard on 3rd Line may emit manure-related odour. Given its small size, odour is expected to be very minimal. It is unlikely to be experienced much beyond the farm property. In a rural and agricultural setting, farm-related odours are expected.
- Aside from car exhaust, there are no significant odours from traffic on Water St. S.

Cumulative effects are expected to be negligible, given the small size of the livestock barn in the area and the minimal odour emitted from other agricultural and traffic sources.

The following mitigation measures have been identified in Table 9-1 to minimize odour:

- Apply daily cover to control odour.
- Re-model odour during detailed design and implement any additional mitigation that is identified.
- Continue the updated program to record, investigate, and respond to public complaints (including complaints related to odour) and take corrective actions.

Given that the cumulative effects of odour are expected to be minimal and relatively few complaints have been received in recent years, no additional mitigation is proposed.

9.2.3 Cumulative Effects of Noise

The net effect of noise due to the landfill expansion is minor and within provincial guidelines. Noise levels are expected to be within provincial guidelines at all receptors. However, small increases or decreases may be experienced at a small number of receptors.

From adjacent land uses, the following additional effects to noise are expected:

- Noise is emitted from the operations at SMC. SMC has had operations in the area for nearly a century. Noise from the operations is common and expected in the area.

November 2022

- Farm-related noise is minimal and associated with the operation of farm equipment. Noise from farm equipment is not regulated and is typically well below noise levels set by the province for other industrial uses (i.e., 55 dBA).
- The maximum noise from the current traffic conditions is 50 to 60 dBA.
- The only potential change to adjacent land uses is the possible conversion of the agricultural lands to the south to aggregate extraction. This would add a new noise source to the area. However, in order to obtain permissions and approvals for a new quarry operation, it would need to be demonstrated that the operation could meet provincial noise limits.

Noise is measured on a logarithmic scale and noises from one source do not directly add to noises from another source. For example, a 50 dB source and a 40 dB source do not equal an affect of 90 dBA. The more likely result is a noise level similar to the highest source (i.e., 50 dB or negligibly higher). The maximum noise level from the expanded landfill is 51 dBA. Some nearby noise sources are similar or higher, as in the case of traffic and potentially the SMC operations. Because the landfill is not the loudest source of noise, future conditions will primarily depend on the louder surrounding noise sources with only minimal impact from the landfill.

The following mitigation measures have been identified in Table 9-1 to minimize noise:

- Keep construction equipment well maintained and in good working order.
- Require contractors to ensure construction activities conform to the criteria set out in Noise Pollution Control (NPC) 115 of 83 dB.
- Limit use of equipment to daytime hours and adhere the Town's Noise By-law.
- Continue the updated program to record, investigate, and respond to public complaints (including complaints related to noise) and take corrective actions.

Given that the cumulative effects of noise are expected to be minimal and relatively few complaints have been received in recent years, no additional mitigation is proposed.

9.2.4 Cumulative Effects to Groundwater

The net effects of the landfill expansion on groundwater are minor. There is a slight increased risk of groundwater contamination from the leachate generated at the landfill.

From adjacent land uses, the following additional effects to groundwater are expected:

- SMC operations have altered groundwater flow. The removal of the overburden for the extraction process increases the vulnerability of the underlying aquifers. Both the SMC lands adjacent to the landfill and the Thomas St. Quarry are considered to be High Aquifer Vulnerability Areas due to the lack of protective overburden. This increases the risk on groundwater contamination if contaminants reach the quarry

November 2022

floor. The potential for a future extraction operation in the agricultural field to the south of the landfill could create a new High Aquifer Vulnerability Area during the landfill's lifespan.

- With respect to agricultural operations, effects to groundwater are minimal and related to spills of oil and other farm-related substances. These are typically minor and very localized in nature. Source Water Protection regulations are in effect to minimize effects from agriculture on groundwater and drinking water sources. No significant effects to groundwater are expected from agricultural sources.
- No effects to groundwater are expected from traffic on Water St. S.

There is a low risk of groundwater contamination from leachate or CKD materials. The landfill's updated monitoring program and Adaptive Management Plan addresses effects, should they occur. Any groundwater contamination from the landfill will be identified in monitoring wells and addressed well before it could reach the SMC lands to the north and east or any potential future quarry to the south. Therefore, cumulative effects are expected to be minimal.

The following mitigation measures have been identified in Table 9-1 to minimize effects to groundwater:

- Maintain and operate a functional leachate control system (LCS) to capture leachate for treatment at the Town's wastewater treatment plant (WWTP).
- In the case of a temporary WWTP shut-down or short-term lack of capacity in the system, close the LCS discharge and hold leachate in the landfill until treatment can resume at the WWTP.
- Regularly monitor the site for seepage due to leachate mounding. If a seep occurs that escapes the LCS, follow Spills/Leachate Seep Protocols (refer to Section 9.0 and 11.3), including patching seeps, closing outlets in SWM basins (where escaped leachate will collect) and directing contaminated water from the SWM basins to the LCS.
- Maintain a network of groundwater and surface water monitoring wells/stations and report on findings in Annual Monitoring Reports. Implement Adaptive Management Plan based on monitoring results (refer to Section 11.3).
- As a contingency only, if effects from CKD are observed in the realigned watercourse through the updated Annual Monitoring Program, measures to separate the watercourse from the CKD will be required. This may include a barrier and collector pipe to trap CKD leachate and direct it to the LCS.
- During closure and post-closure, maintain a network of long-term groundwater and surface water monitoring wells/stations and reporting on findings in Annual Post-Operational Monitoring Reports. Implement Adaptive Management measures based on monitoring results (refer to Section 11.3).

November 2022

- Prepare and carry out procedures during post closure including, but not limited to:
 - Operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
 - Record keeping and reporting;
 - Complaint contact and response procedures; and,
 - Assessing the landfill's contaminating lifespan based on results of groundwater monitoring programs.

Given that the cumulative effects to groundwater are expected to be minimal, no additional mitigation is proposed.

9.2.5 Cumulative Effects to Surface Water Quality

The net effects of the landfill expansion on surface water are minor. There is a slight increased risk of surface water contamination from the leachate generated at the landfill and the CKD material.

From adjacent land uses, the following additional effects to surface water are expected:

- Upstream of the landfill, the watercourse runs through the SMC lands. Some sediment from stockpiles materials likely makes its way into the watercourse. Surface water monitoring at the landfill indicates that water quality has been affected by upstream land uses. Water quality is typically similar upstream and downstream of the landfill. This means that the landfill is not contributing significantly to water quality conditions.
- Agricultural operations contribute sediment and pesticide and fertilizer-related chemicals to nearby watercourses. The farms to the south and east of the landfill drain to the watercourse that runs through the landfill property. As noted above, surface water monitoring indicates that the watercourse has been affected by upstream land uses.
- Traffic on Water St. St. has negligible effect on surface water quality.

There is a low risk of surface water contamination from leachate or CKD materials. The landfill's updated monitoring program and Adaptive Management Plan addresses effects, should they occur. Therefore, cumulative effects are expected to be minimal.

The following mitigation measures have been identified in Table 9-1 to minimize effects to surface water quality:

- Install and maintain erosion and sediment control (ESC) measures prior to any earth works and until the site has been stabilized and then remove them.

November 2022

- Inspect ESC measures to confirm they are functioning and are maintained as required. If control measures are not functioning properly, limit work in the area until the problem is resolved.
- Apply wet weather restrictions during site preparation and excavation. Avoid work near watercourses during periods of excessive precipitation and/or excessive snow melt.
- Refuel and maintain construction equipment within designated areas only.
- Handle hazardous materials used for construction in accordance with best practices and O. Reg. 347.
- Store stockpiled material at least 30 m from any waterway to prevent the discharge of deleterious substances into the water.
- Immediately contain and clean up spills or depositions into watercourses in accordance with provincial regulatory requirements and the contingency plan. Keep a hydrocarbon spill response kit on-site at all times during construction.
- Report spills to the Ontario Spills Action Centre at 1-800-268-6060.
- Provide and maintain stormwater control measures to direct, slow and retain water, including:
 - Additional berms against the waste fill area.
 - Stormwater retention ponds/basins.
 - Flow control measures for stormwater management ditches (which may include rip-rap or vegetation).
 - Vegetated buffer areas along waterways.
- As a contingency only, if effects from CKD are observed in the realigned watercourse through the Annual Monitoring Program, measures to separate the watercourse from the CKD will be required. This may include a barrier and collector pipe to trap CKD leachate and direct it to the LCS.

Given that the cumulative effects to surface water are expected to be minimal, no additional mitigation is proposed.

9.2.6 Cumulative Effects to Aquatic Ecology

The net effects of the landfill expansion on aquatic ecology are minor due to watercourse relocation. A low to moderate increase in the risk of water quality impairment is also expected.

November 2022

From adjacent land uses, the following additional effects to aquatic ecology are expected:

- Upstream channels through the SMC lands have been modified and relocated in the past. No new channel realignment on SMC lands is expected in the future. However, upstream reaches of the watercourse are managed as the Sgariglia Municipal Drain. This drain is subject to occasional cleanout which results in physical alteration to aquatic habitat. There is some potential that the drain could be relocated if the agricultural lands to the south are put into aggregate extraction use. None of these physical alterations to the watercourse are likely to occur at the same as the watercourse realignment proposed on the landfill property. No other physical alterations to the watercourse are expected as a result of other adjacent land uses.
- Water quality the watercourse could be affected by adjacent land uses, as described in Section 9.2.5. For reference, potential effects due to adjacent land uses are as follows:
 - Upstream of the landfill, the watercourse runs through the SMC lands. Some sediment from stockpiles materials likely makes its way into the watercourse. Surface water monitoring at the landfill indicates that water quality has been affected by upstream land uses. Water quality is typically similar upstream and downstream of the landfill. This means that the landfill is not contributing significantly to water quality conditions.
 - Agricultural operations contribute sediment and pesticide and fertilizer-related chemicals to nearby watercourses. The farms to the south and east of the landfill drain to the watercourse that runs through the landfill property. As noted above, surface water monitoring indicates that the watercourse has been affected by upstream land uses.
 - Traffic on Water St. St. has negligible effect on surface water quality.

Although several physical alterations to the watercourse are possible in addition to the realignment proposed at the landfill property, all will need to meet UTRCA and DFO requirements, generally with an overall objective to provide a net improvement in aquatic habitat. A such, cumulative effects are expected to be negligible. As noted in Section 9.2.5, cumulative effects associated with surface water quality are also expected to be minimal.

The following mitigation measures have been identified in Table 9-1 to minimize effects to aquatic ecology:

- Design the realigned watercourse using natural channel design principles with an overall result of improved habitat conditions.
- Naturalize all new and remaining riparian areas with tree, shrub and grass plantings to improve riparian habitat and stabilize stream banks.
- Avoid in-water work will occur during June and July.

November 2022

- Capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas. Dewater gradually to reduce the potential for stranding fish
- Conduct in-water undertakings and activities during periods of low water levels
- Screen intake pipes to prevent entrainment or impingement of fish. Use the code of practice for water intake screens
- Limit impacts on riparian vegetation to those approved for the work, undertaking or activity;
 - Limit access to banks or areas adjacent to waterbodies
 - Construct access points and approaches perpendicular to the watercourse or waterbody
 - Re-vegetate the disturbed area with native species suitable for the site
- Restore stream geomorphology (i.e., restore the bed and banks, gradient and contour of the waterbody) to its initial state;
- Avoid introducing sediments (e.g., silts, clays and sand) in the water;
- Develop and implement an erosion and sediment control plan to avoid or minimize the introduction of sediment into any waterbody during all phases of the work, undertaking or activity; and
 - Conduct all in-water works, undertakings or activities in isolation of open or flowing water to reduce the introduction of sediment into the watercourse
 - Monitor the watercourse to observe signs of sedimentation during all phases of the work, undertaking or activity and take corrective action
- Develop and implement a response plan to avoid a spill of deleterious substances.
- As a contingency only, if effects from CKD are observed in the realigned watercourse through the updated Annual Monitoring Program, measures to separate the watercourse from the CKD will be required. This may include a barrier and collector pipe to trap CKD leachate and direct it to the LCS.

No additional mitigation measures are required to address cumulative effects.

9.2.7 Cumulative Effects to Social Conditions

The net effects of the landfill expansion on social conditions are minor and primarily associated with minor increases in odour. There may also be a minor visual effect when the southern tree line is removed. It is noted that this will alter the view from the southern agricultural field only and the current treeline is topographically low-lying, providing only a minor visual block.

From adjacent land uses, the following additional effects to social conditions are expected:

November 2022

- Odour could be affected by adjacent land uses, as described in Section 9.2.2. For reference, potential effects due to adjacent land uses are as follows:
 - There are no significant odour effects associated with aggregate extraction operations.
 - From agricultural processes, odour may be produced from the spread of fertilizers and pesticides. These odours will be experienced infrequently only when fertilizers and pesticides are in use. The small barnyard on 3rd Line may emit manure-related odour. Given its small size, odour is expected to be very minimal. It is unlikely to be experienced much beyond the farm property. In a rural and agricultural setting, farm-related odours are expected.
 - Aside from car exhaust, there are no significant odours from traffic on Water St. S.
 - With regard to potential changes to the view from residences on Water St. S., all visual buffers around SMC properties are expected to be maintained. Should be agricultural field to the south be converted to extraction use in the future, its view of the landfill will become irrelevant. No other changes to the view are expected.

As noted in Section 9.2.2, cumulative effects associated with odour are expected to be minor. No cumulative effects associated with the view from residences on Water St. S. are expected.

The following mitigation measures have been identified in Table 9-1 to minimize effects to social conditions:

- Apply daily cover to control landfill gas emissions, odour, dust, reduce blowing litter and control vermin.
- Continue to operate the landfill within daylight hours only.
- Odour will be re-modeled during detailed design. Any additional mitigation identified at that stage will be implemented.
- Plant a new treeline and visual buffer along the southern property boundary.
- Maintain, repair or re-install all existing visual barriers, such as berms or tree plantings to block sightlines after construction.
- Conduct regular inspections by landfill staff to observe, record any operational issues and implement corrective actions, including:
 - Fence patrol and litter collection.
 - Cover and vegetation inspections.
 - Erect portable litter fencing.
- Continue the existing program to record, investigate, and respond to public complaints and take corrective actions.

November 2022

- Monitor cover placement (application quality and placement schedule) to minimize the attractiveness of the Site to vectors⁷⁰ and vermin⁷¹ as well as larger animals.

No additional mitigation is required to address cumulative effects.

9.2.8 Cumulative Effects to Environmentally and Culturally Significant Features

Environmentally and culturally significant features are those which have been identified as significant by Indigenous communities. Through this EA, the Thames River has been identified as a significant feature. The net effects of the landfill expansion on the Thames River have been identified as minimal and associated only with the minor increased risk of surface water quality impairment.

From adjacent land uses, the following additional effects to the Thames River are expected:

- Upstream of the landfill, the watercourse runs through the SMC lands. Some sediment from stockpiles materials likely makes its way into the watercourse. Surface water monitoring at the landfill indicates that water quality has been affected by upstream land uses. Water quality is typically similar upstream and downstream of the landfill. This means that the landfill is not contributing significantly to water quality conditions.
- Agricultural operations contribute sediment and pesticide and fertilizer-related chemicals to nearby watercourses. The farms to the south and east of the landfill drain to the watercourse that runs through the landfill property. As noted above, surface water monitoring indicates that the watercourse has been affected by upstream land uses.
- Traffic on Water St. St. has negligible effect on surface water quality.

There is a low risk of surface water contamination from leachate or CKD materials. The landfill's updated monitoring program and Adaptive Management Plan addresses effects, should they occur. Therefore, cumulative effects are expected to be minimal.

The following mitigation measures have been identified in Table 9-1 to minimize effects to the Thames River:

- Install and maintain erosion and sediment control (ESC) measures prior to any earth works and until the site has been stabilized and then remove them.

⁷⁰ A *vector* is an organism, such as a mosquito or tick, which carries disease-causing micro-organisms from one host to another.

⁷¹ *Vermin* are various small animals or insects, such as rats, gulls or cockroaches, which are destructive, annoying, or injurious to health.

November 2022

- Inspect ESC measures to confirm they are functioning and are maintained as required. If control measures are not functioning properly, limit work in the area until the problem is resolved.
- Apply wet weather restrictions during site preparation and excavation. Avoid work near watercourses during periods of excessive precipitation and/or excessive snow melt.
- Refuel and maintain construction equipment within designated areas only.
- Handle hazardous materials used for construction in accordance with best practices and O. Reg. 347.
- Store stockpiled material at least 30 m from any waterway to prevent the discharge of deleterious substances into the water.
- Immediately contain and clean up spills or depositions into watercourses in accordance with provincial regulatory requirements and the contingency plan. Keep a hydrocarbon spill response kit on-site at all times during construction.
- Report spills to the Ontario Spills Action Centre at 1-800-268-6060.
- Provide and maintain stormwater control measures to direct, slow and retain water, including:
 - Additional berms against the waste fill area.
 - Stormwater retention ponds/basins.
 - Flow control measures for stormwater management ditches (which may include rip-rap or vegetation).
 - Vegetated buffer areas along waterways.
- As a contingency only, if effects from CKD are observed in the realigned watercourse through the updated Annual Monitoring Program, measures to separate the watercourse from the CKD will be required. This may include a barrier and collector pipe to trap CKD contaminated groundwater and direct it to the LCS.

Given that the cumulative effects to the Thames River are expected to be minimal, no additional mitigation is proposed.

9.2.9 Cumulative Effects Summary

The adjacent aggregate extraction, agricultural operations and traffic on Water St. S. result in some effects to local air quality, odour, noise and ground and surface water quality. When combined with the effects of the landfill, a minor increase in the magnitude of the effects can be expected. Standard operating procedures, described in Table 7-2 and the additional mitigation identified in Table 9-1 are sufficient to address landfill effects and cumulative effects. No additional mitigation is required.

A summary of cumulative effects is provided in Table 9-3.

November 2022

Table 9-3: Cumulative Effects Assessment

Environmental Component	Indicators of Effects on the Environment	Net Effects of the Landfill ⁷²	Potential Effects from Adjacent Land Uses	Cumulative Effect	Need for Additional Mitigation
Air Quality	Changes in air quality due to construction/closure activities	Minor net effects anticipated: M: Minor. All air emissions are within provincial guidelines F: Contaminants and dust will be emitted in a low level on an ongoing basis. D: Emissions are expected through the construction, operation and closure phases of the landfill. R: Air quality effects are reversible but only after landfill closure.	Aggregate Extraction: Aggregate extraction operations emit dust and products of combustion (i.e., vehicle exhaust). The aggregate processing plant adjacent to the landfill may contribute additional products of combustion. Agricultural Activities: Dust may be emitted during ploughing/tilling and harvesting. Products of combustion from farm vehicle and equipment exhaust are expected to be minimal. Traffic: Traffic on Water St. S. emits contaminants associated with vehicle exhaust.	Background air quality conditions from the provincial air quality monitoring network station in London were added to the landfill emissions modelled for the Undertaking. When background conditions were included, all contaminants were below 70% of the provincial limit when combined, with the exception of particulate matter, which was slightly higher than the provincial limit. It is likely that the London monitoring station underrepresents the background dust in the Study Area Vicinity. Therefore, it is assumed that particulate matter (dust) in the Study Area Vicinity will be higher than provincial limits as a result of the cumulative effects of the landfill, SMC operations and agricultural activities. This modelling is described in greater detail in the Landfill Expansion Emission Summary and Dispersion Modelling Report provided in Volume III, Appendix A.	No additional mitigation is required. The Town will commit to reviewing and updating dust suppressant procedures should dust concerns become apparent i.e., if complaints rise significantly.
	Changes in air quality due to landfill operations				
Odour	Number of Receptors Potentially Impacted by Odour	Minor net effects anticipated:	Aggregate Extraction: There are no odour effects associated with aggregate extraction operations. Agricultural Activities: Odour may be produced from the spread of fertilizers and pesticides. These odours will be experienced infrequently only when fertilizers and pesticides are in use. The small barnyard on 3rd Line may emit manure-related odour. Given its small size, odour is expected to be very minimal. It is unlikely to be experienced much beyond the farm property. Traffic: Aside from car exhaust, there are no significant odours from traffic on Water St. S.	Cumulative effects are expected to be negligible, given the small size of the livestock barn in the area and the minimal odour emitted from other sources.	No additional mitigation is required.
	Frequency of odour impacts				

⁷² M= Magnitude, D= Duration, F= Frequency, R= Reversibility

November 2022

Environmental Component	Indicators of Effects on the Environment	Net Effects of the Landfill ⁷²	Potential Effects from Adjacent Land Uses	Cumulative Effect	Need for Additional Mitigation
		<p>M: Minor – Effect is expected to be low and only slightly higher than existing conditions.</p> <p>F: Infrequent – Odour effects are expected infrequently but potentially more often than other Alternatives at two receptors.</p> <p>D: Long-Term – Odour effects will be experienced over the life of the landfill.</p> <p>R: Reversible – Odour effects are reversible once the landfill has closed.</p>			
<p>Noise</p>	<p>Noise levels at receptors as a result of construction/ closure activities</p> <p>Number of receptors experiencing noise above provincial limit during landfill operations</p> <p>Number of receptors experiencing a change in noise level during landfill operations</p>	<p>Net effect is minor and within provincial guidelines.</p> <p>M: Minor. All noise is within provincial guidelines at all receptors. However, small increases or decreases may be experienced at a small number of receptors.</p> <p>F: Noise will be ongoing during operational hours.</p> <p>D: Noise is expected through the construction, operation and closure phases of the landfill.</p> <p>R: Noise effects are reversible but only after landfill closure.</p>	<p>Aggregate Extraction: Noise is emitted from the operations at SMC. SMC will be required to meet provincial noise limits.</p> <p>Agricultural Activities: Farm-related noise is minimal and associated with the operation of farm equipment.</p> <p>Traffic: The maximum noise from the current traffic conditions is 50 to 60 dBA, higher than noise expected from the landfill operations</p>	<p>The maximum noise level from the expanded landfill is 51 dBA. All other surrounding noises are 55 dBA or slightly higher, as in the case of traffic. Therefore, future conditions are expected to be approximately 55 dBA or slightly higher and cumulative effects are minimal.</p>	<p>No additional mitigation is required.</p>

November 2022

Environmental Component	Indicators of Effects on the Environment	Net Effects of the Landfill ⁷²	Potential Effects from Adjacent Land Uses	Cumulative Effect	Need for Additional Mitigation
Hydrogeology	<p>Risk of Increasing Leachate Generation and Strength</p> <p>Risk of impacting groundwater</p> <p>Risk of altering groundwater flow</p>	<p>Minor net effects anticipated:</p> <p>M: Minor increase in risk of effects after mitigation.</p> <p>D: Groundwater effects would persist for the contaminating lifespan of the site controlled by the continued operation of the LCS.</p> <p>F: Leachate generation and risk of groundwater impact is continuous over life of landfill.</p> <p>R: Effects to groundwater are reversible in the long-term as leachate strength and quantity diminish when the landfill closes or when any leakages are resolved.</p>	<p>Aggregate Extraction: SMC operations have altered groundwater flow. The removal of the overburden for the extraction process increases the vulnerability of the underlying aquifers. Both the SMC lands adjacent to the landfill and the Thomas St. Quarry are considered to be High Aquifer Vulnerability Areas due to the lack of protective overburden. The potential for a future extraction operation in the agricultural field to the south of the landfill could create a new High Aquifer Vulnerability Area.</p> <p>Agricultural Activities: effects to groundwater are minimal and related to spills of oil and other farm-related substances. These are typically minor and very localized in nature. Source Water Protection regulations are in effect.</p> <p>Traffic: No significant effects to groundwater are expected from traffic on Water St. S.</p>	<p>There is a low risk of groundwater contamination from leachate or CKD materials. The landfill's updated monitoring program and Adaptive Management Plan addresses effects, should they occur. Any groundwater contamination from the landfill will be identified in monitoring wells and addressed well before it could reach the SMC lands to the north and east or any potential future quarry to the south.</p> <p>No significant cumulative effects are expected.</p>	<p>No additional mitigation is required.</p>
Surface Water Quality	<p>Risk of contaminated runoff reaching surface water</p> <p>Risk of leachate from seeps reaching surface water</p> <p>Risk of leachate from CKD pile reaching surface water</p> <p>Risk of on-site surface water quality impacting Thames River</p>	<p>Minor net effects anticipated:</p>	<p>Aggregate Extraction: Upstream of the landfill, the watercourse runs through the SMC lands. Some sediment from stockpiles materials likely makes their way into the watercourse. Surface water monitoring indicates that the watercourse has been affected by upstream land uses.</p> <p>Agricultural Activities: Agricultural operations contribute sediment and pesticide and fertilizer-related chemicals to the watercourse.</p> <p>Traffic: Traffic on Water St. St. has negligible effect on surface water quality.</p>	<p>Water quality in the watercourse is degraded as a result of the upstream agricultural and aggregate extraction operations. Surface water quality monitoring has indicated that water quality is typically similar upstream and downstream of the landfill. This means that the landfill is not contributing significantly to water quality conditions.</p> <p>There is a low risk of contamination from leachate or CKD materials. The landfill's updated monitoring program and Adaptive Management Plan addresses effects, should they occur.</p> <p>No significant cumulative effects are expected.</p>	<p>No additional mitigation is required.</p>

November 2022

Environmental Component	Indicators of Effects on the Environment	Net Effects of the Landfill ⁷²	Potential Effects from Adjacent Land Uses	Cumulative Effect	Need for Additional Mitigation
		<p>M: Low risk of effect with mitigation and monitoring</p> <p>D: Surface water effects would gradually change during construction/operation and decline through the contaminating lifespan.</p> <p>F: Risk of surface water impact is continuous over life of landfill.</p> <p>R: Effects to surface water are reversible in the long-term as leachate strength and quantity diminish when the landfill closes or when any leakages are resolved.</p>			

November 2022

Environmental Component	Indicators of Effects on the Environment	Net Effects of the Landfill ⁷²	Potential Effects from Adjacent Land Uses	Cumulative Effect	Need for Additional Mitigation
<p>Aquatic Ecology</p>	<p>Impact to Aquatic Habitat</p>	<p>Net effects due to water quality impairment only. Effects due to realignment of watercourse can be mitigated.</p> <p>M: Low risk of effect with mitigation and monitoring</p> <p>D: Surface water effects would gradually change during construction/operation and decline through the contaminating lifespan.</p> <p>F: Risk of surface water impact is continuous over life of landfill.</p> <p>R: Effects to surface water are reversible in the long-term as leachate strength and quantity diminish when the landfill closes or when any leakages are resolved.</p>	<p>Aggregate Extraction:</p> <p>Upstream of the landfill, the watercourse runs through the SMC lands. Some sediment from stockpiles materials likely makes their way into the watercourse. Surface water monitoring indicates that the watercourse has been affected by upstream land uses.</p> <p>There is some potential that the section of the watercourse south and east of the landfill could be relocated if the agricultural lands to the south are put into aggregate extraction use.</p> <p>Agricultural Activities:</p> <p>Upstream reaches of the watercourse are managed as the Sgariglia Municipal Drain. This drain is subject to occasional cleanout which results in physical alteration to aquatic habitat.</p> <p>Traffic:</p> <p>Traffic on Water St. St. has negligible effect on surface water quality.</p>	<p>Several physical alterations to the watercourse are possible in addition to the realignment proposed at the landfill property, all will need to meet UTRCA and DFO requirements, generally with an overall objective to provide a net improvement in aquatic habitat. A such, cumulative effects are expected to be negligible.</p> <p>Cumulative effects associated with surface water quality are also expected to be minimal.</p>	<p>No additional mitigation is required.</p>

November 2022

Environmental Component	Indicators of Effects on the Environment	Net Effects of the Landfill ⁷²	Potential Effects from Adjacent Land Uses	Cumulative Effect	Need for Additional Mitigation
<p>Social Conditions</p>	<p>Potential impacts to enjoyment of life and private property associated with the residences along Water St. S.</p>	<p>Net effects are minor and due to odour only. Other nuisance effects can be mitigated through standard operating procedures.</p> <p>M: Minor – Odour effects are expected to be low and only slightly higher than existing conditions. Visual effect is minor as only the view from the south will be affected and the current treeline is topographically low-lying.</p> <p>F: Infrequent – Odour effects are expected infrequently but potentially more often than other Alternatives at two receptors. Existing visual break will be removed once.</p> <p>D: Long-Term – Odour effects will be experienced over the life of the landfill. The visual impact will be experienced short-term until the new trees have matured.</p> <p>R: Reversible – Odour effects are reversible once the landfill has closed. Changes to the view are reversible with a newly planted visual break.</p>	<p>Aggregate Extraction:</p> <p>There are no odour effects associated with aggregate extraction operations.</p> <p>All visual buffers around SMC properties are expected to be maintained. Should be agricultural field to the south be converted to extraction use in the future, its view of the landfill will become irrelevant.</p> <p>Agricultural Activities:</p> <p>Odour may be produced from the spread of fertilizers and pesticides. These odours will be experienced infrequently only when fertilizers and pesticides are in use. The small barnyard on 3rd Line may emit manure-related odour. Given its small size, odour is expected to be very minimal. It is unlikely to be experienced much beyond the farm property.</p> <p>Traffic:</p> <p>Aside from car exhaust, there are no significant odours from traffic on Water St. S.</p>	<p>Cumulative effects are expected to be negligible, given the small size of the livestock barn in the area and the minimal odour emitted from other agricultural sources.</p> <p>No cumulative effects associated with the view from residences on Water St. S. are expected.</p>	<p>No additional mitigation is required.</p>

November 2022

Environmental Component	Indicators of Effects on the Environment	Net Effects of the Landfill ⁷²	Potential Effects from Adjacent Land Uses	Cumulative Effect	Need for Additional Mitigation
<p>Indigenous Communities</p>	<p>Impacts to culturally or environmentally significant features</p>	<p>Low risk of net effect anticipated.</p> <p>M: Low risk of effect with mitigation and monitoring</p> <p>D: Surface water effects would gradually change during construction/operation and decline through the contaminating lifespan.</p> <p>F: Risk of surface water impact is continuous over life of landfill.</p> <p>R: Effects to surface water are reversible in the long-term as leachate strength and quantity diminish when the landfill closes or when any leakages are resolved.</p>	<p>Aggregate Extraction:</p> <p>Upstream of the landfill, the watercourse runs through the SMC lands. Some sediment from stockpiles materials likely makes their way into the watercourse. Surface water monitoring indicates that the watercourse has been affected by upstream land uses.</p> <p>Agricultural Activities:</p> <p>Agricultural operations contribute sediment and pesticide and fertilizer-related chemicals to the watercourse.</p> <p>Traffic:</p> <p>Traffic on Water St. St. has negligible effect on surface water quality in the Thames River.</p>	<p>There is a low risk of contamination from leachate or CKD materials reaching the Thames River. The landfill's updated monitoring program and Adaptive Management Plan addresses effects, should they occur.</p> <p>No significant cumulative effects are expected.</p>	<p>No additional mitigation is required.</p>

November 2022

10.0 Consultation Summary

Consultation with potentially affected and other interested parties is a key component of the Environmental Assessment process (MOE, 2008). A plan for consultation during the preparation of the EA was provided in the approved TOR and completed in accordance with Section 4.3.1 of the *Code of Practice – Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (MOE, October 2009⁷³).

In accordance with Section 4.3.7 of the *Code of Practice – Preparing and Reviewing Environmental Assessments in Ontario* (MOE, January 2014) the Record of Consultation is to include information about the consultation process and consultation activities that took place including methods, schedule of events, notification that was given about the activities and the materials used.

The following sections offer a brief list of contacted parties and key notifications and opportunities for consultation presented at various project milestones. Comments and how they were considered and addressed in the EA are summarized herein. Details and copies of all correspondence are included in the Record of Consultation Report (Volume IV).

10.1 Project Contact List

A Project Contact List was developed and included:

- Various agencies with an approval or jurisdictional relevance to the project;
- Various stakeholder groups and organizations with potential interest in the project;
- Utilities with infrastructure in the vicinity; and,
- Fifty-two landowners with property within 1km of the existing landfill site.

The list also included Indigenous communities and organizations associated with Treaty 29 (1827). The modern signatories to this treaty are:

- Aamjiwnaang First Nation (formerly Chippewas of Sarnia First Nation);
- Caldwell First Nation;
- Chippewas of Kettle & Stoney Point;
- Chippewas of the Thames First Nation; and
- Walpole Island First Nation.

⁷³ The *Code of Practice - Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* was updated in January 2014, following submission of the TOR for this Project.

November 2022

The Haudenosaunee Development Institute (representing the Haudenosaunee Confederacy) and Six Nations of the Grand River also have an interest in the Site due to its location within the area covered by the Nanfan Treaty.

The Indigenous communities listed above are believed to have Indigenous Rights, Treaty Rights, or both, affecting the subject property. However, this list may not be exhaustive.

The Project Contact List is provided in the Consultation Record, Vol IV, Appendix A.

10.2 Project Notices

Project Notices were published at the following project milestones:

- Notice of Acceptance of the Terms of Reference and Commencement of the EA (February 9, 2015);
- Notice of Public Information Centre (PIC) #1 (July 27, 2015);
- Notice of PIC #2 (May 25, 2016);
- Notice of first Draft EA for Inspection (July 5, 2017);
- Notice of revised Draft EA for Inspection (February 26, 2021); and
- Notice of Submission of the EA (August 5, 2021).

Each Notice was published in two consecutive editions (weeks), respectively, of the the following newspapers:

St. Marys Journal Argus⁷⁴
74 115 Queen Street
St. Marys, ON
Phone: (519) 284-2440

St. Marys Independent
36 Water Street
St. Marys, ON
Phone: (519) 284-0041

Copies of all Notices were emailed/mailed to all contacts on the Project Contact List. Copy of the Project Contact List and Project Notices are provided in Volume IV, Appendix K.

10.3 Public Consultation

10.3.1 Public Information Centres

Two Public Information Centres (PICs) were held at key milestones, as shown in Table 10-1.

⁷⁴ The St. Marys Journal Argus ceased publishing in November 2017. After that date, Notices were only published in the St. Marys Independent.

November 2022

Table 10-1: Public Information Centres

PIC	Timing
PIC #1	Upon completion of the draft evaluation of <i>Alternatives to the Undertaking</i> , held August 26, 2015.
PIC #2	Upon completion of draft evaluation of <i>Alternative Methods to the Undertaking</i> , held June 23, 2016.

All PICs were conducted in a drop-in format and knowledgeable staff were on hand to answer questions. Materials included are as follows:

- A series of display boards describing the EA process and work conducted to date.
- Sign-in sheets to document participation.
- Comment sheets to allow participants to submit comments.
- Copies of draft documents and supplementary information available for review.

Documentation related to PIC #1 is provided in the Record of Consultation, Vol IV, Appendix B. Documentation related to PIC #2 are provided in the Record of Consultation, Vol IV, Appendix C.

10.3.2 Project Information Posted to the Town’s Website

Project information, including Notices, Work Plans and draft documents were posted to the Town’s website: <https://www.townofstmarys.com/en/living-here/Landfill-Environmental-Assessment.aspx>.

10.3.3 Review of Draft Documents

Early in the EA process, Work Plans were created to provide a detailed framework for the technical studies to be completed. The following Work Plans were created:

- Air Quality, Noise and Vibration Work Plan;
- Hydrogeological Work Plan;
- Ecological Work Plan;
- Archaeological and Cultural Heritage Work Plan; and
- Socio-economic Work Plan.

Work Plans provided a detailed methodology for characterizing each component of the environment and how the evaluation would be carried out. Work Plans were available for public review during PIC #1 and were placed on the Town’s website.

Work Plans are provided in Volume II, Appendices A through E.

November 2022

A draft EA document was also shared with the public for a five-week period in July of 2017. The document was placed on the Town's website and notification was provided via a newspaper notice, as described in Section 10.2.

A Final Report was developed and submitted to the Ministry of the Environment, Conservation and Parks and made available for public comment from August 13 - October 1, 2021.

10.3.4 Summary of Public Comments

A summary of comments received from adjacent landowners and other members of the public is provided in Table 10-2. Most comments were made verbally during the PICs. One written comment sheet was received. Comments were made by neighbouring landowners and generally related to quality-of-life issues including dust, odour, traffic, and drinking water.

Details and copies of all correspondence are included in the Record of Consultation Report (Volume IV, Appendices B and C).