



Public Information Session 4

Twin Creeks Environmental
Centre Landfill Optimization
Project Environmental
Assessment

November 19, 2025





Welcome

Public Information Session 4 is being held to present:

- An **update** on the Environmental Assessment (EA)
- The **Preferred Alternative** for the vertical expansion
- The **effects assessment of the Preferred Alternative**
- An **overview of the Draft Environmental Assessment Study Report**
- **Next steps** in the EA Process

WM staff and consultants are available to answer your questions



Site Overview



Twin Creeks Environmental Centre Overview

Year Opened
1972

First Year Operated by WM
1996

Projected Life Remaining
~6 years

Total Area
301 ha

Permitted Landfill Footprint
101.8 ha

Approved Capacity
~26.5M m³

Remaining Capacity
~8.9M m³

Annual Fill Rate
1.4M tonnes/year

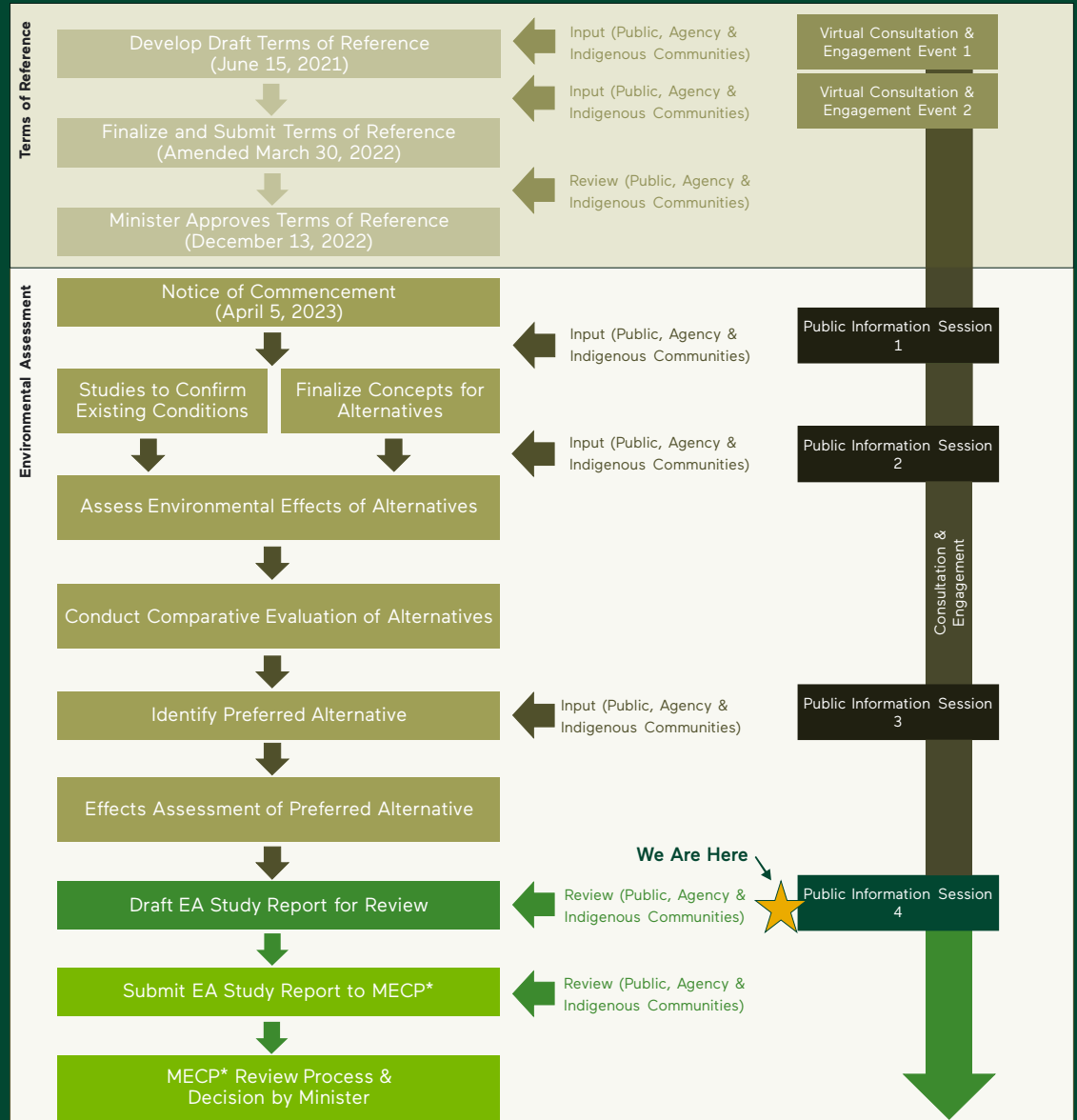
Environmental Assessment Update

The Environmental Assessment (EA) is being carried out according to the approved Terms of Reference and the requirements of the Ontario Environmental Assessment Act.

A Preferred Alternative for a vertical landfill expansion has been assessed in the EA.

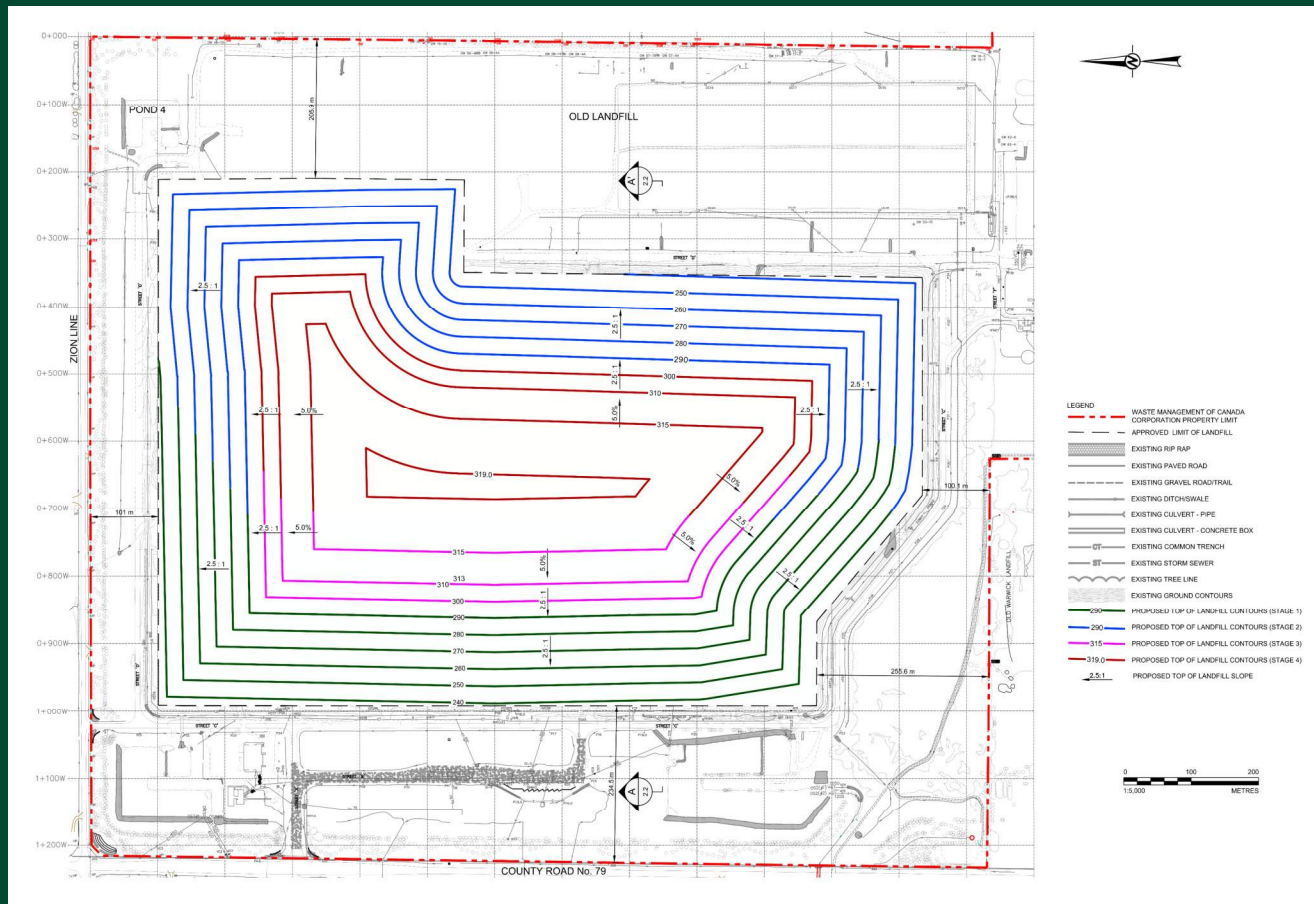
The effects of the Preferred Alternative have been assessed and documented in the Draft EA Study Report. The Draft EA Study Report will be available for public review from November 19, 2025 to January 30, 2026.

The next step will be to review public input on the Draft EA Study Report and develop the Final EA Study Report.

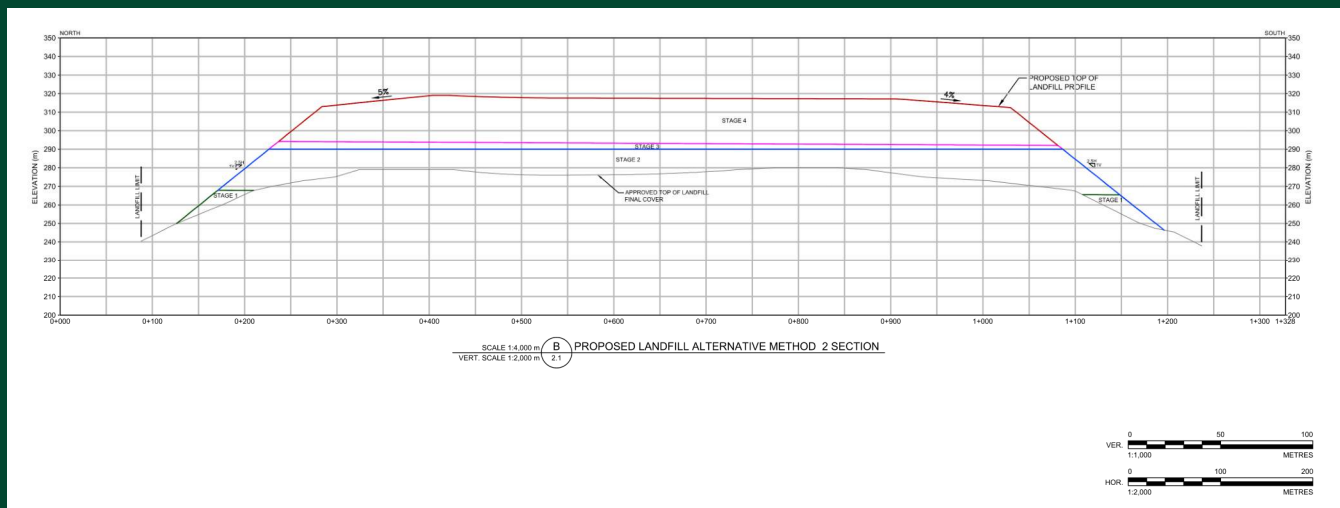
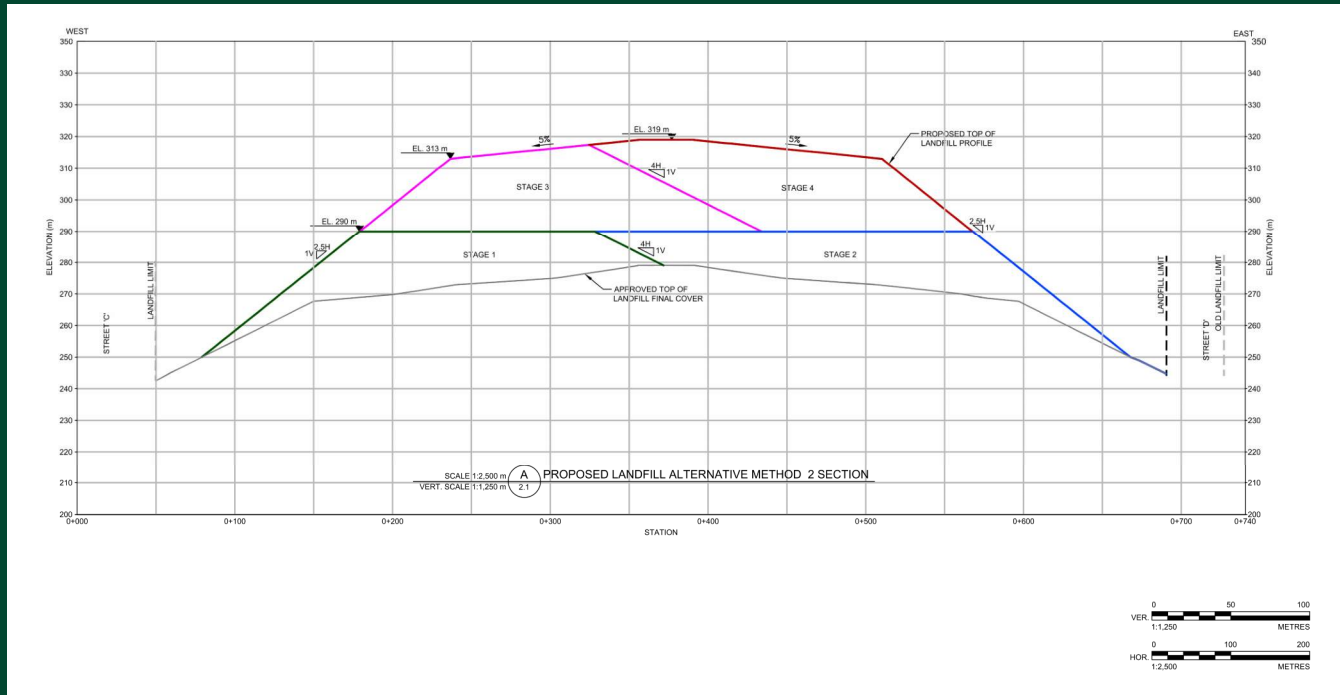


Preferred Alternative

- Capacity of 14.3 million m³
- 12 years of operation
- 4 stages
- Maximum height = 319 masl
- 39 m higher than approved Expansion Landfill (280 masl)
- Increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 310 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope



Preferred Alternative – Cross-Sections



Air Quality Effects Assessment

Three Scenarios Assessed

1

End of Stage 1 (2034)
Working face in
northwest corner

2

End of Stage 2 (2037)
Working face in
northeast corner

3

End of Stage 4 (2042)
Final year before
closure, maximum waste

Dust

Concentrations of **annual TSP**, **annual PM_{2.5}**, and **24-hour PM_{2.5}** were predicted **< criteria for all Scenarios**.

Concentrations of **24-hour TSP** and **24-hour PM₁₀** were predicted **> criteria for all Scenarios**.

24-hour TSP (criteria 120 µg/m³)



Maximum concentration
range across scenarios:
172 µg/m³ to 281 µg/m³



Maximum frequency
range across scenarios:
0.5% (~2 days/year) to
2.2% (~8 days/year) at
R4



Number of receptors
affected across
scenarios:
Between 3 and 9

24-hour PM₁₀ (criteria 50 µg/m³)



Maximum concentration
range across scenarios:
67 µg/m³ to 100 µg/m³



Maximum frequency
range across scenarios:
0.4% (~1.5 days/year)
to 1.3% (~5 days/year)
at R4



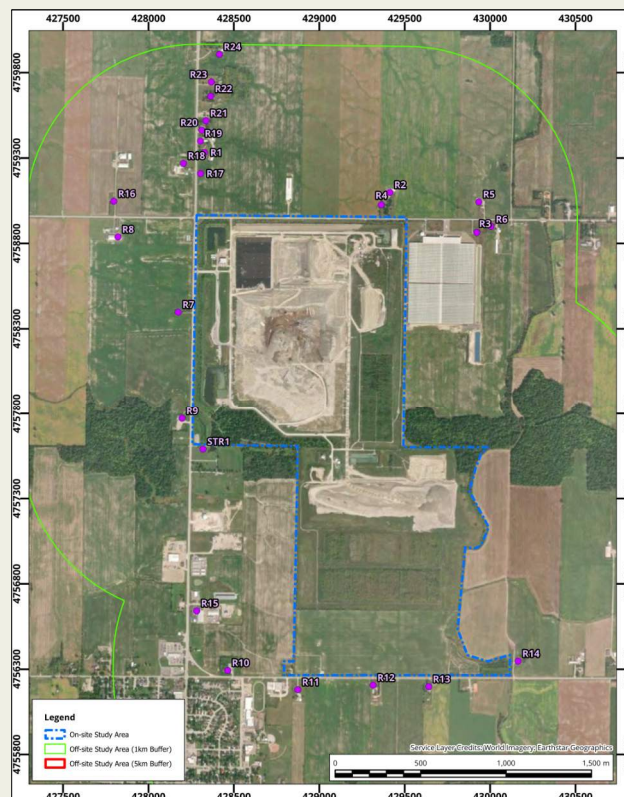
Number of receptors
affected across
scenarios:
3

Mitigation:

- Replace existing south haul ramp with a hard material equivalent to a paved surface.
- Implement enhanced watering protocols for paved roadways to achieve 95% control.
- Update and continue implementation of the Dust Best Management Practices Plan (BMPP).

Monitoring:

- Dust monitoring will continue as per Condition 13.8 of Waste ECA A032203.



Air Quality
Receptor Locations

Air Quality Effects Assessment

Landfill Gas and Combustion By-Products

Concentrations of **benzene, vinyl chloride, 1,2-dichloroethane, ammonia, SO₂, NO_x, Dioxins & Furans, and 24-hour H₂S** were predicted **< criteria for all Scenarios** with background included.

Concentrations of **10-min H₂S, 10-min TRS, and 24-hour TRS** were predicted **> criteria for all Scenarios** with background included.

Elevated concentrations result from high background concentrations generated by off-site sources, and landfill operations have very little contribution.

10-min H₂S (criteria 13 µg/m³)



Maximum concentration from landfill operations: 0.76 µg/m³

10-min TRS (criteria 13 µg/m³)



Maximum concentration from landfill operations: 1.15 µg/m³

24-hour TRS (criteria 7 µg/m³)



Maximum concentration from landfill operations: 0.11 µg/m³ to 0.16 µg/m³

No net effects identified:

- Changes in predicted concentrations will be minimal.
- No frequency of exceedance at receptors due to landfill operations.
- No receptors with predicted concentrations exceeding criteria due to landfill operations.

Monitoring:

- Hydrocarbon and VOC monitoring will continue as per Condition 13.8 of Waste ECA A032203.

Blowing Litter

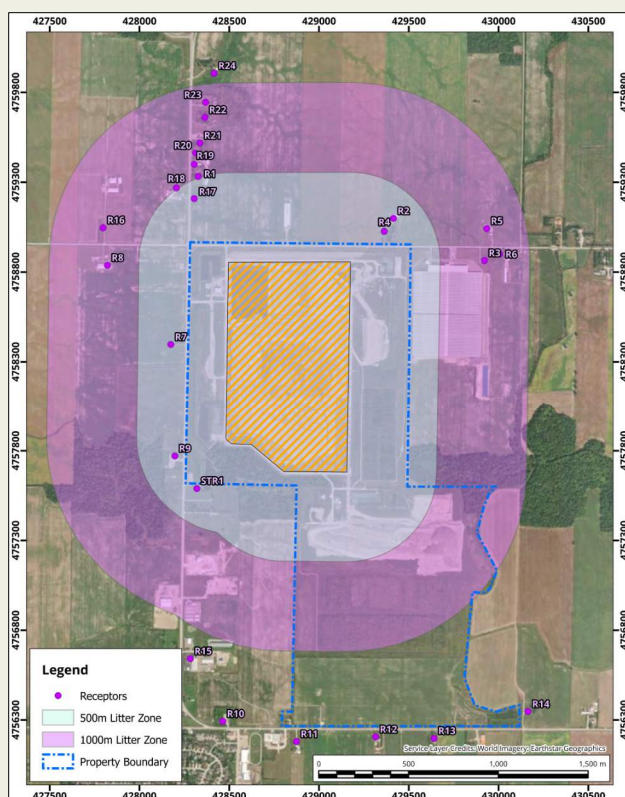


No net effects identified:

- No changes to litter zones.
- No changes to number of off-site receptors within litter zones.

Mitigation:

- Continued implementation of the Litter BMPP.



Litter Zones

Odour Effects Assessment

Odour Concentration Levels

Odour is measured in odour units per cubic metre (OU/m³).

MECP: odour < **1 OU/m³** acceptable at receptors if frequency is < **0.5%** of the time.

1

Detection
Threshold

3

Recognition
Threshold

5

Annoyance
Threshold

Three Scenarios Assessed

1

End of Stage 1 (2034)

Working face in
northwest corner

2

End of Stage 2 (2037)

Working face in
northeast corner

3

End of Stage 4 (2042)

Final year before
closure, maximum waste

Scenario ①



Maximum concentration:
> 1 OU/m³ at all receptors
> 3 OU/m³ at 8 receptors
➤ 5 OU/m³



Maximum frequency:
> 1 OU/m³: maximum
2.9% (~252 hr/yr) at R7
> 3 OU/m³: maximum
0.1% (~10 hr/yr) at R4



Number of receptors
affected:
> 1 OU/m³ >0.5% of the
time: 19
> 3 OU/m³: 8

Scenario ②



Maximum concentration:
> 1 OU/m³ at all receptors
> 3 OU/m³ at 2 receptors
➤ 5 OU/m³



Maximum frequency:
> 1 OU/m³: maximum
1.6% (~141 hr/yr) at R7
> 3 OU/m³: maximum
0.009% (~0.8 hr/yr) at
R4



Number of receptors
affected:
> 1 OU/m³ >0.5% of the
time: 12
> 3 OU/m³: 2

Scenario ③



Maximum concentration:
> 1 OU/m³ at all receptors
> 3 OU/m³ at 1 receptor
➤ 5 OU/m³



Maximum frequency:
> 1 OU/m³: maximum
0.4% (~38 hr/yr) at R4
> 3 OU/m³: maximum
0.002% (~0.2 hr/yr) at
R4



Number of receptors
affected:
> 1 OU/m³ >0.5% of the
time: none
> 3 OU/m³: 1

Predicted concentrations, frequency of exceedance at receptors, and number of affected receptors are expected to be similar to the approved Expansion Landfill and decrease over the life of the Project as final cover is applied.

Mitigation:

- Continued implementation of the Odour BMPP.

Noise Effects Assessment

Three Stages Assessed

1

Stage 1

- Typical landfilling lower elevation
- Side slope redevelopment
- Typical landfilling upper elevation

2

Stage 2

- Typical landfilling lower elevation
- Side slope redevelopment
- Typical landfilling upper elevation

3

Stage 3

- Typical landfilling



No net effects identified:

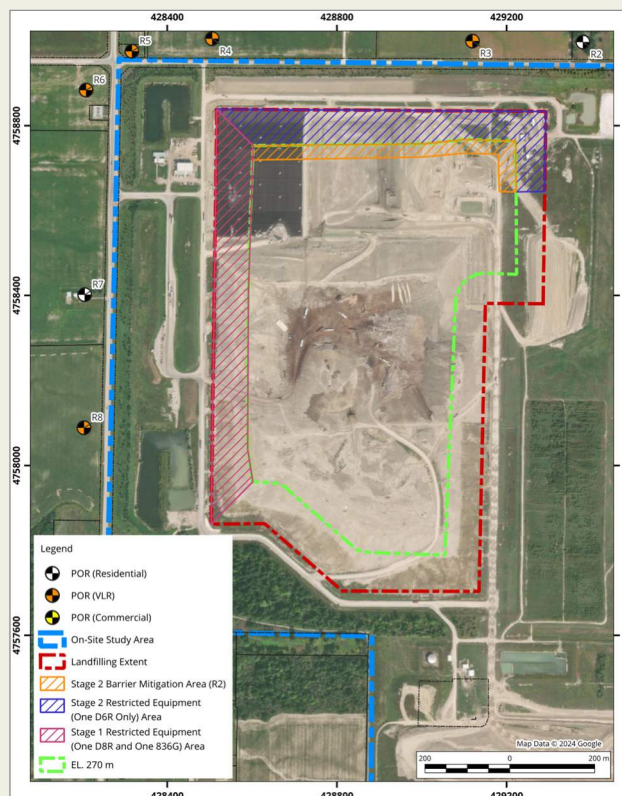
- Noise levels will meet applicable landfilling noise guidelines during daytime hours, with the implementation of the identified mitigation measures.
- Changes in sound levels were qualitatively rated as insignificant (≤ 3 dB).

Mitigation:

- Limit the number of active equipment near the perimeter of the landfill when developing the side slopes in proximity to receptors R2 and R7.
- Implement operational berms (3 m in height) along the northern edge of the 270 m elevation during Stage 2.

Monitoring:

- Annual (once per year) acoustic audits at receptor locations R2 and R7 during the development of Stages 1 and 2.
- Conduct an acoustic audit when landfilling operations trigger a mitigation requirement.
- Annual compliance monitoring will verify that the Landfilling Noise Guidelines are being met.



Stage 1 and 2 Mitigation Areas

Hydrogeology Effects Assessment

The design of the Expansion Landfill is hydraulic containment, which promotes groundwater flow towards the landfill footprint, preventing the outward movement of leachate.

Groundwater Quality

The Preferred Alternative will generate a greater volume of leachate (3% more) than the approved Expansion Landfill.



No net effects on Groundwater Quality on-site or off-site from the increased waste quantity. Hydraulic containment will be maintained as required under the Waste and Sewage ECAs.



Contaminating Lifespan (CLS) **increased by 61 years**, from 102 years for the approved Expansion Landfill to 163 years post-closure.

The contaminating lifespan (CLS) is the duration of time in the future when the leachate could no longer negatively affect surface water quality.

Mitigation:

- Continuation of leachate management practices and continued monitoring of Groundwater Quality in accordance with the Waste and Sewage ECAs.

Monitoring:

- Groundwater Quality monitoring (e.g., analytical testing for leachate and groundwater) will continue at established groundwater and leachate monitoring locations in accordance with the relevant conditions of the Waste and Sewage ECAs.
- Groundwater environmental monitoring programs will continue into the CLS of the Expansion Landfill.

Groundwater Quantity



No net effect on Groundwater Quantity and flow on-site or off-site. Hydraulic containment will be maintained as required under the Waste and Sewage ECAs.

Mitigation:

- Continuation of leachate management practices and continued monitoring of Groundwater Quality in accordance with the Waste and Sewage ECAs.

Monitoring:

- Groundwater Quantity monitoring (e.g., liquid levels for both leachate and groundwater) will continue in accordance with the relevant conditions of the Waste and Sewage ECAs.

Surface Water Quality Effects Assessment

Erosion



No net effects to Surface Water Quality on-site (prior to off-site discharge) from erosion (Total Suspended Solids [TSS] and heavy metal concentrations):

- The risk for impacts to Surface Water Quality due to erosional effects will be effectively managed through the mitigation measures.

Mitigation:

- Continue to operate and monitor Surface Water Quality in accordance with the Waste and Sewage ECAs.
- Install/maintain sediment control measures at various locations within the surface water drainage network.
- Supplement the northern component of the drainage network with erosion control measures as the landfill expands north prior to initiating the Project.
- Complete as-required sediment removal where sediment builds up in the surface water drainage network.
- Place topsoil and seed over areas of the Expansion Landfill side slopes completed with interim cover, where appropriate.
- Inspect areas of soil stockpiling for erosion and install erosion control measures where necessary.

Leachate Seeps



No net effects to Surface Water Quality on-site (prior to off-site discharge) from leachate seeps:

- No expected net effect to Surface Water Quality from leachate impacts with the implementation of a seepage monitoring and repair program.

Mitigation:

- Continue to operate and monitor Surface Water Quality in accordance with the Waste and Sewage ECAs.
- Conduct seep repairs immediately and, if possible, prior to seepage entering and/or running off landfill sideslopes and into the surface water drainage network.
- Carry out routine inspections (e.g., monthly during post-closure) of the landfill surface to provide sufficient frequency to identify and address leachate seepage.

Automobile Shredder Residue (ASR) in Roadside Ditch



No net effects to Surface Water Quality:

- No expected net effect to Surface Water Quality from ASR track out with continued mitigation.

Mitigation:

- Continue to implement a rigorous routine inspection and cleanup of ASR track out. On-site and off-site ASR cleanup efforts are completed as needed.

Monitoring:

- Routine and verification monitoring to be completed at established surface water monitoring stations for the following Surface Water Quality monitoring programs in accordance with the Waste and Sewage ECAs:
 - Compliance
 - Poplar System
 - Poplar Plantation
 - Compost and Waste Diversion Area



Surface Water Quantity Effects Assessment



Effects modelled using 100-year 4-hour Chicago Storm

Runoff Volumes and Peak Flows

No changes in **total runoff volumes** from the landfill site.

All four Stormwater Management Ponds have enough **capacity** to store the 100-year flows and do not require alteration or enlargement.

Changes in peak flows only predicted **at four of ten outlets**.



Net effects:

- Up to 10% increase in peak flows.
 - Outlet A: ↑ 7%
 - Outlet B: ↓ 4%
 - Outlet C: ↓ 19%
 - Outlet G: ↑ 10%

Drainage Areas

No changes in **off-site drainage areas**.

No changes to the **Stormwater Management Ponds**, existing **swales**, or **Catchments D, E, F, H, I, and J**.



Net effects:

- Changes in catchment areas of between -22% and 34% within the landfill optimization area.
 - Catchment AB: ↑ 3.8%
 - Catchment C1A: ↑ 0.8%
 - Catchment C1B: ↓ 22.4%
 - Catchment G1B: ↓ 12.7%
 - Catchment G3A: ↑ 34.0%
 - Catchment G4A: ↑ 0.9%

Off-site Surface Water Flows

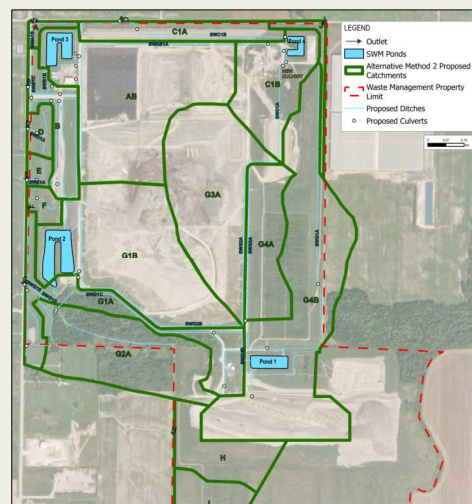


Net effects:

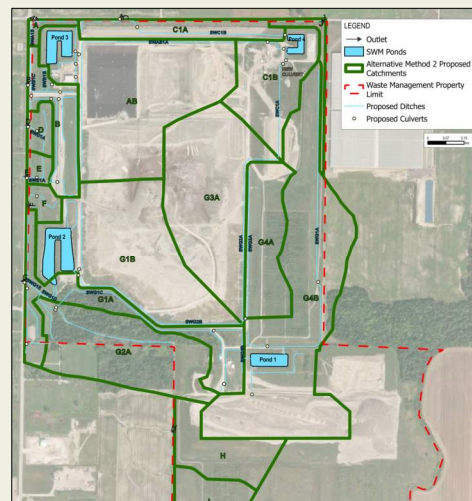
- Increase in peak flows of up to 10%.
 - Outlet A: flow < 1 m³/s → Auld-Redmond Drain
 - Outlet B: flow < 1 m³/s → Gilliland-Geerts Drain
 - Outlet C: flow < 1 m³/s → Auld-Redmond Drain
 - Outlet G: flow < 1.8 m³/s → Gilliland-Geerts Drain

Monitoring:

- Annually during current site inspection program for surface water in accordance with the Waste and Sewage ECAs.



Stormwater Management System – Approved



Stormwater Management System – Preferred Alternative

Human Health Effects Assessment

Changes from 2005 Human Health Risk Assessment (HHRA)

One new COC flagged as a potential risk based on the modelled emissions for the 2005 HHRA: The inhalation risk estimate for Hydrogen Sulphide (H_2S) increased because the regulatory value (24-hour AAQC) changed from $150 \mu\text{g}/\text{m}^3$ to $7 \mu\text{g}/\text{m}^3$.



Measured concentrations of benzene, 1,2-dichloroethane, trichloroethylene, and vinyl chloride **were greater than predicted for the Expansion Landfill** in the 2005 HHRA.

Predicted concentrations of 1,1-dichloroethane, butan-2-ol, 1,1,2-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1-dichloroethylene, mercuric chloride, methyl mercury, methyl mercaptan, bromodichloromethane, octane, dimethyl sulphide, ethyl mercaptan, chloroethane, hydrogen chloride, benzo(a)pyrene, and carbon dioxide, and carbon monoxide **for the Preferred Alternative were greater than predicted for the Expansion Landfill** in the 2005 HHRA.

Particulate Matter (Dust) and Related Metals



No net effects:

- The predicted risks for all of the chemicals were orders of magnitude below the health-based benchmarks.

Mitigation:

- Mitigation measures identified for dust in the Air Quality Effects Assessment.
- Continued implementation of the Dust BMPP.

Gaseous Contaminants



Net effects:

- Risks associated with bromodichloromethane, 1,1,2,2-tetrachloroethane and vinyl chloride are anticipated to be minimal.
- No measurable long-term or short-term adverse health impacts were predicted to occur as a result of exposure to LFG combustion emissions, with the exception of worst-case H_2S concentrations due to the decreased regulatory value.

Mitigation:

- Emissions of LFG should continue to be managed by routine maintenance of the final cap and interim cover areas.

Monitoring:

- Polycyclic aromatic hydrocarbons (PAH), using benzo(a)pyrene as a surrogate, should be added to the suite of chemicals being monitored in future air quality sampling events.

Social Environment Effects Assessment

Number of Residents and Residences



No net effects:

- No changes to the number of residents or residences.

Number and Type of Local Businesses



No net effects:

- No changes to number and type of local businesses.
- No displacement of business activities.

Nuisance Effects



No net effects from litter, noise, birds, and traffic.

Net effects:

- Potential increases in **odour**; the frequency of exceedance and the number of affected receptors will vary depending on the stage of landfill operations.
- Potential increases in **dust**; the frequency of exceedance and the number of affected receptors will vary depending on the stage of landfill operations.
- Changes to **visual landscape**: High visual effect on 23 receptors, a moderate visual effect on 52 receptors, a low visual effect on 15 receptors.

Mitigation:

- Mitigation measures identified for dust, odour, litter, and noise in the Air Quality and Noise Effects Assessments.
- Avifaunal (bird) scavengers will continue to be managed following current protocols using deterrents.
- Existing vegetated screening berms will continue to grow and increase in height.
- Continuation of Property Value Protection (PVP) plan.
- Continue to provide prompt attention to nuisance complaints to mitigate adverse effects to the surrounding community.

Use and Enjoyment of Property



Net effects:

- Minor changes to use and enjoyment of property are anticipated due to increased odour at recreational areas located south of the landfill.

Mitigation:

- Mitigation measures identified for odour in the Air Quality Effects Assessment.

Level of Satisfaction with Living/Working in the Community



Net effects:

- Minor changes in the level of satisfaction with living and working in the community due to increased odour and changes to the visual landscape.

Mitigation:

- Mitigation measures identified for odour in the Air Quality Effects Assessment.
- Existing vegetated screening berms will continue to grow and increase in height.

Confidence in TCEC Operations



No net effects: Operations will continue with no changes to operating hours, haul routes, equipment, nuisance complaint process, or regulatory reviews and inspections.

Economic Environment Effects Assessment

Employment at Site



Net effects:

- Existing **35 stable employment positions will continue for an additional 12 years** during operation of the Preferred Alternative.

Contributions to the Host Community



Net effects:

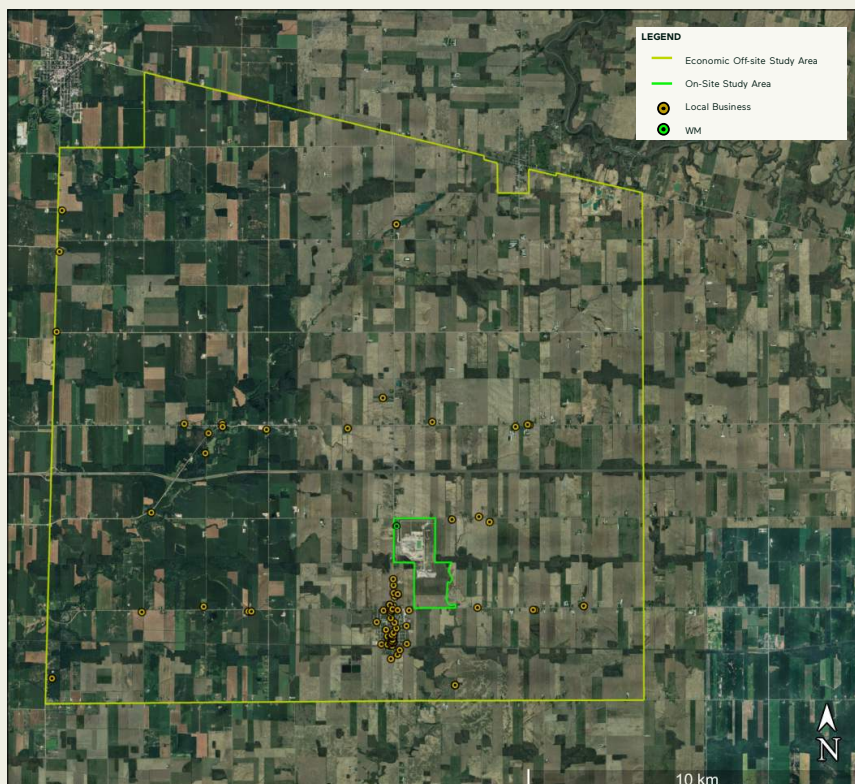
- Host community payments** for the duration of the Preferred Alternative are estimated to amount to **~\$50 million** based on the average annual contributions under the current Host Community Agreement (~\$4.1 million). The host community payments amount to ~24% of the Township's total gross annual operating budget and ~36% of the Township's total municipal revenue.
- Property tax contributions** forming at least **3.5% of the Township's property tax revenue** for the duration of the Preferred Alternative based on current tax rates.
- Continued contribution to community projects** during operation of the Preferred Alternative.

Provision and Procurement of Products and/or Services



Net effects:

- Contribution of **~\$30 million to the local economy** over the duration of the Preferred Alternative based on an annual average of \$2.5 million in local expenditures.



Economic Off-site Study Area
(Township of Warwick) and
Local Businesses

Visual Landscape Effects Assessment

Magnitude of Visual Change

1. Visible landfill area
2. Distance to the Landfill Optimization site
3. Horizontal angle of view
4. Visual Absorption Capacity Factor (VACF)

Combined Effect Value (CEV) = \sum 4 Factors

CEVs and Visual Effect Levels

CEV Scale	Visual Effect
13 - 20	High Effect
9 - 12	Moderate Effect
4 - 8	Low Effect
0 - 4	No Effect

1. Perceived Visible Area and Effect Levels

Perceived Area Index	Effect Level	Value
>23.0	Very high	5
18.1 - 23.0	High	4
13.1 - 18.0	Moderate	3
7.51 - 13.0	Low	2
0 - 7.5	Very low	1

2. Distance and Effect Levels

Distance in Metres	Effect Level	Value
0 - 600	Very high	5
601 - 800	High	4
801 - 1500	Moderate	3
1501 - 2200	Low	2
2201 - 3500	Very low	1

3. Horizontal Angle of View and Effect Levels

Horizontal Angle of View	Effect Level	Value
>90°	Very high	5
50° - 90°	High	4
31° - 50°	Moderate	3
16° - 30°	Low	2
0° - 15°	Very low	1

4. VACF and Effect Levels

Range	Description	Effect Level	Value
≤ 1.2	Very low VACF	Very high	5
1.21 - 2.4	Low VACF	High	4
2.41 - 3.6	Moderate VACF	Moderate	3
3.61 - 4.8	High VACF	Low	2
4.81 - 6.0	Very high VACF	Very low	1

Assessment conducted on six representative viewpoints and 121 receptors.

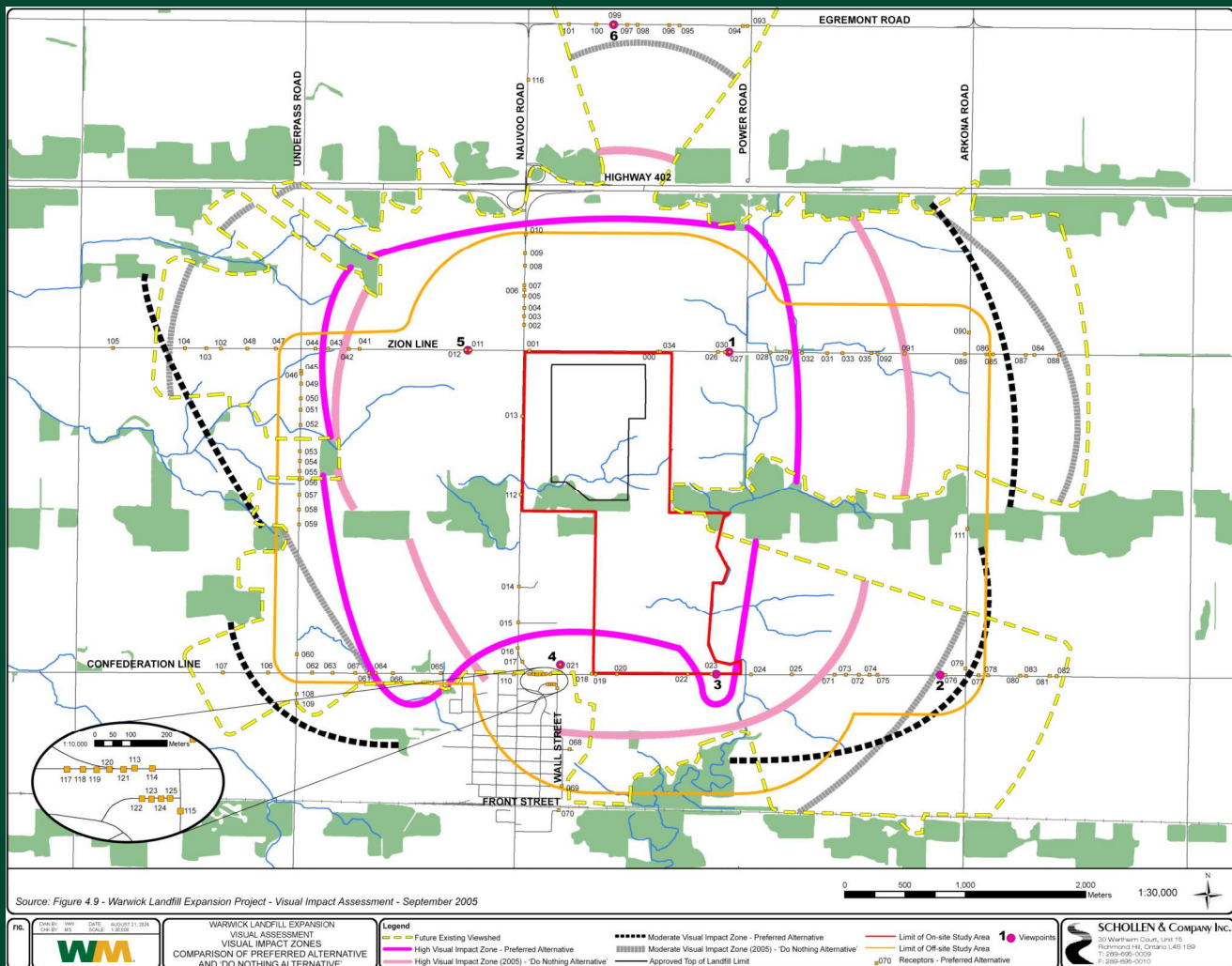
Visual Impact of the Facility

Net effects:

- Representative viewpoints: High = 1, 3, 5; Moderate = 2, 4; Low = 6
- High visual effect on 23 receptors
- Moderate visual effect on 52 receptors
- Low visual effect on 15 receptors

Mitigation:

- Existing screen plantings will increase in height and density.



Visual Effects – Preferred Alternative



Viewpoint 1
Combined Effect Value = 17; high effect.



Viewpoint 2
Combined Effect Value = 9; moderate effect.



Viewpoint 3
Combined Effect Value = 14; high effect.



Viewpoint 4
Combined Effect Value = 12; moderate effect.



Viewpoint 5
Combined Effect Value = 17; high effect.



Viewpoint 6
Combined Effect Value = 8; low effect.

Cultural Heritage Resources Effects Assessment

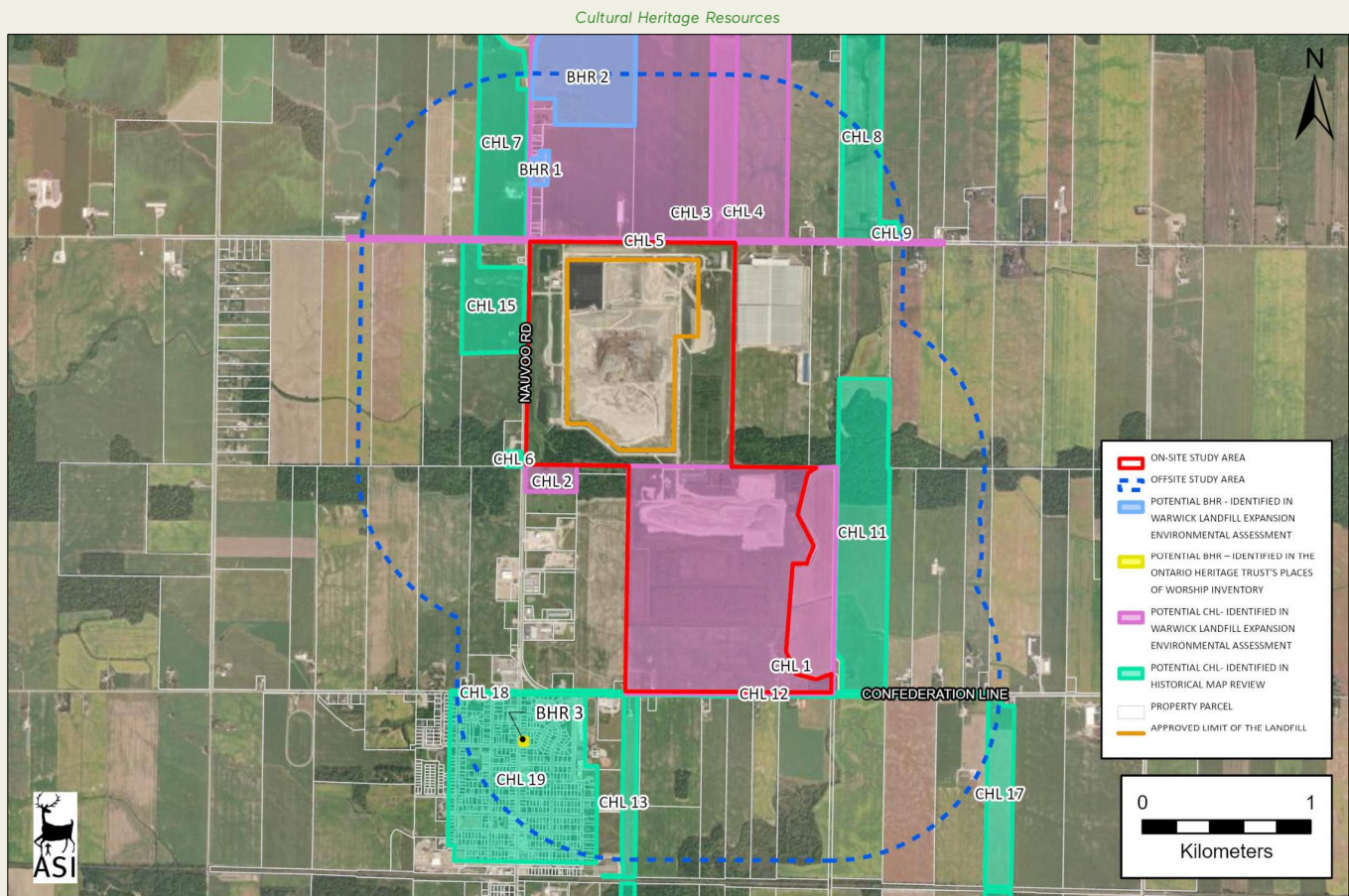
A **Built Heritage Resource (BHR)** is a building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community.

A **Cultural Heritage Landscape (CHL)** is a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings, structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association.



No net effects:

- No direct or indirect effects to Built Heritage Resources (BHRs) or Cultural Heritage Landscapes (CHLs).



Archaeological Resources Effects Assessment

Archaeological Resources

No net effects:

- No potential for disturbance of unassessed or documented archaeological resources.
- No net effects on on-site Archaeological Resources and areas of archaeological potential.

Mitigation:

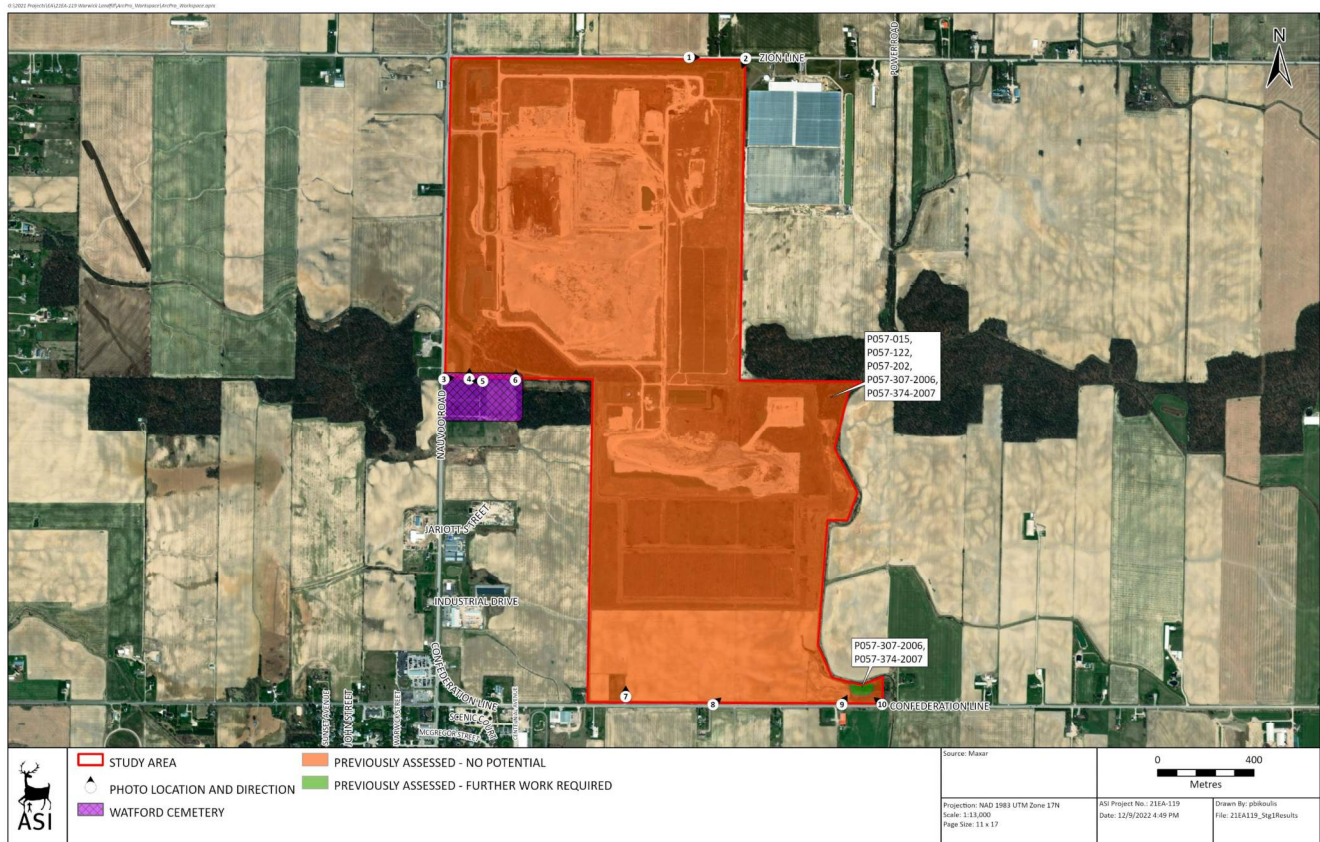
- Should previously undocumented Archaeological Resources be discovered, they may represent a new archaeological site and therefore be subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

Cemetery Property

No net effects:

- No potential for the disturbance of the adjacent cemetery.

Archaeological Resources



Transportation Effects Assessment

Traffic Volumes



No net effects:

- The TCEC site traffic will not change and will have no additional effect on the surrounding transportation network traffic volumes.
- The growth of traffic volumes within the Off-site Study Area is attributed to background growth and background developments.

Intersection Performance



No net effects:

- Site traffic is anticipated to have a negligible impact on queues at all Off-site Study Area intersections except at the TCEC site entrance.

Road Safety



No net effects:

- Collision rates are not expected to change as a result of the Preferred Alternative.
- No relationship was identified between site traffic and collisions occurring within the Off-site Study Area.

Sight Distance at Site Entrance



No net effects:

- The TCEC site entrance on Nauvoo Road is expected to remain unchanged from existing conditions. Sight distances at the driveway are acceptable.

TCEC Driveway at Nauvoo Road Looking North



TCEC Driveway at Nauvoo Road Looking South



Land Use Effects Assessment

Current Land Use, Planned Land Use, Off-site Recreational Resources, Sensitive Land Uses, Agricultural Land Use/Operations

No significant net effects to **current land use, planned land use, off-site recreational resources, any sensitive land uses, or agricultural land use/operations:**

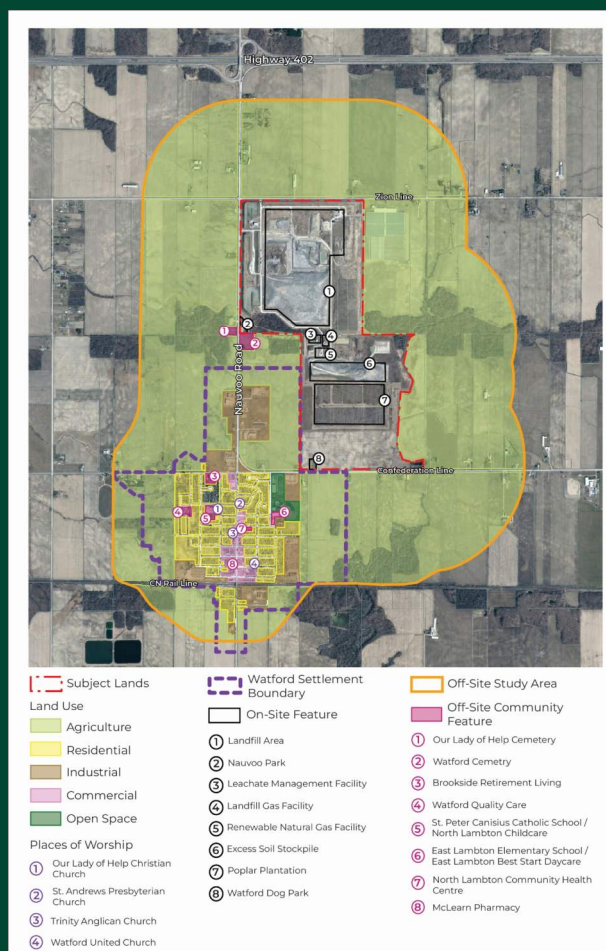
- Setback distances are maintained.
- Legally established existing land uses, existing off-site recreational resources, existing sensitive land uses, and existing agricultural land uses within 500 m of the landfill are permitted (pursuant to the *Planning Act*).

The Preferred Alternative will require **new planning approvals** (County and Local Official Plans, Township Zoning By-law, and Site Plan Control), and result in continued restrictions for surrounding land uses for an additional 12 years.

No net effects anticipated with respect to nuisance effects associated with the TCEC operation with employed nuisance controls.

Mitigation:

- Maintain previously approved setback and buffer distances, and existing berming.
- Continued employment or enhancement of nuisance controls by WM, related to odour, litter, dust, noise and birds on the surrounding environment.



Existing On-site and Off-site Land Uses



Solar Exposure Assessment

Computer modelling was completed to determine the potential reduction in solar energy reaching the ground in the area around the landfill for the approved Expansion Landfill and the Preferred Alternative.

Comparison between the Preferred Alternative and the approved Expansion Landfill:

- **Maximum 2% to 3% reduction** in solar energy on the western edge of the adjacent greenhouse **on an annual basis**, and **< 7% on a monthly basis**.
- **Total solar energy loss across the entire greenhouses of < 0.09% during all months.**
- **No reductions in solar energy > 1% at any location beyond 250 m west of the TCEC.**



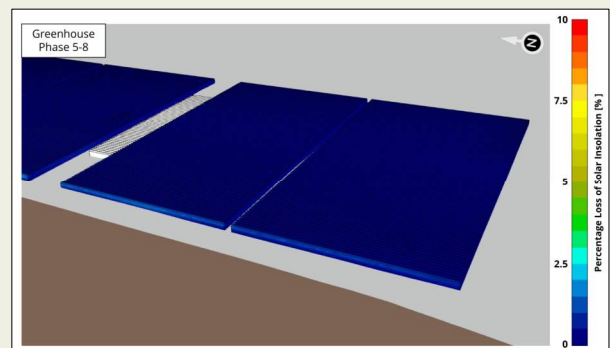
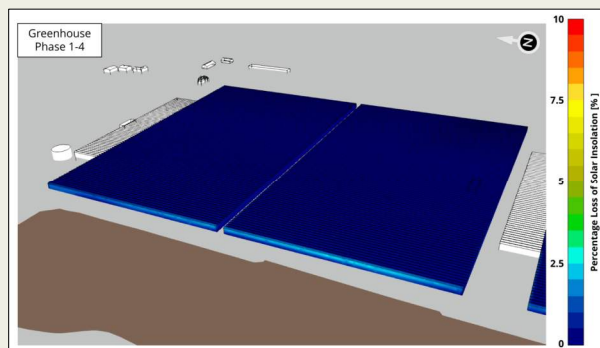
Decrease in total solar energy received over the entire **Phase 1-4 greenhouse** for the Preferred Alternative compared to the approved Expansion Landfill:

- **Maximum 0.09% decrease during the colder months.**
- **< 0.03% decrease during the summer months.**

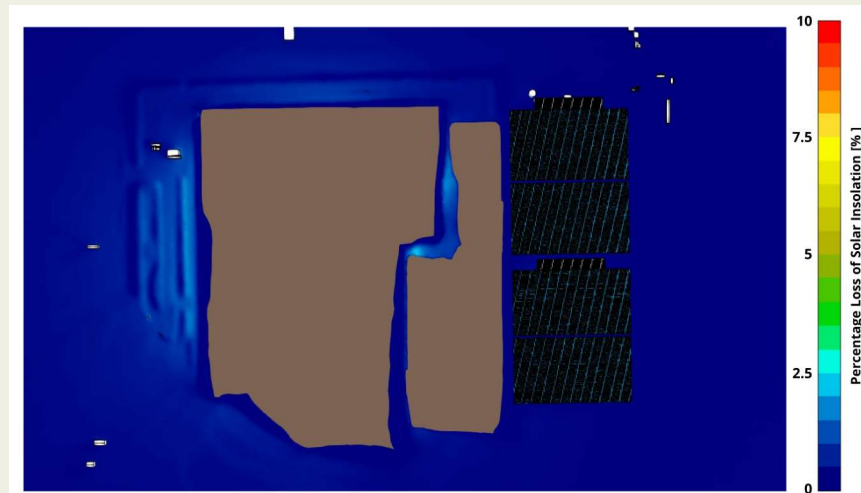
Decrease in total solar energy received over the entire **Phase 5-8 greenhouse** for the Preferred Alternative compared to the approved Expansion Landfill:

- **Maximum 0.04% decrease during any month.**

Average Annual Percentage Loss of Solar Insolation – Approved Expansion Landfill vs. Preferred Alternative

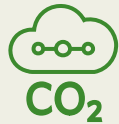


Average Annual Percentage Loss of Solar Insolation – Approved Expansion Landfill vs. Preferred Alternative – At Grade



Climate Change Effects Assessment

Effect of Preferred Alternative on Climate Change



No significant net effect:

- GHG emissions of ~584,777 tonnes CO₂e per year.
- GHG emissions of ~330,830 tonnes CO₂e per year (excluding CO₂ from biomass).
- Reduction of 43,317 tonnes CO₂e per year (excluding biomass) compared to approved Expansion Landfill.

Comparison of GHG emissions – Approved Expansion Landfill vs. Preferred Alternative

Source	Approved Expansion Landfill Peak Year Emissions (2031)	Preferred Alternative Peak Year Emissions (2042)	Change
TCEC Landfill GHG Emissions	374,147 (t/year CO ₂ e)	330,830 (t/year CO ₂ e)	-43,317 (t/year CO ₂ e)
GHG avoided through LFG use and RNG Facility	84,129 (t/year CO ₂ e)	90,446 (t/year CO ₂ e)	6,317 (t/year CO ₂ e)
Percentage of Ontario Total GHG Emissions	0.238%	0.210%	-0.0280%
Percentage of Canada Total GHG Emissions	0.052%	0.046%	-0.006%
Ontario GHG Emissions	157,200 (kt/year CO ₂ e)		—
Canada GHG Emissions	719,400 (kt/year CO ₂ e)		—

Effect of Climate Change on the Preferred Alternative

The current BMPPs for Dust, Odour, and Litter include processes for monitoring, maintenance, and response that can address the potential risks from climate change on **air quality** such as increased temperatures and higher wind speeds.

In terms of **surface water quantity**, increasing the intensity and frequency of storms will cause larger peak flows; however, the existing ponds and swales of the stormwater management system have sufficient capacity to manage the runoff under these storms.

For **surface water quality**, the implementation and maintenance of sediment control measures may need to adapt to changing climate conditions to control TSS concentrations associated with erosional effects. Surface water quality events and monthly inspections will continue to be valuable to assess for leachate seeps after rainfall events at an on-going regular frequency. Changes to the surface water quality monitoring programs may be required to adapt to changing climatic conditions.

No significant impacts to **groundwater quantity** or **groundwater quality** are expected from the increase in intense inclement weather. Changes to the groundwater monitoring programs may be required to adapt to changing climatic conditions.

Geotechnical Feasibility

Background:

- A **geotechnical feasibility study** of potential vertical expansion **alternative methods** was completed during the Terms of Reference (ToR) process.
- A commitment was made in the ToR to determine the need for a more detailed geotechnical assessment of the Preferred Alternative in the EA.
- Questions were received during consultation regarding geotechnical issues related to:
 - settlement of the landfill base; and
 - stability of the landfill side slopes.

An additional **geotechnical feasibility study** was conducted for the **Preferred Alternative**.

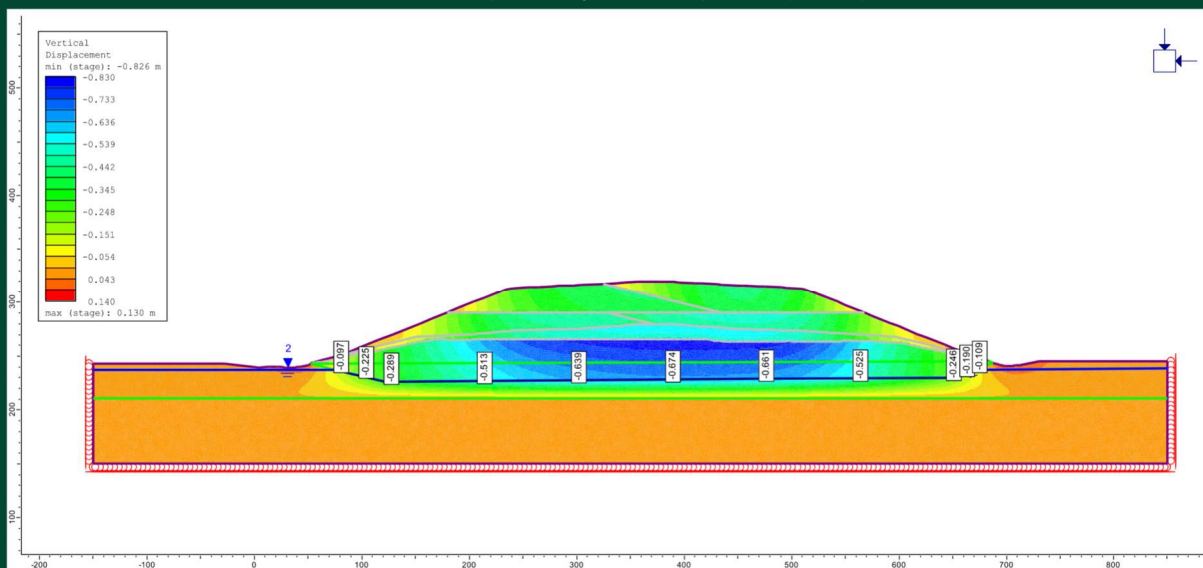
- 1) A **settlement analysis** was conducted to assess if the landfill base grades would meet the 0.5% minimum grade design toward the leachate collection system under the increased waste loading.

The analysis concluded that cell floor **settlement will not have a significant effect on functionality of the leachate collection systems**. Overall slope in a westerly direction will be maintained, and leachate will continue to drain toward the designated withdrawal points.

- 2) A **stability analysis** was conducted to determine the safety factor associated with increasing the side slopes from 4H:1V to 2.5H:1V.

The static safety factors and seismic safety factors are considered **acceptable and comparable to typical target values**.

Static Conditions – Final Expansion Stage – Vertical Displacement (12 kN/m³)



Advantages/Disadvantages of the Preferred Alternative

Advantages

- WM will be able to **continue to provide disposal services** to its customers and fulfill long-term contractual commitments within Ontario.
- **Cumulative noise levels** for some areas of the Preferred Alternative will be **equal** to the 'Do Nothing' Alternative so the dominant noise source will be background traffic.
- **Off-site haul route noise** is generally rated as 'insignificant' (**< 3 dB difference**) compared to the 'Do Nothing' Alternative.
- The **peak storage** used for SWM Ponds 2 and 4 is **slightly lower** than for the 'Do Nothing' Alternative.
- **2% reduction in peak flows** leaving the site compared to the 'Do Nothing' Alternative.
- **No changes to local businesses** for an additional 12 years.
- **16 fewer 'high' effect visual receptors** overall compared to the 'Do Nothing' Alternative.
- Continuation of **35 stable employment positions** for an additional 12 years.
- Continued **host community payments**, which make up approximately 24% of the Township's total gross annual operating budget and an approximately 36% of the Township's total municipal revenue, for an additional 12 years, amounting to **~\$50 million**.
- Continued **property tax contributions** of at least 3.5% of the Township's property tax revenue for an additional 12 years.
- Continued **contributions to community projects** for an additional 12 years.
- **Local economic contributions of ~\$30 million** over 12 years.
- **No need to accommodate future waste at another existing landfill or a new landfill** elsewhere.
- **Increased quantity of LFG available for use as a source of RNG** as an alternative to fossil fuels.

Disadvantages

- Predicted **concentrations of dust contaminants** at discrete receptors, the **frequency** of predicted exceedances, and the **number of receptors** experiencing exceedances will be **higher** for the Preferred Alternative than for the 'Do Nothing' Alternative.
- **Higher potential for blowing litter** than the 'Do Nothing' Alternative.
- Predicted **odour concentrations**, the **frequency** of predicted exceedances, and the **number of receptors** experiencing exceedances will be higher than for the 'Do Nothing' Alternative.
- Continued **noise** due to landfilling activities.
- **Extended Contaminating Lifespan (CLS) by 61 years** relative to the 'Do Nothing' Alternative.
- Prolonged attractiveness of the landfill to **avifauna scavengers** and **delay the time for the naturalization** of the land above the landfill.
- Continued **nuisance effects** for an additional 12 years;
- Minor changes to the **use and enjoyment of property** due to increased odour at recreational areas located south of the landfill.
- Minor changes in the **level of satisfaction** with living and working in the community due to increased odour and changes to the visual landscape.
- **Increase of 15 'moderate' visual effect receptors**.
- Continued **site traffic** for an additional 12 years.
- **New planning approvals** required (County and Local Official Plans, Township Zoning By-law, and Site Plan Control), and result in continued **restrictions for surrounding land uses** for an additional 12 years.

Overview of Draft Environmental Assessment Study Report

The EA Study Report comprises the following chapters, appendices, and technical reports/reference documents for addressing the requirements set out in the approved Terms of Reference:

EA Study Report Sections	
Section 1	Introduction Provides an introduction to and background information regarding the TCEC, the undertaking, the proponent (WM), and the EA.
Section 2	Overview of the EA Process and Study Organization Describes the process used to carry out the EA, the <i>Ontario Environmental Assessment Act</i> (OEAA) requirements, and provides an overview of the organization of the EA Study Report
Section 3	Overview of the Undertaking Identifies the purpose of and rationale for the undertaking, including the Preferred Alternative to the undertaking.
Section 4	Description of the Environment Potentially Affected by the Undertaking Provides an overview of the existing environmental conditions in both the On-site Study Area and Off-site Study Areas.
Section 5	Alternative Methods of Carrying Out the Undertaking Identifies and describes the Alternative Methods for carrying out the undertaking.
Section 6	Net Effects of the Alternative Methods Identifies and describes the net effects for the Alternative Methods for each environmental component.
Section 7	Comparative Evaluation of Net Effects and Identification of the Preferred Alternative Provides the comparative evaluation of the Alternative Methods and identifies the Preferred Alternative.
Section 8	Net Effects Assessment of the Preferred Alternative Presents an assessment of the effects of the Preferred Alternative and a description of any potential cumulative effects. Climate change considerations for the Preferred Alternative are discussed, and the advantages and disadvantages of the Preferred Alternative are identified.
Section 9	Consultation and Engagement Provides an overview of the consultation and engagement process and a summary of consultation and engagement activities undertaken.
Section 10	Monitoring and Commitments for the Undertaking Describes the commitments as well as the monitoring strategy and schedules for the Preferred Alternative.
Section 11	Approvals Outlines the anticipated approvals required for implementing the preferred undertaking.
Section 12	References Provides the references used in the EA Study Report.

EA Study Report Appendices	
Appendix A	Approved Terms of Reference
Appendix B	Terms of Reference Commitments Table

Supporting Documents	
Supporting Document 1	Existing Conditions Reports
Supporting Document 2	Conceptual Design Report
Supporting Document 3	Effects Assessment Reports
Supporting Document 4	Record of Consultation and Engagement
Supporting Document 5	Geotechnical Feasibility Review for the Preferred Alternative
Supporting Document 6	Solar Exposure Assessment

Next Steps

- Information received through this Public Information Session and other comments received will be considered in the EA.
- **The Draft Environmental Assessment Study Report will be available on the Project website for review from November 19, 2025 through January 30, 2026.**
- Input received on the Draft Environmental Assessment Study Report will be considered in the preparation of the Final Environmental Assessment Study Report



<https://www.wm.com/ca/en/twin-creeks-landfill/landfill-optimization-project>

If you would like to be added to the project mailing list or have project-related questions, please contact:

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Thank you for your attendance and comments on the Project.

