

**Table 7.6-1: Work Plans**

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	<b>Atmosphere</b>					
	Air quality (dust, odour and GHG) <sup>(1)</sup>	<ul style="list-style-type: none"> <li>Expected concentrations of air quality indicator compounds (selected regulated air contaminants to represent this type of project) at the property boundary.</li> <li>Expected site-related odour at sensitive receptors.</li> <li>Expected GHG emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Compile and interpret existing Environment Canada or MECP's air quality monitoring data and meteorological data.</li> <li>Review available air quality data from Ontario locations outside of London in a similar setting with a landfill, and if considered more representative than local data, consider incorporating it as existing air quality for this assessment</li> <li>Review aerial photographic mapping.</li> <li>Review zoning maps.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the differences in potential air and odour concentrations from emission sources based on their distance and direction to nearest receptors, the property boundary, and site characteristics such as height of the landfill that will influence dispersion.</li> <li>Identify difference in the alternatives that will impact GHG generation such as the landfill configuration that may impact LFG collection efficiency.</li> <li>Rank each alternative based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Select air indicator compounds appropriate for the landfill expansion.</li> <li>Complete air and odour emission estimates based on published emission factors and available literature, as well as a site-specific LFG generation model for input into the dispersion model.</li> <li>Execute an air quality dispersion model for the currently approved landfill and for an expanded landfill.</li> <li>Examine historical odour complaints, their location, recorded weather and operational procedures for that day to assess possible mitigation measures. If possible, determine if site-specific emissions measurements warrant consideration.</li> <li>Predict worst-case air quality and odour effects for off-site receptors based on an expanded landfill operations scenario.</li> <li>Calculate GHG emissions based on the expanded landfill.</li> <li>Review of landfill gas collection system efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>Environment Canada or MECP's regional air quality data, hourly meteorological data and climate normals.</li> <li>Published emission factors (including odour).</li> <li>Site-specific LFG generation model.</li> <li>Preferred 'Alternative Method' landfill phasing plan.</li> <li>Odour complaints history.</li> <li>Existing site-specific studies.</li> <li>Applicable provincial regulations, standards and guidelines.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>Noise Levels at off-site PORs, or vacant lots that accommodate the construction of PORs.</li> </ul>	<ul style="list-style-type: none"> <li>Review aerial imagery.</li> <li>Review zoning / land use mapping.</li> <li>Review previously prepared noise studies.</li> <li>Undertake field program to quantify existing noise levels.</li> </ul>	<ul style="list-style-type: none"> <li>Identify existing and potential PORs in the vicinity of the landfill.</li> <li>Identify potential differences in expected noise levels off-site based on the distance and potential line-of-site exposure of the PORs to the landfilling equipment/activities.</li> <li>Review the direct interaction of the proposed alternative method footprints and existing/potential PORs.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Noise emission estimates based on available project-specific information, manufacturer's noise data, and consultant's database of similar noise sources.</li> <li>Establish applicable noise limits in accordance with accepted MECP practices.</li> <li>Develop a project/site-specific three-dimensional noise prediction model in accordance with MECP and internationally accepted standards.</li> <li>Using the site-specific noise model described above, model the predictable worst-case noise levels from the preferred landfill expansion at identified off-site PORs, and compare them to MECP noise guidelines.</li> <li>If required, identify mitigation that can be implemented into the design of the preferred alternative to allow the landfill expansion to achieve compliance with applicable noise limits.</li> </ul>	<ul style="list-style-type: none"> <li>Landfill equipment list and expected utilization.</li> <li>Preferred 'Alternative Method' landfill phasing plan.</li> <li>Existing site-specific noise studies.</li> <li>Existing noise studies for facilities in the vicinity (if available).</li> <li>Manufacturer's noise data.</li> <li>Consultant's database of similar noise studies.</li> <li>Ministry of Transportation Ontario (MTO) traffic count data or newer data collected as part of this EA.</li> </ul>

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Environmental	<b>Biology</b>					
	Aquatic ecosystems	<ul style="list-style-type: none"> <li>Expected change in surface water quality on-site and within the site-vicinity.</li> <li>Expected impact on aquatic habitat and biota, including rare, threatened or endangered species within on-site and within the site-vicinity.</li> </ul>	<ul style="list-style-type: none"> <li>Habitat assessment of the four (4) watercourses within the site-vicinity study area, to consist of:                             <ul style="list-style-type: none"> <li>Channel Type.</li> <li>Channel morphology.</li> <li>Flow characteristics.</li> <li>Substrates, in-stream cover.</li> <li>Specialized habitat.</li> <li>Bank and riparian community characteristics.</li> <li>Valley form characteristics.</li> <li>Benthic (macro) Invertebrate Surveys.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Identify differences in potential impacts to watercourses.                             <ul style="list-style-type: none"> <li>Temperature.</li> <li>Sedimentation.</li> <li>Fish habitat.</li> </ul> </li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Identify areas of disturbance including:                             <ul style="list-style-type: none"> <li>Direct habitat loss/disturbance.</li> <li>Indirect habitat disturbance.</li> <li>Impacts to aquatic SAR habitat and species.</li> <li>Evaluation of short term vs. long-term impacts.</li> <li>Identify appropriate mitigation measures.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>W12A Landfill Area Plan Study – Ecological Background Study and Natural Heritage Study (Earth Tech, 2005).</li> <li>Middlesex Natural Heritage Systems Study (Middlesex County, 2014).</li> <li>The London Plan (2016)</li> <li>City of London Inventory and Evaluation of Woodlands (North-South Environmental Inc. (2009).</li> <li>Dingman Creek Subwatershed Study (Aquafor Beech et.al., 1995) and Dingman Creek Subwatershed Study Update (Delcan, 2005).</li> <li>Dingman Creek Watershed Report Card (2012).</li> <li>Dodd Creek Subwatershed Strategy (Wilcox Betsy, 2005).</li> <li>Department of Fisheries and Oceans (DFO) Drain Classification and Fish Habitat Data from the Upper Thames River Conservation Authority (UTRCA) and Kettle Creek Conservation Authority (KCCA).</li> <li>Land Information Ontario (LIO).</li> <li>Ministry of Natural Resources and Forestry (MNR) SAR List.</li> <li>Natural Heritage Information Centre.</li> <li>DFO Drain Classification and Fish Habitat Data from the UTRCA and KCCA.</li> </ul>

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Environmental	Terrestrial ecosystems	<ul style="list-style-type: none"> <li>Expected impact on terrestrial vegetation communities, wildlife habitat, and wildlife, including rare, threatened or endangered species on-site and within the site-vicinity.</li> </ul>	<ul style="list-style-type: none"> <li>Herpetofauna Surveys:                             <ul style="list-style-type: none"> <li>Vernal Pool Surveys.</li> <li>Auditory Amphibian Surveys.</li> <li>Visual Amphibian/Salamander Surveys.</li> </ul> </li> <li>Bat Habitat Suitability Assessment.</li> <li>Preliminary review of site and site-vicinity identified five (5) features requiring assessment.</li> <li>Snake Cover Board and Area Searches.</li> <li>Breeding Bird Surveys.</li> <li>Ecological Land Classification Confirmation and Floral Inventory.</li> <li>Wetland Community Boundary Delineation.</li> <li>Lepidoptera and Odonata Surveys.</li> <li>SWH Surveys.</li> </ul>	<ul style="list-style-type: none"> <li>Identify difference in the alternatives that will impact terrestrial features (removal of habitat, harm or harassment of species, sedimentation, dust, spills and contamination).                             <ul style="list-style-type: none"> <li>Woodlands.</li> <li>SWH.</li> <li>SAR and their habitat.</li> <li>Unevaluated Wetlands.</li> <li>Potential ESA north of Scotland Drive.</li> <li>Locally Significant Wetland (Silver Swamp).</li> </ul> </li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Identify potential impacts to SAR, SWH, ESA, wetland and woodlands including:                             <ul style="list-style-type: none"> <li>Direct habitat loss/disturbance.</li> <li>Indirect habitat disturbance.</li> <li>Impacts to terrestrial SAR habitat and species.</li> <li>Evaluation of short term vs long-term impacts.</li> <li>Vegetation removal.</li> <li>Potential impacts to species.</li> </ul> </li> <li>Implementation of mitigation measures including:                             <ul style="list-style-type: none"> <li>Appropriate setbacks as required.</li> <li>Obtain permits as required under applicable acts such as the Endangered Species Act.</li> <li>Siting, installation and monitoring of appropriate erosion and sediment control measures.</li> <li>Follow construction activity timing windows that minimize impacts to species and habitat.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>W12A Landfill Area Plan Study – Ecological Background Study and Natural Heritage Study (Earth Tech, 2005).</li> <li>Middlesex Natural Heritage Systems Study (Middlesex County, 2014).</li> <li>The London Plan (2016).</li> <li>City of London Inventory and Evaluation of Woodlands (North-South Environmental Inc. (2009).</li> <li>Dingman Creek Subwatershed Study (Aquafor Beech et. al., 1995) and Dingman Creek Subwatershed Study Update (Delcan, 2005).</li> <li>Dingman Creek Watershed Report Card (2012).</li> <li>Dodd Creek Subwatershed Strategy (Wilcox Betsy, 2005).</li> <li>DFO Drain Classification and Fish Habitat Data from the UTRCA and KCCA.</li> <li>Land Information Ontario (LIO).</li> <li>MNRF Ontario SAR List.</li> <li>Natural Heritage Ontario Reptile and Amphibian Atlas.</li> <li>Ontario Breeding Bird Atlas.</li> <li>Ontario Butterfly Atlas.</li> </ul>

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Environmental	<b>Geology and Hydrogeology</b>					
	Groundwater quality	<ul style="list-style-type: none"> <li>Expected effect on groundwater quality at the property boundary.</li> </ul>	<ul style="list-style-type: none"> <li>Extensive field investigations and hydrogeological assessments have been completed for the existing landfill site.</li> <li>The hydrogeological conceptual site model has been verified and major hydrostratigraphic units defined in three dimensions.</li> <li>Additional field investigations will focus on identified data gaps such as the northern terminus of the Upper Aquifer.</li> <li>Extensive hydraulic conductivity testing has been completed for the major hydrostratigraphic units; additional testing will be focused on any identified differences between results of the additional field work and the conceptual model.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the differences between the alternatives that will affect the potential impact on groundwater quality such as waste footprint configuration, direction of groundwater flow, landfill cover type.</li> <li>Estimate how the differences will affect the groundwater quality.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare a predictive model of landfill performance (contaminant transport model) as per <i>O. Reg. 232/98</i>.</li> <li>Predict worst case concentrations in the groundwater of the Upper Aquifer at the property boundary for key leachate indicator parameters with consideration of reasonable mitigation measures.</li> <li>Prepare a groundwater monitoring program.</li> <li>Prepare conceptual trigger mechanism and contingency plan approaches.</li> <li>Predict the contaminating lifespan.</li> </ul>	<ul style="list-style-type: none"> <li>Published regional sources and data on regional geological and hydrogeological conditions such as the Middlesex-Elgin Groundwater Study, Source Protection Assessment Reports.</li> <li>Review MNRF petroleum well records.</li> <li>Provincial Quaternary and Bedrock Mapping.</li> <li>Ontario Water Well Records (water supply wells are considered to be sensitive receptors in terms of potential impacts).</li> <li>Landfill Annual Monitoring Reports.</li> <li>Previous site characterization reports.</li> <li>Borehole Logs.</li> <li>Adjacent property assessment reports.</li> </ul>

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Environmental	<b>Surface Water</b>					
	Surface water quality	<ul style="list-style-type: none"> <li>Expected effect on surface water quality in the SWMS and within the site-vicinity.</li> </ul>	<ul style="list-style-type: none"> <li>Compile and interpret existing annual monitoring reports and supplemental (if required) surface water quality monitoring program data.</li> <li>Update surface water quality stormwater pond design criteria based on published changes to the Dingman and Dodd Creek Subwatershed Study requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the differences that may impact changes in surface water quality such as expansion area and potential impacts on the existing SWMS.</li> <li>Assess any limitations to expand or build new SWM ponds based on landfill expansion designs.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Evaluation of SWM facility expansion/modification or required construction of new on-site facilities and the facilities' ability to mitigate potential changes to water quality.</li> <li>Modeling of proposed SWMS and comparison with MECP and Subwatershed specific design criteria.</li> </ul>	<ul style="list-style-type: none"> <li>Topographic maps.</li> <li>Air photos.</li> <li><i>Stormwater Management Master Plan</i> (Earth Tech, 2002).</li> <li><i>Surface Water Background Study</i> (Dillon, 2005).</li> <li>Annual water quality Monitoring Reports.</li> <li>Design and Operations Reports.</li> <li>Surface water drainage mapping.</li> <li>Agricultural farm drain mapping.</li> <li>Watershed/subwatershed reports, including the Watershed Report Cards (2013 and 2018) and the 2008 Kettle Creek Watershed Characterization Report.</li> <li>Local climate data.</li> <li>Published water quantity and flow information from the MECP, Environment Canada and local Conservation Authorities.</li> <li>Site reconnaissance.</li> <li>Flow observations during sampling program.</li> </ul>
	Surface water quantity	<ul style="list-style-type: none"> <li>Expected change in peak flows (within the on-site SWMS and at the property boundary).</li> <li>Expected degree of off-site effects on surface water quantity within the site-vicinity.</li> </ul>	<ul style="list-style-type: none"> <li>Field review of stormwater management and drainage outlet locations.</li> <li>Update existing conditions assessment of hydraulic capacity, flooding and stream bank erosion.</li> <li>Review current and historic site photos and aerial imagery.</li> <li>Update surface water quantity control design criteria based on published changes to the Dingman and Dodd Creek Subwatershed Study requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the differences that may impact changes in surface water quantity such as expansion area, proposed side slopes of the landfill, proposed landfill cover alternatives, potential changes to watershed divides, and potential impacts on the existing SWMS.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Predict and assess future surface water peak flows and quantity conditions associated with the preferred landfill expansion alternative for a range of storm events (e.g., 2, 5, 10, 25 and 100 year) as required by <i>O. Reg. 232/98</i>, as well as consideration of climate change effects.</li> <li>Evaluate the need for SWM infrastructure to meet <i>O. Reg. 232/98</i>, and prepare EA level design for SWMS.</li> <li>Modeling of proposed SWMS and comparison with MECP and Subwatershed specific design criteria.</li> </ul>	

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Social	<b>Agriculture</b>					
	Agriculture	<ul style="list-style-type: none"> <li>Expected effect on agricultural land base and agricultural operations within the site and site-vicinity.</li> </ul>	<ul style="list-style-type: none"> <li>A field survey of the study areas to document types of farms, farm improvements, cropping patterns, buildings, etc.</li> <li>Review aerial photographic mapping.</li> <li>Compile parcel fabric mapping from City.</li> <li>Review Official Plans and Zoning By-law.</li> <li>Review Canada Land Inventory (CLI) mapping.</li> <li>Review Soils of Middlesex County mapping.</li> <li>Interviews with municipal staff and if necessary, property owners.</li> </ul>	<ul style="list-style-type: none"> <li>The potential effect of the proposed project alternatives on the existing and potential agricultural use of on-Site and off-site lands will be assessed.</li> <li>Differences between alternatives will be identified, for example, proximity to livestock, use of prime agricultural areas, etc.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Based on the proposed landfill operational practices and/or results of predictive assessments of potential nuisance effects as carried out by other components; the technical and operational considerations component; and groundwater and surface water considerations, the potential effects of the preferred method on existing and proposed off-site agricultural use will be assessed.</li> </ul>	<ul style="list-style-type: none"> <li>Preferred 'Alternative Method' landfill phasing plan.</li> <li>Existing site-specific studies.</li> <li>Applicable provincial regulations, standards and guidelines.</li> <li><i>Provincial Policy Statement (2014)</i>.</li> <li><i>City of London Official Plan (1989) and The London Plan (2016)</i>.</li> <li>City of London Zoning By-law.</li> <li>Provincial Policy Statement (2014).</li> <li>Aerial photographic and topographic mapping.</li> <li>Available soils mapping (Soils of Middlesex County mapping, CLI), municipal drain mapping, and available ownership information based on municipal assessment information and including farm tax credit information.</li> <li>Field reconnaissance.</li> <li>Statistics Canada agriculture profiles.</li> <li>Interviews with farmers, if necessary.</li> </ul>

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Social	<b>Archaeology</b>					
	Archaeology	<ul style="list-style-type: none"> <li>Expected archaeological resources potentially affected on-site.</li> </ul>	<ul style="list-style-type: none"> <li>Review and update existing background research including archaeological, historical, and environmental literature.</li> <li>Review updated list of registered archaeological sites within 1 km of the site.</li> <li>Complete Stage 2 Property Assessment (pedestrian and shovel test pit surveys) to identify archaeological sites that may be present within the site.</li> <li>Clean, catalogue, and analyze recovered cultural material to determine cultural heritage value or interest of identified archaeological sites.</li> <li>All archaeological assessments of the expansion EA undertaking will be undertaken by a licensed archaeologist prior to completion of the environmental assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Identify archaeological sites that are anticipated to be impacted by expansion alternatives.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Archaeological sites that will be impacted by the preferred expansion alternative may require Stage 3 assessment to determine spatial extent, complete a full evaluation of significance, and determine the need for strategies to mitigate impacts and provide future conservation (Stage 4 mitigation).</li> </ul>	<ul style="list-style-type: none"> <li><i>Stage 1 Archaeological and Built Heritage Assessment, W12A Landfill Area Study (2006).</i></li> <li>Other existing site-specific archaeological assessment reports.</li> <li>Ontario Archaeological Sites Database.</li> <li><i>Ministry of Tourism, Culture, and Sport (MTCS) Standards and Guidelines for Consultant Archaeologists.</i></li> <li><i>City of London's Archaeological Master Plan.</i></li> </ul>

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Social	<b>Culture</b>					
	Cultural Heritage Landscapes	<ul style="list-style-type: none"> <li>Expected impact on identified cultural heritage landscapes within the site-vicinity.</li> </ul>	<ul style="list-style-type: none"> <li>Background research of archival, published &amp; unpublished sources, municipal heritage policies, and historic maps and aerial imagery.</li> <li>Consultation with municipal heritage planner.</li> <li>Field investigations to document and evaluate existing conditions.</li> <li>A cultural heritage evaluation report (CHER) or cultural heritage assessment report (CHAR) will be completed.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the risk of potential direct or indirect impacts using guidance and types identified in the <i>MTCS Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process</i>.</li> <li>Rank each 'Alternative Method' based on differences.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the potential magnitude, reversibility, extent, duration, and frequency of each type of impact, if present.</li> <li>Methods to predict potential effects following guidance provided in the <i>MTCS Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process</i>.</li> <li>Methods to consist of identifying key vistas and views, sources of direct and indirect impact resulting from construction and operation, and preferred options and conservation measures to reduce or avoid impact to protected heritage properties or known or newly identified properties of cultural heritage value or interest.</li> </ul>	<ul style="list-style-type: none"> <li>Description of proposed expansion alternatives (including construction operations to determine sources of impacts).</li> <li>Preferred landfill design.</li> <li>Existing site-specific studies.</li> <li>Applicable provincial plans, acts, regulations, standards and guidelines, and policies.</li> <li>Applicable municipal official plans, heritage policies, and guidance.</li> </ul>
	Built Heritage Resources	<ul style="list-style-type: none"> <li>Expected impact on the heritage attributes of identified cultural heritage resources within the site-vicinity.</li> </ul>	<ul style="list-style-type: none"> <li>Background research of archival, published &amp; unpublished sources, municipal heritage policies, and historic maps and aerial imagery.</li> <li>Consultation with municipal heritage planner.</li> <li>Field investigations to document and evaluate existing conditions.</li> <li>A cultural heritage evaluation report (CHER) or cultural heritage assessment report (CHAR) will be completed.</li> <li>Built heritage assessments will be undertaken by qualified persons.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the risk of potential direct or indirect impacts using guidance and types identified in the <i>MTCS Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process</i>.</li> <li>Rank each 'Alternative Method' based on differences.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the potential magnitude, reversibility, extent, duration, and frequency of each type of impact, if present.</li> <li>Methods to predict potential effects will follow guidance provided in the <i>MTCS Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process</i>.</li> <li>Methods will include identifying key vistas and views, sources of direct and indirect impact resulting from construction and operation, and preferred options and conservation measures to reduce or avoid impact to protected heritage properties or known or newly identified properties of cultural heritage value or interest.</li> <li>The studies will be submitted to the MTCS and the City's heritage planning staff for review and approval as part of the overall EA approvals process.</li> <li>All technical heritage studies and their recommendations will be addressed and incorporated into the EA.</li> </ul>	<ul style="list-style-type: none"> <li>Description of proposed expansion alternatives (including construction operations) to determine sources of potential impacts.</li> <li>Preferred landfill design.</li> <li>Existing site-specific studies.</li> <li>Applicable provincial plans, acts, regulations, standards and guidelines, and policies.</li> <li>Applicable municipal official plans, heritage policies, and guidance.</li> </ul>



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Social	Land Use					
	Current and planned future land uses	<ul style="list-style-type: none"> <li>Expected impact on sensitive land uses (i.e., dwellings, churches, and parks within the site-vicinity).</li> </ul>	<ul style="list-style-type: none"> <li>A field survey of the study area to document existing land uses including the number, type and proximity of sensitive land uses.</li> <li>Review aerial photographic mapping.</li> <li>Compile parcel fabric mapping from City.</li> <li>Review Official Plan and Zoning By-law.</li> <li>Review Provincial Guidelines (e.g., Land Use Compatibility, Guideline D-1, Land Use On or Near Landfills and Dumps, Guideline D-4).</li> <li>Review Provincial Policy Statement, 2014.</li> <li>Interviews with municipal staff to confirm development activity planned in the site-vicinity and identify potential planning issues.</li> </ul>	<ul style="list-style-type: none"> <li>Identify differences in the use and enjoyment of sensitive uses in the site-vicinity.</li> <li>Differences between alternatives will be identified, for example, proximity to sensitive land uses.</li> <li>Rank each 'Alternative Method' based on differences.</li> </ul>	<ul style="list-style-type: none"> <li>Based on the proposed operational practices and/or results of predictive assessments of potential nuisance effects as carried out by other components and the technical and operational considerations component, the potential compatibility of the preferred method with existing and proposed surrounding land use will be assessed.</li> </ul>	<ul style="list-style-type: none"> <li>Preferred 'Alternative Method' landfill design and phasing plan.</li> <li>Existing site-specific studies.</li> <li>Applicable provincial regulations, standards and guidelines.</li> <li><i>Provincial Policy Statement (2014)</i>.</li> <li><i>City of London Official Plan (1989)</i>.</li> <li><i>City of London Zoning By-law</i>.</li> <li><i>Land Use Compatibility, Guideline D-1</i>.</li> <li><i>Land Use On or Near Landfills and Dumps, Guideline D-4</i>.</li> <li>Aerial photographic and topographic mapping.</li> <li>Field reconnaissance.</li> <li>Discussion with City planning department.</li> </ul>

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Social	<b>Socio-economic</b>					
	Local Economy	<ul style="list-style-type: none"> <li>Expected effect on local employment.</li> <li>Expected effects on local businesses and commercial activity.</li> <li>Expected effects on municipal finances.</li> </ul>	<ul style="list-style-type: none"> <li>Review of current and projected employment numbers (during both construction and operation phases).</li> <li>Review of municipal revenues and projected change from site expansion.</li> <li>Review of land use designations and City of London Official Plan.</li> <li>Interviews with municipal staff to understand potential costs and impacts to services from expanded site (e.g., public works, emergency management systems, transportation).</li> <li>Review of local business database.</li> </ul>	<ul style="list-style-type: none"> <li>Identify total increase in employment hours/full time equivalent positions during both construction and operational phases by alternative design.</li> <li>Identify loss of potential land use for commercial purposes or residential purposes as a result of landfill expansion and associated employment and rental income, respectively.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Re-evaluate property taxes or rent paid to the municipality based on larger property parcel and any potential change in land use designation.</li> <li>Qualitative assessment of impacts on local businesses from changes at the site, (e.g., loss of patronage, operational impacts.)</li> <li>Impacts on employment as determined by change in employment numbers and resultant economic impact at the local level.</li> <li>Calculate amount of increased revenue to the City minus any potential increased costs to determine net economic effect.</li> </ul>	<ul style="list-style-type: none"> <li>City of London Official Plan.</li> <li>City of London Financial Returns.</li> <li>Land use designation database.</li> </ul>
	Residents and Community	<ul style="list-style-type: none"> <li>Displacement of residents.</li> <li>Expected interference with use and enjoyment of residential properties (nuisance effects).</li> </ul>	<ul style="list-style-type: none"> <li>Review aerial photography to identify closest residential properties.</li> <li>Windshield survey of study area to identify residences and businesses (including farms) as well as any other community facilities in the site-vicinity.</li> </ul>	<ul style="list-style-type: none"> <li>Establish closest residential receptors to each alternative design.</li> <li>Review of findings from other disciplines – noise, odour, visual, air quality to ascertain any potential nuisance effects on residential receptors.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate level of nuisance effects once mitigation measures and BMPs have been implemented to determine change from baseline (current) conditions.</li> <li>Evaluate if the preferred alternative could cause displacement of residents from City-owned property.</li> </ul>	<ul style="list-style-type: none"> <li>Site related complaints.</li> <li>Discipline findings – noise, air quality, land use, cultural, visual, agriculture.</li> <li>Existing site related BMPs.</li> </ul>

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	Visual	<ul style="list-style-type: none"> <li>Expected changes in landscape views from off-site.</li> </ul>	<ul style="list-style-type: none"> <li>Using Google Earth mapping software, GeoGratis data of the site and surrounding area, and AutoCAD plans of the currently approved final contours, create a 3D model of the study area, including topography, roads, vegetation, buildings, etc.</li> <li>Prepare high-level description of the site and study area using this 3D model and aerial photos as reference.</li> <li>Photograph existing conditions from selected off-site vantage points.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare 3D models of each proposed landfill expansion 'Alternative Method' and render them with appropriate surface material / vegetation cover (turf, meadow, trees, etc.).</li> <li>Merge the expansion models with the existing site conditions model.</li> <li>Merge the site photos with the 3D model to illustrate the impact of each expansion alternative on each of the selected vantage points within the study area.</li> <li>Apply conceptual level mitigation measures to each alternative.</li> <li>Identify the degree of visual impact of each 'Alternative Method'.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Use 3D model to identify critical viewsheds that can be mitigated.</li> <li>Develop a mitigation evaluation matrix to prioritize evaluation criteria (e.g., cost, effectiveness, immediacy, practicality, appearance, long-term maintenance).</li> <li>Refine conceptual level mitigation measures using 3D models and viewshed analysis.</li> <li>Assess each mitigation measure using the matrix developed.</li> <li>Identify and document the potential net effects of the preferred 'Alternative Method' on views from the selected vantage points.</li> </ul>	<ul style="list-style-type: none"> <li>Google Earth / GeoGratis.</li> <li>City of London aerial photos.</li> <li>ACAD drawings of existing landfill and proposed expansion alternatives.</li> <li>Site photos.</li> </ul>

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Technical	<b>Design and Operations</b>					
	Engineered Containment	<ul style="list-style-type: none"> <li>Expected degree of engineered containment and/or controls required.</li> </ul>	<ul style="list-style-type: none"> <li>Develop three to four alternative design configurations (footprint, height, slopes).</li> <li>Calculate landfill footprint areas, excavation volumes, elevations, and airspace for each alternative.</li> </ul>	<ul style="list-style-type: none"> <li>Identify potential impacts of alternatives on the operation of the landfill, considering leachate generation, potential for leachate mounding, slope stability, construction methods, LFG generation and excess soil management.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare landfill phasing plan.</li> <li>Prepare overall materials balance (excavation, cover and fill requirements).</li> <li>Establish a geotechnical model for the site and complete a geotechnical assessment of preferred alternative (the expected settlement performance and stability of the landfill configuration).</li> <li>Assess the effects that short and long-term settlements may have on the operations of the new cells.</li> <li>Prepare estimate of LFG generation.</li> <li>Develop an estimate of the quantity of leachate generated from the expansion.</li> <li>Prepare conceptual design of LFG management system and leachate collection system.</li> </ul>	<ul style="list-style-type: none"> <li>Annual environmental monitoring reports.</li> <li>Results of Hydrologic Evaluation of Landfill Performance model.</li> <li>Currently approved design and operations report.</li> <li>Existing site-specific studies (on-site subsurface investigations, geotechnical reports).</li> <li>Topographic mapping, soils mapping, available water well records.</li> <li>O. Reg. 232/98.</li> <li>Commercial software specifically developed to assess slope stability.</li> </ul>
	Financial	<ul style="list-style-type: none"> <li>Costs associated with implementation of expansion alternatives.</li> </ul>	Estimated cost for alternative designs.	<ul style="list-style-type: none"> <li>Identify potential cost implications of alternatives.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Develop an estimate of probable cost for construction and operation for the preferred alternative.</li> </ul>	<ul style="list-style-type: none"> <li>Existing cost information from the City.</li> </ul>

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Technical	Transportation					
	Traffic	<ul style="list-style-type: none"> <li>Expected effect on traffic along the Haul Route.</li> </ul>	<ul style="list-style-type: none"> <li>Obtain available recent traffic data (2016/2017) for selected intersections and corridors within the haul route study area.</li> <li>Collect Turning Movement Count (TMC) data for Manning Drive at White Oak Road, Wonderland Road, Wellington Road South, and primary site access locations, including vehicle classifications for regular automobiles, heavy goods vehicles, and slow moving / farm vehicles.</li> <li>Collect AADT volumes on Wonderland Road, Manning Drive, and Wellington Drive.</li> <li>Obtain signal timing data for Manning Drive at Wellington Road South and Wellington Road South at Dingman Drive.</li> <li>Site visit to confirm geometric conditions and observe operating conditions in context.</li> </ul>	<ul style="list-style-type: none"> <li>Assessing existing traffic conditions based on Haul Route and other common users.</li> <li>Identify the differences in traffic operations (both strategic and operational) by evaluating the alternatives for landfill expansion.</li> <li>Rank each 'Alternative Method' based on the differences.</li> </ul>	<ul style="list-style-type: none"> <li>Assess existing hourly and daily carrying capacity of the Haul Route study area roads.</li> <li>Assess existing intersection LOS and other performance metrics for the haul route study area intersections to confirm overall intersection and critical movement performance (capacity and delay).</li> <li>Assess future traffic operation and safety requirements of defined study area (adjacent roadway and haul route) conditions.</li> <li>Assess potential intersection geometric requirements for mitigation. Undertake warrants to confirm auxiliary lane and/or intersection control requirements, as necessary.</li> <li>Assess sensitivity/impacts of partial haul route closure or activation of Highway 401 emergency detour route (up to 2 alternatives).</li> </ul>	<ul style="list-style-type: none"> <li>TMC, AADT, and signal timing data.</li> <li>Additional tonnage and resulting number of trucks to site due to expansion.</li> <li>Collision history statistics.</li> <li>Existing site-specific and related studies, consultant observations, and available City planning and engineering documents.</li> </ul>

**Notes:** \* Any 'Alternative Method' identified as preferred that is determined to have predicted effect(s) in excess of provincial thresholds, regulations or guidelines will be assessed to determine if the unacceptable effect(s) can be mitigated. If the effect(s) cannot be mitigated to below the provincial thresholds, regulations or guidelines, that 'Alternative Method' will be abandoned as the preferred 'Alternative Method' and the next most favourable 'Alternative Method' will be identified as preferred and evaluated

(1) The impact of air emissions from trucks along the haul route will be insignificant when compared to other site air impacts. As such, there is no need to assess them in the EA.