



D-4 GUIDELINE LANDFILL IMPACT ASSESSMENTS

Solid Waste Management



D-4

GUIDELINE LANDFILL IMPACT ASSESSMENT

1.0 BACKGROUND

This outline is intended as a best practices guide to provide Qualified Professionals preparing the study with the County's requirements and thereby improve the efficiency of the review process. This document is only applicable to D-4 Study applications submitted to the County for review.

The D-4 is a direct application of Guideline D-1, "Land Use Compatibility" (Guidelines), which specifies restrictions and controls on land use that the Ontario Ministry of Environment and Climate Change (Ministry, or MOECC) outlines for land use in the vicinity of landfills or dumps. The Simcoe County Official Plan requires the application of the D-4 Guideline and extends to proposals for land use changes on or near operating or non-operating landfills. The D-4 Assessment Area refers to the lands considered to be potentially impacted by waste disposal (landfill) site operations, generally within 500 metres of the waste disposal site.

Factors to be considered for land uses in the vicinity of non-operating landfill sites include: (i) ground and surface water contamination by leachate, (ii) surface runoff, (iii) landfill-generated gases, (iv) ground settlement, (v) visual impact and (vi) soil contamination and hazardous waste. The Guideline notes "particular attention shall be given to the production and migration of landfill gas".

Factors to be considered for land uses in the vicinity of operating landfill sites include: (i) ground and surface water contamination by leachate, (ii) surface runoff, (iii) landfill-generated gases, (iv) litter, (v) odour, (vi) contaminant discharges from associated vehicular traffic, (vii) dust, (viii) noise, (ix) other air emissions, (x) visual impact, (xi) fires, and (xii) vectors and vermin. The Guideline notes "particular attention shall be given to the production and migration of landfill gas".

If a landfill site is closed, but active operations / activities occur at the site (e.g., waste transfer station, household hazardous waste collection, recycling, composting, etc.), in addition to reviewing impacts of the non-operating landfill, the current activities shall be evaluated as per the criteria as per the Certificate of Approval / Environmental Compliance Approval (CofA / ECA) approved activities.

It is noted that, with respect to any proposed development in the vicinity of an operating landfill or waste transfer station, consideration be given not only to the zoning standards set out by the local municipality, but also to assess nuisance or health issues relating to the potential sensitive use of the proposed development. Sensitive use is defined in the D-4 Guideline and includes a permanent structure where a person sleeps or is present on a full-time basis. It is recommended that for uses not strictly outlined in the D-4 Guidelines, that the proponent discuss approved uses with the Municipality and the County prior to completion of a detailed D-4 Study. Additional studies may be required to address issues including but not limited to noise, air quality and traffic, which are beyond the standard review outlined herein.

The County will require that the D-4 Study include the following, outlined in more detail in Section 3:

- i. The proximity of the D-4 study site to the Waste Disposal Site and the potential for nuisance effects;
- ii. Recommendations by the County's peer review consultant that should be implemented; and
- iii. Any subsequent planning applications may require additional D-4 Study.

The County requires these three conditions to ensure that (i) the proximity to the Waste Disposal Site and potential nuisance effects associated with the location of the development are clearly outlined on the title of the property to inform future owners of the property (ii) to guarantee any remedial measures are complied with, and (iii) to ensure the property owners understand that a D-4 study for one development proposal may not apply to another.

2.0 EXPECTATIONS AND RESPONSIBILITIES

Client

- Identify that the site of a proposed development is located within the Assessment Area of an active or closed landfill site;
- Contract a Qualified Professional, either a licenced professional geoscientist or engineer with the requisite training and experience, to complete a D-4 Study to assess the potential impacts on the property; and,
- Ensure that appropriate control measures, as necessary, are implemented as per recommendations of the Qualified Professional involved in the D-4 Study process, as well as any related Planning approval requirements.

D-4 Consultant (Qualified Person)

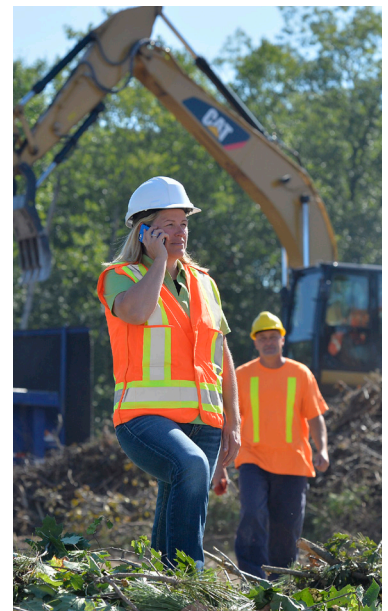
- Assess all factors listed above to evaluate the presence and impact of any adverse effects or risks to health and safety, nuisance impacts and degradation of the natural environment taking into consideration the proposed land use(s) and the uses permitted by local zoning bylaws;
- Communicate with the County and the Ministry to request documentation on the relevant landfill site and additional information as required. This could include monitoring reports, well record information, information about operations/activities on site, hours of operation, traffic patterns, dust/odour/noise/litter complaints regarding the landfill, etc.); and,
- Complete a report outlining environmental considerations and, where necessary, propose appropriate engineered remedial / control measure to prevent or minimize adverse effects.

County

- As operators and/or owners of operating and non-operating landfills, the County must comply with the Environmental Protection Act and O.Reg. 347 (Waste Management) requirements for the control of adverse effects caused by the landfill sites;
- Provide the Consultant completing the D-4 Study with recent monitoring reports, operations information and details requested to enable them to sufficiently complete the assessment;
- Ensure the D-4 Study is peer reviewed by a Qualified Professional experienced in landfill impact assessments; and,
- Following receipt of the peer review, the County will require registration on title with the relevant requirements outlined from the study and the peer review.

County's Reviewer

- Peer review the D-4 Study reports to ensure that the Qualified Professional who prepared the report takes into consideration all aspects required under the D-4 Guidelines; and,
- Provide comments and recommendations for follow up assessment, if required.



3.0 GENERAL INFORMATION TO BE PROVIDED IN A D-4 STUDY

- List of reference documentation used in the assessment;
- Discussion of the proposed development at the subject Site being reviewed, including:
 - ▶ Site zoning, intended land use on the Site, and planned/permitted land uses;
 - ▶ Description of topography on the Site, including grade elevations and noting major features such as ditches;
 - ▶ Provide a description of building(s) to be constructed, including uses, design, depths of excavation, height of building(s);
 - ▶ Discussion of current / proposed water and sanitary servicing on the site (e.g., municipal servicing for water and sewer). Note if a water supply well drilled as part of the project and, if so, indicate the proposed depth and the proposed hydrostratigraphic unit in which the well will be screened, commenting on the relevant regional known / inferred hydrostratigraphy;
 - ▶ For closed landfills, distance to the landfill site boundaries and waste footprint or fill area;
 - ▶ For active landfill areas or waste management facilities, as the size of the fill area can change over time, the distance to the property line should be used; and,
 - ▶ Provide a detailed Site Plan Drawing showing the location of all planned buildings and structures to be constructed, including septic systems, wells, stormwater management facilities, etc.
- Provide details about the landfill, including whether it is active or closed and a description of any other current operations / activities on the site (e.g., waste transfer station, recycling, composting, etc.)
 - ▶ Information of the known waste limits, depth and cover, buffer or perimeter area, presence of any Contaminant Attenuation Zones;
 - ▶ Types of waste disposed at the landfill;
 - ▶ Reference to active CofA / ECA related to operations / activities on the landfill site, including description of recent monitoring;
 - ▶ Description of the history of the landfill and any engineering controls (e.g., liners, leachate collection systems, drainage ditches, etc.);
 - ▶ Hours of landfill site operation;
 - ▶ Description of surrounding land use; and,



- ▶ Any noted complaint history (or lack thereof) based on information received from the County and the Ministry.
- Physiography, Topography and Hydrostratigraphy
 - ▶ A review of available information and summary of physiography, topography, surface water features, drainage and hydrogeological conditions in the area of the landfill site and subject development site; and,
 - ▶ Confirmation of assumptions or conclusions with respect to groundwater flow, depth to water, soil type, etc. using available information including reports, well records, etc. Where information is not from a report provided by the County, it shall be included in the D-4 Study.



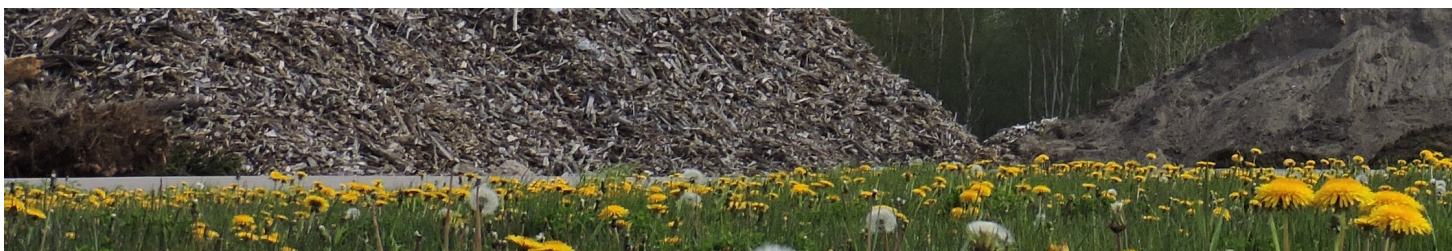
4.0 LANDFILL IMPACTS

Groundwater Contamination By Leachate

- Determine the direction of groundwater flow in the shallowest aquifer under the landfill and subject property using existing referenced information or wells constructed for this purpose;
- Referenced information should provide sufficient details, (summarized as necessary), including water well records, hydraulic boundaries or other influences;
- Describe if the site is upgradient, cross-gradient or downgradient of the landfill;
- Discuss the extent, if known, of any existing groundwater impacts from the landfill;
- If a water supply well will be part of the development, note its potential influence on groundwater flow, the aquifer will likely be constructed into, etc. (as noted above); and,
- Indicate if dewatering will be required on the subject property during construction and discuss the potential for impact of contaminated water during this process.

Surface Water Contamination By Leachate / Surface Run-off

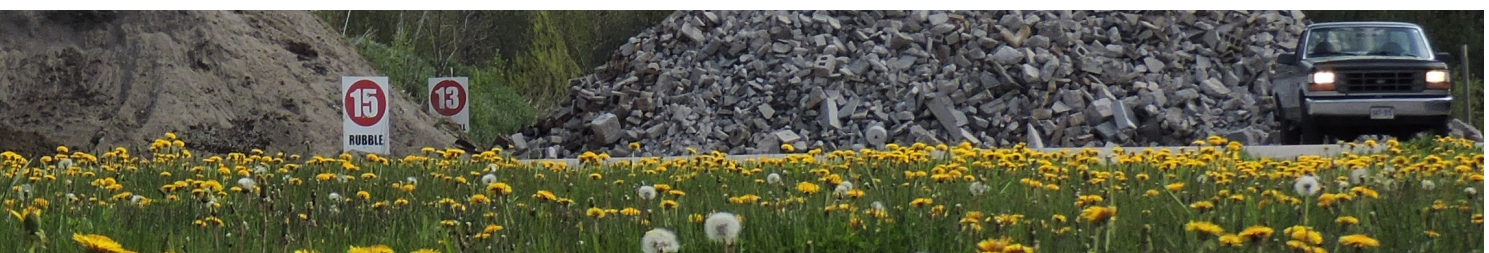
- Identify any surface water features on the landfill site and subject property, including streams, creeks, water bodies and wetlands;
- Describe surface water flow directions and drainage at the landfill and subject property using existing referenced information;
- Describe surface runoff from the landfill site, including description of ditching on the site, nature of surficial materials, extent of infiltration, etc. on the landfill site. If there are any hydraulic barriers or other influences they should be discussed;
- Describe if the subject site is upgradient, cross-gradient or downgradient, etc. of the landfill; and,
- Discuss the extent, if known, of any existing surface water impacts from the landfill.



Landfill Generated Gases

Landfill gas (LFG) generation and migration from a landfill to a subject development site is a primary consideration in the D-4 Guideline assessment process. Accordingly, the D-4 Study should focus on the available information including proven soil-gas concentrations (or the absence thereof) or if no information is available, use of existing historic, topographic, geological information, etc. shall be used to assess the potential likelihood for migration of landfill gas to the subject development. Assumptions shall be backed up with available information.

- Review available soil gas monitoring data from any gas probes constructed for this purpose at the landfill site/subject property;
- Describe the depth to the water table in the area of the landfill (i.e., the depth of the unsaturated zone);
- Review the gas probe construction and identify if they are reliable to determine potential combustible gas generation at the landfill;
- If gas probes are constructed between the landfill and the development site, they should be designed to assess migration to likely structures including basements;
- Monitoring of landfill gas concentrations should be undertaken and confirmed (i.e., two or three rounds) including one monitoring round under frozen ground conditions;
- The methods of monitoring including the means to purge and collect representative data provided, and confirmation of monitoring equipment and calibration noted;
- Discuss the extent, if known, of any existing soil gas impacts from the landfill or estimate the extent;
- Discuss the age of the landfill, thickness of the waste below grade, depth to the water table, type of soil at ground surface and the presence of any hydraulic barriers to estimate the potential for migration of landfill gases;
- Discuss if there is a potential for buildup of explosive concentrations of LFG in enclosed spaces; and,
- If there is a potential for landfill gas impacts, propose mitigation measures (e.g., on-site monitoring, building design and relevant codes (e.g., electrical) to address the potential presence of LFG in soil).



Ground Settlement

- Discuss whether or not the proposed development is in the footprint of the waste disposal area or located at a distance from the landfill; and,
- Discuss the age and heterogeneity of the waste and whether or not any settlement is anticipated.

Visual Impact

- Discuss the grade elevations at the landfill site relative to the grades on the development property, in addition to proposed heights of any new building(s);
- Discuss the vegetation/character or the completion of the closed landfill and whether or not any other current operations / activities exist at the landfill site; and,
- Discuss the presence and permanence of any vegetation, trees or other buffers between the landfill and the development; and,
- If the landfill site is operational, including other current operations/ activities on the site that will be visible, evaluate whether or not there are any sensitive land uses on the proposed development that could be impacted.

Soil Contamination and Hazardous Waste

- Describe any known soil contamination or hazardous waste at the landfill site and evaluate whether or not this could impact the proposed development based on the hydrogeological interpretations noted above.



5.0 ADDITIONAL CONSIDERATIONS FOR OPERATING LANDFILL AND WASTE MANAGEMENT FACILITIES

Litter

- Describe current litter control measures at the site, including fencing, covering practices, etc., which would control litter;
- Discuss prevailing wind direction in the vicinity of the landfill site relative to the proposed development in evaluation of potential impact of litter at the proposed development property; and,
- Discuss if the County or Ministry has received any litter complaints for the site operations.

Odour / Other air emissions

- Discuss prevailing wind direction in the vicinity of the landfill site relative to the proposed development in evaluation of potential impact of odour at the proposed development property;
- Discuss the presence of any buffers between the landfill site and the proposed development that could limit impacts from odour/other air emissions;
- Discuss if the County or Ministry has received any odour complaints at the landfill site; and,
- Indicate if there are any sensitive land uses on the proposed property that could be negatively impacted by odour. If so, proposed mitigation or engineering solutions, such as sealing of windows, locations of air intakes, climate control systems, etc., should be identified.

Traffic

- Discuss information from the County related to access routes and hours of operation of waste management vehicles to the active landfill (or other site operations) evaluate their impact on the proposed development; and,
- Discuss if the County or Ministry has received any traffic complaints related to the site.

Dust

- Discuss prevailing wind direction in the vicinity of the site relative to the proposed development in evaluation of potential impact of dust at the proposed development property;
- Discuss the presence of any buffers between the site and the proposed development that could limit impacts from dust;
- Discuss if the County or Ministry has received any dust complaints due to operations at the site; and,
- Indicate if there are any sensitive land uses on the proposed property that could be negatively impacted by dust. If so, discuss proposed mitigation or engineering solutions, such as sealing of windows, locations of air intakes, climate control systems, etc. in consultation with the municipality and County.

Noise

- Discuss operations/activities on site which generate noise at a level anticipated to be detectable off-site;
- Indicate hours of operation at the site;
- Discuss the presence of any buffers between the landfill site and the proposed development that could limit impacts from noise;
- Discuss if the County or Ministry has received any noise complaints due to operations at the landfill site; and,
- Indicate if there are any sensitive land uses on the proposed property that could be negatively impacted by noise. If so, discuss proposed mitigation / engineering solutions to limit the impact from noise.

Fires

- Discuss the potential for fires at the site and the potential impact on the proposed development relative to health and safety including air quality.

Vectors and Vermin

- Discuss the presence of any known vectors and/or vermin at the site and discuss current practices at the site to limit the presence of these vectors and/or vermin impact; and,
- Indicate if the County or Ministry has received any complaint about vectors/vermin at the site.

NOTES:



County of Simcoe

1110 Highway 26
Midhurst, Ontario
L0L 1X0

705-735-6901
simcoe.ca