WM Response to Comments on Discussion Papers #7, 8, & 9

Waste Management of Canada Response to July 2005 Township of Warwick Peer Review Team *Response to Discussion Paper Nos. 7, 8 and 9*

Waste Management provides the following response to the Warwick Peer Review Team (PRT) *Response to Discussion Paper Nos. 7, 8 and 9.* The PRT document was provided to Waste Management on July 14, 2005.

The comments provided by the PRT team have been thoroughly reviewed. The input is appreciated and will be considered in finalizing the EA documentation. It will also be of assistance in WM's future discussions regarding the landfill expansion proposal as it relates to the interests of the Township of Warwick.

The WM responses are provided within the context of the approved Terms of Reference of the Environmental Assessment. In a number of instances, the PRT comments deal with levels of detail that are clearly outside the scope of the EA, and are more appropriately deal with in subsequent approval applications. We have identified these specific instances.

The PRT document is organized with the following components:

Executive Summary
Recommendations
1.0 Introduction
2.0 Discipline-by-Discipline Findings
3.0 Key Deficiencies and Recommendations for Improvement
4.0 Conclusions
Appendices: Discipline Specific Comments

The findings of the PRT have been consolidated into 12 Recommendations. WM provides a response to each of these recommendations below.

The Discipline-by-Discipline Findings section provides a summary, generally reflective of the detailed comments provided in the Appendices. Waste Management has therefore prepared an issue by issue response to each of the Discipline Specific Comments provided in the Appendices. These responses are provided in Table 1 attached.

An exception to this approach is the WM response to the Air Quality Assessment comments. As many of these detailed comments in Appendix 2 are editorial, WM has addressed the PRT comments as summarized in Section 2.0 of the main report. Detailed comments will be addressed in preparation of the final EA documents as appropriate. It is also noted that detailed comments regarding Natural Environment and Resources were not provided by the PRT. WM has responded to the summary comments.

WM Response to PRT Recommendations

1. Waste Management (WM) provided the PRT with draft copies of DP 7, 8 & 9, an April, 2005 Addendum to DP 7, 8 & 9 (the Addendum document), subsequent information, as well as a budget, to allow the PRT to complete a review of the documents and provide their comments. WM will consider all comments and recommendations received by all interested parties, including the PRT's. WM will then modify the impact assessment and the design and operating plans, as it determines appropriate, in finalizing DP 7, 8 & 9 and preparing the EA for this project.

    a) The impacts on surface water and air quality of the preferred leachate treatment system was assessed in DP7 and background documents. The Addendum document provides further detail regarding impact assessment issues requested by the PRT, in their Interim Report, and outlines how assessments associated with the leachate treatment alternatives will be considered in the final documents.

    b) The basis for updating the air quality assessment, including the assumptions, modelling and footprint modifications are all found in the Addendum document and confirmed in a May 26, 2005 Memo to Peter Pickfield. The memo details how the revised air quality assessment will be considered by all of WM's consultants in finalizing their assessments. Background conditions have been considered and dust emissions from background vehicles on the haul route has been included in the air quality modelling.

    c) The revised air quality results will be considered in the final Human Health Risk Assessment.

    d) The impacts associated with the preferred haul route, including noise and air quality have been fully assessed and integrated into the impact assessment of the preferred undertaking. This information is contained in Draft DP 7. Noise contours illustrating haul route noise levels and current/future baseline will be provided in the final noise assessment.

    e) Potential adverse economic effects on the municipalities, residents and businesses have already been assessed in the economic assessment and Draft DP 7. The final documents will include additional detail on future economic impacts from both a municipal finance and business perspective. As well, the final version will clarify that businesses will be included in compensation plans for physical damage and all property within the identified area will be included in the property value protection plan.

    f) WM believes that the level of detail of assessment of the compost facility is appropriate for an EA level assessment. This issue was raised by the PRT in their Interim Report and responded to in the Addendum document.

g) WM recognizes that litter will occur with any landfill operation. WM consultants have assessed the potential for litter and its effects, particularly on agriculture operations, and recommended specific mitigation measures. WM has accepted these recommendations and an impact management plan for litter will be detailed as part of the EPA application.

h) The Human Health Risk Assessment (HHRA) will be finalized considering the updated air quality assessment. WM responded to the PRT recommendation to expand the scope of the HHRA in the Addendum document. As previously stated, the scope of the assessment was developed based on the geology and hydrogeology of the site and the general nature of the facility. The Minister of Environment in approving the Terms of Reference for this EA approved this scope. WM does not intent at this point, given the results of our consultant's impact assessment work, to extend the scope of the HHRA.

i) All potential agricultural impacts identified by the PRT have been addressed in the agricultural assessment and Draft DP 7 and discipline analysis has been integrated.

j) Land Use Planning work contained in DP 7 incorporates the impact assessment of the other disciplines.

2. WM has responded to this issue previously by informing the PRT, in response to their Interim report, that the combined impacts from all of the facilities associated with the landfill, which make up the preferred undertaking, have been included in the assessment documented in DP 7.

3. WM's consulting team developed the Addendum report, which outlines revisions and clarifications to the impact assessment, facility characteristics and impact management measures. The completed document was circulated to the full impact assessment team so that this information will be considered and built into the finalized DP 7, 8 & 9 documents and the EA.

4. WM has completed an assessment of impacts associated with the proposed landfill not receiving as much waste as predicted. This analysis is documented in Section 6 of Draft DP 7. WM has previously responded that it would consider fill rate not as an alternative (as recommended by the PRT) but as a potential mitigation tool. Given the conclusions of the impact assessment related to operations of the landfill, WM does not believe a reduction in fill rate is warranted.

5. The impacts of the proposed undertaking, including leachate treatment and the compost facility, are included in Draft DP 7. Additional detail for both of these facilities is contained in the Addendum report. This addition information will be considered in the finalization of DP 7.

   The financial assurance plan is not a part of the impact assessment and need not be a part o f the EA. The financial assurance plan is mandated by the MOE under the Environment Protection Act (EPA).

6. WM commitment is that the landfill expansion will not have a significant impact on human health and safety. The comprehensive methodology established in DP4 for impact assessment outlines a set of tools to be used by the impact assessment consultants, including

    a) Compliance with regulatory standards
    b) Detailed monitoring
    c) Past experience; and
    d) Professional judgment

    It is clear that where regulatory standards exist, impacts will be stated in relation to compliance with the standard. However, compliance with guidelines and standards should not be viewed in isolation from other components of the methodology developed to consider how much of an expansion is environmentally appropriate.

    The draft air quality assessment was the only discipline that identified potential impacts exceeding provincial standards or guidelines. In particular, in the original modelling exceedances were predicted for SO2, associated with landfill gas, overall landfill site odour, and dust emissions related to fugitive dust sources and not related to combustion related dust sources. The duration, intensity and frequency of the predicted exceedances were considered by the air consultant, as was the conservative nature of the assumptions used in the assessment. The health risk assessment then considered the predicted exceedances and confirmed that the likelihood of adverse health effects arising from exposure to landfill related emissions is negligible.

    The PRT has agreed that the air quality assumptions adopted in work to date are unduly conservative. It is recognized that incorporating more realistic assumptions would be expected to reduce the number of air quality exceedances from the current predictions. Additional data collection and secondary source information will be used to justify these new assumptions.

    The PRT input, additional commentsthat may be received by agencies and the public, and final changes to facility characteristic that result from the review process will all be incorporated into a remodelling of impacts. This input will then be used to reconsider the predicted impacts, if any. On the basis of all of this information, WM will ensure that that the likelihood of adverse health effects arising from exposure to landfill related air emissions is negligible.

7. Technical analysis does not support the conclusion of the PRT that DP 7 predicts "significant increases in nuisance impacts". WM has previously indicated that the approved ToR does not require the analysis of alternative designs as recommended by the PRT. WM has stated that these are more appropriately mitigation considerations. Given the impact assessment conclusions related to the design and operations of the proposed undertaking, WM does not believe that these forms of mitigation are warranted.

8. Technical analysis does not support the conclusion of the PRT that DP 7 predicts significant residual impacts. Identified impacts are generally considered to be low and manageable, though it is recognized that the presence of the landfill will have a high visual impact in some areas. The PRT has misinterpreted the discussion of property value protection. The proposed plan is comprehensive and applies to all properties within the identified area. Further details regarding monitoring programs and nuisance impact management plans are outside the scope of the EA.

9. In the Addendum document, WM has stated that it will continue to work with the Township regarding future opportunities for economic development including the potential for attracting waste diversion facilities proposed by the PRT. WM is prepared to consider opportunities and seek approval through separate approval applications.

10. At the request of the PRT, the Addendum document describes both potential end uses and the public consultation process for selecting end-use options. This additional information will be incorporated into the final DP 7, 8 & 9 and the EA.

11. The proposed landfill design and impact management measures presented in Draft DP8 and DP9 and the additional detail that will be provided in the EPA documents clearly indicate potential for long term benefits to the community. Specifically:

    a) a landscape architect is on the design consultant team and will be providing input as part of the EPA process to create more natural form elements in the design;

    b) a range of end uses, as outlined in the Addendum, are compatible with the proposed design; consultation with the community will determine the desired use(s);

    c) WM is prepared to work with the municipality to develop an economic development strategy that will improve the attractiveness of the business park and other opportunities;

    d) WM will work with the municipality in any capacity that value can be added to municipal efforts. This approach is not to offset economic impacts as the analysis has not demonstrated negative impacts on tourism but is consistent with efforts to promote the area;

    e) WM has proposed a comprehensive impact management plan;

    f) WM has clarified the proposed PVP program and believes that the program is a fair and reasonable one; and

    g) WM's current proposal is for an expanded landfill facility; WM will work with the municipality to develop other opportunities in waste management or other areas where there is mutual benefit to do so.

12. The discipline – by-discipline recommendations will be considered.

Appendix 1. Hydrogeological and Site Design

Peer Review Comments	WM Response
Page 1 - Subsection 1.1	➢ WM acknowledges the reviewer's conclusion that the site is hydrogeologically suitable for the construction and operation of the proposed landfill.
Subsection 1.2	➢ The proposed design accommodates the reviewer's concern for leachate mounding and the potential for the system to become plugged. Also refer to the contingencies discussed in Section 11 of DP#7, Hydrogeological Assessment.
Subsection 1.3	➢ WM does not agree with the reviewer that the EA does not support the assumption that recirculation will reduce the contaminating life span of the landfill. The theory and supporting calculations for recirculation are provided in Appendix J of the Hydrogeologic Assessment. The reviewer is also referred to Appendix A – Leachate Characterization of DP#8. Development of leachate strength and the effects of recirculation are detailed in this appendix.
Page 2, Subsection 1.4	➢ Agreed. WM has agreed that the groundwater at the WM property boundary will meet Reasonable Use Policy Limits and that surface water at the property boundary will meet the Provincial Water Quality Objectives (or be consistent with background levels).
Page 2, Subsection 1.5	➢ See response to Table 10-1 Landfill Monitoring Program. Detailed monitoring programs will be set out in the EPA.
Page 2, Subsection 1.6	➢ WM acknowledges PRT acceptance of the range of contingency measures for the groundwater flow regime. ➢ Contingency measures for surface water presented in Section 11.0 of the hydrogeologic assessment for DP#7 provide for a staged and sequential response to potential surface water impacts including increased monitoring, and the development and implementation of remedial actions as appropriate. These may include a reduction or suspension of noted treatment methods. In addition, the contingency measures presented in the Jagger Hims Limited letter of April 25, 2005, and provided in Addendum to Discussion Papers 7, 8 & 9, will be included in the final EA report.
Page 2, Subsection 1.7	➢ We disagree that there is little long-term evidence provided to support experience with treatment by hybrid poplars. We refer the reviewer to "CWS – Leachate Management Plant, Warwick Landfill, Warwick Township, May 2000" by Henderson, Paddon Environmental Inc. for the existing site, leading to approval of the pilot project. In excess of 100 references were provided to substantiate the proposal.
Page 2, Subsection 1.8	➢ The reviewer notes that on-site treatment followed by discharge to surface water or trucking to a treatment plant may have to be implemented in the event that the preferred leachate treatment option is not viable. These options were adequately covered in the DP 7 and DP8 documentation; the three (3) alternative treatment methods were described and the impact assessments provided.
Page 2, Subsection 1.9	➢ WM has committed to the Township that it will provide the Township's consultants an opportunity for a technical review of the EPA during the design phase of the application. WM has confirmed that it will hold a public open house dealing with the EPA prior to the submission of the application to the MOE.
Page 2, Subsection 1.10	➢ In the Addendum to DP#7 WM provided a broad range of end use options based the physical features that will remain post closure and the anticipated adjacent land uses. This information is sufficient to conduct the EA and specific scenarios will be developed through public consultation. The principles for public consultation described in the Addendum will be included in final DP9.
Page 2, Subsection 1.11	➢ Financial assurances will be presented as part of the EPA documents in accordance with Regulation 232/98.
Page 3	**Review of DP#7 (Hydrogeological Impact Assessment)**
Subsection 1.	See response to Appendix 1 Subsection 1.9.

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Peer Review Comments	WM Response
Page 3, Subsection 4.1 **Additional information regarding the application of poplar forest treatment/ polishing.**	➢ WM acknowledges the reviewers comments that the four representative technologies for leachate treatment represent the reasonable range of treatment options. We refer the reviewer to our report "CWS – Leachate Management Plan, Warwick Landfill, Warwick Township, Reference 6.29 "*Populus deltoides Bartr. ex Marsh*. Eastern Cottonwood, Salicaccae - Willow family, *P. deltoides Bartr. ex Marsh. var. deltoides*, Eastern Cottonwood (typical), D.T. Cooper, *P. deltoides var. occidentalis Rydb*., Plains Cottonwood, David F. Van Haverbeke, http://willow.ncfes.umn.edu/silvic..ual/volume_2/populus/deltroides.htm,", which references the appropriate climate for poplar forest growth, as discussed in Item Page 7, Section 2.0, Subsection 2.1, Preferred Leachate Treatment Options.
Page 3, Subsection 4.3 **Preferred Leachate Treatment System**	➢ As clarification of how long leachate will be trucked off-site, we refer to Table 5, which makes estimates of the leachate volumes from the first phases. Considerable variations in estimated quantities are apparent, since we estimate that considerable additional moisture will be required for the waste to reach field capacity, compared with the moisture content at the gate. Accordingly, the amount of leachate for disposal could be relatively small initially, resulting in very little leachate to be trucked off-site.
Page 3 Subsection 5.2.1	➢ The operating practices will include proper recirculation procedures and leachate management to minimize potential for breakout and potential odour.
Page 3 - Subsection 5.3.4 **Effects Due to Contact with Leachate-Impacted Groundwater or Surface Water, page 19**	➢ The benefits of recirculation in the reduction of the contaminating lifespan of a landfill is based on the removal of contaminant mass from the waste by the percolation of water through the waste. As more water percolates through the waste, in the form of infiltrating precipitation or recirculated leachate, more contaminant mass will be removed. Leachate treatment will occur in the landfill to the extent that organics degrade; exposure time within the landfill is repeated for contaminant breakdown when recirculation is practiced, e.g., BOD and VOC's are reduced, ammonia is reduced, inorganic salts and heavy metals precipitate in the landfill and are stabilized when pH levels rise. Through the removal of leachate, leachate treatment, and the stabilization or off-site disposal of residual waste from the treatment process, contaminant mass will be permanently removed from the waste. Therefore, the landfill contaminating lifespan will decrease. The theory and supporting calculations are provided in Appendix J of the hydrogeologic assessment for DP#7.
Page 4 - Subsection 5.3.4 **Effects Due to Contact with Leachate-Impacted Groundwater or Surface Water, page 19**	➢ The potential for leachate seeps from the landfill sideslopes was considered and contingencies were provided in Section 11.1.4 of the hydrogeologic assessment for DP#7. In addition, contingency measures for surface water effects from the poplar system are presented in the Jagger Hims Limited letter of April 25, 2005, and provided in Addendum to Discussion Papers 7, 8 & 9, will be included in the final EA report.
Page 4 - Subsection 5.4.1	➢ No response required.
Page 4 - Subsection 5.4.2 **Effects Due to Discharge of Treated Leachate to Bear Creek, page 24**	➢ WM agrees with the comment.
Page 4 - Subsection 5.6 **Economics, page 34**	➢ WM agrees with the comment.
Page 4 - Section 7.0 Subsection 7.1.1	➢ The potential for basal instability was considered in the determination of the base elevation for the landfill site. Details on the calculation will be presented in the final geotechnical and hydrogeological assessment reports.

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Peer Review Comments	WM Response
Page 4 - Section 7.0 Subsection 7.1.2 **Leachate Management, page 2**	➢ The leachate collection system will be effective in preventing leachate mounding within the landfill cells. The modelling carried out to date indicates that the design is for maximum head on the primary liner of 0.15 m. Detailed calculations will be presented in the EPA documents. ➢ WM agrees that it is important that the leachate collection system be effective in preventing the mounding of leachate within the landfill cells. The EPA submission will provide design details of the leachate collection system including mounding calculations, information regarding the potential plugging of the stone drainage layer and associated mitigation and contingency measures. With specific reference to leachate recirculation, the conclusion is that recirculation simply compresses the time over which contaminants are removed from the landfill site. All conditions with respect to plugging, mounding, etc., can occur whether or not leachate recirculation is carried out. Leachate recirculation, however, has the advantage of decreasing the contaminating life span by accelerating removal of contaminants from the site. Leachate recirculation does not contribute additional contaminant mass to the landfill site, which mass amounts are fixed.
Page 5 - Subsection 7.1.3 **Surface Water Management, page 3**	➢ The reviewer brings up an important point of clarification. We confirm that surface water runoff from open areas of the site that can come into contact with waste must be directed inward to the site and captured as leachate. Surface water runoff from closed areas of the site, not in contact with waste, can be directed to the surface water ditches and surface water ponds. Details on the surface water management system will be provided as part of the EPA documentation ➢ The information presented in DP#7 assesses the concept of the system and indicates no predicted negative off-site impacts. A monitoring program based on information presented in DP#7 will be provided as part of the EPA documentation and will consider the detailed surface water system at the landfill.
Page 5 - Subsection 7.2.1 **Leachate Quantity page 6**	➢ Details on the recirculation system design will be provided as part of the EPA documentation. The hydrogeologic impact assessment considered the principles of recirculation, the effects on the contaminating lifespan of the landfill, monitoring, and contingencies. ➢ As discussed in the Addendum to DP7, the following applies to the recirculation system: ♦ Solid pipe will extend at least 15 m into the landfill site prior to transitioning to perforated recirculation pipe. ♦ Spacing is shown on the leachate gas and recirculation piping detail, Figure D8-19. ♦ Recirculation pipes will slope inward at 0.5 percent. Also, refer to additional discussion later in these responses in regard to recirculation.
Page 5 - Subsection 7.2.2 **Leachate Quality, pages 7 to 10**	➢ Appendix A, Page A1 notes that Keele Valley landfill and other sites were used for base data to determine leachate strength without recirculation. Then, the leachate strength was increased to account for the recirculation. Obviously, the strength must be predicted since the expanded Warwick site does not exist yet with the characteristics that would produce such leachate. However, when compared with literature values (Table A.10 in Appendix A of DP#8), the actual strengths of leachate appear to be similar to or less than predicted by the modelling exercise. ➢ We agree that the quality of the leachate must be considered in the design of the leachate treatment system. However, we note that the treatment system is relatively unaffected by solids loading, except that more or less sludge will be produced that must be accommodated. The contaminating life span will be determined by actual monitoring results instead of any predictions. However, best estimates are made and are presented in the hydrogeological assessment report. ➢ We agree with the reviewer that careful monitoring of the operation early in the life of the landfill as well as throughout the life of the landfill is required. Monitoring details will be provided in the EPA report.

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Peer Review Comments	WM Response
Page 5 - Subsection 7.2.3	➢ The statement refers to the chemical quality of stored leachate (treated and untreated) used in the impact assessment. Only treated leachate will be stored in ponds.
Page 5 - Subsection 8.0	➢ The statement in Section 8.0 indicates that the proposed landfill design and operations, monitoring program, and contingency system will protect the groundwater and surface water resources from a hydrogeological perspective. Thus, no further mitigation measures or enhancements to the design are required..
Page 5 - Subsection 10.1.2	➢ From a performance monitoring perspective, the parameters identified in Section 10.1.2 are reasonable indicators for monitoring potential landfill leachate effects on groundwater and surface water. We concur that leachate should be tested annually for the full suite of chemical parameters indicated in the Landfill Standards to assess the effectiveness of the leachate treatment system.
Page 5 - Subsection 10.2.1 **Groundwater Level Monitoring, page 33**	➢ The reviewer's comment respecting the monitoring of leachate levels has been noted and will be considered as part of the EPA application.
Page 6 - Subsection 10.2.2	➢ The reviewer's comment respecting the placement monitoring wells within the irrigation area has been noted and will be considered as part of the EPA application.
Page 6 - Subsection 10.3	➢ Sample collection and monitoring of surface water will be considered as part of the EPA application.
Page 6 - Subsection 11.1	➢ See comments subsection 2.1.
Page 6 - Subsection 11.2.1.1 **Hydraulic Containment, page 49**	➢ The comment regarding rationale for the Table is noted. We agree with the Reviewer that leachate levels should be measured by standpipes in addition to pressure transducers.
Page 6 Subsection 11.2.1.2	➢ The reviewer's comment respecting the identification of specific points of compliance with respect to Reasonable Use Guidelines has been noted and will be considered as part of the EPA application.
Page 7 - Table 10-1 Item (d) **Landfill Monitoring Program Additional Surface Water Monitoring Stations**	➢ The reviewer's comment respecting the placement of surface water monitoring stations has been noted and will be considered as part of the EPA application.
Page 7 - Figures 7-1 and 10-1	➢ We agree the figures should be revised to show the new landfill footprint.
Page 7 - Figures 11-1 through 11-5	➢ The approximate depth and range of each collector system will be identified in the EPA application.
Section 4.0	➢ **Discussion Paper #8, Preliminary Design, Development & Operations Plan**
Page 7 - Subsection 2.3.2 **Contaminated Soil, page 4**	➢ The reviewer's concern that contaminated soil with heavy odours not be used as daily cover will be addressed in the EPA application.
Page 7 - Item 3 **Proposed Site Plan, page 10**	➢ Refer to DP#8 Final
Page 7 - Subsection 3.1	➢ Refer to DP#8 Final

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Peer Review Comments	WM Response
Page 7 - Subsection 3.1	➢ We note the phasing drawings denote minimum excavation elevations. We note that these are preliminary and will be reaffirmed in detail in the EPA application. However, the hydrogeologist has provided preliminary elevations for guidance. No further work has been carried out in DP#8 Final, although we note that as the landfill footprint shifts westward, generally the landfill slopes down and the bottom slope of the landfill will slope westerly.
Page 8 - Subsection 3.3 **Stormwater Management, page 14**	➢ We affirm that runoff from the active landfill area (stormwater that may potentially come into contact with waste) will be directed into the site as leachate and will be separated from stormwater runoff from the rest of the site, which will be directed to the stormwater management ponds within the disturbed area of the site.
Page 8 - Subsection 3.6.1	➢ Wood is anticipated to be processed at least twice per year and accordingly would not exceed six months' storage on site.
Page 8 - Subsection 3.6.2 **Composting, page 17**	➢ Compost material, once completed, will not be stored on site longer than three (3) months, but will either be removed by local residents who want the material, or it will be used for beneficiation of cap material or on stockpiles, etc.
Page 8 - Subsection 3.7 **Existing Landfill, page 18**	➢ Refer to DP#8 Final
Page 8 - Section 4.0 Subsection 4.1.2	➢ The reviewer's comment respecting the spacing of the leachate collection pipes in both the primary and secondary leachate collection layers has been noted and will be considered as part of the EPA application. ➢ The layout of the primary leachate collection system will be finalized in the EPA documents. We affirm that leachate will be removed and treated or recirculated as it is generated. This mode of operation is required to minimize head on the base of the landfill, which is a design objective.
Subsection 4.3 **Leachate Recirculation, age 37, 39**	➢ We agree that leachate would not be aggressive on an engineered clay liner. However, in the sense of chemical resistance on leachate collectors for instance, stronger leachate could be more detrimental to collector pipes when compared with lesser strength leachate. ➢ As noted in the May 2005 Addendum, Subsection 2.4, the following characteristics pertain to the leachate recirculation system. These items will be described in further detail as part of the EPA application. ♦ The recirculation piping will slope inward to promote drainage of recirculation water into the landfill instead of toward the outer slopes, which could result in leachate seeps. ♦ Modelling has indicated that a combination of infiltration and leachate recirculation will be limited to approximately 200 mm per annum flow through the waste in the long term. Because of the clayey nature of the site and heavy compaction, the rate of sustained recirculation is not anticipated to be large once the initial waste is brought to field capacity. If the waste is initially relatively dry, additional water will be required to bring the waste to field capacity, which could mean higher recirculation rates initially. ♦ Removal of daily cover or interim cover on the waste over which new waste is to be landfilled will break the hydraulic barrier for infiltration or recirculation water. This operation will ensure effective wetting of the waste through recirculation or infiltration to prevent/minimize localized perched water table conditions within the site. ♦ Moisture conditioning of incoming new waste would be based on the amount of water calculated to bring the waste near to, but still short of, field capacity. Laboratory tests on representative waste samples, would determine gate moisture content. The amount of additional water to bring the waste to near field capacity can then be calculated. ♦ Recirculation of water into the waste through the horizontal pipes would not commence on waste above grade until the final cap has been applied. Waste below grade could have recirculation carried out before capping the upper waste.

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Peer Review Comments	WM Response
Page 7 - Subsection 4.4 **Leachate Quality, page 39**	➢ The basic reference to assess recirculation was the HELP model. The other underlying assumptions are indicated in Appendix A, Leachate Characterization. Subsection A.9 discusses the second method to model recirculation. This method is simply a spreadsheet/mass balance calculation. Table A.10 compares predicted results with some literature values from bioreactor information.
Page 9 - Subsection 4.4 **Leachate Quality, page 40**	➢ The reviewer is referred to Tables 6 and 6A of the May 2005 Addendum, which includes additional parameters requested by the Peer Review Team. The frequency of testing and exact analytes will be discussed and decided in the EPA-level documents. Subsection 2.5 of the May 2005 Addendum, Discharge Criteria for Additional Parameters, agreed that PAHs should be included in the semi-annual monitoring of the treatment plant effluent, and only added to routine monitoring if problematic.
Page 9 - Subsection 4.5.1	➢ Refer to DP#8 Final.
Page 9 - Subsection 4.5.2.1 **Poplar Forest System Requirements, page 41**	➢ WM acknowledges the reviewer's acceptance of the use of poplars as a method of leachate treatment. Regarding references on poplars, we refer you to "Consolidated Report, Leachate Management Plan, Warwick Landfill, Warwick Township" prepared by Henderson, Paddon Environmental Inc., July 2001, for the existing site and in regard to the existing poplar forest project. More than 100 references were provided in that report in regard to poplars. We do not agree with the comment that the method of treatment on a poplar forest is untried since there are many references and case studies. ➢ The EA contemplates periodic harvesting operations at ten year or more intervals. The harvested trees will be suitable for use as lumber or, in the case of smaller limbs, wood chips. This operation is likely to occur either once or twice during the active operations of the landfill and not expected to create a significant impact on operations.
Page 9 - Subsection 4.7 **Residuals Management, page 49**	➢ The weight of dry solids in the sludge is estimated to be 8,160 kg/day. Before drying, the sludge will be approximately 32,600 kg/day at a solids content of approximately 25 percent. Drying to at least 50 percent solids was anticipated in DP#6 and DP#8, resulting in about 16,300 kg/day for off-site disposal or solidification. Table 4.4B indicated 17,500 kg/day (anticipating sludge dried to about 50 percent solids). ➢ Long-term trucking on a five day/wk. Basis is anticipated to amount to 5.6 trucks/wk, half the number would be required if the sludge were completely dried. ➢ As we anticipate the process at present, concentrate from the treatment unit would be directed to the dryer unit, where heat will be used to drive off the water, and any vapours will be directed to the methane gas flare for incineration. All sludge will be retained in enclosed tankage, and any emissions will be captured and sent to the flare. No impact on leachate quality is anticipated as a result of residuals management. Since emissions are captured, no odours are anticipated from sludge handling. ➢ It is our understanding that sludge from the treatment system would not be deemed hazardous. However, for the purposes of initial treatment, we have assumed off-site disposal at a suitably-licensed site for sludge solids. As noted, once actual sludge is available, solidification possibilities will be examined. If the sludge could be solidified through the addition of cement, lime, fly ash and other additives, and could be demonstrated to not leach, the solids would likely be relandfilled.
Page 9 - Section 6.0 Subsection 6.1 **Site Closure, page 56**	➢ Refer to DP#8 Final

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Peer Review Comments	WM Response
Page 9 - Subsection 6.2 **End Use Options, page 56**	➢ In the Addendum to DP#7 WM provided a broad range of end use options based the physical features that will remain post closure and the anticipated adjacent land uses. This information is sufficient to conduct the EA and specific scenarios will be developed through public consultation. The principles for public consultation described in the Addendum will be included in final DP9.
Page 10 - Subsection 6.2 **Report Figures**	➢ Refer to DP#8 Final
DP9 Page 10 - Subsection 3.2	➢ See Section 4.7 **Ordered Implementation** dealing with the ordered implementation of impact management methods.
Page 10 - Subsection 4.1	➢ Detailed monitoring plans will be detailed in the EPA documents.
Page 10 - Subsection 4.2	➢ Detailed contingency plans will be detailed in the EPA documents.
Page 10 - Subsection 4.5	➢ Ontario Regulation 232/98 requires financial assurances to be submitted as part of the EPA documents. The requirements and what the financial assurances are to cover are clearly laid out in Regulation 232/98. ➢ The potential costs to implement alternative polishing treatment in the event of failure of the poplar forest would be covered by the contingency cost, which is specified in Regulation 232/98.
Page 10 - Subsection 2.4 **April 25, 2005, Addendum to Discussion Papers 7-9**	➢ Statements are noted. ➢ The recirculation rate of 100 mm per year is reasonable considering the long term. However, as noted above, this should also be considered in conjunction with the infiltration rate. Also, if the waste is dry, then recirculation may be increased initially to get the waste to near field capacity. Accordingly, a firm commitment at recirculation at 100 mm per year is premature before EPA design.. Sufficient flexibility in operation must be retained to allow some variation in this figure.
Page 11 - Subsection 2.8 **Reconfigure landfill footprint to avoid wood lot**	➢ WM has decided to retain a significant portion of the woodlot to provide additional screening of the landfill operations from the adjacent cemetery by redefining the footprint of the landfill. Only about 2.5 ha of wood lot would be removed under the present proposal, compared to 5.5 ha in the original design. The Natural Environment analysis of the woodlot indicates that there is little existing ecological value to this feature. The additional retained area provides a larger area in which regionally significant species can be transplanted and increases the area that can be rehabilitated. The additional woodlot area, particularly following enhancement, will provide additional screening for the adjacent cemetery. ➢ The reviewer's comment supporting WM's decision not to excavate municipal waste from Cells 7, 9 and 11 is noted.
Page 11 - Subsection 3.16 **Reasonable Use Guidelines**	➢ WM recognizes the reviewer's acceptance WM's commitment that groundwater will meet Reasonable Use Guidelines at landfill property boundaries.
Page 11 - Subsection 3.17 **PWQO at the site boundaries**	➢ WM recognizes the reviewer's acceptance WM's commitment that surface water will meet PWQO or background conditions at the landfill property boundary.
Page 11 **Table 6 (Revised May 16/05)**	➢ See response to Subsection 2.1.
Page 12 **Table 6A (Revised May 18/05)**	➢ The reviewer's comment respecting the potential PWQO exceedance has been noted and will be considered as part of the EPA application.
Page 12 **Figure SK206**	➢ Refer to DP#8 Final ➢ Proposed routing of ditches around the landfill will be developed as part of the EPA application.

Appendix 2. Air Quality Assessment

Peer Review Comments	WM Response
Page 7, Section B	➢ The Reviewer has found the methodology and approach contained in the assessment to be appropriate and to reflect current practice. As noted, additional impact assessment is being undertaken to incorporate revised emission rates and to reflect the revised landfill footprint. As agreed with the Reviewer, the new assumptions are more realistic but less conservative i.e., reflect lower rates of emission. The revised modelling therefore expected to significantly reduce the predicted impacts. ➢ Discussion of baseline conditions is included in the Air Quality Impact Assessment Background Document (Section 5). The assessment includes background dust emissions from all roadway sources. Given the nature of the area, dust is the only background emission of concern and road dust contributes a majority of the background dust levels. Background conditions are therefore appropriately accounted for in the analysis. ➢ Monitoring recommendations are discussed below.
Page 8, **Excavating Cells**	➢ The decision by WM not to excavate waste cells was made in response to community concern, and is expected to reduce the potential for odour.
Predicted Exceedances	➢ The PRT agreed to revised dust and Hydrogen Sulphide emission rate assumptions that are significantly lower than the original assumptions. With the revised modelling assumptions, there will be no predicted landfill gas emissions in excess of air quality criteria. ➢ We also expect to see significant improvement in dust results based on the revised modelling, though there may be predictions of dust in excess of guidelines from time to time. It is important to note however, that the dust emission guidelines do not strictly apply to the method of evaluation used in the EA. Many of the dust sources considered for the EA will not be included in the regulatory compliance assessment used in the EPA. From a regulatory point of view full compliance is anticipated. ➢ As in the original modelling, no exceedances of any other air quality guideline is predicted.
Footprint Location	➢ The shift in landfill footprint will be accounted for in the additional modelling being undertaken.
Page 8, 4th paragraph **Modelling Assumptions**	➢ All modelling assumptions have been detailed in the Air Quality Impact Assessment Background Document. Mitigation measures are defined in Section 7, including those that have been built into the modelling and the additional measures that have been qualitatively assessed. With regard to dust mitigation, specific details of mitigation used for road watering are provided in Appendix A. A copy of a dust emission spreadsheet for Year 1, West Entrance was provided to the reviewer to examine the source references and calculations.
Page 8 , bullet 1	➢ The definition of 'in the site vicinity' and 'along the haul route' is provided in section 3.1 and 3.2 of the Air Quality Impact Assessment Background Document.
Page 8, bullet 2	➢ The potential for cumulative effects was considered. In the case of dust impacts, the flare emissions are miniscule when compared to the other dust sources and the flare is physically remote from the other dust emissions. Therefore the additive impact would be an academic exercise only difficult to assess. Similarly, roadway combustion sources are physically removed from other combustion sources, a cumulative assessment would not be of value to the impact assessment.
Page 8, bullet 3	➢ The issue of background levels is discussed above.
Page 8, bullet 4	➢ A discussion of meteorological data are provided in Section 4.1 of the Air Quality Impact Assessment Background Document. Analysis of 54 years of data showed 1996 as representative of long term normals, and 1996 was therefore used in the analysis. An enhanced discussion of this will be included in the final EA documents.

Appendix 2. Air Quality Assessment

Peer Review Comments	WM Response
Page 8, bullet 5 Page 9 bullet 1	➢ The on-site treatment of leachate through evaporation/distillation and chemical treatments is a closed system with no emissions to air. No further air impact analysis is required. ➢ The discussion of potential emissions from all other leachate treatment options is provided in Section 4.6 of the Air Quality Impact Assessment Background Document. All relevant emission sources were incorporated into the analysis.
Page 9 **Reduced Scale**	➢ WM will consider reduced scale as a mitigation measure if predicted impacts are considered unacceptable.
Page 9, second paragraph **Dust Impacts**	➢ The issue of background levels is discussed above as well as in Section 5 of the Air Quality Impact Assessment Background Document.
Page 9, third paragraph **Odour Impacts**	➢ WM is committed to an appropriate odour monitoring program. There is a discussion of proposed odour monitoring in the Air Quality Impact Assessment Background Document 7.6.2. WM will provide further detail in the EPA application documents.
Page 9, fourth paragraph **Composting Facility**	➢ Further detail regarding operation of the composting facility will be provided in the EPA documents.
Page 9 **Health Risk Assessment**	➢ The Health Risk Assessment will consider the revised air quality modelling. Given the anticipated reduction in predicted emissions, however, no change in the health risk conclusions is anticipated.
Page 9, fifth paragraph **Monitoring**	➢ WM is committed to an appropriate air quality monitoring program. WM will provide further detail in the EPA application documents.
Page 9, sixth paragraph **Mitigation**	➢ WM will consider additional mitigation measures if required. The operational details associated with these practices will be provided in the EPA documents.
Page 9, seventh paragraph **Compensation**	➢ WM has provided the rationale for individual impact compensation in draft DP9.
Page 10 bullet 2	➢ Residences will be examined for eligibility for compensation when the results of remodelling are available.
Page 10 bullet 3	➢ Comment noted.
Detailed Comments	➢ The detailed editorial comments provided in Appendix 2 will be considered and appropriate edits made to the final documentation as required. Points of clarification for DP9 will also be considered as the document is finalized and the CCA is developed.
Page #: 3-4 Section: Table 1 - Para. # : 3	➢ **PM2.5 and PM10 – annual basis** –see the following references from the U.S. EPA: ♦ U.S. Environmental Protection Agency (U.S. EPA) (1996). Air Quality Criteria for Particulate Matter, Volumes 1-3. Office of Research and Development, National Centre for Environmental Assessment, Research Triangle Park, NC. EPA/600/P-95/001a-cf. ♦ U.S. Environmental Protection Agency (U.S. EPA) (1996). National Ambient Air Quality Standards for particulate matter: proposed rule. Fed. Reg. 61, 65638-65713. ♦ U.S. Environmental Protection Agency (U.S. EPA) (1996). Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information (OAPQS Staff Paper). Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA/452/R-96/013.

Appendix 3. Health Risks Assessment

Peer Review Comments	WM Response
Page #: 3-1 Section: 1.0 - Para. # : 2	➢ **Surface Water Pathway** – evaluation of the surface water pathway is beyond the scope of the Human Health Risk Assessment (HHRA) as defined in the original Terms of Reference (TOR). The MOE required WMCC to evaluate human health risks related to air emissions as part of the TOR phase of the EA process.
Page #: 3-1 Section: 1.0 - Para. # : 3	➢ **Vectors** – As required by the MOE and the TOR, the focus of the HHRA was chemical related emissions and risks.
Page #: 3-1 Section: 1.0 - Para. # : 4	➢ **Air Quality Impact Deficiencies** – any significant changes to the air quality assessment will be considered within the revised HHRA. ➢ The statement regarding inclusion of background is not correct; Figures 6-11 and 6-12 provide results for facility alone and facility plus existing (background).
Page #: 3-1 Section: 1.0 - Para. # : 6	➢ **Lower Fill Rates Not Assessed** – The results of the impact assessments do not indicate that lower fill rates need to be considered as a mitigation measure.
Page #: 3-2 Section: 1.0 - Para. # : 7	➢ **Footprint Change** – The potential change in air quality impact and health effects due to the footprint change will be addressed.
Page #: 3-3 Section: Table 1 - Para. # : 1	➢ **Future Scenarios** – the date and scenario years are consistent with other components of DP#7 (most notably the AQ assessment); the HHRA will be modified to maintain consistency with the AQ assessment; this issue will be discussed as part of the uncertainties section of the HHRA.
Page #: 3-3 Section: Table 1 - Para. # : 2	➢ **Deterministic vs. Stochastic** – agreed, the HHRA will be modified to correct this inconsistency.
Page #: 3-3 Section: Table 1 - Para. # : 3	➢ **Fill Rate and Life Time** – Extended landfill operating life has been addressed in DP7 Section 6. Conclusions regarding potential for human health impacts would not change under this scenario.
Page #: 3-3 Section: Table 1 - Para. # : 4	➢ **Table. 'Crustal Material'** – only road related dust was considered crustal; other sources of dust were minor compared to road related sources;
Page #: 3-3 Section: Table 1 - Para. # : 5	➢ **Acute Receptors** – agreed, this will be considered the revised HHRA report; consideration will be given to receptors spending up to 8 hr/day at these non-residential locations
Page #: 3-3 Section: Table 1 - Para. # : 6	➢ **Receptors** – the HHRA relied on the AQ assessment and did not reproduced maps provided in the AQ report; consideration will be given to receptors spending up to 8 hr/day at these non-residential locations.
Page #: 3-4 Section: Table 1 - Para. # : 1	➢ **Pathways – Water** – evaluation of the surface water pathway is beyond the scope of the Human Health Risk Assessment (HHRA) as defined in the original Terms of Reference (TOR). The MOE required WMCC to evaluate human health risks related to air emissions as part of the TOR phase of the EA process.
Page #: 3-4 Section: Table 1 - Para. # : 2	➢ **Vehicular Tailpipe Emissions** – the revised HHRA will consider any significant changes to the air quality assessment including revisions to particulate modelling.

Appendix 3. Health Risks Assessment

Peer Review Comments	WM Response
Page #: 3-4 Section: Table 1 - Para. # : 3	➢ **PM2.5 and PM10 – annual basis** –see the following references from the U.S. EPA: ♦ U.S. Environmental Protection Agency (U.S. EPA) (1996). Air Quality Criteria for Particulate Matter, Volumes 1-3. Office of Research and Development, National Centre for Environmental Assessment, Research Triangle Park, NC. EPA/600/P-95/001a-cf. ♦ U.S. Environmental Protection Agency (U.S. EPA) (1996). National Ambient Air Quality Standards for particulate matter: proposed rule. Fed. Reg. 61, 65638-65713. ♦ U.S. Environmental Protection Agency (U.S. EPA) (1996). Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information (OAPQS Staff Paper). Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA/452/R-96/013.
Page #: 3-4 Section: Table 1 - Para. # : 4	➢ **'Exceedance of PM10 is Slightly Greater than PM2.5'** – agreed, this will be modified.
Page #: 3-4 Section: Table 1 - Para. # : 5	➢ **Background Inclusion** - The statement regarding inclusion of background is not correct, Figures 6-11 and 6-12 provide results for facility alone and facility plus existing (background).
Page #: 3-4 Section: Table 1 - Para. # : 6	➢ **Site Characterization** – Revised site characteristics will be addressed.
Page #: 3-5 Section: Table 1 - Para. # : 1	➢ **area receptors for farm produce 'mean of all discrete receptors'** – with the exception of 4 receptor locations (16, 17, 18, 19), all receptor locations are situated in rural areas indicative of typical Ontario farmland and were assumed to be representative of farming locations in the vicinity of the landfill.
Page #: 3-5 Section: Table 1 - Para. # : 2	➢ **Averaging Exposure vs. Averaging Dose** – different life stages and unique exposure patterns were considered; given the averaging factors used, the impact of exposure patters is masked by duration of exposure considerations; this uncertainty will be discussed in greater detail.
Page #: 3-5 Section: Table 1 - Para. # : 3	➢ **Average Background for Particulate** – the HHRA relied on data provided by RWDI; this concern is noted and will be discussed in the revised report.
Page #: 3-5 Section: Table 1 - Para. # : 4	➢ **Table – Outdoor Air** – noted.
Page #: 3-5 Section: Table 1 - Para. # : 5	➢ **Table ND** – the table will be modified to indicated that these values were not reported (NR) by the MOE DWSP program for the Sarnia water treatment plant.
Page #: 3-5 Section: Table 1 - Para. # : 6	➢ **Table** – data was readily available from the Sarnia water plant #1 and as a result these data was used in the background assessment. No local drinking water data was identified.
Page #: 3-5 Section: Table 1 - Para. # : 7	➢ **AAQC as Exposure Limit Values, Especially for Particulate** – agreed.
Page #: 3-5 Section: Table 1 - Para. # : 8	➢ **Footnote 'b'** – noted.
Page #: 3-6 Section: Table 1 - Para. # : 1	➢ **Acute Assessment** – agreed, this will be noted as an uncertainty.

Appendix 3. Health Risks Assessment

Peer Review Comments	WM Response
Page #: 3-6 Section: Table 1 - Para. # : 2	➢ **Figure Title** - noted
Page #: 3-6 Section: Table 1 - Para. # : 3	➢ **SO2 Acute Impacts** - the revised HHRA will consider any significant changes to the air quality assessment including revisions to particulate modelling.
Page #: 3-6 Section: Table 1 - Para. # : 4	➢ **'Worst Case'** – agreed, a better discussion of uncertainties will be provided in the revised report, and the scenario will not be referred to as 'worst case'.
Page #: 3-6 Section: Table 1 - Para. # : 5	➢ **Crustal vs. Combustion and CWS Standard** – agreed, this will be noted in the revised assessment.
Page #: 3-6 Section: Table 1 - Para. # : 6	➢ **Uncertainties** – agreed, the report will be modified to reflect this concern.

Appendix 4. Traffic Impacts Assessment

Peer Review Comments	WM Response
Page 1 Section 1.0 - Para. 4	➢ The estimated future 726 heavy vehicles and 93 other vehicles (2-way traffic) per day on C.R. 79 represent the highest or "worst case" landfill site traffic generation scenario along this particular section of roadway. During most times of the year, the traffic volumes would be significantly lower. As shown in Table A-1 (attached), the <u>average</u> expected total landfill traffic activity would be about one-third of the <u>peak</u> site traffic activity. Focusing on the section of C.R. 79 south of Hwy 402, it means that the average 2-way daily trips would be approximately 216 heavy trucks and 37 other vehicles. Given the same estimated 2005 background traffic documented in our DP7, the WM heavy vehicles would represent, on average, 6% of the **total** traffic on C.R. 79. As the background traffic increases in the future, this heavy vehicle percentage will decrease. For example, the forecast traffic indicates that the <u>peak</u> amount of WM heavy vehicles will represent about 10% of the total C.R. 79 traffic in the year 2030.
Page 1 Section 1.0 - Para. 5	➢ It is acknowledged that there will be an increase in the number of trucks along C.R. 79. A figure showing the increase in heavy trucks would not reflect the day-to-day, seasonal, and other variations that could occur since the surveys of the current site traffic activity were carried out during typical (average) operations. The forecast volumes documented for assessment were based on a "worst case" traffic generation scenario. To put the increase into perspective, the existing (1998/1999 data) average number of loads of waste is about 92 vehicle loads and it is projected to grow to an average of 156 vehicle loads with a peak of 471 vehicle loads. The majority (95%) of these vehicles would be using C.R. 79 to/from Hwy 402.
Page 2 Section 1.0 - Para. 1	➢ The recommended speed change was from the current posted maximum speed limit of 90 km/hr to 60 km/hr and may add about 1 minute and 20 seconds to the travel time. This speed limit reduction may not be necessary in light of other recommended improvements to the Hwy 402/C.R. 79 interchange. Other recommended improvements include "lifting" of the Hwy **402**/C.R. 79 interchange ramp intersections to achieve appropriate sight distances, a northbound to eastbound ramp from C.R. 79 to Hwy 402, and signalization of the north ramp intersection. The future speed limit on C.R. 79 should be decided by the appropriate agencies. Similar roads in the County such as C.R. 21 have a posted maximum speed limit of 70 km/hr.
Page 2 Section 1.0 – Para. 2	➢ WM is committed to providing safe access and facilities to its staff and the community. They will work with the approving agencies to implement the recommended improvements on C.R. 79. Without some of the recommended improvements such as the turning lanes, the potential safety implications could be significant and it would be in the interest of WM and the travelling public to implement these facilities for the safe operation of the site and background traffic. An assessment of the safety impacts in the absence of these improvements would not be effective for the process since the improvements are considered necessary.
Page 3 Section 1.0 – Para. 1	➢ Selection of the C.R. 79 access option included an analysis of all environmental criteria as documented in DP7 Section 3. Traffic flow was one perspective and WM believes that the mitigation measures will minimize disruption to C.R. 79 through traffic. Other factors including noise, dust, public input and other social impacts contributed to the **preference** for the C.R. 79 access. In addition, the Township's Official Plan encourages land uses that generate high volumes of traffic including truck traffic to be located along arterial roads, and the movement of truck traffic through the municipality on arterial roads rather than on collector or local roads. Given the volume of traffic generated by the proposed landfill expansion, the use of Zion Line (local road) was considered less desirable.
Page 3 Section 1.0 – Para. 2	➢ Queuing on Zion Line is currently being addressed through management and scheduling, and the proposed queuing lane will ensure that queuing on Zion Line is not a problem. The proposed lane is subject to review under the C of A amendment process and no change to the landfill expansion impact assessment is deemed necessary .

Appendix 4. Traffic Impacts Assessment

Peer Review Comments	WM Response
Page 3 Section 1.0 – Para. 3	➢ Preference for the C.R. 79 access is not solely based on traffic requirements. With the proposed access design to accommodate separate inbound (southbound left turn and northbound right turn) lanes, and a northbound acceleration lane on C.R. 79 for outbound right turns, queuing on C.R. 79 is not expected. In addition, adequate internal site stacking **space** for trucks and operational measures (WM has experience at various sites) will be used to manage the queues if necessary. Current improvements on Zion Line do not affect the decision on the preferred access location.
Page 3 Section 2.0 – Para. 4	➢ C.R. 79 was resurfaced in 1999 with an expected lifespan of about 20 years. At the time of writing DP7 the pavement was only about 3 years old. Nevertheless, it was recommended that further investigation and a more detailed **geotechnical** study be conducted to determine the deficiencies/needs of C.R. 79 along the haul route so that mitigation measures (resurfacing, reconstruction, etc.) can be determined and carried out prior to the initial operating year.
Page 3 Section 2.0 – Para. 5	➢ Appendix A of the DP7 – Transportation Impact Assessment contains a figure showing the approximate accident locations by year. More details on the collision rate calculations will be provided in the Final Report. The accident rates were compared with Highways 21 and 4, however, a more sizable group of data for these 2 roads will be provided.
Page 3 Section 2.0 – Para. 6	➢ Determination of sight line guidelines are based on the height of a passenger car driver's eye level and the tail light of a **passenger** car. Viewing distance from a truck driver's eye level over the C.R. 79 crest vertical curve at the Hwy 402 interchange would be more of an advantage, however, we have applied the more conservative (lower height) passenger car eye height in determining the sight distance needs. Improvement to the Hwy 402/C.R. 79 interchange by "lifting" the ramp intersections to achieve the standard sight distances is recommended. Reduction of the posted speed limit will be an option for the approving agencies.
Page 3 Section 2.0 – Para. 7	➢ As indicated in DP7 – Transportation Impact Assessment, historical data show that there does not appear to be any precipitating factors that might lead to an increase in collision rates. With the increase in number of heavy vehicles and growth in background traffic, the number of collisions will may increase, however, the recommended road improvements including turning lanes and interchange improvements will help to mitigate the collision rate.
Page 4 Section 3.0 – Para. 2	➢ Generally access for new developments would be desirable from a local road for access management purposes. However, given the high volume of cars and heavy trucks expected from the proposed landfill expansion, access from a higher order roadway is preferred for this development. This is supported by the Township's Official Plan and TAC design guidelines that suggest that local rural roads should handle less than 1,000 vehicles per day (vpd). With the proposed landfill traffic, the total daily volume on Zion Line could be above 1,000 vpd.
Page 4 Section 3.0 – Para. 3	➢ It is agreed that C.R. 79 is an important link between Watford and Hwy 402, however, the decision to recommend the C.R. 79 access is based on a combination of factors. The quality of traffic flow and safety is addressed through the mitigation measures such as turning lanes.
Page 4 Section 3.0 – Para. 4	➢ Separate inbound (southbound left turn and northbound right turn) lanes entering the site from CR79 is proposed, along with sufficient stacking space inside the site. Queuing on C.R. 79 is not anticipated.
Page 4 Section 3.0 – Para. 5	➢ WM is committed to work co-operatively with the public sector and address any future landfill related traffic issues. Reference to traffic issue monitoring will be added to DP9 and Monitoring and Contingency plans as required will be described in the EPA documentation.

Appendix 5. Natural Environment Issue Summary

Peer Review Comments	WM Response
Page 12 (d) **Natural Environment** Para 1	➢ As stated, WM will ensure that surface water discharge will meet background or Provincial Water **Quality** Objectives.
Para 2	➢ Analysis of the woodlot indicates that there is little existing ecological value to this feature. In response to **community** requests and the Interim PRT comments however, WM revised the landfill footprint in order to retain a portion of this woodlot. Discussion with the PRT did not indicate that full retention was necessary. The additional retained area provides a larger area in which Regionally rare species can be transplanted and increases the area that can be rehabilitated. The additional woodlot area, particularly following enhancement, will provide additional screening for the adjacent cemetery.

Appendix 6. Visual Impacts Assessment

Peer Review Comments	WM Response
Page 1 Section 1.0 - Para. 1	➢ General: the visual impacts resulting from the proposed landfill expansion have been acknowledged and examined in DP7 and background documents. These have been taken into consideration in the Social Impact Assessment.
Page 1 Section 1.0 - Para. 2	➢ The comment reflects the reviewer's assessment of significance. The visual impact assessment provides detailed documentation of anticipated visual impacts.
Page2 Section 1.0 - Para. 1	➢ Details of the additional mitigation (plantings) will be provided as part of the EPA documentation. It is acknowledged that the visual impact of the landfill cannot be fully mitigated.
Page2 Section 1.0 - Para. 2	➢ An energy from waste facility has not been proposed. The potential impact of a landfill gas utilization facility will be examined under a separate application should WM pursue this opportunity.
Page2 Section 1.0 - Para. 3	➢ As stated in the EA ToR, reduction in the height of the landfill will only be considered as a mitigation measure if the impact of the proposed undertaking is considered to be unacceptable. Given the overall analysis provided by the social and economic disciplines as to the affect of the visual presence of the landfill, and the magnitude of volume reduction that would be required to make a significant difference in the visual impacts, WM did not consider height reduction as a necessary or reasonable mitigation measure.
Page2 Section 2.0 - Para. 1	➢ Mitigation measures have been provided to integrate the landfill elements where possible.
Page2 Section 1.0 - Para. 2	➢ Addendum 1 to DP4 (April 2003) described the method for considering the two access options. This method was followed and presented in DP7. The comparison of overall impacts of landfill expansion under the two access options supports the selection of CR79 as the preferred entrance location.
Page2 Section 2.0 - Para. 2	➢ Comment noted. DP7 will be revised to be consistent with the visual impact assessment determination that the poplar plantation will not provide a year round effective screening. ➢ All visual impact mitigation measures will be illustrated, and further detail provided in the EPA documents and figures.
Page3 Section 2.0 - Para. 1	➢ The assessment was based on the Facilities Characteristics document DP8 prepared by Henderson Paddon, which provided berms as base mitigation. Trees were recommended as additional mitigation with a subsequent assessment of net effects. WM is committed to this additional mitigation and details of the additional mitigation (plantings) will be provided as part of the EPA documentation.
Page 3 Section 3.0 - Para. 1	➢ Depiction of Impacts – The photo realistic simulations are in no way related to the measurements which were undertaken for the assessment. The photo simulations are summer conditions only because our best quality photographs were taken in the summer.
Page 3 Section 2.0 - Para. 2; Bullet 1	➢ Comment noted, the Final Visual Assessment technical report and DP7 will note the potential for change in visual impacts following landfill closure.
Page 3 Section 2.0 - Para. 3; Bullet 2	➢ As noted in the Appendix Tables, detailed recommendations for impact mitigation are provided in the Visual Assessment technical report. The Tables will be reviewed to ensure consistency with the Technical report and DP7, 8 & 9.
Page 3 Section 2.0 - Para. 3; Bullet 3	➢ The assessment was based on the Facilities Characteristics DP6 prepared by Henderson Paddon which provided berms as base mitigation. Trees were recommended as additional mitigation with a subsequent assessment of net effects. WM commitments to visual impact mitigation are presented in DP8 , p. 28. Other visual impact mitigation measures will be investigated and evaluated during the preparation of EPA documentation.

Appendix 6. Visual Impacts Assessment

Peer Review Comments	WM Response
Page 3 **Section 3.0 -** Para. 1	➢ Depiction of Impacts – The photo realistic simulations are in no way related to the measurements which were undertaken for the assessment. They are summer conditions only because our best quality photographs were taken in the summer.
Page 3 Section 3.0 - Para. 2	➢ MITIGATION – The assessment was based on the Facilities Characteristics document prepared by Henderson Paddon, which provided berms as base mitigation. Trees were recommended and accepted as additional mitigation with a subsequent assessment of net effects. Details of the additional mitigation (plantings) will be provided as part of the EPA documentation.
Page 3 Section 3.0 - Para. 3	➢ IMPACTS ON LANDSCAPE – Noted.
Page 4 Section 3.0 - Para. 4	➢ IMPACTS ON WOODLOTS – Our assessment is based on a number of reasonable assumptions. In our opinion, it is reasonable to assume that the significant woodlands indicated on our plan would remain. In our opinion, it is likely that future removal of significant screening vegetation would be brought to the attention of the Public Liaison Committee for follow-up by Waste Management.
Page 4 Section 3.0 - Para. 5	➢ INCONSISTENCIES / UNCERTAINTIES – Section 4.2.1 Study Assumptions clearly indicates the assumptions regarding mitigation which were taken into consideration for the assessment (berms without trees). Section 5 and Figure 5-1 clearly define proposed additional mitigation, with a subsequent description of the net effects following implementation of the additional mitigation.
Page 4 Section 3.0 - Para. 6	➢ IMPACTS – The social impact assessment considered the potential community impacts associated with the landfill, including the physical presence in the landscape.
Page 4 Section 3.0 - Para. 7	➢ LONG TERM IMPACTS: Comment noted. The final reports will address post closure visual impacts.

Appendix 7. Noise Impacts Assessment

Peer Review Comments	WM Response
Page #15 Paragraph c) Summary	➢ The approach that has been proposed in the Noise DP-7 is consistent with the provincial sound level limit requirements for landfill sites. The approach has been well defined since the inception of the project and the objective sound level limit criteria has not been changed since that time. ➢ Additional information will be provided to clarify details on sound level measurements, and hourly traffic volumes. In addition, noise contours for both the ambient sound environment and haul route generated noise conditions will be provided for further clarification of predicted impacts. This work will be included in the updated Noise Assessment and final DP-7.
Page #15 Paragraph c) End Use, Monitoring	➢ An assessment of noise impacts following closure will be discussed in Final DP7 and the Noise Assessment. ➢ The potential noise impacts due to possible end uses of the landfill will be assessed and mitigation will be outlined accordingly, if required. This information will contribute to the consultation process and selection of end use and ensure that the end use satisfies relevant provincial noise requirements. ➢ Details of a noise monitoring program will be provided in the EPA documents and referenced in the final DP-9.
Page #16 Mitigation and Compensation	➢ Based on our analysis and sound level predictions, and as supported by the agricultural discipline, we do not expect an adverse noise impact on businesses including farming operations. Significant mitigation measures have been implemented as part of the Noise Management Plan for the proposed Landfill Expansion. These measures will be outlined in the final DP-7 and Noise Assessment, and details provided in the EPA submission. ➢ Compensation has only been considered following mitigation measures.
Appendix 7 Key Findings	➢ Additional information, particularly hourly representation of proposed haul route traffic and current/future baseline noise will be provided. Noise increases at the various receptors will be presented accordingly. ➢ Noise Contour data illustrating haul route noise levels and current/future baseline will also be provided in the final Noise Assessment. ➢ The potential noise impacts due to possible end uses of the landfill will be assessed and mitigation will be outlined accordingly, if required. This information will contribute to the consultation process and selection of end use and ensure that the end use satisfies relevant provincial noise requirements ➢ Details of a noise monitoring program will be provided in the EPA documents and referenced in the final DP-9. ➢ As stated in DP9, Governing Principle #1 all reasonable efforts will be taken to reduce or address negative effects through implementation of mitigation measures. Mitigation has been provided to meet the provincial regulatory requirements and where practical, mitigation has been prescribed for further reduction of levels below the MOE limit. This will be clarified in the updated EA. ➢ Based on our analysis and sound level predictions, and as supported by the agricultural discipline, we do not expect an adverse noise impact on businesses including farming operations. Significant mitigation measures have been implemented as part of the Noise Management Plan.

Appendix 7. Noise Impacts Assessment

Peer Review Comments	WM Response
Appendix 7 Page 2 Comments on DP-7 Assessment of Noise Impact	➢ DP-7 does not apply the rationale, as stated by the reviewer, that if the MOE limits are met, there will be no adverse impacts. The analysis recognizes that some impacts may exist and further clarification will be provided in this regard. Further, the term 'impact' is not solely defined by change in sound exposure, as some degree of change will very likely result in no impact. Below a given threshold sound level there will be little to no likelihood of noise impact, regardless of the increase in level. This point will be elaborated upon in the final noise analysis and DP-7. ➢ Hourly Noise Assessment: We agree that the MOE Noise Guidelines require that a predictable worst case be outlined. This objective has been met and the MOE Noise Guidelines have been satisfied. There are no specific quantitative Noise Guidelines for the assessment of haul route traffic – simply Policies defined by MOE. These policies have been addressed in the analysis. Further information that examines hourly sound level scenarios will be provided. The predicted increases above ambient will be reported accordingly as required by MOE policy, with the understanding that there is not substantive quantitative noise level guideline requirement for haul route traffic as there is for 'stationary' sources of noise. According to MOE Landfill Guideline (publication no. 3651e), the purpose of the haul route analysis is to select a haul route that results in minimum noise increases for affected receptors. The recommended haul route is from the proposed Landfill site entrance off County Road 79, north to Highway 402. This route currently already comprises truck and it is clearly the best route based on the analysis presented in DP7. ➢ Clarification needed. An insignificant difference such as 1dB difference (53 vs. 54 dBA) is often most easily explained by 'rounding' error. This will be clarified.
Appendix 7: Page 3 Haul Route Noise Assessment	➢ The first two paragraphs reiterate points that have already been discussed. ➢ Comparison with Current Ambient Noise Environment: A 45 dBA sound level is a valid expectation for a daytime ambient noise environment in a rural area. Additional details on the sound measurements will be provided in the updated work in regard to the assessment of noise levels with and without the existing landfill and additional information to support the prevailing condition(s) for any reported measurements. ➢ It is worthwhile to reiterate that a given increase above a given ambient level does not necessarily define an impact. There exist threshold levels where changes in levels below this threshold result in little to no change in potential annoyance; hence, no impact. Further clarification on noise level increases and impacts will be reported in the updated DP7/Noise/EA. Clarification on the background noise measurements will also be provided; but it should be made clear that the MOE Noise Guideline requirements do not have a minimum daytime hourly ambient sound requirement of less than 45 dBA in any of their publications. Therefore, the 45 to 55 dBA representation of ambient levels at R2 is quite realistic, and in keeping with the requirements of the MOE Guidelines.
Appendix 7, Page 4	➢ Missing Information: An assessment of noise impacts following closure will be discussed in Final DP7 and the Noise Assessment. ➢ The potential noise impacts due to possible end uses of the landfill will be assessed and mitigation will be outlined accordingly, if required. This information will contribute to the consultation process and selection of end use and ensure that the end use satisfies relevant provincial noise requirements. ➢ Noise contour information for the haul routes and background conditions will be provided. Further clarification on sound measurements will be provided. The PRT conclusions regarding measured levels at R2 are erroneous and additional explanation will be provided. The acoustic model is reliable; it has been accepted and adopted by MOE. ➢ The last two paragraphs of Page 4 deal with haul route noise, contours, and these issues have been addressed accordingly. The information requested, namely contours will be provided and distributed to the other disciplines to confirm their conclusions regarding disturbance to terrestrial and aquatic ecosystems. A great deal of this information has been provided and it is our understanding that the magnitude of the impacts generated by landfill site will not have any adverse impacts to the (terrestrial or aquatic) ecosystems nor to wildlife or livestock or businesses including farming.

Appendix 7. Noise Impacts Assessment

Peer Review Comments	WM Response
Appendix 7, Page 5	➢ Contour information as requested will be provided. Beyond 500 m, sound levels are sufficiently low that no impact is anticipated – this point will be substantial upon further review. ➢ Conclusions on Impacts. Noise impact is not solely attributable to change in noise levels but is also a function of threshold levels above which change may occur. The comprehensive methodology established in DP4 for impact assessment outlines a set of tools to be used by the impact assessment consultants, including • Compliance with regulatory standards • Detailed monitoring • Past experience; and • Professional judgment ➢ It is clear that where regulatory standards exist, impacts will be stated in relation to compliance with the standard. However, compliance with guidelines and standards should not be viewed in isolation from other components of the methodology developed to consider how much of an expansion is environmentally appropriate. In the noise assessment, is important to note that the MOE regulatory requirements are satisfied but some increases above ambient, due to either haul route traffic and/or landfill activities will occur. This has been reported in the Noise DP-7 and by other supporting disciplines as well. Professional judgement and experience of the consultant team is then applied to determine the mitigation requirements and to assess the significance of potential net impact.
Appendix 7, Page 5 Mitigation:	➢ Mitigation measures are described in the existing technical support for Noise. Additional details will be provided in the EAP documents; such as berm heights, equipment sound level verification, localized shielding details and equipment restrictions to reduce any nighttime impacts (if and where applicable) to within acceptable limits as defined by MOE Landfill criteria for nighttime operations (1900-0700). The appropriate NPC criteria have been applied for sources other than landfill conveyance (i.e., ancillary diversion activities, etc.). The mitigation measures outlined results in satisfaction of the MOE sound limits and in many cases, sound levels have been reduced to well below the MOE criterion. Additional mitigation will be investigated and where practical, recommendations will be made to further reduce sound levels. ➢ We agree that WM cannot require residents to accept noise mitigation measures on their properties; however, the offer can be made.
Appendix 7, Page 6 Discussion Paper No. 9	➢ Details of the proposed noise monitoring program will be provided in the EPA application documents and provisions for such a program will be referenced in the Final DP-9. ➢ Mitigation Needed: This section of the PRT report references several MOE guidelines ranging from land use planning directives LU-131 reference to developer's responsibility, stationary noise source guidelines to landfill design noise guidelines, and applies them to haul route noise assessment. This interpretation and use of the MOE Noise Guidelines is not appropriate for the case at hand. The haul route is a transportation corridor that is to be used by many entities; WM is not privy to its use. It is not a stationary noise source and to suggest that it be treated as such is a misappropriate use of the MOE Noise Guidelines. The MOE Noise Guidelines have been met in terms of landfill activities, the design complies with the Landfill Noise Design Standards as well as meets the appropriate NPC noise guidelines for stationary sources for the ancillary facilities such as the Diversion area. In addition, the MOE policy on haul route selection on the basis of minimum impact has also been addressed. Significant mitigation has been provided to reduce noise levels to, and in many cases well below, the MOE sound limit. This mitigation is a reasonable approach to minimize impact. ➢ MOE has developed the Noise Guidelines for Landfill Sites to ensure that compliance or satisfaction of the provincial sound limit requirements is sufficient to minimize impact potential for proposed landfill activity and this guideline has been respected in the proposed design.

Appendix 8. Archaeology and Heritage Assessment

Peer Review Comments	WM Response
Page 1 - Item #1	➢ No response required.
Item #2	➢ No response required.
Item #3	➢ Our baseline report states that 100% of the 1999 work on the original project study area was completed, not 94% as indicated by the Reviewer: 88.1% assessed by pedestrian survey, 5.7% by test pit survey, and 6.2% with no potential due to wet, low-lying topography which can not be surveyed. WM subsequently added the "King Property" to the site boundary; survey coverage for that property is now 85% complete and will be finished very shortly. The complete survey information will be provided in the revised Archaeology analysis report.
Item #4	➢ No response required.
Item #5	➢ The rating system used was adequate and appropriate to the scope of the project and meets industry standards. The relative value of resources – in general terms -- was determined by considering a number of factors, including age, integrity, historical and architectural significance and community interest. Numerical values were not assigned given the general nature of historic research on each feature at this stage of work. A more finely tuned level of detail would only be required if the significance of each feature was to be determined with respect to anticipated disruptions or displacements. Some of the details of the evaluation criteria and process were contained on page 13 of the background report and the reviewers may not have seen them -- see PRT item 6.
Item #6	➢ The two blank pages in the report (pages 13 and 18) do contain information. The copy reviewed seems to have contained a printing error. The final version of the report will contain all of the necessary information.
Item #7	➢ Recommendations with respect to mitigation are contained in the heritage summary and will be incorporated into the final version of DP#7. The recommended mitigation strategy acknowledged that a "do-nothing" option, preserving the heritage landscapes, would be the preferred form of mitigation from a heritage standpoint. It is understood, however, that given the intended future development the likelihood for no disturbances to the entire agricultural landscape is remote. ➢ It is recommended therefore, that in detailed site planning, every effort be made to control direct and indirect effects resulting from the introduction of physical, visual, audible or atmospheric elements not in keeping with the heritage attributes of the former rural landscape. It is also recommended that agricultural elements be actively incorporated into the evolving future landscape. Nevertheless, the net effect is that significant on-site impacts are anticipated for two agricultural landscapes of high heritage value. ➢ Note that there are only six CLUs identified in the report, although one more CLU will be added to the final report as a result of information provided at a PIC.
Item #8	➢ No features have been identified under either of Parts IV or V of the Ontario Heritage Act. This will be made more explicit in the final document.
Item #9	➢ The principle investigators are Mary MacDonald, MA, Manager, Built Heritage, Cultural Landscape and Planning Section, CAPHC and Robert Pihl, MA, Anthropology, licenced archaeologist (P057) member of CAPHC, Senior Archaeologist and Manager of EA Division, Archaeological Services Inc. These reference will be provided in the revised background documents.

Appendix 8. Archaeology and Heritage Assessment

Peer Review Comments	WM Response
DP#7 Archaeology Item #10	➢ Note that 10 sites were identified at the time of writing Draft DP7, however only seven require a Stage 3 assessment. The other three have been cleared of further archaeological concern. ➢ While the impact assessment for archaeology was incomplete at the time of the review, this should not be considered problematic. At this time 11 sites now are considered to have archaeological significance, and one or two more may be added once the survey of the woodlot is completed. All of these sites will be subjected to a Stage 3 assessment to further evaluate their archaeological significance, the nature of their deposits and the need to develop a mitigation strategy, if necessary. The actual number of sites requiring full-scale mitigation will likely be quite small. None of the sites identified to date are currently considered to have potential to substantially impact the proposed undertaking, as all sites could be easily mitigated using conventional archaeological methods.
Item # 11	➢ As noted in DP#7, mitigation options are available to address identified archeological resource finds. No net impact, that is impact remaining following mitigation, is anticipated.
Item # 12	➢ Mitigation as described in the heritage summary is adequate to address the loss of the agricultural lands that will be affected. Although they are of high heritage value, they are not rare surviving examples and thus sensitive planning of natural and visual impact mitigation will be sufficient (See item #7).
DP #9 Item #13	➢ Agreed. Final recommendations regarding Archaeology and Built Heritage/Cultural Landscape will be considered and included as appropriate in final DP#9 and EPA documents.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 1 Section 1.1 - Para. 3	➢ The Agricultural Impact Assessment will be updated to include the areas associated with the landfill's ancillary facilities.
Page 1 Section 1.2	➢ The common type of agricultural use that characterizes the Study Area is relatively compatible with the proposed landfill expansion, compared to other forms of intensive or specialized agricultural production or residential uses. ➢ As stated in the Agricultural Impact Assessment report: ♦ *"Due to the nature of agricultural production in the area and the design of the proposed landfill and its associated mitigation measures and monitoring programs, negative impacts on agricultural operations and activity in the area will be managed to a low and acceptable level."*
Page 1 Section 1.3	➢ WM is aware of the limited occurrence of these types of production within the Study Area. The agricultural feedback survey specifically asked about crop types and asked for specification of any special certification or contractual requirements that might apply. ➢ The occurrence of commercial vegetable production (Hogervorst) was identified in the Agricultural Production Baseline mapping and was specifically discussed in the Agricultural Impact Assessment Air Quality Section. It is located at the extreme limit of the Study Area, approximately 3.0 km from the landfill (beyond Highway 402.) ➢ There is some limited organic crop production (King) also situated at the extreme limit of the Study Area. Neither of these types of production are expected to have any landfill visual, odour or nuisance affects that would affect production. ➢ There is no recognized concentration of specialty crops grown in the vicinity of the landfill that might be particularly sensitive to visual, odour or other nuisance effects. There are no known restrictions on crops grown under contract or on certified organic crop production that may occur in proximity to a landfill. ➢ The Human Health Risk Assessment (HHRA) for the proposed landfill expansion incorporates the consumption of locally grown produce in dietary intake. This assessment indicates that the likelihood of health impacts arising from exposure to landfill emissions is negligible.
Page 1 Section 1.4	➢ The Agricultural Impact Assessment considered both visual and odour impacts. The predominant type of agricultural production in the area is not operationally sensitive to either visual or odour impacts.
Page 1 and 2 Section 1.5	➢ Refer to the following excerpts from the Agricultural Impact Assessment Report (Section 3.4.3): ♦ *The RWDI analysis indicates a limited potential for litter deposition on lands east of the landfill site. To avoid the risk of harvesting hazards to machinery, it is recommended that WM adopt a litter management program and a monitoring program to identify and remove any litter from neighbouring farm fields. Litter cleanup operations should be conducted in a manner that avoids crop damage and soil compaction. This program should incorporate an early spring and late summer litter inspection and pickup so that spring planting and fall harvesting is not impeded by any litter accumulation in adjacent agricultural fields (section 6.2).* ♦ *The ongoing monitoring and pickup of blown litter throughout the year and especially prior to planting and harvesting operations will significantly reduce the potential for impact associated with litter deposition in agricultural fields. WM should encourage communications with surrounding farm operators in order to ensure timely removal of litter prior to agricultural field operations* ➢ Waste truck traffic utilizing the haul route will be covered, minimizing litter from this source. WM recognizes the importance of this issue and the Agricultural Impact Assessment Report and DP8 will be revised to specifically refer to monitoring for litter along the haul route.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 2 Section 1.6	➢ The Peer Review reference to an increase of more than 800 landfill vehicles per day is not correct. As noted in Table A-1 attached, average site activity will require 114 trucks/day, including short and long haul trucks and leachate tankers, as well as 50 small vehicles and cars for a total of 164 vehicles/day; during peak site activity there will be up to 383 trucks/day and 125 small vehicles for a total 508 vehicles daily. ➢ The agricultural assessment addresses potential problems relating to slow moving farm machinery. Specific field and facility access and potential farm parcel linkages were assessed as part of the impact assessment. (See Section 3.1 of the Agricultural Impact Assessment Report) and related haul route design recommendations were provided. ➢ Cansult observed and documented farm machinery movements as described in Section 4.1.2.3 of their Transportation Assessment Baseline Conditions Report. ➢ The Transportation Assessment indicates that conflict between agricultural and non-agricultural traffic has been minimal. Traffic collision records for Highway 402, Lambton County Road 79 and Zion Line did not indicate any collisions involving agricultural equipment between 1993 and 2000. ➢ The proposed haul route design upgrades and improvements will enhance the safe usage of road shoulders by slow moving agricultural vehicles. ➢ Public consultation and survey feedback expressed general concerns about increased traffic, however, no information on specific operational constraints were provided.
Page 2 Section 1.7 - Para. 3	➢ Mitigation measures will be implemented to control nuisance impacts on agriculture from rodents at source, including maintenance of the site in a satisfactory condition to limit attraction to rodents. ➢ An ongoing complaint monitoring and response procedure will alert WM of any residual problems allowing them to proactively deal with specific incidents of concern. These measures will minimize the net impact on neighbouring agricultural properties. ➢ Gulls occur commonly within agricultural areas, they are attracted to field cultivation, tillage and harvesting operations. Gulls as disease vectors are primarily of concern for poultry facilities involved in open range feeding. Such production does not occur within the vicinity of the proposed landfill expansion.
Page 2 - Section 1.8 - Para. 4	➢ The Property Value Protection Plan will apply to farms, including farm properties that do not have a residence or farm building on the property.
Page 2 0 - Section 1.9 - Para. 5	➢ Farm business owners will be eligible for nuisance compensation payments according to the criteria established for eligibility under those programs.
Page 2 Section 1.10 - Para. 6	➢ Rodents, vermin, gulls, and landfill related traffic will be monitored in accordance with specific monitoring procedures that will be developed as part of the E.P.A. approval process.
Page 2 Section 1.11 - Para. 7	➢ Specific end use options will be evaluated as part of a planning process that will be undertaken closer to the time of closure. Any proposed non-agricultural land uses would be subject to land use approvals that will require an assessment of potential agricultural impacts.
Page 2 Section 1.13 - Para. 9	➢ The Agricultural Impact Assessment concludes that, beyond the area of landfill expansion and associated ancillary facilities, agricultural productivity and the predominantly of agricultural land use will remain largely unchanged. With agricultural land productivity and product quality predicted to be unaffected in the vicinity of the landfill, a reduction in agricultural investment or production restrictions are not anticipated. The type of common field crop and livestock production that currently characterizes the area will continue to dominate the area. ➢ Any future end uses or agricultural or related spin-off uses, including opportunities for specialized agricultural production associated with landfill energy sources, will be subject to future approvals and related agricultural impact assessments.
Page 2 Section 1.14 - Para. 10	➢ The Agricultural Impact Assessment will be revised to include additional data and analysis associated with the WM response to the Peer Review.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 2 Section - Para. last	➢ The Property Value Protection Plan will apply to farms, including farm properties that do not have a residence or farm building on the property. ➢ Farm business owners will be eligible for nuisance compensation payments according to the criteria established for eligibility under those programs
Page 3 Section 2.0 - Para. 1 Executive Summary and Para 4 - 5.4.8 Displacement:	➢ The statement in the Executive Summary – Natural Environment and Resources, pp i-iii, will be revised to include a preface, as follows: "Beyond the loss of prime agricultural land…" ➢ The revised statistics with respect to agricultural land loss will include the landfill leachate treatment facilities and the poplar plantation treatment area.
Page 3 Section 2.0 - Para. 2 "Even though…"	➢ Executive Summary will be revised to incorporate agricultural impact reference.
Page 3 Section 2.0 2.3 Study Areas…	➢ The 1 km (site vicinity) and 3 km (in the community) study areas, as set out in the Agricultural Baseline Study Report, appropriately encompass a sufficient area to assess off-site impacts associated with the proposed landfill expansion and to characterize agricultural production and land use within the community. ➢ The agricultural land base and related land use patterns are very consistent in terms of crop rotations and production facilities found adjacent to and surrounding the proposed expansion site. Expansion of the Study Areas in relation to ancillary leachate treatment facilities, stockpiles, berms and poplar plantations would not result in any significant change in off-site agricultural baseline conditions or impact assessment findings. ➢ The potential impacts of these facilities are quite site-specific with respect to loss of prime agricultural land. These impacts are being incorporated into the revised agricultural assessment report.
Page 3 and 4 Section 2.0 - Para. last (of pg 35.5.11 Compatibility…	➢ Agricultural lands will be displaced, however, other land use conflicts between the proposed landfill expansion and surrounding agricultural uses will be managed to a low and acceptable level.
Page 4 Section 2.0 - Para. 25.6 Summary of Economic Impacts	➢ On the basis of the Agricultural Impact Assessment studies and with the proposed nuisance impact controls, monitoring and compensation programs and Property Value Protection Plan, it has been concluded that negative impacts on agricultural operations and activities will be managed to a low and acceptable level, without residual negative economic impacts on farms. ➢ The Property Value Protection Plan would offset any perceptions that might dissuade the establishment of new farms.
Page 4 Section 2.0 - Para. 3 5.6.2 Disruption to Business…	➢ WM is aware of the limited occurrence of these types of production within the Study Area. The agricultural feedback survey specifically asked about crop types and asked for specification of any special certification or contractual requirements that might apply. ➢ The occurrence if commercial vegetable production (Hogervorst) was identified in the Agricultural Production Baseline mapping and was specifically discussed in the Agricultural Impact Assessment Air Quality Section. It is located at the extreme limits of the Study Area, approximately 3.0 km from the landfill (beyond Highway 402.) ➢ There is some limited organic crop production (king) also situated at the extreme limits of the Study Area. Neither of these types of production are expected to have any landfill visual, odour or nuisance impacts affecting production. ➢ There is no recognized concentration of specialty crops grown in the vicinity of the landfill that might be particularly sensitive to visual, odour or other nuisance effects. There are no known restrictions on crops grown under contract or on certified organic crop production that may occur in proximity to a landfill. ➢ The Human Health Risk Assessment (HHRA) for the proposed landfill expansion incorporates the consumption of locally grown produce in dietary intake. This assessment indicates that the likelihood of health impacts arising from exposure to landfill emissions is negligible.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 4 Section 2.0 - 2nd paragraph of 5.6.2 Disruption…	➢ The Reviewer quotes the rationale for impact criterion. The economic analysis examined the potential for farm business impact and concluded that no net impact is anticipated.
Page 4 Section 2.0 - Para. 5 "The last sentence… "A community information program…""	➢ The "community information program" referred to in the peer review team comment is described in Discussion Paper #9 (Section 5.4) as "Community Relations Measures". These measures consist of a public liaison committee, an information sharing component and a complaints management procedure.
Page 4 Section 2.0 - Para. 6 5.6.3 Property Value Effects…	➢ The Property Value Protection Plan will apply to farms, including farm properties that do not have a residence or farm building on the property.
Page 4 Section AIA Summary Para. 7 "The overall characterization…."	➢ The Agricultural Impact Assessment Summary in DP7 will be revised to reflect the conclusion that agricultural impacts will be managed to a low and acceptable level. ➢ The bullets that follow this introductory summary statement will be revised to state: ♦ After consideration of recommended landfill design and operations, impact mitigation and monitoring programs; and ♦ "In recognition of the: ♦ Unavoidable loss of some agricultural land on WM property; and ♦ Minimal net operational effects on area agricultural operations.
Page 4 and 5 Section AIA Summary Para. last (4) and first (5)Integration with other disciplines	➢ The agricultural analysis also integrated input from economics and transportation disciplines. There was no integration with the visual discipline due to the lack of visual impact sensitivity associated with agricultural crop and livestock production in the vicinity of the proposed landfill expansion. ➢ Input from the agricultural discipline was provided to the natural environment and resources, social, and economics disciplines. The Agricultural Impact Assessment Summary will be revised accordingly.
Page 5 Section AIA Summary Para. 2 Major Findings	➢ The increased area of displacement of agricultural land will be revised according to the new data being gathered for ancillary areas.
Page 5 Section AIA Summary Para. 3 "The second paragraph in…"	➢ As mapped and described in the Agricultural Baseline Reports, former agricultural buildings on Lot 19, Concession III, are already retired and therefore are not subject to retirement as a consequence of landfill expansion.
Page 5 Section AIA Summary Para. 4 "the Air Quality Section…"	➢ Odour concerns for agricultural operations were not raised in any of the public participation input, including Small Group Meetings, Community Contact Interviews, Mail Back Surveys, and Public Meetings. Farm gate sales of fresh produce were not observed or reported within the 1,000 m to 1,500 m distance from the site. ➢ Litter impacts on adjacent farmlands will be mitigated by a litter management and monitoring program as recommended by the Air Quality discipline; this will be noted in the Agricultural Impact Assessment Summary.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 5 Section AIA Summary Para. 5 "The Economic Section…"	➢ The data and analysis is provided in the Agricultural Impact Assessment Report and Economic Impact Assessment.
Page 5 Section AIA Summary Para. 6 " The land use subsection…"	➢ The common type of agricultural use that characterizes the Study Area is relatively compatible with the proposed landfill expansion, compared to other forms of intensive or specialized agricultural production or residential uses.
Page 5 Section AIA Summary Para. 7 "In the…"	➢ Specialized, intensive forms of agricultural crop production, beyond the common field crops that predominate in this area, include vegetable field crops. Only one commercial scale producer (i.e.: limited occurrence) was documented in the Baseline Study. This operation is situated at the extreme limit of the Study Area (Hogervorst). ➢ Livestock and poultry farms that are common to this area are not included as specialized forms of agricultural crop production.
Page 5 + 6 Section AIA Summary Para. last (5), first (6) "The Traffic Subsection…"	➢ Please see the Traffic Subsection (3.1) of the Agricultural Impact Assessment Report.
Page 6 Section AIA Summary Para. 2 "Proposed Mitigation…"	➢ The Agricultural Impact Assessment Report and DP9 (Impact Management Plan) provide a full analysis of potential impacts, mitigation, and net effects.
Page 6 Section AIA Summary Para. 3 Site Entrance Evaluation	➢ The AIA (Section 5.0) recognized that: ♦ "Smaller roadways such as Zion Line are commonly preferred by agricultural equipment travel, as compared to larger roadways such as Highway 79. However, there is only a short section of Zion Line within the haul route and therefore, agricultural traffic conflict along this short section of Zion Line is not anticipated." The agricultural analysis recognized the potential for a minor difference in safety however concluded that the difference in routes was insignificant.
Page 6 Section App. A 1(b) Para. 4	➢ The indicators include "Identification of potential road safety issues related to landfill traffic". This indicator would include any farm related issues.
Page 6 Section App. A – 2(a) Para. 5	➢ The updated Agricultural Impact Assessment tables will be revised to include the areas associated with the landfill's ancillary facilities.
Page 6 Section App. A - 3(a) Para. 6	➢ Although identified as a general concern about landfill expansion, no specific problems with vermin associated with the existing landfill were identified in the Mail Back Survey.
Page 6 Section App. A – 3[c] Para. 7	➢ Some agricultural lands will be displaced, however, other land use conflicts between the proposed landfill expansion and surrounding agricultural uses will be managed to a low and acceptable level.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 6 + 7 Section App. A – 4(a) Para. last[6] +first[7]	➢ WM is aware of the limited occurrence of these types of production within the Study Area. The agricultural feedback survey specifically asked about crop types and asked for specification of any special certification or contractual requirements that might apply. ➢ The occurrence if commercial vegetable production (Hogervorst) was identified in the Agricultural Production Baseline mapping and was specifically discussed in the Agricultural Impact Assessment Air Quality Section. It is located at the extreme limits of the Study Area, approximately 3.0 km from the landfill (beyond Highway 402.) ➢ There is some limited organic crop production also situated at the extreme limits of the Study Area. Neither of these types of production are expected to have any landfill visual, odour or nuisance impacts affecting production. ➢ There is no recognized concentration of specialty crops grown in the vicinity of the landfill that might be particularly sensitive to visual, odour or other nuisance effects. There are no known restrictions on crops grown under contract or on certified organic crop production that may occur in proximity to a landfill. ➢ The Human Health Risk Assessment (HHRA) for the proposed landfill expansion incorporates the consumption of locally grown produce in dietary intake. This assessment indicates that the likelihood of health impacts arising from exposure to landfill emissions is negligible.
Page 7 Section App. A – 4(a) Para. 2 “Also Under Impact”	➢ No ingestion is anticipated, however if damages do occur they would be subject to nuisance compensation.
Page 7 Section App. A – 4(a) Para. 3 “Reasons for the…”	➢ Reasons for these statements within the Economics Net Effects Table 4(a) – Disruption to Businesses are provided in the Economic Impact Assessment Report.
Page 7 Section App. A – 4(a) Para. 4 + 7 Para 4 – “Under mitigation…” + Para 7 – “Property Value Effects…”	➢ The “community information program” is described in Discussion Paper #9 (Section 5.4) as “Community Relations Measures”. These measures consist of a public liaison committee, an information sharing component and a complaints management procedure. There is no geographic limit for the community relations measures. Communications can include, for example, notices in local newspapers which would have a relatively wide distribution in the community.
Page 7 Section App. A - 4(a) Para. 5 “Good on-site management…”	➢ This is presently, and will continue to be, standard procedure.
Page 7 Section App. A - 4(a) In consideration…	➢ The net effects and conclusions are appropriate.
Page 7 Section App. A – 4(a) Para. 8 (last) “It is not clear if…”	➢ The Property Value Protection Plan will apply to farms, including farm properties that do not have a residence or farm building on the property.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 8 Section App. A Para 1 – "Disruption to businesses…" Para 2 – "Under mitigation…" Para 3 – "In consideration of the above…" Para 5 – "Agriculture: under "mitigation"…"	➢ Comments noted, the Table will be revised.
Page 8 Section App. A Para. 4 + 6 Para 4 – "4(b) Property value effects…"	➢ The Property Value Protection Plan will apply to farms, including farm properties that do not have a residence or farm building on the property.
Page 8 Section App. E Para. 7 "Farm operation owners…"	➢ Farm business owners will be eligible for nuisance compensation payments according to the criteria established for eligibility under those programs.
Page 8 Section App. E Para. 8 "Reference to a community…"	➢ The "community information program" is described in Discussion Paper #9 (Section 5.4) as "Community Relations Measures". These measures consist of a public liaison committee, an information sharing component and a complaints management procedure. There is no geographic limit for the community relations measures. Communications can include, for example, notices in local newspapers which would have a relatively wide distribution in the community.
Page 8 Section App. E Para. 9 "The two bullet…"	➢ *Edits noted.*
Page 8 Section 3.0 Para. 10 'General…"	➢ There are no crops being grown along the haul route that are particularly sensitive to spray effects. ➢ There are no specialty crops with precise microclimatic requirements being grown adjacent to the landfill. ➢ Interim agricultural use of areas awaiting phased landfill development is anticipated.
Page 8 Section 3.0 - Para. 8 (last) "Also noted as missing…"	➢ Specific end use options will be evaluated as part of a planning process that will be undertaken closer to the time of closure. Any proposed non-agricultural land uses would be subject to land use approvals that will require an assessment of potential agricultural impacts.
Page 9 Section 3.0 - Para. 1 "1.0 Introduction, p.1…"	➢ A repeated and consistent occurrence of common field crop rotations and livestock production facilities with similar impact profiles was observed surrounding the proposed landfill expansion and was assumed to occur in all sectors of the Study Areas. ➢ In the site vicinity (1 km), the number of farms was determined. In the community (3 km), general patterns of agricultural production were documented to characterize agricultural use.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 9 Section 3.0 Para. 2 "As indicated in…"	➢ The Agricultural Impact Assessment concludes that, beyond the areas of the landfill, agricultural productivity and the predominance of agricultural land use in the area will remain largely unchanged. ➢ Non-agricultural land uses that might result from the landfill, would be subject to future approvals and related agricultural impact assessments.
Page 9 Section 3.0 Para. 3 "Also omitted…"	➢ Specific end use options will be evaluated as part of a planning process that will be undertaken closer to the time of closure. Any proposed non-agricultural land uses would be subject to land use approvals that will require an assessment of potential agricultural impacts.
Page 9 Section 2.1 - Para. 4	➢ This study area is included within the "Site Vicinity" and "In the Community" Study Areas.
Page 9 Section 2.2 - Para. 5	➢ The Agricultural Impact Assessment considered both visual and odour impacts. The predominant type of agricultural production in the area is not operationally sensitive to either visual or odour impacts.
Page 9 Section 2.2 - Para. 6 "Reference is made…"	➢ We consider the reference made in the AIA to be appropriate.
Page 9 Section 3.0 - Para. 7	➢ These were provided to the PRT in our May 2005 response to preliminary inquiries. The criteria will be included in the final report.
Page 9 Section 3.1.1 - Para. 8	➢ Critical farm machinery movements typically involve owned or leased land parcels that are closely linked operationally, requiring constant movement between the linked parcels. An example would be a farm facility with buildings on both sides of a roadway, resulting in daily movements back and forth. No such circumstances were identified. The haul route design will not prevent or significantly delay routine farm machinery movements associated with cropping operations in the area.
Page 10 Section 3.1.4 - Para. 1	➢ The agricultural assessment does address potential problems relating to slow moving farm machinery. Specific field and facility access and potential farm parcel linkages were assessed as part of the impact assessment. (See Section 3.1 of the Agricultural Impact Assessment Report). Related haul route design recommendations were provided. ➢ Section 4.1.2.3 of the Transportation Assessment Baseline Conditions Report documented farm machinery movements and the Transportation Assessment indicates that conflict between agricultural and non-agricultural traffic has been minimal. Traffic collision records for Highway 402, Lambton County Road 79 and Zion Line did not indicate any collisions involving agricultural equipment between 1993 and 2000. ➢ The proposed haul route design upgrades and improvements will enhance the safe usage of road shoulders by slow moving agricultural vehicles. ➢ The Peer Review reference to an increase of more than 800 landfill vehicles per day is not correct. Average site activity will require 114 trucks/day, including short and long haul trucks and leachate tankers, as well as 50 small vehicles and cars for a total of 164 vehicles/day; at peak site activity there will be up to 383 trucks/day and 125 small vehicles for a total 508 vehicles daily. (Table A-1) ➢ Public consultation and survey feedback expressed general concerns about increased traffic, however, no information on specific operational constraints were provided.

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Peer Review Comments	WM Response
Page 10 Section 3.1.4 - Para. 2 "Potential haul route impacts…"	➢ The haul route from Highway 402 is quite short, representing a minimal intrusion into the agricultural area. With the proposed design of the haul route and access, farm business traffic to agribusinesses situated just north of Watford on CR 79 will be able to continue. Agricultural traffic heading south from Zion Line to these businesses would only experience approximately 360 m of the haul route.
Page 10 Section 3.2.1 - Para. 3	➢ WM is aware of the limited occurrence of these types of production within the Study Area. The agricultural feedback survey specifically asked about crop types and asked for specification of any special certification or contractual requirements that might apply. ➢ The occurrence of commercial vegetable production (Hogervorst) was identified in the Agricultural Production Baseline mapping and was specifically discussed in the Agricultural Impact Assessment Air Quality Section. It is located at the extreme limits of the Study Area, approximately 3.0 km from the landfill (beyond Highway 402.) ➢ There is some limited organic crop production (King) also situated at the extreme limits of the Study Area. Neither of these types of production are expected to have any landfill visual, odour or nuisance impacts affecting production. ➢ There is no recognized concentration of specialty crops grown in the vicinity of the landfill that might be particularly sensitive to visual, odour or other nuisance effects. There are no known restrictions on crops grown under contract or on certified organic crop production that may occur in proximity to a landfill. ➢ The Human Health Risk Assessment (HHRA) for the proposed landfill expansion incorporates the consumption of locally grown produce in dietary intake. This assessment indicates that the likelihood of health impacts arising from exposure to landfill emissions is negligible.
Page 10 Section 3.2.1 - Para. 4 "Since it is reported…"	➢ The type of common field crop production identified along the haul route is not sensitive to the levels of dust emissions predicted for the haul route.
Page 10 + 11 (top) Section 3.2.2 Para. 5, 6 + 7	➢ We are not aware of any restrictions on contractual or certified organic production that relates to dust. The Ontario Ministry of Agriculture and Food administers and enforces a number of provincial statutes designed to minimize food safety risks. None of these specify limitations or setbacks from landfill sites in Ontario. ➢ For organic production, concern is primarily focused on contamination from neighbouring farm areas that may be using herbicides or pesticides or, in some cases, genetically modified crop cultures. If contamination is suspected, the certification body may require chemical residue or genetic analyses. Dust soiling from haul route traffic is not a major concern given the dusty nature of agricultural operations and of rural gravel roadways. ➢ Dust soiling of the Hogervorst vegetable operation on Egermont Road, north of the 402, is not predicted to affect sales. If the reviewer is aware of other commercial farm gate sales in closer proximity that have recently initiated operations, or that have otherwise been left unidentified during the baseline inventory and subsequent public survey, meeting and participation process, these should be identified now in order to assess potential impacts.
Page 10 + 11 Section 3.2.2 Para. 6, 7 (pg 10) and 1 (page 11) "In addition to assessing… + "The documented assessment…"	➢ The most sensitive forms of specialty crop production that would demonstrate some potential loss of opportunity at locations within close proximity of any landfill would be "pick-your-own" or similar forms of fresh produce fruit and vegetable operations that deal with "Farm Gate" sales. ➢ There is no evidence in the land use observations or Agricultural Census data to suggest such production is now present or likely in the future to concentrate in this area. There are no unique soil or microclimatic attributes, local canneries, or nearby urban markets to prompt such production.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 11 Section 3.3.2 - Para. 2	➢ Edit noted, in the event of a contingency situation any change to surface water affecting supply for livestock "will" be mitigated by supplying alternative sources of water. This could involve provision of new wells depending on the circumstances involved. The report states that tile drainage impacts or disruption would be mitigated.
Page 11 Section 3.3.2 - Para. 3 + 4 "It is reported that…"	➢ Water table fluctuations of less than 0.5 m are predicted at all but the west boundary where the fluctuation is predicted to be less than 1.0 m. Agricultural tile drainage typically has a similar (beneficial) effect in the crop-rooting zone. ➢ The soil moisture bank in these clay soils is held tightly and is routinely replenished by surface rainfall. In dry periods, these fine-textured soils allow for very little water movement and do not rely on capillary action from below for moisture replenishment of the crop-rooting zone.
Page 11 Section 3.4 - Para. 5	➢ The Agricultural Impact Assessment considered both visual and odour impacts. The predominant type of agricultural production in the area is not operationally sensitive to either visual or odour impacts. ➢ Feedback from the small group meetings, community meetings, interviews and mail back surveys did not identify consumer perceptions affecting product sales as an issue.
Page 11 Section 3.4.1 - Para. 6	➢ As stated in the Agricultural Impact Assessment Report: "There are no noise sensitive mink or open range poultry production activities in the vicinity of the proposed landfill expansion." Swine and poultry are housed in barns with relatively high levels of background (ventilation) noise. Cattle and horses habituate quickly to any repetitive noise sources. As noted in the Addendum to DP7 the noise and agricultural consultants have considered this issue. Any additional information will be provided in the final Agricultural assessment however no new conclusions have been reached on this issue.
Page 11 Section 3.4.2 - Para. 7 + 8	➢ Please refer to the following excerpts from the Agricultural Impact Assessment Report (Section 3.4.3): ♦ *The RWDI analysis indicates a limited potential for litter deposition on lands east of the landfill site. To avoid the risk of harvesting hazards to machinery, it is recommended that WM adopt a litter management program and a monitoring program to identify and remove any litter from neighbouring farm fields. Litter cleanup operations should be conducted in a manner that avoids crop damage and soil compaction. This program should incorporate an early spring and late summer litter inspection and pickup so that spring planting and fall harvesting is not impeded by any litter accumulation in adjacent agricultural fields (section 6.2).* ♦ *The ongoing monitoring and pickup of blown litter throughout the year and especially prior to planting and harvesting operations will significantly reduce the potential for impact associated with litter deposition in agricultural fields. WM should encourage communications with surrounding farm operators in order to ensure timely removal of litter prior to agricultural field operations* ➢ Waste truck traffic utilizing the haul route are to be covered, preventing litter. Despite this, the Agricultural Impact Assessment Report will be revised to specifically refer to monitoring for litter along the haul route. ➢ Due to the consistency of common field crop and livestock production in the area surrounding the proposed landfill expansion, sensitivity to litter impacts does not vary substantially.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 12 Section 3.4.2 - Para. 1 + 2 "Despite the reference…" + "The identification of…"	➢ Mitigation measures will be placed into effect to control impacts at source, including maintenance of the site in a satisfactory condition to limit attraction to rodents. ➢ For all potential nuisance impacts, an ongoing complaint monitoring and response procedure will alert Waste Management of any residual problems allowing them to proactively deal with specific incidents of concern. These measures will minimize the net impact on neighbouring agricultural properties. ➢ Any specific problems relating to rodents should be reported and corrective measures and/or loss compensation will be provided where appropriate. ➢ Gulls occur commonly within agricultural areas. They are attracted to field cultivation, tillage and harvesting operations. As mentioned, gulls as disease vectors are primarily of concern for poultry facilities involved in open range feeding. Such production does not occur within the vicinity of the proposed landfill expansion. As for concerns about gulls eating worms in farm fields and defecating on farm crops, feeding areas, structures and equipment,
Page 12 Section 3.4.3 - Para. 3	➢ "Specialized" production refers to specialty crop production. Specialty crops, as defined in the Provincial Policy Statement (2005), includes crops such as tender fruits (peaches, cherries, plums), grapes, other fruit crops, vegetable crops, greenhouse crops, and crops from agriculturally developed organic soil lands. As set out in the Policy, these usually predominate in specialty crop areas which have soils and/or microclimatic attributes favouring production or a concentration of farm capital investment in facilities and services to produce, store or process specialty crops.
Page 12 Section 3.4.3 - Para. 4 "Specific reference is made…"	➢ Projected litter contours are provided in the Air Quality Impact Assessment Background Document (Figure 6.7.1).
Page 12 Section 3.4.3 - Para. 5 + 6 Para 5 – "Specific reference is made… + Para 6 – "As noted previously…"	➢ Please refer to the following excerpts from the Agricultural Impact Assessment Report (Section 3.4.3): ♦ *The RWDI analysis indicates a limited potential for litter deposition on lands east of the landfill site. To avoid the risk of harvesting hazards to machinery, it is recommended that WM adopt a litter management program and a monitoring program to identify and remove any litter from neighbouring farm fields. Litter cleanup operations should be conducted in a manner that avoids crop damage and soil compaction. This program should incorporate an early spring and late summer litter inspection and pickup so that spring planting and fall harvesting is not impeded by any litter accumulation in adjacent agricultural fields (section 6.2).* ♦ *The ongoing monitoring and pickup of blown litter throughout the year and especially prior to planting and harvesting operations will significantly reduce the potential for impact associated with litter deposition in agricultural fields. WM should encourage communications with surrounding farm operators in order to ensure timely removal of litter prior to agricultural field operations* ➢ Waste truck traffic utilizing the haul route are to be covered, preventing litter. Despite this, the Agricultural Impact Assessment Report will be revised to specifically refer to monitoring for litter along the haul route.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 12 Section 3.4.3 Para. 7 "The assessment of…"	➢ Mitigation measures will be implemented to control nuisance impacts on agriculture from rodents at source, including maintenance of the site in a satisfactory condition to limit attraction to rodents. ➢ An ongoing complaint monitoring and response procedure will alert WM of any residual problems allowing them to proactively deal with specific incidents of concern. These measures will minimize the net impact on neighbouring agricultural properties. ➢ Gulls occur commonly within agricultural areas, they are attracted to field cultivation, tillage and harvesting operations. Gulls as disease vectors are primarily of concern for poultry facilities involved in open range feeding. Such production does not occur within the vicinity of the proposed landfill expansion.
Page 12 Section 3.5 - Para. 8	➢ The economic analysis will be updates as required.
Page 12 Section 3.6.1 - Para. 9 + 10	➢ Tables in the Agricultural Impact Assessment will be updated to include the areas associated with landfill ancillary facilities. ➢ The cartographic shift errors have been noted and corrected.
Page 12 + 13 Section 3.6.2 - Para. 11 (last on pg. 12) + 1 (1st on pg 13)	➢ As mapped and described in the Agricultural Baseline Reports, former agricultural buildings on Lot 19, Concession III, are already retired and therefore are not subject to retirement as a consequence of landfill expansion.
Page 13 Section 3.6.2 Para. 2 "As noted above…"	➢ Tables in the Agricultural Impact Assessment will be updated to include the areas associated with landfill ancillary facilities.
Page 13 Section 3.6.2 Para. 3 + 4 Para 3 – "Although it is reported…" + Para 4 – "The steep topography…"	➢ Non-prime land would most often have constraints affecting agricultural capability that would likewise constrain opportunities for safe waste disposal, such as steep topography, high water table, rockiness/stoniness, and/or coarse, permeable soils.
Page 13 Section 3.6.2 - Para. 5 "The last paragraph of…"	➢ Comment noted.
Page 13 Section 3.6.3 - Para. 6	➢ The context of the use of the term "unavoidable" in this section refers to the inability to avoid the use of prime agricultural land at this site.
Page 13 Section 3.6.3 - Para. 7 "See previous comments"	➢ As mapped and described in the Agricultural Baseline Reports, former agricultural buildings on Lot 19, Concession III, are already retired and therefore are not subject to retirement as a consequence of landfill expansion.
Page 13 Section 3.6.3 - Para. 8 "The statement about…"	➢ WM and the agricultural consultant consider this statement to be appropriate.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 13 Section 3.6.3 - Para. 9 (last) See previous comments…"	➢ Tables in the Agricultural Impact Assessment will be updated to include the areas associated with landfill ancillary facilities.
Page 14 Section 3.6.3 - Para. 1 "Under the duration…"	➢ Specific end use options, including agriculture, will be evaluated as part of a planning process that will be undertaken closer to the time of closure. ➢ Interim agricultural use of areas awaiting phased landfill development is anticipated.
Page 14 Section 5.0 - Para. 2	➢ Due to the short haul route distance involved in the Zion Line option, the Agricultural Impact Assessment (AIA) determined that there were no significant differences between the two entrance options.
Page 14 Section 5.0 - Para. 3 "In the first paragraph…"	➢ WM preference, based on all of the information provided, is for CR79 entrance.
Page 14 Section 6.2 - Para. 4 + 5	➢ The suggested edits are noted.
Page 14 Section 7.0 - Para. 6 + 7	➢ The Agricultural Impact Assessment report is being revised and expanded to include additional data and analysis associated with the Waste Management response to the Peer Review.
Page 14 Section 3.9 - Para. 8 + 9 Page 15 Section App. D Para. 1 + 2"App. D…" + "Missing information…"	➢ The suggested edits are noted. Additional information will be provided in the EAP documentation.
Page 15 Section 5.0 - Para. 1	➢ Principle 5 will be revised to read: "Affected residents and businesses are entitled to receive compensation to off-set residual effects they experience as a result of the landfill expansion."
Page 15 Section 5.0 - Para. 2	➢ Section 5.3 describes the WM commitment for Individual Impact-Related Compensation to be provided to residents. This form of compensation is intended to assist people living in residences who are predicted to be subject to the greatest nuisance effects from the landfill expansion. The criteria apply to both non-farm residences and farm residences. The Economics discipline predicted that farm and non-farm businesses would not be adversely affected by the proposed landfill expansion. If a business owner believes that their business is being impacted by the landfill expansion, they may discuss the specifics with WM. WM will address these requests on a case-by-case basis.
Page 15 Section 5.0 - Para. 3	➢ Monitoring results will be reviewed by the Public Liaison Committee (PLC) established for the landfill expansion. The PLC will address the issue of nature and timing of any adjustments.
Page 15 Section 5.0 - Para. 4	➢ Ongoing site management practices would identify any issues related to rodents or vermin. A gull management plan will be developed and specified in the EPA documentation. The trucks traveling to the landfill site are monitored through sign-in procedures at the landfill site.
Page 15 Section 5.0 - Para. 5	➢ Individual Impact-Related Compensation is intended to assist people living in residences who are predicted to be subject to the greatest nuisance effects from the landfill expansion. The criteria apply to both non-farm residences and farm residences. The Economics discipline predicted that farm and non-farm businesses would not be adversely affected by the proposed landfill expansion. If a business owner believes that their business is being impacted by the landfill expansion, they may discuss the specifics with WM. WM will address these requests on a case-by-case basis.

Appendix 9. Agricultural Assessment

Peer Review Comments	WM Response
Page 15 Section 5.0 - Para. 6	➢ We agree that payment for impact related compensation should be extended on a case-by-case basis to farm business owners (and others) whose businesses are adversely affected by the landfill expansion.
Page 15 Section 5.0 - Para. 7	➢ Impact-related compensation is designed to assist people who are living with the greatest nuisance effects from the landfill expansion on a day-to-day basis. Business operators who demonstrate impacts on business revenue will be considered for impact-related compensation.
Page 15 Section 5.0 - Para. 8	➢ The form and value of the individual impact-related compensation will be determined through discussions between WM and the Township of Warwick and finalized in the Community Commitments Agreement (CCA).
Page 15 Section 5.0 - Para. 9	➢ The Section referenced as 5.3.2.1 should indeed be 5.3.1.1. This change will be made in DP #9.
Page 16 Section 5.0 - Para. 1	➢ The Property Value Protection Plan applies to all property, residential, non-residential and farm within the identified zone in Figure 2 in DP#9. If a business owner or community facility manager believes that their business' resale value is being impacted by the view of the landfill expansion, they may discuss the specifics with WM. WM will address these requests on a case-by-case basis.
Page 16 Section 5.0 - Para. 2	➢ WM will deal on a case-by-case basis with residents who have special circumstances such as wanting to move quicker than the 12 month timeframe. WM will consider shortening the timeframe during discussions on the CCA.
Page 16 Section 5.0 - Para. 3	➢ WM will deal on a case-by-case basis with residents and farm operators who have special circumstances such as difficulty with re-mortgaging their properties.
Page 16 Section 5.0 - Para. 4	➢ For the Off-Site Property-Specific Impact Management measures, WM will meet with the residents eligible for impact-related compensation (indicated in Figure 1 in DP#9). If other residents identify impacts from the landfill expansion, WM will meet with them on a case-by-case basis.
Page 16 Section 5.0 - Para. 5	➢ Nuisance claims are available to any individual whose physical property is damaged by landfill operations. WM will take a reasonable approach to all requests for nuisance claims.
Page 16 Section 5.0 - Para. 6	➢ WM will meet with community members to discuss the draft CCA before it is finalized.
Page 16 Section 5.0 - Para. 7	➢ The framework for the CCA is provided in DP#9. The timeline for finalizing the CCA has not been established.
Page 16 Section 5.0 - Para. 8	➢ The "community information program" referred to in the peer review team comment is described in Discussion Paper #9 (Section 5.4) as "Community Relations Measures". These measures consist of a public liaison committee, an information sharing component and a complaints management procedure. ➢ Regarding the recommendation of a 24-hour response line to guarantee a rapid WMCC response to community complaints, WM has proposed a plan with the same intent. The 24-hour line will be only for emergency use to ensure rapid response to emergency situations. The complaints to the business office during business hours will be responded to during the following business day.
Page 16 Section 5.0 - Para. 9	➢ The "community information program" referred to in the peer review team comment is described in Discussion Paper #9 (Section 5.4) as "Community Relations Measures". These measures consist of a public liaison committee, an information sharing component and a complaints management procedure. These measures will be implemented by WM. No re-evaluation of the conclusions of the Economic Impact assessment is warranted.

Appendix 10. Economic Issues Assessment

Peer Review Comments	WM Response
Page 1 1.1 to 1.4	➢ These overview comments are referred to specifically in Parts 2.0 through 5.0 and are addressed below.
2.1 Study Area Size Page 1	➢ The study area used by the economics assessment for in the On site and site vicinity study area did extended to 3.5 km. As noted in the Cover letter for the surveys, the survey was distribution to the 3.5 km zone beyond the landfill footprint. The study area descriptions in the text will be revised to be consistent.
Page 2 2.2 Not consulted Township of Warwick Officials.	➢ Township officials were contacted during the course of the economic impact analysis. Final DP 7 will include a record of contacts with staff. ➢ Officials from the Town of Watford have been engaged throughout the EA process, through the public consultation program and direct discussions between the Township and WM. Information gained though these consultations have informed the economic analysis.
Page 2 2.3 Not sufficient time to respond to business survey	➢ The surveys were distributed by hand with a call back number on the survey form. If respondents required more time to fill out the surveys, they had an opportunity to contact the Economics consultant. Surveys within the 1 km area were conducted face-to-face or via the telephone. A minimum of three callbacks were attempted to reach individuals.
Page 2 2.4 Not considered disturbance to business beyond 3.0 km	➢ Businesses beyond the site vicinity study area were considered as part of the analysis of the greater community as determined in the analysis Work Plan. The site vicinity study area is intended to address direct impacts due to physical disturbances. Impacts beyond this distance are not expected. In the event that property value impacts are demonstrated beyond the study area, they will be addressed through the Property Value Protection Program. ➢ Property value change, if any, is expected to be limited to properties in close proximity to the landfill. It is considered unlikely that these changes will have a significant impact on revenue earned by realtors or other related businesses. Survey did not reveal this as an issue with realtors in the area. If businesses demonstrate an experienced loss related to the expansion, WM would consider this on a case by case basis.
Page 3 2.5 Does not quantify net incremental impacts. Will road maintenance costs be deducted from host community payments?	➢ The baseline conditions presented in DP#5 discuss the future local economy without landfill expansion and includes information regarding current host community payments. We will provide a comparison of local economic conditions with and without landfill expansion. ➢ The specific formula for payments to the host community for required road maintenance and other costs would be developed as part of the Community Commitment Agreement. The payments will address both the general residual impacts of the facility on the community and provide funding for direct costs incurred by the municipality as a result of the landfill expansion.
Page 3 2.6 Did not consider business losses to farms.	➢ A detailed assessment of impacts on farm operations was undertaken by the agricultural consultant. The economic impact statement is consistent with those findings. The Agricultural Impact Assessment report states that - *"Due to the nature of agricultural production in the area and the design of the proposed landfill and its associated mitigation measures and monitoring programs, negative impacts on agricultural operations and activity in the area will be managed to a low and acceptable level".*
Page 4 2.7 No adverse impact on the municipal tax base is considered in association with property value declines which would translate into assessed value declines.	➢ Property taxes are determined based on two factors – the "Assessed Value" of individual properties, which is determined by the Municipal Property Assessment Corporation (MPAC), and "Tax Rates" which are determined by the municipality based on its overall budget requirements. Tax rates are determined annually in each municipality, and differ for the various tax classes (i.e., residential, industrial, commercial, etc.). Generally changes in assessed value affect the distribution of property tax burden and changes in the tax rate affect the overall revenue available to the municipality. If property value impacts do occur, they would be very small in comparison to the overall assessment base of the municipality and would not produce a notable change in the distribution of property taxes. As the municipality sets tax rates, a change in assessed value of some properties would not necessarily result in a loss of taxes to the municipality.

Appendix 10. Economic Issues Assessment

Peer Review Comments	WM Response
Page 4 2.8 Road Maintenance Costs	➢ As per point 2.5, the formula to compensate the municipality for road maintenance costs will be determined through the Community Commitment Agreement. WM would meet its responsibilities to fund road maintenance or other direct impacts on municipal costs through the CCA.
Page 4 3.1	➢ The Reviewer correctly notes an error that will be corrected in the Final Economic Impact Assessment and DP7 documents. Table 8-4 of the Economic Impact Assessment presents total operational expenditures over the 25-year operating period; the title of the Table will be corrected. As noted in this Table, direct expenditures over 25 years in the local economy is $86.9 million, on an annual basis this is $3.48 million. This is the figure that should have been quoted in the Net Effects Table, page 60 of Appendix A to DP7. The direct employment over 25 years is 1,893 person years, i.e. on-site jobs, contractors, drivers, etc.; the annual direct years of local employment is therefore 74 person years as correctly noted in the Net Effects Table.
Page 4 3.2	➢ As per point 2.5, we will provide a comparison of economic conditions with and without landfill expansion in the revised final Economic impact Analysis presented with the EA.
Page 5 4.1	➢ No response required.
Page 5 5.1 A community information program is not referred to in DP 9	➢ The "community information program" referred to in the peer review team comment is described in Discussion Paper #9 (Section 5.4) as "Community Relations Measures". These measures consist of a public liaison committee, an information-sharing component and a complaints management procedure.
Page 5 5.2 Property Value Protection Program May be Too Restrictive	➢ Discussion Paper #9 outlines the framework for the proposed property value protection program. All property owners within the area indicated would be eligible for the program. This eligibility has been broadly determined by the predicted visual impact zones, it does not depend on the presence of physical nuisance effects.
Page 6 5.3	➢ Comment noted. Section 4 of DP9 outlines typical impact management measures. Section 4.4 notes that individuals can receive compensation, business owners who experience difficulties or hardships due to residual impacts would be included. DP 9 will be revised to clarify this intention.
5.4	➢ The form and value of the individual impact-related compensation will be determined through discussions between WM and the Township of Warwick and finalized in the Community Commitments Agreement (CCA).
5.5	➢ WM will consider the recommendation. Should the program be implemented with the 12-month provision, WM would consider individual requests for a shorter timeframe.
5.6	➢ It is WM's intention that all properties within the designated zone for property value protection as discussed in DP9 would be eligible, including property without a residence. This will be clarified in the revised documentation.
5.7	➢ Agreed. There will also be an issue resolution process in place to deal with disagreements.
5.8	➢ The principals and framework for the CCA were presented for discussion in draft DP9. The details agreement will be developed following EA and EPA submission.

Appendix 11. Social Impacts Assessment

Peer Review Comments	WM Response
Section 2.0	**Comments on Discussion Paper #7**
Page 3 Section 2.0 – Para. 1	➢ Changes made to the noise, dust and air quality assessments will be reflected in Final Discussion Paper (DP) #7 and the final Social Impact Assessment (SIA) Background Document.
Page 3 Section 2.0 – Para. 2	➢ WM acknowledges the reviewers comment that the impact methodology found to be acceptable.
Page 4 Section 2.0 – Para. 1	➢ No response required.
Page 4 Section 2.0 – Para. 2	➢ The conclusion that the social effects experienced by local residents would be offset by local economic benefits is not stated in DP#7 or in the SIA Background Report.
Page 4 Section 2.0 – Para. 3	➢ No response required.
Page 4 Section 2.0 – Para. 4	➢ The local economic impact is expected to be positive, including the annual impact on municipal revenue, local job creation and the potential for spin off opportunities. This analysis is provided in the economic impact assessment.
Page 4 Section 2.0 – Para. 5	➢ WM has made commitments to the municipality to support new business opportunities related to the landfill, which will be formalized in the Community Commitments Agreement, (CCA).
Page 4 Section 2.0 – Para. 6	➢ The impact management plan was developed from experience with other landfill projects and knowledge of the local community. The measures are supported by input from potentially affected residents. Given the scope of the impact management plan and the broad range of measures to be implemented to address residual impacts, the social impact assessors are confident that the impact management measures will be effective. The details of the impact management measures will be developed in the CCA, but WM's commitments are clearly stated in Discussion Paper #9.
Section 3.0	**Comments on Social Impact Assessment – Background Document**
Page 5 Section 3.0 – Para. 1	➢ Reviewer found the SIA to be comprehensive and methodologically sound. Reviewer was able to reach the same conclusions based on the data presented. No response required.
Page 5 Section 3.0 – Para. 2	➢ Any updated data from the technical disciplines will be reflected in the final SIA Background Document.
Page 5 Section 3.0 – Para. 3	➢ Any updated data from the technical disciplines, including any resulting changes to conclusions about impacts, will be reflected in the final SIA Background Document.
Page 5 Section 3.0 – Para. 4	➢ The conclusions in the SIA Background Report related to community character made no reference to 'stigma'. ➢ Neither Section 6.2.1.3, which quotes sections of the draft Economics Background Report (Pages 47-48), nor Section 6.2.3.1 on community character (Pages 88-89) state that any potential stigma in the community would be off-set by contributing to local industrial expansion. ➢ The SIA states that there will be negative perceptions for many residents due to the increasingly industrial character to the urban settlement area, but does not relate this to any economic benefits described by the Economics discipline.

Appendix 11. Social Impacts Assessment

Peer Review Comments	WM Response
Page 5 Section 3.0 – Para. 5	➢ The social impact assessment does not state that 'some local residents will experience significant impacts over the life of the landfill.' The ' Net Effects' section of the SIA Background Document states (Page 107) : '…a number of residences in the 0 to 1 km study area (which includes the primary haul route study area) are expected to experience occasional dust, odour and litter exceedances, noise increases and visual impact during most of the life of the landfill.' ➢ Regarding the determination of 'significance' of impacts, many of the nuisance impacts, such as visual, dust, odour, noise and litter, can be categorized according to identified levels of intensity based on numerical values or qualitative assessments such as 'significant', 'high', 'moderate' and 'low'. Yet the nuisance levels attributed to impacts by a nuisance discipline may not reflect the level and type of human response. Some nuisance impacts will have more of an effect than others, e.g., when there are combined effects from noise, dust, and odour. There is also variability in how the social impacts are experienced. Some people will experience a certain level of nuisance impacts more severely based on their use of their property, personal beliefs, history, preferences and sensitivities. The net community and individual responses over time to the predicted impacts will also be influenced by the implementation of a full set of impact management measures which will be finalized in the Community Commitments Agreement.
Page 6 Section 3.0 – Para. 1	➢ No response required.
Page 6 Section 3.0 – Para. 2	➢ The statement that the proposed landfill expansion will create 'significant' social impacts is the reviewer's. See the response to the peer review comment on Page 5, Section 3.0, Paragraph 5 above. ➢ We agree with the remainder of the comments in this paragraph.
Page 6 Section 3.0 – Para. 3 + Bullets 1-7	➢ No response required.
Page 7 Section 3.0 – Bullets 1-4 + Para. 1 + Bullets 5-6	➢ No response required.
Page 8 Section 3.0 Para. 1 + Bullet 1 +Para. 2	➢ No response required.
Page 8 Section 3.0 – Para. 3	➢ Agreed.
Page 8 Section 3.0 – Para. 4	➢ No response required.

Appendix 11. Social Impacts Assessment

Peer Review Comments	WM Response
Page 8 Section 3.0 – Para. 5	➢ The SIA does <u>not</u> conclude that 'the residents of Watford and specifically residents in the vicinity of the expanded landfill will experience <u>significant</u> social impacts'. ➢ The SIA conclusion (Section 10.0 page 117 of the Background Document to Discussion Paper #7) states that, "With the full range of mitigation measures identified by the technical disciplines, many of the effects will be within existing standards and, to a large degree, minimized. The remaining social impacts on a number of residents and on the community can be addressed with a regular monitoring program, implementation of identified impact management measures, and an open communications process between the company, residents and the Township." The report further states that "such an approach will minimize the negative effects and enhance the positive effects and result in the (*overall social)* impact of the project being low and manageable."
Section 4.0	**Comments on Discussion Paper #8**
Page 9 Section 4.0 – Para. 1, 2 and 3	➢ WM agrees with the reviewer that mitigation measures associated with the Design and Operations Plan will be important for reducing social impacts. The statement in DP8 will be revised and Final DP8 will include all mitigation measures to be implemented by WM.
Section 5.0	**Comments on Discussion Paper #9**
Page 9 Section 5.0 – Para. 1	➢ As indicated in the response to several comments above, the SIA consultants did <u>not</u> conclude that local residents will experience significant impacts over the life of the landfill. ➢ The SIA conclusions (page 117 Section 10.0 of the Background Document to Discussion Paper #7) states that, "With the full range of mitigation measures identified by the technical disciplines, many of the effects will be within existing standards and, to a large degree, minimized. The remaining social impacts on a number of residents and on the community can be addressed with a regular monitoring program, implementation of identified impact management measures, and an open communications process between the company, residents and the Township." The report further states, "such an approach will minimize the negative effects and enhance the positive effects and result in the *(overall social)* impact of the project being low and manageable."
Page 9 Section 5.0 – Para. 2	➢ No response required.
Page 9 Section 5.0 – Para. 3	➢ The Municipality of the Township of Warwick and WM will further develop the impact management commitments described in DP#9 through discussions held to develop of the Community Commitments Agreement.
Page 9 Section 5.0 – Para. 4	➢ No response required.
Page 10 Section 5.0 – Para. 1	➢ No response required.
Page 10 Section 5.0 – Para. 2 & 3	➢ The study areas used in the SIA determined the geographic area for the assessment of potential social impacts. The impact management plan did not utilize the study areas to determine eligibility for nuisance related compensation; rather, specifically defined impact criteria, based on the level and extent of predicted impacts, determined eligibility. Changes to the social impact assessment results due to changes in the footprint will be reflected in the criteria table in DP#9, listing eligible recipients for impact-related compensation.
Page 10 Section 5.0 – Para. 4	➢ No response required.

Appendix 11. Social Impacts Assessment

Peer Review Comments	WM Response
Page 10 Section 5.0 – Para. 5	➢ Agreed. There will also be an issue resolution process in place to deal with disagreements.
Page 10 Section 5.0 – Para. 6 & 7	➢ WM agrees to developing an economic partnership with the Municipality regarding industrial development opportunities arising from the landfill and supporting the Municipality's economic development initiatives. WM will add a principle to DP#9 to reflect this. Assistance with tourism initiatives is not included in the scope of WM's commitments.
Page 11 Section 5.0 – Para. 1	➢ WM does not provide an offer to purchase in the proposed PVP program. The program stipulates that WM will have the option to purchase at fair market value or to "top up" the highest offer received and the identified fair market value.
Page 11 Section 5.0 – Para. 1, Bullet 1	➢ In case of disagreement with the initial appraisal, residents can select a qualified appraiser for the second appraisal.
Page 11 Section 5.0 – Para. 1, Bullet 2	➢ WM will deal on a case-by-case basis with residents who have special circumstances such as wanting to move quicker than the 12 month timeframe.
Page 11 Section 5.0 – Para. 1, Bullet 3	➢ WM will deal on a case-by-case basis with residents who have special circumstances such as difficulty with re-mortgaging their properties.
Page 11 Section 5.0 – Para. 1, Bullet 4	➢ The Property Value Protection Plan is being provided for residential and non-residential properties, including farms. If a business owner or community facility manager believes that their business/facility's resale value is being impacted by the view of the landfill expansion, they may discuss the specifics with WM. WM will address these requests on a case-by-case basis.
Page 11 Section 5.0 – Para. 2	➢ The form and value of the individual impact-related compensation will be determined through discussions between WM and the Township of Warwick and finalized in the Community Commitments Agreement.
Page 11 Section 5.0 – Para. 3, Bullet 1	➢ The 'Nuisance Claims Procedure', (which is a separate and different impact management measure than Individual Impact-Related Compensation to Residents) is available per individual per year to the limit of $1,500. This measure is indented to address situations where damage to physical property has resulted from the presence of the landfill.
Page 11 Section 5.0 – Para. 3, Bullet 2	➢ If a business owner or community facility manager believes that their business or facility is being impacted by the landfill expansion, they may discuss the specifics with WM. WM will address these requests on a case-by-case basis. ➢ The nuisance claims procedure is also available to address specific physical damages.
Page 11 Section 5.0 – Para. 3, Bullet 3	➢ The 'Nuisance Claims Procedure' is available per individual per year to the limit of $1,500. This program is indented to address situations where damage to physical property has resulted from the presence of the landfill. Compensation would be paid to the individual/facility owner who has experienced the physical damages.

Appendix 11. Social Impacts Assessment

Peer Review Comments	WM Response
Page 11 Section 5.0 – Para. 3, Bullet 4	➢ WM interprets that this comment is concerned with the proposed Individual Impact-Related Compensation to Residents, (not the Nuisance Claims Procedure which does not rely on criteria for eligibility). ➢ For the purposes of this program, WM has developed a set of criteria to identify those residential properties anticipated to experience the highest residual nuisance impacts (dust, noise and odour) over the life of the landfill. WM has proposed individual criteria with low thresholds, including: ♦ any predicted exceedance of dust criteria; ♦ all residences along the haul route meet a criterion experiencing an increase in traffic volume and associated noise; ♦ any noise above MOE landfill standards guideline or >6dBA over ambient for construction noise; and, ♦ exceedances of 3 OU at any frequency or 1OU more than 0.6% of the time. ➢ Including a requirement that at least 2 of these thresholds are met recognizes that WM is being inclusive and conservative in the threshold levels. ➢ In examining the data, few households meet one but not more than one of these criteria; 2 residences have predicted odour marginally above 1 OU but no other compensation criteria are met. In addition, 2 residences are predicted to experience temporary construction noise meeting the compensation criteria but no other thresholds are met. WM maintains that the proposed program is a reasonable approach which fairly represents the residences that are expected to experience the most significant nuisance impacts, as was indented with this program.
Page 12 Section 5.0 – Para. 1	➢ A separate CCA for residents is not contemplated as the CCA is intended to respect the interests of both individual residents and the community. WM has received some input on impact management from affected residents (as documented in DP#9 Appendix A. WM will also meet with community members to discuss the draft CCA before it is finalized.
Page 12 Section 5.0 – Para. 2	➢ The Individual Impact-Related Compensation to Residents is based on predicted impacts over the life of the landfill. Should monitoring identify impacts which are significantly different than predicted, WM will revisit the compensation measure. Through the Public Liaison Committee, residents currently have access to records indicating the types of waste accepted. This form of access is expected to continue through the current (or a future) liaison committee.
Page 12 Section 5.0 – Para. 3	➢ The issue of funding for peer review for the Municipality will be addressed through discussions between the Township of Warwick and WM in developing the Community Commitments Agreement.
Page 12 Section 5.0 – Para. 4 & 5	➢ As stated earlier, it is the Reviewer's opinion that the social impacts will be 'significant'. The SIA Background Report has indicated that there will be social impacts but a range of mitigation measures and impact management measures can minimize the negative effects and maximize the positive effects. ➢ Draft Discussion Paper #9, the proposed Impact Management Plan, has been provided for comment and further discussion. The specific details of the impact management measures will be developed jointly between the Township of Warwick and WM in the development of the Community Commitments Agreement.

Appendix 12. Land Use Assessment

Peer Review Comments	WM Response
1.0 Key Findings	
Page 1, Section 1.1	➢ Previous issues which arose during the peer review process have been addressed. Most recently, the peer review concerns were responded to within the Addendum to DP 7,8 and 9.
Page 1, Section 1.2	➢ The methodology specifically addresses the stated purpose of the Environmental Assessment, it is not scoped or limiting in its exploration of broader issues, should they be found to be relevant. It looks at impacts On-Site and in the Site Vicinity; Along the Haul Routes, and In the Community. In the Community looks at any impacts that may extend beyond the immediate site area to have some impact within the larger community (see Section 3.3 of Land Use Impact Assessment).
Page 1, Section 1.3	➢ Please indicate which section of the report characterizes the community within 3.5 km of the landfill as rural and rural residential. Section 3.1 of the LUIA regarding study areas states: "a 3.5 km study area which includes the Village of Watford to the south, and extends just beyond Underpass Road in the west, Highway 402 and Egremont Road in the north, and Arkona Road in the east."
Page 2, Section 1.4	➢ The Impact Assessment Reports from all other relevant disciplines were reviewed and their finding used to assess impacts upon land use (including Agricultural, Economic, Social, Transportation, Noise, Visual, and Health, etc.). The Land Use discipline relied on the conclusions and findings of the various discipline experts. The mitigation measures recommended by these disciplines will be required to ensure there are no land use impacts. Since these mitigation measures are stated in the respective reports, it was unnecessary to repeat them all within the LUIA.
Page 2, Section 1.5	➢ The LUIA clearly evaluates the land use pattern through analysis of designations within the Official Plan land use map and the zoning map. In addition, a land use inventory was undertaken to confirm "existing land uses on the ground" through a site visit to document the exact type of use currently occurring at each property throughout the study area (see Schedule C of Land Use Impact Assessment, and Addendum document). The LUIA's sole purpose is to evaluate the potential impacts of the undertaking on the land use pattern. The Official Plan and Zoning By-law policies and regulations only represent one component of the Assessment (Section 6.2).
Page 2, Section 1.6	➢ The justification for the Official Plan and Zoning By-law Amendments are the conclusions of the LUIA that there are not anticipated to be any impacts upon the current or future land use pattern resulting from the proposed expansion. The amendments are required by the Planning Act to permit the proposed expansion since such uses are not currently permitted in the expanded area. The draft OPA and ZBA documents will be made available shortly.
Page 2, Section 1.7	➢ The 2005 Provincial Policy Statement has been considered in the LUIA (see Section 6.1.2). In addition, a comparison of old and new PPS policies is provided in Appendix D of the LUIA.
Page 2, Section 1.8 (1.6)	a) The impacts of the proposed landfill were evaluated and measured for all land uses, businesses and dwellings within the 3.5 km study area, and no significant impacts were found to result. The issue in question is a statistic only and does not change the findings. The same number of residents and dwellings were considered, as they were within the study area, regardless what percentage of the Township they comprise. b) The reduced posted speed limit on County Road 79 does not produce any impacts on land use. This was a recommendation by the Transportation Impact Assessment for safety reasons, to mitigate potential collisions, as there will be additional truck traffic resulting from the landfill. c) The westerly shift of the landfill footprint also incorporates a design change that retains more of the woodlot adjacent to the cemetery. The retention of more woodlot is beneficial for the land uses. In terms of other impacts of the footprint shift, such things as noise and visual impacts will be assessed by other disciplines.

Appendix 12. Land Use Assessment

Peer Review Comments	WM Response
	d) The visual impact of the landfill is intended to be mitigated by integration into the community landscape through berming, separation, and landscaping. There will continue to be visual impacts, however, none are anticipated to alter land uses. e) The Economic Impact Assessment found that business owners will experience varying levels of visual effects and occasional nuisance effects, but no business losses are anticipated. A property value protection program is provided for identified properties with a high potential for adverse effects so that no net economic impact due to property value change is anticipated. No businesses will be displaced as a result of the landfill development. Direct business and spin-off activity is expected to result from the landfill expansion. There is a sufficient supply of lands designated to accommodate any such business growth.
Page 2, Section 1.9 (1.7)	➢ Official Plan, Zoning By-law and Site Plan are mechanisms for land use mitigation. Draft amendments to the Official Plan and Zoning By-law will be submitted to the municipality. The purpose of these documents is to provide added policies to protect surrounding uses by ensuring that the expanded landfill is governed by appropriate policies. The Ministry of Environment will ensure monitoring through the Certificate of Approval, however, there should also be Municipal policies and directives in place for general conformity, and to ensure good planning and compatibility of land use. Similarly the Site Plan Agreement will serve to guide construction in compliance with the above and the approval and will ensure key issues are addressed. Other mitigation measures that protect land use are being recommended by area specific disciplines (ex. Noise, Visual, Economic, Agricultural, Social, etc.).
Page 3, Section 1.10 (1.9)	➢ A discussion of potential end use options is provided in the Addendum to DP7,8 and 9, this information is sufficient for the EA process. Community consultation and assessment of these options will be undertaken at a date closer to landfill closure.
Page 3, Section 1.11 (1.8)	➢ We believe that the LUIA is complete and adequately addresses and assesses impacts anticipated from the proposed landfill on the land uses within the study areas (On-site and in Site Vicinity; Along the Haul Routes; and In the Community).
Detailed Comments Appendix 12	
Page 3, Section 2.1	➢ The reduced posted speed limit on County Road 79 does not produce any impacts on land use. This was a recommendation by the Transportation Impact Assessment for safety reasons, to mitigate potential collisions, as there will be extra truck traffic resulting from the landfill.
Page 3, Section 2.2	➢ Agreed
Page 4, Section 2.3	➢ The loss of agricultural lands due to ancillary facilities is being addressed by the Agricultural discipline, the results will be incorporated into the land use assessment. ➢ The WM has provided an analysis of provincial landfill requirements in the Waste Diversion Overview Draft Report, May 2004, which is provided as part of the Diversion Impact Assessment Background Document to DP#7. This document clearly supports the land use justification statement. Further analysis of need for landfill capacity is outside the Terms of Reference for this EA.
Page 4, Section 2.4	➢ The presence of impacts does not necessarily imply that the uses are incompatible. It is agreed that the mitigation measures must be assessed to determine whether net impacts are reduced or eliminated to an acceptable standard. The individual disciplines have undertaken this assessment and provide conclusions based on net or residual impacts. These conclusions have been integrated into the land use assessment.
Page 5, Section 2.5	➢ It is agreed that a revised assessment must be made for the cemetery to consider the revised footprint design. The LUIA will incorporate other discipline findings.

Appendix 12. Land Use Assessment

Peer Review Comments	WM Response
Page 5, Section 2.6	➢ The Visual discipline provides an analysis of residual impact, following the implementation of recommended mitigation measures.
Page 5, Section 2.7	➢ Refer to WM responses to the PRT Appendix 8 Discipline Specific Comments.
Page 6, Section 2.8	➢ The presence of impacts does not necessarily imply that the uses are incompatible. It is agreed that the mitigation measures must be assessed to determine whether net impacts are reduced or eliminated to an acceptable standard. The individual disciplines have undertaken this assessment and provide conclusions based on net or residual impacts. These conclusions have been integrated into the land use assessment.
Page 6, Section 2.9	➢ Please indicate where the LUIA characterizes the community as exclusively rural agricultural and rural residential. There is already an existing landfill in the general location of the proposed expansion. The technical analysis does not support the reviewer's statement that the expansion will impact the Township's characterization. There are many Towns and Cities throughout the Province and elsewhere that possess landfills. Such places have characters independent of their respective landfill sites. Community character is also discussed in the Social Impact Analysis, page 81-82.
Page 6, Section 2.10	➢ Baselines and growth projections for land uses have been projected over the projected life of the landfill (2005-2030) within the LUIA and in Appendices A&B . The Baseline Report provides land use projections without the landfill expansion, with little variation anticipated. The Economic and Social disciplines specifically evaluated impacts on jobs and population.
Page 6, Section 2.11	a)/b) Schedule A-1 of the Township of Warwick Official Plan designates land use. The existing landfill is designated "Landfill Site". We are aware that the Official Plan does not contain land use policies for this designation , only limited policies for Waste Management Systems are provided in Section 3.6. The draft Official Plan Amendment will propose to add Land Use Policies for Landfill Site to the Official Plan c) The 74.6 ha of agricultural land use will be updated to reflect revised agricultural impact analysis d) The landfill and the surrounding agricultural operations were shown by the various impact assessments, to be compatible (Agricultural, Environmental, Air Quality, Noise, Traffic, Economic, etc.). There is no question that the two operations are different, but the assessments found that no significant impacts would result, or effect the continued viability and operation of the use. While the statement in question may not discuss the impacts for the Village of Watford, the Impact Assessment overall does. This statement is simply comparing and discussing compatibility of the landfill with the agricultural area in the immediate surroundings. e) The Provincial Land Use Standards and various MOE Guidelines for Landfills are to be reviewed so that key policies and principles may be incorporated. The policies are not going to be replicated or directly inserted or entrenched into the Official Plan. Rather they form the background and provide the knowledge to prepare appropriate new policies to the Warwick Official Plan. The Township will not be put in a position to enforce the Provincial Guidelines and Standards, but only the amended Official Plan policies. The new Official Plan policies are only to complement and support the mitigation and work required by the Province and committed to by Waste Management. The Official Plan Amendment will apply to the entire land area owned by Waste Management and include the existing landfill site.

Appendix 12. Land Use Assessment

Peer Review Comments	WM Response
Page 8, Section 2.12	a) It is agreed that the purpose of the A2 – Restricted Agriculture Zoning is to address potential nuisance effects from the proximity to the Village of Watford and some of the more sensitive land uses located there. This area will only contain the poplar plantation and some of the excess soil stockpile (the leachate treatment facility is located north of this zone). Similar concerns the Township may have had for the Restricted Agricultural Zoning (noise, odour) are also specifically being assessed as part of the Impact Assessment process. b) Agreed c) There will be a buffer area far in excess of 30 m between the southern limit of the poplar plantation and the southern limit of the property. In addition, there will be a buffer area of at least 100 m from the expanded fill area at every point. d) The use of holding provisions were only given as an example of a type of zoning provision to help regulate the landfill's progression. The By-law has not yet been prepared. It is agreed that the Certificate of Approval can adequately regulate the landfill's progression. The Zoning By-law Amendment will maintain the current landfill within the M3 Industrial Waste Disposal Zone.
Page 10, Section 2.13	a) It is our understanding through discussions with the Township and County that a site plan and site plan agreement will be required as per the Planning Act. The timing of this process will be confirmed. Our review of other landfill's throughout the Province have shown that site plans and site plan agreements are standard practice. There are aspects that the site plan agreement can address that may not be included within the EA approval. b) It is agreed that the Certificate of Approval can guide mitigation and monitoring requirements, however, the site plan agreement can include some supportive wording along such lines, and guide the site issues during the initial period of construction.
Page 11, Section 2.14	➢ This analysis was undertaken by the Economic discipline in their Impact Assessment, which we reviewed and presented the findings.
Page 11, Section 2.15	➢ A discussion of potential end use options is provided in the Addendum to DP7,8 and 9, this information is sufficient for the EA process. Community consultation and assessment of these options will be undertaken at a date closer to landfill closure.
Page 12, Section 2.16	➢ The LUIA had regard to both the 1997 Provincial Policy Statement and the new Provincial Policy Statement. Sections on both PPS documents are provided within the Impact Assessment as is a comparison table with discussion of policy variations and any implications for the proposed landfill expansion. We understand that the new PPS will be used to evaluate the expansion.

Agency Comments

Ministry of Natural Resources – Jan. 24, 2005

(97393-65/2005)

Phil Bosco - R: Warwick Landfill Expansion Environmental Assessment - ref -97393-65

From: <daraleigh.irving@mnr.gov.on.ca>
To: <pbosco@gartnerlee.com>
Date: 1/24/2005 4:41 PM
Subject: R: Warwick Landfill Expansion Environmental Assessment - ref -97393-65
CC: <fiona.walker@mnr.gov.on.ca>, <jason.ritchie@mnr.gov.on.ca>, <daraleigh.irving@mnr.gov.on.ca>

Mr. Bosco,

For your record – re: Warwick Landfill Expansion Environmental Assessment – ref: 97393-65.

Aylmer District, Ministry of Natural Resources, has reviewed the following documents:

- Draft Discussion Paper #7 – Impact Assessment
- Draft Discussion Paper #8 – Preliminary Design, Development, and Operations Plan,
- Draft Discussion Paper #9 – Impact Management.

Based on our review, we have no further concerns regarding the proposed Warwick landfill expansion at this time.

Thank you for keeping us informed within the process. Please do not hesitate to contact me if you have any questions, concerns or comments.

Have a great day!

Daraleigh

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Ministry of the Environment – Surface Water May 3, 2005

(97393-65/2005)

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Ontario

May 03, 2005

File # SI LA WA C3 610

Memorandum

To: Gemma Connolly
EAAB - Toronto

From: Hugh Geurts
Surface Water Evaluator

Surface Water Review - Draft Discussion Papers 7 (Impact Assessment), 8(Preliminary Design, Development and Operations Plan, 9 (Impact Management Plan- October 2004 Warwick Landfill Proposed Expansion . Canadian Waste Services Ltd.

Discussion Paper 7 - Impact Assessment

Section 4.0 - Leachate treatment - Poplar Plantation Application . How will monitoring occur at the plantation to ensure no unacceptable movement of leachate contaminants off site. (Previously requested in Discussion Paper 6 below) or is monitoring required due to the Evaporation/distillation process for leachate treatment

Section 5.4.2. The landfill is to be run as a Hydraulic trap with recycling of collected leachate onto the landfill and excess leachate is to be treated and applied to a polar plantation. Section 5.4.1 notes no impact to surface water Resources (Bear Creek) . Treated leachate may be added to the Creek as required (Section 5.4.2.)

Appendix A Page 14 of the DP 7 Appendix "A" notes leachate discharge to bear creek will be flow weighted to 15-25% of the stream base flow during periods of discharge.

Discussion Paper #8 - Preliminary Design, Development and Operations plan

Section 3.1 Pages 11 and 12 notes that approximately 5.5 hectares of woodlot will be removed for the creation of the landfill footprint. The Report then further notes that a long term plan will be provided to replant the forest when the landfill is closed. From a non point source water quality perspective the continued loss of forest cover within the Sydenham watershed continues to be a concern. Is there not an opportunity for the proponent to reforest retired agricultural land somewhere else in the Bear Creek Watershed to mitigate the forest cover removed, without having to wait 25 years. More discussion about commitment and time lines should be provided.

Section 3.3 Storm water management: The report notes ditching will be designed to the 25 return storm and the SWMP will be sized to the 100 year return. Discharge will occur to both Brown and Bear Creek to be reflective of pre-development conditions. Discussion should be provided as to the provision of triggers for maintenance schedules.

Section 3.6.2 Section 3.6.2 refers to potential composting on site. Composting pads can often produce high organic strength and possibly high ammonia runoff from large storm events. I would ask there be more specific discussion as to how the proponent intends to treat such runoff.

Section 4.5.2.3, and 4.5.2.4

Because leachate will be recirculated onto the landfill, active degradation of the waste will occur and high strength leachate is anticipated. In section 4.5.2.3, and 4.5.2.4, the report notes that Evaporation/distillation (with mechanical vapour recompression) will be the preferred treatment option for the leachate for application of leachate onto the poplar plantation and should discharge of treated leachate is required into a surface water feature. For 4 to 5 years after start up and the establishment of the poplar plantation , the report notes leachate may need to be hauled to a nearby sewage treatment plant. Residuals from the Evaporation/distillation process will be reapplied to the landfill or sent to a hazardous waste facility as required.

Discussion Paper #9

Sections 5.1 and 5.2

For information only : Monitoring plans and Contingency plans for surface water have been committed to in Sections 5.1 and 5.2 of DP 9

Please note the below noted was submitted by Surface water on January 22, 2003 regarding discussion papers 5 and 6

Surface Water Review - Draft Discussion Paper 5- Sept 2002 (Baseline Conditions) and Discussion Paper 6 - Nov, 2002 (Facility Characteristics) and Background Document J.- October 2002 (Surface Water Baseline) Warwick Landfill Proposed Expansion . Canadian Waste Services Ltd.

I have reviewed the above noted landfill reports and provide the following comments.

Background Document J - Surface water Baseline & Discussion Paper # 5 - Baseline Conditions

No comment. Data and issues addressed appears to be appropriate

Discussion Paper 6 - Facility Characteristics

Section 3.3 *It should be noted that any discharge from stormwater ponds will be identified as compliance points for surface water sampling as part of a annual monitoring program*

Section 4.5.3.3 *I could not see in this section how monitoring is to occur at the poplar evapotranspiration site to ensure that leachate is not escaping from the poplar site. Could the consultant please elaborate.*

Section 4.5.2.1 *The May 27, 1991 letter of Dan Gaudenzi provided in Appendix B and Table 4.1 appear to be acceptable criteria for discharge criteria for monitored parameters for leachate discharge . However, could the consultant please confirm that the analytical parameters in the letter and in table 4.1 are what is proposed to be monitored for an expanded landfill.*

General Note: I note that the sample sites presented by the consultant in Documents 5 and J differ somewhat from the current monitoring stations that exist for annual monitoring for the existing landfill. I could not see within the reports, discussion as to where annual monitoring stations for surface water discharge are to be proposed nor did I see a listing of proposed analytical parameters for annual monitoring of stormwater discharge. It may be that these items have already been included in previous discussion papers or will be discussed in subsequent documentation. It may be that the consultant felt this could be better presented within a Design and Operations proposal for a certificate of Approval rather than the EA process. I ask that the consultant elaborate as to if this information has been or will be addressed.

Hugh Geurts
Surface Water Evaluator

WM Response to the MOE Surface Water Comments on Discussion Paper's 7, 8, & 9, May 03, 2005

Agency Comment	WM Response	Link to Terms of Reference
DP #7 Section 4.0	Runoff from the Poplar Tree system application area has the potential to affect surface water quality. However, baseline surface water quality information indicates that elevated surface water turbidity is typical in the area as a result of the erosion of surficial soil during runoff conditions. Within vegetated areas, such as the northeastern corner of the existing landfill site, soil erosion and water turbidity are less. Further operation of the land application system as designed will prevent ponded effluent or effluent runoff from the application area. Evapotranspiration of the effluent will either reduce constituent concentrations through uptake by the poplar trees or constituents will be stored within the shallow soil or soil moisture. As the infiltration of precipitation will encourage the downward movement of parameters, chemicals will remain within the subsurface soil. The runoff of precipitation unaffected by soil erosion will not affect the local surface water quality. There is a potential for surface water effects from the erosion and suspension of shallow soil within runoff. The runoff quality from the application area will depend on the establishment of a vigorous vegetative cover to reduce soil erosion. Owing to the flat topography and the surficial drainage divide that extends through the application area, there should be a low frequency of runoff events. The following recommendations are provided to reduce the potential for elevated turbidity within surface water runoff. • A ground cover of vigorous vegetation should be established to limit erosion during the maturation of the polar trees and from October to April. The ground cover should extend over the buffer zones. • Runoff from the land application area should be directed through a sedimentation system to remove sediment during runoff events. Direction may be provided with a network of low soil berms. Runoff water quality sampling should be completed after runoff events to confirm acceptable surface water quality. Water quality should be comparable to upstream surface water quality within Brown Creek or Bear Creek.	
DP #7 Section 5.4.2	No response required.	
DP#7 Appendix A	No response required.	
DP #8 Section 3.1	The issue of additional woodlot protection was raised with WM and modifications have been made to the site footprint to largely retain the existing woodlot. Opportunities for further re-forestation within the Bear Creek Watershed will be explored by the proponent, with input from the St. Clair Region Conservation Authority, during the operational and post-closure periods of the site.	

WM Response to the MOE Surface Water Comments on Discussion Paper's 7, 8, & 9, May 03, 2005

Agency Comment	WM Response	Link to Terms of Reference
DP #8 Section 3.3	Triggers and maintenance schedules will be detailed in the design and operations plan for the EPA application.	
DP #8 Section 3.6.2	Runoff from the compost operations pad will be retained in an adjacent pond, the contents of which will either be used for wetting the compost or added to leachate, if the pond's contents do not meet surface discharge criteria.	
DP #8 Section 4.5.2.3 and 4.5.2.4	No response required.	
DP #9 Sections 5.1 and 5.2	No response required.	

Ministry of the Environment – Noise

May 13, 2005

(97393-65/2005)

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13 May 2005

DRAFT

RE: WARWICK LANDFILL EXPANSION
ENVIRONMENTAL ASSESSMENT
DRAFT DISCUSSION PAPERS 7, 8, 9 (October 2004)
REVIEW OF NOISE ASPECTS

This reviewer was requested by G. Connolly of MOE to review the above-referenced documents for the aspect of noise emissions. The Draft Environmental Assessment Discussion Papers referenced above, along with the document "Noise Impact Assessment, Background Document to Draft Discussion Paper #7, October 2004", were found, in general , to properly refer to and conform to MOE guidelines for the assessment of noise impact. Following are several comments regarding areas of concern in these documents;

1) The predecessor MOE noise reviewer, in reviewing earlier documents of this project, commented several times (Letters from R. Krawczyniuk to G. Connolly, "RE: Discussion Paper #6 - Initial Draft, Addendum 1", dated June 19, 2003, and "RE: Discussion Paper #6 - Initial Draft" dated January 8, 2003) on the need to provide hourly estimates of both background and landfill-related road traffic on the site access routes, in order to best judge the worst-case impact of the landfill traffic. This does not yet appear to have been done. The effect of landfill-related traffic shown in Table 5-7 of the Noise Impact Assessment is based upon a 12-hour overall average, rather than a worst-case hour, and the background traffic estimates in Table 3-1 of that document specify a range rather than indicating the hourly information.

2) Another concern stated in both the above-referenced previous MOE noise reviews of this project is the absence of explicit hours for various landfill site activities. This concern appears to not yet have been satisfied.

3) Yet another previously voiced MOE concern (in the June 19, 2003 reference above) involves the lack of sufficient information in Figure D6-30 regarding the relationship of the site entrance off County Road 79 and the closest homes to that entrance. In the final version of DP 6 as provided for this review, this figure had been omitted entirely. In DP 9 there is a list of receptors in this general area of interest which have been designated as eligible for compensation, without stating the exact criteria for selection to this list, the schedule for provision of compensation, or the criteria determining which forms of acoustic mitigation would be provided to which property. Without such information it is not possible for this reviewer to determine if noise guidelines are being applied reasonably and effectively. It is also noted that this list in DP 9 uses a new set of "R" designations for receptors which does not correspond to the locations of the "R" receptors

used in earlier Discussion Papers.

4) While the Noise Impact Assessment (Background Document to Draft Discussion Paper #7) defines two of the sensitive receptors as R6 and R9, with differing sound levels attached to each, there does not appear to be any one drawing which indicates where both these receptors are located. There is one drawing in the Noise Impact Assessment, Figure 8-11-ALT 1, in which R6 and R9 are used in differing fonts to apparently indicate the same location. This situation requires clarification.

Should you have any questions, please contact the undersigned.

T. Shevlin, P.Eng.

WM Response to the MOE Noise Comments on Discussion Paper's 7, 8, & 9, May 13, 2005

<table>
<tr><th>Agency Comment</th><th>WM Response</th><th>Link to Terms of Reference</th></tr>
<tr><td>1.</td><td>Hourly estimates of both background noise and landfill-related road traffic on the haul routes will be provided in the Finalized DP-7 document. Noise contours of the haul route traffic noise and background traffic noise will be provided for year 1 expansion and final year 26. Background traffic is expected to increase while haul route traffic is expected to remain unchanged. Therefore year 1 and year 26 traffic analysis is reasonable.</td><td></td></tr>
<tr><td>2.</td><td>Aercoustics Table 8-1 is revised to show explicit hours of operations.
Table 8 – 1 Landfill Machinery & Equipment and Vehicles
<table>
<tr><th>Source Name</th><th>Equipment Modeled in Each Source Group</th><th>Number of Units Modeled in Each Source Group</th><th>SPL @30m (Each Unit)</th><th>Hours of Operation</th></tr>
<tr><td rowspan="9">Cell Prep</td><td>Cat D5R</td><td>6</td><td>71</td><td rowspan="9">May to Sept, 7:00am to 7:00pm</td></tr>
<tr><td>Water Truck</td><td>4</td><td>64</td></tr>
<tr><td>Rollers</td><td>10</td><td>71</td></tr>
<tr><td>Cat 815 Compactors</td><td>3</td><td>74</td></tr>
<tr><td>Backhoe</td><td>1</td><td>72</td></tr>
<tr><td>Farm Tractors</td><td>5</td><td>71</td></tr>
<tr><td>Loader 966</td><td>2</td><td>72</td></tr>
<tr><td>Excavators</td><td>8</td><td>70</td></tr>
<tr><td>Cat 350</td><td>23</td><td>75</td></tr>
<tr><td rowspan="7">Landfill Operations</td><td>Cat 836G</td><td>2</td><td>79</td><td rowspan="7">7:00am to 7:000pm</td></tr>
<tr><td>Cat D8R</td><td>2</td><td>77</td></tr>
<tr><td>Cat D6R</td><td>1</td><td>72</td></tr>
<tr><td>Cat D400</td><td>2</td><td>72</td></tr>
<tr><td>Cat 330L</td><td>1</td><td>70</td></tr>
<tr><td>Cat 140H</td><td>1</td><td>74</td></tr>
<tr><td>Landfill Operations</td><td>Cat D8R</td><td>2</td><td>77</td><td>6:00am to 8:00pm</td></tr>
<tr><td>Flare x 3</td><td>Flare</td><td>3</td><td>60</td><td>24/7</td></tr>
<tr><td>Crusher</td><td></td><td>1</td><td>83</td><td>2 days, twice per year, 7:00am to 5:00pm</td></tr>
<tr><td>Chipper</td><td></td><td>1</td><td>76</td><td>2 days, twice per year, 7:00am to 5:00pm</td></tr>
</table></td><td></td></tr>
</table>

WM Response to the MOE Noise Comments on Discussion Paper's 7, 8, & 9, May 13, 2005

Agency Comment	WM Response	Link to Terms of Reference
3.	Figure D6-30 will be reconciled to clearly illustrate the proximity of the site entrance off of County Road 79 and the closest homes to the entrance. This information will be relayed to the appropriate disciplines to ensure that the figure is included in the DP6 documentation. Section 5.3 Table 1 and 2 and Figure 1 in DP9 identify the specific criteria and residences eligible for nuisance impact compensation. Aercoustics will ensure that the "R" receptor designations in the DP-9 report are reconciled with respect to information to be provided in the updated Noise report.	
4.	Clarification will be provided to distinguish between receptors R6 and R9. R6 is located in the middle of the west half of the Watford Cemetery. R9 is located at the northeast corner of the Watford Cemetery extension. Figures will be clarified.	

Ministry of the Environment – Groundwater

June 2, 2005

(97393-65/2005)

Ministry of the Environment | Ministere de l'Environnement
Southwestern Region
733 Exeter Rd.
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519-873-5000

Region du Sud-Ouest
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519-873-5000

MEMORANDUM

MOE File No. SI LA WA C3 610

TO: Gemma Connolly
EAAB Toronto

FROM: Bruce Harman
Groundwater Group, Southwestern Region

DATE: June 2, 2005

RE: Warwick Landfill Expansion
Environmental Assessment Document Review
Technical Support Section: Groundwater Review Comments

I have reviewed the following documentation related to the Warwick Landfill Expansion Environmental Assessment process.

• Discussion Paper #5, Final Draft	**Baseline Conditions**	August 2004
• Discussion Paper #6, Final	**Facility Characteristics**	August 2004
• Discussion Paper #7, Draft	**Impact Assessment**	October 2004
• Discussion Paper #7, Draft	**Appendices A-E**	October 2004
• Background Document to DP#7	**Hydrogeological Impact Assessment**	October 2004
• Discussion Paper #8, Draft	**Preliminary Design, Development and Operations Plan**	October 2004
• Discussion Paper #9, Draft	**Impact Management Plan**	October 2004

Also reviewed and pertaining to the existing Warwick Landfill Site;
- 2004 Poplar System Monitoring Report, by Jagger Hims Limited, January 2005,
- 2003/2004 Monitoring Report, by Jagger Hims Limited, November 2004
(formal comments pertaining to monitoring have been issued directly to the Sarnia District Office.)

The following is a summary of my Environmental Assessment documentation review:

1) The proposed site will operate as a solid non-hazardous landfill accepting residential and Industrial/Commercial/Institutional (ICI) waste and contaminated soil.
2) Proposed site life is projected at 25 years accepting 750,000 tonnes/year.
3) Composting will be an approved activity.
4) The site has been designed for progressive closure thereby minimizing the generation of leachate.
5) Site hydrogeology consists of a clayey silt to silty clay (active and upper aquitard) over interstadial deposits (silts and sands) overlaying the Rannoch Till (lower aquitard) over a basal sand and gravel (interface aquifer) all over shale bedrock. The approximate 30 metres of fine grained soils above bedrock provides optimum conditions for the location of this landfill site.
6) The landfill will be designed with a clay liner and drainage capability for the management of leachate. The site will operate under a designed hydraulic trap with underdrain and gas collection technology.

The hydraulic trap will cause the inflow of groundwater and the containment of landfill-generated leachate. Approximately 200 m^3/day of leachate (73 ha. X 100 mm/a) is proposed to be pumped from the primary drain of the trap. Pumping of leachate from a secondary drain will only be as required as a contingency measure.

7) The hydraulic trap will induce the interface aquifer to move upward at a very slow rate of 0.01 mm/a. Groundwater will seep into the secondary drain and then into the primary drain from which it will be pumped. Complete saturation of the secondary drain has been estimated over a range of 10 to 50 years.

8) A portion of the collected leachate is proposed to be recirculated back onto the landfilled waste with the primary benefit being the resultant reduction in the contaminating life span of the site. The remaining portion of collected leachate is to be treated for on-site disposal. The recirculation process is estimated to be required for approximately 50 years. The benefits and short comings of the recirculation of leachate have been identified in the reports. I concur there are more benefits and the potential negative impacts can be managed.

9) HELP 3.07 Version Nov. 1997 (Hydrogeologic Evaluation Landfill Performance Model) was used to model leachate recirculation hydraulically within the landfill. This reviewer has no experience or training with this computer model, however, I have reviewed the *Leachate Characterization Study* (Discussion Paper #8) where leachate recirculation is presented in detail and find the assumptions hydrogeologically sound and conclusions reasonable. The average leachate recirculation rate has been estimated to be 100 mm/a. This is in addition to the infiltration of precipitation after site closure, also 100 mm/a.

10) The recirculation of leachate is anticipated to increase the leachate mound within the landfill property. A leachate level trigger of 6 meters has been established. Leachate levels above this trigger level could cause the loss of hydraulic containment and require the activation of contingency measures (such as pumping the secondary drain).

11) Collected leachate not being recirculated will undergo full on-site treatment with irrigation of a poplar forest for long term requirements. There will be no liquid effluent discharge to surface water. On site treatment will involve evaporation/distillation with mechanical vapour recompression. The level of leachate pretreatment will be designed to meet surface water discharge criteria to ensure life of the poplar forest. Treated leachate will be stored 6.5 months/year and irrigation will occur 5.5 months/year. Until such time as the poplar trees are adequately mature to withstand the proposed applications, treated leachate will be trucked off site.

12) As recirculation is anticipated to cause an increase in the generation of landfill gas (specifically methane), the management of gas will occur through collection and flaring.

13) Impact projections for the landfill design have been calculated to affect the surrounding shallow groundwater resources by causing the water table to fluctuate 0.5 metres at the site's north, south and east boundaries and approximately 1 metre at the western boundary.

14) Discussion Paper #7 states "Groundwater quality within the water table and the aquifer located at the interface of the bedrock will not be affected by landfill leachate." The designed monitoring program and prepared Contingency Plans are in place to back this statement. The natural dense clayey soil beneath the landfill and resultant slow groundwater flow rates will provide time to permit the installation of necessary contingency measures should the first alert monitoring program determine a necessity.

15) The land application of leachate should satisfy MOE Guideline B-7 (Reasonable Use Policy) at site boundaries. This will be supported by the Contingency Plans.

16) Groundwater base flow to the surrounding surface water quality is projected to be unaffected by the landfill.

17) The Environmental Monitoring Program (EMP) has been reviewed in detail and found to be acceptable.

Leachate levels: May and November – Primary Drainage Layer Pumping Stations

Leachate quality: annual – Primary Drainage Layer Pumping Stations

PLIL: Cl, NO_4, B

SLIL: Alk, SO4, Ca, Mg, K, Na, Fe, DOC, Ammonia, TKN, field pH, cond, turb.

Groundwater levels: May and November – as shown in DP#7

Groundwater quality: Points of Compliance

Parameters: PLIL and SLIL

Overburden: May and November

Interface: May

BTEX: biennially

Annual Report: April

Trigger Mechanisms:

Leachate Mound: 6 metres

Groundwater quality: RUP at Points of Compliance and PLIL

Gas: >20% LEL methane.

(Full details of the EMP are summarized in Table 10-1 DP#7 Hydrogeologic Assessment.)

18) Waste landfilled in cells 5 and 6 of the existing landfill will be relocated as per the Design Development and Operations Plan to permit the construction of the clay liner at this location.

19) The engineered primary clay liner has been reported (DP #8) to be comprised of on-site and "select" silty clay with a hydraulic conductivity of K = 5 x 10^{-8} cm/s. I am unclear as to what measures are in place to determine that the "select" K of the on-site clay being remolded and recompacted is consistent with that required.

Summary Comments

- The proposed Warwick landfill will be situated on approximately 30 metres of fine grained soils above the bedrock surface. This provides an optimum condition for the location of this landfill. In addition, this landfill will be operated on the principle of hydraulically containing leachate within the waste footprint for collection, treatment and disposal. Should the proposed on-going Environmental Monitoring Plan detect a failure in the hydraulic containment of the leachate mound beneath the site,

the slow flow characteristics of the surrounding fine grained soils are such that considerable time would be permitted to address this loss of containment with an appropriate contingency measure.

- As the phytoremediation process utilizing the poplar forest may require 3 to 5 years or more (should the trees not mature/grow as expected) before it can commence, an interim contingency has been proposed to truck treated leachate to sewage treatment plants in either Sarnia, London or other area plants. I believe consideration should be given to entering into such an agreement with a specific municipality prior to landfill start up to confirm this is an achievable measure that might be required as a long term option.
- I concur that the recirculation of leachate will result in a shortened contaminating life span for the site with a more aggressive leachate resulting in the earlier years of the leachate collection and distribution system. Based on information presented in the documentation I believe the resultant negative impacts (odors, seeps, mounding, etc.) should be manageable by way of the contingencies presented.
- The HELP computer model was used to model leachate recirculation hydraulically within the landfill. This reviewer has no experience or training with this computer model; however, I have found the assumptions and conclusions made to be reasonable from a hydrogeological perspective.
- The Environmental Monitoring Program, as presented, is comprehensive and acceptable.
- The designed environmental monitoring program and prepared Contingency Plans are adequate to support the documented statement that the groundwater quality within the water table and the aquifer located at the interface of the bedrock will not be affected by landfill leachate.
- I remain unclear as to what measures are in place to ensure the consistent integrity of the necessary hydraulic conductivity of the primary clay liner during installation.

If you should have questions with the above review comments, please do not hesitate to contact me.

Regards,

Bruce G. Harman, P.Geo.
Regional Hydrogeologist
Technical Support Section

WM Response to the MOE Hydrogeologic Comments on Discussion Paper's 7, 8, & 9, July 8, 2005

Agency Comment	WM Response	Link to Terms of Reference
	Comments 1 through 19 provide a summary of the document review. Statements that request additional information are provided in the Summary Comments and are addressed below.	
	Although the poplar trees will require 3 to 5 years to achieve maturity, treated leachate effluent may be applied during the initial years of tree growth to supplement the precipitation deficit that typically occurs during the growing season. Operation of the pilot scale Poplar Tree System on the existing Warwick Landfill Site has shown the poplar tree ability to evapotranspirate low strength leachate/effluent. An existing commercial arrangement between WM and the London Greenway Pollution Control Plant permits the disposal of landfill leachate. This arrangement will continue post landfill expansion.	
	The details on the quality control and quality assurance (QA/QC) program for the primary liner will be provided as part of the detailed landfill design. Components of the QA/QC will include the following: • Determination of the quality of the source material for the liner. Optimum moisture contents and 98% standard Proctor values will be determined for the selected onsite material. Based on liner construction for the existing landfill site, the onsite clayey silt to silty clay is suitable material for the primary liner. • Testing for moisture and compaction for each lift of the remoulded material during liner placement. • Field infiltration testing of the completed liner.	

Ministry of Agriculture and Food – June 17, 2005

(97393-65/2005)

Ministry of Agriculture and Food

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Ontario

ENVIRONMENT POLICY AND PROGRAMS BRANCH
AGRICULTURAL LAND USE UNIT

June 17, 2005

Mr. Philip J. Bosco, B.E.S.
Environmental Planner
Gartner Lee Limited
300 Town Centre Boulevard, Suite 300
Markham, Ontario
L3R 5Z6

Dear Mr. Bosco:

Re: Warwick Landfill Expansion Environmental Assessment
Draft Discussion Paper #7 on Impact Assessment
Township of Warwick, County of Lambton

In response to your request, I have reviewed the above-noted matter and provide the following technical comments, which are based on the provincial policies regarding agricultural land as found in the **Provincial Policy Statement, 2005 (PPS).** Provincial Policy Statement, 2005 came into effect on March 1, 2005. For more information regarding PPS, 2005 it is recommended you contact the Ministry of Municipal Affairs and Housing or visit the Ministry's website at www.mah.gov.on.ca and follow the links to 'Provincial Policy Statement.' Sorry for the delay in getting these comments to you.

It is understood the above noted Discussion Paper is one of a series of documents that have been released for public and agency comments as part of the Environmental Assessment process for the proposed undertaking. Technical reports, released concurrently with the series of Discussion Papers, provide background information and data on how the potential impacts of the proposed Warwick Landfill Expansion were assessed. The purpose of Discussion Paper #7 (currently out for public consultation) is to document the choice of the preferred site access option and leachate treatment alternatives and to present the net environmental impacts.

With respect to technical reports, Discussion Paper #7 contains a technical report titled 'Agricultural Impact Assessment.' The technical report states "the purpose of this report is to document the assessment of potential impacts of the proposed Warwick Landfill Expansion on agricultural resources, operations and activities within and surrounding the proposed area of expansion." The Ministry understands this 'Agricultural Impact Assessment' report utilizes the inventory of agricultural resource characteristics and land uses as described in the Agricultural Baseline Studies contained in Discussion Paper #5.

The Ministry has reviewed Discussion Paper #7 and the associated Agricultural Impact Assessment technical report and offers the following comments. As part of this Ministry's review, consideration was also given to Discussion Paper #5.

The Ministry has identified four areas of concern. First, the study area for the proposed undertaking is a little unclear. The Ministry suggests the study area be defined as a 3.5 km radius from the boundary of all existing lands and proposed lands for the landfill operation. Second, the Ministry questions whether 4 days of traffic counts is sufficient data from which to draw conclusions. I have consulted with the Ministry of Transportation and I have been advised that this is difficult determine without reviewing the methodology of Traffic Impact Study. Third, it has not been articulated as to who will pay for water and drainage mitigation measures and further, more information on the proposed water monitoring program is needed. Fourth, the Ministry requires more information with regard to how the noise consultants reached their conclusions. Each of these concerns will now be discussed in more detail.

1. Study Area

According to Figure 2 of the Final Draft of Discussion Paper #5 (Baseline Conditions), there are several livestock operations within a 3.5 km radius of the landfill footprint. The Ministry notes the landfill footprint includes the boundary of the actual landfill site and the proposed expansion. It appears the landfill footprint does not include all of the existing and proposed lands to be used for the landfill operation. For the purposes of this undertaking, the Ministry suggests the study area be defined as a 3.5 km radius from the boundary of all existing lands and proposed lands for the landfill operation.

2. Haul Route/Traffic

The Ministry notes Section 3.1.4 of the 'Agricultural Impact Assessment' report states that 'due to the short extent of the haul route, and the provision of appropriate design upgrades and road alterations as described by the consultant, there will be minimal interference with farm machinery movement related to the proposed landfill expansion." The Ministry notes from the table in Section 2.11 of the Final Draft of Discussion Paper #5 that four daily traffic counts were completed: June 4, 1998 (weekday); August 20, 1999 (weekday); August 20 [21st?], 1999 (Saturday); and September 18, 1999. Section 2.11 also states that 'instances of agricultural related vehicles or farm implements on the roadway were recorded.' The Ministry offers three comments.

First, what was classified as an agricultural related vehicle? That is, was a livestock transport truck counted as an agricultural related vehicle? Second, the Ministry questions whether 4 days of traffic counts is sufficient data from which to draw conclusions. I have consulted with the Ministry of Transportation and I have been advised that this is difficult to determine without reviewing the methodology of the Traffic Impact Study. Third, according to the Final Draft Discussion Report #5 (p. 2-7), crop production in the area includes corn, alfalfa, wheat and soybeans. The typical growing for these types of crops in southwestern Ontario ranges from planting early April to late October, depending on weather. To get a more accurate indication of agricultural traffic, the Ministry suggests traffic counts include days from April to October inclusive. It is also important to note that weather plays a significant role in agricultural traffic. For example, wet, rainy days will significantly reduce the amount of agricultural traffic.

3. Groundwater and Surfacewater

The Ministry is not in receipt of the Hydrogeology Report prepared by Jaggar Hims however, according to section 3.3.2 of the 'Agricultural Impact Assessment' report, the groundwater

baseflow to surface water features in the Brown Creek Watershed and Bear Creek Watershed will not be notably affected by the proposed landfill expansion. That is, there will be minimal impact on the quantity of surface water available to agricultural operations downstream of the proposed landfill expansion. With respect to surfacewater quality, the Ministry notes the report states "the assessment determined that, as designed, there will not be any mounding of leachate above the ground surface. Leachate seeps are therefore not predicted. The control of litter, proper fuel storage and leachate handling procedures, as well as the control of sediment through storm water management ponds will control water quality effects from site operations and on-site erosion."

The Ministry notes Section 3.3.2 of the 'Agricultural Impact Assessment' report states "any changes in surface water quality or quantity affecting supply for livestock can be mitigated by providing alternative water sources. This could involve the provision of new wells." While the Ministry does not disagree with this statement, the question which appears to remain outstanding is who pays? The Ministry suggests this concern be addressed in Discussion Paper #7. In addition, it is important to identify to whom this mitigation would apply. That is, will it apply to new and existing livestock operations within a 3.5 km radius of the lands zoned for waste disposal?

As for groundwater, Section 3.3.2 of the 'Agricultural Impact Assessment' report indicates that the quantity of the shallow groundwater table is not expected to severely affect crop production since fluctuations in the water table are expected to be less than 0.5 m at the site boundaries with the exception of the western site boundary, which is predicted to fluctuate less than 1 metre. The Ministry has no reason to disagree with this statement. With respect to groundwater quality, the 'Agricultural Impact Assessment' report states "Jaggar Hims Limited have indicated that the quality of groundwater associated with farms lands in the vicinity of the proposed landfill expansion would not be impacted by the proposed Warwick landfill expansion." It is unclear to this Ministry as to how 'in the vicinity' is defined. Is 'in the vicinity' defined as within 3.5 km of the landfill site lands? Also, the Ministry suggests the proposed water monitoring program include monitoring the quantity and quality of water for surrounding livestock operations.

Related to the topic of water, the Ministry notes section 3.3.2 of the 'Agricultural Impact Assessment' states "the likelihood of widespread tile drainage impacts relating to the proposed expansion is limited. Any tile drainage impacts or disruption of drainage outlets would be easily mitigated by installation of new drainage works." The Ministry does not disagree with this statement however, as suggested above, the Ministry suggests Discussion Paper #7 articulate who will pay for the installation of new drainage works, if necessary.

4. Nuisance Impacts

Section 3.4 of the 'Agricultural Impact Assessment' report deals with nuisance impacts. The impacts include noise, litter, gulls and rodents. With respect to noise, the 'Agricultural Impact Assessment' states 'the noise consultants (Aercoustics Engineering Limited) indicated that farm livestock acclimatize rapidly to whatever noise environment they are exposed to. This would apply to cattle production at feedlots and in fields located in the vicinity of the landfill."

According to an article in the Journal of Animal Science (1993) volume 71: 1065-1070, "cattle and sheep are more sensitive to high frequency noise than are humans. Excessively loud noise is stressful but, animals can adapt to reasonable noise levels." Further, according to an article titled 'Importance of Reducing Noise When Handling Livestock, prepared by Dr. Temple Grandin, Associate Professor of Animal Science at Colorado State University, "animals that become agitated and excited bunch together and are more difficult to separate and sort. If animals

become agitated or excited, allowing them to calm down for a few minutes makes them easier to handle. It takes up to 20 minutes for the heartrate of severely agitated cattle to return to normal." This same article also suggests the "clanging and banging metals parts should be silenced with rubber pads. Equipment operated with hydraulics should be engineered to minimize noise. Some types of hydraulic pumps make more noise than others. High pitched noise from a hydraulic pump is disturbing to animals. Air hissing is very distressful to livestock. Air operated equipment should be equipped with mufflers to reduce noise."

The Ministry acknowledges the term 'reasonable' is not defined however, the available information appears to suggest there is a difference between 'reasonable' noise and noise generated by heavy equipment. As such, the Ministry would like to request clarification on how the noise consultants reached their conclusion.

With respect to litter, gulls and rodents, the Ministry notes the 'Agricultural Impact Assessment' report recommends the proponent "adopt a litter management program and a monitoring program to identify and remove any litter from neighbouring farm fields." The report states "litter cleanup operations should be conducted in a manner that avoids crop damage and soil compaction" and "should incorporate an early spring and late summer litter inspection and pickup so that spring planting and fall harvesting is not impeded by any litter accumulation in adjacent agricultural fields." The Ministry supports this recommendation and trusts it will be incorporated into the Litter Management Strategy.

Also, section 3.5 of the 'Agricultural Impact Assessment' report states "economic impacts related to the displacement or disturbance of farm businesses and agribusiness due to the effects described above [traffic, air quality, water, noise, litter, gulls and rodents] are being assessed by Price Waterhouse Coopers." Is this report now available?

While the above represents the Ministry's interpretation of provincial policy with regard to agricultural land, it does not reflect an overall provincial position on this matter. There may be planning concerns or interests of other agencies that should be considered, in addition to any municipal planning considerations.

Should you have any questions or wish to discuss this matter further, please feel free to contact this office.

Sincerely,

Dwayne Evans, MCIP, RPP
Rural Planner

cc: David Cooper, Manager – Agricultural Land Use, OMAF, Guelph
Penny Lawlis, Animal Care Specialist, OMAF, London

WM Response to the OMAF Comments on Discussion Paper's 7, 8, & 9, June 17th, 2005

Agency Comment	WM Response	Link to Terms of Reference
1. Study Area	There were four study Areas defined for the Agricultural Impact Assessment. These included: • The Haul Route from the site to Highway 402; • The site itself. Initially this only included the landfill footprint and immediate area. Subsequently, the calculation of loss of prime agricultural land was expanded to include additional lands extending to Nauvoo Road [County Road 79] that were added to provide for alternative access and also, all lands associated with leachate treatment facilities, berms, soil storage areas and the poplar treatment area; • An area extending one kilometer from the boundary of the landfill. This study area looked at potential operational impacts on adjacent or nearby farm operations; and • A 3 km. study area defined to characterize agricultural production in the community. This study area involved a more generalized look at agricultural land use patterns in the area. Agricultural land use patterns within the 3 km study area were found to be relatively consistent with livestock facilities and common field crop production occurring on almost all of the prime agricultural land that dominates the area. Although we did not extend our investigations beyond the 3.0 km to the 3.5 km distance suggested by the Ministry, we believe that, due to the relative consistency of the agricultural land use patterns in the area, doing so would not have materially altered our findings or conclusions.	
2.Haul Route/Traffic	**1. Agricultural Related Vehicles** Traffic engineering studies were prepared by Cansult. This firm had made observations of agricultural traffic as documented in Section 4.1.2.3 of our Transportation Assessment, Discussion Paper No. 5 – Baseline Conditions. For the purposes of the traffic counts and observations, agricultural related vehicles were considered to include farm tractors and other agricultural equipment which traveled at lower speeds relative to the normal traffic (e.g., less than 40 km/hr). Livestock transport trucks and other commercial agricultural vehicles were not specifically identified since some of these vehicles were not distinguishable from other forms of commercial heavy trucks. However, all of the agricultural related vehicles were taken into account in our assessment under the categories of "short heavy trucks" for tractors and other slow moving agricultural equipment, and "long heavy trucks" for all other larger transport vehicles. Given that the larger agricultural transport vehicles (e.g., livestock trucks) operate with similar acceleration/deceleration and travel characteristics as other commercial heavy trucks, we have incorporated these vehicles as part of the total heavy vehicle component in the Background Traffic layer of our analysis. **2. Number of Count Days** Traffic surveys and observations of agricultural traffic were carried out along the haul route during the following days:	

Agency Comment	WM Response	Link to Terms of Reference
	• Tuesday-Friday, June 2-5, 1998 (4 days) • Friday-Saturday, August 20-21, 1999 (2 days) • Saturday, September 18, 1999 (1 day) A total of 7 days of observations were made and the range of agricultural related vehicle instances was documented. As previously mentioned, our methodology in the traffic assessment was to incorporate the agricultural vehicles as short or long heavy trucks in the intersection assessment. In addition, the intersection turning movement volumes applied in the analysis reflected the highest or "worst case scenario" in terms of peak hour traffic and mitigation measures addressed this worst case scenario. It is noted that the Ministry of Transportation (MTO) staff has also completed a review of our Draft Discussion Paper No. 7 – Traffic Impact Assessment for the Warwick landfill expansion. In MTO's comments, there is no mention that the methodology applied is unacceptable recognizing that some recommended improvements may be further discussed. In addition to some of the road improvements already noted, one of the key recommendations is the paving of the shoulders on both sides of County Road 79 from the Highway 402 interchange to the proposed Warwick landfill site access on County Road 79. This improvement would not only reduce the amount of roadway dust but also enhance the safe usage of the shoulders by slow moving agricultural vehicles. **3. Seasonal and Weather Conditions** It is acknowledged that the typical agricultural growing season may range from April – October (depending on weather) and this was considered in establishing the time periods for the traffic surveys. As mentioned in our Discussion Paper No. 5 – Baseline Conditions: "As the dates of the traffic counts (June, August and September) correspond somewhat to the typical peak agricultural activity, the observed farm activity is considered quite representative of average agricultural traffic." Considering that the traffic assessment is examining the "worst case scenario" of combined landfill site traffic and background traffic, it was determined that late Spring and Summer conditions reflected the highest seasonal combined traffic volumes within the study area. We believe that the June, August and September counts are representative of typical peak agricultural activity and landfill site generated traffic activity. With respect to weather, all the surveys/counts were carried out during days with sunny or cloudy skies and dry roadway pavement and represented 'worst-case scenario'. None of the days involved rain or adverse weather since some of our surveyors had to be standing/sitting outside for over 10 hours. Based on this, we conclude that the amount of agricultural traffic observed was not reduced by adverse weather conditions during our surveys.	

WM Response to the OMAF Comments on Discussion Paper's 7, 8, & 9, June 17th, 2005

Agency Comment	WM Response	Link to Terms of Reference
3. Groundwater and Surfacewater	**OMAF Comment 1:** If new water sources, such as wells or surface water supplies, are required as a result of surface water contamination (quantity or quality) of livestock water, who pays? **Response Comment 1:** No detrimental effects to groundwater supplies or to surface water are predicted from the proposed landfill expansion. The thick clayey soil around the proposed waste footprint and the slow movement of groundwater toward the waste protects the local water resources. A comprehensive groundwater and surface water monitoring program is proposed to monitor for potential landfill effects on the groundwater and surface water resources on the landfill site and near the perimeter of the landfill site boundary. This monitoring network permits an evaluation of water quality and quantity where landfill effects would be greatest, if present. In the event of a detectable effect, a number of contingency systems are proposed to mitigate and prevent offsite impacts. If an allegation of offsite landfill impacts is received, the allegation will be investigated and assessed. The investigation will include an assessment of the complainant's water source with a site visit and possible testing, as well as a review of landfill monitoring results to determine if there was a potential landfill source for the allegation. Depending on the sensitivity of the complaint to the health and safety of the public or agricultural operation, a temporary water supply would be provided during the assessment. If a detrimental landfill effect were determined, corrective measures would be implemented, which would include mitigation of the landfill effect at the source and/or the provision of an alternative water supply. The landfill owner would provide the necessary funding if the landfill were the source of the contamination. **OMAF Comment 2:** To whom would the mitigation of water supply contamination apply? **Response Comment 2:** No detrimental landfill effects to groundwater or surface water are predicted adjacent to the proposed landfill expansion property. The potential for detrimental landfill effects decreases with distance from the landfill in a downstream or downgradient direction, and does not occur in an upstream or upgradient direction. Allegations of landfill effects would be assessed within the 3.5 km radius of the site with a site visit and a review of the results of the landfill monitoring program. If required, supplemental water testing would be completed. **OMAF Comment 3:** Define 'in the vicinity of' with respect to potential landfill effects on groundwater and surface water resources. **Response Comment 3:** No detectable landfill effects on groundwater quality and quantity are predicted within 100 m of the WM property. As a result, groundwater baseflow to local watercourses will not be affected by the landfill expansion. Agricultural land within 3.5 km of the site was considered in the impact assessment.	

WM Response to the OMAF Comments on Discussion Paper's 7, 8, & 9, June 17th, 2005

Agency Comment	WM Response	Link to Terms of Reference
	OMAF Comment 4: OMAF suggests the incorporation of surrounding livestock operations into the proposed landfill monitoring program. **Response Comment 4:** The proposed landfill monitoring program permits a comprehensive assessment of groundwater and surface water quality and quantity on and near the landfill site. This monitoring network permits an evaluation of water quality and quantity where landfill effects would be greatest, if present. In the event of a detectable effect, a number of contingency systems are proposed to mitigate and prevent offsite impacts. Monitoring of local livestock operations would be considered and implemented with the implementation of the contingency measures if required. Sampling of groundwater quality at local water wells was completed as part of the baseline conditions assessment of the proposed landfill expansion. Based on the natural ability of the native clayey soil to contain landfill leachate effects, the water management program for the landfill, and the proposed monitoring program, the incorporation of livestock operations into the monitoring program is not necessary. **OMAF Comment 5:** If new drainage works are required as a result of the destruction of tile drains or disruption of drainage outlets, who pays? **Response Comment 5:** The landfill design considers the existing agricultural and municipal drainage systems around the proposed landfill site. No detrimental effects to these drainage systems are predicted. If the drainage system is negatively impacted during landfill construction or operation, the landfill owner will mitigate the damage at its cost. WM is committed to working with the municipality, county, and local landowners to prevent unacceptable drainage system effects from the existing and proposed landfill sites. In fact, WM has assisted the municipality in the maintenance of adequate drainage within the Zion Line ditch, although the effects were not landfill related.	
4. Nuisance Impacts	Aercoustics, the noise consultants working on the Environmental Assessment, reviewed the journal article referenced by the Ministry concerning noise impact on livestock. They indicate that their work on the landfill assessment dealt with environmental noise levels from land filling activities and associated haul route truck traffic. The journal article suggests that the concerns therein relate instead to livestock that are immersed in an enclosed setting and directly exposed to machinery noise at very close distances, say a few meters or less away and in a highly reverberant sound environment that is not comparable to the outdoors. This exposure would be analogous to Occupational Noise Exposure In Humans, i.e. sound levels that are greater than 80 to 85 dBA. A quick review of the references in the paper suggests that this research has been done for the handling of large	

WM Response to the OMAF Comments on Discussion Paper's 7, 8, & 9, June 17th, 2005

Agency Comment	WM Response	Link to Terms of Reference
	groups of cattle/livestock and in some cases for animals being led to slaughter. The background noise alone from a group of animals being handled (no machinery noise) is likely to be in the 60 dBA range as detected by a herder or other person or animal. This level alone is greater than the sound level that is predicted from landfill activities. The noise level environment that we are dealing with the landfill is not of the variety that is typically judged by occupational standards, but rather by annoyance standards that have been defined by MOE. The MOE sound limit of 55 dBA is substantially lower than the 85 dBA + levels that are characteristic of the high noise environment that is typical of an occupational setting, which appears to be the basis of the paper. The frequency content of the environmental noise emissions from landfill operations is relatively broadband and not dominated by the high frequency range of the type of high-pitched noises mentioned in the OMAF comments. Truck traffic pass-by noise is a common sound in farm areas, with cattle often comfortably grazing in close proximity to many 400 Series highways. Highway sound levels exceeding 70 dBA (average levels, with maximum levels significantly greater) would be expected in this scenario. Cattle observed along such major highways appear to be well adapted to this highway sound environment. The 70 dBA+ sound environment along Highway 401 would therefore be considered as reasonable from an agricultural perspective. The noise from the proposed activities in Warwick expansion will be considerably below this level, typically in the 45 to 55 dBA range. In response to your question about the availability of the Price Waterhouse Coopers report, Gartner Lee is forwarding the Economic Assessment report to the Ministry.	

Ministry of Transportation – June 29, 2005

(97393-65/2005)

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June 29, 2005

Mr. Philip J. Bosco
Gartner Lee Limited
140 Renfrew Drive
Suite 102
Markham, Ontario
L3R 6B3

via mail and fax
(905) 477-1456

Dear Mr. Bosco:

RE: Warwick Landfill Expansion Environmental Assessment
Draft Discussion Papers Numbers 7, 8, and 9
County of Lambton - Highway 402 and Lambton Road 79

I apologize for the delay in providing comments to you for the abovementioned submission. Our comments are outlined as follows:

The ministry has completed its review of the Draft Discussion Papers Numbers 7, 8, and 9 for the Warwick Landfill Expansion Environmental Assessment. Our review was focused on transportation issues and the potential impacts this proposed development could have on the provincial highway system.

The Transportation Impact Assessment prepared by Cansult examined the anticipated traffic impact that the proposed landfill expansion would have on the surrounding road network including the Highway 402 at Lambton Road 79 Interchange.

Full expansion of the development will not be complete until the year 2030, at which point the landfill site will cease operation. It is difficult to predict traffic growth and traffic patterns for a 25-year projection; however, the 2.5% annual growth rate used in the report for Lambton Road 79 is acceptable.

According to the report, the available stopping sight distance on Lambton Road 79 at the south ramp terminal does not meet ministry standards. As a result, the consultant has suggested the reduction of the posted speed limit on Lambton Road 79 from 90 km/h to 60 km/h. The ministry does not agree with reducing posted speed limits as a means of correcting existing deficiencies; nevertheless, we recognize that this road is within the jurisdiction of the local road authority. The report notes that the available stopping sight distance at this location is 165m, which corresponds to an operating speed that is slightly above the posted speed limit. This concern has been noted and will be evaluated in detail during any future highway projects planned for the area.

.../2

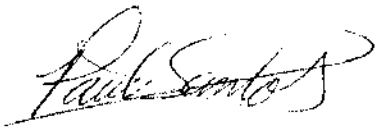
The report suggests that a southbound left turn lane at the north ramp terminal will be required on Lambton Road 79 in the year 2025. The ministry does not believe that this improvement is necessary at this time based on current volumes.

The report also suggests that a northbound left turn lane at the south ramp terminal with 30 metres of storage will be required on Lambton Road 79 as soon as the expansion has started and will require 40 metres of storage in 2030. We agree with the requirement for these improvements as a result of the proposed landfill expansion.

Since the need for the improvements is a direct result of the proposed development, the developer/municipality will be responsible for them. This includes, but is not limited to, property requirements, engineering design, utility relocations, tendering, contract administration, construction, etc. An encroachment permit will also be required from the ministry to perform this work. The design and construction must be in accordance with ministry standards; therefore, all the engineering design drawings and associated tender package related to these works will need to be reviewed by the ministry.

Should you have any questions or comments regarding any of the above, please do not hesitate to contact this office.

Yours truly,



Paul Santos
Regional Development Review Coordinator
Planning & Design Section
Southwestern Region - London

c. J. Graham Harkness, Planning and Design
B. Kope, Operational Services – London

WM Response to the MTO Comments on Discussion Paper's 7, 8, & 9, June 29, 2005

Agency Comment	WM Response	Link to Terms of Reference
Page 1 Para. 4	The expansion of the proposed facility will occur upon approval. For impact assessment purposes a 25 year operating life was assumed with a base year of 2005 and a horizon year of 2030.	
Page 1 Para. 5	In light of the concerns raised by various agencies and the public regarding the recommendation to reduce the current posted speed limit on County Road 79 from 90km/hr to 60km/hr, other mitigation measures at the 402 interchange have been reviewed: 1. **Lift CR79/Ramp Intersection Approaches to provide adequate Sight Lines –** The improvements would allow CR79 to be maintained at the current posted speed limit or a lower posted speed limit depending on MTO and/or the County's decision. However, it provides for adequate safe stopping sight distance for 110/km/h design speed on CR79. The works involve flattening the curves at the intersection approaches and lift the roadway by about 1.9m on the north side critical point and about 2.5m on the south side critical point. Consequently, the highway 402 ramp and loop approaches to and from the intersections would need to be lifted as well. The bridge structure itself would not require any modifications. At the same time, it is recommended that the future southbound left turn lane for southbound CR 79 to westbound Highway 402 movements be implemented to minimize any future reconstruction. 2. **Northbound CR79 to Eastbound Highway 402 Right-Turn ramp –** This direct connection would serve to eliminate the current northbound left turn movement. It would relieve a potential point of conflict at the south intersection to the interchange. The proposed ramp may require a small amount of property at the SE quadrant. Any land implications should be confirmed at a more detailed design stage depending on MTO's requirements and acceptance in principle of the proposed ramp. 3. **Signalization of the CR79/402 Westbound Off-Ramp (North) Intersection –** Although this intersection will not meet the volume warrants for a signal, the implementation of a signal will reduce the number of conflicting movements and, in conjunction with sight line improvements, will further enhance the overall operation for auto and truck turning manouvers. It is recommended that the westbound ramp approach to CR79 be widened at the same time to accommodate a separate right turn lane consisting of a 70m storage and 30m taper so that drivers making a right turn are not delayed significantly by stopped left turning vehicles. The left turn lane should be activated so that the north-south signal green time is interrupted only when the presence of a vehicle on the westbound left-turn lane is detected.	
Page 2 Para. 1	It is agreed that current traffic volumes do not warrant a separate southbound left turn lane at the north ramp of the CR79/402 interchange. However, with the future growth in background traffic and additional site traffic, it is recommended in the future. Given the above-mentioned recommendation to lift and implement a traffic signal at the north ramp intersection to improve safety, it would be beneficial to construct the left turn lane at the same time so that reconstruction is not required in the future. The left turn lane would minimize the blockage of the southbound traffic through movements and allow safer operations at the intersection.	
Page 2 Para. 2	With the currently recommended northbound to eastbound right turn ramp from CR 79 to Highway 402, the northbound left turn lane suggested in the report will no longer be required. In fact, this northbound left turn movement would be eliminated due to the recommended directional ramp which will reduce the current conflict point between southbound through movement and northbound left turn movement.	
Page 2 Para. 3	It is acknowledged that the appropriate ministry design standards and details would be followed. All relevant plans and documents would be submitted to the Ministry for review once acceptance in principle of these recommendations is received. Related costs for works, fees, etc. and the developer's contribution would be agreed to with the various agencies prior to commencement of the proposed facility expansion.	

Ministry of the Environment – Air Quality

July 8, 2005

(97393-65/2005)

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July 8, 2005

MEMORANDUM

To: Gemma Connolly

From: Gerald Diamond, Ph.D.
Air Quality Analyst

Re: Discussion Paper 7 - Warwick Landfill

It is somewhat difficult to review this document since it has few particulars. However, I have the following comments. I trust you find them helpful.

Section 5.3

To determine the explosion hazard, calculation should be made of evolution rates, and potential escape rates. It is unclear why gas would be less likely to accumulate if a collection system is in place as collection sites are presumably relatively sealed with respect to gas flow.

I do not believe that litter is an air-related issue.

Odours will always be an issue. Proper practice may diminish them, it will not dispel them entirely.

I disagree with the idea that the gas should be flared on site. Collected landfill gas can be used to provide energy and simply flaring it on site flies in the face of ongoing efforts to combat the increase of "greenhouse" gases.

Since landfill gases can include known carcinogens, it is important to minimize exposure wherever possible. However, since some exposure will be inevitable, an ongoing measurement and analysis program should be instituted.

The largest impact of vehicle exhaust exposure will probably be related to diesel engines. Protocols should be put in place to ensure minimizing the source so as to minimize possible exposures. Some of these might include:

- scheduling arrivals,
- ensuring waiting trucks do no idle their engines, and
- planning truck routes to minimize traffic through more densely settled routes.

I believe that the risk due to particulate exposure may be higher than the tone of the document would suggest. Because of the diverse nature of the source, it is possible that trace amounts of organics, metals or biologically active substances may constitute a higher than average fraction of the particulate. In this case, the risk to receptors lies not just in the particulate density but also in exposure to its various components. I would suggest that periodic particulate sampling and analysis, also take place.

The risk related to traffic-generated fine particulate will depend, to a degree, upon how well dust is contained on-site and how much loss occurs from trucks as they travel near the landfill. If significant amounts of dust, especially contaminated dust, are released and settle on the roads only to be re-entrained, the risk may be much higher that it would be for roads that are not influenced by the landfill's presence. As well, drier conditions will lead to increased particulate generation. The dust mitigation plans, including truck and road cleaning should be carefully scrutinized.

Section 5.5

I do not have access to traffic figures for truck traffic to the landfill. However, I suspect that this may be an issue. If they are to institute mitigative practices, I suggest that they be well documented and an on-going log be kept by the landfill so that complaints may be correlated with these activities to assess their relative merit.

My experience around other landfills suggests that they are underestimating the litter. While it may not be a major issue depending upon the type of waste received, it will certainly be an irritant with the local community, especially if other problems occur.

I also believe they are underestimating the impact, if not the degree, of odour issues. It is difficult, if not impossible, to minimize odour on an active site. Persons sensitive to, or sensitized to, odour will have very low detection thresholds, and may require very short exposures to become aware of the odour. Note that in certain cases odour by itself is sufficient to trigger adverse health effects in sensitive individuals.

Gerald Diamond

WM Response to the MOE Air Comments on Discussion Paper's 7, 8, & 9, July 8, 2005

Agency Comment	WM Response	Link to Terms of Reference
Page 1 Para. 2	Noted. The statement "that gas is less likely to accumulate if a collection system is in place" refers to gas accumulation beyond the landfill footprint boundaries. Gas accumulating inside the landfill footprint would be captured by the collection system.	
Page 1 Para. 3	Strictly speaking litter is not an air quality issue. It typically falls to the air quality discipline because of experience with wind related issues.	
Page 1 Para. 5	The proposal to flare landfill gas complies with the landfill design standards of Ont. Reg. 232/98. Waste Management is a proponent of developing the landfill gas resource at the Warwick landfill. The company intends to bring this application forward at a later date.	
Page 1 Para. 6	With regard to flaring, there will be a roughly tenfold reduction in the greenhouse potential of the flared gas. The gas is roughly 50/50 methane/carbon dioxide. By flaring the gas, the methane is converted to carbon dioxide. Methane has a twenty times greater greenhouse potential than carbon dioxide. In the meantime, the flaring will reduce the emissions of pollutant and odourous gasses.	
Page 1 Para. 7	WM understands that the final Design and Operation (D&O) plan will contain a provision for monitoring. This has been recommended in air quality documents as well.	
Page 1 Para. 8	It is a matter of economics to WM that trucks at the landfill turnaround as quickly as possible. Many of the trucks will be their own and minimizing the time all trucks spend on-site reduces operating costs. A restriction on idling engines will be assessed as part of the D&O plan. A comprehensive traffic assessment has been completed to develop the best haul routes.	
Page 2 Para. 1	WM has responded to this concern through its agreement to monitoring as recommended in the Air Quality Impact Assessment Background Document. Please see section 7.0 of the Air Quality Impact Assessment Background Document for recommended monitoring and mitigation. Please see section 6.0 of the Human Health Risk Impact Assessment Background for the characterization of risk relating to particulate matter.	
Page 2 Para. 2	A full dust management plan will be part of the D&O. Please see section 7.0 of the Air Quality Impact Assessment Background Document for recommended monitoring and mitigation. Please see section 3.10 of DP8 for the details for the monitoring of dust.	
Page 2 Para. 3	Documentation of site activities and a detailed complaint log will be implemented as per the recommendations in the Air Quality Impact Assessment Background Document. Please see section 7.0 of the Air Quality Impact Assessment Background Document for recommended monitoring and mitigation. Please see section 3.13 of DP8 for details on the complaint response process	
Page 2 Para. 4	A litter management plan including a complaint mechanism will be implemented as part of the D&O plan	
Page 2	An odour management plan will be implemented as part of the D&O plan that will minimize the odour impact from	

WM Response to the MOE Air Comments on Discussion Paper's 7, 8, & 9, July 8, 2005

Agency Comment	WM Response	Link to Terms of Reference
Para. 5	the landfill. Odour impacts from the landfill are predicted to be minimal. Please see section 7.0 of the Air Quality Impact Assessment Background Document for recommended monitoring and mitigation. Additional modelling, as identified in the addendum to DPs 7,8, and 9, is currently being undertaken.	

Ministry of the Environment –
CoA Review Section, Waste Unit

Discussion Paper #7

June 7, 2005

(97393-65/2005)

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June 7, 2005

MEMORANDUM

TO: Gemma Connolly
Special Project Officer
EA Project Coordination Section

FROM: Greg Washuta, P. Eng.
Senior Waste Engineer
Certificate of Approval Review Section - Waste Unit

RE: **DISCUSSION PAPER #7 (DP #7) - DRAFT - OCTOBER 2004**
APPENDICES A-E
WARWICK LANDFILL EXPANSION ENVIRONMENTAL ASSESSMENT
CANADIAN WASTE SERVICES INC. (CWS)
CERTIFICATE OF APPROVAL (C of A) NO. A032203

I have reviewed Discussion Paper #7 Draft, Appendices A-E dated October 2004 and the following comments are provided for response by the proponent:

1. **Appendix A comments**

a: **Criteria 1(a), Page 1** - Installation of methane detectors in on site buildings would be mandatory in the Ministry's opinion.

b: **Criteria 1(a), Page 4, Impact** - The text states a percolation rate of 300 mm/annum through the waste yet on page 23 of Discussion Paper #6, Final, dated August 2004, the leachate infiltration through the cap is indicated to be 100 mm/yr. Please confirm the proposed percolation rate.

c: **Criteria 1(a), Page 5, Impact** - What are the characteristics of the aquitards that will allow protection of groundwater quality?

d: **Criteria 1(a), Page 6, Impact** - Stormwater ponds should be designed to accommodate the peak flow generated from the higher of the 100 year design storm or the prevailing Regional Storm Event as per Ontario Regulation 232/98 requirements.

e: **Criteria 1(a), Page 7, Mitigation** - Another mitigation measure for disease

transmission via insects or vermin would be insecticides or exterminators.

f: **Criteria 1(b), Page 8, Mitigation** - More elaboration should be provided on the emergency response and contingency measures. If there is a document, it should be referenced.

g: **Criteria 1 c), Page 11, Mitigation** - Possible mitigation measures should be provided even though the landfill is outside the 8 kilometre radius and there have not been any problems with gulls affecting aviation. This does not preclude the possibility that an incident may happen in the future. Some mitigation measures include the application of daily cover, bird bangers and use of a falcon.

h: **Criteria 2(a), Page 13, impact** - Phytoremediation is not mentioned. There may be possible disruption of surface water resources.

i: **Criteria 2(a), Page 15, impact** - I don't recall the inducement of groundwater to the landfill waste being mentioned before. I would think that this would be avoided.

j: **Criteria 3(a), Page 36, mitigation** - Pest control, bird bangers, use of a falcon, employment of an exterminator are possible mitigation measures.

2. **Appendix B comments**

a: **Criteria 1(a), Page 4, impact** - On page 23 of Discussion Paper #6, Final, dated August 2004, the leachate infiltration through the cap is indicated to be 100 mm/yr yet the text in this Discussion Paper indicates a percolation rate of 300 mm/year. Please confirm the proposed percolation rate.

b: **Criteria 1(a), Page 6, Impact** - Stormwater ponds should be designed to accommodate the peak flow generated from the higher of the 100 year design storm or the prevailing Regional Storm Event as per Ontario Regulation 232/98 requirements.

c: **Criteria 1(a), Page 7, Mitigation** - Another mitigation measure for disease transmission via insects or vermin would be insecticides or exterminators.

d: **Criteria 1 c), Page 11, Mitigation** - Possible mitigation measures should be provided even though the landfill is outside the 8 kilometre radius and there have not been any problems with gulls affecting aviation. This does not preclude the possibility that an incident may happen in the future. Some mitigation measures include the application of daily cover, bird bangers and use of a falcon.

e: **Criteria 4 c), Page 61, Impact** - Reference should be to Highway 402 not

Highway 407.

3. **Appendix E comments**

a: **Page 2, 1c. Air Quality: Landfill Gas, Monitoring** - Definition should be provided for the term *"regularly inspect the covered landfill areas"*.

b: **Page 3, 1e. Air Quality: Odour** - Definitions should be supplied for the terms *"Cap completed cells as quickly as possible"* and *"Conduct regular inspections of the covered fill areas."*

c: **Page 3, 1f. Air Quality: Blowing Litter** - The term *"Routinely monitor and retrieve blowing litter around the site"* should be defined. Also, with regards to the inclement weather area, it is unclear where the exact location of this area is and its affect on the landfill base. Will it be a temporary area or will landfilling occur below the proposed base grades? Will LCS have to be redesigned?

d: **Page 5, 7. Landfill Gas: Explosive Hazard** - What does the term *"Regular monitoring program for LFG probes"* mean?

Should you have any questions regarding this matter, please call me at (416) 314-5138.

Greg Washuta, P. Eng.

c: Mike Morone, District Manager, MOE, Sarnia District
Dan Gaudenzi - MOE Sarnia District Office
Ian Parrott, Supervisor - Waste Unit, MOE EAAB Waste Unit

WM Response to the MOE Waste Unit on Discussion Paper 7, June 7, 2005

Agency Comment	WM Response	Link to Terms of Reference
1. A)	Agreed.	
1. B)	The use of a percolation rate of 300 mm/a was presented at the draft report stage to demonstrate the effect of increased percolation rates on the reduction in the contaminating lifespan of the landfill. A reasonable precipitation infiltration rate into the waste is 100 mm/a based on the proposed thick final cover of silty clay. With recirculation an overall percolation rate of 200 mm/a is predicted. If the actual precipitation infiltration is more or less, the amount of recirculation can be varied.	
1. C)	Hydrogeologic details on the characteristics of the aquitards are presented in the hydrogeologic support documents for DP#6 and DP#7. In summary, the aquitard consist of the unweathered clayey silt to silty clay, the interstadial clay, and the clayey silt to silt till of the Rannoch Till. The fine-grained texture of the soil results in bulk hydraulic conductivities that range from 5 x 10 -10 m/s to 7 x 10 -8 m/s, with a geometric mean of about 1 x 10 -9 m/s. The thickness of the aquitard is typically greater than 20 m in thickness.	
1. D)	We are aware of the Regulation requirement for the larger of 100 year or regional storm flow events. However, in consultation with the St. Clair Conservation Authority, it was requested that the 100 year storm be used for design. We request that 100 year storm instead of regional storm be used in view of the Conservation Authority's request.	
1. E)	Noted.	
1. F)	Emergency Response and Contingency Measures will be outlined in detail in the EPA application Design and Operations Plan.	
1. G)	Noted.	
1. H)	Disposal of treated leachate effluent on the poplar trees will not result in a disruption of the quantity or quality of groundwater or surface water resources. A performance monitoring program is proposed with contingencies if unacceptable effects to water resources occur. Details on the assessment findings, monitoring, and contingencies will be provided in the final report.	
1. I)	The inducement of slow groundwater movement toward the landfill waste is the primary component of the hydraulic trap concept. In principle, hydraulic gradients and associated slow groundwater movement toward the waste will prevent the advective movement of leachate into the surrounding soil and groundwater.	
1. J)	Noted.	
2. A)	The use of a percolation rate of 300 mm/a was presented at the draft report stage to demonstrate the effect of	

WM Response to the MOE Waste Unit on Discussion Paper 7, June 7, 2005

Agency Comment	WM Response	Link to Terms of Reference
	increased percolation rates on the reduction in the contaminating lifespan of the landfill. A reasonable precipitation infiltration rate into the waste is 100 mm/a based on the proposed thick final cover of silty clay. With recirculation an overall percolation rate of 200 mm/a is predicted. If the actual precipitation infiltration is more or less, the amount of recirculation can be varied.	
2. B)	We are aware of the Regulation requirement for the larger of 100 year or regional storm flow events. However, in consultation with the St. Clair Conservation Authority, it was requested that the 100 year storm be used for design. We request that 100 year storm instead of regional storm be used in view of the Conservation Authority's request.	
2. C)	Noted.	
2. D)	Noted.	
2. E)	The typographical error will be corrected.	
3. A)	Definitions will be supplied in Final DP7.	
3. B)	Definitions will be supplied in Final DP7.	
3. C)	"routine monitoring and retrieving escaped litter" means that litter will be picked up as often as required, more often during adverse wind conditions and regular, weekly monitoring. WM staff routinely stop and pick up litter along the access route. Litter along the access route does not usually originate from the tarped and covered waste trucks but from small deliveries inappropriately secured.	
3. D)	The low-level landfilling area will only be used during wind events as it will be below grade and will be part of the waste cell. The waste will be placed as permanent landfill and will not be removed. It will be on the lined component of the particular cell phase. This will be fully described in the EPA documents.	

Ministry of the Environment –
CoA Review Section, Waste Unit

Discussion Paper #8

June 7, 2005

(97393-65/2005)

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June 7, 2005

MEMORANDUM

TO: Gemma Connolly
Special Project Officer
EA Project Coordination Section

FROM: Greg Washuta, P. Eng.
Senior Waste Engineer
Certificate of Approval Review Section - Waste Unit

RE: **DISCUSSION PAPER #8 (DP #8) - DRAFT - OCTOBER 2004**
PRELIMINARY DESIGN, DEVELOPMENT AND OPERATIONS PLAN
WARWICK LANDFILL EXPANSION ENVIRONMENTAL ASSESSMENT
CANADIAN WASTE SERVICES INC. (CWS)
CERTIFICATE OF APPROVAL (C of A) NO. A032203

I have reviewed Discussion Paper #8 dated October 2004. DP #8 is eerily similar to Discussion Paper #6 Final entitled "*Facility Characteristics*". Please note that some of the comments are similar in nature to the comments provided on DP#6 final. The following comments are provided for response by the proponent:

1. **Section 1.1 - Background (page 1)** - It is stated that "**Contaminated soil** meeting Ontario Regulation 347 for non-hazardous waste **may be included in this waste quantity** [up to 750,000 tonnes per year], and **may be used for daily cover**". This statement appears to conflict with statements in previous DP's, such as "The proposed undertaking would accommodate disposal of up to 750,000 tonnes per year of non-hazardous waste, **exclusive of cover material**" (draft DP #5 - page 1-1). Please confirm whether contaminated soil used as daily cover is to be included in the maximum rate of fill of 750,000 t/yr. Also, contaminated soil must meet Ontario Regulation 347 as amended to Ontario Regulation 558/00.

2. **Section 1.1 - Background (page 1)** - In the 4th paragraph, 2nd sentence, it should be noted that the EPA C of A will govern the construction, operation, closure **and post-closure care** of the site.

3. **Section 2.3 - Waste Type and Waste Volume and Waste Receiving Hours (page 3)**

a. It is stated that "the residential component could increase to 70 percent" and that "additional organics within the residential waste stream would increase gas production". According to the preliminary conceptual design presented in this draft DP, **organics** will be **diverted from landfill** via an on-site composting/diversion area (Section 3.6). Therefore, please justify these statements in light of the emphasis on diversion of organics from landfill **in** Ontario.

b. The proposed hours of operation are 7:00 am to 7:00 pm Monday to Saturday. Will the site be open on **statutory holidays**?

4. **Page 4, Section 2.3.2 - Contaminated soil** - This section does not indicate what screening procedures will be in place to ensure that hazardous waste is not disposed of at the site. For example, what procedures will be taken if soils that arrive at the site have concentrations equal to TCLP? In addition, the text mentions that 2,000 tons/day of contaminated soil could be disposed of at the site. Please be advised that contaminated soil is considered a waste and that the total amount disposed of at the site per year cannot exceed the site's yearly limit for waste disposal.

5. **Section 2.3.2 - Waste Volumes (page 4)** - It is stated that ".....waste input peak **volumes** will be based on 3,650 **t/day**.....". Tonnes per day is a **fill rate**, not a volume.

10. **Section 2.5 - Site Capacity (page 5)** - Please specify and justify the assumed **waste density** which was used to obtain the volumetric capacity of 23.5 million m^3.

11. **Section 2.8 - Staff (page 8)-** Reference is made to "a leachate plant/gas plant operator" (i.e., one person). Each plant should have its own **dedicated operator(s)** because of the highly specialized operations (equipment, controls, monitoring, etc.) associated with each plant.

12. **Section 3.1 - Landfill Footprint (page 11)**

a. Reference is made to a **30 m buffer** on the west half of Lot 19, Concession 3. Landfill Standard #7 in Reg. 232/98 requires a minimum **100 m buffer** width, but allowance is made for reduction to not less than 30 m if shown to be appropriate based on a site specific assessment. The assessment, to be submitted to the EPA Director in a written report, must demonstrate that there is sufficient site access for site monitoring, maintenance and any environmental control measures (e.g., perimeter leachate collector). The site specific assessment must be submitted to support the EPA application.

b. Please confirm that the maximum site elevation of **279 m ASL** includes **final**

cover.

c. Please confirm whether there is any intention to landfill above site elevation 279 m ASL (i.e., "overbuild") during the site operating life such that the maximum elevation will be achieved at closure following waste settlement. If this is not the intention of CWS then the EPA C of A for expansion will stipulate that no waste shall be landfilled above elevation 279 mASL **at any time**.

d. Reference is made to **"hydraulic trap"**. This term should be added to the Glossary at the end of the report.

e. What are the **maximum slopes** for excavation below grade and for final contours?

13. **Page 12, Seventh paragraph** - The text references a closed landfill site belonging to the Township of Warwick being shown on Figure D8-1. A review of this figure does not show the landfill being evident.

14. **Section 3.2 - Roads (page 13)** - "Road base material will be built from recycled or salvaged concrete, bricks, cement blocks or asphalt material to the extent possible from off-site sources....". Please confirm the **chemical quality** of these materials with respect to potential impacts on groundwater and surface water. Who will check the off-site sources to confirm acceptance of this material at the site for this use?

15. **Section 3.3 - Stormwater Management (page 14)** - Reference is made to the **100 year storm event** versus the **regional storm event**. See Section 4.9.2, Guideline (d)(ii) on page 61 of the *Landfill Standards Guideline*, MOE May 1998:

"the design of any storm water management facilities for the purpose of surface water quantity control (i.e., peak flow reduction) of non-contaminated storm water should be designed to temporarily store the runoff volume generated from controlling all storm events up to **the higher of the 24-hour, 100-year design storm or the prevailing Regional Storm event, at or below the existing condition (i.e., pre-landfill) peak flows**, such that there is no appreciable change in the potential for flooding and/or erosion in the watercourses receiving surface water discharges from the landfilling site".

16. **Section 3.5 - Site Buildings (page 11)** - The potential for **subsurface migration of landfill gas** into on-site buildings must be addressed. The methane component of landfill gas is of particular concern because it creates a potential explosion hazard if it becomes trapped in enclosed spaces at levels ranging from 5 % to 15 % in air by volume. Landfill Standard #14(2)2 in Reg. 232/98 specifies:

"The concentration of methane gas must be less than 1.0 per cent by volume in any on-site building or enclosed structure, and in the area immediately outside the foundation or basement floor of the building or structure, if the building or structure is accessible to any person or contains electrical equipment or a potential source of ignition."

17. **Page 16, Section 3.6.1 - Waste Processing** - The discussion paper mentions that painted or treated wood could be used as daily cover material after treatment. Painted wood from older buildings typically may contain lead based products. In addition, treated wood may contain Chromated Copper Arsenate (CCA). This material must be classified **non-hazardous** according to Reg. 347/558 if it is to be used as cover material. What steps will be taken to ensure that the chipped wood being used for daily cover material meets the requirements of O. Reg 558/00?

18. **Section 3.6.2 - Composting (page 17)** - Quality criteria for use of finished leaf and yard waste **compost** is provided in Reg. 101/94.

19. **Section 3.7, Page 18, second paragraph** - It is unclear from the text or Drawing D8-4 what the extent of the waste north of existing landfill is. In addition, what is the nature of the waste that will be moved?

20. **Section 3.7, Page 18, third paragraph** - The figure D8-11B which refers to the cell designations for the existing landfill is not in the document. Therefore, it makes it difficult to determine how the proposed landfill is related to the existing landfill.

21. **Section 3.7, Page 18, fifth paragraph** - The text indicates that waste that is excavated will be relandfilled or, in the case of contaminated soil, may be used as daily cover. What forms of testing and inspection will be undertaken to ensure that the contaminated soil is useful for daily cover material?

22. **Section 3.8, New Landfill Phasing, page 20** - It is indicated that screening berms around the outside of the site will have a 3:1 slope and that the berm on the east property line adjacent to Cells 7, 9 and 11 will have a steep back slope (1.5:1). Please advise that O. Reg 232/98 requires the final slopes to be in the range of 5% to 25%.

23. Page 22 of the document is missing.

24. **Section 3.8.7, Phase 7 (page 25)** - What will be the requirements for use of odour masking sprays?

25. **Section 3.8.10 - Phase 10 (page 26)** - Please elaborate on **"Move old waste"**. What is considered as "old waste"?

26. **Section 3.9, Litter Control, page 27** - What is the definition of *"routine monitoring and retrieving escaped litter"*? How often will litter be picked up?

27. **Section 3.9, Litter Control, page 27** - A further explanation of the term "*use of inclement weather area (low elevation area) during high wind events"* means. Where is the location of this area? What elevation is this area at in comparison to the proposed base grades? Will this area hold waste temporarily and then the waste is removed?

28. **Section 4.1, Hydraulic Trap, page 34** - What monitoring will be undertaken to ensure that basal instability is not evident in the excavated base?

29. **Section 4.1.2 - Landfill Liner and Drainage System (page 34)**

    a. It is stated that "The surface of the **Rannoch till** will be graded to provide a **slope** toward the leachate collector pipe systems". What will this slope be on the top of the silty clay primary liner?

    b. What are the assumed **service lives** of the leachate collection/drainage layers and the engineered clayey liner?

    c. Please provide a copy of the hydrogeology impact assessment.

    d. In a hydrogeologic setting where there is significant natural groundwater protection, the level of engineering in the generic designs may not be necessary and the site specific design approach could be followed. The site specific design approach included in Reg. 232/98 gives the site owner flexibility to design the landfill site to suit the local environmental setting, provided the Ministry's Reasonable Use limits for groundwater protection are met. This is a performance based standard with the acceptability of a design judged on its ability to meet the Reasonable Use limits at the site property boundary. Therefore, proof must be supplied to show that the proposed design will allow the Reasonable Use Limits to be met at the site property boundary.

30. **Section 4.1.2 - Landfill Liner and Drainage System (page 35)**

    a. Reference is made to **"select waste"** to be placed on top of the primary drainage layer. What types of waste would be included/excluded in this initial layer?

    b. It is stated that the **secondary drainage layer** "must be capable of future control as a **contingency**". Please elaborate on this statement. Could this layer be used as a hydraulic control layer? (e.g. Halton Landfill - see *Design and construction of the barrier system for the Halton Landfill*, R. K. Rowe, C. J. Caers, G. Reynolds,

C. Chan, Canadian Geotechnical Journal, Volume 37, pages 662-675, 2000).

c. It would seem logical that a permanent pumping station should be installed for the secondary drainage layer. In the event that the use of the secondary drainage layer may be used, it would be useful to have the pumping station installed ahead of time.

31. **Section 4.2 - Leachate Quantity (page 35)** - It is stated that infiltration through the cap will be **less than 100 mm/year**. This is relatively **low**. Please justify this preliminary estimate based on the conceptual design of the final cover and integrity of the final cover with respect to freeze/thaw cycles. In fact Discussion Paper #7 mentions percolation through the waste at a rate of 300 mm/year. Please discuss.

32. **Section 4.2 - Leachate Quantity, page 36, third paragraph** - Why was data on moisture content from other WM sites used as opposed to data from the Warwick site? Also, where is the data that was used to arrive at the time for the waste to reach field capacity?

33. **Section 4.3 - Leachate Recirculation (pages 36-38) - Potential benefits** are listed on pages 20 and 21. **Potential concerns** should also be listed and addressed, including the following:

Limited Effectiveness - Due to heterogeneity of waste, significant variations in the moisture content throughout the waste mass, preferential flow paths, difficulty in achieving even distribution of recirculated leachate.

Inorganic Contaminants - Operation of the landfill as a **bioreactor** via leachate recirculation does not decrease the concentrations of inorganic contaminants (e.g., salts and heavy metals).

Reduced Services Lives - Enhanced biological activity may have an adverse effect on the engineered components of the leachate collection/containment system, clogging of the leachate collection system may occur at a faster rate.

Extended Contaminating Life Span - Inorganic contaminant loading and additional waste placement following rapid waste settlement.

Moisture Sources - Available leachate may not be sufficient to achieve optimum moisture conditions, additional moisture sources may have to be evaluated.

Stability - Adding moisture (leachate) to the waste mound will increase the weight of the waste and reduce the shear strength of the waste and any engineered components in the final cover and liner system. Excess porewater pressures associated with leachate

recirculation have lead to at least one landfill failure (Hendron, D. M., Fernandez, G., Prommer, P. J., Giroud, J. P. and Orozco, L. F., 1999. *Investigation of the cause of the 27 September 1997 slope failure at the Dona Juana landfill.* Proceedings of the 7th International Landfill Symposium, Cagliari, Italy, Vol. 3, pp. 545-554). The **geotechnical assessment** to be carried out for the landfill site per Reg. 232/98 (Standard #6(2)(c)(v)) must specifically consider any proposal to recirculate leachate. Monitoring and reporting of moisture content of the waste, leachate heads and waste density should be carried out during any leachate recirculation operations.

Leachate Seeps - The anisotropy of waste and the potential for low permeability daily cover soils increase the potential for leachate seeps.

Costs - Increased capital and operational costs for leachate recirculation.

Waste Management Issues - Growing trend toward composting of organic materials outside of landfills will likely reduce the effectiveness of biological decomposition processes within landfills.

Total and Differential Settlement - increased total and differential settlement may have an effect on the integrity of the final cover material.

Increased Financial Assurance - due to shorter contaminating lifespan, the amount of financial assurance will be greater. Also, increased monitoring, inspection costs during leachate recirculation will be evident.

34. **Section 4.3 - Leachate Recirculation (page 36-38)**

a. It is stated that "Waste contaminants are removed from the landfill quicker or broken down, as compared with only normal leachate infiltration acting to degrade and remove waste contaminants from the landfill". This may be the case for **organics**, but it is not necessarily the case for **inorganics**, such as chloride. In fact, concentrations of inorganics may potentially increase with leachate recirculation.

b. It is stated that "Such waste as food, yard waste, and paper products can be degraded in relatively few years". As noted above, growing trends toward composting of organic materials outside of landfills will likely reduce the effectiveness of biological decomposition processes within landfills.

c. Reference is made to "comparison of a **normal, dry landfill** with a **wetter landfill**". Dry tomb landfills may be "normal" in the United States per US EPA Subtitle D landfill design, but they are not normal in Ontario. In the United

States, municipal waste landfills are designed as "dry" sites. The US EPA regulations (i.e., 40 C.F.R. Parts 257 and 258) came into effect in 1993 and require the use of a final cover system designed to minimize infiltration. In contrast, Ontario utilizes a "wet" landfill design approach and recognizes the potential benefits of moderately enhanced moisture addition. For engineered landfill sites (i.e., sites with leachate collection systems), a more permeable soil final cover is used to encourage infiltration and leachate production to help ensure that the "service life" of the leachate collection system and any liner exceeds the "contaminating life span" of the waste.

35. **Pages 38 and 39** - There is a large empty space in report between bullet point #2 on page 38 and bullet point #1 on page 39.

36. **Section 4.3 - Leachate Recirculation (page 39)** - The report recommends that "recirculation piping horizontal spacing be **30 m**, except the top layer, which will be installed at **20 m** spacing" and "Vertical spacing will be **15 m**". What is the technical basis for this conceptual design spacing? Does it account for heterogeneity of the waste, variations in the moisture content throughout the waste mass, preferential flow paths, and difficulty in achieving even distribution of recirculated leachate?

37. **Section 4.4 - Leachate Quality (page 39)** - Why does this Section not appear to rely on **leachate quality** data from the **existing Warwick Landfill**?

38. **Section 4.5 - Leachate Treatment (pages 40-49)** - I defer the review of this Section to the Wastewater Unit, C of A Review Section, EAAB (Stefanos Habtom).

39. **Section 4.5.2.4, page 45** - The document mentions that "peak flows will be accommodated by on site storage and recirculation back into the landfill." What if recirculation is not possible for one reason or another?

40. **Section 4.5.3 - On-Site Pretreatment of Leachate and Truck Haulage to an Off-Site Area Treatment Plant, page 46** - WMCC assumes that "It is the responsibility of the receiving plant, municipality or operator, if a contract were to be negotiated with CWS, to assess impacts of accepting pre-treated leachate on their system". **As the proponent of this site-specific environmental assessment (EA), CWS should be responsible for doing any impact assessment on an off-site WPCP as part of the EA.** It is the responsibility of the plant owner/operator to obtain any necessary sewage works approvals under Section 53 of the OWRA.

Under the EPA, Landfill Standard #11 in Reg. 232/98 states:

> *A person shall not establish a new landfilling site or increase the total waste disposal volume of an existing landfilling site unless a written report containing*

plans, specifications and descriptions for the management and disposal of any leachate collected at the site has been prepared.

The leachate management and disposal plans for the landfill site expansion should include an assessment of the impact on the sewage works, the effluent discharge and sewage residue from the sewage works, and the receiving waterbody based on the expected quality and quantity of leachate to be discharged from the landfill site.

41. **Section 4.5.3 - On-Site Pretreatment of Leachate and Truck Haulage to an Off-Site Area Treatment Plant, page 46** - WMCC states that "Impacts with respect to trucking to deliver leachate to the plant or the area sewer system will be on highways or truck routes and will **not** be assessed with respect to neighbourhood haul routes within the receiving municipality". **Why not? Leachate management/disposal is an integral part of this environmental assessment for landfill expansion. Therefore, please justify this approach.**

42. **Section 4.7 - Residuals Management (page 49)** - Reference is made to the possible disposal of **sludges** in the landfill. Sludge must pass the Reg. 347 slump test prior to landfilling at this site as a solid non-hazardous waste. Also, in order to prevent premature clogging of the leachate collection system, it is recommended that a thickness of **at least 5 metres** of compacted waste and daily cover be maintained between the landfilled sludge and the leachate drainage layer and any leachate monitoring wells within the waste (Rowe, R. K., et al., October 1994. *Evaluation of Service Life of the Engineered Components of Landfills*, report prepared for the Interim Waste Authority Limited - see page 39).

43. **Section 5.1 - Gas Management - Introduction (page 51)** - The following assumption is made with respect to landfill gas generation: "30 to 40 percent readily decomposable waste by volume". This component may decrease in the future with the growing trend toward composting of organic materials outside of landfills.

44. **Section 5.2, Conceptual Design, page 52** - The report assumes that peak landfill gas production is to occur one year following site closure in 2030. Does this take into consideration leachate recirculation during which the peak gas production will occur earlier than in a conventional landfill? Also, assuming a 25 year operational life and considering approval has not been granted yet, the earliest date for peak gas production would be 2031-2032.

45. **Section 5.2, Conceptual Design, page 52** - The peak landfill gas production is estimated to be 30% above the estimates without recirculation. The range of 23,100 to 31,300 cubic metres/hour is not 30% above the range provided in the previous paragraph.

46. **Section 5.2, Conceptual Design, page 52** - What is the basis for 70% collection

efficiency?

47. **Section 5.2 - Gas Management - Conceptual Design (page 52)** - The first 3 environmental benefits regarding **greenhouse gas emissions** are identical or similar and could be combined into 1 benefit.

48. **Section 5.2 - Gas Management - Conceptual Design (page 52), last sentence** - Please define the term "LGCFS".

49. **Section 5.2 - Gas Management - Conceptual Design (page 53)**

    a. Reference is made to **horizontal LFG collection pipes** and **vertical wells** as part of the LFG collection system. Will the horizontal pipes be progressively installed during the site operating life? Will vertical wells be installed after landfilling has reached final grades?

    b. It is stated that "The **vertical extraction well layout** assumed a horizontal radius of influence of approximately **40 m**". What is the technical basis for this conceptual design assumption?

50. **Section 5.3, Combustion Emissions, Landfill Gas, page 54** - Please define the term *"extended time"* in the second bullet point and the term *"regular inspections"* in the fourth bullet point.

51 **Section 5.4, Landfill Gas Monitoring and Safety, page 55** - What will be the triggers and verification for landfill gas that will initiate further remedial work?

52. **Section 6.0, End Use, Page 56** - The text should mention that the end use must conform with Section 46 of the EPA, (i.e. once the end use has been defined, it cannot be change unless Minister approves).

53. **References -**
Items 6, 7 & 8 refer to **bioreactor** landfill design. Further information is available from the US EPA at: www.epa.gov/epaoswer/non-hw/muncpl/landfill/bioreactors.htm.

54. **Comments on Figures**

    a: **Figure D8-1** - It is extremely difficult to see the proposed landfill footprint and the existing landfill footprint. Also, Brown Creek should be shown in a different colour (preferably blue) than the other lines. A legend should also be provided.

    b: **Figure D8-2** - It is not clear what the blue shading on the drawing means.

c: **Figure D8-3** - It is unclear what the primary existing haul route on this drawing is. The location of route 79 in relation to the site is not clear. It appears that a layer of this drawing was turned off prior to printing. Also, the scale on this drawing is barely legible.

d: **Figures D8-4 to D8-14** - It is very difficult to differentiate the existing landfill from the proposed landfill. The font of the text on these drawings should be larger. For surface water bodies and creeks, a blue colour should be used. Roads should be shown in a different colour other than blue.

e: **Figure D8-4** - A legend should be provided on this drawing. What will be the effect of the sedimentation pond (east side of site) on the waste below?

f: **Figures D8-5 to D8-13** - "Compost Deversion Area" should be "Compost Diversion Area".

g: **Figure D8-15** - The **scale** (bottom right corner) is not legible. It is very difficult to differentiate the existing landfill from the proposed landfill. The font of the text on these drawings should be larger and more legible. For surface water bodies and creeks, a blue colour should be used. Roads should be shown in a different colour other than blue.

h: **Figure D8-16** - The **scale** (bottom right corner) is not legible.

i: **Figure D8-17**

a. Please confirm that the **slopes** of the **final contours** are within **5% (20H:1V) and 25% (4H:1V)**.

b. Please confirm whether the **final contours** shown on this figure include **final cover**.

c. The font should be larger and in some cases more legible.

d. There is too much background information. One questions whether existing contours are necessary.

j: **Figure D8-18C**

a. The title should be "Proposed Liner **and Leachate Collection System**".

b. The thickness of the primary leachate drainage layer between pipes should be increased from 300 mm to **500 mm** for a 100 year service life (Reg.

232/98 - Schedule 1).

c. The depth of stone at the leachate pipes should be shown.

k: **Figure D8-19** - In the pipe separation detail, what is the **minimum vertical separation distance** between the LFG pipe and leachate recirculation pipe? How far will the pipes be from the final cover and the bottom of the waste? What is the width and depth of the granular material. What type of material will be used in the excavation? What is the meaning of "*other uniform bedding material*"?

l: **Figure D8-20B, D8-23B, D8-28B** - The type of treatment unit, pretreatment unit and the meaning of "storage" should be provided on these drawings.

m: **Figure D8-26B** - This drawing is difficult to read. Some of the background information is too small and is not legible. It is not clear if the landfill gas collection header connects to the landfill gas collection facility.

n: **Figure D8-29** - The text on this drawing is barely legible. Also, it is not clear which route would be taken after trucks exit Highway 402.

55. **Table 3.1** - The density that has been assumed should be provided on this table. MOE standard for waste to cover ratio is 4:1 which means daily cover should be 20% of the waste and daily cover volumes. Why has the proponent used 15%?

56. **Appendix A** - Page numbers would be helpful and should be provided.

57. **Appendix A comments**

a: **Page 2** - What is the basis for the statement that "*the higher pH may reduce the mobility of heavy metals*"?

b: **Page 3** - The text indicates that *"the study considers once-through conditions for water infiltrating the landfill and does not include recirculation"*. What is the relevance of the study given that recirculation is being proposed at this site?

c: **Page 4, third paragraph** - The text should be revised to reflect that the fact that the Keele Valley landfill site is closed. Also, the actual final capacity of the site should be provided and any data that is more current should be supplied.

d: **Page 4, fourth paragraph** - How are the Warwick landfill and the Keele Valley landfill comparable in rates of fill? Also, it appears that the Warwick landfill does not have the same waste composition as Keele Valley.

e: **Table A.1 (page 5)** - Why is the **final cover** for the Warwick Site designed to be

twice as thick compared to the other landfill sites (2 m vs. 1 m)?

f: **Page 5, third paragraph** - Table does not assume leachate recirculation which will be occurring at this site. Also, it is indicated that the *"build up to peak concentration is almost impossible to predict because each landfill, upon which base data has been accumulated, has developed differently."*

g: **Section A.6 - HELP Modelling for Recirculation (page 5)** -HELP stands for **Hydrologic** (not Hydrogeologic) **E**valuation of **L**andfill **P**erformance. It is stated that "A capped landfill condition with an upper limit of **100-mm per annum infiltration** was modelled". This value is **relatively low** for an engineered landfill site. A low permeability soil and vegetative cover is typically used for a natural attenuation landfill where a reduced rate of infiltration and leachate generation is normally desirable. For an engineered landfill site with leachate collection, an increased rate of infiltration to promote controlled waste stabilization would normally be desirable to reduce long-term maintenance and monitoring requirements, and to reduce the contaminating life span of the site. In fact, the generic designs included in Regulation 232/98 specify a minimum infiltration rate (150 mm/year) for this reason, i.e., to help ensure that the service lives of the engineered facilities (leachate collection system, liners) exceed the contaminating life span of the waste.

h: **Page 6**- It is stated that "Recirculation was assumed for **fifty (50) years**". Why was 50 years chosen? Are leachate recirculation pipes buried in the lower/deeper levels of waste expected to be operational in 50 years?

i: **Page 6, first bullet** - It is stated that "Waste permeability and daily/interim cover, on average, was assumed to be **2×10^{-4} cm/s**". An accurate determination of waste hydraulic conductivity is necessary to predict the rate and pattern of moisture movement within municipal solid waste (MSW), especially for landfills practising leachate recirculation when infiltration rates are increased. Hydraulic conductivity of MSW is highly dependent on waste composition, degree of compaction, overburden pressure and waste age:

Waste Composition - Relative grain size and porosity will influence hydraulic conductivity.

Degree of Compaction - More heavily compacted waste shows lower hydraulic conductivity due mainly to reduction in void space.

Overburden Pressure - Increasing the level of vertical stress decreases the hydraulic conductivity due mainly to reduction in void space at higher overburden pressures.

Waste Age - Degradation process tends to densify the waste resulting in a decrease in hydraulic conductivity as the waste ages.

Based on these factors, the hydraulic conductivity of MSW is highly variable. One clear trend that has been identified is that the hydraulic conductivity of MSW decreases with depth (overburden pressure) and time within the landfill. There is growing evidence to suggest that the hydraulic conductivity could be one or two orders of magnitude lower near the bottom of the waste (e.g., ~10^{-4} cm/s for waste depths of 10 m or less, ~10^{-5} cm/s for waste depths of 10 to 30 m, and ~10^{-6} cm/s for waste depths of 30 to 50 m).

A decrease in MSW hydraulic conductivity with depth has significant implications on the design of leachate collection systems (LCS). An underdrain LCS is typically designed assuming a constant infiltration rate using a water balance method (e.g. HELP Model) and an assumed waste hydraulic conductivity. The goal of the design is to achieve a specific hydraulic head acting on the base liner in order to reduce outward advective contaminant transport. Variation of hydraulic conductivity with depth has a significant effect on the developed pore water pressures within the waste and on the achievable infiltration rate through the waste. This is particularly important for the design of landfills using leachate recirculation.

The anisotropy of waste ($k_{vertical} < k_{horizontal}$) should also be considered with respect to leachate recirculation.

j: **Page 6, fourth bullet** - What is the basis for the statement that *"partial clogging of the primary collection system was assumed with an equivalent hydraulic conductivity of 5 x 10^{-2} cm/s?"*

k: **Page 6, fifth bullet** - The correct spacing of primary leachate collectors depends on the service life. For example, for a 100 year service life the maximum drainage path before leachate can potentially intercept a collection pipe shall not be more than 50 metres as per Ontario Regulation 232/98. Please confirm that the leachate collection pipe spacing confirms with the appropriate service life under Ontario Regulation 232/98.

l: **Page 6, seventh bullet** - It is stated that "The hydraulic conductivity of the primary liner was assumed at **1 x 10^{-8} cm/s**". According to Figure D6-18, the hydraulic conductivity of the silty clay primary liner is **10^{-7} cm/s**. Therefore, further modelling should be performed using 10^{-7} cm/s versus 10^{-8} cm/s.

m: **Section A.7, Page 7, first paragraph** - What is the basis for assuming that leachate strengths increase linearly with the recirculation ratio? Also, what is the

basis for the recirculation rates provided in the last two sentences of the paragraph?

n: **Section A.7, Page 8** - In the 4th paragraph on page A-8, the 2nd sentence should be: "Again, the mass of ammonia has been accelerated **in its removal from the landfill** by using recirculation".

o: **Section A.8, Page 10** - In the 4th paragraph, it is stated "....particularly for the Warwick Landfill, where infiltration is relatively little because of the clayey nature of the cap material and the **additional thickness of the landfill cap proposed**". Why is the final cover designed to be extra thick?

p: **Section A.8, Page 10, 7th paragraph** - It is stated that "the benefit of recirculation is to remove contaminants early in the life of the landfill before failure of the liner/collection systems, which are more likely to function properly earlier in the landfill life as opposed to later". Leachate recirculation will result in rapid waste settlement (compared to no recirculation) and the opportunity to landfill more tonnes of waste within the recovered airspace prior to reaching final approved contours. This will prolong the operating life of the landfill and potentially the contaminating life span of the landfill due to the greater mass of waste landfilled within the approved volume. Based on the conclusions in Section A.8, especially:

> "Recirculation will increase the strength of leachate contaminants, and require a higher efficiency treatment plant unit."
>
> "Accelerated leaching of contaminants and precipitants from the landfill will decrease the time to clog the primary leachate collection system".

it is recommended that CWS also consider the scenario of no leachate recirculation and a **more permeable final cover** to enhance natural infiltration via precipitation (>150 mm/year) versus engineered infiltration via leachate recirculation.

q: **Section A.8, Page 10, seventh paragraph** - What is the estimated service life of the leachate collection system and how does it compare to the time to clog the leachate collection system?

r: **Section A.9, Page 11, first paragraph** - What is the source of the second model of leachate recirculation that is being proposed?

s: **Section A.9, Page 11, third paragraph** - Is the 26% removal figure for the case with no leachate recirculation?

t: **Table A.2 - Peak Leachate Strengths** - Are the peak concentrations supplied from Keele Valley landfill also? Peak values should be provided for all parameters.

u: **Table A.3** - Why was the waste thickness different in cases 20 and 21?

v: **Table A.7 - Time to Clog Primary LCS** - Please provide the method of calculation of clogging. Was it Appendix B in Reference #9 (Rowe et al - October 1994)? It is noted that the calculations are based on drainage layer porosity reduction of **94%**. Please justify this value. The onset of clogging and serious impairment of system performance may occur at a lower porosity reduction. On page 139 of Reference #9, it is proposed that a "significant clog is defined to have occurred when there is a reduction in porosity from 0.48 to 0.09".

w: **Table A.7 - Time to Clog Primary LCS** - How was the time to clog the primary collector calculated in this table?

x: **Table A.9** - How are the values for infiltration and kg cl removed arrived at? Also, please provide a definition of the terms k, c1, c2 and c.

y: **Table A.9** - It is not clear how the value of LR is arrived at. If, for example in year one, 60% of LG is calculated, the leachate recirculation would be 0.62.

58. **Appendix C comments**

a: **Page 1, heading** - How is the leachate pre-treated and what criteria must be met prior to use for irrigation in the poplar forest?

b: **Page 1, table** - What is the source for the information provided in this table?

c: **Page 2, fourth paragraph** - The text indicates that the poplar cuttings are to be planted on or off the landfill cell. Previous drawings indicate that the poplar trees will be located south of the landfill area. Please confirm.

d: **Page 2, last paragraph** - From the text, it is understood that leachate will irrigate the poplar cap in the spring, summer and fall months. What will be done with the leachate during the winter months?

e: **Section c.4, page 4, first paragraph of section** - It is unclear on Drawing D8-26B where the storage pond is located that is referenced in the text.

59. **Appendix D comments**

a: **Criteria 1c Air Quality, Landfill Gas, Page 2** - What is the definition of

regularly in the recommendation *"Regularly inspect the covered landfill areas"?*

b: **Criteria 1e Air Quality, Odour, Page 3** - What is the definition of *regularly* in the recommendation *"Conduct regular inspections of the covered fill areas"?*

c: **Criteria 1c Air Quality, Odour, Page 3** - What is the definition of *routinely* in the recommendation *"Routinely monitor and retrieve blowing litter around the site"*?

d: **Criteria 1c Air Quality, Blowing Litter, Page 3** - As mentioned previously, the location of the inclement weather area and the depth of it is unclear.

e: **Criteria 7, Landfill Gas: Explosive Hazard, Page 5** - What is the definition of *regular* in the recommendation *"Regular monitoring for LFG probes"?*

Should you have any questions regarding this matter, please call me at (416) 314-5138.

Greg Washuta, P. Eng.

c: Mike Moroney, District Manager, MOE, Sarnia District
Dan Gaudenzi, District Engineer, MOE Sarnia District Office
Ian Parrott, Supervisor-Waste Unit, MOE, EAAB, Waste Unit

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1.	Contaminated soil is to be included in the maximum rate of fill of 750,000 tonnes per year. We agree that contaminated soil must meet Regulation 347 as amended to Ontario Regulation 558/00. It is noted that the analysis changed between DP#6 and DP#8, since the existing site recently received approval to monofill contaminated soil material in existing Cells 8 and 10. It is proposed to excavate this contaminated soil and re-landfill it in the new landfill expansion, using the contaminated soil as daily cover, if suitable. Accordingly, Table 2.1 is no longer part of DP#8, which was in DP#6. It is intended that contaminated soil received at the site will only be from local sources and received less frequently than previously intended. However, Waste Management (WM) wishes to maintain the option to receive this material from any local cleanups from time to time. We also point out that as part of the consultation with the Township of Warwick Public Liaison Committee (PLC), the contaminants for any contaminated soil used for daily cover will be one-tenth the value of those in Schedule 4, Regulation 347, making the material somewhat less contaminated than it otherwise could be.	
2.	We agree that the EPA Certificate of Approval (C of A) will also govern post-closure care of the site.	
3.	a)The organics to be diverted from the landfill will pertain only to local service area. No diversion of additional organics is proposed for waste coming from transfer stations. The statement also pertains to the possibility that the percentage of residential waste may increase during the site life, that is, the industrial/commercial/institutional (ICI) component, which the site is anticipated to receive initially, may decrease with time. Higher percentages of residential waste are anticipated to have higher percentages of organic material, which affect the consideration of impacts, (e.g., more gas production, greater potential for odour). Such potential impacts have been considered. b)The site will not be open on statutory holidays.	
4.	It is WM's policy that no soils are brought to the site without prior approval by WM. Such prior approval will involve the submission of quality analysis of the soils provided by the generator. Also, note the provision for ten (10) percent of Schedule 4 values (mentioned in Item 1 above) for the receipt of any contaminated soils. WM has the option of taking additional samples to confirm the generator's analysis for large quantities or if there is any question, or a load appears suspicious in any way. All this protocol will be described in the EPA documents. We agree that the contaminated soil is waste and the total waste amount will not exceed the yearly limit for waste disposal. Therefore, the amount of contaminated soil anticipated to be received will be relatively minor. However, during a cleanup, relatively large volumes can be generated in a short time, which speaks to the 2,000 tonnes per day rate indicated.	
5.	We note the comment and agree.	

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6.		
7.		
8.		
9.		
10.	The waste density can be calculated in two (2) ways. WM refers to "apparent waste density", which means weight of waste divided by the volume of waste and daily cover. The figure used for calculations is 0.8 tonnes per cubic metre. The second assumption is that 15 percent daily cover will be used for the input rates contemplated, and the actual waste density in place will be approximately 940 kg/m3 (actual waste density, not considering daily cover). These figures are reasonable expectations of WM based on similar experience in North America. We note that the smaller landfills currently operated in Ontario by WM do not usually achieve this density.	
11.	WM will take the comment under advisement. We do not see the requirement for dedicated operators for each plant since these will be highly controlled/supervised through electronic systems (SCADA). However, it is anticipated that one (1) additional person will require training in operations to fill in for the main operator when required during illness, vacations, leave, etc. In effect, two (2) operators will be available most of the time.	
12.	12(a) WM now owns the King property (West ½, Lot 19, Concession 3) to County Road 79 (Nauvoo Road) to accommodate requests by the public and the peer review team. Accordingly, the proposed landfill has been slightly reshaped to eliminate the excavation of waste on the east side of the existing site and to preserve more of the woodlot in the southwest corner of the site, and to reduce impacts on the adjacent cemetery. Initially, pre-DP#6, a 100-m buffer from the adjacent King property was proposed. Subsequently, WM purchased the King property to the County Road 79. The landfill design has shifted approximately 75 m west and encroaches into the former King property. Auxiliary facilities are also provided on the property. The proposed landfill has a buffer of approximately 255 m to County Road 79. The owned property satisfies all contingency requirements that can be foreseen. 12 (b) The elevation of 279 mASL includes final cover. 12 (c) The response to this item will be considered as part of the EPA application and review. 12 (d) "Hydraulic trap" will be added to the glossary as follows: Hydraulic gradients that are inward to the waste and associated leachate collection system from the surrounding soil. 12 (e) Refer to DP#8 Final.	

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13.	The closed landfill site belongs to the Township of Warwick and is in the southwest area on lands owned by the Township of Warwick. The landfill site is labeled on Figure D8-1.	
14.	Road base material will not consist of waste or material from a contaminated site. WM has material screening protocols for its landfill sites which will be implemented. As such, material used for road base will not have a detrimental effect on groundwater or surface water resources. A performance monitoring program is proposed to detect unacceptable effects from the landfill site and, if required, the necessity for implementation of contingency measures. Details are provided in the hydrogeologic technical support document for DP#7. This material may be periodically tested, but unless unusual circumstances exist, the materials are not anticipated to be problematic since they are widely accepted at landfill sites for on-site road construction throughout Ontario.	
15.	We are aware of the Regulation requirement for the larger of 100 year or regional storm flow events. However, in consultation with the St. Clair Conservation Authority, it was requested that the 100 year storm be used for design. We request that 100 year storm instead of regional storm be used in view of the Conservation Authority's request.	
16.	We agree that the potential of subsurface migration of landfill gas will need to be addressed, including proper protection and monitoring for all buildings, and will be outlined in the EPA documents. A landfill gas monitoring program will be implemented for the landfill site as discussed in DP#7. In summary, potential landfill gas movement will be monitored at gas probes located around the waste footprint and near structures. If methane gas levels exceed the trigger concentration of 20% LEL, the contingency systems discussed in DP#7 will be implemented, which include a perimeter cut-off wall or a perimeter gas interceptor trench.	
17.	We agree that wood material must be nonhazardous. Wood samples would be periodically submitted for testing to ensure nonhazardous conditions. We would appreciate any information the reviewer can provide regarding treated or painted wood found hazardous.	
18.	Note the comment regarding compost quality criteria.	
19.	Refer to DP#8, Figure D8-11B for the existing cells and proposed cells within the existing landfill site. Cell 9 is presently being prepared (south half) for future landfilling. A copy of Figure D8-11B was forwarded June 21/05 under separate cover. We also note Figure SK206 (see Addendum 1, May 2005) changes with respect to the location of the proposed landfill expansion with respect to the waste cells.	
20.	We forwarded Figure D8-11B under separate cover June 25/05 and apologized for its absence in the DP#8 document.	
21.	Re-excavation of the waste is not currently proposed. Testing the contaminated soil is undertaken as part of its receipt at the existing site. Accordingly, to retest for re-use as daily cover would be redundant. The material must be of suitable consistency and moisture for reasonable use as daily cover material.	
22.	Our interpretation of the Regulation 232/98, Section 30 (1) is that the slopes quoted apply only to above-grade landfill slopes. The Ministry of Transportation (MTO) routinely places road slopes at 1.5:1.	

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23.	Page 22 is attached to this document.	
24.	It is anticipated that masking sprays would be used if odour concentrations exceed 3 odour units 10 percent of the time. However, we note that using sprays when excavating existing waste would not apply since putrescible waste excavation is not proposed.	
25.	"old waste" refers to the original waste landfilled on site, approximately 10,000 m3, mostly above grade and mostly degraded. Very little of this waste would be removed if SK206 applies	
26.	"routine monitoring and retrieving escaped litter" means that litter will be picked up as often as required, more often during adverse wind conditions, and regular, weekly monitoring. WM staff routinely stop and pick up litter along the access route. Litter along the access route does not usually originate from the tarped and covered waste trucks but from small deliveries inappropriately secured.	
27.	The low-level landfilling area will only be used during wind events as it will be below grade and will be part of the waste cell. The waste will be placed as permanent landfill and will not be removed. It will be on the lined component of the particular cell phase. This will be fully described in the EPA documents.	
28.	The design of the base elevation of the landfill waste area was considered a factor of safety in the evaluation of basal stability. The evaluation considered the thickness of the lower aquitard (Rannoch Till) and the groundwater pressures within the underlying interface aquifer. To ensure basal stability, the proposed monitoring program includes groundwater level monitoring of the interface aquifer around the waste footprint. If groundwater pressures in the interface aquifer show a notable increase that could potentially destabilize the landfill base, construction dewatering can be implemented until an adequate thickness of waste is emplaced.	
29.	29 (a) The slope of the top of the silty clay primary liner will be similar to that of the top of the Rannoch Till to enhance leachate movement by gravity toward the leachate collection pipes. The slope toward the collection pipes will be about 0.5%.. 29 (b) The assumed service lives of the leachate management system are detailed in the hydrogeologic technical support document for DP#7. In summary, the predicted services lives are as follows. • Primary Drainage Layer – 60 years • Primary Silty Clay Liner – Unlimited • Secondary Drainage Layer – 1000 years • Secondary Natural Liner (Rannoch Till) – Unlimited The engineered clay liner is anticipated to have a service life as "unlimited", according to the Landfill Standards, and in accordance with Schedule 4. 29 (c) Ms. Gemma Connelly of the MOE will provide a copy of the Hydrogeologic Impact Assessment Report for	

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	review. 29 (d) The design is site specific. The hydrogeologist has assessed the Reasonable Use criteria and found the design to be in compliance at the property boundaries. Confirmation that the proposed landfill design will satisfy Guideline B-7 criteria at the site boundary is provided in the hydrogeologic technical Support document for DP#7. In summary, predictive computer modeling indicates that groundwater quality within the active aquitard, interstadial silt and sand, and the interface aquifer will satisfy Guideline B-7 for the reasonable use of groundwater at the site boundary. A performance groundwater monitoring program is also proposed to permit an on-going evaluation of the predictions and contingency measures are proposed if unacceptable effects are detected.	
30.	30 (a) "select waste" means residential waste. 30 (b) The secondary drainage layer will be equipped with leachate collection pipes, headers and leachate pumping stations. Details will be provided in the EPA documents. The layer could act as a hydraulic control layer, as in the Halton example cited. The secondary drainage layer will be maintained as a passive layer with periodic monitoring of water quality. It is recognized that water quality in the SDL will naturally degrade with time as the more mineralized deeper groundwater is induced to move upward toward the landfill leachate collection system. If required as a contingency system, the SDL may be pumped or recharged to provide hydraulic control beneath the primary silty clay liner. Details are provided in the hydrogeologic support document for DP#7. 30 (c) The permanent pumping station will be constructed for the secondary leachate collection layer. However, it will be determined if it will be equipped with pumps, electrical panels and controls, or whether a pump will be brought in from time to time powered by a portable generator until permanently required. A permanent pumping station will be incorporated into the landfill design for either pumping water from the Secondary Drainage Layer (SDL) or to pressurize the SDL. Details on these two contingency measures are provided in the hydrogeologic support document for DP#7.	
31.	Infiltration is predicted to be regularly low because the proposal is to cap the site with material consisting of 2 m of clay-type material. The site does not have alternate less permeable material. We also wish to control infiltration and vary the moisture into the waste with the recirculation volume. Best estimates suggest that recirculation and infiltration combined will be approximately 200 mm per year. This is in the long term, but short term volumes could possibly be greater if the gate moisture content of the waste is not at field capacity. With the depth of cover proposed, we do not envisage freeze/thaws cycles to affect the permeability of the cap greatly. The hydrogeological report, using 300 mm per year infiltration, intended to provide a range of infiltration or flow-through volumes that show changes in the contaminating life span of the site with flow-through water. Precipitation infiltration through the final landfill cover of 100 mm/a or less is predicted based on the proposed	

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	thickness of the final landfill cover of about 2 m. Recirculation will be completed to maintain the wetted field capacity of the waste for decomposition and gas generation. If the actual precipitation infiltration is less or greater than predicted, the leachate volume used for recirculation may be adjusted accordingly. The use of a percolation rate of 300 mm/a was presented at the draft report stage to demonstrate the effect of increased percolation rates on the reduction in the contaminating lifespan of the landfill. A reasonable precipitation infiltration rate into the waste is 100 mm/a or less based on the proposed thick final cover of silty clay. With recirculation an overall percolation rate of 200 mm/a is predicted.	
32.	The actual moisture content of the waste has not been available. Also, the moisture content of the waste will vary with geographical location and with the seasons. Therefore, the only relevant moisture content data would be that measured from the actual waste received, when a final determination can be made about what the additional water required would be to reach field capacity. The waste at the Richmond landfill site was used as a basis for moisture content estimates.	
33.	33 (a) We acknowledge the various points and generally agree. As for reduced service life, it is our view that recirculation does not increase the end point of chemical deposits or leachate collection clogging but simply compresses the time frame for such deposits and clogging. The mass of contaminant is fixed. 33 (b) An extended contaminating lifespan does not apply since no additional waste is proposed to be added after waste settlement. 33 (c) Stability will be geotechnically assessed. 33 (d) The capital and operational costs of leachate recirculation must be assessed by WM in light of the reduced contaminating lifespan of the site. 33 (e) With respect to a portion of the organic material being removed from landfills, our literature suggests that there is plenty of organic material for the generation of methane gas, biological activity, degradation, etc. 33 (f) Differential and total settlement will occur whether recirculation occurs or not, with recirculation slightly compressing the time span to total settlement. A protocol will be outlined in the EPA documents to inspect and repair cap materials due to settlement. We respectfully disagree that financial assurances will increase with recirculation, since the contaminating lifespan has been demonstrated to be reduced.	
34.	34 (a) We suggest that the removal of contaminants from the landfill be accelerated in all aspects since the flow-through is increased. While we agree that concentrations of contaminants increase initially, they soon decrease to values less than those produced without recirculation, and the decrease in strength accelerates thereafter. All contaminants are removed from the landfill by the leachate treatment system. The accumulation of inorganic concentrations within recirculated leachate and the potential for an extended contaminating lifespan of the waste was	

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	considered. A component of leachate will be treated and associated sludge will be stabilized or transported offsite for disposal. Thus, inorganic contaminant mass will be removed from the waste, which will reduce the contaminating lifespan of the waste. 34 (b) We refer to the comment concerning organics within landfills as stated in Item 33 (e) above. 34 (c) "normal, dry landfill" was meant to reference Ontario landfills without recirculation instead of "wetter landfills" employing recirculation. We suggest that our approach is not at odds with the Ontario Objectives, i.e., to encourage degradation with enhanced moisture. We feel that rather than designing a cap with relatively permeable characteristics, we would employ a 2 m thick clayey native soil because in particular: (a) The thick cap would be conducive to reducing infiltration but moisture could be added through the recirculation system. (b) The thick cap would be ideal for a poplar plantation if such were proposed on the 5 percent slope on top of the landfill in the future. (c) A relatively permeable cap would enhance landfill gas emissions, with the resulting greater issues, such as odour production. (d) When the wells are installed in the top of the final landfill with the final cap, a permeable cap will allow additional infiltration of oxygen, which will degrade or impede the use of the methane when the wells are pumped.	
35.	The space is simply a formatting error.	
36.	The spacing of the leachate recirculation system is a compromise between best distribution and practicality. We note that the recirculation pipes will be offset with respect to the pipes below or above, enhancing the distribution. Although a water droplet from recirculation will generally trend vertically with a 15-degree angle, the horizontal flow permeability versus the vertical permeability, combined with the daily cover lifts, will tend to spread the recirculation water horizontally. We acknowledge the potential for isotropy and short-circuiting, etc. The spacing of the top layer of recirculation piping will be reviewed in the EPA document to determine if even tighter spacing would be desirable.	
37.	The hydrogeological report contains information about the existing Warwick site. However, since the site is relatively small and shallow, the Keele Valley site is felt to provide a better characterization of leachate than the existing leachate at Warwick. We draw your attention to Table A.1 (located in Appendix A), which lists the various sites and compares them with the Warwick site.	

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38.	Comment noted.	
39.	We would not expect to see circumstances where all leachate recirculation would not be possible in any part of the site. At the meeting of June 9, 2005, Mr. Cleland indicated that this is the method of leachate disposal at the Petrolia landfill site, i.e., disposing leachate from the present cell into previously landfilled waste. Notwithstanding, if recirculation were not possible, then the water will obviously be retained and treated as leachate.	
40.	Leachate from the Warwick landfill will be pre-treated and either recirculated with in the landfill or managed through the poplar plantation. In the event that either of these options is not available to WM, the pretreated leachate will be trucked to a receiving municipality for disposal subject to applicable provisions of the be municipal discharge sewer use bylaw. The pretreated effluent will not affect the municipal treatment plant. We would agree with the comment if raw leachate would be sent to the area treatment plants. WM has a commercial arrangement in place with the City of London for the disposal of leachate from the Warwick landfill. WM is required to submit to testing of the leachate and meet the City of London municipal discharge sewer use bylaw. The London Greenway plant is a large plant, and the leachate volume is minuscule when compared with their total treatment capacity. The City of Sarnia sewage treatment plant is a second option for disposal of leachate from the Warwick landfill. Similarly, the Sarnia treatment plant is also relatively large and has recently undergone an expansion and has additional capacity that could accommodate the pre-treated leachate.	
41.	We do not feel that assessing the truck routes used to deliver leachate to treatment plants is necessary for the following reasons: •Trucking leachate is not proposed as the long-term, preferred solution, but would be a short-term contingency and only early in the site life, when leachate volumes would be small (as with Sarnia). •The trucking routes are on heavily traveled roads. •The route is designated by the receiving municipality (as in London), and only a few trucks would be involved.	
42.	Liquid sludges from the treatment system are not to be returned to the landfill. Possible solidification of liquid sludge is described. It would have to be proven that solidification is feasible and that leaching is low enough so that contaminants are not re-released into the landfill.	
43.	The comment is noted.	
44.	The peak landfill gas production takes into account the leachate recirculation. Whether peak gas production will occur earlier than in a conventional landfill may be true. We agree with your comment about peak production timing in view of the time taken for the approval process.	
45.	To account for recirculation, the change occurred in the values for Lo (170 m3/t increased to 221 m3/t for the EPA model, and 125 m3/t increased to 162.5 m3/t for the MOE default values). Lo is the potential methane generator capacity factor in the EPA Scholl Canyon equation. As well, the methane generation rate k has been varied to	

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	account for recirculation (0.05 mm/year increased to 0.075 mm/year for EPA values, and 0.04 mm increased to 0.075 mm for MOE values).	
46.	The 70 percent collection efficiency was assumed from typical literature. It is noted that efficiencies can increase up to 90 percent. Efficiencies may be much higher for the Warwick site due to the clay cap and its proposed thickness of 2 m. The 70% number was a conservative estimate the base the impact assessment.	
47.	The comment regarding greenhouse gas emissions is noted.	
48.	"LGCFS" means landfill gas collection and flaring system, and is defined in the second paragraph of page 52	
49.	49 (a) We confirm that the horizontal LFG collection pipes will be progressively installed during construction of the landfill. Vertical wells will be installed after final grades are reached. 49 (b) The 40 m horizontal radius for vertical extraction well layout was determined from on-site pilot testing conducted by GRS Comcor and their experience with gas systems at similar sites.	
50.	These details will be further defined in the EPA application.	
51.	Triggers and verification would be required for various location, such as: • methane levels at property boundaries; • methane levels in or near buildings; and, • methane and oxygen content of gas for control of pumping systems. All these activities will require awareness of trigger levels, verification procedures and active or passive control work, depending on the circumstances. This will all be defined in the EPA documents.	
52.	We acknowledge that end use must conform to Section 46 of the EPA.	
53.	We note additional reference material for bioreactors.	
54.	54 (a) The comment, and several other comments, deal with the clarity of the drawings. On June 21, 2005,HPA provided a better copy quality and increased scale for your review set. 54 (b) The blue shading references the existing licensed landfill site property. 54 (c) Revised drawings will clearly show the primary, existing haul route. The existing, primary haul route is southerly on Highway 402 to Zion Line (north side of the site) and then east on Zion Line to the site entrance. 54 (d) HPA provided Drawing D8-11B which may have been left out of some/all of the distributed reports when they were mass produced. The drawing clarifies the relationship of the proposed landfill site to the existing landfill site. Filling has progressed northerly on the existing landfill site to Cells 7 and 8. Cell 9 is presently under construction (south one-half) to be used for landfilling this year. Cell 10 will be the second contaminated soil	

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	monofill. Cells 11 and 12 are yet to be developed. 54 (e) We believe that the drawing provided to you on June 21, 2005 having increased scale will be clear. The drawing is extensively labeled. The sedimentation pond on the east side of the site is not expected to affect the waste below since it will be outside the liner system. 54 (f) Comment noted. 54 (g) See larger scale drawings provided. 54 (h) See larger scale drawing provided. 54 (i) Landfill slopes above grade are within 5 percent to 25 percent. Final contours include final cover. Hopefully, additional, larger-scale drawings will assist and clarify. 54 (j) (a) The comment is noted. (b) We had intended that the drainage layer would have a 60-year service life according to Schedule 1; however, we are reviewing the matter further. (c) The depth of stone at the leachate pipes is 550 mm. (k) The separation distance between the landfill gas pipe and the leachate recirculation pipe is intended to be 0.6 m. The top of the gas pipes in the typical trench section will be approximately 0.3 m minimum under the final cover. However, the maximum distance will vary since the trench will slope negatively inward while the top cap will have a positive slope of 5 percent. The pipes will be approximately 12 m above the bottom of waste. The depth of the granular or equivalent material will be approximately 1.7 m. The material under consideration is granular or tire shred or similar type of permeable material. (l) The schematics are meant to represent a variety of treatment units under consideration, which are described	

Agency Comment	WM Response	Link to Terms of Reference
	in the report and in DP#6. The selection of the actual preferred treatment unit will be included in the EPA documents. (m) See a larger scale drawing provided June 21/05 under separate cover. The landfill gas collection header will connect to the landfill gas collection facility. Additional detail and much larger scale will be provided in the EPA drawings. The drawing provided was intended to show an overview of the gas system for the site and the general location of the facilities. (n) See the larger scale drawings provided June 21/05 under separate cover.	
55.	The "apparent" waste density (weight of waste divided by total volume) is 0.8 tonnes/m3, and actual waste density is anticipated to be 940 kg/m3, assuming 15 percent daily cover. At the rate of input proposed, daily cover use is expected to be 15 percent instead of 20 percent for smaller landfills.	
56.	Comment noted.	
57.	57 (a) We reference "Landfill Bioreactor, Design & Operation, D R Reinhard and T G Townsend, Lewis Publishers,1998" and note "During the methane fermentation phase (Phase 4), intermediate assets are consumed by methane-forming consortia (methanogenic bacteria) and converted into methane and carbon dioxide. Sulphate is reduced to sulphide. The pH value is elevated, being controlled by the bicarbonate buffering system, and consequently supports the growth of methanogenic bacteria. Heavy metals are removed from the leachate by complexation and precipitation and transported to the solid phase..." 57 (b) The non-recirculation condition is used to establish the base value for the leachate. Then, leachate strength is increased to account for recirculation. 57 (c) We note the comment regarding Keele Valley being closed. The actual final capacity will not materially affect the conclusions. The peer review team has identified some parameters, which they suggest be increased to reflect additional data. We will be considering this in the EPA. 57 (d) The period of operation and waste composition are comparable for the Warwick landfill and Keele Valley landfill. Our understanding is that the fill rate for the Keele Valley landfill could, at times, exceed 1.2 million tonnes per year. 57 (e) The 2 m thick final cover for Warwick has been addressed in Item 34 (c) above. 57 (f) Table A.2 shows concentrations before modification resulting from increased leachate strength due to	

Agency Comment	WM Response	Link to Terms of Reference
	recirculation. We note the statement but there does not appear to be a question. Rowe states that the rise in leachate contaminants to peak concentration cannot be predicted, and ignores the rate of increase and concentrates on the peak concentration of contaminants. 57 (g) We agree regarding the definition of "HELP". The rate of infiltration has been discussed under Items 31 and 34 (c). The modeling suggests those high rates of infiltration and recirculation through the landfill are likely impossible, keeping in mind that the site is heavy clay. 57 (h) Fifty years was sufficient to show major changes with respect to contaminant values. Note Table A.4 shows values for 100 years. We also question whether the recirculation system will be functional in 50 years, except the highest level, which can be reconstructed. It was also demonstrated that many contaminants have undergone very significant degradation in the time periods modeled. We would suggest it is speculative whether or not the recirculation pipes in the lower levels of waste would be operational in 50 years. 57 (i) Essentially, we agree with the comment, although it is our view that waste hydraulic conductivity will vary horizontally in any site, and will decrease vertically. Accurate determinations would not be possible without many tests. We have adopted certain assumptions for the purpose of preliminary modeling. We agree with the comments concerning waste composition, degree of compaction, overburden pressure, waste age and decrease in permeability with depth. We acknowledge that the horizontal permeability is greater than the vertical permeability, i.e., the anisotropy. However, this applies equally well to infiltration as well as recirculation water. Recirculation systems will be kept well in from the edge of waste so that leachate seepage is not promoted. 57 (j) This statement is based on "Evaluation of Service Life of the Engineered Component of Landfills", K. Rowe et al, Appendix B, Table B4, which indicates 34 to 170 times decrease in hydraulic conductivity of the drainage gravel from the initial value of 10 - 30 cm/s.	

WM Response to the Waste Unit Comments on Discussion Paper 8, June 7, 2005

Agency Comment	WM Response	Link to Terms of Reference
	57 (k) The design of the leachate collection system will conform with the pipe spacing requirements of Ontario Regulation 232/98. 57 (l) Figure D6-18 should be corrected to 5 x 10-8 cm/s. This value was used in the hydrogeological modeling prepared by Jagger Hims Limited (Section J6.2.3). Site liners constructed on the existing site have confirmed that this value is achievable. For the purposes of Appendix A, in our view, remodeling is not justified since we were not trying to model the base liner but instead the recirculation/infiltration/moisture storage change within the landfill. The corrected value of 5 x 10-8 cm/s will be used in the EPA document. Figure D8-18C shows the permeability as the maximum K=5x10-8 cm/sec for the engineered clay primary liner. We enclosed a copy of the figure under separate cover June 21/05. 57 (m) We suggest that it is reasonable and logical to assume if one pass of a water droplet through the waste results in a contaminant of x mg/L, then two passes through the waste will result in 2x mg/L, providing saturation levels are not reached for the contaminant. 57 (n) We agree with the suggested wording. 57 (o) The additional thickness of cap material has been discussed under Items 31 and 34 (c). 57 (p) We agree that leachate recirculation will accelerate waste settlement but no proposal to recover airspace is made. Accordingly, no proposal to prolong the operating life of the landfill is anticipated. Similarly, no effect on the contaminating lifespan would be required. Appendix A does consider no leachate recirculation, and the removal of contaminants has been proven beneficial because of recirculation. 57 (q) The estimated service life of the primary leachate collection system is equal to the time required for "significant clogging" of the system, and will depend on the continued infiltration plus recirculation rate. Refer to revised Table A.7, Item 57(v). 57 (r) The second model of recirculation is simply a spreadsheet developed by Henderson Paddon & Associates Limited and Jagger Hims Limited. 57 (s) We confirm the 26 percent removal figure is the "no recirculation" case.	

WM Response to the Waste Unit Comments on Discussion Paper 8, June 7, 2005

Agency Comment	WM Response	Link to Terms of Reference
	57 (t) Peak leachate values are from the Keele Valley Landfill. Chloride was selected by MOE criteria in conjunction with the Keele Valley Landfill. Peak values have been provided for the critical contaminants. We do not have peak values for those indicated as average concentration. 57 (u) Waste thickness was varied to show the impact of waste thickness. 57 (v)(w) The values reported in Table A.7 were calculated using equation B18 from Appendix B of "Evaluation of Service Life of the Engineered Component of Landfills" by K. Rowe et al., October 1994. The reported time to clog the primary leachate collection system was based on a distributed porosity decrease from 0.48 to 0.03 (94 percent reduction), i.e., original porosity occupied by clogs Vf = 0.45. This value is presented in Table B4 of the referenced document, and is considered representative for "complete clogging" of the system. The author indicates that for "significant clogging", porosity reduction to 0.09 (Vf = 0.39) is required. It should be clarified that in Table A.7, we used a gravel thickness B = 0.5 m, but the proposed site design is based on B = 0.3 m. It is also noted that the initial calcium concentration used in our calculations was increased for various recirculation rates in accordance with Table A.4. For this reason, the revised Table A.7 (below) shows the time required for "complete" and "significant clogging" of the primary leachate collection system. 57 (x) The HELP model for specific landfill soil profile was used to obtain approximately 100 mm average infiltration (without recirculation) by trial and error method. The infiltration value in Column 4 of T able A.9 was taken directly from the HELP model annual output (sum of leachate removed, leakage and change in landfill water storage). The definition of the various terms in Table A.9 is as follows: k (Column 5) - Empirical decay constant. See equations [1 and 4b], Reference No. 9 "Leachate Characterization" by K. Rowe et al, October 1994. C1(Column 6) - Leachate chloride concentration [mg/L] in a given year using equation [1] of the same reference (no recirculation). C2 (Column 7) - Average chloride concentration for mixture of infill treated water and recirculated leachate in a given year C (Column 8) - Leachate chloride concentration in a given year calculated as the sum of C1 and C2 (includes recirculation effect). The mass of chloride removed in year i was calculated in the spreadsheet using the following formula:	

WM Response to the Waste Unit Comments on Discussion Paper 8, June 7, 2005

Agency Comment	WM Response	Link to Terms of Reference
	(LCi + LRi) (Ci-1 + Ci) / 2 Proper conversion of imperial and metric units is required for the above formula. 57 (y) The value of LR (leachate recirculated) was taken directly from the HELP model output for each year of simulation.	
58.	58 (a) Pre-treatment will consist of the same treatment plant as for discharge to surface water or to the municipal waste treatment plant, although to a lesser degree. For instance, for irrigation on a poplar forest, ammonia must be less than 450 to 500 kg/ha. Other critical contaminants can involve total dissolved salts, sodium and boron. W e refer to Table 6 in Addendum #1, which will be provided to you by Gemma Connolly, as decided in our meeting of June 9, 2005. This table was prepared at the request of the Peer Review Team. Table 6 (revised May 16, 2005) identifies the maximum contaminants in the water irrigated on the poplars and is governed by chloride, which was determined by the hydrogeologist to be the critical contaminant to ensure no impacts at the property boundary from shallow groundwater flows. 58 (b) Most of the data in the table was extracted from Technology Evaluation Report, TE-98-01 entitled "Phytoremediation" prepared by Jerald L. Schnoor, University of Iowa, Department of Civil and Environmental Engineering and Center for Global and Regional Environmental Research, Iowa City, Iowa, October 1997, and prepared for Groundwater Remediation Technologies Analysis Center. Similar data appears in many reports. 58 (c) As noted at our meeting of June 9, 2005, the poplars are proposed for south of the landfill area; however, it is also indicated that WM wishes to preserve the option of planting poplars on top of the landfill in the future, on the 5 percent sloping area, without repeating EA procedures. As noted, WM is currently in a pilot plant study for the existing landfill to irrigate raw leachate from the existing site onto the poplar plantation at the south of the landfill and as shown on the various site drawings. 58 (d) Pre-treated effluent from the leachate treatment plant will be stored in the lagoon on site, immediately south of the existing site. This is shown on **Figure D8-1**7, among others. 58 (e) The drawing number was incorrectly referenced and should be Drawing D8-17. Also, the storage pond is shown on the phasing drawings.	
59.	59 (a) The covered landfill areas would be inspected approximately eight (8) times per year, monthly from April to November, to identify any fissures, cracks or erosion of the soil cover that would allow unmitigated landfill gas to escape directly to the atmosphere. This will be confirmed in the EPA documents. 59 (b) Reply as above.	

WM Response to the Waste Unit Comments on Discussion Paper 8, June 7, 2005

Agency Comment	WM Response	Link to Terms of Reference
	59 (c) I believe the reference should be to Criteria 1(f) - Air Quality, Blowing Litter. "Routinely monitor and retrieve blowing litter around the site" means retrieve blowing litter as often as required after wind events. "Routinely monitor" means at least weekly if no unusual events occur. WM drivers are requested to stop and pick up litter on the haul routes, which litter is usually the result of improperly tarped or covered waste from small vehicles. 59 (d) The inclement weather area will be part of or adjacent each landfill phase, but moved to a low level instead of at the higher elevations of the landfill, where most landfilling will occur. The inclement area for each phase will be detailed on the EPA phasing drawings. 59 (e) Regular monitoring of landfill gas probes is proposed to be done quarterly, unless special circumstances require more frequent monitoring.	

Ministry of the Environment
Ministère de l'Environnement

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Environmental Assessment and Approvals Branch (EAAB)

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June 7, 2005

MEMORANDUM

TO: Gemma Connolly
Special Project Officer
EA Project Coordination Section

FROM: Greg Washuta, P. Eng.
Senior Waste Engineer
Certificate of Approval Review Section - Waste Unit

RE: **DISCUSSION PAPER #9 (DP #9) - DRAFT - OCTOBER 2004**
IMPACT MANAGEMENT PLAN
WARWICK LANDFILL EXPANSION ENVIRONMENTAL ASSESSMENT
CANADIAN WASTE SERVICES INC. (CWS)
CERTIFICATE OF APPROVAL (C of A) NO. A032203

I have reviewed Discussion Paper #9 dated October 2004 and the following comments are provided for response by the proponent:

1. **Page 2, Section 3.2, Principle 2** - A definition of the term "*residual nuisance effects*" should be provided.

2. **Page 6, Section 4.2, Contingency Plans** - Contingency measures identify remedial actions to be undertaken in the event of unforseen problems, failure of the landfill to perform as predicted as well as any emergency situations. If the site is operating in accordance with the Certificate of Approval, Ontario Regulation 232/98 and Regulation 347, there should not be any operational problems. Therefore, the use of "operational problems" under the guise of contingency plans is a misnomer.

3. **Page 9, Section 4.5, Financial Assurance Package** - It is debatable whether financial assurance packages are negotiable with the MOE. As a minimum, the proponent must follow the requirements for Ontario Regulation 232/98 for financial assurance. In O. Reg 232/98, financial assurance is required for contingency plans for the site, and for closure and post-closure care of the site.

4. **Page 9, Section 4.6, Post Landfill End Use** - It should be noted that the proponent must ensure that the use of the landfill after closure must conform with Section 46 of the EPA.

Section 46 of the EPA states "*No use shall be made of land or land covered by water which has been used for the disposal of waste within a period of twenty-five years from the year in which such land ceased to be used unless the approval of the Minister for the proposed use has been given.*" The closure plan must specify the end use of the landfill site. Any change in use of the landfill site for a period of 25 years after closure would be subject to approval by the Minister.

5. **Page 11, List of aspects that will be monitored** - The terms groundwater and surface water should be labelled as "Groundwater quality and levels" and "Surface water quality and quantity". In addition, monitoring of the leachate recirculation system will need to be completed.

6. **Page 11, Section 5.2, Contingency Plans** - In addition to the contingency plans listed, contingency plans should be developed for the following:

- landfill gas migration from the landfill site;
- contaminated surface water exclusive of stormwater;
- equipment failure;
- liner failure;
- leachate collection or gas control system failure;
- inappropriate waste disposal; and,
- use of an alternative waste disposal site in the event of labour disputes, temporary site closure, premature permanent closure due to operational problems.

7. **Page 21, Financial Assurance** - It should be mentioned that financial assurance is required for contingency plans for the site, and for closure and post-closure care of the site. Financial assurance is not just used to address any issues that may arise from landfill closure to the end of the contaminating lifespan of the site. The owner of the site is required to provide financial assurance in accordance with Ontario Regulation 232/98 and it is to *"remain in place until a written report is prepared that shows that financial assurance in no longer required"(O. Reg. 232/98, Section 17(5), 18(9).* In addition, the financial assurance *"shall be updated annually or as otherwise required by the Director"* (O. Reg. 232/98, Section 17(4), 18(8). Financial assurance is required by the MOE for the period from the start of site operations to the proposed closure date also.

Should you have any questions regarding this matter, please call me at (416) 314-5138.

Greg Washuta, P. Eng.

c: Mike Moroney, District Manager, MOE, Sarnia District
Dan Gaudenzi, District Engineer, MOE, Sarnia District Office
Ian Parrott, Supervisor - Waste Unit, MOE, EAAB Waste Unit

WM Response to the MOE Waste Unit on Discussion Paper 9, June 7, 2005

Agency Comment	WM Response	Link to Terms of Reference
1.	A residual nuisance effect is a nuisance effect that remains even after additional mitigation has been put in place. It is also sometimes referred to as a 'net effect'. A definition will be provided in Final DP9.	
2.	Wording will be modified to be consistent with O. Reg 232/98 and O. Reg 347 in Final DP9.	
3.	Noted.	
4.	Noted.	
5.	The terms will be modified to reflect your comments in Final DP9.	
6.	The contingency plans identified will be developed for the EPA application.	
7.	Noted.	

St. Clair Region Conservation Authority

May 24, 2005

ST. CLAIR REGION CONSERVATION AUTHORITY

205 Mill Pond Crescent, Strathroy, Ontario, N7G 3P9

Tel.: 519-245-3710
Fax: 519-245-3348

May 24, 2005

Gartner Lee Ltd.
300 Town Centre Blvd
Suite 300
Markham, Ontario
L3R 5Z6

Attention: Mr. Paul Murray

Dear Mr. Murray:

Re: Warwick Landfill Expansion and Environmental Assessment
Draft Discussion Paper 5 - Baseline Conditions
Draft Discussion Paper 6 - Facility Characteristics
Draft Discussion Paper 7 - Impact Assessment and Background Document
Draft Discussion Paper 8 - Preliminary Design, Development and Operations Plan
Draft Discussion Paper 9 - Impact Management

The St. Clair Region Conservation Authority has reviewed the above noted documents from a natural heritage, natural hazard and ground water / surface water perspective. The Authority retained Linda Nicks, groundwater specialist, Upper Thames River Conservation Authority to provide comments on the hydrogeological assessment. Comments are provided below:

A. Natural Hazards: Conservation Authorities Act - Ontario Regulation 167, "Fill, Construction and Alteration to Waterways" Regulation.

There are no concerns with respect to natural hazards from the proposed landfill expansion described in Discussion Paper #6 and impact assessment described in Discussion #7. The expansion area is not subject to the Conservation Authority's Regulation 167 which regulates activities that may have a potential impact on flooding and erosion. This is due mainly to the landfill's Bear Creek headwater location.

B. Natural Heritage Features

Terrestrial Resources
DP#7 indicates that approximately 5.5 ha of forest will be eliminated, with the proposed landfill expansion. Two of the affected woodlands, W2 and W4, are identified as Significant Woodlots in the Township of Warwick Official Plan. As indicated in this Official Plan, we recommend that "Restoration work should be required at the rate of twice the area of forest cover that was removed. The replacement tree stock should consist of indigenous species where quality stock is available and be maintained by the proponent to the free to grow stage."

It is recognized that a 28 ha poplar plantation will be planted and maintained for leachate treatment purposes. We do not consider maintenance of hybrid poplar clones to be providing compensation or mitigation for removal of existing woodlots. These poplars are managed solely to provide leachate treatment.

We recommend that planting of 11 ha of indigenous trees be initiated prior to the removal of the existing woodlands. We recommend that this wooded habitat be developed as riparian habitat bordering Brown Creek, in order to enhance the Primary corridor along Brown Creek, as indicated on the County of Lambton Official Plan Natural Heritage System.

Aquatic Resources
In November 1998, this Authority signed a Level II agreement with the Federal Department of Fisheries and Oceans (DFO). The agreement stipulates that the St. Clair Region Conservation Authority will assume the responsibility of reviewing the potential impact of proposed works on fish habitat. We understand you have received comments from DFO Sarnia directly with regard to the landfill expansion's impact on fish habitat. As a result, this Authority did not review the expansion with regard to fish habitat.

C. Hydrogeology
The Hydrogeological Impact Assessment was compiled by Jagger Hims Limited for Waste Management . The hydrogeological assessment appears to be a comprehensive compilation, analysis and interpretation of the geoscience data. The hydrogeological technical report (hereafter referred to as the report) is part of a much larger report. The report documents the objectives and scope of the work program in detail and includes potential impacts to the environment, additional mitigation, net effects on the environment, environmental monitoring program and contingency plans and triggering mechanisms. The report includes detailed and comprehensive diagrams and figures which include maps, plans, geologic schematic cross-sections, tables, groundwater flow and groundwater modeling results.

The report summary is comprehensive and adequately demonstrates that from a hydrogeologic perspective, the proposed landfill will not have a detrimental impact on the regional groundwater resources, existing sand and gravel resources, or potential oil and gas resources.

The numerical code selected for groundwater modeling was MODFLOW. MODFLOW is a 3-dimensional, finite-difference model developed by the USGS and is a broadly accepted code for landfill modeling and other applications.

The data interpretation appears to be based on all of the information collected. The methodology used for the delineation and the associated uncertainties appears to be documented.

If you have any questions with regard to our comments, please contact the undersigned.

Yours truly,

Patricia Hayman

Patricia Hayman
Director of Planning and Research

ph/ln/mia/gc

cc: UTRCA Att: Linda Nicks fax SCRCA Director, Percival Heath, mail
Twp of Warwick Att: D. Bruder fax SCRCA General Manager, R. Coe e-mail
DFO Att: L. Reising fax
\planning\planning\warwicklandfillexpansion EAMay2005

WM Response to the SCRCA Comments on Discussion Paper's 7, 8, & 9, May 24, 2005

Agency Comment	WM Response	Link to Terms of Reference
A. Natural Hazards	No response required.	
B. Natural Heritage Features Terrestrial Resources	The issue of additional woodlot protection was raised with WM and modifications have been made to the site footprint to largely retain the existing woodlot. WM is prepared to undertake restoration work for any lost forest area at a rate of twice the area of the forest area removed and consistent with the Warwick Township Official Plan. Opportunities for further re-forestation within the Bear Creek Watershed will be explored by WM, with input from the St. Clair Region Conservation Authority, during the operational and post-closure periods of the site.	
B. Natural Heritage Features Aquatic Resources	No response required.	
C. Hydrogeology	No response required.	

Township of Warwick –
Fire Departments

February 10, 2005

TOWNSHIP OF WARWICK

6332 Nauvoo Road, R.R. #8, Watford, Ontario N0M 2S0

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February 10, 2005

Mr. Phil Bosco-Project Coordinator
Gartner Lee Limited
300 Town Centre Blvd., Suite 300
Markham, ON
L3R 5Z6

Dear Mr. Bosco:

RE: Warwick Landfill Expansion Environmental Assessment

Both Fire Departments have now had time to review Discussion Papers 7, 8, and 9. The following issues are presented with respect to the health and safety impacts envisioned, which will cause additional fire and rescue services from both fire stations and in turn have financial implications etc.:

1. We note that on page 7 you indicate that "no increase in collision rate is predicted". How can this conclusion be made when there is no prior/historic data as to the proposed speed rate, turning land and volume of trucks? According to our recollection, there have been numerous accidents on top of the overpass already as a result of the current traffic turning through the on-coming traffic. We can think of at least four or five.

2. With respect to the reduction in speed to 60 kms, how will the O.P.P. be able to enforce this, as they already have limited resources? Why would the municipality encourage this, as this limit would be dangerous during operational hours and especially after hours for minimal traffic to maintain this low speed for approximately 3 kms?

3. The proposed queue area is entirely too short, if the entrance is to be off County Road 79. For the amount of additional traffic volume that will be caused on a main north south artery, four lanes should be installed for regular and specifically for rural farm traffic.

4. Access on and off of the 402 is an issue as the existing ramps may handle the existing volumes, however are still hazardous to traffic turning on the bridge area, let alone the major impact of truck traffic proposed.

5. We also express concern that frequently during the year, the 402 is closed east of Nauvoo (CR 79) due to accidents and/or snow. Traffic is routed down CR 22 from the Kerwood exit causing vehicles to turn at the intersection of CR 22 and 79 (which is less than 3 kms from the proposed site expansion.) In summary, this situation will cause an extreme burden to the noted intersection and in our opinion warrants traffic signals there.

In summary, the proposals outlined are impractical and will generate health and safety issues.

Yours truly,

Watford Chief Rick Sitlington

Warwick Chief Peter Ferwerda

c.c. Warwick Township Council
Warwick Peer Review Team

WM Response to the Township of Warwick Fire Departments on Discussion Paper 7, Feb. 10, 2005

Agency Comment	WM Response	Link to Terms of Reference
1.	We acknowledge that accidents have occurred in the past in the vicinity of the County Road 79 and Highway 402 interchange, although none involving Waste Management related trucks, and this was identified in a figure contained in Appendix A of our Discussion Paper No. 7 – Traffic Impact Assessment. As mentioned in our Discussion Paper No. 7, it is not to say that collisions will not occur, but that historical data show that there does not appear to be any precipitating factors that might lead to an increase in collision rates (i.e., number of accidents per million vehicle kilometres). With the increase in number of heavy vehicles and growth in background traffic, the number of collisions may increase, however, the recommended road improvements including turning lanes and interchange improvements will help to mitigate the collision rate. Please review comments below.	
2.	In light of the concerns raised by various agencies and the public regarding the recommendation to reduce the current posted speed limit on County Road 79 from 90km/hr to 60km/hr, other mitigation measures at the 402 interchange have been reviewed: 1. **Lift CR79/Ramp Intersection Approaches to provide adequate Sight Lines –** The improvements would allow CR79 to be maintained at the current posted speed limit or a lower posted speed limit depending on MTO and/or the County's decision. However, it provides for adequate safe stopping sight distance for 110/km/h design speed on CR79. The works involve flattening the curves at the intersection approaches and lift the roadway by about 1.9m on the north side critical point and about 2.5m on the south side critical point. Consequently, the highway 402 ramp and loop approaches to and from the intersections would need to be lifted as well. The bridge structure itself would not require any modifications. At the same time, it is recommended that the future southbound left turn lane for southbound CR 79 to westbound Highway 402 movements be implemented to minimize any future reconstruction. 2. **Northbound CR79 to Eastbound Highway 402 Right-Turn ramp –** This direct connection would serve to eliminate the current northbound left turn movement. It would relieve a potential point of conflict at the south intersection to the interchange. The proposed ramp may require a small amount of property at the SE quadrant. Any land implications should be confirmed at a more detailed design stage depending on MTO's requirements and acceptance in principle of the proposed ramp. 3. **Signalization of the CR79/402 Westbound Off-Ramp (North) Intersection –** Although this intersection will not meet the volume warrants for a signal, the implementation of a signal will reduce the number of conflicting movements and, in conjunction with sight line improvements, will further enhance the overall operation for auto and truck turning manouvers. It is recommended that the westbound ramp approach to CR79 be widened at the same time to accommodate a separate right turn lane consisting of a 70m storage and 30m taper so that drivers making a right turn are not delayed significantly by stopped left turning vehicles. The left turn lane should be activated so that the north-south signal green time is interrupted only when the presence of a vehicle on the westbound left-turn lane is detected.. With the additional northbound to eastbound ramp, the subject interchange will be consistent in functionality as other similar interchanges in the area including the County Road 21/Highway 402 interchange. These additional recommended improvements will provide greater safety at the interchange and will adequately accommodate the increase in future site and background traffic. Although the sight line improvements will alleviate most concerns, it is still recommended that the agencies also consider a reduction in the posted speed limit on County Road 79.	
3.	It should be noted that the proposed County Road 79 access will be located at approximately 300m (centreline to centreline) south of the Zion Line and this distance is considered adequate to accommodate the design elements for a left turn lane up to a design speed of 100 km/h. Given that there may be a northbound left turn lane for future background traffic at the Zion Line northbound approach, the 300m should accommodate a back-to-back left turn lane or be designed as a third (centre) lane for left turns only. It is suggested that an appropriate design for the turning lanes be considered as a condition of approval for the E.A. However, the	

WM Response to the Township of Warwick Fire Departments on Discussion Paper 7, Feb. 10, 2005

Agency Comment	WM Response	Link to Terms of Reference
	design will depend on the posted speed limit selected. In our Discussion Paper No. 7 – Traffic Impact Assessment, a storage (S) length of 30m was recommended based on an 80 km/hr design speed. However, it is noted that the design of a left turn bay includes a taper (T), a parallel (P), and a storage length (S). The parallel and taper lengths are standards for a given speed and not dependent on traffic volume. Therefore, the actual available storage length would include the recommended storage (S) of 30m and parallel length (e.g., 50m for 80 km/hr). With an average length of 15m assumed for a heavy vehicle, this length can accommodate a queue of about 5 heavy vehicles at any one time before the back vehicle encroaches upon the taper – which would have a standard length of 130m for an 80 km/hr design speed and increasing with a higher design speed. Based on the additional traffic volumes projected for the site and background growth in the area, four (4) lanes on County Road 79 are not warranted. The proposed turn lanes at various intersections including a southbound left turn inbound lane, northbound right turn inbound lane, and northbound acceleration lane for right turns out of the site access would mitigate the effects of site generated traffic. In addition, paved shoulders along the County Road 79 haul route extending from Highway 402 to the site access are recommended in order to provide an extra margin of safety for rural farm traffic.	
4.	As mentioned earlier, proposed improvements to the ramp intersections at the Highway 402/County Road 79 interchange have been made including signalization of the north ramp intersection and a new northbound to eastbound ramp from Country Road 79 to Highway 402. These improvements would reduce the potential for turning movement conflicts in the bridge area.	
5.	It is recognized that sections of Highway 402 can be closed due to accidents or adverse weather; however, designing intersections and implementing traffic control signals to accommodate for such infrequent events is not practical or generally warranted. The intersection of County Road 22 and County Road 79 is not on the primary haul route of the proposed landfill expansion, and mitigation measures to address unusual circumstances should not include a traffic signal (if it does not meet normal traffic volume and safety warrants). During such times (e.g., closure of Highway 402), it is anticipated that OPP and other response agencies would be directing traffic at the key intersections along the available routes. A traffic signal in such a situation may be redundant. If traffic is re-routed back onto Highway 402 at the County Road 79 interchange then the improvements recommended, including a signal at the north ramp, turn lanes, improved sight lines, and a new NB to EB ramp, would help in reducing the turning conflicts and improve safety in the area.	

Ontario Provincial Police -

January 19, 2005

(97393-65/2005)

Ontario Provincial Police
Police provinciale de l'Ontario

Lambton Detachment
4224 Oil Heritage Road
P.O. Box 400
Petrolia, Ontario
N0N 1R0

Tel: (519) 882-1011
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File: 640

January 19, 2005

Mr. Phil Bosco- Project Coordinator
Gartner Lee Limited
300 Town Centre Blvd., Suite 300
Markham, ON L3R 5Z6

Re: Warwick Landfill Expansion Environmental Assessment

I, along with Lambton Traffic Sergeant Chris Martin have completed an initial review of Discussion Papers 7,8, and 9.

In discussion paper 7 Traffic Congestion/Collisions under impact, bullet point 4 "no precipitating factors that might lead to increased collision rates have been identified. No increase in collision rate predicted." Historic data cannot be relied upon to support this comment, as there has been no point in history where CR79 has been tasked with the volume of CMV traffic spoken of.

A reduction in the speed limit on CR79 is a poor means of dealing with the traffic issues related to the increased CMV. Expectations for enforcement and responding to complaints will fall directly on policing services. I see nowhere in your document for enhancement of traffic officers to deal with this issue, nor would I suggest the Municipality have an appetite for this. Further, the costs of calls for service for this enhancement of CMV's will download directly on the municipality. This speed reduction further would require "all users" to adhere to the 60km zoning. If improvements are required to "fit" landfill traffic into the present system then improvements, namely the addition of proper ramps at CR79 and Hwy 402 interchange, longer storage lengths (queue areas) for turning for north and south bound CMV should reflect that. Dropping the speed limit to 60km is not only the easy way out; it downloads the responsibility to policing services.

Another particular concern to us is the resulting congestion as the CMV's precede back NB on CR79 to the 402. Resultant queue issues on the North and South both northbound and southbound CR79 and westbound 402 off ramp would only be further compounded by emergency road closures due to accidents, weather, or something as simple as a broken down CMV. I can assure you we "do" have historic data in this regard. Our observations and historic data indicated that most CMV garbage haulers travel in groups and due to the expansion of the haul rates most drivers have limited or no experience.

On page 46 of Discussion paper #7, under mitigation, recommended road improvements notes for both SB and NB a queue area on CR79 of 30 meters. This limits a queue to 1 CMV on CR79 and would force all other CMV and private passenger traffic to unreasonable delays and ultimately to resort to unsafe shoulder or passing maneuvers and again call for a police response should a collision or ongoing violations take place. I would suggest this area is not adequately addressed.

We do not favor the main entrance from CR79 over Zion Line access. Your reasoning for movement of farm equipment favoring CR79 is concerning. The speed differential on CR79 is much greater than Zion. The frequency of farm equipment that travels at slower speeds, utilizing Zion Line would be much less frequent than the amount of traffic on CR79. I would suggest that Zion would be much more advantageous to slow CMV as they approach the landfill and also to minimize potential conflicts with other traffic. I appreciate that the use of Zion would have additional impacts on local residents but I would also suggest that mitigation of issues such as litter or roadway cleaning would be much easier on this secondary road than a main artery such as CR79. I also believe the need to address the ramp issues at CR79 and Hwy 402. The potential for queues exists for NB CMV traffic to precede EB 402 is enhanced by CMV traffic coming SB on CR79 proceeding to the site. The present ramp system also requires WB CMV to stop and make a left turn across NB CR79 traffic in order to precede SB on CR79. This can also create queues on WB ramp. I do not profess to be a traffic enginer however, my opinion for the "Public Safety" the ramp system should be changed to allow WB CMV to go under the overpass and exit on the west side of the overpass and then merge with SB traffic on CR79. For NB CMV on CR79 they are now required to make a left turn crossing SB lane to access the EB Hwy 402 ramp. A new ramp should be constructed to allow direct access by merging right off CR79 onto EB 402.

My comments are directed towards enhancing "Public Safety" and impacts on services we provide. To enhance policing services requirements without any consideration towards funding those enhancements, or providing proper infrastucture is a failure to address "all" circumstances.

I would suggest that the conclusions made in the document reading, "no negative impact on public health and safety due to traffic conflict is anticipated", is without foundation and due consideration to all circumstances involving "Public Safety" and enhancement of service requirements.

F.W. Wessels
Inspector
Detachment Commander
Lambton County

Cc Mr James Kutyba, Manager Infrastructure & Development County of Lambton
Mayor Todd Case, Township of Warwick

WM Response to the OPP Comments on Discussion Paper 7, January 19, 2005

Agency Comment	WM Response	Link to Terms of Reference
Page 1, Paragraph 2	As mentioned in our Discussion Paper No. 7 – Traffic Impact Assessment, it is not to say that collisions will not occur, but that historical data show that there does not appear to be any precipitating factors that might lead to an increase in collision rates (i.e., number of accidents per million vehicle kilometres). With the increase in number of heavy vehicles and growth in background traffic, the number of collisions may increase; however, the recommended road improvements including turning lanes and interchange improvements will help to mitigate the collision rate.	
Page 1, Paragraph 3	In light of the concerns raised by various agencies and the public regarding the recommendation to reduce the current posted speed limit on County Road 79 from 90km/hr to 60km/hr, other mitigation measures at the 402 interchange have been reviewed: 1. **Lift CR79/Ramp Intersection Approaches to provide adequate Sight Lines –** The improvements would allow CR79 to be maintained at the current posted speed limit or a lower posted speed limit depending on MTO and/or the County's decision. However, it provides for adequate safe stopping sight distance for 110/km/h design speed on CR79. The works involve flattening the curves at the intersection approaches and lift the roadway by about 1.9m on the north side critical point and about 2.5m on the south side critical point. Consequently, the highway 402 ramp and loop approaches to and from the intersections would need to be lifted as well. The bridge structure itself would not require any modifications. At the same time, it is recommended that the future southbound left turn lane for southbound CR 79 to westbound Highway 402 movements be implemented to minimize any future reconstruction. 2. **Northbound CR79 to Eastbound Highway 402 Right-Turn ramp –** This direct connection would serve to eliminate the current northbound left turn movement. It would relieve a potential point of conflict at the south intersection to the interchange. The proposed ramp may require a small amount of property at the SE quadrant. Any land implications should be confirmed at a more detailed design stage depending on MTO's requirements and acceptance in principle of the proposed ramp. 3. **Signalization of the CR79/402 Westbound Off-Ramp (North) Intersection –** Although this intersection will not meet the volume warrants for a signal, the implementation of a signal will reduce the number of conflicting movements and, in conjunction with sight line improvements, will further enhance the overall operation for auto and truck turning manouvers. It is recommended that the westbound ramp approach to CR79 be widened at the same time to accommodate a separate right turn lane consisting of a 70m storage and 30m taper so that drivers making a right turn are not delayed significantly by stopped left turning vehicles. The left turn lane should be activated so that the north-south signal green time is interrupted only when the presence of a vehicle on the westbound left-turn lane is detected. With the additional northbound to eastbound ramp, the subject interchange will be consistent in functionality as other similar interchanges in the area including the County Road 21/Highway 402 interchange. These additional recommended improvements will provide greater safety at the interchange and will adequately accommodate the increase in future site and background traffic. Although the sight line improvements will alleviate most concerns, it is still recommended that the agencies also consider a reduction in the posted speed limit on County Road 79.	
Page 1, Paragraph 4	We acknowledge that accidents have occurred in the past in the vicinity of the County Road 79 and Highway 402 interchange, although none involving Waste Management related trucks, and this was identified in a figure contained in Appendix A of our Discussion Paper No. 7 – Traffic Impact Assessment. However, with the proposed geometric and intersection operational improvements including signalization of the north ramp intersection at the Highway 402/County Road 79 interchange and a new northbound to eastbound ramp from Country Road 79 to Highway 402, the potential for turning movement conflicts at the bridge area would be significantly reduced.	
Page 2, Paragraph 1	It should be noted that the proposed County Road 79 access will be located at approximately 300m (centreline to centreline) south	

WM Response to the OPP Comments on Discussion Paper 7, January 19, 2005

Agency Comment	WM Response	Link to Terms of Reference
	of the Zion Line and this distance is considered adequate to accommodate the design elements for a left turn lane up to a design speed of 100 km/h. Given that there may be a northbound left turn lane for future background traffic at the Zion Line northbound approach, the 300m should accommodate a back-to-back left turn lane or be designed as a third (centre) lane for left turns only. It is suggested that an appropriate design for the turning lanes be considered as a condition of approval for the E.A. However, the design will depend on the posted speed limit selected. In our Discussion Paper No. 7 – Traffic Impact Assessment, a storage (S) length of 30m was recommended based on an 80 km/hr design speed. However, it is noted that the design of a left turn bay includes a taper (T), a parallel (P), and a storage length (S). The parallel and taper lengths are standards for a given speed and not dependent on traffic volume. Therefore, the actual available storage length would include the recommended storage (S) of 30m and parallel length (e.g., 50m for 80 km/hr). With an average length of 15m assumed for a heavy vehicle, this length can accommodate a queue of about 5 heavy vehicles at any one time before the back vehicle encroaches upon the taper – which would have a standard length of 130m for an 80 km/hr design speed and increasing with a higher design speed	
Page 2, Paragraph 2	The selection of the County Road 79 access was based on several factors including noise, dust, public input and other social impacts. In addition, the Township's Official Plan encourages land uses which generate high volumes of traffic, including truck traffic, to be located along arterial roads and the movement of truck traffic through the municipality on arterial roads rather than on collector or local roads. Given the high volume of traffic generated by the proposed landfill expansion, the use of Zion Line (local road) was considered less desirable. With the proposed turn lanes at various intersections including a southbound left turn inbound lane, northbound right turn inbound lane, and northbound acceleration lane for right turns out of the site access, the effects of the site generated traffic can be mitigated. In addition, paved shoulders along the County Road 79 haul route extending from Highway 402 to the site access are recommended in order to provide an extra margin of safety for rural farm traffic. In consideration of the speed differential between the movement of farm equipment and other traffic, the reduction of the posted maximum speed limit is also an option for the agencies. With the currently recommended northbound to eastbound right turn ramp from County Road 79 to Highway 402, the northbound left turn lane suggested in the report will no longer be required. In fact, this northbound left turn movement would be eliminated due to the recommended directional ramp thus, also eliminating the current conflict point between the southbound through movement and northbound left turn movement. Also, the recommended traffic signal at the north ramp along with proposed separate southbound and westbound left turn lanes would reduce the turning conflicts. Our assessment of a ramp system to allow westbound to southbound traffic under the bridge indicated that the bridge structure and weaving section cannot accommodate such a design without completely reconstructing the bridge overpass. In addition, there would be significant implications on land at the northwest quadrant of the interchange.	

County of Lambton (LEA Consulting) -

February 16, 2005

LEA Consulting Ltd.
Consulting Engineers & Planners
Suite 900, 625 Cochrane Drive, Markham, ON, L3R 9R9 CANADA
Tel: 905-470-0015 Fax: 905-470-0030 www.LEA.ca

February 16, 2005 Our Ref.: 2577-200

Mr. J. Kutyba, P. Eng.
General Manager, Infrastructure & Development Services Division
County of Lambton
789 Broadway Street, P.O. Box 3000
Wyoming, ON
N0N 1T0

Dear Mr. Kutyba,

Re: WARWICK LANDFILL EXPANSION ENVIRONMENTAL ASSESSMENT

PEER REVIEW: Background Document to Discussion Paper #7
Transportation Impact Assessment (and other transportation documentation)

LEA Consulting Ltd. has completed a preliminary peer review of *Background Document to Discussion Paper #7 - Transportation Impact Assessment*, *October 2004* and other transportation material provided in Discussions Papers #5, 6, 8 & 9. Our preliminary comments on the Transportation Impact Assessment and on general transportation matters are summarized below. As can be seen from our comments, we are unable to complete our Peer Review and provide you with our opinion without further information. In order to facilitate our review, it would be useful to meet with the proponent's traffic consultant in order to generate responses to our questions in a timely fashion.

1. Background Document to Discussion Paper #7: Transportation Impact Assessment

Section 1.2

The existing truck traffic distribution pattern from the existing traffic diagrams in Discussion Paper #6 indicate that 70-78% of current truck traffic on Zion Line originates from north of the landfill. It is unclear from the traffic figures as to how much of the truck traffic through the County Rd. #79/Zion Line intersection is generated by the existing landfill, if any. Based on this, the Consultant should provide the rationale for distributing future truck traffic 95% to/from the north and provide an assignment or description of existing landfill truck trips through the County Rd. #79/ Zion Line intersection and equate to a distribution.

The Consultant should confirm if any trucks presently travel through Watford on County Road #79. and identify the route for any existing or future garbage trucks from the Windsor-Chatham area that may use the landfill.

Section 2.2

The Consultant should identify how the quantity or percentage of trucks was incorporated into the assessment of turning lane storage lengths using MTO procedures.

Section 3.2

As per Section 1.2.

Also, the consultant makes reference to County Road 39. They should be advised that this is a local road and is not under the county's jurisdiction.

Section 3.3

This section should be re-written as it is unclear as to what the Consultant is referring to in this section.

Section 4.2

The Consultant should identify or provide the statistics on agricultural vehicles and school buses using County Road #79 (CR 79) and Zion Line.

Section 4.4

It is indicated that there is some pavement deterioration on Zion Line between CR 79 and the site entrance. Considering that both Zion Line and CR 79 were resurfaced in 1999, it should be noted that this deterioration is occurring on a low-volume route, with a far lower number of trucks than proposed for the expansion. With a significant increase in the number of trucks utilizing a more travelled route (CR 79) the rate of deterioration will be accelerated. The Consultant should provide a geotechnical study on pavement stability, complete with pavement management recommendations.

Section 4.6

The consultant provides only one recommendation to improve safety on CR 79 at the interchange. Alternative recommendations should be looked at, including modifications to the interchange ramp configurations.

Section 5.2

<u>Staff</u>

The staff of the proposed landfill expansion are not included in the traffic forecasts during peak travel periods. The Consultant should provide details on staff numbers, with shift arrival and departure times and how these shift times relate (or not) to street peak periods.

Truck Volumes

It appears that the daily truck volume projections were divided evenly throughout the day to arrive at peak hour volumes. The Consultant should confirm this assumption and provide rationale for the even hourly distribution of trucks. The Consultant should address the potential for trucks "clustering" or arriving in packs, which they often do. The Consultant should provide supporting documentation for the assumption (eg. survey results of hourly truck distribution from comparable sites).

Future Traffic Projections

Reference is made to Discussion Paper #6 (DP 6) and future traffic projections (under Section 2.7 and Table 2.2). Of primary importance, Table 2.2 is missing from our copy of DP 6. However, all tables and appendices are missing from the document. The Consultant should provide all of the tables and appendices.

There is no clear and simple table of vehicle and truck trip generation, summarizing trip generation into inbound trips, outbound trips and total trips, by peak hour and all day. The consultant should provide this. It is unknown if Table 2.2 (missing) contains this information. Other trip tables in the Appendices are confusing and it is unclear if trips are one- or two-way. The Consultant should clarify through easy-to-interpret trip tables.

Section 6.3

Turn lane warrant calculations should be conducted on the basis of design speeds relating to actual posted speeds. In the assessment, the Consultant has assumed that the posted speed will be reduced to 60 km/h all along County Rd. #79. The Consultant should provide lane storage requirements based on actual posted speed limits.

Furthermore, lane storage requirements should be summarized to show the total recommended storage and taper length for each lane. This includes storage (S), parallel lane (P) and taper (T). The summary tables as provided in the report are very misleading, which is evident from the OPP review comments, as only storage (S) is summarized, which makes it look like some storage lanes, for example, should be 15 m long, whereas the actual storage would be 15 m (S) plus 50 m (P) for a total vehicle storage of 65 m, excluding taper. The Consultant should revise the summary tables to include all elements of the storage lane so it is clear what the entire storage length is.

Section 7.2

It is suggested that 95% of site trips are from Highway 402. The Consultant should provide justification to support this distribution. The Consultant should also confirm the routing of trucks from the Windsor-Chatham, should that area be served by the expanded landfill. It is our understanding that the landfill site in Petrolia will be closing in the foreseeable future, so the Consultant should confirm if their assumptions take that into account.

Section 7.2.2

See comments Section 6.3.

Section 7.2.3

See comments Section 6.3.

Section 7.2.4

The Consultant should provide a geotechnical study on pavement stability, complete with recommendations on pavement improvements required, pavement management and responsibility for contributions towards any required improvements and future maintenance of the road.

Section 7.2.5

Collision and Safety

Despite the significant increase in truck traffic, the consultant has indicated that an increase in collisions is unlikely. The consultant should provide a basis for stating that an increase is not foreseen. The amount of additional truck traffic that will be seen on CR 79 is unprecedented for this facility.

A significant number of slow moving trucks will be moving from westbound Hwy 402 to southbound CR 79 and northbound CR 79 to eastbound Hwy 402 and will be required to make left turns at the intersections between Hwy 402 and CR 79. In addition, outbound trucks will cross the path of inbound trucks when turning from CR 79 to the eastbound Highway 402 on-ramp.

Section 7.3.2

See comments Section 6.3.

Section 7.3.3

See comments Section 6.3.

Section 7.4

See comments Section 6.3.

Section 8.0

The summary should be modified in accordance with any changes arising from the preceding comments.

For the scenario with a CR 79 access, the Consultant should address the need for a northbound acceleration lane on CR 79 upon exiting the site.

2. General Comments

- There is no easily readable table showing a clear breakdown of projected site traffic. The Consultant should provide a trip generation table that would be easy for the general public to understand, with inbound, outbound and total traffic, separated into vehicle classification (i.e. trucks, cars), by peak hours and all day.

- The Consultant should confirm the length of a CMV and provide vehicle lengths for other types of trucks that will be delivering or removing material from the expanded landfill site. It would be very helpful if the Consultant provided a truck classification table, complete with illustration of the truck, name, dimensions, weight, serving what purpose, etc.

- The consultant has recommended the lowering of speed limits on CR 79. An alternative to lowering the speed would be to improve the interchange configuration to provide for direct westbound 402 to southbound CR 79 and northbound CR 79 to eastbound 402 movements. This would eliminate the need for left turns between CR 79 and Highway 402 and may reduce the potential for vehicle queuing and accidents. The Consultant should consider improving the interchange to improve safety, rather than proposing a reduced speed limit. A functional plan of such improvements should be prepared by the Consultant for agency review and consideration.

- The consultant should consider if there are any traffic operation benefits of splitting inbound and outbound site traffic between 2 access points, on Zion Line and CR 79, and whether the splitting of traffic will result in less impact to existing vehicle operations along Zion Line or CR 79 south of Zion Line, or the CR 79/Zion Line intersection. The impact of vehicles queuing at the entrance, in the event of a spill-back, would be lower if trucks entered the site from a Zion Line access.

- With the number of trucks increasing more than tenfold on CR 79 as a result of the expanded landfill, the Consultant should consider the need for an additional southbound lane on CR 79 to accommodate slow-moving trucks and reduce the impact to existing traffic. The existing pavement width is only 6.7 m. A second southbound lane along CR 79 would improve safety in situations with trucks breaking down and requiring repair. The consultant should also address the need to pave the shoulders.

- There is very little assessment provided on incoming truck traffic at the access, dwell time for weigh-ins, potential vehicle queuing at the entrance, emergency measures for weigh-scale breakdowns, etc. The Consultant has also assumed uniform distribution of truck traffic throughout the day. The Consultant should provide a detailed access assessment with a sensitivity analysis on vehicle arrivals to reflect higher hourly arrivals than those simply based on “uniform hourly distribution”. Details on weigh-in times, dwell time for trucks in queue, etc. should be provided in the sensitivity analysis.

- In addition to turning lanes, the Consultant should address and make recommendations on other types of road improvements, such as the need for improved illumination at intersections, signage, etc.

- It would be useful for the Consultant to provide statistics from landfills of comparable size. Following are some of the details that should be considered:

    - Hourly and daily distribution of trucks;
    - Wait time for trucks to get onto the weigh scale. Consider average, minimum and maximum times.
    - Total time required for trucks to enter the site, weigh-in, drop the load, weigh-out and exit the site.
    - Location of weigh-in scale with respect to access. Observations of vehicle queuing.

Yours very truly

LEA Consulting Ltd.

Terry G. Wallace, P.Eng.
Vice President
Transportation Engineering

:tgw

cc: Stephen D'Agostino, Thompson Rogers

WM Response to Lambton County(LEA Consulting) on Discussion Paper 7, October 2004

Agency Comment	WM Response	Link to Terms of Reference
1. Background Document to Discussion Paper #7: Transportation Impact Assessment Section 1.2	Traffic counts at the site access on Zion Line and study area intersections were carried out on several days and the highest of the individual intersection volumes were adopted as the worst case "existing" traffic volumes. The breakdown of the existing traffic layer into "EXISTING BASELINE VOLUMES (existing background + existing site)", "EXISTING SITE VOLUMES (existing site traffic)", and "EXISTING COMPOSITE VOLUMES (highest existing baseline minus existing site)" are shown herein as Appendix B. These figures illustrate the approximate amount of current site traffic at each of the intersections including the truck composition. Since the volume of waste to be trucked will increase from the current 55,000-62,000 tonnes per year to 750,000 tonnes per year, the future truck distribution pattern will be somewhat different from the existing truck distribution pattern. According to Waste Management (WM) the vast majority of the trucks will be to/from the north via Highway 402 given the transfer station locations and service areas. In addition, information previously obtained from WM indicated that approximately 95% of the site generated truck traffic originates from the Exeter Road waste transfer facility in the City of London. Based on this information, it was assumed that 95% of the future landfill truck trips would be to/from Highway 402 north of the site. As a worst case scenario for the critical left turning movements at the County Road 79/Highway 402 interchange, the truck movements were distributed and assigned to/from the east on Highway 402. It should be noted that the existing distribution pattern of trucks observed in the count surveys indicate some site trucks using Zion Line. This practice of using Zion Line east of the site and west of County Road 79 has stopped and drivers have been directed to use County Road 79 as the designated route. Given these measures and the future volume concentration of trucks originating from north and east of the site, the 95% distribution was considered reasonable. Based on the traffic observations at the County Road 39/County Road 79/Confederation Line intersection, only 3 northbound through and 3 southbound through trucks related to the Warwick landfill were counted during an entire day. These trucks were for local pick up services only and this situation is expected to continue in the future. At present, no WM site trucks use County Road 79 through the Village of Watford as a through route. Should the Windsor-Chatham area be served by the subject landfill in the future then potential haul routes from this south-westerly and westerly area could be shared between a number of highways including County Roads 21, 26 and 40 as north-south routes, and County Road 22 and Highway 402 as east-west routes. However, the majority of the trucks from the westerly area would converge onto Highway 402 west of the site and this would account for a very small proportion (approximately 5%-10%) of the total volume of waste expected to the site.	
Section 2.2	Turn lane storage lengths were based on MTO's warrant graphs for unsignalized left turn storage lanes on two lane highways. As additional storage length of 15m was added to the graph value (denoted as +S in the left turn design warrant calculations in Appendix E of *Discussion Paper #7*) to account for the significant percentage of left turning trucks (WB15 size) in accordance with Table E9-3 of the MTO Geometric Design Manual.	
Section 3.2	As mentioned in Section 3.2 of the *Discussion Paper #7* and our response here to Section 1.2, the vast majority (95%) of the truck trips are expected to follow the primary haul route on County Road 79 to/from north of the site given the future volumes. For non-truck traffic generated by the landfill, it was assumed that the future trip distribution pattern would resemble the existing observed patterns and this is indicated in Figures 3 and 4 of *Discussion Paper #7* for the site traffic assignment.	

WM Response to Lambton County(LEA Consulting) on Discussion Paper 7, October 2004

Agency Comment	WM Response	Link to Terms of Reference
	Regarding County Road 39 (Confederation Line), we will note that this is a local road west of County Road 79 and this section is not under the County's jurisdiction. However, east of County Road 79, we understand that County Road 39 is under the County's jurisdiction. Reference to County Road 39 will include the name "Confederation Line" in our future documents.	
Section 3.3	We will revise Section 3.3 to read: "Although the transportation impact assessment focuses on the haul routes themselves, the impacts 'In the Community' are quantified in the analysis of the haul route impacts. Therefore, the 'In the Community' study area is discussed in subsequent sections of this report but is deemed to be included in the 'Along the Haul Route' section of this analysis and not studied as a separate component herein."	
Section 4.2	Data on agricultural vehicles and school buses in the study area were obtained and documented in detail in Section 4.1.2.3 of *Discussion Paper #5 – Baseline Conditions.* Details of these minor volumes and observed frequencies were not deemed necessary in *Discussion Paper #7.*	
Section 4.4	It is agreed that, with an increase in the number of heavy trucks, the rate of pavement deterioration will increase. Appropriate pavement structure should be constructed to accommodate the high percentage of landfill-related heavy vehicles. As mentioned in Section 7.2.4 of *Discussion Paper #7*, a detailed geotechnical study is recommended to investigate the pavement deficiencies/needs so that proper mitigation measures (resurfacing, reconstruction) can be carried out. It is suggested that this study can be carried out as a condition of the EPA approval.	
Section 4.6	For the Highway 402/County Road 79 interchange, it was indicated that the current sight lines on County Road 79 are less than desirable for stopping sight distance based on generally accepted MTO and County criteria. In order to address the pre-existing condition on this section of County Road 79, it was recommended that the current posted speed limit of 90 km/h be reduced to 60 km/h so that the available reaction time of drivers can be increased and the required stopping distances reduced. This would allow a greater degree and better margin of safety. However, based on various comments received from the public and the representative agencies, a review of other mitigation measures at the subject interchange was conducted. As a result, the following three (3) alternative improvements were also recommended and are illustrated in the attached functional concept plans shown herein as **Appendix C**.	
	1. **"Lift" the County Road 79/Ramp Intersection Approaches to Provide Adequate Sight Lines** - This improvement would allow County Road 79 to be maintained at the current posted speed limit or at a lower posted speed limit depending on MTO and/or the County's decision. It provides for adequate safe stopping sight distance for a 110 km/h design speed on County Road 79. The works would involve "flatting" the curves at the intersection approaches and "lift" the roadway by about 1.9m on the north side critical point and about 2.5m on the south side critical point. Consequently, the Highway 402 ramp and loop approaches to/from the intersections would need to be "lifted" as well. The bridge structure itself would not require any modifications. At the same time, it is recommended that the future southbound left turn (SBLT) lane, for southbound County Road 79 to westbound Highway 402 movements, be implemented in order to minimize any future re-construction. 2. **Northbound County Road 79 to Eastbound Highway 402 Right-Turn Ramp** - This direct connection between northbound County Road 79 and eastbound Highway 402 would serve to eliminate the northbound left turn movement currently required to access the interchange loop. It would relieve a potential point of conflict at the south intersection to the interchange. However, the proposed ramp may require a small amount of property at the southeast quadrant. Any land implications should be confirmed at a more detailed design stage depending on MTO/s requirements and acceptance in principle of the proposed ramp.	

WM Response to Lambton County(LEA Consulting) on Discussion Paper 7, October 2004

<table>
<tr><th>Agency Comment</th><th>WM Response</th><th>Link to Terms of Reference</th></tr>
<tr><td></td><td>
3. Signalization of the County Road 79/Highway 402 Westbound Off-Ramp (North) Intersection - Although this intersection will not meet the volume warrants for a signal, the implementation of a signal may reduce the number of conflicting movements and, in conjunction with sight line improvements, will further enhance the overall operation for auto and truck turning manoeuvres. It is recommended that the westbound ramp approach to County Road 79 be widened at the same time to accommodate a separate right turn lane consisting of at least 70m storage and 30m taper so that drivers making a right turn are not delayed significantly by stopped left turning vehicles. The left turn lane should be actuated so that the north-south signal green time is interrupted only when the presence of a vehicle on the westbound left-turn lane is detected.

In consideration of the improvements to the interchange, we believe that the above measures adequately address the safety concerns and provide a good level of service for the interchange traffic operations. With the additional northbound to eastbound ramp, it will be consistent in functionality as other similar interchanges in the area including the County Road 21/Highway 402 interchange.
</td><td></td></tr>
<tr><td>Section 5.2</td><td>
<u>Staff</u>
It is anticipated that the expanded landfill will have the following staff levels:
• Regular WM site staff: 22 to 32
• Summer Cell Construction staff: 15 to 25

The 15 to 25 Cell Construction staff will likely be on the site from 6:30 a.m. to 7:30 p.m. with some auto trip activity throughout the day and their trip activity has been reflected in the site traffic projections contained in Appendix B of Discussion Paper #7. For the regular 22 to 32 WM staff, the following estimates of staff activity are projected:

<table>
<tr><th>Staff Type</th><th>Approx.</th><th>Est. Arrival-Departure Times</th><th>Within Adjacent</th><th>Est. Auto Trips</th></tr>
<tr><td>Landfill Manager</td><td>1</td><td>8:00 am – 5:00 pm</td><td>yes</td><td>1</td></tr>
<tr><td>Scale Attendants</td><td>2</td><td>1@ 6:30 am-2:30 pm and</td><td>no</td><td>0</td></tr>
<tr><td>Secretaries/Admin</td><td>3</td><td>8:00 am – 5:00 pm</td><td>yes</td><td>3</td></tr>
<tr><td>Landfill Foreman</td><td>1</td><td>6:30 am - 6:00 pm</td><td>no</td><td>0</td></tr>
<tr><td>Tipping Inspectors</td><td>2</td><td>1@ 6:30 am - 2:30 pm and</td><td>no</td><td>0</td></tr>
<tr><td>Labourers</td><td>2-4</td><td>6:45 am - 4:00 pm</td><td>no</td><td>0</td></tr>
<tr><td>QA Inspector</td><td>1</td><td>8:00 am - 5:00 pm</td><td>yes</td><td>1</td></tr>
<tr><td>Leachate Plant Op.</td><td>1</td><td>8:00 am - 5:00 pm</td><td>yes</td><td>1</td></tr>
<tr><td>Lab Analyst</td><td>1</td><td>8:00 am - 5:00 pm</td><td>yes</td><td>1</td></tr>
<tr><td>Compactor Operators</td><td>3-6</td><td>1st shift @ 6:30 am-2:30 pm</td><td>no</td><td>0</td></tr>
</table>
</td><td></td></tr>
</table>

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		2nd shift @ 11:00 am-7:00 pm		
Truck Operators	2-4	10:00 am-6:00 pm	no	0
Excavators	1-2	10:00 am-6:00 pm	no	0
Mechanic	1	6:30 am-2:30 pm	no	0
Dozer Operators	2-4	1st shift @ 6:30 am-2:30 pm 2nd shift @ 11:00 am-7:00 pm	no	0
TOTAL	**23-32**			**7**

Generally, there is potential for up to 7 WM site staff to arrive/depart during the adjacent street peak hours of approximately 7:45-8:45 a.m. and 4:15-5:15 p.m. All other staff arrive/depart during the off-peak hours. Given the minor amount of staff and their trips within the peak hours, they were considered negligible relative to the other site generated trips.

Truck Volumes

Only some of the truck peak hour volumes were derived by dividing the daily truck volumes evenly throughout the day. This even distribution was applied to vehicles such as the gravel trucks for cell construction which would be fairly evenly distributed throughout the day. However, as mentioned in Section 5.2 and indicated in the spreadsheet calculation sheets contained in Appendix B of *Discussion Paper #7*, peaking factors were also applied to obtain the A.M. and P.M. peak hour truck volumes.

Besides adopting the worst case peak seasonal volumes, the following adjustments were made:

- For the A.M. peak hour, a peaking factor of 1.56 (i.e., 56% higher than an even hourly distribution) was applied to the transfer trailer arrival patterns based on loading characteristics at transfer stations.
- For the P.M. peak hour, a peaking factor of 1.59 (i.e., 59% more than an average hour) obtained from hourly surveys of WM's Warwick and Richmond sites were applied to the transfer trailers and other key vehicle types including trucks for special waste and new diversion activity.

Applying the peaking factors would account for some of the "clustering" anticipated. In addition, a peak hour factor (PHF) of 0.90 was applied in the Highway Capacity Manual (HCM) method analysis of all the future intersection operations and this addresses some of the peaking within the peak hour. Therefore, based on adopting the seasonal peak site volumes, applying peaking factors for key truck activity, and applying a PHF in the analysis, we believe that the assessment does address the potential for "clustering" and the worst case traffic scenario.

Future Traffic Projections

The relevant Table 2.2 from *Discussion Paper #6* has been appended herein as **Appendix D**. A copy of other tables and appendices from Discussion Paper #6 will be provided to Lea Consulting.

In terms of a trip table, the peak site traffic generation for the proposed landfill expansion broken down into trucks versus autos by daily, A.M., P.M., and Saturday peak hours in both the inbound and outbound directions is shown on Figures 3 and 4 of *Discussion Paper #7*. This has also been appended herein as part of Appendix D for reference. In addition, we have re-summarized the estimated site trip activity in terms of vehicles and two-way trips in a new table contained herein Appendix D.

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Section 6.3	Our turn lane design elements were based on the recommended reduced posted speed limit of 60 km/h (and a design speed of 80 km/h). It is recognized that these design parameters may change depending on the reviewing agencies requirements in light of the alternative improvements mentioned in addressing Section 4.6 above. Should a speed limit different than our recommendation be adopted by the authorities then we will make changes to the design elements documented in *Discussion Paper 7* to reflect the new design speed. It should be noted that the proposed County Road 79 access will be located at approximately 300m (centreline to centreline) south of the Zion Line and this distance is considered adequate to accommodate the design elements for a left turn lane up to a design speed of 100 km/h. Given that there may be a northbound left turn lane for future background traffic at the Zion Line northbound approach, the 300m should accommodate a back-to-back left turn lane or be designed as a third (centre) lane for left turns only. It is suggested that an appropriate design for the turning lanes should be considered as a condition of approval for the E.A. We agree to summarize the lane storage requirements to include the storage (S), parallel (P), and taper (T). It is noted that the parallel and taper are standard lengths for a given design speed and this redundant information was detailed in the Appendix E of *Discussion Paper #7*. We will also clarify in the report that the actual available storage length will include the parallel length (e.g., 50m) in addition to the calculated storage (S).	
Section 7.2	See response to comments for Section 1.2 A small amount (5%) of the trucks was conservatively assumed to be distributed via Confederation Line (County Road 39) west of Watford for servicing surrounding areas, however, no assumptions were made with respect to the Petrolia landfill site closure. In case the Petrolia landfill site is closed in the future then it is likely that most of the trucks to/from the west and south will use Highway 402 west of the subject site. A minor proportion of trucks may use the existing highways including County Roads 21, 22, 26, and 40 to access Highway 402 from the south and west, however, it is anticipated that the truck volumes on these County Roads would be less than 5% of the site generated traffic. If the proportion of trucks on these roads is greater than this amount then WM will reconsider their routing options.	
Section 7.2.2	See response to comments for Section 6.3	
Section 7.2.3	See response to comments for Section 6.3	
Section 7.2.4	A detailed geotechnical study has been recommended to be carried out prior to the initial operating year and this would be dealt with in terms of a condition for the EPA approval. The study would indicate the deficiencies/needs of the road pavement. Following the geotechnical study, the agencies should agree on a funding mechanism for the improvements and future maintenance. We have also suggested that the County should continue to closely monitor all the roads along the primary haul route in order to quickly respond to physical road deficiencies/needs as they arise.	
Section 7.2.5	The historic collision data did not reveal any significant underlying safety issues or concerns with respect to waste haulage. As indicated in *Discussion Paper #7*, "this is not to say that collisions may not occur; rather, given the very few collisions in the area over the past few years, there does not appear to be any precipitating factors that might lead to increased collision rates…" It is acknowledged that there will be a large increase in truck turning movements, however, the recommended improvements including the turning lanes and posted speed limited reduction could enhance the safety and intersection operations along the primary haul route. In addition, the new improvement as indicated in our response to Section 4.6 should further eliminate some of the conflicting turning movements at the County Road 79/Highway 402 interchange intersections and provide a safer design for future	

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	background and landfill site traffic.	
Section 7.3.2	See response to comments for Section 6.3	
Section 7.3.3	See response to comments for Section 6.3	
Section 7.4	See response to comments for Section 6.3	
Section 8.0	The summary will be modified in accordance with changes arising from the preceding. For the County Road 79 access scenario, we will recommend a northbound acceleration lane on County Road 79 upon exiting the site.	
2. General Comments	Trip tables were included in Figures 3 and 4 of Discussion Paper #7 showing the required information. We have re-summarized the site trip generation information and it is shown in a new table contained herein as Appendix D.	
2. E)	For the purposes of our assessment, the length of a CMV was assumed to be 15m. Typical dimensions (L x W x H) and vehicle types to be used for the landfill expansion include: 1. Walking floor - transfer trailers/new diversion activities: 69 ft x 8.5 ft x 13 ft (length = 21.0m) 2. Roll-off trucks for local service: 38 ft x 8.5 ft x 10 ft (length = 11.6.0m) 3. Front-end loaders for residential packers: 32 ft x 8.5 ft x 13.5 ft (length = 9.8m) 4. Dump trailers for gravel/special waste: 64 ft x 8.5 ft x 11 ft (length = 19.5m)	
3. A)	Alternative improvements to the County Road 79/Highway 402 interchange are discussed as per our response to Section 4.6. In addition to these physical improvements, a reduction in the posted speed limit is recommended for agency consideration.	
	Queue stacking space at the new entrance scales is anticipated to accommodate approximately 24-30 trucks (all in 3 queuing lanes). This is considered adequate to eliminate potential spillback on County Road 79. The use of the Zion Line access for inbound only and the County Road 79 access for outbound only may reduce the potential for queue spillback on County Road 79, but it introduces another conflicting movement between trucks making the southbound left turn and trucks heading northbound through the County Road 79/Zion Line intersection. We do not believe that the operational benefits of splitting the inbound and outbound movements to two access points would provide any significant improvements to background traffic, and would be more onerous on the operations of the County Road 79/Zion Line intersection. In addition, area residents have indicated in various public forums that they would prefer the elimination of heavy truck traffic on Zion Line. Based on these considerations and the available entrance stacking space, the use of the County Road 79 access for inbound and outbound truck movements is still recommended.	
	It should be noted that the number of trucks will be increasing but we are not aware of the basis for the "tenfold" increase suggested by Lea Consulting. From the baseline conditions, we observed that the average total daily truck loads of waste was about 92, and this is anticipated to increase to an average of about 156 truck loads. Although the volume of waste will increase significantly upon expansion of the landfill, the truck loads will not proportionally increase due to the fact that a greater number of heavy trucks (the type with 4 or more axles) will be used. It is emphasized that the peak hour site generated truck traffic used in the analysis represents the "worst case" peak seasonal traffic scenario and caution should be applied in comparing it with relatively lower typical baseline (current) observed volumes. Considering the future total traffic volumes on County Road 79, the roadway capacity with 1 lane in each direction is adequate to accommodate the trucks and autos. The need for paved shoulders have been addressed by other disciplines and it was	

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	recommended that paved shoulders be implemented on the primary haul route to reduce dust and facilitate slow moving agricultural vehicles from Highway 402 to the site access. We will include this recommendation in our report.	
	As mentioned in our response to Section 5.2, peaking factors were applied to the transfer trailer arrival patterns and other heavy trucks based on loading characteristics and observed hourly frequencies at the WM Warwick and Richmond sites. The truck arrivals were not simply based on a "uniform hourly distribution". Considering the queue stacking space available and the peak site activity, we do not believe that a sensitivity analysis is required. Also, with WM's operational experience at various sites, it is anticipated that truck arrivals can be managed or staggered as necessary, if queuing does become a problem in the future.	
	Besides the turning lane requirements, we had also suggested and recommended other mitigation measures documented in *Discussion Paper #7*, including: - illumination of the access and intersections along the primary haul route; - a mud removal lay-by facility to minimize outbound trucks tracking mud onto County Road 79; - additional on-site queue stacking space at the entrance as needed; - reduction of the posted speed limited on County Road 79 south of Highway 402 to the Village of Watford; and - continued monitoring of pavement conditions on County Road 79 and Zion Line, and respond as necessary. In addition, other recommended improvements will be included as follows: - "lifting" of the Highway 402/County Road 79 intersections to achieve the appropriate sight lines; - a northbound to eastbound directional ramp from County Road 79 to Highway 402; - a traffic signal at the north ramp intersection to the Highway 402/County Road 79 interchange along with separate southbound left turn and westbound right turn lanes; - paved shoulders on County Road 79 along the primary haul route from Highway 402 to the site access; and - a northbound acceleration lane for vehicles exiting from the County Road 79 access.	
	Counts and observations of hourly and daily operations at the WM Warwick and Richmond sites were obtained over several days and this information was applied in the analysis. As such, gathering the detailed data suggested would not further enhance the analysis.	

Public Comments

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Open House December 8, 2004	**WM Response**	**Link to Terms of Reference**
There were no comment sheets received.		
The residents attending the open house spoke with WM officials and the consultants that were present. The concerns expressed were as follows:		
Property value protection;	A framework for the property value protection plan is outlined in draft DP9.	
Increased noise due to the landfill operations; back-up beepers	The operations of the proposed facility, including mitigation measures to deal with increased noise levels, is outlined in draft DP8.	
Increased traffic; the number of trucks; condition of the roads	The operations of the proposed facility, including mitigation measures to deal with increased traffic, is outlined in draft DP7 and DP8.	
Protection of the agricultural land surrounding the landfill	The assessment of the effects on surrounding agriculturals lands is outlined in draft DP7.	
View of the landfill from the Village of Watford	The visual impact of the proposed facility is outlined in draft DP7.	
Air quality; the dust from landfill operations; increased odour	The effect of the proposed facility on local air quality is outlined in draft DP7.	
Economic effect on the town; lack of interest in purchasing property at the Industrial Park because of proximity to landfill;	The potential economic effect of the proposed facility is outlined in draft DP7.	
Effect on the real estate of residential homes surrounding the landfill;	The potential economic effect of the proposed facility is outlined in draft DP7.	
Leachate treatment; trucking leachate or treating it on-site;	The assessment of the various leachate treatment alternatives is outlined in draft DP7.	
Health concerns with living close to the landfill;	The assessment of health risk relating to the proposed facility is outlined in draft DP7.	
Height of the berm surrounding the landfill, proximity of the berm to the road; vegetation on the berm	The visual impact of the proposed facility is outlined in draft DP7.	
Increased seagull population; increase in other rodents (i.e. rats, skunks)	The assessment of effects due to vectors is outilned in draft DP7.	

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Discussion Paper #7		
Air Quality - The amount of dust that makes its way to my home 750 m away (although not in the 1 km according to you) is worse than when I lived on a gravel road. I have asked CW to water down their roads but to no avail. With the expansion I see it getting worse.	We have been informed that no complaints or requests for watering have been received at the Warwick landfill site from current operations regarding dust at your property on Confederation Line. WM currently has a dust mitigation plan in place, which requires watering of on-site roads in dry conditions and sweeping in wet conditions to prevent mud tracking. If you are currently experiencing dust problems, please provide a formal complaint to Reid Cleland. It is expected that you will receive some additional dust impact as a result of the expansion. You will not be in an area that is expected to exceed dust guideline values.	
Noise - I have on numerous occasions been awakened in the AM by beeping back-up signals. Yet IER tells me I'm not affected because I'm outside the 1 km zone. The noise is multiplied when heavy wind is from the north. PS I'm a heavy sleeper yet it wakes me up. What am I to expect when the full expansion is underway?	The noise impact from backup beepers will be reduced when the expansion is underway. First of all, backup beepers are safety devices that are mandatory in a workplace such as a landfill and this is required by the Ministry of Labour. Sleep disturbance may occur at noise levels ranging from 40 to 50 dBA for various individuals. Some people are more sensitive to certain sounds than others; hence, what may be audible or annoy or awaken one person may not affect another. It is not surprising that under certain atmospheric conditions sleep disturbance may exist for some individuals in the present site specific case. In the proposed expansion, there are several factors that will improve the situation over what currently exists. The net result being lower noise impact levels from beeper operation. First of all expansion will proceed northward, farther away from Confederation Line. Therefore, increased distance will help in reducing noise. Second, a light to medium duty back up beeper will be employed and these units are quieter than the current units. Third, the units will be mounted lower on the vehicles. This will help maximize the noise reduction benefits provided by any berm shielding as the potential for blocking sight lines is greatly improved in comparison to the current situation. Fourth, a higher perimeter berm and higher working berms than what currently exists is also proposed. In this case, the line of sight from the equipment to the receptor will be broken resulting in more effective noise reduction. The net result is that noise impacts from beeper operation (at Confederation Line) should be lower than current levels and will sound less than half as loud as what	

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	currently exists. This places the noise impacts typically below the range of where sleep disturbance is expected to occur for the majority of individuals. Therefore, with the implementation of the above controls, the potential for sleep disturbance once the full expansion is underway should be decreased over what presently exists.	
Additional Comments - Again I would like to know why I am not included in the 1 km study. My lawyer and I would like an in-depth answer to this. My property butts onto CW and the leachate plant is about 800-750 m away.	The 1 km boundary is drawn from the perimeter of the area to be landfilled if the expansion is approved. The 0 to 1 km study area does not define the extent of impacts, nor the eligibility for compensation. Monitoring of impacts will be undertaken to determine if impacts are occurring as predicted. If monitoring shows that impacts occur beyond the area predicted, WM will address this situation.	
Discussion Paper # 8		
Proposed Leachate Treatment System - Are you proposing to use the Watford Lagoons?	No.	
Natural Environment		
You talked about a preferred method to treat leachate. Under what circumstance would an alternative method be used instead of a preferred method?	Alternative methods are contingencies. We hope we do not have to use them. If poplars are not fully grown after pre-treatment, then the leachate will be taken to the treatment plant in London or Sarnia for treatment. There is quite a bit of land on top of the landfill that could be used for poplars.	
Are you still planning to use Watford lagoon?	No.	
You suggest 350 tonnes of garbage and carve up hectares of land and you guarantee that there will be no environmental problem and loss of habitat?	In terms of landscape, there is not a lot of natural habitat now within the footprint of the landfill, only a small proportion at the south end.	
Where do sea gulls go at night? There will be gulls attracted to the landfill anywhere they have access to food.	The gulls that feed at the landfill won't stay after dark because the waste will be covered every day. Also, gulls are not comfortable roosting on land overnight and they will go back to Lake St. Clair to roost in the evenings.	
We have a lagoon; don't you think that they will rest there knowing that there is food there?	This is my specialty. Gulls do not establish night roosts on small bodies of water because they do not feel secure enough from potential predators.	
You don't foresee a problem with rats?	A contingency for this can be built in to the landfill operation. There are basic measures related to standard landfill operations (i.e., good housekeeping practices) to control or reduce attraction to the site by gulls and rats.	
There is a potential problem with Canada Geese, raccoons, and turkey vultures.	We don't anticipate that Canada Geese will be a problem, as they need turf grass to feed on. You would probably find more on a golf course. We don't anticipate turkey vultures to be a problem because the population is not growing in southern Ontario and they are not a pest species. In regard to raccoons, the landfill will not create a population explosion.	

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Air Quality		
What is the odour management plan?	It will be developed in conjunction with WM.	
What is the plan to deal with odour or what process has been developed?	*There is a plan in place and it will be in DP#9. A landfill gas management plan is proposed [a pipe system will be put in place that will allow odour to be controlled by being pumped more or less hard].*	
DP#7 says that odour impact will be experienced by some residents. I'm not sure you can compensate me or the community for that. Sometimes odour is brought to us. In this case, we don't want it brought to us.	The odour will only be detected from time to time. Barely detectable odour will be experienced.	
Detectable is key. "Time to time" can be five hours of odour in a day. What about if you have a wedding outside? This continues to be a concern for the community.	I understand your concern and there will be a slight odour. Other odours emitted in the community already will affect you more frequently.	
This is new odour and I'm not sure we want new odour.		
You talked about relocating waste; have you looked at the impact of doing this?	WM will not be relocating waste.	
There is a new process dealing with composting. In earlier years, there will be composting on the landfill. The most major odour is given off by composting, especially when it is turned over. What are the odour mitigation measures for composting?	The smell depends on the type of material in the compost. The odour also depends on the degree to which it is managed properly. Large scale composting is relatively new. Odour that is experienced can also relate to too much material being composted. This can be avoided through new technology and mitigation measures. If it's done right, it would smell like mild tobacco pipe, unless it's gone bad, but it would not be an unpleasant smell. If it is done properly, there will be low odour from composting.	
There are a lot of ifs. Do we know what type of compost is coming in and has a procedure been established for mitigation?		
What is the potential on humans when you get a mixture of gas and dust? What produces vinyl chloride?	Vegetation. It does occur naturally.	
You mentioned composting; I visited Orillia landfill and they have three significant composting areas and it was well managed. They had made composting in Orillia into a business. When I talked to the people about the composting, the public seemed happy with it. Are you familiar with that site?	No. You usually hear of failures. In the last ten years, a lot of technology has been developed to help with composting. Technology is getting better and knowledge is getting better. In Toronto, the composting facility was within the city limits. The facility has to operate within guidelines. There is odour from time to time. We can build in odour mitigation to control odour. The key is that the PLC continue to function. This won't	

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	be a static condition.	
You set guidelines according to the Province; you say that you are meeting provincial standards. What happens when they get stricter	WM will have to develop steps or a strategy to reduce odour and to meet the new standard. There are things that can be done to mitigate and reduce odour. If the Province changes the standard, WM/the facility will have to take steps to meet the new standards.	
Air Health Risk		
The combination of the gases/chemicals has an impact, the effects of a complex mixture. Which gas combination is the most problematic or causes the most problems?	Vinyl chloride. Also chlorinated VOC, which would have been assessed individually and in combination. Specific combinations of chemicals are usually seen.	
Do you find the same with particulate matter and dust?	We need to ask – what makes up that particle (i.e., combustion particle is of more concern than non-combustion particle).	
Therefore as a resident, we should be concerned with these combinations of dust and gas?	No.	
DP#7 talks about magnified impact. It says that most people who have cardiac problems, who are elderly or who have bronchitis will experience magnified impact. Well, there are many of us with this [i.e., who fit into those categories], so it would be of concern to us would it not?	Those types of effects are not predicted for this facility.	
There are a number of major [waste disposal] sites in North America; have you taken a sample to see what actually occurs at other facilities?	Certainly. During examination, we considered what is occurring at other similar facilities.	
I don't believe that it can be that clean and green and not cause much impact or negative effect.	Data today indicates that there will be no impact	
We already have cancer.	This facility won't increase what is already going on in the community. Cancer is a concern. The risk assessment looked at the impact of the facility in the future and it was found that expansion of the facility will not increase cancer.	
What guidelines do you use? One in one million standard?	We use the one in one million, as that is the provincial guideline and is generally what is used in the international community. Other agencies use one in 100,000. The most stringent is the one in one million and the province has adopted that.	
For asthmatics, people will not be affected if they live near the landfill?	In our study, we considered young children with asthma as a benchmark for protection.	
Each presentation has been on each area. Have you	Peter Homenuck (PH), facilitator - This is addressed in the social presentation. DP#7	

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considered how they will compound together? On their own it sounds great. What is the impact on the residents when it is compounded?	has a number of criteria to assess net effects, which combines impacts from cumulative impacts.	
Over half of the village of Watford is affected by the landfill. We are subjected to undue mental unrest. This should be considered. You can't say it doesn't impact us. Odour is part of well-being and it affects mental well-being.		
You presented different health risks such as cancer risks, but did you consider other health risks?	Yes, but it is not easy to present the statistics. We do look at it in a numerical way and it is in the report. In terms of looking at non-cancer risks, we look at the threshold, for example, above or below a point. We can't say zero with cancer risks, but we can say the risk is below a certain line.	
What happens if you detect elevated vinyl chloride levels, how do you deal with that?	If it is predicted before the facility is built, then the facility would not be approved to be built without modifications. If it is detected after the facility has been built then it would have to be mitigated to bring it down to acceptable levels. With other facilities we've seen a factor of forty below what we have predicted for chemicals. It is important to note that a short blip would not cause long-term health effects. For cancer, there needs to be long-term exposure.	
Noise		
What about construction, which takes place over many years, is that not considered? What about the long-term effects of trucking?	The impacts are outlined in DP#7. The duration of construction will be one to two months. Noise will be elevated during that period. There is municipal exemption granted for construction and it is limited to a certain number of hours per day.	
What does R3 mean? Our house is in the northeast and I can hear trucks backing up and grinding and crunching. Does it mean it's going to get louder?	R3 defines a point of reception, typically a home near the landfill and in this case a home located to the northeast of the site. It will be quieter because of the berms and due to the direction of the expansion and location of the entrance (i.e., it will be on the other side). As the landfill expansion progresses to the north and east, the noise range will be 45–55dBA, which is comparable to what you are hearing now. The proposed berms will be more effective than what currently exists.	
I'm concerned. How much louder will it be than now?	It will be about 3 – 4 dB higher than the current background noise for landfill operations that will be closest to your home (will occur in later years of the landfill expansion). Changes of 3 dB or less are generally not significant and barely detectable. A change of 4 dB is noticeable but it will be much less than twice as loud. You will probably feel very little difference.	

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Maintenance programs for trucks are not something that WM can control because they don't own the trucks. Can that be a recommended mitigation?	We could enforce non-use of Jake brakes. The municipality could pass a by law to prevent or prohibit the use of Jake brakes.	
It is difficult to believe any of the topics because everything is slanted favourably to the landfill and the expansion. You made a point that three tonnes of leachate will be trucked off site, but that this would be of small concern when you consider trucks during expansion. You are banking on dulling the senses of the community, for example, if you live next to a railroad you get used to constant noise. I think in the long haul, you are banking on dulling senses.	It is correct that leachate trucking is small in comparison to overall landfill traffic. As part of the development of the worst case, leachate trucking was considered and included as part of the worst case scenario. Truck traffic noise will be in the noticeable impact range and has been documented as such. It is not about dulling of senses. We have amongst the strictest requirements in the Country in this Province and we recognize the impacts that will exist with proposed haul routes.	
What is the height of the berm?	The height is 6-7 meters, which attains the maximum acoustic benefit. Above that height, there will not be much change – law of diminishing returns.	
How much more effective are concrete barriers as opposed to soil (i.e., berms)?	Barriers that are closer to the source are more effective. Whether the material is concrete or earth, it doesn't make much of a difference. Per square foot, there is not much of a difference between concrete and earth berms as both satisfy the weight requirements defined by MOE. Soil berms typically absorb sound better and berms provide the most effective shield against noise. Concrete berms can bounce sound back. These options were reviewed and discussed.	
If you put vegetation on berms, would that make it more effective?	Vegetation would have to be very thick and deep for it to be effective. Vegetation on a berm has little to no acoustic benefit but there are aesthetic benefits and on this basis, it would be marginally better.	
Agriculture		
Studies show that there will be an impact with everything. We know that we have problems, but we say that they are not that bad now, so we'll go ahead anyway. Then in the future, we'll have a monstrous problem on our hands. Is this something that has been thought of?	The traffic volume in year 26 should be the same as traffic volume generated in year one and that is what we have addressed. Further, due to growth in the community, the local traffic in year 26 will be greater than today; hence, the incremental noise impact attributable to landfill truck traffic will actually decrease as time progresses.	
The document says that there will be 150 trucks in 110 hours. Will there be a problem crossing Nauvoo Road?	There might be some small delay, but that is already a high traffic road.	
Will there be traffic lights put there some day?	The Town doesn't want traffic lights at that intersection.	

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In the summer there is substantial tourist traffic. Watford will suffer [due to truck traffic]. I'm hearing that you are going to do things, but I'm not hearing how.	Mitigation details are outlined in DP8.	
I'm concerned about leachate into Bear Creek and the capacity of Watford to take water. Wouldn't it be better to take the leachate some place else?	In the long term, the leachate will be treated on-site and poplar trees will be planted. The second plan is to truck the leachate to a different site, such as, London.	
Within the 3 km study area, we have farm crops you didn't mention and we have 'pick your own' farms, which you indicated we didn't have.	We did identify one 'pick your own', but it is at a distance where there wouldn't be an impact on the produce.	
In the report it says that there will be no impact with the proposed haul route, but then in your presentation you said that there 'might' be an impact.	There will be low, but manageable impact. There will be no long-term, chronic impact that will affect agriculture in the area.	
We should look at a synthetic layer to mitigate leachate.		
What about dust?	Dust will be the native type and not unlike what you get now. The dustfall will not be enough for negative impacts to occur.	
I'm concerned about leachate leaking through liners.	The liner is permeable and will hold up any leakages that occur. For secondary leachate, there is another layer under the first layer that will protect the soil.	
There's potential for leakage to occur if you have 150 tonnes of garbage sitting there. Also, that's prime agricultural land.	The soil is class 4-5. Both agriculture and WM are looking for the same type of land/soil, so there is some conflict.	
Isn't it better to use land with class 1-3?	Yes.	
If you had a farm, which side would you be sitting on today?	I would feel comfortable because of the mitigation plans in place. I know these people [i.e., WM consultants] and I know that they are professional.	
Rather than mitigation, would you change the design? I'm not sure we feel comfortable with it so close to the town and people.	There will be surface and air quality monitoring in place. The design is such that there will be a low to manageable impact scenario.	
I'm concerned about the traffic and its flow. Traffic just goes flying by. What will the interaction [of WM trucks] be with other traffic, such as school buses and other businesses?	Traffic will increase by 15%, but it is already a busy route. There is not a lot of direct farm field or facility access along County Road 79 to the landfill from Highway 402. There will be more agricultural traffic on Zion Line. The north-south access [County Road 79] is not heavily populated with farm facilities generating farm machinery movements.	
Economics		
You're assuming a lot. I don't see any meat to back up	Jobs will be created and the host fee will offset any stigma. There is a need for	

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your finding. We do have an industrial park. One of the biggest hurdles in marketing that park has been the landfill.	community relations to provide more certainty and understanding.	
What value you do you put on stigma?	Where there is good communication there is minimal stigma.	
If I listened to all the speeches I would think that I was living in a utopia.		
Businesses in the industrial park are having trouble attracting business, yet you are saying that there will be an increase in business. What businesses are you looking at?	Businesses associated with the landfill. Expansion of the landfill will lead to an increase in employment.	
How many people will be employed?	About 25-30 at the landfill and 100 in the community.	
What about power generation? Is that in the design?	That's a separate application. Hypothetically, at this point, WM is committed to taking advantage of landfill gas produced. For example, in Quebec, the WM landfill powers a paper mill. Some people here were able to see how we are performing in conjunction with power. We have the intent and we have demonstrated our commitment. It is not part of this assessment, but WM has intent and has shown it at other locations.	
This is a very unique situation. In terms of future businesses, the issue is what won't we be able to attract [due to the landfill expansion]. In terms of taxation, currently the tax paid by WM is not $20,000, it's $9,000 and the Town receives 25%.	The figures will be revised.	
How is the landfill assessed [i.e., in terms of tax]? Because a very small amount is paid in taxes compared to WM's income.	Hypothetically, WM pays one dollar per tonne of waste.	
What is WM paying in other host communities?	$1.62 in some communities.	
I would prefer $20 per tonne.	We have to look at the impact with the expansion and assess and consult with the community. This has not been done yet, but it will be done.	
I don't understand how the landfill will create jobs because it doesn't now and even if it does it won't be the community that is employed.	A 1:1 multiplier model was used.	
In which community?	Sarnia and Lambton.	
Most of the tax revenue goes to the Province and very little stays in the community.	A substantial amount [of the tax revenue] stays in the municipality.	
Highway 402 is a solid industrial, commercial and residential area. The landfill will make people stay away	There will be several benefits to the community, such as decreased taxes, employment opportunities and it will attract people to the community.	

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from the Highway 402 corridor near and around Warwick.		
Because the landfill is there, it will make people stay away from Warwick.	If there is a stigma, it can be offset by increased opportunities and community facilities that the landfill will bring. Facilities will be available in the community that would not have otherwise been there if it were not for the landfill.	
Social		
During the group and individual interviews, were there any negative concerns?	Yes.	
Basically, there was a negative point of view. We don't appear to be a welcoming community [in regard to the landfill].	Some people expressed opposition, while others saw two sides to the issue.	
Did anyone say they were in favour of having the expansion here?	No.	
Who prepared the questionnaire?	IER did.	
You didn't use experts?	We've been experts in this field and preparing questionnaires for social impact assessments for over 25 years.	
In DP#7 in the Social Impact Assessment, it says that the adverse health effects will be negligible. There will be more people susceptible to health problems; therefore there will be social impacts. In D#7 it says that there will be dust and odour exceedances. I would hate to go to a funeral and smell garbage. The garbage will continue to affect the community and we have to stand up and say 'get out of town'. You think you're 100% right and everyone else is wrong.	No one is saying there are no impacts.	
There are impacts, but you're saying that they can be mitigated. We have to live here; you can drive out of town. People interviewed said that they did not want a landfill. No one said that they wanted this with open arms.	That is correct.	
GENERAL QUESTIONS (Questions asked during the breaks) Q. The bulk of the 1 km study area is WM property. What percentage is WM property in the 1 km study area? Our property will be 750 m from the leachate plant. I feel		

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we should be included in the 1 km study area.		

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Hydrogeology		
[Referring to the presentation slide showing both the existing and proposed expansion landfills] Why is the landfill bottom on the expansion not flat on the slide?	The leachate collection system will drain naturally by gravity. To create the gravity drainage, we need to have a slope.	
What is happening now at the landfill regarding slope and leachate collection?	Older portions of the landfill have no leachate collection; they were retrofitted to collect leachate in trenches. The newer portions have a leachate collection system on a slope. The need now is to pull leachate out of the waste, reduce leachate levels and haul it off-site or apply it to poplar trees.	
Does your experience with other landfills include ones similar in size to the proposed expansion? The Warwick expansion is one of the biggest in Ontario.	The Essex-Windsor landfill is smaller, not as deep, nor as high. It covers 65 ha and is 11-12 m deep at its deepest point. For the hydraulic trap you need to have the landfill low, but not too low for the pressure.	
How deep will the expansion be?	On average, 15 to 16 m below the ground surface; some areas will be higher.	
The leachate collection design is to meet provincial standards. What assurance do we have that WM will collect the leachate?	WM is responsible for collecting the leachate. The Ministry of the Environment (MOE) monitors landfill sites and public groups are involved as well.	
Do you recommend that the site be kept as dry as possible for leachate collection?	Yes, to keep leachate levels to a minimum height above the base.	
Is leachate produced for 400 years?	The contaminating lifespan is for 400 years, based on chloride and the landfill design assumptions considered.	
You say that the purpose of recirculation is to reduce the contaminating lifespan. Do you expect the liner to fail? How do you know there would not be contamination before the end of the life of the liner?	The collection system is based on components in the regulations. There are lifespans for various components. Natural containment will extend beyond the life of the landfill. Recirculation will reduce the contaminating lifespan.	
There will be monitoring of leachate, groundwater and surface water. But you also discuss contingencies. This means that there is a potential for failure, and this is of concern to the community.	We will have an engineered system; it may not be 100%. Therefore, we need to build in a contingency. If a problem does occur, there needs to be a contingency that can be implemented. Contingencies need to be identified as part of the approval process.	
Why are contingencies not mentioned in your conclusion? There are mitigation and monitoring, but not contingencies.	This is not intentional; we are not trying to downplay this. But contingencies are included.	
Any small part of the liner may fail. Why is there no back-up layer for security?	Liners are to protect the environment. In Warwick there is also natural containment, better than an engineered system, of underlying till and a back-up clay layer.	
WM needs a back-up as security protection for the	We looked at options and determined that this would not provide additional benefit.	

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community.		
In our world there are liabilities and insurance. It would not be a bad idea to have an extra layer of insurance beyond the natural.		
[Referring to the presentation slide showing the cross-section of the two landfills] The top of the proposed expansion is cut off. How high is it?	It is 139 m high. [Showed the approximate height on the slide].	
If leachate is re-circulated to assist in faster decomposition, how will it work for the whole landfill?	There will be a series of layers where leachate is re-circulated through the dry waste.	
Will this be top to bottom?	It will be in layers.	
The leachate is being re-circulated; is it also being pre-treated?	The re-circulated leachate will not be treated. The treated leachate will be applied to the poplar trees.	
Are you putting cleaner leachate in?	No, more concentrated leachate is being re-circulated as, over time, the chemicals are being pulled out of the waste material.	
The concept is to not have leachate in groundwater. You said that the proposed treatment is to apply leachate to poplar trees and that this will not affect the quality of groundwater and surface water.	Pre-treated leachate will be of such quality that it will be taken up by the poplars or attenuated into the soils. There will be no impact to groundwater or surface water quality.	
The leachate will have some chemicals in it (above those in groundwater).	Some parameter loadings will be less than in groundwater.	
Are you assuming that poplars will take up every bit of leachate?	WM needs to ensure a sufficient amount of poplar trees. Leachate will need to be stored in rainy seasons or in winter to be applied when appropriate. The waste can store some leachate in winter until the growing season.	
Transportation		
Your findings show that daily truck traffic will increase from 92 to 156, but Discussion Paper #7 says that heavy transport will increase to 726; how do you explain the difference?	There will be 156 truckloads, which is the number of vehicles (short and long heavies) that will be taking waste as well as material for construction to and from the site. In regard to the discrepancy, I would have to re-look at the numbers. The current number we are using is an average of 156 truckloads. The number you mentioned may be the peak daily number of trips which includes vehicles other than waste trucks. I will have to confirm the numbers and I will follow up with you.	
We need to know the exact number of trucks. You should base your findings on the maximum number of trucks. You talk about hardly any accidents occurring, but in the past there haven't been as many trucks.	We have based our findings on peak hours of truck activity. We have taken the peak traffic time into consideration. I will take a look at the discrepancy in the numbers you mentioned, but I believe it is consistent with what is in Discussion Paper #7. (J. Armstrong) The following is a breakdown of traffic expected, which could partly	

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	explain the discrepancy in the numbers: 8 leachate trucks, 3 residential vehicles, 5 roll-off trucks, 50 small vehicles (related to WM), 72 transport vehicles, 21 new diversion vehicles, and 17 waste trucks; which gives a total of 156 vehicles.	
Why have the traffic numbers changed?	Those numbers that you are referring to in the report were based on peak conditions and they include peak spring conditions; therefore, the number may be triple that of normal hours. We have designed our analysis model to spring peak conditions. I will re-look at the number of trips generated from the landfill site and the total truck numbers during peak hours from the landfill site. We made our evaluations based on worst case conditions, but what is shown here with 156 truckloads is the average daily conditions. During seasonal peaks, waste truckloads could be as high as 308.	
You have to measure peak hours during the 12 hour opening during the day.	We have looked at morning and evening peak hours and traffic variations throughout the day. We looked at various factors for the peak hours and considered the worst case scenario.	
Can you tell us from where you are referring the figures and numbers?	From Discussion Paper #6 and Discussion Paper #8 Table 2.2.	
I like the idea of speed limits, but I don't know how you will enforce them. Will there be lights at the intersection? I'm concerned about going west on Zion Line and turning south. It would be rather unsafe if all that traffic is coming down and people are turning left.	The intersection is currently operating at level of service B, which is quite satisfactory if compared to most other roads. We have observed that intersection and we don't think that there will be significant delays, but we have recommended a left turn lane on north and south bound roads. The amount of traffic will continue to be low and does not meet signal warrants.	
In regard to traffic from the south going north and turning left at Zion Line (particularly if buses are turning left), I am concerned about the safety of the turn. Would you suggest putting traffic lights at that intersection?	We have looked at this situation and found sufficient space to make the turns. We recommend reducing the speed limit, which we believe is sufficient and will provide more safety. In regards to a signal, we do not think that the situation is critical enough and it doesn't meet the criteria to warrant a signal at this point.	
In regard to Hwy 402 turning onto County Road 79, MTO didn't plan this well. I am concerned every time a truck is going to make a left turn because there isn't much time to make that turn. Also, at Hwy 402 going west to south, the alternative would be to provide a loop ramp further west and north by five to six hundred feet to make the turn safer.	It may make the turn safer, but this would require land and structural changes to the bridge, so in terms of physical ability, it is very difficult to achieve. It could be safer, but we need to weigh whether the benefits outweigh the negative aspects of doing this.	
Who makes the decisions about improvements being made to the roads?	Waste Management will be working closely with the County, MTO and consulting team to look at improvement options and to see if they can be adopted and what the conditions may be for doing this.	
But who makes the decisions?	The County and MTO, but once there is an agreement, WM will act on it.	

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In regard to the "recommended improvements", is that what will be funded by WM?	These are draft and are open for comments, and we will respond based on comments received. Comments will be documented and all stakeholders will be involved.	
So it's the County, MTO and Township that will have control over the decisions? If the recommendations are not adopted, what will happen?	We'll look at other alternatives and recommendations. We'll have to coordinate and discuss the situation further.	
Waste drivers occur in a higher percentage of accidents than the average. Drivers need to be aware of farmers.	Drivers of certain companies have been known to be hazardous on the road, but WM has a good record.	
You emphasize safety, but I'm concerned with the nuisance effect because we are expected to go at 60km/hr.	There may be other alternatives to reducing the speed limit to 60km/hr. Other County roads are at a lower speed limit than this road. A speed limit of 60km/hr is not unreasonable compared to other roads. We acknowledge that it may be inconvenient to some, but we thought that safety is more important.	
The busiest road is Confederation Line going west. There will be a lot more traffic on Confederation going into Sarnia. As you go north on County Road 79, there are all-year-round businesses, which will have slower moving vehicles going past them. Also there will be nuisance from the noise of trucks gearing down. In the summer, there is considerable tourist traffic that stops in Watford. In the winter, Hwy 402 has been closed a considerable number of times due to accidents occurring on the highway. Trucks will spread out during these situations and there will be traffic going right through Watford.	Thank you for your comments. We will take them into consideration and they will be a part of the review.	
We need a full clear left turn at Hwy 402, at least access on to Hwy 402 heading north and merging south.		
For the traffic going north, there is a cheap fix. As a minimum you need traffic lights there. There is no way a truck can get off that highway without traffic lights. Also, you should consider a right turn ramp going from County Road 79 to east on Highway 402.	I hear your comments and we will consider alternative options. WM has criteria that have to be met and we don't want to create a more dangerous situation.	
Land Use		
If you look at compatibility of land uses, the odour exceedances may be intrusive at times for the 2 cemeteries and in the Village for 1 to 3 % of the time. It may be unpleasant for people and the community facilities. The expansion is not a compatible land use, if the community suffers as a result. Do you really think that	From a land use point of view the landfill expansion will be designed with berms to minimize visual noise and odour. It is seen as a compatible use as well.	

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it's compatible? It is not, from a community perspective.		
It is intrusive as well.	This relates to a definition of compatibility of land uses.	
I do not believe the land uses are compatible.		
The peer review team is concerned about the potential incompatibility of the landfill expansion design in the SW corner with the 2 cemeteries. The goal is to avoid land use conflicts. With removal of part of the woodlot and the landfill coming so close to the cemetery, could WM do more to avoid the conflict, e.g. by creating more buffers?	The site plan includes replacement of part of the woodlot to ensure appropriate buffering to adjacent land uses. From a land use perspective, the uses will be compatible.	
Why not just leave the woodlot and avoid coming closer to the cemetery?	The design of the landfill includes areas to the south and west for berming and landscaping.	
I do not like removing woodlots for any reason; trees take a long time to grow. If new trees are planted and we wait for them to grow, it will take time. When a land use changes from agricultural to commercial, woodlots should not be removed. Township Council should promote this.		
In Discussion Paper #7 or #8 WM states that trees are to be planted on the cemetery grounds. This is an asinine idea.	Normally, if people at a receptor want screening, it is done by the proponent.	
It does not say so in print.		
The EA documentation does not make a good case for removing the woodlot	We looked at the woodlot and decided it could be removed. We looked at the growth an felt it was not a substantial forest and some vegetation could be planted in the buffer. We tried to stay way from the cemetery in some areas. Trees are a better buffer than fencing.	
Why remove the trees, then?	It will improve the woodlot.	
You can't improve a woodlot by reducing it.	There is planting in among the woodlot, too, and improving vegetation.	
Could that buffer not be increased?	The buffer is more than the minimum required by MOE standards. The consultant responsible felt this was a suitable thing to do.	
Burials are not seasonal. In winter months evergreen buffers are needed.	There will be evergreens along the berms, along the cemetery and on other parts of the property.	
Where do you get your advice from regarding woodlots?	Don Fraser of Gartner Lee Limited is qualified to assess the natural environment.	

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An independent person assessing this would have a different view of this. I believe it will be a tragedy to see the woodlot go.	There is a peer review team consultant to provide an independent review. WM will take these comments forward.	
We are arguing that there is a lack of compatibility of the landfill with the cemetery. These are separated by the woodlot. In Section 3.1 in Discussion Paper #8 it states that there will be tree planting on cemetery land. You are removing trees and replanting them on cemetery property.	We are looking at land use planning regarding compatibility. The results depend on the work from a number of the consultants, e.g. visual, noise, air quality. The concerns about the factors to be used for mitigation are noted. The consulting team, with WM, will look at these concerns and make some decisions. This is not just an issue of tree removal versus screening; trees are just one factor and may not be the best for screening. Occasionally mitigation is best on adjacent properties; it is one option to be considered	
Why did we not go further south or east with the landfill expansion footprint, instead of west? With a different footprint we could replant that corner.	There were 2 alternative footprints originally, north/west and centre. The aim was to maximize the distance from the urban area and the impacts on Zion Line residents. Also at that time, the King property was not available.	
Why does the forest have to come out?	Due to a combination of factors, including design and mitigation. But these issues will be re-examined.	
The impacts on the community will be huge. The woodlot trees now provide screening. If they were removed, there would be concerns.		
The trees on the King property are no good; half are ash and many will be dead in 10 years. Trees can be replanted and will grow quickly. Cedars and soft maples I planted are now 30 feet tall. I see no problem with what is removed, because what you plant will be better.		
It is distance that gives a buffer. Without it, you get nuisance noise, dust and odour.		
	Subsequent to many comments received on the draft DP's, WM has created and addendum to DP 7 and 8. In the addendum the layout of the proposed facility has been modified. The landfill footprint has been re-configured to leave in place the majority of the woodlot, with only the outer edges being thinned.	
Visual		
On the page [in the presentation handout] for "Additional Mitigation", point L is for "Natural Shaping of Ponds". Which one (i.e., pond) is naturally shaped?	No this has not happened yet. This is a recommendation.	
Then why are you looking at natural shaping if you're going to cover the landfill anyway?	We are looking ahead.	

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I encourage you to use imagination at the EA phase in regard to the shape of the ponds because this is what the minister will approve. So why not build that in up front?	Because it doesn't effect the outcome of my study. The shape of the pond has no bearing on impact levels.	
Did you study visual impacts from the cemetery to the landfill?	Yes.	
What was your conclusion?	It is in a high impact zone.	
The basic principle when dealing with visual impact is that as the distance increases, then the visual impact decreases. In regard to the cemetery, retaining the woodlot would provide significant mitigation	Not necessarily, due to the lack of evergreen vegetation and understorey.	
It wouldn't reduce impact?	No. The end result would be the same. It would have to be significantly further back.	
In regard to the viewshed, from a community viewpoint, we are not stationary creatures. We are dynamic and move around; therefore, we can see the landfill on an ongoing basis. Over the 25 years, we'll experience dust, odour and traffic nuisance. That should be part of the study as well. You can mitigate, but you cannot eliminate.	Zion Line runs through a high impact zone.	
But more people are affected than your study indicates.	It was a receptor-based study, but I am not saying that people on roads won't be affected.	
It affects a higher percentage of people than the results indicate.		
Waste Diversion		
Are the numbers on your recyclables annual or total?	They are annual.	
Is it "aggressive recycling" when we throw bottles and cans into the garbage? There should be more recycling initiatives by the provincial government. Bubble wrap is also a problem.	An example of "aggressive recycling" assumed in the analysis is that 75% of residential waste will be diverted. This will require municipalities to make services available and the people's will to recycle further. The analysis demonstrates that even if we do get significant diversion, landfill capacity is still needed.	
Here each municipality looks after its needs. Do other municipalities (e.g. in the US) work on behalf of others?	In Ontario there is a role for the province to play, that of guidance. The regions and the municipalities can be involved: all levels are to work together.	
Should there be waste export or not?	It is necessary right now to accommodate the waste generated in Ontario.	
How long have we exported waste to the US?	Waste was exported since 1982 in lower amounts. With the closing of the Keele Valley landfill, up to 3 million tonnes per year are exported. The province has responded with its 60% diversion initiative and will provide more regulatory	

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	direction, including for industrial, commercial and institutional (ICI) waste.	
This has gone on for 23 years. There should be a different solution.	We are agreed on that.	
Archaeology		
Have you found things that are two thousand years old?	The trends, in terms of occupation, have varied over time. There is the potential to find items that are over two thousand years old, but we just haven't found them yet	
Have you found tools?	We expected to find them, but the findings produced no traces.	
I'm surprised you didn't find a horseshoe, I'm still finding old ones from 1878 from my grandfather's time.	The problem is distinguishing between archaeologically significant items and those that are not. Horseshoes from that time are not considered archaeologically significant.	
What if you were to find something two thousand years old of great value and significance?	Depends on the site. We would go back and examine the area for additional material. If nothing is found than the examination would end. If material is found then we would move to Stage 4 of the mitigation process and we would recommend the area for protection, but this would usually be for a unique site, for example, if an undisturbed village site or unbroken pots are found, but these sites have already been disturbed, which reduces the archaeological significance. An unmarked burial site could force a change in the direction of the examination.	
Over the last 30 – 40 years, with suburban sprawl, are you involved in the same way and do you study new homes being built?	Yes. That's been part of the Planning Act. The municipality is required to use us well in advance of construction to survey properties, so that if significant resources are found, they can be protected if needs be.	
Cultural Heritage		
There are two cemeteries. Why did the study not consider the Roman Catholic Cemetery? It should be included.	Agreed. It should be in the inventory if it is adjacent to the haul route, and will be corrected.	
We heard that the proposed landfill expansion activities will not have an effect, yet there will be noise, odour and dust on the community, which are not reported.	Different disciplines measure different impacts, e.g. social impacts. I look at the heritage characteristics of that feature; social impact measures human impacts.	
We have a Memorial Day Ceremony in August where we pay respects to our ancestors since 1888. If there are nuisance impacts, they cannot be separated from heritage.		
In the Cultural Impact Assessment Background Document to Discussion Paper #7, on Page 16 it states: "The introduction of intrusive and high levels of background noise related to landfill development and operation is considered to be out of character with a rural setting, thus having a potentially negative effect upon the	You are reading general definitions. We look at whether changes that are proposed will affect the heritage buildings or landscapes. Other disciplines deal with dust, odour and noise. Unless there are specific things that need to be done to people's homes due to the impacts, there will not be negative heritage impacts.	

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setting of cultural landscapes." There are similar quotes for dust, odour and litter.		
WM proposes to mitigate impacts on the cemetery; there may be tree planting as mitigation. Will this not interfere with cultural character?	In 19th Century Canada many cemeteries had natural tree screening. We need to keep it visually identifiable as the heritage feature. I would not consider tree planting as a major impact.	
Would a line of evergreen trees not affect the landscape character?	It would become part of the cultural landscape.	
So, you are saying that the landfill expansion will not have an adverse impact?	No, not for heritage.	
I disagree. The cemetery is a built structure.	Yes, it is.	
DP8 – Design and Operations Plan		
In regard to landfill gas, please expand on the potential for uses.	It can be used for a number of things, such as, electrical energy for hydro, or collected and pumped off site for other uses, or used in the leachate treatment process. The final use is unknown at this time as it is too early to tell, as other markets for the gas may develop.	
What might it be used as?	Landfill gas is seen as an asset, and can be used in several ways. We are actively looking for a use. There is good opportunity to develop these resources, and will be reviewed as markets develop.	
What is the recovery rate of landfill gas based on your study? From five to twenty-five years, what is the btu value?	The conservative estimate for the gas recovery rate is 70%. We estimate 16,000 – 21,9000 m^3/hr at peak production rates. I do not know the BTU conversion but I will get that answer for you. (Note: this amounts to approximately 1.9 Million BTU/min to 2.6 Million BTU/min at peak rate)	
So it's not a vacuum system that will increase to 90%?	No, this is a vacuum system. The collection efficiency used was 70% to be conservative, but actual collection will likely be higher.	
Isn't enough gas produced to produce enough electricity to heat all of Warwick?		
In regard to gas conversion, didn't you see an area or have a way of dealing with it if it is going to be used as an alternative feature? There doesn't seem to be anything planned for other facilities that might be involved with the alternative options.	The Discussion paper outlines how the gas is to be collected by both vertical wells and horizontal pipes (located vertically every 15 m). Gas is extracted from these collection systems and brought back to the gas blower facility where it could be distributed to another facility. Other uses could be electrical generation, or used in the leachate treatment process to heat leachate, but these other uses have not been determined at this time.	
So it (i.e., the extracted gas) would be for internal use for the site? After closure, is there a plan for an end use and is the public already involved?	That is WM's decision. We've received a lot of the comments in regard to using the buffer land. We'll accommodate some of the comments stating to use the buffer lands to further enhance the facility. We will certainly look into your point.	

WM Response PUBLIC Comments on Discussion Paper's 7 & 8

Workshop February 26, 2005	WM Response	Link to Terms of Reference
The Peer Review team recently realized that because of the changes to the EA, we have a landfill mining proposal before us, so what you're proposing is not just a landfill expansion proposal.	The existing site presently has a small amount of waste to be relocated in the northern cells. For the expanded site, since this process has dragged on longer than expected, waste has been landfilled in the area for the proposed expansion. Discussion Paper #8 talks about landfill mining. Presently one half of a cell in the east has been completed and the second cell is half full (or just finished filling). The waste in the cell will be excavated and moved to a new cell when the weather is favourable, to minimize odours. Movement of the cells that have been filled with impacted soil will not cause any odour when relocated.	
What's not discussed is the odour, which can be overwhelming. The original concept was to go around the landfill site. I'm wondering why that hasn't been maintained?	The discussion paper outlines procedures to be used when moving the waste. The waste will be moved a short distance, and will be screened by the landfill expansion. There are mitigation methods for the odour, for example, odour masking agents can be sprayed, and operations will be done in the winter months to minimize odours.	
Moving 500,000 tonnes of waste is a huge operation. I'm really concerned because it hasn't been discussed with the community. It is important to discuss this with the community because this is a shift from what was originally proposed.	Upon the susbsequent consideration of numerous comments, the relocation of waste has been dropped from consideration.	
One of our concerns is the collection of leachate, its build up, how much poplar trees can take up and how much surrounding homes will be disturbed. I am concerned that this has not been seriously addressed by the study team. Is there another way to deal with this situation?		
Once you start digging the landfill, what assurances can you provide?	That would be controlled under the EPA approval and you'd have to stick to what has already been approved in the C of A.	
Why do you have to dig up the waste in the first place?	Upon the susbsequent consideration of numerous comments, the relocation of waste has been dropped from consideration.	
You're going to have odours whether you do it the right or wrong way.		
Where is the discharge point for surface water?	Where Bear Creeks meets County Road 79.	
In regard to litter management on and off site, this should be done on a daily basis or it should be done frequently. I noticed that when you dump loads, the trucks are not completely cleaned, so there is littering as the truck leaves the site. Also, the netting should be kept in place all the time.	Good point. This will be monitored.	

WM Response PUBLIC Comments on Discussion Paper's 7 & 8

Workshop February 26, 2005	**WM Response**	**Link to Terms of Reference**
Should that be an operating procedure?	Good point.	
Under due diligence, all you have to say is that the trucks can't leave the site without it being covered with netting.	When a truck comes, it has to be covered, but when it leaves it doesn't.	
Covering after leaving the site could be a new operating procedure to prevent littering.		
What happens to the auxiliary structures in the end?	The office, scales, and maintenance buildings will be removed. The gas and leachate treatment facility and sedimentation ponds will not be removed. For the most part, the infrastructure that is not required will be removed.	
Has there been any group or individual in favour of the expansion in the six weeks since the last workshop?		
Is there any technical reason why the woodlot can't be retained?	Subsequent to many comments received on the draft DP's, WM has created and addendum to DP 7 and 8. In the addendum the layout of the proposed facility has been modified. The landfill footprint has been re-configured to leave in place the majority of the woodlot, with only the outer edges being thinned.	
Will leachate be pumped to the maximum possible limit at all times with this design?	Yes.	
I requested detailed operating parameters for the treatment of leachate indicating that this system works, but I have not received these parameters. Will the system completely treat leachate?	We will look into your request and see to it that you receive this information.	

WM Response PUBLIC Comments on Discussion Paper 9

Open House March 10, 2005	WM Response	Link to Terms of Reference
Comment Sheet 1: • The property owner should select the first appraiser. • Is the IGA in or out with respect to compensation? (Answer requested)	• The details of the property value protection plan will be detailed in Community Commitments Agreement. The current proposal allows for a second appraiser should the property owner request it. • Predicted Impacts at the IGA do not meet our compensation criteria.	
Comment Sheet 2: • Regarding property value protection being related to visual contours in the subdivision, the north side of McGregor Street is included, the south is not. The south side should also be included.	• The south side of McGregor Street gets visual screening from the houses located on the north side.	
Comment Sheet 3: • I was encouraged by the information presented at the open house. It appears that WM is intent on protecting the local residents and community against impacts from the expansion and its future operation. • I have one comment to make. This applies to the local municipality more than WM. But this seems to be a good place to present it. I feel that the funds to the Township should go through a trust fund administered by a board and not directly to the Township General Funds. By doing this, the administration of the fund could ensure that these funds are used to the benefit of those who are the most impacted by the landfill operation. This would also prevent the funds from leaving the local community should we ever come under regional government.	• Comment noted. • This comment will be forward to the Township.	
The residents attending the open house spoke with WM officials and the consultants that were present. The comments expressed were as follows:		
The property value protection plan should extend beyond the operating life, since leachate could impact properties in the future.	The details of the property value protection plan will be detailed in Community Commitments Agreement. This suggestion will be considered.	
WM should identify on the map homes that are owned by WM.	WM will modify the mapping to reflect this request.	
There should be no displacement of the woodlot.	After reviewing numerous comments regarding the woodlot, WM has created an	

WM Response PUBLIC Comments on Discussion Paper 9

Open House March 10, 2005	WM Response	Link to Terms of Reference
Don Craig from the St. Clair Conservation Area to review and advise on the proposed displacement of the woodlot. Bird species and other animals use this woodlot as a path between woodlots.	addendum to DP's 7, 8, and 9. This addendum includes a reconfiguration of the landfill footprint that largely preserves the woodlot.	
When will the financial assurance plan be in place?	The financial assurance package will be calculated as part of the EPA application.	
When will the CCA be completed?	The CCA will be developed as soon as possible.	
What is meant by "concurrent submissions of the EA and EPA documentation"?	This means that two different applications will be submitted within the same general time period.	
I expected a personal response to the comments I made at a kitchen table meeting.	WM will arrange a response to your meeting.	
You have facilities 750m from my place. Why was I not included in the 1 km zone? The zone of impact for compensation should extend to the whole Village.	The 1km zone extends outward from the edge of the landfill footprint. It is not a intended to be a compensation zone. The full extent of impacts will be reviewed and compensation will be extended to those meeting the necessary criteria.	
We get dust and noise from the back-up beepers now.	The operational plan for the proposed facility, including mitigation for increased noise, is outlined in draft DP8.	
Each municipality should look after its own waste. We are country folk and do not send our waste to the city. We can look after our own waste; others should look after theirs.	Comment noted.	
Some people are paid now for living near the landfill.	That is correct.	