Durham/York Residual Waste Study

Application of Short-List Evaluation Criteria

Technical Considerations:

Annex H -

Report on Compatibility with Existing Infrastructure and Design/Operational Flexibility

September, 2007

GENIVAR

Jacques Whitford

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prepared by:

GENIVAR Ontario Inc.
600 Cochrane Drive, Suite 500
Markham, Ontario, Canada
L3R 5K3

Jacques Whitford Limited
3430 South Service Road,
Burlington, Ontario, Canada
L7N 3T9

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1. Introduction

1.1 Overview of the Durham/York Residual Waste EA Study

Durham and York Regions (the Regions) have partnered to undertake a joint Residual Waste Planning Study. Both municipalities are in need of a solution to manage the solid waste that remains for disposal after diversion (residual or post-diversion waste). The Regions are working together to address the social, economic, and environmental concerns of residents through an Environmental Assessment (EA) Study process to examine potential long-term residual waste management alternatives.

Shared Issues

Even with the expanded diversion efforts, Durham and York continue to face the challenge of managing residual waste that cannot be currently diverted. Both Regions face a shortage of available landfill capacity over the long term. In response to the closing of existing landfill sites in the Greater Toronto Area (GTA) and the inability to develop new landfill capacity, Durham and York, along with other GTA municipalities, were forced to enter into contracts for the "export" of their residential waste to disposal facilities located primarily in the State of Michigan. On August 31, 2006 Michigan Senators announced they had reached an agreement with the Province of Ontario to end shipments of Municipal Solid Waste (MSW) to Michigan by 2010. Following 2010, Ontario Municipalities including Durham and York will no longer have the option of disposal of MSW in Michigan landfills.

Shared Opportunities

Facing common waste disposal issues, the Regions are acting to implement, as quickly as possible, a Durham/York based solution that: is socially and politically acceptable to both communities; maximizes environmental protection; and, fosters the wise management of potential resources which are currently lost by way of landfill in Michigan. In addition to solving long-term, residual waste management issues, Durham and York, recognize the growing need for additional sources of energy generation in Ontario. Both Regions recognize that there is an opportunity associated with the utilization of the waste stream as a fuel source to produce energy and have identified this opportunity as a key benefit associated with the subject waste disposal EA Study.

1.2 The Environmental Assessment Act

An EA Study provides a planning approach where environmental constraints or opportunities are considered in the context of the broadly defined environment (i.e. the natural environment as well as the social, economic and heritage and other "environments" relevant to the undertaking) and potential effects are understood and addressed before development occurs. Since the enactment of the Environmental Assessment Act (EAA) in the 1970s, the environmental assessment (EA) process has evolved into the completion of a decision-making process that is carried out in consultation with the public and other interested parties. The EA process evaluates: alternatives considering potential effects on the environment; the availability of mitigative measures that address, in whole or in part, the potential effects; and, the comparison of the advantages and disadvantages of the remaining or "net" effects. The result of this process

provides the planning rationale and support for a preferred approach and method to implement the undertaking.

This process can be considered as consisting of three parts:

PART A – The EA Terms of Reference

PART B – The Evaluation of "Alternatives To" the Undertaking

PART C – The Evaluation of "Alternative Methods" of Implementing the Undertaking

1.2.1 The EA Terms of Reference

Under the EA Act, an Environmental Assessment (EA) Terms of Reference must be prepared and submitted to the Minister of the Environment for approval before an EA Study can be undertaken. The purpose of the EA Terms of Reference is to describe in a clear and concise manner the purpose of the proposed undertaking and how the proponent intends to carry out an environmental assessment. This description includes the proposed evaluation methodology and criteria for the evaluation of alternatives, including, in this case, the process to be applied in the identification of a preferred site. The EA Terms of Reference, once finalized and approved by the Minister of the Environment, becomes the guiding document for the completion of the environmental assessment study and the EA documentation. On March 31, 2006, the Durham/York Residual Waste EA Terms of Reference[1] was approved by the Minister of the Environment.

The purpose of the undertaking (i.e. what the outcome of this EA Study is intended to do) as described in the approved EA Terms of Reference is:

> *"To process - physically, biologically and/or thermally - the waste that remains after the application of both Regions' at-source waste diversion programs in order to recover resources - both material and energy - and to minimize the amount of material requiring landfill disposal.*
>
> *In proceeding with this undertaking only those approaches that will meet or exceed all regulatory requirements will be considered."*

The following report has been prepared as part of a series of supporting documentation, to document the process followed and analysis undertaken in support of the identification of a preferred "Alternative Method". A copy of the approved EA Terms of Reference document may be obtained from the study website, www.durhamyorkwaste.ca.

1.2.2 The Evaluation of "Alternatives To" (i.e. Technologies)

The evaluation of "Alternatives To" the undertaking serves as the first step in the completion of the Durham/York Residual Waste EA. "Alternatives To" are defined as fundamentally different ways of managing waste and achieving the purpose of the undertaking. To fully address the purpose of the undertaking, different waste management approaches capable of processing and recovering resources from post-diversion waste were combined into alternative residuals

[1] Durham/York Residual Waste Study - Approved Environmental Assessment Terms of Reference, March 31, 2006.

processing systems. The Study EA Terms of Reference established that alternative systems comprised of the following approaches and technologies would be formulated and evaluated:

- Mechanical Treatment;
- Biological Treatment; and
- Thermal Treatment.

The following four alternative systems were formulated using the alternative processing approaches from the approved EA Terms of Reference:

- System 1 - Mechanical and Biological Treatment with Biogas Recovery.

  This system includes mechanical processing of the post-diversion waste to recover any remaining recyclable materials and to separate out the organic fraction for biogas generation via anaerobic digestion. The biogas would be combusted to produce electricity and heat. The stabilized residue from this system would be disposed in a landfill.

- System 2(a) – Thermal Treatment of Mixed Waste with Recovery of Materials from the Ash / Char.

  This system involves the thermal treatment (by combustion, gasification or pyrolysis) of the post diversion waste to produce electricity and heat. The resulting ash would be processed to recover metals for recycling, with the remaining ash disposed in a landfill.

- System 2(b) – Thermal Treatment of Solid Recovered Fuel

  This system includes mechanical and possibly biological processing (composting) of the post diversion waste to recover recyclable materials and produce a solid recovered fuel (SRF). The SRF is then thermally treated (by combustion, gasification or pyrolysis) to produce electricity and heat. The residues from the processing of the residual waste and ash/char from the thermal treatment process would be disposed in a landfill.

- System 2(c) – Thermal Treatment of Solid Recovered Fuel with Biogas Recovery

  This system includes mechanical processing of the post diversion waste to recover recyclable materials, to separate out the organic fraction for biogas generation via anaerobic digestion and to and produce a solid recovered fuel (SRF). Electricity and heat are produced through combustion of the biogas and thermal treatment of the SRF. The residues from the processing of the residual waste, stabilized anaerobic digestion residue and ash/char from the thermal treatment process would be disposed in a landfill.

On May 30, 2006 the report entitled the "Evaluation of "Alternatives To" and Identification of the Preferred Residuals Processing System" was released, documenting the results of the evaluation of the alternative systems. Based on the consideration of relative advantages and disadvantages and the environmental priorities established through public and agency consultation, the preferred long-term residuals processing system was identified as *System 2(a) – Thermal Treatment of MSW and Recovery of Energy followed by Recovery of Materials from the Ash/Char*.

System 2(b) also exhibited an acceptable range of advantages and disadvantages. For some of the criteria where System 2(b) did not rank equivalent to 2(a), (technical risks, costs and legal/contractual risks for example), the determination of the relative advantages and disadvantages was based upon the information that was readily available on both the mechanical and biological processes that are being used to recover solid fuel in other jurisdictions and on the thermal technologies that can process this fuel. Many of the technologies that could be used to thermally treat the solid recovered fuel (e.g., gasification) in System 2(b) are regarded as 'new technologies', with active research and development, but are less proven than the technologies that are currently available to combust residual waste in System 2(a).

In June 2006, Durham and York Regional Councils approved System 2(a) as the preferred residuals processing system and determined the competitive process should allow for the submission of proposals to implement either System 2(a) or System 2(b), and that the final decision on the technologies be based on the results of this competitive process.

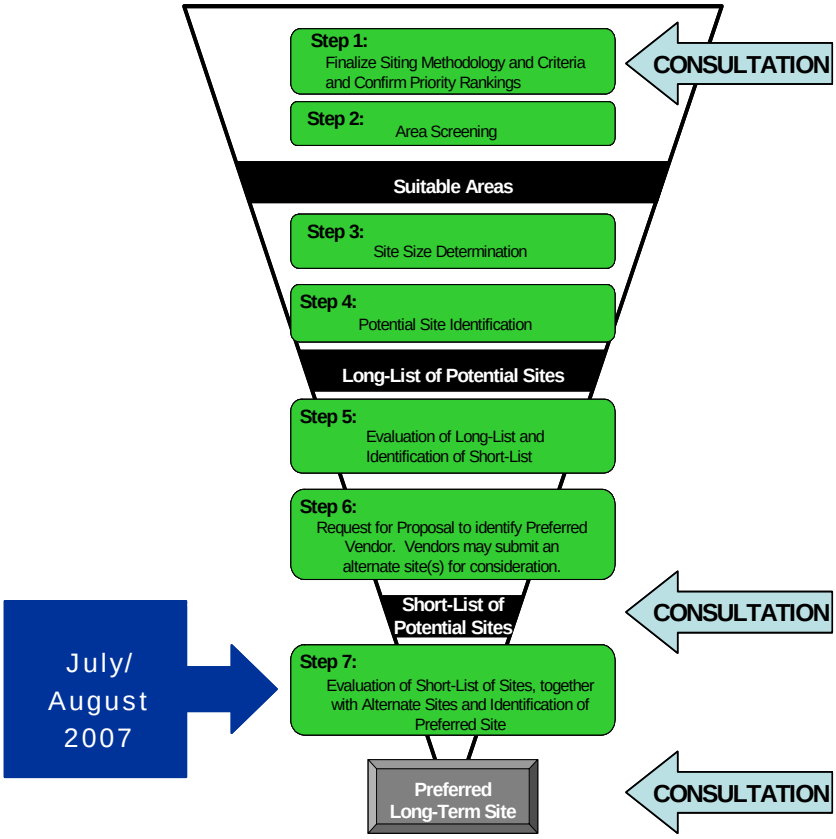
1.3 The Evaluation of "Alternative Methods" (i.e. Facility Siting)

Following the identification of a preferred technology, a seven-step facility site selection process, outlined in Figure 1-1 below was initiated to identify a preferred site for development of the preferred Durham/York residual waste processing system (i.e. a new thermal treatment facility). The step-by-step methodology for siting a residual waste processing facility was originally presented in approved EA Terms of Reference and Background Document 2-3[2] (prepared as supporting documentation to the approved EA Terms of Reference).

The proposed methodology and criteria were confirmed with agencies, stakeholders and the public through a series of information sessions, workshops, and polling activities in September 2006. Generally, the site selection methodology and criteria, outlined in the approved EA Terms of Reference, were confirmed by the consultation participants.

[2] Durham/York Residual Waste Study - Background Document 2-3 "Consideration of Alternative Methods of Implementing the Undertaking", December 16, 2005.

Figure 1-1 Overview of the Facility Siting Process



Completion of Steps 1 thru 5 of the above siting process resulted in the identification of six (6) Short-List sites to undergo a further detailed evaluation process. For a more detailed account of the steps taken to identify a Short-List of sites, please refer to the report entitled "Draft Report - Thermal Facility Site Selection Process Results of Steps 1-5 Identification of the Short-List of Alternative Sites, March 2007"[3] available at www.durhamyorkwaste.ca.

Following issuance of the draft report identifying the Short-List of sites, two of the six sites were removed from consideration. Site Clarington 02 was removed from the Short-List as the land use designation for the property changed in late March 2007 such that the site no longer met Step 2 evaluation criteria. Site Clarington 03 was removed from the Short-List as the site was withdrawn from consideration by the private owner of the property, such that this site could no longer be considered a 'willing seller' property.

[3] Draft Report - Thermal Facility Site Selection Process Results of Steps 1-5 Identification of the "Short-List" of Alternative Sites, March 2007

1.4 The Short-List of Alternative Sites

The following provides a more detailed description of each of the remaining four (4) Short-List sites.

1.4.1 Short-List Site: Clarington 01

Site Clarington 01 is undeveloped land owned by the Region of Durham, south of Hwy 401 in the Municipality of Clarington. The site is located on the west side of Osbourne Road north of a CN Rail corridor. There are commercial properties north of the site. The lands east and west of the site are undeveloped and are currently used for agricultural purposes. The Courtice Water Pollution Control Plant, which is scheduled to be completed in 2007, is being built just south of the site. The Darlington Nuclear Generating Station is located approximately 0.5 km to the east. The nearest major intersection is Hwy 401 and Courtice Road, which is approximately 1.7 km from the site. The site is approximately 12.1 hectares in area and is located in the Clarington Energy Park.

1.4.2 Short-List Site: Clarington 04

Site Clarington 04 is privately owned undeveloped land, south of Hwy 401 between Bennett road and South Service Road, in the Municipality of Clarington. The lands east and west of the site are undeveloped and are currently used for agricultural purposes. A CN Rail corridor is located south of the site. There are commercial properties located on east and west, non-adjacent sides of the property. A number of residences and farms are located north of the property on the north side of Hwy 401. The nearest major intersection is Hwy 401 and Bennett Road, which is approximately 1.1 km from the site. The site size is approximately 15 hectares.

1.4.3 Short-List Site: Clarington 05

Site Clarington 05 is privately owned undeveloped land, south of Hwy 401 between Courtice Road and Osbourne Road, in the Municipality of Clarington. Commercial properties are located north of the site, north of Hwy 401. A CN Rail corridor is located south of the site. The lands east and west of the site are undeveloped and are currently used for agricultural purposes. The nearest major intersection is Hwy 401 and Courtice Road, which is approximately 0.2 km from the site. The site size is approximately 26 hectares. This site is located in the Clarington Energy Park.

1.4.4 Short-List Site: East Gwillimbury 01

Site East Gwillimbury 01 is owned by York Region and is located in the Town of East Gwillimbury, 2.6 km from the nearest major intersection – Hwy 404 and Davis Drive. The site is undeveloped land surrounded by commercial/ industrial properties to the West, East, and South. The York Region Waste Management Centre which consists of a new Materials Recycling Facility and Waste Transfer Station is located immediately West of the site. York Region also owns the lands immediately east of the site. The Household Hazardous Waste and Recycling Depot are situated south of the site. The land north of the site is undeveloped and is currently used for agricultural purposes. The site is approximately 11 hectares in size.

1.5 Step 7: Evaluation of the Short-List Sites

Following consultation on the Short-List of potential sites, a detailed comparative evaluation of the sites was initiated. This assessment considers the sites as well as the haul routes, transfer requirements and requirements for additional infrastructure to develop the sites.

Step 7 entails a comparative evaluation of the identified sites utilizing criteria and indicators to measure potential effects within the above categories. There are different methods (qualitative, quantitative or a combination of both) that can be used to evaluate the sites. There is no requirement to apply any specific methodology except that the process must be rational, traceable and replicable and must consider advantages and disadvantages based on a net effects analysis of alternatives. This methodology is commonly applied to address the approval requirements of the EAA and promotes the selection of siting preferences considering relative advantages and disadvantages based on net effects after the application of reasonably available mitigative measures.

The evaluation criteria applied at this Step have been assembled under 5 categories:

1. Public Health and Safety and Natural Environment (High Priority);
2. Social and Cultural (Medium Priority);
3. Economic / Financial (Medium Priority);
4. Technical Suitability (Medium Priority); and
5. Legal (Low Priority).

The priorities for each category of criteria were determined based on the results of consultation in Step 1 of the facility siting process.

This net effects analysis consists of the following steps:

1. Undertake data collection and apply the comparative evaluation criteria to each of the Short-List sites. Potential effects to the environment would be identified based on the application of the comparative evaluation criteria. The net effects analysis will initially be carried out based on secondary data sources (i.e., Official Plans, aerial photographs, existing base maps and limited field reconnaissance).
2. Consider measures that may be reasonably applied to mitigate potential effects identified in the previous step for each site. The result of this step will be the identification of net or post-mitigation effects for each of the sites.
3. Compare the net effects associated with each site and establish the relative advantages and disadvantages of each site. Under each criterion, sites would receive a ranking based on the comparative analysis against the other sites, ranging as follows:
    - Major Advantage
    - Advantage
    - Neutral
    - Disadvantage

- Major Disadvantage.

The site that best meets the objective of the criterion would be identified as having a major advantage and the site that least meets the objective of the criterion a major disadvantage. It is not intended that specific ranges would be predetermined for the ranking; instead they will be developed based on a comparison between the potential sites. For this study, a qualitative evaluation methodology will be applied which considers tradeoffs between sites using professional judgment in the context of priorities set by the community.

4. The rankings will be recorded in a summary table and overall rankings for each of the five categories of criteria will be established based on the advantages and disadvantages of the sites. The preferred site will be the one with the preferred balance of advantages and disadvantages relative to the established category priorities and rankings. This decision will be based on the priorities and professional judgment exercised by both Regions and in consideration of the technical database, advice from technical experts and input received from stakeholders (i.e., public, neighbours, agencies, etc.).

Ultimately the selection of the preferred site will be subject to approval by both Regional Councils.

1.6 Overview of Preferred Site Supporting Documentation

A series of documents are being prepared to provide the necessary background and rationale in support of the identification of the Preferred Site. Each of these documents address one or more of the Short-List Evaluation Criteria as set out in Table 1-1.

Table 1.1 Comparative Evaluation Criteria to be used in the Evaluation of the Short-List of Alternative Sites and Applicable Reports

Environmental Considerations	Evaluation Criteria	Applicable Report
Public Health & Safety and Natural Environment Considerations	Potential Air Quality Impacts	Report on Potential Air Quality Impacts
	Potential Water Quality Impacts (Surface Water and Groundwater)	Report on Potential Water Quality Impacts (Surface Water and Groundwater)
	Potential Environmentally Sensitive Areas and Species Impacts Potential Aquatic and Terrestrial Ecology Impacts	Potential Environmentally Sensitive Areas and Species Impacts and Potential Aquatic and Terrestrial Ecology Impacts
Social and Cultural Considerations	Compatibility with Existing and/or Proposed Land Uses Potential Impact on Residential Areas Potential Impact on Parks and Recreational Areas Potential Impact on Institutional Facilities or Areas	Report on Compatibility with Existing and/or Proposed Land Uses
	Potential Impact on Archaeological and Cultural Resources	Report on Archaeological and Cultural Resources
	Potential Traffic Impacts	Report on Potential Traffic Impacts
Economic / Financial Considerations	Operation and Maintenance Costs for Facility(ies) Capital Costs to develop Facility(ies)	Report on Capital Costs, Operation and Maintenance Costs
Technical Considerations	Compatibility with Existing Infrastructure Design/operational flexibility provided by site	Report on Compatibility with Existing Infrastructure and Design/Operational Flexibility
Legal Considerations	Complexity of Required Approvals Complexity of Required Agreements	Report on Complexity of Required Approvals and Agreements

Indicators have been identified for each of the above criteria and have been used to determine the advantages and disadvantages for each of the sites. Applicable indicators for the criteria addressed in this report are noted in Section 1.7.

1.7 Purpose of this Report

This draft report entitled "*Application of Short-List Evaluation Criteria – Technical Considerations – Report on Compatibility with Existing Infrastructure and Design/Operational Flexibility"* has been prepared to identify the compatibility of each of the Short-List sites with respect to existing infrastructure and to examine the flexibility of the facility design and operation offered by each of the Short-List sites.

This report will form part of the supporting documentation and materials for stakeholder consultation in the evaluation of "Alternative Methods" and identification of the preferred facility location for the Durham/York Residual Waste Study. Public and agency input received

on this draft report will be considered when moving forward in the process and when preparing the EAA approval documentation.

Specifically, this document addresses the "Technical Considerations" requirements as identified in the approved EA Terms of Reference[4], Appendix F, Table F-3 under the category of "Environmental Considerations – Technical Considerations" and the "Preliminary Evaluation Criteria – Compatibility with Existing Infrastructure" and the "Preliminary Evaluation Criteria Design/Operational Flexibility Provided by Site" as indicated below.

Table 1.2 Technical Considerations: Criteria and Indicators

Technical Considerations		
Criteria	**Indicator**	**Rationale**
Compatibility with Existing Infrastructure	Distance from required infrastructure (i.e., sewers, hydro, road access, water)	Construction may take additional time, increase costs and extend beyond site location if site does not have existing access to required utilities.
Design/Operational Flexibility Provided by Site	Area surplus to minimum requirement provided by site.	Surplus lands will enhance the flexibility in the design to allow for the facility to be capable of a future expansion or managing additional sources of residual wastes (e.g. IC&I wastes or other municipalities). The surplus lands may be used to enhance the on-site buffer area.

[4] Durham/York Residual Waste Study - Approved Environmental Assessment Terms of Reference, March 31, 2006.

2. Methodology for Study

2.1 Study Approach and Key Assumptions

The new Durham/York thermal treatment facility is expected to manage either 150,000 tonnes per year (tpy) or 250,000 tpy of residual waste at the beginning of the planning period depending on the residual waste disposal needs of both municipalities and the availability of waste from neighbouring municipal jurisdictions. The maximum tonnage scenario for a Durham/York thermal facility is 400,000 tpy, and represents potential waste quantities and future expansion requirements towards the end of the 35-year planning period.

In regards to compatibility with existing infrastructure, the connection points to existing infrastructure were determined to be the nearest location to the Short-List site with the capacity to accommodate the typical infrastructure demands for a 250,000 tonne per year (tpy) facility. The comparison of sites regarding the compatibility with existing infrastructure is based on the infrastructure requirements for this facility site size.

Ultimately, the facility may be expanded to process up to 400,000 tpy of waste. In the future, if this were to occur, the infrastructure servicing for the site may be quite different. Key differences for site servicing that can be determined at this time are noted for the major infrastructure elements.

In regards to design/operational flexibility, it is a requirement that all Short-List sites be able to accommodate a facility that represents the maximum tonnage scenario of 400,000 tpy, this was meant to ensure that if necessary the facility could be expanded to meet the future requirements for a 400,000 tpy facility.

2.2 Compatibility with Existing Infrastructure

The various components of infrastructure considered for the application of this criteria included:

- Electrical Grid Connections;
- Water & Sewer Connections;
- Natural Gas Connections;
- Road Access;
- Potential Heat Loads; and
- Synergy with Other Municipal Infrastructure.

Each of these infrastructure components was examined in detail and documented in a series of technical memoranda, included in Appendices A through E, with the exception of road access that was addressed in the *Report on Potential Traffic Impacts.* The steps used to identify the site-specific infrastructure requirements were generally as follows:

- The output or input requirements of the proposed facility were identified. For example a 150,000 tonne per year (tpy) thermal treatment facility will supply approximately 11 MW of power to the electrical grid. Information on these output or input requirements was based on performance data from existing thermal treatment facilities.

- Meetings were then held with appropriate representatives from the organizations responsible for the individual infrastructure components to determine appropriate interconnection points. For example a meeting was held with representatives of Enbridge Gas Distribution Inc., regarding the supply of natural gas to each of the Short-List sites. Natural gas is required as an auxiliary fuel during the start up and shut down of the facility to ensure that waste is treated under stable thermal conditions.
- Once an appropriate interconnection point was identified, a route, generally following existing roadways, from the interconnection point to the site was identified.
- Any unique aspects associated with the required connections were identified along with an estimate of the associated costs.
- Where applicable, mitigative measures were identified.

Details on the specific methodology and approach used and results for each component of infrastructure are outlined in the individual technical memoranda provided in the appendices.

2.3 Design/Operational Flexibility

As indicated in Table 1.2, the indicator used to determine the design/operational flexibility associated with the sites is the area surplus to the minimum requirement provided by the sites. The areas surplus beyond the minimum required area for the thermal treatment facility and related infrastructure (roads, scales, parking, stormwater ponds) acts as a buffer between the facility and the surrounding areas, mitigating the potential impacts from the facility including odour, noise, dust and cooling tower plumes. These surplus areas also provide design flexibility to accommodate the typical thermal facility requirements such as on-site roads, stormwater management and landscaping and flexibility to accommodate alternative facility designs associated with the configuration of major elements of the thermal treatment process.

Information for applying the criteria was developed in a number of complementary studies and reports listed as follows:

- A preliminary layout for a three unit, 400,000 tpy, mass burn incinerator equipped with a wet flue gas cleaning system was prepared by Ramboll of Denmark and is presented in Appendix E. This facility is deemed to be representative of the largest thermal treatment facility that could ultimately be required by Durham and York. The area required for this facility, including on-site roads, is approximately 330 m x 220 m, or 7.26 ha.
- The *Report on Potential Water Quality Impacts (Surface Water and Groundwater)* identified the required site area for storm water management facilities.
- The *Report on Potential Environmentally Sensitive Areas and Species Impacts and Potential Aquatic and Terrestrial Ecology Impacts* identified natural heritage features that must be avoided on some sites.

This information coupled with professional judgement was used to identify the surplus lands available at each of the Short-List sites presented in Appendix E. Mitigative measures were identified that could affect the availability of surplus lands.

2.4 Identification of Site Advantages and Disadvantages

The Short-List evaluation process involved a 'net effects analysis' of the four (4) Short-List sites. A 'net effects analysis', which is a requirement of the Environmental Assessment Act, was identified in the methodology (see Section 1.5 of this report) and included in the approved EA Terms of Reference. The methodology involved the following:

- First, the comparative evaluation criteria (identified in Table 2.1) were applied to the Short-List sites and the range of potential effects resulting from this application were identified.
- Second, each potential effect was reviewed and a determination made as to whether or not mitigative measures exist that could be applied to offset or eliminate the potential effect. In the case of a positive effect, enhancement measures may be considered to increase the benefit.
- Finally, the remaining, or 'net' effects are tabulated for consideration further in the evaluation process.

The intent of this exercise is to ensure that all of the Short-List sites are being reviewed in the context of best practices or best available technology – provided these measures are reasonably available and can be reasonably applied to the undertaking.

Step 7 of the evaluation process focused on the identification of relative advantages and disadvantages for each of the four (4) sites. These were identified based on the net effects for each site and a comparison of these net effects is intended to, in essence, establish a ranking of sites under each comparative consideration. The process of differentiating between what constitutes an advantage or disadvantage is outlined below:

Table 2.1 Ranking System for Advantages and Disadvantages

Ranking	Description
Major Advantage	A major advantage was identified for any site with the significant ability to meet the evaluation criteria when compared with the other sites.
Advantage	An advantage was identified for any site with the ability to meet the evaluation criteria when compared with the other sites.
Neutral	Neutral was identified for any sites that showed no advantage or disadvantage after the application of the evaluation criteria when compared with the other sites.
Disadvantage	A disadvantage was identified for any site with the inability to meet the evaluation criteria when compared with the other sites.
Major Disadvantage	A major disadvantage was identified for any site with the significant inability to meet the evaluation criteria when compared with the other sites.

The rankings for the sites, in regards to their potential technical impacts were developed based on the relative comparison of Short-List sites.

3. Results and Findings: Compatibility with Existing Infrastructure

3.1 Electrical Grid Connection

The initial facility will process either 150,000 tpy or 250,000 tpy and supply either 11 MW or 19 MW to the grid respectively.

A 44 kV circuit is required for an interconnection with the electrical grid. Such a circuit runs along at least one side of each of the Short-List sites. There are two parallel circuits that run along the north side of the Clarington 05 site. It may be possible to connect directly to these existing circuits.

For the three Clarington sites, capacity constraints may be encountered due to potential wind power development projects in the area. If capacity constraints are identified it may be necessary to construct a new transmission line, parallel to the existing circuit from the facility back to the Wilson transformer station.

Additional details on the electrical grid connections at each of the Short-List sites are provided in Appendix A.

3.2 Water and Sewer Connection

3.2.1 Water Connection

Water supply requirements were provided by thermal treatment facility operators for typical process, domestic, and fire protection demands for a 250,000 tpy facility. Water demand was estimated to be 100 litres per second (or 1,600 gallons per minute) requiring a 300 mm (or 12”) diameter watermain. It is recommended that a full hydraulic analysis of the water distribution system be carried out along with the determination of facility/technology specific flow requirements based on Fire Insurers Underwriters guidelines, during the design stage. It is possible that additional water supply for fire protection could be provided using the on-site stormwater ponds.

Table 3.1 illustrates the pipe requirements, water supply connection points and routes plus an identification of any significant construction issues associated with making the connection for each of the Short-List sites for a 250,000 tpy thermal treatment facility. Additional details on the water supply connections are provided in Appendix B.

Table 3.1 Summary of Water Servicing Requirements (250,000 tpy Thermal Treatment Facility)

Short-List Site	Pipe Requirements	Pipe Connection Points and Route	Potential Construction Issues
Clarington 01	4,000 m of 300 mm pipe	- First connection north of CPR West of Osbourne Rd - Second connection on South Service Rd east of Maple Grove - Route from site north on Osbourne and East on South Service Rd.	None identified
Clarington 04	2,000 m of 400 mm pipe	- First connection on Lake Road - Second connection on Baseline Rd west of Bennett - Route from site north on Lambs Road and West on Baseline Road	Crossing Highway 401
Clarington 05	4,500 m of 300 mm pipe	- First connection north of CPR West of Osbourne Rd - Second connection on South Service Rd east of Maple Grove - Route from site north on Osbourne and east on South Service Rd.	None identified
East Gwillimbury 01	50 m of 300 mm pipe	- One connection required, Garfield Wright Blvd at site	None identified

3.2.2 Sewer Connection

Wastewater sewer discharge requirements were provided by thermal treatment facility operators for typical processes that include certain 'wet' air pollution control technologies and domestic discharges generated by plant staff for a 250,000 tpy facility. Waste water discharge was estimated to be 63 litres per second (or 1000 gallons per minute) requiring a 300 mm diameter force main or a 450 mm (18") diameter gravity sewer.

It is noted that it may be possible, depending on the type of air pollution control (APC) system selected, to design a facility with no process wastewater discharge. If this proves to be the case, sewer servicing would only be required for the domestic wastewater generated by the plant staff, which could potentially be treated using a septic system in lieu of discharging into the municipal sewer.

However, in the interest of maintaining maximum flexibility in the choice of APC technology option available for the design of the facility at this stage, sewer servicing requirements were considered as potential infrastructure for the Short-List sites. These requirements were considered for the comparison of the Short-List sites.

Table 3.2 illustrates the pipe requirements, sewer connection points and routes, and identifies any significant construction issues associated with making the connection for each of the Short-List sites.

Additional details on the required sewer connections are provided in Appendix B.

Table 3.2 Summary of Sewer Servicing Requirements (250,000 tpy Thermal Treatment Facility)

Short-List Site	Pipe Requirements	Pipe Connection Points and Route	Potential Construction Issues
Clarington 01	300 m of 450 mm gravity sewer	- West of Osbourne Rd north of CPR tracks	None identified
Clarington 04	2,500 m of 450 mm gravity sewer	- Port Darlington WPCP - Route: from site twin sewer along Lake Rd then south on Port Darlington Road to WPCP	Crossing CPR tracks and a water crossing
Clarington 05	1,300 m of 450 mm gravity sewer	- West of Osbourne Rd north of CPR tracks - Route: from site east on South Service Rd, south on Osbourne Rd	None identified
East Gwillimbury 01	7,000 m of 300 mm force main	- YDSS at Bayview Parkway Pumping Station - Route: from site west on Garfield Wright Blvd, north on Woodbine Ave, west on Green Lane, south parallel to Holland River to pumping station.	Pumping station and force main required, crossing Highway 404, plus several watercourse crossings.

3.3 Natural Gas Connection

Thermal treatment facilities operate on the principle of self-sustaining combustion of the wastes, so natural gas is required only as an auxiliary fuel during brief periods of facility start up and shut down. Natural gas may also be required, depending on the design of the air pollution control system, to reheat the flue gas prior to its further treatment in a selective catalytic reactor (SCR). Information from several operators of existing facilities was obtained regarding both peak hourly and annual natural gas flow requirements. Based on this information, it was determined that a 250,000 tpy thermal treatment facility could require a peak gas flow of approximately 10,200 standard cubic meters per hour (6,000 standard cubic feet per minute) and 415 kilopascals (60 pounds per square inch) of pressure at the plant. At a minimum, it was determined that connection to at least a 100 mm (4") gas main was required. The nearest connection points to the existing infrastructure were determined for each of the sites to supply the gas demand for a 250,000 tonne per year (tpy) facility.

Table 3.3 presents the gas servicing requirements, assuming an extension of the existing connection point and route, and identifies any significant construction issues for each of the Short-List sites.

Additional details on the required natural gas connections are provided in Appendix C.

Table 3.3 Summary of Natural Gas Servicing Requirements (250,000 tpy Thermal Treatment facility)

Short-List Site	Pipe Requirement	Pipe Connection Point & Route	Potential Construction Issues
Clarington 01	3 km of 200 mm (8") pipe	- Bloor & Hancock - Route Hancock south to site	Crossing Highway 401 and several small water courses
Clarington 04	4 km of 150 mm (6") pipe	- Providence Rd. & Concession St. - Route Concession St., west to Lambs Rd, south to site	Crossing Highway 401 and several small water courses
Clarington 05	2.6 km of 200 mm (8") pipe	- Bloor & Courtice - Route Courtice south to site	Crossing Highway 401 and several small water courses
East Gwillimbury 01	Existing 100 mm (4") pipe at site	No added pipe required	None identified

3.4 Road Access and Improvements

All of the Short-List sites have good access and are in reasonable proximity to 400 series highways. The final sections of access roads from the various 401 off-ramps to the Clarington sites will require upgrades to the road infrastructure to accommodate future truck traffic. No potential construction issues have been identified with these required road upgrades. The road access from the 404 to the East Gwillimbury 01 site is acceptable, and does not require improvements.

Table 3.4 illustrates for each of the Short-List sites the length of access road requiring upgrading.

Table 3.4 Summary of Access Road Upgrade Requirements

Short-List Site	Length of Roadway Requiring Upgrade (m)	Potential Construction Issues
Clarington 01	1,200	None identified
Clarington 04	500	None identified
Clarington 05	400	None identified
East Gwillimbury 01	0	None identified

Additional details on road access and the required road improvements are provided in the *Social and Cultural Considerations: Report on Potential Traffic Impacts.*

3.5 Potential Heat Loads

For every tonne of residual waste processed by a thermal treatment facility, approximately 600 kWh (or 2,160 MJ) of electricity and 1,200 kWh (or 4,400 MJ) of low-grade heat is produced.

Table 3-5 shows the estimated quantity of electricity and low-grade heat that could be produced by a thermal treatment facility processing 150,000 and 250,000 tpy of residual waste. It is assumed that the facility will operate at 90% availability over the year (i.e., 329 days per year).

Table 3-5 Electricity and Heat Produced by Thermal Treatment Facility

	150,000 tpy Thermal Treatment Facility	250,000 tpy Thermal Treatment Facility
Residual Waste Managed (tph)	19	32
Electricity Produced per Tonne of Waste (MJ/tonne)	2,160	2,160
Electricity Produced (MJ/hour)	**41,000**	**68,000**
Low Grade Heat Produced per Tonne of Waste (MJ/tonne)	4,400	4,400
Low Grade Heat Produced (MJ/hour)	**84,000**	**139,000**

The following sections summarize the potential for heat loads associated with each of the Short-List sites. Additional details are provided in Appendix D.

3.5.1 Clarington 01 and 05

The Clarington 01 and 05 sites are located in the Clarington Energy Park, just north of the Courtice WPCP. A 150,000 or 250,000 tonne per year thermal treatment facility would be capable of supplying sufficient heat loads to meet the heating requirements of the Courtice WPCP. Utilizing process heat from the thermal treatment facility would offset natural gas and biogas usage. The Courtice WPCP is a reasonable size to generate sufficient biogas quantities to be viable for electricity generation in a cogeneration facility.

The Clarington Energy Park is in the planning stages and therefore the potential exists to build a district heating system into the development of the Clarington Energy Park to supply heat at cost savings to potential Energy Park occupants.

3.5.2 Clarington 04

The Clarington 04 site is located approximately 1 km east of the Port Darlington WPCP and the Bowmanville water supply plant. A Class EA on expanding the water pollution control plant is presently underway. A 150,000 or 250,000 tonnes per year thermal treatment facility would be capable of supplying sufficient heat loads to meet the heating requirements of the Port Darlington WPCP. However, the Port Darlington WPCP is much smaller than the Courtice WPCP, and is not a reasonable size to generate sufficient biogas quantities to be viable for electricity generation in a cogeneration facility.

There is some potential for other industrial and/or commercial development around Clarington 04 but it is limited and would not serve to utilize more than a small percentage of the available heat energy.

3.5.3 East Gwillimbury 01

The East Gwillimbury 01 site is located immediately east of the York Region Materials Recycling Facility (MRF) on Garfield Wright Boulevard.

At the East Gwillimbury 01 site, existing buildings around the proposed thermal treatment location, the MRF, the police garage and other industries have small heat loads and established heating systems (rooftop units) the replacement of which would not make economical sense because of the limited capacity opportunity.

3.6 Synergy with Municipal Infrastructure

The proposed Durham/York thermal treatment facility generally has potential synergies with the following aspects of municipal infrastructure:

- Water Pollution Control Facilities:
  - provide process heat to a WPCP, reducing natural gas requirements and freeing up digester biogas for use in electricity production (discussed above);
  - thermal treatment of dewatered biosolids.
- Surrounding Developments:
  - Shared infrastructure regarding interconnections for electricity, natural gas, potable water and wastewater.
- Municipal Waste Management Facilities:
  - Shared infrastructure such as weigh scales, access roads, parking areas;
  - Disposal of combustible residues.

The following sections summarize the potential for synergy with municipal infrastructure associated with each of the Short-List sites. Additional details are provided in Appendix D.

3.6.1 Clarington 01 and 05

The Clarington 01 and 05 sites have the following potential for synergy with municipal infrastructure:

- Potential thermal treatment of 14,800 to 24,700 tpy of dewatered biosolids, for a thermal treatment facility sized at 150,000 to 250,000 tpy respectively. Some biosolids from the Courtice WPCP could be dewatered and treated at a facility located at either of these sites. Both sites are also within a reasonable distance for it to be cost effective to haul dewatered biosolids from the Duffin Creek facility.
- The short distance, less than 500 m, between the Courtice WPCP and the potential thermal treatment facility may allow other synergies, including biogas pipeline conveyance to the thermal treatment facility for generation of electricity.
- Infrastructure such as water, sewer and natural gas, necessary to the thermal treatment facility, could be sized to provide servicing to other potential Clarington Energy Park buildings thereby providing cost savings by cost sharing.

3.6.2 Clarington 04

The Clarington 04 site has the following potential for synergy with municipal infrastructure:

- Potential thermal treatment of 14,800 to 24,700 tpy of dewatered biosolids, for a thermal facility sized at 150,000 to 250,000 respectively. Biosolids from the Port Darlington WPCP could be dewatered and treated at a facility located at this site. Clarington 04 is also within a reasonable distance for it to be cost effective to haul dewatered biosolids from the Duffin Creek facility.
- The longer distance of 1 km from the thermal treatment facility to the WPCP would likely prohibit the conveyance of biogas by pipeline to the thermal treatment facility.
- At this time the extent of the potential for new development around the Clarington 04 site is not known, and thus the potential for any shared infrastructure cannot be determined.

3.6.3 East Gwillimbury 01

The East Gwillimbury 01 site has the following potential for synergy with municipal infrastructure:

- It is possible to use the scales, some of the onsite roads and visitor parking areas at the blue box material recovery facility (MRF) located at the adjacent York Region's Waste Management Centre.
- It is possible to consider incinerating the MRF residues at the new thermal treatment facility thereby eliminating transportation costs.
- Some dewatered biosolids from the Duffin Creek facility could also be hauled to a facility located at the East Gwillimbury site and thermally treated. The haul distances to this site are much greater than the distances to the Clarington sites.

4. Design/Operational Flexibility

The primary site-specific factor that has the potential to affect the design and operational flexibility of the facility is the size and configuration of the site.

For each of the Short-List sites, the surplus areas were determined, based on consideration of lands excluded due to site constraints, stormwater management requirements and the area required to accommodate a 400,000 tpy thermal treatment facility plus roads, parking, and weigh scales. This surplus area of land would be available to accommodate variations in the potential facility design and would provide operational flexibility for the facility.

4.1 Assumptions

Thermal treatment facility sizing estimates were based on the Durham/York need for thermal treatment of residual Municipal Solid Waste (MSW) over the 35-year planning period. The ultimate capacity of the thermal facility could be as much as 400,000 tonnes per year (t/yr) of MSW, at the end of the 35-year planning period for the study, operating 24 hours per day and 7 days per week.

The site sizing estimate was based on a “stand-alone” facility with provision for expansion to a capacity of 400,000 Tonnes per year, on-site ash processing, storm water management features, parking for 100 vehicles, on-site roads for full management and queuing of waste and ash vehicles and adequate buffer zones and set-backs.

4.2 Minimum Required Site Size

Appendix E to this report entitled the *Technical Memo on Thermal Treatment Facility Site Sizing and Surplus Areas* outlines the minimum required site size for a 400,000 tpy thermal treatment facility based on a generic design developed by Ramboll. The minimum required site size for the actual footprint of the facility process components plus roads, parking, and weigh scales, but excluding any allowance for an additional buffer zone, is approximately 7.26 ha (220 m x 330 m).

Stormwater storage requirements were based on the generic thermal treatment facility design and the configuration of the sites and were addressed in detail within Section 3.1 of the *Report on Potential Water Quality Impacts*. The size of the stormwater retention pond has been calculated as 1.0 ha for the Clarington 01 and 05 sites and the East Gwillimbury site and 0.9 ha for the Clarington 04 site.

The *Report on Potential Environmentally Sensitive Areas and Species Impacts and Potential Aquatic and Terrestrial Ecology Impacts* identified natural heritage features that must be avoided on some sites.

Appendix E provides detailed information and drawings, for the potential configuration of a 400,000 tpy thermal treatment facility and required infrastructure on each of the Short List sites. The potential configurations consider the need to avoid constrained areas, the preferred location for the stormwater ponds for good site drainage, and appropriate placement of the generic facility footprint on the remaining lands.

4.3 Surplus Area at each of the Short-List Sites

Table 4.1 shows the total area of each site under consideration and the usable and surplus areas of each of the sites.

Table 4.1 Summary of Useful Site Areas

Short-List Site	Total Area (ha)	Excluded Lands (ha)	SWM Pond Area (ha)	Site Plan (ha)	Surplus Area (ha)
Clarington 01	12.4	0.0	1.0	7.3	4.2
Clarington 04	14.8	0.0	0.9	7.3	6.7
Clarington 05	27.2	13.4	1.0	7.3	5.5
East Gwillimbury 01	11.5	2.8	1.0	7.3	0.5

The Clarington sites have surplus lands that would be available to accommodate variations in the potential thermal treatment facility design and would provide operational flexibility for the facility. The East Gwillimbury 01 site has some surplus lands.

5. Identification of Preliminary Site Advantages and Disadvantages

In order to evaluate the four Short-List sites and determine which site is best suited for the proposed undertaking, the net effects associated with each site were compared through the application of indicators reflecting the criterion of compatibility with existing infrastructure and the design/operational flexibility provided by the site. This evaluation was used to establish the relative advantages and disadvantages for each site.

These advantages and disadvantages presented in Table 5.1 below, are based on the professional judgement of the project team.

Table 5.1 Summary of Technical Considerations – Application of Short-List Evaluation Criteria

Criteria	Indicator	Clarington 01	Clarington 04	Clarington 05	East Gwillimbury 01
Compatibility with Existing Infrastructure	Distance from Required Infrastructure (i.e. sewers, hydro, road access, water)				
	• Electrical Grid Connection	Disadvantage • Electrical grid connection along one side of site • Potential capacity constraints may require new transmission line to Wilson transformer station	Disadvantage • Electrical grid connection along one side of site • Potential capacity constraints may require new transmission line to Wilson transformer station	Disadvantage • Electrical grid connection along two sides of site • Potential capacity constraints may require new transmission line to Wilson transformer station	Advantage • Electrical grid connection along one side of site
	• Water Connection	Disadvantage • Secondary connection required • Requires 4,000 m of 300 mm pipe	Disadvantage • Secondary connection required • Requires 2,000 m of 400 mm pipe • Requires crossing Highway 401	Disadvantage • Secondary connection required • Requires 4,500 m of 400 mm pipe	Advantage • No secondary connection required • Requires only 50 m of 300 mm pipe

Table 5.1 Summary of Technical Considerations – Application of Short-List Evaluation Criteria

Criteria	Indicator	Clarington 01	Clarington 04	Clarington 05	East Gwillimbury 01
	• Sewer Connection	Advantage • Potentially requires 300 m of 450 mm gravity sewer	Disadvantage • Potentially requires 2,500 m of 450 mm gravity sewer • Potentially requires rail crossing and a watercourse crossing	Disadvantage • Potentially requires 1,300 m of 450 mm gravity sewer	Major Disadvantage • Potentially requires 7,000 m of 300 mm force main • Potentially pumping station and force main required, crossing Highway 404, plus several watercourse crossings
	• Natural Gas Connection	Disadvantage • 3 km of 200 mm (8") pipe • Requires crossing Highway 401 and several small water courses	Disadvantage • 4 km of 150 mm (6") pipe • Requires crossing Highway 401 and several small water courses	Disadvantage • 2.6 km of 200 mm (8") pipe • Requires crossing Highway 401 and several small water courses	Advantage • Existing 100 mm (4") pipe at site
	• Road Access	Disadvantage • Good access from highway 401 • 1,200 m of access road requires upgrading	Disadvantage • Good access from highway 401 • 500 m of access road requires upgrading	Disadvantage • Good access from highway 401 • 400 m of access road requires upgrading	Advantage • Good access from highway 404 • No road upgrades required
	• Heat Loads	Major Advantage • Courtice WPCP can use some of available heat load • Sufficient biogas from WPCP to generate electricity cost effectively • District heating could be provided to adjacent Energy Park	Disadvantage • Less viable for Port Darlington WPCP to use available heat load • Insufficient Biogas from WPCP to generate electricity cost effectively • Limited potential for use of heat energy in adjacent areas	Major Advantage • Courtice WPCP can use some of available heat load • Sufficient biogas from WPCP to generate electricity cost effectively • District heating could be provided to adjacent Energy Park	Disadvantage • Limited potential for use of heat in adjacent areas/buildings

Table 5.1 Summary of Technical Considerations – Application of Short-List Evaluation Criteria

Criteria	Indicator	Clarington 01	Clarington 04	Clarington 05	East Gwillimbury 01
	• Synergy with Municipal Infrastructure	Major Advantage • Potential to thermally treat dewatered biosolids from Courtice WPCP • Some synergy with Courtice WPCP due to proximity and size of WPCP • Potential to share major infrastructure with Energy Park	Advantage • Potential to thermally treat dewatered biosolids from Port Darlington WPCP • Little synergy with Port Darlington WPCP, greater distance and smaller WPCP	Major Advantage • Potential to thermally treat dewatered biosolids from Courtice WPCP • Some synergy with Courtice WPCP due to proximity and size of WPCP • Potential to share major infrastructure with Energy Park	Advantage • Potential to share scales, some access roads and parking area with York Region Recycling Facility • Potential to thermally treat Recycling Facility residues
	OVERALL:	ADVANTAGE (disadvantages associated with electrical, water, gas and road infrastructure, are more than offset by advantage associated with sewer infrastructure and major advantages associated with adjacent WPCP and Energy Park)	DISADVANTAGE (disadvantages associated with electrical, water, sewer, gas and road infrastructure, as well as the disadvantage associated with less viable heat loads; are not offset by the potential to thermally treat biosolids at adjacent WPCP)	NEUTRAL (disadvantages associated with electrical, water, sewer, gas and road infrastructure, are offset by major advantages associated with adjacent WPCP and Energy Park)	ADVANTAGE (major disadvantage associated with potential sewer infrastructure and disadvantage with limited potential heat loads; are more than offset by the advantages associated with electrical, water, gas and road infrastructure, and advantage of potential synergies with York Recycling facility)
Design /Operational Flexibility Provided by Site	Area surplus to minimum requirement provided by site	ADVANTAGE • Useful Area 12.4 ha • Surplus Area 4.2 ha	ADVANTAGE • Useful Area 13.8 ha • Surplus Area 5.5 ha	ADVANTAGE • Useful Area 14.8 ha • Surplus Area 6.7 ha	NEUTRAL • Useful Area 8.7 ha • Surplus Area 0.5 ha
	OVERALL:	ADVANTAGE (site has significant surplus area)	ADVANTAGE (site has significant surplus area)	ADVANTAGE (site has significant surplus area)	NEUTRAL (site has some surplus area)
OVERALL		ADVANTAGE	NEUTRAL	ADVANTAGE	ADVANTAGE

6. Summary and Conclusion

In summary, the sites are listed below with associated advantages and disadvantages based on the evaluation of their suitability for the proposed project.

Clarington 01: In regards to compatibility with existing infrastructure, this site has disadvantages in regards to connections to the electrical grid, water servicing, natural gas connections and requirements for upgrades for the access roads to the site. This site has an advantage in regards to sanitary sewer servicing as the connection is quite close to the site. The site has major advantages in regards to the potential heat loads available in proximity to the site and in regards to synergy with municipal infrastructure, largely due to the close proximity of the site to the Courtice WPCP. In regards to design and operational flexibility, this site has an advantage based on 4.2 hectares of surplus lands, outside of the required area for the processing components and the required site infrastructure.

Clarington 04: In regards to compatibility with existing infrastructure, this site has the most disadvantages in regards to connections to the electrical grid, water servicing, sanitary sewer servicing, natural gas connections and requirements for upgrades for the access roads to the site. This site has no real advantages in regards to the potential heat loads available in proximity to the site and in regards to synergy with municipal infrastructure, as the heat requirements for the Port Darlington WPCP are relatively low and this WPCP is located one (1) kilometre away from the Clarington 04 site. In regards to design and operational flexibility, this site has an advantage based on 6.7 hectares of surplus lands, outside of the required area for the processing components and the required site infrastructure.

Clarington 05: In regards to compatibility with existing infrastructure, this site has disadvantages in regards to connections to the electrical grid, water servicing, natural gas connections and requirements for upgrades for the access roads to the site. This site also has a disadvantage in regards to sanitary sewer servicing as the connection is 1.3 km from site. The site has major advantages in regards to the potential heat loads available in proximity to the site and in regards to synergy with municipal infrastructure, largely due to the close proximity of the site to the Courtice WPCP. In regards to design and operational flexibility, this site has an advantage based on 5.5 hectares of surplus lands, outside of the required area for the processing components and the required site infrastructure.

East Gwillimbury 01: In regards to compatibility with existing infrastructure, this site has the most advantages in regards to connections to the electrical grid, water servicing, natural gas connections and requirements for upgrades for the access roads to the site. This site has a disadvantage in regards to sanitary sewer servicing, requiring the construction of 7 km of force main. The site also has a disadvantage in regards to potential heat loads, as the potential use of heat is limited in the vicinity of the site. In regards to synergy with municipal infrastructure, there are some potential advantages in shared infrastructure with the York Region MRF adjacent to the site. In regards to design

and operational flexibility, this site has some (0.5 hectares) of surplus lands, outside of the required components for the processing area and the required site infrastructure.

Clarington 04 is the only site without an overall advantage in regards to technical considerations.

For the purpose of considering the net effects associated with each site in regards to *Technical Considerations: Compatibility with Existing Infrastructure and Design/Operational Flexibility*, based on the results of the assessment described above, it is proposed that the relative advantages and disadvantages of the Short-List sites be as outlined in Table 6.1 below.

Table 6.1 Summary Table – Technical Considerations: Compatibility with Existing Infrastructure and Design/Operational Flexibility– Relative Advantages and Disadvantages

Criteria	Clarington 01	Clarington 04	Clarington 05	East Gwillimbury 01
Compatibility with Existing Infrastructure	ADVANTAGE	DISADVANTAGE	NEUTRAL	ADVANTAGE
Design /Operational Flexibility Provided by Site	ADVANTAGE	ADVANTAGE	ADVANTAGE	NEUTRAL
OVERALL	ADVANTAGE	NEUTRAL	ADVANTAGE	ADVANTAGE