



LAMBTON COUNTY
WASTE MANAGEMENT MASTER PLAN

VOLUME 1

MASTER PLAN REPORT

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LIST OF ACRONYMS

3Rs	Reduce, Reuse, Recycle
C of A	Certificate of Approval
EAA	Environmental Assessment Act
EFW	Energy-from-Waste
EPA	Environmental Protection Act
ha	Hectare
HDPE-SPI2	High Density Polyethylene (e.g. plastic bottles and tubs)
HHW	Household Hazardous Waste
IC&I	Industrial, Commercial and Institutional
LDPE-SPI4	Low Density Polyethylene (e.g. plastic wrap and bags)
MOEE	Ontario Ministry of Environment and Energy
MRF	Materials Recovery Facility
OPA	Official Plan Amendment
PAC	Public Advisory Committee
PET-SPI1	Polyethylene Terephthalate (e.g. plastic soft drink bottles)
PP-SPI5	Polypropylene (battery cases, cereal box liners)
PS-SPI6	Polystyrene (e.g. foam plastic cups and clam shell containers)
PSC	Pre-submission Consultation
WMMP	Waste Management Master Plan
WRO	Waste Reduction Office

1.0 INTRODUCTION

Waste management is a challenge facing municipalities across Ontario. In Lambton County, as in other areas across Ontario and throughout Canada, the production of waste has risen as population, economic development and our standard of living have increased.

In 1992, the residents, businesses and industries of Lambton County produced approximately 100,000 tonnes of solid non-hazardous garbage. This figure is equivalent to about 2.2 kg (almost 5 lbs.) of waste per person per day.

Effective municipal waste management requires comprehensive long-term planning. This report presents a long-term Waste Management Master Plan (WMMP) for the County of Lambton. The process followed to develop the Master Plan is documented, and the recommended waste management activities and initiatives are identified.

The types of wastes addressed by the Master Plan are municipal solid wastes, which include residential and commercial wastes, and solid non-hazardous industrial wastes. The Plan addresses a 25 year period, from 1991 to the year 2016. Since it is expected to take approximately five years for the approval and development of new landfill capacity, landfill capacity needs are based on a 20 year period, from 1996 to the end of 2015.

The Lambton County Waste Management Master Plan is presented in four volumes, as follows:

**Volume 1
Master Plan Report**

This volume contains a summary of the main activities and findings of the Lambton County WMMP planning process. It presents the study background, a summary of public and agency consultation, descriptions of waste diversion and waste generation, a description of the waste management system development, the short-term and long-term waste diversion strategies, and the results of the facility siting and transfer station feasibility studies. The last chapter deals with the implementation of the Master Plan.

**Volume 2
Technical Appendices**

This volume contains the technical appendices related to the development of the waste management system. The appendices include a glossary; the Master Plan Terms of Reference; a description of waste management regulations, legislation and policies; details regarding the determination of waste quantities and the waste diversion rate; details of the transfer station feasibility study; details of the development of the long-term waste diversion strategy; and a description of the Concordance Analysis Method.

**Volume 3
Public and Agency
Consultation Appendices**

This volume, in two parts, contains appendices related to the public and agency consultation program. Included are notices, newsletters, agendas, minutes of meetings and sign-in sheets from the Public Information Centres.

**Volume 4
Site Selection
Appendices**

This volume presents the technical appendices for the site selection process. This includes some detailed scale maps related to the identification of alternative sites and the technical reports related to the detailed comparison of the four potential sites.

1.1 The Goal and Objectives of the Master Plan

The goal of the Lambton County WMMP process was to develop the best system for the long-term management of municipal solid wastes in the County. The specific objectives were to define a system that would:

- minimize impacts on the environment;
- minimize costs; and
- maximize service to the people in Lambton County.

Consistent with the above goal and objectives, a basic premise in developing the Plan was to develop a system that would provide for maximum waste diversion (i.e. the maximum diversion of wastes from disposal facilities, such as landfills). With the aim of maximizing waste diversion, the priorities for the reduction and management of wastes are defined as follows:

- first priority: reduction of waste generated;
- second priority: reuse of materials;
- third priority: recycling of materials; and
- last priority: disposal of wastes.

The emphasis on diversion is consistent with the Ministry of the Environment and Energy's (MOEE's) target for Ontario to divert at least 50% of wastes from disposal by the year 2000.

A second basic premise in developing the Plan was that it would focus on the development of public sector (County) solutions to long-term waste management needs. This was based on the County's decision that it could not be solely dependant upon the private sector for the provision of long-term solutions. The long-term planning assumption, therefore, was that the County would pursue public sector solutions for waste management needs unless and until private sector solutions are in place. According to the Public Works Committee (minutes of meeting on June 7, 1994), the following motion regarding private versus public sector solutions was passed on May 18, 1993: *"That the County continue to pursue both the private sector and public sector (Waste Management Master Plan) options in order to determine the preferred course of action for the County and its municipalities in the long-term"*.

Therefore, although this Plan focuses on the development of public sector waste management solutions, the County has been pursuing and will continue to pursue, possible private sector contributions to its long-term needs, and the potential role of the private sector is encouraged in the Master Plan.

1.2 The Ontario Waste Management Planning Program

A Waste Management Master Plan (WMMP) Program was initiated by the Ontario Ministry of Environment and Energy (MOEE) in 1985 to assist municipalities in long-term waste management planning. The MOEE's advisory document on "Waste Management Planning and the Ontario Environmental Assessment Act,"¹ identified the purpose of the WMMP process as follows: "to establish a preferred, environmentally acceptable waste management system for the long-term management (20 years or more) of primarily municipal waste" (p. 24). The planning process was to include "a comprehensive review of all reasonable waste management technologies and processes, in accordance with *Environmental Assessment Act* requirements" (p. 25). The advisory document outlined five stages for the waste management planning process:

- **Stage 1, Data Collection:** Stage 1 was to include the collection of general background information, an assessment of the current waste management system, projections of future system requirements, and the development of criteria to evaluate waste management alternatives.
- **Stage 2A, Candidate Areas and Markets:** In Stage 2A, possible areas for waste management activities and markets were to be identified and evaluated, followed by the development of preliminary recommendations regarding the appropriate components for the waste management system.
- **Stage 2B, Analysis of Alternatives:** Stage 2B was to include the identification and evaluation of alternative facilities, sites and technologies, according to natural environmental, social, economic, cultural, technical and land use planning criteria. A preferred waste management system was to be identified and adopted at the end of Stage 2B.

¹ First issued in 1985 and revised in 1988 and 1990.

- **Stages 3A and 3B, Master Plan:** In Stage 3A the preferred system was to be examined in detail; the final report was to document how the system would be implemented. If the Master Plan was to be submitted for an *Environmental Assessment Act* approval, a summary document (Stage 3B) was to be prepared.

In each stage of the Master Plan process, input from the public and government review agencies was to be incorporated.

In February 1992, the Waste Reduction Office (WRO) was established by the Minister of Environment and Energy to develop waste diversion programs and projects. As part of its mandate, the WRO has revised the WMMP Program to reflect new government initiatives.

Appendix 2C in Volume 2 outlines the key legislation, regulations, policies and guidelines which regulate waste management in Ontario. Two key Ontario statutes, the *Environmental Assessment Act*, 1990 (EAA) and the *Environmental Protection Act*, 1990 (EPA), regulate the planning, approval and implementation of certain types of waste management facilities.

The MOEE requires that WMMPs be developed in accordance with the requirements of the EAA. Some waste management facilities recommended by a Master Plan, such as a new landfill site, are subject to the requirements of both the EAA and the EPA. Other facilities, such as a transfer station or certain types of materials recovery facilities (MRF), may require approval under the EPA only.

The MOEE approved new 3Rs (reduce, reuse, recycle) Regulations for Ontario in March 1994. Under the regulations, some facilities may receive approval using a new streamlined process. Under this process, the procedure to obtain a Certificate of Approval for a waste disposal site from the MOEE is not required in advance of opening the facility. Instead, the proponent is required to comply with certain siting, design, notification, operating and reporting requirements. The streamlined process mainly applies to diversion system facilities such as material recovery facilities and composting sites. Other facilities, such as landfill sites, still require application for and approval of a Certificate of Approval for a waste disposal site.

1.3 A Brief History of the Lambton County WMMP Process

The County of Lambton and City of Sarnia began preparing the Waste Management Master Plan in 1986. The Terms of Reference for the Master Plan are provided in Appendix 2B in Volume 2.

M.M. Dillon Limited (Dillon) was retained to assist in the preparation of the Master Plan. The firm of Paterson Planning and Research Limited assisted Dillon during the early planning stages with administrative and financial aspects of the Plan.

The preparation of the Master Plan was directed by a Steering Committee composed of members of Lambton County Council and the City of Sarnia Council, County and City staff and representatives of the MOEE's Waste Management and Environmental Assessment Branches. Members of a Public Advisory Committee (PAC), formed in 1989, have been actively involved in the planning process. Representatives of the MOEE's Environmental Assessment Branch have provided advice and assistance throughout.

Following the five waste management planning stages outlined in Section 1.2 (above), three reports were prepared by Dillon in 1986 and 1987:

- **The Stage 1 Report** (September 1986) identified a long list of possible waste management elements and components, described the existing waste management system and documented its adequacy to meet future needs. It also identified areas which were suitable for particular elements and components. An Addendum to the Stage 1 Report was issued by Dillon in January 1987. The Addendum included revisions to some of the information included in the Stage 1 Report.
- **The Stage 2A Report** was issued by Dillon in May 1987. The report established a framework for the evaluation of alternative waste management systems and components. The report identified two alternative systems for further evaluation. These systems were:
 1. the existing collection system and landfill facilities plus source separation/recycling and household composting; or
 2. the existing collection system and landfill facilities with an energy from waste (EFW) facility, plus source separation/recycling and household composting.
- **The Stage 2B Report** (May 1988) presented the evaluation of the two systems identified in the Stage 2A Report. It described opportunities for recycling and the impact of recycling on the alternatives. It presented an optimization of the two systems, based on the allocation of waste flows, transfer station requirements, the desirability of shredding and the import/export of wastes. The landfill based system, with no EFW, was identified as the preferred alternative.

The Stages 1, 2A and 2B Reports also concluded that no new landfill capacity would be required within the planning period for the Master Plan.

During much of 1988 and 1989, work on the Master Plan was on hold pending the outcome of the boundary negotiations between the City of Sarnia, the Town of Clearwater and Lambton County. Several events occurred in late 1988 and 1989 which affected the results of the previous work and the overall direction and purpose of the Master Plan:

- In late 1988, it was determined that the City of Sarnia Landfill Site was reaching its capacity much sooner than expected.²
- Bill 35, "An Act respecting the Amalgamation of the City of Sarnia and the Town of Clearwater and its addition to the County of Lambton," was passed by the Provincial Legislature in 1989. The Bill provided for the amalgamation of the City and the Town, as the City of Sarnia-Clearwater (now named the City of Sarnia), and the addition of the new City to Lambton County on January 1, 1991. Also on that date, responsibility for waste management was transferred from the City of Sarnia and the County's local municipalities to Lambton County. Prior to this, the County had not been responsible for waste management. The County hired a Waste Management Administrator and formed a Waste Management Department in late 1989.
- In March 1989, the MOEE announced new waste diversion from landfill objectives of at least 25 per cent diversion by 1992 and at least 50 per cent diversion by the year 2000.
- Originally, the Master Plan was not intended to meet the requirements of the EAA. In July 1989, a decision was made by the Steering Committee to upgrade the Master Plan to meet the requirements of the EAA. A significant feature of the upgraded Master Plan was an expanded public consultation program.

As a result of these events, a decision was made in 1989 to prepare a new EAA-level Master Plan which would build upon the previous work, where appropriate, and summarize new work.

In December 1989 a partial Draft Master Plan was prepared by Dillon and distributed to the Steering Committee and the PAC. The purpose of the draft was to provide a summary of the work completed to date and to encourage the implementation of any aspects of the

² In November 1990, the City of Sarnia and the County of Lambton applied to the MOEE for an *Environmental Assessment Act* Exemption Order and a Certificate of Approval under the *Environmental Protection Act* for a proposed interim (five year) expansion of the Sarnia Landfill Site. As a result of Bill 35, Lambton County became the sole proponent of this application. Approval for the interim expansion was obtained in October 1994.

recommended system (such as the 3Rs) which were independent of the siting of a new waste management facility.

In November 1993, a full draft of the EAA-level Master Plan was produced and distributed for review by the Steering Committee, County Council, the Public Advisory Committee, the Ministry of Environment and Energy, and other interested groups in Lambton County. The March 1994 draft was distributed to government review agencies, and to the firm of Gore and Storrie who conducted a technical review of the Master Plan on behalf of the Townships of Moore and Sombra.

This February 1995 Master Plan Report (Volume 1), along with its three volumes of supporting appendices, documents the complete EAA-level Master Plan. Information pertinent to the pre-1989 process, including information relevant to the development of the recommended waste management system, has been summarized and incorporated. Comments received from reviewers, the County's responses, and where appropriate, revisions resulting from the review process have also been incorporated.

1.4 Organization of Master Plan Report and Appendices

The contents of the Master Plan Report (this volume) and its Appendices are listed in Table 1.1.

**TABLE 1.1
ORGANIZATION OF MASTER PLAN REPORT AND APPENDICES**

VOLUME 1 - MASTER PLAN REPORT	
1.0	Introduction
2.0	Public and Agency Consultation
3.0	Current Status of Waste Management in Lambton County
4.0	Description of the Development of the Recommended Waste Management System
5.0	Waste Diversion Strategies
6.0	Site Selection for Long-Term Composite Facility
7.0	Economic Feasibility of Transfer Stations
8.0	Administration and Implementation of the Master Plan
VOLUME 2 - TECHNICAL APPENDICES	
2A	Glossary of Terms
2B	Terms of Reference
2C	Legislation, Regulations and Guidelines Pertaining to Waste Management Planning in Ontario
2D	Determination of Past, Present and Future Waste Quantities
2E	Waste Management Component and System Evaluation and Selection
2F	Transfer Station Feasibility Study
2G	Long-Term Waste Diversion Strategy
2H	Description of Concordance Analysis

TABLE 1.1
ORGANIZATION OF MASTER PLAN REPORT AND APPENDICES
(Continued)

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4B	Biology Impact Assessment
4C	Design and Operations Assessment
4D	Hydrogeologic Impact Assessment
4E	Land Use Impact Assessment
4F	Social Impact Assessment
4G	Surface Water Impact Assessment
4H	Transportation Impact Assessment

1.5 The Study Area

The study area for the Master Plan is the County of Lambton, including the City of Sarnia.³ The County is located in Southwestern Ontario, about 40 km west of London and 220 km southwest of Toronto. It is bordered on the north by Lake Huron and on the west by the St. Clair River, which forms the boundary between Canada and the United States.

One of Ontario's largest counties, Lambton has an area of approximately 283,091 hectares. Its 1991 census population, including its 20 local municipalities, was 128,943. The City of Sarnia, which had a 1991 population of 74,376, is the County's largest urban centre.

The County's townships include Brooke, Dawn, Enniskillen, Euphemia, Moore, Plympton, Sombra and Warwick. Most of these, with the exception of Moore and parts of Plympton, are agricultural townships where farming is the major economic activity.

³ The City of Sarnia and the Town of Clearwater (formerly the Township of Sarnia, which became a Town in 1987) were amalgamated on January 1, 1991, to form the City of Sarnia-Clearwater. The new City was added to the County as one of the County's local municipalities. The City's name officially changed back to Sarnia on January 1, 1992.

The City of Sarnia is the County's major urban centre. The most important economic activity in Sarnia and Moore Township is the petro-chemical industry. This industry is centred in the "Chemical Valley" located in the southwestern portion of Sarnia, the western portion of Moore Township and the northwest corner of Sombra Township. Major industries include Dow Chemical Canada, Esso Petroleum Canada, Polysar Rubber and Novacor Chemicals.

Other urban centres in the County include the Towns of Forest (1991 population of 2,787) and Petrolia (4,594 people). Both towns are important retail and service centres for the surrounding agricultural areas and, in the case of Forest, the residential and recreational development located along the Lake Huron shoreline. The Town of Petrolia is also a small manufacturing centre. Other urban centres include the Villages of Alvinston (920 people), Arkona (530), Grand Bend (789), Oil Springs (690), Point Edward (2,336), Thedford (791), Watford (1,524) and Wyoming (2,048). With the exception of Point Edward and Grand Bend, all of these Villages function as retail and service centres for the surrounding agricultural areas. The Village of Point Edward is located adjacent to the City of Sarnia and is part of the Sarnia urbanized area.

The Village of Grand Bend, including the adjoining areas in the Town of Bosanquet (4,884 people)⁴, is one of Ontario's most popular summer resorts. Pinery Provincial Park and Ipperwash Provincial Park are located in this area. The area features sandy beaches, sand dunes, including the nationally significant dunes at Port Franks, and oak and pine forests which include many rare and endangered plant and wildlife species.

⁴ Bosanquet officially became a town on December 1, 1994.

2.0 PUBLIC AND AGENCY CONSULTATION

This chapter summarizes the public and agency consultation which occurred during all stages of the Master Plan process. Volume 3 presents copies of the material relevant to the consultation program, including notices, newsletters, agendas, minutes of meetings, and sign-in sheets from the Public Information Centres, as well as the comments reviewed and responses developed during the 1994 review of the Draft Master Plan.

2.1 Purpose and Objectives of Pre-Submission Consultation

As explained in Chapter 1, the Lambton County Waste Management Master Plan was upgraded in 1989 to meet the requirements of the EAA. A significant feature of the upgraded Master Plan was an expanded public and agency consultation program, intended to meet the requirements of MOEE's policy on "*Pre-submission Consultation in the Environmental Assessment Process*".

The purpose of pre-submission consultation is to ensure that effective communication occurs between the proponent, members of the public, and government agencies in the planning of a Master Plan prior to submission of the final document for MOEE approval.

Lambton County's Master Plan consultation program provided an interactive and open approach to the assessment process allowing the public and government agencies to become more familiar with the details of the proposed undertaking and to participate in decision making. The consultation program also provided the proponent with the opportunity to gather information concerning local and government agency perspectives, goals, attitudes, values, concerns and potential impacts.

The pre-submission consultation program for Lambton County's Waste Management Master Plan has:

- contributed to the development of an environmentally sound and defensible proposal;
- helped establish the credibility of the proponent with the public;
- provided forums for the negotiation of agreements on key issues; and
- assisted in obtaining public and agency support for the proposal.

The Stages 1 and 2 public and agency consultation programs were completed prior to 1989. The expanded consultation program was completed after 1989.

2.2 Stage 1 Consultation

Materials related to the consultation activities which took place during Stage 1 are included in Appendix 3A of Volume 3. The following activities occurred at the beginning of Stage 1:

- A letter dated February 28, 1986, from the Lambton County Planning Department to the County's local municipalities (Volume 3, Appendix 3A, Schedule 3A-1) explained the purpose of the Master Plan. The letter included a copy of Newsletter No. 1 (Schedule 3A-2) which described the purpose of the Master Plan, the Master Plan process and how the public and interest groups could participate in its preparation. Also included was a questionnaire (see Schedule 3A-1) concerning current municipal waste management systems. The municipalities were asked to distribute the newsletter to the public and complete the questionnaire and return it to the consultant.
- In March 1986, Newsletter No. 1 was distributed to all County libraries for distribution to the public.
- In March 1986, a Notice advising of the start-up of the Master Plan (see Schedule 3A-3) was placed in ten daily and weekly newspapers serving the City of Sarnia and Lambton County. The notice summarized the information included in Newsletter No. 1 and invited the public and interest groups to participate.
- About 55 Federal and Provincial Ministries and agencies were invited to participate in the Master Plan process, by letter dated February 28, 1986, from the Lambton County Planning Department (Schedule 3A-4). Newsletter No. 1 was enclosed. About 30 agencies responded that they would like to participate, and together they became an External Team of advisors and reviewers. The agency responses are also included in Schedule 3A-4.
- About 25 local interest groups were invited to participate in the Master Plan by letter dated March 13, 1986, from the Lambton County Planning Department (Schedule 3A-5). Newsletter No. 1 was also enclosed. Response to this letter was limited.
- A letter dated March 5, 1986, (Schedule 3A-6) to 46 industries located in Sarnia and the County, explained the purpose of the Master Plan and enclosed Newsletter No. 1. Also enclosed, was a questionnaire on current waste generation and disposal practices and potential energy from waste applications (included in Schedule 3A-6).

Two series of Open Houses were held during Stage 1.

The first series was held on April 23, 1986, at the Lambton County Offices in Wyoming (4:00 to 6:00 p.m. and 7:30 to 9:30 p.m.) and on April 24, 1986, at Sarnia City Hall (4:00 to 8:00 p.m.). The Open Houses were advertised at least twice in ten daily and weekly newspapers serving the County. The advertisement (included in Schedule 3A-7) was also distributed to local radio and television stations. A letter dated March 31, 1986, (see Schedule 3A-8) from the consultant invited the External Team to the Open Houses. Local interest groups were invited by a letter dated April 9, 1986 (Schedule 3A-9).

The purpose of the first series of Open Houses was to obtain public and agency comments on the existing waste management system and possible future system components. The format was informal with walk-through displays describing the existing landfill sites, possible future system components, the Master Plan and *Environmental Assessment Act* processes and the evaluation process and criteria which would be used to evaluate future components. Representatives of Dillon, MOEE, Lambton County and the City of Sarnia explained the displays to those who attended, answered their questions and recorded their comments.

Thirteen people attended the Open House in Wyoming and 12 attended the Open House in Sarnia. These included representatives of Lambton Wildlife Inc., residents who live near the Sarnia Landfill Site and the Laidlaw Landfill Site in Warwick Township and a few entrepreneurs interested in business opportunities in recycling. The representatives of Lambton Wildlife were interested in the preservation of various environmentally sensitive areas around Lambton County. The resident who lived near the Sarnia site was concerned by the quality of her well water. The Warwick resident was concerned by the possible expansion of the Laidlaw site. One comment card, supporting the project, was completed and submitted (Schedule 3A-10).

The second series of Open Houses was held on June 24, 1986, at the Lambton County Offices (4:00 to 5:30 p.m., and 7:00 to 9:00 p.m.) and on June 25, 1986, at Sarnia City Hall (6:00 to 8:00 p.m.). Notices for the Open Houses (see Schedule 3A-11) were placed in the ten local newspapers, advertised in other local media, and sent to the External Team, local interest groups and to those people who attended the first Open Houses in April. The External Team and local interest groups were invited by a Dillon letter dated June 9, 1986 (Schedule 3A-12).

The purpose of the second set of Open Houses was to obtain public and agency comments on the results of Stage 1. Again, the Open House was informal, with walk-through displays dealing with future waste management needs, the ability of the existing system to meet these needs, possible future system components and areas suitable for these components.

A total of 18 people attended the Open House in Wyoming and seven people attended the one in Sarnia. Two comment cards were filled in and submitted (see Schedule 3A-13). One

was from the same resident who lives near the Sarnia Landfill Site and was concerned about the quality of her well water. The other was from a resident of Warwick Township whose comments supported recycling. A letter was also subsequently received from a resident of Sarnia (also included in Schedule 3A-13) who stated that he supported the Master Plan and wished to be involved in its preparation. (This resident became involved in the PAC formed during Stage 3.)

A meeting with the External Team was held during Stage 1, on April 23, 1986, at the Lambton County Offices. A letter dated March 31, 1986, (Schedule 3A-14) from Dillon invited the agencies to attend. The meeting was held to explain the purpose of the Master Plan and the study's progress to date. The goals and objectives of a waste management system (included in Chapter 1.2.1 of the Stage 1 Report) were reviewed. Those who attended were asked to ensure that their agency's concerns were covered by these goals and objectives.

Ten people attended the meeting and included representatives of the Ministry of the Environment and Energy (Sarnia District Office), the Ausable Bayfield Conservation Authority, the Ministry of Tourism and Recreation, the Ministry of Citizenship and Culture (Native Branch), the Lambton Health Unit and the Ministry of Natural Resources. Very few comments were made by those who attended either during or subsequent to the meeting.

In June 1986, Newsletter No. 2 (Schedule 3A-15) was distributed to the External Team, local interest groups, local municipalities and to all County libraries for distribution to the public. The Newsletter explained the Master Plan process, the various components of a waste management system, the existing facilities in the County, and how to become involved in the Master Plan process.

On September 4, 1986, copies of the Stage 1 Report were distributed to all of the County's local municipalities and to those agencies and interest groups who had participated in Stage 1, for their review and comments. Very few comments were received by Dillon on the Stage 1 Report.

More detailed information on Stage 1 public and agency consultation is provided in the Stage 1 Report.

2.3 Stage 2A Consultation

Appendix 3B, Volume 3, includes the public consultation materials used during Stage 2A.

The Stage 2A Open Houses were held on June 2, 1987, at Sarnia City Hall (3:30 to 5:30 p.m.) and on June 3, 1987, at the County Offices (4:00 to 5:30 p.m. and 7:00 to 9:00 p.m.). A letter dated May 12, 1987, (included in Schedule 3B-1, Appendix 3B) from the County invited the External Team to the Open Houses. The letter also advised that a draft of the Stage 2A Report was available on request, for review and comment. Notices for the Open Houses (see Schedule 3B-2) were sent to local interest groups and to those who attended the Stage 1 Open Houses. The notices were also placed in ten weekly and daily newspapers.

The purpose of the Open Houses was to present the recommended waste management system and administrative structure which were identified in Stage 2A. The Open Houses were attended by about ten people. These included residents from Brooke and Warwick Townships, representatives of the Ontario Federation of Agriculture and local entrepreneurs. The residents of Warwick were concerned by alleged incidents of "off-hours dumping" around the Laidlaw Landfill Site. The representatives of the Federation of Agriculture stated that new facilities should not be located on prime agricultural land.

The letter dated May 12, 1987, (in Schedule 3B-1) invited the External Team to a June 3, 1987, meeting at the Lambton County Offices. The purpose of the meeting was to review the results of Stage 1 and the Draft Stage 2A Report. The meeting was attended by six people including representatives of the Ministry of Natural Resources, the Ministry of the Environment and Energy (Sarnia District), the Ausable Bayfield Conservation Authority, the St. Clair Region Conservation Authority and the Lambton Health Unit. Questions and comments concerned the method to be used by Dillon to determine suitable areas for new facilities, the effectiveness of EFW facilities with respect to waste reduction to landfills, and the environmental suitability of the existing landfill sites.

Comments received on the Stage 2A Report (see Schedule 3B-3) from the External Team included the following:

- The Ministry of Environment and Energy (formerly called the Ministry of Energy) had many comments and questions regarding statements made in the report about EFW. The Stage 2A Report was revised to respond to the Ministry's comments.
- Transport Canada, Airports Authority Group, provided their land use guidelines which require that municipal landfill sites be located at least 8 km away from airports. This was noted in the Stage 2B Report.

- The Environmental Assessment Branch of the MOEE made some suggestions regarding future Open Houses. The Branch suggested that the Open Houses be held during the evening in a shopping mall and that the County use a technique known as "Consensus Decision Making" using professional "Process Facilitators".
- The Ministry of Education commented that the local school boards should be involved. The Ministry was informed that both school boards were advised of the Master Plan and declined to participate in 1986.

Lambton County, by letter dated August 19, 1987, provided a copy of the Draft Stage 2A Report to the County's local municipalities, for review and comment. Comments (included in Schedule 3B-4) were received from the Village of Grand Bend and the Townships of Brooke, Moore and Sarnia. Grand Bend Council stated that their landfill site, when closed, should be used as a transfer station for any future landfill site. Sarnia Township Council stated that they preferred Administrative Alternative B (local municipalities responsible for collection and County responsible for handling, treatment and disposal, including City of Sarnia wastes). Brooke Township Council commented that the Master Plan should be completed as soon as possible. Moore Township Council (at that time, involved in boundary negotiations with the City of Sarnia) stated that they objected to being considered as part of the Sarnia Urban Area and recycling would be more effective as a County-wide program, rather than as separate municipal programs. Schedule 3B-5 provides copies of public comments on the Draft Stage 2A Report and County and Dillon responses.

2.4 Stage 2B Consultation

The Stage 2B Open Houses were held on November 9, 1987, at Sarnia City Hall (4:00 to 5:30 p.m.) and November 10, 1987, at the County Administration Building (4:00 to 5:30 p.m. and 7:00 to 8:30 p.m.). The purpose of the Open Houses was to present the recommended waste management system which was identified in Stage 2B. The methods used to advertise the Open Houses to the public, external agencies, local interest groups and the municipalities were the same as those used for the previous Open Houses. The public notice advertising the Open Houses is included in Volume 3, Appendix 3C, Schedule 3C-1.

These Open Houses were attended by a few residents of Warwick who were concerned by the possible expansion of the Laidlaw Landfill Site and some local entrepreneurs interested in recycling. A representative of Transport Canada also attended and reiterated their concerns regarding the proximity of any future landfill sites to the Sarnia Airport.

A letter dated October 22, 1987, (Schedule 3C-2) from Dillon invited the External Team to the Open Houses and to a meeting on November 9, 1987, at Sarnia City Hall. All local municipal councillors and City Aldermen were invited to the meeting. The purpose of the meeting was to discuss the recommended administrative structure (identified in Stage 2A) and the recommended waste management system (identified in Stage 2B). A presentation was made by staff from Dillon and Paterson Planning and Research. A discussion period followed. Those who made comments stressed the importance of recycling and appeared to favour a waste management system which would be administered on a county-wide basis.

2.5 Expanded Consultation Program

As mentioned in Section 2.1, the public and agency consultation program for the Master Plan was expanded in 1989 to allow further opportunity for public input and to meet the requirements of MOEE's policy for pre-submission consultation. Major features of the program were a Municipal Councillors' Workshop, a series of Public Information Centres, the establishment of a PAC and a series of site selection workshops. Public consultation materials used during this phase of the Master Plan study are provided in Volume 3.

2.5.1 Municipal Councillors Workshop

A workshop with Lambton County's local municipal councillors was held on November 20, 1989 at the County's Administration Building. All members of the local Municipal Councils were invited to attend. Approximately 30 councillors attended, along with several municipal staff. A copy of the invitation letter and the record of attendance is provided in Schedule 3D-1, Appendix 3D in Volume 3.

Dillon staff presented an overview of the work which had been completed during Stages 1 and 2, including recommendations for waste reduction and recycling programs. The presentation also covered the process which would be followed to identify potential sites for new landfill capacity. A copy of the minutes is included in Schedule 3D-1. After the presentation, there was a question and answer period. The Councillors were then invited to review the displays for the Public Information Centre, which was being held later that day.

2.5.2 Public Information Centres, November 1989

The purpose of the Public Information Centres was to inform Lambton County residents of the findings of the Master Plan to date and to obtain comments. Two Information Centres were held: one on November 20, 1989, from 3:00 to 9:00 p.m., at the Lambton County Building in Wyoming, and the other on November 21, 1989, from 2:00 to 8:00 p.m., at Sarnia City Hall. The Information Centres were advertised as follows:

- in the November 7, 9, 14, and 16, 1989 editions of the *Sarnia Observer*, and in the November 6 and 13, 1989, weekly editions of the *Sarnia Gazette*, the *Watford Guide Advocate*, the *Dresden Leader*, the *Wallaceburg Courier Press*, the *Petrolia Advertiser - Topic*, the *Forest Standard*, the *Glencoe Transcript and Free Press* and the *Zurich Advance*. A copy of the advertisement is provided in Schedule 3D-2.
- A newsletter (see Schedule 3D-3) was distributed to all households in Sarnia and the County in November 1989. It included the location, date and time of the Public Information Centres. The newsletter also described the Master Plan process, the County's existing waste management system, proposed 3Rs programs, the proposed interim expansion of the Sarnia Landfill site and the proposed site selection process for a new landfill for the County.
- Letters (copies are provided in Schedule 3D-4) were sent to all of the local municipalities, Federal and Provincial Ministries and agencies and local agencies and interest groups, inviting them to the Public Information Centres.

The Information Centres were informal walk-in sessions. Representatives of Lambton County, the City of Sarnia, the MOEE and Dillon were present to explain the displays and answer questions. The displays (a copy is provided in Schedule 3D-5) described the Master Plan process, the results of Stages 1, 2A and 2B, the 3Rs, the proposed Public Advisory Committee, the upcoming site selection public workshops, and the proposed process for selecting a new landfill site. The displays also showed a proposed study area for the site search (the study area, at that time, was based on a waste centroid/waste haul time concept and included areas within a 20-minute haul distance of the waste centroid, the Sarnia area). A copy of the display boards were sent to anyone who requested a copy at the Information Centre.

Comment forms were available, including nomination forms for the Public Advisory Committee and registration forms for the landfill site selection workshops. Approximately 45 people attended the Information Centre in Wyoming and 37 people attended the one in Sarnia. In addition to local residents, those who attended included representatives of the Sarnia-Lambton Health Unit, the Ministry of Natural Resources, DuPont Canada Inc., Esso Petroleum Canada and Lambton Wildlife Inc. Twenty-six comment, nomination and registration forms were completed. Comments and concerns included the following:

- many people stressed the importance of the 3Rs, especially recycling, composting and the re-use of waste materials;

- a number of people who live close to the Sarnia Landfill Site and the Laidlaw Landfill Site in Warwick stated that they were concerned by the quality of their well water, and piped municipal water should be provided to the residents surrounding any future landfill sites;
- three people stated that the County should not accept waste from Toronto or the United States; and
- some suggestions were made regarding the preferred location for a new landfill site including the following: the site should be at least 1 km away from existing and future residential areas; the site should avoid wetlands and the site should not be located on productive agricultural soils.

Schedule 3D-6 tabulates these comments.

2.5.3 Public Advisory Committee

A PAC was established in late 1989 to assist the Steering Committee in the development of the Master Plan and its implementation. To provide representation from across the County, Lambton County's local municipal councils were asked to submit the name of a ratepayer who would be willing to sit on the PAC. In addition, a few names were submitted for nomination to the Committee at the November 1989 Public Information Centres.

The PAC's first meeting took place on December 12, 1989. The Committee discussed its membership, a draft "Aim and Objectives", and a Terms of Reference. Representatives of Lambton County, Dillon and the MOEE's Environmental Assessment Branch attended the first meeting to assist the Committee and to answer questions about the Master Plan.

As of July 1993, the PAC included 22 members. A copy of the list of PAC members is provided in Schedule 3D-7. It has met on a fairly regular monthly basis since December 1989 and has played a very active role in the development of the Master Plan. The Committee's Chairman and Vice-Chairman have been voting members on the Steering Committee. The major activities of the PAC included the following:

- PAC members played a major role in the site selection workshops (described in Chapter 2.5.4).
- The PAC prepared detailed comments on the partial Draft Master Plan which was issued to the Steering Committee and PAC for comments, in December 1989.

- In August 1990, the PAC prepared an "Action Plan" for the Master Plan. The Action Plan dealt with waste diversion, waste reduction, education, waste bans and waste audits.
- In April 1991, the PAC prepared a "Waste Reduction Program" for the Steering Committee's consideration. The PAC proposed that it be authorized to co-ordinate volunteer efforts across the County to reduce wastes. The proposed program included workshops and preparation of information packages on household hazardous waste, and the 3Rs, including composting.
- In March 1993, PAC participated in "Envirofest", an event co-ordinated by the Lambton Industrial Society.

2.5.4 Site Selection Workshops

Special workshops provided the public with an opportunity to be involved in the decision making process for the selection of a new composite waste management facility site. Participants included those who had filled out a form at the November 1989 Public Information Centres indicating an interest in the workshops, and several members of the PAC. Participants were from the City of Sarnia, Town of Clearwater, the Villages of Alvinston, Grand Bend, Oil Springs, Thedford, Watford and Wyoming and the Townships of Brooke, Moore and Plympton.

Four site selection workshops were held. The workshops followed a constraint mapping process, whereby a series of progressively more restrictive constraints were applied to eliminate areas unsuitable for the facility. The steps used in this process (explained in further detail in Volume 1, Chapter 6 and Volume 4) were as follows:

- identify the study area for the site search
- identify candidate areas
- identify siting areas
- identify possible sites
- comparative evaluation of possible sites
- detailed comparison of the best sites to identify a preferred site.

a) **Workshop No. 1**

The first workshop was held on April 7, 1990 at Lambton College in Sarnia and was attended by 25 people. A copy of the information kit and meeting notes is provided in Schedule 3D-8. Workshop facilitators included County and Dillon staff. Participants were assigned three tasks:

- Identify the study area.
- List the constraints to be used to identify candidate areas.
- List the constraints to be used to identify siting areas.

The workshop participants asked Dillon staff to provide overlays showing the location of these constraints and opportunity areas, and the participants met again on April 14, 1990, without the facilitators, to review and discuss this information.

b) Workshop No. 2

This workshop was held on September 13, 1990 at the County's Administration Building and was attended by 25 people. County and Dillon staff facilitated the workshop. Participants agreed on a list of constraints which would be used to identify candidate areas for the waste management facility. A copy of the information kit and meeting notes is provided in Schedule 3D-9.

c) Workshop No. 3

The third workshop was held on October 11, 1990 in Wyoming. It was attended by 29 people and facilitated by County and Dillon staff. Participants were asked to further refine the constraints for the candidate areas to identify potential siting areas. After this was completed, participants then reviewed and agreed on the criteria to be used to identify potential sites. The participants agreed that the site should be at least 71 ha⁴ so that it could accommodate a landfill, an MRF and a composting facility. This decision and the previous work completed at the workshops resulted in the identification of potential sites (see Chapter 6).

The participants also discussed and ranked the goals of the site selection process. Criteria groupings and indicators for the comparative evaluation of potential sites were also reviewed and discussed. Participants were asked to rank the criteria and indicators as "low, medium or high" importance. They agreed on a list of criteria and indicators, but deferred any ranking until more information was available on the potential sites.

Dillon staff agreed to prepare tables showing data for the comparative evaluation of the potential sites and to provide a copy to each workshop participant, prior to Workshop No. 4. A copy of the information kit and meeting notes from this workshop is provided in Schedule 3D-10.

⁴ This was later increased by Dillon to 75 ha to maximize the site's flexibility.

d) Workshop No. 4

The final workshop was held on November 29, 1990. It was attended by 18 people. The purpose of the workshop was to review Dillon's data for the comparative evaluation of the potential sites and to rank the criteria to be used in the comparative evaluation as "low, medium or high" importance. This information was then used by the study team in the comparison of potential sites (see Chapter 6). A copy of the information kit and meeting notes is provided in Schedule 3D-11.

The workshop group decided that further meetings were not required. They requested that they be kept informed, by Dillon and the County, about the results of the technical evaluation of the potential sites. Dillon's technical evaluation of the sites is included in Volume 1, Chapter 6 and Volume 4.

2.5.5 Consultation With Moore Township Council, the Media and Property Owners

As mentioned, the site selection process undertaken by workshop participants and County and Dillon staff resulted in the identification of potential sites for a new composite facility. All of these sites were located in Moore Township.

To ensure that the most directly affected parties were the first to be informed about the potential sites and the site selection process, the owners of the top seven potential sites (as identified at that time) were advised by the County of Lambton Waste Management Department, by letter dated January 4, 1991, that their property had been identified as a possible location for a centralized waste management facility. It was considered reasonable to inform owners of only the top seven sites to prevent unnecessary disruption or concern to owners of the sites that were less preferred, and that unlikely were to be carried forward for further consideration. A letter dated January 7, 1991, invited the property owners to a January 16, 1991, meeting. A copy of these letters is provided in Schedule 3D-12.

Also, the Steering Committee and Dillon presented an overview of the site selection process to Moore Township Council on January 4, 1991, and the local media on January 7, 1991. A copy of the presentation material is provided in Schedule 3D-13.

The presentation on the site selection process covered the following:

- the aim and contents of the Master Plan;
- the need for new landfill capacity;
- the waste management system recommended for Lambton County;

- the key events of Stage 3, including the Public Information Centres, the activities of the PAC and the site selection workshops;
- the steps involved in the site selection process;
- key siting assumptions;
- site selection study area;
- identification of candidate areas, siting areas and sites; and
- the comparative evaluation of sites.

a) Meeting with Moore Township Council

The Steering Committee's January 4, 1991 meeting with Moore Township Council was attended by all members of Council, the Township's Planning Advisor from the Lambton County Planning and Development Department, two representatives of the PAC and staff of MOEE's Waste Management Branch and the Sarnia District Office. Following Dillon's presentation on the site selection process, Council members stated that they did not agree with the process and were opposed to the site being located in Moore.

In the Spring of 1991, Moore Township received "intervenor funding" from the County to review the Master Plan and the site selection process. The Township hired the firms of UMA Engineering Ltd. and Consolidated Environmental Group Ltd. to prepare a submission to the County on the adequacy of the Master Plan. Dillon prepared a response to the critique for the Master Plan Steering Committee, dated June 18, 1991. Copies of the submission, and Dillon's response, are provided in Schedule 3D-14.

b) Meeting and Discussions with Affected Property Owners

The January 16, 1991 meeting with property owners was attended by about 75 residents, members of Moore Township Council, the Steering Committee and Dillon staff. Dillon staff outlined the purpose of the Master Plan and the site selection process. After the presentation, the property owners and Council members asked many questions and made numerous comments, summarized as follows:

- Concerns included possible impacts of the facility sites on well water, gas storage areas located on some of the sites, the Great Lakes system and property values.

- Questions related to the site selection process, the criteria for selecting the sites, how much the County would be willing to pay for a site, whether it would consider expropriation, and whether the County would buy the entire property.
- The Township Reeve summarized Moore Township Council's opposition to the sites. He disagreed with the siting criteria and the site selection process. He also stated that the PAC was "politically slanted" and it should have included more people from Moore Township.

During the meeting, many of the property owners provided information about their properties which they felt had not been considered in the selection of potential sites. This information included the location of creeks, gas wells and storage areas and the number of owners per site. The Steering Committee agreed to send a questionnaire to each property owner and tenant of the seven sites. The questionnaire requested information on agricultural activities, the natural environmental characteristics of the property, natural resources (such as oil and gas wells) and surface water (such as creeks and municipal drains). The questionnaire also requested any general comments. A copy of the questionnaire is provided in Schedule 3D-15.

A total of 49 questionnaires were sent. Of these, 32 were completed and returned to the County. The information provided by the questionnaires was considered in the subsequent comparative evaluation of the potential sites.

2.6 Consultation Activities on Hold - July 1991 to December 1992

From July 1991 to December 1992, Master Plan technical work activities were put on hold pending MOEE funding, with the exception of PAC meetings and other consultation activities carried out by the County.

2.7 Site Selection Review Presentation

Because of the temporary hold on the technical activities, a presentation was made to Moore Township Council in September 1992 and to PAC members in October 1992 to review the site selection process. Included in the presentation to PAC was a summary of the debate about the study area criteria, the implications of the revised study area interpretation, and the possible inclusion of Site K. A copy of the presentation material is provided in Schedule 3D-16.

2.8 Detailed Comparison of Sites Consultation

In January 1993, Master Plan progress resumed at the detailed comparison of sites stage and public consultation included a Public Information Centre, two Resident Meetings, and a Public Presentation.

2.8.1 Project Announcement Activities

Project announcements occurred in conjunction with the Public Information Centre advertisements. A contact list was developed and project announcement letters were sent out to individuals and groups.

In order to develop a current mailing list of contacts in the study area, names and addresses of landowners and tenants, government agencies, interest groups, politicians, and PAC members were obtained. This mailing list was continually revised and updated as the study continued.

Approximately 200 project announcement letters were sent to all those on the project contact list. The letter announced the new phase of the project and was an invitation to the Public Information Centre. One example of a letter is provided in Schedule 3D-17.

A number of agencies responded to the study announcement. Their comments and responses to these comments are provided in Table 2.1.

2.8.2 Public Information Centre

The purpose of this Public Information Centre (PIC) was to inform the public of the past and future activities for the Master Plan. Waste collection and handling system options were presented and the site selection process was explained.

The PIC was held on March 30, 1993, from 2:00 p.m. to 4:00 p.m. and from 7:00 p.m. to approximately 9:30 p.m. at Moore Township Civic Centre, 1155 Emily Street, Mooretown, Ontario. A formal public meeting was convened at 7:30 p.m.

The PIC was advertised in six local newspapers serving Lambton County and a radio announcement was prepared for two local radio stations. In addition, a Newsletter was delivered County-wide as well as inserted with the project announcement letters.

**TABLE 2.1
AGENCY RESPONSES FROM STUDY ANNOUNCEMENT 1993**

Letter To	Comments
<p>Mr. Tim Eger Director, Policy Co-ordination Branch Ontario Native Affairs Secretariat 595 Bay Street, Suite 1009 Toronto, Ontario M5G 2C2</p>	<ul style="list-style-type: none"> • interested in project • communities of Walpole Island, Chippewas of Sarnia, and Chippewas of Kettle and Stony Point First Nations have expressed interests in off-reserve territory in Lambton County • meet with First Nations to discuss undertaking and possible implications • contact: <ul style="list-style-type: none"> Chief Dan Miskokoman (519) 627-1481 Walpole Island First Nation R.R. 3 Wallaceburg, Ontario N8A 4K9 Chief Tom Bresette (519) 786-2125 Chippewas of Kettle & Stony Point First Nation 53 Indian Lane, R.R. 2 Forest, Ontario N0N 1J0 Chief Philip Maness (519) 336-8410 Chippewas of Sarnia First Nation 978 Tashmoo Avenue Sarnia, Ontario N7T 7H5 • if further information is required from this office, please contact: <ul style="list-style-type: none"> Mr. John Van West (416) 326-4758 Policy Analyst Negotiations Support and Community Relations Branch Ontario Native Affairs Secretariat 595 Bay Street, Suite 1009 Toronto, Ontario M5G 2C2 • continue to keep the Secretariat informed of progress
<p>Dr. R. Schabas, Director Public Health Branch Chief Medical Officer of Health Attn: Ms. Joyce Nsubuga Ministry of Health 15 Overlea Boulevard, 5th Floor Toronto, Ontario M4H 1A9</p>	<ul style="list-style-type: none"> • letter forwarded to local medical officer of health, from whom input should be requested: <ul style="list-style-type: none"> Dr. C. Greensmith (519) 383-8331 Medical Officer of Health Sarnia-Lambton Health Unit 160 Exmouth Street Point Edward, Ontario N7T 7Z6 • no further comment at this time (Note: Dr. C. Greensmith is already on initial contact list.)

TABLE 2.1
AGENCY RESPONSES FROM STUDY ANNOUNCEMENT 1993
(Continued)

Letter To	Comments
CN Railway Company Manager, Property Tax 277 Front Street West, Suite 920 Toronto, Ontario M5V 2X4 (landowners list)	<ul style="list-style-type: none"> • CN Rail should be requested to provide input based on the following considerations: <ul style="list-style-type: none"> a) if it is determined that Railway property could be impacted b) if it is determined that CN property or operations could have been an impact on the outcome of the plan • extent of any of the preceding matters should be identified and resolved • suggest that central landfill facility proposed in the plan should be designed to accept non-hazardous industrial/commercial wastes typical of those generated within urban and rural areas of the county • contact: <p style="margin-left: 20px;">E. Waldinsperger Environmental Officer, Southern Ontario District Engineering Services 277 Font Street West, Suite 401 Toronto, Ontario M5V 2X7</p>
Ms. Irene Posliff, Senior Planner St. Clair Region Conservation Authority 205 Mill Pond Crescent Strathroy, Ontario N7G 3P9	<ul style="list-style-type: none"> • none of the four sites located adjacent to natural watercourses • appears that Sites D and K located near Coyle Drain which eventually outlets at Clay Creek; Sites H and I adjacent to Johnston Drain which outlets at St. Clair River • at design stage, consideration should be given to the control of surface water runoff at the site to predevelopment conditions, to protect the receiving watercourses from increased flows, erosion and sediment • please keep informed • would like further information on site selection as the evaluation process continues
Mr. M. Hamilton, Regional Director Ministry of Community and Social Services 195 Dufferin Avenue IBM Building, 5th Floor London, Ontario N6A 1K7	<ul style="list-style-type: none"> • thank you for the opportunity to participate (response was from P. Anderson, Windsor office)

**TABLE 2.1
AGENCY RESPONSES FROM STUDY ANNOUNCEMENT 1993
(Continued)**

Letter To	Comments
<p>Mr. Sarah Jimenez Environmental Planning and Management Lands, Revenues and Trust Department of Indian & Northern Affairs Canada 25 St. Clair Avenue East, 5th Floor Toronto, Ontario M4T 1M2</p>	<ul style="list-style-type: none"> • activities unlikely to have significant affect on our mandate • Walpole Island and Chippewas of Sarnia First Nations should be contacted • for further information, can contact: Ms. Michelle K. Jones (416) 973-7451 Environmental Assistant, Environmental Planning Department of Indian and Northern Affairs Canada 25 St. Clair Avenue East, 5th Floor Toronto, Ontario M4T 1M2
<p>Mr. Fred Leech, Acting Manager Environmental Office Transportation Engineering & Standards Branch Ministry of Transportation 1201 Wilson Avenue Downsview, Ontario M3M 1J8</p>	<ul style="list-style-type: none"> • direct all future correspondence to: Mr. D. Leckie, Manager Ministry of Transportation 659 Exeter Road, Box 5338 London, Ontario N6A 5H2 <p>(Note: Mr. Leckie is already on initial contact list)</p>
<p>Mr. W. Bien, Chairman Environmental Assessment Co-ordinating Committee Environment Canada Water Planning and Management Branch Inland Waters Directorate, Ontario Region P.O. Box 5050, 867 Lakeshore Road Burlington, Ontario L7R 4A6</p>	<ul style="list-style-type: none"> • study does not directly impact Environment Canada • will not be participating and do not need to receive further correspondence regarding this proposal
<p>Mr. D. Leckie, Manager Engineering and Right-of-Way Ministry of Transportation P.O. Box 5338 659 Exeter Road London, Ontario N6A 5H2</p>	<ul style="list-style-type: none"> • would like to be kept informed on progress of study • will provide comments when more detailed information on proposed undertaking is made available • forward all future correspondence to: A.E. Irving, P.Eng., Head Planning and Design Ministry of Transportation P.O. Box 5338 659 Exeter Road London, Ontario N6A 5H2

**TABLE 2.1
AGENCY RESPONSES FROM STUDY ANNOUNCEMENT 1993
(Continued)**

Letter To	Comments
<p>Ms. Jill Pritchard-Scott Environmental Assessment Co-ordinator Policy Development and Co-ordination Division Ministry of Energy 56 Wellesley Street West, 14th Floor Toronto, Ontario M7A 2B7</p>	<ul style="list-style-type: none"> • from energy perspective, Ministry has two main interests in the waste management master plan: <ol style="list-style-type: none"> 1) minimizing transportation energy use in the waste management system; and 2) collecting landfill gas • waste management system should be designed and operated to minimize the use of energy for transportation • methane from landfill should, at a minimum, be collected and burned • energy production from collected landfill gas may be feasible; Ministry may consider providing financial assistance if pursued • we expect the Master Plan to include an explicit commitment to install, as a minimum, a landfill gas collection and combustion system • note new Ministry name: Ministry of Environment and Energy
<p>Mr. R.J. Malvern, Manager Environmental Support and Integration Dept. Engineering and Construction Services Branch Ontario Hydro H17 E22 700 University Avenue Toronto, Ontario M5G 1X6</p>	<p>(Ontario Hydro requested that maps of sites be sent to them prior to making comments)</p> <ul style="list-style-type: none"> • maps have been reviewed and at this time have no concerns • would like to continue to participate in the study
<p>Mr. Peter Carruthers Environmental Assessment Co-ordinator Development Plans Review Unit Heritage Policy Branch Ministry of Culture and Communications 77 Bloor Street West, 2nd Floor Toronto, Ontario M7A 2R9</p>	<ul style="list-style-type: none"> • if preferred alternative appears as though it will impact areas of heritage potential, then an assessment survey should be conducted • our office wishes to continue to be involved • it would be useful to be provided with detailed information and maps of the preferred alternative outlining the extent and type of land disturbance activities to be carried out • please direct all future correspondence to: Mr. Neal Ferris Regulatory and Operations Ministry of Culture, Tourism and Recreation 55 Centre Street London, Ontario N6J 1T4

2.8.2.1 Newspaper Advertisement

Advertisements announcing the PICs were placed in the newspapers listed in Table 2.2. The advertisement provided the date, time and location of the information centre, and explained the purpose of the event. A County of Lambton representative and a Dillon staff member were listed as contact persons and telephone numbers were provided. A copy of the advertisement is provided in Schedule 3D-18.

**TABLE 2.2
PIC NEWSPAPER ADVERTISEMENT DATES**

Newspaper	Dates
Forest Standard	Wednesday, March 17, 1993
Lakeshore Advance	Wednesday, March 17, 1993
Mooretown Monitor	Wednesday, March 10 & 24, 1993
Petrolia Topic	Wednesday, March 17, 1993
Sarnia Observer	Saturday, March 3, 1993 & Wednesday, March 24, 1993
Watford Guide Advocate	Wednesday, March 17, 1993

2.8.2.2 Radio Announcement

A 30-second radio announcement was prepared to promote the PIC on two local radio stations. The announcement was broadcast several times a day over several days, as shown on the schedule outlined in Table 2.3. A copy of the announcement outline that was sent to the radio stations is provided in Schedule 3D-19.

**TABLE 2.3
PIC RADIO ANNOUNCEMENT SCHEDULE**

Radio Station	Dates	Frequency
CHOK 1070	Thursday, March 25, 1993	3 times
	Friday, March 26, 1993	3 times
	Saturday, March 27, 1993	3 times
	Sunday, March 28, 1993	3 times
	Monday, March 29, 1993	4 times
FOX 99.9 FM	Thursday, March 25, 1993	2 times
	Friday, March 26, 1993	3 times
	Saturday, March 27, 1993	3 times
	Sunday, March 28, 1993	5 times
	Monday, March 29, 1993	5 times

2.8.2.3 March 1993 Newsletter

A Newsletter, with details of the public information centre and brief description of the progress to date, was delivered County-wide by Canada Post's Admail Service. In addition, all those on the project mailing list received a Newsletter enclosed with the project announcement letter.

The Newsletter indicated the date, time, location and purpose of the PIC, provided a brief overview of the project and progress to date, encouraged the practice of reducing, re-using, and recycling of garbage, included a waste diversion survey, and explained the waste management facility site selection process. A County of Lambton representative and a member of the Dillon study team were listed as contact persons and phone numbers were provided. A copy of the March 1993 Newsletter is provided in Schedule 3D-20.

2.8.2.4 Public Input on Waste Diversion

A survey form was included in the March 1993 Newsletter to solicit public opinions on potential waste diversion initiatives that the County could implement in the future. The survey results provided support for the selection of the Expanded Blue Box with User Pay diversion strategy. More detailed discussion on the responses and comments regarding the waste diversion strategy are addressed in Chapter 5 and in Volume 2, Appendix 2G.

2.8.2.5 Public Information Centre Format

The PIC was divided into two sessions. From 2:00 p.m. to 4:00 p.m. and again at 7:00 p.m. informal walk-through sessions were held. At 7:30 p.m. there was an organized public meeting session which included a presentation of the study progress and allowed an opportunity for questions and answers.

Information Centre Session

Upon arrival, attendees were asked to record their attendance at the registration table and were given an information package (copy provided in Schedule 3D-21) and a comment form (copy provided in Schedule 3D-22). At the same time, visitors were given a brief overview concerning the layout of the displays and reminded of the start time of the public meeting. Refreshments were also provided.

The display boards were laid out to permit a free-flow of attendees in a walkthrough format. The boards served to welcome the public, provided a brief overview of the project, presented waste collection and handling systems options, and explained the composite waste facility site selection process. The information package contained copies of most of the display boards.

Some of the large drawings and plans which were presented at the meeting are not reproduced in this report due to their size. Representatives from the County of Lambton, Steering Committee and Dillon were in attendance to answer questions. The sessions were also attended by representatives from the PAC and the MOEE.

One hundred and fifty-one (151) attendees signed-in at the registration table. The actual attendance figures may be somewhat higher as some people may have by-passed the registration table.

Public Meeting Session

A formal presentation was made by Dillon staff at 7:30 p.m. Representatives of Lambton County and MOEE also contributed to the presentation. The Mayor of Moore Township and the Chairman of the County's Public Works Committee introduced the County, Dillon and MOEE Staff and outlined the purpose of the presentation.

The presentation was attended by about 100 people. These people included Moore Township residents, Moore Township Councillors, various Lambton County Councillors and staff, members of the Public Advisory Committee and residents from across the County and the City of Sarnia. Reporters from CKCO-TV, CHOK Radio, the *Sarnia Observer* and the *Petrolia Advertiser-Topic* were also present.

The presentation covered the following:

- the aim of the Waste Management Master Plan;
- the components of the recommended Waste Management System including recycling/source separation, backyard composting and a long-term waste management facility which would include centralized composting, a MRF and landfill;
- an overview of the waste quantities generated in Lambton County in 1992;
- the 3Rs of waste diversion;
- waste collection and handling options for the County;
- waste reduction measures currently being undertaken by Lambton County and its local municipalities; at that time, these included Blue Box collections, recycling depots, backyard composters, leaf and yard waste collections, household hazardous waste collections and one user pay collection program (Village of Grand Bend);

- the key assumptions and policies affecting the Master Plan:
 - the County would not depend on the private sector for waste management solutions, although the County would continue to pursue opportunities with the private sector;
 - the County would not import or export wastes;
 - a site of approximately 75 ha would be required to accommodate the long-term waste management facility.
- the process which lead to the identification of Sites D, H, I and K as the short list of alternative sites for the long-term waste management facility; these sites would be evaluated in detail to select the recommended site;
- the public consultation activities which had been conducted to date; the important role played by the PAC was emphasized; and
- an outline of the work to be completed on the Master Plan.

After the presentation, the Mayor of Moore Township facilitated the question and answer period. This is described in Section 2.8.4, Summary of Verbal Comments.

2.8.3 Summary of Written Comments

During the walkthrough session, attendees were given an opportunity to ask staff questions regarding the project. Also, all those in attendance were invited to fill out a comment form before leaving the Open House or to mail it to the address provided.

A total of 21 forms and eight letters containing 67 detailed comments were received as of June 9, 1993.

All comments were categorized under the following headings: siting process, waste collection and handling systems, public consultation, socio-economics, traffic, and others. Table 2.4 tabulates all the written comments received to June 9, 1993, and provides a response to each comment.

Provided below is a discussion of the more frequent comments which were recorded.

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)

Issue	# of Comments	Response	Reference
SITING PROCESS	25		
· Site H and/or I preferred (affects less people; industrial area); Sites D and/or K not preferred (has more people, wildlife and woodlots)	6	Potential effects on residents have been considered under the Social Impact Assessments. Sites H and I were considered to be more preferred than Sites D and K from a social impact perspective.	Volume 1, Chapter 6, and Volume 4, Appendix 4F
· County should not pursue purchase of new site in Moore with borrowed money; do not want Moore site	2	Comment noted.	
· do not want County's garbage in my backyard	2	The facility has to be located somewhere within the County.	
· site should not be only industrial lands	1	Industrial designated lands were considered by the public participants and study team to be desirable for siting as the waste management facility is considered to be a land use of industrial character.	Volume 1, Chapter 6
· sites are municipally well-drained, therefore are good agricultural land	1	All four sites on the short list - Sites D, H, I, K - are on lands designated for industrial use, with the exception of a portion of Site K. The industrial designation has removed these lands from the long-term agricultural land base of the Township. In addition, impacts on agriculture were taken into account in the landfill site selection process.	Volume 1, Chapter 6
· sites should not be built on streams that enter Great Lakes (e.g. Petrolia site)	1	All water courses identified on available mapping, with a 500 m buffer placed around each of them, were removed from further consideration in siting.	Volume 1, Chapter 6
· concern is about best possible site with least impacts to residents and environment	1	A central aim in the siting process was to identify a location where impacts on all aspects of the environment would be minimized.	Volume 1, Chapter 6
· good process but too slow	1	The length of time taken to complete the siting process, and the Master Plan as a whole, has been affected by several factors including: <ul style="list-style-type: none"> • the need to do the studies in sufficient level of detail to meet the process goals and EAA requirements; • the need to wait for and respond to changing circumstances, such as the transfer of waste management responsibility to the County in 1991; and • the need to await funding from the MOEE at certain points in the process 	Volume 1, Chapter 1

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)
(Continued)

Issue	# of Comments	Response	Reference
<ul style="list-style-type: none"> · expand the license of existing County-owned landfills and use in conjunction with Warwick and Petrolia private landfills 	1	<p>Existing landfills were considered in the landfill site selection process, just as all lands within the County were considered. The lands eventually identified as potential sites were those that were found to best meet the criteria established. Just one potential site - Site K - includes an existing landfill. Other existing landfills, and their adjacent lands, were eliminated due to various constraints, as documented in Chapter 6.</p> <p>With respect to the private landfills, the County continues to pursue possible private sector solutions, in parallel with the Master Plan.</p>	<p>Volume 1, Chapter 6</p> <p>Volume 1, Chapter 1</p>
<ul style="list-style-type: none"> · assuming all four sites are similarly secure, expand the existing site rather than creating new one 	1	<p>Although Site K includes the existing Moore Township landfill, if selected, the new landfill would be separate from the existing landfill which would be closed. However, following the detailed comparison of Sites D, H, I and K, Site K was found to rank fourth in the order of preference, based on the range of criteria applied.</p>	Appendix 4C
<ul style="list-style-type: none"> · consider aesthetic impact of locating landfill along main thoroughfare 	1	<p>The site comparative evaluation addressed the potential visual impacts.</p>	<p>Volume 1, Chapter 6</p> <p>Volume 4, Appendix 4F</p>
<ul style="list-style-type: none"> · siting should be left with the Townships 	1	<p>Through Bill 35, the County of Lambton became legally responsible for waste disposal.</p>	Volume 1, Chapter 1
<ul style="list-style-type: none"> · Moore Township is best place for garbage since Council loves it 	1	<p>Comment noted.</p>	
<ul style="list-style-type: none"> · concerns re: addition of Site K; lives within 1 km of Site K 	1	<p>Following consultation with Moore Township Council, Site K was added to the list of potential sites due to a revised interpretation of the study area criteria, as explained in Chapter 6. With respect to people living near the sites, it was found that there are significantly more residents living near Sites D and K, compared to either of Sites H or I.</p>	Volume 1, Chapter 6
<ul style="list-style-type: none"> · Terra International's commitment to protect the environment is the reason why Site H should remain in agricultural use 	1	<p>Based on the Moore Township Official Plan, the lands on which Site H is located are intended for industrial uses in the long term.</p>	<p>Volume 1, Chapter 6</p> <p>Appendix 4E</p>

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)
(Continued)

Issue	# of Comments	Response	Reference
<ul style="list-style-type: none"> · ICI Canada has plans to use Site I for additional storage ponds or as a land irrigation area, in connection with the phosphate pond water treatment process. ICI has made a public commitment that there will be no discharge to the St. Clair River and if the remaining development work showed the need to use Site I and it was not available because of the landfill, then major concerns would be raised by ICI and the community. Remaining development will not be completed until end of 1994, at which time ICI will have a firmer position. 	1	Comment noted. This proposed use for Site I was taken into account in the land use assessment and was considered to be a disadvantage.	Appendix 4E
<ul style="list-style-type: none"> · if the Moore Disposal Site was an expansion of the existing site, then acquisition of some property belonging to Novacor may be required. The Lambton Bowhunters Association Inc. has been operating an archery range on this property. Because we are non-profit and have a small operating budget, we cannot afford to relocate. We hope you will consider another location for the waste disposal site. 	1	Impacts on the Lambton Bowhunters Association Inc. were taken into account by the Social discipline in the comparative evaluation.	Appendix 4F
<ul style="list-style-type: none"> · Union Gas has underground transmission lines in lands designated as Site H, and a line running along the north lot line at Sites D and K. 	1	This has been considered in the comparative evaluation.	
WASTE COLLECTION AND HANDLING SYSTEMS	21		
<ul style="list-style-type: none"> · garbage disposal should not be run by government but by free enterprise; municipalities/counties should not be setting standards for waste management 	3	The Waste Management Master Plan recognizes the role that the private sector has in the waste management system. It is recommended that the private sector continue to provide for the collection of wastes, and the collection and processing of recyclables in the future. Many of the municipalities presently use private contractors to provide these services. It is recommended that the County remain responsible for providing disposal facilities in the future. This will ensure that the County will have long-term disposal capacity.	Volume 1, Chapter 8.

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)
(Continued)

Issue	# of Comments	Response	Reference
<ul style="list-style-type: none"> · County should be responsible for own waste; do not let private sector take control or else we'll be in a "hostage" situation 	2	<p>The Waste Management Master Plan Steering Committee has passed a resolution supporting the premise that the County will not rely solely on the private sector for its long-term landfill needs. It is recommended in the Waste Management Master Plan that the County remain responsible for providing waste disposal facilities to help reduce the County's dependence on privately owned facilities. This responsibility was initially assigned to the County by Bill 35. However, the County continues to pursue possible private sector waste management solutions that are compatible with the Master Plan recommendations, with the proviso that public sector solutions will be pursued unless and until the private sector solutions are in place.</p>	<p>Volume 1, Chapters 4, 6 and 8.</p> <p>Bill 35 - An Act respecting the amalgamation of the City of Sarnia and the Town of Clearwater and the Addition of the amalgamated City to the County of Lambton.</p>
<ul style="list-style-type: none"> · close existing dump only when capacity reached, and then use sites as garbage collection points rather than have roadside collection 	2	<p>It is expected that when the County's new long-term landfill opens at the composite waste management facility that the existing County landfill sites will be closed. It is anticipated that this will occur some time in late 1997 to mid-1998. By this time, it is likely that the existing sites will be at or close to capacity. In the long-term waste diversion strategy, it is recommended that the closed landfills be considered as sites for depots for recyclables and/or bulky items. It is expected that roadside waste collection will continue in the future in the communities where this service is presently provided.</p>	<p>Volume 1, Chapters 4 and 5</p>
<ul style="list-style-type: none"> · implement user pay (fee based on whole cost of landfilling) to sustain recycling program 	1	<p>User pay at the County level and at the municipal collection level is part of the recommended long-term waste diversion strategy for Lambton County.</p>	<p>Volume 1, Chapter 5.</p>
<ul style="list-style-type: none"> · most important R is Responsibility for own waste 	1	<p>County Council and the WMMP Steering Committee have passed resolutions supporting the premises that the County will not rely solely on export or on the private sector for its long-term landfill needs. This implies that the County will not rely on disposal facilities outside of the County. This is consistent with the policies of the Ontario Ministry of Environment and Energy. In April 1991, the Minister announced that the search for new landfill sites for the Greater Toronto Area will not be outside the GTA's borders.</p>	<p>Volume 1, Chapter 4.</p> <p>Ontario Ministry of the Environment and Energy News Release, April 2, 1991.</p>

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)
(Continued)

Issue	# of Comments	Response	Reference
· who will educate everyone to use systems properly? Educate the children who in turn will prod the parents.	1	Public education and promotion is a component of the recommended long-term waste diversion strategy. The Waste Management Master Plan Public Advisory Committee has been active in promoting waste reduction, reuse and recycling in the County. It is recommended that the County remain responsible for public education and promotion.	Volume 1, Chapter 5 and 8.
· options presented lend themselves to an add-on system	1	The alternative long-term waste diversion strategies presented at the March 1993 public meeting included add-on diversion initiatives such as enhanced Blue Box collection and expanded backyard composter distribution programs. The recommended long-term waste diversion strategy is based on enhancement and expansion of the existing waste diversion system and contains primarily add-on type initiatives. This approach was determined to be the best with respect to several criteria, including potential for waste diversion, ease of implementation, potential impacts, and costs.	Volume 1, Chapter 5.
· encourage 4Rs to reduce waste	1	The objective for developing the long-term waste diversion strategy was to develop a strategy that would enable the County to comply with the Provincial Government's waste diversion objective of at least 50% diversion by the year 2000 through waste reduction, reuse and recycling (3Rs) initiatives.	Volume 1, Chapter 5.
· incinerate non-recyclables and landfill non-hazardous residues	1	On April 11, 1991, the Ontario Minister of the Environment and Energy announced that the Ontario provincial government intended to ban the future development of municipal solid waste incinerators in Ontario. The ban became law when the provincial government enacted Regulation 555/92 under the <i>Environmental Protection Act</i> on September 11, 1992.	Volume 1, Chapter 4. Volume 2, Appendix 2C. Ontario Ministry of the Environment and Energy News Release, April 11, 1991. Ontario Regulation 555/92 made under the <i>Environmental Protection Act</i> , September 11, 1992.
· do not need grass clippings picked up; can compost	1	Some backyard composters cannot handle high volumes of grass clippings. Regular collection of leaf and yard wastes is included as part of the long-term waste diversion strategy in order to provide a diversion alternative for excessive quantities of leaf and yard wastes.	Volume 1, Chapter 5.

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)
(Continued)

Issue	# of Comments	Response	Reference
· will collection of recyclables be 2 or 3 stream?	1	Wet/dry collection is not included in the long-term waste diversion strategy. Systems which include three stream wet/dry collection were considered in the evaluation of alternative systems.	Volume 1, Chapter 5.
· are there problems with vermin in using composters?	1	A survey of composting experts recently completed by the Recycling Council of Ontario provides evidence that a properly operating composter does not act as an attractant to pests. Composters can be pest-proofed by lining them with wire screening.	Recycling Council of Ontario Update, January-March 1993.
· will compostables be collected weekly or biweekly?	1	Wet/dry collection, which would involve the regular collection of wet or compostable wastes, is not included in the recommended long-term waste diversion strategy. The City of Sarnia presently collects leaf and yard wastes on a periodic basis in the Spring and Fall. In the recommended long-term strategy it is recommended that the number of leaf and yard waste collections be increased so that there are regular collections in urban areas in the Spring, Summer and Fall.	Volume 1, Chapter 5.
· concerned with storing wet waste for more than a week	1	Wet/dry collection, which would involve the regular collection of wet or compostable wastes, is not included in the recommended long-term waste diversion strategy. The City of Sarnia presently collects leaf and yard wastes on a periodic basis in the Spring and Fall. In the recommended long-term strategy it is recommended that the number of leaf and yard waste collections be increased so that there are regular collections in urban areas in the Spring, Summer and Fall.	Volume 1, Chapter 5.

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)
(Continued)

Issue	# of Comments	Response	Reference
<p>a decision has been taken to rely only on waste generated in the County (no import or export); have you generated a report on the limitations imposed on the available options by this decision? Has a study been made of communities which have "opened their doors" to waste from other areas? There are several examples of substantial economic benefit to the communities which have chosen to do this.</p>	1	<p>A study on the potential impacts of export or import of wastes, recyclables and compostables has not been completed as part of the Master Plan. Lambton County Council passed a resolution against the import of waste. Also, it is the position of the Ministry of the Environment and Energy that export should only be considered where the proponent is unable to locate a landfill site that will receive approval. As a result, export/import was not included as a component of the recommended waste management system for the County. However, the export/import of non-waste materials, such as recyclables and compostables, is still an allowable alternative. In the Master Plan it is recommended that the County become involved in the development of new markets for recyclables. Importing recyclables from bordering municipalities could help improve the feasibility of developing some new markets.</p>	Volume 1, Chapter 4
<p>this plan is to address the needs of the County for up to 20 years; at present, this is based on only 3Rs; what is the process to modify this plan should other technologies be proven successful?</p>	1	<p>It is recommended that a formal review of the Master Plan be undertaken every five years at a minimum, and revisions made to reflect any necessary changes. It may be appropriate to update the diversion strategy more frequently since this area is rapidly evolving and new technologies or techniques may be available before the five year period for formal review has passed.</p>	Volume 1, Chapter 8.
<p>assuming that the aim of the program is to manage waste with minimal environmental impact, has a life cycle inventory study been conducted on the various options? Without this type of information, it is impossible to assess whether the arbitrarily established targets for reduction will withstand scrutiny as being environmentally and economically sound.</p>	1	<p>The identification of the recommended waste management system for the County included assessment of potential environmental impacts of the alternatives using the definition of the environment in the <i>Environmental Assessment Act</i>. However, very few full life-cycle analyses have been completed for waste diversion initiatives and divertible materials. Therefore, it is not known whether or not the diversion initiatives included in the long-term waste diversion strategy will prove to be environmentally and economically sound in the future. It is recommended that the Master Plan and diversion strategy be updated on a regular basis so that new technologies and information can be incorporated to keep the Master Plan up-to-date.</p>	Volume 1, Chapters 4 and 8.

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)
(Continued)

Issue	# of Comments	Response	Reference
PUBLIC CONSULTATION	8		
· displays were well presented and interesting at the March PIC; provided a clear understanding of site selection process.	2	Comment noted.	
· presentation of March PIC was waste of time as not enough answers were provided; not enough time given to ask questions	2	A variety of opportunities have been and continue to be available to obtain and provide input.	Volume 1, Chapter 2
· have more public meetings	1	The County will consider any further requests for meetings and will arrange meetings at future decision points.	
· public awareness such as these meetings are necessary to simplify change regarding quantities we landfill	1	Agreed; maximizing waste diversion is a central objective of the Master Plan.	Volume 1, Chapter 1
· public has had many opportunities to receive and consider information	1	Agreed.	Volume 2, Chapter 2
· the survey regarding waste management is a commendable gesture but can the average householder provide knowledge about waste management or an option about a siting area, except "not in my area!"; perhaps better to have study team propose systems that are best for our situation and ask the opinion of the household for their preference	1	Based on the technical analysis now complete, and input from the survey, a long-term diversion strategy has been recommended. Comments on this strategy are being solicited through the Draft Master Plan review.	Volume 1, Chapter 5
SOCIO-ECONOMIC	6		
· compensation will not pay for damage to community	1	It is anticipated that the County will develop a compensation policy which will include addressing payment for possible damages.	
· site will devalue all farmlands for a radius of 3 miles	1	It is anticipated that the County will develop a compensation policy which will include addressing property value protection.	
· will all adjacent farmland be bought-out?	1	The specific lands to be purchased will be negotiated at time of purchase.	
· want \$1 M compensation if Sites D or K chosen (own Lots 24, 23 and W½ 22)	1	It is anticipated that the County will develop a compensation policy.	
· County cannot afford \$25 M facility	1	The County will make every effort to minimize cost while fulfilling waste management responsibilities and Provincial requirements.	
· does the current budgeting of the County account for replacement cost, or is it only based on current cost? The target of billing at replacement cost is to establish a fund reservoir for replacement of filled facilities without imposing substantial tax increases at uneven intervals	1	The County has or will in future years, budget for the planning, approval, and development of any services or facilities arising from the master plan.	

TABLE 2.4
SUBMISSIONS OF WRITTEN COMMENTS
(to June 9, 1993)
(Continued)

Issue	# of Comments	Response	Reference
TRAFFIC	1		
· traffic will increase and endanger children and farmers	1	In the comparison of "short-list" sites, the transportation discipline included a traffic safety criteria that estimated the accident risk and applied this to the increase in traffic caused by the new landfill site. The sites with a lower accident potential are preferred.	Appendix 4H
OTHERS	5		
· process is much too slow and expensive	1	Time and costs reflect the level of detail required to meet the County's waste management responsibilities and Provincial requirements.	Volume 1, Chapter 1
· time to make conclusions now as much time and money has been spent on studies	1	Comment noted.	
· Dillon's study is waste of money (\$1.8 M); committee with common sense can do as well	1	Comment noted.	
· present MOEE regulations exclude air and water to be buried in landfill; this would seemingly prevent decomposition of wastes	1	MOEE regulations, e.g. Regulation 347, require the use of cover material but the purpose is not to exclude air or water. In fact, the guidelines accompanying Policy 14-15 discuss leachate recirculation as a way of accelerating waste decomposition.	General - Waste Management Regulation under the <i>Environmental Protection Act</i> , Regulation 347 of Revised Regulations of Ontario, 1990, June 1993.
· what is the basic aim of the plan? is it to minimize landfill or to minimize environmental impact while most effectively managing the solid waste stream?	1	The intent is to divert as much as possible from disposal and to landfill what cannot be diverted in a manner which minimizes impacts on the environment.	Volume 1, Chapter 1

Siting Process

Twenty-five of all the comments summarized related to the siting process. Some of the issues that were raised repeatedly are outlined here.

- Six people indicated a preference for Site H and/or I because it is an industrial area and less people would be affected, than Sites D and/or K, since these sites have more people, wildlife and woodlots.
- Two people stated that they do not want a Moore site.
- Two people stated that they do not want the County's garbage in their backyards.

Waste Collection and Handling Systems

Twenty-one of the comments summarized related to waste collection and handling systems. Some of the major issues that were raised are outlined here.

- Three people felt that garbage disposal should not be run by government but by private enterprises. They said that municipalities and counties should not be setting standards for waste management.
- Two people suggested closing the existing dumps when capacity is reached and use sites as garbage collection points.
- Two people felt that the County should be responsible for its own waste and that the private sector should not be able to take control.

Public Consultation

Eight of the comments summarized related to the issue of public consultation. Some of the major issues that were raised are outlined here.

- Three people expressed that the displays at the PIC were well presented, interesting and provided a clear understanding of the site selection process; and that the public has had many opportunities to receive and consider information.
- Two people felt that presentation of the March PIC was a waste of time and not enough time was provided to ask/answer questions.
- One person suggested having more public meetings.

Socio-Economic

Six of the comments summarized related to socio-economics. The issues raised included:

- compensation will not pay for damages;
- site will devalue farmlands;
- want \$1 million compensation; and
- County cannot afford a \$25 million facility.

Traffic

One person commented that traffic will increase and endanger children and farmers.

Others

Five of the comments summarized were of a general nature. Briefly, the issues raised were:

- process is too slow and expensive;
- make conclusions now;
- study is waste of money;
- MOEE regulations exclude air and water to be buried in landfills, hence decomposition is prevented; and
- does County budget account for replacement cost?.

2.8.4 Summary of Verbal Comments

As mentioned in Section 2.8.3, an opportunity was provided after the presentation for questions and comments. In fact, throughout the entire PIC, many verbal comments were made and noted by Dillon staff. Provided in Table 2.5 is a summary of these comments and responses to each. Most of the questions and comments pertained to Sites D and K. The remainder dealt with general waste management issues. No specific concerns were raised with respect to Sites H and I.

2.8.5 Residents Meeting No. 1

At the March 1993 PIC, several residents living in the vicinity of Sites D and K asked the County Waste Management Administrator for an informal meeting to discuss the site selection process. As a result, a Residents' Meeting was held on April 21, 1993, at the home of a local resident.

TABLE 2.5
SUMMARY OF VERBAL COMMENTS
(from March 1993 PIC)

Questions and Comments	Responses	Reference
Siting		
Why are all of the preferred sites in Moore Township?	The site selection process and the constraint mapping approach was developed with the participation of attendees at the site selection workshops, and reflects their desire to make use of Classes 3-7 agricultural lands and industrial lands.	Volume 1 Chapter 6
Another resident in the vicinity of Sites D and K stated that fewer residents would be affected by Sites H and I because that area is less densely populated; and, there are other Townships and areas across the County which are less densely populated than the area around sites D and K. This resident also said that Site D includes a hardwood bush and there are eight to ten houses located close to the site.	Impacts on residential properties, impacts on the natural environment and land uses were considered in the comparative evaluation of Sites D, K, H and I.	Volume 1 Chapter 6 Volume 4 Appendices 4B, 4E, and 4F
One resident remarked that Site K would probably be the least expensive to develop because most of it is already owned by the County. They asked if Site K would receive "preferential treatment".	Sites D, H, I, K were considered on an equal basis, with criteria applied consistently.	Volume 1 Chapter 6
Another resident pointed out that Sites D and K include gas storage and potential gas storage areas. These may be very costly to close or relocate.	This information was considered with respect to Sites D, H, I and K. Inquiries were made concerning the storage areas, and it was determined that landfilling activities would not conflict with the storage areas.	
A Moore Township resident stated that the Township has most of the industrial designated lands in the County but most of these lands will never be developed. The presence of large areas of industrial lands should not justify concentrating on Moore Township.	The decision to include industrial lands in the study area was made at the site selection workshops, and this decision was a reasonable one since a waste management facility is an industrial-type use.	Volume 1 Chapter 6
Surprised at how little progress had been made over the last two years; all four sites "look good" except H and I are too close to the river and D and K have too many houses around them.	Those issues were taken into account in the comparative evaluation.	Volume 1 Chapter 6 Volume 4 Appendix 4F and 4G
Very angry that Site D is one of the preferred sites; Sites H or I should be chosen as the preferred site; the industrial designation in Site D is only proposed, it was not approved; he fought the expansion of Tricil, now he has to fight this; moved out to the County to get away from industries and pollution; his wife wanted to be on the PAC but "no one would let her".	The industrial designation of Site D in the Township of Moore Official Plan was approved by the Province on May 1, 1990. PAC representatives were selected by local municipal councils; meetings are open to the public.	Volume 4 Appendix 4E Volume 1 Chapter 2
Sites H and I are the best sites.	Comment noted.	

TABLE 2.5
SUMMARY OF VERBAL COMMENTS
(from March 1993 PIC)
(Continued)

Questions and Comments	Responses	Reference
Resident of Highway 80 near Site D opposes the use of Site D because it has too many houses around it; would like the County to only evaluate Sites H and I.	Proximity of residents to the sites was taken into account in the comparative evaluation.	Volume 1 Chapter 6 Volume 4 Appendix 4F
Some concern about closeness of sites to St. Clair River.	This issue was addressed in the comparative evaluation.	Volume 1 Chapter 6
Site K will likely be the least expensive site. It may also be most suitable because it already has a dump there.	Potential cost differences between sites were considered in the overall comparison of sites.	Volume 1 Chapter 6 Volume 4 Appendix 4C
Details wanted on what were the comparative rankings of sites by criteria and how they were arrived at.	Sections 6.7 and 6.8 of Volume 1, Chapter 6, identify the criteria used for, and the results of, the two site comparison steps: 1) the comparative evaluation of the long list (eleven sites); and 2) the comparative evaluation of the short list (four sites).	Volume 1 Chapter 6
Public Consultation		
A resident who owns part of Site K stated that he was never notified directly that his land was part of Site K.	Site K was identified within the past few months, and property owners were notified by letter. This is the first time it has been presented to the general public.	Volume 1 Chapter 2
Why did Dillon miss Site K? What other "mistakes" have been made that no one knows about; public consultation is valuable because the public may be able to recognize mistakes that have been made and help correct them.	Site K was not missed. In the original application of the "industrial lands" criteria, only those lands specifically designated for industrial uses, and lands designated and licensed for waste disposal, on clay based soils were included. The lands on which Site K is now located are designated for "waste disposal" but are not licensed. The exclusion of the unlicensed lands was based on the interpretation that unlicensed lands have the potential to be directed in the future to agriculture uses. Moore Township responded that the intent of the Official Plan is that the designated but unlicensed lands will be used for waste disposal in the future. These lands were therefore included as part of the revised study area resulting in the identification on Site K.	Volume 1 Chapter 6
Residents near D and K want clear explanation of why these sites are on short list.	Volume 1, Chapter 6 explains the site selection process followed which resulted in the identification of Sites D, H, I and K for detailed comparison.	Volume 1 Chapter 6

TABLE 2.5
SUMMARY OF VERBAL COMMENTS
(from March 1993 PIC)
(Continued)

Questions and Comments	Responses	Reference
Costs		
One resident requested confirmation that it would cost \$25M for a new waste management facility. He also asked who would pay for the facility.	The approximate cost for a new facility would be \$25M. This cost would be paid by the County. As a matter of principle, the County has decided not to rely on the private sector for waste management solutions as relying on the private sector is sometimes risky. For example, several Elgin County municipalities relied on the private Green Lane Facility. The owners have applied for an expansion of the site but there is no assurance that it will be approved. Meanwhile, the affected municipalities have to truck waste to another landfill, farther away, at great expense.	Volume 1 Chapter 1
Cost should be an important consideration in the assessment of the proposed systems. In these times, the County shouldn't be paying for expensive programs.	Economic impacts were considered in the evaluation of waste management systems and costs were assessed as part of the evaluation of alternative long-term waste diversion strategies. It is important to note that the recommended long-term waste diversion strategy for the County contains many expansions or enhancements of existing programs which should help to keep costs down.	Volume 1 Chapters 4 and 5
General concerns about spending a lot of money and concentrating only on Moore Township, e.g. why not go with private developer offering former gravel pits on supposedly hydrogeologically acceptable lands in Plympton Township?	The site selection process, explained in Volume 1, Chapter 6, involved consideration of all lands in the County at the initial stages. As the process evolved, lands were eliminated from consideration at various steps, due to the criteria selected by the workshop participants and the study team. The Plympton Township lands referred to did not meet the study area criteria.	Volume 1 Chapter 6
Design and Operation		
One resident stated that they were concerned about leachate migration from Sites D and K.	All four of the alternative sites are located on clay-based soils and were found to provide excellent protection against ground water impacts.	Volume 1 Chapter 6 Volume 4 Appendix 4D
Waste Management		
Very interested in recycling and waste management issues.	The development of a waste diversion system has been an integral part of the Lambton County Waste Management Master Plan. Waste diversion and recycling issues have been addressed in the recommended long-term diversion strategy. The Public Advisory Committee is active in waste management issues in the County and in promoting waste diversion initiatives.	Volume 1 Chapter 5

TABLE 2.5
SUMMARY OF VERBAL COMMENTS
(from March 1993 PIC)
(Continued)

Questions and Comments	Responses	Reference
Backyard composting should remain an option for people in rural areas. People on farms don't always need backyard composters because they have room to set up their own pits or to spread their organics.	Expanded distribution of backyard composters is included in the recommended long-term waste diversion strategy. It is recommended that backyard composters be distributed to households free of charge, but only to those households who indicate that they are willing to accept one or feel that they could use one.	Volume 1 Chapter 5
Compensation		
A resident in the vicinity of Sites D and K asked if property owners would be compensated for loss of property value and other adverse impacts. The resident also asked if the County would hold special meetings with residents if Site D or Site K was chosen as the preferred site.	<p>The County's property value protection plan being developed for the Sarnia Landfill Expansion includes compensation to a property owner, consisting of the difference between a bona fide offer to purchase and a land appraiser's report. In the event that an owner was unable to sell their property, the County would buy it.</p> <p>The County will hold meetings with residents surrounding the preferred site for the Master Plan to determine appropriate impact management measures, including compensation.</p>	
Collection Systems		
The proposed waste management systems do not include consideration of used appliances. Depots should be set up to allow them to be collected. These depots could be located at the existing facility.	The recommended long-term waste diversion strategy for the County does include collection of bulky items such as appliances, furniture, tires, etc. In urban areas, it is recommended that regular collection be done. In rural areas, it is recommended that depots be established at either the existing landfill sites or at municipal public waste yards.	Volume 1 Chapter 5
Several people commented that they thought that user pay collection was a good idea, as long as their tax bill was reduced. Such a system will make people more aware of the amount of garbage they produce.	User pay is included in the recommended long-term waste diversion strategy. It is recommended that user pay be implemented at two levels - at the County level and at the municipal level. At the County level it is recommended that the existing tax levy system used by the County for recovering waste disposal costs be replaced with a user pay alternative. The best alternative will be to charge the municipalities a tipping fee based on the quantities of waste disposed. Because the municipalities presently run their own collection programs, it will be up to them to decide how they will recover the cost of the tipping fee. It is suggested that many will add user pay onto their collection programs.	Volume 1 Chapters 5 and 8

TABLE 2.5
SUMMARY OF VERBAL COMMENTS
(from March 1993 PIC)
(Continued)

Questions and Comments	Responses	Reference
Moore Township has gone to bi-weekly Blue Box collection, from weekly collection previously. This discourages people from using their Blue Boxes.	Please refer to the above response. If Moore Township changes to a user pay waste collection system, this will have the reverse effect of encouraging residents to use their Blue Boxes even more because Blue Box collections will remain free. In turn, Moore Township may have to revert to weekly Blue Box collection in order to keep up with the expected increased quantities. The start up of a user pay collection program in Grand Bend resulted in a significant increase in the quantities of materials placed in Blue Boxes for recycling.	Volume 1 Chapters 5 and 8 Paul Turnbull, Village of Grand Bend
Education		
Public education is a waste of money. People don't read and follow instructions.	Public education is a valuable tool for informing people on how to participate in waste diversion programs. Given the popularity of the existing Blue Box and backyard composter programs in the County, it is reasonable to assume there are many residents who want to participate in waste diversion programs. Public education is the most effective means of keeping participants abreast of changes to programs.	Volume 1 Chapter 5
Property Value		
Landfill will devalue property. Do you want to buy and live in my house?	Following selection of the preferred site, the County will meet with affected residents and determine appropriate impact management measures, including possible compensation measures.	
Others		
A representative of Canada Post stated that anyone who does not wish to receive junk mail can call a 1-800 number to prevent its delivery.	Comment noted.	

Approximately 28 residents attended the meeting (a copy of the attendance report is provided in Schedule 3D-23 in Volume 3); a Lambton County representative and a Dillon staff member attended to present information and answer questions.

A brief overview of the site selection process was presented, including a review of the key site identification maps. An informal question, answer and discussion period followed the presentation.

One of the main concerns expressed was the residents' dissatisfaction with the fact that all sites being considered were located in Moore Township. The main study area criteria that resulted in a concentration of sites in one area - the "industrial lands" criterion and the "Class 3 to 7 agricultural lands" criterion - were reviewed and discussed. The residents also expressed particular concern about the inclusion of Sites D and K on the "short list" of sites for further study. In their view, Sites D and K are located in the midst of an agricultural community and are not appropriate for the development of a new long-term waste management facility. With respect to Site K, they indicated that although they live nearby the existing Moore Township Landfill, they do not feel it would be fair to have all wastes from the County disposed in their "backyard". In response, the characteristics of Sites D and K leading to their inclusion on the short list were reviewed and discussed.

A petition by the Lambton Bowhunters Association Inc. was also presented. Concerned members petitioned that Lambton County consider another location for the facility, as one of the sites presently being considered is on property owned by Novacor where they have their archery range.

2.8.6 Residents Meeting No. 2

A second meeting of the residents living in the vicinity of Sites D and K was held on October 13, 1993. The residents requested the meeting with the purpose of hearing a status report on the detailed comparison of the four sites (D, H, I and K) and, if possible, finding out the results of the site comparison.

The meeting was held at the same location as Resident Meeting No. 1 and approximately 30 residents attended. A copy of the attendance record is provided in Schedule 3D-24 in Volume 3. A Lambton County representative and Dillon staff member again attended to make an informal presentation regarding the status of the site selection activities, and to answer questions. The Mayor of Moore Township also attended.

Prior to the meeting, the representative from Lambton County explained to a few inquiring residents that the detailed comparison of sites was still in progress, and that the "best" site

had not yet been identified. He indicated, however, that the activities being done to compare the sites would be explained and discussed.

At the meeting, the residents once again expressed their view that neither of Sites D or K should be selected for the long-term facility. In their view, Sites H and I are in a more appropriate location, with their proximity to heavy industry and a low surrounding population.

An overview of the site comparison studies being conducted was provided, and the preliminary findings of some studies were cited, such as the fact that, from a ground water perspective, all sites were found to be relatively equal. It was emphasized that no conclusions regarding a preferred site had yet been developed.

During discussion of the Social Impact Assessment Study, some residents indicated that they did not feel enough effort had been made to interview all of the residents. It was explained that residents and landowners up to 1,500 m from each site had been included in the survey list, and that, for the telephone survey, at least four attempts had been made - at various times of the day and evening - to contact the people on the list. For those that were not reached by phone, a letter was sent out requesting that residents call Dillon if they wished to be interviewed. A sign-up sheet was passed around the meeting with the request that the participants provide their name and telephone number if they wished to have further information or an additional opportunity to participate.

Towards the end of the meeting, the approximate future schedule of events towards completion of site selection, and finalization of the overall Master Plan, was explained and discussed. It was explained that the main conclusions and recommendations of the Master Plan, including the recommended site for the long-term waste management facility, would likely be presented to the public in mid-December 1993.

2.8.7 Public Presentation

A Public Presentation to provide a summary of the key Master Plan results and recommendations was held on November 25, 1993, from 7:00 p.m. to approximately 9:00 p.m., at the Moore Township Civic Centre, 1155 Emily Street, Mooretown, Ontario.

2.8.7.1 Advertisements

Newspaper Ads

The Public Presentation was advertised in six local newspapers serving Lambton County (see Table 2.6). The ad provided the date, time, location and purpose of the meeting. Names of contacts and phone numbers were also provided. A copy of the advertisement is provided in Schedule 3D-25.

**TABLE 2.6
PUBLIC PRESENTATION
NEWSPAPER ADVERTISEMENT DATES**

Newspaper	Dates
Forest Standard	Wednesday, November 10, 1993
Lakeshore Advance	Wednesday, November 10, 1993
Petrolia Topic	Wednesday, November 10, 1993
Sarnia Gazette	Wednesday, November 10, 1993
	Wednesday, November 17, 1993
Sarnia Observer	Saturday, November 13, 1993
	Tuesday, November 16, 1993
	Wednesday, November 17, 1993
	Monday, November 22, 1993
Watford Guide Advocate	Wednesday, November 10, 1993

Radio Announcement

A 30-second radio announcement was prepared to promote the Public Presentation. The announcement was broadcast several times a day over several days, as outlined in Table 2.7 below. A copy of the announcement outline that was sent to the radio stations is provided in Schedule 3D-26.

**TABLE 2.7
PUBLIC PRESENTATION
RADIO ANNOUNCEMENT SCHEDULE**

Radio Station	Dates	Frequency
CHOK 1070	Monday, November 22, 1993	4 times
	Tuesday, November 23, 1993	5 times
	Wednesday, November 24, 1993	5 times
	Thursday, November 25, 1993	2 times
FOX 99.9 FM	Saturday, November 20, 1993	3 times
	Sunday, November 21, 1993	5 times
	Monday, November 22, 1993	3 times
	Tuesday, November 23, 1993	2 times
	Wednesday, November 24, 1993	3 times
CKTY 1110	Saturday, November 20, 1993	3 times
	Sunday, November 21, 1993	5 times
	Monday, November 22, 1993	3 times
	Tuesday, November 23, 1993	2 times
	Wednesday, November 24, 1993	3 times

Flyer

A one-page flyer announcing the Public Presentation was distributed to all those on the project mailing list (about 1,000 people). The flyer provided an update on the study progress, the date and location of the Public Presentation, and contact names and phone numbers for more information. A copy of the flyer is provided in Schedule 3D-27.

2.8.7.2 Presentation

Upon arrival, attendees were asked to record their attendance at the registration table and were given a comment form (copy provided in Schedule 3D-28). The presentation was attended by about 140 people. These people included Moore Township residents, Moore Township Councillors and staff, various Lambton County Councillors and staff, members of the Public Advisory Committee, and residents from across the County and the City of Sarnia. Reporters from the *Sarnia Observer*, the *Sarnia Gazette*, FOX FM Radio, CHOK Radio and CBC Windsor were also present.

The Mayor of Moore Township introduced the County, MOEE and Dillon staff, and outlined the purpose of the presentation. An MOEE representative and a representative from MOEE's Waste Reduction Office gave introductory presentations. Dillon staff then presented on the following topics:

- Waste Management Master Plan goal/hierarchy;
- recommendations regarding:
 - overall system
 - waste diversion (3Rs)
 - site for new long-term facility;
- native land claims issue; and
- future steps leading to site development for the new long-term waste management facility anticipated to be completed in late 1997 to mid-1988.

This material (a copy is provided in Schedule 3D-29) was also presented to the Steering Committee and County Council prior to the Public Presentation.

2.8.7.3 Summary of Comments

After the presentation, the Mayor of Moore Township facilitated the question and answer period.

A number of comments pertained to costs. There was also interest in the socio-economic, design and operation, hydrogeology, land use and siting aspects of the study. Other comments pertained to transportation, water and waste systems. Provided in Table 2.8 is a summary of these comments and responses to each.

To date, two comment forms and a letter were collected at the Public Presentation. The comments focused on:

- the consideration of incineration;
- turning landfill and garbage disposal over to free enterprise; and
- a compliment that literature from the County has been professional and informative.

**TABLE 2.8
PUBLIC PRESENTATION
SUMMARY OF COMMENTS**

Questions and Comments	Responses	References
COSTS		
What is the cost for this landfill?	The capital cost is approximately \$15 million, however, without detailed design drawings at this stage, it is difficult to provide a more exact figure. The operating cost is about \$2 million to \$3 million per year. This figure includes the operation of a MRF, landfill and composting facility. Post-closure costs would be on-going until it can be proven that there will be no impact to the landfill site area.	
How much has Dillon spent to date?	The project started in 1986 and since then, there has been quite a lot of changes in scope. The total budget is \$1.2 million with the provincial government paying half of that.	
Are private sector options being considered?	While pursuing public sector solutions to waste management, we are also looking at private sector solutions to see if they can handle one or more components of the system at a less expensive rate.	Volume 1 Chapter 1
Can we control the costs or form a residents committee to oversee costs?	Lambton County will ultimately control costs but certainly, as another cost control measure, a Liaison Committee, part of which would be formed by residents, could be formed to monitor aspects of the waste facility, including costs.	
SOCIO-ECONOMIC		
What will happen to tourism? Every beach along the River is being polluted.	Pollution of any kind is a genuine concern. One of the reasons a comprehensive site selection process has been undertaken is to ensure that the site selected will provide maximum protection against impacts. Site I - the recommended site - is not located on lands zoned for recreation or tourism, but on lands zoned for industry, adjacent to existing heavy industrial uses.	Volume 4 Appendix 4E

**TABLE 2.8
PUBLIC PRESENTATION
SUMMARY OF COMMENTS
(Continued)**

Questions and Comments	Responses	References
Terra International employs 240 people. Were they included within the radius which you considered? I am sure that once they are more knowledgeable about the process, they will want to be involved.	People living in the area are given primary consideration, but, of course, employees are important too. They can be involved in the process at any time.	Volume 1 Chapter 2 Volume 4 Appendix 4F
Has an impact study been done on property values?	Economic and property value impact assessment has been discussed with the County but an analysis has not been undertaken at this level of detail. It could certainly be done at the recommended site with a study zone of 1,000 to 1,500 m. However, property values may not necessarily go down as a result of a nearby waste facility; across Ontario, there are examples where values stayed stable or actually went up.	
DESIGN AND OPERATION		
What will the capacity of the landfill be in metric tonnes? And when will the closure date be?	The design capacity is up to about 2 million tonnes. The closure date will be 20 years from start date. However, the design is based on a worst case scenario with no diversion. In fact, the landfill would last longer than 20 years with waste diversion.	Volume 1 Chapter 3 Volume 4 Appendix 4C
How deep will the landfill be?	Without design drawings, it is difficult to guess. Perhaps 30 to 35 feet.	
HYDROGEOLOGY		
Who will guarantee that the landfill will not leak? Not just 5 years from now, but 20, 30, 40 years from now?	The landfill will be designed to meet provincial guidelines that prevent pollution of water resources. In addition, ground and surface water quality will be continuously monitored. The monitoring program will be designed to detect changes in water quality, so that unacceptable changes can be prevented. This monitoring program will continue after the landfill is closed.	Volume 4 Appendix 4D
Has Site I been checked for faults and soil type?	Yes. Hydrogeologic investigations were completed on all short-listed sites, and indicated that all sites had excellent clay soils. No significant sand seams were found at any site.	Volume 4 Appendix 4D
LAND USE		
How can you say there is no recreational area? St. Clair Parkway is all recreational.	All lands at Site I are zoned industrial. This type of waste facility is compatible with surrounding heavy industrial land uses.	Volume 4 Appendix 4E
If we use up our industrial lands for a landfill site, will that take up more land used for agriculture?	Moore Township is currently assessing the industrial land base in the township, and future needs. At present, the stock of industrial lands exceeds predicted needs.	
SITING PROCESS		
Are we stuck with the four short list sites? Can the facility be placed somewhere else?	The technical evaluation must be undertaken such that it can be defended at a hearing. If there is an error in the evaluation, then it will certainly be re-examined; however, whatever location is chosen must be defensible.	

**TABLE 2.8
PUBLIC PRESENTATION
SUMMARY OF COMMENTS
(Continued)**

Questions and Comments	Responses	References
This process started in 1986 and the whole facility is to last 20 years. What will happen after the 20 years? Will we start the whole process over again?	Technically, we are required to find the best site in the County. With diversion, the landfill may last for more than 20 years. After that, a new assessment of needs and possible solutions will have to be done, taking into consideration many factors (e.g. new diversion strategies, new technologies, 3Rs, etc.).	
TRANSPORTATION		
Is Lambton County lobbying with the Provincial Government to widen Highway 40?	The Transportation Specialist undertook a detailed comparative evaluation of the sites; it was determined that the capacity of the present highways is adequate.	Volume 4 Appendix 4H
WATER		
How can you say that there is no potential flood hazard? All the water and waste residue pours into the river. We live in heavy clay so there must be floods.	The design and operation of the landfill site will include monitoring, management and mitigation measures to ensure proper site drainage and minimize off-site surface water effects. Overall, there should be no increase in the flood hazard as a result of site development.	Volume 4 Appendices 4C and 4G
WASTE SYSTEMS		
I travelled to Eastern Canada and have seen the capability of an incinerator. Why don't we consider it here?	The government under former MOEE Minister Ruth Grier banned the development of any new municipal solid waste incinerators in Ontario.	Volume 1 Chapter 4 Volume 2 Appendix 2C Ontario Ministry of Environment and Energy Regulation 555/92

2.9 Review of Draft Master Plan Report

After the Public Presentation in November 1993, the November 1993 Draft Lambton County Waste Management Master Plan Report was sent to several groups in December 1993 and January 1994 for their review. These groups included:

- the Steering Committee,
- County Council,
- PAC Members,
- MOEE,
- concerned landowners, and
- other interested groups.

A copy of this distribution list is provided in Volume 3, Appendix 3E, Schedule 3E-1.

Notices were placed in the local newspapers to announce to the general public the availability of the Draft Master Plan Report in the public libraries and local municipal offices (see Table 2.9). The ad identified the locations where the Draft Master Plan Report was available and also the date of the review period and deadline for comments. A contact person and phone number was also provided. A copy of the ad is provided in Schedule 3E-2.

**TABLE 2.9
PUBLIC REVIEW
NEWSPAPER ADVERTISEMENT DATES**

Newspaper	Dates
Forest Standard	Wednesday, December 22, 1993
Petrolia Topic	Wednesday, January 5, 1994
Sarnia Gazette	
Sarnia Observer	
Watford Guide Advocate	
Lakeshore Advance	Wednesday, December 22, 1993 Wednesday, January 12, 1994

An update to the November 1993 Draft Report was undertaken and a March 1994 version was made available to government review agencies and interest groups for their participation in the review of the Draft Master Plan. A letter and response form were sent out to the agencies and groups (copies provided in Schedule 3E-3). Many of the agencies indicated an interest in participating in the review process. Schedule 3E-4 provides a summary of the Volumes that the agencies requested. Comments were received throughout 1994 from the various groups and agencies reviewing the Draft Master Plan. The comments received from reviewers, along with the County's responses, are provided in Schedules 3E-5 to 3E-9.

Based on the input received from various groups during the review period, relevant revisions and updates have been incorporated into the February 1995 Master Plan Report and the appendices.

2.10 Consultation with Walpole Island First Nation

Local First Nations, including the Walpole Island, the Chippewas of Kettle & Stony Point, and the Chippewas of Sarnia First Nations, have been kept informed of the Lambton County WMMP Study since 1986. Letters, invitations to public open houses and other notices have been sent to the First Nations on an ongoing basis. Examples of these can be found in

Volume 3, Public and Agency Consultation Appendices (specifically, Schedules 3A-5, 3A-9, 3A-12, 3D-4, 3E-3 and 3E-4 in Volume 3).

In 1994, Walpole Island First Nation responded to the information sent to them regarding the Master Plan. On August 16, 1994, a representative of Walpole Island made a presentation to the Lambton County WMMP Steering Committee regarding the land claims throughout Southern Ontario, including those affecting Lambton County. Comments submitted by Walpole Island are included in Schedule 3E-8.

The County was then invited to Walpole Island to make a presentation regarding the Waste Management Master Plan and to discuss any concerns. The presentation was made at an Information Meeting held September 14, 1994. Displays and handouts were also available for review. A copy of the presentation material is provided in Schedule 3E-10. Dillon and County staff made the presentation and answered questions. Liaison with Walpole Island First Nation is continuing on an as-required basis.

2.11 Moore-Sombra Townships - Public Meeting

The consulting firm of Gore & Storrie Ltd. was hired to peer review the Draft Master Plan documents on behalf of Moore and Sombra Townships and provide input to Lambton County from the Townships' perspective, as well as provide opinions as to the applicability of the Master Plan to the long-term needs of the County.

A Public Meeting was held by Moore and Sombra Townships to identify affected landowner/stakeholder concerns regarding the Master Plan so that Gore & Storrie Ltd. could account for, and address, the concerns of those in the affected vicinity of the short listed sites. The meeting was held at Moore Township Civic Centre on Friday, September 30, 1994, at 10:00 a.m. Representatives from the Councils of Moore and Sombra Townships, the County, and Gore & Storrie Ltd. were present.

Several residents made oral presentations and expressed concerns about Sites D and K as potential sites. A few residents also presented concerns about Sites H and I.

In addition, an oral presentation was made by a representative of Terra International (Canada) Inc., indicating that their firm did not object to a properly managed site. The representative then went on to list some issues that would need to be addressed if Sites H or I were selected as the preferred site. Copies of the written submissions prepared by the presenters are provided in Schedule 3E-11.

3.0 CURRENT STATUS OF WASTE MANAGEMENT IN LAMBTON COUNTY

In Chapter 1, it is stated that the goal of the Lambton County WMMP process was to define the best system for the long-term management of wastes within the County. A key requirement for the development of any waste management plan is information about the type and amount of waste materials to be managed, the existing waste management system, and the amount of waste diversion being achieved. Some materials can be managed and/or eliminated from the waste stream through waste diversion practices (the 3Rs: reduction, reuse, recycling). The remaining materials (residual wastes) must be managed through waste disposal. The ideal of the Master Plan was to increase the amount of waste diverted, and decrease (ideally to zero) the amount of waste requiring disposal.

This chapter addresses the following:

- the types of wastes generated in Lambton County;
- the types of wastes considered in the Master Plan;
- past, present and future waste quantities;
- the current waste management system; and
- the calculation of the current waste diversion rate.

3.1 Waste Types and Quantities

3.1.1 Types of Wastes Generated in Lambton County

For the purpose of this study, wastes were classified as one of three types: municipal; IC&I; and other. This classification considered the source of the waste and current diversion or disposal practice.

i) Municipal Wastes

In Lambton County municipal wastes consist of residential wastes plus quantities of residential-type commercial and institutional wastes. Residential waste is mainly household-type garbage (paper, cans, food scraps, packaging materials, etc.) with some large or bulky items, small amounts of construction-type debris, and small amounts of household hazardous wastes not regulated by the MOEE under Regulation 347. Commercial and institutional wastes are generated in commercial and institutional establishments and are generally similar to residential waste. In Lambton County, municipal waste is disposed of at municipal and private landfill sites licensed for municipal waste disposal.

The MOEE defines municipal waste in Regulation 347 as any waste controlled or managed by a municipality, except for hazardous waste, liquid industrial waste or gaseous waste.

ii) IC&I Wastes

IC&I wastes are wastes produced by industrial, commercial and institutional establishments within the study area, and wastes produced by industry outside of the study area which are imported for the purpose of treatment and/or disposal. There are three different types of IC&I wastes: solid non-hazardous, solid hazardous and liquid wastes.

IC&I solid non-hazardous wastes consist of a diversity of waste materials including, for example, office/cafeteria wastes, packaging, insulation materials and construction/demolition wastes.

Solid hazardous and liquid wastes from the IC&I sectors are not managed by the County, and are not addressed in the Lambton WMMP. The individual generator is responsible for ensuring that these wastes are properly handled and disposed in accordance with the MOEE's Regulation 347. Solid hazardous and liquid wastes produced in the IC&I sectors are regulated by the MOEE through the manifest/waybill system. This system was developed as part of Regulation 347 under the EPA. Solid hazardous and liquid wastes are treated and disposed of on-site by the generator or at private facilities licensed to accept these wastes for treatment and/or disposal. The most prominent of these facilities in Lambton County is Laidlaw Environmental Services Ltd. in Moore Township.

The County is a net importer of liquid industrial and solid hazardous wastes. As part of Stage 1 of the WMMP study, a survey of IC&I establishments was conducted to determine the quantities of waste produced and disposed of in the County. It was determined that in 1985, approximately 166 million litres of these wastes were treated and disposed of at a number of licensed facilities in the County. More than 60 per cent of these wastes were generated outside of the County. The remaining approximately 40 per cent, or 63 million litres, was generated from within the County.

iii) Other Wastes

Other wastes can come from a variety of sources:

- **Hospital wastes:** The wastes generated by the County's three hospitals are either municipal-type wastes or biomedical wastes (dressings, syringes, cultures, etc.). The municipal-type wastes are collected separately and disposed of at landfill sites which are licensed to accept municipal wastes. Hospitals are responsible for ensuring that biomedical wastes are properly handled and disposed in accordance with the MOEE's Regulation 347.
- **Wastes from parks and conservation areas:** There are 12 Conservation Areas (under the jurisdiction of the Ausable Bayfield Conservation Authority or the St. Clair Region Conservation Authority) and two Provincial Parks (under the jurisdiction of the Ministry of Natural Resources) in the County. The wastes from these facilities are municipal-type wastes which are collected by the operating authority, or private haulers under contract, and disposed of at local landfills.
- **Wastes from Indian Reserves:** There are three Indian Reserves located in Lambton County: Kettle and Stoney Point Indian Reserve No. 11; Walpole Island Indian Reserve No. 46; and the Chippewas of Sarnia Indian Reserve No. 45. The wastes from these reserves are municipal-type wastes. The Band Councils are responsible for the collection and disposal of their own wastes. Wastes from Walpole Island are disposed of on the Reserve. The Chippewas of Sarnia and the Kettle and Stoney Point Band dispose of their wastes at local landfills.
- **Sewage treatment sludge** and water treatment sludges are produced by water and sewage treatment systems. A number of methods are currently used for disposal of these wastes. Some sewage treatment sludges are disposed of at landfills which are licensed to accept this type of waste. Where the sludge meets the MOEE criteria for land application, the sludge is disposed of on approved organic soil conditioning areas. Where the sludge does not meet these criteria, or where approved disposal sites are not available, the sludge is either placed in lagoons or sent to private treatment facilities. Several small communities rely on lagoons for sewage treatment. Sludge disposal from lagoons is generally not required on a regular basis. If disposal is required, it occurs on approved organic soil conditioning sites or in landfill sites which are licensed to accept sewage sludge, such as the Moore Township and Laidlaw landfill sites. Sludges from water treatment plants in Lambton County are disposed of in the source water body, or are sent to sewage treatment plants for disposal. Septic tank pumpings are disposed of at sewage treatment plants or are land-applied where the appropriate approvals have been obtained.

- **Farm operations:** A variety of wastes which require special disposal are produced by farm operations. Examples are animal carcasses, empty agricultural chemical containers, spoiled grains and fencing wire. Animal carcasses are not allowed in municipal landfills and are usually given to renderers. The County has further banned the disposal of dead animals and animal wastes at its landfill sites. Empty agricultural containers can be disposed at municipal landfills if they are cleaned properly. Some agricultural containers can now be recycled where programs exist. Fencing and similar materials can be disposed of at sites licensed to accept construction debris. Most of the remaining wastes generated by farms are considered to be municipal wastes and can be disposed at local landfills.

3.1.2 Waste Types Considered in the Master Plan

The purpose of this section is to describe the types of wastes considered in the Master Plan and the types not considered. This is necessary primarily because Lambton County is unique compared to most other municipalities in Southern Ontario with respect to how IC&I wastes are handled. Traditionally, most of the large generators of IC&I waste in the County have been responsible for the disposal of their wastes and have either utilized their own landfill sites or they have used other privately owned sites.

Wastes Considered in the Master Plan

A basic premise in developing the Master Plan was that the only wastes which would be considered would be wastes which historically have been collected by local collection contractors and municipal forces, or have been disposed in municipal landfill sites. This is consistent with the definition of municipal waste in Regulation 347 which states that municipal waste means any waste controlled or managed by a municipality except for hazardous and liquid industrial wastes.

In the Master Plan, municipal wastes include residential wastes, some residential-type IC&I wastes (e.g. light commercial and institutional wastes), and some other types of wastes (e.g. residential-type wastes from hospitals and farm operations, wastes from parks and conservation areas, and some sewage sludges). Waste generation rates and future generation quantities were determined using historical quantities of municipal wastes as defined in the Master Plan.

Wastes Not Considered in the Master Plan

Wastes not considered in the Master Plan include IC&I wastes which have not traditionally been disposed in municipal landfill sites including solid hazardous and liquid wastes, biomedical wastes, wastes from Indian Reserves and animal carcasses. The County has

traditionally not been responsible for these types of wastes and it is reasonable to assume that the County will continue to not be responsible for these wastes in the future.

Redirected Wastes

In the past, some IC&I wastes collected by private contractors but disposed of in municipal landfill sites were redirected to privately owned sites. For the purpose of defining the role that these IC&I wastes have in the Master Plan, the following three additional classifications for wastes in Lambton County have been developed:

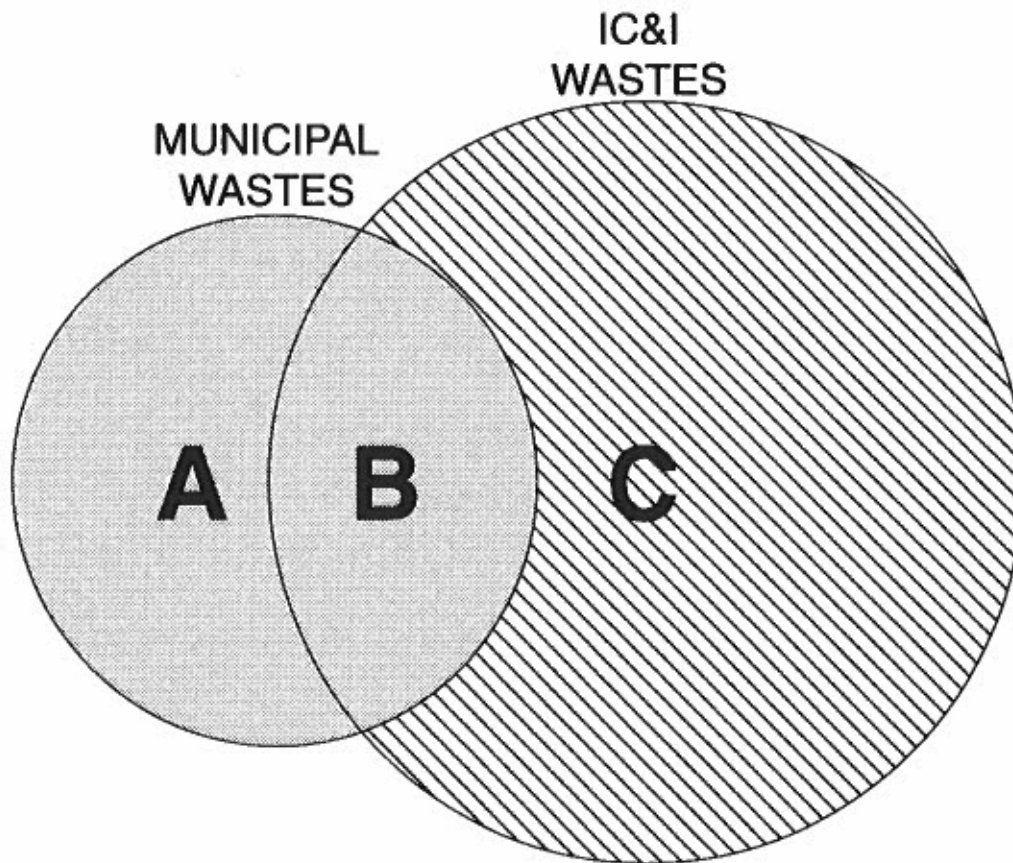
- A - Residential wastes, which have traditionally been disposed in municipal landfill sites in the County. Approximately 50,000 tonnes of residential wastes are produced in the County each year. These wastes were considered in the Master Plan.
- B - Residential-type IC&I wastes which have traditionally been disposed in municipal landfill sites. These wastes primarily originate from commercial and institutional establishments. Approximately 40,000 tonnes of Type B wastes are produced in the County each year. These wastes were considered in the Master Plan.
- C - IC&I wastes, which traditionally have not been disposed in municipal landfill sites. Approximately 135,000 tonnes of Type C wastes are produced in the County each year. These wastes were not considered in the Master Plan.

The relationships between A, B and C type wastes and the Master Plan are illustrated in Figure 3.1.

In 1988, the County increased tipping fees at the Sarnia Landfill site in order to extend the remaining capacity of the landfill. This resulted in the redirection of the majority of B type wastes generated in the Sarnia area to private landfill sites. The quantity of wastes redirected was estimated to be approximately 32,500 tonnes per year.

Historically, the County has been responsible for the disposal of residential-type IC&I or B type wastes in the past. It is reasonable to expect that if tipping fees were reduced to historical levels, B type wastes would return to municipal landfill sites. On this basis, it is also reasonable to expect that the County will be responsible for the disposal of the B type wastes in the future.

FIGURE 3.1 WASTE TYPES CONSIDERED IN THE MASTER PLAN



Legend

- A - Residential Wastes
- B - Residential-type Wastes Produced by the IC&I Sectors
- C - IC&I Wastes
- - Wastes Considered in the Lambton County WMMP
- ⊘ - Wastes Not Considered in the Lambton County WMMP

Note: The Sizes of the Circles are Proportional to the Waste Quantities Produced

In the Master Plan, future waste generation projections were calculated using generation rates that were determined in Stage 1 in 1985. The generation rates were determined using historical data that included both A and B type wastes. Therefore, future waste quantities and the sizes of new facilities recommended in the Master Plan reflect the assumption that B type wastes will return to municipal landfill sites in the future.

The determination of the 1992 waste diversion rate for the County only considered the waste streams handled by the County in 1992. As a result, the 32,500 tonnes of B-type wastes redirected away from municipal landfill sites was not considered in the calculations. There is a possibility that some of the redirected wastes may have been diverted from disposal by the generators. However, information regarding the quantities of redirected wastes that have been diverted is not available to the County.

The above discussion on the types of waste considered in the Master Plan may be summarized as follows:

1. The County does expect that C type wastes will continue to be disposed in privately owned IC&I landfills and that the County will not be responsible for these wastes in the future.
2. The IC&I wastes that the County is planning to manage in the future are the B-type portion or the residential-type IC&I wastes which have traditionally been disposed in municipal landfill sites. The historical quantity was estimated to be 32,500 tonnes per year (excluding waste diversion). It would not be reasonable to assume that the County will be responsible for C type wastes because historically the County has not been responsible for these wastes and likely will not be in the future.
3. Existing municipal landfills in the County cannot handle the C type or IC&I wastes. The new proposed County landfill will only be licensed to handle municipal wastes, which includes A and B type wastes.
4. The new proposed County landfill has been sized to handle A and B type wastes, but not the C type wastes.

3.1.3 Past, Present and Future Waste Quantities

The waste quantities generated in Lambton County in 1985 were originally estimated during the development of the Sarnia/Lambton Waste Management Master Plan Stage 1 Report (September 1986). During subsequent years, the September 1986 information has been updated to reflect current conditions in the County. This section summarizes the estimates of past, present and future waste quantities. The estimates discussed in this section reflect

the total maximum quantities that have been or could be generated in the County. Additional details on the waste quantity calculations are included in Appendix 2D in Volume 2.

For the purposes of predicting future waste quantities, it was assumed that the County will be responsible for the handling and disposal of only municipal wastes. As noted previously, municipal wastes include some household-type wastes from commercial and institutional establishments that have traditionally been collected by local contractors and municipal forces, or have been disposed in municipal landfill sites. It was assumed that the County will not be responsible for the handling and disposal of IC&I wastes that have not traditionally been collected by local contractors and municipal forces, or disposed in municipal landfill sites.

Future waste quantities were predicted by determining waste generation rates. A waste generation rate represents an estimate of the amount of waste produced per day by each person in a given area. These rates tend to differ from area to area, and are often lower in rural areas than in urban areas.

Past Waste Quantities and Generation Rates

Waste quantities for 1985 were determined in Stage 1 by sending questionnaires to the County's local municipalities and area industries, conducting site visits to the existing landfills, and holding conversations with municipal staff, MOEE staff, and private waste management operators/contractors. Based on this work, it was estimated that approximately 226,700 tonnes of wastes were generated in Lambton County in 1985. Of this total, it was estimated that approximately 39 per cent or 87,960 tonnes were municipal wastes.

Per capita municipal waste generation rates were calculated for each municipality using the 1985 estimated waste tonnages and 1985 population figures from assessment data. It was found that these rates were slightly higher than the rates of 2 kg/capita/day for urban areas and 1 kg/capita/day for rural areas developed by the MOEE. As a result, slightly higher estimates of 2.2 kg/capita/day for urban areas and 1.1 kg/capita/day for rural areas were used. It was assumed that all cities, towns and villages represented urban areas and all of the townships represented rural areas. Higher rural rates were assumed for Moore and Plympton Townships because those municipalities contain significant urban development relative to the other townships. Rates of 2.0 kg/capita/day and 1.7 kg/capita/day were used for Moore and Plympton Townships, respectively.

Review of Present Waste Quantities and Generation Rates

The municipal waste generation rates developed in Stage 1 using 1985 data were reviewed in 1993 to determine if these rates were still appropriate for determining future waste quantities. It was assumed that if the waste quantity estimated for 1992 using the 1985 waste generation rates was similar to the actual quantity produced, then the 1985 rates would still represent current waste generation in Lambton County. In this case, it was considered reasonable to use the 1985 rates for estimating future waste quantities.

The 1985 waste generation rates were multiplied by 1992 population estimates to produce a theoretical 1992 waste quantity of 95,200 tonnes of municipal waste for the County. The actual amount of municipal waste produced in the County in 1992 was determined to be 81,700 tonnes. (This quantity included the actual amount of waste disposed in the County's landfills, the amount diverted through waste diversion programs, plus the amount of municipal waste from IC&I sources that was redirected away from the County's landfills in 1988.) The difference of 13,500 tonnes was not considered to be significant because the estimate of the quantity of waste produced in 1992 did not take into consideration the amount of waste diverted through at-source waste diversion activities (waste reduction and reuse) and the effects of the recent economic recession. As a result, it was concluded that the 1985 waste generation rates would be the appropriate rates for estimating future waste quantities in the County.

Future Waste Quantities

Future waste quantities were predicted by multiplying the 1985 municipal waste generation rate estimates by future population estimates.

Future population projections were determined by reviewing previous census data, including data from the 1991 census, and estimating future growth rates for each municipality. (Additional details on the development of the population projections are provided in Appendix 2D in Volume 2.)

Municipal waste quantity projections were developed for the 20-year period, 1996-2015. The projections were then extended for an additional 20 years to the end of 2035.

It was determined that approximately 2 million tonnes of municipal waste will be produced in Lambton County during the 20-year period from the start of 1996 to the end of 2015. This quantity excludes the impact from future waste diversion initiatives.

Additional waste quantity projections were developed considering the impacts of waste diversion. It was assumed that waste diversion will increase at a constant rate from 25% in 1992 until it reaches 50 per cent in the year 2000. It was also assumed that diversion will remain at 50 per cent for the remainder of the study period after the year 2000. Under this assumption, it was determined that with waste diversion, a total of approximately 1 million tonnes of waste will require disposal between the start of 1996 and the end of 2015.

3.2 Current Waste Management System

The current waste management system in Lambton County includes the following components:

- waste collection;
- source separation/recycling;
- household composting;
- central composting;
- materials recovery facilities; and
- landfill sites.

The purpose of this section is to describe the current waste management activities in Lambton County within each of these components.

3.2.1 Waste Collection

The collection of solid wastes is currently the responsibility of each municipality. The County is responsible for the disposal of wastes collected by the municipalities. The municipalities within Lambton County were initially surveyed during Stage 1 of the WMMP study (1986) through a mailed questionnaire to determine the extent of their collection services. This information has been updated using new information compiled by the County.

Most municipalities have contracted out waste collection and haulage (City of Sarnia, Town of Petrolia, the Villages of Alvinston, Arkona, Grand Bend, Oil Springs, Thedford, Watford and Wyoming, and the Townships of Euphemia, Moore, Plympton and Sombra). Four municipalities (Townships of Brooke, Dawn, Enniskillen and Warwick) have no arranged collection and residents haul wastes directly to a landfill site or make individual arrangements with a collection contractor. The remaining municipalities have municipal collection for most households (Town of Forest, Village of Point Edward and Town of Bosanquet). Special collection days for pick-up of large or bulky items are provided in several of the municipalities, generally for the spring and fall clean-up periods.

There are no large scale transfer facilities within Lambton County. Small bins ranging from 3 to 4.5 m³ (4 to 6 yd³) are used at some apartment buildings and commercial establishments under contract with a private hauler. In the Township of Euphemia a contracted local hauler collects garbage on Saturdays at the municipal garage in Cairo.

Many industries contract directly with private haulers for waste collection, or use their own vehicles to transport wastes to a landfill. A small portion of industrial wastes are collected by the municipalities, particularly small businesses producing only normal household type wastes. Most commercial establishments, particularly within the smaller communities, have wastes collected under the residential contract of the municipality.

The smaller parks and conservation areas are serviced by conservation forces who direct haul wastes to a local landfill within the area. The larger conservation areas, particularly those with camping facilities, and the provincial parks have their wastes collected under contract with a private hauler, and their wastes are disposed of at local landfills.

The existing waste collection activities for each municipality within Lambton County are described in Table 3.1. The information provided in Table 3.1 is current to March, 1993.

**TABLE 3.1
REFUSE COLLECTION CONTRACTORS AND DISPOSAL SITES
(MARCH 1993)**

Municipality	Refuse Collection Contractor	Disposal Site
City		
Sarnia	990651 Ontario Inc.	Sarnia Landfill
Towns		
Bosanquet Forest Petrolia	Municipal Municipal K&E Solid Waste Management	Laidlaw-Warwick Landfill Laidlaw-Warwick Landfill Philip-Petrolia Landfill
Villages		
Alvinston Arkona Grand Bend Oil Springs Point Edward Thedford Watford Wyoming	Mike Damchuk McDonald Sanitation McDonald Sanitation K&E Solid Waste Management Municipal McDonald Sanitation McDonald Sanitation K&E Solid Waste Management	Laidlaw-Warwick Landfill Laidlaw-Warwick Landfill Laidlaw-Warwick Landfill Philip-Petrolia Landfill Sarnia Landfill Laidlaw-Warwick Landfill Laidlaw-Warwick Landfill Philip-Petrolia Landfill
Townships		
Brooke Dawn Enniskillen Euphemia Moore Plympton Sombra Warwick	Direct Haul Direct Haul Direct Haul Ron Aubertine A-1 Fabricating Tri-Land Recycling A-1 Fabricating Direct Haul	Brooke Landfill Dawn Landfill Philip-Petrolia Landfill Laidlaw-Warwick Landfill Moore Landfill Philip-Petrolia Landfill Sombra Laidlaw-Warwick Landfill

3.2.2 Source Separation

Waste diversion in the County includes waste reduction and reuse that occurs in residential households and in industrial, commercial and institutional (IC&I) sector establishments. It is difficult to measure the exact amount of waste diversion that is achieved through at-source reduction and reuse because these are activities that are done internally.

A number of government policies and regulations have been developed that are intended to encourage the reduction, reuse and recycling of materials to minimize waste generation and disposal. Of particular note are Ontario's objectives to reduce the amount of waste disposal by at least 50% by the year 2000. The degree to which people participate in waste reduction and reuse is dependent upon such things as public attitudes, the state of the economy, and economic incentives. Public attitudes can be influenced through public education. The County, the municipalities and the WMMP Public Advisory Committee (PAC) have been active in promoting waste reduction and reuse activities. Economic incentives include product stewardship (where manufacturers are required to be responsible for the ultimate fate of the products that they produce), and direct cost disposal systems.

All of Lambton County is presently served by Blue Box and/or depot recycling programs. The municipalities within the County are currently responsible for making their own arrangements for recycling services. All of the participating municipalities have agreements with one of three recycling contractors for collection and processing of their recyclables. The contractors that serve Lambton County are Bluewater Recycling Association in Huron Park in Huron County, K&E Waste Resources in Sarnia and BFI (formerly Tri-Land Recycling Inc.) in Petrolia. The municipalities in Lambton County, their collection contractors, their recyclables processing contractors and the types of programs that they operate (e.g., Blue Box or depot) are listed in Table 3.2. The information provided in Table 3.2 is current to April 1993.

Warwick Township has a special agreement with Laidlaw Waste Systems (Warwick) Ltd. for recycling collection. Under this agreement, Laidlaw operates a recycling depot for local residents to use at the landfill in Warwick Township, which is owned and operated by Laidlaw. Laidlaw takes the collected recyclables to Bluewater Recycling in Huron County for processing. Laidlaw subsidizes a portion of this cost resulting in a low recycling cost for the Township.

**TABLE 3.2
SUMMARY OF EXISTING RECYCLING PROGRAMS
(APRIL 1993)**

Municipality	Recyclables Collection Contractor	Recyclables Processing Contractor	Program Type
Sarnia	K&E Waste Resources	K&E Waste Resources	Blue Box
Bosanquet	Bluewater Recycling	Bluewater Recycling	Blue Box
Forest	Bluewater Recycling	Bluewater Recycling	Blue Box
Petrolia	BFI K&E Waste Resource	BFI K&E Waste Resources	Depot Depot at Landfill - new
Alvinston	Bluewater Recycling	Bluewater Recycling	Blue Box
Arkona	Bluewater Recycling	Bluewater Recycling	Blue Box
Grand Bend	Bluewater Recycling	Bluewater Recycling	Blue Box
Oil Springs	Bluewater Recycling	Bluewater Recycling	Blue Box
Point Edward	K&E Waste Resources	K&E Waste Resources	Blue Box
Theford	Bluewater Recycling	Bluewater Recycling	Blue Box
Watford	Bluewater Recycling	Bluewater Recycling	Blue Box
Wyoming	K&E Waste Resources	K&E Waste Resources	Depot
Brooke	BFI	BFI	Depot at Landfill
Dawn	Bluewater Recycling	Bluewater Recycling	Depot at Landfill
Enniskillen	K&E Waste Resources	K&E Waste Resources	Depot at Petrolia Landfill
Euphemia	Bluewater Recycling	Bluewater Recycling	Depot
Moore	BFI	BFI	Blue Box
Plympton	BFI	BFI	Blue Box
Sombra	BFI	BFI	Blue Box
Warwick	Laidlaw Waste Systems	Bluewater Recycling	Depot

All three contractors in Lambton County were contacted in April 1993 to determine which materials they presently collect.⁵ The basic Blue Box materials, including newspapers, bi-metal and aluminum cans, PET soft drink bottles, and clear and coloured glass, are collected by all three contractors. Additional materials, such as magazines, fine paper, cardboard, boxboard, phone books, plastic bottles, tubs and bags, and aluminum foil are collected in some areas. The materials collected by each of the contractors are summarized in Table 3.3. It is important to note that the materials listed represent what is generally collected by the contractors, even though not all of the materials listed for each contractor are collected in all of the municipalities that the contractor serves.

All three recycling contractors that operate in Lambton County were contacted in April 1993 to determine their future operating plans.⁶ All three contractors indicated that they intend to expand the number of materials that they collect, although none have specific plans at this time. They indicated that the feasibility of adding materials is dependent on the identification of viable markets.

In 1991, Lambton County conducted a survey of municipalities to determine the effectiveness and cost of the existing recycling programs. This data was analyzed to determine the capture rates and unit costs for the programs. The results indicated that Grand Bend had a capture rate of 140 kg/capita/year for their Blue Box program, which was the highest capture rate observed. Capture rates in the other Blue Box programs were lower, ranging from 38 to 74 kg/capita/year. The average capture rate for Blue Box programs was 49 kg/capita/year. The capture rates in the depot programs were lower, ranging from 14 to 37 kg/capita/year. The average capture rate for depots was 27 kg/capita/year.

The cost data for the recycling programs was analyzed in an attempt to establish relationships between program costs, the level of service provided and the type of area (e.g. urban or rural) served. This information is useful for determining the cost effectiveness of upgrading existing programs. However, the costs were found to vary significantly from program to program and no significant relationships could be determined. This is likely due to a number of factors, including:

- each municipality has a separate agreement with their contractor and each agreement has its own cost structure;

⁵ Per. Comm., Paul McLister, April 16, 1993; Linda Rotteau, April 14, 1993; Steve Van Roboys, April 14, 1993.

⁶ Per. Comm., Steve Van Roboys, April 14, 1993; Paul McLister, April 16, 1993; Linda Rotteau, April 14, 1993.

TABLE 3.3
MATERIALS COLLECTED IN RECYCLING PROGRAMS
(MARCH 1993)

Material	Bluewater Recycling ^{3,4}	BFT ⁴	K&E Waste Resources ⁴
Newspapers	X	X	X
Magazines		X	X
Fine Paper	X ²	X	
Cardboard	X	X	X
Boxboard	X	X	
Phone Books	X	X	
Steel Cans	X	X	X
Aluminum Cans	X	X	X
Aluminum Foil	X		
Plastics ¹			
- SPI1	X	X	X
- SPI2	X	X	X
- SPI4	X	X	X
- SPI5		X	
- SPI6		X	
Clear Glass	X	X	X
Coloured Glass	X	X	X

¹ Society of Plastics Industries (SPI) identification codes:

SPI1 is polyethylene terephthalate (PET).

SPI2 is high density polyethylene (HDPE).

SPI4 is low density polyethylene (LDPE).

SPI5 is polypropylene (PP).

SPI6 is polystyrene (PS).

² Fine paper is collected through schools.

³ Bluewater Recycling also plans to add propane tanks and waste batteries to their program in Fall 1993.

⁴ Not all of the materials listed for each contractor are collected in all of the municipalities served by the contractor.

- processing costs vary in proportion to the amount of recyclables collected; and
- collection and transportation costs vary in proportion to the distance between the municipality and the processing centre.

As a result, trends in the costs for operating the recycling programs could not be established. This will make it difficult to predict the cost effectiveness of upgrading the recycling programs in the future.

The County is helping to fund a wet/dry collection pilot study in Wyoming. The results obtained from this study will be helpful for determining the feasibility of wet/dry collection in the County in the future.

Some of the recycling contractors provide special collections for materials not normally collected through weekly or bi-weekly recycling collections. The City of Sarnia provides monthly collections for large items such as white goods, through a contractual arrangement with K&E Waste Resources. BFI also provides monthly collections for white goods (e.g., appliances), used furniture and scrap wood. Bluewater Recycling provides fine paper recycling through local schools, a paint exchange and a program for used tires. At some County landfill sites (e.g. Brooke, Dawn, Sombra), white goods and scrap steel are stockpiled and collected by a scrap dealer on an annual basis.

Lambton County has banned a number of materials from disposal at their landfill sites. The materials banned from some or all of the County's sites include:

- wood waste;
- derelict automobiles and farm machinery;
- field stones and/or concrete;
- tree stumps;
- demolition and/or building materials;
- cardboard;
- liquid or hazardous waste; and
- dead animals and/or animal waste.

As part of the 5 year Laidlaw-County contract to operate HHW collection days, the County operated collection days on June 8, 1991, at Lambton College and September 26 and October 31, 1992, at the Laidlaw Environmental Services facility on County Road No. 4 in Moore Township. An additional collection was operated in Forest on November 28, 1992. The types of household hazardous wastes collected included acids, pharmaceuticals, paint thinners, pesticides, oils, alkyd and latex paints, propane tanks and automotive batteries.

In 1993, collection days were operated on the last Saturday of each month from March to October, with the exception of July, due to the number of people on vacation. All of the collection days were held at the Laidlaw facility in Moore Township. A September collection was planned for the Village of Watford to provide a convenient depot for residents who live in the eastern municipalities of the County.

The Village of Grand Bend started a direct cost garbage collection program in October 1992. Under this program, residents are required to purchase tags for their garbage bags. The tags cost \$2.00 each and are sold by local merchants. A similar bag tag program was implemented in Bosanquet in April 1994. Early observations from the Grand Bend program indicate that the direct cost program has resulted in significant reductions in the amounts of waste put out for collection and increased use of the existing Blue Box program. Purchases of backyard composters have also increased significantly. There have been no noticeable problems with illegal dumping of waste or tag theft.⁷

3.2.3 Household Composting

Backyard composters are sold to residents in Lambton County by the local municipalities. Two-thirds of the cost of the composters is subsidized by the Ministry of Environment and Energy (MOEE). The program is operated in the following manner:

- the lower-tier municipality takes orders from local residents for composters and sends the orders to the County;
- the County consolidates the orders, purchases the composters and distributes them to the lower-tier municipalities;
- the lower-tier municipalities sell the composters to local residents at a subsidized price of \$12 to \$20 per composter. The lower-tier municipalities then pay the County for the total cost of the composters that they sell; and
- the County pays the composter suppliers for the total cost of the composters, applies for the subsidy from the MOEE, and forwards the appropriate share of the total subsidy to the lower-tier municipalities.

Bluewater Recycling Association members apply for their composter purchases and subsidy through the Association instead of the County.

⁷ Per. Comm., Paul Turnbull, March 22, 1993.

The individual municipalities are responsible for the sale and distribution of backyard composters to local residents. This has resulted in a variety of types of composters being sold to local residents, including both plastic and cedar aerobic composters and anaerobic digesters. The City of Sarnia has also sold a number of vermicomposters.

At the end of 1992, a total of 6,950 composters had been sold through the County program and 1,441 composters had been sold through Bluewater Recycling for a total of 8,391 composters for the entire County. This means that, with approximately 50,000 households in Lambton County, an average of one out of every 6.0 households had a backyard composter by the end of 1992. In 1993, the County sold an additional 710 composters and 466 composters were sold by Bluewater Recycling. The total number of composters sold by the end of 1993 was 9,567. This is equivalent to one composter for every 5.25 households.

Bluewater Recycling is a participant in the MOEE's Model Backyard Composting Program. The purpose of this program is to determine participation rates and waste diversion rates for backyard composters. Communities who participate in the program receive additional funding so that the participation and waste diversion achieved by local residents who purchase composters can be monitored. As part of this program, Bluewater Recycling is planning to sell, at subsidized prices, and monitor an additional 500 backyard composters in the Forest area.

3.2.4 Central Composting

The City of Sarnia received approval in the Fall of 1989 for a 2.8 ha (7 acre) outdoor composting site beside the existing sewage treatment plant. Leaf and yard wastes collected in the Fall in Sarnia are composted at this facility using a simple windrow technique. Approximately 1,750 tonnes of leaf and yard wastes were composted in 1990, 1,500 tonnes in 1991 and 1,850 tonnes in 1992 and 2,200 tonnes in 1993.⁸

The City of Sarnia has had their Certificate of Approval (C of A) amended to allow yard wastes collected in the Spring to be composted at their facility. The City started spring yard waste collections in 1993. In addition, the City has also had their C of A amended to allow leaf and yard wastes collected in other areas in Lambton County to be composted at their facility. The City intends to charge a tipping fee to other municipalities who bring their leaf and yard wastes for composting.

The Town of Petrolia opened its own leaf and yard waste composting facility in the Fall of 1993. The Town of Forest is also planning to open a leaf and yard waste facility, but exactly when is not known.

⁸ Per. Comm., Bill Veitch, March 17, 1993; Bill Veitch, November 3, 1994.

3.2.5 Materials Recovery Facilities

The three contractors that operate recycling programs in Lambton County also operate their own materials recovery facilities (MRFs). The Bluewater Recycling Association MRF is located in Huron Park in Huron County. Philip Environmental constructed and started to operate their MRF in Petrolia in 1994. Browning-Ferris Industries (formerly Tri-Land Recycling Inc.) presently own and operate a MRF in Petrolia.

3.2.6 Landfill Sites

Bill 35, the legislation respecting the amalgamation of the City of Sarnia with the County, requires the County to provide facilities for receiving and disposing of municipal wastes for its municipalities. Additionally, the County designates the facility each municipality will use for waste disposal. The facility can either be County owned or privately owned. As a result, the County utilizes both its own sites licensed for municipal wastes (e.g., the Brooke, Dawn, Moore, Sarnia and Sombra landfills) and privately owned sites licensed for municipal wastes (e.g., the Philip Environmental site in Petrolia and the Laidlaw Waste Systems site in Warwick Township). The disposal sites used by each municipality are listed in Table 3.1.

There are three privately owned and operated landfill sites not utilized by the County for municipal wastes that are licensed to accept non-hazardous solid wastes from industries as well as construction wastes and other inert wastes. The Laidlaw Waste Systems (Warwick) site is also licensed to accept these wastes.

3.3 Calculation of Current Waste Diversion Rate

3.3.1 1992 Diversion Obtained Through County Programs

In 1992, residential wastes were diverted from landfill disposal in Lambton County through three main programs: recycling, backyard composting and central composting of leaf and yard wastes. Wastes were also diverted by reduction and reuse in people's homes and in IC&I establishments. However, it is difficult to measure the amount of wastes diverted through at-source reduction and reuse initiatives. Therefore, the following summary of waste quantities diverted in Lambton County can be considered to be a minimum.

Estimates of quantities diverted through recycling programs in 1992 were provided by Lambton County. These quantities did not include the amounts of wastes diverted by the IC&I sector. In 1992, the County did not accept IC&I wastes at its landfill sites and was not involved in diversion programs for IC&I wastes. The majority of municipal wastes from

IC&I sources that traditionally have been disposed in municipal landfills were redirected away from the County's landfills in 1988.

The number of backyard composters sold in each municipality was also provided by the County. For the backyard composters, it was assumed that people place quantities in their composters ranging from 100 kg to 240 kg of waste per year. It was assumed that 75% of residents who have composters put 100 kg per year in their composters and the remaining 25% put 240 kg per year into their composters. This is equivalent to an average diversion rate of 135 kg per household per year. It was also assumed that all of the people purchasing composters would use them. Information on the quantities of leaf and yard wastes collected and composted by the City of Sarnia in 1992 was provided by the City.⁹

The amount of residential waste diverted through Lambton County programs in 1992 is summarized in Table 3.4. The calculations show that, in 1992, a total of 8,651 tonnes of recyclables and compostables were diverted from disposal.

3.3.2 Calculation of Waste Diversion Rate

Background

The Ontario Ministry of the Environment and Energy (MOEE) has established a waste diversion from landfill objective of at least 50% diversion by the year 2000. The 1992 waste diversion rate for residential wastes for the County was calculated to determine the effectiveness of existing programs, and to provide a baseline for expanding waste diversion efforts to comply with the year 2000 waste diversion objective. Municipal wastes from IC&I sources were not considered in the determination of the 1992 waste diversion rate because the majority of these wastes were not disposed in the County's landfill sites in 1988.

The MOEE has outlined procedures for calculating waste diversion in the Waste Reduction Office's Initiatives Paper No. 4. This paper, which is entitled *Measuring Progress Towards Ontario's Waste Reduction Targets*, was released in June 1992. It recommends that waste diversion be calculated on a waste generation per capita basis using 1987 waste quantities as the basis. The following formula was recommended:

$$\text{Percent Waste Diversion in 1992} = \frac{\frac{1987 \text{ Waste Disposal}}{1987 \text{ Population}} - \frac{1992 \text{ Waste Disposal}}{1992 \text{ Population}}}{\frac{1987 \text{ Waste Disposal}}{1987 \text{ Population}}} \times 100$$

⁹ Per. Comm., Bill Veitch, March 17, 1993.

**TABLE 3.4
CALCULATION OF WASTE QUANTITIES DIVERTED IN 1992
THROUGH RECYCLING AND COMPOSTING PROGRAMS**

Municipality	Materials Recycled (Tonnes)	Total Composters	Backyard Composters (Tonnes)	Leaf & Yard Wastes Composted (Tonnes)	Total Diverted (Tonnes)
Sarnia	3,467	4,622	1,109	1,852	6,428
Bosanquet	387	858	206		593
Forest	118	328	79		197
Petrolia	83	400	96		179
Alvinston	38	33	8		46
Arkona	20	45	11		31
Grand Bend	110	131	31		141
Oil Springs	25	92	22		47
Point Edward	132	112	27		159
Theford	33	46	11		44
Watford	62	99	24		86
Wyoming	45	129	31		76
Brooke	27	10	2		29
Dawn	0	0	0		0
Enniskillen	67	0	0		67
Euphemia	38	30	7		45
Moore	471	700	168		639
Plympton	289	175	42		331
Sombra	227	538	129		356
Warwick	27	43	10		37
Total	5,666	8,391	1,133	1,852	8,651

Determination of 1992 Waste Diversion Rate

To determine the quantities of residential wastes disposed in 1987, generation rates for residential wastes for 1987 (see Appendix 2D in Volume 2) were multiplied by the 1986 Census Canada population counts to determine an overall residential waste tonnage disposed for Lambton County. This value was 51,000 tonnes. The calculations are summarized in Table 3.5.

**TABLE 3.5
SUMMARY OF CALCULATION OF 1987 RESIDENTIAL WASTE QUANTITIES**

Municipality Type	1986 Census Population	1987 Residential Waste Generation Rate (kg/capita/year)	Waste Quantity (Tonnes)
City	72,787	1.2	31,880
Towns	7,005	1.2	3,070
Villages	8,823	1.5	4,830
Townships	34,163	0.9	11,220
Totals	122,778		51,000

Census Canada population counts for 1986 and 1991 were used to determine the 1987 and 1992 population figures. Residents who live on the Kettle Point, Sarnia and Walpole Island Indian Reserves were not included in the population counts because they do not contribute wastes to Lambton County. The populations used in the calculations were 122,778 for 1986 and 127,079 for 1991.

The amount of residential waste disposed in Lambton County in 1992 was 39,671 tonnes. This value was obtained from the County, based on weigh scale records, and truck count and weight estimates for the landfills that do not have scales.

Using the equation shown above, the waste diversion rate for Lambton County for 1992 was determined as follows:

$$\text{Percent Diversion} = \frac{\frac{51,000}{122,778} - \frac{39,671}{127,079}}{\frac{51,000}{122,778}} \times 100 = 24.8\% \text{ or } 25\%$$

4.0 DESCRIPTION OF THE DEVELOPMENT OF THE RECOMMENDED WASTE MANAGEMENT SYSTEM

4.1 Introduction

The goal of the Lambton County WMMP process was to develop the best system for the long-term management of municipal solid wastes in the County. To attain this goal, it was necessary to assess all waste management alternatives in the study area and identify the recommended alternatives for long-term use. This included the consideration of alternative systems, components for these systems and sites for the components.

Stage 1 of the Master Plan was completed in September 1986. In this stage, potential waste management system components were identified and subjected to a screening process to analyze and eliminate components not technically feasible or not suited to Lambton County. This resulted in the identification of a short list of components, which was carried forward to Stage 2A.

Stage 2A was completed in May 1987. The purpose of this stage was to identify potential waste management systems, consisting of a combination of the components which were short-listed in Stage 1. The short-list was simplified by:

- excluding common elements which could be deferred until later in Stage 2A; and
- excluding those components which could be considered after the potential systems were identified. These components were deferred to Stage 2B.

The components remaining after this exercise were all treatment type components such as composting, combustion with and without energy recovery and refuse derived fuel. These components were evaluated to identify a preferred treatment component which could be incorporated into the potential waste management systems. The potential systems were then identified by combining the preferred treatment component with the components common to all systems. This exercise identified two different potential waste management systems which were further considered during Stage 2B.

Stage 2B was completed in May 1988. This stage further defined and optimized the potential waste management systems identified in Stage 2A by considering the feasibility of including the components which had been deferred in Stage 2A. The two optimized systems were then evaluated to identify the recommended waste management system for Lambton County.

The screening and evaluation of potential waste management components, which was undertaken in Stages 1 and 2A, was updated in July 1993. The purpose of the update was to incorporate new government regulations and policies which had been implemented since the completion of Stage 2A in May 1987. The materials recovery facility (MRF) component was added to the list of components identified in Stage 1, and then subjected to the same screening process that was used for the other components in Stage 1.

The identification and evaluation of potential waste management systems completed in Stages 2A and 2B was also updated in July 1993. The purpose of this update was to consider the changes resulting from the update of the screening and evaluation of potential components. In addition, the need for new landfill capacity in the County was incorporated into the development of potential systems. Three new systems were identified to replace the two originally identified in Stage 2A. The three new systems were evaluated to identify the recommended waste management system for Lambton County.

Figure 4.1 is an organization diagram which shows the order and results of the steps taken to screen components, and to develop and evaluate potential waste management systems in Stages 1 to 2B. The steps taken in July 1993 to update the original work are also shown.

4.2 Evaluation of Waste Management Components

4.2.1 Stage 1 Results

A list of 15 components which could be included as part of the waste management system for Lambton County was initially identified in the September 1986 Stage 1 Report. These components represented the most up-to-date waste management alternatives available to the County at the time. The components identified included:

Waste Collection and Handling

- collection (curbside pick-up/direct haul);
- source separation/recycling;
- transfer station - urban facilities; and
- transfer station - bin or rural-type facilities.

FIGURE 4.1

WASTE MANAGEMENT COMPONENT AND SYSTEM SELECTION FLOW CHART

LONG-LIST OF POTENTIAL WASTE MANAGEMENT SYSTEM COMPONENTS	STAGE 1 - SEPTEMBER 1986	REVIEW OF THE LONG-LIST TO IDENTIFY THE SHORT-LIST OF POTENTIAL SYSTEM COMPONENTS	STAGE 1 - SEPTEMBER 1986	REVIEW OF THE SHORT LIST TO IDENTIFY COMPONENTS THAT CAN BE DEFERRED UNTIL LATER IN THE MASTER PLAN	STAGE 2A - MAY 1987	REVIEW OF THE INDEPENDENT OPTIONAL COMPONENTS TO IDENTIFY A RECOMMENDED COMPONENT	STAGE 2A - MAY 1987	DEVELOPMENT OF POTENTIAL WASTE MANAGEMENT SYSTEMS	STAGE 2A - MAY 1987	STAGE 2A - MAY 1987	STAGE 2A - MAY 1987	STAGE 2A - MAY 1987	STAGE 2B - MAY 1988	STAGE 2B - MAY 1988	STAGE 2B - MAY 1988
<ul style="list-style-type: none"> • COLLECTION • SOURCE SEPARATION/RECYCLING • TRANSFER STATIONS-URBAN • TRANSFER STATIONS -BIN OR RURAL • COMPOSTING • Baling • SHREDDING • COMBUSTION-WITH AND WITHOUT ENERGY RECOVERY • PYROLYSIS • REFUSE DERIVED FUEL AND PREPARED WASTE BURNING • WET OXIDATION • HYDROLYSIS • PLASMA ARC • LANDFILLING • EXPORT/IMPORT 	<ul style="list-style-type: none"> • COLLECTION • SOURCE SEPARATION/RECYCLING • TRANSFER STATIONS-URBAN • TRANSFER STATIONS -BIN OR RURAL • COMPOSTING • SHREDDING • COMBUSTION-WITH AND WITHOUT ENERGY RECOVERY • REFUSE DERIVED FUEL AND PREPARED WASTE BURNING • LANDFILLING • EXPORT/IMPORT 	<ul style="list-style-type: none"> • MATERIALS RECOVERY FACILITY (MRF) RETAINED AND ADDED TO SHORT-LIST 	<ul style="list-style-type: none"> • MATERIALS RECOVERY FACILITY (MRF) ADDED TO LIST OF INDEPENDENT OPTIONAL COMPONENTS. LIST NOW COMPRISES: <ul style="list-style-type: none"> • CENTRAL COMPOSTING • COMBUSTION (WITH AND WITHOUT ENERGY RECOVERY) • REFUSE DERIVED FUEL AND PREPARED WASTE BURNING • MATERIALS RECOVERY FACILITY (MRF) 	<ul style="list-style-type: none"> • COMBUSTION (WITH AND WITHOUT ENERGY RECOVERY) AND REFUSE DERIVED FUEL AND PREPARED WASTE BURNING COMPONENTS NOT CONSIDERED PREFERRED BECAUSE THEY DO NOT COMPLY WITH GOVERNMENT POLICIES. 	<ul style="list-style-type: none"> • WASTE MANAGEMENT SYSTEMS <ul style="list-style-type: none"> 1) • EXISTING COLLECTION SYSTEM • EXISTING LANDFILL SITES 2) • EXISTING COLLECTION SYSTEM • ONE EFW MODULAR FACILITY • EXISTING LANDFILL SITES 	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS	<ul style="list-style-type: none"> • TRANSFER STATIONS ADDED TO SYSTEMS 2 AND 3. SHREDDING AND EXPORT/IMPORT ELIMINATED FROM FURTHER CONSIDERATION. SYSTEMS ARE NOW: <ul style="list-style-type: none"> 1) • EXISTING COLLECTION • EXISTING LANDFILL SITES 2) • COLLECTION • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS 3) • COLLECTION • CENTRAL COMPOSTING • MRF • EXISTING PLUS NEW LANDFILL SITES • TRANSFER STATIONS

Waste Treatment

- composting;
- baling;
- shredding (mechanical size reduction);
- combustion - with or without energy recovery (refers to both the mass-burning integral technology and the mass-burning modular technology);
- pyrolysis;
- refuse derived fuel and prepared waste burning technology;
- wet oxidation;
- hydrolysis; and
- plasma arc.

Waste Transfer and Disposal

- landfilling; and
- export/import.

Generic component descriptions were developed in the September 1986 Stage 1 Report (Section 3.2.2). The component descriptions were generic and not site or area specific. The descriptions covered the following:

- definition and description of the component;
- how widely the technology employed in the component is used (e.g. is the technology well established and widely used and can it be considered to be proven?);
- waste quantity requirements;
- effect of geographic setting on the component; and
- ownership considerations (e.g. public or private).

The alternative components identified in Stage 1 were screened to eliminate those which were not technically feasible or suited to Lambton County (e.g. experimental and exotic components). This screening was based on four criteria which reflected the definition of the environment in the EAA:

- **Technology/Policy:** The component must be suitable for Lambton County with respect to performance, reliability, safety and operational aspects, based on past experiences in other jurisdictions.

- **Significant Environmental Impacts and Risks:** A component must not have expected net environmental impacts or risks which could potentially be significant. Net environmental impacts and risks were determined by considering mitigation and enhancement measures. The social/cultural, natural and economic environments were considered.
- **Cost:** Generic costs per tonne associated with the component must be acceptable.
- **Applicability/Benefits:** The component must be able to meet the area's waste management needs and the net benefits must be greater than the disbenefits.

Open Houses for this part of Stage 1 were held in Sarnia and Wyoming in April 1986. The purpose of the Open Houses, which were informal drop-in centres, was to obtain public and agency comments on the existing waste management system and possible future system components. The displays shown at the Open Houses described the existing waste management system, the initial list of 15 components (see Page 4-4), the Master Plan and EAA processes and the preceding four criteria which would be used to evaluate the 15 components. Public comments received at the Open Houses (described in Section 2.2) mostly consisted of concerns regarding the existing landfill sites. None of the comments pertained to the evaluation process and criteria or to the list of 15 components.

All four of the screening criteria were considered to be of equal importance. The components were assessed under each of the criteria and components were excluded if, according to any of the four criteria, a significant disadvantage or potential impact/risk was identified which could not be mitigated. For example, if the technology associated with a component was not proven, then this was considered to be a significant disadvantage and the component was eliminated from further consideration. Or, if the impacts/risks or enhancement/mitigation measures for a component could not be determined, then the impacts/risks for that component were considered significant and the component was eliminated. The assessment and screening of the components using the four criteria and the resulting conclusions are summarized in Section 3.2.2 of the September 1986 Stage 1 Report.

The assessment and screening of the components was presented at public Open Houses held in Sarnia and Wyoming in June 1986. The purpose of the Open Houses was to obtain public and agency comments on the results of Stage 1. The displays shown at the Open Houses dealt with future waste management needs, the ability of the existing system to meet these needs, possible future system components and areas in the County suitable for these components. Again, the comments received at the second series of Open Houses (described in Section 2.2) pertained mostly to the existing landfill sites. Aside from support for

recycling, no comments were made on the evaluation of the possible future system components.

The following ten components were identified as acceptable and were carried on to the next step of the evaluation process:

Waste Collection and Handling

- collection (curbside pick-up/direct haul);
- source separation/recycling;
- transfer station - urban facilities; and
- transfer station - bin or rural-type facilities.

Waste Treatment

- composting;
- shredding (mechanical size reduction);
- combustion - with and without energy recovery; and
- refuse derived fuel and prepared waste burning technology.

Waste Transfer and Disposal

- landfill; and
- export/import.

4.2.2 Stage 2A Results

Work on Stage 2A started in the Fall of 1986. The remaining waste management system components from Stage 1 were reviewed to determine those components which required further evaluation, and those which could be deferred until later stages of the study once the alternative waste management systems were better defined. The components were categorized into the following four classifications:

1. Common to all Systems - Components compatible with all potential waste management systems and which would provide a definite benefit to all systems.
2. System Dependent - Optional components which were dependent on the inclusion of or location of other components included in the alternative systems.

3. Independent Essential - Components considered to be essential for any waste management system but independent of any of the other components included in the systems.
4. Independent Optional - Components considered to be optional for waste management systems and independent of any other components included in the systems.

The review of the components is summarized as follows:

- Source Separation/Recycling was considered to be a component common to all systems because of the MOEE's waste diversion policies. Further consideration of this component was deferred until Stage 2B, after the recommended waste management system was identified.
- The collection (curbside pick-up/direct haul) and transfer station components were considered to be dependent on the location of other components in the system, such as treatment facilities or landfill sites. Further consideration of these components was deferred until the potential waste management systems were optimized in Stage 2B.
- The need for shredding was assumed to depend on other components in the system, such as refuse derived fuel and composting. Further consideration of shredding was deferred until the potential waste management systems were optimized in Stage 2B.
- Composting was considered to consist of central and household composting. Central composting was considered to be a treatment alternative that was optional and independent of the other components. Household composting was considered to be a component common to all systems and it was also considered to be important with respect to the MOEE's waste diversion policies. Further consideration of household composting was deferred until Stage 2B, after the recommended waste management system was identified.
- The need for export/import of waste was assumed to depend on the inclusion or exclusion of waste treatment (e.g. incineration or composting) and landfill disposal in the systems. Further consideration of export/import was deferred until the potential waste management systems were optimized in Stage 2B.
- Landfill disposal was considered to be an essential component that was independent of any other components included in the systems. Further consideration of this component was deferred until the potential waste management systems were developed later in Stage 2A.

As a result of the preceding exercise, the following three independent optional components remained:

- central composting;
- combustion - with and without energy recovery; and
- refuse derived fuel and prepared waste burning.

These three components are waste treatment alternatives, and were not considered to be either essential to any of the potential waste management systems or dependent upon any of the other components.

It was assumed that at least one of the potential waste management systems would contain the best of the three independent optional treatment components. Dillon completed an evaluation to determine which of these three components was preferred, to simplify the development of potential systems. The evaluation also provided an opportunity to further assess the specific technologies associated with some of the components. (A technology is a specific method within a component. For example, the technologies considered for composting included windrow and in-vessel mechanical composting. The technologies considered for incineration included mass-burn integral and mass-burn modular combustion.)

The following assessment criteria, based on the objectives of the Master Plan, were used for the evaluation of the three independent optional treatment components:

- technical effectiveness of the component with respect to performance, reliability and feasibility, based on operating experiences in other jurisdictions;
- financial uncertainty of the component with respect to the availability of markets for products produced by the component, based on industrial surveys and experiences in other jurisdictions;
- expected costs and revenues, based on development and operating costs and revenues from the sale of products produced by the component;
- expected amount of reduction of waste going to landfill sites;
- assessment of the possible significant impacts to human health and the natural environment;
- possible public perception of the potential risks and benefits associated with each component;

- potential for and significance of nuisance effects caused by the component; and
- potential for displacement of land uses and residences for each component.

Using these criteria, Dillon identified the advantages and disadvantages of each of the three components to highlight the major tradeoffs between them. The components were then subjectively ranked according to each criteria. The rankings were comparatively evaluated to determine which component was the most preferred. The analysis of the three components is included in Tables 3.3 and 3.4 of the May 1987 Stage 2A Report.

Dillon identified the EFW modular combustion technology as the recommended treatment component for the potential waste management systems.

4.3 Waste Management Systems Development, Evaluation and Selection

4.3.1 Stage 2A Systems Development

Following the identification of the preferred waste management components, Dillon identified potential waste management systems.

Consideration of the source separation/recycling, household composting, collection, transfer station, shredding, and export/import components had been deferred until after the systems were developed. Therefore, the remaining components available for consideration in the development of potential systems were:

- the existing collection system;
- EFW modular technology; and
- landfilling.

Using these components, the two systems that were identified were:

- 1) the existing collection system and landfill facility(ies); and
- 2) the existing collection system with EFW facility(ies) and landfill facility(ies).

The required number of EFW facilities was determined by considering the amount of waste available, markets for steam, and the size of facility that would be most economically feasible. Based on this assessment, one EFW facility was found to be preferable. Additional details of the evaluation are included in the May 1987 Stage 2A Report.

The required number of new landfill sites was determined by assessing the future needs for landfill capacity and the environmental suitability, remaining capacity and the expansion potential of the existing landfills. This assessment concluded that sufficient capacity remained at the existing landfill sites to meet the long-term needs of the County. As a result, a search for new landfill capacity was not conducted.

Stage 2A concluded that the following two waste management systems should be carried forward to Stage 2B:

- System 1 - the existing collection system and existing landfill facilities;
and
- System 2 - the existing collection system, one EFW facility and the existing landfill facilities.

An External Team Meeting was held on June 3, 1987, to review the Draft Stage 2A Report. The meeting was attended by six representatives of the Ministry of Natural Resources, the MOEE, the Conservation Authority and the Health Unit. Questions and comments concerned the method to be used by Dillon to determine suitable areas for new facilities, the effectiveness of EFW with respect to reduction of waste going to landfills, and the environmental suitability of the existing landfill sites.

Open Houses were also held in Stage 2A in June 1987. The purpose of the Open Houses was to present the two waste management systems and the administrative structures identified in Stage 2A. The Open Houses were attended by about ten people including residents of Brooke and Warwick Townships and representatives of the Ontario Federation of Agriculture. Concerns expressed by some of the residents included the operation of the Laidlaw Landfill Site in Warwick. The representatives of the Ontario Federation of Agriculture stated that new facilities should not be located on prime agricultural land. This concern had already been incorporated into the evaluation criteria which were developed during Stage 1 (see Section 4.2.1).

4.3.2 Stage 2B Systems Evaluation

In Stage 2B, the potential waste management systems identified in Stage 2A were further defined and optimized by incorporating site-dependent components. The optimization of the systems considered:

- the allocation of waste flow to existing landfill sites;
- transfer station requirements;
- the desirability of shredding waste; and
- the feasibility and desirability of export/import of waste.

Each of these considerations was addressed primarily with regards to economics although other factors such as benefits, needs and practicality were also considered. The evaluation was based on qualitative arguments, as opposed to a structured quantitative approach.

The optimization of System 1 (the existing collection system and landfill sites) resulted in the addition of a rural transfer station located at the Grand Bend Landfill Site. The purpose of the station was to accept waste from Grand Bend and reduce waste haul costs to the Laidlaw Landfill Site in Warwick Township. New collection programs, waste export/import and shredding were not added because the perceived benefits were not significant and the costs were considered to be high. It was recommended that shredding be considered in future updates of the Master Plan. The optimization of System 1 is documented in the May 1988 Stage 2B Report.

The optimization of System 2 (the existing collection system, one EFW facility, and the existing landfill sites) also resulted in the addition of a rural transfer station located at the Grand Bend landfill and the exclusion of the collection, export/import and shredding components. The reasons for including a transfer station and excluding collection, export/import and shredding are similar to those for System 1. It was also recommended that shredding be considered further in future updates of the Master Plan. The optimization of System 2 is documented in the May 1988 Stage 2B Report.

In summary, the two optimized systems which were developed during Stage 2B were:

- System 1 - the existing collection system, a new transfer station at the Grand Bend landfill site, and the existing landfill sites; and
- System 2 - the existing collection system, a new transfer station at the Grand Bend landfill site, one EFW facility and the existing landfill sites.

4.3.3 Evaluation of Waste Management System Options

The two optimized systems were assessed and compared to identify a recommended system. The systems were assessed as complete packages in order to highlight absolute differences between them.

The following were assessed for each system:

- predicted environmental effects;
- mitigation/enhancement possibilities; and
- net environmental effects.

The predicted environmental effects were identified by considering the three objectives of the Master Plan:

- minimize environmental impacts;
- minimize costs; and
- maximize service to the people in Lambton County.

These objectives directed the Master Plan process and addressed the definition of the environment in the EAA. However, the objectives were not considered specific enough to allow a sufficiently detailed analysis of the system options. Therefore, based on the Master Plan objectives, Dillon developed the following list of criteria groupings for the systems evaluation:

- **Minimize Impacts on the Environment** — air pollution, groundwater pollution, surface water pollution, occupational health and safety, natural environment, existing resources, social impacts.
- **Minimize Costs** — capital expenditures, annual operating cost, financial uncertainty.
- **Maximize Service** — technical performance, system flexibility, system reliability.

The evaluation of the systems consisted of a three step process. The first step involved the assessment of the predicted environmental impacts of the systems and the identification of significant advantages and disadvantages for each criteria. Details of the assessment are provided in Tables 6.1 and 6.2 of the May 1988 Stage 2B Report.

In the second step, the two waste management systems were comparatively evaluated to highlight the major tradeoffs between the advantages and disadvantages of each system, according to the criteria grouping. The tradeoffs are described in detail in Table 6.3 of the May 1988 Stage 2B Report.

The final step in the evaluation was to summarize the advantages and disadvantages of each system to identify the recommended option. The main differences between Systems 1 and 2 were found to be the following:

- Risks associated with air pollution and occupational health and safety are potentially more significant for System 2 because of the EFW facility.

- Potential negative natural environment and social impacts are lower for System 2 resulting from less dependence on landfill disposal and the ability to site the EFW facility on industrial land.
- System 1 is preferred from a technical perspective because this system relies on landfilling, which is generally considered to be more reliable than EFW. In addition, System 1 offers more flexibility to incorporate new technologies in the future because the entire waste stream is available. In System 2, a large portion of the waste stream will be needed for the EFW facility.
- System 2 has higher capital and operating costs and has a higher financial risk.

Based on the preceding, System 1 (existing collection system, transfer station at the Grand Bend Landfill Site, existing landfill sites) was identified as the recommended waste management system for Lambton County. Source separation/recycling and household composting were assumed to be included in this system. It was also recommended that further consideration of the development of an EFW facility be deferred for five to ten years. This would allow for the possibility that less expensive waste treatment or diversion technologies may be identified in the future.

The evaluation of the two alternative waste management systems, including the identification of System 1 as the recommended alternative, was presented to the public at the Stage 2B Open Houses in November 1987. Again, the Open Houses were mostly attended by residents concerned by the operation of the existing Laidlaw Landfill Site. No specific comments were made on the evaluation of the alternative systems and the identification of the recommended option.

The External Team was invited to a joint City/County Council meeting which was also held in November 1987. The purpose of this meeting was to present the findings and recommendations of Stage 2B. Most of the comments made at the meeting stressed the importance of recycling. Source separation/recycling and household composting were an important component of the recommended system.

4.4 Update of the Evaluation of Potential Waste Management System Components

In the initial Stage 2A work completed in 1987, the EFW modular technology component was identified as the recommended independent treatment component, compared to central composting. However, since 1987, regulatory and policy and other changes have occurred which have a significant impact on this conclusion. The major changes include the following:

- On April 11, 1991, the Ontario Minister of Environment and Energy announced that the Ontario provincial government intended to ban the future development of municipal solid waste incinerators in Ontario. The ban became law when the provincial government enacted Regulation 555/92 under the EPA on September 11, 1992. As a result, the combustion (with and without energy recovery) and the refuse-derived fuel and prepared waste burning technology components are now considered to be less preferable than the MRF or central composting components. The two combustion components may, however, be reconsidered in future updates of the Master Plan.
- The provincial government approved its 3Rs Regulations in March 1994. The regulations make recycling programs mandatory for municipalities in Ontario with populations over 5,000 which provide collection or disposal services for municipal waste. The collection and composting of leaf and yard wastes is mandatory for all municipalities with populations of 50,000 or more (e.g., Sarnia). The central composting of leaf and yard wastes for municipalities with populations of 5,000 or more who presently collect leaf and yard wastes separately is also mandatory under the regulations.
- The City of Sarnia and the Town of Petrolia have established central composting facilities for leaf and yard wastes. The Town of Forrest is also planning to open a leaf and yard waste composting facility.
- All of the municipalities in Lambton County have started Blue Box and/or depot recycling programs. The municipalities have contracted with private sector firms to collect the recyclables and process them at their MRFs.

In order to comply with the 3Rs Regulations, maximize waste diversion, and remain compatible with the existing waste management system, both the central composting (for Sarnia and Petrolia) and MRF components will have to be included in potential waste management systems. In the July 1993 update of Stages 1 to 2A, both the MRF and central composting components were reconsidered as independent optional treatment components.

The MRF component was subjected to the same process that was used in Stage 1 to screen the other potential system components. This was not necessary for the central composting component because it was included in the original screening process completed in Stage 1. A description of the MRF component is included in Appendix 2E of Volume 2, and is presented in the same format as the generic component descriptions in the Stage 1 Report. The MRF component is the sixteenth system component to be considered in the Master Plan.

The criteria and rationale used in the screening process were the same as those used for the other waste management system components identified in Stage 1. The results of the screening process for the MRF component are presented in Tables E-1 and E-2 of Appendix 2E, Volume 2.

The screening of the MRF component with respect to the technology/policy, costs and applicability/benefits criteria is summarized in Table E-1 in Volume 2. It was confirmed that the MRF component should be included for further consideration. The primary reasons for this decision are as follows:

- it helps to achieve the MOEE waste diversion objective;
- MRF is consistent with the MOEE's 3Rs Regulations and is applicable under the MOEE's new streamlined approvals process for municipal recycling facilities; and
- it constitutes sound waste management practice and results in the reduction of waste disposal.

The screening of the MRF component with respect to the environmental impacts and risks criteria is shown in Table E-2 in Volume 2. The potential impacts and risks to the social/cultural, natural and economic environments were considered along with mitigation/enhancement measures and the resulting net effects. The predicted effects were based on literature, manufacturer's information and working knowledge of the MRF component.

The advantages/disadvantages of the MRF component, based on the environmental risks and benefits criteria, are summarized as follows:

- it allows maximum waste diversion rates to be achieved, thereby increasing the life of existing landfills and decreasing landfill requirements;
- it results in positive net social/cultural, natural and economic environment effects;
- an MRF will help the County meet the Provincial waste diversion objective of at least 50% diversion by year 2000; and
- it's only major disadvantage is that the facility may result in relatively high capital and operating costs.

In conclusion, the list of recommended waste management system components for Lambton County now includes the MRF and central composting components, but excludes the EFW modular combustion component. These changes were made mostly in response to government regulation and policy directives developed subsequent to the initial Stages 1-2A studies.

4.5 Update of System Identification and Evaluation

In the initial Stage 2A study completed in 1987, the need for new landfill sites was also evaluated as part of the development of the waste management systems. The evaluation concluded that sufficient potential landfill capacity remained at the existing landfill sites in Lambton County to serve the County's long-term needs. As a result, a search for new landfill capacity was not conducted. Also, the waste management systems developed in Stage 2A were based on the assumption that the existing landfill sites would provide sufficient capacity.

A detailed contour survey of the Sarnia Landfill completed in 1989 indicated that the remaining capacity of the landfill was much lower than that assumed in the 1987 Stage 2A evaluation. In response to this, Dillon re-evaluated the remaining capacity of all of the County's existing landfill sites in 1989. The new evaluation included updated future waste quantity projections, consideration of the environmental suitability of the County's remaining sites, and the remaining capacity of the sites. (The details of the evaluation of the remaining capacities are provided in Appendix 2E of Volume 2.). A comparison of the remaining capacities of the County's existing landfill sites with future waste disposal needs revealed that the existing sites would not provide sufficient capacity to serve the County's future needs. Based on this conclusion, Dillon recommended that the County conduct a search to identify a new landfill site(s).

To incorporate the conclusion that new landfill capacity was required, it was necessary to update the evaluation of the two waste management system options. The two systems previously identified in Stage 2A were:

- System 1 - existing collection system and existing landfill sites; and
- System 2 - existing collection system, one EFW modular facility, existing landfill sites.

Source separation/recycling and household composting were assumed to be common to both of these systems.

System 1 was retained in the update because it represents the "do nothing" or null alternative system. As required by the EAA, the "do nothing" alternative was included to determine whether or not the net effects of other system options on the environment were preferable.

System 2 is similar to System 1 except new landfill sites have been added. The collection component has also been changed from "the existing collection system" to "collection". This recognizes that, in the future, it may be necessary to expand or modify the existing collection system to be compatible with more advanced types of collection systems. More advanced collection systems may be used to enhance the source separation/recycling component. System 2 now comprises collection, the existing landfill sites and new landfill site(s).

System 3 is similar to the System 2 which was identified in Stage 2A, except that the EFW modular technology component has been replaced with the central composting and MRF components. The need for new landfill site(s) has also been added. This system consists of collection, central composting, MRF and existing plus new landfill sites.

The new Systems are summarized in Table 4.1. The source separation/recycling and household composting components were assumed to be common to all three systems.

**TABLE 4.1
UPDATED WASTE MANAGEMENT SYSTEM OPTIONS**

System 1 (Do Nothing or Null Alternative)	System 2	System 3
<ul style="list-style-type: none"> • existing collection • source separation/recycling • household composting • existing landfill sites 	<ul style="list-style-type: none"> • collection • source separation/recycling • household composting • existing plus new landfill sites 	<ul style="list-style-type: none"> • collection • source separation/recycling • household composting • central composting • MRF • existing plus new landfill sites

In the initial Stage 2B study, the potential waste management systems identified in Stage 2A were optimized before they were evaluated. The purpose of optimizing the systems was to determine whether or not the system dependent components, such as transfer stations, shredding and export/import, were needed in the systems.

The updated systems shown in Table 4.1 were compared to the systems originally identified in Stage 2A. The purpose of the comparisons was to assess whether or not the changes made to the updated systems required changing the decision previously made in Stage 2B to include transfer stations, but exclude shredding and export/import from the optimized systems.

The purpose of adding transfer stations to the systems in Stage 2B was to help reduce waste haul costs to the Laidlaw Landfill site in Warwick Township. It is likely that with Systems 2 and 3, as shown in Table 4.1, the inclusion of one or more transfer stations could still provide a benefit in terms of cost savings for waste haul. However, the magnitude of potential cost savings will depend on the location of the new landfill site(s). As a result, it was recommended that further analysis of the transfer stations component be deferred to a later stage of the Master Plan, after potential new landfill site(s) have been identified.

In the initial Stage 2B study, it was also recommended that the shredding component not be included in any of the systems. The perceived benefits associated with shredding mixed waste were not considered to be significant. In Systems 2 and 3, shown in Table 4.1, shredding of specific feedstocks, such as compostable organics or separated recyclable materials, may be part of the central composting or MRF components. However, it is likely that the shredding of mixed wastes prior to disposal will still not provide significant benefits to the systems. Therefore, it was recommended that shredding still be excluded as an individual component in Systems 2 and 3. (However, shredding may be included as part of the central composting or MRF components.)

In the 1988 Stage 2B study, it was recommended that the export/import component not be included in the waste management systems. On April 2, 1991, the Ontario Minister of the Environment and Energy announced that the search for long-term disposal sites for the Greater Toronto Area (GTA) would not include areas outside of the GTA's borders. The Ministry's current position is that landfill sites should be located within the jurisdiction of the proponent. Export should only be considered in cases where the proponent is unable to locate a landfill site that will receive approval within its own jurisdiction (as stated in the MOEE's *Sectoral Environmental Assessment Proposal for Waste Management Planning (1994)*).

On November 29, 1989, Lambton County Council passed the following resolution dealing with the import of waste, particularly from the GTA:

"Whereas the Greater Toronto Area needs an interim site for its waste disposal;

And whereas municipalities in Southwestern Ontario, particularly in Lambton County, have been offered substantial financial rewards and assistance to accept waste disposal for the GTA;

And whereas the financial rewards and assistance may be substantial and appealing to the municipalities, they do not reflect the long term financial and environmental impact to their communities;

Be it resolved that the Council of the County of Lambton does not support the "establishment of, or enlargement of, any new or existing disposal landfill sites"¹⁰ by the GTA, in any municipality within the County of Lambton and that the GTA with the Province of Ontario should communicate any proposal through the Waste Management Committee of County Council as well as the municipal Council.

And that copies be sent to: Premier Peterson; Chairman Alan Tonks; Metro Works Commissioner Robert Ferguson; Minister of Environment James Bradley; Dave Smith, M.P.P. Lambton; Andy Brandt, M.P.P. Sarnia; and all municipal Councils in Lambton/Sarnia. Carried."

In light of the MOEE's position on the export of waste and the resolution passed by County Council regarding the import of waste, it was recommended that the export/import component not be included in the updated waste management systems.

The updated and optimized waste management systems are summarized in Table 4.2.

TABLE 4.2
OPTIMIZED WASTE MANAGEMENT SYSTEM OPTIONS

System 1 (Do Nothing or Null Alternative)	System 2	System 3
<ul style="list-style-type: none"> • existing collection • source separation/recycling • household composting • existing landfill sites 	<ul style="list-style-type: none"> • collection • source separation/recycling • household composting • existing plus new landfill sites • transfer stations 	<ul style="list-style-type: none"> • collection • source separation/recycling • household composting • central composting • MRF • existing plus new landfill sites • transfer stations

The source separation/recycling and household composting components are assumed to be common to all three systems shown in Table 4.2.

The updated systems were evaluated in the same way as the original systems were evaluated in Stage 2B. This included consideration of the following for each system:

- predicted environmental effects;
- mitigation/enhancement possibilities; and
- net environmental effects.

¹⁰ Added by an amending motion passed on June 13, 1990.

The predicted environmental effects were identified using criteria similar to the criteria used in the Stage 2B evaluation. The criteria groupings used in the evaluation of the updated systems were:

- social/cultural environment;
- natural environment;
- technical environment; and
- economic environment.

These criteria groupings cover the full scope of the environment, as defined in the EAA. The evaluation of the systems is included in Tables E-3, E-4 and E-5 in Appendix 2E of Volume 2.

The advantages and disadvantages for each system were identified based on the net effects for each criteria grouping. The comparison between the advantages and disadvantages for Systems 1 and 2 are summarized as follows:

- System 1 or the "do nothing" system does not provide additional long-term landfill capacity thereby potentially increasing impacts caused by littering and illegal dumping; and
- System 2 potentially has higher costs due to need to develop new landfill site(s). However, the "do nothing" system relies on the existing landfill sites as the sole disposal option, so the County might have to rely on private landfill sites in the future.

This comparison indicates that System 2 is preferred over System 1.

The comparison between the advantages and disadvantages for Systems 2 and 3 may be summarized as follows:

- System 2 provides waste diversion through source separation/recycling and household composting, but likely not enough to enable the County to meet the MOEE's waste diversion objectives. System 3 provides opportunities for diversion that will likely allow the County to meet the MOEE's objectives;
- System 3 includes the central composting and MRF components. These components are already part of the County's waste diversion system;

- System 3 will allow the County to take full advantage of future advancements in waste management technologies which will help to divert waste from disposal and reduce negative environmental impacts;
- System 3 has greater potential to foster public awareness and participation in waste management issues;
- System 3 has more potential to conserve resources; and
- The central composting and MRF components in System 3 may result in higher costs.

This comparison between the advantages and disadvantages associated with Systems 2 and 3 indicates that System 3 is most preferred. The source separation/recycling and household composting components were considered to be common to all of the systems considered. Therefore, the recommended waste management system for Lambton County comprises the following components:

- collection;
- source separation/recycling;
- household composting;
- central composting;
- materials recovery facility (MRF);
- landfill (existing plus new sites); and
- transfer stations.

4.6 Composite Waste Management Facility

The recommended waste management system includes the central composting, MRF, landfill site and transfer stations components. These facilities all require sites. While it is likely that the transfer facilities will not be located at the landfill site, the central composting and MRF facilities may be. Several factors influence the siting of facilities, including costs and level of service provided. Within the evaluation of the waste management systems it was assumed that the facilities requiring sites would be located independently. However, it was considered that the combining of the landfill, central composting and MRF facilities into one composite facility may provide advantages for Lambton County with respect to reduced costs and improved level of service.

Service would likely be improved if the recyclables, compostables and garbage handled by the County were taken to a composite facility. A recent trend is for municipalities to use

co-collection trucks having more than one compartment that allow garbage and compostables; garbage and commingled recyclables; or garbage, compostables and commingled recyclables to be collected simultaneously. A composite facility can better service co-collection trucks if the municipal governments choose to use them in the future.

A composite facility could also help to reduce costs by minimizing the distance that residuals from the central composting and MRF facilities have to be hauled to the landfill site.

A composite facility also maximizes effective land use by allowing the three facilities to share buffers. The sharing of facilities and equipment such as offices, lunchrooms, washrooms, trucks, loaders, etc. is simplified at a composite facility. Cost savings will also be realized because servicing (e.g. water, electricity and sewers) will only have to be provided at one site.

The composite facility site concept was discussed at the Landfill Siting Process Workshop held on October 11, 1990. The workshop was attended primarily by members of the Public Advisory Committee (PAC). Several different landfill site size scenarios were considered at the workshop. Members of the PAC attending the workshop resolved that a composite site having a minimum area of 71 hectares should be identified. The site size was later revised to 75 hectares.

4.7 Summary of Public Input on the Development of the Recommended Waste Management System

Public input was sought at several points during the process conducted to identify a recommended long-term waste management system for Lambton County. The opportunities that were provided for public input, and the impacts that the input had on the process, may be summarized as follows:

- In Stage 1, the initial long-list of 15 potential waste management components and the criteria used to evaluate them were presented at Open Houses held in Sarnia and Wyoming in April 1986. Public comments received at the Open Houses (described in Section 2.2) mostly consisted of concerns regarding the existing landfill sites. None of the comments pertained to the evaluation process and criteria or to the list of 15 components.
- The two potential management systems identified in Stage 2A were presented at Open Houses held in June 1987. None of the comments provided by the public affected the proposed systems or the evaluation process used to identify a recommended system.

- The recommended system identified in Stage 2B was presented to the public at Open Houses held in November 1987. No specific comments were made on the evaluation of the alternative systems and the identification of the recommended option.

5.0 WASTE DIVERSION STRATEGIES

The development of a waste diversion system was an integral part of the Lambton County WMMP process. The recommended waste diversion components for the long-term waste management system were identified in Chapter 4. The waste diversion components in the recommended system include source separation/recycling, household composting, central composting and materials recovery facilities.

This chapter presents the recommended short-term and long-term waste diversion strategies for Lambton County. The purpose of the short-term strategy was to identify waste diversion initiatives to be undertaken by the County in 1993/94 in order to comply with government legislative and policy requirements and to increase the amount of waste diverted from landfill disposal. The implementation period for the short-term strategy was assumed to be August 1993 to July 1994. The purpose of the long-term strategy was to develop a strategy that would enable the County to comply with the provincial government's waste diversion objective of at least 50% diversion by the year 2000. The implementation period for the long-term strategy was assumed to be August 1994 to the year 2000.

5.1 Short-Term Diversion Strategy

5.1.1 Introduction

The purpose of this section is to summarize the short-term waste diversion strategy that was developed for Lambton County. The Short-Term Waste Diversion Strategy Report was originally submitted to the County in July 1993. This section represents an update of portions of the original report. The WMMP Public Advisory Committee received the Short-Term Waste Diversion Strategy Report and endorsed some of the recommended initiatives. The short-term strategy was intended to lead the County towards the implementation of a long-term waste diversion strategy, which is described later in this chapter.

The development of the short-term strategy involved several tasks as follows:

- assessment of the existing waste diversion system with respect to government legislative and policy requirements;
- identification of waste diversion initiatives to be undertaken by the County in 1993/94 in order to comply with government legislative and policy requirements and to increase the amount of waste diverted from landfill disposal; and

- incorporation of the recommended initiatives into an overall short-term waste diversion strategy for the County.

The short-term waste diversion strategy dealt only with municipal wastes from residential sources produced within Lambton County. This included non-hazardous municipal residential solid wastes and small quantities of household hazardous wastes that are not regulated by the MOEE under Regulation 347.

It was recognized that municipal wastes also include non-hazardous solid wastes from the IC&I sector. These wastes comprise a significant proportion of the wastes produced within Lambton County. It has been acknowledged in the Master Plan that the County may have to become more involved with the diversion of municipal wastes from IC&I sources in the future in order to comply with the Provincial Government's long-term waste diversion objectives. Initiatives involving the diversion of wastes from the IC&I sector were examined in the development of the long-term diversion strategy for Lambton County.

Solid hazardous and liquid wastes from the IC&I sector are not managed by the County, and are not addressed in the Lambton WMMP. The individual generator is responsible for ensuring that these wastes are properly handled and disposed in accordance with the MOEE's Regulation 347.

5.1.2 Compliance With Regulations and Policies

The waste diversion rate for Lambton County indicates that the County complied with the provincial government's waste diversion objective of at least 25% diversion from landfill by 1992. This illustrates the success of the existing waste diversion initiatives within the County (the calculation of the waste diversion rate was described previously in Chapter 3, Section 3.3.). As a result, few short-term measures were required in order to ensure that the County was in compliance with the 1992 diversion objective. There are, however, other aspects of the provincial government's 3Rs Regulations with which the County will have to comply. (*Editor's note: the 3Rs Regulations became law on March 3, 1994.*)

The 3Rs Regulations require municipalities with populations of 5,000 or more that provide collection or disposal services for municipal wastes (the City of Sarnia, Moore Township, Town of Bosanquet, and Plympton Township) to start up and operate Blue Box and backyard composter programs. These communities presently have Blue Box recycling programs with curbside pickup and participate in the County's backyard composter program. The materials collected in these communities by the recycling contractors (Bluewater Recycling, K&E Waste Resources and BFI) include all of the materials that are required to be collected, as specified in the regulations. Therefore, all that these communities have to do to comply with

the regulations is to ensure that they promote their programs effectively and report annually to the MOEE.

The 3Rs Regulations for municipal source separation programs also require municipalities with populations of more than 5,000 to operate recyclables collection programs that provide the same level of service as their garbage collection programs.

The 3Rs Regulations require municipalities that provide leaf and yard waste collection services to compost the collected leaf and yard wastes. In addition, municipalities with populations greater than 50,000 are required to collect leaf and yard wastes and compost them. The City of Sarnia already provides leaf and yard waste collection services and composts these wastes at their approved composting site. Under the regulations, the City will need to comply with several additional requirements, including ensuring that the compost is used as a soil conditioner, that leaf and yard waste collections are advertised, that an annual report is submitted to the MOEE and that the facility is operated within MOEE guidelines.

5.1.3 Proposed Short-Term Diversion Initiatives

The short-term diversion strategy for Lambton County consisted of several initiatives which were intended to build upon waste diversion programs that were already operating and that would represent little additional cost to the County.

It was assumed that the short-term diversion strategy would be implemented during the one year period from August 1, 1993, to July 31, 1994, at which time the implementation period for the amalgamation of the City of Sarnia and the County was also ending. It was expected that once the implementation period had ended, the County could update the existing method used for charging the local municipalities for waste disposal costs. This could have a significant effect on the long-term diversion strategy. Therefore, for the purposes of analysis, it was assumed that the short-term strategy would end at this point and the long-term strategy would commence. In reality, however, the implementation of the County's diversion activities has been, and will continue to be, a continuous ongoing process.

The diversion initiatives that were recommended for the short-term strategy are described in detail in the following sections. The initiatives are summarized in Table 5.1.

**TABLE 5.1
SUMMARY OF SHORT-TERM DIVERSION STRATEGY INITIATIVES**

Initiative	Expected Additional Diversion (Tonnes/Year)
1. Recycling	
- new recycling depot in Dawn Township*	50
- expand materials already collected in recycling programs	550
2. Composting	
- increase number of backyard composters so that one in four households in the County has one	300
- Spring yard waste collections in Sarnia	500
- leaf and yard waste collections outside of Sarnia	300
Total Additional Diversion	1,700

* Two recycling depots in Dawn Township were opened in October 1993 after the completion of the Short-Term Diversion Strategy.

Recycling Programs

It was recommended that the County take action to encourage the establishment of a recycling program in Dawn Township. Dawn Township was the only municipality in the County that did not have a recycling program. Township Council considered various proposals prior to setting up a program, and two recycling depots were set up in Dawn Township in October 1993 (one at the Dawn Landfill and one at the Township Municipal Offices in Rutherford).

It was also noted that the recycling contractors within the County collect the basic recycling materials (e.g., newspapers, glass containers, aluminum and bi-metal cans, PET soft drink bottles) plus additional materials, depending on the contractor. For example, Bluewater Recycling also collects magazines, fine paper, cardboard, boxboard, phone books, aluminum foil, and plastic bottles and bags. All three of the recycling contractors that operate in the County indicated that the number of materials that they collect is dependent on markets and that they would collect more materials if markets were available.

It was therefore recommended that the County become more involved in identifying and developing markets for recyclables. The County's position is that it could help to develop new markets for recyclable materials, or to improve markets for existing materials, by identifying possible uses for reused or recycled materials in its own operations (e.g. the possible use of recycled materials in road work). Also, the County Economic Development Commission could identify existing users of recyclables and encourage new users to locate

in the County in conjunction with its ongoing economic development work. However, it is the County's position that the private sector is better able to carry out other initiatives to identify markets for recyclables, such as market analyses and conducting waste audit workshops or courses.

It was estimated that efforts to increase the number of types of materials collected by the recycling contractors in the existing programs could increase the amount of recyclables collected by at least 10%. Based on the quantity of recyclables collected in 1992, this increase would represent an additional diversion of 550 tonnes per year.

Material Bans

It was noted that Lambton County has bans for some or all of the following materials at their landfill sites:

- wood wastes;
- derelict automobiles and farm machinery;
- field stones and/or concrete;
- tree stumps;
- demolition and/or building materials;
- cardboard;
- liquid or hazardous waste; and
- dead animals and/or animal waste.

Tires can be disposed at a cost of \$5.00 per tire.

In Metro Toronto and other jurisdictions in Ontario, additional materials have been banned from municipal landfills. These materials typically include white goods, tires, drywall, fine paper and off-specification and surplus goods. It was therefore recommended that the County could consider adding some of these materials to existing material bans to help to maximize the diversion of these materials from disposal.

It was also recommended that when implementing a material ban, the County should ensure that an appropriate diversion option was provided so that banned material did not end up in private landfill sites. It was noted that, for example, if the County bans drywall, then depots should be established at the landfill sites to collect drywall for recycling and a market for the collected drywall should be identified.

It was also noted that the amount of waste diversion achieved through material bans is difficult to determine. Material bans are usually used as a tool to maximize participation in recycling programs or to conserve landfill capacity. The costs for material bans are

dependent on the amount of administrative effort required to implement them. These costs can vary depending on the legal implications of instituting the bans. Additional costs can be incurred through promotion of the bans and monitoring of the bans at the landfill site(s).

Household Composting Programs

Household composting was identified as a component of the County's recommended waste management system. In Ontario, household composting programs have proven to be a cost-effective method of achieving waste diversion. In developing the short-term diversion strategy, it was noted that the individual municipalities in the County are responsible for selling composters to their residents and applying to the County for the Provincial subsidy on the cost of the composters. Municipalities who are members of Bluewater Recycling apply for their subsidy through Bluewater instead of the County.

A total of 6,950 backyard composters had been sold through the County's program by the end of 1992. This represents approximately one composter for every 6.3 households. A total of 1,441 composters had been sold through Bluewater's program by the end of 1992. This represents approximately one composter for every 4.5 households. The combined total number of composters distributed through the two programs was 8,391. With approximately 50,000 households in Lambton County, an average of one out of every 6.0 households had a backyard composter by the end of 1992.

In 1993, the County sold an additional 710 composters and Bluewater sold 466 composters. The combined total number of composters distributed through the two programs by the end of 1993 was 9,567. This is equal to one composter for every 5.25 households in the County.

It was considered reasonable to assume that through enhanced marketing and incentives to the municipalities, the number of households per composter in the County's program could be reduced to 4. This represented an additional 2,200 composters that would need to be sold through the County's program.

Three methods were recommended for the County to increase the number of composters sold through its program:

- 1) Use public promotion to encourage residents to purchase composters from their local municipalities.
- 2) Have the County purchase the composters and then sell them to the local municipalities at the subsidized price. It was noted that this would eliminate the need for the municipalities to wait to receive their subsidy from the provincial government through the County. The County would cover the cost of the subsidy while waiting

to receive it from the Province in order to encourage municipalities to market more composters.

- 3) The County could pay some or all of the difference between the cost of the composter and the subsidy provided by the Province to reduce or eliminate the cost of the composters to local residents. It was noted, however, that this could raise an equity issue with residents who purchased a composter previously at a higher price. It was suggested that one way that this problem could be addressed was to provide residents who already own a composter with an opportunity to apply to the County for a credit equal to the amount that they previously paid for their composter.

Studies on the effectiveness of backyard composters in Ontario have indicated that about 25% of composter users divert 240 kg of waste a year with their composters and the remaining 75% divert 100 kg per year. This is equivalent to an average diversion rate of 135 kg per composter per year. It was estimated, therefore, that if the County and the local municipalities were to sell an additional 2,200 composters, then this would result in an added diversion of approximately 300 tonnes per year. It was also noted, though, that the cost of achieving this additional diversion would depend on how difficult it would be to market the additional composters. At a minimum the County would need to do additional marketing of the composters in order to sell the required number, at a likely cost of less than \$10,000. If the County were to subsidize the cost of the composters, then the total cost could potentially exceed \$55,000 (assuming an average cost of \$75.00 per composter, two-thirds of which would be subsidized by the MOEE).

Central Leaf and Yard Waste Composting

A central composting facility was identified as a component at the County's recommended waste management system. The City of Sarnia operates a composting facility for leaf and yard wastes collected within Sarnia. The Town of Petrolia recently opened up its own leaf and yard waste facility and the Town of Forest is planning to open one in the near future. The City has recently received approval from the MOEE to accept leaf and yard wastes that are generated outside of the City but within Lambton County. The City plans to charge a tipping fee to outside communities to accept leaf and yard wastes.¹¹

It was recommended that the County become involved with the collection of leaf and yard wastes at other communities outside of Sarnia. Several methods for the collection of leaf and yard wastes were identified, including the following:

¹¹ Per. Comm., Bill Veitch, March 17, 1993.

- The County could organize leaf and yard waste collections by private collection contractors. This would be done in conjunction with the local municipalities. The County could organize the collections and potentially could subsidize the cost of the collections and the cost of the tipping fee at Sarnia's composting site.
- The County could provide collection bins for leaf and yard wastes at strategic locations during the Spring and Fall seasons. For example, bins could be set up at the Brooke, Dawn, Moore, and Sombra landfills. The County could arrange to have these bins picked up regularly and hauled to the Sarnia composting facility.

In 1993, the City of Sarnia operated leaf and yard waste collections in the Spring, in addition to the regular Fall collections. It was considered likely that the Spring collection increased the amount of leaf and yard wastes composted by approximately 25% over previous years, resulting in an additional 500 tonnes per year of waste diversion. It was recommended that the amount of leaf and yard wastes diverted could be increased even more if the City were to conduct collections on a regular basis from April through to September. The City of Sarnia has had their C of A for their composting facility amended to allow yard wastes collected from April to September to be composted.

It was also stated that if the County were to organize leaf and yard waste collections that would cover about half of the population of the County outside of Sarnia, then an additional 300 tonnes of leaf and yard wastes could be collected. This was assuming a capture rate of half the rate observed in Sarnia. This was assumed to be reasonable considering the rural nature of the areas outside of Sarnia. In rural areas many people have their own compost heaps for disposing their leaf and yard wastes and don't participate in leaf and yard waste collections as often.

It was noted that the costs for the County for additional composting initiatives would be mainly dependent on how involved the County became in leaf and yard waste collection. At minimum, if the County set up several depots and hauled the collected materials to Sarnia, the total cost would likely be less than \$10,000 to \$20,000. This estimate included the cost of the tipping fee at the Sarnia composting facility. If the County became involved in organizing curbside collections, then the costs could be higher.

An important point regarding leaf and yard waste collection programs is that the 3Rs Regulations require municipalities with a population of 5,000 or more that collect leaf and yard wastes to compost the collected materials. It was noted that if the County operated its own leaf and yard waste collection program, then it would be required to compost the collected materials. The composting options for the County would be to use the City of Sarnia's composting site or, in the long-term, start up its own composting facility. These possibilities were examined more closely in the long-term diversion strategy.

5.1.4 Calculation of Future Diversion Rate

Calculations were completed to determine what the waste diversion rate would be in Lambton County if the diversion initiatives recommended in the short-term strategy were implemented before July 31, 1994. It was calculated that these initiatives would result in an additional diversion of 1,700 tonnes per year, as was shown in Table 5.1.

The following assumptions were made in the calculations:

- The population of Lambton County would increase by 1% between 1991 and July 1994. This was consistent with the most recent estimates of population growth rates based on the results of the 1991 Census that were developed for the WMMP.
- Overall waste generation rates would remain the same between 1992 and 1994. This meant that the amount of waste disposed in 1994 would also increase by 1% in proportion with the population.

The waste diversion rate calculated for 1994 is shown in the following equation. This equation is similar to the equation shown in Chapter 3, Section 3.3:

$$\text{Percent Diversion in 1994} = \frac{51,002}{122,778} - \frac{(39,671 \times 1.01) - 1,700}{(127,079 \times 1.01)} \times 100 = 28.0\% \text{ or } 28\%$$

The calculations demonstrated that if the County implemented the waste diversion initiatives recommended in the short-term strategy, then it would result in an increase in the overall diversion rate to approximately 28% by the end of July 1994.

5.1.5 Implementation of the Short-Term Strategy

With respect to implementation of the short-term diversion strategy, it was noted that the County should become more involved in waste diversion programs in the County. It was recommended that the County should either designate an existing staff member or hire a person to look after the implementation of the short-term diversion strategy. This person could also look after the implementation of the long-term strategy.

It was also suggested that the initiatives recommended in the short-term diversion strategy would require an increased level of participation by the County, the municipalities and the recycling contractors. In the Short-Term Waste Diversion Strategy Report, it was

recommended that the County establish a new committee consisting of representatives from these three stakeholders, in co-operation with the WMMP PAC. It was noted that this new committee could assist in the implementation of the short-term diversion strategy and the committee would be useful in the future to assist in implementing the long-term diversion strategy.

At the WMMP PAC meeting held September 28, 1993, the Committee considered this recommendation and decided to endorse it.

5.1.6 Status of the Implementation of the Short-Term Strategy

The status of the implementation of the short-term diversion strategy at the end of 1994 is summarized below:

- Two recycling depots were set up in Dawn Township in October 1993. The depots are located at the Dawn landfill site and at the Township Municipal Offices in Rutherford. The County provided a site for the depot at the Dawn landfill. The Township has joined the Bluewater Recycling Association. Bluewater collects the recyclables from the depots and processes and markets them.
- The City of Sarnia started spring leaf and yard waste collections in 1993. The quantity of leaf and yard wastes collected in 1993 increased to 2,200 tonnes compared to 1,850 tonnes in 1992. The quantity collected in 1994 was also expected to increase.¹²
- The Town of Petrolia opened a leaf and yard waste composting facility in Fall 1993. The Town of Forest is also planning to open its own leaf and yard waste facility, but exactly when the facility will open is not known.
- Efforts by the private recycling contractors to increase the number of materials collected in the Blue Box programs are ongoing.
- Efforts by the County to increase the number of backyard composters distributed are also ongoing.

The implementation period for the short-term diversion strategy was August 1, 1993 to July 31, 1994. The best way to determine the effectiveness of the short-term diversion strategy would be to compare the quantities of wastes diverted from disposal in 1993 and 1994. However, diversion quantities for 1994 are not available yet (as of December 1994).

¹² Per. Comm., Bill Veitch, November 3, 1994.

The status of the short-term diversion strategy will have to be further updated at a later date once the 1994 diversion data is available.

5.2 Long-Term Waste Diversion Strategy

5.2.1 Introduction

The short-term diversion strategy described in the previous section of this chapter provided the basis for the development of a long-term diversion strategy for the County. A basic objective of the long-term strategy was to develop a strategy that would enable the County to comply with the provincial government's waste diversion objective of at least 50% diversion by the year 2000. This section documents the development of the long-term waste diversion strategy, and summarizes the recommended strategy.

The development of a waste diversion system was an integral part of the Lambton County Waste Management Master Plan (WMMP) process. A recommended waste management system for the County was identified in Chapter 4. The recommended system is composed of components (e.g. source separation/recycling) which are groupings of waste management technologies and processes (e.g. recyclables collection, organics collection, special materials collection). The diversion components included in the recommended system include:

- source separation/recycling;
- household composting;
- central composting; and
- materials recovery facility (MRF).

The overall aim in developing the long-term diversion strategy was to identify the optimum combination of waste diversion technologies and processes available, given the waste diversion components that are included in the recommended waste management system.

The development of the long-term strategy involved several tasks, including:

1. Identification of available waste diversion technologies and processes within the diversion components of the recommended system.
2. Incorporation of the technologies and processes into alternative strategies.
3. Evaluation of the alternative strategies to identify a recommended waste diversion strategy within the recommended system.
4. Assessment of the results of the waste diversion survey in relation to the recommended strategy.

The long-term strategy deals only with municipal wastes which have traditionally been accepted at municipal landfill sites within the County. This includes non-hazardous municipal residential solid wastes and some non-hazardous solid wastes from the industrial, commercial and institutional (IC&I) sectors. Small quantities of household hazardous wastes are not regulated by the Ministry of the Environment and Energy (MOEE) under Regulation 347.

Solid hazardous and liquid wastes from the IC&I sectors are not managed by the County, and are not addressed in the Lambton WMMP. These wastes are regulated by the MOEE. The individual generator is responsible for ensuring that these wastes are properly handled and disposed in accordance with the MOEE's Regulation 347.

5.2.2 Identification of Available Waste Diversion Technologies and Processes

This section presents the waste diversion technologies and processes that were considered in the development of reasonable long-term diversion strategies. The technologies and processes considered are as follows:

Source Separation/Recycling

i) Public Education on the 3Rs

The 3Rs hierarchy assigns priority to waste reduction and reuse. Reduction refers to a decrease in the quantities of waste produced through changes in consumer practices and industrial processes. Reuse refers to the return of a product to a useful function without modifying it. Examples of reduction and reuse initiatives include:

- purchasing products that have no packaging or less disposable packaging;
- using reusable cloth bags for grocery shopping.

Reduction and reuse represent the first two Rs of the 3Rs hierarchy. Given their importance, and the fact that they are compatible with any waste diversion strategy, reduction and reuse were considered to be common to all waste diversion strategies.

Activities which promote the 3Rs and educate people about the ways to increase participation in the 3Rs are also essential to any waste diversion strategy.

ii) Recycling Collection

Recycling collection includes technologies and processes that involve source separation and collection of recyclable materials for subsequent processing and marketing. Examples of the types of recycling collection considered include:

- Collection of Blue Box recyclables;
- Collection of an increased number (enhanced) of Blue Box recyclables; and
- Collection of Blue Box recyclables as part of a three stream wet/dry collection program.

Much of Lambton County is already served by Blue Box and/or depot collection programs. Enhanced Blue Box collection represents a Blue Box program that incorporates a larger variety of dry recyclables. Recyclables collected in an enhanced Blue Box program, which are not normally collected in regular programs, include boxboard, polycoat milk cartons, phone books, magazines, mixed household paper, aluminum trays and foil, plastic tubs and bags, film plastic, plastic foam cups and containers, and textiles. The primary advantage of an enhanced Blue Box program is that it helps to achieve increased waste diversion using existing or modified facilities and systems. The Centre and South Hastings Waste Management Board is presently conducting a pilot study to assess an enhanced Blue Box program.

Wet/dry collection programs require residents to separate their wastes into two components - the wet or primarily organic fraction and the dry fraction which consists of paper, plastics, metals, etc. Each stream is stored and collected separately. In a two stream system, all the wastes are separated into either of two containers, one for wet and one for dry. In a three stream system, a third container for garbage (e.g. waste that is not suitable for either the wet or dry stream) is provided and the existing Blue Boxes are generally used to collect the dry recyclables. Expanded material recovery facilities and central composting facilities that can handle both food and yard wastes are normally required to accommodate wet/dry collection programs. Pilot studies of wet/dry collection programs have been conducted in Guelph, Oakville, Mississauga and Metro Toronto. The County is helping to fund a wet/dry collection pilot study taking place in Wyoming.

The 3Rs Regulations require most municipalities in Lambton County to establish and operate Blue Box collection programs. Two stream wet/dry collection contradicts the intentions of the 3Rs Regulations because in a two stream system, the Blue Box materials are collected mixed with other dry wastes. The recyclables are separated later at a processing facility. As a result, two stream collection is not similar to a true Blue Box program. Therefore, two stream wet/dry collection was not considered in this analysis.

iii) Direct Cost Program for Waste Collection

In a direct cost program, waste generators pay for waste collection on the basis of the amount of waste disposed. Recycling and organics collections are provided free of charge. Direct cost acts as an enhancement for source separation programs because it encourages residents to divert wastes from disposal. Within Lambton County, direct cost is used for most IC&I wastes but has only been implemented in Grand Bend and Town of Bosanquet for residential wastes.

iv) Organics Collection

Organics collection refers to the collection of organics from residences for subsequent composting. The types of organic collection programs considered were:

- Leaf and yard waste collections in Sarnia;
- Expanded leaf and yard waste collections to areas outside of Sarnia; and
- Collection of household organics as part of a wet/dry collection program.

Leaf and yard wastes are already collected on a seasonal basis in Sarnia for composting at the City's existing outdoor windrow facility. The City collected and composted 1,850 tonnes of leaf and yard wastes in 1992 and 2,200 tonnes of leaf and yard wastes in 1993. The Town of Petrolia has recently opened a leaf and yard waste composting facility and the Town of Forest is planning to open a facility in the near future.

There are urban areas in other parts of the County that could support seasonal leaf and yard waste collections. These areas include some of the larger towns and villages, such as Point Edward and the populated areas near Lake Huron and the St. Clair River in Moore, Plympton and Bosanquet.

Collection of household organics is included as part of a wet/dry collection program.

v) Other Collections

Other collections represent source separation and collection of special materials. These initiatives include:

- Collection of bulky items such as white goods, used furniture, scrap wood, used tires, and brush; and
- Collection of household hazardous wastes.

Collection of bulky items is already conducted on a periodic basis in some areas of the County. This includes curbside collection in some urban and rural areas and collection depots at some of the County's landfill sites in rural areas. Curbside collections should be expanded to cover all urban areas and depots should be established at public works yards and closed landfill sites to serve all rural areas.

Household hazardous wastes are presently collected on designated collection days which are organized by the County. Permanent depots for these wastes should be established in the larger urban areas (e.g. the Laidlaw Environmental Services facility in Moore Township). Collection days should continue on a periodic basis at strategic locations to serve other areas.

vi) Recycling Depots

Recycling depots provide an opportunity for residents in smaller communities and rural areas to self-haul source separated recyclables to a collection area for recycling. Depots are presently operating in Petrolia and Wyoming and in Brooke, Euphemia, Dawn and Warwick Townships. It is recommended that households served by depots should also receive a Blue Box so that residents will have a container to store their recyclables in between visits to the depot. For the enhanced Blue Box and wet/dry collection programs, the depots should be enhanced to allow for the collection of additional materials. As noted above, depots should also be established for bulky items at strategic locations.

vii) Industrial, Commercial and Institutional Programs

Present and future waste generation in Lambton County is discussed in Chapter 3, Section 3.1. Municipal wastes are defined as residential and IC&I wastes that are generally disposed in municipal landfill sites. Municipal wastes generated by IC&I sources come primarily from commercial and institutional establishments and are generally similar to residential wastes. Municipal wastes are disposed of at municipal and private landfill sites licensed for municipal waste disposal.

As part of the long-term waste diversion strategy, it is recommended that the County become more involved in diversion initiatives for IC&I wastes that are part of the municipal waste stream. The County's role primarily would be to encourage the establishment of programs for IC&I wastes that would be operated by private sector firms. These firms already operate most of the existing municipal recycling programs in the County. As an example, the County could provide locations for depots for the recyclables that some IC&I establishments are required to source separate under the 3Rs Regulations. Private sector firms would operate the depots. Additional details on the 3Rs Regulations are provided in Appendix 2B, Volume 2. Examples of initiatives for IC&I wastes include:

- collecting Blue Box materials from IC&I establishments: this is similar to collection of recyclables from residences and would likely be most suitable for small commercial and institutional establishments such as doctors' and dentists' offices and small retail establishments that do not produce significant quantities of recyclables;
- establishing recycling depots for collecting Blue Box materials from IC&I establishments: depots would likely be most effective in the commercial areas of the larger communities such as Sarnia, Petrolia and Forest; the types of establishments would include shopping malls and hospitals;
- collecting and composting of food wastes from commercial establishments such as food stores and restaurants and at institutions: these wastes can only be composted at a facility approved for the composting of food wastes; the existing approval at the City of Sarnia's leaf and yard waste composting facility would not be appropriate for composting this waste stream. Food wastes from commercial establishments could also be composted at a facility owned and operated by a private sector company.

The collection of Blue Box recyclables from IC&I establishments was included in the Centre and South Hastings Waste Management Board's enhanced Blue Box pilot study. Over 1,000 businesses on municipal routes participated, adding significantly to the quantities of recyclables collected.

Household Composting

viii) Household Composting

Household composting represents an effective method for diverting organic wastes from disposal. The types of household composting considered for the long-term diversion strategy were:

- Expanded backyard composter distribution programs (this would include plastic composters, cedar bins, green cones and vermicomposters).
- Large three-bin composting units for multi-family housing complexes and apartment buildings.

By the end of 1993, a total of 9,567 composters had been distributed in Lambton County. Assuming one composter per household, this means that approximately 19% of the households in Lambton County had a composter by the end of 1992.

For the long-term diversion strategy, it is proposed that the distribution programs be expanded so that the number of composters distributed in the County can be increased significantly. Bluewater Recycling, who distribute composters to their member municipalities, are participating in the MOEE's Model Backyard Composter Program. As part of this program, Bluewater plans to sell up to 500 backyard composters to residents in Forest in 1993 and evaluate their performance over a one year period. Durham Region, Region of Waterloo, and the Centre and South Hastings Waste Management Board have all studied the distribution of free composters to residents.

Central Composting

ix) Central Composting Facilities

The central composting facilities component represents the different technologies and processes that can be used to compost organic wastes. The two types of central composting considered for the waste diversion strategy were:

- Outdoor windrow composting of source separated leaf and yard wastes.
- In-vessel or windrow composting of source separated leaf and yard wastes and household organics collected in a wet/dry program.

The City of Sarnia and Town of Petrolia already operate outdoor windrow composting facilities for leaf and yard wastes. The City has had their Certificate of Approval amended to allow leaf and yard wastes collected in other areas in Lambton County to be composted at their facility. The Town of Forest is also planning to open a leaf and yard waste composting facility.

If a wet/dry collection system is implemented in the County, then one possibility would be to obtain an amended Certificate of Approval to allow the composting of both leaf and yard wastes and household organics at the City of Sarnia's site. If it is not possible to compost the organics collected by the wet/dry collection program at the City's existing site, then an option available to the County is to establish a suitable composting site at the proposed Composite Waste Management facility. Use of the new facility in Petrolia and the one planned for Forest should also be considered.

Materials Recovery

x) *Materials Recovery Facilities (MRFs)*

MRFs are facilities where collected dry recyclables and other dry materials are processed into forms suitable for sale to secondary materials markets. There are three privately owned and operated MRFs that serve Lambton County. The Bluewater Recycling Association MRF is located in Huron Park in Huron County, east of Grand Bend. Browning-Ferris Industries owns and operates the former Tri-Land Recycling Inc. MRF in Petrolia. Philip Environmental started operating a MRF in Petrolia in June 1994.

It is not known if the existing privately owned and operated MRFs in the County will be able to handle the quantities and types of materials that will be collected in the wet/dry or enhanced Blue Box collection programs. If these facilities are unsuitable, then an option available to the County is to construct a suitable MRF at the proposed Composite Waste Management facility.

5.2.3 Development of Alternative Strategies

Five alternative waste diversion strategies were identified for consideration. The names of the five alternatives are:

- Strategy 1 - the Existing Diversion Strategy;
- Strategy 2 - Enhanced Blue Box;
- Strategy 3 - Enhanced Blue Box with Direct Cost;
- Strategy 4 - 3 Stream Wet/Dry Collection; and
- Strategy 5 - 3 Stream Wet/Dry Collection with Direct Cost.

Generator-based initiatives, such as waste reduction and reuse by householders, and waste diversion education, are assumed to be included in all of the strategies. These elements are essential to any waste diversion strategy. On their own they will not result in significant diversion of residential or IC&I wastes. However, these initiatives can help to increase the waste diversion achieved in any of the strategies.

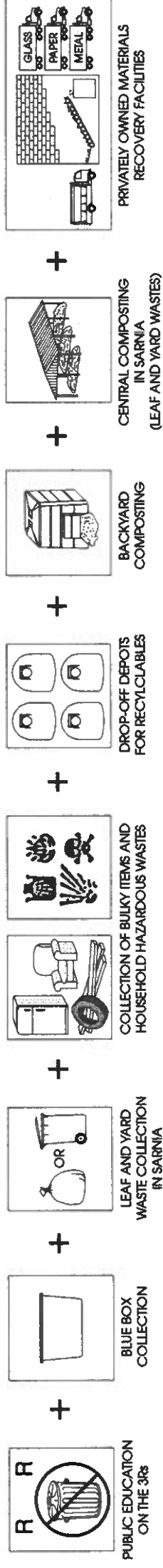
Collection programs for household hazardous wastes (HHW) are also assumed to be included in all of the strategies. These programs are essential for diverting these wastes from landfill disposal.

The development of, and rationale for, the five strategies are explained in more detail below. The initiatives included in each of the strategies are shown in Figure 5.1.

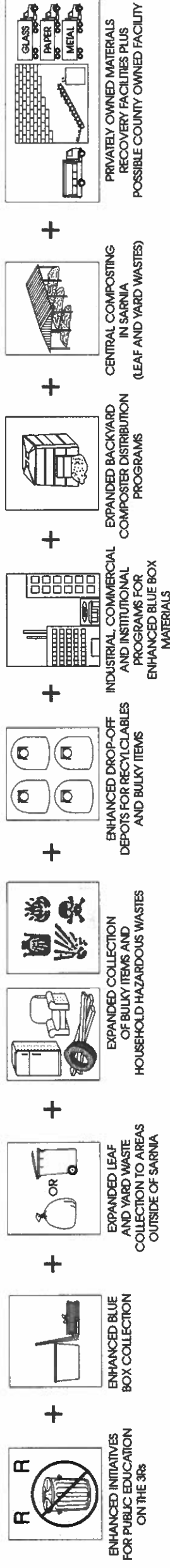
FIGURE 5.1

ALTERNATIVE LONG-TERM WASTE DIVERSION STRATEGIES

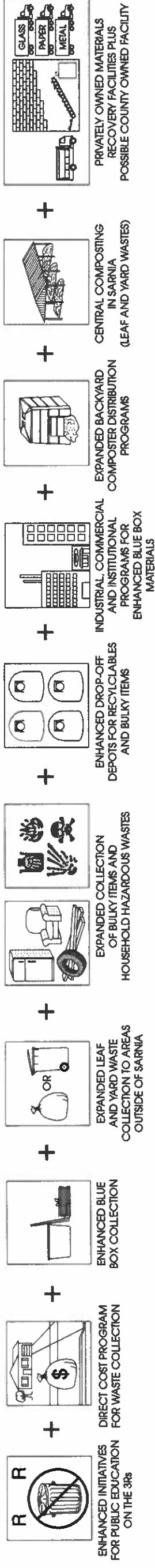
STRATEGY 1: EXISTING



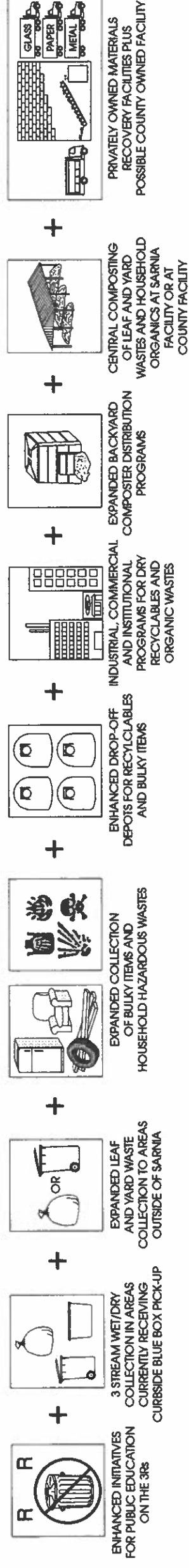
STRATEGY 2: ENHANCED BLUE BOX



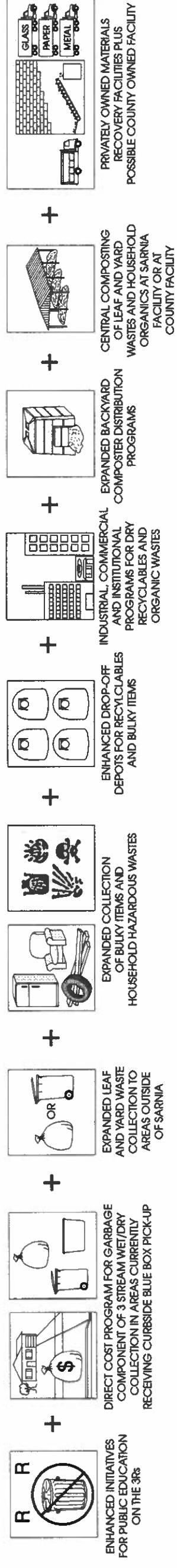
STRATEGY 3: ENHANCED BLUE BOX WITH DIRECT COST



STRATEGY 4: 3 STREAM WET/DRY COLLECTION



STRATEGY 5: 3 STREAM WET/DRY COLLECTION WITH DIRECT COST



Strategy 1 (Existing Diversion Strategy)

This strategy reflects the existing waste diversion strategy in place in Lambton County at the end of 1992. This strategy represents the "do nothing" scenario, i.e. the County would continue with the existing diversion strategy, with no new initiatives. The diversion initiatives included in Strategy 1 are listed in Table 5.2.

The other four strategies outlined below were chosen to represent reasonable options for the County to increase waste diversion in the future. Each strategy represents an incrementally higher commitment in terms of cost and effort, coupled with the potential benefit of greater waste diversion.

Strategy 2 (Enhanced Blue Box)

This strategy features source separation and collection of an increased variety of recyclables. The waste diversion initiatives included in this strategy are listed in Table 5.2. This strategy represents a natural progression from the existing diversion strategy because the recycling contractors in Lambton County are already collecting some recyclables that are typical of enhanced Blue Box programs. With this strategy, the types of recyclables collected by the recycling contractors would be increased and would be more consistent across the County. Curbside collection of enhanced Blue Box recyclables would be provided at single-family households. The existing recycling program for multi-family housing complexes and apartment buildings in Sarnia would also be converted to an enhanced program. For residents in rural areas who do not have curbside Blue Box collection, existing recycling depots would be enhanced to allow collection of more types of recyclables.

Strategy 2 also includes collection of leaf and yard wastes in urban areas outside of Sarnia where population densities are high enough to make this feasible. These wastes can be composted at leaf and yard waste composting facilities in Sarnia, Petrolia and possibly Forest. Eventually, the County may opt to establish their own leaf and yard waste composting facility at the proposed Waste Management Composite facility.

Other initiatives included in Strategy 2 are increased collections of bulky items such as white goods and used tires. These wastes are presently collected in some areas of the County. The collections should be expanded, particularly in urban areas. In rural areas, it is proposed that drop-off depots be established at public works yards and at existing landfill sites. It is assumed that most rural residents have access to a pick-up truck which they can use to haul bulky items to the depots. Establishing the depots at existing public works yards is the most feasible manner to provide supervision, which is needed in order to discourage residents from disposing of their wastes at the depots.

**TABLE 5.2
LIST OF WASTE DIVERSION STRATEGY TECHNOLOGIES AND PROCESSES**

Strategy	Source Separation/Recycling Collection					Household Composting	Central Composting	Materials Recovery Facility	
	Recycling Collection	Direct Cost Collection	Organics Collection	Other Collections	Recycling Depots				IC&I Programs
STRATEGY 1: Existing	<ul style="list-style-type: none"> Curbside collection of Blue Box recyclables from single-family households by private contractors. Typical materials include newspaper, cardboard, steel, and aluminum cans, PET soft drink bottles, plastic bottles and tubs, clear and coloured glass Collection of bins of recyclables from apartment buildings by private contractors in Sarnia 	<ul style="list-style-type: none"> Direct cost collection programs operating in Grand Bend and Town of Bosanquet Direct cost for IC&I wastes 	<ul style="list-style-type: none"> Collection of residential leaf and yard wastes in Sarnia by private contractor in Spring and Fall 	<ul style="list-style-type: none"> Periodic collection of white goods, used furniture, scrap wood, fine paper, and used tires in some areas by private contractors Household hazardous waste collection days held on a regular basis in the County 	<ul style="list-style-type: none"> Drop-off depots for Blue Box recyclables in rural areas to provide recycling opportunities for self-haul generators Drop-off depots for bulky items such as white goods and brush at some existing landfill sites 	<ul style="list-style-type: none"> No programs for collecting recyclables from IC&I establishments presently operating in the County 	<ul style="list-style-type: none"> Backyard composter distribution programs (9,567 composters distributed by end of 1993) 	<ul style="list-style-type: none"> Centralized windrow composting of leaf and yard wastes operated by the City of Sarnia and Town of Petrolia 	<ul style="list-style-type: none"> Bluewater Recycling Association MRF in Huron County BFI MRF in Petrolia Philip Environmental MRF in Petrolia
STRATEGY 2: Enhanced Blue Box	<ul style="list-style-type: none"> Curbside collection of enhanced Blue Box recyclables from single-family households by private contractors Collection of enhanced Blue Box recyclables from apartment buildings and multi-family complexes 	<ul style="list-style-type: none"> Direct cost collection programs operating in Grand Bend and Town of Bosanquet Direct cost collection for IC&I wastes 	<ul style="list-style-type: none"> Collection of residential leaf and yard wastes in Sarnia by private contractor in Spring and Fall Collections of leaf and yard wastes in urban areas outside of Sarnia 	<ul style="list-style-type: none"> Regular collection of bulky items such as furniture, scrap wood, and used tires Permanent drop-off depots for HHW in urban areas Special HHW drop-off days for rural areas 	<ul style="list-style-type: none"> Engineered drop-off depots for enhanced collection of dry recyclables for communities that presently do not receive curbside Blue Box collection Drop-off depots at public works yards in rural areas for bulky materials such as white goods, brush, used furniture, scrap wood and used tires 	<ul style="list-style-type: none"> Curbside collection and drop-off depots for collection of enhanced Blue Box materials from IC&I establishments 	<ul style="list-style-type: none"> Expanded backyard composter distribution programs Composters distributed free of charge to up to 80% of households in the County Large three-bin composting units distributed to multi-family housing complexes and apartment buildings 	<ul style="list-style-type: none"> Centralized windrow composting of leaf and yard wastes operated by City of Sarnia and Town of Petrolia Central windrow composting of leaf and yard waste collected outside of Sarnia at Sarnia composting facility 	<ul style="list-style-type: none"> Processing of enhanced Blue Box recyclables at Bluewater Recycling Association MRF in Huron County, Petrolia and Philip Environmental MRF in Petrolia Processing of expanded Blue Box materials at County MRF located at composite facility

TABLE 5.2
LIST OF WASTE DIVERSION STRATEGY TECHNOLOGIES AND PROCESSES
(Continued)

Strategy	Source Separation/Recycling Collection					Household Composting	Central Composting	Materials Recovery Facility	
	Recycling Collection	Direct Cost Collection	Organics Collection	Other Collections	Recycling Depots				IC&I Programs
STRATEGY 3: Direct Cost and Enhanced Blue Box	<ul style="list-style-type: none"> Enhanced curbside collection of Blue Box recyclables from single-family households by private contractors Collection of enhanced Blue Box recyclables from apartment buildings and multi-family complexes 	<ul style="list-style-type: none"> Direct cost system for waste collection expanded to cover whole County Direct cost for IC&I wastes 	<ul style="list-style-type: none"> Collection of residential leaf and yard wastes in Sarnia by private contractor in Spring and Fall Collection of leaf and yard wastes in urban areas outside of Sarnia 	<ul style="list-style-type: none"> Regular collection in urban areas of bulky items such as white goods, used furniture, scrap wood and used tires in all areas of County Permanent drop-off depots for HHW in urban areas Special HHW drop-off days for rural areas 	<ul style="list-style-type: none"> Engineered drop-off depots for enhanced collection of dry recyclables for communities that do not receive Blue Box collection Drop-off depots at public works yards in rural areas for bulky materials such as white goods, brush, used furniture, scrap wood and used tires 	<ul style="list-style-type: none"> Curbside collection and drop-off depots for collection of enhanced Blue Box recyclables from IC&I establishments 	<ul style="list-style-type: none"> Expanded backyard composter distribution programs Composters distributed free of charge to up to 80% of households in the County Large three-bin composting units distributed to multi-family housing complexes and apartment buildings 	<ul style="list-style-type: none"> Centralized windrow composting of leaf yard wastes operated by City of Sarnia and Town of Petrolia Centralized windrow composting of leaf and yard wastes collected outside of Sarnia 	<ul style="list-style-type: none"> Processing of enhanced Blue Box recyclables at Bluewater Recycling Association MRF in Huron County, BFI MRF in Petrolia, and at the Philip Environmental MRF in Petrolia Processing of expanded Blue Box materials at County MRF located at composite facility
STRATEGY 4: Residential Three Stream Wet/Dry Collection	<ul style="list-style-type: none"> Curbside collection of residential Blue Box recyclables from three stream collection by private contractors in rural and urban areas Large bins provided in the garbage management areas of multi-family housing complexes and apartment buildings for voluntary separation of dry recyclables portion of three streams by residents 	<ul style="list-style-type: none"> Direct cost collection programs operating in Grand Bend and Town of Bosquet Direct cost for IC&I wastes 	<ul style="list-style-type: none"> Curbside collection of household organics from three stream collection by private contractors in rural and urban areas Large bins provided in the garbage management areas of multi-family housing complexes and apartment buildings for voluntary separation of wet wastes portion (in sealed bags) of three streams by residents Collection of residential leaf and yard wastes in Sarnia by private contractor in Spring and Fall Collection of leaf and yard wastes in urban areas outside of Sarnia 	<ul style="list-style-type: none"> Regular collection of bulky items such as white goods, used furniture, scrap wood and used tires Permanent drop-off depots for HHW in urban areas Special HHW drop-off days for rural areas 	<ul style="list-style-type: none"> Engineered drop-off depots for enhanced collection of dry recyclables for communities that do not receive Blue Box collection Drop-off depots at public works yards in rural areas for bulky materials such as white goods, brush, used furniture, scrap wood and used tires 	<ul style="list-style-type: none"> Curbside collection and drop-off depots for collection of enhanced Blue Box recyclables from IC&I establishments Composting of food wastes from IC&I establishments 	<ul style="list-style-type: none"> Expanded backyard composter distribution programs Composters distributed free of charge to up to 80% of households in the County Large 3-bin composting units distributed to apartment buildings and multi-family housing complexes 	<ul style="list-style-type: none"> Centralized windrow composting of leaf and yard wastes operated by City of Sarnia and Town of Petrolia Central composting facility (in-vessel or windrow) for composting of source separated household organics (wet stream) and commercial and institutional organics at composite waste management facility 	<ul style="list-style-type: none"> Processing of dry recyclables from three stream collections at Bluewater Recycling Association MRF in Huron County, BFI MRF in Petrolia, and at the Philip Environmental MRF in Petrolia New MRF owned by the County at the composite waste management facility for processing dry recyclables from three stream collection

TABLE 5.2
LIST OF WASTE DIVERSION STRATEGY TECHNOLOGIES AND PROCESSES
(Continued)

Strategy	Source Separation/Recycling Collection						Household Composting	Central Composting	Materials Recovery Facility
	Recycling Collection	Direct Cost Collection	Organics Collection	Other Collections	Recycling Depots	IC&I Programs			
STRATEGY 5: Residential Three Stream Wet/Dry Collection With Direct Cost	<ul style="list-style-type: none"> Curbside collection of residential Blue Box recyclables from three stream collection by private contractor in rural and urban areas Large bins provided in the garbage management areas of multi-family housing complexes and apartment buildings for voluntary separation of dry recyclables portion of three streams by residents 	<ul style="list-style-type: none"> Direct cost system for garbage collection expanded to cover whole County Direct cost for IC&I wastes 	<ul style="list-style-type: none"> Curbside collection of household organics from three stream collection by private contractors in rural and urban areas Large bins provided in the garbage management areas of multi-family housing complexes and apartment buildings for voluntary separation of wet wastes portion (in sealed bags) of three streams by residents Collection of residential leaf and yard wastes in Sarnia by private contractor in Spring and Fall Collection of leaf and yard wastes in urban areas outside of Sarnia Special curbside collection of Christmas trees 	<ul style="list-style-type: none"> Regular collection of bulky items such as white goods, used furniture, scrap wood and used tires in all areas of the County Permanent drop-off depots for HHW in urban areas Special HHW drop-off days in rural areas 	<ul style="list-style-type: none"> Engineered drop-off depots for enhanced collection of dry recyclables for municipalities that do not receive Blue Box collection Drop-off depots for public works yards in rural areas for bulky materials such as white goods, brush, used furniture, scrap wood and used tires 	<ul style="list-style-type: none"> Curbside collection and drop-off depots for collection of enhanced Blue Box materials from IC&I establishments Collection and composting of food wastes from IC&I establishments 	<ul style="list-style-type: none"> Expanded backyard composter distribution programs Composters distributed free of charge to up to 80% of households in the County Large three-bin composting units distributed to multi-family housing complexes and apartment buildings 	<ul style="list-style-type: none"> Centralized windrow composting of leaf and yard wastes operated by City of Sarnia and Town of Petrolia Central composting facility (in-vessel or windrow) for composting of source separated household organics (wet stream) and commercial and institutional organics at the composite waste management facility 	<ul style="list-style-type: none"> Processing of dry recyclables from three stream collections at Bluewater Recycling Association MRF in Huron County, BFI MRF in Petrolia and at the Philip Environmental MRF in Petrolia New MRF owned by the County at the Composite Waste Management facility for processing dry recyclables from three stream collection

Household hazardous waste collections are included in all of the alternative diversion strategies. In Strategy 2, it is recommended that a permanent depot be established near the larger urban areas (e.g. the Laidlaw Environmental Services facility in Moore Township) plus more collection days be held at strategic locations in other areas.

Strategy 2 includes curbside collection and drop-off depots for the collection of enhanced Blue Box recyclables from IC&I establishments. The collection of food wastes from IC&I establishments was not included in this strategy.

Strategy 2 also includes extensive expansion of the existing backyard composter distribution efforts. Backyard composting represents the primary opportunity that residents have to divert organics from disposal in this strategy. Free door-to-door distribution of composters to residents who are willing to accept them has been studied in Durham Region, the Region of Waterloo, and Centre and South Hastings. In these studies, it was observed that approximately 70 to 80% of households accepted the composters. Strategy 2 also features composting at multi-family housing complexes and apartment buildings. It is likely that this initiative will be most effective at multi-family establishments such as housing co-ops and townhouse complexes.

Leaf and yard waste collections were considered to be an important aspect of Strategy 2 despite an increased emphasis on backyard composting. This is because backyard composters in some situations cannot handle excessive quantities of leaf and yard wastes. Curbside collection and composting of these wastes provides a diversion option for residents. In a study completed by the City of Ottawa, it was found that a significant number of residents who participated in the study and who had composters still placed some leaf and yard wastes on the curb for refuse collection. This suggested that many program participants found their composters to be too small to compost all of their yard wastes.

The enhanced Blue Box recyclables collected in Strategy 2 will require processing at a MRF in order to prepare them for marketing. The recyclables presently collected in the County are processed at the MRFs that are owned and operated by the private recycling contractors. As noted previously, some of the contractors are already collecting some materials that would typically be collected in an enhanced Blue Box program. This would suggest that if the County were to implement an enhanced Blue Box program County-wide, the collection contractors might be able to process the additional materials at their existing facilities. If this is not the case, then the County could establish a MRF at the proposed Composite Waste Management facility.

The waste diversion initiatives included in Strategy 2 are based primarily on the initiatives proposed in the short-term waste diversion strategy. The short-term strategy was described

previously in this chapter. The initiatives recommended in the short-term strategy, which have been incorporated into Strategy 2, include:

- increasing the number of materials collected in the existing Blue Box programs;
- increasing the number of backyard composters distributed within the County;
- seasonal collection of leaf and yard wastes in areas outside of Sarnia;
- collection of bulky items, such as white goods, tires, etc., at depots in rural areas; and
- more collection days for household hazardous wastes.

Strategy 3 (Enhanced Blue Box with Direct Cost)

This strategy is similar to Strategy 2 except that it includes a direct cost waste collection program to be implemented County-wide. In this strategy, local municipalities and residents would be required to pay for garbage collection and disposal based on the amount they dispose. Enhanced Blue Box collection of dry recyclables and seasonal collection and composting of leaf and yard wastes would continue and would be free of charge. In addition, backyard composters for single-family residences and large three bin composters for multi-family housing complexes and apartment buildings would be aggressively promoted and distributed. The direct cost program would help to maximize public participation in these initiatives. The diversion initiatives included in this Strategy are listed in Table 5.2.

Municipal direct cost collection programs have been operating in Grand Bend since October 1992 and in Bosanquet since April 1994. In these programs, residents are required to purchase tags for their garbage bags. According to municipal officials in Grand Bend, their program has resulted in significant reductions in the amounts of wastes put out for collection and has increased the effectiveness of the existing Blue Box collection and backyard composter programs. Problems such as illegal dumping of waste or bag tag theft have not occurred as a result of the program (per.comm., Paul Turnbull, March 22, 1993). Direct cost programs have also been implemented in the Town of Gananoque, in the Townships of Westmeath and McNab in Renfrew County, and in a number of communities in the United States. The general experience with these programs has been that the advantages outweigh the disadvantages. Direct cost waste collection programs have yet to be proven in large cities. This is due to the larger number of households in large cities and the problems inherent with implementing direct cost programs in apartment buildings.

Strategy 4 (3 Stream Wet/Dry Collection)

This strategy is based on the source separation and collection of wastes in three streams - the wet or organic fraction, the dry recyclables fraction, and the garbage fraction. A true wet/dry program, which features collection of wet and dry wastes with no garbage option, was not considered in this analysis. The diversion initiatives included in this strategy are listed in Table 5.2.

Wet/dry collections would be provided primarily in areas that receive curbside Blue Box collections. The viability of successfully operating wet/dry collection programs in areas that do not receive curbside Blue Box recyclables collection (e.g. apartment buildings and some rural areas) is somewhat uncertain. In rural areas, many residents have their own compost heaps and feed their food wastes to farm animals and pets. The County is helping to fund a wet/dry collection pilot study taking place in Wyoming. The results of this study will help to determine the feasibility of implementing wet/dry programs in the County, particularly in smaller communities and in rural areas.

Wet/dry collection in apartment buildings is difficult because most buildings only have one chute for disposal. In most buildings, the collection of Blue Box recyclables is accommodated by providing bins on the ground floor. A similar approach would likely be necessary for wet/dry collection. This would involve the voluntary separation of food wastes by residents and disposal in sealed plastic bags at an accessible common area in the building. The feasibility of implementing this type of program is not known.

A wet/dry collection program requires the wet fraction to be composted at a facility approved for the composting of both leaf and yard wastes and household organics. One possibility would be to obtain an amended Certificate of Approval under the *Environmental Protection Act* for the City of Sarnia's leaf and yard waste composting facility in order to allow for the composting of household organics at the site. The City of Sarnia's existing site may not be suitable for composting this waste stream. In this case, the County would need to seek approval for a composting operation at the proposed Composite Waste Management facility, or other suitable location.

With Strategy 4, the seasonal collection of leaf and yard wastes in Sarnia, and in urban areas outside of Sarnia, would continue. These collections would help to divert seasonal quantities of leaf and yard wastes which may be too great to be effectively handled by the wet/dry collection program and by backyard composters. The leaf and yard waste composting facilities in Sarnia, Petrolia and possibly Forest would remain in operation to compost these wastes.

Backyard composting would continue to be promoted with this strategy. This would help to enhance the diversion of organic wastes, particularly in areas that will not receive wet/dry collection. Other collections, such as bulky items and household hazardous wastes, should also continue to be promoted. The level of effort for these initiatives should be similar to the level of effort recommended for these initiatives in Strategies 2 and 3.

The wet/dry collection program will require the processing of large quantities of source separated dry stream recyclables at a MRF. The Blue Box recyclables presently collected in the County are processed at MRFs which are owned and operated by the private recycling contractors. Whether or not these facilities will be able to handle the dry waste stream produced by a wet/dry collection program is not known. If the privately owned MRFs cannot handle this waste stream, then one option would be for the County to construct a MRF at the proposed Composite Waste Management facility to provide additional processing capacity.

Strategy 4 includes curbside collection and drop-off depots for the collection of enhanced Blue Box recyclables (e.g. the dry waste stream) at IC&I establishments plus the collection and composting of food wastes from IC&I establishments.

Strategy 5 (Wet/Dry Collection Program with Direct Cost

This strategy is similar to Strategy 4, except that it includes a direct cost waste collection component to be implemented County-wide. The diversion initiatives included in this strategy are listed in Table 5.2. Residents would be required to pay for the collection of the garbage stream of the three stream wet/dry collection program. The collection of the dry recyclable and wet waste streams would be provided free of charge. The direct cost program would help to maximize participation in the wet/dry collection, composting and other waste diversion programs in this strategy.

5.2.4 Evaluation of Alternative Waste Diversion Strategies

The alternative waste diversion strategies developed in the previous section were evaluated to identify a recommended long-term diversion strategy within the waste management system for the County. The evaluation followed a five-step process. The steps were:

- i) Identification of evaluation criteria;
- ii) Assessment of the alternative strategies with respect to each criterion;
- iii) Comparative evaluation of the alternative strategies to identify a recommended strategy;

- iv) Tests to determine the sensitivity of the evaluation to changes in the criteria, and ranks and weights used; and
- v) Consideration of the results of the waste diversion survey.

The following sub-sections describe the steps in more detail.

Identification of Evaluation Criteria

In the first step, the aim was to identify criteria that would help to determine key differences between the alternative diversion strategies. The four criteria that were identified, the rationale for using them, and the importance or "weight" assigned to each one are explained below. The assigned weights define the relative importance of the criteria. The most important criteria is given the highest weight. The sum of the weights is equal to 100.

i) Potential for Waste Diversion

Potential for waste diversion is an important consideration in the evaluation of alternative diversion strategies because it is a measure of the ability of the strategies to help the County attain maximum waste diversion and the MOEE's waste diversion objective. Potential for diversion also indicates the amount of dependence on landfill disposal that the overall waste management system would have. Generally, the lower the potential for waste diversion, the higher the dependence on landfill disposal, and the higher the potential for negative effects caused by landfill disposal.

Potential for waste diversion was considered to be the most important criterion because the goal of the diversion strategy is to allow the County to attain the MOEE's waste diversion objective. A weight of 40 out of 100 was assigned to this criterion.

ii) Ease of Implementation

The ease of implementation for the strategies indicates the degree to which the existing waste management system would need to be modified to accommodate the new diversion strategy. The more compatible the proposed new diversion strategy is with the existing system, the more preferred it would be.

Ease of implementation was also considered to be an important criterion because it serves as a measure of the ability of the County to implement the strategy. The strategies that will be more difficult to implement will have a higher chance of not being implemented. A weight of 30 out of 100 was assigned for this criterion.

iii) Potential for Impacts from New Diversion Facilities

Some of the alternative diversion strategies may require new diversion facilities such as central composting and materials recovery facilities. The construction and operation of these facilities could cause negative on-site removal of features (e.g. agricultural land, biological features) and off-site nuisance impacts (e.g., odours, noise, dust, etc.).

This criterion was not considered as important as diversion potential or ease of implementation because not all of the alternative strategies will need new diversion facilities. If new facilities are needed, the potential exists that impacts created by constructing and operating the facilities can be mitigated to some degree. As a result, this criterion was assigned a weight of 20 out of 100.

iv) Cost

This criterion addresses net costs for implementation and operation of the alternative diversion strategies. Costs could affect the feasibility or ease of implementing and maintaining the diversion strategies.

This criterion was considered to be least important because differences between the strategies could not be determined under this criterion. In addition, cost does not represent a true representation of the potential financial impacts of the diversion strategies. Cost does not consider the benefits of waste diversion such as reduced dependence on landfill disposal, reduced consumption of non-renewable resources, etc. A weight of 10 out of 100 was assigned to this criterion.

Assessment of the Alternative Strategies***Potential for Waste Diversion***

The amount of waste that could potentially be diverted by each of the five alternative diversion strategies was determined. Diversion resulting from initiatives intended for residential wastes and initiatives intended for IC&I wastes were considered separately. This is because little was known about the present quantities and composition of the IC&I waste stream that has traditionally been disposed in municipal landfill sites.

The County redirected the majority of IC&I wastes away from the Sarnia landfill in 1988 in order to extend the life of the landfill. The wastes redirected were composed primarily of residential type wastes from commercial and institutional establishments. The quantity redirected in 1988 was estimated to be 32,500 tonnes per year. In 1988, this was assumed

to be a temporary measure and that this waste stream would return to municipal disposal sites once a new site was opened by the County.

The redirected IC&I wastes comprise part of the municipal waste stream and therefore a portion of these wastes will have to be diverted by the recommended waste diversion strategy in order to enable the County to achieve the MOEE's waste diversion objective. Because little is known about the IC&I waste stream that was redirected, the amount that could be diverted through the alternative strategies could not be determined. Instead, estimates of the volume of residential wastes that could be diverted for each strategy were combined with diversion rates that were assumed for the redirected wastes. The rates were assumed to range from 10 to 60 percent and are shown in Table 5.3.

**TABLE 5.3
ESTIMATED DIVERSION RATES FOR
ALTERNATIVE DIVERSION STRATEGIES**

Strategy	Diversion Rate Corresponding to Assumed IC&I Diversion Rate					
	10%	20%	30%	40%	50%	60%
2	23.7	27.4	31.2	34.9	38.7	42.5
3	34.5	38.3	42.1	45.8	49.6	53.3
4	32.2	36.0	39.7	43.5	47.3	51.0
5	41.1	44.9	48.7	52.4	56.2	59.9

Estimates of the quantities of residential wastes that could potentially be diverted were determined using waste disposal quantities and quantities diverted for 1992. All of the diversion estimates were based on 1992 quantities.

The potential waste diversion for residential wastes was calculated by estimating the amount of each type of waste available for each of the diversion initiatives. This quantity was then multiplied by the capture rate for each initiative in each strategy. A capture rate represents the proportion of the total quantity of a type of waste that can readily be diverted through a diversion initiative. The quantities for each type of waste were determined using the results of a waste composition analysis. As there have been no waste composition studies completed in Lambton County, the results of the MOEE's Ontario Waste Composition Study were used. Additional details on how the waste composition study results were used are provided in Appendix 2G of Volume 2.

Capture rates for the various diversion initiatives in the alternative strategies were determined using the results of other studies previously conducted in Ontario. A detailed discussion of

how the capture rates were determined, and how other initiatives such as direct cost affect them, is presented in Appendix 2G of Volume 2.

The estimates of the total waste quantities that could potentially be diverted by each of the alternative strategies were used to determine overall diversion rates. The calculations are similar to the diversion rate calculations presented in Chapter 3, Section 3.3.

The diversion rates that were determined for each of the alternative strategies are presented in Table 5.3. The results show that the diversion rates that could be achieved by Strategies 2, 3, 4 and 5 ranged from a minimum of 23.7% to a maximum of 59.9%. It is important to note that the impacts of waste reduction, reuse and public education initiatives and household hazardous waste programs were not considered in the analysis. It is difficult to determine the amount of waste diverted by these initiatives. There is little information available on the impact that these initiatives have with respect to waste diversion. The diversion rates shown in Table 5.3 could potentially be marginally higher as a result.

As indicated in Table 5.3, Strategy 5 provides the most opportunities for the County to attain the MOEE's objective of at least 50% diversion by the year 2000. Strategy 3 provides the second most number of opportunities. Strategy 3 was ranked second, followed by Strategies 4, 2 and 1.

Ease of Implementation

The alternative waste diversion strategies were assessed with respect to this criterion using a qualitative analysis.

The order of preference established for the alternative strategies, and the rationales, are described as follows:

- Strategy 1 - This strategy was ranked first with respect to ease of implementation because it is based solely on the existing diversion strategy and does not involve the implementation of any new initiatives.

- Strategy 2 - This strategy was ranked second with respect to ease of implementation because this strategy requires some new diversion initiatives to be implemented. However, the number of new initiatives required for this strategy is less than the number of new initiatives required for Strategies 3, 4 and 5.

- Strategy 3 - This strategy was ranked third in terms of ease of implementation. This strategy was considered to be less preferred than Strategies 1 or 2 because it involves the implementation of direct cost waste collection in conjunction with enhanced Blue Box collections. However, Strategy 3 was considered to be more preferred than Strategies 4 or 5 because these strategies include wet/dry collection, which is considered to be more difficult to implement than enhanced Blue Box collection.
- Strategy 4 - This strategy was ranked fourth because it includes wet/dry collection. However, this strategy was considered to be more preferred than Strategy 5 because Strategy 5 also includes direct cost waste collection.
- Strategy 5 - The strategy was ranked fifth because it includes both wet/dry collection direct cost waste collection. As a result, Strategy 5 was assumed to be the most difficult strategy to implement.

Potential for Impacts from New Diversion Facilities

The alternative waste diversion strategies were ranked with respect to potential for impacts from new diversion facilities using a qualitative analysis. The rankings that were established for the alternative strategies and the rationales are as follows:

- Strategies 1, 2 & 3 - These strategies were considered most preferred and equal because they all include diversion initiatives which are based on the existing waste diversion strategy. It is unlikely that new diversion facilities will be required for these strategies.
- Strategies 4 & 5 - These strategies were considered least preferred and equal because there is a higher probability that new diversion facilities will be required in order to implement these strategies. The new facilities could cause both on-site and off-site negative environmental impacts (e.g., removal of features, noise, dust, etc.)

Cost

The net cost for implementing and operating each of the alternative waste diversion strategies was determined by subtracting the estimated waste collection and disposal costs from the estimated costs for the diversion initiatives in each strategy. Costs for the reduction, reuse and public education, household hazardous waste (HHW) and IC&I program initiatives were

not considered in the cost analysis because these initiatives were common to all of the strategies and their costs do not vary from strategy to strategy.

Waste collection and disposal costs were determined using data from the County's 1991 waste management cost survey. Additional details on the determination of these costs are provided in Appendix 2G in Volume 2.

Revenue from direct cost programs was not considered in the analysis. It is not known how much of a fee will be charged in the direct cost programs and what type of a fee program will be implemented (e.g., pay by number of bags, pay by weight, etc.). It was assumed that the amount of fee charged will be sufficient to cover the cost of operating the direct cost programs.

Unit costs for operating the diversion initiatives in the alternative strategies were determined using published results from other studies conducted in Ontario. In addition, data from some of the municipalities in the County were also used. A detailed discussion of how the unit costs for the diversion initiatives were determined is presented in Appendix 2G in Volume 2.

The estimated implementation and operating costs that were determined for each of the alternative diversion strategies are presented in Appendix 2G in Volume 2. The difference in cost between the highest and lowest cost strategies was determined to be less than 5%. This is not an unexpected result, considering that the costs for diverting some wastes are comparable to the cost for landfill disposal. The amount of possible error associated with some of the estimates of unit costs used in the calculations are greater than the 5% cost difference. Therefore, the difference in estimated costs between the alternative strategies is not significant enough to allow them to be ranked based on the cost calculations.

For the cost criterion, the alternative waste diversion strategies were ranked in the following manner:

- Strategies 1, 2 & 3 - These strategies were considered to be most preferred and equal because they will likely not require any new diversion facilities to be constructed.
- Strategies 4 & 5 - These strategies were considered to be least preferred and equal because they will likely require new diversion facilities to be constructed. In the cost calculations, unit costs for operating these facilities were used. The unit costs do not reflect the financial risks (e.g. cost for hearings, delays in obtaining approvals, higher than expected construction costs) associated with constructing and operating new waste diversion facilities.

Comparative Evaluation of the Diversion Strategies

The alternative waste diversion strategies were comparatively evaluated using the Concordance Method. A description of the concordance method is provided in Appendix 2H in Volume 2.

The weights used for the criteria in the concordance analysis are summarized in Table 5.4. The resulting ranking from the analysis are summarized in Table 5.5.

**TABLE 5.4
CRITERIA WEIGHTS USED FOR CONCORDANCE ANALYSIS OF THE
ALTERNATIVE DIVERSION STRATEGIES**

Criteria	CRITERIA WEIGHTS			
	Base Case	Test 1: All Criteria Assigned Equal Weights and Ranks	Test 2: Criteria Ranks Changed So that Potential for Diversion Ranked First	Test 3: Weight for Potential For Diversion Increased with Strategy 5 Preferred
1. Potential for Waste Diversion	40/100	25/100	40/100	70/100
2. Ease of Implementation	30/100	25/100	10/100	15/100
3. Potential for Impacts From New Diversion Facilities	20/100	25/100	20/100	10/100
4. Cost	10/100	25/100	30/100	5/100

**TABLE 5.5
CONCORDANCE ANALYSIS RESULTS FOR THE
COMPARATIVE EVALUATION OF THE DIVERSION STRATEGIES**

Diversion Strategy	STRATEGY RANKS			
	Base Case for Criteria Ranks	Test 1: All Criteria Assigned Equal Weights and Ranks	Test 2: Criteria Ranks Changed so that Potential for Diversion Ranked First	Test 3: Weight for Potential for Diversion Increased Until Strategy 5 Preferred
Strategy 1: Existing Strategy	3	2	3	5
Strategy 2: Enhanced Blue Box	2	2	2	4
Strategy 3: Enhanced Blue Box with Direct Cost	1	1	1	3
Strategy 4: Wet/Dry Collection	5	5	5	2
Strategy 5: Wet/Dry Collection with Direct Cost	4	4	4	1

The analysis indicated that Strategy 3 (Enhanced Blue Box with Direct Cost) was the most preferred strategy. The second most preferred strategy was Strategy 2 (Enhanced Blue Box), followed by Strategy 1 (Existing), Strategy 5 (Wet/Dry Collection with Direct Cost) and Strategy 4 (Wet/Dry Collection). Additional details on the results of the analysis are provided in Appendix 2G in Volume 2.

The recommended long-term waste diversion strategy for Lambton County includes the following waste diversion initiatives:

- Enhanced Public Education on the 3Rs;
- Direct Cost Program for Waste Collection;
- Enhanced Blue Box Collection of Recyclables;
- Expanded Collection of Bulky Items;
- Enhanced Drop-Off Depots for Recyclables and Bulky Items;
- Industrial, Commercial and Institutional Programs;
- Collection of Household Hazardous Wastes;
- Expanded Leaf and Yard Waste Collections to Areas Outside of Sarnia;
- Expanded Backyard Composter Distribution;
- Large 3-Bin Composters for Multi-Family Housing Complexes and Apartment Buildings;
- Leaf and Yard Waste Composting at the Sarnia and Petrolia Sites or at the proposed County Composite Facility; and
- Privately or County Owned Materials Recovery Facilities.

Sensitivity Tests

Tests were completed to determine the degree to which the outcome of the evaluation of the alternative diversion strategies was sensitive to the criteria weights and rankings applied. Three different tests were done as follows:

- Test 1) All criteria were assigned equal weights and rankings.
- Test 2) The criteria rankings were changed so that "potential for waste diversion" remained ranked first, but the ranking of the remaining three criteria was reversed so that "cost" was ranked second, "potential for impacts from new diversion facilities" was ranked third, and "ease of implementation" was ranked fourth. The weights were not changed so that the criteria ranked first received a weight of 40/100, the second ranked criteria received a weight of 30/100, etc.

Test 3) The criteria rankings were not changed from those originally established. However, the weight for the "potential for waste diversion" criterion was increased incrementally while the weights for the other three criteria were decreased proportionally. The weight for the "potential for waste diversion" criterion was increased until Strategy 5, which has the highest potential for waste diversion, was identified as the most preferred.

The criteria weights and the ranks of the strategies in the tests are shown in Tables 5.4 and 5.5

The results of the first two sensitivity tests did not result in a change in the overall outcome of the evaluation. Strategy 3 was still most preferred for both of these tests. In the third test, the weighting for the "potential for waste diversion" criterion had to be increased to 70/100 before Strategy 5 became the most preferred of the strategies. However, this weighting was considered to be unrealistically high considering the relatively low weights that the other three criteria were assigned in this test. These results indicate that the evaluation of the alternative waste diversion strategies was not sensitive to the criteria ranks and weights used when reasonable adjustments to the ranks and weights were made.

5.2.5 Waste Diversion Survey

A newsletter was distributed to all of the residences and businesses in Lambton County in March 1993 informing them of the status of the Waste Management Master Plan. The newsletter included a survey form intended to solicit public opinion on potential waste diversion initiatives that the County could implement in the future. The survey also included a short description of the options available, such as wet/dry collection, etc. The newsletter was distributed to 53,000 households and businesses in the County. A copy of the newsletter and survey is provided in Volume 3, Appendix 3D, Schedule 3D-19.

A total of 729 completed surveys were returned. The return addresses on the surveys were analyzed to determine their origin. The results indicated that the completed surveys came from all parts of the County. The sources and number of surveys coming from each source are listed in Table 5.6.

The survey results were also analyzed to determine if the responses originated primarily from urban or rural areas. Urban areas were considered to include cities, towns and villages and it was assumed that residents in these areas would either have a street or post office number in their address. For rural areas, it was assumed that all rural residents had a rural route number in their address. The analysis indicated that 583 or 80% of the responses came from urban areas and 146 or 20% of the responses came from rural areas.

**TABLE 5.6
DISTRIBUTION OF SOURCES OF SURVEY RESPONSES**

	Municipality	Number of Responses	Percent
City	Sarnia	424	58.2
Towns	Bosanquet (incl. Kettle Point and Port Franks)	8	1.1
	Forest	41	5.6
	Petrolia	39	5.3
Villages	Alvinston	7	1.0
	Arkona	8	1.1
	Grand Bend	26	3.6
	Oil Springs	7	1.0
	Point Edward	9	1.2
	Theford	13	1.8
	Watford	25	3.4
	Wyoming	23	3.2
Townships	Brooke	0	0
	Dawn (incl. Florence)	0	0
	Enniskillen (incl. Oil city)	2	0.3
	Euphemia	0	0
	Moore (incl. Corunna, Brigden, Courtright, Mooretown)	41	5.5
	Plympton (incl. Camlachie)	23	3.2
	Sombra (incl. Port Lambton)	20	2.7
	Warwick	0	0
	No address provided	13	1.8
Total		729	100.0

A complete discussion of the results of the survey is presented in Appendix 2G of Volume 2. The survey results were not comprehensive enough to contribute directly to the evaluation of the five alternative diversion strategies. However, the survey results provide support for the selection of Strategy 3 (Enhanced Blue Box with Direct Cost) as most preferred, for two reasons.

First, the results of the survey indicated that 90% of respondents from urban areas and 80% of respondents from rural areas use their Blue Boxes on a regular basis. This result indicates the popularity of the Blue Box programs and suggests that participation in an enhanced Blue Box program would be high.

Second, comments provided by respondents from both rural and urban areas indicated concern about the costs of waste management. They suggested that the existing waste management system is too expensive and should either remain as is, or the number of services provided should be reduced in order to cut costs. Several respondents also made positive comments about direct cost collection programs. Even though the respondents represent only a small portion of the County's population, their comments suggest that cost for waste management is an issue for many people in Lambton County. The recommended waste diversion strategy (Strategy 3 - Enhanced Blue Box with Direct Cost) would, in part, address these comments by expanding upon the existing Blue Box program and by including direct cost to help cover costs and make the program more equitable.

6.0 SITE SELECTION FOR LONG-TERM COMPOSITE FACILITY

6.1 Introduction

The recommended waste management system for Lambton County includes the following components:

- source separation/recycling;
- composting (householder level);
- composting (centralized facility);
- MRF;
- curbside collection;
- transfer facilities (as required); and
- landfill.

An overall recommendation of the Master Plan is that the waste diversion initiatives be implemented to the maximum extent possible so that the need for waste disposal is minimized. However, there will be some need for waste disposal and some reliance on landfilling for the disposal of residual wastes.

The capacity available at the existing County landfills will not be sufficient to meet the County's landfill disposal needs for the 25-year planning period, in spite of the waste diversion activities being implemented to meet MOEE waste diversion objectives. Some new landfill capacity will be required.

This chapter documents the process followed to select a site for the development of a new County-owned waste management facility. A key siting assumption was that the site chosen would accommodate three facilities: a landfill, a MRF and a centralized composting facility. (See Section 4.6.)

Public involvement was a central element in the site selection process. The involvement of the public in site selection occurred primarily through a series of four Site Selection Workshops led by County staff and the technical consulting team. Members of the Steering Committee and the PAC reviewed site selection criteria and key siting decisions.

6.2 Site Selection Approach

6.2.1 Goal and Objectives

The overall aim of the site selection process was to identify a site for a composite waste management facility that would be optimum in terms of the following:

- minimizing impacts on the environment;
- minimizing costs; and
- maximizing service to people in Lambton County.

The above objectives formed the basis of the framework used to identify and evaluate potential sites.

6.2.2 Site Selection Process

In order to identify potential sites, a constraint mapping procedure was undertaken. In essence, this procedure involved the progressive elimination of areas within the County considered unsuitable or less suitable for landfilling. The requirements for the landfill component were given priority since the landfill is considered to have greater potential for impacts than either the MRF or composting facility components.

The site selection process was accomplished in a series of steps:

- identification of a site selection study area;
- identification of candidate areas within the study area;
- identification and screening of siting areas;
- identification of potential sites within siting areas;
- comparative evaluation of the long list of sites;
- identification of a short list of sites;
- detailed comparison of the short list of sites; and
- identification of the preferred site.

The level of detail increased as the process progressed. A guiding principle was that the scope and number of siting options should be reduced efficiently, while at the same time retaining a reasonable range of options at each stage.

The specific criteria used to eliminate areas from consideration and to identify and compare potential sites are discussed in subsequent sections of this chapter.

6.2.3 Criteria Identification

At each step in the site selection process, a set of criteria were used to either eliminate unsuitable or less suitable areas, or to compare siting options. The criteria were identified with reference to the overall siting goals. At each step, the potential to minimize impacts, minimize costs and maximize service was addressed. This was achieved through the identification of "criteria" and, where applicable, their associated "indicators".

"Criteria" are the types of impacts, costs and service concerns that are considered when making siting decisions, for example:

- the potential for contamination of ground water (hydrogeology);
- the potential for displacement of residents; and
- the potential capital costs.

The criteria are normally grouped into "criteria groups" according to the aspect of the environment (broadly defined) to which they relate most directly, for example:

- ground water (hydrogeology) environment;
- social/community environment; and
- costs.

"Indicators" are identified for each of the criteria. The indicators are the specific criteria or measures used to predict the nature and degree of potential impacts, for example:

- presence of wells (potential for contamination of ground water); and
- number of residences to be removed (potential for displacement of residents).

Table 6.1 (provided at the end of Section 6.6) presents the master list of the criteria groups that were considered in the site selection process. Table 6.1 indicates the relationship of each criteria group to the definition of the environment specified in the Ontario EAA. At each step in site selection, the applicable criteria were developed from this master list.

6.2.4 Siting Assumptions

As indicated in previous chapters, some key assumptions affected the development of the overall Master Plan. One general assumption, as noted in Chapter 1, was based on the County's decision that it would not be dependent upon the private sector. For the purposes of long-term planning, therefore, it was assumed that the County would pursue public sector solutions for waste management needs unless and until private sector solutions are in place.

A second general assumption, as discussed in Chapter 4, was based on the County's desire to avoid the import or export of wastes. The planning assumption, then, was that neither waste import nor waste export would be part of the long-term system.

In addition to these general assumptions, some other assumptions were central to the site selection process. These assumptions were considered reasonable for the purposes of narrowing down siting options and predicting potential impacts.

One key assumption made was that the site to be selected would accommodate three facilities: a landfill, an MRF and a composting area. The rationale for this assumption, in brief, is that the integrated facility would have the least potential for impacts, would be less costly and would provide better service than would separate facilities. Other assumptions central to siting were the following:

- only municipal solid wastes, and solid, non-hazardous wastes which are currently taken from industrial and commercial sources (e.g., kitchen wastes, office wastes) will be handled by County facilities;
- existing landfill sites will be closed;
- there will be a deficit of disposal capacity of up to 2.0 million tonnes¹³; and
- a site 75 ha in size would be required.

6.3 Study Area Identification

The first phase of the study area definition was a review of the terrain assessments maps as presented in the Stage 2B Report. This review indicated that except for areas of high constraint located in the extreme southeast corner of the County and along the Lake Huron shore, the entire County was acceptable from a broad hydrogeologic perspective for a landfill facility.

Therefore, since the terrain evaluation indicated that clay soils were located throughout most of Lambton County, no area could be considered to be at an advantage over another in terms of hydrogeology, nor could any areas be eliminated from further consideration on this basis.

¹³ The disposal capacity deficit was previously estimated to be a deficit of up to 2.8 million tonnes, based on the 1989 calculations for a 25-year disposal period (1991 to 2016). The deficit was later estimated to be up to 2.0 million tonnes, based on revised calculations for a 20-year disposal period (1996 to 2016) (see Chapter 3, Section 3.1).

Secondly, the general population distribution throughout Lambton County was assessed by identifying all areas within 1 km of a single residence. This indicated that there was a relatively equal distribution of areas throughout the County that would be constrained or unconstrained with respect to population. Therefore, no area within the County could be considered to be advantageous for facility siting with respect to population distribution.

In summary, the results of the preliminary terrain evaluation and population distribution analyses indicated that there were no areas which possessed a general overriding advantage for waste management facility siting. Therefore, additional steps were taken to reduce the study area to a reasonable size for site selection.

Initially, a waste centroid concept was proposed to the Workshop group as a basis upon which to select a study area. However, after much group discussion it was decided that a waste centroid concept would be too restrictive and seemed to be based on economic considerations (i.e. based on the premise that shorter haul distances would minimize costs). Cost considerations were deemed not to be the most important goal of the study process.

The Workshop group decided that the study area for the identification of a preferred site should include all clay based lands with predominantly Class 3 to Class 7 capability for agriculture which includes rehabilitated eroded lands of uncertain current capability class and organic soils found within the County. These lands were identified for inclusion in the study area because of their high potential to contain sites that are suitable for a landfill from a hydrogeologic perspective, and to preserve Class 1 and 2 agricultural soils which will help to protect the agricultural nature of the County. Ontario's Food Land Guidelines state that where prime agricultural land has been identified, the more productive soil classes should receive a higher priority. Soil capability for agriculture is classified by the Ontario Ministry of Agriculture and Food according to the Canada Land Inventory system.

The workshop group also decided that the study area should include clay-based lands designated for industrial uses (regardless of agricultural capability). This decision was based on the idea that lands that have been designated for future industrial uses have already, by Provincial policy, been removed from the future agricultural land base. Therefore, they do not have long-term potential for agriculture, in spite of their soil capability.

Clay-based lands were defined from a hydrogeologic perspective and are presented in Figure 6.1 (in back pocket). Lands with predominantly Class 3 to 7 capability for agriculture in Lambton County are presented in Figure 6.2 (in back pocket). Figure 6.3 (also in back pocket) illustrates lands designated for industrial uses in Lambton County. Figure 6.4 (provided at the end of Section 6.6) illustrates the study area as it was defined in 1990, based on the above criteria.

In early 1993, a revision in the interpretation of the above study area criteria occurred. The revision in interpretation was precipitated by a formal request from the members of Moore Township Council for an explanation of the reasons why the existing Moore Township landfill site and adjacent lands had been eliminated from further consideration. The key aspects of this evolution are briefly reviewed below.

There were several reasons for the elimination of the Moore Township site and adjacent lands. Two key reasons were that the existing Moore site was not large enough on its own to meet the siting requirement of 75 ha, and an extension of the site to the east was limited by the presence of lands with Class 2 agricultural capability.

Moore Township, however, indicated that, in their view, the lands to the east are designated in their Official Plan for waste disposal and, therefore, the agricultural capability should be ignored. The County responded that, even though the lands are designated in the Official Plan, they are not licensed for waste disposal. In the original application of the "industrial lands" criterion, only those lands specifically designated for industrial uses, and lands designated and licensed for waste disposal, on clay-based soils (regardless of agricultural capability), were included. The exclusion of the unlicensed lands was based on the interpretation that unlicensed lands have the potential to be directed in the future to agricultural (or similar non-industrial) uses; therefore, the potential for agriculture, however small, remains. This interpretation was considered to be restrictive but consistent with the original site selection premise established by Workshop participants: that priority should be given to the protection of good agricultural land.

Moore Township responded that the intent of the Official Plan is that the designated but unlicensed lands will be used for waste disposal in the future. Given this intention, those lands, in their view, are not considered to have future potential for agriculture.

Based on the above debate, the County decided to consider a broader interpretation of the study area criterion: "clay-based lands designated for industrial uses (regardless of agricultural capability)". The possibility of including "industrial-type" lands, such as lands intended for waste disposal, and aggregate extraction areas with potential for waste disposal, was discussed and reviewed with the Master Plan Steering Committee and the PAC.

Following approval by these groups, in January 1993, the County decided to adopt the broader interpretation of the "industrial lands" criterion. This resulted in a final definition of the study area as follows:

SITE SELECTION STUDY AREA DEFINITION (as of January 1993)

INCLUDE	EXCLUDE
<ul style="list-style-type: none"> • clay-based lands with Class 3 to 7 agricultural capability 	<ul style="list-style-type: none"> • non clay-based lands
<ul style="list-style-type: none"> • clay-based industrial-type lands (defined as: lands designated for industrial uses; lands designated or used for waste disposal; worked-out or nearly worked-out aggregate extraction areas*) regardless of agricultural capability 	<ul style="list-style-type: none"> • lands with Class 1 and 2 agricultural capability (unless industrial-type lands)

**Only aggregate extraction areas determined to be large enough were included.*

Figure 6.5 (provided at the end of Section 6.6) illustrates the revised study area resulting from the revised interpretation of the "industrial lands" criterion. A more detailed scale version of Figure 6.5 is presented in the back pocket. Table 6.2 (at the end of Section 6.6) identifies the lands that were added to the study area as a result of the revised interpretation, and shows the eventual fate of those new lands during subsequent steps in site selection.

Given this final definition of the study area, the next step in site selection, the identification of candidate areas, is explained below.

6.4 Candidate Area Identification

The purpose of this step was to identify broad sections of the study area in which there was some potential for a suitable landfill site. This was done by identifying and eliminating, on the basis of regional scale data, the areas that would be less suitable for landfill siting.

Table 6.3 (at the end of Section 6.6) presents the constraint criteria that were applied to identify the candidate areas. These criteria are organized according to the relevant criteria groups identified in Table 6.1.

In this step, all of the constraint indicators applied were considered exclusionary, such that any part of the study area exhibiting one or more of these constraints was eliminated from further consideration. The exclusionary constraints within the study area were identified using regional scale data.

Candidate areas were identified through the application of the constraint criteria. The constrained areas are shown on the detailed map presented in Figure 6.6 in back pocket. The remaining (unconstrained) areas were identified as the candidate areas.

A total of 70 candidate areas were identified, as illustrated in Figure 6.7 (at the end of Section 6.6).

6.5 Identification of Siting Areas

The purpose of this step was to eliminate those portions of the candidate areas considered less suitable for a waste management facility, and in particular those areas less suitable for a landfill. The remaining lands within the candidate areas were identified as siting areas.

Table 6.4 (at the end of Section 6.6) presents the constraint criteria used to eliminate less suitable areas within the candidate areas. The criteria are organized according to the relevant criteria groups.

The less suitable areas (as defined by siting area identification criteria - Table 6.4) were identified on 1:10,000 scale maps of the 21 candidate areas larger than 75 ha. The remaining portions of the candidate areas were then outlined and highlighted for further consideration as "siting areas". A total of 29 siting areas were identified within the 21 candidate areas (i.e. in some candidate areas, more than one siting area was identified).

Each of the siting areas were then measured to see if they were large enough to accommodate the composite waste management facility; each siting area had to be 75 ha or greater in size. Eight of the siting areas were found to be 75 ha or greater; the other 21 siting areas were determined to be too small and were eliminated from further consideration.¹⁴

The eight remaining siting areas were considered to be the best places to identify specific sites for the waste management facility. These eight siting areas were carried forward to the next step in the site selection process.

6.6 Identification of Sites

The eight siting areas carried forward from the previous step were found to be both suitable and large enough to accommodate at least one 75 ha potential site. The purpose of this step was to identify the specific 75 ha parcels within the siting areas that would be considered "potential sites" for the composite waste management facility.

¹⁴ Note: As discussed in Section 6.6, further review of mapping identified that an additional siting area (16C) met the minimum 75 ha size requirement. This resulted in a total of nine siting areas.

The 75 ha parcels (potential sites) were located according to the following considerations:

- **recognition of utility corridors:** features such as roads, pipelines and hydro lines were used as site boundaries;
- **distance from residential areas:** in the siting areas that were greater than 75 ha, the sites were located such that the distance from areas with a concentration of residences would be maximized;
- **site accessibility:** the sites were located adjacent to or as close as possible to existing access route(s) in order to minimize land displacement for the construction of new site access roads;
- **number of land parcels and property owners affected:** the sites were located to minimize the number of land parcels/property owners which would be affected per site;
- **removal of high quality forests:** the sites were located to minimize or avoid the removal of high quality forests.

Although sites do not overlap, for some siting areas more than one potential site was identified. An attempt was made to maximize the number of sites within a siting area without overlapping the sites. Overlapping of the sites was felt to be unnecessary as it was expected to greatly increase the number of candidate sites available with few significant differences.

The process described above resulted in the identification of 16 potential sites. This list of 16 potential sites was considered by the Study Team to be too long to undertake a comparative evaluation at a meaningful level of detail. The sites were, therefore, reviewed to determine whether any of the sites were at an obvious disadvantage to the others. Seven of the potential sites were determined to be in areas of high intensity agricultural use (defined as areas with current predominant use of land for crops such as corn and soybeans) on lands designated for agricultural purposes. Given the priority accorded to high quality agricultural lands early in the site selection process, and the fact that these sites had no obvious advantages, it was considered reasonable to remove these seven sites from further consideration and focus attention on the remaining nine sites located within areas designated for industrial or industrial-type uses. The nine sites were alphabetically labelled Sites A to I.

Subsequent to the identification and an initial comparison of Sites A to I in 1990, a complete review of all constraint mapping was undertaken in early 1991. The purpose of this review was to verify the accuracy of all constraint mapping steps.

As a result of this review, an additional site, Site J, was identified. This area had originally been eliminated because, on the 1:50,000 scale map being used for site identification, the area was determined to be too small for further consideration. However, more detailed examination of the site at the 1:10,000 scale revealed that there is enough unconstrained area to meet the minimum 75 ha area requirement.

The cross-check of potential sites at the 1:10,000 scale did not reveal any other sites, aside from Site J, that were large enough to be reconsidered.

Secondly, as noted in Section 6.3, in early 1993 a revised interpretation of the "industrial lands" study area criterion was adopted, resulting in a revised study area. The lands added to the study area as a result of the revision were reviewed with respect to all criteria applied for each site selection step. As shown in Table 6.2, the net result of the revised study area was the identification of another new site: Site K.

In defining the boundaries for Site K, a portion of the lands designated for agriculture and under intensive agricultural use was included. This refinement was made to meet site design requirements.

With the inclusion of Sites J and K, the long list of sites ultimately included 11 potential sites. Figure 6.8 (at the end of Section 6.6) illustrates the location of the sites. Figure 6.9 documents the progression of the site selection process.

Table 6.5 (at end of Section 6.6) traces the decision-making process from the candidate area stage to the long list of 11 potential sites. The 11 sites were carried forward to the next step in the site selection process: the comparative evaluation of the long list of potential sites.

**TABLE 6.1
MASTER LIST OF CRITERIA GROUPS IN RELATION TO THE
ONTARIO ENVIRONMENTAL ASSESSMENT ACT**

Definition of Environment from the EAA	Criteria Group	Goals	Objectives (supported by legislation and policy)
Section 1(c)(i) AIR	Air Quality	To minimize impact to air resources and risk to human health	To minimize the disruption of air resources as per the Ontario <i>Environmental Protection Act</i> (EPA)
LAND	Natural Environment and Resources	To minimize impact to mineral resources	To minimize the displacement and disruption of mineral resources as per the <i>Aggregate Resources Act</i> To minimize the displacement and disruption of features as per the <i>Conservation Authorities Act</i> , the <i>Public Lands Act</i> , the <i>Conservation Lands Act</i> , and the <i>Shoreline Property Assistance Act</i>
	Natural Environment and Resources	To minimize impact to forest resources	To minimize displacement of forest resources as per the MNR, ANSI policy, the <i>Trees Act</i> and the Wetlands policy statement
	Natural Environment and Resources	To minimize impact to agricultural resources	To minimize displacement of prime agricultural soils as per Foodland Preservation Guidelines
Section 1.c)11) PLANT AND ANIMAL LIFE INCLUDING MAN	Natural Environment and Resources	To minimize impact to terrestrial biological resources	To avoid destruction and minimize disruption of significant and/or wildlife populations as the ANSI policy To avoid destruction and minimize disruption of rare or uncommon species of plant or animal life
	Natural Environment and Resources	To minimize impact to aquatic biological resources	To avoid destruction and minimize disruption of aquatic habitat as per the Fisheries Act, the DFO policy for the Management of Fish Habitat

TABLE 6.1
MASTER LIST OF CRITERIA GROUPS IN RELATION TO THE
ONTARIO ENVIRONMENTAL ASSESSMENT ACT
(Continued)

Definition of Environment from the EAA	Criteria Group	Goals	Objectives (supported by legislation and policy)
	Transportation (also see air quality, hydrogeology and surface water (criteria))	To minimize risk and impact to human health	To avoid human health effects as related to facility safety and security
Section 1.c)(111) THE SOCIAL, ECONOMIC AND CULTURAL CONDITIONS THAT INFLUENCE THE LIFE OF MAN OR A COMMUNITY	Social/Cultural	To minimize impact to the social environment	<p>To minimize the displacement of people, particularly those groups and individuals vulnerable to change</p> <p>To minimize conflict between the facility components, operations and the use of enjoyment of properties in the vicinity of the site(s), and to maximize compatibility between the facility components and the character, image, traditions and lifestyle of the affected area</p> <p>To minimize conflict between facility traffic, individuals and communities</p>
	Economics	To minimize impact to economic environment and maximize benefits of waste facility	<p>To minimize the displacement of businesses</p> <p>To minimize the disruption to the operation of businesses</p> <p>To minimize adverse effects upon the provision and use of public and private community services and features</p> <p>To minimize the burden on municipal services and finance</p>

TABLE 6.1
MASTER LIST OF CRITERIA GROUPS IN RELATION TO THE
ONTARIO ENVIRONMENTAL ASSESSMENT ACT
(Continued)

Definition of Environment from the EAA	Criteria Group	Goals	Objectives (supported by legislation and policy)
	Social/Cultural	To minimize impact to heritage and archaeological resources	To minimize displacement and disruption to heritage and archaeological resources as per the Ontario Heritage Act
Section 1.c(IV) ANY BUILDING, STRUCTURE, MACHINE OR OTHER DEVICE OR THING MADE BY MAN	Land Use Cost	To minimize impact to existing and proposed land uses To maximize and meet projected demand To minimize cost	To minimize conflict with existing committed, proposed and planned land uses To maximize service and meet the identified need To minimize capital and operating costs

**TABLE 6.2
SITING RESULT FOR "INDUSTRIAL-TYPE"
WASTE DISPOSAL/AGGREGATE EXTRACTION LANDS**

Lands	Study Area	Candidate Area	Siting Area	Long List of Sites
Abandoned pit south of Thedford	Not included as lands are not clay-based			
Abandoned pit in North Clearwater	Not included as lands are not clay-based			
Brooke Landfill Site	Not included as lands are not clay-based			
Dawn Landfill Site	Yes	No, within 500 m of residence (also < 75 ha)		
Moore Landfill Site plus adjoining lands designated "waste disposal area"	Yes	Yes	Yes	Site K
Petrolia Landfill Site plus adjoining 64 acres designated industrial and approved landfill	Yes	No, as within 500 m of a major stream		
Sarnia Landfill Site	Yes	Yes	Too small (< 75 ha)	
Sombra Landfill Site	Yes	No, as within 500 m of a major stream		
Laidlaw (Warwick) landfill site plus adjoining 100 acre parcel	Yes	Yes	Too small (about 50 ha which is < 75 ha)	
Laidlaw Hazardous Waste Disposal Site	Yes	No, most of site within 500 m of a residence, and considered to be a "built-up" area		

**TABLE 6.3
CANDIDATE AREA IDENTIFICATION CRITERIA**

Criteria Group/Criterion/Indicator	Definition	Rationale
Natural Environment and Resources		
Potential for displacement and disruption of natural features		
<ul style="list-style-type: none"> • Areas with endangered species and their habitat. 	<ul style="list-style-type: none"> • Endangered species are, by virtue of their low population, size and restricted distribution, threatened with immediate extinction in Ontario. 	<ul style="list-style-type: none"> • The <i>Endangered Species Act</i> prohibits anyone from wilfully destroying, injuring or interfering with an endangered species or its habitat
<ul style="list-style-type: none"> • Areas of Natural and Scientific Interest (ANSIs) provincial/regional significance), with 500 m buffer. 	<ul style="list-style-type: none"> • ANSIs are defined by MNR as areas of land and water containing significant natural landscapes or features. Significance is determined according to the presence of values related to protection, natural heritage appreciation, scientific study or education. 	<ul style="list-style-type: none"> • Areas of Natural and Scientific Interest which have been deemed by MNR to be of provincial or regional significance would be inappropriate for a landfill due to their recognized special environmental status. MOEE Policy No. 0707 "Guidelines for Land Use on or Near Landfills or Dumps" indicates that most impacts would be left within 500 m of a landfill. Therefore, a 500 m buffer around sensitive areas is considered reasonable.
<ul style="list-style-type: none"> • Class 1-3 wetlands (provincial/regional significance), with 500 m buffer. 	<ul style="list-style-type: none"> • Wetlands classified by the Provincial Evaluation System as Class 1, 2 or 3 are identified to be of provincial or regional significance. 	<ul style="list-style-type: none"> • Wetlands of recognized high significance would be inappropriate for landfill siting.
<ul style="list-style-type: none"> • Environmentally Sensitive Areas (ESAs) identified by the University of Waterloo Study Team for the Lambton County Planning Department or in local municipal plans, with 500 m buffer. 	<ul style="list-style-type: none"> • Environmentally Sensitive Areas are identified as the finest examples of ecosystems or landforms and the range of habitats with their associated species existing in the region. 	<ul style="list-style-type: none"> • ESAs are identified as worthy of preservation as examples of what constitutes the areas' natural heritage.
<ul style="list-style-type: none"> • Areas within 500 m of major streams with significant/rare fish species. 	<ul style="list-style-type: none"> • This indicator identifies the presence of significant/rare fish species and their habitat. 	<ul style="list-style-type: none"> • Significant/rare fish species habitats are environmentally significant and would be inappropriate for a landfill. MOEE Policy No. 0707 states that most impacts are felt within 500 m of landfills. Therefore, a 500 m buffer is considered reasonable.

TABLE 6.3
CANDIDATE AREA IDENTIFICATION CRITERIA
(Continued)

Criteria Group/Criterion/Indicator	Definition	Rationale
Social/Cultural Environment		
Disruption of existing residences		
<ul style="list-style-type: none"> • Areas within 500 m of built-up areas and residences. 	<ul style="list-style-type: none"> • This indicator addresses the presence of residences. 	<ul style="list-style-type: none"> • MOEE Policy No. 0707, "Guidelines for Land Use on or Near Landfills or Dumps" indicates that residential development would be inappropriate within 500 m of a landfill. The majority of nuisance effects would be felt within this distance. Therefore, 500 m is the separation distance used in landfill siting.

**TABLE 6.4
SITING AREA IDENTIFICATION CRITERIA**

Criteria Group/Criterion	Definition	Rationale
Hydrogeology		
<ul style="list-style-type: none"> • Presence of wells (abandoned oil, gas, water and brine injection). 	<ul style="list-style-type: none"> • Addresses the presence of abandoned wells. 	<ul style="list-style-type: none"> • Abandoned wells may provide an avenue for leachate to contaminate ground water and should be avoided.
Surface Water		
<ul style="list-style-type: none"> • Flood plains and related hazard lands (100 and 200 year flood zones). 	<ul style="list-style-type: none"> • Flood plains are areas adjoining a watercourse which have been or may be covered by floor water. In some areas, fill lines may be established to regulate the placing or dumping of fill. 	<ul style="list-style-type: none"> • The Flood Plain Planning Policy Statement indicates that regard must be made for flood plain management problems. Lands susceptible to flooding are considered to be a potential risk to human safety and related environmental impact would occur if the flood waters were contaminated. Fill regulations are established to control flooding or pollution.
<ul style="list-style-type: none"> • Areas within 500 m of all water courses previously not identified as outlined on both 1:50,000 topographic map and 1:10,000 Ontario Base Map.¹ 	<ul style="list-style-type: none"> • Addresses the presence of streams and allows for a 500 m buffer from landfill operation. 	<ul style="list-style-type: none"> • The protection of surface water has high priority in landfill siting. A 200 m buffer will provide protection against leachate contamination.
Natural Environment and Resources		
<ul style="list-style-type: none"> • Displacement of high quality forests and Management Agreement Areas on site. 	<ul style="list-style-type: none"> • Addresses the presence of high quality forests and Management Agreement Areas. 	<ul style="list-style-type: none"> • High quality forests and Management Agreement Areas are inappropriate for a landfill.
<ul style="list-style-type: none"> • Special areas (areas with strong potential for ESA status) identified in the Appendix of Background Report No. 13 to the Lambton County Official Plan (and located outside industrial use designations, with 500 m buffer). 	<ul style="list-style-type: none"> • Identifies the presence of special areas with strong potential for ESA status which are located outside lands designated for industrial use. 	<ul style="list-style-type: none"> • Areas with strong potential for ESA status would not be suitable for a landfill.
<ul style="list-style-type: none"> • Presence of active oil and gas wells. 	<ul style="list-style-type: none"> • Addresses the presence of oil and gas wells and the displacement of resources due to landfill siting. 	<ul style="list-style-type: none"> • The protection of oil and gas resources has high priority in landfill siting.
Social/Cultural Environment		
<ul style="list-style-type: none"> • Presence of Indian Reserves plus a 500 m buffer. 	<ul style="list-style-type: none"> • Addresses the presence of Indian Reserves. 	<ul style="list-style-type: none"> • Due to their sensitive nature and potential for social/cultural impacts, all Indian Reserves plus a 500 m buffer are constrained.
<ul style="list-style-type: none"> • Presence of cemeteries plus a 500 m buffer. 	<ul style="list-style-type: none"> • Addresses the presence of existing cemeteries. 	<ul style="list-style-type: none"> • Due to their sensitive nature, there exists a potential for nuisance effects from landfill related activities.

TABLE 6.4
SITING AREA IDENTIFICATION CRITERIA
(Continued)

Criteria Group/Criterion	Definition	Rationale
<ul style="list-style-type: none"> • Presence of, and areas within 500 m of, future committed residential development 	<ul style="list-style-type: none"> • Addresses the potential for future committed residential development and a buffer zone of 500 m around each residence. 	<ul style="list-style-type: none"> • Avoids or minimizes impacts on future committed residents. MOEE Policy No. 0707 "Guidelines for Land Use on or Near Landfills or Dumps" indicates that the majority of nuisance effects would be felt within 500 m of a landfill.
<ul style="list-style-type: none"> • Presence of existing and future (committed) planned recreational features. 	<ul style="list-style-type: none"> • Addresses the presence and planned presence of parks or lands with a high natural capability for outdoor recreation within the study area. This includes areas of Class 1-4 in the Canada Land Inventory Land Capability for Recreation, as well as Provincial and Municipal Parks. 	<ul style="list-style-type: none"> • Parks and lands with a high natural capability for outdoor recreation have provincial and regional significance. Therefore, they are excluded.
<ul style="list-style-type: none"> • Presence of known archaeological features plus a 500 m buffer. 	<ul style="list-style-type: none"> • Addresses the potential displacement of archaeological resources due to facility siting. 	<ul style="list-style-type: none"> • Addresses cultural conditions influencing an individual or a community as required by the <i>Environmental Assessment Act</i>. These areas are excluded.
<ul style="list-style-type: none"> • Presence of heritage features plus a 500 m buffer. 	<ul style="list-style-type: none"> • Addresses the displacement/disruption effects on heritage features. 	<ul style="list-style-type: none"> • Addresses cultural conditions influencing an individual or a community as required by the <i>Environmental Assessment Act</i>. Therefore, heritage features are excluded.
<ul style="list-style-type: none"> • Presence of existing and future approved utilities in the area. 	<ul style="list-style-type: none"> • Addresses the presence of existing and future approved utilities (e.g., gas pipeline, railway, hydro corridor, etc.) within the area. 	<ul style="list-style-type: none"> • The cost and time of rerouting utilities is unwarranted and would cause other impacts to occur.

¹ It was assumed that the most significant watercourses would be indicated on the 1:50,000 scale mapping. There were only three cases identified where watercourses were indicated on 1:50,000 scale but not 1:10,000 scale maps. These included siting areas 12, 14 and 19. A drain on siting area 12A was not recognized as it was not indicated on the 1:10,000 scale map. This area became potential Site A. A drain as marked on the 1:50,000 scale map also passed through siting area 14. As no potential sites were located within 500 m of this watercourse, its recognition as a constraint would not have influenced the long list of potential sites. With respect to site area 19, a portion of the site area also has a drain passing through as marked on 1:50,000 scale map. Whether or not the drain is marked on the 1:10,000 scale map is difficult to confirm. Nevertheless, as these lands are used by ICI for storage/waste management, they were considered unavailable anyways. Finally, both 1:50,000 and 1:10,000 scale mapping indicated a watercourse (drain) southwest of siting area 19. A 500 m buffer from this watercourse defined the southwest boundary of this siting area. To allow Site H to have a uniform shape (square) which would ease site design, the placement of Site H encroached upon this buffer making the site boundary within 200 m of the buffer. This exemption was made due to the already close proximity of the drain to the ICI industrial complex and that a township road separates the site from the drain. The proximity of this drain was considered in the site comparative evaluation by the Surface Water discipline.

**TABLE 6.5
LAMBTON WMMP
SITE SELECTION SUMMARY TABLE**

Candidate Area	Candidate Area Sizing Review	Siting Area Identification	Long List of Potential Sites	Active Agricultural Land Constraint	Long List of Sites
1	> 75 ha	Siting Area 21	Siting Area too small (< 75 ha)	---	---
2	Too small (< 75 ha)	---	---	---	---
3	Too small (< 75 ha)	---	---	---	---
4	Too small (< 75 ha)	---	---	---	---
5	> 75 ha	Siting Area 22	Siting Area too small (< 75 ha)	---	---
6	Too small (< 75 ha)	---	---	---	---
7	Too small (< 75 ha)	---	---	---	---
8	Too small (< 75 ha)	---	---	---	---
9	Too small (< 75 ha)	---	---	---	---
10	Too small (< 75 ha)	---	---	---	---
11	Too small (< 75 ha)	---	---	---	---
12	Too small (< 75 ha)	---	---	---	---
13	Too small (< 75 ha)	---	---	---	---
14	Too small (< 75 ha)	---	---	---	---
15	Too small (< 75 ha)	---	---	---	---
16	> 75 ha	Siting Area 1	Siting Area too small (< 75 ha)	---	---
17	Too small (< 75 ha)	---	---	---	---
18	Too small (< 75 ha)	---	---	---	---
19	Too small (< 75 ha)	---	---	---	---
20*	Too small (< 75 ha)	---	---	---	---
21	> 75 ha	Siting Area 3	Siting Area too small (< 75 ha)	---	---
22	Too small (< 75 ha)	---	---	---	---
23	Too small (< 75 ha)	---	---	---	---

**TABLE 6.5
LAMBTON WMMP
SITE SELECTION SUMMARY TABLE
(Continued)**

Candidate Area	Candidate Area Sizing Review	Siting Area Identification	Long List of Potential Sites	Active Agricultural Land Constraint	Long List of Sites
24	> 75 ha	Siting Area 4	Siting Area too small (< 75 ha)	---	---
25	> 75 ha	Siting Area 5	Siting Area too small (< 75 ha)	---	---
26	> 75 ha	Siting Areas 7A & 6	Siting Areas too small (< 75 ha)	---	---
27	> 75 ha	Siting Area 7B	Large enough for a site	Yes, so eliminated	---
28	> 75 ha	Siting Areas 8A, 8B, 8C and 8D	Siting Areas too small (< 75 ha)	---	---
29	Too small (< 75 ha)	---	---	---	---
30	Too small (< 75 ha)	---	---	---	---
31	Too small (< 75 ha)	---	---	---	---
32	> 75 ha	Siting Area 9	Siting Area too small (< 75 ha)	---	---
33	Too small (< 75 ha)	---	---	---	---
34	Too small (< 75 ha)	---	---	---	---
35	> 75 ha	Siting Area 10	Siting Area too small (< 75 ha)	---	---
36	> 75 ha	Siting Area 11	Siting Area too small (< 75 ha)	---	---
37	Too small (< 75 ha)	---	---	---	---
38	Too small (< 75 ha)	---	---	---	---
39	> 75 ha	Siting Area, 12A, 12B and 12C	Siting Areas 12A and 12C large enough but Siting Area 12B too small (< 75 ha) (included a total of four potential sites)	Yes, lands in Siting Area 12C east of Lot 22	Site A (12A), B (12C) and C (12C)
40	> 75 ha	Siting Area 13	Large enough for a site	Yes	---
41	Too small (< 75 ha)	---	---	---	---
42	> 75 ha	Siting Area 14	Large enough for several sites (total of seven potential sites; initially only six sites)	Yes, only lands east of Lot 22 though	Sites D, E, F, G and K (Site K not initially identified)

**TABLE 6.5
LAMBTON WMMP
SITE SELECTION SUMMARY TABLE
(Continued)**

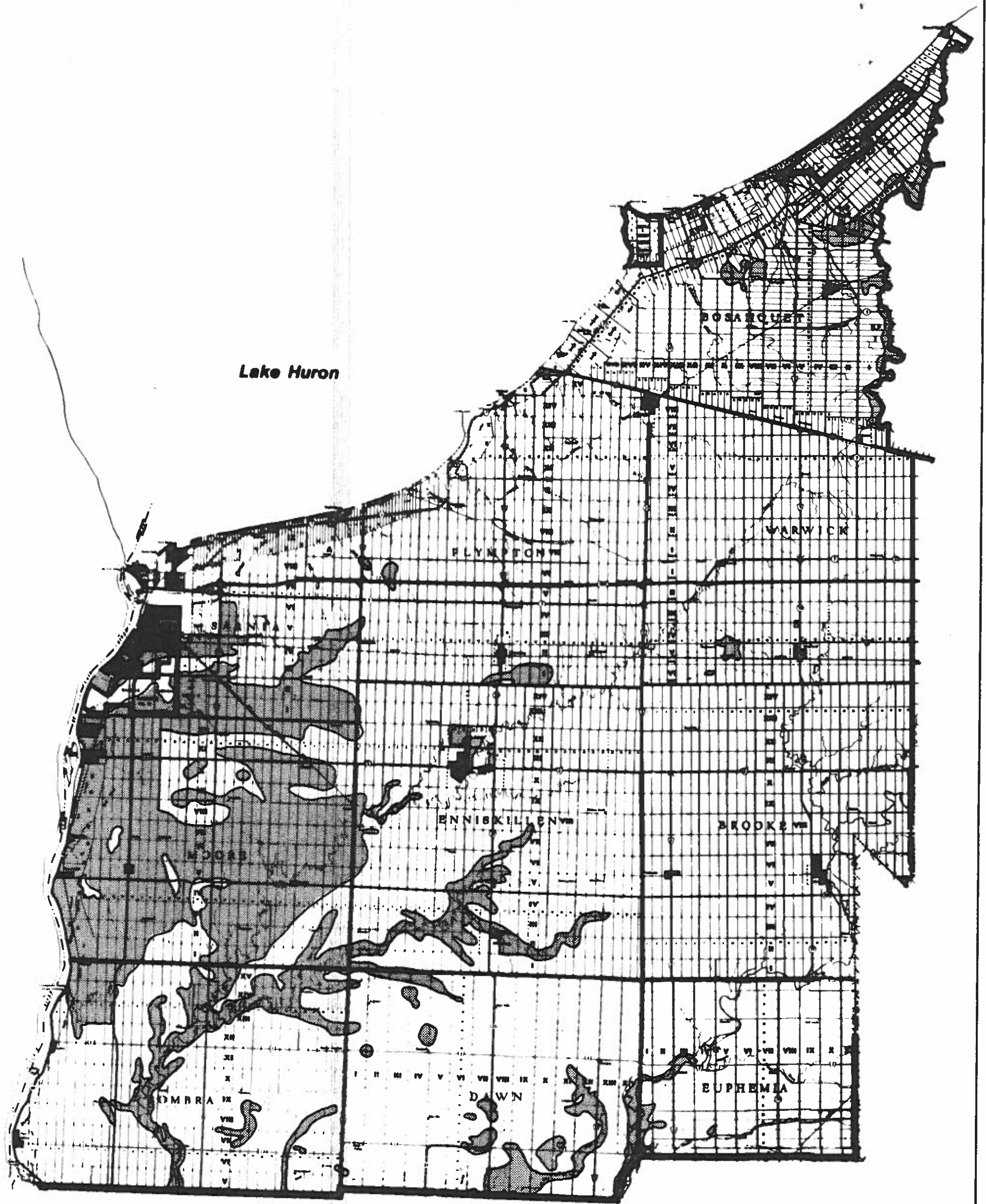
Candidate Area	Candidate Area Sizing Review	Siting Area Identification	Long List of Potential Sites	Active Agricultural Land and Constraint	Long List of Sites
43	> 75 ha	Siting Area 15	Siting Area too small (< 75 ha)	---	---
44	Too small (< 75 ha)	---	---	---	---
45	Too small (< 75 ha)	---	---	---	---
46	> 75 ha	Siting Area 16C	Considered large enough for a site (71 ha) (not initially though)	No	Site J (not initially identified)
47	> 75 ha	Siting Areas 16A and 16B	Siting Area 16A too small (< 75 ha) Siting Area 16B large enough for a site	Yes, (16B) so eliminated	---
48	> 75 ha	Siting Area 17	Siting Area too small (< 75 ha)	---	---
49	> 75 ha	Siting Area 18	May be just large enough for a site	Yes, so eliminated	---
50	> 75 ha	Siting Areas 19A and 19B	Large enough for two sites	No	Sites H and I
51	Too small (< 75 ha)	---	---	---	---
52	Too small (< 75 ha)	---	---	---	---
53	Too small (< 75 ha)	---	---	---	---
54	Too small (< 75 ha)	---	---	---	---
55	Too small (< 75 ha)	---	---	---	---
56	Too small (< 75 ha)	---	---	---	---
57	Too small (< 75 ha)	---	---	---	---
58	Too small (< 75 ha)	---	---	---	---
59	Too small (< 75 ha)	---	---	---	---
60	Too small (< 75 ha)	---	---	---	---
61	Too small (< 75 ha)	---	---	---	---
62	Too small (< 75 ha)	---	---	---	---

TABLE 6.5
LAMBTON WMMP
SITE SELECTION SUMMARY TABLE
(Continued)

Candidate Area	Candidate Area Sizing Review	Siting Area Identification	Long List of Potential Sites	Active Agricultural Land Constraint	Long List of Sites
63	Existing Sarnia Landfill too small (< 75 ha)	---	---	---	---
64	Too small (< 75 ha)	---	---	---	---
65	Too small (< 75 ha)	---	---	---	---
66	Laidlaw (Warwick) Landfill too small (< 75 ha)	---	---	---	---
67	Too small (< 75 ha)	---	---	---	---
68	Too small (< 75 ha)	---	---	---	---
69	Too small (< 75 ha)	---	---	---	---
70	Too small (< 75 ha)	---	---	---	---

* Initially, Siting Area 2 was originally identified within Candidate Area 20. Further work identified that these lands were within a hydrogeologic constraint area, resulting in the remaining lands within the Candidate Area to be less than 75 ha. As a result, Siting Area 2 was eliminated.

** Originally, Siting Area 19B was identified as Siting Area 20. However, as the siting area was in the same candidate area as Siting Area 19, the two siting areas were renamed as Siting Areas 19A and 19B to be consistent with the other siting areas.



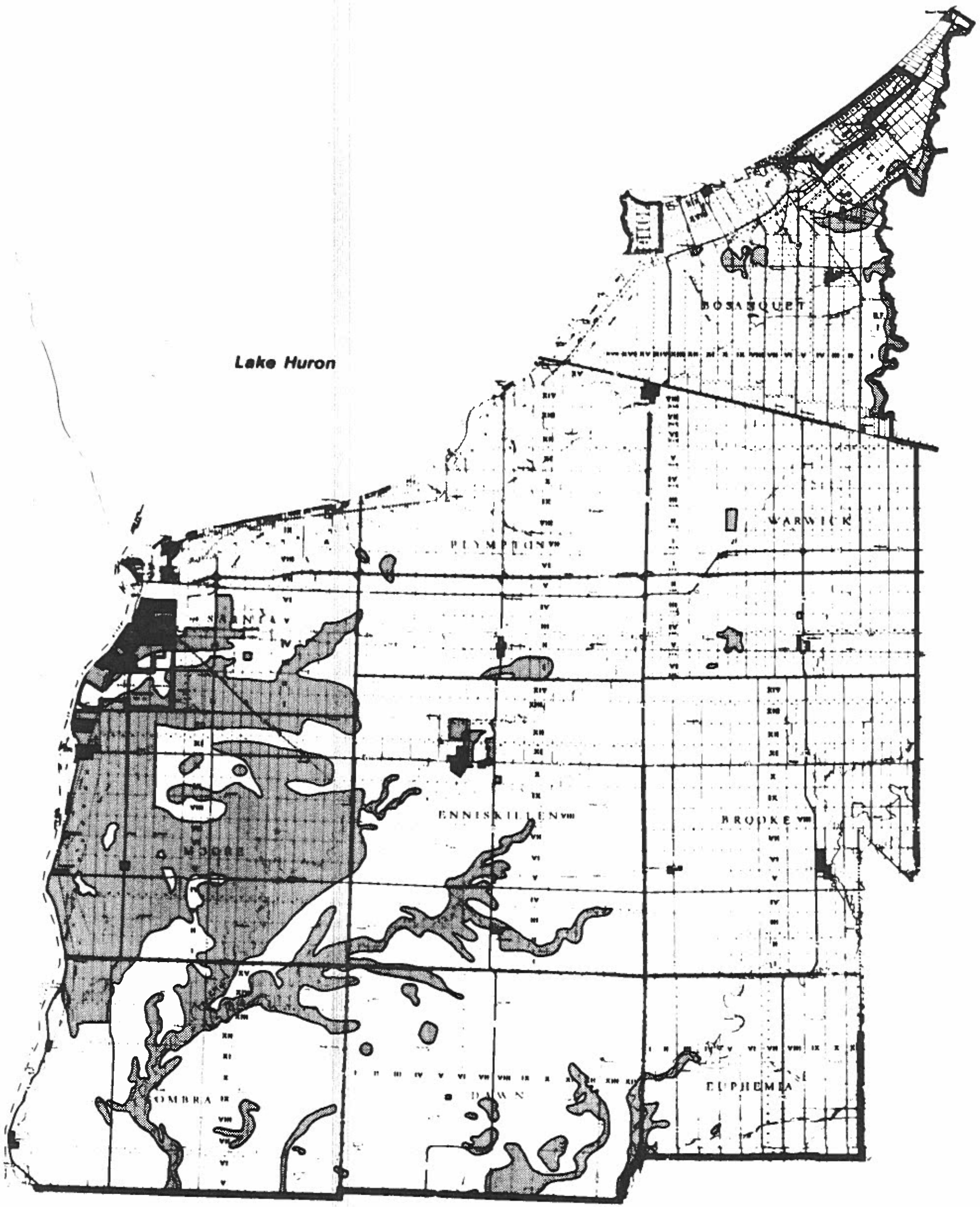
LEGEND

 **STUDY AREA**



**LAMBTON COUNTY
WASTE MANAGEMENT MASTER PLAN**

**STUDY AREA
(as defined in 1990)**

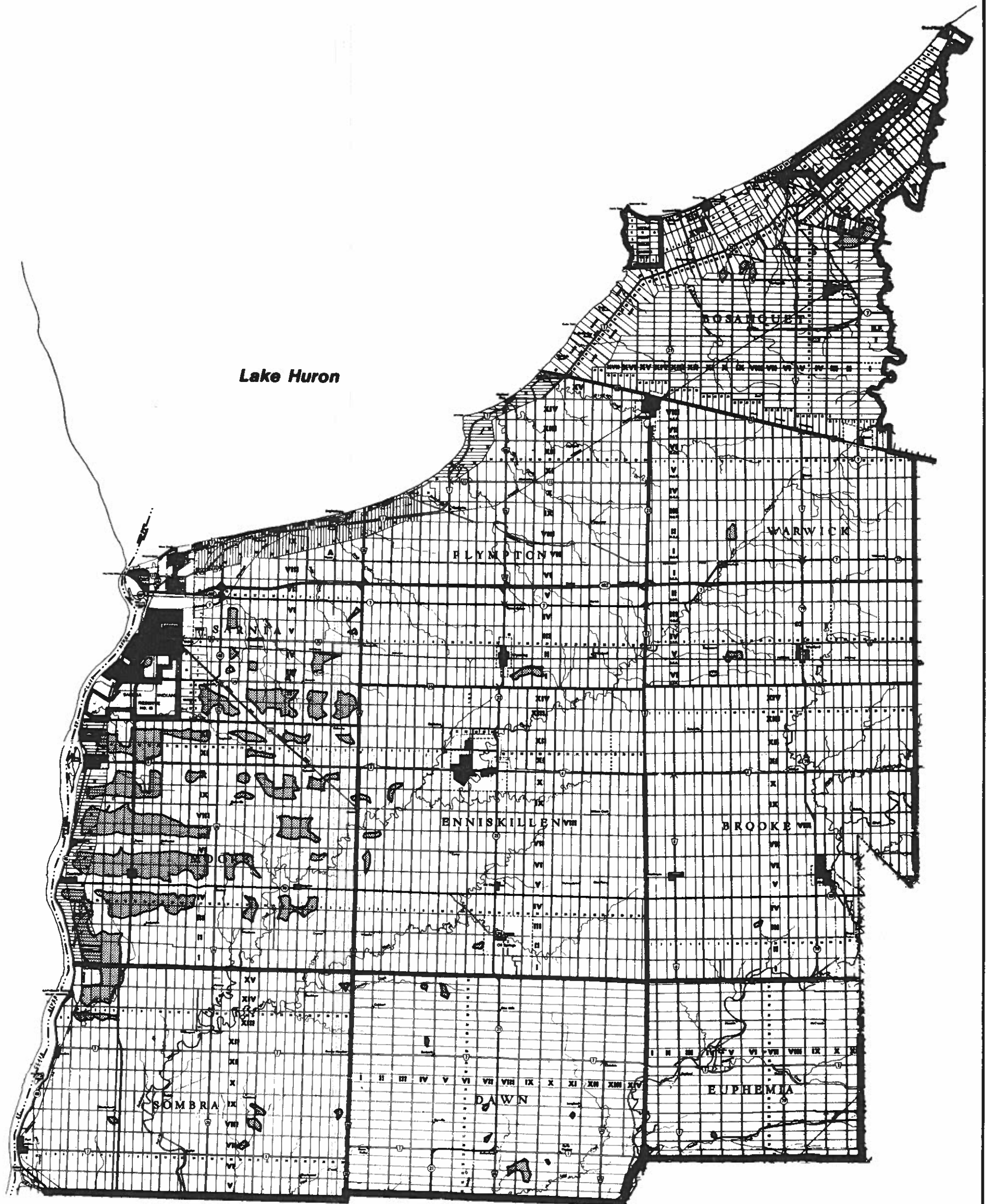


LEGEND
 [Shaded Box] STUDY AREA

0 10km
 SCALE 1:200,000

**LAMBTON COUNTY
 WASTE MANAGEMENT MASTER PLAN**

**STUDY AREA
 (AS REVISED IN 1993)**



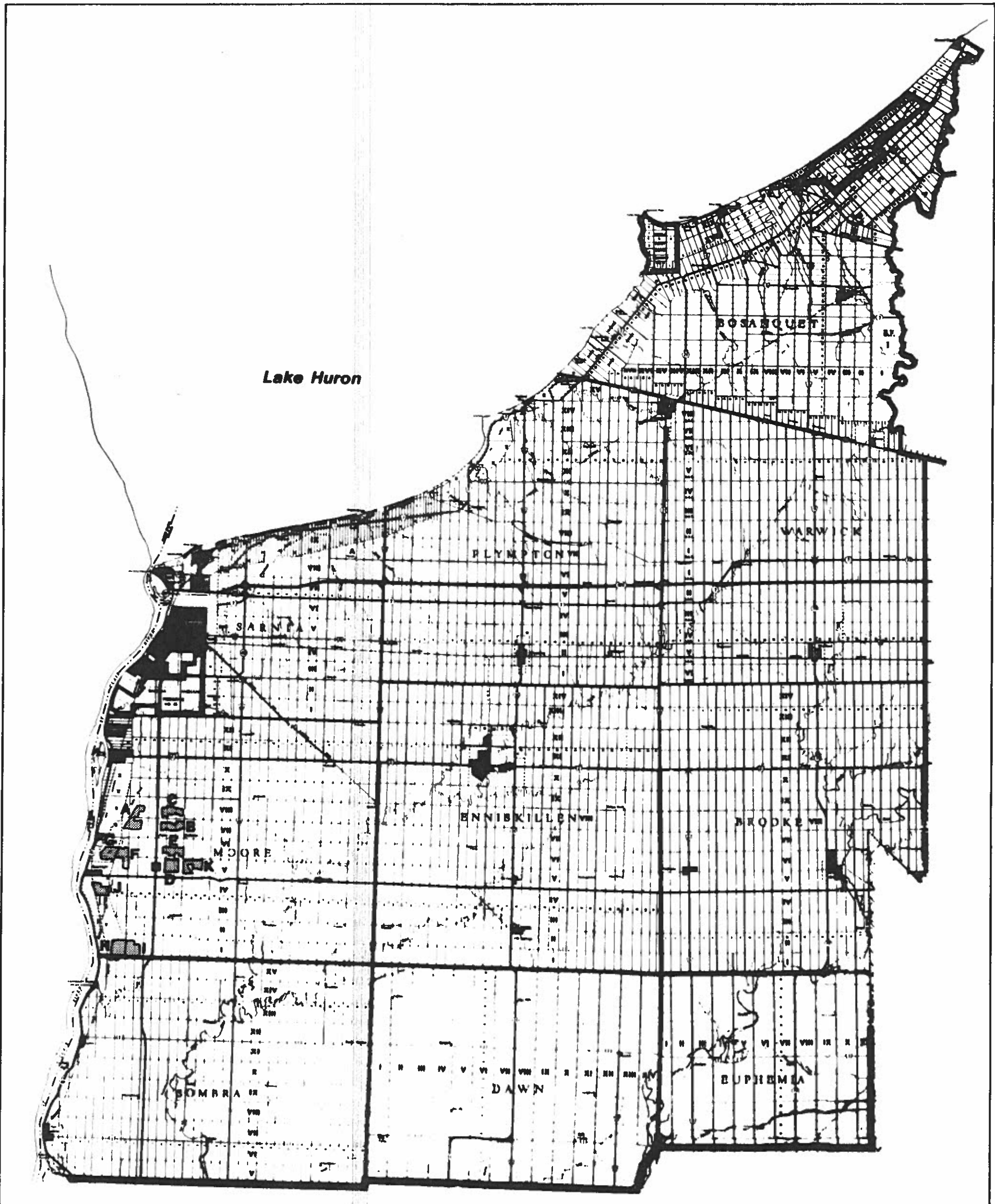
LEGEND

 **CANDIDATE AREAS**



**LAMBTON COUNTY
WASTE MANAGEMENT MASTER PLAN**

CANDIDATE AREAS



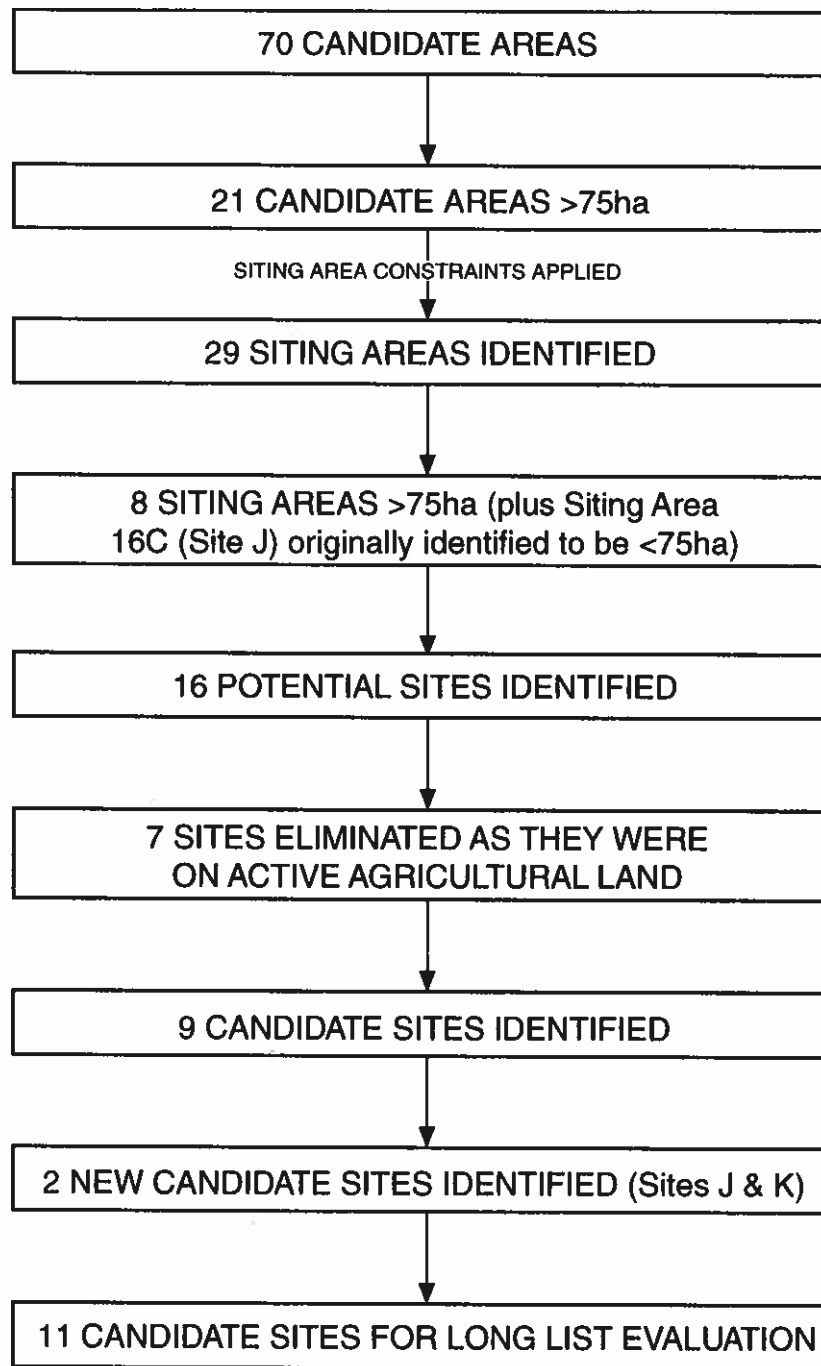
LEGEND

 **CANDIDATE SITES**

0  10km
SCALE 1:250,000

**LAMBTON COUNTY
WASTE MANAGEMENT MASTER PLAN**

CANDIDATE SITES



LAMBTON WMMP SITE SELECTION PROGRESSION

6.7 Comparative Evaluation of Long List of Sites

6.7.1 Introduction

The purpose of this step was to assess and compare the long list of 11 sites which had been identified as having the best potential for waste management facility development. The objective was to identify a shorter list of more preferred sites which would then be subject to a more detailed assessment and comparative evaluation.

The comparative evaluation of the long list of sites was accomplished through the following activities:

- the relevant criteria and associated indicators to be used as a basis to assess each site were identified;
- information about each site was collected and recorded according to the relevant criteria and indicators and each site was assessed from each disciplines' perspective;
- the relative "weight" or importance of the various criteria groups and criteria was identified;
- through a qualitative and quantitative evaluation approach, the most preferred to least preferred sites with respect to each criteria group were identified based on the data collected, taking into account the relative criteria "weights" where applicable;
- a short list of the more preferred sites was identified based on the preferences identified above and taking into account the relative importance accorded to the criteria groups.

The following subsections summarize the process and results of these comparative evaluation activities.

6.7.2 Identification of Criteria

The master list of criteria groups (see Table 6.1) was first reviewed to identify the criteria which would be applicable to the comparison of sites. Based on this review, the consultant team prepared a draft list of criteria and associated indicators. The draft list was then reviewed and confirmed with the site selection workshop participants. Table 6.6 (provided at the end of Section 6.7) presents the final list of the criteria and indicators used for the comparative evaluation of the long list of sites.

6.7.3 Method of Estimating Environmental Effects and Generic Mitigation Measures

The approach followed in this site selection process was designed so that the level of detail with which environmental effects were analyzed increased with each step of the process. For example, the initial constraint mapping steps were conducted primarily through secondary information sources. Not until specific sites were identified at the long list stage was it feasible to undertake "field visits" and use more detailed data sources. This increase in level of detail for the analysis continued to the short list of sites assessment stage when on-site field investigations occurred and those who may be most affected were interviewed.

For the long list of sites comparative evaluation, mitigation was limited to non-site specific measures, as presented in Table 6.7 (at end of Section 6.7), which can be applied generally at any location. In order to determine specific mitigation measures for each site, a conceptual landfill design and detailed on-site data (e.g. hydrogeologic drilling data) would be necessary. As this was not available at this stage of the site selection process, it was not possible to do a meaningful analysis of "net environmental effects". For this reason, the comparative evaluation of the long list of sites is based on data collected for each of the indicators.

In the short list of sites comparative evaluation, the comparison of sites was also primarily based on the data collected. The potential environmental effects, mitigation measures, and net environmental effects were also considered. Net effects tables are presented in each of the Appendices (4A to 4H) in Volume 4.

6.7.4 Data Collection

6.7.4.1 Data Sources

Data collection was based on the indicators for each of the evaluation criteria. Data sources included published information, roadside surveys, government agency contacts and interest group contacts. Table 6.6 details the specific information sources for each criterion. The collected data was recorded in both tabular form and on 1:10,000 scale site maps where possible.

6.7.4.2 Study Zones

For the long list of sites assessment and comparative evaluation, four study zones were used as the basis for collecting data and comparing the long list of sites:

- on-site study zone;
- off-site study zone;

- local access route study zone; and
- haul route study zone.

Figures 6.10 to 6.20 (provided at the end of Section 6.7) show each of the 11 sites including the on-site, off-site and local access route study zones. The haul route study zone is not outlined, as the routes extend to the waste production centres throughout the county and, thus, could not be illustrated on a 1:50,000 scale map.

On-Site Study Zone

The on-site study zone addresses the loss or displacement of features which are included within the 75 ha land parcel required for the facility. It is assumed that all features within facility site boundaries will be either lost or displaced.

Off-Site Study Zone

MOEE Policy 07-07, Land Use On or Near Landfills and Dumps, states that "the most significant adverse environmental effects are normally within 500 m of the perimeter of a fill area". However, in recognition that this 500 m guideline is based on an average distance over which landfill effects are anticipated, an additional 500 m was added as a margin of safety to arrive at a total distance of 1,000 m for the outer limit of the off-site study zone. The actual distance from the landfill site within this 1,000 m off-site study zone varied among the criteria groups. For example, from a natural ecosystem perspective, only features within 200 m of the site were recognized, as this was judged to be the zone with the greatest potential for significant impacts. On the other hand, the Social and Land Use criteria groups recognized the potential for impact 0-500 m and 500-1,000 m from the site.

Local Access Route

It was assumed that all potential sites would be accessed via either Highway 80 or Highway 40. The local access routes were defined as all regional and township roads which would have to be travelled to access the site via either Highway 80 or Highway 40. The local access route for each site was selected to minimize the travel distance between the site and the nearest highway. As part of the local access route study zone, features (e.g. residences) adjacent to the local access routes were inventoried and considered within the comparative evaluation. It should be noted that for Site A, given its proximity to Corunna and the potential for landfill traffic from that community and others along the St. Clair River, the local access route included the section of road between Site A and the "Blue Water Route" along with the section of road between the site entrance and Highway 40.

Haul Route Study Zone

The haul route study zone was the total length of haul route between all major "waste production centres" within Lambton County and each of the alternative sites. Only the transportation criteria group recognized this study zone through the criteria "Potential for Impacts from Hauling Waste to Candidate Sites".

6.7.5 Criteria Ranking

In order to begin the process of comparing the sites, it was necessary to determine which considerations should be given most priority when analyzing the advantages and disadvantages of the various sites. It was, therefore, necessary to determine the relative importance of the criteria groups to one another and the relative importance of the criteria within each criteria group.

Through the fourth Site Selection Workshop, rankings were identified for both criteria groups and for criteria within each criteria group. The Workshop facilitators first explained the purpose of ranking criteria groups and criteria. Workshop participants then reviewed and discussed the data collected in order to clarify the type of information that would be "weighed" in the comparison of sites. This review of site data was done without knowledge of specific site locations as the sites were identified on the tables by only a code letter (see Table 6.8 at the end of Section 6.7). The individual site maps (as shown in Figures 6.10 to 6.20) were not presented to participants during the workshop process.

Following this, Workshop participants assigned each criteria group to one of the following categories:

- high importance;
- moderate importance; and
- low importance.

Participants were then asked to categorize the criteria within each criteria group. This involved assigning the importance of each criteria (high, medium or low) relative to other criteria. In cases where there was only one criteria within the criteria grouping, criteria ranking was not required.

Table 6.9 (at end of Section 6.7) presents the results of the criteria group and criteria ranking exercise conducted at the fourth public workshop. It should be noted that there were some changes to the criteria presented at the workshop as compared to the final set used in the comparative evaluation. These changes are noted on Table 6.9. For each criteria group and criteria, the table outlines the number of Workshop participants out of the total who ranked

that criteria group or criteria as either "high", "moderate" or "low" importance. As the scores shown on the table indicate, some criteria groups and some criteria were assigned a "high" ranking by a clear majority of participants. For some other criteria groups and criteria, the consensus of the group was not as clear. Following the study team's review of the scores, it was decided that the following criteria group/criteria categories more accurately reflected the distinctions made by the Workshop group:

- high importance;
- high/moderate importance; and
- moderate importance.

In effect, none of the criteria or criteria groups were considered to be of low importance by a majority of workshop participants. Table 6.10 (at the end of Section 6.7) presents the study team's interpretation of the criteria group/criteria ranking weights resulting from the Workshop.

The results of the criteria ranking exercise provided the basis for the next steps in the comparative evaluation process. Members of the Study Team identified, where appropriate, the site preferences with respect to each criteria group. The most preferred/least preferred sites according to each criteria group were identified based on consideration of the data collected and the relative importance of the criteria. This ranking of the sites according to each criteria group was followed by a review and overall ranking of the sites. The following subsections present these two comparative evaluation steps.

6.7.6 Ranking of Sites by Criteria Group

The method used within each criteria group to rank the potential long list of sites varied. Depending upon the criteria, the number of them, the complexity and the nature of the data, a qualitative and/or quantitative evaluation method was employed.

In undertaking the comparison, study team members were advised to indicate only significant differences, and not to feel obligated to differentiate between the sites if meaningful differences were not identified. Also, recognizing that the analysis was undertaken without detailed on-site investigations and without a facility conceptual design, most of the study team members grouped the sites by preference categories (e.g. high, medium and low). This not only avoided having to support minor differences between sites but also simplified the overall comparative evaluation.

The rationale for the ranking of the long list of sites within each criteria group is presented below. The discussion is presented by criteria group ranking, with the highest ranked criteria

groups discussed first. Table 6.8 presents the data used as the basis for the comparative evaluation of the 11 sites.

"High" Ranked Criteria Groups

Hydrogeology

An outcome of the fourth Site Selection Workshop was the decision to divide the *Hydrogeology* criteria group into three criteria. The three criteria are:

- *Local/regional aquifer characteristics;*
- *Local ground water use; and*
- *On-site hydrogeologic conditions.*

For the "*Local/regional aquifer characteristics*" criterion, data concerning the nature of the aquifer, depth to basal aquifer, and potential yields were reviewed for each of the potential sites. The aquifer data source was Ministry of the Environment Water Well Records.

The regional aquifer in the study area is the fractured upper part of the black shale bedrock or the gravel layer located above the bedrock. No shallow overburden (local) aquifers were identified in the vicinity of the potential sites.

The minimum depth to the basal aquifer ranged from 35 m below ground surface in the area of Sites A, F, and G to about 42 m b.g.s. around Sites C, H, and I. The maximum depth to the basal aquifer ranged from approximately 43 m b.g.s. near Sites B,E, and I to as deep as 60.5 m b.g.s. in the area of Site K.

The potential ground water yields were as low as 2 gallons per minute or less at Sites D,H and I and over parts of Sites A, B, C, E, F, and J. The highest potential yields of 50 gpm or greater were identified over parts of Sites B, C, E, and G. Potential yields between 10 and 50 gpm were present at Site K and over parts of Sites A, C, E, F, G and J.

A comparative evaluation of the potential landfill sites based on the "*Local/regional aquifer characteristics*" criterion showed no significant difference between the sites. All sites had an acceptable thickness of overburden overlying the regional aquifer.

The differences in the potential yields suggests that the ground water yield from the basal aquifer can differ significantly over a small geographic region. However, recognizing that the 1:100 000 scale MOEE Ground Water Probability Maps are prepared from a limited number of water well records (less than 19 for Site A and only one well for Site D), the

difference in the potential yield data alone was not considered a sufficient reason to rank the sites differently.

The "*Local ground water use*" criterion was evaluated using the number of wells on record and the number of potential users of ground water for potable water (number of residences) within one kilometre of the sites. The availability of municipal water supply was also considered for each site.

The number of wells on record within one kilometre of the sites ranged from one at Site D to as high as 17 at Site C. All other sites had between 2 and 16 wells on record. The number of potential users of ground water for potable water ranged from 8 to 19 for Sites K, C, D, B, E, and A. Sites H and I had no potential users of ground water within 1 km. For Sites G and J, the number of potential users of water for potable water were greater than 100.

Municipal water supply is available in the area of all of the potential landfill sites. Because of the availability of potable water, and the small number of wells on record within the 1 km radius of the sites, all of the potential sites were judged equal for the "*Local ground water use*" criterion.

The "*On-site hydrogeologic conditions*" criterion was evaluated based on the surficial geology and the range in overburden thickness. Sites A, B, C, F, and G are located on the St. Joseph Till unit which is described as a clayey silt till. A glaciolacustrine deep water clay with silt and fine sand covers all of Sites D and K and 70% of Site E. The remaining 30% of Site E is covered with the St. Joseph Till unit. Sites H, I, and J are set in the Black Shale Till unit which is described as a clayey silt to sandy silt till. All of the surficial deposits have high clay and silt content and considered a good geological setting for a municipal landfill.

The overburden thickness ranges from a minimum of approximately 40 m b.g.s. at Sites B and E to as deep as 56 m b.g.s. at Site K. Accordingly, all sites have an acceptable thickness of overburden over the bedrock.

Based on the surficial geology and overburden thickness data, all of the sites were considered suitable for further study.

None of the sites evaluated possessed any serious disadvantages that would make the potential for ground water contamination any different for any of the sites studied. Therefore, from a hydrogeologic perspective, each of the sites were considered acceptable and equally ranked.

Surface Water

This criteria group contains only one criterion (*potential for contamination of surface water and downstream flooding*); therefore, criteria ranking was not applicable. The following describes why all sites were considered acceptable and ranked equally.

With respect to the number of downstream users, no obvious surface water users in the immediate downstream area were identified.

In considering the presence of surface watercourses on site, Sites A, B, C, D, E, H, I, J and K contained no watercourses flowing through or originating on the site. Sites F and G each contain small tributaries of the Baby Creek originating on site. However, as the upstream drainage areas of these watercourses are very small, appropriate mitigation measures could be implemented to protect surface water quality.

In reviewing the location of flood plains, it was found that none of the sites have been regulated by the St. Clair Region Conservation Authority. No flood plain mapping is available for any of the sites.

Sites B, C, D, E and K have no natural watercourses adjacent to them. With respect to Sites A, F, G, H, I and J, separation distances between the sites and adjacent watercourses (Baby Creek, Bowen's Creek, Clay Creek and St. Clair River) are large enough to eliminate any concern for contamination.

Finally, the sites did not significantly differ on the basis of number of watersheds and characteristics as sites drain into either Baby Creek, Clay Creek or Bowen's Creek. Site topography also varied slightly from flat to depressional.

Overall, none of the sites possessed any serious disadvantages with respect to surface water. As a result, all sites were considered acceptable from a surface water perspective and equally ranked.

Social/Cultural Environment

The following first discusses the differences between the sites on the basis of each criterion, and second, presents an overall ranking of each site from the social/cultural perspective. It should also be noted that the criterion "*potential effects on school bus routes*" was initially proposed and weighted by the public. However, after further consideration, it was decided to not include this criterion due to the high potential for change in school bus routes over the life of the facility.

In examining the highly weighted criterion "*potential disruption to residents in site vicinity*", Sites H and I were most preferred (0 and 1 residences respectively) closely followed by Sites C, D and K which have 8, 12 and 8 residences respectively within 500-1,000 m of each site¹⁵. Sites A, B and E were considered to be less preferred as they have 24, 18 and 17 residences respectively. Site A also has no existing buffers unlike the other sites. Finally, Sites F, G and J were least preferred as Site F has approximately 40 residences and Sites G and J each have over 100 residences.

Second, considering the moderately-high weighted criterion "*potential disruption to community/recreation features in site vicinity*", Sites B, C, E and I were considered to be most preferred as there are no features within 1,000 m of each of these sites. Sites A, D, H and K were considered to be less preferred as they each have one feature in their vicinity. Sites F, G and J were least preferred as Sites F and J each have two features while Site G has several.

In considering the criterion "*potential disruption to residents along local access routes*" (defined as all non-provincial highway roads) which was also weighted "moderately-high", Site A, B and C were considered to be least preferred as they are the only sites which have residences along local access roads (18, 7 and 7 residences respectively).

As the criterion "*potential disruption to residents in site vicinity*" is the only criterion weighted "high importance", it could be used as a starting point for site ranking. Sites C, D, H, I and K were considered to be most preferred on the basis of this criterion as they had the lowest number of residences in their vicinity. In considering the other two criteria, these sites were in all cases, with the exception of Site I, most preferred for one criterion and second most preferred for the other. Site I was most preferred for both criteria.

As these sites were most preferred for the highest weighted criterion and most and second most preferred for the other two criteria (except Site I which was preferred for both), Sites C, D, H, I and K were considered to be most preferred from the Social perspective.

In considering the remaining sites, (Sites A, B, E, F, G and J), Sites A, F, G and J were clearly the least preferred sites. Sites F, G and J have the greatest number of residences and community/recreation features within 1,000 m. Site A has a moderately high number of residences in its vicinity (24 within 1,000 m), a golf course within 1,000 m and also has the highest number of residences along local access routes (18).

¹⁵ As all the sites are in the same Township, the number of residences were not transformed to an estimated number of residents based on the Township average number of people per household.

Site B and E were considered to be moderately ranked overall. Although they were least preferred with respect to the criterion "*potential disruption to residents in site vicinity*", they were generally more preferred than Sites A, F, G and J with respect to the two other criteria.

In summary, Sites C, D, H, I and K were most preferred from a social perspective, Sites B and E moderately preferred and Sites A, F, G and J least preferred.

Criteria Group Ranked "High/Moderate"

Natural Ecosystems

As a result of the criteria ranking exercise, no distinction was made on the relative importance of the two criteria within the *Natural Ecosystems* criteria group (*potential removal of natural ecosystems on-site* and *potential disruption of natural ecosystems off-site*). Thus, the two criteria were considered equal in importance.

For the *Natural Ecosystems* evaluation of the long list of sites, a trade-off analysis was not done. For each indicator, impact levels were scored on a low, medium or high scale which was based on the amount of habitat type by study area addressed by each indicator. For example, for the indicator "moderate quality forest", 0-3 ha was scaled as "low", 4-9 ha scaled as "medium" and 10 ha or more as "high". The overall impact score for a site was based on the highest impact score of any of the indicators for that site.

Sites A, E, F and I were considered to be most preferred and to have the lowest potential for natural ecosystem impacts. With respect to Site A, the only on-site natural ecosystem is 4 ha of hawthorn scrub. Also, the only natural ecosystem of significance within 200 m of the site is 16 ha of high priority forest. Site E has no natural ecosystems on-site but has 12 ha of high quality forest and 12 ha of moderately quality forest within 200 m of the site. Site F is preferred as it only has 8 ha of hawthorn scrub on-site and 3 ha of both high quality and moderate quality forest within 200 m of the site. Finally, Site I has no natural ecosystems on-site and has 1 ha of candidate sensitive area within 200 m of the site and 6 ha of high quality forest within 200 m of the site.

Sites B, C, D, H and J were considered to have a moderate potential for impact. Although Sites B and C have no on-site natural ecosystems, they have 20 and 25 ha respectively of candidate sensitive area within 200 m of each site. Site D has 8 ha of moderate quality forest on-site and 52 ha of high and moderate quality forest within 200 m. Site H is of moderate preference as 4 ha of moderate quality forest will be removed and 3 ha of candidate sensitive area are within 200 m of the site. Finally, Site J is moderately preferred primarily due to 15 ha of candidate sensitive area within 200 m.

Sites G and K have the highest potential for natural ecosystem impacts and were least preferred. Site G would result in the loss of 45 ha of scrub woodland and Site K would result in the loss of 10 ha of moderate quality forest and 43 ha of scrub woodland.

Although the sites were ranked in terms of their relative importance, it can be argued that from a provincial perspective, impacts on natural ecosystems would be relatively minor for all of the sites. The site identification process ensured that all significant natural features within the study area were eliminated early in the process. In terms of potential removal of natural features, the most significant effect would be the removal of moderate quality forest. From a provincial and even local perspective, moderate priority forests are not considered highly significant. With respect to disruption effects of natural ecosystems, the implementation of mitigation measures would ensure that effects remain minimal. Thus, the proximity of some of the sites to higher order environmentally sensitive features should not be a major concern.

Agriculture

As with natural ecosystems, no distinction could be made between the relative importance of the two criteria within this criteria group. Thus, "*potential removal of agricultural resource lands on-site*" and "*potential disruption of agricultural resource lands off-site*" were ranked equally.

Sites B, C, D, E, H, I and J were considered to have the lowest potential for agricultural impacts and thus were considered to be most preferred. These sites were considered to be most preferred as neither of these sites would result in the loss of agricultural resource lands (defined as lands designated for future agriculture use in the Official Plan and lands in current agricultural use on lands designated agriculture). These sites also had the lowest amount of agricultural lands within 500 m which ranged from 0 to 53 ha.

Site K was the only site ranked of moderate preference. The development of Site K would result in the loss of 18 ha of land designated for agricultural of which 5 ha is currently under agricultural use. Site K also has 165 ha of designated agricultural land within 500 m of the site.

Sites A, F, and G were considered to have the highest potential for agricultural impacts and thus ranked least preferred. Site A, F and G, will result in the loss of 63, 75 and 75 ha of land designated for agricultural use respectively. In addition, these sites have between 110 to 170 ha of agricultural land with 500 m of their site boundaries.

In summary, the most significant difference between the sites for the agricultural criteria group was based on land use designation. Since Sites A, F and G are the only sites entirely within lands designated for agricultural use, they were considered to be the least preferred sites from an agricultural perspective.

Other Resources

No mineral aggregate resources or timber agreement areas were found on any of the sites. Thus, all sites were ranked equally with respect to this criteria group.

Land Use

The *Land Use* criteria group considered the compatibility of the potential sites with the on-site and surrounding existing and future land uses. The number of individual parcels of land and owners affected by each site were also considered. The five criteria used to evaluate the sites were weighted equally.

Overall, Sites D, H, I and K were considered to have the least potential for land use impacts and were ranked the most preferred. Sites B, C and E were expected to have moderate land use impacts and were, therefore, moderately preferred. Sites A, F, G and J could have high land use impacts and were the least preferred. The following is a summary of the evaluation of the Sites according to the five criteria:

Land Ownership

With respect to this criteria, Sites D, I and K were preferred since they only affect one to two parcels of land and owners. Sites A, B and C were the least preferred because they affect more than five parcels and owners.

Compatibility with Existing Land Use(s) On-Site

Most of Site K is occupied by the existing Moore Township landfill site. A small portion of Site A is vacant industrial land. With the exception of these lands, the existing land use of the remainder of Sites K and A and the other sites is agricultural which is considered not to be compatible with landfilling. Sites A and K were therefore considered to be more preferred than the remaining sites for this criterion.

Compatibility with Future Designated Land Use(s) On-Site

Many of the sites, including Sites B, C, D, E, H, I and J and most of Site K, are designated for industrial or waste disposal uses in the Township of Moore Official Plan. A waste management facility was considered to be compatible with these land use designations. Most of Site A and all of Sites F and G are designated for long-term agricultural uses which were not considered compatible with a waste management facility.

Compatibility with Existing Land Use(s) in Site Vicinity

This criterion was evaluated in terms of land uses within 0 to 500 m and land uses within 500 m to 1 km:

- Since most of the lands within 0 to 500 m of Sites B, C, D, E, H and I are currently developed with industrial or waste disposal uses, they were preferred in this respect. The least preferred sites were Sites A, F, G, J and K where most of the surrounding area is agricultural.
- Sites H and I are the only two sites where most of the lands within 500 m to 1 km are currently developed with industrial uses and they were, therefore, preferred for this indicator. Most of the lands within 500 m to 1 km of Sites A, B, C, D, E and K are agricultural and in some cases also include residential and recreational uses. Sites F, G and J were the least preferred because the surrounding 500 m to 1 km area includes many residential uses. In the case of Sites G and J, a large portion of the hamlets of Mooretown and Courtright are located in the surrounding 500 m to 1 km area.

Compatibility with Future Designated and Proposed Land Use(s) in Site Vicinity

This criteria was evaluated in terms of the land designations within 0 to 500 m and 500 m to 1 km.

- In the case of Sites B, C, D, E, H, I and J, a large portion of the surrounding 0-500 m is designated for industrial or waste disposal uses in the Township of Moore and/or Township of Sombra Official Plans. As a result, these sites were the most preferred. The least preferred sites were Sites A, F, G and K, where the majority of the surrounding lands are designated for agricultural uses.
- Most of the lands within 500 m to 1 km of Sites B, C, D, E, H, I and J are designated for industrial or waste disposal uses in the applicable Official Plans. However, some of the lands within 500 m to 1 km of Sites B, D, E, and J include some future residential development. The least preferred sites were Sites A, F, G and K where

most of the surrounding lands are designated for long-term agricultural uses and/or open space and residential uses.

Facility Development/Operating Cost

Although a number of indicators were considered within the criterion "*site capital/operating cost*", the sites were primarily compared on the basis of "*estimated total present value cost*" due to similarities among the sites with respect to other indicators. In estimating this cost, the following was taken into account: proximity to a receiving body (for leachate pipeline construction cost), total transportation haulage distance from source (operating cost) and total length along local and new access road (road upgrades and new road construction cost).

The difference among the sites with respect to cost is not large. The most significant cost with respect to facility development is usually excavation and development of a liner if required. However, since all the sites are equivalent with respect to these two cost considerations, the difference among the sites with respect to cost was considered to be quite small. The cost data is presented in Table 6.8.

Criteria Group Ranked "Moderate"

Transportation

Within this criteria group, sites were ranked on the basis of the criterion "*potential for impacts from hauling waste to candidate sites*" which took into account the annual tonne-kms travelled on public roads from a waste centroid to each landfill site. The calculation of the annual tonne-kms was based on the determination of landfill disposal requirements by centroid and the location and length of the haul routes.

It should be recognized that although ranking of sites within the transportation criteria group was possible, the actual difference among the sites was not large. Seven of the nine sites are all within approximately 5 km of one another while the two most outlying sites are within approximately 10 km of the other sites. In addition, most of the sites are in very close proximity to Highway 40 and no routes in the vicinity of the sites travel through built-up areas. As a result, none of the sites were considered to have significant disadvantages with respect to transportation. Nevertheless, the sites could be categorized into three groupings:

Low Impact/Cost:	Sites A, B, C;
Moderate Impact/Cost:	Sites D, E, F, G, J, K; and
High Impact/Cost:	Sites H, I.

Economics

The consideration of the criterion *potential disruption to businesses in the site vicinity* was based on the number and character of businesses within 500-1,000 m of the site boundaries.

Sites G and J were identified to be less preferred than the other sites as these sites have a greater number of retail/service commercial uses (which are considered to be the most sensitive uses) within their vicinity than the other sites.

6.7.7 Overall Ranking of Sites

The information summarized above provided the basis for the overall comparison and ranking of the sites. Table 6.11 (at the end of Section 6.7) presents a summary of the site rankings by criteria group. The discussion below presents the overall ranking of sites resulting from two methods of evaluation: quantitative concordance analysis and a qualitative (descriptive) evaluation.

The purpose of this comparative evaluation was not to identify a single preferred site, but rather to identify a short list of sites for more detailed analysis.

Quantitative Evaluation

A concordance method was used to compare the sites in the quantitative evaluation. The concordance method uses a matrix of alternative sites, criteria groups, raw or scaled data and weights. A detailed description of the concordance method is provided in Volume 2, Appendix 2H.

In order to carry out the concordance analysis, it was necessary to assign a "weight" or quantified level of importance to each of the criteria groups. The purpose of weighting is to provide a representation of people's values within the context of the study. Weighting is used to make it easier to resolve trade-offs between the alternatives being evaluated by quantifying how important one criteria group is relative to the others.

As was previously discussed, weights for the criteria groups were established through public workshops. Three weighting categories were established:

- 1) High;
- 2) High/Moderate; and
- 3) Moderate.

As the concordance approach requires numerical weights, the following weights were used by the study team:

<u>Public Workshop Weighting</u>		<u>Numerical Weight</u>
high	=	10 (59%)
high/moderate	=	5 (29%)
moderate	=	2 (12%)

These numerical weights were considered by the study team to best reflect the qualitative rankings developed by the public.

Based on these weights, Table 6.12 (at the end of Section 6.7) outlines the concordance matrix presenting the overall concordance scores. Based on the concordance analysis, the six most preferred sites were Sites C, D, E, H, I and K. Further distinctions in ranking among these "top" six sites was not considered appropriate, due to the similarities among the sites at this level of detail. To further assist in determining the short list of sites, a qualitative evaluation was also undertaken as discussed below.

Qualitative Evaluation

Two qualitative methods were used to compare the eleven alternative sites: the dominance approach and trade-off analysis. Both methods involve a comparison of the relative advantages and disadvantages of each site to those of the other sites.

The dominance approach was first used to identify whether there were any sites "dominated" by all other sites. A site is considered "dominated" if it is less preferred or no more preferred than all other sites for all criteria. These sites are considered to have no advantages (and thus no trade-offs) over any of the other sites and would therefore be eliminated from further consideration. Site G was considered to be "dominated" by the other sites and was therefore eliminated.

The ten remaining sites were evaluated using a trade-off analysis. This evaluation involved the identification and resolution of trade-offs among the remaining sites by examining the relative advantages and disadvantages of each site vis-a-vis the other, taking into consideration the relative importance of the criteria groups. Table 6.13 (at end of Section 6.7) summarizes the relative advantages and disadvantages of the nine sites. The *Cost* criteria group is not included in this table as it was difficult to categorize costs into specific preference groups. Sites were considered to differ with respect to cost only if there was a difference of at least \$1 million between each site. Costs have, however, been considered in the discussion of the overall evaluation below.

In reviewing the site rankings by criteria group, it became evident that Sites A and F were less preferred sites. Both of these sites were least preferred with respect to the *Social* criteria group, which was a high weighted criteria group, and also least preferred with respect to two of the three high/moderate weighted criteria groups. The advantages of these sites with respect to *Natural Ecosystems* (high/moderate importance), *Transportation* (for Site A) and the *Economic* and *Cost* criteria groups (both of moderate importance) were not considered to offset the disadvantages.

Of the remaining sites, (B, C, D, E, H, I, J and K), Sites B and J were found to be less preferred. Although Site B was most preferred with respect to *Agriculture* (high/moderate importance) and *Transportation* and *Economics* (moderate importance), this site was less preferred than Sites C, D, E, H, I and K on the basis of *Social* (the only high weighted criteria group) and either equal or less preferred than the remaining high/moderate criteria groups (*Natural Ecosystems* and *Land Use*). As a result, Site B was considered to be a less preferred site. Similarly, Site J was found to be less preferred than Sites B, C, D, E, H and I on the basis of *Social* (the only highly weighted criteria group). The site was also least preferred with respect to *Land Use* and either equal or less preferred than the other sites with respect to *Natural Ecosystems*, *Transportation* and *Economics*. Its only advantages were with respect to *Agriculture* and *Costs*. With respect to *Cost*, the difference between the sites was considered to be small. These advantages were not considered strong enough to offset its significant disadvantages with respect to the other criteria groups. As a result, Site J was not carried further in the evaluation.

The six remaining sites (Sites C, D, E, H, I and K), which match the top six sites based on the concordance analysis, were then further reviewed. To begin with, the differences between these sites was not considered to be large, at this level of detail. With respect to *Economics*, all the sites were ranked "low impact" thus discounting this criteria group. One obvious difference among these sites was that, with the exception of Site E, these sites were ranked the highest with respect to the *Social* criteria group, which was the only high weighted criteria group relevant to the comparative evaluation.

Using this difference as a basis, Site E was then compared to the other remaining sites (Sites C, D, H, I and K) to see whether it had any advantages to offset its disadvantage with respect to the *Social* criteria group. It should be noted that as the sites did not differ with respect to *Hydrogeology*, *Surface Water* and *Economics*, these criteria groups were not considered in the paired comparison. The following discusses these comparisons:

Site E vs Site C

In comparing Site E to Site C, the only advantage which Site E has is a greater preference with respect to the *Natural Ecosystems* criteria group. Site C has 25 ha of natural ecosystems (including a sensitive woodlot) which could be disrupted whereas Site E has 24 ha of natural ecosystems. This one advantage was not considered to offset the Site E advantage with respect to the *Social* environment. As a result, Site E was considered to be less preferred than Site C.

Site E vs Site D

Again, the only advantage which Site E has over Site D is with respect to the *Natural Ecosystems* criteria group. Site D will result in the removal of 8 ha of moderate quality forest and may disrupt 52 ha of natural ecosystems whereas Site E only has the potential to disrupt 24 ha of natural ecosystems. Site D, however, is more preferred than Site E on the basis of the *Social*, *Land Use* and *Cost* criteria groups. This one advantage which Site E has over Site D was not considered to offset all of Site D's advantages. As a result, Site D was considered to be more preferred than Site E.

Site E vs Site H

In comparing Site E to Site H, Site E is more preferred on the basis of *Natural Ecosystems* and *Transportation*. With respect to *Natural Ecosystems*, Site H will result in the removal of 8 ha of natural ecosystems and potentially disrupt 3 ha (Bickford Woods). Site E on the other hand, will remove no features but has the potential to disrupt 24 ha of natural ecosystems. Alternatively, Site H is more preferred on the basis of the *Social* and *Land Use* criteria groups. The slight advantage which Site E has over H on the basis of *Natural Ecosystems* was not considered to offset the two key advantages which Site H has over Site E. Therefore, Site H was considered to be more preferred than Site E.

Site E vs Site I

The only advantage which Site E has over Site I is with respect to the *Transportation* criteria group which was weighted the lowest category. This one advantage does not offset Site I's advantages with respect to the *Social*, *Natural Ecosystems* and *Land Use* criteria groups. Site I was therefore considered more preferred than Site E.

Site E vs Site K

Site E's advantages over Site K are on the basis of *Natural Ecosystems* and *Agriculture*. Site K, however, is more preferred on the basis of the *Social*, *Land Use* and *Cost* criteria groups. The most significant advantage which Site E has is with respect to *Natural Ecosystems* as Site E has the potential to disrupt 24 ha of natural ecosystems whereas Site K will result in the removal of 53 ha of natural ecosystems (43 ha of which are shrub woodland) and potentially disrupt 25 ha of moderate quality forest. However, as previously discussed, *Natural Ecosystem* impacts from any of the sites are not considered to be highly significant. Site E is also more preferred on the basis of *Agriculture* as Site K has more than five times the amount of lands in agricultural use within 500 m. Site K, on the other hand, has a fairly strong advantage with respect to *Social* (8 residences vs 17 residences being potentially disrupted) and a key advantage on the basis of *Land Use*, as the land for Site K is designated for waste disposal and would be developed next to an existing landfill. Given Site K's advantage with respect to *Social* (which is a high weighted criteria group) and the preference for Site K on the basis of *Land Use*, Site K was considered to be slightly more preferred than Site E.

In summary, as Site E was considered to be less preferred than Sites C, D, H, I and K, it was eliminated. The remaining long list of sites included Sites C, D, H, I and K. This list was still considered to be too long a list for a short list of sites. It was the County of Lambton's preference, if possible, to generate a short list of two sites for more detailed investigation. To accomplish this, the five remaining sites were reviewed further.

To begin with, all the sites were considered equal with respect to the *Social* criteria group. As a result, the criteria group was no longer considered as it would not help to distinguish among the sites. Recalling that the *Economics* criteria group had earlier been eliminated due to similarities among the sites, the remaining criteria groups included:

high/moderate	<i>Natural Ecosystems</i>
	<i>Agriculture</i>
	<i>Land Use</i>
	<i>Cost</i>
moderate	<i>Transportation.</i>

Using Site C as a basis, the following describes further paired comparisons on the basis of the above criteria groups.

Site C vs Site D

The only differences between Site C and D are on the basis of the *Land Use* and *Transportation* criteria groups. Site D is more preferred than Site C on the basis of land use, whereas Site C is more preferred on the basis of transportation. Given that higher weight was attributed to the *Land Use* criteria group and that the difference between the sites on the basis of transportation was not recognized to be key (3.06 vs 3.48 annual tonnes-km), Site D was considered to be more preferred than Site C.

Site C vs Site H

Site H differed from Site C on the basis of the *Land Use*, *Cost* and *Transportation* criteria groups. In terms of *Land Use*, Site H was preferred as it is located in an industrial designated area (as with Site C) and would be compatible with the existing character and industrial uses in the area, unlike Site C which is still somewhat rural in terms of its land uses and character. Site C was slightly more preferred than Site H on the basis of cost (difference of \$1.1 million) and transportation with a difference of (3.06 vs 4.19 annual tonnes-km). Thus, the tradeoff is a preference for Site H on the basis of *Land Use* versus a preference for Site C with respect to *Cost* and *Transportation*.

In considering these tradeoffs, the preference for Site H on the basis of *Land Use* was considered to be key. The site is situated in an area intended for industrial development and across from an existing industrial complex thus having potential for high compatibility. This advantage was considered to be more significant than the advantage of Site C with respect to cost and transportation where the differences were less pronounced. As a result, Site H was considered to be more preferred than Site C.

Site C vs Site I

Site I was considered to be more preferred than Site C on the basis of the *Natural Ecosystems* and *Land Use* criteria groupings. Alternatively, Site C was considered more preferred on the basis of *Transportation*. As the *Transportation* preference for Site C is only of moderate weight as compared to the preferences for Site H on the basis of two high/moderate weighted criteria groups, Site I was considered to be more preferred than Site C.

Site C vs Site K

Site C is more preferred than Site K on the basis of *Natural Ecosystems* and *Agriculture* and slightly preferred on the basis of *Transportation* (moderate weight). Alternatively, Site K is more preferred on the basis of *Land Use*. The tradeoff between these sites was considered to be difficult. The lands included in Site K are designated for waste disposal and are

adjacent to an existing landfill. This was considered to be a key advantage. Alternatively, although Site C is preferred over Site K on the basis of *Natural Ecosystems* and *Agriculture*, impacts related to both *Natural Ecosystems* and *Agriculture* were expected to be minor as the constraint mapping undertaken in previous steps eliminated the most significant features.

Overall, the difference between Sites C and K was considered to be marginal by the study team. However, Site C was considered to be less preferred than Sites D, H and I. As a result, Sites D, H and I were considered to be more preferred than Sites C and K.

As previously indicated, it was the County's preference that the short list be reduced to two sites, if possible. In evaluating Sites C, D, H, I and K, the difference among the sites was considered to be slight. Nevertheless, five sites were considered to be too many to carry forward for the short list evaluation. As noted above, Sites D, H and I were considered slightly better than the other two. Given, however, that Site K is somewhat unique, in that it is adjacent to an existing landfill and on lands designated for waste disposal, and it is a site that was originally supported by the "host" municipality, the study team decided to add Site K to the short list. This resulted in a short list of sites which included Sites D, H, I and K.

This short list was established based on the assumption that Site C or any of the other sites on the long list could be re-evaluated if none of the short listed sites proved to be acceptable following the more detailed analysis in the next step.

**TABLE 6.6
CRITERIA/INDICATORS USED IN THE COMPARATIVE
EVALUATION OF THE LONG LIST OF SITES**

Criteria Group/Criterion	Indicators	Data Sources
Hydrogeology		
<ul style="list-style-type: none"> Local/regional aquifer characteristics 	<ul style="list-style-type: none"> nature of aquifer(s) depth to basal aquifer potential yields 	<ul style="list-style-type: none"> Ontario Ministry of the Environment and Energy, Well Water Records for Lambton County.
<ul style="list-style-type: none"> Local ground water use 	<ul style="list-style-type: none"> number of wells on record within 1 km availability of municipal supply number of potential users of ground water for potable water (number of residences within 1 km) 	<ul style="list-style-type: none"> Ontario Ministry of the Environment and Energy, Well Water Records for Lambton County. County of Lambton, Public Works Department. Topographic Mapping, 1:50,000 Scale. Windshield Survey.
<ul style="list-style-type: none"> On-site hydrogeologic conditions 	<ul style="list-style-type: none"> surficial geology range in overburden thickness site stratigraphy 	<ul style="list-style-type: none"> Ontario Geological Survey (MNR Mapping). Preliminary Map P. 2222. Quarterly Geology. Sarnia-Brights Grove Area. Ontario Geological Survey (MNR Mapping). Preliminary Map P. 2206. Bedrock Thickness. Sarnia-Brights Grove Area. Ontario Geological Survey (MNR Mapping). Preliminary Map P. 2207. Drift Thickness. Sarnia-Brights Grove Area.
Surface Water		
<ul style="list-style-type: none"> Potential for contamination of surface water and downstream flooding 	<ul style="list-style-type: none"> number of downstream users presence of surface watercourses on site location of floodplains location of surface water bodies adjacent to site number of water sheds and characteristics 	<ul style="list-style-type: none"> Ministry of the Environment and Energy Surface Water Taking Permits. Windshield Survey. Floodplain Mapping (St. Clair Region Conservation Authority). Topographic Mapping 1:50,000 Scale.
Natural Ecosystems		
<ul style="list-style-type: none"> Potential removal of natural ecosystems on site 	<ul style="list-style-type: none"> area of moderate quality forest on site area of shrub woodland on-site total of above 	<ul style="list-style-type: none"> Topographic Mapping 1:50,000, 1:25,000 and 1:10,000 Scale. Forest Resources Inventory Mapping, 1:10,000 Scale. Roadside checking.

TABLE 6.6
CRITERIA/INDICATORS USED IN THE COMPARATIVE
EVALUATION OF THE LONG LIST OF SITES
(Continued)

Criteria Group/Criterion	Indicators	Data Sources
<ul style="list-style-type: none"> • Potential disruption of natural ecosystems off site 	<ul style="list-style-type: none"> • area of candidate sensitive area within 200 m of site • area of high quality forest within 200 m of site • area of moderate quality forest within 200 m of site • total of above 	<ul style="list-style-type: none"> • Topographic Mapping 1:50,000, 1:25,000 and 1:10,000 Scale. • Roadside Checking. • Forest Resources Inventory Mapping, 1:10,000 Scale.
Agriculture		
<ul style="list-style-type: none"> • Potential removal of agricultural resource lands on site 	<ul style="list-style-type: none"> • area of land designated in Official Plan for future agricultural use on site • area of current agricultural use on lands designated agriculture 	<ul style="list-style-type: none"> • Official Plan for the Moore Planning Area and recent amendments. • Ontario Ministry of Agriculture and Food. • Aerial photography. • Roadside survey.
<ul style="list-style-type: none"> • Potential disruption of agricultural resource lands off site 	<ul style="list-style-type: none"> • area of current agricultural use on lands within 500 m of the site 	<ul style="list-style-type: none"> • Ontario Ministry of Agriculture and Food. • Aerial photography. • Roadside survey.
Other Resources		
<ul style="list-style-type: none"> • Potential removal of mineral aggregate resources 	<ul style="list-style-type: none"> • area of mineral aggregate resources on site 	<ul style="list-style-type: none"> • Contact with Ontario Ministry of Natural Resources, District Office.
<ul style="list-style-type: none"> • Potential removal of timber agreement resources 	<ul style="list-style-type: none"> • area of timber agreements on site 	<ul style="list-style-type: none"> • Contact with Ontario Ministry of Natural Resources, District Office.
Social/Cultural Environment		
<ul style="list-style-type: none"> • Potential disruption to residents in site vicinity 	<ul style="list-style-type: none"> • number of residences within 500-1,000 m of the site • Presence and extent of existing buffers 	<ul style="list-style-type: none"> • Ontario Base Mapping, 1:10,000 Scale. • Windshield Survey.
<ul style="list-style-type: none"> • Potential disruption to community/recreation features in site vicinity 	<ul style="list-style-type: none"> • number and character of community/recreation features within 0-1,000 m of site boundary • Presence and extent of existing buffers 	<ul style="list-style-type: none"> • Ontario Base Mapping, 1:10,000 Scale. • Windshield Survey.
<ul style="list-style-type: none"> • Potential disruption to residents along local access routes 	<ul style="list-style-type: none"> • number of residences along local access routes 	<ul style="list-style-type: none"> • Ontario Base Mapping, 1:10,000 Scale. • Windshield Survey.
<ul style="list-style-type: none"> • Potential disruption to community/recreation features along access routes 	<ul style="list-style-type: none"> • number and character of community/recreation features along local access routes 	<ul style="list-style-type: none"> • Ontario Base Mapping, 1:10,000 Scale. • Windshield Survey.

TABLE 6.6
CRITERIA/INDICATORS USED IN THE COMPARATIVE
EVALUATION OF THE LONG LIST OF SITES
(Continued)

Criteria Group/Criterion	Indicators	Data Sources
Land Use		
<ul style="list-style-type: none"> Land ownership 	<ul style="list-style-type: none"> number of ownership parcels consumed by the site number of landowners 	<ul style="list-style-type: none"> Assessment Roll Data.
<ul style="list-style-type: none"> Compatibility with existing land use(s) on site 	<ul style="list-style-type: none"> existing land uses on the site 	<ul style="list-style-type: none"> Ontario Base Mapping, 1:10,000 Scale. Windshield Survey.
<ul style="list-style-type: none"> Compatibility with future designated land use(s) on site 	<ul style="list-style-type: none"> Official Plan designations on the site 	<ul style="list-style-type: none"> Official Plan for the Moore Planning Area and recent amendments.
<ul style="list-style-type: none"> Compatibility with existing land use(s) in the site vicinity 	<ul style="list-style-type: none"> existing land uses within 0-500 m of site existing land uses within 500-1,000 m of site 	<ul style="list-style-type: none"> Ontario Mapping, 1:10,000 Scale. Windshield Survey.
<ul style="list-style-type: none"> Compatibility with future designated and proposed land use(s) in the site vicinity 	<ul style="list-style-type: none"> Official Plan designations and development activity and/or proposals within 0-500 m of site Official Plan designations and development activity and/or proposals within 500-1,000 m of site 	<ul style="list-style-type: none"> Official Plan for the Moore Planning Area and recent amendments. Contact with the Township of Moore.
Economics		
<ul style="list-style-type: none"> Potential disruption to businesses in the site vicinity 	<ul style="list-style-type: none"> number and character of businesses within 500-1,000 m of site 	<ul style="list-style-type: none"> Ontario Base Mapping, 1:10,000 Scale. Windshield Survey.
Transportation		
<ul style="list-style-type: none"> Potential for impacts from hauling waste to candidate sites 	<ul style="list-style-type: none"> annual tonne-kms travelled on public roads, from waste centroids, to each landfill site 	<ul style="list-style-type: none"> Topographic Mapping, 1:50,000 Scale. Ministry of Transportation, Ontario Transportation Map Series, 1:250,000. Consultation with Ministry of Transportation and Moore Township. City Plan of Sarnia/Port Huron, Map Art, 1988. Field Inspection. Location of work centroids, sites and tonnes provided by Project Manager.

TABLE 6.6
CRITERIA/INDICATORS USED IN THE COMPARATIVE
EVALUATION OF THE LONG LIST OF SITES
(Continued)

Criteria Group/Criterion	Indicators	Data Sources
Facility Development/Operating Cost		
<ul style="list-style-type: none"> • Site capital/operating cost 	<ul style="list-style-type: none"> • distance to and availability of Municipal water and sewers • ease of development of landfill • availability of cover material • proximity to receiving body • total annual vehicle km • total length along local access road and new access road required • estimated total present value cost 	<ul style="list-style-type: none"> • County of Lambton, Public Works Department. • Topographic Mapping, 1:50,000 Scale. • Surficial Geology Mapping. • Windshield Survey. • Ministry of Transportation, Ontario Transportation Map Series, 1:250,000 Scale. • Official Plan for the Moore Planning Area.

TABLE 6.7
MITIGATION ASSUMED AT THE LONG LIST OF SITES
COMPARATIVE EVALUATION

Criteria Group/Criterion	Indicators	Assumed Mitigation
Hydrogeology		
<ul style="list-style-type: none"> • Local/regional aquifer characteristics 	<ul style="list-style-type: none"> • number of aquifer(s) • depth to basal aquifer • potential yields 	<ul style="list-style-type: none"> • Incorporate leachate control measures to prevent off-site impacts. • Develop and implement monitoring and contingency programs.
<ul style="list-style-type: none"> • Local ground water use 	<ul style="list-style-type: none"> • number of wells on record within 1 km • availability of municipal supply • number of potential users of ground water for potable water (number of residences within 1 km) 	<ul style="list-style-type: none"> • Incorporate leachate control measures to prevent off-site impacts. • Develop and implement monitoring and contingency programs.
<ul style="list-style-type: none"> • On-site hydrogeologic conditions 	<ul style="list-style-type: none"> • surficial geology • range in overburden thickness • site stratigraphy 	<ul style="list-style-type: none"> • Incorporate leachate control measures to prevent off-site impacts. • Develop and implement monitoring and contingency programs.
Surface Water		
<ul style="list-style-type: none"> • Potential for contamination of surface water and downstream flooding 	<ul style="list-style-type: none"> • number of downstream users • presence of surface watercourses on site • location of floodplains • location of surface water bodies adjacent to site • number of watersheds and characteristics 	<ul style="list-style-type: none"> • Incorporate leachate control measures to prevent outbreaks. • Install surface water run-off controls. • Develop and implement monitoring and contingency programs.
Natural Ecosystems		
<ul style="list-style-type: none"> • Potential removal of natural ecosystems on site 	<ul style="list-style-type: none"> • area of moderate quality forest on site • area of shrub woodland on site • total of above 	<ul style="list-style-type: none"> • Limit removal of natural ecosystems by design of facility.
<ul style="list-style-type: none"> • Potential disruption of natural ecosystems off site 	<ul style="list-style-type: none"> • area of candidate sensitive area within 200 m of site • area of high quality forest within 200 m of site • area of moderate quality forest within 200 m of site • total of above 	<ul style="list-style-type: none"> • Control leachate. • Construct berms. • Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. • Appropriate on-going site maintenance to reduce surface refuse. • Initiate good site security and monitoring measures to prevent dumping.
Agriculture		
<ul style="list-style-type: none"> • Potential removal of agricultural resource lands on site 	<ul style="list-style-type: none"> • area of land designated in Official Plan for future agricultural use on site • area of current agricultural use on lands designated agriculture 	<ul style="list-style-type: none"> • Limit removal of agricultural resource lands by design of facility.

TABLE 6.7
MITIGATION ASSUMED AT THE LONG LIST OF SITES
COMPARATIVE EVALUATION
(Continued)

Criteria Group/Criterion	Indicators	Assumed Mitigation
<ul style="list-style-type: none"> • Potential disruption of agricultural resource lands off site 	<ul style="list-style-type: none"> • area of current agricultural use on lands within 500 m of the site 	<ul style="list-style-type: none"> • Control leachate. • Construct berms. • Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. • Appropriate on-going site maintenance to reduce surface refuse. • Initiate good site security and monitoring measures to prevent dumping.
Other Resources		
<ul style="list-style-type: none"> • Potential removal of mineral aggregate resources 	<ul style="list-style-type: none"> • area of mineral aggregate resources on site 	<ul style="list-style-type: none"> • Limit removal of mineral aggregate resources by design of facility
<ul style="list-style-type: none"> • Potential removal of timber agreement resources 	<ul style="list-style-type: none"> • area of timber agreements on site 	<ul style="list-style-type: none"> • Limit removal of timber agreement resources by design of facility
Social/Cultural Environment		
<ul style="list-style-type: none"> • Potential disruption to residents in site vicinity 	<ul style="list-style-type: none"> • number of residences within 500-1,000 m of the site • presence and extent of existing buffers 	<ul style="list-style-type: none"> • Buffer zone provides separation distance; construct berms or other artificial noise barriers. • Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. • Appropriate on-going site maintenance to minimize odour effects. • Appropriate on-going site maintenance to reduce surface refuse. • Initiate good site security and monitoring measures to prevent illegal dumping. • Adjust hours of operation to minimize effects. • Buffer zone, provides separation distance; construct berms or other artificial noise barriers. • Compensation to property owners. • Locate working area in least visible section of site if other conditions (e.g. hydrogeology) allow. • Construction of berms and vegetation will provide screening.

TABLE 6.7
MITIGATION ASSUMED AT THE LONG LIST OF SITES
COMPARATIVE EVALUATION
(Continued)

Criteria Group/Criterion	Indicators	Assumed Mitigation
<ul style="list-style-type: none"> • Potential disruption to community/recreation features in site vicinity 	<ul style="list-style-type: none"> • number and character of community/recreation features within 0-1,000 m of site boundary • presence and extent of existing buffers 	<ul style="list-style-type: none"> • Buffer zone provides separation distance; construct berms or other artificial noise barriers. • Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. • Appropriate on-going site maintenance to minimize odour effects. • Appropriate on-going site maintenance to reduce surface refuse. • Initiate good site security and monitoring measures to prevent illegal dumping. • Adjust hours of operation to minimize effects. • Buffer zone, provides separation distance; construct berms or other artificial noise barriers. • Compensation to property owners. • Locate working area in least visible section of site if other conditions (e.g. hydrogeology) allow. • Construction of berms and vegetation will provide screening.
<ul style="list-style-type: none"> • Potential disruption to residents along local access routes 	<ul style="list-style-type: none"> • number of residences along local access routes 	<ul style="list-style-type: none"> • Maximize use of provincial highways in route selection. • Monitoring landfill traffic. • Limit use of roads to certain hours of day. • Complaint monitoring program.
<ul style="list-style-type: none"> • Potential disruption to community/recreation features along access routes 	<ul style="list-style-type: none"> • number and character of community/recreation features along local access routes 	<ul style="list-style-type: none"> • Maximize use of provincial highways in route selection. • Monitoring landfill traffic. • Limit use of roads to certain hours of day. • Complaint monitoring program.

TABLE 6.7
MITIGATION ASSUMED AT THE LONG LIST OF SITES
COMPARATIVE EVALUATION
(Continued)

Criteria Group/Criterion	Indicators	Assumed Mitigation
Land Use		
<ul style="list-style-type: none"> • Land ownership 	<ul style="list-style-type: none"> • number of ownership parcels consumed by the site • number of landowners 	<ul style="list-style-type: none"> • Buffer zone provides separation distance; construct berms or other artificial noise barriers. • Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. • Appropriate on-going site maintenance to reduce surface refuse. • Initiate good site security and monitoring measures to prevent illegal dumping. • Adjust hours of operation to minimize effects. • Buffer zone provides separation distance; construct berms or other artificial noise barriers.
<ul style="list-style-type: none"> • Compatibility with existing land use(s) on site 	<ul style="list-style-type: none"> • existing land uses on the site 	<ul style="list-style-type: none"> • Buffer zone provides separation distance; construct berms or other artificial noise barriers. • Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. • Appropriate on-going site maintenance to reduce surface refuse. • Initiate good site security and monitoring measures to prevent illegal dumping. • Adjust hours of operation to minimize effects. • Buffer zone provides separation distance; construct berms or other artificial noise barriers.

TABLE 6.7
MITIGATION ASSUMED AT THE LONG LIST OF SITES
COMPARATIVE EVALUATION
(Continued)

Criteria Group/Criterion	Indicators	Assumed Mitigation
<ul style="list-style-type: none"> • Compatibility with future designated land use(s) on site 	<ul style="list-style-type: none"> • Official Plan designations on the site 	<ul style="list-style-type: none"> • Buffer zone provides separation distance; construct berms or other artificial noise barriers. • Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. • Appropriate on-going site maintenance to reduce surface refuse. • Initiate good site security and monitoring measures to prevent illegal dumping. • Adjust hours of operation to minimize effects. • Buffer zone provides separation distance; construct berms or other artificial noise barriers.
<ul style="list-style-type: none"> • Compatibility with existing land use(s) in the site vicinity 	<ul style="list-style-type: none"> • existing land uses within 0-500 m of site • existing land uses within 500-1,000 m of site 	<ul style="list-style-type: none"> • Buffer zone provides separation distance; construct berms or other artificial noise barriers. • Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. • Appropriate on-going site maintenance to reduce surface refuse. • Initiate good site security and monitoring measures to prevent illegal dumping. • Adjust hours of operation to minimize effects. • Buffer zone provides separation distance; construct berms or other artificial noise barriers.

TABLE 6.7
MITIGATION ASSUMED AT THE LONG LIST OF SITES
COMPARATIVE EVALUATION
(Continued)

Criteria Group/Criterion	Indicators	Assumed Mitigation
<ul style="list-style-type: none"> Compatibility with future designated and proposed land use(s) in the site vicinity 	<ul style="list-style-type: none"> Official Plan designations and development activity and/or proposals within 0-500 m of site Official Plan designations and development activity and/or proposals within 500-1,000 m of site 	<ul style="list-style-type: none"> Buffer zone provides separation distance; construct berms or other artificial noise barriers. Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. Appropriate on-going site maintenance to reduce surface refuse. Initiate good site security and monitoring measures to prevent illegal dumping. Adjust hours of operation to minimize effects. Buffer zone provides separation distance; construct berms or other artificial noise barriers.
Economics		
<ul style="list-style-type: none"> Potential disruption to businesses in the site vicinity 	<ul style="list-style-type: none"> number and character of businesses within 500-1,000 m of site 	<ul style="list-style-type: none"> Buffer zone provides separation distance; construct berms or other artificial noise barriers. Construct windbreaks, wet the soil or apply CaCl₂ during windy conditions to limit dust. Appropriate on-going site maintenance to minimize odour effects. Appropriate on-going site maintenance to reduce surface refuse. Initiate good site security and monitoring measures to prevent illegal dumping. Adjust hours of operation to minimize effects.
Transportation		
<ul style="list-style-type: none"> Potential for impacts from hauling waste to candidate sites 	<ul style="list-style-type: none"> annual tonne-kms travelled on public roads, from waste centroids, to each landfill site 	<ul style="list-style-type: none"> Upgrade access roads as required to standards suitable for haulage vehicles. Maximize use of provincial highways in route selection. Adjust hours of operation to minimize effects. Provide turning lanes where required.

TABLE 6.7
MITIGATION ASSUMED AT THE LONG LIST OF SITES
COMPARATIVE EVALUATION
(Continued)

Criteria Group/Criterion	Indicators	Assumed Mitigation
Facility Development/Operating Cost		
<ul style="list-style-type: none"> • Site capital/operating cost 	<ul style="list-style-type: none"> • distance to and availability of municipal water and sewers • ease of development of landfill • availability of cover material • proximity to receiving body • total annual vehicle km • total length along local access road and new access road required • estimated total present value cost 	<ul style="list-style-type: none"> • None available.

**TABLE 6.8
DATA FOR COMPARATIVE EVALUATION OF
LONG LIST OF SITES**

CRITERIA GROUPING / INDICATOR	DATA FOR POTENTIAL SITES											
	A	B	C	D	E	F	G	H	I	J	K	
HYDROGEOLOGY												
Local/Regional Aquifer Characteristics												
• nature of aquifer(s)	• Fractured upper part of black shale bedrock or gravel layer above bedrock.	• Fractured upper part of black shale bedrock or gravel layer above bedrock.	• Fractured upper part of black shale bedrock.	• Fractured upper part of black shale bedrock.	• Fractured upper part of black shale bedrock.	• Medium sand and gravel above black shale bedrock.	• Medium sand and gravel layer above black shale bedrock.	• Fractured upper part of black shale bedrock or gravel layer above bedrock surface.	• Medium sand and gravel layer above black shale bedrock.	• Fractured upper part of limestone/shale bedrock or gravel layer above bedrock.	• Fractured upper part of black shale bedrock or gravel layer above bedrock.	• Fractured upper part of black shale bedrock or gravel layer above bedrock.
• depth to basal aquifer	• 35.0 m to 50.3 m bedrock aquifer (115' to 165')	• 37.8 m to 43.0 m (124' to 134')	• 41.4 m to 46.3 m (136' to 152')	• > 46.9 m.	• 37.8 m to 43.9 m (124' to 135')	• 35.0 m to 48.8 m (115' to 160')	• 34.7 m to 48.5 m (115' to 159')	• 42.4 m to 45.7 m (139' to 150')	• 41.8 m to 43.6 m (137' to 143')	• 5.1 m to 56.0 m (169' to 184')	• 48.5 m to 60.5 m (159' to 198.5')	• 48.5 m to 60.5 m (159' to 198.5')
• potential yields	• 60% < 2 gpm • 40% 10 to 50 gpm	• 70% > 50 gpm • 30% < 2 gpd	• 40% > 50 gpm • 30% 10 to 50 gpm • 30% < 2 gpd	• 100% < 2 gpm	• 60% < 2 gpm • 30% 50 gpm • 10% 10 to 50 gpm	• 90% 2 gpm • 10% 10 to 50 gpm	• 70% 10 to 50 gpm • 30% 50 gpm	• 100% 2 gpm	• 100% < 2 gpm	• 99% < 2 gpm • 1% 10 to 50 gpm	• 100% 10 to 50 gpm	• 100% 10 to 50 gpm
Local Ground Water Use												
• number of wells on record within 1 km	• 16 wells	• 11 wells	• 17 wells	• 1 well	• 9 wells	• 5 wells	• 2 wells	• 6 wells	• 4 wells	• 9 wells	• 3 wells	• 3 wells
• availability of municipal supply	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.	• Area serviced by watermains.
• number of potential users of ground water for potable water (number of residences within 1 km)	• 19	• 15	• 8	• 9	• 15	• 40	• >100	• 0	• 0	• >100	• 8	• 8
On-Site Hydrogeological Conditions												
• surficial geology	• 100% St. Joseph Till - clayey silt till.	• 100% St. Joseph Till - clayey silt till.	• 100% St. Joseph Till - clayey silt till.	• 100% Glaciolacustrine (deep water) - clay with silt and fine sand.	• 70% Glaciolacustrine deposits (deep water) - clay with silt and fine sand. • 30% St. Joseph Till - clayey silt till.	• 100% St. Joseph Till - clayey silt till.	• 100% St. Joseph Till - clayey silt till.	• 100% Black Shale Till - clayey silt to sandy silt till.	• 100% Black Shale Till - clayey silt to sandy silt till.	• 100% Black Shale Till - clayey silt to sandy silt till.	• 100% Black Shale Till - clayey silt to sandy silt till.	• 100% Glaciolacustrine deposits (deepwater); clay with silt and fine sand
• range in overburden thickness	• 42.7 m north to 50.3 m south (140' to 165')	• 39.6 m to 41.1 m (130' to 135')	• 41.4 m south to 45.7 m to north (136' to 150')	• 46.9 m east to 49.4 m west (154' to 162')	• 39.6 m northeast to 49.4 m west (130' to 162')	• 45.7 m south to 51.8 m west (150' to 170')	• 45.7 m to 51.8 m (150' to 170')	• 45.7 m to 48.8 m (150' to 160')	• 43.6 m at southeast corner to 45.7 m east (143' to 150')	• 43 m northwest to 51 m south (141' to 167')	• 46 m northeast to 56 m south (146' to 184')	• 46 m northeast to 56 m south (146' to 184')
• site stratigraphy	Well data only.	• Well data only.	• Well data only.	• Well data only.	• Well data only.	• Well data only.	• Well data only.	• Well data only.	• Well data only.	• Well data only.	• Well data only.	• Well data only.

**TABLE 6.8
DATA FOR COMPARATIVE EVALUATION OF
LONG LIST OF SITES
(Continued)**

CRITERIA GROUPING / CRITERIA / INDICATOR	DATA FOR POTENTIAL SITES											
	A	B	C	D	E	F	G	H	I	J	K	
SURFACE WATER												
Potential for contamination of surface water and down stream flooding												
• number of downstream users	• No obvious surface users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface water users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No obvious surface water users in immediate downstream area. • Watercourses and/or drains may be used to water livestock.	• No MOEE water taking permits issued for Clay Creek.	• No MOEE water taking permits issued for Clay Creek.
• presence of surface watercourses on-site	• There are no watercourses flowing through or originating on the site.	• Agricultural drain flows south along east boundary of site.	• There are no watercourses flowing through or originating on the site.	• An agricultural drain flows along the north boundary of the site into main drain which originates approximately 2 concessions to the north of the site. This drain outlets into Clay Creek.	• An agricultural drain flows west along the south boundary of the site. This drain feeds into a main drain which originates approximately 2 concessions to the north of the site. This drain empties into Clay Creek.	• Two tributaries of the Baby Creek originate toward the northwest corner of the site. The upstream drainage area of these watercourses are very small, but may extend into the site.	• A tributary of the Baby Creek originates within the west half of the site. The upstream drainage area of this watercourse is very small and is contained within the site area.	• There are no watercourses on the site.	• There are no watercourses on the site.	• Small drainage ditch located in southwest corner of site drains into St. Clair River approximately 900 m downstream of site.	• Small roadside drain flowing south along west boundary of site. Drainage ditch outlets into Clay Creek approximately 2 km downstream of site.	• Small roadside drain flowing south along west boundary of site. Drainage ditch outlets into Clay Creek approximately 2 km downstream of site.
• location of flood plains	• There is no flood plain mapping for the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for any of the watercourses or drains on the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for any of the watercourses or drains on the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for any of the watercourses or drains on the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for any of the watercourses or drains on the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for any of the watercourses or drains on the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for any of the watercourses or drains on the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for the site. • The site has not been regulated by the St. Clair Region Conservation Authority.	• There is no flood plain mapping for the site. • The site has not been regulated by the St. Clair Region Conservation Authority.

**TABLE 6.8
DATA FOR COMPARATIVE EVALUATION OF
LONG LIST OF SITES
(Continued)**

CRITERIA GROUPING / CRITERIA / INDICATOR	DATA FOR POTENTIAL SITES										
	A	B	C	D	E	F	G	H	I	J	K
<ul style="list-style-type: none"> location of surface waterbodies adjacent to site 	<ul style="list-style-type: none"> Baby Creek flows southwesterly to the west of the site area. The site is located approximately 9 km upstream of the St. Clair River. 	<ul style="list-style-type: none"> There are no natural watercourses adjacent to or near the site. 	<ul style="list-style-type: none"> There are no natural watercourses adjacent to the site. 	<ul style="list-style-type: none"> There are no natural watercourses adjacent to the site. 	<ul style="list-style-type: none"> There are no natural watercourses adjacent to the site. 	<ul style="list-style-type: none"> Baby Creek flows southwesterly near the western boundary of the site. The site is located approximately 3 km upstream of the St. Clair River. 	<ul style="list-style-type: none"> Baby Creek flows southwesterly near the western boundary of the site. The site is located approximately 3 km upstream of the St. Clair River. 	<ul style="list-style-type: none"> Bowen's Creek and the St. Clair River flow southerly to the west of the site and Clay Creek to the east. 	<ul style="list-style-type: none"> Bowen's Creek and the St. Clair River flow southerly to the west of the site and Clay Creek to the east. 	<ul style="list-style-type: none"> St. Clair River is located approximately 800 m west of the site. Clay Creek is located approximately 1500 m east of the site 7 ha pond located immediately south of site. 	<ul style="list-style-type: none"> There are no natural watercourses adjacent to the site.
<ul style="list-style-type: none"> number of watersheds and characteristics 	<ul style="list-style-type: none"> Site drains to Baby Creek. Site topography is flat to depressional. 	<ul style="list-style-type: none"> Site drains to Clay Creek. Site topography is flat to depressional. 	<ul style="list-style-type: none"> Site drains to Clay Creek. Site topography is flat to depressional. 	<ul style="list-style-type: none"> Site drains to Clay Creek. Site topography is flat to depressional. 	<ul style="list-style-type: none"> Site drains to Clay Creek. Site topography is flat to depressional. 	<ul style="list-style-type: none"> Approximately an eighth of the site drains to Baby Creek. The remainder of the site drains to Clay Creek. Site topography is flat to depressional. 	<ul style="list-style-type: none"> The site drains to Baby Creek. Site topography is flat to depressional. 	<ul style="list-style-type: none"> Site drains to Bowen's Creek. Site topography is flat to depressional. 	<ul style="list-style-type: none"> Approximately half of the site drains to the drainage ditch located along the southeast property boundary. Site topography is flat to depressional. 	<ul style="list-style-type: none"> 100% of the site drains to the drainage ditch located along the southeast property boundary. Site topography is flat to depressional. 	<ul style="list-style-type: none"> Approximately 90% of the site drains to Clay Creek. The remaining 10% drains to Nichol Creek. Site topography is flat to depressional.
NATURAL ECOSYSTEMS											
Potential removal of natural ecosystems on-site											
<ul style="list-style-type: none"> area of moderate quality forest on-site 	0	0	0	8 ha	0	0	0	4 ha	0	0	10 ha
<ul style="list-style-type: none"> area of shrub woodland on-site 	4 ha	0	0	0	0	8 ha	45 ha	4 ha	0	11 ha	43 ha
<ul style="list-style-type: none"> total of the above 	4 ha	0	0	0	0	8 ha	45 ha	8 ha	0	11 ha	53 ha
Potential disruption of natural ecosystems off-site											
<ul style="list-style-type: none"> area of candidate sensitive area within 200 m of site 	0	20 ha (Payne Woodlot)	25 ha (Payne Woodlot)	0	0	0	0	3 ha (Bickford Woods)	1 ha (Bickford Woods)	15 ha	0
<ul style="list-style-type: none"> area of high quality forest within 200 m of site 	16 ha	0	0	10 ha	12 ha	3 ha	5 ha	0	6 ha	0	0
<ul style="list-style-type: none"> area of moderate quality forest within 200 m of site 	0	0	0	42 ha	12 ha	3 ha	0	0	0	0	25 ha
<ul style="list-style-type: none"> total of above 	16 ha	20 ha	25 ha	52 ha	24 ha	6 ha	5 ha	3 ha	7 ha	15 ha	25 ha

TABLE 6.8
DATA FOR COMPARATIVE EVALUATION OF
LONG LIST OF SITES
(Continued)

CRITERIA GROUPING / CRITERIA / INDICATOR	DATA FOR POTENTIAL SITES											
	A	B	C	D	E	F	G	H	I	J	K	
AGRICULTURE												
Potential removal of agricultural resource lands on-site												
• area of land designated in Official Plan for future agriculture use on-site	• 63 ha	• 0	• 0	• 0	• 0	• 75 ha	• 75 ha	• 0	• 0	• 0	• 0	• 18 ha
• area of current agricultural use on lands designated agricultural	• 59 ha	• 0	• 0	• 0	• 0	• 50 ha	• 30 ha	• 0	• 0	• 0	• 0	• 5 ha
Potential disruption of agricultural resource lands off-site												
• area of current agricultural use on lands designated agricultural within 500 m of the site	• 120 ha	• 52 ha	• 43 ha	• 10 ha	• 34 ha	• 170 ha	• 110 ha	• 0	• 0	• 20 ha	• 0	• 165 ha
OTHER RESOURCES												
Potential removal of mineral aggregate resources												
• area of mineral aggregate resources on-site	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0
Potential removal of timber agreement resources												
• area of timber agreements on-site	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0
SOCIAL/CULTURAL ENVIRONMENT												
Potential disruption to residents in site vicinity												
• number of residences within 500-1000 m of the site boundary	• 24	• 18	• 8	• 12	• 17	• 42	• > 100	• 0	• 1	• >100	• 8	• 8
• presence and extent of existing buffers	• No buffers between site and residences to the north and south.	• Woodlots north of site but no buffer between site and residences to the south.	• Woodlots south and west of site but no buffer between site and residences to the north.	• Woodlots north, east and west of site but no buffer between site and residences to the south.	• Some woodlots south of site but no buffers between site and residences to the north.	• Woodlots east and west of site but no buffers between site and residences to the north and south.	• Woodlots south, west and northeast of site.	• Woodlots north of site.	• Woodlots north of site.	• Woodlots north and south of site but residences to the north will not be completely buffered.	• Woodlots north and west of site but residences to the north will not be completely buffered.	• On-site woodlots and woodlots to east and west of site.

**TABLE 6.8
DATA FOR COMPARATIVE EVALUATION OF
LONG LIST OF SITES
(Continued)**

CRITERIA GROUPING / CRITERIA / INDICATOR	DATA FOR POTENTIAL SITES											
	A	B	C	D	E	F	G	H	I	J	K	
Potential disruption to community/recreation features in site vicinity												
• number and character of community/ recreation features within 500-1000 m of the site boundary	• 1 Golf Course	• 0	• 0	• Bowhunters Club	• 0	• 1 Golf Course • 1 Cemetery	• Community Hall • 1 Golf Course • Sports Complex • 6 churches • 1 school • Museum • Raceway • 2 cemeteries	• Ball Park	• 0	• Ball Park • Community Hall	• Bowhunters Club	
• presence and extent of existing buffers	• No buffers	• N/A	• N/A	• N/A	• N/A	• Very limited buffers between site and features	• some woodlot buffers between site and features (to Northwest)	• N/A	• N/A	• Some small woodlot buffers between site and features.	• N/A	
Potential disruption to residents along local access routes												
• number of residences along local access routes	• 18	• 7	• 7	• 0	• 0	• 0	• 0	• 0	• 0	• 0	• 0	
LAND USE												
Land Ownership												
• number of ownership parcels consumed by the site	• 9	• 5	• 7	• 1	• 6	• 5	• 4	• 5	• 2	• 4	• 2	
• number of land owners	• 9	• 5	• 6	• 1	• 3	• 4	• 3	• 2	• 1	• 4	• 2	
Compatibility with existing land use(s) on-site												
• existing land uses on-site	• Fifth of site is vacant industrial. Remaining area is agricultural.	• Agricultural.	• Agricultural	• Agricultural.	• Agricultural.	• Agricultural.	• Agricultural.	• Agricultural.	• Agricultural.	• Agricultural.	• Existing Moore Township landfill site (44 acres), remaining area is mostly wooded with some agricultural lands.	

**TABLE 6.8
DATA FOR COMPARATIVE EVALUATION OF
LONG LIST OF SITES
(Continued)**

	DATA FOR POTENTIAL SITES										
CRITERIA GROUPING / INDICATOR	A	B	C	D	E	F	G	H	I	J	K

Compatibility with future designated land use(s) on-site

- | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Fifth of site designated Industrial - Type Two. Remaining area is designated Agricultural. | <ul style="list-style-type: none"> • Industrial - Type Three. | <ul style="list-style-type: none"> • Industrial - Type Three. | <ul style="list-style-type: none"> • Industrial - Type Three. |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|

Compatibility with existing land use(s) in the site vicinity

- | | | | | | | | | | | | | |
|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • existing land uses within 0-500 m of the site | <ul style="list-style-type: none"> • Golf Course • Agricultural Lands • Novacor Chemicals Ltd. • Vacant Industrial Land | <ul style="list-style-type: none"> • Novacor Chemicals Ltd. • Union Gas Compressor Station • Agricultural Lands | <ul style="list-style-type: none"> • Moore Township Disposal Site • Agricultural Lands | <ul style="list-style-type: none"> • Agricultural Lands | <ul style="list-style-type: none"> • Agricultural Lands | <ul style="list-style-type: none"> • Agricultural Lands | <ul style="list-style-type: none"> • Industrial - Type Three | <ul style="list-style-type: none"> • Industrial - Type Three | <ul style="list-style-type: none"> • Industrial - Type Three. | <ul style="list-style-type: none"> • Industrial - Type Five. According to Section 9.9.3 of the Moore Township Official Plan, industrial uses which do not require water access shall not be permitted in the Industrial Type Five designation. | <ul style="list-style-type: none"> • "Waste Disposal Area" (% of site), remainder is agricultural. | |
| <ul style="list-style-type: none"> • existing land uses within 500-1000 m of the site | <ul style="list-style-type: none"> • Golf Course • Agricultural Lands • 24 Single Family Houses • Novacor Chemicals Ltd. • Moore Township. Works Garage | <ul style="list-style-type: none"> • Novacor Chemicals Ltd. • 18 Single Family Houses • 1 Commercial Use • Agricultural Lands | <ul style="list-style-type: none"> • 8 Single Family Houses • Agricultural Lands • Air Quality Monitoring Station • Novacor Chemicals Ltd. • Nova Refinery | <ul style="list-style-type: none"> • 12 Single Family Houses • Agricultural lands • Contractor's Yard • CKJD Radio Antenna | <ul style="list-style-type: none"> • 17 Single Family Houses • Agricultural Lands • 1 Commercial Use | <ul style="list-style-type: none"> • 42 Single Family Houses • Moore Township. Works Garage • MTO Storage Yard • St. Clair Pkwy Golf Course • Agricultural Lands | <ul style="list-style-type: none"> • > 100 Single Family Houses • Moore Township Works Garage • About 80% of Mooretown. • About 70% of Courtright. • Agricultural Lands • St. Clair Pkwy Golf Course • Closed Landfill Site • 2 Cemeteries • 6 Churches • 1 School • Mooretown Museum • Community Hall • Riverbend Raceway • 6 Commercial Uses • 2 Industrial Uses • Moore Sports Complex | <ul style="list-style-type: none"> • Trans Canada Pipeline Station • ICI Industrial Plant • Vacant Monsanto Industrial Plant | <ul style="list-style-type: none"> • ICI Industrial Plant • Agricultural Lands | <ul style="list-style-type: none"> • Agricultural lands • Lambton Generating Station • Watson Homecare Building Centre | <ul style="list-style-type: none"> • CKJD Radio Antenna • Agricultural Lands • 166814 Canada Ltd. (Abandoned Oil Fields) | <ul style="list-style-type: none"> • 8 Single Family Houses • Oil Storage Facility • 1 Commercial Use (Robbins Construction) • Agricultural Lands • 166814 Canada Ltd. (Abandoned Oil Field) |

**TABLE 6.8
DATA FOR COMPARATIVE EVALUATION OF
LONG LIST OF SITES
(Continued)**

CRITERIA GROUPING / CRITERIA / INDICATOR	DATA FOR POTENTIAL SITES										
	A	B	C	D	E	F	G	H	I	J	K
<p>Compatibility with future designated and proposed land use(s) in the site vicinity</p> <ul style="list-style-type: none"> Official Plan designations and development activity and/or proposals within 0-500 m of the site Official Plan designations and development activity and/or proposals within 500-1000 m of the site 	<ul style="list-style-type: none"> Agricultural (about 1/3), remainder is Industrial - Type Two, Industrial - Type Three, Major Open Space and Institutional. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three (about 1/4), remainder is Agricultural. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three (about 1/4), remainder is Agricultural. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three (about 9/10), remainder is Agricultural, and Waste Disposal Area. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three (about 1/4), remainder is Agricultural with a small area designated Waste Disposal Area. No current development proposals. 	<ul style="list-style-type: none"> Agricultural. No current development proposals. 	<ul style="list-style-type: none"> Mostly Agricultural with small areas designated Environmental Protection and Residential-Urban Single Family. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Two, Industrial - Type Three (Moore Township OP). Industrial (Sombra Township OP). No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three (Moore Township OP). Industrial (Sombra Township OP). No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Five, Industrial - Type Three (about 1/4), remaining area is Agricultural, Highway Commercial, and Service Commercial. No current development proposals. 	<ul style="list-style-type: none"> Agricultural (about 1/3), remainder is Industrial - Type Three. No current development proposals.
<ul style="list-style-type: none"> Official Plan designations and development activity and/or proposals within 500-1000 m of the site 	<ul style="list-style-type: none"> Agricultural (about 1/3), remainder is Industrial - Type Two, Industrial - Type Three, Major Open Space/ Institutional and Residential Urban Single Family. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three (about 1/4), remainder is Agricultural. One residential severance has been approved. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three, Industrial - Type Two (about 1/4), remainder is Agricultural. One industrial severance has been granted. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three (about 1/4), remainder is Agricultural and Waste Disposal Area. Two residential severances have been granted. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three (about 1/4), remainder is Agricultural with a small area designated "Waste Disposal Area". One residential severance has been granted. No current development proposals. 	<ul style="list-style-type: none"> Agricultural (about 1/3), remainder is Major Open Space/Institutional with small areas designated Industrial Type Two and Industrial Type Three. Three residential severances have been granted. No current development proposals. 	<ul style="list-style-type: none"> Mostly Agricultural with small areas designated Environmental Protection and Residential-Urban Single Family. No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Two, Industrial - Type Three (Moore Township OP) and Industrial, very small areas designated Open Space and Hazard Lands (Sombra Township OP). No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Three, small areas designated Agricultural, Environmental Protection, Industrial - Type Two (Moore Township OP). Industrial, small areas designated Rural (Sombra Township OP). No current development proposals. 	<ul style="list-style-type: none"> Industrial - Type Five, Industrial - Type Three (about 1/4), remaining area is Agricultural, Highway Commercial, and Service Commercial. No current development proposals. 	<ul style="list-style-type: none"> Agricultural (about 1/3), remainder is Industrial - Type Three. No current development proposals.
<p>ECONOMICS</p> <p>Potential disruption to businesses in site vicinity</p> <ul style="list-style-type: none"> number and character of businesses within 0-1000 m of site boundaries Williams Landscaping Ltd. 	<ul style="list-style-type: none"> Novacor Chemicals Ltd. Novacor Chemicals Ltd. 	<ul style="list-style-type: none"> Nova Comuna Plant Novacor 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 1 Commercial Use 	<ul style="list-style-type: none"> Contractor's Yard 	<ul style="list-style-type: none"> 4 Commercial Uses (retail stores and restaurants in Mooretown and Courtright. 	<ul style="list-style-type: none"> ICI Industrial Plant Vacant Monsanto Industrial Plant 	<ul style="list-style-type: none"> ICI Industrial Plant 	<ul style="list-style-type: none"> Contractor's Yard, Watson Homecare Building Centre, Airey Bowling Lanes and River Road Inn. 	<ul style="list-style-type: none"> Contractor's Yard 	<ul style="list-style-type: none"> Contractor's Yard

**TABLE 6.8
DATA FOR COMPARATIVE EVALUATION OF
LONG LIST OF SITES
(Continued)**

CRITERIA GROUPING / CRITERIA / INDICATOR	DATA FOR POTENTIAL SITES											
	A	B	C	D	E	F	G	H	I	J	K	
TRANSPORTATION												
Potential for impacts from hauling waste to candidate sites												
Annual tonne-kms travelled on public roads from waste centroids, to each landfill site	• 2.91	• 3.15	• 3.06	• 3.48	• 3.71	• 3.67	• 3.76	• 4.19	• 4.08	• 3.66	• 3.60	
FACILITY DEVELOPMENT/OPERATING COST												
Site capital/operating cost												
• approximate distance to and availability of Municipal water and sewers	• 750 mm Ø watermain along east edge, 450 mm Ø watermain to north and south.	• 1350 m to 750 mm Ø watermain to west, 650 m to 200 mm Ø watermain to north.	• 550 m to 200 mm Ø watermain to south of site, 1350 m to 750 mm Ø watermain to west.	• 500 m to 250 mm Ø watermain to south (along Highway 80).	• 650 m to 150 mm Ø watermain to north.	• 750 mm Ø watermain along east edge of site.	• 600 mm to 750 mm Ø watermain at east, 700 m to 450 mm Ø watermain at north, 1200 m to 300 mm Ø at south.	• 600 mm Ø watermain along east and south edge of site.	• 600 mm Ø watermain along west edge of site.	• 500 m to 250 mm Ø watermain to the north and a 1000 m to 600 m Ø watermain to the east.	• 450 m to 250 mm Ø watermain to the south, 1350 m to 150 mm Ø watermain to the north.	
• ease of development of landfill	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.	• High - flat site.
• availability of cover material	• Suitable on-site soil.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.	• Suitable on-site soils.
• proximity to receiving body	• Baby Creek is located 500 m to the west.	• Agricultural drain flows south along east edge of site.	• No natural watercourses adjacent to or near the site.	• Agricultural drain flows along the north edge of site.	• Agricultural drain flows west along the south edge of site.	• Agricultural drain flows along east edge of site.	• Baby Creek flows southwesterly near western edge of site.	• Bowen's Creek and the St. Clair River flows southerly to the west and Clay Creek to the east.	• Bowen's Creek and the St. Clair River flows southerly to the west and Clay Creek to the east.	• Clay Creek is located within 500 m to the east.	• Agricultural drain flows south along west edge of site.	
• total annual vehicle km (millions)	• 0.58	• 0.63	• 0.61	• 0.70	• 0.74	• 0.73	• 0.75	• 0.84	• 0.82	• 0.73	• 0.72	
• total length along local access road requiring road upgrade and new access road required	• 4.1	• 3.5	• 2.7	• 0.5	• 1.8	• 1.6	• 2.4	• 0	• 0	• 0.6	• 0.9	
• estimated total present value cost (\$ millions) (only includes costs which differ among the sites)	• 11.8	• 11.8	• 11.4	• 10.8	• 12.3	• 12.0	• 12.9	• 12.5	• 12.2	• 11.5	• 11.4	

TABLE 6.9
LONG LIST OF SITES COMPARISON
PUBLIC WORKSHOP
CRITERIA GROUP/CRITERIA RANKING

Criteria Group/Criterion	High	Moderate	Low	Abstentions
Hydrogeology	15/17	2/17		
• potential for contamination of ground water ¹	13/17	1/17	1/17	2/17
Surface Water	13/17	4/17		
• potential for contamination of surface water and downstream flooding	13/17	4/17		
Natural Ecosystems	9/17	6/17	2/17	
• potential removal of natural ecosystems on site	6/17	9/17	2/17	
• potential disruption of natural ecosystems off site	7/17	9/17	1/17	
Agriculture	6/17	9/17	2/17	
• potential removal of agricultural resource lands on site	6/17	8/17	3/17	
• potential disruption of agricultural resource lands off site	9/17	8/17		
Other Resources²				
• potential removal of mineral aggregate resources on site	-	-	-	
• potential removal of timber agreement resources on site	-	-	-	
Social Cultural	15/17	2/17		
• potential disruption to residents in site vicinity	15/17	2/17		
• potential disruption to community/recreation features in site vicinity	10/17	6/17	1/17	
• potential disruption to residents along local access routes	10/17	7/17		
• potential disruption to community/recreation features along access routes	no features identified so ranking not required			
• potential effects on school bus routes	8/16 ³	5/16	3/16	
• potential disruption of heritage features	no features identified so ranking not required			
• potential for buffering of facility ⁴	10/16	2/16	4/16	

TABLE 6.9
LONG LIST OF SITES COMPARISON
PUBLIC WORKSHOP
CRITERIA GROUP/CRITERIA RANKING
(Continued)

Criteria Group/Criterion	High	Moderate	Low	Abstentions
Land Use	10/16	5/16		1/16
• land ownership ⁵	6/16	5/16	5/16	
• compatibility with existing land use(s) on site	5/16	10/16		1/16
• compatibility with future designated land use(s) on site	5/16	9/16	1/16	1/16
• compatibility with existing land use(s) in the site vicinity	8/16	7/16		1/16
• compatibility with future designated land use(s) in the site vicinity	8/16	6/16	1/16	1/16
Economics	7/16	3/16	6/16	
• potential disruption to business in the site vicinity		criteria ranking not required for one criteria		
Transportation	1/16	11/16	4/16	
• potential for impacts from hauling waste to candidate sites ⁶		criteria ranking not required for one criteria		
Costs	8/16	5/16	3/16	
• site capital/operating costs ⁷		criteria ranking not required for one criteria		

1. The hydrogeology criteria group was divided into three criteria after the criteria ranking by the public. All three criteria were considered to be of equal importance.
2. No other resources were identified on the potential sites, therefore, ranking not required.
3. From this point on, the total number of participants was reduced to 16, as one member had to leave early.
4. This criterion was changed to an indicator for criteria 1 and 2 within the Social/Cultural criteria group.
5. Originally there were two separate "land ownership" criteria ranked by the public. These were combined into one and moved from the social criteria group to the land use criteria group after the workshops.
6. Originally there were two separate criteria within the transportation criteria group. To simplify the transportation assessment, they were combined into one criteria.
7. The cost criteria group originally contained two separate criteria. These were combined into one criteria to simplify the cost assessment.

**TABLE 6.10
LONG LIST OF SITES COMPARISON
CRITERIA GROUP/CRITERIA RANKINGS BY STUDY TEAM**

Criteria Group/Criterion	Ranking
Hydrogeology	• High
<ul style="list-style-type: none"> • Local/regional aquifer • Local ground water use • On-site hydrogeologic conditions 	<ul style="list-style-type: none"> • Rank equally • Rank equally • Rank equally
Surface Water	• High
<ul style="list-style-type: none"> • Potential for contamination of surface water and downstream flooding 	<ul style="list-style-type: none"> • Only one criteria so ranking not applicable
Social/Cultural	• High
<ul style="list-style-type: none"> • Potential disruption to residents in site vicinity • Potential disruption to community/recreation features • Potential disruption to residents along local access routes • Potential for buffering of landfill effects 	<ul style="list-style-type: none"> • High • High/moderate • High/moderate • High
Natural Ecosystems	• High/moderate
<ul style="list-style-type: none"> • Potential removal of natural ecosystems on-site • Potential disruption of natural ecosystems off-site • Potential removal of agricultural resource lands on-site • Potential disruption of agricultural resource lands off-site 	<ul style="list-style-type: none"> • Ranked equally • Ranked equally • Ranked equally • Ranked equally
Agriculture	• High/moderate
<ul style="list-style-type: none"> • Potential removal of agriculture resource lands on-site • Potential disruption of agricultural resource lands off-site 	<ul style="list-style-type: none"> • Ranked equally • Ranked equally
Land Use	• High/moderate
<ul style="list-style-type: none"> • Land ownership • Compatibility with existing land use(s) on-site • Compatibility with future designated land use(s) on-site • Compatibility with existing land use(s) in the site vicinity • Compatibility with future designated and proposed land use(s) in the site vicinity 	<ul style="list-style-type: none"> • Ranked equally • Ranked equally • Ranked equally • Ranked equally • Ranked equally
Landfill Development/Operation Cost	• High/moderate
<ul style="list-style-type: none"> • Site capital/operating cost 	<ul style="list-style-type: none"> • Ranking not required as only one criteria
Transportation	• Moderate
<ul style="list-style-type: none"> • Potential for impacts for hauling waste to candidate sites 	<ul style="list-style-type: none"> • Ranking not required as only one criteria
Economics	• Moderate
<ul style="list-style-type: none"> • Potential disruption to businesses in site vicinity 	<ul style="list-style-type: none"> • Ranking not required as only one criteria

**TABLE 6.11
SUMMARY OF SITE RANKINGS BY CRITERIA GROUP**

Criteria Groups (Organized by Weights)	Sites										
	A	B	C	D	E	F	G	H	I	J	K
High											
Hydrogeology*	-	-	-	-	-	-	-	-	-	-	-
Surface Water*	-	-	-	-	-	-	-	-	-	-	-
Social	H	M	L	L	M	H	H	L	L	H	L
High/Moderate											
Natural Ecosystems	L	M	M	M	L	L	H	M	L	M	H
Agriculture	H	L	L	L	L	H	H	L	L	L	M
Land Use	H	M	M	L	M	H	H	L	L	H	L
Cost (millions)**	11.8	11.8	11.4	10.9	12.3	12.0	12.9	12.5	12.2	11.5	11.4
Moderate											
Transportation	L	L	L	M	M	M	M	H	H	M	M
Economics	L	L	L	L	L	L	M	L	L	M	L

NOTE:

- * All sites were considered to be equal with respect to the ground water and surface water criteria groups.
- ** Cost criteria group did not rank sites into high, medium or low categories but used actual cost estimates (in millions).

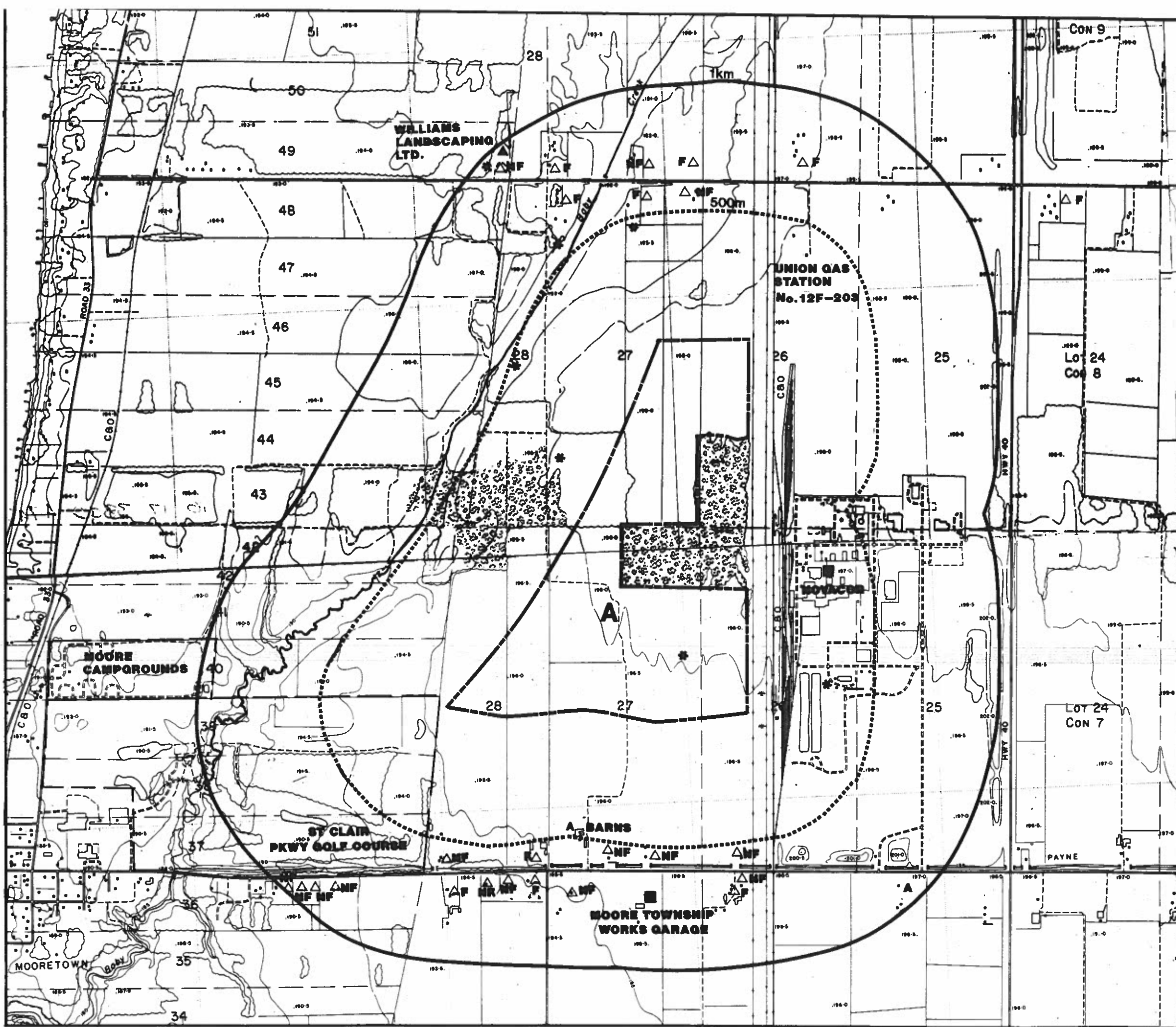
H = High Impact/Cost
M = Moderate Impact/Cost
L = Low Impact/Cost

**TABLE 6.12
CONCORDANCE MATRIX FOR COMPARISON OF SITES A TO K**

	A	B	C	D	E	F	G	H	I	J	K	SUM
A		.28	.28	.31	.24	.53	.71	.31	.24	.56	.31	3.77
B	.72		.35	.31	.46	.75	1.00	.31	.24	.78	.46	5.38
C	.72	.65		.46	.60	.75	1.00	.53	.38	.78	.60	6.47
D	.69	.69	.54		.72	.79	.97	.60	.53	.75	.65	6.93
E	.76	.54	.40	.28		.79	.90	.38	.31	.82	.43	5.61
F	.47	.25	.25	.21	.21		.60	.31	.24	.53	.28	3.35
G	.29	0.00	0.00	.03	.10	.40		.13	.13	.28	.10	1.46
H	.69	.69	.47	.40	.62	.69	.87		.43	.65	.54	6.05
I	.76	.76	.62	.47	.69	.76	.87	.57		.72	.62	6.84
J	.44	.22	.22	.25	.18	.47	.72	.35	.28		.40	3.53
K	.69	.54	.40	.35	.57	.72	.90	.46	.38	.60		5.61

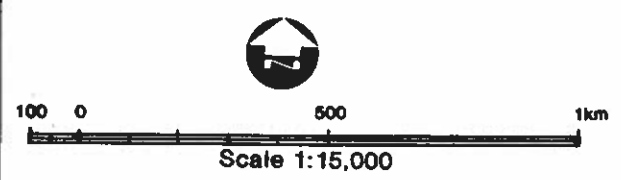
**TABLE 6.13
SUMMARY OF ADVANTAGES AND DISADVANTAGES
OF SITES A, B, C, D, E, F, H, I, J, K**

Site	Advantages	Disadvantages
Site A	<ul style="list-style-type: none"> • most preferred in terms of the natural ecosystems, transportation and economic criteria groups 	<ul style="list-style-type: none"> • least preferred with respect to the social, agriculture and land use criteria groups
Site B	<ul style="list-style-type: none"> • most preferred in terms of the agriculture, transportation and economic criteria groups 	<ul style="list-style-type: none"> • no significant disadvantages
Site C	<ul style="list-style-type: none"> • most preferred in terms of the social, agriculture, transportation and economic criteria groups 	<ul style="list-style-type: none"> • no significant disadvantages
Site D	<ul style="list-style-type: none"> • most preferred with respect to the social, agriculture, land use, and economic criteria groups 	<ul style="list-style-type: none"> • no significant disadvantages
Site E	<ul style="list-style-type: none"> • most preferred with respect to natural ecosystem, agriculture and economic criteria groups 	<ul style="list-style-type: none"> • no significant disadvantages
Site F	<ul style="list-style-type: none"> • most preferred with respect to the natural ecosystem and economic criteria groups 	<ul style="list-style-type: none"> • least preferred with respect to the social, agriculture and land use criteria groups
Site H	<ul style="list-style-type: none"> • most preferred with respect to the social, agriculture, land use and economic criteria groups 	<ul style="list-style-type: none"> • least preferred with respect to the transportation criteria group
Site I	<ul style="list-style-type: none"> • most preferred with respect to social, natural ecosystems, agriculture, land use and economic criteria groups 	<ul style="list-style-type: none"> • least preferred with respect to the transportation criteria group
Site J	<ul style="list-style-type: none"> • most preferred with respect to agriculture 	<ul style="list-style-type: none"> • least preferred with respect to the Social, Land Use and Economics criteria groups
Site K	<ul style="list-style-type: none"> • most preferred with respect to the social, land use and economic criteria groups 	<ul style="list-style-type: none"> • least preferred with respect to the natural ecosystem criteria group

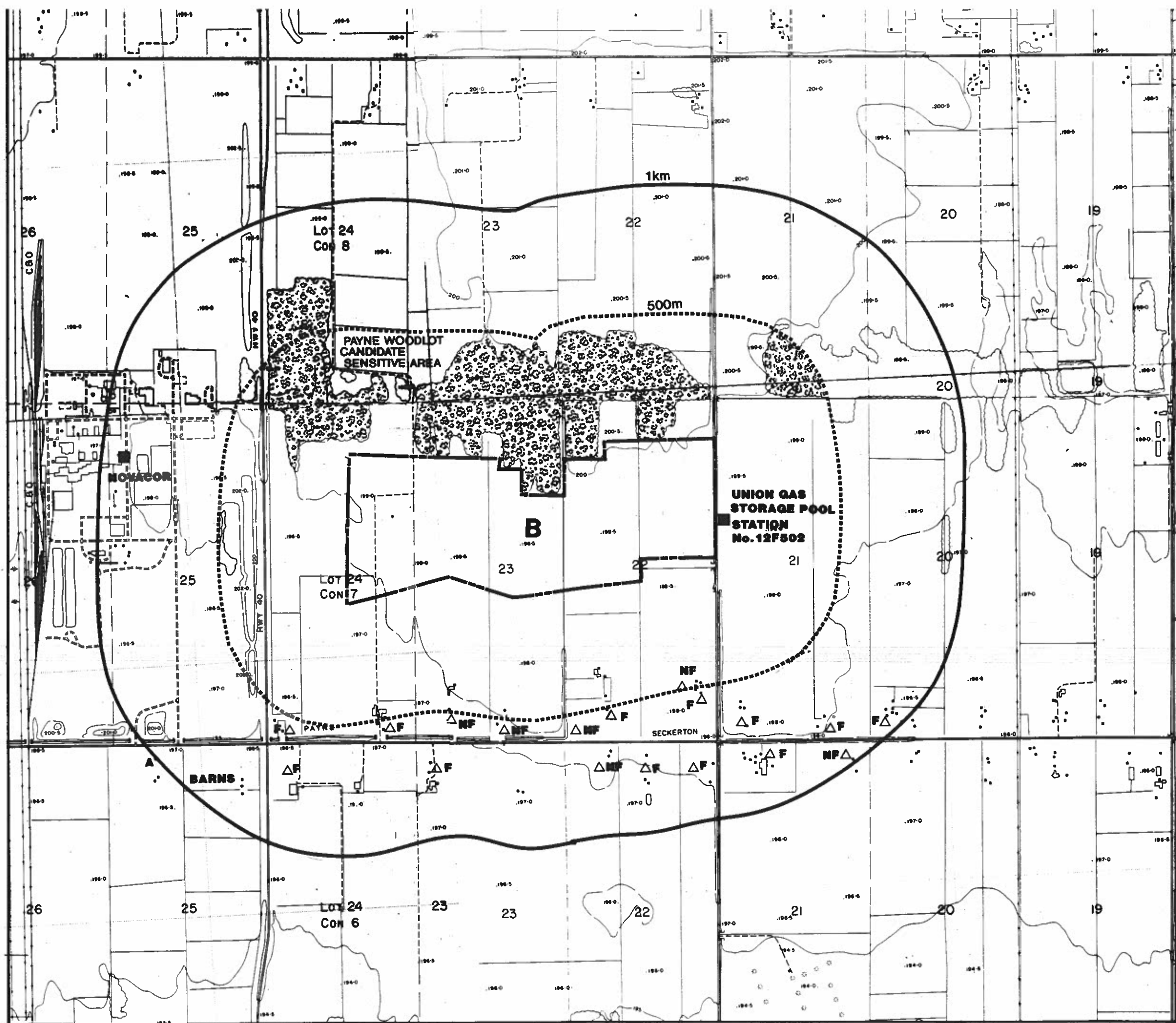


LEGEND

- △ RESIDENCE (F-FARM, NF-NON-FARM)
- ▲ INDICATES ABANDONED LAND USE
- ▲ COMMERCIAL
- INDUSTRIAL
- ◆ INSTITUTIONAL
- RADIO ANTENNA
- AGRICULTURAL
- HIGH QUALITY FOREST
- * WELLS
- SITE BOUNDARY
- 500m STUDY AREA
- 1km STUDY AREA

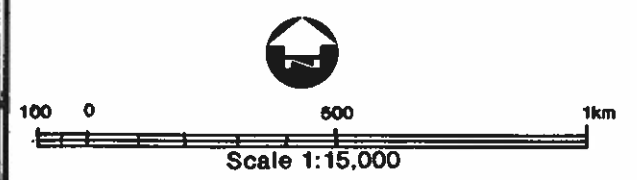


**CANDIDATE SITE A
LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN**

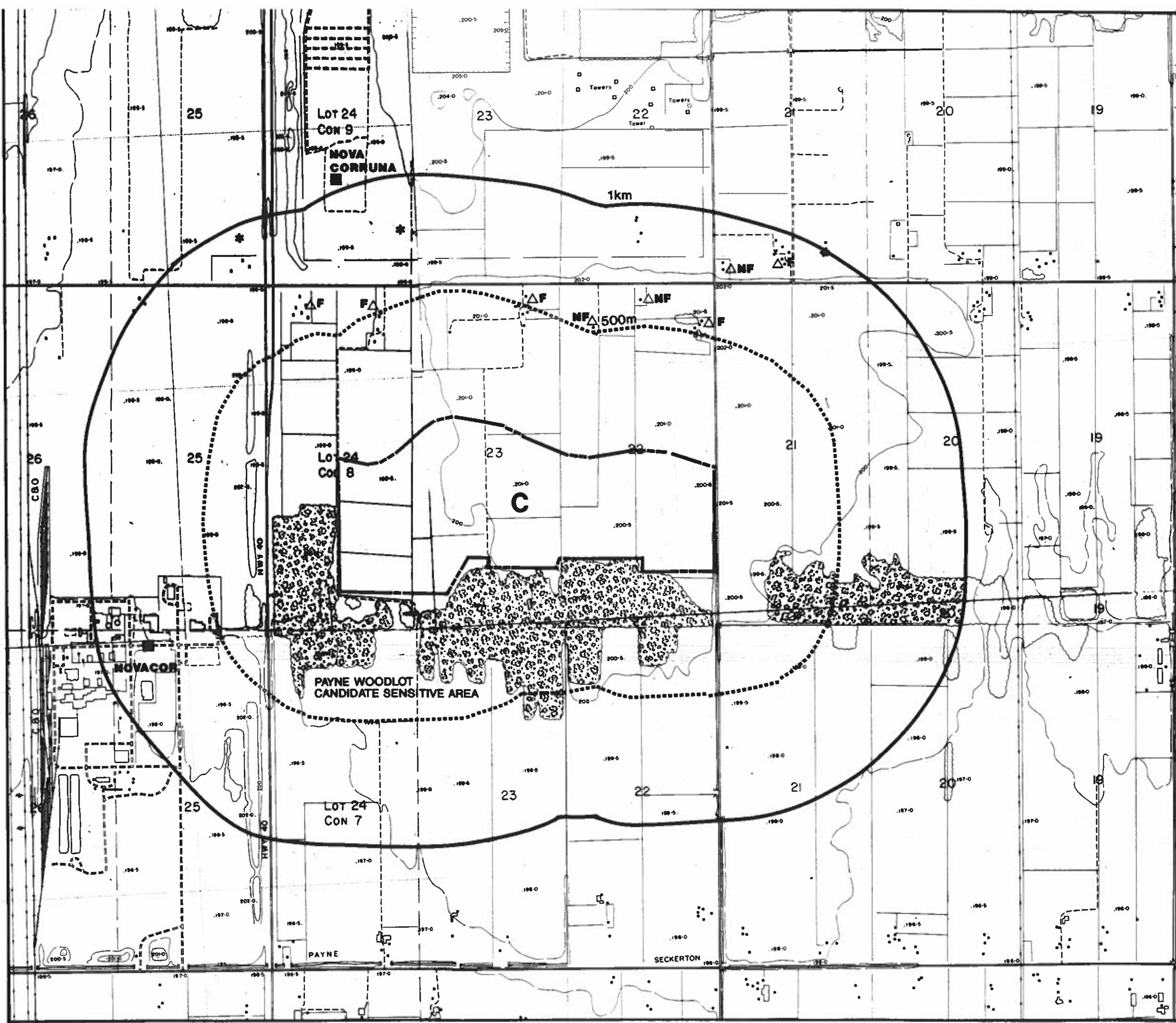


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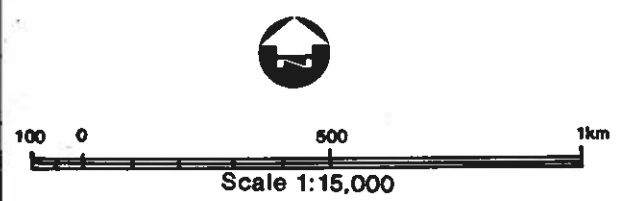
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- ▲ COMMERCIAL
- INDUSTRIAL
- ◆ INSTITUTIONAL
- RADIO ANTENNA
- AGRICULTURAL
- HIGH QUALITY FOREST
- * WELLS
- SITE BOUNDARY
- 500m STUDY AREA
- 1km STUDY AREA



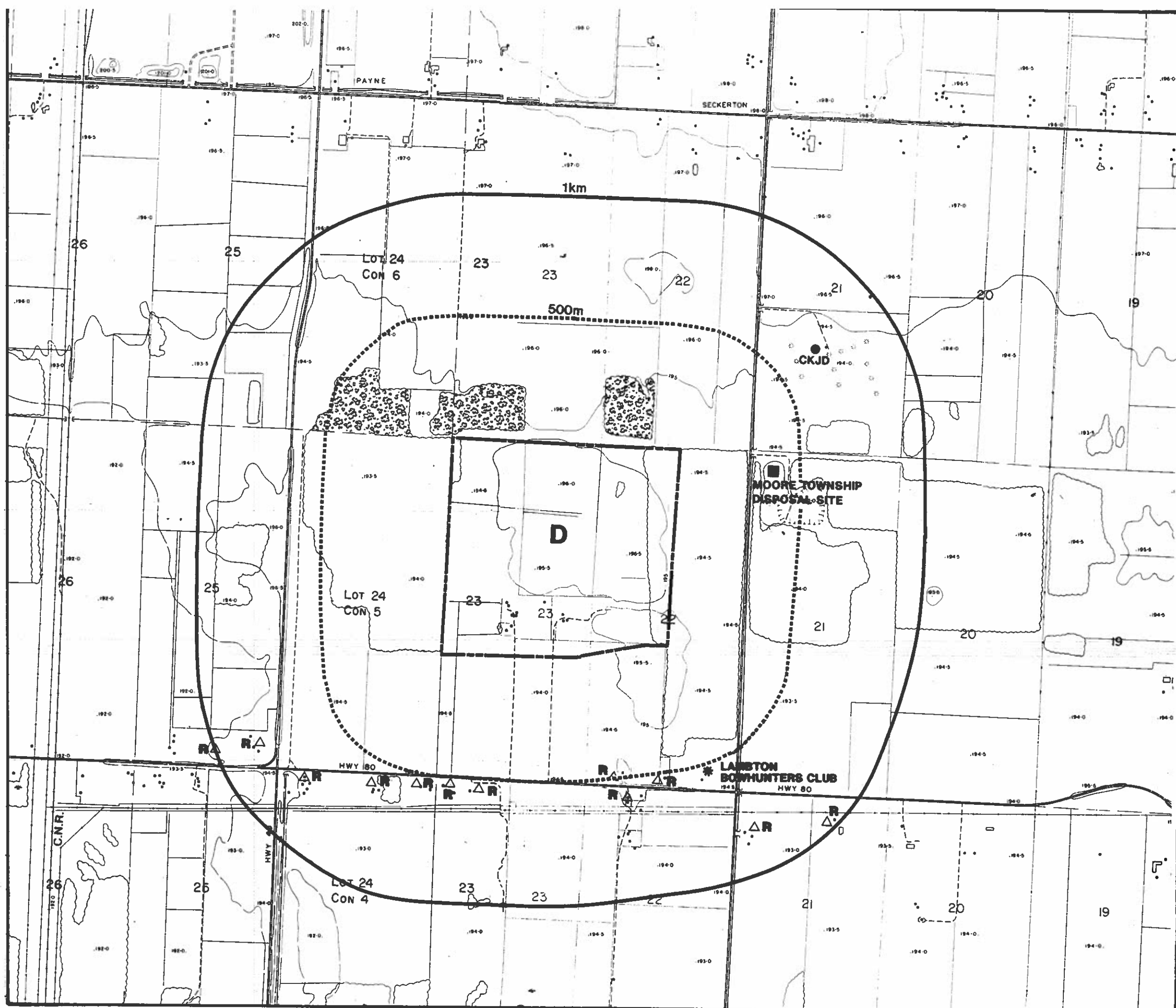
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LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN**



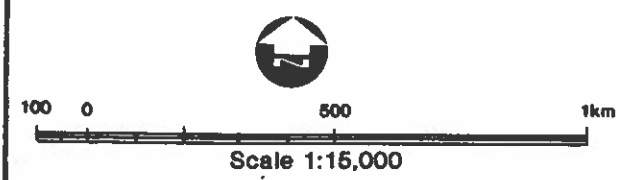
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 - ▲ INDICATES ABANDONED LAND USE
 - ▲ COMMERCIAL
 - INDUSTRIAL
 - ◆ INSTITUTIONAL
 - RADIO ANTENNA
 - AGRICULTURAL
 - ⊞ HIGH QUALITY FOREST
 - * WELLS
 - SITE BOUNDARY
 - ⋯ 500m STUDY AREA
 - 1km STUDY AREA



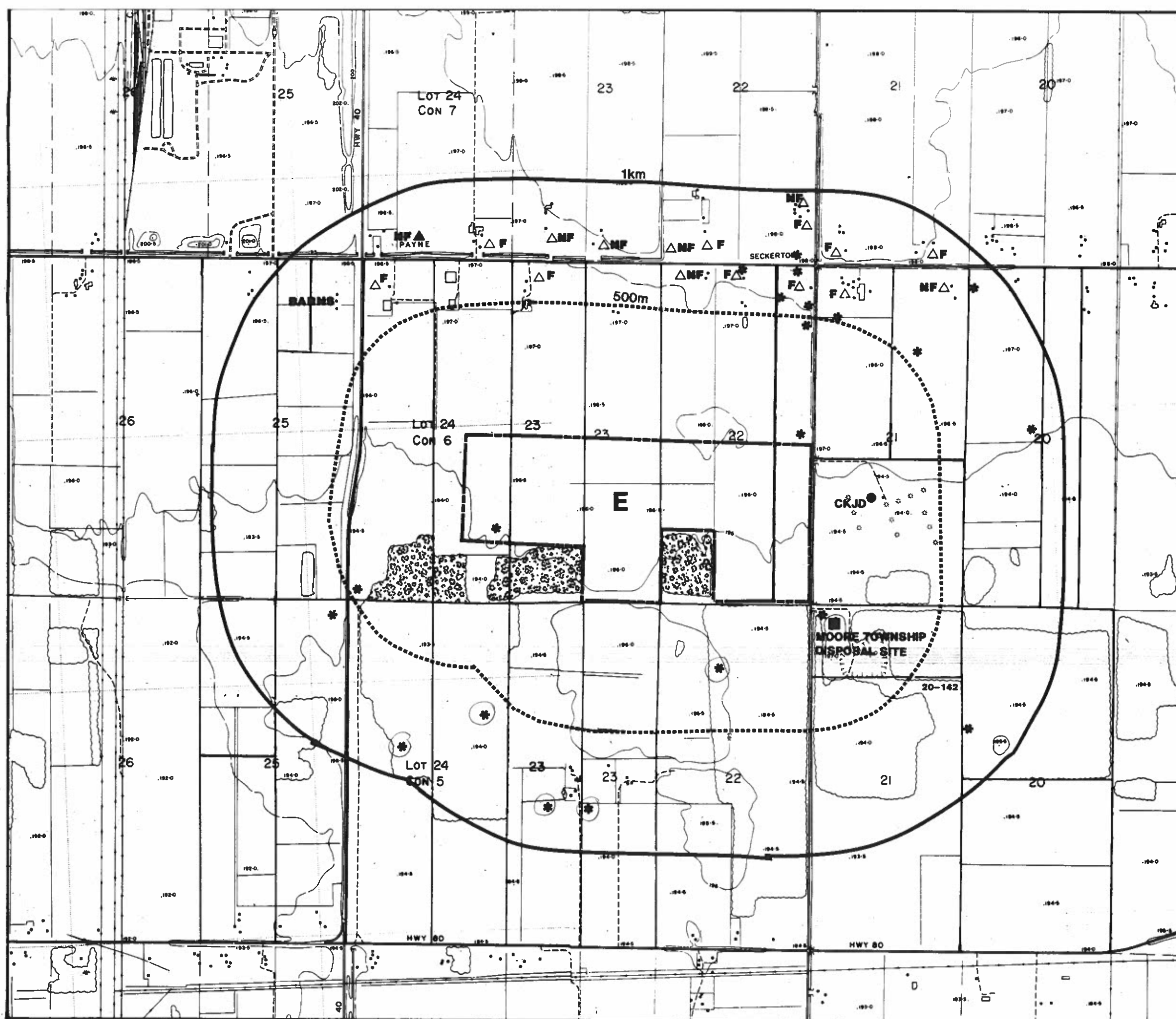
**CANDIDATE SITE C
LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN**



- LEGEND**
- △ R RESIDENCE
 - ▲ INDICATES ABANDONED LAND USE
 - ▲ COMMERCIAL
 - INDUSTRIAL
 - ◆ INSTITUTIONAL
 - RADIO ANTENNA
 - AGRICULTURAL
 - ▨ HIGH QUALITY FOREST
 - * COMMUNITY FEATURES
 - SITE BOUNDARY
 - 500m STUDY AREA
 - 1km STUDY AREA

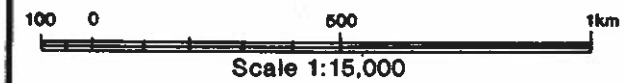


CANDIDATE SITE D
LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN



LEGEND

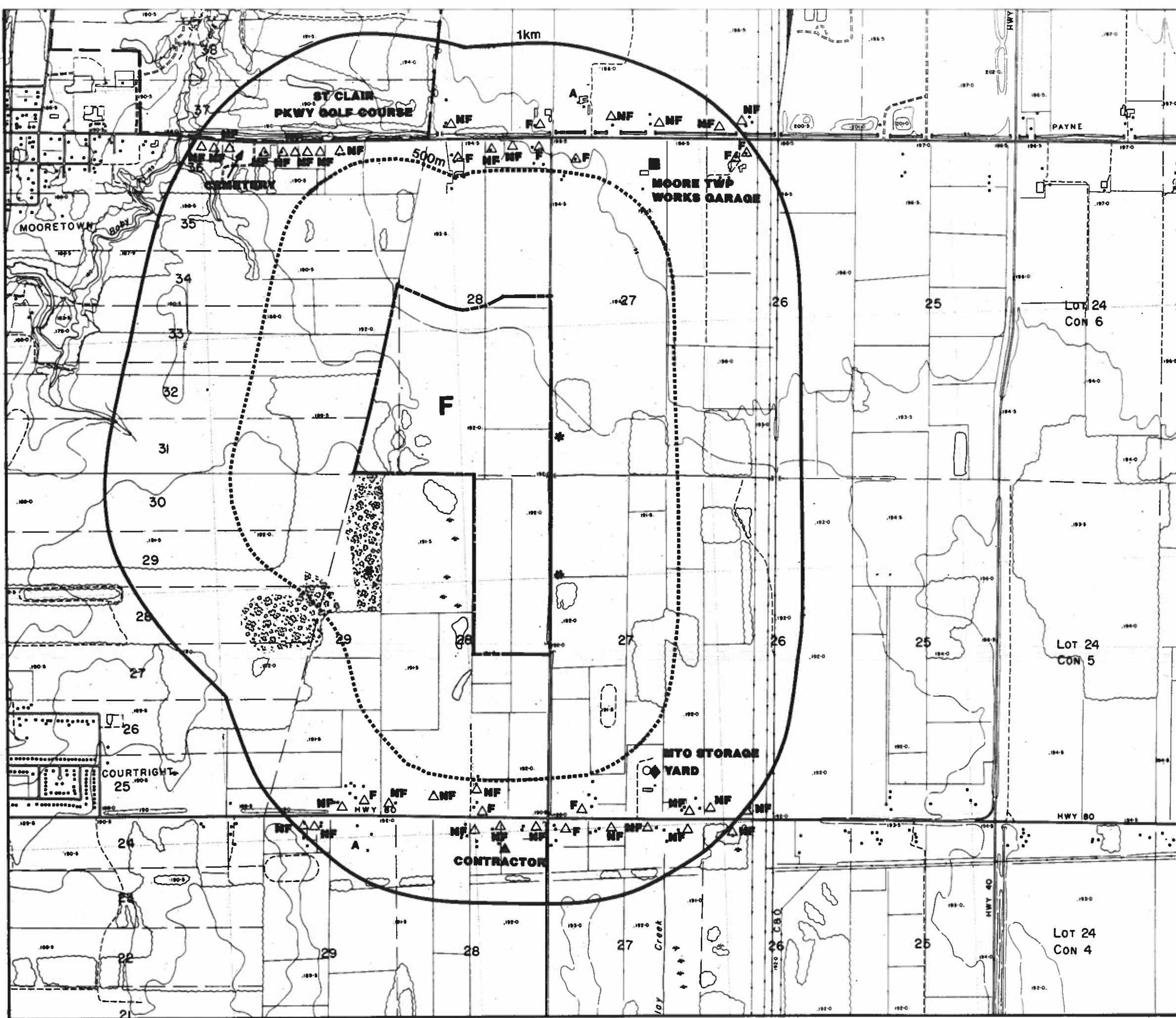
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- ▲ COMMERCIAL
- INDUSTRIAL
- ◆ INSTITUTIONAL
- RADIO ANTENNA
- AGRICULTURAL
- ⊞ HIGH QUALITY FOREST
- * WELLS
- SITE BOUNDARY
- 500m STUDY AREA
- 1km STUDY AREA



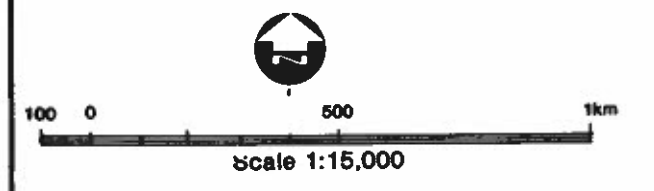
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LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN**

Project No.9928

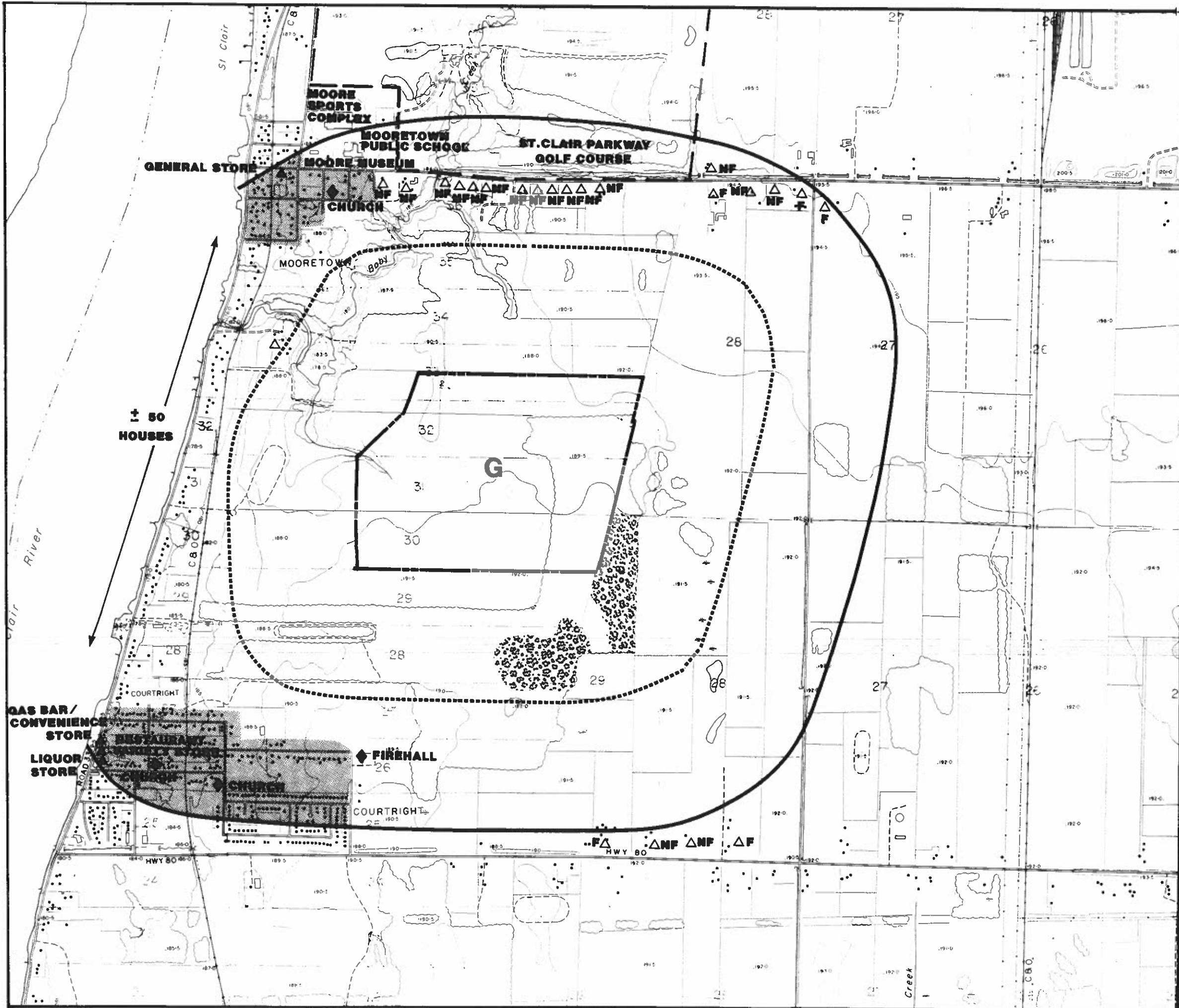
FIGURE No. 6.14



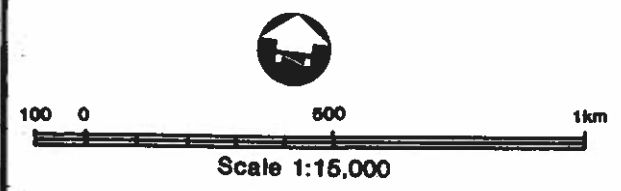
- LEGEND**
- △ RESIDENCE (F-FARM, NF-NON-FARM)
 - A INDICATES ABANDONED LAND USE
 - ▲ COMMERCIAL
 - INDUSTRIAL
 - ◆ INSTITUTIONAL
 - RADIO ANTENNA
 - AGRICULTURAL
 - High Quality Forest Symbol HIGH QUALITY FOREST
 - * WELLS
 - SITE BOUNDARY
 - 500m STUDY AREA
 - 1km STUDY AREA



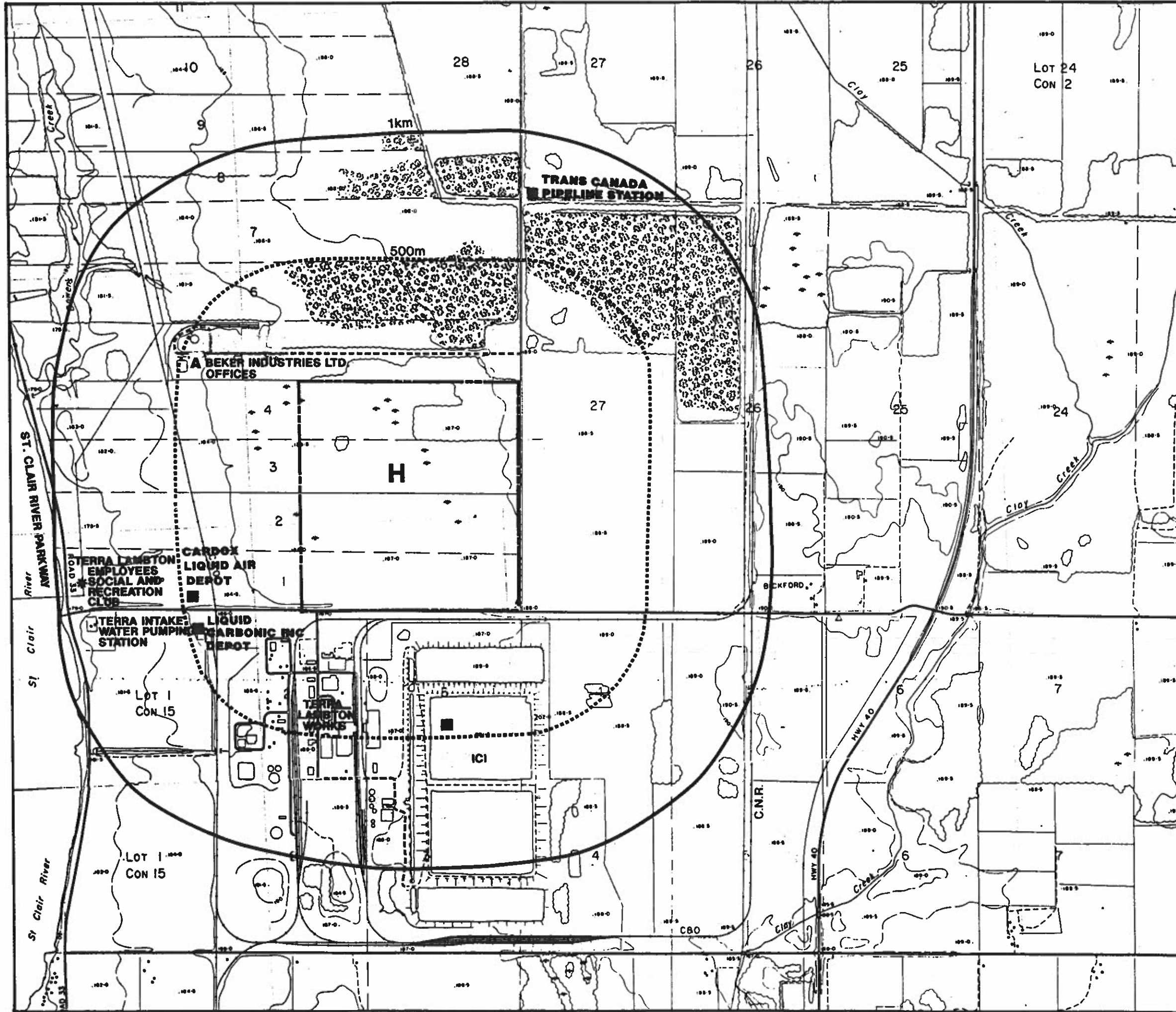
CANDIDATE SITE F
LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN



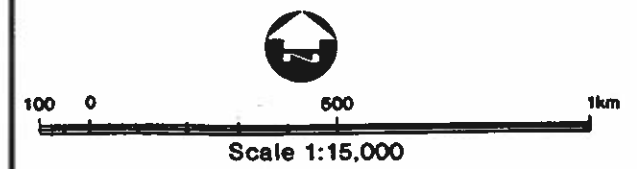
- LEGEND**
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 - BUILT-UP AREAS
 - ▲ INDICATES ABANDONED LAND USE
 - ▲ COMMERCIAL
 - INDUSTRIAL
 - ◆ INSTITUTIONAL
 - RADIO ANTENNA
 - AGRICULTURAL
 - HIGH QUALITY FOREST
 - WELLS
 - SITE BOUNDARY
 - ⋯ 500m STUDY AREA
 - 1km STUDY AREA



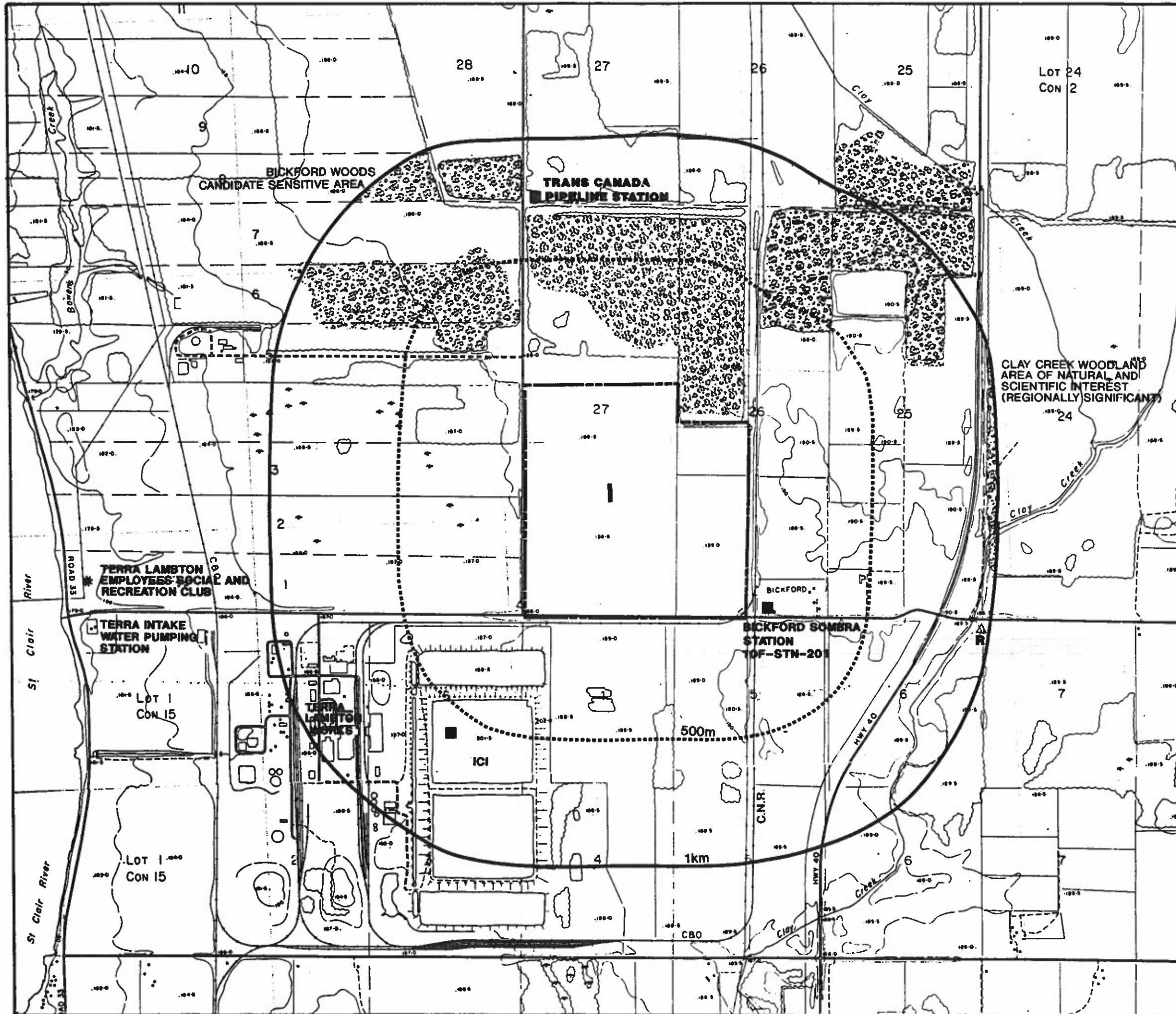
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LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN**



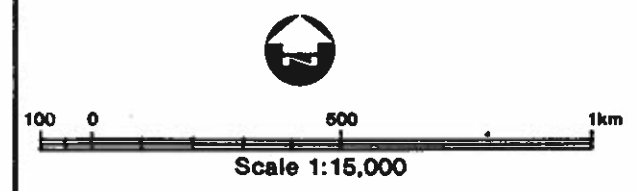
- LEGEND**
- △ R RESIDENCE
 - A INDICATES ABANDONED LAND USE
 - ▲ COMMERCIAL
 - INDUSTRIAL
 - ◆ INSTITUTIONAL
 - RADIO ANTENNA
 - AGRICULTURAL
 - ▨ HIGH QUALITY FOREST
 - * COMMUNITY FEATURES
 - SITE BOUNDARY
 - ⋯ 500m STUDY AREA
 - 1km STUDY AREA



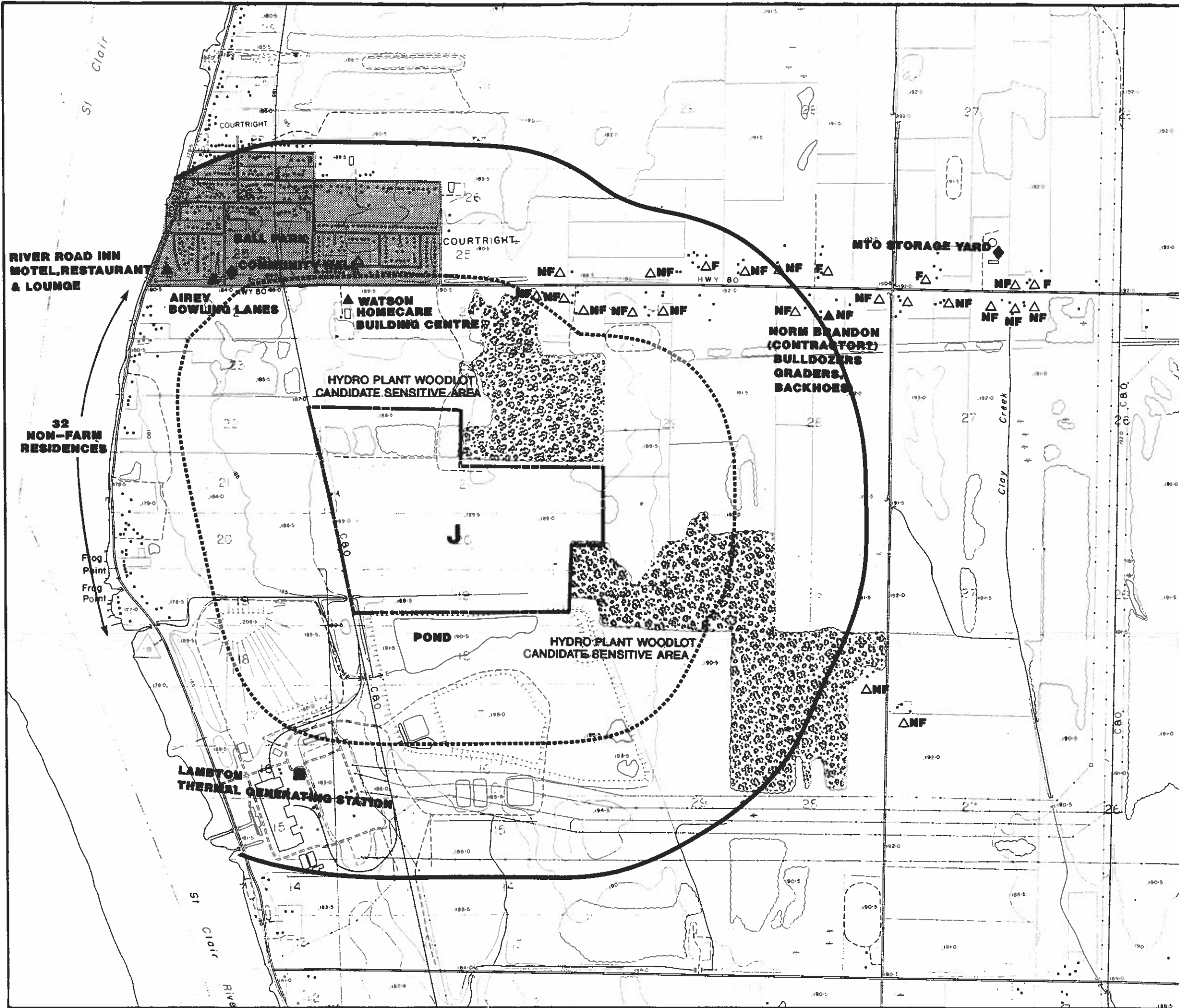
CANDIDATE SITE H
LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN



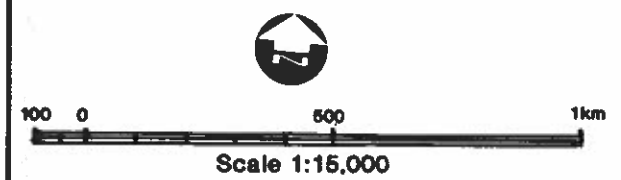
- LEGEND**
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 - ▲ INDICATES ABANDONED LAND USE
 - ▲ COMMERCIAL
 - INDUSTRIAL
 - ◆ INSTITUTIONAL
 - RADIO ANTENNA
 - AGRICULTURAL
 - ⊞ HIGH QUALITY FOREST
 - * COMMUNITY FEATURES
 - SITE BOUNDARY
 - ⋯ 500m STUDY AREA
 - 1km STUDY AREA



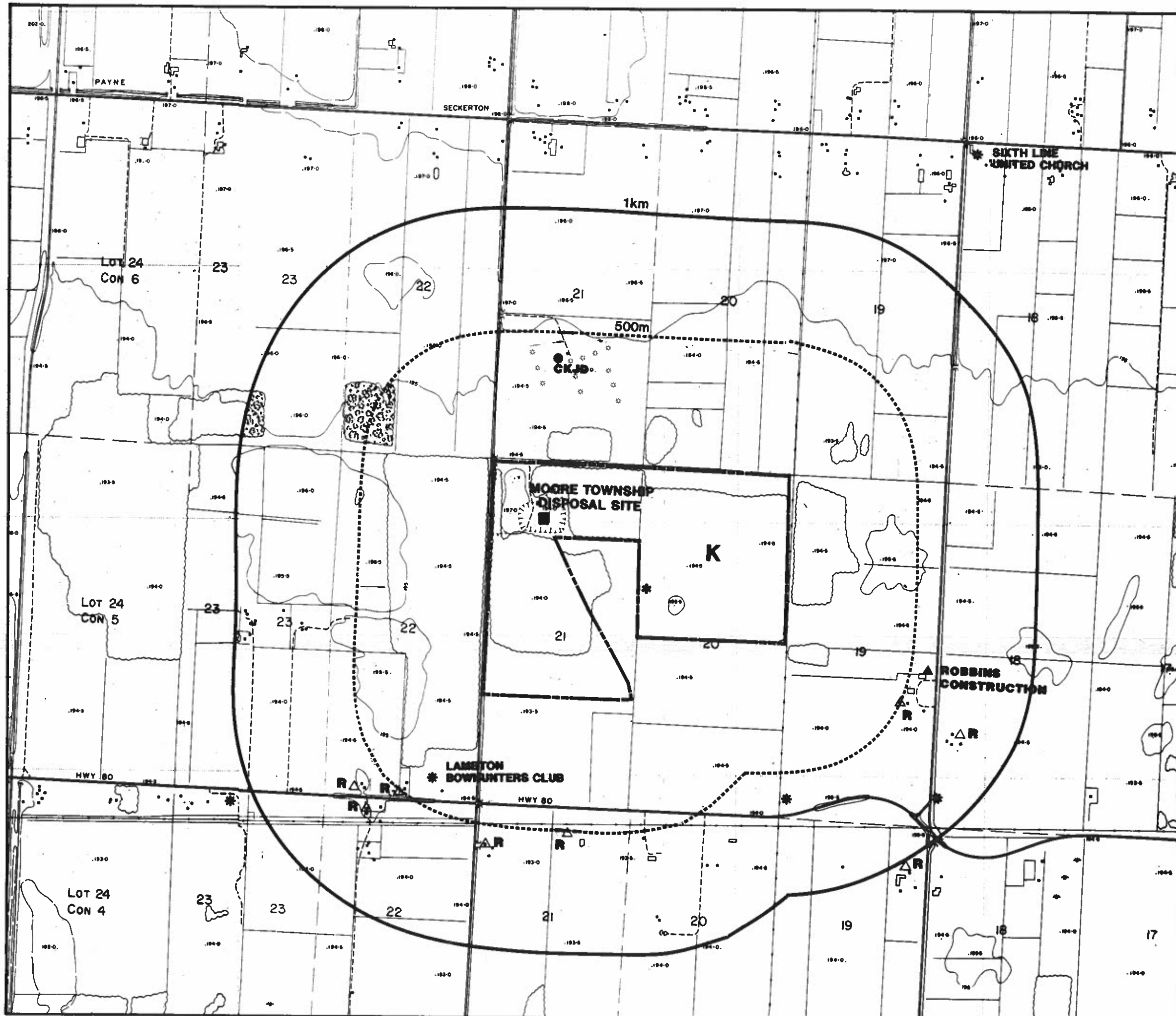
**CANDIDATE SITE 1
LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN**



- LEGEND**
- △ RESIDENCE (F-FARM, NF-NON-FARM)
 - BUILT-UP AREAS
 - ▲ INDICATES ABANDONED LAND USE
 - ▲ COMMERCIAL
 - INDUSTRIAL
 - ◆ INSTITUTIONAL
 - RADIO ANTENNA
 - AGRICULTURAL
 - 🌲 HIGH QUALITY FOREST
 - * WELLS
 - SITE BOUNDARY
 - ⋯ 500m STUDY AREA
 - 1km STUDY AREA

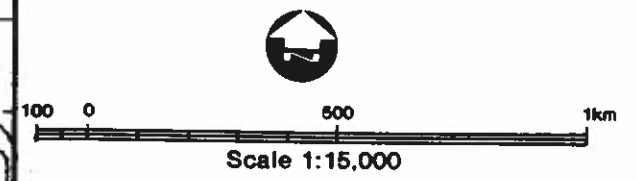


**CANDIDATE SITE J
LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN**



LEGEND

- △ R RESIDENCE
- A INDICATES ABANDONED LAND USE
- ▲ COMMERCIAL
- INDUSTRIAL
- ◆ INSTITUTIONAL
- RADIO ANTENNA
- AGRICULTURAL
- ⊘ HIGH QUALITY FOREST
- * COMMUNITY FEATURES
- SITE BOUNDARY
- - - 500m STUDY AREA
- 1km STUDY AREA



**CANDIDATE SITE K
LAMBTON COUNTY
WASTE MANAGEMENT
MASTER PLAN**

6.8 Comparative Evaluation of Short List of Sites

6.8.1 Introduction

The purpose of this step was to assess and compare the short list of four sites which had been identified as having the best potential for a long-term composite waste management facility. The objective was to identify a preferred site which would be carried forward for detailed on-site investigations pursuant to *Environmental Protection Act* (EPA) and other relevant approvals requirements.

Similar to the evaluation of the long list of sites, the comparison of the short list was accomplished through the following activities:

- the relevant criteria and associated indicators to be used as a basis to assess each site were identified (see Table 6.14 provided at the end of Section 6.8);
- information about each site was collected and recorded according to the relevant criteria and indicators and each site was assessed from each disciplines' perspective;
- the relative "weight" or importance of the various criteria groups were established;
- through a qualitative and quantitative evaluation approach, the most preferred to least preferred sites with respect to each criteria group were identified based on the data collected, taking into account relative criteria "weights" where applicable; and
- a preferred site was identified based on the preferences identified by each criteria group and taking into account the relative importance accorded to the criteria groups.

6.8.2 Impact Analysis

The approach used to analyze environmental impacts was specific to each criteria group. Data was collected and interpreted, net effects were generated, the sites were compared, and ranked in order of preference by each criteria group. Appendices 4A to 4H in Volume 4 (Site Selection Appendices) present the detailed assessment of the four short listed sites carried out according to each criteria group. These Appendices contain the net effect tables. Although conceptual designs were developed for each of the sites, due to the generic nature of impact management measures at this stage of the analysis, the site evaluations conducted by each criteria group were primarily based on the data. Table 6.15 (at the end of Section 6.8) presents the data by criteria for each of the four short listed sites.

6.8.3 Comparative Evaluation by Criteria Group

The method used within each criteria group to rank the short list of sites varied. Depending upon the criteria, the number of them, the complexity and the nature of the data, a qualitative and/or quantitative evaluation method was employed.

Study team members were advised to indicate only significant differences and not to feel obligated to indicate differences among the sites, if differences were not significant. The analyses undertaken included detailed on-site and site vicinity investigations.

A general discussion of the ranking of the short list of sites within each criteria group is presented below in order of criteria group ranking. A summary table of the ranking by criteria group is provided in Table 6.16 below. The ranking assigned to each criteria group was the same used for the long list of sites. It should be noted, however, the Cost criteria group as used in the Long List comparative evaluation was replaced by the Design and Operations criteria group.

**TABLE 6.16
SUMMARY OF SITE RANKING BY CRITERIA GROUP**

Criteria Group	Criteria Group Ranking	Sites*			
		D	H	I	K
Hydrogeology	high	no significant differences			
Surface Water	high	3	2	1	4
Social	high	4	2	1	3
Biology	high/ moderate	2	2	1	4
Agriculture	high/ moderate	3	1	2	4
Land Use	high/ moderate	3	1	2	4
Design & Operations	high/ moderate	1	1	1	4
Transportation	moderate	1	4	3	2

**NOTE: "1" denotes most preferred while "4" denotes least preferred.*

Hydrogeology

With respect to the criterion *Compare potential for site to provide natural protection from leachate*, a comparison of the geological conditions at the four different sites indicates that all sites have a significant thickness of consistent low permeability clay soils overlying the basal aquifer. There were no significant layers of higher permeability soils encountered in the drilling of boreholes at any site. Comparison of laboratory analyses of soils indicates that there is no significant change in overburden composition between the sites. Overall, it is considered that there are no significant differences in geological conditions at the four sites.

A comparison of hydrogeologic conditions at the sites indicates that the overburden soils have very low hydraulic conductivities. Vertical hydraulic gradients, which induce downward movement of ground water, are higher at Sites H and I than at Site D. Preliminary data from Site K indicates gradients in between Site D and Sites H and I. The relatively high piezometric head in the basal aquifer at Site D is the reason for the relatively low gradients at that site. Also Sites H and I are closer to the St. Clair River which has regionally been identified as a point of discharge for the basal aquifer which would account for the lower piezometric head in the basal aquifer at that location. Due to these criteria, it is considered that the differences in vertical hydraulic gradients do not provide sufficient reason to rank any site as preferred over the others.

In considering the criterion *Compare ability to monitor ground water and implement contingency measures*, all sites have two ground water migration pathways and have monitoring layers that consist of weathered till and monitoring layers.

With respect to the criterion *Compare potential for disrupting ground water supplies and resources*, all of the site areas are serviced by watermains and all have wells on record within 1 km of the site. Site D has 1 well and 9 potential potable water uses; Site H has 6 wells and no potential users; Site I has 4 wells and no potential users; and Site K has 3 wells and 8 potential potable water users within 1 km of the site.

In summary, all sites have a considerable thickness (greater than 32 m) of low permeability overburden that would provide significant natural protection of the basal aquifer from impacts from landfill leachate. Only well record data was used to determine site stratigraphy for all sites. Similarly all sites were found to have predictable geological and hydrogeologic conditions with no significant sand seams or other complicating features found at any site.

Based on the results of these investigations, hydrogeologic conditions at all of the identified sites have the same potential to limit contaminant migration from a landfill and protect ground water resources. No site is preferred over the others.

Surface Water

Site I, which ranks first overall, is considered to be the most preferred for landfill site development from a surface water perspective. With respect to *Potential for impairment of surface water quality*, Site I contributes surface runoff to a single watershed (Johnston Drain) and a single subwatershed (Johnston Drain) and discharges surface runoff to only one watercourse. In addition, there are no identified downstream usages of surface water and the length of watercourse is limited (1.8 km). Accordingly, the potential for impairment of surface water quality is rated the lowest. In regards to *Potential flood hazard* (Criterion 2), Site I exhibits a low peak flow through and/or adjacent to the site (23 m³/s) and has favourable outlet conditions, which combined provides the lowest relative rank for this criterion.

Together, these two ratings result in the lowest potential for surface water effects and places candidate Site I as the most suitable for site development.

With respect to *Potential for impairment of surface water quality*, Site H contributes surface runoff to two watersheds (Bowen's Creek and Johnston Drain), and two subwatersheds (Tributary of Bowen's Creek and Johnston Drain) which is indicative of a higher potential for impairment of surface water quality. However, there are no identified downstream usages of surface water and the length of watercourse (1 km) is limited. Therefore, Site H ranks second to only Site I with regards to Criterion 1. The *Potential flood hazard* effects (Criterion 2) associated with this site are considered low. Peak flows through and/or adjacent to the site are minimal (27 m³/s) and suitable outlet conditions prevail.

Overall, Site H was given a relative rank of 2 and is second to only Site I with regards to surface water.

Sites D and K are judged to be of equal ranking and least preferred with regards to surface water. For *Potential for impairment of surface water quality*, Site K ranks more favourably than Site D because it contributes surface runoff to a single watershed (Clay Creek) and single subwatershed (Coyle Drain). Site D contributes surface runoff to a single watershed (Clay Creek) and two subwatersheds (Coyle Drain and Wheeler Drain). For both Sites D and K, the length of the watercourse is considerable. In regards to *Potential flood hazard* (Criterion 2), Site D ranks more favourably due to the smaller length of on-site (0 m) and adjacent watercourses (700 m). Site K ranks less favourably as it has 640 m of on-site watercourse and 950 m of adjacent watercourse. The combined site scores for both candidate sites are relatively close and therefore were ranked similarly.

Overall, Sites D and K maintain the highest potential for surface water effects under both Criterion 1 and 2 and are therefore regarded as least suitable for site development.

The overall site ranking is as follows:

SURFACE WATER SITE RANKINGS

	Site	Ranking
Most Preferred	Site I	1
	Site H	2
	Site D	3
Least Preferred	Site K	3

Social

Overall, from a social perspective, Site I is the preferred site as it was most preferred on the basis of the following five criteria:

1. *Potential for disruption to individuals in the site vicinity study area (within 1,000 m of site boundary) - 1 residence;*
2. *Potential for disruption of community/recreation features in the site vicinity study area (within 1,000 m of site boundary) - no features disrupted;*
3. *Potential for disruption of residents in the access route study area - no residents disrupted;*
4. *Potential for disruption of community/recreation features in the access route study area - no features disrupted; and*
5. *Potential for disruption to communities in the site vicinity.*

Site H is considered slightly less preferred due to its closer proximity to the ICI Lambton Employees Social and Recreation Club and the St. Clair River Parkway which was identified as a public concern.

With respect to Sites D and K, they were considered equal with respect to Criteria 2 and 5, thus, these criteria were discounted. In terms of Criteria 1, Site K is more preferred as there is less potential for impacts to residents in the site vicinity. Site K has the potential to affect 8 residences and Site D, 12 residences. However, as Site K has a longer access route, there is a greater potential for impacts to individuals (8 residences) and features (1 feature) along the route. Within the access route study area for Site D, there is the potential to disrupt 5 residences and no features. Thus, Site K is less preferred than Site D on the basis of Criteria 3 and 4.

Therefore, the trade-off is between a greater potential for impact to individuals in the vicinity of Site D versus a greater potential for impact to residents and features along the access route to Site K. Recognizing that the residents/features along the access route are located on a provincial Highway and that the increase in traffic is only to be 5% above of the existing background level, the potential for impact to individuals in the vicinity of the site is anticipated to be greater. As a result, Site K is slightly more preferred than Site D. The overall site ranking is as follows:¹⁶

SOCIAL SITE RANKINGS

	Site	Ranking
Most Preferred	Site I	1
	Site H	2
	Site K	3
Least Preferred	Site D	4

Biology

The comparison of the four short list sites with respect to biological criteria involved identifying units of habitat, classifying them according to indicators (habitat types), measuring their area (or length), multiplying these by indicator and impact study zone weights, and summing the weighted scores.

The impact study zones used in the analysis consisted of each site plus three concentric ring zones around each site. Indicators were given progressively less weight due to probable less impact the further they occurred from the sites. Indicators within each zone were weighted in order of recognized biological value in terms of pre-settlement representativeness and maintaining future options.

Site I is biologically the most preferred site for landfill site selection. This site is almost entirely cultivated and almost devoid of natural areas on-site (except for some hedgerows and specimen trees). Its vicinity does contain noteworthy forests and chemical plant evaporation ponds used by species such as the provincially significant Ruddy Duck and Black Tern, as well as the Lesser Scaup that is rare in the Site Region (Windsor to Toronto), according to OMNR (1993).

¹⁶ Note: As the distinction between Sites H and I, and D and K is small, it was recommended that a sensitivity test should be run assuming that Sites H and I were equal and most preferred over Sites K and D which were assumed to be equal and least preferred. This sensitivity test was conducted and the change in site ranking did not alter the overall site preference.

Sites D and H are in second preference and cannot be significantly differentiated at this level of analysis. Sites D and H both have noteworthy blocks of forest near their edges whose exclusion would significantly improve the impact level. The forest on Site H has a noteworthy component of sycamore (rare in Lambton) and has the same chemical plant evaporation ponds in its vicinity as Site I. Site D has some interesting small ponds used by Great Blue Herons as well as intermittent watercourses whose value may not be sufficiently reflected in the numerical evaluation. Mitigation measures proposed for Sites D and H would include exclusion of the wooded blocks from the landfill operating area.

Site K is biologically the least preferred site. Site K consists predominantly of valuable biological habitats that could not be avoided by landfill operations. It contains a large and diverse forest classified as medium quality per average unit of area, although there are some sections with high quality characteristics (maturing oak and hickory) and other sections of noteworthy swamp wetland. A large shrub woodland provides significant transitional habitat. Noteworthy plants include Wild Crab Apple (rare in Lambton according to Tiedge and Tiedge 1992). Noteworthy bird species breeding on the site include Yellow-throated Vireo and Nashville Warbler. Yellow-throated Vireo is a bird of extensive southern deciduous woodlands and the Nashville Warbler is rare in Lambton County according to atlas (Cadman *et al.* 1987) data.

The overall site ranking is as follows:

BIOLOGY SITE RANKINGS

	Site	Ranking
Most Preferred	Site I	1
	Site D	2
	Site H	2
Least Preferred	Site K	4

Agriculture

In terms of agriculture, Site H would be the best site for development of a landfill facility. In considering *Removal of Agriculture* and *Disruption of Agriculture*, although 68.0 ha (representing 1.7 potential farm units) would be removed from agricultural production on-site, Site H is designated for industrial use, is somewhat isolated from the farming community and only 4.4 potential farm units (178 ha of cleared agricultural land) within 1,000 m would be affected by the facility. The site also only has 178 ha of cleared agricultural land designated for other uses within 1,000 m.

In comparison to other sites, Site I is a close second as 5.8 potential farm units (2.34 ha) would be affected within 1,000 m and 75.0 ha designated for industrial use would be removed from production. There is also 224 ha of cleared agricultural land designated for other uses within 1,000 m.

Sites D and K are in third and fourth preference respectively. Building the landfill on these sites would potentially affect 10.7 (429 ha) and 14.7 (592 ha) potential farm units within 1,000 m respectively. Sites D and K also have 174 ha and 457 ha respectively of cleared agricultural land designated for agricultural use within 1,000 m and 254 ha and 135 ha of cleared agricultural land designated for other uses within 1,000 m. Site D would remove 57.7 ha (1.4 potential farm units) of cleared agricultural land designated for agriculture and 3.2 ha of cleared agricultural land designated for other uses.

The overall site ranking is as follows:

AGRICULTURE SITE RANKINGS

	Site	Ranking
Most Preferred	Site H	1
	Site I	2
	Site D	3
Least Preferred	Site K	4

Land Use

The following describes the comparative evaluation of the short list of sites from a land use perspective.

With respect to the criterion, *Impacts on existing urban structure*, sites H and I were considered preferred as both these sites are located in heavy industrial areas. With respect to Sites D and K, Site K is slightly preferred as development of this site would result in the continuation of an existing waste disposal use, although it is in an agricultural area.

In considering the criterion, *Conformity to Lambton County Official Plan*, Sites D and I were identified as preferred as they are located in the "Chemical Valley - Heavy Manufacturing Anchor" designation. Half of Site K is within this designation whereas Site I is outside of it and thus, less preferred. This, however, is not considered to be a major disadvantage as the County Plan states that the location of specific anchor uses shall be defined in local municipal Official Plans.

Sites D, H and I were considered to be most preferred with respect to the criterion, *Conformity to Township of Moore Official Plan*, as the sites are designated "Major Industrial". Site K was identified to be least preferred as it is located in the agricultural portion of the Township.

With respect to the criterion, *Compatibility with Official Plan land use designations in surrounding 1 km area*, Sites H and I were identified as most preferred as lands in the surrounding area are primarily designated "Industrial Type 3". Site D is considered second most preferred as 2/3 of the lands are "Industrial Type 3" and 1/3 are "Agricultural". Site K is considered to be least preferred as 2/3 of the surrounding lands are designated "Agricultural".

The next criterion considered was *Compatibility with existing land uses on-site and in surrounding 1 km area*. Sites H and I were considered to be most preferred as land uses in the vicinity are predominately industrial. There is only 1 residence within 1 km of Site I. Sites D and K have predominately residential and agricultural uses in the site vicinity and are thus considered to be less preferred.

With respect to the criterion, *Compatibility with proposed land uses on-site and in surrounding 1 km area*, Sites D and K were considered to be most preferred as there are no identified proposed land uses either on-site or in the vicinity. Sites H and I were considered to be less preferred due to Terra Canada International's plans to develop the sites for pond water disposal.

In considering the criterion, *Potential impacts on development potential of property occupied by the site*, Sites H and I were considered less preferred as the sites will displace potential "Dangerous Industrial Uses". Sites D and K were identified to be most preferred as they result in no loss of potential development.

The potential for impact on residential and farm-related commercial and industrial development opportunities were addressed through the criterion, *Potential impacts on existing development opportunities in surrounding 1 km area*. Under this criterion, Site H and I were considered to be most preferred as there is very limited potential for this type of development activity within 1000 m of these sites. Site D was identified as second most preferred closely followed by Site K as least preferred as it has the greatest potential for residential and farm-related development activity. All sites are expected to encourage industrial development.

Finally, with respect to the criterion *Impacts on future urban structure*, Sites H and I were clearly preferred as landfill development at either Sites D or K could prematurely introduce heavy industrial type uses in an area which is predominantly agricultural in nature.

Overall from a land use perspective, Sites H and I were identified to be most preferred for a landfill. They were preferred with respect to the following criteria:

- *impacts on existing urban structure;*
- *conformity to Township of Moore Official Plan;*
- *compatibility with Official Plan land use designations in surrounding 1 km area;*
- *compatibility with existing land uses on-site and in surrounding 1 km area;*
- *potential impacts on existing development opportunities in surrounding 1 km area;*
and
- *impacts on future urban structure.*

Site I was also identified to be a preferred site with respect to the criterion, *Conformity to Lambton County Official Plan.*

The only disadvantages of Sites H and I were respect to the criterion:

- *compatibility with proposed land uses on-site and in surrounding 1 km area; and*
- *potential impacts on development potential of property occupied on-site.*

These disadvantages were associated with the proposed pond water disposal on-site by Terra Canada International and the loss of land which could be developed for "Dangerous Industrial Uses". These disadvantages were not considered to off-set the many strong advantages of Sites H and I, particularly their location within an industrial designated area (both County and Township) and the fact that they fit into the existing and future urban structure of Moore and Sombra Townships.

Distinguishing between Sites H and I was found to be difficult and they were thus considered equivalent.

Sites D and K were considered to be less preferred than Sites H and I due to:

- *greater potential for impacts on urban structure;*
- *incompatibility with surrounding land use designations; and*
- *greater potential for impacts and development opportunities.*

Of the two sites, Site D was identified to be more preferred as it was ranked higher for the following criteria:

- *conformity to Lambton County Official Plan;*
- *conformity to Township of Moore Official Plan;*

- *compatibility with Official Plan land use designations in surrounding 1 km area; and*
- *potential impacts on existing development opportunities in surrounding 1 km area.*

The only advantage which Site K has over Site D is with respect to the criterion, *Impacts on existing urban structure*, as the development of Site K would involve the continuation of an existing waste disposal use although within an agricultural area. This one advantage was not considered to offset its disadvantages. As a result, Site K was identified to be least preferred from a land use perspective.

The overall site ranking is as follows:

LAND USE SITE RANKINGS

	Site	Ranking
Most Preferred	Site H	1
	Site I	1
	Site D	3
Least Preferred	Site K	4

Transportation

The majority of the waste is generated in the Sarnia area. Therefore, the sites situated closer to Sarnia would tend to minimize the overall transportation impacts (Sites D and K) and the sites situated further away would tend to maximize the overall transportation impacts (Sites H and I). Sites H and I also have the disadvantage of two additional railway level crossings situated on the Moore/Sombra Townline.

Site D is ranked first for every indicator for both *Potential for impacts to traffic safety along haul routes*, and *Potential for impacts to traffic operations along haul routes*, which results in a ranking of first overall. It is the closest site to the major sources of waste.

Site K is ranked second overall. It is ranked second for both the traffic safety and traffic operations criteria. Although it ranks last for both indicators measuring the annual number of vehicles through intersections, the other advantages in traffic safety and traffic operations result in a ranking of second overall.

Site I is ranked third for both the traffic safety and traffic operations criteria, while Site H is ranked fourth for both. These two sites are further away from the major sources of waste than Site D and Site K, with Site H being the furthest.

For both the traffic safety and traffic operations criteria (and therefore the site ranking), Site D is preferred, followed by sites K, I, and H. The differences between the ranked sites are small; however, in the context of the four sites being analyzed, they are distinguishable. The overall site ranking is as follows:

TRANSPORTATION SITE RANKINGS

	Site	Ranking
Most Preferred	Site D	1
	Site K	2
	Site I	3
Least Preferred	Site H	4

Design and Operations

The four short-listed sites were compared based on the design and operations criteria related to landfill capacity and cost.

The potential landfill capacity was calculated for each site using common assumptions for landfill design. Differences in potential capacity were attributed to differences in the shape and size of each site. Of the four sites, Sites H, I, and D were ranked higher than Site K which had less potential capacity (approximately 500,000 to 700,000 t less potential capacity for Blocks 2, 3 and 4).

Site development costs for land purchase, clearing and grubbing, fencing, power servicing, road development, and leachate treatment were estimated for each site. No significant differences in the overall site development costs were found between the sites (the costs ranged between 2 and 2.4 million dollars). Accordingly, from a cost perspective, each of the sites were ranked equally.

Based on the design and operations criteria, all of the sites were considered suitable for facility development provided the required landfill capacity for the long-term site is no greater than 1.4 million tonnes, which is the maximum potential capacity of Site K using the facility characteristic assumptions. If the required landfill capacity of the long-term site is higher than the maximum capacity of Site K, then the other three sites, H, I and D, would be more preferred. The overall site ranking is as follows:

DESIGN AND OPERATIONS SITE RANKINGS

	Site	Ranking
Most Preferred	Site D	1
	Site H	1
	Site I	1
Least Preferred	Site K	4

6.8.4 Overall Site Comparative Evaluation

A concordance method was used to compare the short list of sites. The concordance method uses a matrix of alternative sites, criteria groups, raw or scaled data and weights. A detailed description of the concordance method is provided in Volume 2, Appendix 2H.

Briefly, in a concordance analysis, the alternative sites are compared in pairs for each criteria group. If the first site is the best of the pair, it receives "points" equivalent to the weight of the criteria group under which the two sites are being compared. If the sites are equally good for that criteria group, the "points" are divided equally between the sites. If the first site is the worst of the two, it receives no "points". This pairwise comparison is carried out for all sites for each criteria group. The "points" attributed to each paired comparison are summed, and divided by the sum of the weights. The resultant score is entered into a concordance matrix with the first site indicated by the rows and the second by the columns.

The criteria group weights used in the long list of sites comparative evaluation were used in the first run of the concordance analysis. Table 6.17 below shows the weights and site ranks by criteria group used for the initial run of the concordance analysis.

**TABLE 6.17
WEIGHTS AND SITE RANK BY CRITERIA GROUP**

Criteria Group	Weight	Sites			
		D	H	I	K
Surface Water	10	3	2	1	4
Social	10	4	2	1	3
Biology	5	2	2	1	4
Agriculture	5	3	1	2	4
Land Use	5	3	1	1	4
Transportation	2	1	4	3	2
Design & Operations	2	1	1	1	4

It should be noted that the Hydrogeology criteria group was screened out since there was found to be no significant difference among the four sites.

The table below illustrates the resulting concordance matrix for this evaluation. The site with the highest total score in the matrix was deemed to be most preferred.

	Site D	Site H	Site I	Site K	Sum
Site D		.14	.08	.74	.96
Site H	.86		.22	.95	2.03
Site I	.92	.78		.95	2.65*
Site K	.26	.05	.05		.36

**Highest sum denotes preferred site.*

In conclusion, based on the concordance analysis Site I was the preferred site, followed by Sites H, D and K.

To test the degree to which the above result was dependent upon the criteria group weights established by the public, four sensitivity tests were run using different weighting scenarios. A fifth sensitivity test was undertaken to test the sensitivity of the site ranking for the Social criteria group. The following discussion provides a description of the rationale for each sensitivity test and the results of each test.

The first sensitivity test used only two of the weighting categories that were established, the high and moderate/high. The Surface Water and Social disciplines retained the weight of 10 (high). All other disciplines received a weight of 5 (high/moderate). This was done to eliminate the moderate weight and to provide only two weighting categories one of which assigned twice the level of importance to two criteria groups over the others. Site I still remained as the preferred site using this weighting scenario. The table below provides the criteria group weights used for this sensitivity test.

CRITERIA GROUP WEIGHTING SENSITIVITY TEST #1

Criteria Group	Weight
Agriculture	5
Biology	5
Land Use	5
Social	10
Surface Water	10
Transportation	5
Design & Operations	5

The following table shows the resulting concordance matrix:

	Site D	Site H	Site I	Site K	Sum
Site D		.22	.17	.78	1.17
Site H	.78		.22	.89	1.89
Site I	.83	.78		.89	2.50*
Site K	.22	.11	.11		.44

**Highest sum denotes preferred site.*

The second sensitivity test gave all disciplines an equal criteria group weight of 1. This eliminated any differentiation in level of importance between the criteria groups. The following table shows the criteria group weights used for this sensitivity test:

CRITERIA GROUP WEIGHTING SENSITIVITY TEST #2

Criteria Group	Weight
Agriculture	1
Biology	1
Land Use	1
Social	1
Surface Water	1
Transportation	1
Design & Operations	1

The resulting concordance matrix is:

	Site D	Site H	Site I	Site K	Sum
Site D		.29	.21	.86	1.36
Site H	.71		.29	.86	1.86
Site I	.79	.71		.86	2.36*
Site K	.14	.14	.14		.42

**Highest sum denotes preferred site.*

The third sensitivity test conducted utilized all three weighting categories. However, the weight assigned to each category had marginal differences in the level of importance attributed to the criteria grouping. The weights originally established by the public were 10 for high, 5 for high/moderate, and 2 for moderate. This sensitivity test utilized a weight of 3 for high, 2 for high/moderate, and 1 for moderate. The table below provides a summary

of the weights used for this evaluation. The relative level of importance between the criteria groups remained as it was established by the public for the original evaluation.

CRITERIA GROUP WEIGHTING SENSITIVITY TEST #3

Criteria Group	Weight
Agriculture	2
Biology	2
Land Use	2
Social	3
Surface Water	3
Transportation	1
Design & Operations	1

The resulting concordance matrix is:

	Site D	Site H	Site I	Site K	Sum
Site D		.18	.11	.79	1.08
Site H	.82		.25	.93	2.00
Site I	.89	.75		.93	2.57*
Site K	.21	.07	.07		.35

**Highest sum denotes preferred site.*

The concordance matrix above shows that the overall results remained unchanged with Site I as the preferred site followed by Sites H, D and K.

The fourth sensitivity test conducted also established the weights as having marginal differences in the level of importance attributed to the criteria groups. This weighting scenario reflects discussions with members of the study team and their concerns about previous weighting scenarios. It was, therefore, determined that the Surface Water and Design and Operations disciplines had mitigable potential effects and were given a moderate weight of one. The Biology, Agriculture, and Transportation disciplines were given a high/moderate weight of 2. The disciplines documenting the least mitigable effects were given a high weight of three. Social and Land Use were the disciplines with a high weight.

This sensitivity test established that Site I remained as the preferred site followed by Site H, Site D, and Site K. The following table summarizes the criteria group weights used for this sensitivity test:

CRITERIA GROUP WEIGHTING SENSITIVITY TEST #4

Criteria Group	Weight
Agriculture	2
Biology	2
Land Use	3
Social	3
Surface Water	1
Transportation	2
Design & Operations	1

The resulting concordance matrix is:

	Site D	Site H	Site I	Site K	Sum
Site D		.25	.18	.79	1.22
Site H	.75		.29	.86	1.90
Site I	.82	.71		.86	2.39*
Site K	.21	.14	.14		.49

**Highest sum denotes preferred site.*

Throughout the four sensitivity tests of the weighting scenarios, the overall site rankings remained unchanged with the overall preferred site being Site I followed in order by Site H, Site D and Site K.

The last sensitivity test was conducted based on a change in the database rather than a change in the weights. For this test, the Social criteria group assumed that Sites H and I were equal and most preferred while Sites D and K were equal and least preferred. This test was conducted to test confidence in the Social database as the ranking of the sites from the Social perspective could change slightly. This was described on Page 6-89.

The weighting scenario used for this test was the same as that used for the original concordance analysis. The following table shows the site ranks and weights used for this sensitivity test:

**SENSITIVITY TEST #5
WEIGHTS AND SITE RANK BY CRITERIA GROUP**

Criteria Group	Weight	Sites			
		D	H	I	K
Surface Water	10	3	2	1	4
Social	10	3	1	1	3
Biology	5	2	2	1	4
Agriculture	5	3	1	2	4
Land Use	5	3	1	1	4
Transportation	2	1	4	3	2
Design & Operations	2	1	1	1	4

The resulting concordance matrix for this sensitivity test is:

	Site D	Site H	Site I	Site K	Sum
Site D		.14	.08	.87	1.09
Site H	.86		.35	.95	2.16
Site I	.92	.65		.95	2.52*
Site K	.13	.05	.05		.23

**Highest sum denotes preferred site.*

This sensitivity test confirmed the results of the evaluation; Site I was most preferred followed by Sites H, D and K. Therefore, a slight change in the ranking of the sites from the Social criteria group's perspective would not change the results of the evaluation.

**TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES**

Evaluation Criteria	Indicators	Rationale	Data Sources
HYDROGEOLOGY			
1. Compare potential for site to provide natural protection from leachate	<ul style="list-style-type: none"> · thickness of attenuation layer · nature and permeability of attenuation layer · vertical gradient 	<p>Conditions that have a higher degree of natural protection are preferred.</p>	<ul style="list-style-type: none"> · site specific data including: <ul style="list-style-type: none"> - borehole logs - hydraulic conductivity - water levels - grain size data - geophysical data - ground water chemistry · same as above
2. Compare ability to monitor ground water and implement contingency measures	<ul style="list-style-type: none"> · number of ground water pathways · nature of ground water migration pathways (medium, thickness, permeability, extent, and continuity) · local ground water flow directions (convergent, divergent, uniform) · depth to ground water migration pathways 	<p>Sites for which simple and reliable monitoring of site performance and simple contingency measures can be implemented are preferred.</p>	<ul style="list-style-type: none"> · same as above
3. Compare potential for disrupting ground water supplies and resources	<ul style="list-style-type: none"> · presence of ground water resources in vicinity of site · number of wells on record in vicinity of the sites · quality and quantity of on-site ground water resources 	<p>It is desirable to minimize the potential for disruption to ground water supplies and resources. Sites that are more remote from good quality, high yield ground water resources are preferred.</p>	<ul style="list-style-type: none"> · same as above
SURFACE WATER			
1. Compare potential for impairment of surface water quality	<ul style="list-style-type: none"> · number of watersheds and subwatersheds receiving site runoff · number of downstream surface water users 	<p>The ability to reliably monitor the performance of surface water management systems, and apply effective control and contingency measures, is partially dependent upon the number of watersheds and subwatersheds a candidate area occupies. The potential for surface water contamination increases with the number of watersheds and subwatersheds which receive runoff from a candidate site.</p> <p>The presence of the landfill site creates the potential for downstream surface water effects on potable water supplies, recreational and agricultural water uses.</p>	<ul style="list-style-type: none"> · 1:10,000 scale OBM mapping · 1:25,000 scale OMAF artificial drainage mapping · 1:5000 aerial photographs (1992) · discussion with agencies (e.g. MOEE, SRCA, Township) · on-site investigation and site photographs · information from other disciplines (e.g. Biology, Design and Operations)

TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)

Evaluation Criteria	Indicators	Rationale	Data Sources
2. Compare potential flood hazard	<ul style="list-style-type: none"> · number of watercourses affected by site runoff · total peak flow conveyed through and adjacent to the site · length of an on-site and adjacent watercourses · the number of watercourses entering the site and receiving surface water runoff from the site · availability of outlet 	<p>Minimizing the number of watercourses receiving flow from the site maximizes the ability to reliably monitor the performance of surface water management systems and apply effective control and contingency measures.</p> <p>Alteration to the existing drainage system to accommodate site development could potentially change the peak flow delivered downstream. The total peak flow conveyed through and adjacent to the site is an indicator of potential flood hazard to areas downstream of the candidate sites.</p> <p>Alteration of flood storage currently available from on-site and adjacent watercourses potentially increases the flood and erosion hazard downstream of the candidate site.</p> <p>Site development may alter both upstream and downstream flood hazard potential. This indicator will assess the number of locations potentially affected by site development.</p> <p>Adequate slope of watercourses receiving site runoff is necessary to ensure the adequate transport of surface runoff through the downstream drainage system. Lack of surficial topographic relief may potentially increase the flow and erosion hazard downstream of the candidate site.</p>	<ul style="list-style-type: none"> · 1:10,000 scale OBM mapping · 1:25,000 scale OMAF artificial drainage mapping · on-site investigation and site photographs · information from other disciplines (e.g. Biology, Design and Operations) · discussion with agencies (e.g. MOEE, SRCA, township)

**TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)**

Evaluation Criteria	Indicators	Rationale	Data Sources
SOCIAL			
1. Potential for disruption to individuals in the site vicinity study area (within 1,000 m of site boundary)	<ul style="list-style-type: none"> · number of residences/ residents · number of vulnerable residents: <ul style="list-style-type: none"> - age - health - number home during facility operating hours · use of property (by residents and non-residents) · satisfaction with place 	<p>This criteria deals with the potential for disruption to existing residents who live in the vicinity of facility and those individuals who are involved in social/recreation activities in the vicinity of the facility. Individuals may experience disruption to their daily activities and use, and enjoyment of property. These disruption effects may be generated through nuisance effects resulting from the waste management facility.</p>	<ul style="list-style-type: none"> · field survey · assessment roll · land use assessment · site vicinity resident interviews
2. Potential for disruption of community and recreation features in the site vicinity study area (within 1,000 m of site boundary)	<ul style="list-style-type: none"> · number of features in the site vicinity · characteristics of features: <ul style="list-style-type: none"> - hours of operation - outdoor vs. indoor use - expansion plans 	<p>This criteria deals with the potential disruption to community and recreation features in the vicinity of the facility. The concern is with the potential change in demand for the feature and/or change in its quality. Community and recreation features contribute to the cohesion of an area and disruption of the features could lead to changes in resident interactions.</p>	<ul style="list-style-type: none"> · field survey · assessment roll · land use assessment · interviews with owners/operators of features
3. Potential for disruption of residents in the access route study area	<ul style="list-style-type: none"> · number of residents within the access route study area · number of vulnerable residents: <ul style="list-style-type: none"> - age - health - number home during facility operating hours · uses of property · uses of shoulder of road 	<p>This criteria deals with the potential for disruption to existing residents who live along the facility access routes. Residents may experience disruption to their daily activities and use, and enjoyment of property. These disruption effects may be generated through nuisance effects resulting from the waste management facility related traffic (noise, dust, congestion, etc.)</p>	<ul style="list-style-type: none"> · field survey · assessment roll · land use assessment · access route resident interviews
4. Potential for disruption of community and recreation features in the access route study area	<ul style="list-style-type: none"> · number of features · characteristics of features 	<p>This criteria deals with the potential for disruption to community/recreation features located along the access routes. The concern is with the change in the potential demand of the feature on its level of service and/or change in its quality.</p>	<ul style="list-style-type: none"> · field survey · assessment roll · land use assessment · interviews with owners/operators of features

**TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)**

Evaluation Criteria	Indicators	Rationale	Data Sources
<p>5. Potential for disruption to communities in vicinity of sites</p>	<ul style="list-style-type: none"> • community cohesion • community character 	<p>This criteria refers to the potential disruption to existing residents in the vicinity of the facility. Residents may experience disruption to their daily activities and use, and enjoyment of property. These disruption effects may be generated through nuisance effects often associated with the waste management facilities (i.e. noise, odour, dust, traffic disturbance, etc.).</p> <p>Community cohesion refers to the level of interaction or "tightness" among the members of a community. Level of cohesion is dependent upon such criteria as length of residence, attachment to the community, level of involvement in community activities and shared values. Community cohesion could decrease if local residents opt to move out due to facility-related effects.</p> <p>The development of the facility may have implications for community character which can be described as physical in nature (land uses, environmental quality) or social-cultural (way of life, local values). The change in community character could influence the resident's satisfaction with the community and future orientation of the community. A change in community character may also be attributed to the stigma of having an unwanted land use such as a waste management facility within the community.</p>	<ul style="list-style-type: none"> • site vicinity resident interviews • field survey • land use information • results of public consultation activities
VISUAL			
<p>1. Extent of visibility (viewshed)</p>	<ul style="list-style-type: none"> • number of viewers • types of viewers 	<p>The greater the extent of viewshed, the greater the impact.</p>	<ul style="list-style-type: none"> • viewshed generated from 1:10,000 OBM mapping • field studies conducted July 1992

**TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)**

Evaluation Criteria	Indicators	Rationale	Data Sources
BIOLOGY			
1. Compare potential for loss or disruption of biological systems	<ul style="list-style-type: none"> • amount and type of systems potentially affected: <ul style="list-style-type: none"> - regional life science Area of Natural and Scientific Interest (ANSI) - candidate sensitive area - high quality forest - medium quality forest - shrub woodland - ponds and open wetlands - permanent natural streams 	<p>Biological systems represented by various habitat types provide the basic form and function for biological processes and diversity in the natural environment. Their identification allows the attribution of biological values and direct focus for protection, enhancement or monitoring actions.</p>	<ul style="list-style-type: none"> • topographic maps • aerial photographs (April 1992 at scale of 1:5000) • OMNR Forest Resources Inventory Maps (1978) • site visits and roadside checks • Life Science ANSI Report (Lindsay 1984) • OMNR Sensitive Areas Reports (1977/78) • government review agencies and the public
AGRICULTURE			
1. Removal of agriculture	<ul style="list-style-type: none"> • cleared agricultural land designated for agriculture within site • cleared agricultural land designated for other uses within site • number of potential farm units removed (1 farm unit = 40 ha of cleared agricultural land). 	<p>Designated agricultural land shows a long term commitment by the municipality to retain such land for agricultural purposes.</p> <p>Lands which have been designated other than agricultural still have potential to produce excellent yields and contribute to the agricultural economy of the area.</p> <p>Use of this indicator visualizes the number of farm units that would be removed by each site.</p>	<ul style="list-style-type: none"> • official planning documents • field visits • official planning documents • field visits • air photo interpretation
2. Disruption of agriculture	<ul style="list-style-type: none"> • amount of cleared agricultural land designated for agriculture within 500 m from site boundary • amount of cleared agricultural land designated for agriculture > 500 m but ≤ 1,000 m from site boundary • amount of cleared agricultural land designated for other uses within 500 m from site boundary • amount of cleared agricultural land designated for other uses > 500 m but ≤ 1000 m from site boundary 	<p>Nuisance effects from landfill (noise, dust, debris, rodents) may have moderate effect on the growing of crops, cultivation and other farm related activities.</p> <p>Nuisance effects from landfill may have minimum effects on the growing of crops, cultivation and other farm related activities.</p> <p>Nuisance effects from landfill (noise, dust, debris, rodents) may have moderate effect on growing crops, cultivation, raising livestock and other farm related activities.</p> <p>Nuisance effects from landfill (noise, dust, debris, rodents) may have minimum effect on growing crops, cultivation, raising livestock and other farm related activities.</p>	<ul style="list-style-type: none"> • farmer interviews • air photo interpretation (1:5,000 scale) • farmer interviews • air photo interpretation • farmer interviews • air photo interpretation • farmer interviews • air photo interpretation • farmer interviews • air photo interpretation

**TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)**

Evaluation Criteria	Indicators	Rationale	Data Sources
LAND USE			
1. Impacts on existing urban structure	<ul style="list-style-type: none"> • number of potential farm units within 1,000 m study area (note: 1 farm unit = 40 ha) • number of farmers using haul route to move equipment 	<p>Use of this indicator visualizes the number of potential farms that would be effected by the facility.</p> <p>Waste handling may interfere with slow moving farm equipment with wide or tall loads.</p>	<ul style="list-style-type: none"> • air photo interpretation • farmer interviews
2. Conformity to Lambton County Official Plan	<ul style="list-style-type: none"> • potential changes to existing urban structure • potential changes to existing urban structure of Sombra Township 	<p>The facility should not significantly change the existing urban structure of a municipality; be generally compatible with and a continuation of the existing land use pattern; and not result in "pockets" of land uses which are isolated from similar types of land uses.</p> <p>Significant changes could result in: short-term adverse impacts on adjacent lands which are not compatible with the facility; long-term adverse impacts in cases where the future land uses of adjoining lands are not compatible with the facility; and unnecessary and costly extensions of urban services and road improvements.</p>	<ul style="list-style-type: none"> • land use mapping and field surveys of generalized existing land use • information regarding services and roads from the affected municipalities
3. Conformity to Township of Moore Official Plan	<ul style="list-style-type: none"> • conformity to "Economic Anchor" Designations • conformity to Structure Plan Designations • consistency with intent of On-site Land Use Designations 	<p>The County Plan is not a detailed land use plan but a "long range management plan which outlines County policy on a number of broad settlement and resource management issues".</p> <p>Section 1.4d) of the County Plan requires that all local municipal Official Plans and Zoning By-laws conform to the County Plan.</p> <p>All development and public facilities should:</p> <ul style="list-style-type: none"> • generally conform to the future urban structure as identified in a local municipal Official Plan; • generally conform to the major policy direction of the Plan; and • be basically consistent with the intent of the on-site land use designation and not constitute a significant departure from the designation. 	<ul style="list-style-type: none"> • Lambton County Official Plan and background studies • Township of Moore Official Plan and background study • discussions with Moore Township municipal staff and staff of the Lambton County Planning and Development Department

**TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)**

Evaluation Criteria	Indicators	Rationale	Data Sources
4. Compatibility with Official Plan Land Use Designations in surrounding 1 km Area	<ul style="list-style-type: none"> • compatibility with Township Official Plan land use designations 	<p>To avoid adverse impacts over the short and long-term, the facility should be basically compatible with the uses allowed by the Official Plan on the surrounding lands.</p>	<ul style="list-style-type: none"> • Township of Moore and Township of Sombra Official Plans • discussions with staff of Moore and Sombra Townships, and the Lambton County Planning and Development Department
5. Compatibility with existing land uses on-site and in surrounding 1 km area	<ul style="list-style-type: none"> • existing land uses on-site • number of property owners affected • existing uses within 1,000 m 	<p>The facility should:</p> <ul style="list-style-type: none"> • be located on vacant land and not displace any existing land uses. • affect a minimum of property owned. • be compatible with the surrounding existing land uses. 	<ul style="list-style-type: none"> • field surveys of existing land use • property ownerships (from the municipal assessment roll) • discussions with owners of the alternative sites regarding their plans for the property
6. Compatibility with proposed land uses on-site and in surrounding 1 km area	<ul style="list-style-type: none"> • loss of on-site proposed uses • impacts on proposed uses in surrounding 1 km area 	<p>The facility should:</p> <ul style="list-style-type: none"> • not interfere with the owner's proposed plans for the property. • be compatible with any uses which are proposed for lands in the surround area. 	<ul style="list-style-type: none"> • current development applications • discussions with staff of Moore and Sombra Townships and the Lambton County Planning and Development Department
7. Potential impacts on development potential of property occupied by the site	<ul style="list-style-type: none"> • loss of on-site development opportunities • impact of loss of property on development potential of remaining property • impacts of loss of on-site development opportunities on municipal supply of land 	<p>This evaluation criteria relates to the development potential of the property occupied by the site according to the Official Plan and Zoning By-law.</p> <p>The facility should not adversely affect the development potential of the property which remains after the facility is developed. For example, the remaining property should not be land locked, have inadequate frontage or lot depth or be too small to accommodate the potential development.</p> <p>Also, the loss of developable land should not adversely affect the municipality's supply of land for the particular use.</p>	<ul style="list-style-type: none"> • property ownerships • Moore Township Official Plan and Zoning By-law • supply of industrial land data from the Sarnia Lambton Economic Development Commission and the Lambton County Planning and Development Department • discussions with property owners

TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)

Evaluation Criteria	Indicators	Rationale	Data Sources
<p>8. Potential impacts on development opportunities in surrounding 1 km area</p>	<ul style="list-style-type: none"> • impact on residential development opportunities • impact on farm-related commercial and industrial development opportunities • impact on industrial development opportunities 	<p>In addition to being compatible with existing uses, the facility should also be compatible with uses which could potentially be developed in the surrounding area as permitted by the existing Official Plan and Zoning By-law.</p> <p>The identification of potential land uses also helps to determine the changes that should be made to local planning documents to help make the surrounding area more compatible with the facility and to prevent future adverse impacts. Ideally very few changes should be necessary. If many changes are necessary, this would tend to show that the facility is generally incompatible with the surrounding area.</p> <p>The impacts of the facility could discourage some types of uses and encourage others. For example, residential uses would be greatly discouraged while moderate and heavy industrial uses may be attracted to the lands around the facility.</p>	<ul style="list-style-type: none"> • field surveys of existing land uses • property ownerships including size and frontages • Townships of Moore and Sombra Official Plans and Zoning By-laws • discussions with staff of the two Townships and the Lambton County Planning and Development Department
<p>9. Impacts on future (Year 2016) urban structure</p>	<ul style="list-style-type: none"> • Potential changes to future urban structure 	<p>Since the facility has a long-term site life, it is important to determine the most likely future land uses in the surrounding area. This helps to identify:</p> <ul style="list-style-type: none"> • the ability of the site to fit into the future urban structure. • any discrepancies which may exist between future land uses, as designated in the Official Plan, and what is most likely to occur. This is especially relevant to Moore Township where the Official Plan includes large tracks of land designated for industrial development. Not all of these lands may be developed for industrial uses in the long-term. The resulting situation may be that the facility, although located in an area designated for industrial development, could be located in an area which remains predominantly agricultural, even over the long-term. 	<ul style="list-style-type: none"> • information on past and current development activity from the Samia Lambton Economic Development Commission • the Townships and the Lambton County Planning and Development Department • the municipal Official Plans • discussions with Township and County staff

TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)

Evaluation Criteria	Indicators	Rationale	Data Sources
DESIGN AND OPERATIONS			
1. Compare potential landfill capacity	<ul style="list-style-type: none"> • estimated maximum landfill capacity 	Flexibility in site layout and development.	<ul style="list-style-type: none"> • 1:10,000 mapping • facility characteristics assumptions
2. Compare site development costs	<ul style="list-style-type: none"> • land purchase • clearing and grubbing • fencing • power servicing • road works • leachate treatment 	Minimize cost to Lambton County.	<ul style="list-style-type: none"> • 1:10,000 mapping • County of Lambton • Ontario Hydro
TRANSPORTATION			
1. Compare potential for impacts to traffic safety along haul routes	<ul style="list-style-type: none"> • potential number of annual accidents • annual number of potential at-grade truck/train accidents 	<p>Accidents are a safety concern because of injury and damage-related consequences. This indicator measures the potential number of accidents along the haul routes to each site.</p> <p>At-grade railway crossings are a safety concern because a truck-with-train type accident may have serious injury and damage-related consequences. A potential truck/train conflict is the product of the truck traffic and train traffic volumes. This gives an indication of the number of instances that a truck/train collision might occur and is representative of an increase in transportation risk.</p>	<ul style="list-style-type: none"> • provincial average accident data for the three most recent years available • location of waste centroids provided by Design and Operations discipline • annual traffic volumes for each waste centroid provided by Design and Operations discipline • Energy Mines and Resources Canada, 1:50,000 topographic maps • Province of Ontario Road Map, 1990-1991, MTO, 1990 • Ontario Transportation Map Series, Map 1, MTO, June 1, 1993 • City Plan of Sarnia/Port Huron, Map Art, 1988 • field inspection • consultation with CN, MTO and Moore Township • location of waste centroids provided by Design and Operations discipline • annual traffic volumes for each waste centroid provided by Design and Operations discipline • Energy Mines and Resources Canada, 1:50,000 topographic maps • Province of Ontario Road Map, 1990-1991, MTO, 1990 • Ontario Transportation Map Series, Map 1, MTO, June 1, 1993 • City Plan of Sarnia/Port Huron, Map Art, 1988

TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
(continued)

Evaluation Criteria	Indicators	Rationale	Data Sources
<p>2. Compare potential for impacts to traffic operations along haul routes</p>	<ul style="list-style-type: none"> • annual number of trucks travelling through intersections • annual vehicle-km travelled on single-lane (in one direction) on public roads • annual vehicle-km travelled on multi-lane (in one direction) on public roads 	<p>Intersections where a waste haul vehicle may slow or stop are an important traffic safety concern because of injury and damage-related consequences. Intersections typically have higher accident rates than other sections of road. Truck movements at intersections cause safety concerns as trucks are less manoeuvrable, are slower accelerating/ decelerating and can obstruct the vision of other traffic.</p> <p>Additional waste haul vehicles on these roads presents the potential to delay road users. On single-lane (in one direction) roads, it is difficult to pass trucks.</p> <p>Additional waste haul vehicles on these roads presents the potential to delay road users. On multi-lane (in one direction) roads, it is difficult to pass trucks.</p>	<ul style="list-style-type: none"> • field inspection • location of waste centroids provided by Design and Operations discipline • annual traffic volumes for each waste centroid provided by Design and Operations discipline • Energy Mines and Resources Canada, 1:50,000 topographic maps • Province of Ontario Road Map, 1990-1991, MTO, 1990 • Ontario Transportation Map Series, Map 1, MTO, June 1, 1993 • City Plan of Samia/Port Huron, Map Art, 1988 • field inspection • location of waste centroids provided by Design and Operations discipline • annual traffic volumes for each waste centroid provided by Design and Operations discipline • Energy Mines and Resources Canada, 1:50,000 topographic maps • Province of Ontario Road Map, 1990-1991, MTO, 1990 • Ontario Transportation Map Series, Map 1, MTO, June 1, 1993 • City Plan of Samia/Port Huron, Map Art, 1988 • field inspection • location of waste centroids provided by Design and Operations discipline • annual traffic volumes for each waste centroid provided by Design and Operations discipline • Energy Mines and Resources Canada, 1:50,000 topographic maps • Province of Ontario Road Map, 1990-1991, MTO, 1990 • Ontario Transportation Map Series, Map 1, MTO, June 1, 1993 • City Plan of Samia/Port Huron, Map Art, 1988

TABLE 6.14
EVALUATION CRITERIA AND INDICATORS BY CRITERIA GROUPING
FOR SHORT LIST OF SITES
 (continued)

Evaluation Criteria	Indicators	Rationale	Data Sources
	<ul style="list-style-type: none"> • annual number of waste haul vehicles travelling through intersections 	<p>Intersections where waste haul vehicles may slow or stop are an important traffic operation concern because of the potential increase in delay to road users</p>	<ul style="list-style-type: none"> • field inspection • location of waste centroids provided by Design and Operations discipline • annual traffic volumes for each waste centroid provided by Design and Operations discipline • Energy Mines and Resources Canada, 1:50,000 topographic maps • Province of Ontario Road Map, 1990-1991, MTO, 1990 • Ontario Transportation Map Series, Map 1, MTO, June 1, 1993 • City Plan of Sarnia/Port Huron, Map Art, 1988

**TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES**

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
HYDROGEOLOGY					
Compare potential for site to provide natural protection from leachate	minimum thickness (m) of the attenuation layer	37.5	38.5	37.0	32.5
	nature and permeability of the attenuation layer	44	58	52	50
	<ul style="list-style-type: none"> · clay content of the attenuation layer indicated by soil testing (arithmetic mean %) · permeability (hydraulic conductivity) of the attenuation layer indicated by well testing (in-situ tests cm/s) 	2.7 x 10 ⁻⁸	4.5 x 10 ⁻⁸	4.3 x 10 ⁻⁸	3.5 x 10 ⁻⁷
Compare ability to monitor ground water and implement contingency measures	number of ground water migration pathways	2	2	2	2
	nature of monitoring layers (hydrostratigraphic unit)	weathered till and basal aquifer	weathered till and basal aquifer	weathered till and basal aquifer	weathered till and basal aquifer
Compare potential for disrupting ground water supplies and resources	ground water resources in the vicinity of the sites				
	<ul style="list-style-type: none"> · ground water resource quality (water type) · ground water resource quantity (estimated transmissivity) 	Sodium Chloride type water quality low	Sodium Chloride type water quality low	Sodium Chloride type water quality low	no data low
	ground water use in the vicinity of the sites	1 well on record 9 residences nearby	6 wells on record 0 residences nearby	4 wells on record 0 residences nearby	3 wells on record 8 residences nearby

TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
SURFACE WATER					
Compare potential for impairment of surface water quality	number of watersheds	1 (Clay Creek)	2 (Johnston Drain and Bowen's Creek)	1 (Johnston Drain)	1 (Clay Creek)
	number of subwatersheds	2 (Coyle Drain and Wheeler Drain)	2 (Tributary of Bowen's Creek and Johnston Drain)	1 (Johnston Drain)	1 (Coyle Drain)
	characteristics of downstream usage (km)	16.5	1.0	1.8	17.3
	number of watercourses receiving surface water discharge	1	1	1	1
	peak flow through and adjacent to site (m ³ /s)	72	27	23	72
Compare potential flood hazard	total length of watercourses (m)	700	1750	1600	1590
	length of on-site watercourses (m)	0	0	0	640
	length of adjacent watercourses (m)	700	1750	1600	950
	number of watercourses entering site and number receiving site runoff	3	3	2	2
availability of outlet (%)	0.09	0.8	0.5	0.09	

**TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)**

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES				
		D	H	I	K	
SOCIAL Potential for disruption to individuals in the site vicinity study area (within 1,000 m of site boundary)	number of residences/residents (estimated)	12/37	0/0	1/3	8/25	
	number of vulnerable residents					
	• number/percentage of children 0-14 years old	13/32%	0/0%	N/A ¹	5/36%	
	• number/percentage of seniors > 65 years old	4/10%	0/0%	N/A	1/7%	
	• number/percentage of individuals with respiratory health problems	8/19%	0/0%	N/A	6/43%	
	• number/percentage home during facility operating hours	17/41%	0/0%	N/A	5/36%	
	use of property					
	• number/percentage of households involved in outdoor sensitive activities	11/100%	0/0%	N/A	5/100%	
	• number/percentage of respondents who feel that outdoor activities would be affected by facility operations	10/91%	0/0%	N/A	4/80%	
	use of property by non-resident owners					
• number/percentage of owners involved in outdoor activities on their property	9/50%	1/11%	0/0%	8/42%		
• number/percentage of owners with plans for future residences on their property	1/5%	1/11%	0/0%	1/5%		

TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
Potential for disruption of community/recreation features in the site vicinity study area (within 1,000 m of site boundary)	number of features	1	1	0	1
	characteristics of features				
	· number with hours of operation during facility operating hours	1	1	0	1
	· number predominantly based outdoors	1	1	0	1
	· number who perceive operations of the feature will be affected by proposed facility	0	1	0	0
Potential for disruption of residents in the access route study area	· number with plans for expansion	1	0	0	1
	number of residences/residents	5/22	0	0	8/33
	number of vulnerable residents				
	· number/percentage of children 0-14 years old	7/32%	0/0%	0/0%	12/36%
	· number/percentage of seniors > 65 years old	2/9%	0/0%	0/0%	2/6%
· number/percentage of individuals with respiratory health problems	2/9%	0/0%	0/0%	8/24%	
- number/percentage home during facility operating hours	11/50%	0/0%	0/0%	17/51%	

TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
	use of property	5/100%	0/0%	0/0%	8/100%
	<ul style="list-style-type: none"> • number/percentage of households involved in outdoor sensitive activities 				
	use of roadway shoulder	5/100%	0/0%	0/0%	8/100%
Potential for disruption of community/recreation features in the access route study area	<ul style="list-style-type: none"> • number/percentage of households which use shoulder of access route roadway 	5/100%	0/0%	0/0%	8/100%
	<ul style="list-style-type: none"> • number/percentage who feel waste traffic would affect them 	0	0	0	1
	number of features	0	0	0	1
	characteristics of features				
	<ul style="list-style-type: none"> • number with hours of operation during facility operating hours • number predominantly based outdoors • number concerned about waste management facility traffic 	0	0	0	0
Potential for disruption to communities in the site vicinity	community character	see description in text (Section 5.3)			
	community cohesion	see description in text (Section 5.3)			

**TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)**

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
VISUAL					
Extent of visibility (viewshed) (the potential for visual impacts was taken into account within the Social criteria group)	number of viewers	45	19	27	66
	types of viewers	45 residences	19 residences users of St. Clair River	27 residences users of 1 park users of the St. Clair River	66 residences
BIOLOGY					
Compare potential for loss or disruption of biological systems	On-site				
	• candidate sensitive area (ha)	0.0	4.1	0.0	0.0
	• high quality forest (ha)	0.0	0.0	0.0	0.0
	• medium quality forest (ha)	8.9	3.2	0.0	20.2
	• shrub woodland (ha)	1.4	0.0	0.0	36.0
	• ponds and open wetlands (ha)	0.6	0.2	0.0	0.8
	0-200 m zone				
	• candidate sensitive area (ha)	0.0	1.6	4.0	0.0
	• high quality forest (ha)	9.8	0.0	6.6	0.0
	• medium quality forest (ha)	38.2	2.1	4.5	41.5
	• shrub woodland (ha)	0.0	14.6	3.5	0.2
	• ponds and open wetlands (ha)	0.0	3.1	2.1	0.0
	200-500 m zone				
• candidate sensitive area (ha)	0.0	22.0	11.9	0.0	
• high quality forest (ha)	8.5	2.8	21.1	1.7	
• medium quality forest (ha)	49.3	12.2	8.8	25.6	
• shrub woodland (ha)	0.0	8.3	3.0	0.1	
• ponds and open wetlands (ha)	0.8	11.5	11.3	0.1	

TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
	500-1000 m zone				
	· regional life science ANSI	0.0	0.0	5.0	0.0
	· candidate sensitive area (ha)	0.0	36.1	39.2	0.0
	· high quality forest (ha)	0.0	37.0	41.3	4.2
	· medium quality forest (ha)	25.5	22.4	23.4	0.7
	· shrub woodland (ha)	6.7	38.1	14.2	1.1
	· ponds and open wetlands (ha)	1.5	23.0	20.4	0.7
	· permanent natural streams (m)	0	1500	1300	0
AGRICULTURE					
Removal of agriculture	cleared agricultural land designated for agriculture within site (ha)	0	0	0	11.7
	cleared agriculture land designated for other uses within site (ha)	57.7	68.0	75.0	3.2
Disruption of agriculture	number of potential farm units removed (1 farm unit = 40 ha)	1.4	1.7	1.8	0.4
	amount of cleared agricultural land designated for agriculture within 500 m from site boundary (ha)	13.4	0	0	170.9
	amount of cleared agricultural land designated for agriculture > 500 m but ≤ 1000 m from site boundary (ha)	161.0	0	9.7	286.0
	amount of cleared agricultural land designated for other uses within 500 m from site boundary (ha)	111.3	80.8	110.4	27.4

**TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)**

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
	amount of cleared agricultural land designated for other uses > 500 m but ≤ 1000 m from site boundary (ha)	143.2	97.2	114.0	107.9
	number of potential farm units within 1000 m study area (Note: 1 farm unit = 40 ha)	10.7	4.4	5.8	14.8
	number of farmers using haul route to move equipment	4	2	2	4
LAND USE					
Impacts on existing urban structure	potential changes to existing urban structure	Introduces a heavy industrial type use into an agricultural area	None, introduces a heavy industrial type use in Chemical Valley, a heavy industrial area	None, introduces a heavy industrial type use in Chemical Valley, a heavy industrial area	Continues existing waste disposal use of site but the use is significantly intensified; introduces a heavy industrial type use into an existing agricultural area.
Conformity to Lambton County Official Plan	conformity to Economic Anchor Designations	Conforms, designated "Chemical Valley - Heavy Manufacturing Anchor"	Does not conform, located outside of Chemical Valley designation in Agricultural area	Conforms, same as Site D	1/2 of site conforms to "Chemical Valley - Heavy Manufacturing Anchor"; remaining 1/2 does not conform to Agricultural area
Conformity to Township of Moore Official Plan	conformity to Structure Plan Designations	Conforms, designated "Major Industrial".	Same as Site D	Same as Site D	Does not conform, located in agricultural portion of the Township
	consistency with intent of On-Site Land Use Designations	"Industrial-Type 3" (heavy industry) Consistent with intent to accommodate large scale or heavy industries	Same as Site D	Same as Site D	Waste Disposal Area" (3/4) and "Agriculture" (1/4) Consistent with intent of "Waste Disposal Area" policies but not consistent with intent of "Agriculture" policies

TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
Compatibility with Official Plan land use designations in surrounding 1 km area	compatibility with Township Official Plan land use designations	Moore Township compatible with "Industrial-Type 3" area and "Waste Disposal Area" (2/3 of surrounding 1 km area) but not compatible with "Agricultural" area (remaining 1/3)	Moore Township compatible with "Industrial-Type 3" area and very small area designated "Environmental Protection"; not compatible with small area designated "Agricultural" on lands east of Highway 40 (for remaining 1/3 of surrounding area, see next indicator) Sombra Township compatible with "Industrial" area, "High Hazard" area (Clay Creek) (1/3 of surrounding area) but not compatible with small area designated "Rural" east of Highway 40	Moore Township compatible with "Industrial-Type 3" area and very small area designated "Environmental Protection" (Clay Creek); not compatible with small area designated "Agricultural" east of Highway 40 Sombra Township compatible with "Industrial" area and "High Hazard" area (Clay Creek) but not compatible with small area designated "Rural" east of Highway 40	Moore Township not compatible with "Agricultural" area (2/3 of surrounding 1 km area); compatible with "Industrial-Type 3" area (remaining 1/3)
Compatibility with existing land uses on-site and in surrounding 1 km area	number of property owners affected	1 (166814 Canada Limited)	2 (Terra Canada International and Monsanto)	1 (IC Canada Inc. owned by Terra Canada International)	2 (Wolff and Township of Moore)
	loss of existing on-site uses existing uses within 1,000 m	requires 58 ha of farmland Potential incompatibility with surrounding land uses: 12 residences agricultural lands contractor's yard CKJD Radio Antenna Archery Club	requires 68 ha of farmland Generally compatible with surrounding land uses: vacant industrial lands and plants agricultural lands Terra Industrial Plant recreational park	requires 75 ha of farmland Generally compatible with surrounding land uses: 1 residence Terra Industrial Plant vacant industrial lands recreational park	requires 15 ha of farmland Potential incompatibility with surrounding land uses: 8 residences oil storage facility 1 commercial use (Robbins Construction) CKJD Radio Antenna agricultural lands archery club

**TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)**

		DATA FOR SHORT LIST OF SITES				
CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	D	H	I	K	
Compatibility with proposed land uses on-site and in surrounding 1 km area	loss of on-site proposed uses	None	Changes Terra Canada International plans to dispose pond water on Sites H and I	Same as Site H	None	
	impacts on proposed uses in surrounding 1 km area	None; there is no current development activity.	Same as Site D	Compatible with Lambton Sportsmen proposed gun club	Same as Site D	
Potential impacts on development potential of property occupied by the site	loss of on-site development opportunities	None	Displaces 1 "Dangerous Industrial Use" or about 100 light and moderate industrial uses	Displaces 1 "Dangerous Industrial Use" or about 70 light and moderate industrial uses	None	
	impact of loss of property on development potential of remaining property	No adverse impacts	No adverse impacts	Isolates a 23 ha parcel of land zoned for agricultural uses on north part of Lot 26, resulting in no road access to this property. Not significant, however, since the property is designated for industrial uses and its development could be combined with lands to the west	No adverse impacts	
Potential impacts on existing development opportunities in surrounding 1 km area	impact of loss of on-site development opportunities on municipal supply of land	No adverse impacts	No adverse impacts	No adverse impacts	No adverse impacts	
	impact on residential development opportunities	Adverse impacts of the facility would discourage the 20 farm-related houses allowed	Not applicable	Same as Site D but only affects 2 farm related houses	Same as Site D, but affects about 28 houses	
	impact on farm-related commercial and industrial development opportunities	About 7 uses of this type could be discouraged from the facility	None	None	Same as Site D, but affects about 11 potential uses of this type	

TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
Impacts on future (year 2016) urban structure	impact on industrial development opportunities	The facility would encourage the development of moderate and heavy uses but discourage light industry.	Same as D	Same as D	Not applicable
	potential changes to future urban structure	Could prematurely introduce a heavy industrial type use and other uses attracted by the facility into an area which is expected to be predominantly agricultural in the future; this will unnecessarily and prematurely extend the Chemical Valley area to the east	No adverse changes, fits into future urban structure	Same as Site H	Could prematurely introduce a heavy industrial type use and other uses attracted by the facility into an area which is expected to be predominantly agricultural in the future; this will unnecessarily and prematurely extend the Chemical Valley area to the east
DESIGN AND OPERATIONS					
Compare potential landfill capacity	estimated maximum landfill capacity	Block 2 - 1,000,000 t Blocks 2&3 - 1,400,000 t Blocks 2, 3&4 - 1,900,000 t	Block 2 - 1,000,000 t Blocks 2&3 - 1,600,000 t Blocks 2, 3&4 - 2,100,000 t	Block 2 - 1,000,000 t Blocks 2&3 - 1,600,000 t Blocks 2, 3&4 - 1,900,000 t	Block 2 - 1,000,000 t Blocks 2&3 - 1,100,000 t Blocks 2, 3&4 - 1,400,000 t
	Compare site development costs	land purchase (lump sum) cleaning and grubbing medium quality forest shrub woodland fencing power servicing road works leachate treatment Total	\$285,000 8 ha 0 ha 3,500 m \$24,000 \$708,000 \$800,000 \$2,048,000	\$296,000 4.6 ha 0 ha 3,600 m \$55,000 \$508,000 \$1,080,000 \$2,151,000	\$289,000 0 ha 0 ha 3,600 m \$72,000 \$516,000 \$1,047,000 \$2,104,000

TABLE 6.15
DATA FOR COMPARATIVE EVALUATION OF SHORT LIST OF SITES
(Continued)

CRITERIA GROUPING/ CRITERIA	INDICATOR/ SUB-INDICATOR	DATA FOR SHORT LIST OF SITES			
		D	H	I	K
TRANSPORTATION					
Compare potential for impacts to traffic safety along haul routes	potential number of annual accidents	0.714	0.899	0.842	0.763
	annual number of potential at-grade haul vehicles/train accidents	128,672	209,096	209,096	128,672
	annual number of haul vehicles travelling through intersections	156,969	160,613	160,613	177,075
Compare potential for impacts to traffic operations along haul routes	annual vehicle-km travelled on single-lane (in one direction) on public roads	345,065.2	461,948.8	443,853.4	368,652.2
	annual vehicle-km travelled on multi-lane (in one direction) on public roads	318,717.8	318,717.8	318,717.8	318,717.8
	annual number of haul vehicles travelling through intersections	156,969.0	160,613.0	160,613.0	177,075.0

I. N/A = One residence in the vicinity of Site I but was not available for an interview.

6.9 Native Land Claims

Specific and comprehensive land claims are being negotiated with native communities throughout Ontario. In addition, treaty rights (e.g. hunting and fishing) extend over large areas in the province.

Sites H and I are on lands subject to a specific land claim submitted by the Walpole Island native community. In addition, all sites in Moore Township are on lands subject to treaty rights. Native concerns (as a downstream community) are greatest with regard to sites that are closest to the St. Clair River (Sites A, G, F and J). Sites B, C, E, D and K are of least concern to the Walpole community.

The specific land claim affecting Sites H and I has been under negotiation for approximately thirty years. Recently, the negotiations between the federal Department of Indian and Northern Affairs has focussed on the geographic boundary of the land claim. Most of the discussion has centred on the extent of the boundary in Lake St. Clair; no agreement has been reached to date.

Addressing the land claim issue in a siting process requires complex legal assessments. In general, however, it appears that the automatic exclusion of lands subject to native land claims may not be reasonable due to the significant uncertainties regarding:

- the specific boundaries of the lands subject to a claim;
- the date when final resolution of a claim will be achieved; and
- the nature of the compensation to be given (compensation may be in land or in cash).

In the Environmental Assessment Board decision on the North Simcoe Environmental Assessment, the board criticized the proponent for excluding areas similar to lands subject to land claims because it disqualified suitable areas from consideration.

Given the results of the technical evaluations identifying Site I and Site H as the first preferred and second preferred sites respectively, it is recommended that further clarification regarding the status of the claim affecting Sites H and I be pursued through meetings with Walpole Island First Nation representatives, and provincial and federal government native affairs representatives.

6.10 The Recommended Site

Based on both the qualitative and quantitative evaluations, the order of preference of the sites for development of the long-term waste management facility is:

- 1st - Site I;
- 2nd - Site H;
- 3rd - Site D; and
- 4th - Site K.

Pending further clarification of land claim status, it is recommended that Site I be carried forward for detailed assessment studies.

7.0 ECONOMIC FEASIBILITY OF TRANSFER STATIONS

7.1 Introduction

In the Lambton County WMMP study, potential waste management systems were evaluated and a recommended waste management system for the County was identified. The development of potential systems and the identification of a recommended system are described in Chapter 4.

Transfer stations were identified as a component of the recommended system because of the financial benefits that transfer stations could potentially provide in terms of cost savings for waste haul. However, during the evaluation of the system components, it was recognized that the magnitude of potential cost savings would be dependent on the locations of other system components that receive wastes. As a result, it was recommended that further consideration of the transfer stations component be carried out at a later stage of the Master Plan study, after potential sites for facilities that receive wastes were identified.

A siting study was commenced in 1990 to identify a site for the composite waste management facility. The site includes a materials recovery facility (MRF), a central composting facility and a landfill. The identification and evaluation of potential sites for the composite facility is described in Chapter 6.

The recommended site for the composite facility and the other three sites on the short list are located in the western portion of Moore Township. It was assumed that once the composite facility is opened, a significant proportion of the compostable and recyclable materials collected in the County and all of the municipal wastes collected from residential and industrial, commercial and institutional (IC&I) sources could be directed to this facility. Given that the recommended composite facility site is located in Moore Township, it was recognized that the haul distances to the new facility for some municipalities, such as the Village of Grand Bend and the Town of Bosanquet, will be significant (e.g. up to approximately 100 km). As a result, it was considered appropriate to determine the economic feasibility of constructing waste transfer stations in Lambton County to provide a potentially less expensive alternative to direct hauling wastes to the new composite facility.

This section summarizes the results of the transfer station economic feasibility study. Additional details of the study are provided in Appendix 2F in Volume 2.

7.2 Method

7.2.1 Description of Method

The method for the transfer station economic feasibility study was based on a comparison between the savings in haul costs that will be realized by providing transfer stations versus the costs of building and operating the stations. If transfer stations are provided, then wastes will only have to be direct hauled by the collection trucks to the transfer stations instead of to the composite facility. This will result in reduced direct haul distances and possibly increased cost savings. However, these savings will be offset by the costs of building and operating the transfer stations and hauling wastes via transfer truck from the stations to the composite facility. A simplified representation of this methodology is presented in Equation 1.

$$\text{Net Cost/Benefit of Providing Transfer Stations} = \left(\begin{array}{l} \text{Cost of Direct} \\ \text{Hauling To the} \\ \text{Composite Facility} \end{array} - \begin{array}{l} \text{Cost of Direct} \\ \text{Hauling To the} \\ \text{Transfer Stations} \end{array} \right) - \left(\begin{array}{l} \text{Cost of} \\ \text{Operating the} \\ \text{Transfer Station} \end{array} + \begin{array}{l} \text{Cost of Hauling} \\ \text{to the Composite Facility} \\ \text{Using Transfer Trucks} \end{array} \right) \quad (1)$$

The calculations for this study were completed only for waste quantities going to the landfill component of the composite facility. It was not known what quantities of compostables and recyclables will be transported to the composite facility. However, the quantities of wastes that will be disposed at the landfill component of the composite facility were better defined and were assumed to be much greater than the quantities of compostables and recyclables that will be transported to the facility. If recyclables and compostables are handled at the transfer station, this could potentially improve the feasibility of building and operating stations. However, the amount of the potential benefit is not known.

For direct haul from the municipalities to either the composite facility or to the transfer stations, it was assumed that the vehicles presently used to collect wastes in the lower tier municipalities in the County will be used. All of the municipalities in the County presently use their collection trucks to haul wastes to the existing landfill sites.

All calculations were based on the one year period commencing January 1, 1996 and ending December 31, 1996. It was assumed that the landfill component of the composite facility will open in January, 1996. The feasibility of constructing and operating transfer stations may change in the future as waste quantities increase with increasing populations. As a result, sensitivity analyses were completed to determine if the net cost/benefit of constructing and operating transfer stations will change when waste quantities change in the future.

The costs of direct hauling wastes from the municipalities to the composite facility and the transfer stations were determined by multiplying the hourly operating costs for municipal collection vehicles by the total travel time per year. Total travel times were determined by multiplying the number of trips required by the travel time per trip to the composite facility or the transfer stations. The calculations yielded a total cost per year for each municipality. The calculations are summarized in Equation 2. Additional details on the determination of municipal collection truck operating costs and trip distances and travel times are provided in Appendix 2F in Volume 2.

$$\text{Total Direct Haul Cost per Year} = \text{Truck Operating Cost per Hour} \times \text{Number of Trips per Year} \times \text{Travel Time per Trip} \quad (2)$$

The costs for operating the transfer stations were assumed to consist of the building operating costs, the equipment operating costs, and the labour costs. The calculation of the operating costs for the transfer stations is summarized in simplified form in Equation 3. More detailed information on the determination of these costs is provided in Appendix 2F in Volume 2.

$$\text{Total Cost for Transfer Station Operation} = \text{Transfer Station Building Operating Cost} + \text{Equipment Operating Cost} + \text{Station Labour Cost} \quad (3)$$

The capital costs for the transfer stations were determined by developing a conceptual design for the stations. Based on the capital cost for the conceptual design, annual interest and depreciation costs were determined. Annual costs for maintenance and insurance were also included in the determination of the overall operating cost.

Equipment operating costs were determined based on the assumption that wastes will be loaded into the transfer trucks using a skid steer loader. This is consistent with the conceptual design for the stations. Operating costs for the loader were determined by multiplying the number of operating hours per year by the hourly operating cost. The number of hours per year that the machine would be needed was assumed to be a function of the amount of wastes handled at the stations.

Labour costs for the stations were determined by assuming that the stations would be supervised most of the time by an operator who would be responsible for supervising the unloading of wastes, the loading of the transfer trucks, driving the trucks to the composite facility, and maintaining the stations. In situations where it was expected that increased amounts of wastes would be handled at the stations, it was assumed that the station operator would be assisted by an equipment operator on a part-time basis. Costs for benefits were also included in the labour costs.

Operating costs for the transfer trucks were determined using information from the Federal Government report entitled "Operating Costs of Trucks in Canada - 1990". This study provided estimates of operating costs per kilometre for various types of trucks. It was assumed that a transfer truck is similar to the 5 axle tractor semi-trailer truck classification used in the Federal report. Operating costs for the transfer trucks were calculated by multiplying the number of trips required per year from the transfer stations to the composite facility by the trip distance and the operating cost per kilometre. The calculation is summarized in equation 4. The cost data obtained from the Federal report was inflated to 1996 costs using Consumer Price Index information produced by Statistics Canada. Additional details of the calculations are provided in Appendix 2F in Volume 2.

$$\begin{array}{l}
 \text{Transfer Truck} \\
 \text{Operating Cost} \\
 \text{Per Year}
 \end{array}
 =
 \begin{array}{l}
 \text{Number of Trips} \\
 \text{To The Station} \\
 \text{Per Year}
 \end{array}
 \times
 \begin{array}{l}
 \text{Travel Distance} \\
 \text{Per Trip}
 \end{array}
 \times
 \begin{array}{l}
 \text{Operating Cost} \\
 \text{Per Kilometer} \\
 \text{Traveled}
 \end{array}
 \quad (4)$$

7.2.2 Development of Waste Transfer Scenarios

A total of six potential waste transfer scenarios were considered in the analysis. For each scenario, it was assumed that one transfer station would be constructed at a strategic location within the assumed service area for the scenario. The service areas were developed based on what were considered to be reasonable combinations of municipalities. The considerations used were the proximity of the municipalities to each other and the landfill sites that they presently use for waste disposal. Moore and Sombra Townships were not considered in the analysis because these municipalities are very close to the recommended site for the composite facility and it is unlikely that there will be significant benefits to be gained by providing transfer stations for these municipalities. The remaining 18 municipalities in the County were included in different combinations in the six transfer scenarios. The scenarios are summarized in Table 7.1. A brief rationale for each scenario follows.

**TABLE 7.1
SUMMARY OF WASTE TRANSFER SCENARIOS**

Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Sarnia Point Edward	Petrolia Wyoming Oil Springs Dawn Enniskillen Plympton	Alvinston Watford Brooke Euphemia	Forest Arkona Thedford Grand Bend Warwick Bosanquet	Alvinston Watford Brooke Euphemia Forest Arkona Thedford Grand Bend Warwick Bosanquet	Petrolia Wyoming Oil Springs Dawn Enniskillen Plympton Alvinston Watford Brooke Euphemia Forest Arkona Thedford Grand Bend Warwick Bosanquet

Transfer Scenario No. 1 includes the City of Sarnia and the Village of Point Edward. These communities presently use the Sarnia landfill for waste disposal. Even though Sarnia and Point Edward are relatively close to the recommended composite facility site in Moore Township, it may be possible that waste transfer will be cost effective given the relatively large amount of wastes produced in Sarnia.

Transfer Scenario No. 2 includes the municipalities in the centre of Lambton County that are near the Philip Environmental landfill site in Petrolia. The Town of Petrolia, the Villages of Wyoming and Oil Springs, and Enniskillen and Plympton Townships presently use the Philip site for waste disposal. Dawn Township uses its own landfill site for waste disposal. However, it is expected that once the County's new landfill site is opened, Dawn Township's wastes will be redirected to the new site and the Dawn landfill will be closed.

Transfer Scenario No. 3 includes the municipalities in the eastern portion of the County that are located south of the Laidlaw landfill site in Warwick Township. The municipalities in this area include the Villages of Alvinston and Watford, and Brooke and Euphemia Townships. Alvinston, Watford and Euphemia presently use the Laidlaw site for waste disposal. Brooke Township presently uses its own landfill site for waste disposal. Similar to Dawn Township, it is expected that Brooke Township's wastes will be redirected to the County's new landfill when it opens and the Brooke site will be closed.

Transfer Scenario No. 4 includes the municipalities in the eastern portion of the County that are located north of the Laidlaw landfill site. These municipalities include the Towns of Bosanquet and Forest, the Villages of Arkona, Thedford and Grand Bend, and Warwick Township. All of these municipalities presently use the Laidlaw landfill site for waste disposal. The municipalities at the eastern end of the County were divided into two groups because of the long distance between some of the municipalities to the north (e.g. Grand Bend and Bosanquet) and the municipalities to the south (e.g. Alvinston and Euphemia).

Transfer Scenario No. 5 consists of Scenarios 3 and 4 combined. This scenario includes all of the municipalities in the eastern portion of the County. Except for Brooke Township, all of the municipalities in this scenario presently use the Laidlaw landfill site for waste disposal.

Transfer Scenario No. 6 consists of Scenarios 2, 3 and 4 combined. This scenario includes all of the municipalities located in the central and eastern portions of the County. Except for Brooke and Dawn Townships, which have their own sites, all of the municipalities in this scenario presently use the Philip Environmental and Laidlaw landfill sites for waste disposal.

7.2.3 Locations of the Transfer Stations

For each waste transfer scenario, an optimum location was determined for a transfer station to serve all of the municipalities included in the scenario. The optimum location was assumed to be located at the centroid of the service area. A centroid represents the theoretical centre of waste generation in an area. It is determined by calculating the weighted average of distance multiplied by waste quantity produced for each municipality in the area. The theoretical location of the centroid for each waste transfer scenario was moved to the closest significant road intersection. It was assumed that the transfer station would be located at or close to this intersection. A significant intersection was defined as consisting of at least two municipal roads (e.g. County or Township Roads). The proposed transfer station locations for each transfer scenario are presented in Table 7.2.

**TABLE 7.2
PROPOSED TRANSFER STATION LOCATIONS
FOR TRANSFER SCENARIOS**

Scenario	Proposed Transfer Station Location
1	Highway 402 and Highway 40 in Sarnia
2	Highway 21 and Enniskillen Township Concession VII/VIII Road
3	Brooke Township Lot 15/16 Sideline Road and Concession VI/VII Road
4	Highway 79 and County Roads 6 and 9 in the Town of Bosanquet
5	County Roads 9 and 12 on the Town of Bosanquet and Warwick Township Boundary
6	Highway 402 and Highway 21 and County Road 8 on the Warwick and Plympton Township Boundary

7.3 **Results of Analysis**

7.3.1 Overall Results

The results of the calculations for the transfer station feasibility model are shown in Table 7.3. The results show that for all 6 waste transfer scenarios, the cost of operating the transfer stations is greater than the cost of direct hauling the wastes to the composite facility using collection trucks. The annual costs range from about \$200,000 per year for Scenario 4 to a maximum of about \$350,000 per year for Scenario 1. In terms of unit costs, the costs range from a minimum of approximately \$9.00 per tonne for Scenario 1 to approximately \$110.00 per tonne for Scenario 3. These results indicate that establishing transfer stations will not provide a direct economic benefit for Lambton County.

**TABLE 7.3
RESULTS OF TRANSFER STATION FEASIBILITY MODEL**

Transfer Scenario	Direct Haul Cost To New Facility (\$/yr) (1)	Direct Haul Cost To Transfer Station (\$/yr) (2)	Transfer Station Operating Cost (\$/yr) (3)	Transfer Truck Operating Cost (\$/yr) (4)	Net Transfer Station Operating Benefit/(Cost) (\$/yr) [5]=[1)-(2)]-[3)+(4)]	1996 Net Waste Quantity (tonnes/yr) (6)	Net Transfer Station Benefit/(Cost) (\$/tonne) (5÷6)
1	\$260,700	\$ 84,100	\$348,100	\$177,000	\$(348,500)	39,075	\$ (8.92)
2	\$ 76,100	\$ 31,000	\$233,200	\$ 45,400	\$(233,500)	7,243	\$ (32.24)
3	\$ 27,500	\$ 9,200	\$179,700	\$ 52,000	\$(213,400)	1,933	\$(110.40)
4	\$149,000	\$ 40,600	\$231,800	\$ 72,600	\$(196,000)	6,171	\$(31.76)
5	\$176,500	\$ 65,400	\$234,400	\$ 83,250	\$(206,550)	8,104	\$(25.49)
6	\$252,600	\$140,000	\$268,200	\$112,550	\$(268,150)	15,347	\$(17.48)

7.3.2 Results of Sensitivity Tests

Several sensitivity tests were completed with the transfer station economic feasibility model to test the sensitivity of the model to changes in the data. The purpose of the tests was to check if the results will change if reasonable changes are made in the input data. These changes reflect possible changes to the data that may occur in the future and possible variations to some of the assumed values used in the model.

The following sensitivity tests were completed:

- 1) The municipal collection truck operating cost for all municipalities was set to the same rate. This rate was \$66.62 per hour, which was the average rate observed for all municipalities for 1996. This value is comparable to the rate of \$69.28 per hour that was determined for Sarnia.
- 2) The average municipal collection truck operating cost for all municipalities was increased by approximately 20% to \$80.00 per hour.
- 3) The average municipal collection truck operating cost for all municipalities was increased by approximately 50% to \$100.00 per hour.
- 4) The net waste quantity for 1996 was changed to the net quantity expected in 2015. The net waste quantity includes waste diversion, which was assumed to reach 50% by the year 2000 and remain at 50% for the rest of the study period.
- 5) The net waste quantity for 1996 was changed to the total quantity expected in 1996. The total waste quantity assumes no waste diversion. This value represents the highest waste quantity that could reasonably be expected to be produced in Lambton County in 1996.
- 6) Machine operating, labour, interest and depreciation costs for the transfer station were reduced by 50%.
- 7) This test was similar to Test #6 above, except the transfer truck operating costs were also reduced by 25%. It was not considered reasonable to decrease the transfer truck operating cost by more than 25% because this would have resulted in a transfer truck operating cost similar to the municipal collection truck operating cost. Transfer trucks are much larger than municipal collection trucks and typically cost more to operate.
- 8) This test was a combination of Tests #5 and #7.

The resulting benefit (cost) for the sensitivity tests are shown in Table 7.4.

**TABLE 7.4
RESULTS OF MODEL SENSITIVITY TEST**

Transfer Scenario	SENSITIVITY TEST							
	1	2	3	4	5	6	7	8
1	\$(339,509)	\$(302,242)	\$(246,536)	\$(330,197)	\$(300,513)	\$(164,466)	\$(120,225)	\$(81,626)
2	\$(234,045)	\$(225,093)	\$(211,714)	\$(226,035)	\$(221,105)	\$(120,224)	\$(108,871)	\$(88,372)
3	\$(202,359)	\$(196,465)	\$(187,653)	\$(211,167)	\$(189,706)	\$(123,801)	\$(110,799)	\$(114,403)
4	\$(232,144)	\$(217,631)	\$(195,938)	\$(208,228)	\$(195,226)	\$(108,435)	\$(90,284)	\$(53,603)
5	\$(230,782)	\$(213,333)	\$(187,252)	\$(213,478)	\$(187,673)	\$(111,922)	\$(91,108)	\$(39,846)
6	\$(291,772)	\$(273,901)	\$(247,190)	\$(261,887)	\$(224,177)	\$(152,650)	\$(124,514)	\$(57,065)

As shown in Table 7.4, in all eight sensitivity tests there is a resultant cost for transfer stations. This indicates that the transfer station economic feasibility model is insensitive to reasonable changes in the input data. This result supports the overall conclusion that transfer stations will result in a cost rather than a benefit to the County in the future and this result will likely not change in the future.

7.4 Discussion of Results

The calculations completed in this study indicate that the net costs for establishing transfer stations will be greater than the costs of direct hauling wastes from the municipalities to the recommended site for the composite facility. This applies to all six of the transfer station scenarios that were considered. The economic feasibility of establishing transfer stations could improve if recyclables and compostables were also handled at the transfer station. However, the economic benefit that could be provided by handling these additional materials is not known.

It is important to consider that transfer stations provide benefits that cannot be measured in terms of monetary costs. For example, a possible benefit associated with transfer stations is that they provide the County with several potential options for compensating the lower-tier municipalities that will have to direct haul their wastes a longer distance to the composite facility. Transfer stations can also help to decrease the number of trucks that will use the access roads leading to the composite facility. This will help to reduce the negative impacts that are caused by truck traffic. These benefits are discussed in more detail in the following sections.

7.4.1 Compensation of Municipalities

The lower-tier municipalities in the County presently use landfills that are either owned by the County (e.g. City of Sarnia and Sombra, Moore, Dawn and Brooke Townships) or by private companies (Laidlaw site in Warwick Township and Philip Environmental site in Petrolia). The County has designated these sites for use by the lower-tier municipalities under Bill 35, which provides the County with the power to designate, for each municipality, one or more facilities to accept the municipality's wastes.

Assuming the County's new landfill site at the composite facility opens in Moore Township in 1996, it is assumed that the County will designate that all of the lower-tier municipalities in the County must use this site. Bill 35 stipulates that once the County has designated a landfill site for a local municipality, the municipality cannot utilize any other facilities for waste disposal. When the County's new landfill opens, each municipality, except Moore and Sombra Townships, will have to direct haul their wastes a distance significantly greater than they are presently hauling their wastes.

It is likely that the lower-tier municipalities will expect to be compensated by the County for the additional costs of having to direct haul their wastes farther to the new site. The County has five options available to address this issue. These options are explained in more detail in the following sections. For each option discussed, the practical and cost considerations have been identified. It is important to note that political considerations will have a significant bearing on the acceptability of the options. However, political issues have not been incorporated into the analysis.

Option 1 - Do Nothing

The County could opt to do nothing and expect the lower-tier municipalities to absorb the additional costs of direct hauling their wastes to Moore Township. It is estimated that this will result in the municipalities having to absorb an additional \$275,000 per year for waste haul costs (the calculations are summarized in Table 7.5). The cost increases expected for the individual municipalities range from a low of \$2.88 per tonne for Oil Springs to \$30.26 per tonne for Grand Bend.

The primary issue associated with the do nothing option will be equitability. As shown in Table 7.5, some municipalities will be required to absorb higher costs per tonne produced than other municipalities (e.g. Grand Bend versus Sarnia). The main advantage of this option for the County is that no new changes to the existing waste management system will be needed so that increases in the County's involvement and commitment in the waste management system will be minimal.

**TABLE 7.5
DETERMINATION OF INCREASE IN
DIRECT HAUL COSTS TO NEW SITE**

Municipality	Direct Haul Cost to Existing Disposal Site (\$/yr)	Direct Haul Cost to New Disposal Site (\$/yr)	Increase in Direct Haul Cost (\$/yr)	Net 1996 Waste Generation (tonnes/yr)	Cost Increase for Direct Haul (\$/tonne)
	(1)	(2)	(3)	(4)	(3) ÷ (4)
City					
Sarnia	\$120,100	\$245,000	\$124,900	37,891	\$3.30
Towns					
Bosanquet	\$17,300	\$40,000	\$22,700	2,475	\$9.17
Forest	\$10,300	\$19,700	\$9,400	1,441	\$6.52
Petrolia	\$3,150	\$12,200	\$9,050	2,364	\$3.82
Villages					
Alvinston	\$3,800	\$7,500	\$3,700	466	\$7.94
Arkona	\$2,400	\$7,100	\$4,700	273	\$17.22
Grand Bend	\$32,500	\$61,400	\$28,900	955	\$30.26
Oil Springs	\$1,250	\$2,300	\$1,050	364	\$2.88
Point Edward	\$8,400	\$15,700	\$7,300	1,184	\$6.16
Theford	\$4,750	\$11,100	\$6,350	401	\$15.83
Watford	\$1,650	\$7,900	\$6,250	769	\$8.12
Wyoming	\$4,400	\$12,600	\$8,200	1,146	\$7.15
Townships					
Brooke	\$1,450	\$6,700	\$5,250	454	\$11.56
Dawn	\$1,600	\$4,400	\$2,800	407	\$6.88
Enniskillen	\$2,100	\$7,300	\$5,200	800	\$6.50
Euphemia	\$3,950	\$5,400	\$1,450	244	\$5.94
Plympton	\$19,400	\$37,300	\$17,900	2,162	\$8.28
Warwick	\$2,000	\$9,700	\$7,700	626	\$12.30
Totals	\$240,500	\$513,950	\$273,450		

Note: Moore and Sombra Townships were not included in the analysis because their haul distances to the new site are not expected to change significantly.

Option 2 - Use Existing Private Landfill Sites

The provisions in Bill 35 allow the County to designate private landfill sites for use by local municipalities. The County has already designated the Philip Environmental and the Laidlaw landfill sites to accept wastes from local municipalities. An option available to the County is to continue to require the municipalities that are located near these private sites to use them as disposal sites in the future. This would help to reduce the increases in direct haul costs that some municipalities will have to absorb when the new landfill at the composite facility in Moore Township opens. However, this option is not reasonable in the context of the Master Plan because the Master Plan assumes that the County intends to use its new landfill site to serve all of the County in the future.

Option 3 - Modify the Existing Tax Levy System

A tax levy system is used by the County in the existing waste management system to recover waste disposal costs. A third option available to the County for subsidizing the local municipalities for increased waste haul costs to the composite facility would be to adjust the levy charged to the residents in each municipality. The municipalities could then increase their levy to cover the increased haul costs. The County would have to assess the additional costs incurred by each municipality and then determine an appropriate levy adjustment.

The predicted direct haul cost increases for the municipalities, as shown in Column 3 of Table 7.5, provides an indication of the additional costs that the County would be expected to absorb when the new landfill opens under this option. An issue that will be difficult to resolve with this option will be equitability. It may be difficult to prove to each municipality that the compensation that they receive in the form of a levy adjustment is similar to the degree of compensation awarded to other municipalities. The variability of the increased cost estimates shown in Table 7.5 provides an indication of how difficult it may be to satisfy each municipality.

Option 4 - Implement a Direct Cost System

The existing amalgamation agreement between the County and the local municipalities will end in July 1994. The County will have the option of either staying with the existing tax levy system for recovering waste disposal costs or changing to a new system. Considering that it has been determined that the tax levy system does not charge the municipalities for waste disposal costs in an equitable manner (Lambton County, 1993), a likely choice for an alternative would be a direct cost type of system.

Direct cost waste collection was identified as an initiative in the recommended long-term diversion strategy. It was recommended that direct cost be implemented at both the municipal and County levels. In a municipal level direct cost program, the municipalities charge the residents directly for waste collection on a weight or per bag basis. In a County program, the County charges municipalities directly to accept and dispose wastes on a weight or volume basis. These charges are likely best applied using tipping fees. Additional details on the identification of the recommended long-term diversion strategy are provided in Chapter 5. Implementation of the direct cost program is considered further in Chapter 8.

The County could subsidize the increased direct haul costs that most of the municipalities will incur when the composite facility opens by charging varying tipping fees. The tipping fee could be adjusted, depending on the increased haul cost incurred by each municipality. The expected haul cost increases shown in Table 7.5 provide an indication of how much the tipping fees would have to be adjusted. The base tipping fee would have to be high enough to ensure that sufficient revenue would be generated to cover disposal costs. This base fee would then be adjusted accordingly, considering the amount of waste generated by the municipality and the increased cost for direct haul.

Implementing a direct cost program which features variable fees may be problematic for the County. Similar to Option 3, it will likely be difficult for the County to subsidize some municipalities for their haul costs in a manner that all of the municipalities will view as equitable for all concerned. It is important to note that the practice of a County or Regional Government in Ontario charging lower-tier municipalities varying fees for waste disposal has not been attempted anywhere else in Ontario.

Option 5 - Implement a Direct Cost System with Transfer Stations

A fifth option available to the County would be to establish a direct cost program and then incorporate transfer stations as part of the waste management system. There are two alternatives available for implementing this option.

- a) The County could charge higher tipping fees at the transfer stations than at the landfill site. The higher charge at the transfer stations could be used to help cover the cost of operating the stations.
- b) Costs could be equalized by charging a common tipping fee at both the transfer stations and at the landfill site. The value of the tipping fee would be established so that the cost of operating the transfer stations would be included. The costs for the transfer stations would be shared by all of the municipalities.

Metropolitan Toronto presently charges two different tipping fees, a lower fee at their landfill sites and a higher fee at their transfer stations. The fee charged at the landfill sites is 17% lower than the fee charged at the transfer stations. This difference helps to pay for the cost of operating the stations.

The costs per tonne that would have to be recovered using the tipping fees in order to cover the costs of the transfer stations in Alternatives A and B were determined. The calculations are shown in Table 7.6. It is important to note that the cost figures shown in Table 7.6 are total costs for operating the transfer station. These figures do not take into consideration the haul cost savings that the municipalities will receive if the County provides transfer stations. The County may be able to receive some of these savings from the municipalities. However, as demonstrated previously, the overall cost of operating the transfer stations will exceed any cost saving benefits.

The results indicate that for Alternative A, the tipping fee charged at the transfer stations would have to be increased by an amount ranging from \$13.44 per tonne for Scenario 1 to \$119.87 per tonne for Scenario 3 to cover the cost of operating the transfer stations. Only the municipalities who use the station will be responsible for paying for it. The costs for Alternative B are much lower because they are shared amongst all of the municipalities in the County. These costs range from \$4.60 per tonne for Scenario 3 to \$8.66 per tonne for Scenario 1.

Alternative A will likely not be feasible due to the high unit costs of operating the transfer stations. These high costs will result in high tipping fees and large differences between the tipping fee charged at the landfill site and the tipping fee charged at the transfer stations. Alternative B is more practical because it will result in an increase of less than \$10.00 per tonne in the common tipping fee charged at both the transfer stations and the landfill site.

7.4.2 Impact on Number of Vehicles Entering Composite Facility

Calculations were completed to determine the impact that transfer stations will have on the number of trucks carrying waste that will enter the composite facility. The calculations were done only for the wastes entering the landfill component of the facility. If recyclables and compostables are also handled at the transfer station, this will help to even further reduce the number of vehicles entering the composite facility. The truck arrival estimates were determined using total waste quantities which do not consider waste diversion. The total waste quantities were used because they provide a more conservative estimate of truck arrivals than the net quantities do.

**TABLE 7.6
TRANSFER STATION COSTS FOR OPTION 5**

Waste Transfer Scenario	Municipalities Served	Transfer Station Building Cost (\$/yr) (1)	Transfer Truck Operating Cost (\$/yr) (2)	Total Transfer Station Cost (\$/yr) (3)=(1)+(2)	ALTERNATIVE A		ALTERNATIVE B	
					1996 Net Waste Generation (tonnes/yr) (4)	Transfer Station Cost Per Tonne (\$/tonne) (5)=(3)÷(4)	1996 Net Waste Generation (tonnes/yr) (6)	1996 Predicted Waste Generation (\$/tonne) (7)=(3)÷(6)
1	Sarnia, Point Edward	\$348,100	\$177,000	\$525,100	39,075	\$ 13.44	60,594	\$8.66
2	Petrolia, Wyoming, Oil Springs, Dawn, Enniskillen, Plympton	\$233,200	\$ 45,400	\$278,600	7,243	\$ 38.46	60,594	\$4.60
3	Alvinston, Watford, Brooke, Euphemia	\$179,700	\$ 52,000	\$231,700	1,933	\$119.87	60,594	\$3.82
4	Forest, Arkona, Theford, Grand Bend, Warwick, Bosanquet	\$231,800	\$ 72,600	\$304,400	6,171	\$ 49.32	60,594	\$5.02
5	Alvinston, Watford, Brooke, Euphemia, Forest, Arkona, Theford, Grand Bend, Warwick, Bosanquet	\$234,400	\$ 83,250	\$317,650	8,104	\$ 39.20	60,594	\$5.24
6	Petrolia, Wyoming, Oil Springs, Dawn, Enniskillen, Plympton, Alvinston, Watford, Brooke, Euphemia, Forest, Arkona, Theford, Grand Bend, Warwick, Bosanquet	\$268,200	\$112,550	\$380,750	15,347	\$ 24.81	60,594	\$6.28

The calculations used for determining the number of waste collection and transfer trucks arriving at the composite facility are shown in Table 7.7. The results show that Scenario 1 will result in a 34% decrease in the number of waste haul trucks entering the composite facility. Scenario 6 will result in a 14.5% reduction in waste haul traffic volumes.

TABLE 7.7
PREDICTED REDUCTION IN TRUCK TRAFFIC
DUE TO TRANSFER STATIONS

Waste Transfer Scenario	Predicted Number of Trucks Entering the Landfill Component of the Composite Facility from All Municipalities in 1996				
	No Transfer Station	With Transfer Station			% Decrease
		Regular Trucks	Transfer Trucks	Total	
1	10,050	3,740	2,850	6,590	34%
2	10,050	8,770	525	9,265	8%
3	10,050	9,700	140	9,840	2%
4	10,050	9,050	450	9,500	5.5%
5	10,050	8,700	590	9,290	7.5%
6	10,050	7,420	1,115	8,535	14.5%

7.5 Conclusions

The calculations completed using the economic model developed in this study show that transfer stations will not be cost effective for Lambton County. In all of the six combinations of municipalities that were considered, it was determined that the cost of operating the transfer stations will exceed the benefits of reduced waste haul costs to the composite waste management facility. This means that when the composite facility opens, it will be less expensive to have the local municipalities haul their wastes directly to the composite facility in their collection trucks compared to the cost of operating transfer stations.

When the composite facility opens in 1996, most of the municipalities in the County will incur higher waste haul costs. The most practical method of subsidizing these costs, if the County chooses to do so, would involve establishing a direct cost program at the County level and transfer stations. The tipping fee would be the same at both the transfer stations and the landfill site at the composite facility. The tipping fee would be set at a value to ensure that the costs of operating the transfer stations are covered. All of the municipalities would help to share the cost of the transfer stations in an equitable manner.

8.0 ADMINISTRATION AND IMPLEMENTATION OF THE MASTER PLAN

8.1 Introduction

8.1.1 Components and Initiatives Requiring Implementation

A recommended waste management system for Lambton County was identified in Chapter 4. The list of components included in this system is as follows:

- waste collection;
- source separation/recycling;
- household composting;
- central composting;
- materials recovery facility (MRF);
- transfer stations; and
- landfill.

Within the recommended waste management system, a long-term waste diversion strategy for the County was recommended. The development of the strategy involved identifying available waste diversion initiatives (e.g. technologies and processes) associated with each of the diversion components in the recommended system. The initiatives were organized into potential waste diversion strategies and evaluated. The recommended long-term waste diversion strategy includes the following system components and diversion initiatives:

- | | |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source Separation/Recycling | <ul style="list-style-type: none">- Enhanced Public Education on the 3Rs- Direct Cost Program for Waste Collection- Enhanced Blue Box Collection of Recyclables- Expanded Collection of Bulky Items- Enhanced Drop-Off Depots for Recyclables and Bulky Items- Industrial, Commercial and Institutional (IC&I) Programs- Collection of Household Hazardous Wastes- Expanded Leaf and Yard Waste Collections to Areas Outside Sarnia |
| Household Composting | <ul style="list-style-type: none">- Expanded Backyard Composter Distribution- Large 3-Bin Composters for Multi-Family Housing Complexes and Apartment Buildings |

Central Composting - Leaf and Yard Waste Composting at the Sarnia and Petrolia Sites or at the County Composite Facility

Materials Recovery Facilities - Privately and/or County-Owned Facilities

The existing waste management system in Lambton County already includes some of the components and diversion initiatives included in the recommended system. This includes waste collection, source separation/recycling, household composting and landfill. In addition, the City of Sarnia and Town of Petrolia own and operate central leaf and yard waste composting facilities and the three contractors responsible for Blue Box collections operate their own materials recovery facilities. However, to maximize waste diversion in the future, many of these components and initiatives will have to be enhanced and/or expanded, and new initiatives implemented.

To successfully implement the recommended system, its components and diversion initiatives, the intended purpose of each must be clearly understood. The objectives of each system component are as follows:

WASTE COLLECTION

- to continue providing curbside collection of wastes; and
- to continue allowing direct haul of wastes to facilities.

SOURCE SEPARATION/RECYCLING

- to increase at-source waste reduction and reuse;
- to increase public participation in recycling initiatives;
- to include additional recyclable materials in existing collection programs (i.e. enhanced Blue Box program);
- to provide more collections for bulky items (e.g. refrigerators, used furniture);
- to include additional recyclables and bulky items at collection depots;
- to include IC&I establishments in the enhanced Blue Box or depot programs for recyclables;
- to expand the collection of HHW in terms of locations and availability; and
- to collect leaf and yard wastes from areas in addition to the City of Sarnia.

HOUSEHOLD COMPOSTING

- to increase the number of residences utilizing a backyard composter; and
- to allow composting at multi-family housing complexes and apartment buildings.

CENTRAL COMPOSTING

- to compost collected leaf and yard wastes at existing facilities or at the County's proposed composite facility.

MATERIALS RECOVERY FACILITY

- to process the increased quantity and variety of dry recyclables collected through the enhanced Blue Box program at the existing privately owned materials recovery facilities or at the County's proposed composite facility.

TRANSFER STATIONS

- to allow the convenient and efficient transportation of wastes and recyclables to the appropriate waste management facility.

LANDFILL

- ~~to develop and operate a new landfill site to serve the County at the proposed composite facility or to identify appropriate private landfill capacity.~~

In addition to the actions required to implement these system components and diversion initiatives, there are a number of other initiatives which should be undertaken by the County when implementing the Master Plan. These include:

- the development of markets for recyclables. Examples include identifying possible uses for reused or recycled materials in County operations and having the County's Economic Development Commission encourage new users of recyclables to locate in the County in conjunction with its ongoing economic development work;
- ongoing system monitoring and the possible adoption of new system components and diversion initiatives in the future, as new components and initiatives are developed and tested; and
- public consultation in relation to the implementation of components and initiatives, ~~including environmental approvals process for the new landfill site at the proposed composite facility.~~

8.1.2 Implementation Policies

The implementation of the waste management system is guided by the goal and objectives of the Master Plan. As stated in Chapter 1, the overall goal of the Master Plan process was to develop the "best" system for the long-term management of municipal solid wastes in Lambton County. The "best" system was defined to be one that would meet the overall objectives of:

- minimizing impacts on the environment;
- minimizing costs; and
- maximizing service to the people in Lambton County.

Consistent with the goal and the objectives, the maximization of waste diversion was defined as a basic premise of the Plan. To provide for maximum waste diversion, specific priorities were identified as follows:

- | | | |
|---------------|---|-----------------------------|
| 1st priority | - | waste reduction; |
| 2nd priority | - | reuse of materials; |
| 3rd priority | - | recycling of materials; and |
| last priority | - | disposal of wastes. |

The Ministry of Environment and Energy has announced an ambitious target for Ontario to divert at least 50% of residential and IC&I wastes from disposal by the year 2000.

To meet the goal, objectives, waste management priorities and successfully implement the recommended system, supporting policies should be established and actively pursued by the County and local municipalities. The following policies are recommended for the reasons discussed under each.

- **Both levels of municipal government, the County and the local municipalities, should actively pursue the waste diversion initiatives recommended in the long-term diversion strategy.**

Regardless of the jurisdictional framework eventually adopted in Lambton County for the implementation of the long-term waste diversion strategy, the attainment of provincial targets for diverting waste will require a concerted effort by all the parties involved.

- **Ongoing mechanisms for co-operation and the co-ordination of municipal initiatives will be required.**

The management of the long-term waste diversion strategy requires the careful integration of activities. For example, recycling components typically require the integration of collection methods with transportation and processing technologies, and the overall collection/transportation/processing arrangement can in turn affect the quality of recycled materials and their subsequent marketability and market value.

For the County of Lambton to control any or all aspects of the waste diversion strategy, the County must assume the appropriate powers under Section 209 of the *Municipal Act*. This includes waste collection, diversion (reduction, reuse, recycling) processing and transfer. These powers can be obtained by County by-law.

Waste disposal and the former local municipal landfill sites have been under the jurisdiction of Lambton County since January 1, 1991. The County should review the *Official Plans and Zoning By-laws* of the municipalities where municipal landfill sites are located to make sure that they allow the continued use of these sites for initiatives in the long-term diversion strategy (e.g. depots for bulky materials).

- **A high level of ongoing public and industrial/commercial/institutional involvement must be developed and maintained to fully implement the long-term waste diversion strategy.**

Reduction, reuse, and recycling are all activities which require the active participation of all waste generators. Public meetings and the survey conducted in relation to the preparation of this Master Plan have indicated a high degree of public interest in waste diversion. The challenge, therefore, is to harness and direct this interest to produce concrete results in waste diversion efforts. In addition to implementing the recommended system components and waste diversion initiatives identified in Chapters 4 and 5, educational, promotional and advertising programs will be required to help ensure a high level of involvement.

- **The County and local municipalities should co-ordinate closely with the Ontario Ministry of Environment and Energy in implementing the long-term diversion strategy, and make maximum use of Provincial initiatives.**

The Ministry of Environment and Energy has a number of programs directed at helping municipalities, businesses and institutions implement the waste diversion initiatives. At the municipal level, the Ministry provides funding for various activities. The County and local

municipalities should work closely with the Ministry to ensure that these funding programs are utilized to the greatest extent in Lambton County.

- **Municipal policies should be supportive of sound waste management practices.**

An example of a municipal policy which supports waste management is the establishment of recycling programs in municipal offices. Similarly, purchasing programs can be established to give priority to materials which include a recycled component (for example, recycled fine papers).

- **The *Lambton County Official Plan* should be updated to be consistent with the Master Plan.**

Part D, Section 2.12 of the *Lambton County Official Plan* includes background information, objectives and policies which apply to "landfill". The policies are directed toward the local municipalities and encourage "proper site selection" for new landfills, increased co-operation between municipalities to realize "economies of scale" and increased recycling of waste. Much of the background information and some of the objectives and policies are no longer valid. It is recommended that the County review this section of the Official Plan and that it be replaced by background information, objectives and policies which are consistent with the Master Plan. *The County is in the process of redrafting their Official Plan and these updates will reflect the appropriate policy changes.*

8.2 Implementation Requirements

Before any of the components and diversion initiatives of the waste management system can be implemented, a number of fundamental decisions must be made. These decisions relate to four key implementation requirements:

- determination of the administrative and jurisdictional responsibility for each system component or waste diversion initiative;
- identification of the appropriate administrative organization and staffing requirements to implement and operate the components and initiatives;
- identification of the financial framework which is most appropriate to implement each system component or waste diversion initiative and to maintain a financially sustainable system; and

- determination of the sequence of actions required to implement each component or initiative, and the schedule for implementation of the recommended system.

The first of these implementation requirements involves the determination of "who does what", or more specifically, which level of government (the County or local municipalities) should be responsible for each system component or waste diversion initiative. The *Sarnia-Lambton Act, 1989* (Bill 35) assigns responsibility to the County for the "receiving, dumping and disposing of waste". However, for other components, particularly collection and the diversion initiatives, jurisdictional responsibility is maintained by the lower tier municipalities. The administrative/jurisdictional responsibility for these components and initiatives should be distributed between the upper and lower tier municipal governments in the most effective manner.

The second requirement deals with "how the administrative and jurisdictional responsibilities are best handled". This includes the identification of the appropriate administrative organization and staffing needs necessary to carry out the implementation responsibilities identified above.

The third implementation requirement involves the determination of "how each system component or diversion initiative is financed". This includes identifying who should be responsible for financing each aspect of the system. In most cases this will most likely be the same as the responsibility for implementation. However, there may be situations where it is desirable for the County to provide assistance to local municipalities to ensure, for example, that local initiatives are implemented at the same level across the County. In addition to determining the responsibility for financing, there may be various means of financing different initiatives and different options or financial "formulas" may need to be considered.

The fourth implementation requirement addresses the question of "when various actions should be undertaken". The key concern here is to ensure that system components and waste diversion initiatives are implemented in a logical sequence and within a reasonable time frame.

In some instances, a number of options for implementation may be available to the County. As a result, political decisions may be necessary to choose among options before implementation is possible. In these instances, the need for more detailed research and analysis is identified.

8.3 Jurisdictional Framework

The responsibility for the management of municipal solid wastes within the County of Lambton is presently divided between the County and the individual lower tier municipalities. The County is responsible for the "receiving, dumping and disposing of waste...." as outlined in the *Sarnia-*

Lambton Act, 1989. The lower tier municipalities remain responsible for all other aspects of waste management including waste collection, diversion (reduction, reuse, recycling), processing and transfer of municipal wastes. In the future, the County of Lambton may assume some or all of these additional waste management responsibilities. This would be achieved by passing a by-law under Section 209 of the *Municipal Act*.

As outlined in the Ministry of Municipal Affairs discussion paper entitled, "Municipal Waste Management Powers in Ontario (1992)", two options exist in Counties for distributing waste management authority between the upper and lower tier municipal governments. These options are:

- a) All waste management powers of local municipalities be transferred to the upper tiers and the upper tiers be granted waste diversion powers;
- b) Upper tiers be granted authority over waste disposal and diversion programs; lower tiers retain authority over collection subject to upper tier terms and conditions.

A discussion of which option will be most appropriate for Lambton County for implementation of the recommended waste management system and long-term diversion strategy follows.

Through the waste management system and diversion strategy outlined in this Master Plan, the County of Lambton will need to provide an enhanced and equivalent level of waste management services throughout the County. To ensure the co-ordinated effort of the implementation of the waste management system and diversion strategy, increased involvement of the County will be necessary. In order for Lambton County to become more involved, additional authority under Section 209 of the *Municipal Act* may be required. The main areas of authority to be considered include waste collection, diversion (reduction, reuse, recycling), processing, transfer and disposal.

Waste diversion, processing and disposal powers are closely related. Waste processing is tied directly to diversion since it is essential for removing recyclables from the waste stream and preparing the materials for markets. ~~The availability of long term waste disposal capacity is dependent upon the level of waste diversion achieved. With the County already responsible for disposal and proposing to develop a new long term landfill site, the importance of having some control over the waste diversion and processing efforts leading to reduced disposal is increased. This is because the County will be responsible for disposing of the wastes, independent of what level of diversion is being achieved by the lower tier municipalities.~~

The County may encounter some difficulties in implementing various diversion initiatives if it has no legal authority to implement them. To maximize the implementation of all aspects of the diversion strategy, it will likely be necessary for the County to assume authority for waste diversion

and processing from the lower tier municipalities. The assumption of these responsibilities does not preclude the County from designating that specific aspects of the long-term diversion strategy remain the responsibility of the local municipalities or that the actual work be contracted. Alternately, the County may choose to initially fill a co-ordination role between the local municipalities for implementing the waste diversion strategy. The County could monitor the participation of the municipalities, the level of diversion achieved and the overall effectiveness of individual programs being operated before choosing to assume the responsibility for waste diversion and processing.

The potential distribution of responsibilities between the County and lower tier municipalities may be slightly more complex for some diversion initiatives relative to others. In large part, the distribution of responsibilities revolves around the uncertainty concerning technical choices which have yet to be made for the various waste diversion initiatives. For example, the City of Sarnia and Town of Petrolia operate central composting facilities for leaf and yard wastes. In addition, the private sector collection contractors operate their own materials recovery facilities. As part of the implementation of the long-term diversion strategy, it will be important to determine if these facilities will be adequate and available to the County for use in the future. If not, then the County will have to consider establishing its own central composting facility or materials recovery facility.

Allowing the lower tier municipalities to continue being responsible for diversion and processing will result in the duplication of effort (both time and money) between the municipalities and confusion due to differing programs. As a minimum, a co-ordinating role for the County would result in a unified approach to diversion across the County, maximizing the efficiency and cost effectiveness of waste diversion initiatives being implemented across the various municipalities. This more unified approach and the larger financial base of the County give the County a stronger position from which to implement the diversion initiatives.

A unified County-wide approach to implementation, either through a co-ordinating role or one of complete responsibility, is best suited to such initiatives as:

- promotion, advertising and education programs;
- feasibility and pilot studies;
- monitoring waste diversion and the performance of the waste management system;
- market development for recyclable materials added in an enhanced Blue Box collection program;
- purchase of household composting units;
- collection of household hazardous wastes;
- central composting;
- processing of recyclables at materials recovery facilities.

As discussed previously, the assumption of waste diversion and processing authority does not preclude the contracting of any activities or programs but rather provides a consistent approach to waste management across the County.

Waste diversion and disposal powers are not dependent on waste collection. As a result, the County may choose to leave the responsibility for collection with the lower tier municipalities. In other areas within Ontario where County governments have assumed waste management powers, the responsibility for collection has remained with the lower tier municipalities. It is likely that this responsibility will remain at the same level in the future. Control of waste collection is not required by the County to achieve participation in other aspects of the recommended waste management system and diversion strategy. Since waste collection is contracted out to local contractors in the County, there does not appear to be a need to centralize this component of the system. The need for County control of waste collection can be considered in the future as part of the Master Plan review and updating process.

The need for Lambton County to assume jurisdiction of waste transfer is also not necessary in the short-term. The feasibility of building and operating transfer stations was considered in the Master Plan. It was concluded that transfer stations will not provide an economic benefit to the overall waste management system, but they may provide other benefits such as making waste haul more convenient for some lower tier municipalities. In the event that such benefits are considered to be more important than economics, the County should assume responsibility for transfer. A transfer facility can serve more than one local municipality as well as some IC&I haulers. The County has available a larger financial base to finance the approval, development and operation of a transfer station. County control of transfer stations will be essential for the County to recover processing and/or disposal costs from the appropriate waste generators. Similar to waste collection, the need for waste transfer, and subsequently County control, can be considered in the future as part of the Master Plan review and updating process.

The jurisdiction for municipal waste disposal was transferred to the County of Lambton from the lower tier municipalities, effective January 1, 1991, as part of the *Sarnia-Lambton Act*. The County became responsible for the operation of the existing municipal landfill sites (on that date) and will be responsible for their monitoring, rehabilitation, closure and perpetual care.

To conclude, the following jurisdictional framework for the implementation of the Master Plan is recommended:

- 1) The County should remain responsible for waste disposal.
- 2) The lower-tier municipalities should remain responsible for waste collection.

- 3) For the time being, the lower-tier municipalities should remain responsible for waste diversion and processing with the County acting in a co-ordinating role to monitor diversion rates and to implement a unified approach to diversion across the County.
- 4) If, in the future, the County finds that the level of participation of the lower-tier municipalities is not sufficient, or the diversion rate is not high enough, then the County has the option to assume responsibility for some or all aspects of diversion and processing. This may include the County taking over some contracts for waste diversion programs.
- 5) If transfer stations are required, it is recommended that the County assume responsibility for this component.

8.4 Administrative Structure

To implement and operate the components and initiatives or programs within the recommended waste management system and diversion strategy, it will be essential for the County of Lambton to have the appropriate administrative body in place. The County has already taken a number of steps towards establishing this administration.

The development of the Lambton County Waste Management Master Plan has been guided by the Master Plan Steering Committee, a committee of County Council. This committee comprises the County's Public Works Committee plus representatives from the MOEE. Support and input is provided to the Steering Committee by County staff and the WMMP Public Advisory Committee (PAC).

It has been recommended to the Public Works Committee by the PAC that the County establish a standing committee to oversee the implementation of the recommended short-term diversion strategy. This committee was originally identified as part of the Short-Term Diversion Strategy Report, which was submitted to the County in July 1993, and is summarized in Chapter 5 of this report. The WMMP Public Advisory Committee endorsed this recommendation at their meeting on September 28, 1993. The standing committee will include a broader cross-section of representatives compared to the Steering Committee. This committee will consist of County councillors, county staff (i.e. County Waste Management Administrator), the public (i.e. representatives of PAC) and private-sector recycling/waste management contractors. The standing committee is to report back to the Public Works Committee.

For the implementation of the long-term waste management system and diversion strategy, it is recommended that the County play a larger role in, or assume responsibility for, waste diversion and processing. With the County playing a much larger role in the waste management system, it is

likely that it will be more efficient for the County to deal with implementation issues directly rather than through the Standing Committee, recommended as part of the short-term diversion strategy. The existing WMMP Steering Committee may be appropriate for this role, but it is assumed that the Steering Committee will be disbanded once the Master Plan is completed. As a result, it is recommended that the Public Works Committee be responsible for facilitating the implementation of the long-term waste management system and diversion strategy.

The public should be involved in the implementation and operation of the County's recommended waste management system and diversion strategy. The WMMP Public Advisory Committee is a likely candidate for providing public input since it is already serving in this role for the Master Plan. In the long-term, the PAC would provide public input to the County's Public Works Committee on issues of public concern regarding implementation of the waste management system and diversion strategy.

The need for municipal staff to administer the implementation and operation of the waste management system and diversion strategy, under the guidance of the County's Public Works Committee, must also be considered. The County initiated the development of a municipal department to manage the County's waste management responsibilities as a result of the *Sarnia-Lambton Act*. ***The Waste Management Division is directed by the Director of Public Works. The Director position requires extensive experience in all aspects of waste management. The Operations Manager, a technical staff person responsible for overseeing the operation of the County's landfill sites, reports to the Director.*** A full-time waste diversion co-ordinator, or more experienced person, will also be required. The responsibility and level of experience required for this position will be dictated by the County's involvement and jurisdiction in implementing the long-term diversion strategy. A less experienced person, with good clerical skills, may be adequate for simply co-ordinating the activities and programs of the lower tier municipalities. However, if the County assumes responsibility for waste diversion and processing, a more experienced technical person will be required for implementing and operating all aspects of the waste diversion strategy. This would include overseeing related studies and preparation of contracts. Additional County staff may be required in the future. The number will be dependent upon the facilities and services which the County owns and chooses to operate as opposed to contract out.

Technical support and human resources will also be required by the County for specialist services such as obtaining environmental approvals, facility design and facility operations. This support will be available to the County through the Ministry of Environment and Energy, consultants and waste management contractors.

The recommended administrative structure for the implementation and operation of the waste management system and long-term diversion strategy is shown on Figure 8.1.

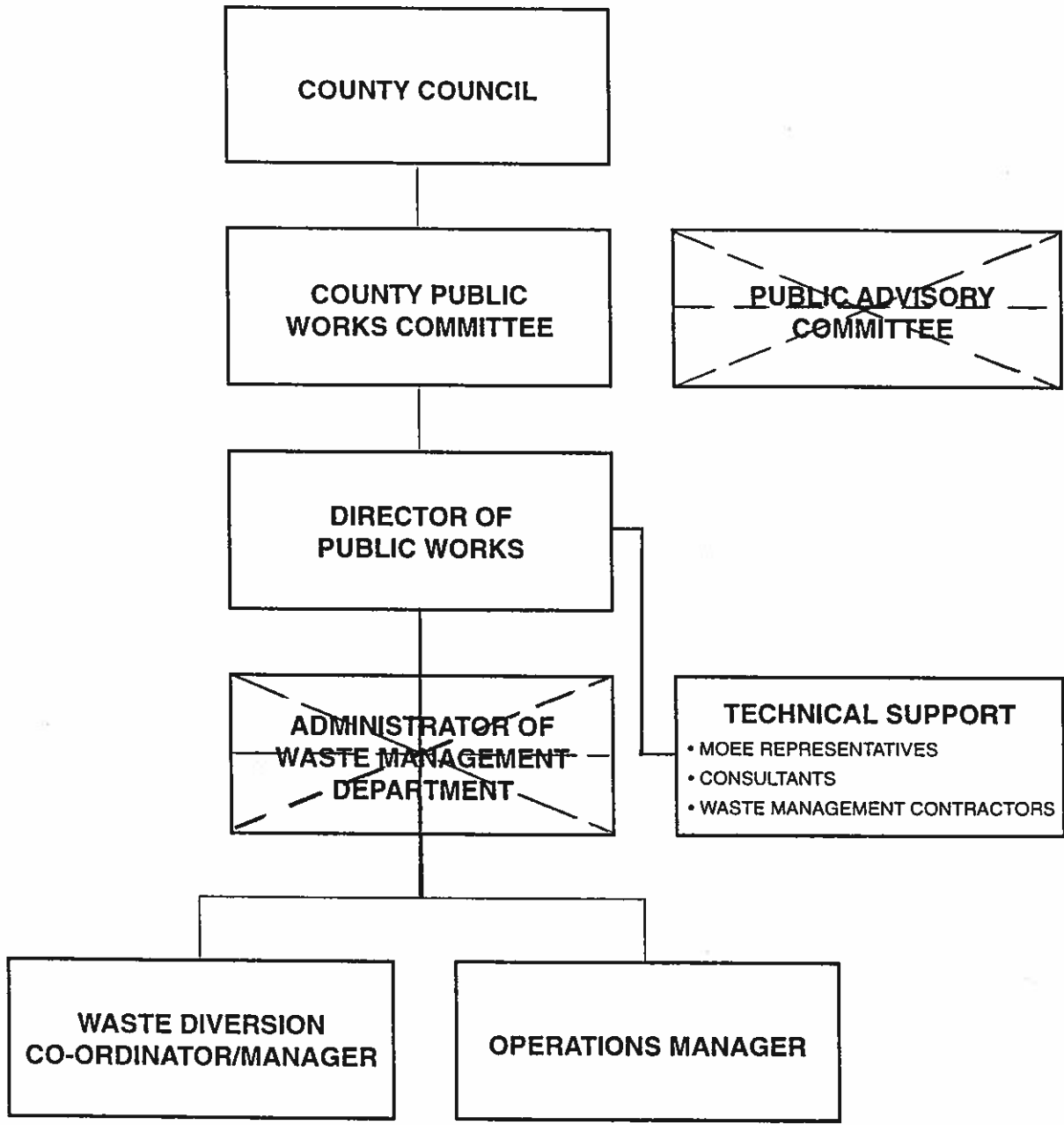
8.5 Financing the Waste Management System

The responsibility and method for financing the implementation of the recommended waste management system will be determined by which aspects of the waste management system the County assumes jurisdiction over and at what time.

It is essential that the waste management system that is implemented be financially sustainable, independent of any distribution of responsibilities between the County and the lower tier municipalities.

The County presently has responsibility for municipal waste disposal, including the financing of this aspect of the waste management system. The costs incurred by the County are billed back to the residents through municipal taxes. The residents are charged based on the percentage of the County's tax assessment base relative to their local municipality. The County is considering changes to this cost recovery method. Consideration is being given to removing County disposal charges from the municipal tax bill and charging the municipalities directly based on their portion of the total amount of waste disposed by the County. This proposed method is similar to financing by tipping or user fees. This direct cost method of finance was identified as part of the long-term diversion strategy. The lower tier municipalities will become responsible for recovering these costs from local generators through taxes or some other direct cost method. *See the Executive Summary for an explanation of the system implemented by the County.*

If the County assumes control over the waste diversion and processing aspects of the waste management system, then a slightly more complex financial structure will be required. Presently, each lower tier municipality has a separate contract for the collection, processing and marketing of recyclables. Maintaining these separate contracts under a County-controlled system would be inefficient and difficult to co-ordinate. The most appropriate approach would be to have a single County-wide contract for the diversion (e.g. enhanced Blue Box and depot programs) initiatives, or to have a small number of regional contracts. A regional contract would serve a group of municipalities in the County, depending upon such things as geographic locations, proximity to local private sector contractors, and which contractors have been used in the past. If a single contract method is used, the costs should be equalized across the lower tier municipalities in the County. This is similar to the method proposed for financing waste disposal costs. If a smaller number of regional contracts are used, the costs for the waste diversion initiatives may still be equalized (taxes or tipping fees) across the County. An alternate method would be to equalize the costs for each contract amongst the smaller group of municipalities that are covered by the contract.



LAMBTON COUNTY WASTE MANAGEMENT MASTER PLAN

RECOMMENDED COUNTY ADMINISTRATIVE STRUCTURE FOR WASTE MANAGEMENT

To obtain a full cost accounting of the waste management system, a number of issues must be considered. These issues include:

- the County will be required to determine the level of financial compensation that will have to be paid to the controlling local municipality of an existing waste management facility (e.g. City of Sarnia central leaf and yard waste composting facility) if the County assumes control;
- the cost of environmental studies, and long-term monitoring and closure costs for existing landfills;
- projected approval, design, capital and operating costs for the new landfill and any County controlled materials recovery facilities, central composting facilities and transfer station(s) if required and developed in the future.

Costs related to the other initiatives recommended as part of the diversion strategy (e.g. backyard composter distribution, household hazardous waste collection, etc.) should also be incorporated into the County's financial planning as soon as possible. Considering all potential costs upfront will allow the County to initiate the establishment of a reserve fund to cover the large future capital expenditures related to waste management. If a reserve fund is not established, the County may be required to incur long-term debt through debentures. Consequently, costs should be projected for all programs and facilities, outlined in the recommended system, for inclusion in the County of Lambton's financial plans.

As previously described, it is recommended that the future operation of the waste management system should be financed through taxes or tipping (i.e., user) fees and revenues from recyclables. The tipping fee may increase annually to cover the costs incurred and also to maintain the recommended waste management reserve fund. The costs billed back to participating municipalities by the County will be based on the unit value (i.e. price per tonne) which may vary based on the type of service received. For example, the level of recycling provided may vary between the various municipalities. The costs can be expected to vary depending on the types of service provided for collection and processing, and also other fixed costs. The private sector should also pay a tipping fee that will vary depending on the type and source of the wastes.

In order to develop a financially sustainable waste management system and determine the appropriate accounting procedures and the method of financing (i.e. taxes or tipping fees), the County of Lambton should retain a professional management consultant. Some specific duties of the management consultant would include:

- Determine how assets and liabilities of existing facilities will be assessed in the future, following the assumption of municipal waste management powers by the County.
- Develop a cost accounting method or system for use by the County to operate a financially sustainable waste management system.
- Identify how lower tier municipalities will be charged for the type of waste management services received.

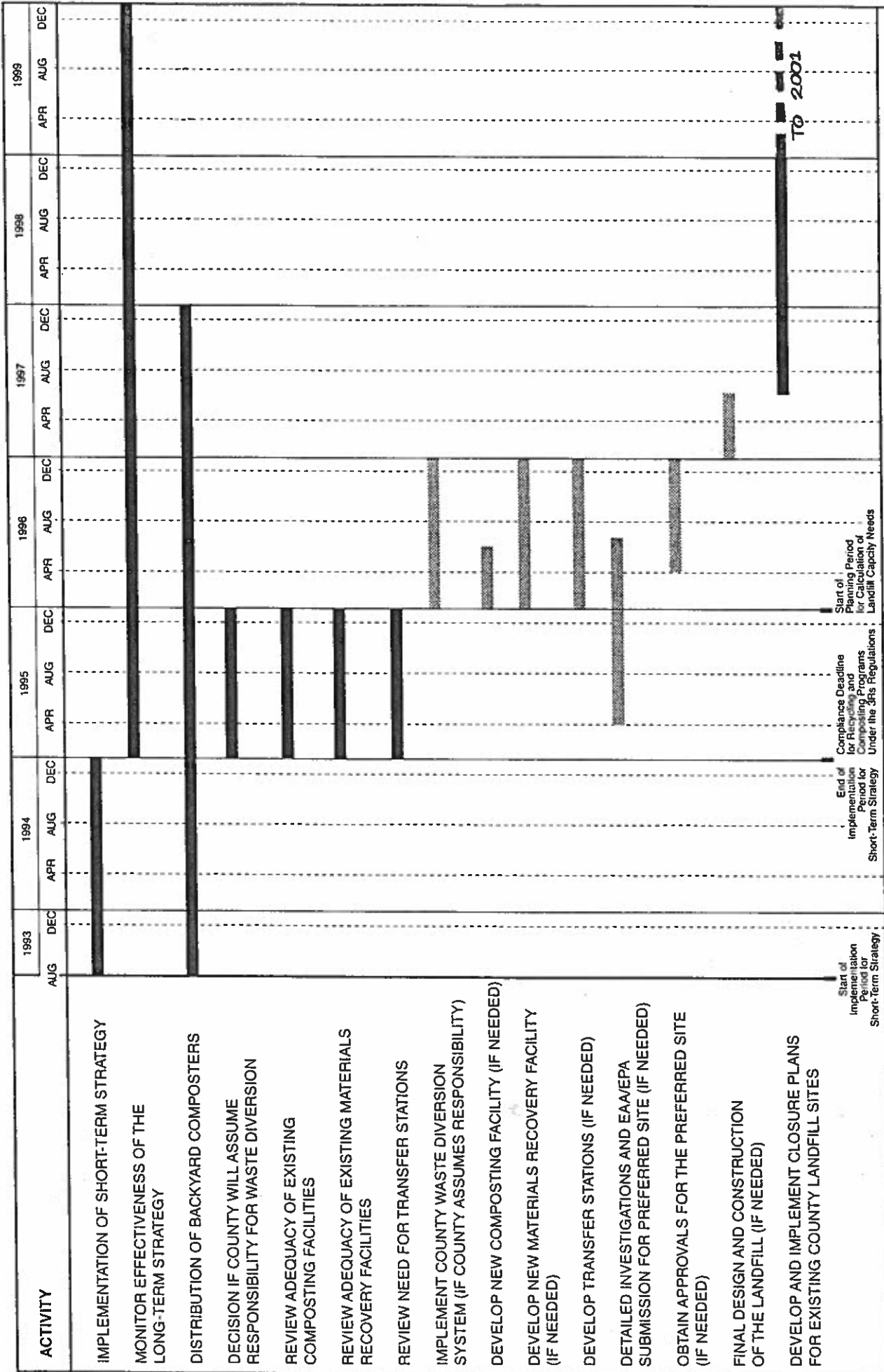
Funds collected and placed in the waste management reserve fund should be used to fund the capital cost of facilities, costs of future studies, and the cost of landfill site closures. The future studies may include Master Plan updates, and approvals studies for specific waste management facilities (i.e. transfer stations, landfills).

The Ministry of Environment and Energy has a number of programs directed at helping municipalities, businesses and institutions implement waste diversion programs and facilities (e.g. materials recovery facilities, central composting facilities, transfer stations and landfill sites) and upgrading of existing landfills. However, capital costs for facilities such as the new landfill site and transfer stations are not covered by the funding programs. The MOEE is considering options for restructuring their funding programs. As a result, the availability of funding may be substantially reduced in the future. A specific request for funding will have to be made by the County to determine the amount of funding, if any, available. This funding uncertainty further highlights the importance of establishing a reserve fund to ensure financial sustainability of the waste management system.

8.6 Implementation Activities and Schedule

There are a number of activities which need to be completed as part of the implementation of the waste management system. The system implementation is largely influenced by the County's decision whether to serve in a co-ordination role for the implementation of the long-term diversion strategy or to take a more active position by assuming control of waste diversion and processing from the lower tier municipalities. The implementation is also affected by the 3Rs Regulations and the insufficient amount of long-term disposal capacity remaining at the existing County landfills. These factors in-turn influence the implementation priority of the system components and diversion initiatives.

Specific tasks and requirements for the implementation of the system components are discussed below. A proposed implementation schedule for the Master Plan is illustrated in Figure 8.2.



LAMBTON COUNTY WASTE MANAGEMENT MASTER PLAN

PROPOSED IMPLEMENTATION SCHEDULE

FIGURE 8.2

INITIATIVES TO BE IMPLEMENTED

INITIATIVES TO BE IMPLEMENTED ONLY IF NEEDED

NOTE: THE ORIGINAL PLANNING PERIOD FOR THE CALCULATION OF LANDFILL CAPACITY NEEDS COMMENCED JANUARY 1, 1996. THE DATES SHOWN REFLECT THE COUNTY'S PROPOSED IMPLEMENTATION SCHEDULE AS ESTIMATED IN JANUARY 1995. THEREFORE, THE CURRENTLY ESTIMATED SCHEDULE FOR THE IMPLEMENTATION OF SOME INITIATIVES AND FACILITIES MAY NOT COINCIDE WITH THE ORIGINAL PLANNING PERIOD.

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Waste Collection

It is recommended that the responsibility for waste collection remain with the lower tier municipalities. Each municipality should continue to be responsible for securing their own contract for the collection of wastes, if undertaken by private contractors.

Source Separation/Recycling

The implementation of the source separation/recycling component requires the County to make a decision at the outset as to what role they will assume in the implementation and the operation of the component. Once this decision has been made, the County will have to implement the source separation/recycling initiatives in the appropriate manner. The following lists the key implementation steps for the source separation/recycling component:

- Decision to be made by the County to determine if the County will co-ordinate the implementation of activities amongst the lower tier municipalities or if the County will assume responsibility for waste diversion and control the implementation.
- If the County decides to assume responsibility for waste diversion and the implementation of the source separation/recycling component, the County must pass a by-law under Section 209 of the *Municipal Act* to obtain the appropriate legal authority.
- The County should hire a waste diversion co-ordinator/manager to guide the implementation of the component. The level of experience and responsibility required for the position will be dependent on the implementation role the County chooses to fill (i.e. co-ordination versus control).
- The Waste Diversion Manager should review existing contracts and identify when and how existing programs may be enhanced and/or expanded. Programs should also be reviewed with respect to establishing a smaller number of contracts (e.g. County wide or groups of municipalities) for implementing and operating the programs.
- The County should retain a professional management consultant to assist in identifying and establishing the appropriate financial structure (i.e. direct cost) for the long-term diversion strategy and waste management system to be financially sustainable.
- The County should monitor the results of the wet/dry pilot study in Wyoming to determine the feasibility of implementing wet/dry collection in the County in the future.

Household Composting

Expanded distribution of household composters is a key initiative in the long-term diversion strategy because it represents the only alternative that County residents will have to divert household organics. It is recommended that backyard composters be distributed free to all households in the County that will accept them plus large three-bin composters should be installed at multi-family housing complexes and apartment buildings.

The County is already involved in the distribution of backyard composters. The County purchases and distributes composters to the lower tier municipalities and applies for and distributes the MOEE subsidy. Bluewater Recycling Association members apply for their composter purchases and subsidy through the Association instead of the County. The individual municipalities are responsible for the sale and distribution of composters to local residents.

In order to implement the new distribution system, it is recommended that the County assume a larger role. The County should take the following steps to implement the expanded household composting programs:

- To start the expanded household composting program, the County should carry out the following steps simultaneously:
 - a) Develop promotional materials (e.g. a pamphlet) that can be distributed to all households in the County. This will help ensure consistency between the municipalities. The promotional materials should explain the purpose of the program and provide a mail-back portion for those residents who do not want a composter.
 - b) Establish agreements with the local municipalities for distribution of composters to households except ones that indicate that they do not want one. It should be expected that approximately 70-80% of households will be interested in receiving a composter.
 - c) Establish a distribution agreement with the Bluewater Recycling Association for its member municipalities in the County.
 - d) Establish an agreement with the City of Sarnia for distributing three-bin composters to multi-family housing complexes and apartment buildings. Consideration of who will look after the composters will be an important aspect of this agreement. It is possible that tenants associations, interest groups, etc., could fill this role.

- e) Establish agreements with composter suppliers to ensure that a suitable supply of composters will be available at the best possible prices.
 - f) Determine how the capital cost of the composters not covered by the MOEE subsidy and the cost of the distribution program will be paid for. If possible, these costs should be covered by the waste management reserve fund.
- The actual distribution program can start once all of the above agreements have been finalized. It is recommended that distribution start in Sarnia and move outwards to the rest of the County.
 - Once the distribution program is completed, the County should establish programs to monitor usage of the composters and to supply composters to new households or households that did not receive one previously. The purpose of the monitoring program will be to collect information on the number of households that actively use their composter and the amount of waste diverted by participants. This information will be needed to determine the waste diversion rate in the County.

Central Composting

The long-term diversion strategy and recommended waste management system includes central composting of leaf and yard wastes from across the County. This component may make use of the existing central composting facilities in the County. The following implementation tasks are required:

- Confirm the availability and use of the existing central compost facilities for leaf and yard wastes in Sarnia, Petrolia and possibly Forest. This may include establishing any necessary agreements for the use of the site (e.g. contract or purchase).
- If the existing compost facilities are not available to the County, or are not adequate, a new facility will be required. It is recommended that a central compost facility be developed at the County's proposed composite waste management facility. The approval requirements for a central compost facility at this location should be determined.
- If approval of the facility is applicable under the MOEE's new streamlined process for receiving approvals for municipal recycling sites, no Certificate of Approval is required.

- If the central compost facility requires a Certificate of Approval, approval must be obtained under the *Environmental Protection Act* (EPA). Approval may also be required under the *Ontario Water Resources Act* and *Planning Act*. A site operations report and hydrogeology report must be prepared in support of the approval application.
- A hearing may be required as part of the EPA approval. In this case, the County should consider obtaining approval for the central compost facility at the same time as the other proposed composite waste management facility components (i.e. landfill).
- Upon approval of the facility, preparation of the site area and associated works will be required.

Materials Recovery Facility

The need for a County controlled materials recovery facility (MRF) as part of the recommended waste management system is dependent upon the use of existing private sector MRFs. A number of private MRFs are presently utilized as part of the existing waste management system in the County. The long-term availability of these facilities for use by the County, with respect to capacity and capability to manage a larger variety of recyclable materials, will determine the need for a County facility. If a County MRF is required, the following implementation tasks are required:

- Determine the approvals required for the MRF to identify the documentation that must be prepared to accompany an application for approval (i.e. approval under the MOEE's new streamlined process or the *Environmental Protection Act*).
- Prepare the necessary documents to support the application for approval of the MRF, including a conceptual design of the facility.
- If approval is required under the *Environmental Protection Act*, a hearing may be held. In this case, the County should consider obtaining approval for the materials recovery facility at the same time as the other proposed composite waste management facility components (i.e. landfill).

Transfer Stations

The feasibility of building and operating transfer stations within the County's recommended waste management system was considered as part of the Master Plan. It was concluded that transfer stations will not provide an economic benefit to the waste management system. However, it was identified that transfer stations may provide other benefits, such as making waste haul more

convenient for remote areas of the County. In the event that these benefits are considered to be more important than economics, the following activities will need to be undertaken to implement a transfer station.

- Identify an appropriate location for the transfer station with input from the local municipality and the public and in accordance with applicable legislation.
- Prepare engineering reports for the transfer facility to fulfil the requirements of the *Environmental Protection Act* (EPA).
- Submit documentation to the MOEE to obtain approval of the transfer facility under the EPA and receive a Certificate of Approval. Approval of the transfer facility may require a hearing.

Landfill

~~The proposed composite waste management facility, including the long term landfill, will serve all municipalities in Lambton County. The following outlines the implementation requirements for the landfill:~~

- ~~• Receive endorsement from County Council of the recommended site for the composite waste management facility. With this endorsement, the recommended site becomes the preferred site.~~
- ~~• Apply for and obtain funding from the Ministry of Environment and Energy to undertake detailed investigations of the preferred site.~~
- ~~• Undertake detailed site specific investigations of the preferred site to assess any potential environmental impacts based on the proposed design and operating plan for the landfill. These investigations are undertaken to fulfil the requirements of the *Environmental Protection Act*.~~
- ~~• Submit documentation to obtain approvals for the landfill site as required under the *Environmental Assessment Act*, *Environmental Protection Act*, and under the *Planning Act*. Additional approvals may be required and should be determined as part of the site specific investigations. Approval of the landfill may require a hearing. As a result, the County may wish to obtain approval for all components of the proposed composite waste management facility (i.e. materials recovery facility and/or central composting facility), if required, at the same time.~~

- ~~Upon approval of the new landfill, final design and construction of the landfill and associated works will be required.~~
- Develop and implement closure plans for the existing County landfills.
- Monitoring and maintenance of closed landfill sites should continue as necessary and be dictated by the annual monitoring data collected and Certificate of Approval requirements.

8.7 Monitoring and Updating of the Waste Management Master Plan

The Waste Management Master Plan should, as a minimum, undergo a formal review every five years. Revisions should be made to the Master Plan to reflect any changes in the County's recommended waste management system. Updates to the Plan may be made more frequently, particularly due to the constantly evolving and expanding area of waste diversion.

Certain areas of the Master Plan should be monitored on a regular basis. This will allow changes in the system to be identified and incorporated into updates of the Master Plan. Monitoring of the system and its components can provide many benefits for the County. For example, monitoring diversion rates will enable the County to determine whether or not the estimated waste diversion rates are being achieved. If the waste diversion rates are not being achieved, changes to the long-term diversion strategy will be required or a change in the County's implementation role (i.e. County becoming responsible for diversion compared to co-ordinating lower tier municipalities). In addition, monitoring the amounts of waste going to the new landfill can help the County determine remaining landfill capacity and future disposal needs. This information is important for determining when studies to identify new landfill or other disposal sites should be started so that new sites can be opened at the appropriate time. Finally, waste generation and composition information is important for achieving optimum operation of the recommended waste management system.

The following areas of the Master Plan should be monitored on a regular basis and updated if projections or targets are not being achieved.

- Population projections, waste quantities, waste composition and generation sources within the County, and the distribution of waste amongst the available waste management facilities. This includes a comparison of projected annual facility capacity versus actual usage.
- Public concerns regarding operation of the waste diversion programs and landfill site and potential environmental impacts.

- Promotion of existing waste diversion activities in the County.
- The local development of 3Rs initiatives and the progress towards the provincial waste diversion objectives.
- The need for the County to develop their own materials recovery facility or central compost facility at the proposed composite waste management facility.
- New waste management components and efforts, particularly in the area of waste diversion.
- The cost of the waste management system and its components relative to the County and also the resultant costs to the lower tier municipalities.
- Changing and new Ministry of Environment and Energy, or other government agency, policies and regulations which will impact on the waste management system.
- The results of the wet/dry pilot study in Wyoming.

The County of Lambton should take the initiative to update the Master Plan if any of the monitoring activities identify any significant changes to the conclusions or recommendations of the Master Plan. Public input to the updates and review can be provided by the Public Advisory Committee, if maintained, or another established public group such as a facilities monitoring committee. Public forums may be held if significant changes to the Master Plan are required. Any decisions should be made by the Public Works Committee and County Council.

Public review of the Lambton County waste management system should be done on an ongoing basis. This should be achieved through a proactive public consultation and education program. Surveys and monitoring complaints may also be useful in obtaining insight into the public opinion of the system once it has been operational.

Public input can be used to optimize the system and improve service. Changes made to the system should be incorporated into updates of the Master Plan accordingly.

Part of the Master Plan updating process should include a review of new available waste management components. Advancing technology and changing public attitudes towards waste management may make it appropriate to add components to the waste management system in the future. Criteria that were used for selecting waste management components in the Master Plan Study should also be used for evaluating new available components. As part of the evaluation

process, the criteria should initially be reviewed and updated, if necessary, by the Public Works Committee, the Ministry of Environment and Energy and an appropriate public committee. This will provide the necessary public and reviewer input to the process.

8.8 Waste Management Contingency Plan

~~Waste disposal contingency options must be considered should the proposed new County landfill not receive approval.~~

~~8.8.1 Waste Disposal Options Within Lambton County~~

~~The Laidlaw landfill in Warwick Township is in the process of applying for an expansion of their site. They also wish to expand their service area to include all of Southern Ontario. The Laidlaw (Warwick) application has not made much, if any, progress over the last few years. Laidlaw have expressed an interest in addressing the County's landfill disposal needs over the short term and long term.~~

~~The Petrolia Landfill is now owned by Philip Environmental, who have applied for a County-wide C of A for municipal solid wastes. Philip have also expressed an interest in looking after the County's long term disposal needs.~~

~~8.8.2 Waste Export Options~~

~~Waste export was not considered to be an option available to Lambton County. It is the position of the Ministry of the Environment and Energy that export should only be considered where the proponent is unable to locate a landfill site that will receive approval (as stated in the MOEE's *Sectoral Environmental Assessment Proposal for Waste Management Planning, 1994*).~~

8.9 Administration and Implementation Recommendations

The following recommendations outline actions to be taken by Lambton County regarding the jurisdictional framework for waste management, administrative structure, system financing, implementation activities and schedule, and monitoring and updating of the Master Plan.

- The County should decide as quickly as possible the type of role it will have in the implementation and operation of the waste management system.

- The County should obtain the waste management authority for diversion and processing to allow implementation of the long-term diversion strategy if the County decides to control the implementation.
- A waste diversion co-ordinator or manager should be hired by the County, depending on the level of County authority, to be responsible for the implementation of the long-term diversion strategy.
- Establish the appropriate structure (i.e. committee) for the future involvement of the general public in the implementation and operation of the waste management system.
- Policies should be developed and adopted to define, for the public, the goals and objectives for waste management.
- Determine costs for all existing waste management programs and facilities, and identify future waste system costs.
- Retain a professional management consultant to assist in developing the appropriate "true cost" accounting method for the system.
- Apply for financial assistance under the appropriate funding programs to assist in financing the implementation of system components.
- Implement the long-term diversion strategy across the County in a co-ordination role or as the controlling authority (following the assumption of the appropriate powers).
- Determine the availability of existing central compost and materials recovery facilities as part of the County's long-term diversion strategy and the need for the County to develop its own facilities.
- ~~• Initiate detailed site specific investigations for the components of the proposed composite waste management facility (i.e. landfill, central compost and materials recovery facility) allowing the development of a conceptual design and operating plan, approvals, final design and construction.~~
- Develop and implement landfill closure plans for existing municipal landfills as required.

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