DRAFT – Solid Waste Management Master Plan

PREPARED FOR:

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EXECUTIVE SUMMARY

Earth Tech Canada Inc. (Earth Tech) has been retained by the Corporation of the City of Temiskaming Shores (the City) to prepare a Solid Waste Management Master Plan (SWMMP). This SWMMP will be a tool which City Council can reference when developing policies, guidelines and best practices for the short and long term benefit of the City's Waste Management program.

In 2007, the Ministry of the Environment published a Policy Statement on Waste Management Planning, outlining the framework for waste management in Ontario. The Policy Statement provides the waste management sector with direction and guidance in developing a more consistent waste management strategy, identified by the following guiding principles:

- Commitment to meeting the 60% diversion rate from final disposal;
- Cooperation between the public and private sectors to realize cost savings and maximize efficiencies;
- Consideration of economic, social and environmental costs;
- Avoid waste disposal capacity issues;
- Management of waste as close to the source as possible; and
- Open and transparent decision-making process.

Through this Plan, the City intends to help the province meet the sustainable waste management objectives and protect the environment. Therefore, this report evaluates the existing waste management program and identifies ways to improve the effectiveness of the program. The results of the evaluation are provided as recommendations to be implemented over a short and long term period.

Of concern in the short term is the consolidation of the existing by-laws for each of the former municipalities and the preparation of a site closure plan for the New Liskeard Landfill Site. The New Liskeard Landfill Site is of importance as it has less than two (2) years of service life remaining. This report should be finalized within the year.

The long term waste management needs recommend that the City establish policies requiring the Industrial, Commercial and Institutional sectors to manage the disposal of their own waste. Currently, these sectors contribute large volumes of waste to the City's landfill sites and contribute very little financially to the development of future site(s).

The information and recommendations of this report are intended to provide the City with the information needed to implement a uniform and sustainable Solid Waste Management Program.

1.0 INTRODUCTION

Earth Tech Canada Inc. (Earth Tech) has been retained by the Corporation of the City of Temiskaming Shores (the City) to prepare a Solid Waste Management Master Plan (SWMMP). This SWMMP will be a tool which council can use to develop the waste management policies, guidelines and best practices for both the short and long term benefit of the City.

The long-term waste management plan is essential to ensuring that integrated and sustainable waste systems are provided, within the City of Temiskaming Shores, that:

- Address the province's waste management objectives, including the commitment to meeting the provincial target of 60% diversion from waste disposal;
- Avoid waste disposal capacity issues by ensuring the necessary resources are committed to meeting the needs of the community, now and in the future;
- Ensure waste is managed as close to the source of generation as possible;
- Meet the requirements set out in Provincial Planning documents, such as the Provincial Policy Statement (2005), to address the long term growth and development objectives of the community; and,
- Are supported by the community, through public consultation and a transparent decision making process.

1.1. Background

The City of Temiskaming Shores[1] was formed in January 2004 by the amalgamation of the former Towns of Haileybury, New Liskeard, and the Township of Dymond. In 2001, the population of the area was 10,630. In 2003, the population of the City was 10,487, comprising of 4,468 people (i.e., 1,941 households) from the former Town of Haileybury (Haileybury), 4,793 people (i.e., 2,254 households) from the former Town of New Liskeard (New Liskeard), and 1,226 people (i.e., 445 households) from the former Township of Dymond (Dymond). The City also contained 409 Institutional, Commercial, and Industrial (ICI) facilities, of which one was a hospital, nine (9) were schools, and one (1) campus (Haileybury and New Liskeard) of a local area community college. In 2006 Stats Canada reported the population of the City as being 10,732 (4,833 households).

[1] Note: For the remainder of this document, when Dymond, New Liskeard, and Haileybury are cited without "former" in front, the former is implicit since upon amalgamation in January 2004, these municipalities no longer exist. However, for the purpose of this report, it was necessary to discuss them as separate identities.

Upon amalgamation it was found that there were discrepancies in solid waste management between the three amalgamated municipalities and the need for a standard set of policies, guidelines, and best practices was identified. It was later identified that the City's landfill sites were reaching their maximum design capacity and that there was not adequate room to improve the existing recycling program.

1.2. Study Area

The City of Temiskaming Shores is located in northeastern Ontario near the Quebec border in the District of Temiskaming. The City is situated at the head of Lake Temiskaming and covers an area of approximately 177 square kilometers. As discussed in the background, the City was formed in January 2004 through the amalgamation of the former Town's of Haileybury, New Liskeard and the Township of Dymond.

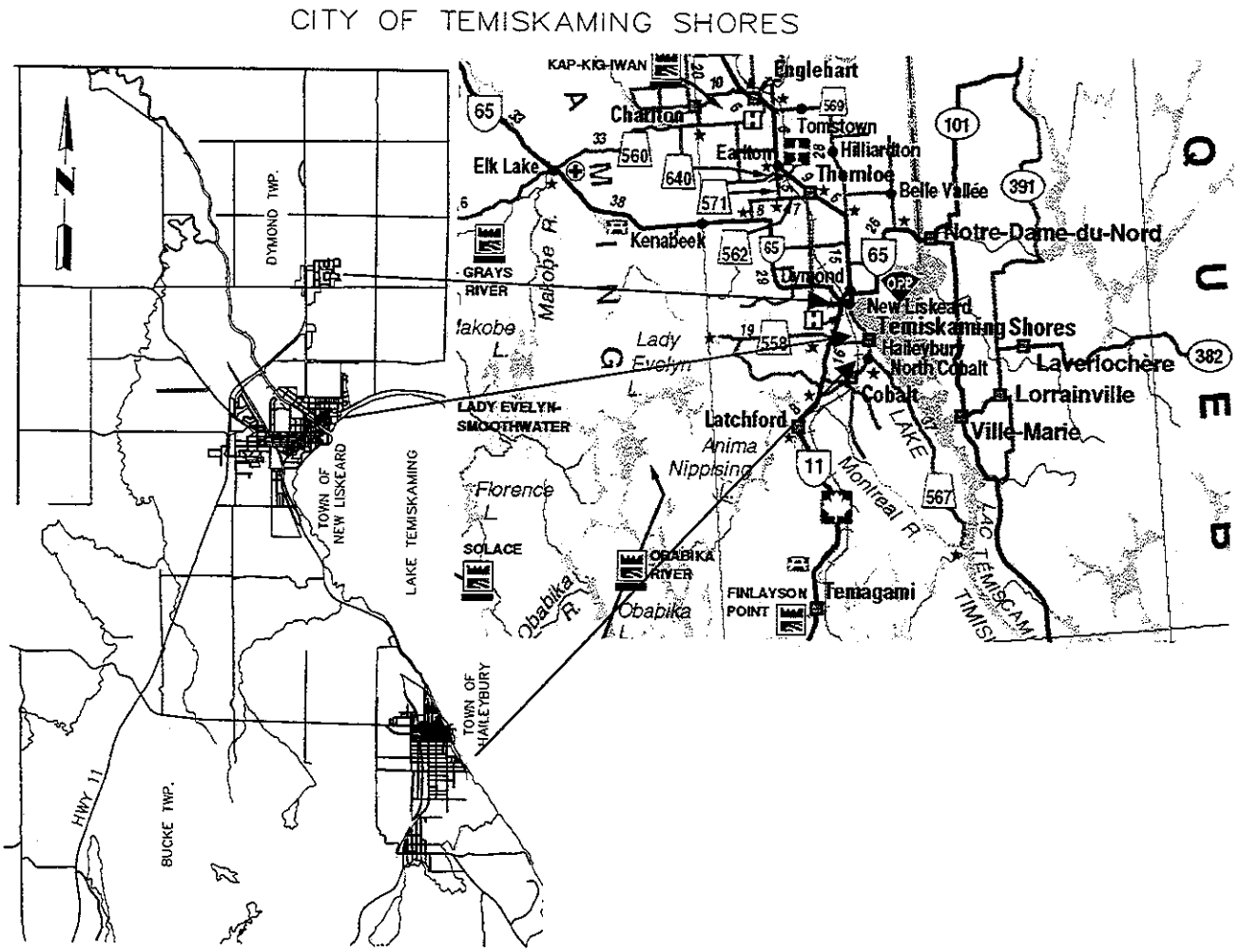


Figure 1: Study Area

2.0 STATED PROBLEMS

Since the 2004 amalgamation, the City has been pursuing a more efficient solid waste management system for the community.

There are three (3) main issues facing the City of Temiskaming Shores' waste management system, 1) non-uniform level of service, 2) limited volume and life capacity at the landfill sites and 3) inadequate capacity at the Material Recovery Facility.

1) Non-uniform Level of Service

Since amalgamation, the City continues to provide the same level of service as provided by the three (3) former municipalities. The inconsistencies in the level of services provided are discussed in Section 4.

2) Landfill Site Capacity

The City is currently using both landfill sties, New Liskeard and Haileybury, for the disposal of the City's solid waste. The City's Haileybury landfill site also accepts solid waste from the Town of Cobalt. The sites are approaching the capacity limits. Therefore, it is necessary for the City to begin examining the options of expanding the existing sites or investigating the development of one or more landfill sites. Section 5.1 discusses the conditions of the existing landfill sites.

3) Capacity of the Material Recovery Facility

The City administers the operation of a material recovery facility (MRF), on behalf of the Cochrane Temiskaming Waste Management Board (CTWMB). The MRF, however, does not have the capacity to accommodate additional recyclable materials, and the location of the facility limits the possibility of expansion. Therefore, the City has restrictions on its current recycling program and may result in the potential relocation of the facility to an area that can handle the increased recycling volumes. Section 5.3 discusses the shortcomings of the MRF. The Council for the City of Temiskaming Shores envisions an improved recycling system than that currently in place.

3.0 ROLES AND RESPONSIBILITIES, GOALS, AND OBJECTIVES

3.1. Roles and Responsibilities

There is a collective need to increase the awareness of the diversion program amongst the residents of the municipality as well as throughout the business community. However, with limited space at the Material Recovery Facility and with a limited market to sell materials to, increasing the diversion rate will be challenging.

Outlined in the Policy Statement on Waste Management Planning, each waste generating sector has roles and responsibilities in the management of solid waste. Each sector must **actively participate** in trying to achieve a more sustainable waste management system, while being environmentally responsible.

The following roles and responsibilities have been developed by the Ministry of the Environment as a guide for communities trying to attaining a sustainable solid waste management community.

Municipality

- Plan for and provide direct waste management services to the residents of the City of Temiskaming Shores, and in some cases, local businesses, including programs for waste diversion and disposal of residential waste.
- Plan for, site and invest in necessary waste management infrastructure.
- Comply with provincial waste management standards and requirements.
- Fund and implement diversion programs under the *Waste Diversion Act.*

Industrial, Commercial and Institutional

- Plan for, and help reduce, the amount of waste generated by their operations.
- Comply with provincial waste management standards and requirements.

The Public

- Help reduce the amount of waste generated through their activities and choices.
- Engage in waste management decisions and participate in waste prevention and diversion programs.

Private Sector Waste Management Industry

- Provide waste services to clients of the IC&I sectors, and in some cases, through contract to the municipality, waste services to residents.
- Comply with provincial waste management standards and requirements.

Environmental Groups

- Promote the need to reduce waste and conserve the local natural resources.
- Raise public awareness of waste management issues.

3.2. Waste Management Goals

- The following waste management goals have been established for the City of Temiskaming Shores:
- To promote an attitude of environmental responsibility.
- To reduce the risk associated with the contamination of water and land through solid waste disposal.
- To develop mechanisms to prevent, minimize or mitigate adverse effects of solid waste on the environment by promoting waste diversion, waste reduction, and material reuse.
- To develop waste diversion strategies through public education and feedback.

3.3. Waste Management Objectives

- The objectives of the Solid Waste Management Master Plan are as follows:
- To encourage and promote composting by all households.
- To encourage residents, businesses and institutions to increase their reduction, reuse and recycling of waste materials.
- To develop measures and procedures to reduce construction, demolition and hazardous wastes from going to the landfill.
- To meet or exceed the Province's waste diversion/reduction targets.

4.0 EXISTING WASTE COLLECTION PROGRAMS

4.1. Non-Uniform Collection Service

Since the amalgamation, the City continues to use the existing solid waste collection policies of the former municipalities to define the solid waste collection program within those specific areas. Those collection programs vary from area to area and continue to be based on the services provided by the former Towns of Haileybury and New Liskeard and the former Township of Dymond prior to amalgamation. The three (3) by-laws governing the collection and disposal of garbage and other refuse are listed below and a copy found in Appendix A:

- The Corporation of the Town of Haileybury: By-law 94-15 - Being a by-law to establish a system for the collection and disposal of garbage and other refuse and to designate certain lands from garbage disposal. (March 8, 1994).
- The Corporation of the Township of Dymond: By-law No. 799 - Being a by-law for establishing and maintaining a system for the collection, removal and disposal of garbage. (November 10, 1977).
- The Corporation of the Town of New Liskeard By-law No. 2807 - Being a by-law to establish a system for the collection and disposal of garbage and other refuse and to designate certain lands for garbage disposal. (October 22, 2002).

There are many discrepancies when comparing these by-laws and the services provided by the former municipalities. Based on the need to streamline the waste collection program and consolidate the policies within the by-laws, it is **recommended that a standardized by-law be developed for the City**. The by-law should provide the City with a more standardized approach to solid waste collection and disposal. The following sections describe the existing waste collection program provided by the City of Temiskaming Shores.

4.2. Residential and Industrial, Commercial, and Institutional Collection Service

The City's residential and Industrial, Commercial and Industrial (IC&I) waste collection programs provide non-uniform levels of service based solely on historical municipal boundaries. Service level differences include:

- Bag limits and collection frequency: during the summer bag limits range from two (2) or three (3) bags/hhld/week, while in the winter months the bag limit is increased and the frequency of collection is reduced to once every two (2) weeks;
- Bag tag costs ($0, $1 or $2 per tag);

- The collection of Old Corrugated Cardboard (OCC) is banned for the IC&I sector in New Liskeard but not in Haileybury or Dymond;
- A separate fiber pick-up service had been provided in downtown New Liskeard and at five schools within New Liskeard but not elsewhere within Temiskaming Shores. Note: Downtown New Liskeard is defined as Whitewood Avenue from Riverside Place (55 Riverside Drive) to Sumbler Florist (417 Whitewood Avenue) and Armstrong Street from the Wabi River southerly to the Liquor Store (55 Armstrong Street); and
- Enhanced commercial collection frequency is provided in downtown New Liskeard compared to other parts of New Liskeard, Haileybury and Dymond.

Table 1: Summary of Existing Residential Waste Collection Services

	Dymond	**New Liskeard**	**Haileybury**
No. of Households	445	2254	1941
Bag Limit/Week(bi-weekly)	3 (6)	3 (6)	2 (4)
Bag Tag Fee ($/tag)	$0.00	$2.00	$1.00
Collection Schedule 1) Summer 2) Winter	 Weekly Bi-weekly	 Weekly Bi-weekly	 Weekly Bi-weekly
Container Size	Max. height- 36" (91.5 cm) Max. diameter- 24" (61 cm) Max. weight- 23 kg (50 lbs) Plastic garbage bags must not exceed 24" x 36" (61 x 91.5 cm)	Max. height- 36" (91.5 cm) Max. diameter- 18" (38 cm) Max. weight- 23 kg (50 lbs) Plastic garbage bags must not exceed 24" x 36" (61 x 91.5 cm)	Max. height- 36" (91.5 cm) Max. diameter- 18" (38 cm) Max. weight- 23 kg (50 lbs) Plastic garbage bags must not exceed 24" x 36" (61 x 91.5 cm)
OCC Ban	No	Yes	No
Collection Days	Wednesday	Monday- North of Wabi River Wednesday- South of Whitewood Avenue and Hospital Hill Friday- Whitewood Avenue and North of Whitewood Avenue	Tuesday- Little Street and North of Radley's Hill Thursday- South of Little Street and North Cobalt
Clean-up Week	Yes	Yes	Yes
Christmas Tree Removal	Yes	Yes	Yes
Leaf and Yard Waste- accepted at New Liskeard and Haileybury landfills at no charge to residents. Hazardous Waste - limited to batteries and waste oils.			

*number of households based on 2003 census data

Table 2: Summary of Existing IC&I Waste Collection Services

	Dymond	New Liskeard	Haileybury
Bag Limit per Collection	10	10	10
OCC Ban	No	Yes	No
Bag Tag Fee ($/tag)	$0.00	$2.00	$1.00
Collection Schedule 1) Summer	Weekly	2 x per week in the downtown core, weekly elsewhere	Weekly
2) Winter	Bi-weekly	2 x per week in the downtown core, weekly elsewhere	Bi-weekly
Collection Days	Wednesday	Monday - Downtown and North of Wabi River Wednesday - Downtown (OCC only) South of Whitewood Avenue and Hospital Hill Friday - Downtown, Whitewood Avenue and North of Whitewood Avenue	Tuesday - Little Street and North of R adley's Hill Thursday - South of Little Street including North Cobalt

Differences also exist between the former municipalities with respect to:

- Non-standardized IC&I waste containers (i.e. size, maintenance, storage location, maximum weight, etc.);
- Inconsistencies with multi-family dwelling collection locations;
- Inconsistencies with respect to the definition of prohibited wastes that will not be collected at the curb or accepted at the landfill sites.

However, the noted By-laws do collectively list the *Non-Collective Wastes* for the City, as:

- Manufacture waste, including wire;
- Oil soaked or gasoline soaked absorbent material and any explosive or highly combustible material of any nature whatsoever;
- Broken plaster, lumber or other waste or residue resulting from the construction alteration, repair, demolition or removal of any building or structure;
- Sawdust and/or shavings;
- Organic matter not properly drained or wrapped;
- Liquid waste;

- Bandages, poultices, dressings and other such waste;
- Hay, straw, manure;
- Night soil;
- Carcass of any animal;
- Live animals or birds;
- Furniture;
- Stock of any wholesaler which shall be regarded as manufacture waste;
- Any material which has become frozen to the receptacles and cannot be removed by shaking;
- Discarded truck and automobile tires;
- Tree branches or roots exceeding three (3) inches in diameter;
- Ashes;
- Old corrugated cardboard; and
- Other materials as may, from time to time, be designated by the City as non-collectible waste.

The exceptions to the above list are the following:

- The Town of Haileybury's By-law allows the appropriate curbside disposal of ash; and
- The Town of Haileybury's By-law is the only by-law which includes the blanket clause with respect to materials as may, from time to time, be designated by the City as non-collectible waste.

In addition to the regular solid waste collection program, the City operates special waste management programs that include: Spring Clean-Up Program, Christmas Tree Collection, a limited hazardous waste management program, and areas where organic materials can be deposited at each landfill. Those special programs are discussed below in more detail.

4.3. Hazardous Waste

At present, the City operates a limited hazardous waste program. The program entails:

- The collection of old paint, varathane, and similar materials; these items can be put at curbside during Spring Clean-up and are collected in a separate vehicle. This waste is set aside at the landfill, opened, and once dried out placed in the landfill;
- The segregation of used paint, varathane, varnish, old propane tanks, and batteries at each landfill. The used paint, varathane, and varnish, etc. is managed as indicated above. The old propane tanks have the valves removed and are placed in the white goods piles;
- The segregation of used batteries at each landfill which are sold to a Battery Recycler when the quantities are sufficient; and

- The collection of used motor oil in 250 gallon tanks at each landfill. Once the tanks are full, the oil is disposed of through a licensed disposal contractor.

As a result, most household hazardous wastes are disposed of in the City's existing landfills. The disposal of hazardous wastes in natural attenuation sites such as the Haileybury and New Liskeard landfills **could have a significant negative impact on off-site groundwater resources and on the City's ability to ensure that each landfill remains in compliance with its Certificate of Approval.**

It is **recommended that the City consider implementing periodic (e.g.1 or 2 days/year) one day collection depots to divert household hazardous waste from landfill disposal**. Such depots could be operated at the City's public works yard or another facility with suitable space. In order to operate one day collection events, the City must obtain a Certificate of Approval from the Ministry of Environment. Additional discussion about the implementation of a Hazardous Waste Collection program is provided in Section 7.

4.4. Spring Clean-Up Program and Bulky Item Collection

The *Spring Clean-Up Program* occurs the week following the long weekend in May. It allows residents of the City to dispose of items at curbside which would not normally be collected by the solid waste collection program, such as:

- Furniture;
- Larger tree branches and/or roots (not exceeding 18 inches in length);
- Stoves;
- Fencing;
- Furnaces;
- Bed springs;
- Mattresses;
- Barrels; and
- General household items of similar nature, but not items which are exempt from solid waste collection except furniture, tree branches, waste or residue from alterations or repairs to building.

A "Convoy Collection Program" is used to make the collection program more efficient and reduce cost. The City is divided into eight zones or areas. There are two (2) groups collecting materials in different areas at all times during the Spring Clean-Up Program. A group is made up of approximately five dump trucks, one loader, and one half-ton truck. The half-ton truck is designated for the collection of tires and hazardous waste such as paint, batteries, and propane containers. One dump truck collects metals while another dump truck collects wood. The three (3) remaining dump trucks collect general waste.

In 2004, 11.75 days were required to collect all of the waste deposited at curbside as part of this program: 1.25 days for Dymond, 3.5 days for New Liskeard, and seven (7) days for Haileybury. The total quantity of waste material delivered to the landfill during the 2004 Spring Clean-Up Program was approximately 2,600 cubic meters (3,400 cubic yards), where 1,223 cubic meters was disposed of at the New Liskeard Landfill and 1,376 cubic meters at the Haileybury Landfill.

In 2005, 11.5 days were required: 1.0 day for Dymond, 3.5 days for New Liskeard, and seven (7) days for Haileybury. The total volume of waste delivered to landfill in 2005 was 2,495 cubic meters (3,263 cubic yards). Approximately 1,173 cubic meters was disposed of at the New Liskeard Landfill and 1,322 cubic meters at the Haileybury Landfill.

It is believed that the seven (7) days required to complete the clean-up in Haileybury, may be attributed to the fact that historically the Haileybury residents were encouraged to put solid waste at the curbside for "Goods for Nothing Week" and that concept has carried over into the Spring Clean-Up Program. Also, the Haileybury Landfill is located a fair distance from the City and consequently the residents of Haileybury are less likely to transport their waste materials to the Landfill throughout the year. The City is evaluating ways in which to reduce the current number of days required to complete the Spring Clean-Up Program in Haileybury.

This program cost the municipality approximately:

Table 3: Spring Clean-Up Program Annual Fee

	2004	2005	2006
Total	$85,600	$70,638	$50,050

The administration and collection service program is conducted entirely by the City, with the use of some rental equipment. The cost savings realized are attributed to the implementation of the Spring Clean-Up Program policies.

Bulky Items

In an effort to further control the Spring Clean-Up Program costs, an accurate definition of "bulky items" to be collected during the Spring Clean-Up Program or as part of any other "bulky item" collection program was requested. Therefore the following definition of bulky items is suggested for use by the City:

> *Large items including, but not limited to large furniture (television sets, mattresses, furniture, tables, patio furniture, etc.), microwaves, barrels, and any other discarded materials which items would normally accumulate at a residential dwelling or multi-unit residential building and can easily be lifted up and into a collection vehicle, such as white goods (refrigerators, ovens/stoves, washers,*

dryers, dishwashers, freezers), air conditioning units, microwave ovens, furnaces, wood stoves, hot water tanks, air exchange units, gas barbeques with fuel tanks removed, and other items designated as bulky items by the City.

4.5. Christmas Tree Collection

The City currently operates a Christmas tree collection program. Christmas trees can be placed at the curbside during January to be collected by Public Works Operations Division Staff. The trees are then transported to designated areas at the landfill sites.

4.6. Composting/Organic Materials

Historically, there was a compost site within the Town of Haileybury, located at the end of Morissette Drive, known as the "old dump". The "old dump" predated Certificates of Approvals; therefore, there was no operating or closure plans for this former landfill. The compost site was supervised from June through to the end of September on Saturday and Sunday from 10:00 a.m. to 4:00 p.m.

Residents of Haileybury were allowed to bring compostable yard waste, grass clippings and brush less than three (3) inches in diameter, to this site. A review of the 2004 data for this program shows that 777 cubic meters of material were brought to the site during 1,107 visits. The site was closed in 2005 since inappropriate material was being disposed of at the site and it was being used as a transfer station and not a compost site (i.e., municipal employees had to collect the material and transport it to the compost site at the Haileybury Landfill along with waste).

There was also a grass clippings compost site in Dymond. This site was also closed in 2005 since some people were depositing inappropriate material at the site and it was being used as a transfer station.

Currently, the City does not operate a composting program at the local landfill sites. However, the landfills have areas where organic materials can be placed. Residents can deliver their compostable materials to either landfill during normal operating hours. There is no tipping fee applicable to the disposal of compostable materials.

5.0 WASTE MANAGEMENT PRACTICES AND SYSTEMS

5.1. Landfill Sites

The City has two (2) municipal landfills: the former Town of Haileybury Landfill, now the Temiskaming Shores Haileybury Landfill, and the former New Liskeard Landfill, now the Temiskaming Shores New Liskeard Landfill. These landfills will be referred to as the Haileybury Landfill and the New Liskeard Landfill.

The New Liskeard Landfill, is located approximately three (3) kilometers (km) west of downtown New Liskeard and is accessed off of Rockley Road, while the Haileybury Landfill, is located approximately nine (9) km southwest of Haileybury and is accessed off of Highway 11 along Dump Road.

A single contractor, Phippen Waste Management, is responsible for solid waste collection and the operation of both municipal landfills. White goods, metals, tires, organic material and clean wood are all managed according to the same standard procedures at both landfills. Stockpiled material, which includes, foundry sand, clay and sand are used for intermediate cover. Recycled glass is stockpiled at both landfills.

Organics and White Goods

Each landfill has an area set aside for organic waste and a separate location for the deposition of white goods and metals. These materials are stockpiled and recycled approximately twice a year. The City receives tipping fees for the disposal of this material at the landfills and they also receive approximately $1,000 per landfill per visit from the contractor who collects the used white goods.

Tires

Waste tires are also stockpiled separately from the other waste. Following the Hagersville Tire Fire on February of 1990, the Ministry of the Environment (MOE) inspected all landfill sites in the province to determine whether other tire fire risks existed. The New Liskeard Landfill was found to contain a very large stockpile of used tires and the MOE ordered the immediate burial of all tires at a location on the landfill site. The tires were buried at the north end of the landfill site in an area approximately 20 m x 60 m and at an unknown depth.

Subsequent to a MOE Landfill Site Inspection at the New Liskeard Landfill, a Non-Hazardous Solid Waste Disposal Site Inspection Report was issued by the MOE containing a list of actions required. The Inspection Report indicated that the burying of tires was an interim measure and that the long-term deposition of the tires in this area is not approved. The tires must be removed or the City can make an application for a waste tire disposal site at this location.

Currently, when there are sufficient tires to be recycled, they are collected by an independent tire recycler at the expense of the City. When the tires are picked up, an estimate is done to determine the cost of removing the tires. It is estimated that the tipping fees obtained from the disposal of these tires covers the fees paid to the Tire Recycler. In the past, the City estimated that they pay between $1.25 and 1.30 per tire to dispose of the tires and the City receives on average $2.00 per tire. Tires are only recycled when the volume of tires is enough to fill a transport trailer or the quantity of tires approaches 300 cubic meters.

Wood

Clean Wood is managed according to the Clean Wood Waste Handling Report prepared by H. Sutcliffe Limited February 10, 1999 (HSL 1999). The report concludes that controlled burning of clean wood, along with reuse and salvaging of pallets and used lumber are the preferred options for reducing the impact of wood waste at the landfill sites. These options allow for a high degree of volume reduction without the requirement of large capital expenditures necessary for the purchase of a pit incinerator or the cost of grinding wood waste (HSL 1999).

Adjacent Land use

The following is a list of land uses within 500 m of each landfill site:

New Liskeard Landfill Site:

North Undeveloped forested land and an electric power transmission line right-of-way used by Hydro One.

West Undeveloped forested land on the ridge and agricultural pasture land west of the ridge.

Northeast Undeveloped forested land and agricultural pasture land.

Southeast Single family dwellings, farm buildings, pasture land and Ministry of Transportation Facility.

South Single family dwellings, agricultural buildings, pasture land and hydro/telephone lines.

Haileybury Landfill Site:

North Undeveloped forested land.

South/Southwest Undeveloped forested land, sand and gravel pits.

West Undeveloped forested land and TransCanada Pipeline.

East Undeveloped forested land.

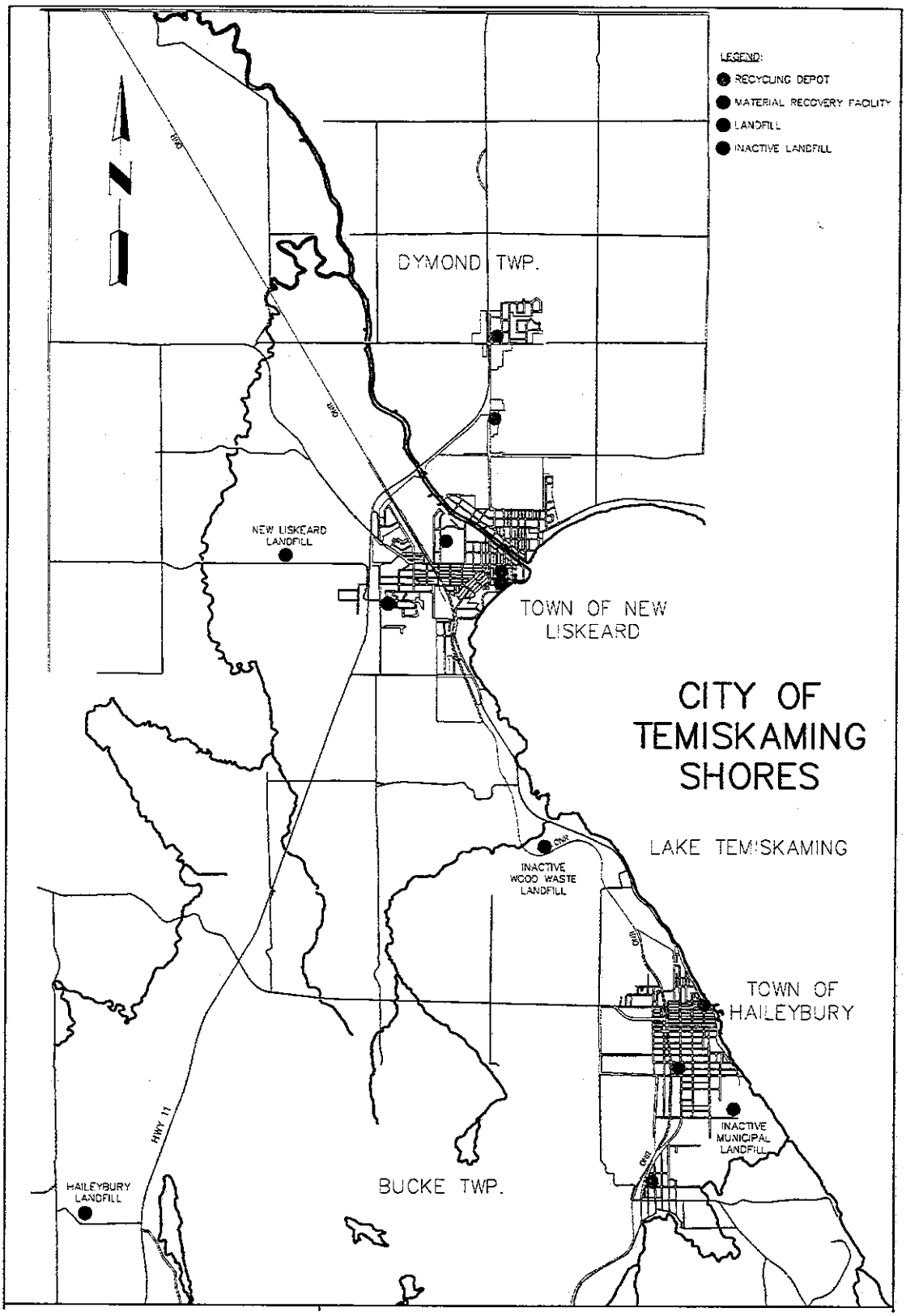


Figure 2: Location of Drop-off Depots, Landfills and MRF within the City

5.1.1. New Liskeard Landfill Site

New Liskeard purchased the property in August of 1916 and the site has been used as a landfill site since that time (SRQ 1999). Prior to the 1970's, deposited solid waste materials were burned. A detailed summary of the site, background information regarding the Landfill and historical work which has been conducted at the site, is available in Section 2.0 of Volume 1 of the New Liskeard Landfill 2004 Annual Report prepared by Sutcliffe Rody Quesnel Inc.

The following site description was taken from the Jagger Hims Limited (JHL) 2005 annual report:

"The landfill was developed at the site of a former limestone quarry and is situated on the northern end of a broad limestone bedrock ridge landform that rises above surrounding shallow-sloping plains. The ridge forms a local surface drainage divide between Wabi Creek to the east and South Wabi Creek to the west. The fill area is situated on the east side of that ridge. North of the fill area is a peninsula-like exposed bedrock escarpment which is the northern terminus of the ridge.

The elevations of the bedrock ridge range from approximately 270 meters to 276 meters above sea level. The surrounding plains have ground elevations of less than 256 meters above sea level, and the land slopes gently away from the ridge in a northeasterly direction towards Wabi Creek. The fill area is wedge-shaped, in cross-section, and has a peak elevation of approximately 278 m above sea level. The total footprint of the historical fill area is approximately 5.9 ha.

The existing waste footprint is rectangular in shape, oriented northwest to southwest and has approximate of dimensions of 130 to 160 m wide by 410 m long. The landfill property has dimensions of 400 m east-west by 790 m north-south."

JHL also states that the stratigraphy of the landfill consists of three (3) geologic formations:

- Soil overburden
- Limestone bedrock forming the ridge and underlying the overburden.
- Igneous bedrock which underlies the limestone formation.

The site overburden is a glacial till having a grain size composition ranging from a silty sand/gravel to silt (JHL 2005). There is exposed bedrock along much of the landfill ridge line and at the former quarry face north of the waste fill area. And, the overburden thickness ranges from 1.3 to 3.0 m thick in the vicinity of the landfill (with an average thickness of 1.9 m), to over 9 m south of Rockley Road and over 11 m northeast of the site.

The landfill site is located off of Rockley Road and the legal description is West ½ of South ½ of Lot 5, Concession 2, Township of Dymond, District of Temiskaming. The MOE issued an amended Provisional

Certificate of Approval (CofA), No. A571505, on May 9, 2000 for the approved 2.02 hectare (ha) fill area within a total site area of 32 ha. A copy of the Certificate of Approval is included in the Appendix B.

Prior to amalgamation the landfill only received solid waste from the New Liskeard area. In 2004, the CofA was amended to permit the disposal of solid waste from the entire City of Temiskaming Shores. The landfill site continues to be operated according to the terms and conditions of the original C of A.

Over the years the fill area has extended beyond the 2.02 ha area; however current waste disposal is restricted to the 2.02 ha area. A New Liskeard Landfill Site Plan is available in Volume 1 of the New Liskeard Landfill 2004 Annual Report prepared by Sutcliffe Rody Quesnel Inc (SRQ), where the site plan illustrates the perimeter buffer area, the completed fill areas and the monitoring well locations.

In 2004, the landfill operator accepted materials that were deposited outside the approved fill area. The accepted materials were reported to be foundry sand waste and wood waste. The materials were deposited on the eastern side at the toe of the active waste fill area. As part of the 2004 Landfill Site Inspection Report, the MOE requested that the waste be removed and be properly disposed of within the approved limits. This situation was resolved to the satisfaction of the MOE by November 12, 2004.

Operation of Landfill

The operation of this landfill is contracted to Phippen Waste Management. There is a written agreement between the City and the contractor, Phippen Waste Management, outlining the contractor's responsibilities in operating the landfill. The contractor operates the landfill according to the Operation Manual prepared by the City of Temiskaming Shores Public Works Director (1998).

The Operation Manual provides the contractor with guidelines with respect to maintenance and/or control of the buffer area, on-site roads, equipment and housing, signs, surface drainage, leachate management, tipping fees, and methods of disposal.

The tipping fee structure has been updated since the preparation of the Operation Manual. It should be noted that the methods of depositing and covering the waste identified in the Operation Manual need to be revised to comply with Ontario Regulation 232/98.

Based on discussions with Phippen Waste Management, daily waste is spread along a ramp with a 15 m (minimum) wide working face and a 75 m length. The waste material is repeatedly compacted on an uphill slope of no greater than 3H:1V, using a John Deer 655B bulldozer. The completed cells are then capped, as an interim measure, with 150 mm thick layer of compacted foundry sand, such that the waste to cover ratio is approximately 4:1, although, no daily covers are applied. The final capping of the landfill

will be completed by the City according to the terms and conditions of the C of A. The final elevations of the cells will match the existing adjacent completed landfill areas (approximately 279.0 m).

Leachate Migration and Management

According to JHL, no distinct surface water courses exist on the registered landfill property or on the surrounding lands within 500 m north and east of the waste fill area. The lands northeast of the waste fill area are poorly drained while the lands to the west appear to be well drained.

Uncovered portions of the waste fill area encourage infiltration resulting in the generation of landfill leachate. JHL reports that the Temiskaming area has an average moisture surplus of 281 mm/year. The moisture surplus, which is representative of moisture surplus values across northeastern Ontario, is an indicator of landfill leachate generation rates. Based on a waste footprint of 5.9 ha and a moisture surplus of 281 mm/year, the New Liskeard landfill would be expected to generate approximately 16,500 m^3/year of landfill leachate.

Annual reports have been prepared for this landfill starting in 2004 and groundwater monitoring data is available for some of the on-site monitoring wells extending back to 1980. A total of twenty-one (21) on-site monitoring wells and two (2) off-site monitoring wells are currently part of the groundwater monitoring program. A summary of this data is available in Volume 2 of the New Liskeard Landfill Site 2004 Annual Report, entitled New Liskeard Landfill Site 2004 Annual Groundwater Monitoring Report and Supplemental Hydrogeologic Investigation, prepared by Jagger Hims Limited.

The 2004 Annual Monitoring Report concluded that a leachate plume is migrating in a northeasterly direction, beyond the site property limit. And, according to the report, the site is in non-compliance with the MOEs B-7-1 Guideline titled "Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities" (Appendix C).

Non-compliance at and beyond the site property limit is occurring as a result of exceedances of the following: alkalinity, dissolved organic carbon (DOC), fluoride, manganese, total dissolved solids (TDS), aluminum, sodium, sulphate and iron. JHL attributed exceedances of Guideline B-7-1 for alkalinity, aluminum, fluoride, iron, manganese and sulphate to natural background water quality but concluded that exceedances of the guideline for DOC, sodium and TDS were likely related to landfill leachate. In addition, JHL also concluded that water supply wells located along Rockley Road and Highway 65 have not been impacted by landfill leachate.

As a mitigation measure to control the off site migration of leachate, the City has extended the attenuation zone of the New Liskeard Landfill site. Certificate of Approval A571505 (Appendix B), was amended by

the Ministry of the Environment on April 17, 2007 to recognize the addition of a contaminant attenuation zone as required by Provincial Officer's Order No. 7026-6GQLJY.

Additional mitigation measures which may be used to minimize the generation of leachate include:

- Capping of all areas of the landfill which have reached their approved final contours. Proper capping will substantially reduce the leachate generation rate by reducing percolation through the waste pile; and
- Installation of a leachate collection system (e.g. collection wells, interceptor drain) and a leachate treatment system (e.g. treatment wetland, on-site package treatment system, haulage to existing municipal treatment system). The type of collection and treatment system most suited for the New Liskeard Landfill should be determined through a site specific study including an assessment of leachate treatability.

Site Life

The average volume of loosely compacted waste deposited in the landfill over the past seven (7) year period is 13,968 cubic meters (see Table 4). Volume 1 of the New Liskeard Landfill Site 2004 Annual Report, prepared by Sutcliff Rody and Quesnel Inc. indicated that the landfill would reach its final capacity in 4.5 years or in late 2009. A more recent survey was completed in 2007 and indicated that the landfill site has much less remaining capacity then expected.

Table 4: New Liskeard Landfill Past Seven (7) Year Waste of Deposition

Year	Waste Deposited (cubic meters as received at Landfill)
2000	16,806
2001	14,769
2002	13,844
2003	11,667
2004	10,102
2005	12,032
2006	18,554
Average	**13,968 m^3/year**

A digital terrain model (DTM) of the site was also prepared using a 2005 topographical survey prepared by Sutcliffe Rody Quesnel Inc. Using the DTM, Earth Tech calculated that the remaining volume and years at the New Liskeard landfill as being:

Total Remaining Volume (2005) - 83,400 m^3

Final Cover Volume	-	19,450 m^3
Waste and Daily Cover Volume	-	63,950 m^3
Annual Fill Rate	-	3,500 tonnes
In-place Waste Density (assumed)	-	0.5 tonnes/m^3
Waste to Daily Cover Soil Ratio(assumed)	-	4:1
Estimated Remaining Site Life	-	7 years (2012)

In preparing this report, the City retained SRQ to conduct a new survey of the New Liskeard Landfill Site to determine the current remaining capacity. The survey was completed in November of 2007.

It was estimated that the net amount of waste deposited in 2.5 years, between April 2005 and October 2007, was approximately 30,080 cubic meters, including cover material. This equates to approximately 12,032 cubic meters of waste deposited per year. In order to provide an estimate on the remaining volume, the following assumptions were made:

Volume remaining as of April 2005	=	49,676 cubic meters
Less amount deposited up to October 2007	=	30,080 cubic meters
Remaining volume	=	19,596 cubic meters

If it is assumed that waste deposition will continue at a rate of 12,032 m^3/year, it is then fair to conclude that the **site will reach capacity in less than two (2) years**; this coincides with the information presented by SRQ in their 2004 report. The deposition rate could however be higher if any of the demolition waste from the residence at College Boreal or the old Canadian Tire building were deposited in New Liskeard's landfill.

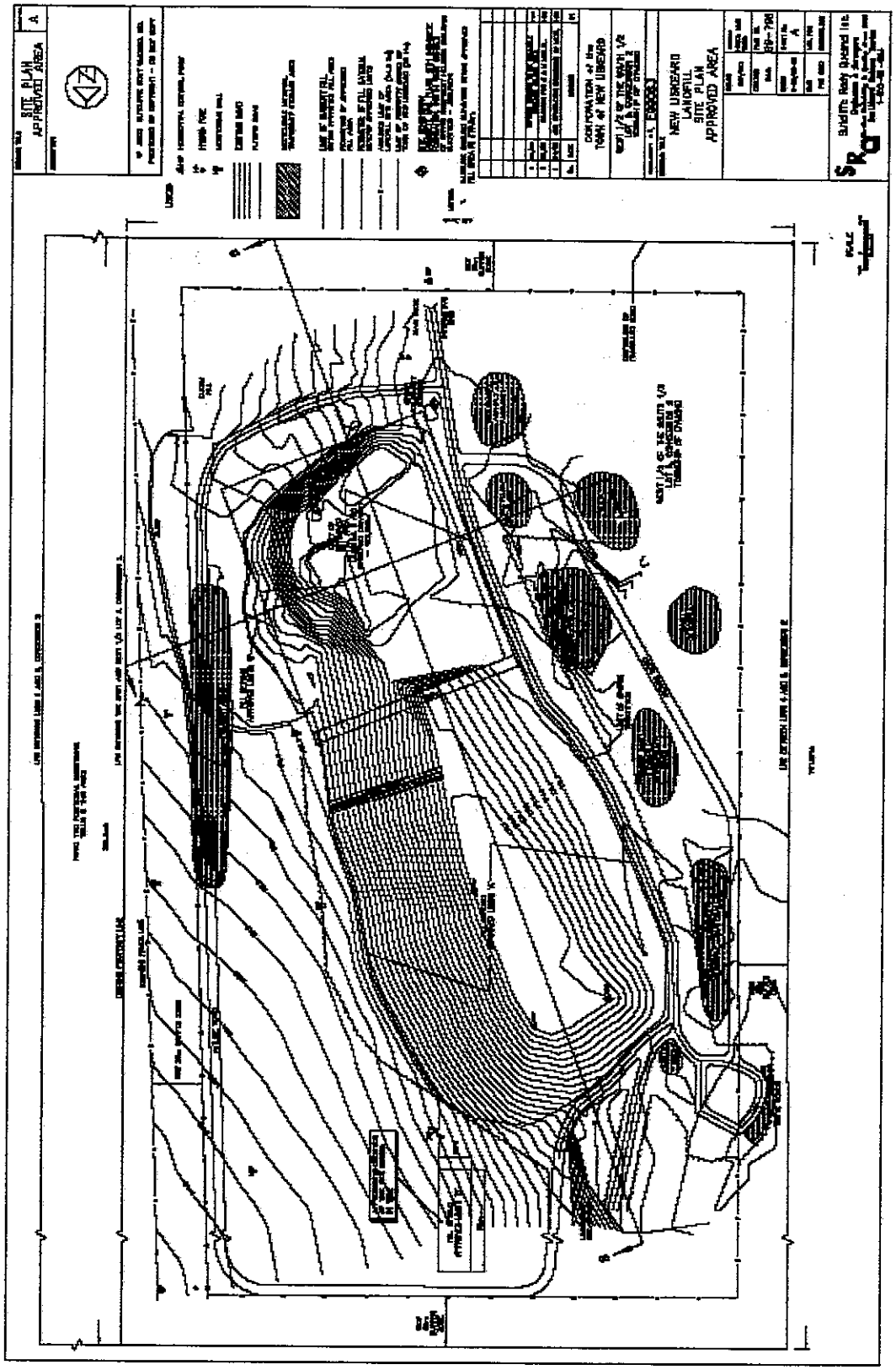


Figure 3: New Liskeard Landfill - Approved Area (2004)

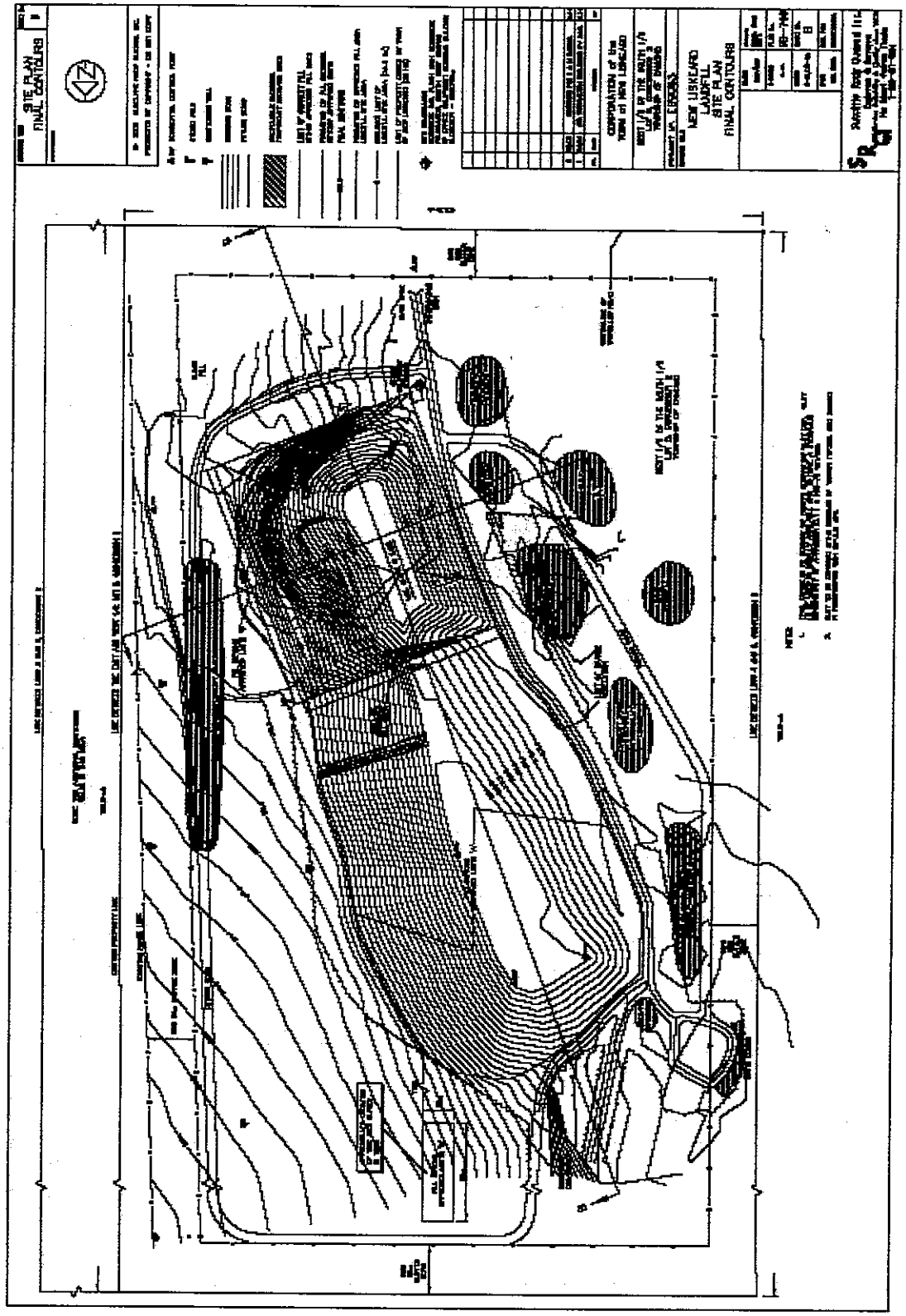


Figure 4: New Liskeard Landfill - Final Contour (2004)

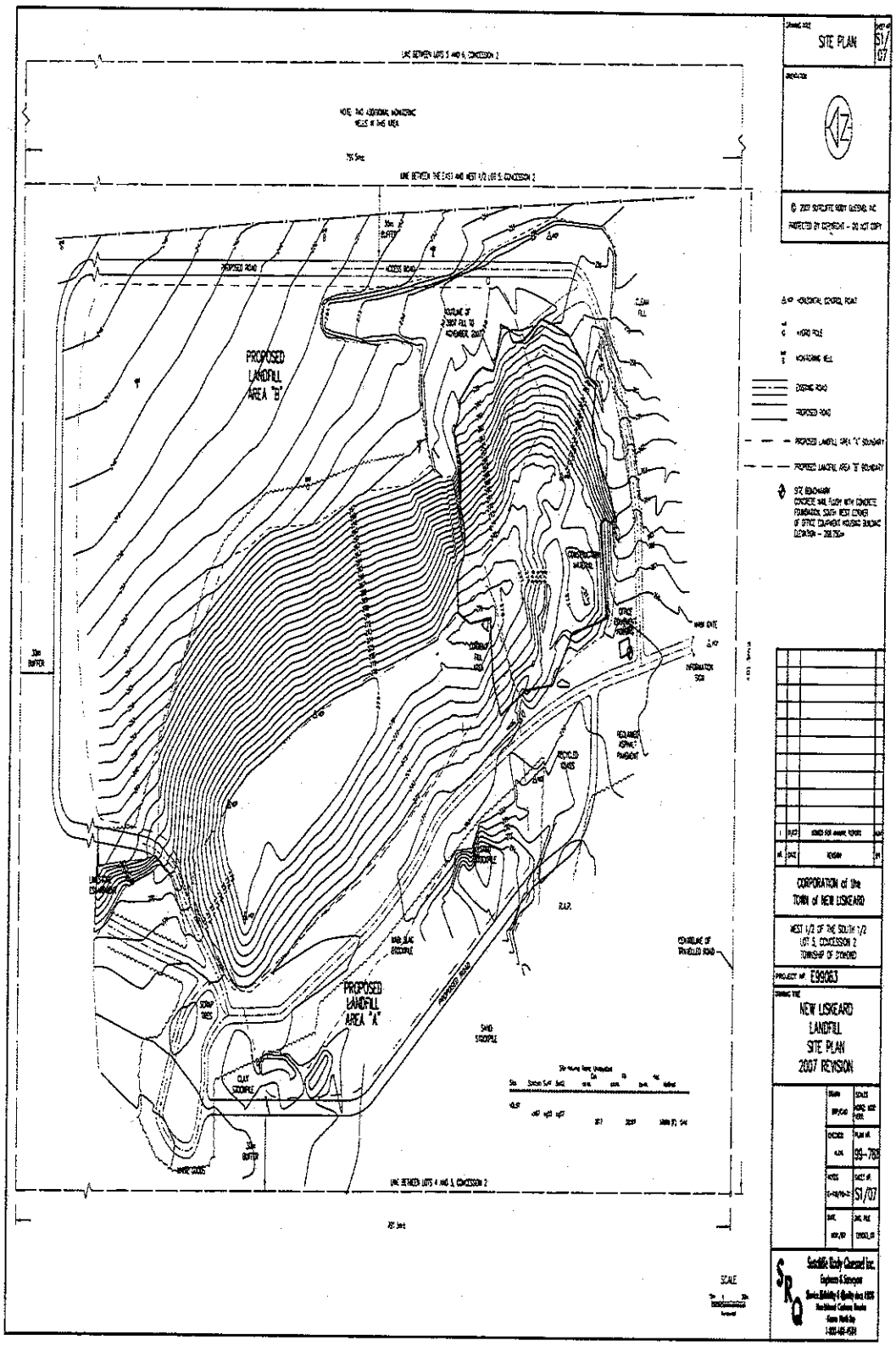


Figure 5: New Liskeard Landfill - Updated Survey (2007)

5.1.2. Haileybury Landfill site

The Haileybury Landfill is located off of Highway 11 along Dump Road, 9 km southwest of the Town of Haileybury on the south half of Lot 1, Concession 2, in the Township of Bucke. The site, which has been in operation since 1975, operates under Certificate of Approval No. A570420 (Appendix B). The certificate identifies the site as having a total area of 32.4 ha and a current waste fill area of 7.0 ha.

The Haileybury Landfill is located in the South Wabi Creek drainage basin which flows northward into Moose Lake then drains into Lake Temiskaming. Site geology is characterized by sand and gravel deposits overlying Precambrian bedrock which appears at surface along the northern and eastern boundaries of the waste fill area.

Prior to the amalgamation, the landfill received solid waste from Town of Haileybury, the Township of Dymond, the Town of Cobalt, as well as, the residents of Firstbrook and Lorrain Townships. The deposition of waste from the Township of Dymond and the Town of Cobalt was historically done under a separate agreement (Appendix A) that outlined the fees which were payable by each municipality to the Town of Haileybury and the allocation of funding from each municipality to a reserve fund.

The reserve fund was established to cover future capital costs which would be incurred by the landfill, including but not limited to: costs necessary for the development, engineering, surveying or enlargement of the landfill, and the costs required to have the landfill comply with the Certificate of Approval, including the closure and post-closure costs of the landfill. Site closure procedures and party involvement in the development of a new landfill are also addressed as part of this agreement.

The Town of Cobalt is responsible for its own collection and transportation of solid waste to the Haileybury Landfill. Prior to dumping their waste, the residents of Firstbrook and Lorrain Townships must obtain bag tags from the City. They are also required to show identification upon arrival at the landfill. The tipping fees for these non-residents are $4.00 per bag and/or $30.00 per cubic yard.

The City applied for, and received approval for an amendment to the landfill C of A to permit the receipt of solid waste at this landfill from the entire City of Temiskaming Shores and to continue receiving solid waste from the Town of Cobalt.

Operation of Landfill

The landfill is operated in accordance with the terms and conditions contained within the C of A and the Haileybury Landfill Operation Manual.

The Operation Manual provides direction to the contractor with respect to the maintenance and/or control of the buffer area, on-site roads, equipment and housing, signs, surface drainage, leachate management, tipping fees, and methods of disposal.

There are currently two (2) active waste deposition areas at this landfill, one for construction waste and a second for domestic waste. The detailed procedure for depositing the waste at the landfill is outlined in the report entitled, "Corporation of the Town of Haileybury Landfill Site Approval Report", Project No. E91-008 dated October 1992 and prepared by H. Sutcliffe Limited.

Despite the C of A, daily covers are not applied at this landfill. However, intermediate covers are applied once areas of the landfill reach their final elevations or the Landfill Contractor moves to a different location to deposit solid waste. The final covers are the responsibility of the City and will be constructed according to the requirements of the C of A. The final elevations of the cells will match the existing adjacent landfill areas.

Leachate Migration and Mitigation

Starting in 1998, annual reports have been prepared for this site. Groundwater monitoring data extending back to 1991 is available for some of the on-site monitoring wells. A total of eight (8) on-site monitoring wells and three (3) off-site monitoring wells are currently part of the groundwater monitoring program. These wells are monitored three (3) times per year.

On December 12, 2003 the former Town of Haileybury was fined $305.00, for failure to comply with Condition 7. Subsequently the MOE issued a Provincial Officer's Order requiring that land be acquired to establish a leachate attenuation zone by August 1, 2004.

Also, there are five (5) surface water monitoring stations at this landfill, which are monitored twice per year. A summary of this monitoring data is available in the "City of Temiskaming Shores, 2004 Annual Monitoring Report, Haileybury Landfill Site, Volumes 1 of 2" prepared by Story Environmental Services.

In the 2004 Annual Monitoring Report for the Haileybury Landfill, Story Environmental Services (SES) reported that a groundwater leachate plume was flowing through the landfill area in a westerly /northwesterly direction. SES also reported that the site was in non-compliance with the MOEs B-7-1 Guideline titled "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities." The non-compliance at and beyond the site property boundary has occurred for Total Dissolved Solids (TDS) and arsenic.

SES concluded that the landfill site's leachate migration was affecting off-site groundwater resources and recommended that further monitoring be completed to establish the extent of the off-site impacts. SES also recommended that the City establish a leachate attenuation zone at the site as soon as possible.

The recommendations made by SES coincide with Condition 7 of the landfill site's C of A which requires that the City obtain an easement or the water rights to the land described as Parcel 904NND, part of the south half of Lot 1, Concession 2, in the Township of Firstbrook, District of Temiskaming. The City continues to negotiate with the property owner in this regard.

In addition to the migration of leachate through groundwater, uncovered portions of the waste fill area encourage infiltration resulting in the generation of additional volumes of landfill leachate. Based on an average moisture surplus of 281 mm/year for the Temiskaming area (JHL 2005) and a waste footprint of 7.0 ha, the Haileybury landfill is expected to generate approximately 16,300 m^3 of leachate per year.

As with the New Liskeard landfill, additional mitigation measures which may be used to minimize the generation of leachate include:

- Capping of all areas of the landfill which have reached their approved final contours. Proper capping will substantially reduce the leachate generation rate by reducing percolation through the waste pile; and
- Installation of a leachate collection system (e.g. collection wells, interceptor drain) and a leachate treatment system (e.g. treatment wetland, on-site package treatment system, haulage to existing municipal treatment system). The type of collection and treatment system most suited for the Haileybury landfill should be determined through a site specific study including an assessment of leachate treatability.

Site Life

The average volume of loosely compacted waste deposited in the landfill over the past seven (7) year period is 19,783 cubic meters, as shown in Table 5. In Volume 1 of 2 of the "City of Temiskaming Shores, 2004 Annual Monitoring Report, Haileybury Landfill Site", prepared by Story Environmental Services, it is indicated that the landfill will reach its final capacity during the year of 2018. This calculation was conducted by Sutcliffe Rody and Quesnel and is based on volume deposition records obtained from the City, waste compaction in the landfill, and projected increases in population.

Table 5: Haileybury Landfill Past Seven (7) Year of Waste Deposition

Years	Waste Deposited (cubic meters as received at Landfill)
2000	16,578 (including 1,648 from Cobalt)
2001	21,009 (including 2,259 from Cobalt)
2002	22,562 (including 1,942 from Cobalt)
2003	20,431 (including 1,805 from Cobalt)
2004	17,952 (including 1,832 from Cobalt)
2005	19,877 (est.)
2006	20,076 (est.)
Average	**19,783 m^3/year**

A digital terrain model (DTM) of the site was also prepared using a 2005 topographical survey prepared by Sutcliffe Rody Quesnel Inc. Using the DTM, Earth Tech calculated that the remaining volume and years at the Haileybury landfill as being:

Total Remaining Volume (2005)	-	277,500 m^3
Final Cover Volume	-	44,500 m^3
Waste and Daily Cover Volume	-	233,050 m^3
Annual Fill Rate	-	5,000 tonnes
In-place Waste Density (assumed)	-	0.5 tonnes/m^3
Waste to Daily Cover Soil Ratio(assumed)	-	4:1
Estimated Remaining Site Life	-	18 years (2033)

In 2006, SES revised the estimated landfill site capacity and documented the results in the Haileybury Landfill Site 2006 annual report, as follows:

- The remaining fill area capacity (waste ad daily cover only) is 132,814 cubic meters.
- Based on the waste deposition records obtained from Temiskaming Shores and an estimated 1% increase in the population served by the Site, the Fill Area will reach capacity during the year 2017.
- The demolition of the Agricultural College Residence building in 2006 and the disposal of the resulting waste material at the Haileybury Landfill was responsible for the elevated volumes deposited in the landfill site that year.

It should be noted that the Haileybury Landfill site will soon be accepting solid waste from the entire City and surrounding areas, as contained in the C of A once the New Liskeard Landfill reaches capacity and is closed. The Tables in Section 6 provide an estimated indication of the volumes of waste accepted at each landfill site, the years remaining, and the potential effect that the Haileybury landfill site might expect once the New Liskeard site reaches capacity.

It is **recommended that a detailed assessment of the Haileybury Landfill site, including a revised survey of the fill area, be scheduled upon the closure of the New Liskeard site in less than two (2) years time**.

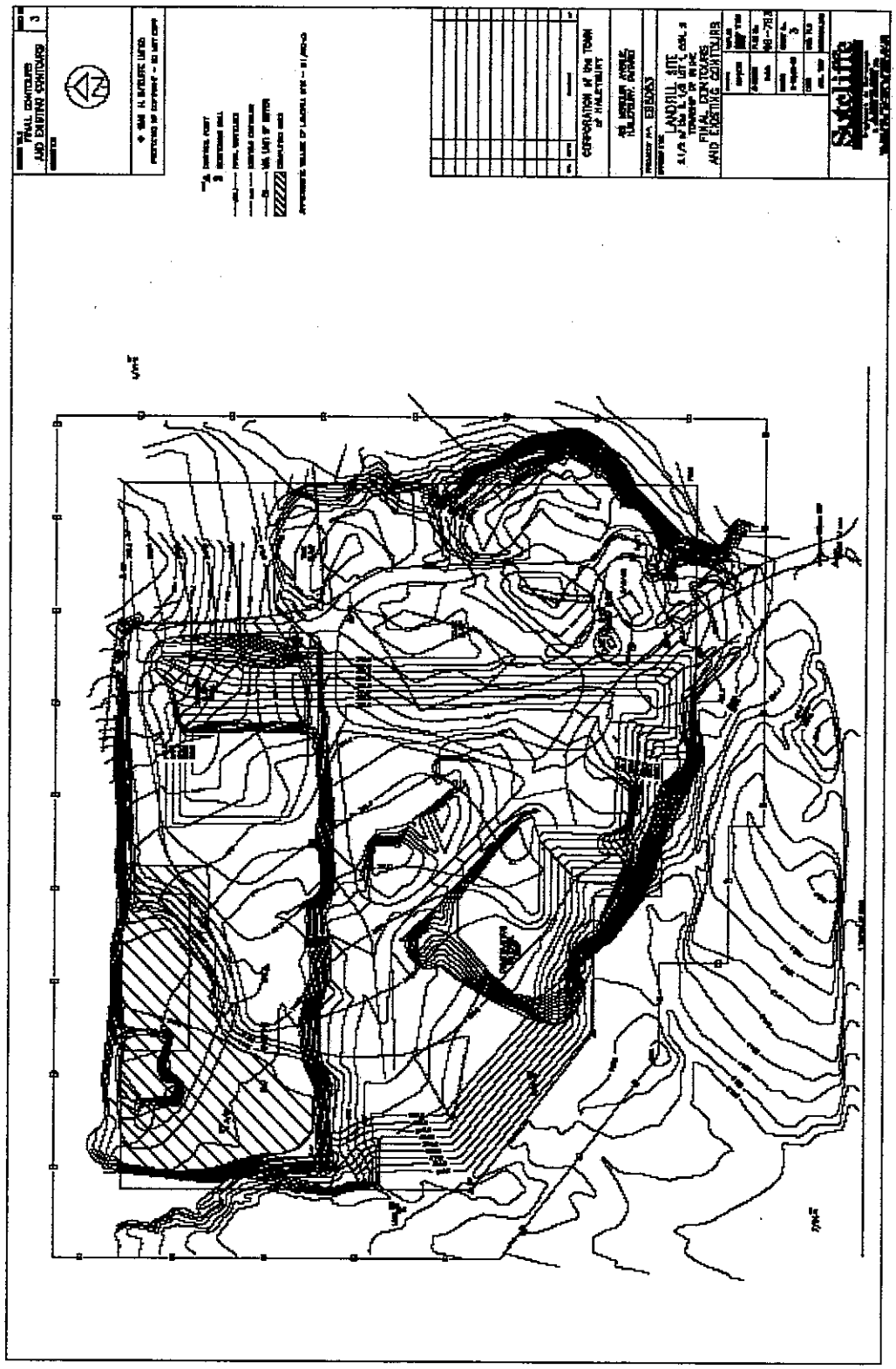


Figure 6: Haileybury Landfill Site - Existing and Final Contours (2004)

5.2. Site Operation and Closure

The New Liskeard Landfill site operations and maintenance is governed by the "New Liskeard Landfill Operations and Maintenance (O&M) Manual, May 2004" prepared by Sutcliffe Rody Quesnel Inc. While site operations and maintenance at the Haileybury landfill site is governed by the "Landfill Site Approval Report, July 1997" also prepared by Sutcliffe Rody Quesnel Inc.

Both reports describe site development, operations and maintenance, final cover composition and thickness, and site equipment.

Once the landfill sites are at capacity, the sites O&M Manuals recommend that the following tasks be completed to ensure proper closure of the sites:

- Begin to plan for disposal at an alternate/new landfill site 3 *to 4 years* prior to landfill site closure.
- Advise the public through the media and signs of the landfill site closure date one month prior to and after the landfill site is closed. Media advertising and signs should advise the general public as to the location of the new landfill site and the changed status of the existing landfill site.
- Implement a rodent baiting program prior to closure. Institute a rodent extermination program if the baiting program indicates that it is unsuccessful.
- Complete the final cover of the landfill site with 750 mm of compacted clay cover, 150 mm of topsoil, and seed.
- Dismantle all the landfill site structures. Any bulk materials remaining on landfill site shall be hauled away and any tires buried. The perimeter fence shall be kept in place until vegetation has been established.
- After vegetation has been established, reforest the area under the supervision of the MNR.
- Periodic landfill site visits, three (3) times annually, shall be made to ensure that the vegetation is growing, leachate outbreaks have not occurred and that there are no vector or vermin problems.
- Continue monitoring groundwater on a three (3) times per year basis.
- Register on the property title that the property has been used for a landfill area. Prohibit construction of any structure on the landfill site by passage of a municipal by-law.

It is, therefore, **recommended that the City comply with the closure process as identified above**. In addition, the site's C of A's require that the City **submit an updated closure plan to the Ministry of the Environment for approval two (2) years before the sites are expected to stop receiving waste.**

Based on the estimated remaining site life at the New Liskeard Landfill Site, **a closure plan should be prepared submitted to the MOE by mid to late 2008; however should the municipality apply to expand the site, the closure plan would be delayed.** The updated closure plan for the Haileybury Landfill Site can be prepared at a later date once the capacity of the site is confirmed with updated surveying.

The closure costs for the New Liskeard Landfill and the Haileybury Landfill, in accordance with the recommendations contained in the O&M Manual, are noted in the following tables:

Table 6: New Liskeard Landfill Site - Estimated Closure Costs Schedule of Unit Prices (2005)

Item	Description	Unit	Estimated Quantity	Estimated Unit Price	Total
1	Compaction Clay Cap	tonnes	79,900	$ 10	$799,000
2	Topsoil	tonnes	15,980	$ 12	$ 191,760
3	Perimeter Ditching	m	1,000	$ 10	$ 10,000
4	Stormwater Ponds	each	2	$ 35,000	$ 70,000
5	Hydro seeding	m^2	46,300	$ 0.50	$ 23,150
6	Gas Vents	each	17	$ 1,500	$ 25,500
7	Site Shaping	ha	4.5	$ 8,500	$ 38,250
8	Contingency	LS	1	$ 75,000	$ 75,000
9	Engineering/Contract Administration	LS	1	$ 60,000	$ 60,000
				Approximate Total	**$ 1,292,660**

Table 7: Haileybury Landfill Site - Estimated Closure Costs Schedule of Unit Prices (2005)

Item	Description	Unit	Estimated Quantity	Estimated Unit Price	Total
1	Compaction Clay Cap	tonnes	110,000	$ 12	$ 1,320,000
2	Topsoil	tonnes	22,000	$ 12	$ 264,000
3	Perimeter Ditching	m	1,100	$ 10	$ 11,000
4	Stormwater Ponds	each	2	$50,000	$ 100,000
5	Hydro seeding	m^2	77,000	$0.50	$ 38,500
6	Gas Vents	each	22	$ 1,500	$ 33,000
7	Site Shaping	ha	7.0	$ 10,000	$ 70,000
8	Contingency	LS	1	$ 125,000	$ 125,000
9	Engineering/Contract Administration	LS	1	$ 100,000	$ 100,000
				Approximate Total	**$2,061,500**

m - meter; m^2 - meters squared; ha - hectare; LS - lump sum

5.3. Recycling Program

The City recycling program is provided by the Cochrane Temiskaming Waste Management Board (CTWMB). The CTWMB is divided into two (2) service zones, southern node and northern node, and provides recycling services to sixteen (16) municipalities. The City is part of the board's southern node which includes the communities of Temagami, Cobalt, Evanturel, Englehart, Charlton, and Chamberlain.

Presently, the City's Public Works Operations Manager serves as the administrator for the Board's southern node. The City receives $10,000 annually for the services provided.

Recyclables are currently delivered by residents to eight (8) drop-off depots located within the City (i.e. Haileybury - 3, New Liskeard - 3, Dymond - 2). The recycling material at the depots is collected by employees of the CTWMB on Monday, Wednesday, Thursday and Friday. The recyclable materials are then delivered to the material recovery facility (MRF) located on Barr Drive. Material is processed on Tuesday's.

The Public Works Operations Division maintains the aesthetics of the depots (bins) within the City and has attained the two (2) aged recycling units recently replaced by CTWMB to assist with this maintenance.

The current recycling program includes the following materials: paper fibers, aluminum and steel cans, container glass (clear and coloured), and No. 1 polyethylene terephthalate (PET) plastic.

Similar to the City's waste collection program, the recycling program is governed by the existing by-laws of its former municipalities with the Cochrane-Temiskaming Waste Management Board (CTWMB).

5.3.1. *Proximity*

Waste should be managed as close as possible to the source of generation.

Presently, there are two known Super Material Recovery Facilities in northern Ontario, one in North Bay and one in Sudbury which accepts recyclable materials. Other than the City of Timmins, the City of Temiskaming Shores is the largest population centre north of North Bay, approximately 160 kilometers apart. The cost per tonne for the CTWMB's recyclable material includes shipment of material to those markets.

It is suggested that the City continue to liaise with neighbouring communities with the objective of identifying a Mega MRF to permit collection of other recyclable materials above those currently collected. An increased recycling program may create partnership opportunities for the City to share the cost of transporting the recycled materials to markets located over 100 kilometers away.

6.0 PROJECTED WASTE MANAGEMENT NEEDS OVER THE PLANNING PERIOD (5 TO 25 YEARS)

The City is faced with two (2) landfill sites that are running out of disposal capacity. A recent survey of the New Liskeard Landfill site in November 2007 concluded that the site would reach capacity in less than two (2) years. Once the New Liskeard site reaches capacity, all solid waste generated in the City, and from outlining areas as approved by the Certificate of Approval (i.e., Cobalt), will then be diverted to the Haileybury Landfill. The additional waste from the closed New Liskeard site will accelerate the rate at which the Haileybury Landfill site reaches capacity.

The following tables provide an estimate of: 1) the projected future waste quantities based on an annual growth rate of 1% for the City, 2) the project life expectancy of each landfill site with a project waste diversion rate increase of 6% every five (5) years and without diversion, and 3) the combined impact of the closure of the New Liskeard landfill site on the Haileybury landfill site.

Table 8: New Liskeard Landfill Site - Estimated Remaining Capacity and Site Life

Loosely Compacted (55%)							
Existing Data				Potential Benefits			
Years	# of years	Waste & Daily Cover Remaining Capacity (m^3)	Annual Vol of loosely compacted waste (m^3)	Diversion Rate (est. 6% inc/5yr)	Remaining Capacity (m^3)		Annual Vol of loosely compacted waste w/ diversion (m^3)
2005	1	49,676	7,391	15%	49,676	7,391	6,282
2006	2	42,285	7,465	15%	43,394	7,465	6,345
2007	3	19,596	7,539	15%	19,596	7,539	6,409
2008	4	12,057	7,615	15%	13,187	7,615	6,473
2009	5	4,442	7,691	15%	6,715	7,691	6,537
2010	6	(3,249)	7,768	21%	177	7,768	6,137
2011	7			21%	(5,959)	7,846	6,198

Non-Compacted							
Existing Data				Potential Benefits			
Years	# of years	Waste & Daily Cover Remaining Capacity (m^3)	Annual Vol of non-compacted waste (m^3)	Diversion Rate (est. 6% inc/5yr)	Remaining Capacity (m^3)		Annual Vol of non-compacted waste w/ diversion (m^3)
2005	1	49,676	13,438	15%	49,676	13,438	11,422
2006	2	36,238	13,572	15%	38,254	13,572	11,537
2007	3	19,596	13,708	15%	19,596	13,708	11,652
2008	4	5,888	13,845	15%	7,944	13,845	11,768
2009	5	(7,957)		15%	(3,824)	13,984	11,886
2010	6			21%	(15,710)	14,123	11,158

Table 9: Haileybury Landfill Site - Estimated Remaining Capacity and Site Life

Loosely Compacted (55%)						
Existing Data				Potential Benefits		
Years	# of years	Waste & Daily Cover Remaining Capacity (m^3)	Annual Vol of loosely compacted waste (m^3)	Diversion Rate (est. 6% inc/5yr)	Remaining Capacity (m^3)	Annual Vol of loosely compacted waste w/ diversion (m^3)
2005	1	153,330	10,838	15%	153,330	9,212
2006	2	132,814	11,042	15%	144,118	9,304
2007	3	121,772	11,152	15%	134,813	9,397
2008	4	110,620	11,264	15%	125,416	9,491
2009	5	99,356	11,377	15%	115,924	9,586
2010	6	87,979	11,490	21%	106,338	8,999
2011	7	76,489	11,605	21%	97,339	9,089
2012	8	64,883	11,721	21%	88,250	9,180
2013	9	53,162	11,839	21%	79,071	9,271
2014	10	41,324	11,957	21%	69,799	9,364
2015	11	29,367	12,076	27%	60,435	8,739
2016	12	17,290	12,197	27%	51,696	8,827
2017	**13**	**5,093**	**12,319**	27%	42,869	8,915
2018	14	(7,226)		27%	33,954	9,004
2019	15			27%	24,949	9,094
2020	16			33%	15,855	8,430
2021	**17**			**33%**	**7,425**	**8,515**
2022	18			33%	(1,090)	8,600

Non-Compacted						
Existing Data				Potential Benefits		
Years	# of years	Waste & Daily Cover Remaining Capacity (m^3)	Annual Vol of non-compacted waste (m^3)	Diversion Rate (est. 6% inc/5yr)	Remaining Capacity (m^3)	Annual Vol of non-compacted waste w/ diversion (m^3)
2005	1	153,330	19,706	15%	153,330	16,750
2006	2	132,814	19,903	15%	136,580	16,918
2007	3	112,911	20,102	15%	119,662	17,087
2008	4	92,809	20,303	15%	102,576	17,258
2009	5	72,506	20,506	15%	85,318	17,430
2010	6	52,000	20,711	21%	67,888	16,362
2011	7	31,288	20,918	21%	51,526	16,525
2012	**8**	**10,370**	**21,127**	21%	35,000	16,691
2013	9	(10,757)	21,339	21%	18,310	16,858
2014	**10**			**21%**	**1,452**	**17,026**
2015	11			26%	(15,574)	16,108

Table 10: Haileybury Landfill Site - Estimated Remaining Capacity and Site Life, with combined Solid Waste from the Closed New Liskeard Landfill Site

Loosely Compacted (55%)								
Existing Data				N.L. Waste Diverted to Haileybury Landfill Site	Potential Benefits			N.L. Waste Diverted to Haileybury Landfill Site w/ Diversion
Years	# of years	Waste & Daily Cover Remaining Capacity (m^3)	Annual Vol of loosely compacted waste (m^3)		Diversion Rate (est. 6% inc/5yr)	Remaining Capacity (m^3)	Annual Vol of loosely compacted waste w/ diversion (m^3)	
2005	1	153,330	10,838		15%	153,330	9,212	
2006	2	132,814	11,042		15%	144,118	9,304	
2007	3	121,772	11,152		15%	134,813	9,397	
2008	4	110,620	11,264		15%	125,416	9,491	
2009	5	99,356	14,626	3,249	15%	115,924	9,586	
2010	6	84,730	22,540	7,768	21%	106,338	14,958	5,959
2011	7	62,190	30,611	7,846	21%	91,380	15,287	6,198
2012	**8**	**31,579**	**38,841**	7,924	21%	76,093	15,440	6,260
2013	9	(7,262)	47,233	8,003	21%	60,654	15,594	6,323
2014	10				21%	45,059	15,750	6,386
2015	11				27%	29,310	15,189	6,449
2016	**12**				27%	**14,121**	**15,341**	6,514
2017	13				27%	(1,220)	8,915	

Non-Compacted								
Existing Data				N.L. Waste Diverted to Haileybury Landfill Site	Potential Benefits			N.L. Waste Diverted to Haileybury Landfill Site w/ Diversion
Years	# of years	Waste & Daily Cover Remaining Capacity (m^3)	Annual Vol of non-compacted waste (m^3)		Diversion Rate (est. 6% inc/5yr)	Remaining Capacity (m^3)	Annual Vol of non-compacted waste w/ diversion (m^3)	
2005	1	153,330	19,706		15%	153,330	16,750	
2006	2	132,814	19,903		15%	136,580	16,918	
2007	3	112,911	20,102		15%	119,662	17,087	
2008	4	92,809	28,260	7,957	15%	102,576	20,542	3,284
2009	5	64,549	36,500	13,845	15%	82,034	29,316	11,886
2010	**6**	**28,049**	**50,849**	13,984	21%	52,718	27,520	11,158
2011	7	(22,800)	65,481	14,123	21%	25,198	28,412	11,886
2012	**8**				21%	**4,279**	**27,848**	11,158
2013	9				21%	(16,848)	16,858	

Note: The data presented is based on the waste records from the City. The life expectancy of the landfill sites was confirmed against the data contained in the 2006 Haileybury Landfill Site Annual Report prepared by Story Environmental.

An increased diversion rate of 6% per year was estimated based on Table 6 of Interim Report #1, *Landfill Space Saved by the Recycling Program 2004*(Appendix D). In 2004, the City diverted approximately 7% of its solid waste from the landfill sites.

7.0 INTEGRATED WASTE MANAGEMENT: WASTE VALUE CHAIN

The Ministry of the Environment expects that the municipality will consider waste management options according to the 3Rs - reduce, reuse and recycle - and that, where feasible, all methods of resources will be considered prior to final disposal of waste.

The development of a municipal Solid Waste Management Master Plan (SWMMP) requires the adoption of guiding principles which will govern the evaluation and selection of long-term waste management programs. The following guiding principles of the City of Temiskaming Shores SWMMP are in line with the Policy Statement Waste Value Chain:

- Provide a uniform collection service across the City where feasible;
- Promote waste diversion with an objective, where feasible, of achieving Ontario's 60% waste diversion goal as outlined in the Ministry of Environmental publication titled "Ontario's 60% Waste Diversion Goal - A Discussion Paper, June 10, 2004"
- Minimize waste collection and disposal costs, as practical;
- Provide convenient service levels for homeowners/businesses, where feasible;
- Provide long-term waste disposal capacity; and
- Comply with Provincial landfill regulations and guidelines related to landfill sites, waste diversion, and off-site contaminations.

7.1. Waste Prevention

While recognizing that industry producers and stewards have a significant contribution to make within this area, the municipality should also be focusing on waste prevention as a first step. This could include creating programs to encourage reducing waste at the source, such as consumer education programs (e.g., helping consumers to identify packaging that is recyclable through the municipality's recycling program), or financial incentives (e.g., user-pay systems that charge waste management fees based on the amount of non-recyclable waste that is deposited). The municipality can also make purchasing decisions that focus on buying products or services for municipal operations that minimize waste management costs.

There are currently a number of penalty-based programs being experimented with in North America and Europe which can be applied at the curb-side to help increase the rate of waste diversion within the community. Some of these programs include:

- Bag Limits;

- Pay-As-You-Throw (PAYT); or
- Clear Garbage Bag Programs.

The most common of these programs are bag limits which many municipalities are implementing. However, PAYT and clear bag based programs often can show the best performance and have the potential for significant increases in waste diversion. The following sections provide an outline of each penalty-based program that could potentially be implemented by the City.

7.1.1. Bag Limits

The City currently operates a bag limit program restricting the number of bags set-out by residential and IC&I waste generators. However, the bag limits are not consistent throughout the amalgamated City; some areas are permitted two (2) bags, while others have a three (3) bag limit. These inconsistencies are also apparent in the rural area versus the urban area, and the winter collection program versus the summer collection program.

In recent years, bag limits have been found to be an effective tool in increasing waste diversion. As the number of permitted bags at the curb decreased, residents either increased their participation in the diversion programs or found alternative means of disposal (i.e. take the material to a drop-off themselves).

It is **recommended that the City enhance their current waste collection program by addressing the inconsistencies of the program by introducing new clauses to establish a uniform bag limit of two (2) bags for the entire City**.

7.1.2. User Pay/Pay-as-you-throw (PAYT)

The user pay or PAYT programs are beginning to receive greater attention in the municipal solid waste management world.

In most municipalities the industrial sector is directly responsible for the waste they generate, including the contract for its disposal. As the cost to dispose of the waste generated increases, many industries are investigating alternative ways to reduce, reuse and recycle materials to decrease overall disposal costs. This level of awareness is not shared by many in the residential sector as many are unaware of the costs to manage residential waste.

This direct cost accountability in the industrial sector is slowly being transferred to waste generators in the municipal sector in the form of PAYT programs. In PAYT programs, each time a resident places garbage at the curbside, a fee is charged for the collection service. The less garbage set out for pick up, the less it will cost the resident. This type of program has been proven to accomplish the following:

- Encourage residents to be more accountable for the amount of waste being produced. This can also increase the amount of waste being diverted through recycling and composting initiatives.
- Reduce costs to those households which generate less waste.
- Distribute the costs associated with waste collections more equitably amongst waste generators.

There are a number of user-pay approaches currently utilized in Ontario and North America. Each system is specific to the local community environment. These systems include:

7.1.2.1. Flat Annual Rate

In this approach residents pay a flat rate for waste collection and waste management services. This is the system that many municipalities follow, where waste management costs are incorporated into municipal property taxes. This type of system does not encourage participation in waste diversion programs.

7.1.2.2. Bag Stickers/Tags

This program requires residents to purchase a sticker/tag to be placed on the bag(s). Only bags with a sticker/tag are collected at the curbside. Typically, this type of program parallels a bag limit program, meaning that if a resident exceeds the weekly bag limit there is an option of purchasing additional tag(s).

7.1.2.3. Standardized Bags

Residents in this program purchase a specific plastic bag which has been marked with a symbol or some other method of identification. Only these marked bags will be collected at the curb. With this option the waste management and collection services costs are incorporated into the price of the bag at the time of purchase.

7.1.2.4. Standardized Containers

In this option residents pay an annual fee based on the volume of the waste container(s). Approved containers would be marked to identify that the resident has paid the annual fee for waste management services for the year. This type of program requires the resident to use a rigid container that a label can be applied.

The option is also available to charge residents based on the number of containers collected. Several municipalities have implemented electronic tracking systems which operate similar to bar codes and scanners. Each container is labeled with a bar code that is scanned at the time of collection. The resident will then be invoiced for the number of containers set out, similar to a water or hydro bill. Depending on the collection technology used, the invoicing system could be based on the weight of the material collected at the curb each week.

7.1.3. Clear Garbage Bag Programs

The advantage of this program is that only garbage placed in clear bags will be collected. This type of program has minimal implications on curbside waste collection as it operates the same as any other plastic bag based garbage collection program. The difference is the collection crew will be able to clearly identify the contents of the bag and reject it if any recyclable materials have been mixed with regular waste.

The disadvantage of this program is that bags that are not collected could end up accumulating on the property or could be illegally disposed of.

7.1.4. Implementation of Penalty Based Programs

As with any penalty-based program, the key to successful implementation is to support all activities with a comprehensive public education program that:

- Promotes and explains the system well in advance of its implementation;
- Explains the effects a system may have on waste diversion and participation in diversion initiatives;
- Provides alternative disposal and recycling options;
- Promotes positive effects on the environment; and
- Discourages illegal dumping which can sometimes result from the implementation of penalty based programs.

A number of communities including, the City of Woodstock, the City of Barrie, the Region of Niagara, and Peel Region have implemented a PAYT system with an initial grace period. Residents were provided with free tags for a number of months to help ease the transition to the new system.

Another option allowed residents to dispose of a specific number of bags free each week with additional bags, beyond the prescribed limit, requiring a tag to be collected. The City of Greater Sudbury implemented a combined three (3) bag limit, to be reduced to two (2) bags, with a $1.50 bag tag system for residential waste collection services.

If the City wants to promote and increase waste diversion, it is recommended that a combination of the discussed approaches be implemented. An aggressive two (2) bag limit combined with the enhanced recycling and diversion program, along with bag tags for each bag exceeding the bag limit, should achieve the desired result.

It is **recommended that waste management costs associated with the bag limit and waste diversion programs be funded on the general tax levy**. A user pay system should be implemented for residents

exceeding the bag limit, such as with the purchase of bag tags. The combination of a flat rate/user pay system should offer the City the most flexibility with respect to cost recovery and the promotion of waste diversion.

7.2. Waste Diversion

Reuse activities should be fostered throughout municipal operations by providing space for and information about reuse centers for residential waste. This ensures that the useful life of products is exhausted prior to recycling.

Recycling products and materials that cannot be used, and diverting organics through composting and anaerobic digestion, are integral options for maximizing the rate of diversion from disposal.

7.2.1. Waste Collection Systems

The City currently operates a two (2) stream waste collection system consisting of:

- Curbside collection of garbage, including the Spring Clean-Up Program and bulk item collection; and;
- Depot style collection of recyclables for paper fibers, aluminum/tin cans, container glass, No. 1 plastic.

Across North America, however, there are three (3) primary waste stream collection systems that have been implemented by municipalities with varying levels of success. The following sections provide a description of these systems.

7.2.1.1. One - Stream Waste Collection

A single stream waste collection system allows residents to place all waste materials out for collection. Residents are not required to separate out recyclables or organics; this task is performed at a processing facility designed to accommodate a mixed waste stream.

The advantage of this system is that the waste diversion program does not require the participation of residents. All waste management takes place at a processing facility and/or waste disposal facility. This system also has lower collection costs as all materials are collected together with a single vehicle. Excluding the municipalities that do not operate waste diversion programs, there are a limited number of single stream waste collection programs in operation in North America. There are significant disadvantages to this system which has resulted in its limited adoption throughout North America. These disadvantages include:

- Increased processing costs in order to separate materials, especially when higher on-route compaction ratios (i.e. lower collection costs) are realized;

- Increased waste management costs relative to other forms of waste collection;
- Decreased waste diversion rates.

7.2.1.2. Two - Stream Waste Collection (Wet/Dry Model)

A two-stream wet/dry system has residents place materials at the curb in two (2) containers as follows:

- ***Wet*** - Wet containers are reserved for all organic materials including household organic waste, pet waste, non-recyclable fibres, etc. and other wet residual materials.
- ***Dry*** - Dry containers are reserved for all dry materials including items typically found in a blue box, as well as other dry residual materials.

The advantage of a wet/dry system is in the reduced collection costs as compared to a 3 stream collection system. Another advantage is in the quantity of material diverted when compared to a single stream collection system. Rather than residents separating out their recyclables, all recyclables are separated at the processing facility or a Material Recovery Facility.

The organic waste collected is processed as a compostable material and any residual waste that does not compost is screened out. This process is capable of capturing greater quantities of recyclable and organic materials. However, the process can also result in significantly higher processing costs due to the sorting requirements and the technologies required in separating and processing the mixed waste materials. Another by-product of this process is a larger quantity of residual waste being managed. This can impact the overall quality of the recyclable materials captured.

The primary model for wet/dry waste collection existed in the City of Guelph. About two (2) years ago, the City changed to a three (3) stream system, (Garbage, Recycling, and Organics).

7.2.1.3. Three - Stream Waste Collection (Traditional "Blue Box" Model)

The traditional method of waste collection has been based on a three-stream waste collection model. This system of collection provides curbside and/or depot services for garbage, recycling and organics (usually leaf and yard waste only). Each stream is collected separately and transferred to their respective facility for processing.

The advantage of a three-stream system is that it places a greater level of responsibility on residents to separate their recyclable material; this results in reduced processing costs. The lower processing costs and higher diversion rates associated with three-stream waste collection have resulted in it being the most commonly implemented collection system in Ontario. However, the disadvantage is that if residents refuse to participate in the program, the materials will most likely be landfilled.

There are a number of ways of encouraging participation in a three-stream waste collection system which are discussed in *Section 7.1, Waste Prevention.*

7.2.2. Waste Collection Alternatives

When considering the collection of household wastes there are three (3) options available for multiple waste stream collection:

7.2.2.1. Separate Collection

Separate collection dedicates one vehicle to the collection of each waste stream as follows:

- Separate Collection
- Co-collection
- Depot Collection

In separate collection, the same vehicle may be used to collect different waste streams (e.g. a collection vehicle may collect regular waste on its first pass and on the second pass collect leaf/yard waste). Alternatively, the garbage collection vehicle may collect only garbage on specified days and leaf/yard waste on other days.

Traditionally, curbside collection in the City has been based on a manual system; where a collection vehicle is dedicated only to the curbside collection of garbage. A multi-stream waste collection system would require separate collection for each waste stream, including:

- Regular waste, including all bulk items which fit in a garbage truck;
- Recyclables;
- Leaf/Yard Waste; and
- Bulk items, which do not fit in a garbage truck.

Separate collection is advantageous if an area is primarily urban in nature, such as the urban areas of Haileybury and New Liskeard. However, in more sparsely populated areas, such as the rural areas of Dymond and Haileybury, this method of collection may be more costly.

7.2.2.2. Co-Collection

Co-collection dedicates one vehicle to the simultaneous collection of two or more waste streams, such as:

- Truck 1 - Garbage Stream and Leaf/Yard Waste Stream
- Truck 2 - Recycling Stream

A recent trend in the curbside collection of municipal waste is to collect more than one stream of waste within a single collection vehicle. Co-collection is a relatively new technology available to municipalities and has become an increasing popular method of waste collection, especially when considering adding an additional stream of waste to be collected at the curb, such as leaf and yard waste. However, some municipalities, especially those with large rural areas, have used co-collection in the form of a traditional garbage truck and a pull-behind recycling collection trailer.

This new and emerging technology for collection has been shown as a viable alternative in reducing costs and increasing program efficiencies, and ultimately achieving greater waste diversion rates.

Implementing a co-collection system requires a vehicle specially designed to collect two or more waste streams simultaneously, while preventing the contamination or mixing of the waste. Co-collection has worked very well, especially where setouts (material at the curb) are at a greater distance from each other.

The implementation of a co-collection based waste management system has significant impacts on more than just the trucks required to collect the material. Co-collection based systems can have different route requirements. If used in the rural area, the routes can be longer with fewer stops due to a greater range needed to be covered.

In most cases, switching to a co-collection based system, requires a significant level of effort in terms of redesigning routes and the collection schedules; as well as, contracting/purchasing of a new fleet of specially designed split compartment collection vehicles.

7.2.2.3. Depot Collection

A third option for collecting waste is to use a waste drop-off depot. Waste depots can be situated in a number of locations around the City, including at the existing waste management facilities or at the rural recycling centers. These types of drop-off depots have been found to be an effective alternative to curbside collection in areas with low population densities.

In order for drop-off depots to work effectively, they must be staffed by a waste management official. Un-staffed depots are typically prone to littering, the improper use of containers, and can be difficult to manage/control in a system with bag limits and user-pay initiatives.

7.2.3. Spring Clean-Up Program and Bulky Item Collection

The City currently provides a Bulky Item collection program as part of the Spring Clean-up Program service which is expected to be maintained at the current level.

The existing bulk item collection program collects items, such as, white goods, sofa's, mattresses, to name a few which are collected at the curb. In an attempt to reduce the cost of Spring Clean-up Program

and to promote recycling, the City implemented the following additional Spring Clean-up Program policies:

- No recyclables or OCC are allowed;
- No tires;
- Maximum total volume per household is three (3) cubic meters;
- Appliances which have contained freon, must be tagged by a licensed refrigeration contractor or they will not be accepted;
- Tipping fees for regular waste are waived at the landfill during the Spring Clean-up Program;
- Solid waste must be placed at curbside in front of the property;
- There is no collection from back lanes;
- Residents must assist by placing waste in separate piles (i.e., brush, wood, metal, garbage, etc.);
- Residents may dispose of excess waste over and above the allowable maximum permitted directly at either of the landfills and the tipping fees for regular waste shall be waived during the Spring Clean-up Program;
- Residents must assist by bagging or bundling all material as appropriate; and
- Residents must place the material at curbside the night before the collection day as clean-up operations will not return a second time to pick-up material that has been placed at curbside after the collection vehicles have gone passed.

Options with respect to bulk item collection include:

- Option 1 - maintain current program (Spring Clean-up Program)
- Option 2 - elimination of all bulk item collection
- Option 3 - provision of year-round bulk item collection

In 2005, the programs cost was approximately 30% of the City's annual solid waste collection budget. In 2006, the program cost was reduced to 20% of the City's annual solid waste collection budget.

The current program is effective and efficient and the City will continue to monitor the program for process improvements and will implement modifications as required.

7.2.4. Christmas Tree Collection

The City currently collects Christmas trees that are set out at the curb for collection. However, two (2) concepts have been considered for future collection of Christmas trees:

- Option 1: This option would require the City to staff a central drop-off location to ensure that residents were not illegally dumping regular waste with their Christmas tree. It would also require that the City have waste collection vehicles available to transport the trees to the appropriate locations at the landfill sites.
- Option 2: This option relies on residents to actively participate in the proper disposal of their used Christmas Trees. Trees would be delivered by residents to the active landfill site or designated locations for proper disposal. This system could end up costing the municipality more if trees are dumped illegally and the City has to collect them.
- Option 3: This option maintains the current collection program whereby the City provides a tree collection service after Christmas. This program requires significant staff time, but appears acceptable to the community.

The City should consider implementing Option 2 on a trial basis to determine the programs effectiveness at reducing the cost of tree collection. The City may reassess the effectiveness of this new program in the future.

7.2.5. Composting

In an attempt to increase the diversion of organic waste from being deposited in the landfill sites, the City is looking at new methods of encourage composting within the community. One method is through the purchase and use of individual residential compost bins that are available at the Public Works Operations Complex at a current subsidized cost of approximately $15.00.

To further assist residents in understanding what organic materials are considered compostable the City developed the following definition: "anything which can be composted in a backyard compost bin, such as, yard and garden waste (i.e., leaves, grass clippings, and branches that are less than three (3) inches in diameter and can be chipped) and kitchen scraps which do not contain dairy or meat products."

These materials are also accepted at the City's landfill sites. Currently, there are no approved composting areas at the landfill sites, yet each landfill site contains an area for the dumping of organic materials. Residents are permitted to dump their organic waste with no applicable tipping fee. However, if the landfill operator notices that the organics are mixed with regular waste, the landfill operator is permitted to charge the applicable tipping fee.

Occasionally this stockpiled material is utilized as cover material when warranted. If the City chooses to implement a composting program at either of their local landfill sites, the existing Certificate of Approval will have to be amended and the program enhanced significantly to comply with regulatory standards. Due to limited volumes and weather conditions a composting program is not recommended.

Municipal Composting Programs

Municipal composting programs in Ontario vary from municipality to municipality with some municipalities operating simple drop-off depots for leaf/yard wastes while others provide seasonal collection of leaf/yard waste (e.g. Sudbury, Sault Ste. Marie). The following table summarizes municipal composting programs of selected communities in Ontario.

Table 11: Comparison of Municipal Composting Programs

Municipality	Materials Composted	Collection Method	Composting Method	Diversion Tonnages (tonnes/year)	2001 Operating Costs
Sudbury	Leaf/yard waste	Spring/fall curbside collection plus depot collection	Windrow	466 - curbside 1,144 - depot	$450/tonne - collection $40/tonnecomposting
Sault Ste. Marie	Leaf/yard waste	Fall curbside collection plus depot collection	Windrow	1,500	TBD
North Bay	Leaf/yard waste	Depot	Windrow	700	$36/tonne to collect, process and compost
District Municipality of Muskoka	Leaf/yard waste	Spring/fall curbside collection in urban areas only	Windrow	12	NA
Pembroke	Kitchen wastes Leaf/yard wastes	Bi-weekly collection of kitchen wastes Special (seasonal) collection of yard wastes	In-vessel Windrow	NA NA	NA

7.2.6. *Construction and Demolition Material*

In an attempt to extend the service life of the City's landfills, the City will need to be more assertive at determining what materials may be disposed of from construction and demolition (C&D) projects. The City is aware that many C&D projects in the City have not recycled their materials, which end up being placed in the landfill sites. This uses up valuable landfill volume and shortens an already meek service capacity.

C&D waste includes materials that are generated from the construction and demolition of residential, commercial, industrial and institutional facilities. It can also include C&D waste generated from the remodeling of landscapes, roads and site cleaning.

To extend the life of the City's landfills, the City needs to strongly consider policy development for the disposal of C & D materials. Some methods already used in other municipalities are to salvage, reuse and/or recycle the C&D materials, where the materials can include: lumber, drywall, metal, masonry (brick, concrete, etc.), carpet, plastics, pipe, rock, dirt, paper, cardboard, or green waste.

On the Ministry of the Environments website, it is stated that based on the 2004 Statistics Canada survey the ICI sector in Ontario diverted approximately 18% of non-residential waste from landfill compared to about 30% from residential waste. The end result is that additional diversion from the ICI sector is needed to extend the service life of the City's landfill sites.

The Province provides resources to help municipalities better manage C&D projects (Appendix C):

- Ontario Regulation 102/94 requires that construction companies conduct waste audits, and develop and implement a waste reduction work plan for their project.
- Ontario Regulation 103/94 requires the separation of specific waste materials at the source, site of the project.

To further assist municipalities with managing the construction industry with the disposal of waste, the Ministry of the Environment developed guidance documents. The two (2) documents are:

- Guide to Waste Audits and Reduction Work Plans for Construction and Demolition Projects (as required by O.Reg. 102/94); and
- Guide to Source Separation of Recyclable Materials for Industrial, Commercial and Institutional Sectors, and Multi-Unit Residential Buildings (as required under O.Reg. 103/94).

There is also a guidance document and Fact Sheet developed specifically for the industrial, commercial and institutional sectors - *A Guide to Waste Audits and Reduction Workplans for Industrial, Commercial and Institutional Sectors.*

Contractors are required, by the MOE, to complete a waste audit form as part of the C&D project. The City is able to create their own waste audit form however the form must follow the same format as the MOEs form and contain the same requested information.

As noted on the MOEs website the Regulations apply to C&D projects consisting of one or more buildings with a floor area of at least 2,000 square metres, where *buildings* are residential or ICI sector. Compliance with the Regulations is the responsibility of the person who undertakes the C&D project, not the City. Additional information and resources about the recycling of C&D materials can be located on the MOE website under publications.

If not already implemented, it is **recommended that the City develop policies and/or guidelines with the objective of increasing recycling efforts related to Construction and Demolition Projects to coincide with the building permit application process**. By requiring contractors to fill out a waste audit form for their projects over 2,000 square metres, the contractors are then accountable for the waste being generated and its subsequent disposal. It should be noted that home renovation projects that leave the building intact are not subject to the Regulation

7.2.7. Recycling Requirements and Potential Expansion

Regulatory Requirements

Ontario Regulation 101/94 outlines municipal responsibilities with respect to blue box recycling systems in Ontario. These requirements pertain to collection methods/frequency, materials being recycled, promotion and reporting.

Regulation 101/94 requires that Northern Ontario municipalities with a population in excess of 15,000 establish, operate and maintain a blue box recycling system which services all **residential buildings** which receive municipal waste collection. The frequency of blue box collection must be at least half the frequency of municipal waste collection. Northern Ontario municipalities which have a population between 5,000 and 15,000 (Temiskaming Shores) must provide their residents with a blue box recycling service, but the collection frequency does not have to be half the frequency of waste collection. Instead, Regulation 101/94 requires that Northern Ontario municipalities with populations between 5,000 and 15,000 provide for the collection or acceptance of blue box waste in a manner that is "reasonably convenient" to the residents of the community. Regulation 101/94 does not define what is meant by "reasonably convenient" and as a result, the City of Temiskaming Shores, with a 2006 population of 10,732, may choose to provide a curb side collection service or it may choose to continue to provide a depot style collection. It should be noted that Council for the City of Temiskaming Shores is focused on increasing its diversion rate and would like to enhance the recycling program to a curbside program.

Regulation 101/94 requires municipalities that operate blue box recycling systems to include the following materials in their recycling programs:

- aluminum cans
- glass bottles/jars
- newsprint
- #1 PETE plastic
- steel (tin) cans
- In addition, it also requires municipal blue box recycling programs to include at least two (2) of the following seven (7) items:
- aluminum foil
- boxboard
- cardboard
- expanded polystyrene food and beverage containers
- fine papers
- magazines
- paper cups/plates

The City's recycling program complies with Regulation 101/94 in terms of materials which must be recycled, as listed: *1) Paper Products - newspaper, magazines, computer paper, pamphlets, flyers, envelopes, and writing paper; 2) Cardboard/Boxboard - cereal boxes, old corrugated cardboard, tissue boxes, soap boxes, and shoe boxes; 3) Aluminum/Steel Cans; 4) Glass Jars and Bottles; and 5) Plastic Containers (PET).*

Regulation 101/94 also requires that municipalities provide users of blue box recycling systems with information on the performance of the system and encourage the public to participate in its use. Finally, Regulation 101/94 requires that municipalities which operate a blue box recycling system submit an annual report on the system's performance to the MOE on or before June 1 of each year.

Recycling Program

In 2004, the City diverted 7% or 1,996 m^3 of its solid waste from the landfill sites to the Material Recovery Facility (MRF). In 2006, the City increased the amount of solid waste diverted from the landfill sites by approximately 3%, for a total diversion rate of 10% diversion or 2,045 m^3. It should be noted that the identified diversion rates can be misleading as the total waste volumes collected at the landfill in any one year would be significantly higher based on the level of construction and demolition activity. The limited space at the Cochrane-Temiskaming Waste Management Board's MRF and at the City's recycling

depots (bins) limits the type and volume of recyclable materials that can be accepted. Table 12 illustrates the volumes of recyclable materials received at each of the City's deports.

Table 12: The Volume of Non-Compacted Recyclable Materials Collected at Each Depot.

	Dymond	Haileybury	New Liskeard
2004	1,719 m^3	3,077 m^3	4,259 m^3
2005	1,813 m^3	3,151 m^3	4,295 m^3
2006	1,904 m^3	3,005 m^3	4,370 m^3

To further increase the recycling rates, the City could implement a penalty based system. The penalty based system would work best if accompanied by the expansion of the number of materials included in the recycling program and supported by an overall ban on the disposal of recyclables at the landfill site(s).

To increase the number and volume of recyclable materials that the City could accept, the MRF would need to be enlarged, relocated or an alternative MRF identified. The current list of materials would also need to be expanded to include all paper fibers (including soft/hard cover books), empty paint/coating cans, aluminum foil/trays, No. 2 (HDPE) plastics and coated beverage containers (i.e. juice boxes, 1 and 2 L milk/juice cartons).

It has been observed that a large volume of No. 2 plastics are being included in the recycling stream because residents are not separating them out. Therefore, there is a strong push to include the No.2 plastics into the collection program. The addition of No. 2 plastic (HDPE) along with No. 1 plastic PET (polyethylene terephthalate) would allow the City to potentially divert up to 80% of all plastics from the municipal waste stream. Once incorporated, these materials should be banned from landfill disposal. However, the lack of storage space at the MRF and recycling depots limits the implementation of these additional materials at this time. In 2007 the City increased/upgraded container volumes at the depots (bins) as follows:

Haileybury and Dymond			New Liskeard		
Material	Previous	Upgrade	Material	Previous	Upgrade
Fiber	6 yd^3	12 yd^3	Fiber	12 yd^3	18 yd^3
Cans	4 yd^3	4 yd^3	Cans	4 yd^3	4 yd^3
No. 1 Plastic	2 yd^3	6 yd^3	No. 1 Plastic	2 yd^3	6 yd^3
Glass	2 yd^3	2 yd^3	Glass	2 yd^3	2 yd^3

The Public Works Operations Division has been able to increase its level of service at the depots by purchasing one (1) used recycling unit from the Cochrane-Temiskaming Waste Management Board that was recently replaced. Capacity increases at the depots should be sufficient to permit the City to implement a two (2) bag residential limit.

In order to enhance the recycling program from a depot system to a curbside collection program and due to the limitations of the existing MRF as described herein efforts are being focused on identifying a hybrid collection program (i.e. curbside-urban / depot - rural) as well as an expanded or alternative MRF. Until a suitable MRF and collection program are identified the City is limited to existing programs..

7.2.8. Municipal Hazardous or Special Waste (MHSW) Management Options

According to data provided by municipalities in Ontario in the 2005 Waste Diversion Ontario data call, fifty-two (52) municipalities operated a total of ninety-eight (98) Municipal Hazardous or Special Waste permanent depots, operating from one day per year to year round service. On average, depots operated 120 days per year.

Appendix 3 of the MHSW Program Plan (May 23, 2007) identified that many of these 52 municipalities, as well as 34 other municipalities, also provided mobile MHSW collection events to service their jurisdictions. A total of 270 event days were provided across Ontario in 2005.

In 2005, depots and events served approximately 11.4 million residents, for a total of 430,000 visits.

Currently, the options available to manage MHSW include the following:

- Reduction: Manufacturers to reformulate their products, provision of alternatives, etc.
- Reuse: Refillable, rechargeable, on-site reuse filtration systems, etc.
- Recycling: Remanufacture into recycled product
- Disposal: Collection through Municipal or private collection programs

The WDO Waste Diversion Program lays the groundwork for the producers of household hazardous and special wastes to develop and fund a diversion program for specific materials to assist with the reduction, reuse, recycling and disposal.

Currently, 86 municipalities collect MHSW through some form of organized collection program such as the following:

- Permanent depot open from one day per year to year round service;

- Mobile collection events from one (1) day per year up to 43 events moving throughout the municipality; and
- Permanent depot in addition to mobile collection events in the municipality.

Management of MHSW in Temiskaming

There is currently no formal hazardous waste "collection" program in place; however, the City does have several hazardous waste management protocols as follows:

- During the annual Spring Clean-up Program, old paint, varathane, and similar materials can be put out at the curbside and are collected in a separate vehicle. This waste is set aside at the landfill, opened, and once dried out placed in the landfill.
- There are locations at the landfill for setting aside used paint, varathane, varnish, old propane tanks, and batteries. The used paint, varathane, and varnish, etc. is managed as indicated above. The old propane tanks have the valves removed and are placed in the white goods piles and managed as indicated below in Section 3.0. The batteries are set aside at the landfills and are then sold to a battery recycler when quantities are sufficient.
- There is a 250-gallon tank at each landfill for the disposal of used motor oil by residents (non-commercial). Once the tanks are full, the oil is disposed of through a licensed disposal contractor.

For a City with a population of approximately 10,000, annual household hazardous waste quantities are estimated at approximately 75 to 100 tonnes (approximately 1% of the municipal waste stream). Based on the potential volume of MHSW that could be collected within the City of Temiskaming Shores and allowing for the geographic layout of the constituents, it is **recommended that mobile collection events be held to formally collect the MHSW.**

The City would require a Certificate of Approval for a Waste Management System in order to operate the mobile collection system. Alternatively, amendments could be made to the existing Certificates of Approval for the two (2) landfills and the events could be held at those locations.

It is estimated that the cost of a one day depot to collect approximately 100 tonnes of MHSW is estimated at $20,000 to $25,000 based on a $200 per tonne disposal charge and a $5,000 mobilization charge.

Potential Funding

The question about funding MHSW collection programs has been asked of Waste Diversion Ontario (WDO) during the workshops held during the development of a waste diversion program for Municipal Hazardous or Special Waste. Currently, no funding is available from the MOE. Municipalities asked if funding would be provided by the new program in the case of MHSW mobile collection programs,

including the costs to deliver collected materials from mobile collection sites to a central transfer facility (including a Transportation of Dangerous Goods (TDG) certified driver, truck and fuel). The WDO stated that municipalities will be responsible for the cost of collection activities for the full range of MHSW managed through municipal programs, however, post-collection costs may be subject to negotiation. It is **recommended that the activities of the WDO continue to be followed in order to secure potential funding should it become available**.

7.3. Waste Disposal

Recovering energy from thermal treatment or landfill (e.g., methane capture) should be considered prior to thermal treatment or landfill without energy recovery.

The City's New Liskeard landfill site has less than two (2) years of capacity remaining (Table 8), while the Haileybury landfill has just over fifteen (15) years of remaining capacity (Tables 9 and 10). The establishment of a future landfill, or the expansion of an existing site, will require the City to:

- Obtain all necessary provincial approvals; and
- Designate suitable properties as part of its Official Plan and Zoning by-law, which may serve as a host for a future landfill.

A summary of provincial approval requirements and recommended guidelines for incorporation in the City's Official Plan and Zoning By-law are presented below.

7.3.1. Provincial Approval Requirements

The establishment of a new or expansion of an existing landfill generally requires approval under the Environmental Assessment Act (EAA), Environmental Protection Act (EPA) and Ontario Water Resources Act (OWRA). Descriptions of the EAA, EPA and OWRA processes are as follows.

7.3.2. Environmental Assessment Act

Approval under the *Environmental Assessment Act* (EAA) is the first step in the landfill approval process. In pursing EAA approval, proponents are required to examine the proposed landfill's impact on the natural, social and economic environment. In addition, proponents are required to examine alternative solutions to their waste disposal needs and alternative ways of implementing their preferred solution.

The EAA process generally requires 2 - 3 years to complete from the time the process starts until final EAA approval is received. The cost of an EAA approval process will vary based on the project terms of reference but generally ranges between $150,000 to $250,000.

At a minimum, the following tasks must be completed to obtain EAA approval:

- Preparation of project Terms of Reference (ToR) for public review and acceptance by the MOE;

- Development of a problem/opportunity statement;
- Identification and evaluation of various waste management system options available to the City;
- Selection of the preferred waste management system;
- Development of a long list of waste disposal sites;
- Evaluation of the long list of waste disposal sites and development of a short list of sites which may or may not include the existing sites;
- Detailed evaluation of the short list of waste disposal sites and select a preferred long term waste disposal site;
- Preparation of an EAA document and submission to the MOE for review; and
- Participation in an EAA hearing (if necessary).

7.3.3. Environmental Protection Act

The second step in the landfill approval process involves obtaining a C of A under Part V of the *Environmental Protection Act* (EPA) and regulations made there under. The basic legislative framework for waste management is defined in Part V of the Act. The regulatory requirements for the design and operation of existing waste disposal sites are included in O. Reg. 347/90. For new or expanding landfills, O. Reg. 347/90 is superseded by O. Reg. 232/98.

Section 27 of the Act requires that a C of A be obtained from the Ministry of Environment to establish, operate, alter or enlarge a landfill site. A detailed assessment of the site must be carried out to identify any potential effects on the environment and how these effects can be mitigated to the satisfaction of the MOE before an approval for a new or expanding landfill site will be issued. The basis for the assessment and the requirements for site design/operation are provided in O. Reg. 232/98.

The C of A process takes the landfill standards established in O. Reg. 347/90 and O. Reg. 232/98 and refines them as necessary to reflect the local conditions at the subject landfill site. The resulting C of A will define site size, the types of waste to be accepted, and the design and operating conditions. The C of A will also describe closure and post-closure care requirements.

Part V of the Act also specifies when a mandatory or discretionary hearing may be held pertaining to a landfill Certificate of Approval application. Section 30 of the Act stipulates that a hearing is mandatory for applications pertaining to new or expanded landfills serving 1,500 people or more people. As a result of Section 30 requirements, any future Temiskaming Shores landfill (new or expanded) will require a public hearing before the MOE will issue a site C of A.

As with the EAA process, the EPA approval process generally requires 2 - 3 years to complete from the time the process is initiated until a site C of A is issued. At a minimum, the EPA process will require the submission of a Site Design and Operations Plan and a Site Hydrogeological Study to support a C of A application. Additional reports which the MOE may request in support of the application include: visual impact assessment; traffic assessment; air impact assessment; natural environment assessment; and archaeological assessments. The cost of the EPA process ranges from $150,000 to $500,000 and is generally related to the number of studies which must be submitted to the MOE.

7.3.4. Ontario Water Resources Act

The third step in the landfill approval process involves obtaining *Ontario Water Resources Act* (OWRA) approval for any on-site leachate treatment/collection system and stormwater management systems.

The OWRA approval will generally require 6 months from the submission of the application until final approval has been received. The cost of an OWRA approval application is approximately $10,000 in addition to the cost associated with any design drawings (Table 13).

Table 13: Landfill Approval Requirements - Estimate Time and Costs

Legislation	Estimated Time to Obtain Approval	Estimated Cost
Environmental Assessment Act (EAA)	2 - 3 years	$150,000 - $250,000
Environmental Protection Act (EPA)	2 - 3 years	$150,000 - $500,000
Ontario Water Resources Act (OWRA)	6 months	$10,000 +

7.3.5. Official Plan and Zoning Requirements

The City's Official Plan and Zoning By-law should undergo a review to ensure that current and future landfills are designated appropriately. The following guidelines are recommended for consideration in amending the City's Official Plan and/or Zoning By-law with respect to landfill properties:

- Landfill sites should be designated as industrial or rural, and should be zoned accordingly;
- Landfills must contain at least a 1 m thick clayey silt layer having a hydraulic conductivity of 1 x 10-7 m/s. This material is required by O. Reg. 232/98 and will function as a site attenuation layer (Note: If such material is not naturally present on the chosen site it will have to be imported prior to a landfill receiving MOE approval to operate);
- Large enough to accommodate a 2.0 ha fill area (minimum);
- Large enough to accommodate a 500 m perimeter buffer area around the waste fill area;
- At least 2 km from the urban settlement areas of the City;

- Accessible by a year round municipally maintained road;
- At least 1 km from recreational properties;
- At least 500 m from major streams and lakes; and
- Compliance with Provincial Policy Statement (2005) prepared under Section 3 of the Planning Act. Section 1.6.8 "Waste Management" of the Policy Statement deals specifically with municipal obligations pertaining to waste management and requires that waste management systems be provided that are of an appropriate size and type to accommodate present and future requirements and facilitate, encourage and promote waste reduction, reuse and recycling objectives. Section 1.6.8 also requires that waste management systems be located and designed in accordance with Provincial legislation and standards.

7.3.6. Landfill Costs/Value - Future Site

The estimated costs of constructing a new landfill, in accordance with O. Reg. 232/98, are summarized in Table 14 for both single liner and double liner landfills.

Table 14: Landfill Cost and Unit Value

Scenario	Approved Volume (m^3)	Construction Cost	Approval Cost[1]	Total Cost	Unit Cost ($/$m^3$ of air space)	Unit Cost[2] ($/tonne capacity)
Single Liner	532,362	$7,350,000	$400,000	$7,750,000	$14.55	$36.39
Double Liner	532,362	$4,350,000	$400,000	$4,750,000	$8.92	$22.31

Notes:

1) Approval cost assumed to be $400,000.

2) Assumes a waste to cover soil ratio of 4:1 and an in-place waste density of 0.5 tonnes/m^3.

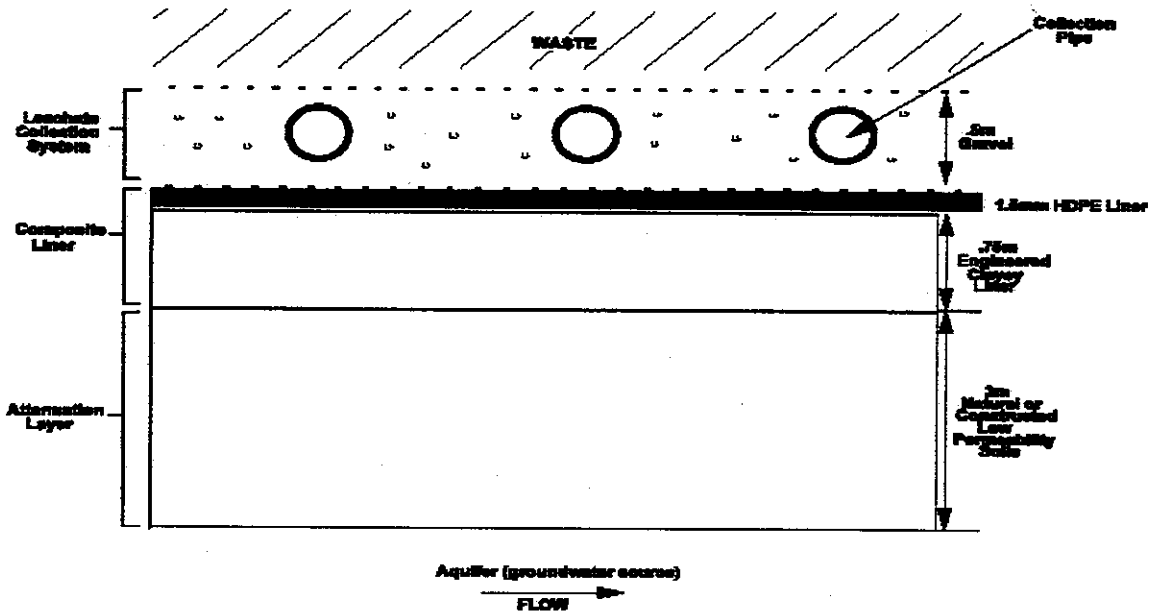
3) Costs do not include land acquisition costs.

The estimated construction costs for both scenarios assume that an attenuation layer (i.e. 3 m of silty clay for a single liner scenario, 1 m of silty clay for a double liner scenario), as required by O. Reg. 232/98, will be present on the selected site and will not have to be constructed. If not present on the selected site, the attenuation layer is estimated to add the following construction costs to the single and double liner scenarios:

1. Single Liner

Cost of a 3m attenuation layer =	Area of waste footprint	x	Allowance for side slopes	x	Thickness of attenuation layer	x	Density of clay/silt	x	Unit price of clay/silt
=	553,000m^2	x	1.1	x	3.0m	x	2.3 tonnes/m^3	x	$12/tonne
=	approx. $4.8 Million								

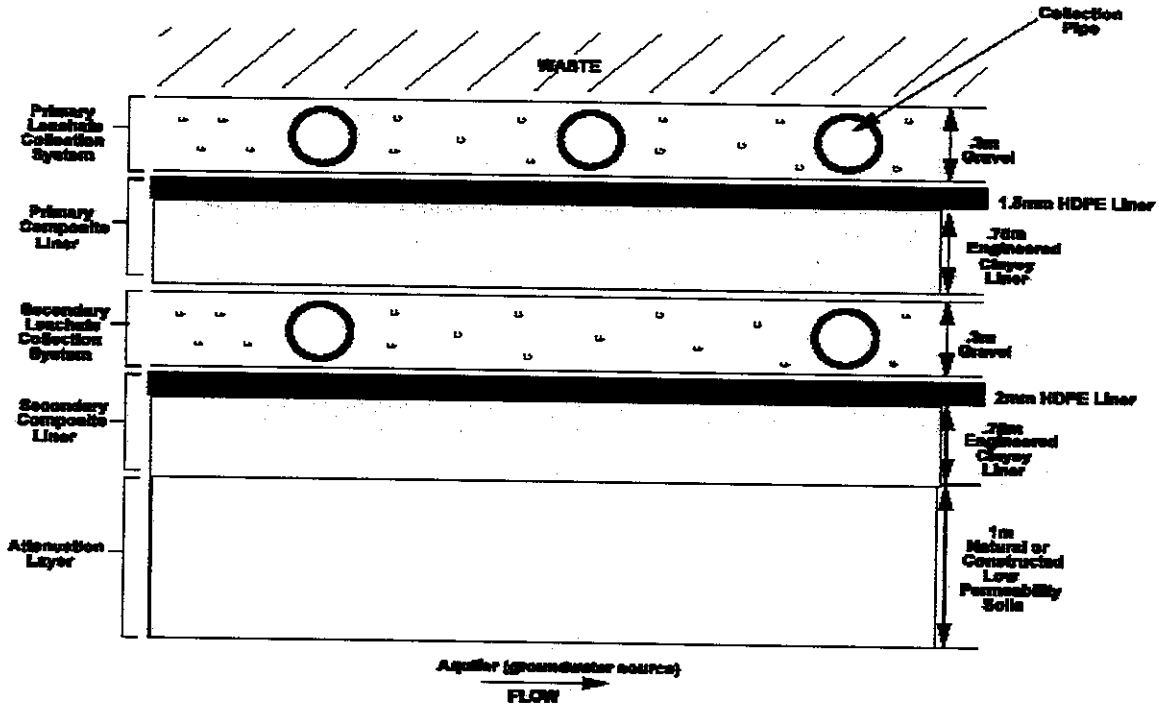
This generic design consists of the following components: a single composite liner consisting of a 1.5 millimetre (60 mil) thick high density polyethylene (HDPE) geomembrane liner, over a 0.75 metre thick compacted clayey liner; with a natural, or constructed, 3 metre thick attenuation layer below the single composite liner; and a leachate collection system above the composite liner, provided the infiltration rate through the landfill cover is greater than or equal to 0.15 metres per year.



2. Double Liner

Cost of a 1m attenuation layer =	Area of waste footprint	x	Allowance for side slopes	x	Thickness of attenuation layer	x	Density of clay/silt	x	Unit price of clay/silt
	= 18,000 m^2	x	1.1	x	1 m	x	2.3 tonnes/m^3	x	$12/tonne
	= approx. $550,000								

This generic design consists of the following components: two (2) composite liners with a primary (upper) liner consisting of a 1.5 millimetre (60 mil) thick high density polyethylene (HDPE) geomembrane liner over a 0.75 metre thick compacted clayey liner; and a secondary (lower) liner consisting of a 2 millimetre (80 mil) thick high density polyethylene (HDPE) geomembrane liner over a 0.75 metre thick compacted clayey liner; a natural, or constructed, 1 metre thick attenuation layer below the lower composite liner; and two (2) leachate collection systems with the first located above the upper composite liner, and the second located between the upper and lower composite liners, provided the infiltration rate through the landfill cover is greater than or equal to 0.15 metres per year.


Collection Pipe
WASTE
Primary Leachate Collection System
.3m Gravel
Primary Composite Liner
1.5mm HDPE Liner
.75m Engineered Clayey Liner
Secondary Leachate Collection System
.3m Gravel
Secondary Composite Liner
2mm HDPE Liner
.75m Engineered Clayey Liner
Attenuation Layer
1m Natural or Constructed Low Permeability Soils
Aquifer (groundwater source)
FLOW

8.0 STRATEGIC PLANNING

Waste management planning is most effective when integrated, on an ongoing basis, with other municipal planning decisions, including but not limited to, development, infrastructure, and financial planning. Waste management should be integrated with, or become an element of, other broad municipal planning activities, such as economic development, growth, environmental or sustainability plans.

The operation of each landfill, the tipping fee structure, the recovery of operating expenses, the management of off-site effects, and the service life of each landfill were reviewed and recommendations have been made as part of the SWMMP.

8.1. Planned Waste Management System: Uniform Collection

One of the objectives of this Master Plan is to develop strategies for ensuring the uniform collection of solid waste throughout the City. In preparing a new *uniform* solid waste by-law for the City, the by-law should address the following items shown in Table 15:

Table 15: Advantages/Disadvantages of a Uniform Collection Program

	Advantages	Disadvantages
Bag Limit	▪ Limiting the number of bags will help reduce the volume of waste being sent to the landfill sites, and prolong the life of each site.	▪ Limiting the number of bags residents can place at the curb without increasing the number of recyclable materials can result in increased illegal dumping.
Bag Tag Cost	▪ The cost for a bag tag should be reasonable for those individuals wishing to dispose of more waste than is allowed by the City. A cost of $2 per bag may assist with the diversion rate.	▪ Too high of a bag tag cost may deter residents from purchasing the tags and may result in the illegal dumping of waste greater than the bag limit permitted by the City.
IC&I collection frequency	▪ Most municipalities in Ontario do not provide a collection service to the IC&I sector; that sector is required to establish contracts for the collection of regular waste and recyclable materials. ▪ Banning the collection of IC&I waste may prove to be a cost savings to the municipality.	▪ Requiring the IC&I sector to make their own arrangements for the disposal of commercial waste may cause many businesses some difficulty if there are not already established commercial waste haulers.
Standardized Waste Containers	▪ Standardizing waste containers would allow the City to ensure that each multi-residential building and commercial facility is disposing of the same volume of waste.	▪ Though standardizing the waste containers will result in the monitoring of waste volumes, the exact number of bins that an industry may need will require additional investigation.
Banned Materials	▪ Banned materials should be consistent throughout the City. In preparing the new by-law, the City should address those areas of inconsistency that are most apparent.	▪ Without providing a facility to accept the banned materials, the program could result in illegal dumping of banned materials.

One of the first strategies in developing a uniform collection service was the need to provide constant service with regard to OCC collection. As discussed throughout this report, the collection of OCCs varies greatly throughout the former municipalities, as well as the commercial areas of New Liskeard and Haileybury.

With Council requesting that this matter be resolved in advance of the finalization of the Solid Waste Management Master Plan, City staff prepared two (2) Administrative Reports addressing this deficiency in collection fairness. The two (2) reports are, PW-054-2007 OCC Downtown Core and PW-054-01-2007 OCC City Wide Collection. Copies of the reports are included in Appendix G of this report.

8.2. Cost and Financial Strategy

8.2.1. *Collection Program Costs*

Funding Options

Historically, municipalities have funded their waste management programs via their general tax levy. In the early 1990's many municipalities moved to fund part or all of their waste management programs through the application of tipping fees at the landfill gate. More recently, some municipalities have begun to impose per bag charges for every bag of garbage above a certain limit collected at the curbside. In addition, some municipalities have implemented an annual fee as a means of funding waste management programs.

The simplest way to fund waste management programs while simultaneously making taxpayers aware of their costs is to remove waste management costs from the general levy and recover costs through an annual waste management fee. The annual fee is easily implemented, covers a defined level of service and would provide the City with an opportunity to recover all waste management costs without raising taxes.

For discussion purposes, additional municipal solid waste collection program financial summaries are included in this section; Table 16 and Table 17 illustrate the advantages and disadvantages of various funding strategies available to the City.

Table 16: Solid Waste Management Funding Options

Option	Description	Advantages	Disadvantages
General Tax Levy	Waste management programs are funded through the general tax levy.	1. Easily implemented.	1. The amount paid by the tax payer is not related to the amount of waste generate. 2. Does not encourage waste reduction or recycling. 3. Waste management programs must compete with other municipal programs for a share of the municipal tax dollar.
Tipping Fees	Tipping fees are assessed against some or all waste delivered to the municipal landfill site. Tipping fees may be assed by weight, vehicle size or by the bag/container. Some municipalities charge tipping fees against all landfill users while others provide a residential or small quantity exemption.	1. Waste generators fund waste management costs based on the amount of waste they generate. 2. Encourages waste reduction and recycling,	1. Requires the municipality to establish a separate billing system. 2. Encourages illegal dumping.
Annual Waste Management Fee	A flat fee is charged to all residents/businesses that receive municipal curbside garbage collection. The fee covers a defined service (e.g. x number of bags per week, x number of bin lifts per month). When implemented the flat fee system is used to cover the cost of all garbage collection services and may also be used to cover other waste management costs (i.e. recycling, landfill)	1. Easily implemented. 2. All residents pay the same rate for the same level of service.	1. Depending on the service level provided (i.e. of bags per week, etc.) it may not encourage waste reduction and recycling or it may encourage illegal dumping. 2. Does not allow for residents or businesses that require additional services. 3. Will only work if enforced at the curb.
Bag Tags	A per bag fee is assessed for the collection of some or all waste placed at the curb for pick-up. The fee may be used to cover collection costs only or collection costs plus other waste management costs. Per bag fees generally range from $0.50 to $1.50 per bag.	1. Ensures that the waste generator pays the cost of waste management. 2. Encourages waste reduction and recycling.	1. Requires a separate administration system. 2. May encourage illegal dumping. 3. Will only work if enforced at the curb.

Table 17: Comparison of Municipal Waste Management Funding Methods

Municipality	Tax Levy	Tipping Fees	Annual Fee	Bag Tags	Misc.
Elliot Lake	100% of waste management costs are funded through the general levy.	NA	NA	NA	NA
Sudbury	Tax levy funds 74% of waste management costs.	Tipping fees applied against the ICI sector only (residential exemption applies). Tipping fees are set at $72/tonne for waste and $44/tonne for contaminated soils. Tipping fees fund approximately 20% of waste management costs.	NA	NA	Approximately 6% of waste management costs are funded through the sale of recyclables and composters. The City has implemented a three (3) bag limit to reduce waste collection costs and promote recycling.
Sault Ste. Marie	Tax levy is used to fund part of waste management costs.	Tipping fees are charged against all landfill users at a rate of $27.50/tonne for loads over 500 kg and $2/load for loads less than 500 kg.	NA	NA	NA

North Bay	Tax levy is used to fund part of waste management costs.	Tipping fees are assessed against landfill users as follows:
		• Private vehicles
		  • ≤ 6 bags - $5
		  • > 6 bags - $20
		• untagged refrigerators -$25
		• Commercial vehicles
		  • waste - $39/tonne
		  • contaminated soil - $20/tonne
		  • biomedical waste- $39/tonne + $100
		• tires
		  • ≤ 16" - $2/tire + vehicle fee
		  • > 16" - $5/tire + vehicle fee
		  • > 22" - $156 /tonne
			NA	NA	NA

Table 17: Comparison of Municipal Waste Management Funding Methods - cont'd

Municipality	Tax Levy	Tipping Fees	Annual Fee	Bag Tags	Misc.
District Municipality of Muskoka	Tax levy is used to fund part of waste management costs	Tipping fees are used to fund part of waste management costs. Residential • ≤ 3 bags - $0 • > 3 bags - $1/ bag Commercial • $60 - 90/tonne, or • $15 - $45/1/2 tonne truck Bulk Items • $90/tonne, or • $5/unit Freon appliances (untagged) • $5/unit Tires • ≤ 4 tires w/o rim - $2.50/tire • ≤ 4 tires with rim - $4.0/tire • > 4 tires - $200/tonne • tires > 16" dia. - $200/tonne or $5/tire	NA	NA	Blue boxes must be purchased. $5 - 63L box $8 - 81 L box
Pembroke	NA	The City of Pembroke does not own its own landfill but utilizes the services of the landfill located in the Township of Laurentian Valley. Tipping fees at this site are: • solid waste - $63/tonne • C & D debris (mixed) - $63/tonne • C & D debris (separated) - $53/tonne • organics - $53/tonne • recyclables - $53/tonne • fuel contaminated soils - $20/tonne • scrap metals/white goods - $0/tonne	Waste Management costs are recovered by an annual fee which includes collection & disposal costs • household - $61/yr. • small business - $78/yr • stores - $156 to 204/yr	NA	NA

Table 17: Comparison of Municipal Waste Management Funding Methods - cont'd

Municipality	Tax Levy	Tipping Fees	Annual Fee	Bag Tags	Misc.
Simcoe County	Annual levy assessed by County against lower tier municipalities based on service provided.	Small quantities - $1/bag up to 10 bags Waste - $115/tonne - $230/tonne if the waste contains recyclable material - $57.50/tonne for clean loads of recyclable material	NA	$1.50/bag (Town of Collingwood)	NA

Table 18 shows the City's budgeted waste collection cost from 2004 through 2006, while Table 19 provides a more detailed breakdown of the annual cost of waste collection of other municipalities; these costs are illustrated as cost per household per year.

Table 18: Actual and Budgeted Solid Waste Collection Costs for 2004, 2005 and 2006

	2004 (Actual)	2005 (Budgeted)	2006 (Actual)
Total Solid Waste Collection	**$240,450**	**$253,280**	**$228,734**

Table 19: Comparison of Municipal Waste Collection Costs

Municipality	Services Provided			Service Description	Cost
	Low Density	High Density	Ind, Comm, & Inst		
Elliot Lake	X	X	X	Services provided by contract and municipal staff. No bag limits. Annual spring clean-up week service.	LDR - $19.46/hh/annum HDR - $12.63/hh/annum HDR - $355.36/bin/annum ICI - $562.35/bin/annum Clean-up Week-3.16/hh/annum
North Bay	X	X	X	Services are provided by contract staff. Low density residential (LDR) buildings having less than 10 units and small ICI establishments receive weekly curbside collection. High density residential (HDR) buildings (>10 units) receive weekly bin service. Bag limits apply to the LDR households and small ICI establishments as follows: LDR - 3 bags/week Small ICI - 6 bags twice per week	LDR & ICI - $29.40/hh/annum HDR - $31/hh/annum - $933/bldg/annum
Sudbury	X	X	Only within the Central Business District	Services are a mix off contract and municipal staff. LDR - weekly curbside with 3 bag limit. HDR - bin style service with each bin serviced once per week. Buildings with 77 to 9 units receive one 2 yd^3 bin pick-up per week. Buildings with 10 to 23 units receive one 4 yd^3 bin pick-up per week. Buildings with 24 to 50 units receive one 6 yd^3 pick-up per week. Buildings over 50 units receive combination of bins with one pick-up per week per bin.	LDR - $30.70 to 37.32/hh.annum HDR - $575/bin/annum ICI - $600/business/annum
Sault Ste. Marie	X	X	X	Services are a mix of contract and City staff. LDR - weekly curbside collection. Bag limits are: 6 bags for buildings containing up to 2 units; and 10 bags for buildings containing 3 or 4 residences. HDR - weekly services. Buildings containing between 5 to 20 residences are entitled to 20 bags per week or one 3 yd^3 bin pick-up per week. Buildings containing 21 to 50 residences are entitled to one 6 yd3 bin pick-up per week. Buildings containing more than 51 units are entitled to one 12 yd^3 bin pick-up per week. ICI - weekly curbside service for small businesses generating up to 6 bags per week. Businesses generating more than 6 bags per week must contract with a private contractor for collection services.	$34/residential or commercial pick-up/annum.

Table 19: Comparison of Municipal Waste Collection Costs - cont'd

Municipality	Services Provided			Service Description	Cost
	Low Density	High Density	Ind, Comm, & Inst		
Pembroke	X	X	X	During 2002 the City of Pembroke began providing four-stream waste collections (i.e. garbage, recyclables, organics and leaf/yard waste). Garbage and organics are collected on alternate weeks. The bag limit for garbage is 4 bags every two (2) weeks.	Combined collection/disposal costs for 2002 are: • Household - $61/year • Small businesses - $78/yr • Stores - $156 to $204/yr During 2001, regular garbage collection costs, including bulk item collection was $35.37/hh /annum.
District Municipality of Muskoka	X	X	X	Garbage collection is provided weekly from May to October and bi-weekly for the rest of the year. 3 bag limit per household.	$45.24/hh or business/annum
County of Simcoe - Town of Collingwood	X	X	X	Curbside service with a 3 bag per week limit with up to 3 additional bags collected per week providing that they are tagged. Tags cost $1.50 each.	N/A

Notes: LDR - low density residential; HDR - high density residential; ICI - Industrial, Commercial, Institutional

Spring Clean-Up Program

During 2004, the Spring Clean-up Program cost the City $85,600 (i.e. $18.45/household). In 2005, it cost the City $70,638 (i.e. $15.22/household) and in 2006 it cost $50,051. On average the City's Spring Clean-Up Program costs approximately 30% of the City's solid waste collection budget.

Recycling Program

During 2005, the City budgeted $92,240 ($19.88 per household) for its recycling program. In 2006, the recycling budget was $85,282. The 2007 recycling budget is estimated at $102,500. Tables 20 and 21 provide a comparison program costs and services by other municipalities in Northern Ontario.

Table 20: Comparison of the City's 2005 Recycling Costs to Other Municipalities in Northeastern Ontario

Municipality	Net Cost		Collection Service
	$/Household	$/Tonne	
Temiskaming Shores	$19.88	$185.21	Depot
Cochrane Temiskaming Waste Management Board	$20.63	$293.00	Depot
West Nipissing	$37.49	$256.00	Curbside/Depot
North Bay	$26.45	$178.00	Curbside
Timmins	$15.37	$147.00	Curbside
Kirkland Lake	$29.78	$516.00	Depot
Sudbury	$33.16	$202.00	Curbside

Table 21: Comparison of Municipal Recycling Services (2001)

Municipality	Materials Recycled	Collection Method / Frequency	Tonnes Recycled Per Annum	Estimated Diversion Rate	Net Cost ($/tonne)
Elliot Lake	Boxboard, cardboard, newsprint, magazines, catalogues, phone books, paperbacks, miscellaneous household papers, #1 PETE plastics, #2 HDPE plastic, aluminum/steel cans.	bi-weekly curbside and drop-off depot	280	3.8% of total waste stream 6.0% of residential waste stream	$185

Table 21: Comparison of Municipal Recycling Services (2001) - cont'd

Municipality	Materials Recycled	Collection Method / Frequency	Tonnes Recycled Per Annum	Estimated Diversion Rate	Net Cost ($/tonne)
Sudbury	Same as Elliot Lake plus hard covered books, fine papers, container glass, aluminum foil/trays, paint cans.	weekly curbside and 7 drop-off depots	11,275	9% of total waste stream 22% of residential waste stream	$185
North Bay	Same as Elliot Lake plus container glass	weekly curbside and drop-off depot	2,500	6% of total waste stream 15% of residential waste stream	$150
Sault Ste. Marie	Same as Elliot Lake plus container glass	weekly curbside and drop-off depot	3,417	5% of total waste stream 13% of residential waste stream	$168
Pembroke	Same as Elliot Lake plus plastic bags, juice boxes, polycoat containers, #'s 3, 4, 5 and 6 plastic and styrofoam	Biweekly with paper fibers being collected one week and all other recyclables being collected the next week.	1,446	14% of the total waste stream	$112
Simcoe County - Town of Collingwood	Same as Elliot Lake	weekly curbside	955	6% of the total waste stream 15% of the residential waste stream	N/A

Recycling Promotion

In an effort to increase waste diversion rates, municipalities across Ontario have adopted a variety of methods and incentives to encourage public participation in recycling programs. These include:

- Public education by various means such as delivering pamphlets to each household on a regular basis and visiting schools to promote recycling;
- Banning ICI recyclables (i.e. cardboard and fine paper) from landfill disposal;
- Implementing tipping fees for landfill waste disposal;
- Requiring all residents and ICI establishments that receive municipal collection to also participate in the municipality's recycling program; and
- Implementing bag limits and/or a bag tag system as part of the municipal waste collection program.

8.2.2. *Tipping Fees*

A common tipping fee tracking form is used at both landfills. On the tipping fee tracking form, New Liskeard is checked off at the top of the form if the waste is deposited in the New Liskeard Landfill and Haileybury is checked off if the waste is deposited in the Haileybury Landfill. These forms indicate who has deposited the waste, the type of waste which has been deposited, the quantity of waste deposited and the associated tipping fee.

Fifty percent (50%) of the tipping fees from the New Liskeard Landfill are shared with the Landfill Contractor (i.e., Phippen Waste Management who currently operates the landfill) and 66% of the tipping fees from the Haileybury Landfill are shared with the same contractor; who also currently operates the Haileybury Landfill.

According to the City's Public Works Manager of Operations, the difference between the percentages shared pertains to the fact that Haileybury tipping fees are based on cubic yards and New Liskeard's are based on cubic meters. The intent of the shared tipping fee with the Landfill Contractor was to allow the Landfill Contractor to recover some of the expenses incurred for landfill operations which could not be foreseen when completing their annual estimate for operating the landfill sites.

Tipping fee revenues for both the New Liskeard and Haileybury landfills for 2005 were estimated to be $80,000.

In 2007, staff prepared Administrative Report PW-006-2007 'Review of Tipping Fee at Landfill Sites for Scrap Tires'. A copy is included in the appendix D. A revised tipping fee strategy report is also included in Appendix D, which reviews the existing fee and a proposed fee system, and provides recommendations on how to meet their long term waste management objectives.

8.2.3. *Landfill Operation and Maintenance*

The 2005 operational budget for the New Liskeard landfill was approximately $100,000. These costs include contractor fees ($45,000), tipping fee revenue sharing with the contractor at 50% of site revenues ($20,000), environmental expenses ($30,000) and miscellaneous expenses ($4,580).

The 2005 operational budget for the Haileybury landfill was approximately $170,400. These costs include contractor fees ($75,000), tipping fee revenue sharing with the contractor at 50% of site revenues ($20,000), environmental expenses ($25,000) and miscellaneous expenses ($5,400) and a contribution to reserve fund ($45,000).

In 2006, the New Liskeard Landfill Site had an operational cost of $146,412 and the Haileybury landfill site had an operational cost of $170,255.

8.3. Implementation Timeline

Phase 1

The recommendations of this Master Plan should be implemented in a phased approach. For the purposes of implementation, two (2) major phases are suggested as follows.

Firstly, once the Solid Waste Management Master Plan has been accepted by the City and adopted by Council, the Master Plan will be an active document for the next 25 years. The Master Plan should be kept on file, referenced and amended as new information becomes available during the life of the document. It is expected that yearly waste volumes will fluctuate which will affect the projected service life of the existing waste facilities. As such, it is recommended that the Solid Waste Master Plan be revised to reflect the landfill service life reported in the annual landfill reports.

Secondly, the City should strongly consider the implementation of a uniform solid waste collection program. This would require the adoption of a new By-law by Council, by recognizing the amalgamated City of Temiskaming Shores and consolidate the existing by-laws.

Thirdly, the City should obtain all outstanding approvals required for continuing to operate the waste management program, or subprograms such as the burning of Christmas trees at the winter festival.

Phase 2

As part of the Phase 2 of implementation, the City needs to address the current and future use of their landfill sites. Considering the actual volume of annual waste being deposited is unknown to the landfill operators, the City should strongly consider investigating the possibility of expanding the existing landfill sites or the creation of one or more sites.

It is estimated that the New Liskeard site will reach capacity in less than two (2) years (2009) and Haileybury (2012-2014) shortly thereafter once the New Liskeard site reaches capacity.

The City will need to consider which option is more feasible for the continued functionality of their landfill sites: expansion or closure (and build new). Because of the service life of the New Liskeard site is approaching so quickly, **it is recommended that the first part of Phase 2 deciding what to do with this site (expand or close).**

If the City decides to use the New Liskeard site until it reaches capacity, and not consider it for a future expansion, then the City should begin working towards the site closure plan as identified in the sites Certificate of Approval.

The Haileybury site is also under pressure from nearing capacity. Considering that this site has just over twelve (12) years of capacity left, assuming the closure of the New Liskeard site, the City needs to

consider the options for continuing to manage this site. The remaining capacity provides the City with adequate time to determine the best approach to managing the Haileybury site, either expansion or closure.

Though the City does not envision making any dramatic changes to their current solid waste collection program in the near future, changes are required of their recycling program sooner rather than later. With the existing landfill sites nearing capacity and the inability of the CTWMB MRF to accept additional recyclable materials, the City will find itself scrambling to meet the province's diversion objectives of 60%. Therefore, as part of the second phase of implementation, the City will need to take a more proactive approach at establishing a sustainable solid waste program. Council embraces new means of waste diversion (i.e. curbside pick-up of recyclable materials) in an effort to increase the diversion rate from the City's landfill sites.

In an attempt to prolong the life of the landfill sites, **it is recommended that the City ban construction and demolition materials from the landfills in accordance with Provincial regulations**. It is also **recommended that the City ban the recycling of ICI sector materials from the recycling depot**. Banning the ICI sector from dumping their recyclables at the depot should provide the City with additional capacity to expand the existing residential recycling program.

These changes to the current waste disposal program may have to be implemented over a number of years; however, based on Council direction efforts to implement a curbside recycling program are a priority and would like to review their options within the fourth quarter of 2008. Waste Contractors and the ICI should be notified of Council's deliberations on the options in order to provide enough time to establish new waste collection contracts.

Based on the current state of the landfill sites, **it is recommended that the City begin to investigate solid waste options for the next two (2) to ten (10) years**.

Finally, the City should continue to communicate with adjacent municipalities regarding a regional solid waste management program. Currently the City is partnered with other municipalities in the Cochrane Temiskaming Waste Management Board (CTWMB). Perhaps this board could be expanded to include additional municipalities and/or increase the type of material captured. If there is commitment from other municipalities and/or an increase in material collected, there could be an opportunity to develop a new material recovery facility that would permit the recycling of additional materials. This could result in additional waste diversion from all area municipalities and help to achieve the 60% diversion rate set by the province.

8.4. Contingencies

With the pending closure of the New Liskeard landfill site, the Haileybury landfill site has adequate capacity to sustain the City's waste management program approximately ten (10) to fourteen (14) years or to 2022. The City is limited in its ability to divert waste from its landfill sites due to the volume constraints of its diversion program. Therefore, it is recommended, in the next few years, that the City begin to develop a new site or expanding the existing Haileybury Site. It is also recommended that the City discuss with the Cochrane-Temiskaming Waste Management Board ways of increasing the volume and material types at the Municipal Recycling Facility (MRF).

Although the City can actively pursue options for the type of curbside collection of recyclables, the implementation of any curbside program is contingent on finding an alternate location to divert the recycled materials.

If the City delays the process of looking for means of disposing and diverting the City's waste, it may cost the City more to enter into a program with an area municipality to accept their waste.

9.0 COOPERATION AMONG MUNICIPALITIES

The province encourages cooperation among municipalities to seek efficiencies and to find mutually acceptable solutions to waste management. This partnership approach could expand the waste management options available to the municipalities involved.

Also, such an approach can have financial benefits and at the same time allow municipalities to make waste management decisions relevant to local circumstances. Smaller municipalities may also benefit from sharing the cost of plan development, by partnering with other municipalities or regions.

9.1. Cochrane Temiskaming Waste Management Board (CTWMB)

There is a municipally operated recycling program in place which encompasses sixteen (16) municipalities from Hearst in the north to Temagami in the south. The association which operates the recycling program is called the Cochrane Temiskaming Waste Management Board (CTWMB). The CTWMB was **established as a program to recycle residential materials**, where the main recycled materials within the 16 municipalities that participate in the program are Fiber, metal and aluminum cans, glass (clear and coloured), and No. 1 polyethylene terephthalate (PET).

The CTWMB is conducted in accordance with the provisions of a comprehensive agreement which provides for agreements between municipalities for the '*joint management and operation of garbage*

collection and disposal systems or other municipal systems or services and for the establishment of joint boards of management thereof and pursuant to Municipal Statute Amendment Act, 1993, S.O. 1993 c.20, Section 1 which provides for the passing of by-laws to establish, maintain and operate a waste management system'. Each of the municipalities participating in this recycling program has instituted by-laws to enter into an agreement with other municipalities for the joint management and operation of the Joint Municipal Waste Management (Recycling) Program.

The municipalities participating in the CTWMB are broken into two (2) nodes: the Southern Node and the Northern Node. The Southern Node consists of (from the south) Temagami, Cobalt, Temiskaming Shores (Haileybury, New Liskeard, Dymond), Evantuel, Englehart, Charlton, and Chamberlain. Whereas the Northern Node consists of (from the south) Iroquois Falls, Cochrane, Moonbeam, Kapuskasing, Opasatika, Mattice-Val Cote, and Hearst.

Each node employs three (3) employees and has one hydraulically driven truck with two (2) non-compacting compartments in each truck. As required the nodes supplement their work force with part-time employees or person(s) from the Workfare Program and each node is overseen by a Designated Administrator.

In the Southern Node, the administrator is the Temiskaming Shores Public Works Manager of Operations. In the Northern Node, this administrator is the Kapuskasing Public Works Administrator. The municipalities who have an employee working as an administrator of one of the nodes receive an annual $10, 000 (2005) reimbursement for their efforts.

The three (3) employees within each node complete all of the work necessary to conduct the recycling within that node, this includes the pick-up all the recycling materials from the municipally owned depots (bins), delivery to the MRF, sorting, compacting, and baling of the materials. Once the materials are baled they are ready to be sold to item specific markets.

Each municipality owns their depots (bins) and they are responsible for the maintenance and general clean-up around them. The municipalities which house the MRFs also assist the CTWMB with maintenance of the trucks and equipment used to manage the recovered waste. These maintenance costs are recovered by the municipalities by billing the CTWMB.

In the Southern Node the CTWMB conduct a fiber pick-up at all of the depots on Monday, a No. 1 PET plastic and metal pick-up on Wednesday, another fiber pick-up on Thursday but not to the outlying areas (i.e., Chamberlain, Charlton, Englehart, Evantuel, Cobalt, and Temagami), and on Friday a final fiber pick-up along with a glass pick-up. There are no scheduled pick-ups on Tuesday, as Tuesday is a sorting, bundling, and catch-up day at the MRF.

Materials are sorted at the MRF. Metal and aluminum cans are separated; fiber is sorted into old newsprint ("ONP"), old corrugated cardboard OCC, old box board ("OBB"), and residential mixed paper ("RMP"); and the plastics are sorted into No. 1 PET plastic and mixed plastic.

There are markets for both No.1 PET plastic and mixed plastics, but the depots are not designed to receive the mixed plastic. The MRF is not capable of accommodating large quantities of the mixed plastic. Therefore, the City does not advertise the recycling of any plastic other than the No. 1 PET plastic. However, mixed plastics are received at the depot. They are not sent to the landfill site; rather they are compacted, bailed, and sold.

Currently transportation costs are cost prohibitive to return certain materials to market. Glass for example is being stockpiled at the New Liskeard Landfill, where it is later used as a Granular "B" substitute in road construction. The cost of crushing the glass with the waste crushed asphalt was virtually the same cost as buying Granular "B". Crushed glass can also be used as intermediate cover at landfills.

Some ICI sectors utilize the residential depots, which contributes to overloading. The use of the recycling depots by the ICI sector limits space for recyclables from the residential sector until the following pick-up. Residents often complain that the depots are full and they often have to travel to more than one depot to deposit all of their recyclables. Others may just leave the materials on the ground beside the bins creating an aesthetically unpleasing situation. It should be noted that the leaving of materials and aesthetics of the depots has improved subsequent to the installation of additional bins and purchase of the one (1) replaced recycling unit by the Public Works Department – Operations Division.

The ICI sector has been provided with notices identifying which days they can bring specific products to the MRF free of charge; whereas, if they delivered the material to the landfill they would have to pay tipping fees. As previously indicated, Phippen Waste Management had a contract with the City to pick-up fiber from the downtown ICI facilities, including the five New Liskeard schools on Wednesdays. As noted previously this service has been eliminated.

The City's Public Works Department had been collecting fiber and other recycling materials from certain businesses in Dymond (i.e., the Dymond Museum), New Liskeard (the New Liskeard Medical Clinic), and Haileybury (North Cobalt Post Office, the Haileybury Medical Clinic, Haileybury Post Office, Haileybury Public School, the Food Bank Building, and the Haileybury Library). However, with the elimination of the fibre collection within the downtown core this collection program has ceased as well.

There is no standardized program for these facilities or recovery of costs (i.e., the City does not bill the schools, the downtown ICI facilities, or the Haileybury and Dymond businesses for this service). Because of the positive participation in the program the City wants to continue encouraging these

facilities to recycle thereby diverting the materials from landfill. However, the City would like to develop a system of recovering the costs of the programs provided.

Since amalgamation, the City has received complaints from the Southern Node MRF that the businesses that have fiber pick-up in Downtown New Liskeard on Wednesday morning sometimes mix solid waste with the fiber for recycling and that the clear plastic bags used for the fiber at some of the ICI facilities are too weak and often break causing a considerable amount of downtime. The City has directed Phippen Waste Management to leave any fiber pick-ups which do not only contain fiber. Since deletion of the downtown fibre collection program this is now a non-issue.

10.0 PUBLIC CONSULTATION

Public consultation should be integrated with the waste management planning and decision-making process, from beginning to end and should be aligned with other long-range planning consultations.

The methods used to evaluate all elements of the plan, including all options being considered, should be made clear during consultation.

The last Public Information Centre (PIC) was held in New Liskeard on October 5 and 6, 2005 to inform the residents of the Master Plan Study, provide background information on the City's existing waste management programs and solicit public input for the Master Plan document. A total of seventeen (17) people attended the information centres and three (3) comment sheets were received. The list of attendees and their comments are contained in Appendix E. Table 22 provides a summary of comments received.

Table 22: Summary of PIC Comments

Comments
1. Requested that bag limits be eliminated and that all garbage placed at the curb be picked up by the City.
1. Asked why No. 1 PET plastic is the only plastic which is accepted by the City's recycling program. 2. Asked if silage bale plastic wrap could be recycled. 3. Asked if the public could review the Master Plan before it is finalized.
1. Encourages more recycling. 2. Supported a bag tag system. 3. Suggested that garbage pick-up continue on a bi-weekly basis during the winter. 4. Suggested that the City establish a hazardous waste depot. 5. Encourages composting. 6. Suggested that everyone be required to recycle. 7. Suggested that the federal/provincial governments be lobbied to pass legislation aimed at reducing product packaging. 8. Stressed the importance of securing long-term disposal needs before the capacity at the City's existing landfills is exhausted. 9. Asked that another public information centre be held before the Master Plan is finalized.

The PIC held in 2005 was the last public meeting in regards to the Master Plan. Additional public consultation is anticipated including Council review of the draft, held May 13, 2008 as well as the provision of a Public Open House in relation to the Master Plan. Subsequently Council will provide a public forum to allow comments either in favour or in objection to the Master Plan prior to adoption.

10.1. Public Education Strategy

A large number of people in the community are either unaware of the details of the recycling program or they simply choose not to participate. Many people continue to mix recyclable materials with the regular, non-recyclable, waste stream. This causes contamination of recycled materials and requires staff to separate the materials.

In order to increase the awareness of the benefits of recycling, and waste diversion, **it is recommended that additional methods of educating the public about *what* and *how* to divert waste needs to be implemented.**

Some areas that would be beneficial in spreading the message about the advantages of waste management include: what items are recyclable and depot collection times to name a few. This information could also be included on the City's website, provided in a newsletter or at an open house.

Providing these venues for the public to get informed about the benefits of waste management, the role that they play in the process and the long term benefits of actively contributing to the efforts, will improve the efficiency of the City's waste collection service.

10.1.1. Website

It is recommended that the City develop a section on their website dedicated to the solid waste management services provided. This section should provide the reader with information about the current waste collection programs, the development of the Solid Waste Management Master Plan, and with this information about the community can provide feedback. The website can also provide the location of the depots, and the times when the Municipal Recycling Facility (MRF) will be open.

10.1.2. Newsletter and Handouts

In providing the public with an online venue to read about the solid waste program, **it is recommended that the City continue to make hard copy information available to the public.** At the municipal office, the City has a flyer describing the recycling program provided by the Cochrane-Timiskaming Waste Management Board. The flyer provides the public with information on the types of materials that can and cannot be recycled.

10.1.3. Open House

As discussed in Section 11, the City intends to conduct another public forum in the form of an Open House. By adopting a SWMMP and in developing a strategy for a new or expanded landfill site once the New Liskeard site closes, the City will be in a great position to engage the public in this process.

Each public consultation processes provides the City with a great opportunity for receiving feedback from the public regarding the current and future collection programs. Also, by providing the public with

opportunities to see the work that the City is doing to better the solid waste programs, it will provide for a more transparent and open decision making process. The new Provincial Policy Statement (2005) is an advocate of the public consultation and education process, in trying to get solid waste generators to help municipalities achieve the waste diversion target of 60%.

11.0 MONITORING AND REPORTING SYSTEM

Capacity Review Survey 2007

In 2005, it was documented that the New Liskeard Landfill site had less than seven (7) years of solid waste disposal capacity. Since 2005, a number of demolition projects have used the site to deposit waste.

Recently, the City retained SRQ to survey the New Liskeard Landfill site. The survey was completed and assessed against the final contours of the approved CofA for the site. The result of the survey was the assumption that the landfill site would reach capacity in 1.6 years.

The Haileybury Landfill site was reported as having over fifteen (15) years of capacity remaining for waste deposition (2005). However, with the pending closure of the New Liskeard site in less than two (2) years the remaining capacity of the Haileybury site will be quickly consumed. The New Liskeard site averages 14,000 cubic meters of waste annually, while the Haileybury site averages an annual volume of 20,000 cubic meters.

Since the landfill sites do not have a weigh scale to record the volumes of waste being deposited annually, both sites should be surveyed annually. The survey should assess the current contour against the final contour. This review of the landfill contour will provide the City, and the contractor, with a yearly update of the remaining capacity of the landfill sites. This assessment is especially important at the Haileybury landfill site as it will soon receive waste from the New Liskeard and Dymond area, in addition to the waste already received from Haileybury and Cobalt.

The City is required to provide the MOE with a closure plan two (2) years before site closure is to commence.

12.0 PLAN REVIEW

It is anticipated that this Solid Waste Management Master Plan will be an active document, being reviewed every five (5) years and updated as new information becomes available.

13.0 RECOMMENDATIONS

Based on the information discussed in this report, and in an effort to meet the goals and objectives outlined in the Ministry of the Environment's *Policy Statement on Waste Management Planning*, Council direction it is recommended:

1. That the City review its options for the New Liskeard Landfill Site (i.e. apply to expand or prepare to close) in order to comply with Condition 25 of the Certificate of Approval. The City be cognizant of Condition 26 of the Certificate of Approval for the Haileybury Landfill Site .

2. Options/alternatives be explored for the implementation of a hybrid curbside recycling program including the identification of an expanded or alternate Municipal Recycling Facility. That any such program expand on the volume and types of material to be recycled including: aluminium foil/plates/pans; No. 2 plastic (HDPE – high density polyethylene); juice boxes and milk/juice containers; empty paint/coating cans; and soft/hard cover books.

3. A common by-law be implemented identifying and authorizing uniform waste management service levels and cost recovery mechanisms including, but not limited to the development of a Tipping Fee strategy..

4. Non-compliance with the MOEs B-7-1 guideline at the New Liskeard and Haileybury landfills be addressed by considering the implementation of one, or both, of the following mitigation measures:

    i. When areas of the landfill have reached their approved final contour, the area should be properly capped. The capping will substantially reduce the generation of leachate as a result of percolation through the waste pile; and

    ii. Installation of a leachate collection system (e.g. collection wells, interceptor drain) and a leachate treatment system (e.g. treatment wetland, on-site package treatment system, haulage to existing municipal treatment system). The type of collection and treatment system most suited for the City's landfills should be determined through a site specific study including an assessment of leachate treatability.

    Note: If the first option, along with the additional attenuation area does not address site compliance, then the second option should be considered as a contingency plan.

5. The guiding principles used to develop the Solid Waste Master Plan be followed in order to implement the following programs:

    i. Uniformity of services across the City where practical;

ii. Promotion of waste diversion with an objective, where feasible, of achieving Ontario's 60% waste diversion goal as outlined in the Ministry of Environmental publication titled "Ontario's 60% Waste Diversion Goal - A Discussion Paper, June 10, 2004" and compliance with O. Reg. 101/94 - Recycling and Composting of Municipal Waste (Appendix C);

iii. Minimization of waste collection and disposal costs as practical;

iv. Provision of convenient service levels for homeowners/businesses where affordable;

v. Provision of long-term waste disposal capacity; and

vi. Compliance with Provincial landfill regulations and guidelines including but not limited to:

- Guideline D-4 - Land Use on or Near Landfills and Dumps (Appendix C)
- Procedure B-7-1 - Determination of Contaminant Limits and Attenuation Zones (Appendix C)
- O. Reg. 232/98 - Landfilling Sites (Appendix C)
- O. Reg. 347/90 - General Waste Management (Appendix C)
- Procedure D-4-1 - Guideline for Assessing Methane Hazards from Landfill Sites (Appendix C);

6. Policies be developed to control the disposal of recyclable materials from construction and demolition projects in accordance with, but not limited to Provincial regulations. The City should provide contractors with a *to-be-determined* grace period to enter into contract with a company to collect their waste and recyclable materials. The City should also require contactors to complete a *construction and demolition form* prior to obtaining Building Permit approval.

7. A weekly two (2) bag limit be implemented for residential collection and a weekly ten (10) bag limit for ICI collection, along with enhanced waste diversion programs and user pay system for waste management services. Waste management costs based on waste collected within the bag limit should be funded on the general tax levy. Waste collected that exceeds the bag limit should be funded on a user pay basis. A combined flat rate/user pay system will offer the City the most flexibility with respect to cost recovery and the promotion of waste diversion.

8. The ICI sector be banned from using the residential depots (bins) to dispose of their recyclable materials. The City had provided the ICI sector that had received the municipally funded Fibre Collection with a grace period to find alternatives for the disposal of their recyclable materials.

9. The landfilling of leaf/yard waste, branches and clean (untreated) wood wastes be banned in an effort to maximize waste diversion rates and the life span of the City's landfills. These materials should be disposed of in the designated locations at the Landfill Site(s).

Note: The finished compost may be used on the landfill sites for cover material and/or City parks if the compost passes the quality requirements of O. Reg. 101/94, "Recycling and Composting of Municipal Waste".

10. An annual Municipal Hazardous or Special Waste (MHSW) collection service be implemented in an effort to divert these materials from landfill disposal. Depots may be operated at the City's Public Works Yard or other City facilities with suitable space.

Note: prior to operating the service, a Cerificate of Approval must be obtained from the MOE.

11. That the following tasks be completed at each landfill to ensure proper closure:

- Begin to plan for disposal at an alternative/new landfill site three (3) to four (4) years prior to landfill site closure.
- Advise the public through the media and signs of the landfill site closure date one month prior to and after the landfill site is closed. Media advertising and signs should advise the general public as to the location of the new landfill site and the changed status of the existing landfill site.
- Implement a rodent baiting program prior to closure. Institute a rodent extermination program if the baiting program indicates that it is unsuccessful.
- Complete the final cover of the landfill site with 750 mm of compacted clay cover, 150 mm of topsoil, and seed.
- Dismantle all the landfill site structures. Any bulk materials remaining on landfill site shall be hauled away and any tires buried. The perimeter fence shall be kept in place until vegetation has been established.
- After vegetation has been established, reforest the area under the supervision of the MNR.
- Periodic landfill site visits (three (3) times annually) shall be made to ensure that the vegetation is growing, leachate outbreaks have not occurred and that there are no vector or vermin problems.
- Continue monitoring groundwater on a three (3) times per year basis.
- Register on the property title that the property has been used for a landfill area. Prohibit construction of any structure on the landfill site by passage of a municipal by-law.

12. The agreement with the Cochrane-Temiskaming Waste Management Board be modified to recognize the fact that the former Towns of Haileybury and New Liskeard as well as the former Township of Dymond is now the amalgamated City of Temiskaming Shores.

13. That the adopting of the following definition for 'bulky items' be considered in an effort to control Spring Clean-Up Program costs:

Large items including, but not limited to large furniture (television sets, mattresses, furniture, tables, patio furniture, etc.), microwaves, barrels, and any other discarded materials which items would normally accumulate at a residential dwelling or multi-unit residential building and can easily be lifted up and into a collection vehicle, such as white goods (refrigerators, ovens/stoves, washers, dryers, dishwashers, freezers), air conditioning units, microwave ovens, furnaces, wood stoves, hot water tanks, air exchange units, gas barbeques with fuel tanks removed, and other items designated as bulky items by the City.

The City of Temiskaming Shores

APPENDIX 2 to *PW-RFP-005-2009*
APPLICABLE CERTIFICATES OF APPROVAL
NEW LISKEARD and HAILEYBURY LANDFILLS

Location: N.L. LANDFILL
C of A #: A571505 Issue Date: MAY 9/00
Revokes/Repeals: _____

Ministry of the Environment

Ministère de l'Environnement

Ontario

Environmental Assessment and Approvals Branch
2 St. Clair Ave. W., 12A Floor
Toronto ON M4V 1L5

Direction des évaluations environnementales et des autorisations
2, avenue St. Clair W., 12A étage
Toronto ON M4V 1L5

Tel/Tél (416) 314-6979
Fax/Téléc (416) 314-8452

1

May 9, 2000

1) ACCESS TO SITE ?
2) NO BURNING OF WASTE ?
3) NO HAZARDOUS WASTE ?
4) HYDROGEOLOGICAL REPORT
5) O/M PLAN
6) CLOSURE PLAN
7) ANNUAL REPORT

Mr. Kenneth D.N. Boal, AMCT, CMC
Chief Administrative Officer
The Corporation of the Town of New Liskeard
P.O. Box 730, 90 Whitewood Avenue
New Liskeard, Ontario
P0J 1P0

Dear Sir:

Re: Certificate of Approval No. A 571505
Corporation of the Town of New Liskeard

We find enclosed the new Provisional Certificate of Approval for the New Liskeard Landfill

(h) "Site" means the facility described in the application for this Provisional Certificate of Approval and in the supporting documentation referred to herein;

(i) "ODWO" means the Ontario Drinking Water Objectives; and

(j) "RUP" means the Ministry's Reasonable Use Policy (Policy 15-08).

GENERAL

(1) Except as otherwise provided by these conditions, the Site shall be designed, developed, used, maintained and operated, and all facilities, equipment and fixtures shall be built and installed, in accordance with the Application for a Certificate Approval for a Waste Disposal Site dated April 12, 2000 and supporting documentation, and plans and specifications listed in Schedule "A".

(2) The requirements specified in this Provisional Certificate of Approval are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this Provisional Certificate of Approval in no way abrogates the Town's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

(3) The requirements of this Provisional Certificate of Approval are severable. If any requirement of this Provisional Certificate of Approval, or the application of any requirement of this Provisional Certificate of Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Provisional Certificate of Approval shall not be affected in any way.

(4) The Town shall ensure compliance with all the terms and conditions of this Provisional Certificate of Approval. Any non-compliance constitutes a violation of the Environmental Protection Act, R.S.O. 1990 and is grounds for enforcement.

(5) (a) The Town shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Provisional Certificate of Approval, including but not limited to, any records required to be kept under this Provisional Certificate of Approval; and

(b) In the event the Town provides the Ministry with information, records, documentation or notification in accordance with this Provisional Certificate of Approval (for the purposes of this condition referred to as "Information"),

(i) the receipt of Information by the Ministry;
(ii) the acceptance by the Ministry of the Information's completeness or accuracy; or
(iii) the failure of the Ministry to prosecute the Town, or to require the Town to take any action, under this Provisional Certificate of Approval or any statute or regulation in relation to the Information

(d) any change of name of the corporation where the Operator or Owner is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the Corporations Information Act shall be included in the notification to the Director; and

(e) change in directors or officers of the corporation where the Operator or Owner is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 9(d), supra.

(10) In the event of any change in ownership of the Site, the Town shall notify, in writing, the succeeding owner of the existence of this Provisional Certificate of Approval, and a copy of such notice shall be forwarded to the Director.

(11) Any information relating to this Provisional Certificate of Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, R.S.O. 1990, C. F-31.

(12) All records and monitoring data required by the conditions of this Provisional Certificate of Approval must be kept on the Town's premises for a minimum period of two (2) years from the date of their creation.

OPERATIONAL

(13) This Certificate revokes all previously issued Certificates for this Site.

(14) The Town shall ensure that the Site is operated by trained personnel in a safe and secure manner, and that the wastes are properly handled, so as not to pose any threat to the general public, Site personnel or the environment, and that access to the Site is limited to the Town and his staff.

(15) Within ninety (90) days of the issuance of this Certificate, the Town shall mark the Site boundaries, as identified in the site plan included with the application and supporting documents, with permanent markers, that shall be erected so as to be visible throughout the year for the life of the Site.

(16) The Town shall ensure that no burning of waste shall take place at the Site.

(17) All waste received at the Site under the authority of this Certificate shall be deposited within a 2.02 hectare landfilling area shown on Sheets A and B, provided with the Application for the Certificate.

(18) The Site shall be closed when final contours shown on Sheet B and reduced by 0.9m for final cover, have been reached.

(19) Liquid industrial waste or hazardous waste as defined in Ont. Reg. 347 shall not be received or deposited at the Site.

(25) Two years before the Site is expected to stop receiving waste, the Town shall submit for the Director's approval an updated Closure Plan. This Plan shall include, but not be limited to the following issues:
- (a) the choice of final cover material;
- (b) changes to the final contour plan that may be previously identified in the annual reports, or recommended in the Closure Plan;
- (c) the sequence and schedule for final cover installation;
- (d) post-closure and end-use plans which reflect an after-use of conservation and passive recreation;
- (e) schedules for Site inspections;
- (f) plans and schedules for post-closure groundwater and surface water monitoring programs; and
- (g) plans and schedules for the routine monitoring and maintenance of the final cover.

(26) The Town shall prepare and submit an annual report to the Regional Director by June 1st of the year following the calendar year covered by the report which shall include as a minimum, the following:
- (a) a summary of total annual quantities of waste received at the Site;
- (b) a drawing(s) of the Site indicating all groundwater monitoring locations;
- (c) tables outlining monitor locations, analytical parameters sampled, and frequency of sampling;
- (d) an analysis and interpretation of groundwater monitoring data; a review of the adequacy of the monitoring program; conclusions of the monitoring data; and recommendations for any changes in monitoring program that may be necessary;
- (e) an assessment of groundwater quality in relation to the RUP and ODWO;
- (f) an assessment of the efficiency of the Contaminant Attenuation Zone established;
- (g) an update of changes in operations, equipment, or procedures made or produced at the Site, and any operating difficulties encountered;
- (h) drawings showing areas of fill, buffer areas, current Site contours, maximum final Site contours, any recommended changes of the final contours of the Site, percentage of available space utilized, and an estimate of the remaining disposal capacity and Site life;
- (i) a statement as to compliance with all Conditions and with the inspection and reporting requirements of the Conditions;
- (j) summary of any complaints made regarding Site operation and the Town's response and action taken; and
- (k) recommendations respecting any proposed changes in the operation of the Site.

COMPLAINT PROCEDURES

(27) If at any time, the Town receives complaints regarding the operation of the Site, the Town shall respond to these complaints according to the following procedures:
- (a) The Town shall record each complaint on a formal complaint form entered in a sequentially numbered log book. The information recorded shall include the nature of the complaint, the name, address and the telephone number of the complainant and the time and date of the complaint;

mCAINTS

(6) The reason for Condition (15) is to allow a viable on-site inspection to realize the limits of the Site during any season.

(7) The reason for Condition (16) is to reduce potential damage and environmental effects due to fire.

(8) The reason for Conditions (17), (18), (19) and (24) is to ensure that this Site is operated in accordance with the application and submitted documentation listed in Schedule A.

(9) The reason for Condition (21) requiring registration of the Provisional Certificate of Approval is that Section 46 of the Environmental Protection Act, R.S.O. 1990, prohibits any use being made of the lands after they cease to be used for waste disposal purposes within a period of twenty-five years from the year in which such land ceased to be used for waste disposal, unless the approval of the Minister for the proposed use has been given. The purpose of this prohibition is to protect future users of the Site and the environment from any hazards which might occur as a result of waste being disposed of on the Site. This prohibition and potential hazard should be drawn to the attention of future owners and users of the Site by the Provisional Certificate of Approval being registered on title.

(10) Condition (22) is to ensure that the Town shall conduct and submit for the Director's approval a hydrogeological report.

(11) The reason for Condition (23) is to ensure that the Town shall develop and submit for the Director's approval an Operation and Maintenance Plan.

(12) The reason for Condition (25) is to ensure that two years before the Site is closed, the Town shall submit for the Director's approval an updated Closure Plan.

(13) The reason for Condition (26) is to ensure that the Town shall prepare and submit an annual report to the Regional Director by June 1st of the year following the calendar year covered by the report.

(14) The reason for Condition (27) is to ensure that the complaints are responded to in a systematic manner to protect the health and safety of the public and the environment.

You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, R.S.O. 1990 c. E-19, as amended, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Location: N.L. LANDFILL
C of A #: A571505 Issue Date: APR 25/05
Revokes/Repeals: AMENDS A571505

600-20-07

Ministry of the Environment / Ministère de l'Environnement

Ontario

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A571505
Notice No. 1

cc: [redacted]
Ken P. Burley
Dave Treen

The Corporation of the City of Temiskaming Shores
PO Box 2050
Haileybury, Ontario
P0J 1K0

Site Location: New Liskeard Landfill
West 1/2 of Lot 5, Concession 2, Dymond Twp
Temiskaming Shores City, District of Timiskaming

You are hereby notified that I have amended Provisional Certificate of Approval No. A571505 issued on May 9, 2000 for a waste disposal site (landfill), as follows:

I. The name of the Owner has changed:

From: **The Corporation of the Municipality of New Liskeard**

To: **The Corporation of the City of Temiskaming Shores**

II. The service area for this site is hereby changed to the municipal boundary of the City of Temiskaming Shores.

III. The hours of operation are hereby changed to 8:00am-12:00pm, Tuesday through Saturday.

All in accordance with the Application for a Provisional Certificate of Approval for a Waste Disposal Site dated November 19, 2004, signed by Dan Harvey, Director of Public Works, City of Temiskaming Shores, including all supporting documentation.

The reason for this amendment to the Certificate of Approval is as follows:

1. To approve the Owner's requests.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A571505 dated May 9, 2000

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as

Location: N.L. LANDFILL
C of A #: A571505 Issue Date: Apr 17/07
Revokes/Repeals: NOTICE #2

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A571505
Notice No. 2
Issue Date: April 17, 2007

APR 26 2007

To: Dave Treen.
April 30, 2007.
CWO

The Corporation of the City of Temiskaming Shores
PO Box 2050
Haileybury, Ontario
P0J 1K0

Site Location: New Liskeard Landfill
West 1/2 of Lot 5, Concession 2, Dymond Twp
Temiskaming Shores City, District of Temiskaming

You are hereby notified that I have amended Provisional Certificate of Approval No. A571505 issued on May 9, 2000 and amended April 27, 2005 for a waste disposal site (landfill) , as follows:

I. This Certificate is hereby amended to recognize the addition of a contaminant attenuation zone.

II. The following Item is hereby added to Schedule "A":

4. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated November 14, 2005 and signed by Dave Treen, Manager of Environmental Services, City of Temiskaming Shores, including the attached drawing entitled "New Liskeard Landfill Site Figure 1" showing the attenuation zone.

The reason for this amendment to the Certificate of Approval is as follows:

1. To recognize the addition of the contaminant attenuation zone as required by Provincial Officer's Order No. 7026-6GQLJY.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A571505 dated May 9, 2000, as amended.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Location: HAIL. LANDFILL
C of A #: A570402 Issue Date: NOV 10/98
Revokes/Repeals: A570402 (MAR 5/92)

Ministry of the Environment
250 Davisville Avenue
Toronto ON M4S 1H2

Ministère de l'Environnement
250, avenue Davisville
Toronto ON M4S 1H2

Ontario

ENVIRONMENTAL ASSESSMENT AND APPROVALS BRANCH
3RD FLOOR
Tel. (416) 314-7967
Fax (416) 314-8452

November 10, 1998

Mr. G. Douglas Walsh, CET
Director of Public Works
Town of Haileybury
Postal Bag "D", 451 Meridian Avenue
Haileybury, Ontario
P0J 1K0

Dear Mr. Walsh:

Re: Amended Provisional Certificate of Approval for a Waste Disposal Site No. A 570402 for a Landfill Site Located on S ½ Lot 1, Concession 2, in the Town of Haileybury

Please find attached the Amended Provisional Certificate of Approval for a Waste Disposal Site No. A 570402.

The draft Certificate of Approval presented to the Environmental Assessment Board, (Board), during the hearing under Part V of the Environmental Assessment Act, has been adopted by the Board with a number of conditions added upon the request from the Board. In addition, we have made some clarifying changes to the wording. All of the changes from the draft dated April 24, 1998, (Exhibit No.11) are listed below:

1. Definition No. 1(3) has been changed to correct the name of the local district office.

2. Definition No. 1(4) has been added to define the Drainage Act, since its use is required in the condition required by the Board. The remaining definitions have been re-numbered.

3. Definition No. 1(6) has been expanded to clarify the extend of the Fill Area.

4. Condition No. 4(1) has been changed to fully define the Pesticides Act.

5. Condition No. 6 has been changed to incorporate the recommendation from the Board, to require a construction of the stormwater management works within a 12-month time frame.

.../2

6. Condition No. 11 has been added to incorporate the recommendation from the Board, to require an installation of a perimeter fence. The remaining conditions have been re-numbered.

7. Condition No.15 has been changed to clarify the units used to describe the depth of the cover material.

8. Condition No. 17 has been changed to clarify the units used to describe the depth of the cover material.

9. Condition No. 18 has been added to require a submission of a clean wood handling plan, to further investigate the need for an installation of a pit incinerator suggested by the Board.

10. Sub-condition No. 22(2) has been changed to incorporate the recommendation from the Board, by adding lead to the groundwater testing parameters.

11. Sub-condition No. 22(3) has been changed to incorporate the recommendation from the Board, by adding suspended solids to the surface water testing parameters and by requiring another surface water testing location.

12. Sub-condition No. 22(4) has been added to describe the location of the additional monitoring station required by the Board. The remaining sub-conditions have been re-numbered.

13. Condition No. 23 has been changed to incorporate the recommendation from the Board, to require an installation of methane monitors at the garage, operator's office and other permanent structures at the site within a 3-month deadline.

14. Condition No. 27 has been changed, by replacing "Item 2" to "Item 3", to correct a typographical error.

15. Condition No. 27 has been changed, to correct the title of Guideline B-7.

16. Document No. 5 has been added to Schedule "A", since it provided clarification to the definition of the Fill Area. The remaining documents have been re-numbered.

If you have any questions on the above, please call Margaret Wojcik, P.Eng., Senior Review Engineer, Waste Section, at (416) 314-7993.

Yours truly,

A. Dominski, P. Eng.
Manager, Waste Section

MW/st
Encls.
cc: District Manager, Timmins District Office
Isabelle O'Connor, Legal Services Branch
Robert M. Fishlock, Blake, Cassels & Graydon

You are hereby notified that Provisional Certificate of Approval No. A 570402 for a Waste Disposal Site (Landfill), dated March 5, 1992, is hereby revoked in its entirety and the following substituted therefor:

Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Town of Haileybury
Postal Bag "D", 451 Meridian Avenue
Haileybury, Ontario
P0J 1K0

for the use and operation of a 5.8 hectare Landfill Site within a 32.4 hectare total Site area;

all in accordance with the following plans and specifications:

listed in Schedule "A";

Located: S ½ Lot 1, Concession 2
Town of Haileybury
District of Timiskaming

which includes the use of the site only for the disposal *of the following categories of waste (Note: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval)* municipal waste;

and subject to the following conditions:

DEFINITIONS

1. In this Provisional Certificate of Approval:

   (1) "Certificate" means this Amended Certificate of Approval No. A 570402, as amended from time to time, including all Schedules attached to and forming part of this Certificate;

(2) "Director" means the one or more persons who, from time to time, are so designated for the purpose of Part V of the *Environmental Protection Act*, R.S.O. 1990, c.E.19;

(3) "District Manager" means the District Manager of the Timmins District Office of MOE;

(4) "Drainage Act" means the *Drainage Act*, R.S.O. 1990, c.D. 17;

(5) "EPA" means the *Environmental Protection Act*, R.S.O. 1990, c.E. 19;

(6) "Fill Area" means the portion of the Site where waste may be disposed as delineated by the "Limit of Sanitary Landfill Fill Area" shown on Sheet 10 of Item 2 in Schedule "A" and described in Item 5 in Schedule "A";

(7) "MOE" means the Ministry of the Environment;

(8) "OWRA" means the *Ontario Water Resources Act*, R.S.O. 1990, c.O. 40;

(9) "Regional Director" means the Director, Northern Region, Ministry of the Environment;

(10) "Town" means the Corporation of the Town of Haileybury; and

(11) "Site" means the 32.4 hectare landfill site including the Fill Area and buffer zone on Lot 1, Concession 2, in the Township of Bucke, District of Timiskaming as shown on the Plan of Survey, Sheet No. 2 of Item 2 in Schedule "A".

GENERAL REQUIREMENTS

2. This Certificate revokes all previously issued Provisional Certificates of Approval issued under Part V, EPA, for this Site. The approval given herein, including the Terms and Conditions set out, replaces all previously issued approvals and related Terms and Conditions under Part V, EPA for this Site.

3. The requirements of this Certificate are severable. If any requirement of this Certificate to any circumstance is held invalid, the application of such requirement to other circumstance and the remainder of this Certificate shall not be affected thereby.

4. The Town shall allow MOE personnel, or a MOE authorized representative(s), upon presentation of credentials, to:

(1) carry out any and all inspections authorized by the EPA, OWRA, or the *Pesticides Act*, R.S.O. 1990, c.P. 11, as amended from time to time, of any place to which this Certificate relates, and without restricting the generality of the foregoing, to:

a. enter upon the premises or the location where the records required by the conditions of this Certificate are kept;

b. have access to and copy, at any reasonable time, any records required by the conditions of this Certificate;

c. inspect at reasonable times, any facilities, equipment (including monitoring and control equipment), practices or operations required by the conditions of this Certificate; and

d. sample and monitor, at reasonable times, for the purposes of assuring compliance with the conditions of this Certificate.

5. (1) The Site shall be developed, operated and maintained by the Town in accordance with the Terms and Conditions herein and items 1 to 4 listed in Schedule "A" of this Certificate.

(2) Should there be any discrepancies between any of items 1 to 4 of Schedule "A" and the conditions in this Certificate, the conditions shall take precedence. Should there be discrepancies between items 1 to 4 listed in Schedule "A", the document bearing the most recent date shall take precedence.

STORMWATER MANAGEMENT WORKS APPROVALS

6. (1) This Certificate does not provide an approval for any works subject to approval under the OWRA, the Drainage Act, or any other legislation that may be applicable.

(2) The Town shall complete the construction of the swale ditches, the sedimentation ponds, and the diversion ditch as outlined in Section 3.2 of Item 3 of Schedule "A", within 12 months from the issuance of this Certificate.

(3) Within six months of the date of issuance of this Certificate, the Town shall submit to the Director an application for approval under the OWRA of the on-site stormwater management works. The Town shall fulfill the requirements under the Drainage Act, or any other legislation that may be applicable.

CONTAMINANT ATTENUATION ZONE

7. Within twelve months from the date of issuance of this Certificate, the Town shall either acquire or obtain an easement and all of the water rights to the land described as:

Parcel 904 NND
Part of the South Half of Lot 1
Concession 2
Township of Firstbrook
District of Timiskaming

CERTIFICATE OF PROHIBITION

8. (1) For the purpose of this condition "Property" means the Site and, effective on the date of acquisition of the land or acquisition of the easement and water rights by the Town, the parcel of land referred to in Condition No. 7, above.

(2) Pursuant to Section 197 of the EPA, neither the Town nor any person having an interest in the Property shall deal with the Property in any way without first giving a copy of this Certificate to each person acquiring an interest in the Property as a result of the dealing.

(3) The Town shall,

a. within 60 days of the date of the date that the Town obtains the easement and water rights required under Condition No. 7, submit to the Director for the Director's signature two copies of a completed Certificate of Prohibition containing a registrable description of the Property, in accordance with Form 1 of O. Reg. 14/92; and

b. within 10 calendar days of receiving the Certificates of Prohibition signed by the Director, register the Certificate of Prohibition in the appropriate Land Registry Office and submit to the Director immediately following registration the duplicate registered copy.

LIMITS OF WASTE

9. (1) Waste disposal shall be limited to the Fill Area.

(2) Waste may only be placed above ground level to the final contour elevations shown on Sheet No. 10 of Item 2 of Schedule "A".

(3) Waste may only be placed below ground level in trenches as shown on Sheet No. 4 of Item 2 of Schedule "A" and to depths of approximately 3 metres below ground level but not exceeding 3.66 metres.

(4) There shall be no further final disposal of waste in the Bulk Material Storage Area shown on Sheet No. 10 of Item 2 of Schedule "A".

WASTE TYPE

10. Only municipal waste, as defined in Ontario Regulation 347, R.R.O. 1990 (as amended), may be disposed of at the Site.

SITE SECURITY AND OPERATING HOURS

11. The Town shall install a complete perimeter fence within 18 months from the issuance of this Certificate.

12. (1) The Site shall not be operated outside of the hours of 9:00 a.m. to 5:00 p.m., Monday to Friday, and from 9:00 a.m. to 12:00 noon on Saturday. The Site will be closed on Sundays and statutory holidays. These operating hours may be varied with the approval of the Regional Director.

(2) During non-operating hours, the Site entrance gate shall be kept locked.

(3) Except for waste deposited in the after-hours dumping bin located outside of the Site gate, waste shall only be received under the supervision of a Site attendant.

13. The Town shall ensure that all Site attendants are adequately trained with respect to the following:

(1) terms, conditions and operating requirements of this Certificate;

(2) the operation and management of the Site;

(3) relevant waste management regulations and legislation;

(4) environmental concerns related to the waste being handled at the Site; and

(5) occupational health and safety concerns pertaining to the management of waste at the Site.

OPERATIONAL REQUIREMENTS

14. The Town shall ensure that waste is deposited in a manner that minimizes the size of the Fill Area working face and that the waste is compacted before cover material is applied.

15. (1) All exposed waste shall be covered by a minimum of 15 centimetres of cover material at the end of each working day.

(2) A cover material layer of at least 30 centimetre-depth shall be applied as soon as reasonably possible on all areas of waste disposal where no final cover has been applied and where no additional waste or final cover is to be placed for six months or more.

16. Alternative materials to clean soil may be used as daily cover only if approval is obtained in accordance with the "Procedure for Gaining Approval to use Alternative Materials to Soil as Daily Cover in Landfills that Receive Only Municipal and Non-Hazardous Solid Wastes" (May, 1994) released by the Science and Technology Branch of the MOE or if approval is obtained in accordance with subsequent MOE procedures, guidelines or regulations.

17. (1) Where final waste contours have been reached for a given cell of the Site, final cover application and seeding shall be completed as soon as practical but not later than nine months from the completion of cover application.

(2) Except where Phase II development is scheduled to begin above a trench within one year of filling the trench, a 30 centimetre-thick layer of interim cover shall be placed above each trench as soon as practicable once it is filled and in any case within nine months of being filled. The interim cover shall be removed, to the extent practicable, and scarified prior to commencement of Phase II development.

18. The Town shall submit to the Director for approval, within three months from the issuance of this Certificate, a plan outlining the options for handling of clean wood at the Site. The plan shall contain the analysis of the environmental impacts of each option, and it shall identify the option preferred by the Town.

done

HSL complete

MONITORING WELLS

19. (1) Within three months of the issuance of this Certificate, a monitoring well to replace TW 7/94 and a monitoring well in the vicinity of Test Pit 14 shall be constructed and incorporated into the Site monitoring program.

done

Completed

(2) Any monitoring wells which are no longer needed or are operational shall be properly abandoned in accordance with Ontario Regulation 903, R.R.O. 1990 or rehabilitated within 3 months of such a determination being made.

(3) A report on the abandonment or rehabilitation of any monitoring well shall be included in the applicable Annual Report prepared in accordance with Condition No. 24 of this Certificate.

done

(4) The well development procedures and data for any new monitoring wells constructed at the Site shall be reported in the applicable Annual Report prepared in accordance with Condition No. ~~24~~ 25 of this Certificate.

Town

LITTER

20. (1) A visual inspection shall be made at least once each week of the public roadways immediately adjacent to the Site and any litter

which may have originated from the Site or from vehicles hauling to the Site which is observed on the inspections, shall be retrieved forthwith.

(2) A visual inspection of the buffer zone shall be made at least once each month from April to October. Any litter present shall be retrieved and disposed of in the Fill Area.

SITE GRADING

21. Site grading and contours shall be maintained such that all surface water run-off from the buffer zone and areas capped with final cover is directed away from the working face of the Site.

SITE MONITORING

22. (1) Ground water shall be monitored three times per year in April/May, August/September and November/December at each of the following monitoring wells:

Replacement well for MW No. 2
TW 1/91(D)
TW 1/91(S)
TW 3/91
TW 4/91
TW 5/91
TW 6/94
TW 8/94
Replacement well for TW 7/94 as required by Condition No. 19(1)
Well to be constructed in the vicinity of Test Pit 14 as required by Condition No. 19(1).

(2) Each sample taken under Condition No. 22(1) shall be analysed for the following parameters:

Metals:	aluminium, arsenic, boron, barium, calcium, cadmium, chromium, copper, iron, potassium, magnesium, lead, manganese, sodium, selenium, strontium, mercury, zinc
Anions:	fluoride, chloride, nitrate, nitrite, phosphate, sulphate
Other Parameters:	(hardness) alkalinity, total Kjeldhal nitrogen (TKN), ammonia, total dissolved solids (TDS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), dissolved organic carbon (DOC), phenols
Field Parameters:	static level, temperature, conductance, pH

(3) Surface water samples shall be taken from monitoring stations SW1, SW2, SW3, SW4 and SW5 twice per year in April/May and August/September. For each sample, an analysis or determination shall be done for the following parameters:

Metals:	aluminium, boron, cadmium, chromium, cobalt, copper, iron, lead, nickel, potassium, sodium, zinc
Other Parameters:	alkalinity, ammonia, chloride, COD, DOC, phenols, TDS, turbidity, suspended solids
Field Parameters:	temperature, conductance, pH, dissolved oxygen, estimated streamflow

(4) The monitoring station SW5 shall be located at the outlet of a beaver dam just upstream of SW4.

(5) Changes to the monitoring requirements shall be made on the basis of recommendations made in the Annual Report and only with the Regional Director's written approval.

23. The Town shall install battery-operated methane gas monitors in the garage, operator's office and any other structure at the landfill, within 3 months from the issuance of this Certificate.

DAILY RECORDS

24. Daily records of Site operations shall be made and shall be kept at the Site for a period of at least two years from the date of the record. The daily records shall include the following:

(1) The type, hauler, vehicle license number and time of arrival for all waste received at the Site;

(2) All complaints from the public received by the Town and an indication of the action taken in response by the Town; and

(3) A record of litter collection activities, Site inspections and application of interim and daily cover.

ANNUAL REPORTS

25. Beginning with the 1998 calendar year, an Annual Report addressing water quality monitoring and Site operations shall be submitted to the Regional Director no later than April 30th following the calendar year being reported upon. The Annual Report shall include the following:

(1) tables outlining analytical parameters sampled and frequency of sampling for each monitoring location;

(2) summary data tables for key analytical parameters and locations;

(3) an analysis and interpretation of the groundwater monitoring results including a discussion of groundwater monitoring data in relation to compliance with the boundary criteria;

(4) a drawing of the Site and neighbouring land showing all monitoring locations;

(5) review of the current monitoring program and a recommendation for any changes;

(6) review of the sampling and analytical procedures, including the QA/QC programs;

(7) a summary of monthly and total annual waste loads received at the Site;

(8) drawings showing existing conditions, completed Fill Areas, buffer area, current Fill Area contours and maximum final Site contours;

(9) calculation of the volume of available space utilized, the remaining Site capacity, the volume of cover material applied and the waste compaction density;

(10) an estimate of the remaining Site life;

(11) an update of changes in Site operations, equipment, procedures and any operating difficulties encountered;

(12) a summary of any complaints made regarding Site operation and the Town's response and action taken; and

(13) recommendations respecting any proposed changes in the operation of the Site.

CLOSURE AND END USE PLANS

26. (1) Within five years of the commencement of landfilling in Phase II of Areas B, C & D of the Site, the Town shall submit a final Site closure and end use plan to the Director for approval.

(2) The Site closure and end use plans shall include, but not be limited to, details regarding the following:

a. proposed end use;

b. any adjustments to the final contour plan that may be recommended;

c. fencing and access control;

d. additional vegetative plantings planned;

e. the sequence and schedule for final cover installation;

f. plans and schedules for the management and continued monitoring;

g. plans and schedules for the routine monitoring and maintenance of the final cover and stormwater management works; and

h. notification procedures related to the Site closure.

CONTINGENCY PLANS

27. (1) Contingency plans as outlined in Section 4.15.2 of Item 3 of Schedule "A" shall be implemented in accordance with the criteria and procedures outlined in Section 4.0 of Item 6 of Schedule "A".

(2) Contingency plans as outlined in Section 4.15.2 of Item 3 of Schedule "A" shall be implemented if groundwater monitoring indicates that leachate migration has or will result in exceedance of the boundary criteria as determined from MOE Guideline B-7, "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities", as amended.

SCHEDULE "A"

This Schedule "A" forms part of Provisional Certificate of Approval No. A 570402:

1. Application for a Certificate of Approval for a Waste Disposal Site (Landfill), signed by Alexander L. Herbert, Town of Haileybury, dated October 27, 1986.

2. Set of Plans entitled "Haileybury Landfill Site - Development, Operational and Closure Plans, Project No. E91008", prepared by H. Sutcliffe Limited, dated October 1992.

3. Report entitled, "Corporation of the Town of Haileybury, Landfill Site Approval Report, Project No. E91008", prepared by H. Sutcliffe Limited, revised July 1997.

4. Report entitled, "Supplemental Hydrogeological Investigation, Town of Haileybury Landfill Site, Haileybury, Ontario", prepared by International Water Consultants Ltd., dated April 3, 1995.

5. Letter dated November 19, 1996 from H.J. Hawken, H. Sutcliffe Ltd., to J. Connelly, Ministry of Environment and Energy, providing responses to Ministry's concerns from August 16, 1996.

6. Letter dated July 28, 1997 from H.J. Hawken, H. Sutcliffe Ltd., to J. Connelly, Ministry of Environment and Energy, providing responses to Ministry's concerns.

7. Report entitled, "Investigation of Proposed Leachate Attenuation Zone, Town of Haileybury Landfill Site, Haileybury, Ontario, 1997", dated February 18, 1997; prepared by International Water Consultants Ltd.

The reasons for the imposition of these conditions are as follows:

1. Conditions No. 1 through 27 have been included to adopt the decision of the Environmental Assessment Board, EP-97-05, dated October 2, 1998.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:

1. *The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;*
2. *The grounds on which you intend to rely at the hearing in relation to <u>each</u> portion appealed.*

In addition to these legal requirements, the Notice should also include:

3. *The name of the appellant;*
4. *The address of the appellant;*
5. *The Certificate of Approval number;*
6. *The date of the Certificate of Approval;*
7. *The name of the Director;*
8. *The municipality within which the waste disposal site is located;*

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
2300 Yonge St., 12th Floor,
P.O. Box 2382
Toronto, Ontario
M4P 1E4

<u>AND</u>

The Director,
Section 39, Environmental Protection Act,
Ministry of the Environment,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

DATED AT TORONTO this 10th *day of* November, 1998.

A. Dominski, P. Eng.,
Director,
Section 39,
Environmental Protection Act

MW/st
cc: District Manager, Timmins

600 - 20 - 08

Ministry of the Environment / Ministère de l'Environnement

Ontario

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A570402
Notice No. 1

RECEIVED
MAY - 9 2005

cc: Dan Harvey
Ken P. Zeurley
Dave Treen

The Corporation of the City of Temiskaming Shores
PO Box 2050
Haileybury, Ontario
P0J 1K0

Site Location: Haileybury Landfill
Lot 1, Concession 2
Haileybury Town, District of Timiskaming
P0J 1K0

You are hereby notified that I have amended Provisional Certificate of Approval No. A570402 issued on November 10, 1998 and amended November 10, 1999 for a waste disposal site (landfill), as follows:

I. The name of the Owner has changed:

From: **The Corporation of the Municipality of Haileybury**

To: **The Corporation of the City of Temiskaming Shores**

II. The service area for this site is hereby changed to the municipal boundary of the City of Temiskaming Shores.

III. The hours of operation are hereby changed to 1:00pm-5:00pm, Tuesday through Saturday.

All in accordance with the Application for a Provisional Certificate of Approval for a Waste Disposal Site dated November 19, 2004, signed by Dan Harvey, Director of Public Works, City of Temiskaming Shores, including all supporting documentation.

The reason for this amendment to the Certificate of Approval is as follows:

1. To approve the Owner's requests.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A570402 dated November 10, 1998

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as

amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required; and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of Environment and Energy
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 27th day of April, 2005

Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

AN/

c: District Manager, MOE North Bay
H. James Hawken, P.Eng., Sutcliffe Rody Quesnel Inc.

The City of Temiskaming Shores

APPENDIX 3 to *PW-RFP-005-2009*
GROUND WATER MONITORING REPORTS
Exerts

The City of Temiskaming Shores

APPENDIX 3.1 to *PW-RFP-005-2009*
2005 Annual Monitoring Report – Executive Summary
Haileybury Landfill Site

City of Temiskaming Shores

2005 Annual Monitoring Report
Haileybury Landfill Site

Executive Summary

Prepared for:

Corporation of the City of Temiskaming Shores
P.O. Box 2050
Haileybury, ON
P0J 1K0

Prepared by:

Story Environmental Services
770 Lakeshore Rd.
Haileybury, ON
P0J 1K0

In conjunction with:

Sutcliffe Rody Quesnel Inc.
9 Wellington Street
New Liskeard, ON
P0J 1P0

April 2006

EXECUTIVE SUMMARY

The following report addresses the Annual Report requirements for the Corporation of the City of Temiskaming Shores Haileybury Landfill Site ("the Site"), formerly known as the Corporation of the Town of Haileybury Landfill Site, for the 2005 calendar year. Specifically, the report summarizes the Site operations and water quality monitoring conducted through the year, as laid out in sections 25(1) to 25(13) of the Provisional Certificate of Approval for a Waste Disposal Site No. A570402 ("C of A"). A copy of the C of A is provided in Appendix H.

The Site is located approximately 9 kilometres southwest of the former municipality of Haileybury (Figure 1). The Site itself occupies an area of 32.4 hectares ("ha") of which the Fill Area (i.e., the portion of the Site where waste may be disposed) occupies an area of roughly 7.0 ha (Figure 2).

Site operations remain unchanged and there have been no changes to the Site's equipment or procedures. Furthermore no operating difficulties were encountered in 2005. In April 2006, Sutcliffe Rody and Quesnel Inc. ("SRQ") completed a topographic survey of the Site. Figure 6, as prepared by SRQ, illustrates the existing topographical conditions, the area in the north of the Fill Area which has had an interim cover applied, the current municipal and the construction material dump areas, the buffer area, and the current Fill Area contours. Figure 7, also as prepared by SRQ, provides the maximum final Site contours.

The volume of refuse received by the landfill in 2005 was approximately 4 percent less than that received in 2004.

SRQ has estimated that:

- the remaining Fill Area capacity is 143 856 cubic metres (see Table 2, Appendix D), and
- based on the waste deposition records obtained from the City of Temiskaming Shores, an estimated 1% increase in the population served by the Site, and a percentage of refuse which is not landfilled, the Fill Area will reach capacity during the year 2019 (see Table 3, Appendix D).

As per Condition 7 of the C of A and a letter of non-compliance received by Temiskaming Shores from the Ontario Ministry of the Environment dated February 25, 2004, negotiations continue between representatives of Temiskaming Shores and of the contaminant attenuation zone property owner regarding obtaining an easement and all of the water rights to the land required for the contaminant attenuation zone.

Groundwater elevations at each sampled monitoring well are measured during every sampling event (see Figure 39). In general 2005 groundwater elevations were lower than those measured in 2004, although normal seasonal fluctuations were evident: groundwater levels were relatively high in May, lower in September and increased again in November. The two exceptions to this general pattern were the TW1 and TW3 wells, where annual peaks were observed in September 2005.

The recent water table contour map suggests a northwesterly flow component in the area southwest of the Fill Area, possibly resulting from the gas pipeline, and a strong westerly flow direction in the area directly west of the Fill Area. The area to the northwest of the Fill Area lacks sufficient information to draw any conclusions. The installation of additional monitoring wells west of TW3 would help to define the groundwater flow direction northwest of the Fill Area.

Groundwater samples were collected from ten monitoring wells at the Site on May 25/26, September 21, and November 23, 2005. Surface water was sampled at five stations, as shown on Figure 1, on May 25, 2004. On September 20, 2005, surface water was sampled at four of the stations: SW1, SW2, SW3, and SW4. Station SW5 was not sampled on September 20, since it was completely dry. These samples were analysed as stipulated in Sections 22(2) and 22(3) of the C of A. Water quality monitoring data for 2005 are evaluated alongside historical data dating back to 1994.

At least two Ontario Drinking Water Objectives ("ODWO") were exceeded at every well, including the background well (i.e., TW8), monitored on each sampling date in 2005. Elevated concentrations of dissolved organic carbon, iron, manganese, organic nitrogen, potassium, total dissolved solids, total Kjeldahl nitrogen, chloride, sodium, and sulphate were commonly observed within the downgradient section of the Fill Area. Water chemistry was spatially variable, with substantial nitrate concentrations observed at one well, TW6, within this section of

the Fill Area. There were three exceedances of a health-based ODWO in 2005. These occurred in an on-site well, TW9, and an off-site well, TW11, for arsenic.

The MOE's Guideline B-7, or the Reasonable Use Concept ("RUC"), was used to define Boundary Criteria for the quality of groundwater leaving the Site. The RUC was applied using water chemistry data from well TW8 to define background groundwater quality.

Four not health-related parameters commonly failed the RUC: dissolved organic carbon, iron, manganese, and organic nitrogen. Three of them, iron, manganese, and organic nitrogen, also exceeded the ODWO at the background well (TW8) on most sampling dates. Well TW3 failed the aluminum RUC on all three sampling dates. Wells TW4, TW9 and TW11, all failed the RUC for TDS on all three monitoring dates. Well TW7 failed the RUC for TDS twice and well TW6 once failed the RUC for TDS. Finally, TW4 failed the RUC for sulphate in September and November 2005, while TW9 and TW11 also failed the RUC for sulphate in September 2005.

Four of the wells failed the RUC for health-related parameters. Water sampled from TW4, TW9, and TW11 failed the RUC for arsenic on all three sampling dates. The concentration of arsenic at TW9 also exceeded the ODWO in May 2005 and the ODWO for arsenic was exceeded at TW11 in September and November 2005. Wells TW4, TW9, and TW11 failed the RUC for boron in September 2005. Water sampled from TW6 failed the RUC for nitrate in September and November 2005.

Three of these four monitoring wells (i.e., TW4, TW9, and TW11) were the monitoring wells that consistently failed the RUC for not health-related TDS in 2005 This suggests that these three wells may be the most heavily impacted by the Fill Area. The two wells, TW7 and TW10, further downgradient of the Fill Area did not fail any health-related RUCs during 2004. The failure of some parameters under the RUC at off-site well TW11 (installed in November 2004) indicates that the Fill Area is negatively impacting off-site groundwater resources. Further work should be done in 2006 in an attempt to establish the full extent of the off-site impact.

The long-term increased concentrations of boron, dissolved organic carbon, iron, manganese, nitrate, TDS, sulphate, sodium, chloride, and potassium across the landfill (i.e., roughly in the direction of groundwater flow) are most likely related to landfill operations. Of these parameters, chloride, nitrate, and sodium concentrations, are elevated at the two wells furthest downgradient

from the Fill Area (TW7 and TW10) compared to background levels. Due to the solubility and mobility of sodium and chloride within the environment, the elevated concentrations of these two parameters at TW7 and TW10 are most likely due to the landfill operations. The concentration isopleth diagrams for sodium and chloride substantiate the fact that the Fill Area is impacting these two monitoring wells.

Attempts were made during 2005 to collect groundwater samples from well TW12, which was installed in November 2004. As was the case in November 2004, insufficient water was available to sample TW12 in 2005. Therefore, a new (and deeper) well should be installed to replace TW12 in 2006. Also, since there is little information west of TW3 (see Figure 5b), two additional monitoring wells should be installed west of TW3. These new wells should be installed at similar distances from TW3 as TW11 and TW12 are installed from TW9. These new monitoring wells would provide information to further define the groundwater flow directions northwest of the Site and further characterize the groundwater quality downgradient of the Fill Area. They will also help to delineate the extent of off-site impact as a result of the landfill operations.

Whereas information is lacking on the groundwater chemistry in the area downgradient and outside of the Fill Area, sufficient data are available to characterize the groundwater quality in the upgradient section of the Fill Area. Therefore, beginning in 2006, monitoring wells TW1 and TW5 will (should) only be monitored once per annum. Water levels in these wells should, however, continue to be measured during each sampling event.

As required by Condition 19(2) of the C of A, the following monitoring wells should be abandoned in accordance with Section 21 of Ontario Regulation 903 as soon as practical:

- MW2 which is no longer used as there are no construction details for this well and was replaced by a new TW9 in 1998, and
- MW1 that is no longer used and was replaced by TW6 in 1994.

Streamflow gauging and sampling was conducted during the May and September 2005 sampling events at five surface water sampling stations. There is considerable evidence of chemical variability in the surface water samples; however, none of it can be definitively attributed to the Site.

If the Fill Area is impacting surface water, this impact will most likely to be detected by comparing the chemistry of water sampled at SW3 (within the proposed leachate attenuation zone) to that of water sampled at the upstream surface water sampling station SW4. Therefore, SES recommends eliminating the surface water sampling at the most distant surface water stations, SW1 and SW2 (Figure 1), and only continuing with the semi-annual monitoring at SW3, SW4, and SW5. If an impact of the surface water is identified at surface water station SW3, then SW1 and SW2 can be reintroduced to the monitoring program.

APPENDIX 3.2 to *PW-RFP-005-2009*
2006 Annual Monitoring Report – Executive Summary
Haileybury Landfill Site

EXECUTIVE SUMMARY

The following report addresses the Annual Report requirements for the Corporation of Temiskaming Shores Haileybury Landfill Site ("the Site"), formerly known as the Corporation of the Town of Haileybury Landfill Site, for the 2006 calendar year. Specifically, the report summarizes the Site operations and water quality monitoring conducted through the year, as laid out in sections 25(1) to 25(13) of the Provisional Certificate of Approval for a Waste Disposal Site No. A570402 ("C of A"). A copy of this C of A can be found in Appendix A. Special attention is also paid to addressing comments made by Ontario Ministry of Environment ("MOE") staff in a letter of October 16, 2006 (McCormack 2006 – see Appendix B).

The Site is located approximately 9 kilometres southwest of the former municipality of Haileybury (Figure 1, Appendix C). The Site itself occupies an area of 32.4 hectares ("ha") of which the Fill Area (i.e., the portion of the Site where waste may be disposed) occupies an area of roughly 5.8 ha (Figure 2, Appendix C.). The Site, the licensed Fill Area (areas indicated by purple), and the fence surrounding the Fill Area are illustrated on Figure 2. The current monitoring program for the Site includes five surface water monitoring stations and 13 groundwater monitoring wells (including the two new wells installed in 2006).

During the fall of 2006, two monitoring wells were installed off-site in the area of the proposed Leachate Attenuation Zone. The first well, TW13, was installed northwest of TW11 and the second well, TW14, was installed in close proximity to TW12 since TW12 is typically dry and can not be sampled. The locations of these new monitoring wells are illustrated on Figure 2. TW13 was drilled to a depth of 15.2 m and TW14 was drilled to a depth of 13.7 m. Bedrock was not encountered during the installation of these monitoring wells.

Site Operations

Site operations remain unchanged and there have been no changes to the Site's equipment or procedures. Furthermore no operating difficulties were encountered in 2006 and there were no complaints made regarding the Site operations during 2006.

Daily records are kept for the Site. These waste deposition records indicate that the total waste volume (uncompacted) received at the Site in 2006 was 20 076 cubic metres ("m^3"). This is 17 percent more than that received in 2005, 12 percent more than that received in 2004, but 2

percent less than that received in 2003. The Agricultural College Residence building, located on Hessle Street in New Liskeard, was demolished in 2006. This demolition is responsible for the elevated volumes of waste deposited in the Haileybury Landfill in 2006.

Estimates have been conducted that indicate:

- the remaining Fill Area capacity is 132 814 m^3 (see Table 2, Appendix E), and
- based on the waste deposition records obtained from Temiskaming Shores and an estimated 1% increase in the population served by the Site, the Fill Area will reach this capacity during the year 2017 (see Table 3, Appendix E).

Negotiations regarding obtaining an easement and all of the water rights to the land required for the contaminant attenuation zone will continue once the full extent of the off-site contamination has been establish and the required attenuation zone identified.

Groundwater Elevations

Groundwater elevations at each sampled monitoring well were measured during every sampling event (see Figure 42).

In 2006, the groundwater elevations were generally higher than 2005 and followed similar seasonal fluctuations as 2005. Peak elevations were observed in May, lower elevations in September, and increased elevations again in December. TW1 and TW3 were the only wells which showed slightly lower water elevations in 2006 than 2005. TW12 is generally virtually dry with only a small amount of water, insufficient to sample, at the bottom of the well.

SES has prepared three (3) water table contour maps based on water table elevations measured in May, September, and December 2006. These are presented as Figures 5a, b, and c, Appendix C. The December water table contour map includes water table elevations from the two new off-site monitoring wells, TW13 and TW14. These water table contour maps suggest a westerly flow direction within the Fill Area and the area directly west of the Fill Area. Due to the presence of the new monitoring wells, TW13 and TW14, in December 2006, the December water table contour map suggests that the groundwater flow direction to the west of the Site may be trending in a northwest direction.

Contrary to what was stated by IWC in their 1995 report, IWC(1995), and SES in the City of Temiskaming Shores 2005 Annual Monitoring Report, the TransCanada Pipeline is most likely not controlling the flow of groundwater in this area. This is because the groundwater in the vicinity of the pipeline tends to be deeper than the base of the excavation for the installation of the pipeline.

Groundwater Monitoring

Groundwater samples were collected from 11 monitoring wells in May, 10 monitoring wells in September, and 12 groundwater monitoring wells in December 2006. TW12 was not sampled in September or December due to insufficient water and TW13 and TW14 were added to the monitoring program in December.

In terms of the indicator parameter time series for the monitoring wells, the most contaminated monitoring wells, TW4 (on-site), TW9 (on-site), TW11 (off-site), and TW13 (off-site) show increased concentrations of most of the indicator parameters throughout the time series.

The MOE's Guideline B-7, or the Reasonable Use Concept ("RUC"), was used to define Boundary Criteria for the quality of groundwater leaving the Site. The RUC was applied using water chemistry data from well TW8 to define background groundwater quality.

Four not health-related parameters commonly failed the RUC: dissolved organic carbon, iron, manganese, and organic nitrogen. The only well which did not show an exceedance of any of these four parameters in 2006 was the new TW14, when it was sampled once in December. Well TW3 also failed the aluminum RUC on the two sample dates which it was sampled in 2006 and TW13 failed the aluminum RUC in December. Also, TDS failed the RUC in TW4, TW9, TW11, and TW13 on all sample dates and sulphate failed the RUC in TW4 on all four sample dates and TW9 in September. TW11 and TW13 are off-site monitoring wells.

Four of the wells, TW4, TW6, TW9, and TW11 failed the RUC for health-related parameters. Water sampled from TW4, failed the RUC for arsenic on all three sample dates, and nitrite in May. Water sampled from TW6 failed the RUC for nitrate in May and September. Water sampled from TW9 failed the RUC for boron on all three sample dates and nitrate in September. Finally water from TW11 failed the RUC for arsenic on all three sample dates and boron in September and December. It is interesting to note that three of these four monitoring wells (i.e.,

TW4, TW9, and TW11) were the monitoring wells which also consistently failed the RUC for not health-related TDS, DOC, iron, manganese, and organic nitrogen in 2006. TW11 is an off-site monitoring well. This suggests that these three wells may be the most heavily impacted by the Fill Area. The five wells, TW7, TW10, TW14, TW1, and TW5 downgradient and upgradient of the Fill Area did not fail any health-related RUCs during 2006.

The failure of several parameters under the RUC at off-site wells TW11 and TW13 suggests that the Fill Area is negatively impacting the off-site groundwater.

Attempts were made during the 2006 sampling year to collect samples from off-site monitoring well TW12. During the May sampling event, limited sample was collected from this well, however all other attempts failed. Therefore, TW12 was replaced with off-site monitoring well TW14 during the fall of 2006. However, TW12 will still be monitored to obtained groundwater elevations in this location. During 2006, SES also installed off-site monitoring well TW13 approximately 75 metres northwest of TW11 (see Figure 2, Appendix C). This well was installed into an assumed bedrock valley (i.e., it was drilled to a depth of 15.2 m and did not encounter bedrock) as are TW11 and TW9 (see Figure 3, Appendix C). Information obtained during the 2006 sampling campaign indicates that TW14 is not impacted but TW13 is impacted by landfill site operations. Based on only one set of analytical data, TW13 appears to be the most impacted off-site monitoring well. Therefore, further work will be done in 2007 to fully delineate the extent of the off-site contamination. SES is currently preparing a work plan for this delineation. SES believes that the plume is following a bedrock valley which runs in a northwesterly direction from the west side of the Site. SES is going to attempt to locate the bedrock valley off-site and install additional monitoring wells in this valley to determine the full extent of the contaminant migration. These new monitoring wells will hopefully provide the information necessary to fully define the groundwater flow directions northwest and west of the Site and fully characterize the groundwater quality downgradient of the Fill Area. They will also be used to delineate the full extent of off-site impact as a result of the landfill operations.

Whereas information is lacking on the groundwater chemistry in the area downgradient and outside of the Fill Area, sufficient data are available to characterize the groundwater quality in the upgradient section of the Fill Area. As approved by the MOE in their letter dated October 16, 2006, commencing in 2007 TW1 and TW5 will only be sampled on an annual basis, however, water levels in these wells will continue to be measured during each sampling event.

SES is concerned that TW8, currently being used as the background well, is not representative of background groundwater conditions as it is very shallow and is installed in a swampy area. Therefore, SES will consider the installation of a new background well in 2007. To ensure that the RUC is being applied appropriately.

As required by Condition 19(2) of the C of A, the following monitoring wells should be abandoned in accordance with Section 21 of Ontario Regulation 903 as soon as practical:

- MW2 which is no longer used as there are no construction details for this well and was replaced by a new TW9 in 1998, and
- MW1 which is no longer used and was replaced by TW6 in 1994.

Surface Water Monitoring

Streamflow gauging and sampling was conducted during the May and September 2005 sampling events at all five surface water sampling sites. These is considerable evidence of chemical variability in the surface water samples; however, none of it can be definitively attributed to the Site.

If surface water is being impacted by the Fill Area, this impact is most likely to be detected by comparing the chemistry of water sampled at SW3 (within the proposed leachate attenuation zone) to that of water sampled at the upstream surface water sampling station SW4. Therefore, SES recommends eliminating the surface water sampling at the most distant surface water stations, SW1 and SW2 (Figure 1), and only continuing with the semi-annual monitoring at SW3, SW4, and SW5. If an impact of the surface water is identified at surface water station SW3, then SW1 and SW2 can be reintroduced to the monitoring program.

SES recommends establishing the source of higher TDS, alkalinity, and other indicator parameter concentrations at SW3 and SW4. Are these increased concentrations due to upstream sources or landfill operations? Based on a limited amount of upstream work conducted by SES in 2006, it appears as though there is an upstream non-landfill source of these parameters. SES should investigate this further in 2007.

Finally, SES is recommending the installation of staff gauges in the stream containing surface water monitoring stations SW3 and SW4 in 2007. This will allow SES to compare the water level in this stream to the groundwater elevations.

The City of Temiskaming Shores

APPENDIX 3.3 to *PW-RFP-005-2009*
2007 Annual Monitoring Report – Executive Summary
Haileybury Landfill Site

EXECUTIVE SUMMARY

The following report addresses the Annual Report requirements for the Corporation of Temiskaming Shores Haileybury Landfill Site ("the Site"), formerly known as the Corporation of the Town of Haileybury Landfill Site, for the 2007 calendar year. Specifically, the report summarizes the Site operations and water quality monitoring conducted through the year, as laid out in sections 25(1) to 25(13) of the Provisional Certificate of Approval for a Waste Disposal Site No. A570402 ("C of A"). A copy of this C of A can be found in Appendix A.

The Site is located approximately 9 kilometres southwest of the former municipality of Haileybury (Figure 1, Appendix B). The Site itself occupies an area of 32.4 hectares ("ha") of which the Fill Area (i.e., the portion of the Site where waste may be disposed) occupies an area of roughly 5.8 ha (Figure 2, Appendix B.). The Site, the licensed Fill Area (areas indicated by purple), and the fence surrounding the Fill Area are illustrated on Figure 2. The current monitoring program for the Site includes five surface water monitoring stations and 16 groundwater monitoring wells (including the three new wells installed in 2007).

In September 2007, three monitoring wells were installed off-site in the area of the proposed Leachate Attenuation Zone. The first well, TW15, was installed to the west of existing impacted wells (TW11 and TW13). The second well, TW16, was installed to the west of TW15. The third well, TW17, was installed at an intermediate position between existing wells TW7 and TW10. The locations of these new monitoring wells are illustrated on Figure 2. Bedrock was not encountered during the installation of these monitoring wells, but it was encountered, based on abrupt auger refusal, at other nearby locations where well installations were attempted.

Site Operations

There are currently three active waste fill locations: the 2007 South Footprint, the 2007 Middle Footprint, and the 2007 North Footprint. The 2007 North Footprint is located at the eastern end of the area in the north of the Fill Area where an interim cover has been applied.

No operating difficulties were encountered in 2007 and there were no complaints made regarding the Site operations during 2007.

Daily records are kept for the Site. These records include the individual who delivered the waste, the date received, and an estimated volume of the total waste received in cubic yards. The daily records for the Site are then consolidated into monthly waste volumes by Temiskaming Shores. A summary of the 2007 monthly and total annual waste deposition records as received at the Site, obtained from Temiskaming Shores, can be found in Table 1, Appendix D. These waste deposition records indicate that the total waste volume received at the Site in 2007 was 18 217 cubic metres ("m^3"). This is nine percent less than that received in 2006 and six percent more than that received in 2005. The average 10 year waste deposition rate at the Haileybury Landfill is 20 377 m^3 (see Table 1, Appendix D). The total volume of waste received in 2007 was 11 percent less than this average 10 year waste deposition rate.

Estimates to determine the remaining fill capacity at the Site have been carried out using two different methods. These methods determined that:

- the remaining Fill Area capacity for compacted waste and cover material is 208 438 m^3 and 198 512 m^3 for compacted waste (see Table 2, Appendix D), and
- based on the waste deposition records obtained from Temiskaming Shores and an estimated 1% increase in the population served by the Site, the Fill Area will reach this capacity during the year 2024 (see Table 3, Appendix D).

Work during 2007 delineated the full extent of the landfill plume in the Leachate Attenuation Zone west of the Site. There was also a geophysical survey conducted in 2007 that identified four areas of elevated conductivity and a shallow bedrock ridge along the northern portion of the study area as well as a deeper bedrock ridge along the southwest corner of the study area. This work will be reported in detail in a document currently under development by SES, which will accompany an amendment to the C of A. This amendment will be seeking approval to redefine the Contaminant Attenuation Zone as described in Section 7 of the C of A.

Site Hydrology

Groundwater elevations at each sampled monitoring well were measured during every sampling event (see Figure 44 and Table 8). In 2007 SES installed a new staff gauge in the stream containing surface water monitoring sites SW3 and SW4. Water level data from this staff gauge, combined with data from a nearby groundwater monitoring well, indicate that the hydraulic gradient is from stream to subsurface, not vice-versa (Table 9). This strongly

suggests that groundwater impacted by the Fill Area is not flowing into the stream at this site, but that stream water may be influencing the groundwater in some areas near the stream.

Contrary to what was stated by IWC in their 1995 report IWC (1995) and SES (2005), the TransCanada Pipeline is most likely not controlling the flow of groundwater in this area. This is because the groundwater in the vicinity of the pipeline tends to be deeper than the base of the excavation for the installation of the pipeline.

Groundwater Monitoring

Groundwater samples were collected from 12 monitoring wells in June, 13 monitoring wells in September, and 13 groundwater monitoring wells in November 2007. In accordance with a letter from the MOE, dated October 15, 2006, the sampling frequency at wells TW1 and TW5 was reduced to annual in 2007, TW12 was not sampled in 2007 due to insufficient water, and TW15, TW16, and TW17 were added to the monitoring program in September and November.

In terms of the indicator parameter time series for the monitoring wells, the most contaminated monitoring wells, TW4 (on-site), TW9 (on-site), TW11 (off-site), TW13 (off-site), show increased concentrations of many of the indicator parameters throughout the time series.

Of the new wells installed in 2007, TW15, installed west of TW13 on the downgradient side of the pipeline right-of-way is impacted by landfill leachate but not to the same extent as TW9, TW11 or TW13. TW16, installed approximately 100 metres west of TW15, contains much lower concentrations of the indicator parameters than TW15 but slightly elevated concentrations of sulphate suggesting potential landfill impact. TW17, installed between existing wells TW7 and TW10, is one of the least impacted wells monitored as part of this monitoring program.

To better understand the hydrochemistry of the wells monitored as part of this monitoring program, SES constructed a ternary diagram (Figure 29b, Appendix B). This diagram illustrates that there are three hydrochemical fingerprints associated with the water monitored in and around the Site.

- Most of the monitored sites are dominated by water containing relatively high proportions of alkalinity. These sites represent groundwater or surface water which is generally less impacted or not impacted at all by the Fill Area.

- Second, several monitored sites are dominated by water containing relatively high proportions of sulphate and alkalinity. These sites contain groundwater impacted by the Fill Area.
- The third type of monitored sites, SW3, SW4, and TW10, are those containing relatively high proportions of chloride and alkalinity. These represent a distinct source of water not influenced by the Fill Area. This confirms that the hydraulic gradient on the landfill side of the stream is from the stream towards the Leachate Attenuation Zone.

The MOE's Guideline B-7, or the Reasonable Use Concept ("RUC"), was used to define Boundary Criteria for the quality of groundwater leaving the Site. The RUC was applied using water chemistry data from well TW8 to define background groundwater quality.

Six not health-related parameters commonly failed the RUC: alkalinity, iron, manganese, dissolved organic carbon, hardness and total dissolved solids. The only well which did not show an exceedance of any of these four parameters in 2007 was TW14 on all three sample dates. Off-site wells, TW11, TW13, and TW15, all failed the RUC for not heath-related parameters in 2007. Four of the wells, TW4, TW6, TW9, and TW11 (off-site) failed the RUC for health-related parameters. The failure of several parameters, not health-related and health-related, under the RUC at off-site wells TW11, TW13, and TW15 suggests that the Fill Area is negatively impacting the off-site groundwater resources.

Work conducted by SES during 2007 delineated the full extent of the landfill plume in the Leachate Attenuation Zone west of the Site.

As a result of the delineation program conducted in 2007, TW10, TW14, TW16, and TW17 are considered to be the monitoring wells within the Leachate Attenuation Zone and outside of the impact of the leachate plume. These locations will continue to be monitored, under the current monitoring program, to ensure that the groundwater quality continues to be attenuated prior to these groundwater monitoring wells.

Surface Water Monitoring

Streamflow gauging and sampling was conducted during the May and September 2007 sampling events. Streamflow was estimated at one site during the May and September sampling events. The other four surface water sampling sites are not generally well suited to

reliable estimates of streamflow using non-chemical methods as the flows at these sites, SW2, SW3, SW4, and SW5, is generally too low or obstructed to accurately measure.

Previously it had been thought that the landfill may impact the surface water downgradient of the landfill and that this impact would most likely be detected by comparing the chemistry of water sampled at SW3 (within the proposed Leachate Attenuation Zone) to that of water sampled at the upstream surface water sampling site, SW4. However, it is now understood that this stream is hydraulically upgradient from the groundwater west of the landfill and consequently is most likely losing water to the subsurface. The sampling conducted at these two monitoring stations during the 2007 monitoring events indicated that the water chemistry at these two monitoring stations was quite similar (Tables 7c and 7d). The water at these two sampling locations does contain elevated concentrations (i.e., higher than the background station SW2) of several of the indicator parameters. However, these elevated concentrations are likely not due to inflow of landfill-impacted groundwater, because the measured hydraulic gradients are in the opposite direction (stream-to-subsurface) and the hydrochemical fingerprint of the water at SW3 and SW4 is generally different from that of the groundwater west of the Fill Area.

Of the surface water sites sampled, the only one that shows any definitive impact as a result of landfill operations is SW5. This is a small intermittent stream draining the swamp east of the Fill Area. This stream often contains significant quantities of refuse. This refuse is most likely responsible for contributing contaminants to the surface water at this site. This garbage should be cleaned from SW5 on a regular basis.

SES recommends eliminating the surface water sampling at the most distant surface water stations, SW1 and SW2 (Figure 1), and only continuing with the semi-annual monitoring at SW3, SW4, and SW5. SW3 and SW4 should continue to be monitored because they will provide additional information necessary for the interpretation of any changes in the chemistry at TW10. SW5 should continue to be monitored to ensure that cleaning the garbage out of this stream helps to reduce the levels of contaminants observed in the stream.

SES also recommends installing a second staff gauge on the small stream containing surface water sampling sites, SW3 and SW4. This should be installed closer to SW4 and will enable SES to better understand the flow of water (i.e., groundwater to surface water or surface water to groundwater) in this area of the stream.

No stream flow gauging or measuring should be done at these sites. However, water elevation measurements should be made at the existing staff gauge and the newly proposed staff gauge in the stream containing SW3 and SW4.

APPENDIX 3.4 to *PW-RFP-005-2009*
2005 Annual Monitoring Report – Executive Summary
New Liskeard Landfill Site

EXECUTIVE SUMMARY

The New Liskeard Landfill Site is located off Rockley Road, approximately three kilometres west of the urban core of New Liskeard. The City of Temiskaming Shores owns and operates the landfill facility, and the site is the sole waste disposal site for the Town of New Liskeard. The total footprint of the historic waste fill area is approximately 6 hectares. The active waste disposal restricted to a 2 hectare approved fill area in the southern portion of the site.

General land usage in the vicinity of the landfill consists of single-family dwellings to the east along Rockley Road and along Highway 65 to the northeast, undeveloped bush, an electricity transmission line right-of-way, and agricultural livestock pasture. Dwellings and local work places in the vicinity of the landfill are serviced by means of individual water supply wells and on-site septic systems.

The landfill is situated on the northern end of a broad limestone bedrock-controlled ridge that rises above surrounding shallow-sloping plains that grade in a northeasterly direction towards Wabi Creek. The waste fill zone is situated on the lower section of limestone bedrock on the eastern side of that ridge. A landfill has been present at this location for in excess of 90 years.

Groundwater at the plains area adjacent to the landfill site moves through a geologic stratigraphy that primarily consists of two units. The upper hydrostratigraphic unit is a layer of soil overburden of glacial till, which is comprised of silty sand to silt textured soils, with some clay content. In general, the till is about 2 metres thick in areas immediately adjacent to the landfill, and increases in thickness to between about 12 to 23 metres in a north/northeasterly direction toward Highway 65. The increased soil thickness is related to a drop in the elevation of the buried bedrock surface due to a geological fault.

The lower hydrostratigraphic unit consists of limestone bedrock with some shale and siltstone interbeds. Igneous bedrock is interpreted to be present below the overburden soil toward the Highway 65 area due to the geological fault. Permeability in the limestone bedrock is controlled by fractures and bedding planes, which occur less frequently at depths below about 10 metres, resulting in lower permeability at depth. The ridge feature consists of exposed limestone bedrock, with overburden soil being generally absent.

The effect of the landfill site on the adjacent groundwater resources is monitored by means of a network of groundwater monitors that has been established on and around the waste disposal area. Groundwater levels were measured at the landfill's groundwater monitor network, for events in June, August, and November 2005. Water levels are measured by City staff and data are compiled and interpreted by Jagger Hims Limited. The average depth to the water table in the plains area northeast of the landfill was about 1 metre below grade, and there is some seasonal variation.

Leachate is generated within the waste fill zone by physical and chemical interactions between infiltrated precipitation and refuse. Raw leachate in the refuse mixes with the shallow groundwater beneath the waste fill zone to form a leachate plume of groundwater with elevated concentrations of several chemical parameters, as compared to background groundwater quality. Decreases in chemical concentrations within the groundwater are anticipated to occur with increased distance from the waste fill area, as a result of dilution and other natural chemical/physical attenuation processes.

Groundwater movement occurs through the overburden and the underlying limestone bedrock toward the northeast, away from the waste fill area. The average rate of groundwater movement in the plains area away from the landfill is estimated to be approximately 1.8 m/year in overburden, and 0.6 to 5.6 m/year in shallower bedrock. The plume of leachate-affected groundwater will generally move at the rates noted above, but higher rates of movement for dissolved components may occur locally, particularly in the

fractured bedrock. There is also a vertical component to movement of the leachate plume as groundwater within the overburden and shallow bedrock tends to move deeper toward a middle depth flow zone.

Groundwater movement occurs from the landfill site in a northeasterly direction towards the dwellings located along Highway 65. The leachate plume is migrating away from dwellings located along Rockley Road east of the landfill and are not affected by leachate impacts.

Groundwater samples were obtained from selected groundwater monitors for events in June, August, and November 2005. Water samples were obtained from eight of the off-site private water supply wells located along Highway 65 during 2005. Quality Assurance and Quality Control procedures were performed, in accordance with company protocols.

The definitive identification of leachate effects on groundwater quality becomes increasingly more difficult to establish at greater distances from the waste fill area, particularly since background groundwater in the vicinity of the landfill site is of variable quality. Leachate impacts on groundwater quality were interpreted by using various screening methods. In 2005, downgradient groundwater quality indicated by monitors located adjacent to the fill area and within approximately 250 m of the waste ranged between significantly to weakly affected by leachate, respectively. Groundwater quality at locations further removed from the waste fill area exhibits weak to non-detectable leachate impacts. Concentrations of leachate indicator chemicals remained relatively constant or decreased over the observation period, with minor fluctuations.

Groundwater samples were analyzed for Volatile Organic Compounds (VOC's) concentration in 2005. Concentrations were below the laboratory detection limit for most compounds. Detected VOC's had either no established standards under the Ontario Drinking Water Standards, or reported concentrations were below the standards. Monitors

located close to the waste fill area indicate that the landfill does not significantly affect groundwater quality with respect to VOC's.

Effects to groundwater quality due to a landfill site are interpreted using Reasonable Use Guideline, also known as Guideline B-7 criteria, that provide maximum allowable concentrations of chemical parameters at the property boundary. Guideline B-7 criteria were applied to monitors and off-site wells located close to the landfill property boundary and beyond the property line.

Concentrations of parameters exceeded or were very close to Guideline B-7 criteria at several downgradient monitors in 2005. The following parameters exceeded the Guideline B-7 criteria at groundwater monitors: alkalinity, aluminum, DOC, iron, manganese, sodium, sulphate, and TDS. Parameters that possibly are elevated due to the landfill include DOC, manganese, and sodium. Parameter concentrations are mostly within compliance of Guideline B-7 criteria at locations west of Highway 65.

Water quality at off-site water supply wells was compared to the most recent (2003) Ontario Drinking Water Quality Standards. Individual wells exceeded the standards for one or more of the following parameters: DOC, hardness, iron, lead, organic nitrogen, and sodium. Results were reported individually in a letter sent to the resident of each property. One off-site supply well had elevated lead which is not attributed to the landfill site. Whereas some wells exceeded Guideline B-7 criteria for iron, lead, and DOC, these concentrations are considered natural or are not attributed to the landfill site. Leachate screening methods indicate that leachate-impacted groundwater is not affecting tested water supply wells. Similarly, two wells that were elevated for odour and chloride concentrations are not interpreted to be affected by the landfill site. In summary, the water quality at off-site water supply wells located along Highway 65 is not impacted by leachate from the landfill.

Some chemical concentrations are elevated with respect to Guideline B-7 criteria in some groundwater monitors which were interpreted to be a result of natural groundwater quality or other non-landfill sources, and not due to the landfill site.

The routine sampling of the existing monitor network and off-site private supply wells should continue through 2006. Some minor modifications to the sampling program are recommended.

The construction, installation, and sampling of two (2) groundwater monitoring well nests that was recommended in previous annual monitoring reports is no longer recommended based on recent data. The absence of leachate effects to groundwater quality at locations removed from by the landfill does not warrant this additional work program at this time. Local water supply wells located along Highway 65 are interpreted to be unaffected by leachate effects from the landfill site.

The MOE should be consulted with regard to the long-term monitoring program for the landfill, including selection of monitors, off-site supply wells, parameters, and monitoring frequency. Delineation of a formal contaminant attenuation zone should also be discussed.

APPENDIX 3.5 to *PW-RFP-005-2009*

2006 Annual Monitoring Report – Executive Summary

New Liskeard Landfill Site

EXECUTIVE SUMMARY

The New Liskeard Landfill Site is located off Rockley Road, approximately three kilometres west of the urban core of New Liskeard. The City of Temiskaming Shores owns and operates the landfill facility, and the site is the sole waste disposal site for the community of New Liskeard. The total footprint of the historic waste fill area is approximately 6 hectares. The active waste disposal operation is restricted to the original approved two hectare fill area in the southern portion of the site.

General land usage in the vicinity of the landfill consists of single-family dwellings to the east along Rockley Road and along Highway 65 to the northeast, undeveloped bush, a hydro transmission line right-of-way, and agricultural livestock pasture. Dwellings and local work places in the vicinity of the landfill are serviced by means of individual water supply wells and on-site septic systems.

The landfill is situated on the northern end of a broad limestone bedrock-controlled ridge that rises above surrounding shallow-sloping plains that grade in a northeasterly direction towards Wabi Creek. The waste fill zone is situated on the lower section of limestone bedrock on the eastern side of that ridge. A landfill has operated at this location for in excess of 90 years.

Groundwater that is present beneath the plains area adjacent to the landfill site moves through a geologic stratigraphy that consists primarily of two units. The upper hydrostratigraphic unit is a surficial deposit of glacial till, which is comprised of silty sand to silt textured soils, with some clay content. The lower hydrostratigraphic unit is limestone bedrock. In general, the till is about two metres thick in areas immediately adjacent to the landfill, and increases in thickness to between about 12 to 23 metres in a north/northeasterly direction toward Highway 65. The increased soil

thickness is related to a drop in the elevation of the buried bedrock surface due to a geological fault.

Beneath the till, the lower hydrostratigraphic unit consists of limestone bedrock with some shale and siltstone interbeds. Igneous bedrock is interpreted to be present beneath the overburden soil in the area toward the Highway 65 due to the geological fault. Hydraulic conductivity in the limestone bedrock is controlled by fractures and bedding planes, which occur less frequently at depths below about 10 metres, resulting in lower permeability at depth. The ridge feature directly west of the landfill consists of exposed limestone bedrock, with overburden soil being generally absent.

The effect of the landfill site on the adjacent groundwater resources is monitored by means of a network of groundwater monitors that has been established on and around the waste disposal area. Groundwater levels were measured at the monitors during events in June, August, and November 2006. Water levels are measured by City staff, and data are compiled and interpreted by Jagger Hims Limited. The average depth to the water table in the plains area northeast of the landfill was about 0.9 metres below grade, and there is some seasonal variation.

Leachate is generated within the waste fill zone as a result of physical and chemical interactions between infiltrated precipitation and the refuse. Raw leachate in the refuse mixes with the shallow groundwater beneath the waste fill zone to form a leachate plume of groundwater with elevated concentrations of several chemical parameters, as compared to background groundwater quality. Decreases in leachate concentrations in the groundwater occur with increased distance from the waste fill area, as a result of dilution and other natural chemical/physical attenuation processes.

Groundwater moves through the overburden and the underlying limestone bedrock, toward the northeast, away from the waste fill area. Groundwater moves from the landfill site in a

northeasterly direction towards Highway 65, and away from Rockley Road east of the landfill. The average rate of groundwater movement in the plains area away from the landfill is estimated to be approximately 1.9 m/year in overburden, and 0.6 to 5.7 m/year in shallower bedrock.

The plume of leachate-affected groundwater generally moves at the rates noted above, however, higher rates of movement may occur locally, particularly in the fractured bedrock. There is also a vertical component to movement of the leachate plume, as groundwater within the overburden and shallow bedrock converges toward a middle depth flow zone.

Groundwater samples were obtained from selected groundwater monitors during events in June, August, and November 2006. Water samples were obtained from seven off-site private water supply wells located along Highway 65 during 2006. Quality Assurance and Quality Control procedures were performed in accordance with company protocols.

The definitive identification of leachate effects on groundwater quality becomes increasingly more difficult to establish at greater distances away from the waste fill area. This is particularly the case as background groundwater quality in the vicinity of the landfill site is quite variable. Leachate impacts on groundwater quality have been interpreted by using various screening methods. In 2006, downgradient groundwater quality indicated by monitors located adjacent to the fill area and within approximately 250 m of the waste ranged between significantly affected to weakly affected by leachate, respectively. Groundwater quality at locations further removed from the waste fill area indicates that leachate impacts are negligible to undetectable.

Groundwater samples were analyzed for Volatile Organic Compounds (VOC's) in 2006. Concentrations were below the method detection limit for most compounds. Detected VOC's had no established standards under the Ontario Drinking Water Quality Standards.

Samples from monitors located close to the waste fill area indicate that the landfill does not significantly affect groundwater quality with respect to VOC's.

Effects on off-site groundwater resources due to a landfill site are interpreted using the Ministry of the Environment's Reasonable Use Guideline, known as Guideline B-7, that provides a methodology to determine the maximum allowable concentrations of specific chemical parameters at the property boundary. Guideline B-7 criteria were applied to groundwater quality in monitors and off-site wells located close to the landfill property boundary and beyond the property line.

Guideline B-7 criteria are exceeded for specific parameters including alkalinity, DOC, manganese, and sodium at several downgradient monitors. Monitors located at the extremities of the City-Owned land and beyond complied with Guideline B-7 criteria in 2006.

Water quality at off-site water supply wells was compared to the most recent (2006) Ontario Drinking Water Quality Standards. Individual wells exceeded the standards for one or more of the following parameters: colour, hardness, iron, organic nitrogen, and sodium. These parameters can occur naturally within the local groundwater and/or can be due to other anthropogenic causes (e.g. road salting, septic systems) and are not attributed to landfill operations. Results were reported individually in a letter sent to the resident of each property. One off-site supply exceeded the Guideline B-7 criteria for manganese, which is interpreted to be natural and is not attributed to landfill operations.

Based on the results of our leachate screening methods, we conclude that groundwater quality at the water supply wells along Highway 65 is not affected by landfill operations. Two wells that show elevated concentrations of chloride and noticeable odour are not interpreted to be affected by the landfill site. A general risk assessment with respect to

the downgradient wells is provided in the report as required by Provincial Order 5777-6M2M47.

The routine sampling of the existing monitor network and off-site private water supply wells should continue through 2007.

A proposed Contaminant Attenuation Zone (CAZ) is delineated in the report. An amendment to the Provisional Certificate of Approval for the site is identified as Notice No. 2, dated April 17, 2007 approves and recognizes the proposed CAZ. A copy of Notice No. 2 is provided in Appendix E. Two new monitoring well nests are recommended to be installed along the eastern boundary of the proposed CAZ. These two monitoring wells nests will function as sentry monitors located between the landfill and the residential wells along Highway 65. The new sentry monitors should be installed during the summer of 2007 so that water quality results may be reviewed following the November sampling event. The 2007 Annual Report can then include an assessment of groundwater quality at the eastern boundary of the CAZ including Guideline B-7 criteria.

The MOE should be consulted with respect to the long-term monitoring program for the landfill, including selection of monitors, off-site supply wells, parameters, and monitoring frequency.

The City of Temiskaming Shores

APPENDIX 3.6 to *PW-RFP-005-2009*

2007 Annual Monitoring Report – Executive Summary

New Liskeard Landfill Site

EXECUTIVE SUMMARY

The New Liskeard Landfill Site is located off Rockley Road, approximately three kilometres west of the urban centre of New Liskeard. The City of Temiskaming Shores owns and operates the landfill facility, and the site is the sole waste disposal site for the Town of New Liskeard. The total footprint of the historic waste fill area is approximately 6 hectares. The active waste disposal is restricted to the 2 hectare approved fill area in the southern portion of the site.

General land usage in the vicinity of the landfill consists of single-family dwellings to the east along Rockley Road and along Highway 65 to the northeast, undeveloped bush, an electricity transmission line right-of-way, and agricultural livestock pasture. Dwellings and local work places in the vicinity of the landfill are serviced by means of individual water supply wells and on-site septic systems.

The landfill is situated on the northern end of a broad limestone bedrock-controlled ridge. The ridge rises above the surrounding shallow-sloping plains which slope in a north-easterly direction towards Wabi Creek. The waste fill zone is situated on the lower section of limestone bedrock on the eastern side of that ridge. The landfill has operated at this location for in excess of 90 years.

Groundwater in the plains area adjacent to the landfill site moves through a geologic stratigraphy that primarily consists of two units. The upper hydrostratigraphic unit is a layer of soil overburden of glacial till, which is comprised of silty sand to silt textured soils, with some clay content. In general, the till is about 2 metres thick in areas immediately adjacent to the landfill, and increases in thickness to between about 12 to 23 metres in a north/north-easterly direction toward Highway 65. The increased soil thickness is related to a decrease in the elevation of the buried bedrock surface due to the presence of a geological fault through this area.

The lower hydrostratigraphic unit consists of limestone bedrock with some shale and siltstone inter-beds. Igneous bedrock is interpreted to be present below the overburden soil toward the Highway 65 area due to the geological fault. Permeability in the limestone bedrock is controlled by fractures and bedding planes, which occur less frequently at depths below about 10 metres, resulting in lower permeability at depth. The ridge feature consists of exposed limestone bedrock, with overburden soil being generally absent.

The effect of the landfill site on the adjacent groundwater resources is monitored by means of a network of groundwater monitors that has been established on and around the waste disposal area. Groundwater levels were measured at the landfill's groundwater monitor network, for events in July, October, and December 2007. Water levels are measured by City staff and data are compiled and interpreted by Jagger Hims Limited. The average depth to the water table in the plains area northeast of the landfill was about 1.25 metres below grade, and there is some seasonal variation.

Leachate is generated within the waste fill zone by physical and chemical interactions between infiltrated precipitation and refuse. Raw leachate in the refuse mixes with the shallow groundwater beneath the waste fill zone to form a leachate plume of groundwater with elevated concentrations of several chemical parameters, as compared to background groundwater quality. Decreases in leachate effects to the groundwater occur with increased distance from the waste fill area, as a result of dilution and other natural chemical/physical attenuation processes.

Groundwater movement occurs through the overburden and the underlying limestone bedrock toward the north-east, away from the waste fill area. Groundwater movement occurs from the landfill site in a north-easterly direction towards Highway 65 and away from Rockley Road east of the landfill. The average rate of groundwater movement in the plains area away from the landfill is estimated to be approximately 1.9 m / year in overburden, and 0.6 to 5.7 m / year in shallower bedrock.

The plume of leachate-affected groundwater will generally move at the rates noted above, but higher rates of movement for dissolved components may occur locally, particularly in the fractured bedrock. There is also a vertical component to movement of the leachate plume as groundwater within the overburden and shallow bedrock converges toward a middle depth flow zone.

Groundwater samples were obtained from selected groundwater monitors for events in July, October, and December 2007. Water samples were obtained from eight off-site private water supply wells located along Highway 65 during 2007. Quality Assurance and Quality Control procedures were performed, in accordance with company protocols.

The definitive identification of leachate effects on groundwater quality becomes increasingly more difficult to establish at greater distances from the waste fill area, particularly since background groundwater in the vicinity of the landfill site has variable quality. Leachate impacts on groundwater quality were interpreted by using various screening methods. In 2007, down-gradient groundwater quality indicated by monitors located adjacent to the fill area and within approximately 250 m of the waste ranged between significantly to weakly affected by leachate, respectively. Groundwater quality at locations further removed from the waste fill area indicates that leachate impacts are negligible to undetectable.

The construction, installation, and sampling of two groundwater monitoring well nests that was recommended in previous annual monitoring reports and ordered by the Ministry of the Environment in July 2006 (Order Number 5777-6M2M47, included in Appendix E) was completed in 2007. Well nests OW-24 and OW-25, each comprising three wells, were installed along the eastern landfill property boundary in October 2007. Groundwater samples from the wells were collected (where possible) in October and December 2007. Data are incorporated into this report.

Groundwater samples were analyzed for Volatile Organic Compounds (VOC's) concentration in July 2007. Concentrations were below the method detection limit for most compounds. Detected VOC's do not have established standards under the Ontario Drinking Water Quality Standards. Samples from monitors located close to the waste fill area indicate that the landfill does not significantly affect groundwater quality with respect to VOC's.

Effects to groundwater quality due to a landfill site are interpreted using Reasonable Use Guideline, also known as Guideline B-7, criteria, that provide maximum allowable concentrations of chemical parameters at the property boundary. As part of the impact assessment, Guideline B-7 criteria were applied to on-site monitors, boundary monitors and off-site wells located beyond the property line.

Guideline B-7 criteria were exceeded for several parameters at several on-site but down-gradient monitors in 2007, including Alkalinity, Aluminium, Chromium, DOC, and sodium. Elevated alkalinity is attributed to natural variations in groundwater quality. Elevated sodium is also attributed to natural groundwater quality or other non-landfill sources, and is not due to the landfill site.

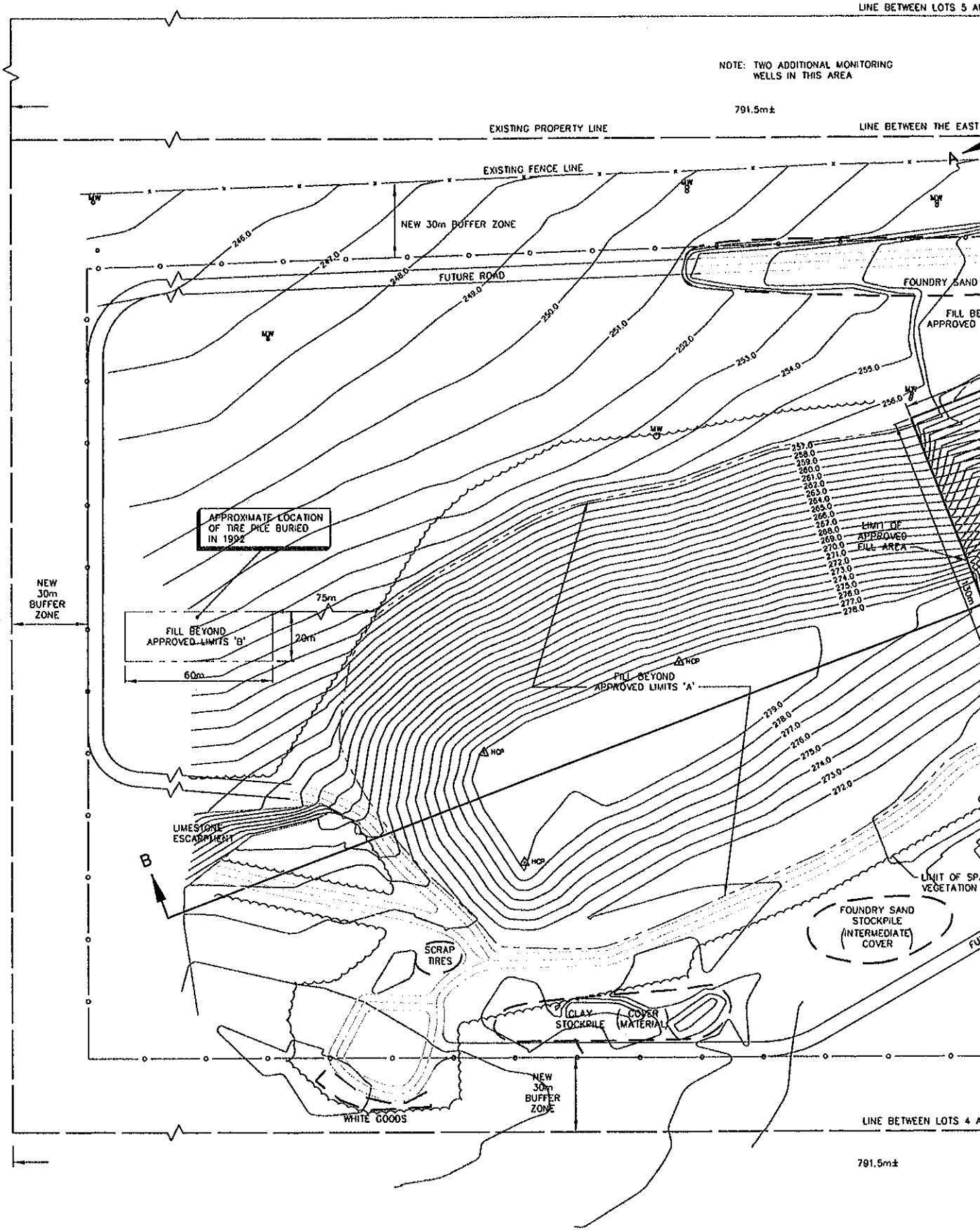
Water quality at off-site water supply wells was compared to the most recent (2006) Ontario Drinking Water Quality Standards. Individual wells exceeded the standards for one or more of the following parameters: colour, hardness, iron, and sodium. Results were reported individually in a letter sent to the resident of each property.

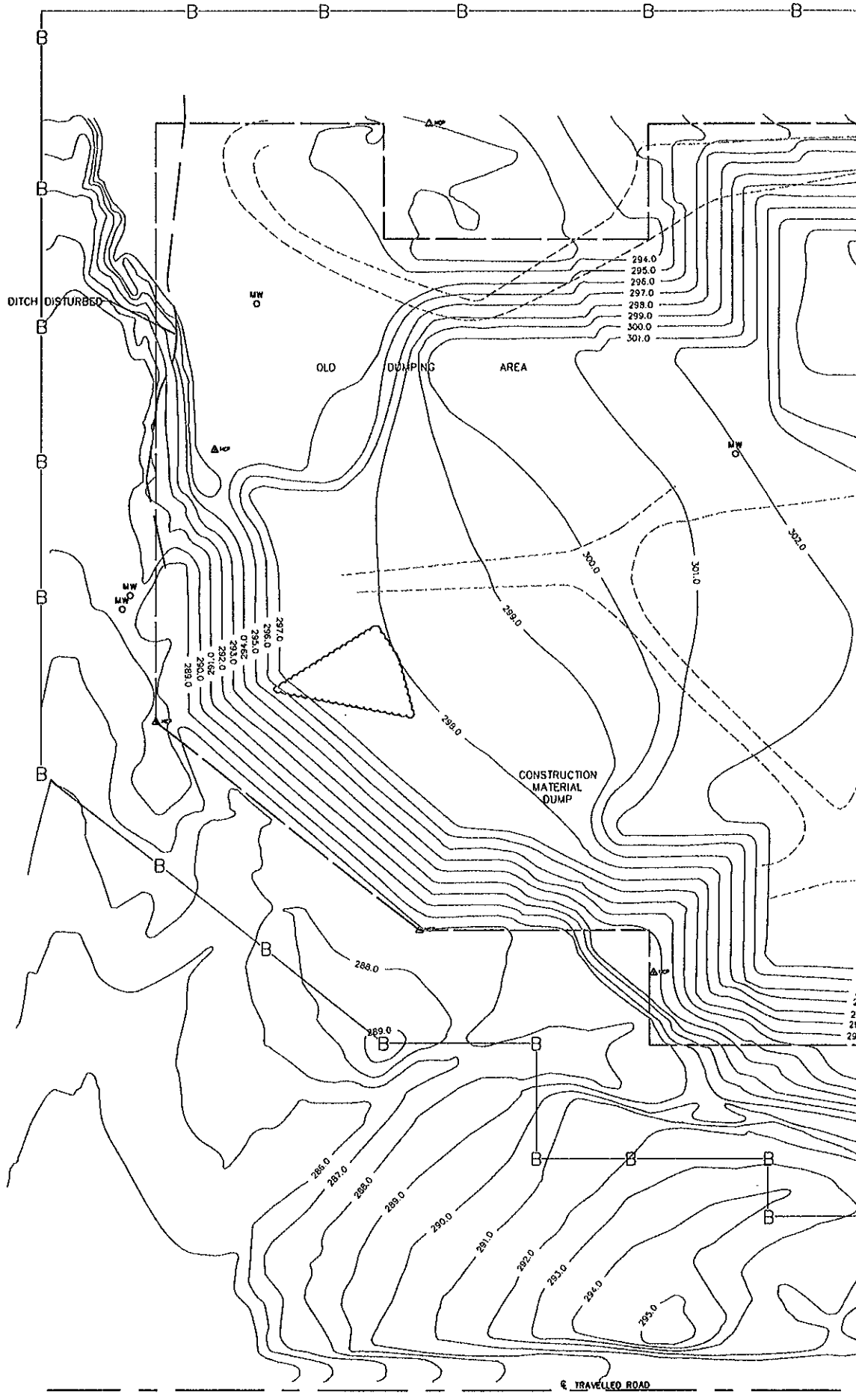
Leachate screening methods indicate that leachate-impacted groundwater is not affecting tested water supply wells. Two wells that were elevated for total dissolved solids are not interpreted to be affected by the landfill site. In summary, the water quality at off-site water supply wells located along Highway 65 is not impacted by leachate from the landfill.

The routine sampling of the existing monitor network and off-site private supply wells should continue through 2008.

The City of Temiskaming Shores

APPENDIX 4 to *PW-RFP-005-2009*
APPROVED FINAL CONTOURS OF SITES


LINE BETWEEN LOTS 5 A
NOTE: TWO ADDITIONAL MONITORING WELLS IN THIS AREA
791.5m±
EXISTING PROPERTY LINE
LINE BETWEEN THE EAST
EXISTING FENCE LINE
NEW 30m BUFFER ZONE
FUTURE ROAD
FOUNDRY SAND
FILL BE
APPROVED
APPROXIMATE LOCATION OF TIRE PILE BURIED IN 1992
LIMIT OF APPROVED FILL AREA
NEW 30m BUFFER ZONE
FILL BEYOND APPROVED LIMITS 'B'
75m
20m
60m
FILL BEYOND APPROVED LIMITS 'A'
LIMESTONE ESCARPMENT
B
SCRAP TIRES
FOUNDRY SAND STOCKPILE (INTERMEDIATE COVER)
CLAY STOCKPILE
COVER MATERIAL
NEW 30m BUFFER ZONE
WHITE GOODS
LINE BETWEEN LOTS 4 A
791.5m±


DITCH DISTURBED
OLD DUMPING AREA
CONSTRUCTION MATERIAL DUMP
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℄ TRAVELLED ROAD

The City of Temiskaming Shores

APPENDIX 5 to *PW-RFP-005-2009*
FRAMEWORK TO SOLID WASTE MANAGEMENT

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

2.0 MATRIX OF KEY DECISIONS AND TIMELINES

The following Matrix depicts the key tasks to which a Council decision is required in order to move forward a Solid Waste Management program for the City of Temiskaming Shores. The Matrix outlines a date for the said decision and a resource that would complete the task. External resources would be under direction of City staff.

The details of the individual tasks outlined in the Matrix are further detailed in Section 3 – Report Elements.

DECISION MATRIX

REPORT ELEMENT 1 – SOLID WASTE DISPOSAL SITE		
Key Task	**By**	**Decision Date**
Diversion of refuse to Haileybury Landfill Site	Municipal Staff	**February 2009**
Re-negotiation of Landfill Operations Contract	Municipal Staff	**April 2009**
Feasibility Study – Expand and/or New Site [2]	Consultant	**September 2009**
Engineering of Recommended Option [2]	Consultant	**November 2013**
Commissioning of Constructed Site	Contractor	**October 2015**
Updated Closure Plan – New Liskeard [2]	Consultant	**April 2011**
Updated Closure Plan – Haileybury [2]	Consultant	**April 2016**
New Liskeard Landfill Closed	Contractor	**December 2012**
Haileybury Landfill Closed	Contractor	**December 2018**

REPORT ELEMENT 2 – RECYCLING		
Key Task	**By**	**Decision Date**
Curbside Collection – Level of Service [1]	Consultant	**November 2009**
By-Law Recycling Collection Contract	Municipal Staff	**June 2010**

REPORT ELEMENT 3 – WASTE DIVERSION PROGRAMS		
Key Task	**By**	**Decision Date**
Spring Clean-Up Program	Municipal Staff	**July 2009**
Composting / Organic Material	Municipal Staff	**July 2009**
Christmas Tree Recycling	Municipal Staff	**July 2009**
Municipal Hazardous or Special Waste [1]	Consultant	**November 2009**
Waste Electrical & Electronic Equipment [1]	Consultant	**November 2009**
Other Special Diversion Programs [1]	Consultant	**November 2009**

REPORT ELEMENT 4 – WASTE COLLECTION SERVICES		
Key Task	**By**	**Decision Date**
Uniform Collection – All Sectors [1]	Consultant	**November 2009**
By-law for Collection Contract	Municipal Staff	**July 2009**

REPORT ELEMENT 5 – LEGISLATIVE REQUIREMENTS		
Key Task	**By**	**Decision Date**
Expanded and/or new Landfill Site [3]	Consultant	**2013**
Closure Plan – New Liskeard Landfill Site [3]	Consultant	**April 2011**
Closure Plan – Haileybury Landfill Site [3]	Consultant	**2016**
Construction / Demolition Waste Policies [1]	Consultant	**November 2009**
Solid Waste Management By-law	Municipal Staff	**March 2010**
Special Diversion Programs [1]	Consultant	**November 2009**

REPORT ELEMENT 6 – FINANCIAL CONSIDERATIONS		
Key Task	**By**	**Decision Date**
Expanded and/or new Landfill Site [3]	Consultant	**September 2009**
Closure Plan – New Liskeard Landfill Site [3]	Consultant	**2011**
Closure Plan – Haileybury Landfill Site [3]	Consultant	**2016**
Cost Recovery Mechanisms [1]	Consultant	**November 2009**
Tipping Fee Strategy [1]	Consultant	**November 2009**

[1] These identified tasks would be grouped together as an assignment for a successful Consultant.

[2] These identified tasks would be stand alone assignments for a successful Consultant.

[3] These identified tasks will be completed as part of an assignment in either [1] or [2].

REPORT ELEMENT 1
SOLID WASTE DISPOSAL SITES

1.0 The Issue

The New Liskeard Landfill Site is anticipated to reach capacity as of May 2009. Haileybury Landfill Site is anticipated to reach capacity by 2017.

2.0 Options

Three options are available:

1. Status Quo: utilize the existing sites until they reach capacity;
2. Expansion: Apply to expand one or both of the existing landfill sites;
3. New Site: Begin the process of identifying a new landfill site to coincide with the Official Plan (i.e. minimum 20 year capacity).

Staff to provide a recommendation(s) based on identified key tasks.

3.0 Key Tasks and Timelines

3.1 Diversion of refuse to Haileybury Site	Council Decision:	**Feb. 2009**
Deliverables: ➢ Update on capacity of New Liskeard Landfill Site; ➢ Impacts resulting from diversion to Haileybury.		
Deliverables to be completed by:	**Municipal Staff**	

3.2 Re-negotiation of Operations Contract	Council Decision:	**Apr. 2009**
Comments: The contract to operate the two landfills expires as of December 31, 2008. There are provisions to operate on a month-by-month basis.		
Deliverables: ➢ Modifications to the operating hours of the sites; ➢ Notification to ratepayers on diversion to Haileybury; ➢ Re-negotiated contract with operator.		
Deliverables to be completed by:	**Municipal Staff**	

3.3 Feasibility Study – Expand and/or New	Council Decision:	**Sep. 2009**
Definition of Feasibility Study: Consultant report identifying all technical and financial parameters to determine feasibility of options.		
Deliverables: ➢ Review sites (i.e. capacity, leachate, location, etc.) with respect to potential expansion; ➢ Determine legislative impacts expansion or new build; ➢ Recommendation to expand and/or construct new site (with location); ➢ Preparation of a Technical Report that supports the recommendation; ➢ Preparation of a Business Case that supports the recommendation; ➢ Municipal staff overall recommendation to Council.		
Deliverables completed by:		**Consultant**

3.4 Engineering of Recommended Option	Council Decision:	**Nov. 2013**
Comments: Engineering would be based on the recommendation(s) evolving out of the Feasibility Study.		
Deliverables (based on recommended Option): ➢ Acquisition of necessary lands, if applicable; ➢ Engineered design in compliance with legislative requirements; ➢ Studies and technical reports to comply with legislative requirements; ➢ Public consultation in compliance with legislative requirements; ➢ Application for issuance of necessary permits and/or certificates; ➢ Preparation of a Business Case (i.e. cost estimates) for construction; ➢ Preparation of Tender Documents for construction.		
Task completed by:		**Consultant**

3.5 Commissioning of Constructed Site	Council Decision:	**Oct. 2015**
Comments: This task would be initiated based on the engineered design accepted by Council.		
Deliverables (based on recommended Option): ➢ Commencement of construction of either an expanded landfill or new landfill; ➢ Installation of all parameters of design; ➢ Completion of construction;		
Task completed by:		**Consultant/Contractor**

3.6 Update Closure Plan – New Liskeard	Council Decision:	**Apr. 2011**
Update Closure Plan – Haileybury	Council Decision:	**Apr. 2016**
Comments: This task would be conditional on Feasibility Study (3.2) indicating a new site.		
Deliverables: ➢ Preparation of updated closure plans in compliance with legislative requirements; ➢ Determination of parameters for decommissioning, complete with cost estimates; ➢ Preparation of Tender Documents for closure.		
Task completed by:	**Consultant**	

3.7 New Liskeard Landfill Closed	Council Decision:	**Dec. 2012**
Haileybury Landfill Closed	Council Decision:	**Dec. 2018**
Comments: These tasks and timelines may have to be adjusted based on legislative requirements. This task would be conditional on Feasibility Study (3.2) indicating a new site.		
Deliverables: ➢ Commencement of closure of site(s); ➢ Installation of all parameters of closure plan; ➢ Completion of decommissioning;		
Task completed by:	**Consultant/Contractor**	

REPORT ELEMENT 2
RECYCLING

1.0 The Issue

Council is desirous of providing an enhanced level of recycling services with the objective of increasing diversion rates.

2.0 Options

Options available:

1. Status Quo: remain at a level in compliance with legislative mandate;
2. Curbside: Provide a curbside recycling collection program;

Staff to provide a recommendation(s) based on identified key tasks.

3.0 Key Tasks and Timelines

3.1 Curbside Collection – Level of Service	Council Decision:	**Nov. 2009**
Deliverables: ➢ Consider all types of materials and sectors (i.e. residential, IC&I) for recycling; ➢ Consider potential Provincially funded special recycling programs, if any; ➢ Consider Market conditions; ➢ Consider curbside collection methods and recommend option; ➢ Preparation of Technical Report that supports recommendation; ➢ Preparation of a Business Case that supports recommendation; ➢ Business Case to provide an associated cost per identified recyclable material.		
	Deliverables to be completed by:	**Consultant**

3.2 By-Law Recycling Collection Contract	Council Decision:	**Jun 2010**
Comments: The Level of Service determined in Section 3.1 will dictate the approach to securing a Contract.		
Deliverables: ➢ Tender to secure a Contractor for collection of recyclables based on Level of Service identified in Section 3.1; ➢ A multi-year (5 year) agreement with a Contractor ➢ Recommendation of a preferred Contractor based on a Tender Process;		
	Deliverables completed by:	**Municipal Staff**

REPORT ELEMENT 3
WASTE DIVERSION – SPECIAL PROGRAMS

1.0 The Issue

There are a number of programs designed to assist in waste diversion and/or recycling efforts.

2.0 Options

There are a number of special programs currently being provided (i.e. spring clean up) as well as a number of other programs being promoted by the Province that may or may not have funding incentives (i.e. Household Hazardous or Special Waste).

The municipality needs to remain current with best practices in regards to special programs.

3.0 Key Tasks and Timelines

3.1 Spring Clean Up Program	Council Decision:	**Jul. 2009**
Deliverables: ➢ Preparation of a Business Case to analyze effectiveness of the Spring Clean Up program; ➢ Preparation of an Administrative Report to Council with recommendation.		
Deliverables to be completed by:	**Municipal Staff**	

3.2 Composting / Organic Material	Council Decision:	**Jul. 2009**
Deliverables: ➢ Analysis of municipal composting programs; ➢ Preparation of a Business Case that supports a recommendation.		
Deliverables completed by:	**Municipal Staff**	

3.3 Christmas Trees	Council Decision:	**Jul. 2009**
Deliverables: ➢ Analysis of Christmas tree recycling program; ➢ Preparation of a Business Case that supports a recommendation.		
Deliverables completed by:	**Municipal Staff**	

3.4 Municipal Hazardous or Special Waste	Council Decision:	Nov. 2009

Deliverables:

- Consultation with Waste Diversion Ontario and Stewardship Ontario in regards to Provincial efforts for implementation of MHSW programs;
- Preparation of a Business Case that supports a recommendation;
- Preparation of an Administrative Report to Council with recommendation.

Deliverables completed by:	**Consultant**

3.5 Waste Electrical & Electronic Equipment	Council Decision:	Nov. 2009

Deliverables:

- Consultation with Waste Diversion Ontario and Stewardship Ontario in regards to Provincial efforts for implementation of Waste Electrical & Electronic Equipment program;
- Preparation of a Business Case that supports a recommendation;
- Preparation of an Administrative Report to Council with recommendation.

Deliverables to be completed by:	**Consultant**

3.6 Other Special Diversion Programs	Council Decision:	Nov. 2009

Deliverables:

- Consultation with Waste Diversion Ontario and Stewardship Ontario in regards to Provincial efforts for implementation of other special programs such as, but not limited to:
  - Re-use Centres; Open Space (Parks) Recycling; Special Event Recycling; etc.
- Preparation of a Business Case that supports a recommendation;
- Preparation of an Administrative Report to Council with recommendation.

Deliverables completed by:	**Consultant**

REPORT ELEMENT 4
WASTE COLLECTION SERVICES

1.0 The Issue

Non-uniform collection based on sectors.

2.0 Options

Staff to provide a recommendation for best practice method to provide a uniform level of collection.

3.0 Key Tasks and Timelines

3.1 Uniform Collection of all Sectors	Council Decision:	**Nov. 2009**
Comments: Council has adopted a two (2) bag limit for residential collection effective January 1, 2009.		
Deliverables: ➢ Analysis of all other sectors (i.e. IC&I sector) collection program; ➢ Preparation of a Technical Report to support recommendation; ➢ Preparation of a Business Case to support recommendation; ➢ Preparation of an Administrative Report to Council with recommendation.		
Deliverables to be completed by:		**Consultant**

3.2 By-law for Collection Contract	Council Decision:	**Jun. 2010**
Deliverables: ➢ Tender to secure a Contractor for collection taking into consideration all collection programs supported by Technical Reports and Business Cases; ➢ A multi-year (5 year) agreement with a Contractor.		
Deliverables to be completed by:		**Municipal Staff**

REPORT ELEMENT 5
LEGISLATIVE REQUIREMENTS

1.0 The Issue

Many aspects of Solid Waste Management are regulated through various legislative requirements.

2.0 Options

The municipality in is provision of Solid Waste Management has no option but to be cognizant of legislative requirements.

The municipality must also impose its' own method of legislation through the adoption of various policies and by-laws for Solid Waste Management.

3.0 Key Tasks and Timelines

3.1 Expansion and/or New Landfill Site	Council Decision:	**2013**
Comments: There extensive obligations to be adhered to under various Acts such as the Environmental Protection Act, Water Resources Act and the Environmental Assessment Act. The legislative requirements for the expansion and/or new landfill site have been identified in Report Element 1 – Solid Waste Disposal Sites.		

3.2 Closure Plan – New Liskeard Landfill	Council Decision:	**Apr. 2011**
Comments: There extensive obligations to be adhered to for the closure of a Landfill and are outlined in the applicable Certificate of Approval. These requirements have been identified in Report Element 1 – Solid Waste Disposal Sites.		

3.3 Closure Plan – Haileybury Landfill	Council Decision:	**2016**
Comments: There extensive obligations to be adhered to for the closure of a Landfill and are outlined in the applicable Certificate of Approval for the specific site. These requirements have been identified in Report Element 1 – Solid Waste Disposal Sites.		

3.4 Construction / Demolition Waste Policies	Council Decision:	Nov. 2009

Deliverables:

- Analysis of Construction and Demolition practices and their related impacts;
- Preparation of a Business Case that supports a recommendation;
- Preparation of policies to control the disposal of recyclable materials from Construction ad Demolition projects;
- Preparation of an Administrative Report to Council with recommendation.

Deliverables completed by:	**Consultant**

3.5 Solid Waste Management By-law	Council Decision:	Mar. 2010

Comments:

The methods of providing Solid Waste Management are currently based on by-laws and policies of the former municipalities or by-laws and policies subsequent to amalgamation.

Deliverables:

- A common By-law for Solid Waste Management within the City of Temiskaming Shores. The by-law would include, but not necessarily limited to provisions for service levels, cost recovery mechanisms, waste collection requirements, special programs, waste disposal site requirements, etc.

Deliverables completed by:	**Municipal Staff**

3.6 Special Diversion Programs	Council Decision:	Nov. 2009

Comments:

Special programs such as the implementation of a Household Hazardous or Special Waste program would require the issuance of a Certificate of Approval from the Ministry of the Environment.

The legislative requirements for special programs will be identified in the associated Technical and/or Business Case per program.

REPORT ELEMENT 6
FINANCIAL CONSIDERATIONS

1.0 The Issue

All Elements of the Solid Waste Management Plan will have financial implications; however there are specific financial aspects to be considered.

2.0 Options

Staff will provide financial analysis associated with all elements.

3.0 Key Tasks and Timelines

3.1 Expanded and/or new Landfill Site	Council Decision:	**Sep. 2009**
Comments: The 5 year capital budget provides cost estimates. The Feasibility Study identified in Report Element 1 complete with a Business Case will permit more accurate financial planning.		

3.2 Closure Plan – New Liskeard Landfill	Council Decision:	**Apr. 2011**
Comments: The anticipated closure timelines for the two sites are outlined in Report Element 1; however the aspects of the potential closure can be analyzed. The associated Business Case will provide the financial implications associated with the closure requirements.		

3.3 Closure Plan – Haileybury Landfill	Council Decision:	**2016**
Comments: The anticipated closure timelines for the two sites are outlined in Report Element 1; however the aspects of the potential closure can be analyzed. The associated Business Case will provide the financial implications associated with the closure requirements.		

3.4 Cost Recovery Mechanisms	Council Decision:	**Nov. 2009**
Deliverables: ➢ Analysis of current financial methods to provide Solid Waste programs; ➢ Preparation of a Technical Report that supports a recommendation; ➢ Preparation of a Business Case that supports a recommendation; ➢ Preparation of an Administrative Report to Council with recommendation.		
	Deliverables completed by:	**Consultant**

3.5 Tipping Fee Strategy	Council Decision:	**Nov. 2009**
Deliverables: ➢ Analysis of current tipping fee program; ➢ Preparation of a Technical Report that supports a recommendation; ➢ Preparation of a Business Case that supports a recommendation; ➢ Preparation of an Administrative Report to Council with recommendation.		
	Deliverables completed by:	**Consultant**