



City of Sault Ste. Marie

Solid Waste Management Environmental Assessment Waste Quantity Projections and Existing Environment Profile

June, 2010

AECOM



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EXECUTIVE SUMMARY

The City of Sault Ste. Marie is developing a Solid Waste Management Plan to determine the preferred way to address the waste management needs within the existing service area comprising of the City of Sault Ste. Marie, Prince Township and Batchewana First Nation's Rankin Reserve over the next 20 to 40 years. The Solid Waste Management Plan will include opportunities for both waste diversion and waste disposal.

The City continues to investigate various ways to divert waste from disposal by promoting and developing programs that support the 3R's hierarchy: reduce, reuse and then recycle.

The other component of solid waste management planning, waste disposal, requires the completion of an Environmental Assessment (EA) under the *Environmental Assessment Act*. The City's EA Terms of Reference (ToR), prepared to guide the EA planning process for future waste management, was approved by the Ministry of the Environment (MOE) in September, 2005.

Since that time the City has inventoried the environment within the study area, prepared population projections, analysed historical waste quantities, developed solid waste quantity projections, and identified and evaluated "alternatives to" or functionally different ways of managing residual waste.

In June 2007, the "Waste Quantity Projections and Existing Environment Profile" Working Paper and the "Alternatives to the Undertaking" Working Paper were released. This document is a follow-up to the June 2007 "Waste Quantity Projections and Existing Environment Profile" Working Paper and includes updated quantity information and public and stakeholder input received to date.

The report concludes that the City of Sault Ste. Marie may reach capacity at its Fifth Line landfill in 2017 and will require an additional 2.33 million tonnes of disposal capacity to 2049.

This information was carried forward into the evaluation of alternatives to the undertaking which looks at functionally different ways of managing waste.

**SOLID WASTE MANAGEMENT
ENVIRONMENTAL ASSESSMENT
WASTE QUANTITY PROJECTIONS
AND EXISTING ENVIRONMENT PROFILE**

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LIST OF ABBREVIATIONS

EA	Environmental Assessment
EAA	Environmental Assessment Act
GMEF	Green Municipal Enabling Fund
HSW	Household Special Waste
IC&I	Industrial, Commercial and Institutional
MOE	Ministry of the Environment
OCC	Old Corrugated Cardboard
PTTW	Permit to Take Water
SSMRCA	Sault Ste. Marie Region Conservation Authority
ToR	Terms of Reference
WEEE	Waste Electric and Electronic Equipment

SOLID WASTE MANAGEMENT ENVIRONMENTAL ASSESSMENT

WASTE QUANTITY PROJECTIONS AND EXISTING ENVIRONMENT PROFILE

1.0 INTRODUCTION AND BACKGROUND

The City of Sault Ste. Marie is developing a Solid Waste Management Plan to determine the preferred way to address the waste management needs within the existing service area comprising of the City of Sault Ste. Marie, Prince Township and Batchewana First Nation's Rankin Reserve over the next 20 to 40 years. The service area is illustrated in Figure 1. The Solid Waste Management Plan will include opportunities for both waste diversion and waste disposal.

The City continues to investigate ways to divert waste from disposal by promoting and developing programs that support the 3R's hierarchy of reduce, reuse and then recycle (see Section 1.2).

The City has implemented programs to divert blue and yellow box recyclables, electronic waste, styrofoam, used tires, leaf and yard waste, metals and municipal hazardous waste and has complemented these programs with by-laws to encourage residents to divert waste.

In the Spring of 2005, an Environmental Assessment (EA) Terms of Reference (ToR) was prepared documenting the planning process to obtain EA approval for the disposal component of the Solid Waste Management Plan. The EA ToR was approved by the Ministry of the Environment (MOE) in September, 2005.

Two of the initial steps in the City's EA are to:

1. describe the waste management problem/opportunity, (ie. need for additional waste disposal capacity), and
2. profile the existing environment potentially affected by the proposed undertaking.

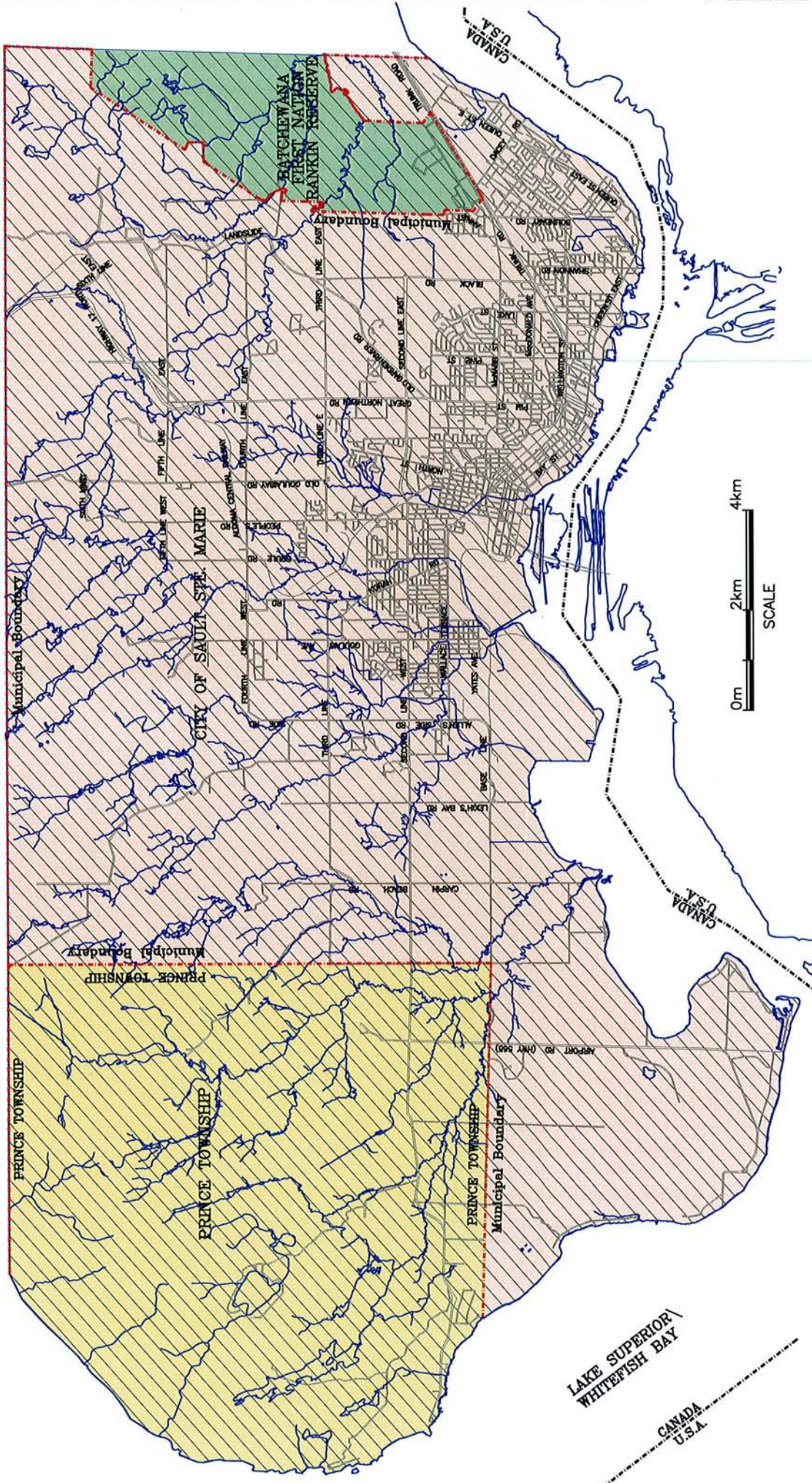
This report documents both steps.

1.1 Background

In September 2000, the City of Sault Ste. Marie initiated a four-phased Solid Waste Management planning process to provide direction on all aspects of its solid waste management system for the next 20 to 40 years. The four phases of the study included:

- Phase 1: Identification of a Preferred Waste Diversion System;
- Phase 2: Identification of a Preferred Waste Disposal System;
- Phase 3: Development of a Business and Implementation Plan; and
- Phase 4: Development of an Environmental Assessment Act Terms of Reference.

Phase 1 identified a need for expansion of the City of Sault Ste. Marie waste diversion programs and is documented in the *Alternative Waste Diversion/Collection Systems Options Report* (June 2001). Many of the recommendations have now been implemented and as a result, the City has increased from a residential diversion rate of approximately 9% in 1999 to 34% in 2009.



LEGEND

	CITY OF SAULT STE. MARIE		BATCHEWANA FIRST NATION RANKIN RESERVE
	TOWNSHIP OF PRINCE		SERVICE AREA

DESIGNED	DATE	BY
CHECKED	DATE	BY
APPROVED	DATE	BY
PROJECT No.	00319	
SCALE	AS SHOWN	

Sault Ste. Marie Waste Management Plan
GENERAL SERVICE AREA PLAN

In addition, the City received funding through the Green Municipal Enabling Fund (GMEF) to undertake a feasibility study on co-composting residential organics and leaf and yard waste with municipal biosolids. The *Co-composting Pilot Study* report was finalized in February 2004.

An overview of the current waste diversion programs is provided in Section 1.2.

Phase 2 of the study was completed in July 2002 with the release of the *Waste Collection and Disposal Report*. In this phase, it was recognized that with the limited disposal capacity remaining in the City's landfill, additional disposal capacity would be required in the future despite the significant efforts to enhance diversion. Within the report a number of disposal alternatives were explored and evaluated and public input on the disposal alternatives was obtained.

Phase 3 of the study was completed in February 2003 with the release of the *Business and Implementation Plan*. This plan outlines the costs of expanded waste diversion programs and waste disposal and explores options to recover those costs. The result of this report was that Council approved the implementation of a partial pay-as-you-throw program with residential bag/container limits, bag fees and increased gate and tipping fees at the landfill site. The City is committed to undertaking periodic updates to the Business and Implementation Plan to ensure it reflects program changes and adequate funds are budgeted to meet future requirements. An update has been initiated in 2010.

Phase 4 resulted in the preparation of an *Environmental Assessment Terms of Reference* (July 2005), a required first step in the preparation of a Waste Management Environmental Assessment.

The above reports provide significant details regarding the background on the existing and future waste management system in the City. Public input was solicited in the preparation of all of these documents.

1.2 Overview of the City's Waste Management System

The population serviced through the City's waste management system is approximately 75,300 residents¹. Waste management services for this population include a combination of waste diversion programs and disposal facilities. Waste is currently disposed in the City landfill site located north of Fifth Line East and west of Kings Highway 17. The site has approximately 832,000 m³ of disposal capacity remaining as of November, 2009². The site life is projected to extend to approximately 2017 based on the project disposal quantities presented in this report.



Over the past decade, the City has been very diligent to promote, develop and enhance waste diversion programs and services that support the 3R's hierarchy: reduce, reuse and recycle and has complemented these programs and services with by-laws to encourage residents to divert waste.

The City has been leading active campaigns to reduce the amount of waste that residents generate with

¹ 2009 WDO Data Call

² Site Development and Operations Report 2008-2009

initiatives such as the plastic shopping bags campaign. This initiative educates residents to reduce the amount of plastic bags generated and encourage them to shop with reusable shopping bags instead. The City is also currently pursuing an initiative where customers will receive a discount if they bring in their own refillable cup to City facilities such as arenas.

In efforts to reuse waste, the City promotes Habitat for Humanity's ReStore where residents and businesses can donate or purchase new and used household items and building materials such as windows, doors, paint, lumber, tools and lighting fixtures.

Some of the recycling programs in Sault Ste. Marie have been established and refined to manage materials designated by the Ontario Waste Diversion Act such as blue and yellow box recyclables, used tires, waste electrical and electronic equipment and municipal hazardous or special waste. These programs are supplemented by other programs that collect and recycle non-designated materials such as styrofoam and plastic grocery bags.

In addition, the City strongly encourages the business sector to comply with recycling mandates and implements strong programs in municipal facilities and at public events. The City also initiated a fluorescent light program that targets local businesses and the public to drop off bulbs to the Hazardous Waste Facility so they could be safely transported to a recycling facility.

An overview of the waste diversion programs is summarized below.

- The City offers an extensive curbside recycling program which services approximately 23,765 single family households¹. In addition the program services approximately 9,943 multi-residential units¹. Recyclables are separated, by residents, into "containers" and "fibres" and set out curbside with their waste for collection on a weekly basis. The management and operation of the curbside recyclables program may change from a Municipal responsibility to a Stewards responsibility in the future. This change will impact the Municipality's ability to influence the future curbside diversion rate. A decision on the future management and operation of this program is expected late in 2010.
- It is estimated that approximately 12,100¹ backyard composters have been distributed to residents in years past. The City also collects leaf and yard waste bi-weekly throughout the growing season (ie: late April to early November) and composts the feedstock in open windrows at the landfill site on Fifth Line. The final compost is used on City projects by the City's Parks and Recreation Department.
- The City has banned leaf and yard waste and old corrugated cardboard (OCC) from the landfill.
- The City has also established a permanent Household Special Waste Facility (HSW) at the Public Works yard. The facility has been operational since 2001 and has been effective in diverting household hazardous waste generated within Sault Ste. Marie and surrounding areas. This facility is owned and operated by the City of Sault Ste. Marie. It is anticipated that the program will be managed and operated by the Stewards commencing in the summer of 2010.
- The City has implemented a staged reduction in residential waste set out limits. The City introduced a 4 bag/container limit on January 1, 2004 which was reduced to 3 bags/containers on May 1, 2004 and 2 bags/containers on January 1, 2005. Tipping fees and

gate fees at the landfill were most recently increased on January 1, 2006 to \$65/tonne and \$6/visit respectively. In conjunction with the gate fee increase the City reduced the permissible weight associated with the gate fee from 500 kg to 300 kg. The curbside waste set out limits, gate fee and tipping fee are currently under review in conjunction with the 2010 update to the Business and Implementation Plan.

- Separation and diversion of clean wood waste and brush, white goods, metals, propane tanks, tires, and batteries is also completed at the City's landfill.
- A diversion event is also staged by Clean North (a citizens environmental group) on an annual basis to facilitate the diversion of Christmas trees.
- Habitat for Humanity has established a Restore for the sale of reusable household items and construction and renovation materials.
- A Community Recycling Depot was also established in 2008. The Depot is operated by Community Living Algoma and accepts a broad range of electronics and Styrofoam. Some products are accepted free of charge and others are accepted for a nominal fee.

Through these programs, approximately 11,740 tonnes of residential material was diverted from disposal in 2009. This represents a residential diversion rate of 34%.

The City has also initiated a Biosolids Management Study. The objective of the study is to review alternative biosolids management strategies and develop a sustainable and effective strategy that reduces the impact on the City's landfill, more effectively manages nuisance odours, has wide public support, is cost effective and environmentally responsible. The Study is scheduled to be completed in 2010.

A private sector energy-from-waste (EFW) proponent called The Elementa Group (Elementa) has built and tested a pilot steam reformation plant that converts municipal solid waste into a char and synthetic gas that can be used to generate electricity. The pilot testing was completed from 2007 to 2009 and Elementa is now proceeding with the construction of a new larger-scale facility, with an estimated annual throughput capacity of 35,000 tonnes. The City has entered into a waste supply agreement with Elementa to process a minimum 12,500 tonnes per year of the City's residential MSW for a minimum ten year period commencing in 2011.

2.0 WASTE QUANTITIES PROJECTIONS

In order to determine the future waste quantities requiring disposal within the service area, a number of factors have to be taken into consideration and include:

- population projections;
- waste generation rates or waste disposal rates; and
- diversion rates.

The population projections are used in conjunction with waste disposal or waste generation rates to determine the quantity of waste to be managed by the City in future years. The following sections provide additional information on each.

2.1 Population Projections

The City's population peaked in the early 1980's, and remained relatively stable in the range of 80,000 to 83,000 for a period of approximately 15 years. The population was generally in decline from the mid 1990's until the early 2000's and has rebounded moderately in recent years. The historical decline in population is largely attributable to industry downsizing and its ripple effect in the service and retail sectors. Since 2001 the City's economic performance has improved and no further significant erosion of the labour force is anticipated in the near term. Furthermore moderate in-migration of elderly people from outlying areas is expected to continue.

In 2008 the City's Planning Department developed population and household projections in conjunction with its review of the City's Official Plan. City staff noted that the City's population is aging and there are not enough workers to fill future job vacancies created by retirements. This will create an opportunity for potential growth provided the municipality is able to attract migrants to fill job vacancies³. The report concluded that a modest population increase would occur from 2006 to 2026.

For the purpose of the EA, the 2006 population was obtained from 2006 census data, projections for 2007 to 2026 were obtained from the City Planning Report and a modest population growth rate of 0.5% per annum was applied for the period from 2027 to 2049. The population projections are included in Table 2.1.

The existing and proposed service area also includes Batchewana First Nation's Rankin Reserve and Prince Township which comprise small populations in comparison to the City of Sault Ste. Marie. The estimated 2006 populations for each of these communities together with future population projections are also included in Table 2.1.

³ Planning Division Report dated 2008 09 22 – Official Plan Review 2008 – Part 1 Population and Household Projections

	2006	2011	2016	2021	2026	2031	2036	2041	2046	2049
Sault Ste. Marie	74,960 ¹	75,500 ²	77,850 ²	81,000 ²	82,500 ²	84,583 ⁵	86,719 ⁵	88,909 ⁵	91,154 ⁵	92,528 ⁵
Prince Township	971 ¹	982 ³	993 ³	1,004 ³	1,015 ³	1,041 ⁵	1,067 ⁵	1,094 ⁵	1,121 ⁵	1138 ⁵
Rankin Reserve	583 ⁴	623 ⁴	662 ⁴	722 ⁴	883 ⁴	905 ⁵	928 ⁵	952 ⁵	976 ⁵	990 ⁵
Total (Service Area)	76,514	77,105	79,505	82,726	84,398	86,529	88,714	90,954	93,251	94,657

- Notes: 1. 2006 Census
 2. City Planning Report, 2008 09 22
 3. Estimated 1 new household per year with an occupancy of 2.2 persons.
 4. Numbers provided by Batchewana First Nations.
 5. Assumed 0.5% per annum growth.

Based on these projections, it is anticipated that the population within the service area will increase to 94,657 by 2049.

2.2 Waste Generation/Disposal Rates

Three distinct waste streams are managed in whole or in part by the City of Sault Ste. Marie and include:

- Residential - wastes generated by people in their home environment.
- Industrial, Commercial and Institutional (IC&I) – wastes generated by people in work/business and institutional environments.
- Municipal Biosolids – wastes generated at waste water pollution control plants.

Population projections are used in conjunction with waste generation rates or waste disposal rates to determine the quantity of wastes to be managed by the City in future years. Waste generation rate is defined as the quantity of waste that is generated by the average person within the service area on an annual basis and is expressed as kilograms or tonnes per person per year and includes diverted and disposed wastes. Waste disposal rate is defined as the quantity of waste that is disposed of by the average person within the service area on an annual basis and is expressed as kilograms or tonnes per person per year and it excludes diverted wastes.

In estimating the quantities of waste to be managed by the City in future years, waste generation rates have been applied for the “residential” and “municipal biosolids” waste streams and a waste disposal rate has been applied for the IC&I waste stream. Wastes diverted within the IC&I sector are mandated through Provincial Regulation and enforced by Provincial officers. IC&I diverted wastes are not controlled by the municipality and are managed almost entirely by the private sector. There is very limited information available to quantify diverted IC&I wastes. The application of a waste disposal rate for the IC&I sector reflects the wastes that have historically been managed by the City at its landfill.

The waste generation rate or waste disposal rate associated with each stream is discussed in greater detail in each of the following subsections.

2.2.1 Residential Waste Generation

The “residential” waste stream is characterized by the wastes that are generated in our home environment. The total quantity of residential waste managed by the City of Sault Ste. Marie between 2005 and 2009 is summarized in **Table 2.2**.

Description	2005	2006	2007	2008	2009	Average 2005 -2009
Residential Waste Managed (tonnes)	29,630	31,340	32,687	33,654	33,905	32,243
Population *	74,872	74,948	75,200	75,200	75,300	75,104
kg/person/year	396	418	435	448	450	429

* Table reflects City of Sault Ste. Marie residents only.

The per capita residential waste generation rate over the five year period 2005-2009 has ranged from 396 to 450 kg/person/year with an average of 429 kg/person/year.

For the purpose of projecting the residential waste stream, a waste generation rate of 450 kg/person/year will be used. It is 5% above the City of Sault Ste. Marie average for the 2006-2009 year period and similar to the 2008 and 2009 residential waste generation rate and is used to be moderately conservative in the long term projections.

2.2.2 IC&I Waste Disposal Rate

The IC&I waste stream is characterized by wastes that are generated in our work/business and institutional (eg. schools, churches, etc) environments. The City of Sault Ste. Marie does not have control over the management of wastes generated in the IC&I sector. IC&I waste is collected and disposed of or processed by private waste haulers and recyclers. Most of the IC&I waste disposal is accommodated at the City landfill due to the limited number of alternate disposal facilities available in the Sault Ste. Marie area.

For the purposes of this EA we have focused on the IC&I waste quantities that have historically been managed by the City (ie: disposal quantities only). The total quantity of IC&I waste disposed of within the City of Sault Ste. Marie landfill between 2005 and 2009 is summarized in **Table 2.3**.

	2005	2006	2007	2008	2009	Average 2005-2009
IC&I Waste Managed (tonnes)	39,067	31,610	30,930	63,714	33,754	39,815
Population *	74,872	74,948	75,200	75,200	75,300	75,104
kg/person/year	522	422	411	847	448	530

* Table reflects City of Sault Ste. Marie residents only.

The per capita IC&I waste disposal rate over the five year period 2005-2009 has ranged from 411 to 847 kg/person/year with an average of 530 kg/person/year. Within this five year time period a significant quantity of contaminated soil was landfilled in 2008 which contributed significantly to the anomalous quantity. The average per capita waste disposal rate over the four year period (ie. 2008 excluded) is 451 kg/person/year.

As is evident from the data included in Table 2.3 there is the potential for considerable volatility in the quantities and types of IC&I waste to be disposed of at City of Sault Ste. Marie disposal facilities. Over the five year period spanning from 2005 to 2009 there was a 106% variation in the IC&I waste quantities managed by the City.

Currently, some IC&I waste is being exported out of the City each year (eg. to a Northern Michigan landfill) and a significant level of diversion is being achieved. Exported and diverted wastes could enter or re-enter the City waste stream at a future date. These exported and diverted waste streams are not accounted for in the figures presented above.

For example, St. Mary's Paper is currently generating approximately 48,000 tonnes of biosolids each year. Some of this material was being disposed of in the City's landfill as recently as 1996. Since 1996, St. Mary's Paper has been successful in identifying alternative destinations for all of their biosolids (ie: primarily mine tailing sites and former waste disposal sites). However, company officials have indicated that it has been challenging in recent years to find suitable sites for biosolids disposal.

Similarly, in the *Organic Waste Diversion Report (April 2001)* it was concluded that approximately 75,000 tonnes of organic wastes (residential and IC&I) were generated within the City in 2000, of which approximately 30,000 tonnes were managed in the City's waste stream. The remainder was managed by the private sector.

Recognizing the variability in the quantities of IC&I waste that will be managed by the City, a reasonable contingency is required in the IC&I waste disposal rate. Therefore, the waste disposal rate to be used for projecting the IC&I waste stream is 550 kg/person/year beginning in 2010. It is 4% above the City of Sault Ste. Marie average for the 2005-2009 year period and less than the highest year in the five year period presented in Table 2.3.

2.2.3 Municipal Biosolids Waste Generation

Municipal biosolids are currently being generated within the service area at waste water pollution control plants. This material is also commonly referred to as sludge. The total quantity of municipal biosolids managed by the City of Sault Ste. Marie between 2005 and 2009 is summarized in **Table 2.4**. These municipal biosolids are generated at the two City of Sault Ste. Marie water pollution control plants.

	2005	2006	2007	2008	2009	Average 2005-2009
Biosolids Waste Managed (tonnes)	9,833	8,474	10,079	8,662	10,257	9,461
Population *	74,872	74,948	75,200	75,200	75,300	75,104
kg/person/year	131	113	134	115	136	126

* Table reflects City of Sault Ste. Marie residents only.

In 2006, one of the two waste water pollution control plants was converted from primary treatment to secondary treatment and in 2008 problems were experienced with sludge management at the plant. The 2007 and 2009 quantities are likely the most representative of typical production under normal operations. Therefore the generation rate for municipal biosolids has been established at 135 kg/person/year.

2.3 Waste Diversion Rates

The wastes that are generated within the service area are either diverted or disposed. This section addresses the waste diversion rates that have been achieved from 2005 to 2009 and projects future waste diversion rates. As with waste generation/disposal rates, diversion rates for the three streams have to be identified separately. Each is discussed in greater detail in the following subsections.

2.3.1 Residential Waste Diversion Rate

The Minister of the Environment announced a 60% diversion target from disposal by 2008 for the Province of Ontario. In MOE's June 2004 Discussion Paper, it is outlined that mandatory diversion targets for municipalities could be phased in. The approach proposed was as follows:

- largest municipalities with populations over 250,000 could have a waste diversion target rate of 60% by 2008;
- "medium-sized" municipalities with populations over 50,000 and less than 250,000 could be given a lower interim waste diversion target, achieving 60% diversion over a longer period of time.

To date these or other waste diversion targets have not been mandated and no firm dates have been established for their implementation.

Despite the lack of a regulatory Provincial framework respecting waste diversion targets, the City of Sault Ste. Marie has completed a significant level of study relating to waste diversion in the City of Sault Ste. Marie. This has included *The Current Waste Management System Summary (September, 2000)*, a *Residential Waste Composition Study (March 2001)*, the *Organic Waste Diversion Report (April, 2001)*, the *Alternative Waste Diversion/Collection System Options Report (June 2001)* and the *Co-composting Pilot Study (February, 2004)* and the ongoing *Biosolids Management Study*.

The City has been very proactive with waste diversion since 2001. Their residential waste diversion rate has increased from 9% in 1999 to 34% in 2009. The City remains committed to further enhancing diversion efforts over time and will continue to strive towards meeting the provincial target of 60% with due consideration of costs and operational challenges.

A waste audit was completed in Sault Ste. Marie in 2006 by Stewardship Ontario. The audit included the single family residential and multi-family residential sectors and included collection in each of the four seasons of the year. Based on the results of that study the estimated capture efficiency in the single family residential blue/yellow box program is 79% and blue/yellow box materials make up approximately 36% of the curbside residential waste stream. In comparison, the estimated capture efficiency in the multi-family residential blue/yellow box program is approximately 51% and blue/yellow box materials make up approximately 38% of the curbside multi-family residential waste stream.

The estimated overall capture efficiency in the residential (single and multi-family) blue/yellow box program is 75%.

The City also provides bi-weekly collection of leaf and yard waste throughout the growing season. Leaf and yard waste made up approximately 7% of the curbside single family residential waste stream and 1-2% of the multi-family residential waste stream according to the 2006 waste audit.

The City has established a goal to achieve 80% capture efficiency in their residential blue/yellow box program and residential leaf and yard waste program. This reflects a target curbside waste diversion rate of 34%.

The curbside waste stream represents an estimated 65% to 70% of the overall residential waste stream. The remaining 30% to 35% is attributed to the public drop-off at the landfill, backyard composters, recycling depots/events, the household hazardous waste depot and deposit return programs.

There are also other diversion opportunities available to residents in addition to the leaf and yard waste program and blue/yellow box program. Other programs include separation of recyclable materials at the landfill (metals/white goods, batteries, propane tanks/cylinders, tires, clean wood waste and other recyclables), the Household Special Waste Depot, Community Recycling Depot, an annual Christmas tree event coordinated by Clean North, distribution of backyard composters and a deposit return program. These programs have contributed an estimated average of 15% to the residential waste diversion rate over the period from 2005 to 2009.

Waste disposal at the landfill public drop-off area is closely supervised by City staff to ensure recyclable materials are properly separated. The other programs noted in the foregoing paragraph are well established, and typically represent relatively small quantities of waste diverted. Only a marginal enhancement in the overall residential waste diversion rate is likely possible through these programs in the future.

The overall residential diversion rate that can likely be achieved with 80% capture efficiency in the leaf and yard waste and blue/yellow box programs is 38% (ie: 23% through blue/yellow box and leaf and yard waste program plus 15% through other programs).

In order to achieve higher levels of residential diversion, the current organics collection program comprising the collection of leaf and yard waste throughout the growing season would have to be expanded to year round weekly collection of kitchen wastes and other organics (ie: source separated organics program). Recognizing that organic materials represent a significant proportion of the overall waste stream, the City completed an *Organics Diversion Report (April 2001)* and a *Co-composting Pilot Study (February 2004)*. The conclusions included in the Co-composting Pilot Study are summarized below:

- It is recommended that the City implement an enhanced leaf and yard waste program in 2004. This program would consist of curbside collection every other week between April and November. ***The City has implemented this recommendation.***
- It is recommended that the City not compost other residential and IC&I organics at this time. The rationale for the recommendation was that with the relatively small quantity of feedstock, the material would have to be composted outdoors to be cost effective. With the colder climate, snow loads and odour concerns, outdoor composting would be a challenge.
- It is recommended that the City not compost municipal biosolids at this time. The rationale for the recommendation was that the City's biosolids do not meet the feedstock restrictions and cannot meet the unrestricted use guidelines included in the compost guidelines. (Note: The City is currently undertaking a Biosolids Management Study. Through that study alternatives are being investigated to divert biosolids from disposal. The Ministry of Environment is also considering changes to its composting guidelines and regulatory framework to permit the use of biosolids as a compostable feedstock in the future. The City has short-listed alkaline stabilization and composting of biosolids. The evaluation of these shortlisted alternatives is contingent on the final composting guidelines and regulations to be implemented by the MOE).

The City will continue to monitor the feasibility of implementing an expanded organics program in the future. Factors that will likely influence its future implementation include provincial policy, composting guidelines/standards, cost efficiencies and operational challenges.

For the purposes of this study it has been assumed that the future residential waste diversion rate will reach 38% by 2013 and remain stable throughout the remainder of the 40 year planning period. This diversion rate reflects further enhancements to the currently approved diversion programs. The City is however committed to progressively increasing diversion beyond 38% provided any further additions/enhancements can be achieved practically and cost efficiently and are provincially mandated or approved by Council.

In 2007, The Elementa Group (Elementa) constructed a pilot-scale steam reformation plant that converts municipal solid waste into a char and synthetic gas (syngas). Testing of the technology, with limited quantities of municipal solid waste, was completed over a three year period from

2007 to 2009. The syngas was burned in a flare and testing of the emissions was completed with favourable results. Elementa subsequently requested that the City enter into an agreement to supply municipal solid waste to support the construction of a larger-scale plant.

Late in 2009, the City of Sault Ste. Marie endorsed a contract with Elementa for the supply of a minimum 12,500 metric tonnes of municipal solid waste for a minimum period of 10 years. The contract is significant in that it will assist the City in managing its problem of diminishing solid waste disposal capacity. The proposed plant will have an estimated capacity of 35,000 tonnes per year. Elementa also plans to source waste from outside Sault Ste. Marie to allow full utilization of the proposed plant capacity.

The Elementa Plant will be unable to process all waste currently being managed at the Fifth Line landfill site. The City is currently managing approximately 60,000 to 70,000 tonnes per year (inclusive of contaminated soil and sewage sludge). Furthermore the Elementa process will generate some residual waste that will require landfilling. The City recognizes that with any new waste management technology, in its infancy, there are risks associated with its implementation. The City intends to mitigate these risks by ensuring an alternative means is available for the disposal of residual waste.

A conservative approach has been adopted by the City in developing the waste quantity projections that will require management in the future. Within the context of this EA, it has been assumed that all residual wastes will require management by the City (ie. no waste will be processed by Elementa). In the event Elementa is partially or fully successful, the quantity managed by the City will be reduced accordingly.

2.3.2 IC&I Waste Diversion Rate

Diversion programs in the IC&I sector are mandated through Provincial regulations and enforced by Provincial officers. Based on a comparison of recent IC&I disposal quantities relative to disposal quantities in the mid-1990's coupled with information gathered in the preparation of the *Organic Waste Diversion Report (April 2001)*, the current diversion rate in the City's IC&I sector appears to be substantial.

For the purposes of this study, a specific target IC&I waste diversion rate has not been identified as it is not possible to accurately quantify the wastes that are being generated and managed within this sector. However, considerable success is currently being achieved in the diversion of wastes in the IC&I sector in Sault Ste. Marie. These successes are largely driven by market conditions for wastes and provincial policy. Although it is hoped that the present diversion levels can be sustained and enhanced it is prudent to make some allowances for fluctuations in IC&I disposal quantities in the future (refer to Section 2.2.2).

2.3.3 Municipal Biosolids Waste Diversion Rate

The City is committed to diverting municipal biosolids from disposal and is currently undertaking a Municipal Biosolids Management Study. To date, alkaline stabilization and composting have been identified as the preliminary preferred processing alternatives. The evaluation of these shortlisted alternatives may be impacted by recently proposed composting guideline and regulatory changes posted on the EBR by the MOE.

Given the City's commitment to diverting municipal biosolids an aggressive approach has been taken within the context of this EA. It has been assumed that all of the municipal biosolids will be diverted from disposal commencing in 2016 (ie: biosolids diversion rate = 100%).

2.4 Waste Requiring Disposal

Table 2.5, included in Appendix A, outlines the projections for the waste generated, diverted and disposed from years 2010 to 2049 for the three waste streams. Also included in the table is the remaining disposal capacity in tonnes at the City landfill based on the reported remaining capacity in 2009⁴.

Based on the assumptions used for these projections, the City of Sault Ste. Marie would run out of disposal capacity in 2017.

Based on the projections, the City of Sault Ste. Marie would require additional disposal capacity of approximately 2.33 million tonnes to 2049.

2.5 Summary

The following conclusions are provided for this section:

- it is anticipated that the permanent population in the service area (ie: the City of Sault Ste. Marie, Prince Township and Rankin Reserve) will increase to 94,657 by 2049;
- a residential waste generation rate of 450 kg/person/year is used in the waste projections;
- a residential waste diversion rate of 38% is used in the waste projections for the period 2013 to 2049;
- an IC&I waste disposal rate of 550 kg/person/year is used in the waste projections;
- a municipal biosolids generation rate of 135 kg/person/year is used in the waste projections;
- it is assumed all municipal biosolids will be diverted commencing in 2016;
- average annual quantity of residual waste requiring disposal ranges from 75,255 in 2010 to 78,470 in 2049; and
- Sault Ste. Marie requires approximately 2.33 million tonnes of additional capacity to 2049.

4 Site Development and Operations Report 2008-2009

3.0 EXISTING ENVIRONMENT PROFILE

A general inventory of the environmental conditions within the study area is provided in the following subsections. For the purposes of the inventory, the “study area” has initially been established as the existing service area comprising the City of Sault Ste. Marie, Prince Township and Batchewana First Nation’s Rankin Reserve (refer to Figure 1). The “study area” may be modified or refined as the study progresses.

3.1 Natural Environment

The study area includes the City of Sault Ste. Marie, Prince Township, and Batchewana First Nation’s and Rankin Reserve. The study area is characterized by St. Mary’s River valley area and the Precambrian Uplands whose two most prominent features are the shorelines of Lake Superior and the St. Mary’s River and the southern limit or rock face of the Precambrian Uplands. The shoreline defines the southerly limits of the communities, while the southerly boundary of the Precambrian Uplands defines the northerly limit of urban expansion. Within the study area there are a number of rivers and streams with a southerly flow to the St. Mary’s River. There are a number of wetlands and forested areas that provide habitat for a variety of flora and fauna.

The Algonquin and Nipising lowland plateaus created by various prehistoric lake levels define the form of the community. The lowland plateaus have two levels with the first extending from the river level to several metres above the river level and the second being approximately 30m higher. The northern edge or the upper plateau contains significant aggregate deposits. The area of the aggregate deposits functions as the recharge area for the groundwater aquifer. The groundwater aquifer is the primary source of drinking water for a large rural community and supplies approximately 50% of the municipal water supply. The rocky uplands area has the potential for the development of recreational opportunities as well as mineral and forestry resource extraction.

3.1.1 Geology / Hydrogeology / Soils

The northern portion of the study area, known as the Precambrian Uplands, is characterized by a rocky, rugged terrain with a very shallow overburden overlaying Precambrian granites. The southern portion of the study area consists of the Algonquin and Nipising lowland plateaus created by prehistoric lake levels. The plateaus are relatively flat areas located between the St. Mary’s River and the Precambrian Shield. The interface between these plateaus and the upland area contains significant prehistoric sand and gravel beach deposits. These deposits form the main recharge area for the groundwater aquifer which flows under the plateau areas. Streams and rivers originating in the uplands are fed by rainfall and spring melt. These streams and rivers recharge the groundwater aquifer due to infiltration through the sand and gravel deposits at the base of the Precambrian Uplands.

The bedrock formations within the study area consist primarily of Precambrian granite and Cambrian sandstone. These bedrock formations typically define the lower limit of the aquifer. The main aquifer is located within the layers of till, sand and gravel directly above the bedrock. A large portion of the plateau area between the St. Mary’s River and the sand and gravel areas abutting the uplands has a layer of glaciolacustrine clay. This clay layer helps to protect the aquifer by limiting any downward migration of pollutants. The upper strata of overburden consisting of sand, gravel or alluvium deposits provide for the recharge and discharge of the aquifer.

Type of Formation	Description	Comments
	Recent alluvium	Mainly found along and within the streambeds
	Glaciolacustrine beach sands and gravel	Along and adjacent to the slopes of the Precambrian uplands
Overburden	Glaciolacustrine shallow water sand	Discontinuous
	Glaciolacustrine deep water clay	Extensive over large part of the low lands surrounding the city of Sault Ste Marie, provides protection to the underlying aquifer
	Sand and gravel	Principal aquifer
	Till	Discontinuous
Bedrock	Cambrian sandstone	Bedrock aquifer, generally contiguous to overlying sand and gravel aquifer
	Precambrian granite	Upper fractured and weathered portions may provide limited groundwater source

Source: Burnside, 2003

3.1.2 Surface Water

The study area is located within the St. Mary's River watershed. The study area consists of the Township of Prince, the City of Sault Ste. Marie and Batchewana First Nation's, Rankin Reserve. While there are only 4 (four) small lakes within the area there are a large number of small ponds. There are 7 (seven) main water courses that flow through the area. The tributaries, creeks and rivers have their source in the Precambrian Uplands and flow in a southerly direction to the St. Mary's River. The 4 lakes are; Walls and Prince Lakes in Prince Township, Allard and Nettleton Lake in Sault Ste. Marie. The 7 major watercourses are; the Big and Little Carp Creeks, the East and West Davignon Creeks, Bennett Creek, Root River and Crystal Creek.

The quality of surface water in the area is generally good. Prince Lake is the only lake in the area that is extensively developed with both seasonal and year round residences. Prince Lake has a surface area of 45.8 hectares and an average depth of 2.6 m. Development around the lake consists of approximately 90 residences with approximately 27 of these being occupied year round. A 1997 Planning report states that the "water quality of Prince Lake is acceptable" however it goes on to state that the further development abutting the lake and conversions to year round residences must be controlled in order to maintain acceptable water quality in the long term. Despite such warnings the number of year round residents and new cottages continues to increase. The remaining lakes in the study area have very little or no development along their shorelines.

There are very few uses within the study area that use surface water for domestic purposes. These would be found in the Prince Lake area where a 1998 survey lists 24 residences taking water from the lake and 19 from shallow wells or springs. In addition, the occasional older residence along

the upper St. Mary's River may depend on shallow wells, springs or river water for domestic usage. Approximately fifty percent of the city water supply for the serviced urban area comes from a surface water intake located in Lake Superior at Gros Cap in Prince Township.

3.1.3 Climate

The study area is located along the eastern end of Lake Superior thus it is on the windward side of the Lake. The recent development of the Prince Wind Farm with 126 wind turbines takes advantage of this setting to generate approximately 189 megawatts of electricity (source Sault Star Aug. 26, 2006). The study area is located in the western part of the Sudbury climatic region. The growing season is longer relative to most of Northern Ontario. However, the lack of heat units significantly limits the growing of crops such as corn. (source: Chapman, Thomas 1986).

Description	Value
Average annual temperature ¹	4.3° C
Average maximum July daily temperature ¹	24.0° C
Average minimum January daily temperature ¹	-15.5° C
Average maximum January daily temperature ¹	-5.5° C
Average minimum annual temperature ¹	-1.0° C
Average maximum annual temperature ¹	9.6° C
Mean date last day of frost in spring ²	May 31
Mean date first day of frost in fall ²	Sept. 18
Mean annual corn heat units ²	2,000
Annual rainfall ³	634.3 mm
Annual snowfall ³	302.9 cm
Average wind speed ³	13.3 k/hr

Source 1 - Environment Canada
 2 - Chapman and Thomas 1968
 3 - Sault Ste. Marie Airport (YAM)

3.1.4 Biology

a) Vegetation

The study area is within the Algoma section of the Great Lakes/St. Lawrence Forest Region. This district is characterized as having sugar maple and yellow birch as the dominant tolerant hardwood species within the Precambrian Uplands (source: Hills Eco Regions (Hills, 1957)). Areas south of the uplands are characterized by agricultural and urban disturbances and will have species such as white birch, aspen, and pin cherry forest stands. The Algonquin and Nipissing lowland plateaus have soils suitable for hay crops and pasture land.

Red maple is found in many forest stands. Elm trees are also found in the area however the occurrences of elm are less frequent due to Dutch elm disease. Red pine is found in drier soils primarily in the western portion of the study area near the airport. White cedar can be found on moist organic soils and some upland sites. Black spruce and tamarack can be found in lowland sites. Alder thickets are common along water courses.

While there are some forest stands south of the Precambrian Uplands they have limited commercial value. Deep soils in the plateau areas that were harvested in the past and marginal farmlands have a potential to be highly productive managed forest sites. Woodlands cover approximately 40% of the city (source: Sault Ste. Marie Official Plan). Their location along water courses, ravines, and on slopelands makes them a valuable community resource. These stands provide habitat and corridors for wildlife, shade for fish habitat, stabilize soils mitigating erosion, and provide aesthetic relief within the urban setting.

There are two known provincially significant wetlands; one located at the mouths of the Carp Rivers, and the second larger wetland located to the northwest of the airport (refer to Schedule B in Appendix B).

b) Wildlife

Wildlife in the study area is typical of that found in the Great Lakes/St. Lawrence Region surrounding urban centers. Moose, the largest animal species, and black bear are found in the Precambrian Uplands. Whitetailed deer are found in the forested portions of the plateau lands south of the Uplands. Species with extensive territorial ranges such as fisher, marten, gray wolf, bobcat and lynx may also be sited within the study area, however, such sightings become rarer with urban expansion.

Common small mammals such as snowshoe hare, eastern gray and red squirrels, chipmunks, beaver, muskrat, porcupine, red fox, raccoon and skunk are also found throughout the study area. There is a program to reintroduce wild turkey and elk into the area.

The area forest stands are the home to hundreds of species of birds. A majority of these bird species are migratory, and are only present during the spring, summer and fall months when they nest and breed and raise their young. Migratory birds can fall into two main groups: short distance migrants, or those birds that only migrate as far south as the United States; and long-distance migrants, or those birds that spend their winters in tropical climates. Short distance migrants include such species as American robins, great blue herons, bald eagles, American crows, winter wrens, and several types of sparrows. Long distance migrants include peregrine falcons, warblers, ruby-throated hummingbirds, and swallows.

With the coming of autumn, the skies over the forest canopy fill with flocks of migratory birds winging south to a more favourable climate. As many as fifty bird species have adapted ways to survive the long winter months. This number is reduced in the northern stretches of the boreal forest. These year-long residents of the boreal forest include nuthatches, chickadees, common ravens, and several species of owls.

c) Fisheries

The study area abuts Lake Superior to the west and the St. Mary's River to the south. Both bodies of water are important fish habitat for recreational sport and commercial fish species such as lake trout, rainbow trout, brook trout, pacific salmon, atlantic salmon, lake whitefish, lake sturgeon, yellow walleye, northern pike, small and large mouth bass, yellow perch. While the creeks and streams provide habitat for coldwater fish such as brook trout they are not extensively used for recreational fishing.

3.2 Social – Cultural Environment

The study area has a long history of prehistoric and historic settlement. The jurisdictional boundaries include the City of Sault Ste. Marie, the Township of Prince and the Batchewana First Nation's Rankin Reserve.

3.2.1 Archaeological / Cultural

The study area has been inhabited since the time the glaciers retreated some 10,000 years ago. They left behind the landscape and contours that characterize the study area. The melt waters created a spillway for Lake Minong the forerunner of Lake Superior. At the location of present day Sault Ste. Marie the drainage outlet formed the old raised cobble and gravel beaches at the southern edge of the Precambrian Uplands. It is on these beaches, 45 metres higher than the present level of Lake Superior, that the first signs of human habitation appear. As the water levels receded the lands along the St. Mary's River provided resources and an effective means of transportation for early inhabitants. The abundance of fish in the river and the rapids provided an abundant food source that attracted and sustained First Nations settlement of the area which has enjoyed continued human occupation for 4000 years.

The early French explorers called the Ojibwe people in the area "Saulteurs" (People of the Rapids). In the 1600's the river was part of the trading and exploration route west in search of a route to the Orient and a route of commerce for the fur trade. In addition to the fur trade the search for copper deposits and the abundant supply of timber contributed to the European settlement of the area. The ease in rafting large volumes of logs down the Lake Superior shoreline made Sault Ste. Marie a center for the area's lumber industry.

The growth of the city as an industrial center began in earnest with the arrival of Francis H. Clergue and the Canadian Pacific Railway in the 1890's. The formation of the steel works and the electric power generating station transformed Sault Ste. Marie from a wilderness outpost to an industrial center.

The Official Plans for the Township of Prince and the City of Sault Ste. Marie have very little information on existing culturally or historically significant sites. While the Sault Ste. Marie Official Plan contains some policies it does not identify specific sites or areas likely to be of cultural or heritage significance. The Ministry of Culture maintains a confidential list of all registered archaeological sites in the area. It is on file in the Planning Division of the City of Sault Ste. Marie and will be referenced whenever a site specific evaluation is done.

An Archaeological Site Potential Assessment is being completed in 2010 to identify locations of archaeological potential throughout the Community.

3.2.2 Social-Cultural

The study area is comprised of the lands within the boundaries of the City of Sault Ste. Marie, the Township of Prince and the Batchewana First Nation's Rankin Reserve. The current and projected future area population is summarized in Section 2.1.

The most recent household projections for the City of Sault Ste. Marie were summarized in a report completed by the City's Planning Department in 2008. A steady increase in the number of households is predicted throughout the 2006 to 2026 period (refer to Table 3.3). The number of households in the Township of Prince and the Rankin Reserve will, like the population, remain relatively stable throughout the timeline. A projected gain of one household per year would be a reasonable estimate of growth for these areas.

Area	2006	2011	2016	2021	2026
Sault Ste. Marie ¹	31,755	32,200	34,000	35,500	36,500
Prince Township	446 ²	451 ³	456 ³	461 ³	466 ³
Rankin Reserve	221 ⁴	226 ³	231 ³	236 ³	241 ³
TOTAL	32,422	32,877	34,687	36,197	37,207

Source: 1 City Planning Report, 2008
 2 Prince Township
 3 Estimated at 1 new household per year
 4 Batchewana First Nation

3.2.3 Official Plans and Policy Documents

The study area contains three local governing bodies, two have set out growth strategies within their planning and growth policy documents. The City of Sault Ste. Marie and the Township of Prince have adopted Official Plans. The Rankin Reserve does not have a similar document.

The Township of Prince's Official Plan was approved in July of 1983 and an update was recently completed. Its growth policies reflect its rural setting. Development criteria maintains the character of existing development, protects the natural and social environment, and is sensitive to the financial well being of the municipal government. The Township sets out policies to guide development within Rural Residential, Rural Agricultural, Commercial, Hamlet, Institutional, Resort, Open Space (hazard lands) and within the Precambrian Uplands (Shield) areas. There are no existing waste disposal sites within the Township boundary and the Official Plan has no policies related to waste collection or disposal.

The City of Sault Ste. Marie's Official Plan was adopted in 1996. A major update was approved in July of 2005 (Amendment # 100). Amendment #100 implemented many of the recommendations of the Sault Ste. Marie Groundwater Management and Protection Study (Burnside 2003). The Official Plan policies impact how land can be used in areas sensitive to development such as;

- a) Groundwater recharge area;
- b) Aggregate deposits;
- c) Woodlands;
- d) Alluvial and lacustrine clay soils;
- e) Fish habitat;
- f) Precambrian uplands;
- g) Great Lakes and tributary flood lines;
- h) Wetlands;
- i) Conservation Authority fill regulated areas;
- j) Wellhead protection zones; and

k) Rural areas.

The above noted areas are illustrated on Schedules A and B of the Sault Ste. Marie Official Plan attached in Appendix B of this report.

There is no mention of a landfill or waste disposal site as a permitted use within any of the Official Plan land use policies or within the designations as illustrated on the Schedule C (land-use). Any new waste disposal site or enlargement to the boundaries of the existing landfill site will require an amendment to the Official Plan.

The Municipal Services section of the Sault Ste. Marie Official Plan has the following policies with respect to waste disposal and landfill.

- S.2 The existing sanitary landfill site has a projected capacity sufficient to meet the needs of the municipality within the timeframe of this Official Plan. Identification of a new site may be required within the period of the Plan.
- S.3 The city shall encourage the development of recycling programs and operations which divert solid waste from the landfill site.

3.2.4 Land Use

The major concentration of developed land is located within the Urban Service Line which occupies approximately 62 square kilometers. Rankin Reserve, Prince Township and the rural area of the city occupy approximately 266.5 square kilometers (source: Planning Division, Sault Ste. Marie)

The land-use patterns within the City are illustrated on Schedule C of the Sault Ste. Marie Official Plan attached in Appendix B of this report.

3.2.5 Transportation

The study area is well connected to the rest of North America. It is located at the mid point of the Trans Canada Highway and connected to the United States Interstate Highway network via the International Bridge and Interstate 75. Rail connections exist to both Canadian Pacific and Canadian National Railways as well as into the mid-west United States via the Wisconsin Central Railway. The Sault Ste. Marie Airport is serviced by Air Canada Jazz and Bear Skin Airlines offering flights to southern and northern Ontario destinations. In addition the study area abuts the Sault Locks which afford a navigable connection between Lake Superior and Lake Huron on the St. Lawrence Seaway.

Within the City of Sault Ste. Marie there are approximately 586.6 km of roads. These are divided into the following categories:

Classification	Length (km)
Rural Arterial	25.7
Rural Collector	20.5
Rural Local	156.0
Urban Arterial	67.4
Urban Collector	54.0
Urban Local	263.0
TOTAL	586.6

Source: Planning Division City of Sault Ste. Marie

The major street network is shown on Schedule D of the Sault Ste. Marie Official Plan attached in Appendix B of this report.

3.2.6 Municipal Servicing Network

a) Waste Management System

The City provides a combination of diversion and waste disposal services and facilities. An overview of the services provided is included in Section 1.2.

b) Sanitary / Storm Sewers

The urban land uses within the study area are served by a system of sanitary and storm water sewers. There are approximately 30,000 laterals connecting users to the sanitary sewerage system. Sanitary sewage flows to two secondary treatment plants. The west end waste water treatment plant located at the corner of Allen’s Side Road and Base Line has a design capacity of 20 ML (megalitres) per day. The east end waste water treatment plant has a design capacity of 36 ML per day. Over the years the municipality has eliminated all combined sanitary and storm sewers. Some inflows and infiltration of storm water into the sanitary system still occurs during significant rainfall events and as a result of spring melt. To address this, the city constructed a 12,000 cubic metre and 700 cubic metre combined sewage overflow tank at Bellevue Park and the Pim Street pump station respectively. The “holding” tanks temporarily stores waste water during spring melt or significant rainfall events mitigating premature discharges to the river at the east end plant and overflows within the collection system.

In addition to the communal sanitary sewage system, waste water is managed through private, on-site systems in the rural areas.

A survey conducted for the Sault Ste. Marie Groundwater Management Study (2003) found approximately 1,350 individual septic systems in the unserviced rural area.

c) Domestic Water

The municipal domestic water supply has two primary sources. Approximately half of the supply is sourced from the groundwater aquifer from six municipal wells at four locations. The remainder is sourced from a water intake located in Lake Superior at Gros Cap. The average

volume of water consumed by municipal customers has fluctuated around 14 million cubic metres over the past four decades.

The *Clean Water Act, 2006* was established to protect water quality. Protecting water at its source is the first step in the multi-barrier approach to source water protection. A Source Water Protection Committee, comprising of a cross-section of community stakeholders, has been established in Sault Ste. Marie to develop a plan to protect the sources of municipal drinking water supplies. The Committee is responsible for identifying and evaluating potential threats to sources of municipal drinking water and setting out and implementing the actions necessary to reduce or eliminate significant threats.

In addition to the potable water provided through the communal system, it is estimated that there are approximately 1960 individual wells in the study area (source Sault Ste. Marie Regional Conservation Authority (SSMRCA) from MOE well records). The estimated annual water consumption within the study area is summarized in Table 3.5.

Water Use Area / Category	Total Annual Volumes (m³ / annum)	Comments
Prince Township ¹	125,000	977 persons at 350 L/person/day
Rankin Reserve ¹	19,000	150 persons at 350 L/person/day
Sault Ste Marie (rural wells)	593,000 ³	1,960 wells ²
Sault Ste. Marie (municipal) ¹	7,850,000	PUC annual pumping
Sault Ste Marie (municipal) ¹	7,400,000	Gros Cap Intake
Sault Ste. Marie Permits to Take Water (PTTW) ¹	1,040,000	MOE Permits To Take Water
Total Volume	17,027,000	

Source: 1 Sault Ste. Marie Water Budget Study prepared by MacViro (2006) for SSMRCA
 2 SSMRCA (MOE well records)
 3 Estimated at 1,960 households x 2.39 persons per household x 126.6 cu. m./ person/annum

3.2.7 Economics

Sault Ste. Marie has made a name for itself in steel making. Essar Steel is its major employer with approximately 3000 employees at the main plant. Algoma Tubes which utilizes local steel employs approximately 400 persons. Forestry is also a major contributor to the local economy employing approximately 400 people. The newest major industry in the area involves business process outsourcing, with several call centers employing approximately 2300 people. The workforce is summarized in Table 3.6.

Description	Male	Female	Total
Total Labour Force Size	19,310	17,685	36,995
Business, Finance & Admin	1,340	4,205	5,545
Health	380	2,270	2,650
Art, Culture, Recreation & Sport	235	375	610
Trades, Transportation & Equipment	5,485	305	5,790
Processing, Manufacturing & Utilities	2,235	205	2,440
Management Occupations	1,895	1,035	2,930
Natural & Applied Science	1,595	405	2,000
Social Science, Education, Government Religion	1,070	2,115	3,185
Sales & Service	4,530	6,635	11,165
Primary Industry (Unique)	540	140	680
Occupation Not Applicable	760	980	1,740

Source: SSMEDC Research Department

3.2.8 Tourism and Recreation

Tourism and recreation opportunities in the area include sport fishing and water sports along the St. Mary's River and Lake Superior, hiking on the Voyager Trail, snowmobiling, cross-country and downhill snow skiing in winter months, and golf on the six local golf courses. In addition tourist and recreation activities such as hunting, fishing, skiing, and eco tourism in surrounding areas contribute to the local economy and employment in the accommodation, food, and retail industries. The Agawa Canyon Tour train accommodates approximately 40,000 tourists per year. Sault Ste. Marie is the primary center in the Algoma Region benefiting from the Tourism and Recreation industry. The following Statistics Canada figures are for the Algoma District Census Division for the year 2004;

- Total Tourism Expenditures = \$230 million
- Annual Tourist Visits:
 - Overnight = 1,000,000
 - Same day = 960,000
 - **TOTAL = 1,960,000**
- Visits from within Canada = 1,200,000
- Visits from United States = 760,000

The estimated number of direct and indirect tourism related jobs within Sault Ste. Marie is summarized below:

- Direct Job = 3500
- Indirect Jobs = 1800

Source: Ian McMillan, Executive Director Tourism, Sault Ste. Marie EDC

3.2.9 Forestry

There are large forest stands within the Precambrian Uplands area comprising primarily hardwoods such as sugar maple. Harvesting activity within the study area is minimal. It generally supplies small local mills and provides firewood for area residents. The large boreal forest to the north of the study area contributes to the local economy through the supply of pulp wood to St. Mary's Paper Mill, logs to Boniferro Mill Works, and wood chips for the Flake Board Plant.

In addition the area provides support services to the forestry industry such as equipment sales and service, forest management offices, and homes for those employed in harvesting activities. The Forestry Research Centers on Queen St. East in Sault Ste. Marie house both federal and provincially funded laboratories dedicated to scientific research geared toward sustainable forestry.

3.2.10 Agriculture

Farms within the study area are generally smaller in size with relatively small revenues. Sixteen farms reported gross sales under \$10,000, eight farms reported gross sales between \$10,000 and \$49,999 and four farms reported sales of \$50,000 or greater.

Land Use

The 2001 census listed 28 farms in the study area totalling 764 ha (1,889 ac). Of these 22 farms had 382 ha (945 ac) dedicated to various crops. These are summarized in Table 3.7.

Description	Area
Tame pastures	41.2 ha (102 ac)
Natural pasture	87.4 ha (216 ac)
Other lands	253.3 ha (626 ac)
Crops:	
Potatoes	1.6 ha (4 ac)
Vegetables	13.7 ha (34ac)
Christmas trees	2.0 ha (5 ac)
Oats	12.7 ha (34 ac)

Production practices on the farms are summarized in Table 3.8.

Description	Area
Irrigation	23.8 ha (59 ac)
Commercial fertilizers	51.8 ha (127 ac)
Herbicides	14.9 ha (37 ac)
Fungicides	2.4 ha (6 ac)
Solid manure	84.5 ha (209 ac)

Livestock

A number of different types of livestock were reported in the 2001 census. Twenty-two farms reported having some type of livestock. Only farms that sell, produce and operate with the intent of making money are asked to report in the agricultural census. Also, farms can report in this category more than once if they have more than one type of animal. Based on the census the types of livestock raised are as follows;

- 6 farms reported some types of poultry (109 chickens, some turkeys and other poultry);
- 13 farms reported having cattle or cows (178 total cows, one farm reported having dairy cows);
- 1 farm reported having pigs;
- 3 farms had sheep and lambs;
- 2 farms reported rabbits;
- 1 farm had bees; and
- 6 farms reported having horses and ponies (101).

3.2.11 Mineral Resources

The most significant mineral resource in the study area is the aggregate (sand and gravel) deposits located at the southern edge of the Precambrian Uplands. The aggregate extracted from the 23 ± licensed pits and quarries are necessary for development of the urban area. The estimated tonnage in the aggregate deposit area is approximately 275,000,000 tons.

The Primary Aggregate Area is illustrated on Schedule A of the Sault Ste. Marie Official Plan attached in Appendix B of this report.

There are no mines operating in the study area. However, mineral deposits of copper, zinc, and lead were mined in the early 1800's. Two old mining trenches can be found in Prince Township. One on the bluffs above Lake Superior north of Jackson Island and the other in the Precambrian Shield north of Marshall Drive. A third old trench can be found in Sault Ste. Marie north of the intersection of Connor Road and Sixth Line. There is an active Jacobsville Sandstone quarry along the Root River just east of Great Northern Road. This site quarries approximately 100 tons of sandstone per year. There is also a potential for the quarrying of blast rock or bedrock aggregate in the Precambrian Upland area. One existing blast rock quarry is located north of Avery Road.

LIST OF REFERENCES AND SOURCES

3.1 Natural Environment

- .1 Geology / Hydrogeology / Soils
 - Sault Ste. Marie Regional Conservation Authority*
 - Sault Ste. Marie Official Plan 1996*
 - Sault Ste. Marie Groundwater Management and Protection Plan, 2003*
- .2 Surface Water
 - Planning Advisory Services*
 - Prince Township*
- .3 Climate
 - Sault Ste. Marie Airport*
 - Environment Canada*
- .4 Biology
 - a) Vegetation
 - MNR, Margaret Carruthers, District EA Forester*
 - Bob Knudsen: SAR Planning Biologist (MNR)*
 - Sault Ste. Marie Landfill Site Environmental Assessment – Dillon 1982*
 - b) Wildlife
 - Sault Ste. Marie Landfill Site Environmental Assessment – Dillon 1982*
 - Heritage Community Foundation – The Boreal Forest*
 - Bob Knudsen: SAR Planning Biologist (MNR)*
 - c) Fisheries
 - Sault Ste. Marie Landfill Site Environmental Assessment – Dillon 1982*
 - Bob Knudsen: SAR Planning Biologist (MNR)*

3.2 Social – Cultural Environment

- .1 Archaeological / Cultural
 - Sault Ste. Marie Official Plan*
 - Superior: Under the Shadow of the Gods (Lynx Images)*
- .2 Social-Cultural
- .3 Official Plans and Policy Documents
 - a) Waste Disposal Policies
- .4 Land Use
 - Planning Division, City of Sault Ste. Marie*

- .5 Transportation
Planning Division – City of Sault Ste. Marie

- .6 Municipal Servicing Network
*City of Sault Ste. Marie Engineering and Planning Department
Sault Ste. Marie Groundwater Management and Protection Plan, 2003*

- .7 Economics
Sault Ste. Marie Economic Development Corp.

- .8 Tourism and Recreation
Ian McMillan, Executive Director Tourism, Sault Ste. Marie EDC.

- .9 Forestry

- .10 Agriculture
David Trivers, Ministry of Agriculture, Feb 16 2007

- .11 Mineral Resources
*Aggregate Resources Inventory, Sault Ste. Marie Area, MNR 1985
Regional Geologist: Hailstone, Mike (MNDM)*

APPENDIX A
WASTE QUANTITY PROJECTIONS

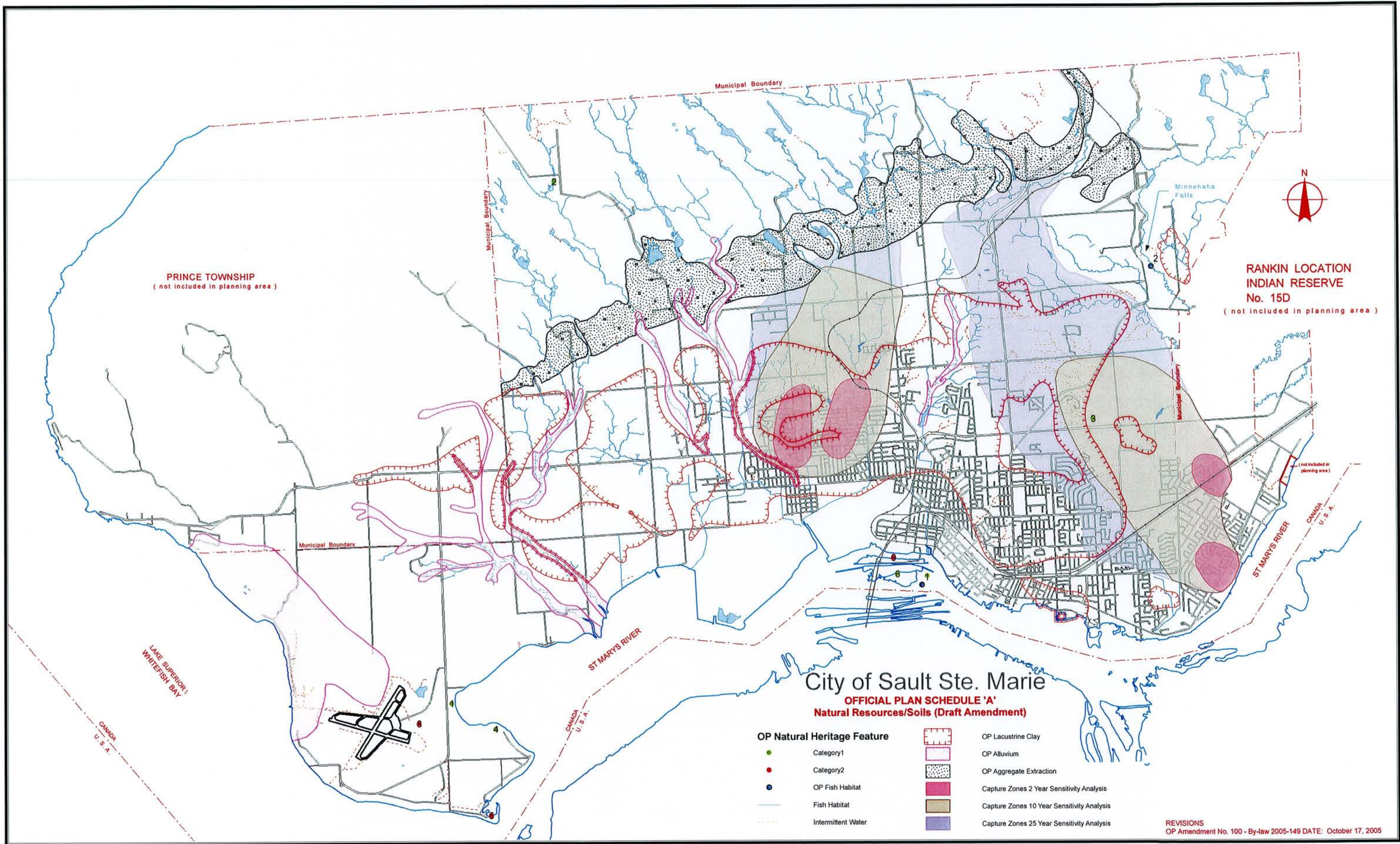
City of Sault Ste. Marie
 Projected Waste Generation, Diversion and Remaining Disposal Capacity

TABLE 2.5

Year	Population	Residential Waste Generation Rate (tonnes/person/yr)	Residential Diversion Rate (%)	IC&I Waste Disposal Rate (tonnes/person/yr)	Municipal Biosolids Generation Rate (tonnes/person/yr)	Municipal Biosolids Diversion Rate (%)	Total Waste to be Managed (tonnes)	Total Waste Diverted (tonnes)	Total Residual Waste (tonnes)	Remaining Disposal Capacity (tonnes)
2005	74872	0.396	33	0.522	0.131	0	78530	9631	68899	
2006	74948	0.418	33	0.422	0.113	0	71423	10394	61029	
2007	75200	0.435	33	0.411	0.134	0	73696	10755	62941	
2008	75200	0.448	33	0.847	0.115	0	106030	11209	94821	
2009	75300	0.450	35	0.448	0.136	0	77916	11740	66176	582000
Avg. 2005-2009	75104	0.429	33.30	0.530	0.126	0	81519	10746	70773	
Projections		0.450		0.550	0.135					
2010	76987	0.450	35	0.550	0.135	0	87380	12125	75255	506745
2011	77105	0.450	36	0.550	0.135	0	87514	12491	75023	431722
2012	77585	0.450	37	0.550	0.135	0	88059	12918	75141	356581
2013	78065	0.450	38	0.550	0.135	0	88604	13349	75255	281327
2014	78545	0.450	38	0.550	0.135	0	89149	13431	75717	205609
2015	79025	0.450	38	0.550	0.135	0	89693	13513	76180	129429
2016	79505	0.450	38	0.550	0.135	100	90238	24329	65910	63519
2017	80149	0.450	38	0.550	0.135	100	90969	24526	66444	-2924
2018	80793	0.450	38	0.550	0.135	100	91701	24723	66978	-69902
2019	81438	0.450	38	0.550	0.135	100	92432	24920	67512	-137414
2020	82082	0.450	38	0.550	0.135	100	93163	25117	68046	-205460
2021	82726	0.450	38	0.550	0.135	100	93894	25314	68580	-274039
2022	83060	0.450	38	0.550	0.135	100	94274	25416	68857	-342897
2023	83395	0.450	38	0.550	0.135	100	94653	25519	69134	-412031
2024	83729	0.450	38	0.550	0.135	100	95033	25621	69412	-481442
2025	84064	0.450	38	0.550	0.135	100	95412	25723	69689	-551131
2026	84398	0.450	38	0.550	0.135	100	95792	25826	69966	-621097
2027	84820	0.450	38	0.550	0.135	100	96271	25955	70316	-691413
2028	85244	0.450	38	0.550	0.135	100	96752	26085	70667	-762080
2029	85670	0.450	38	0.550	0.135	100	97236	26215	71021	-833101
2030	86099	0.450	38	0.550	0.135	100	97722	26346	71376	-904477
2031	86529	0.450	38	0.550	0.135	100	98211	26478	71733	-976209
2032	86962	0.450	38	0.550	0.135	100	98702	26610	72091	-1048301
2033	87397	0.450	38	0.550	0.135	100	99195	26743	72452	-1120752
2034	87834	0.450	38	0.550	0.135	100	99691	26877	72814	-1193566
2035	88273	0.450	38	0.550	0.135	100	100190	27011	73178	-1266745
2036	88714	0.450	38	0.550	0.135	100	100691	27147	73544	-1340289
2037	89158	0.450	38	0.550	0.135	100	101194	27282	73912	-1414200
2038	89603	0.450	38	0.550	0.135	100	101700	27419	74281	-1488482
2039	90052	0.450	38	0.550	0.135	100	102208	27556	74653	-1563134
2040	90502	0.450	38	0.550	0.135	100	102719	27694	75026	-1638160
2041	90954	0.450	38	0.550	0.135	100	103233	27832	75401	-1713561
2042	91409	0.450	38	0.550	0.135	100	103749	27971	75778	-1789339
2043	91866	0.450	38	0.550	0.135	100	104268	28111	76157	-1865496
2044	92325	0.450	38	0.550	0.135	100	104789	28252	76538	-1942034
2045	92787	0.450	38	0.550	0.135	100	105313	28393	76920	-2018955
2046	93251	0.450	38	0.550	0.135	100	105840	28535	77305	-2096260
2047	93717	0.450	38	0.550	0.135	100	106369	28677	77692	-2173951
2048	94186	0.450	38	0.550	0.135	100	106901	28821	78080	-2252031
2049	94657	0.450	38	0.550	0.135	100	107435	28965	78470	-2330502

NOTES:
 Historical values reflect the City of Sault Ste. Marie only.
 Assumed in-place waste density = 0.7t/cu.m
 Population projections include City of Sault Ste. Marie, Prince Township and Rankin Reserve.
 Waste diversion rate projections reflect enhancements to existing approved diversion programs.
 The City will continue to strive to meet provincial diversion targets .

APPENDIX B
OFFICIAL PLAN SCHEDULES A, B, C, AND D

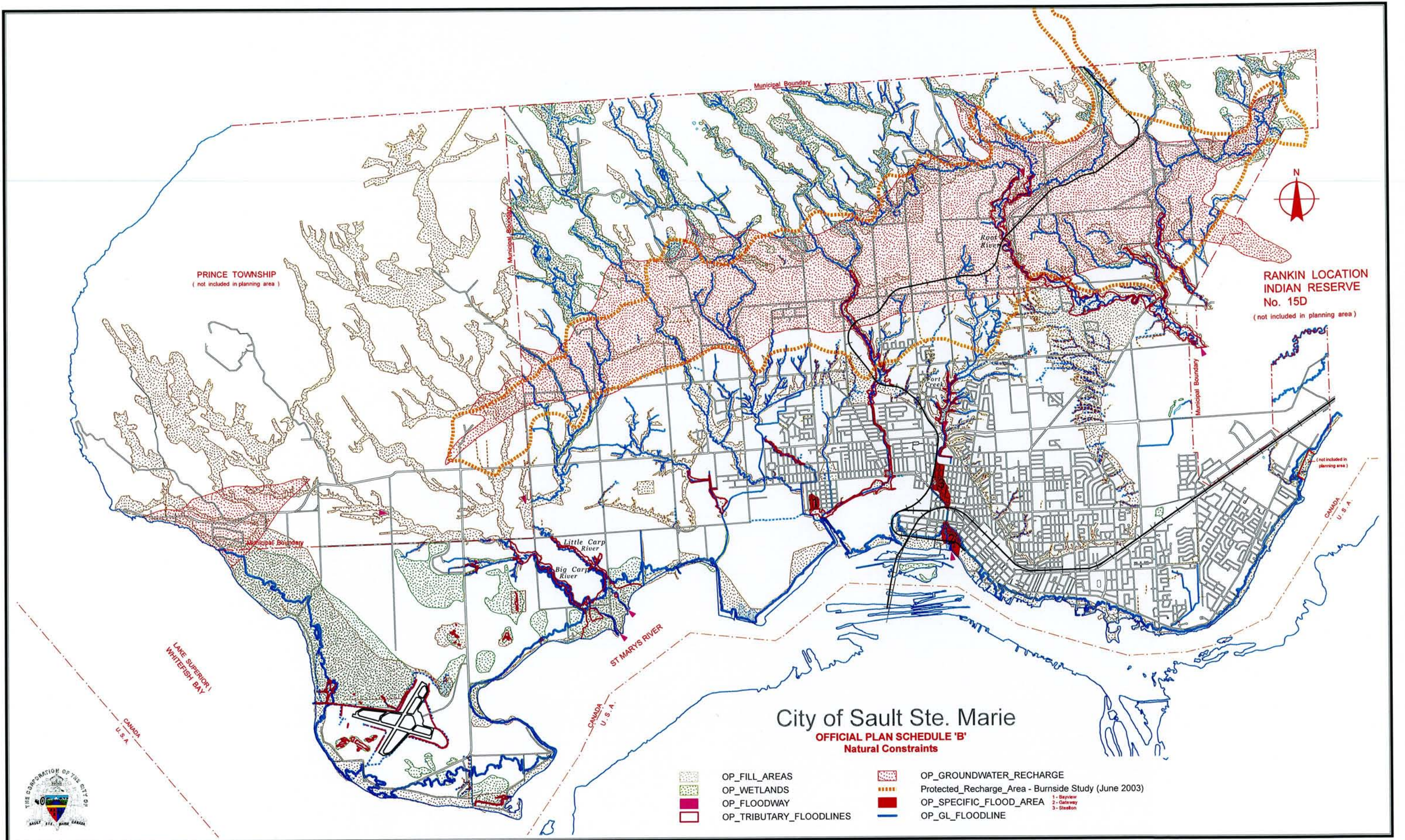


PRINCE TOWNSHIP
(not included in planning area)

RANKIN LOCATION
INDIAN RESERVE
No. 15D
(not included in planning area)



REVISIONS
OP Amendment No. 100 - By-law 2005-149 DATE: October 17, 2005



LAKE SUPERIOR
 WHITEFISH BAY

PRINCE TOWNSHIP
 (not included in planning area)

RANKIN LOCATION
 INDIAN RESERVE
 No. 15D
 (not included in planning area)

City of Sault Ste. Marie
OFFICIAL PLAN SCHEDULE 'B'
Natural Constraints



CANADA
 U.S.A.

CANADA
 U.S.A.

CANADA
 U.S.A.

Little Carp River
 Big Carp River
 ST MARYS RIVER

Fort
 Creek

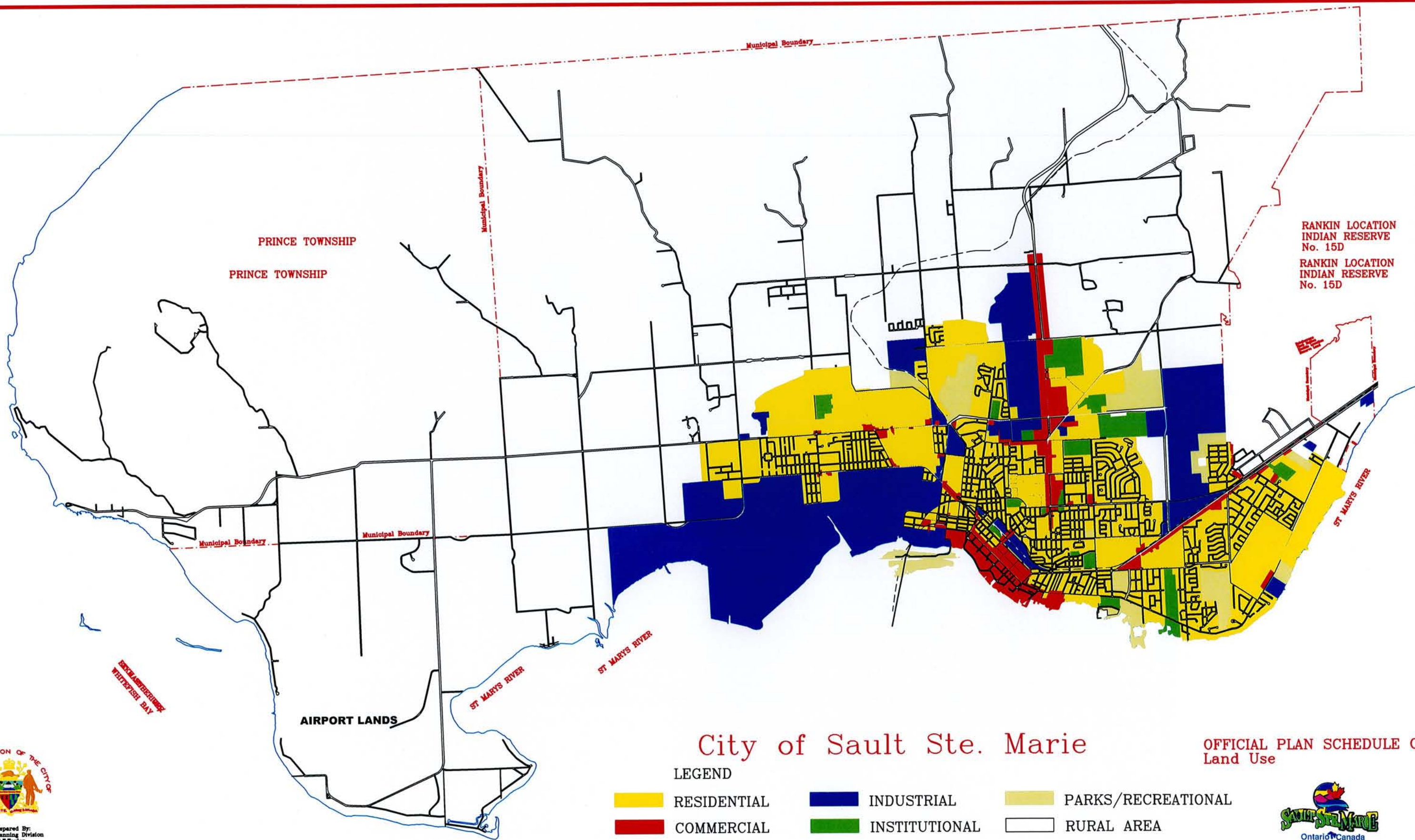
Root
 River

Municipal Boundary

Municipal Boundary

Municipal Boundary

Municipal Boundary









RANKIN LOCATION
INDIAN RESERVE
No. 15D
RANKIN LOCATION
INDIAN RESERVE
No. 15D

City of Sault Ste. Marie

OFFICIAL PLAN SCHEDULE C
Land Use

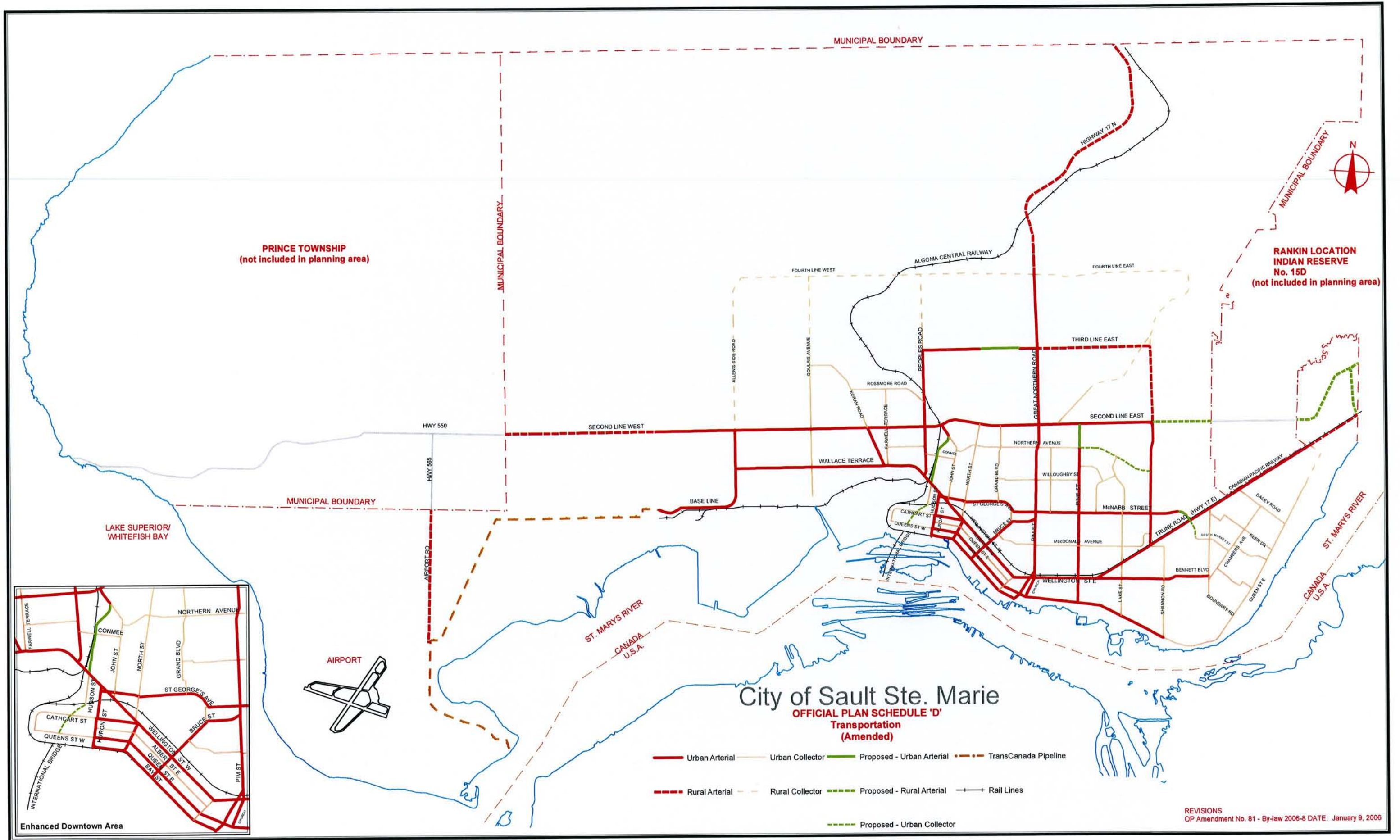
LEGEND

- | | | |
|---|---|--|
|  RESIDENTIAL |  INDUSTRIAL |  PARKS/RECREATIONAL |
|  COMMERCIAL |  INSTITUTIONAL |  RURAL AREA |



Prepared By:
City Planning Division
G.E. Taylor
File: C/OP-SCP-C
March 30, 1996





City of Sault Ste. Marie
OFFICIAL PLAN SCHEDULE 'D'
Transportation
(Amended)

- Urban Arterial
- Urban Collector
- Proposed - Urban Arterial
- TransCanada Pipeline
- - - Rural Arterial
- - - Rural Collector
- - - Proposed - Rural Arterial
- Rail Lines
- Proposed - Urban Collector

REVISIONS
 OP Amendment No. 81 - By-law 2006-8 DATE: January 9, 2006