

SGS LAKEFIELD RESEARCH LIMITED

Evaluation of Best Practices of Rural Recycling Depot Programs

prepared for

QUINTE WASTE SOLUTIONS

SGS Lakefield Reference No.: 10925-001

April 7, 2006

Lakefield Research

SGS Lakefield Research Limited | P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0 t (705) 652-2000 f (705) 652-6365 www.lakefield.com www.sgs.com

Member of the SGS SA Group

EXECUTIVE SUMMARY

Ontario has a large geographical area in which a combination of high and low population densities co-exist. Regardless of their differences, municipal recycling programs servicing less densely-populated areas share similar concerns to those servicing larger demographic – both are striving to improve collection efficiencies and increase diversion rates.

SGS Lakefield Research Limited (SGS Lakefield) was retained by Quinte Waste Solutions and Stewardship Ontario to research and identify best practices in Ontario rural recycling depot systems. “Best practices” refers to depot programs which produce effective capture rates per household; enjoy strong commitment on the part of the population; demonstrate effective user accessibility; and provide these services in a cost-effective manner.

The study identified four main factors which contribute to an efficient and effective recycling depot system:

1. Depot Capacity and Hauling Distance to a MRF
2. Depot Accessibility and Attendant Duties
3. Seasonal Population
4. Waste Diversion Policy

The report produced the following recommendations for municipal depot programs looking to maximize the efficiency and effectiveness of their system:

- Increase capture rate of existing Blue Box material by promoting the depot program in high traffic areas (i.e. waste disposal site, grocery store, convenience stores, seasonal bait shops, hardware stores, libraries, schools, banks, post offices, etc.).
- Municipalities that rely on the same contractor to provide collection and processing services should require costs to be itemized according to lift fees, hauling fees, and processing fees. Such cost itemization allows municipalities to review specific costs associated with the program and hence to consider changes to improve efficiency.
- Encourage revenue sharing or a revenue rebate from the processing contractor or negotiate a reduction of processing costs for materials that have higher market values such as corrugated cardboard, aluminium beverage cans, and clean newspaper. Information on price trends for post-consumer metals, glass, plastic and fibre is available on a monthly basis from Corporations Supporting Recycling’s web site (www.csr.org) and Waste Diversion Ontario’s website (www.wdo.ca). Based on WDO data, revenue from the sale of PET plastic and aluminium cans represents 33% of the residential Blue Box revenue stream.

- A responsible depot attendant is the best defence against material contamination. An attendant who promotes the program and encourages proper material separation contributes to the program's success and increases its perceived and actual effectiveness. This in turn, results in higher community participation and overall capture rate. The provision of a depot attendant also supports mandatory recycling by-laws and/or user pay programs as the attendant can regulate and monitor inbound material.
- Compacting and co-mingling material reduces the frequency of collection from the depot site and increases the potential for a municipality to haul a greater distance at a lower cost. This in turn increases the range of processing facility alternatives available to the municipality. Indeed, depot programs located in areas where there are many hauling and processing contractor options can get bids from several contractors which will reduce the risk of inflated costs since the contractors want to remain competitive. It is important, however, to ensure that the processing MRF is equipped with the necessary infrastructure to handle the change in the material preparation.
- One cost-effective compaction alternative municipalities might consider is to retrofit enclosed containers with an on-site generator to power compaction equipment where access to hydro is not available.
- Consider leasing or renting collection containers if initial purchase of capital equipment is cost-prohibitive. Municipal programs currently renting roll-off containers have the convenience of not incurring any maintenance cost and having low monthly payments (\$100 to \$200/month, depending on length of the contract period).
- Ensure the depot site is well maintained to reduce contamination and to increase participation from the public.
- Diversion policies such as mandatory recycling or user pay systems directly impact recycling depot program capture rates. Depot programs can exceed curbside Blue Box collection capture rates by implementing community programs that support the use of the recycling depot site.

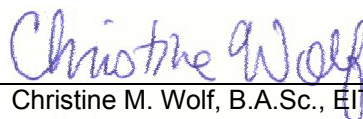
SGS LAKEFIELD RESEARCH LIMITED

Environmental Services



John P. Desbiens, P.Eng.

Manager, Environmental Services



Christine M. Wolf, B.A.Sc., EIT

Project Technologist



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This Project has been delivered with the assistance of Stewardship Ontario's Effectiveness and Efficiency Fund, a Fund financed by Ontario municipalities and stewards of blue box waste in Ontario. Notwithstanding this support, the views expressed are the views of the author(s), and the Association of Municipalities of Ontario and Stewardship Ontario accept no responsibility for these views.

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1.0 INTRODUCTION

SGS Lakefield Research Limited (SGS Lakefield) was retained by Quinte Waste Solutions and Stewardship Ontario to research and identify best practices in Ontario rural recycling depot systems. The evaluation was designed to focus on recycling depot systems that demonstrate a high capture rate of residential Blue Box material in a cost-efficient manner.

For clarification purposes, a recycling depot system is one that collects residential Blue Box recyclable material at a central collection point using a given collection infrastructure (e.g. roll-off containers, recycling totes, stationary compactors, compartmentalized bins, etc.). Once material is collected at the depot, the material and/or depot containers are transferred to an alternate location or facility for processing.

1.1 BACKGROUND

Quinte Waste Solutions (QWS) is an organization responsible for the waste reduction programs of: the Cities of Belleville and Quinte West, Tyendinaga Township, Prince Edward County, Madoc Township, the Municipality of Centre Hastings, the Municipality of Tweed, the Township of Stirling-Rawdon, and the Municipality of Marmora and Lake. QWS is administered by the Centre and South Hastings Waste Services Board, which is made up of an elected councillor from each of the member municipalities.

Through a review of available data, QWS has established that the average Blue Box material capture rate for its rural depot systems (70.5 kg/hh/yr in 2005) is low compared to its rural residential curbside collection programs. This is reflective of rural depots' relative underperformance compared to curbside collection on a province-wide basis. Despite curbside collection systems' proven ability to capture recyclables more effectively, these programs are typically cost-prohibitive in municipalities with high seasonal population fluctuations and low population densities.

To understand the motivational factors affecting the residential population's decision to recycle, and to explore the barriers that discourage participation at recycling depot sites, QWS requested funding from Stewardship Ontario's Effectiveness and Efficiency Fund (E&E Fund) to evaluate best practices in current recycling depot systems. QWS will draw on the successful depot strategies presented in this study to improve its own depot program.

1.2 PURPOSE AND SCOPE

The purpose of this study is to research and identify "best practices" in residential recycling depot programs in Ontario. "Best practices" refers to depot programs which produce effective capture rates per household, enjoy



strong commitment on the part of the population, demonstrate effective user accessibility, and provide these services in a cost-effective manner.

Given Ontario's diverse geographic and socio-cultural demographics, it is important to take into account the specific characteristics of the community receiving the depot service when evaluating the factors contributing to the success of a given program. This study establishes the basic principles that support a successful recycling depot system, with the assumption that the information from components of various depot programs will be transferable to municipalities exhibiting similar characteristics.

The report is organized as follows. Section 2 provides a general overview of recycling depot programs in Ontario, and the methodology used for identifying the top performing residential recycling depot programs is outlined in Section 3. A background summary of the leading residential recycling depot programs in the province is provided in Section 4, while Section 5 examines the factors affecting residential recycling depot programs. Finally, Section 6 provides an evaluation of best practices in residential recycling depot programs, and Section 7 concludes with a summary and recommendations pertaining to the findings of this study.

2.0 RECYCLING DEPOT PROGRAMS IN ONTARIO – AN OVERVIEW

Information gathered from the 2003 Waste Diversion of Ontario (WDO) Tonnage Datacall indicates that 229,838 households are serviced by 70 recycling depot programs in the province. The datacall further identifies three distinct recycling depot systems:

1. Rural Recycling Depot Systems - main source of collection system for populations of 7,000 or less with no supporting curbside Blue Box service, with the majority of programs supporting a population of fewer than 2,000 permanent residents.
2. Centralized Recycling Depot Systems - a supporting service to Blue Box curbside collection for permanent populations ranging from 4,000 to approximately 10,000.
3. Urban Recycling Depot Systems - secondary source of collection within a fully-integrated waste management service, for permanent populations greater than 10,000.

This study focuses on Rural Recycling Depot Systems, which correspond to those municipal depot programs that DO NOT have supporting curbside Blue Box collection servicing the urban sectors of the municipality. For comparison purposes, information on Centralized Recycling Depot Systems and Urban Recycling Depot Systems is nonetheless offered throughout the report. Examples of effective collection mechanisms that may be transferable to Rural Recycling Depot Systems are also presented.

According to the 2003 WDO Tonnage Datacall, there are 48 Rural Recycling Depot programs in Ontario, servicing a total of 106,756 households. In total, these programs marketed 8,455 tonnes of materials, which translates to an average recovery rate of 79 kg/hh/yr. In comparison, Ontario's curbside collection programs on average captured 174 kg/hh/yr of recyclable material. The total system cost for these 48 programs was approximately \$2,433,478, representing an average net cost of \$288/tonne. If one considers this total cost on a per household basis, in 2003 rural recycling programs provided their services for an average cost of \$23 per household per year.

Of the 48 Rural Recycling Depot Systems operating in Ontario, approximately 35% (17 programs) achieved an average capture rate of 40 kg/hh/yr or lower. Approximately 76% of these lower capture rate programs are categorized by the WDO as Rural Depot Northern communities. According to WDO 2003 Datacall information, the Northern Rural Recycling Depot Systems have an average capture rate of approximately 52 kg/hh/yr and an average net cost per tonne of approximately \$680/tonne. For the remaining 65% of Rural Recycling Depot Systems achieving greater than 40 kg/hh/yr, the average capture rate is approximately 105 kg/hh/yr with an approximate average net cost per tonne of \$308/tonne.



The current study draws upon the above-mentioned cost information to examine the factors affecting capture rates and costs associated with rural recycling depots. In doing so, emphasis is placed on identifying best practices that contribute to successful programs.

3.0 METHODOLOGY

Kilograms/household/per year was used as the main benchmarking indicator in assessing depot systems' general effectiveness. Using the 2003 Datacall, 19 programs which reported a capture rate greater than the average capture rate for all 48 Rural Recycling Depot Systems (79 kg/hh/yr) were identified. A questionnaire was faxed to these 19 municipalities in January 2005, followed by a mailed hardcopy. Both were addressed to the concerned Municipal CAO/Clerks, and requested information on their depot programs. In addition, approximately 10 questionnaires were submitted to municipal programs with larger community based depot systems and/or programs providing depot collection services as complement to their Blue Box curbside collection program. Eight questionnaires were completed, representing a 40% response rate. Follow-up telephone calls were made to the municipal programs that did not complete the questionnaire.

The questionnaire addressed the following issues:

- Municipal Attributes - including physical nature of the municipality, permanent household counts, and impacts of seasonal population.
- Facilities and Operations - including depot design, capacity, level of material separation, user access, depot hours of operation, location of depot within community, and public/private method of service.
- Attendant Duties - including roles and responsibilities of the attendant.
- Collection - including contract arrangements, and distance to processing facilities.
- Diversion Infrastructure - including By-laws, user fees, bag limits, mandatory recycling requirements, etc.
- Promotion and Education Program - including methods of communicating to the public at the depot sites, and frequency of promotional activities.

In general, due to the structure of many depot collection contracts, the cost information provided by municipal depot programs was limited. Indeed, a number of the municipalities who responded to the survey rely on a depot contractor to provide all recycling related services (collection, processing and marketing), and are charged according to a total cost per tonne, or total cost per hour rate. An assessment of depot programs based on cost per tonne therefore becomes difficult and less meaningful than one that is based on capture rate. Using the available cost information, the net cost per tonne for the leading Rural Recycling Depot Systems was converted to a cost per household. This provides a useful basis for municipalities wishing to use this information to compare their costs with other programs having similar demographics.

Material composition, because of the impact it has on depot capacity and hauling distances, directly affects Rural Recycling Depot Systems' cost efficiencies. A number of contractors servicing depot municipalities point to the increasing quantities of PET plastic water bottles and 350 ml PET pop bottles within the residential depot material stream (personal communication, Allen Hussey, Muskoka Containerized Services). They further note that the change in beverage packaging from aluminium to plastic and the increased distribution of bottled water in local grocery stores, hardware stores, and vending machines, is beginning to affect the capacity of the depot collection containers. In addition to the increase in PET composition, there is an increase in the volume of larger HDPE four litre detergent jugs and bulk containers. These larger plastic jugs have traditionally been prevalent in higher population density communities where warehouse or factory outlet malls are present; however, these bulk size bottles and jugs are becoming increasingly common in rural locations throughout the province. Given that plastic has a high volume and low weight, depot programs' true capture rates should therefore not be entirely based on weight (kg/hh/yr). It should also be noted that some depot communities have elected to divert low revenue generating glass from the depot system, using it instead in public works related activities or simply sending it to landfill. For the purposes of this study, depot program capture rates are nonetheless assessed using a weighed-based indicator (kg/hh/yr).

The following section examines the nine leading residential depot programs in terms of capture rate per household.

4.0 LEADING RECYCLING DEPOT PROGRAMS IN ONTARIO (2003)

An analysis of 2003 data on rural recycling depot programs in Ontario indicates that approximately 19 municipal programs achieved a capture rate of recyclable material in excess of 100 kg/hh/yr. A closer examination revealed that the capture rate for 10 of these programs was in fact inflated by factors such as the provision of supplementary curbside Blue Box collection service in urban areas of the municipality, and the intake of material from outside their municipal boundaries or from unknown sources. The remaining nine municipal depot programs were thus examined to identify the factors contributing to their high capture rate. These programs are listed below in decreasing order.

1. Township of Amaranth.
2. Township of Casey.
3. Township of Augusta.
4. Township of Algonquin Highlands.
5. Township of Minden Hills.
6. Township of Melancthon.
7. Township of Perry.
8. Township of Admaston/Bromley.
9. Township of Tay Valley.

Contact information for each of these programs is provided in Appendix A.

4.1 TOWNSHIP OF AMARANTH

- Location: County of Dufferin
- WDO Depot Category: Rural Depot South
- Population: 3,570
- Households: 1,294
- Seasonal Impact: None
- Municipal Attributes: Rural Farming Community
- Capture Rate: 286 kg/hh/yr



- Net Cost Per Tonne: \$104/tonne
- Net Cost Per Household: \$30/hh
- Depot Style: Roll-Offs
- Weigh Scale: None

The Township of Amaranth is an agricultural community, surrounded by the Towns of Orangeville, Grand Valley, and Shelburne. There is a very small representation of the Industrial, Commercial or Institutional (IC&I) sector, which receives private collection services for its waste and recyclables; therefore, there is no impact from this sector on the recycling depot system. The Township staff also indicated that there is no significant impact of seasonal population variations, as it is primarily an agricultural-based Township.

The Township owns and operates one waste disposal site (WDS) centrally located within the Township. The WDS offers disposal for municipal solid waste (MSW), construction and demolition material (C&D), leaf and yard waste, and Blue Box recyclables. All township residents must bring their segregated material to the central WDS and deposit the material in the appropriate locations. The recyclable material is collected from the WDS by a private contactor, S.H. Masters and Sons (annual renewal contract); and hauled in 40 cubic yard roll-off containers to the City of Guelph Material Recovery Facility for processing. The recyclable material is segregated into three separate roll-off containers for the following categories: Newspapers and Office Paper Fibres; Boxboard and Corrugated Cardboard; and Co-mingled Containers, including glass, cans, plastic #1,#2,#4, # 5, and polystyrene (no film). There is a designated recycling attendant to assist residents. The hours of operation for the WDS, including the recycling depot site, are Wednesdays from 8:30 a.m. to 5:30 p.m. and Saturdays from 8:00 a.m. to 4:00 p.m.

The Township receives monthly invoices from the contractor. The contractor does not segregate the hauling costs from the processing costs; therefore, the total costs associated with the 2003 depot collection/processing contract for 370 tonnes was approximately \$39,000. This cost also includes approximately 3% of municipal administration costs factored by the Township, but does not include the depot attendant's salary.

4.2 TOWNSHIP OF CASEY

- Location: District of Timiskaming
- WDO Depot Category: Rural Depot South
- Population: 374
- Households: 151
- Seasonal Impacts: Minimal
- Municipal Attributes: Rural Farming Community
- Capture Rate: 245 kg/hh/yr
- Net Cost Per Tonne: \$107/tonne
- Net Cost Per Household: \$26/hh
- Depot Style: Tip Bins and Roll-Offs
- Weigh Scale: None

The Township of Casey is situated in the northeastern portion of the south Timiskaming Region at the Ontario/Quebec border. Agriculture is the Township's main industry.

The Village of Belle-Vallee is home to approximately 40% of the residential population. The municipally owned and operated WDS is located approximately two kilometres north of the village. The recycling depot is located at the WDS in the form of 40 cubic yard roll-off containers which service a fully co-mingled recyclable material mix that includes plastic (# 1, #2, #4, #5, no film or polystyrene); fibres (corrugated cardboard, boxboard, newspapers, flyers, magazines, office paper); glass; aluminium; and steel. Small household metal appliances such as frying pans and toasters are also included in the list of acceptable items for residential recycling and are factored into the total tonnage for residential Blue Box capture (these nonetheless represent a small portion of what is collected, distortion of tonnage data is therefore small). In the winter, the recycling depot is open one day per week (Saturday from 9:00 a.m. to 5:00 p.m.) and in the summer, one and a half day per week (Wednesday 4:00 p.m. to 8:00 p.m. and Saturday 9:00 a.m. to 5:00 p.m.) There is also an alternative recycling depot site located on the road to the WDS. This alternate site has 8 cubic yard bins that can be serviced by a front-end truck. The bins are unattended and accessible 24 hours a day.

The recyclable material is handled by a private contractor from Quebec, Service Sani-Tri, on an on-going basis (no contract). The Materials Recovery Facility (MRF) is located approximately 45 minutes away from the

township. The contractor does not charge a processing fee, but retains any revenue to cover processing costs. The annual cost associated with collecting and processing the Township's 37 tonnes of recyclable material is approximately \$3,950.

4.3 TOWNSHIP OF AUGUSTA

- Location: County of Leeds and Grenville
- WDO Depot Category: Rural Depot South
- Population: 7,265
- Households: 2,418
- Seasonal Impacts: Moderate
- Municipal Attributes: Rural Farming Base Community
- Capture Rate: 242 kg/hh/yr
- Net Cost Per Tonne: \$398/tonne
- Net Cost Per Household: \$96/hh
- Depot Style: Roll-Off
- Weigh Scale: None

The Township of Augusta is located south of the City of Ottawa along the St. Lawrence River. The Town of Prescott is the Township's main urban area. The Township's population is made up of farming communities as well as a high concentration of professionals working for large industrial operations. The Township's IC&I sectors are serviced by private waste and recycling collection contractors.

There are two waste disposal sites in the Township and both sites offer a recycling depot service. There is a WDS located in the northern portion and another WDS in the southern portion of the Township; therefore, the majority of residents do not travel more than 10 kilometres to bring their waste and recyclable material to one of the two sites. A landfill attendant assists residents with their recycling. The recycling depots at the disposal sites consist of five (5) separate collection containers which are designated for the following materials:

- One 40 cubic yard roll-off designated for corrugated cardboard only.
- One 40 cubic yard roll-off designated for newspapers, flyers and boxboard.
- One 20 cubic yard roll-off designated for co-mingled #1 plastic, steel and aluminium cans.

- One 20 cubic yard roll-off designated for clear container glass.
- One 20 cubic yard roll-off designated for coloured container glass.

Waste Management Inc. (WM) is the collection and processing contractor. WM hauls the recyclable materials to its MRF located in Brockville, Ontario. The hauling time from either depot site is approximately 45 minutes. The contractor rebates the Township for the co-mingled loads of aluminium and #1 plastic on a monthly basis at an average of approximately \$300 to \$400 per load. The Township is charged a rate of \$194 per container load of material (collection and processing). In 2003, the Township recycled 585 tonnes of material for a total cost of approximately \$227,565. This cost includes the collection and processing contract, plus 50% of the depot attendant's salary, 3% of Township administration costs, as well as the provision of Blue Boxes at no charge to the residents of the Township.

4.4 TOWNSHIP OF ALGONQUIN HIGHLANDS

- Location: County of Haliburton
- WDO Depot Category: Rural Depot South
- Population: 2,000
- Households: 1,490
- Seasonal Impacts: High
- Municipal Attributes: Rural, Tourism Base Community
- Capture Rate: 234 kg/hh/yr
- Net Cost Per Tonne: \$356/tonne
- Net Cost Per Household: \$83/hh
- Depot Style: Roll-Offs
- Weigh Scale: None

The Township of Algonquin Highlands is located in the northern portion of Haliburton County in south-central Ontario, approximately 30 kilometres east of the Town of Huntsville and 15 kilometres north of the Village of Minden on Highway No. 35. The Township was formed through the amalgamation of six geographic townships, two of these (Lawrence and Nightingale) located within the boundaries of Algonquin Provincial Park. The Township of Algonquin Highlands owns and operates five waste disposal sites located throughout the Township

servicing populated communities surrounding Dorset, Hawk Lake, Maple Lake, Oxtongue Lake, and Pine Springs. There are recycling depot containers located at each disposal site. The depot containers are 40 cubic yard open top roll-off containers, with one roll-off for co-mingled fibres and one roll-off for co-mingled containers. The fibre roll-off accepts all paper fibres including corrugated cardboard, boxboard, newsprint, office paper and flyers. The co-mingled roll-off containers accept steel and aluminium food and beverage containers as well as all grades of plastic containers and film, with the exception of #3 and #7 plastic. A landfill attendant assists residents with their recycling. The Township's IC&I sector is small and receives private collection services for waste and recycling.

Muskoka Containerized Services, in Bracebridge, Ontario is the collection and MRF processing contractor for the Township. The contract arrangement includes a MRF processing fee of approximately \$40/tonne, and a variable lift fee to collect the depot containers. The lift fee factors in the contractor's time to travel to the Township's various waste disposal sites; each site therefore has a different lift fee based on the distance traveled and the estimated time it takes the driver to collect the bin, based on the type of road, the weather conditions, etc. The Township experiences higher lift fees at sites that are on tertiary road systems, and in more remote locations, compared to sites, such as the Dorset WDS, which is located approximately 45 minutes away from the processing MRF.

4.5 TOWNSHIP OF MINDEN HILLS

- Location: County of Haliburton
- WDO Depot Category: Rural Depot South
- Population: 5312
- Households: 3,048
- Seasonal Impact: High
- Municipal Attributes: Rural Tourism Base Community
- Capture Rate: 203 kg/hh/yr
- Net Cost Per Tonne: \$272/tonne
- Net Cost Per Household: \$55/hh
- Depot Style: Roll-Off
- Weigh Scales: None

The Township of Minden Hills is located in the south-western portion of Haliburton County 15 kilometres south of the Township of Algonquin Highlands, along Highway No. 35. The Township of Minden Hills currently operates six waste disposal sites to service the communities surrounding Minden: Scotch Line, Iron Mine, Irondale, Ingoldsby, Little Gull, and Lochlin.

Each depot site has designated 40 cubic yard open-top roll-off recycling containers for both co-mingled fibres and co-mingled containers. The landfill attendant assists residents with their recycling. The fibre roll-off accepts all paper fibres including corrugated cardboard, boxboard, newsprint, office paper and flyers. The co-mingled roll-off accepts steel and aluminium food and beverage containers as well as all grades of plastic containers and film, with the exception of #3 and #7 plastic. The Township's collection contractor is Garbutt Disposal, based in the Minden area, and the processing MRF is Muskoka Containerized Services, located approximately 75 kilometres west of the Township, in Bracebridge, Ontario.

The Township's IC&I sector is minimal and receives private waste and recycling collection service. Township staff indicated that this sector does not impact the depot system.

The annual net operational costs associated with processing and collecting the Township's material in 2003 were approximately \$97,000. In addition to collection and processing costs, the one-time capital cost for the six depot sites represents an additional \$50,000 between the year 2002 and 2003, based on roll-off container purchases at approximately \$10,000 per roll-off.

4.6 TOWNSHIP OF MELANCTHON

- Location: County of Dufferin
- WDO Depot Category: Rural Depot South
- Population: 2,470
- Households: 1,055
- Seasonal Impacts: None
- Municipal Attributes: Rural Farming Community
- Capture Rate: 198 kg/hh/yr
- Net Cost Per Tonne: \$94/tonne
- Net Cost Per Household: \$19/hh



- Depot Style: Roll-Offs
- Weigh Scale: None

The Township of Melancthon is located north and west of the Town of Shelburne, in Dufferin County. To its west lies Grey County, to its north, Simcoe County, and to its south, the Township of Amaranth. The Township is made up of three Hamlets: Riverview, Corbetton and Horning's Mills. The Township's primary occupation is agri-based. Growing and marketing of potatoes is a major industry in the area.

There is a very small number of large scale IC&I operators within the Township. The IC&I sector receives private collection services for its waste and recyclables; therefore, there is no impact from this sector on the recycling depot system. The Township staff also indicated that there is no significant impact of seasonal population variation within this community as it is primarily an agricultural-based Township.

The Township has one municipally owned and operated waste disposal site. The WDS offers disposal options for MSW, C&D material, leaf and yard waste, and Blue Box recyclables. All Township residents must bring their segregated material to the central WDS and deposit their material at the appropriate locations. The recyclable material is collected from the WDS by a private contractor, S.H. Masters and Sons (annual renewal contract) and hauled in 40 cubic yard roll-off containers to the City of Guelph MRF for processing. A dedicated recycling attendant assists residents with their recycling. The recyclable material is segregated into three separate roll-off containers according to the following categories: Newspapers and Office Paper; Boxboard and Corrugated Cardboard; and Co-mingled Containers and Polystyrene (glass, cans, plastic #1,#2,#4 and # 5 - no film).

The hours of operation of the WDS, including the recycling depot site, are Fridays from noon until 8:00 p.m. (until 5:00 p.m. in winter) and Saturdays from 8:00 a.m. to 4:00 p.m. The Township receives monthly invoices from the contractor, which do not separate the hauling costs from the processing costs; therefore, the total costs associated with the 2003 depot collection/processing contract for 209 tonnes were approximately \$19,298. This cost also includes approximately 3% of municipal administration costs factored by the Township, but does not include the depot attendant's salary.

4.7 TOWNSHIP OF PERRY

- Location: District of Parry Sound
- Depot Category: Rural Depot North
- Population: 1,929
- Households: 1,360
- Seasonal Impacts: High
- Municipal Attributes: Rural, Tourism Base Community
- Capture Rate: 174 kg/hh/yr
- Net Cost Per Tonne: \$438/tonne
- Net Cost Per Household: \$76/hh
- Depot Style: Roll-Out Carts and Roll-Off Containers
- Weigh Scale: None

The Township of Perry, located in the District of Parry Sound, is approximately 20 minutes north of Huntsville, Ontario. The Township owns and operates one waste disposal site that also incorporates a small pre-processing operation for recyclable material collected at the site's recycling depot. A landfill attendant assists residents at the depot site. The hours of operation of the site are: Monday, Tuesday, Friday, Saturday, and Sunday, 9:00 a.m. to 4:00 p.m.. The recycling depot site uses 90 gallon recycling totes that are emptied by the on-site landfill attendant, and either the material is baled by a small vertical baler or segregated into roll-offs for further processing by the contractor, Muskoka Containerized Services, located in Bracebridge, Ontario. The Township indicated that the intent of pre-processing the recyclable material is to provide the Township with an opportunity to send material directly to end markets for higher revenue rebates.

The Township has a high seasonal population and low IC&I concentration. The IC&I sector receives private collection of its waste and recyclable material. The recycling depot collects steel and aluminium food and beverage containers, paper fibres including corrugated cardboard, boxboard, newsprint, office paper and flyers, and all grades of plastic containers and film, with the exception of #3 and #7 plastic.

The annual net operational cost associated with processing and collecting the Township material in 2003 was approximately \$103,000. This cost consists of the revenue rebate from the sale of material and the costs associated with on-site pre-processing of the recyclable material prior to sending it off to the MRF.

4.8 TOWNSHIP OF ADMASTON/BROMLEY

- Location: County of Renfrew
- Depot Category: Rural Depot South
- Population: 2,785
- Households: 1,293
- Seasonal Impacts: High
- Municipal Attributes: Rural
- Capture Rate: 152 kg/hh/yr
- Net Cost Per Tonne: \$301/tonne
- Net Cost Per Household: \$46/tonne
- Depot Style: Roll-Off
- Weigh Scale: None

The Township of Admaston/Bromley is located 100 kilometres west of Ottawa, in Renfrew County. The Township's major industry is agriculture, including dairy, cash crop, and livestock.

The Township owns and operates three waste disposal sites, which include recycling depot containers at each site. A landfill attendant assists residents at the depot sites. Recyclables are disposed of in four 40 cubic yard compartment roll-off containers for segregated co-mingled paper fibres; steel and aluminium cans and plastic #1, #2 #4; clear glass; and coloured glass. Beauman Waste and Recycling Facility, located in Renfrew, Ontario, collects and processes the recyclables. Hauling time from the furthest depot is approximately thirty minutes.

There is minimal IC&I contribution to the depot; however, it is believed that a grocery store and a gas station use the depot site. The Township estimates that this represents approximately 2% of the total material entering the depot.

The Township experiences an increase in population in the summer and staff indicated that this affects the participation rate and volume of material at the depot sites.

The contractor does not separate the costs associated with the collection and processing of the depot material. In 2003, annual net operational costs were approximately \$59,000.

4.9 TOWNSHIP OF TAY VALLEY

- Location: County of Lanark
- Depot Category: Rural Depot South
- Population: 5,267
- Households: 3,564
- Seasonal Impacts: Moderate
- Municipal Attributes: Rural
- Capture Rate: 136 kg/hh/yr
- Net Cost Per Tonne: \$78/tonne
- Net Cost Per Household: \$11/hh
- Depot Style: Roll-Off
- Weigh Scales: None

The Township of Tay Valley, located in Lanark County, approximately 80 kilometres southwest of Ottawa, amalgamates the Townships of Bathurst, North Burgess and South Sherbrooke. Located in eastern Ontario, the Township of Tay Valley covers approximately 554 square kilometres. Kingston and the United States border are approximately 70 kilometres to the south.

The Township owns and operates three waste disposal sites, which include recycling depot containers at each site. The collection and processing contractor (five year contract) for the recycling depot service is Goulbourn-Stittsville Sanitation Ltd., located in Carp, Ontario. Hauling time from the furthest depot is approximately one hour.

Recyclables are collected in 50 cubic yard roll-off containers with two compartments. The landfill attendant assists residents at the depot site. The roll-off containers segregate co-mingled fibres (including boxboard, corrugated cardboard and newsprint) from co-mingled containers (including steel and aluminium beverage cans and all grades of plastic #1- #7). The Township currently does not recycle its glass containers due to the low revenue and high costs associated with processing the material. All glass containers are currently disposed of at the waste disposal sites.

The annual net operational costs associated with collecting and processing the Township's material in 2003 were approximately \$37,000.

5.0 EXAMINATION OF BEST PRACTICE OF RURAL RECYCLING DEPOT SYSTEMS

The following section examines the factors contributing to the success (effective capture rates and efficient cost) of the leading Rural Recycling Depot Systems, as described in Section 4.0.

5.1 USER ACCESSIBILITY AND PARTICIPATION

The reduction of barriers associated with participation and access to recycling depot sites is an important step toward achieving high annual capture rates per household.

The Township of Augusta

- The Township provides free Blue Boxes to its residents, available at the recycling depot sites. This enables residents to centrally collect their recyclables at home, prior to bringing the material to the depot site.
- In order to increase user participation, the depot is centrally located within the community. The Township estimates that 75% of the population travels a maximum distance of 10 kilometres to access one of the community's recycling sites.

The Township of Amaranth and the Township of Melancthon

- Both Townships have Blue Boxes for sale at their respective recycling depot sites.
- The Township of Amaranth improved its waste disposal site's accessibility by setting up a transfer station at the entrance. Residents now have access to open top roll-off containers via a drive-through ramp system, where they have an opportunity to segregate a variety of materials including an expanded stream of recyclables, source-separated kitchen organics, leaf and yard waste, construction and demolition waste, bulky waste, waste electronic equipment, and their household garbage. Once the roll-off containers are full, they are transferred to designated areas within the waste disposal site for further processing or disposal. The recycling containers are removed and directly transferred to the processing MRF. The Township has found that having in place the transfer station has increased traffic flow, enhanced diversion participation, and improved users' accessibility.

The Township of Algonquin Highlands and the Township of Minden Hills

- Both Townships offer extended hours of operation during the summer to accommodate higher usage by seasonal population. The recycling depot is open various hours throughout the week, as well as Saturdays from 7:00 a.m. to 5:00 p.m. and Sundays noon until 8:00 p.m. During long weekends, both

Townships also operate their recycling depot sites on Statutory Holiday Mondays, from noon until 6:00 p.m.

- Both Townships offer residents, including seasonal participants, a two-stream sort system by providing a designated roll-off for co-mingled fibres and another designated roll-off for co-mingled containers. The two sort option enables seasonal residents to quickly understand the sorting requirements and reduces the time spent by all residents to sort material at the busy waste disposal sites. An additional bin is designated for clean corrugated cardboard, collected at either a reduced rate or at no charge by the contractor depending on market pricing, and processed at no charge. During peak seasonal periods, the Township of Algonquin Highlands rents additional roll-off containers from the collection contractor to prevent overflows of material.

The Township of Admaston/Bromley and the Township of Perry

- These Townships also have a high seasonal population and have chosen to extend their recycling depot sites' hours of operation for the period of May 1st to October 1st. The majority of their recycling depot sites are also operational Saturdays, Sundays, and Statutory Holiday Mondays.

Township of Casey

- This Township's recycling depot is open one day per week, but to encourage recycling, the Township provides an unattended eight cubic yard tip bin on the road leading to the waste disposal site. The Township has a small service population; the risk of non-Township residents accessing the unattended depot is therefore minimal. Township staff have indicated that residents have a strong sense of environmental responsibility, and that the depot bin remains free of contamination due to the community's strong support. Residents also have the added convenience of co-mingling all recyclable material, including small metal appliances, into one recycling depot bin, thereby reducing confusion at the depot site.

5.2 ATTENDANT DUTIES

Based on the information gathered from the leading Rural Recycling Depot Systems, the presence of a depot attendant and the level of "hands-on" involvement associated with a depot attendant appear to translate into a perception by residents that the depot site is being monitored to prevent contamination issues, as well as offering a sense of motivation to encourage recycling participation.

The Township of Amaranth and the Township of Melancthon

- Both Townships have municipal employees whose duties are specifically dedicated to the recycling depot site, in addition to two on-site attendants whose duties relate to monitoring inbound and outbound traffic and operating waste disposal site equipment.
- The recycling attendants hand out promotional and educational literature to site users.
- The attendants are kept informed by Township staff about any changes to the recycling program; they can therefore provide helpful information and sorting advice to the depot sites' users.

The Township of Algonquin Highlands

- Township staff regard the depot attendant as the main enforcement mechanism for the mandatory recycling by-law implemented by the municipality in 2004. The attendant monitors the recycling depot site to ensure recyclable material is not entering the waste disposal area of the site. The attendant also provides residents with promotional literature regarding the mandatory recycling by-law and also asks all inbound residents if they have any recycling to segregate prior to entering the waste disposal site.

The Township of Minden Hills

- The Township's depot attendant inspects residents' bagged residential waste as they enter the waste disposal site. The attendant periodically lifts incoming garbage bags and shakes the contents to determine if recyclable material may be hidden inside. If this is the case, the attendant asks the resident to place the recyclable material in the appropriate recycling compartment of the depot bin, prior to depositing the garbage bag in the waste disposal site. Township staff indicated this type of periodic inspection has proven to be an effective incentive for residents to separate their recyclables, as the practice of carrying out periodic checks of garbage bags has quickly spread through the community by word of mouth.

5.3 SUPPORTING WASTE DIVERSION POLICY

Recent research indicates that short-term monetary incentives that reward a random recycler for his/her efforts, such as lotteries, do not produce lasting behavioural change (EnvirosRIS, 2001). Community recycling rates typically return to prior levels when the incentive is no longer available. However, there is substantial supporting documentation indicating the effectiveness of waste diversion policies, such as pay-as-you-throw programs, mandatory recycling by-laws, illegal dumping by-laws, backyard burning by-laws, and higher waste disposal site tipping fees (EnvirosRIS, 2001). The following is an overview of best practices pertaining to waste diversion policies in place in the leading Rural Recycling Depot Systems.

Township of Amaranth and the Township of Melancthon

- Effective January 1st, 2004, the Township of Amaranth and the Township of Melancthon have implemented the use of clear bags for garbage in order to encourage participation and increase capture rates of recyclables. Both Townships have also had a User Pay program in place since 2002 (two free bags per week and a charge of \$1/bag for any additional bag). Prior to implementing mandatory clear bags, information regarding the program was provided to residents at the waste disposal site. Township staff indicated that recycling awareness began to increase in 2002 with the User Pay program, and again in 2003 with the distribution of the clear bag program education literature. Post clear bag program implementation, the Township of Amaranth witnessed an increase in recyclable material tonnage diverted from 370 tonnes in 2003 to 448 tonnes in 2004. Similarly, the Township of Melancthon diverted 209 tonnes of recyclables in 2003 and 268 tonnes in 2004.

Township of Algonquin Highlands

- The Township implemented a mandatory recycling by-law in 2004, which prohibits Township residents and participating seasonal residents from depositing Blue Box recyclable materials in the Township's waste disposal sites. As a result, recycling depot tonnage increased from 348 tonnes in 2003, to 421 tonnes in 2004.

Township of Tay Valley

- The Township of Tay Valley put in place a Waste Management Advisory Committee to relay the concerns and needs of the community to the Township Council. The Advisory Committee conducted a survey to determine the effectiveness of the recycling depot. Based on the responses from the survey, the Township increased the depot's hours of operation and developed an educational newsletter. The newsletter provides recycling sorting tips and updates on waste management activities in the community. Township residents also expressed concern regarding the disposal of glass containers at their local waste disposal sites. In response to this, the Township is endeavouring to educate the public on alternative strategies for handling glass.

5.4 COLLECTION CONTRACT ARRANGEMENTS

Several Rural Recycling Depot Systems indicated that they are charged a single fee amount (per tonne, per lift, or per hour) for collecting, processing and marketing the recyclable materials. Within the leading municipal recycling depot programs however, some municipalities have adopted a more involved approach to their recycling collection contract, and are requesting the contractor to segregate total recycling costs according to specific

services, thereby enabling them to track inefficiencies. The following section provides an overview of such practices.

Township of Algonquin Highlands

- The Township's recycling depot service contract is itemized according to the following three categories: collection costs, processing costs, and bin rental fees. This has enabled the Township to determine that approximately 46% of its total depot costs are associated with the collection and hauling of the bins to the processing MRF in Bracebridge, Ontario. The Township has also identified those depot sites with higher collection costs based on their distance to the MRF. In addition to collection/hauling costs, approximately 31% of the recycling depot costs are associated with processing the material, and the remaining 23% of the costs are related to the rental of approximately 10 roll-off containers.
- When the Township initially implemented the depot program, it estimated the cost of purchasing 10 roll-off containers to be approximately \$100,000. The Township determined it was more cost-effective to reduce initial capital investment and eliminate maintenance-related expense and transportation liability risk by leasing the roll-off containers from the collection contractor at an average price of \$150/month. By deferring the cost of purchasing capital equipment, the Township was able to utilize municipal funds to put into place a transfer station.

The Township of Amaranth and the Township of Melancthon

- Both Townships have the same collection contractor and are charged a single cost per tonne for collection and processing. Any revenue from sales of materials is retained by the contractor and is rebated from collection fees. Both municipal programs therefore cooperate with the contractor to ensure that their material is contaminant free, and hence to ensure maximum revenue from their sale. The contractor and municipal staff communicate on a weekly basis regarding the operation of the depot programs.
- The contractor informs both Townships of the end market destination of their materials. This ensures the municipality is aware of revenue pricing for various recyclable materials. Based on this information, the Townships have chosen to eliminate polystyrene from their depot collection program due to the associated costs to process and collect the material.

The Township of Augusta

- The Township has negotiated a revenue rebate for their co-mingled aluminium and PET plastic bottles, which averages approximately \$300 to \$400 per container load, based on current market value.

5.5 SUMMARY OF BEST PRACTICES OF LEADING RURAL RECYCLING DEPOT SYSTEMS

This research determined that rural depots' low capture rates was mainly due to residents' perception that the program was not easily accessible and/or that it was difficult to use. These municipal programs indicated that the lack of public education may further fuel this negative perception.

This research has also found that the presence of an informed recycling depot attendant positively affects participation in the recycling program, particularly for communities with an important seasonal population. Information gathered from leading rural recycling depot systems indicated that the depot attendant is often the only source of waste management education for many seasonal residents. It was also determined that a depot attendant is critical in enforcing a User Pay Program, especially in those communities that do not provide curbside garbage collection.

Due to hauling costs, municipal programs offering several recycling depot sites examined in this research had a higher average cost per tonne than programs offering fewer sites. For example, the Township of Minden Hills has six recycling depot sites and an average net cost of approximately \$270 per tonne, whereas the Township of Amaranth has one recycling depot site with an average net cost of approximately \$100 per tonne.

Municipal programs offering several depot bins per site have a higher net cost per tonne than depot programs offering only two depot bins per site. For example, the Township of Augusta has five separate roll-off bins of varying sizes for specific materials and an average net cost of approximately \$400 per tonne. The Township of Perry has approximately the same number of separations within 90 gallon recycling totes and their operational costs average \$440 per tonne. In comparison, the Township of Algonquin Highlands has two 40 cubic yard roll-off bins to capture an expanded range of Blue Box material with an average operational cost of approximately \$360 per tonne, and the Township of Casey uses one 40 cubic yard roll-off to collect a fully co-mingled recycling stream that includes small scrap metal appliances for just over \$100 per tonne.

Rather than pay a single fee for multiple services, some municipal programs require the contractor to separate total recycling costs according to specific services. Municipal programs such as the Township of Algonquin Highlands for example, can know what respective fee they are being charged for collection, hauling and processing the recyclables. This enables the municipality to compare alternative depot systems and cost scenarios, which in turn leads to increased efficiency. Algonquin Highlands has thus determined that their main depot system costs are hauling related costs; therefore, consideration is being given to other collection options that involve low to medium capital investment and provide compaction of material to reduce the frequency of hauling trips to the processing MRF.

6.0 EVALUATION OF RURAL RECYCLING DEPOT PROGRAM BEST PRACTICES

Based on an examination of leading Rural Recycling Depot Systems in Ontario, this study has identified four main factors which contribute to an efficient and effective recycling depot system:

1. Depot Capacity and Hauling Distance to a MRF
2. Depot Accessibility and Attendant Duties
3. Seasonal Population
4. Waste Diversion Policy

As all four contributing factors are interconnected, the following section will include cross-references among factors. Supporting information from Centralized Depot Systems and Urbanized Depot Systems, as well as from lower capture rate programs, is also included for comparison purposes.

6.1 DEPOT CAPACITY AND HAULING DISTANCE TO A MRF

Amongst the leading recycling depot programs examined, those experiencing a high capture rate of material but a high cost per tonne shared the following characteristics:

- All programs used of non-compacting open-top roll-off containers.
- All programs had two or more separation bins for material.
- All programs accepted separated high volume materials such as several grades of plastics and polystyrene.
- All programs had their materials hauled to a MRF located more than one hour drive away.

Depot containers' capacity directly impacts the frequency of hauling trips the collection contractor is required to make to service the depot. Municipal programs with low depot-related costs typically have lower hauling-related costs. Municipalities that are located less than one hour hauling time from a MRF (Township of Casey, Township of Amaranth, and Township of Melancthon) appear to experience an average net cost per tonne of \$102, regardless of method of collection. Municipalities in close proximity to a MRF then, typically have lower operational costs.

Municipalities experiencing the highest hauling costs appear to be those whose haul time to the MRF typically exceeds two to three hours and who cannot be serviced using alternative collection systems (i.e. front-end trucks servicing areas near a depot site using front-end bins, or side-loading curbside trucks servicing curbside collected

communities located near a depot site using roll-out carts). Therefore, when a depot site is located more than two hours away from a processing MRF, factors such as the method of collection, number of material sorts and material volume, begin to affect the total depot program costs.

Approximately thirty minutes are required to collect an open top roll-off container from a depot site (this includes tarping, loading onto the truck, and leaving the empty roll-off at the site). To this should be added driver breaks, decreased speed limits on seasonal or gravel based roads, poor road conditions in the winter, and unloading time at the MRF. Municipal programs located more than two to three hours one-way from a MRF thus experience higher costs since the hauling contractor is obliged to devote an entire day and charge overtime rates once the eight-hour work day to one depot site is exceeded.

It is important to note that hauling time is not restricted to the total distance travelled, but also depends on road conditions. For example, the Township of Melancthon is located approximately the same distance from a market as the Township of Algonquin Highlands. Whereas the roads linking Melancthon to its market are mostly provincial ones, the contractor servicing the Township of Algonquin Highlands must travel on secondary and tertiary roads.

The Township of Seguin, located in the District of Parry Sound, relies on a patented Haul-All depot collection system and Transtores to transfer recycling material from its depot sites to a processing facility. The collection system compacts material to reduce the number of trips required, which is significant since the Township has seven depot sites spread out over a 700 square kilometre area. These fully-automated depot containers enable the Township to provide access to recycling services 24 hours per day, 7 days per week, without the need to have an attendant. The material is separated into co-mingled fibres and co-mingled containers and is not heavily compacted. It can therefore be processed by MRFs capable of handling a two-stream system. The material compaction does, however, allow the Township the flexibility of hauling at greater distances with a reduced total hauling cost. For example, the Township contracts Clean Harbours to haul its municipal solid waste material to Greenlane Environmental in London, Ontario (an approximate 4-hour hauling distance one-way) for \$45/tonne.

However, this system has not proven as beneficial for the collection of the Township's recyclable material, since the central collection bins' tonnage volume is lower than the compaction requirements of many processing MRF's, particularly when container glass is incorporated within the co-mingled material. Moreover, according to Township staff, the initial capital investment has a long pay back period (15+ years) and may be cost prohibitive for smaller communities. The Township of Seguin also expressed concern that material entering the unattended depot sites was not generated within the Township boundaries; and that the Township was therefore paying to haul and process material from other municipalities.

The Region of Peel uses a similar Transtore depot system. Based on the large size of its program (339,500 households and 13,070 tonnes of recyclable material collected in 2003), the Region has found this system to be a sustainable solution to their depot capacity and hauling costs. The Region of Peel uses the automated Transtore systems as a secondary method of collection, to increase overall capture rate and reduce total waste from disposal particularly in the multi-residential sector. The Region of Peel estimates the approximate cost of a central Transtore system is \$90,000 per large compacting unit, to which transfer station design costs must be added.

6.2 DEPOT ACCESSIBILITY AND ATTENDANT DUTIES

Understanding the factors that motivate and discourage people regarding recycling is essential in increasing the effectiveness of a rural recycling depot program. Independent studies conducted in California (Gamba & Oskamp, 1994) determined that the perceived effectiveness of a recycling system is directly linked to the program's actual effectiveness. The studies further suggest the more people see recycling as effective, the more likely they are to participate.

When asked why they thought their programs enjoyed high capture rates per household, municipal staff commonly pointed to residents' perception of the program's effectiveness. When accounting for its programs' success, one municipality reporting a 200 kg/hh/yr capture rate did not mention anything about system cost or capture rates, but rather emphasized the communities' belief that the program was beneficial. Studies have also found that when there is a perception that a recycling program is inconvenient or difficult, this perception directly impacts recycling behaviour (McKenzie-Mohr Associates, 2002)

An examination of municipal programs with a low depot capture rate (less than 40 kg/hh/yr) found that residents did not participate in the recycling program due to lack of convenience. Inquiries placed with municipal public works and administrative clerks regarding recycling depot bin location indicated that the bin was considered an "after-thought" to the waste management program. It was indicated by some municipalities that the traffic flow was directed away from the depot bin and toward the tipping face of the waste disposal site; residents therefore defaulted all their material for disposal.

The transfer station design at Township of Amaranth's waste disposal site provides a user-friendly system that enables residents to have access to an enhanced waste management system without the associated costs of curbside collection. According to information provided by Township staff, residents find the transfer station layout easy to understand and the configuration is readily accessible to all members of the public. The depot attendant also indicated that the site is easy to maintain from an aesthetics perspective as there is minimal contamination of material or overflow of depot bins. In contrast, depot systems with low capture rates that use smaller roll-out totes

at the entrance of their waste disposal site or locally-manufactured wooden boxes or canvas lined collection barrels, often experience material overflows on the ground, causing cross-contamination and confusion to the participating public.

6.3 SEASONAL POPULATION

When assessing depot program capture rates, it is important to consider the impact of seasonal population on material composition. Seasonal impacts on programs such as Seguin Township, Perry Township, District of Muskoka, Township of Algonquin Highlands, Township of Madawaska Valley, and the Township of Killaloe, Hagarty and Richards, result in an expanded stream of recyclable material that includes several grades of plastics and fibres. In particular, those municipal programs with large seasonal populations and that rely on non-compacting roll-off containers find that their hauling costs double between May and June and then triple between June and August compared to their regular hauling costs in the fall and winter. For example, if the Township of Minden Hills were to average its hauling costs across the year without factoring in the impact of its seasonal population, the cost of its depot program per household would drop from an average of \$55/hh to just under \$25/hh.

A significant seasonal population also impacts the overall capture rate of a recycling depot program, thereby distorting a municipality's true recycling capture rate (kg/hh/yr). An increase in seasonal population results in an increase in participation in municipal recycling depot programs, since many of the seasonal visitors actively recycle in their permanent place of residence and therefore continue to recycle at their seasonal cottages/resorts. As such, the Township of Algonquin Highlands, the Township of Minden Hills, and the Township of Perry are directly impacted by their seasonal population base; therefore, their high capture rates are not fully a result of public promotion activities, waste diversion policies, or user accessibility. In terms of determining best practices for this particular grouping of municipal depot programs then, one should keep in mind that high capture rates are primarily a result of high seasonal population impacts.

Based on this information, it is important for municipalities to consider the costs associated with recycling depot programs with a high seasonal population base and to determine collection strategies that can accommodate fluctuating volumes on a seasonal basis.

6.4 DIVERSION POLICY

Municipal programs that implemented diversion strategies supporting public involvement in the recycling depot program experienced a minimum 10% increase in material tonnage collected. Municipalities who are concerned with the political ramifications of implementing diversion policies such as mandatory recycling by-laws, or

mandatory clear bag by-laws, can draw on the successful experiences of the Township of Amaranth, the Township of Melancthon, and the Township of Algonquin Highlands. These Townships have been able to demonstrate the cost-effectiveness of implementing an enforceable by-law that has immediate and positive impact on their recycling depot program.

According to information gathered from various recycling depot programs, the following diversion policies have been effective at maximizing municipalities' recycling capture rates:

- Imposing a maximum bag limit for residential waste - Many rural depot programs determined that the average waste generation at the waste disposal sites is approximately two (2) bags per household per week; therefore, programs implementing a two or three bag limit on residential waste will ensure that the community's waste generation does not increase and diversion programs are well utilized.
- Applying a pay-as-you-throw system on bagged residential waste – Although pay-as-you-throw systems vary widely in how they are implemented (some programs have specially marked bags that residents must use, other programs have a prepaid card system that residents use at the waste disposal site, and other programs use a tag system), all programs show higher than average recycling capture rates per household.
- Mandatory recycling by-law and backyard burning by-law - Municipalities are noticing the positive impact that implementing limits on backyard burning has on the capture rates of Blue Box material at rural depot sites, particularly material such as paper fibres and cardboard.
- Clear bags for bagged garbage - Municipal programs that change the way residents see their waste have experienced increases in their recycling program's rate of participation.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The majority of municipalities providing recycling depot services as their only method of recyclable material collection also typically own and operate small municipal waste disposal sites, many of which will soon be reaching capacity. Traditionally, these communities have had low waste disposal costs (no tipping fees), and have been avoiding the long-term costs associated with the expansion or closure of their disposal site. Generally speaking, communities with such low disposal costs do not have supporting diversion policies in place (e.g. recycling by-laws, backyard burning policies, etc.) to encourage recycling. As a result, recycling participation is low, community awareness is negligible, and total capture rate per household is at a minimum. Furthermore, the costs to haul a small amount of recyclables become excessive as these municipalities rely on their lower waste disposal tipping fee costs as a benchmark for comparison. As some of these municipalities' waste disposal sites reach capacity however, they are faced with the costly process of seeking approvals to expand or develop a new disposal site.

Rural municipalities facing the potential loss of their waste disposal sites are thus beginning to place a stronger emphasis on expanding their current recycling programs. Even if they are not required to do so under Regulation 101/94, municipalities with fewer than 5,000 residents are seeking proactive methods to divert material from landfill. Small communities are becoming increasingly aware of the need to shift their emphasis away from disposal towards diversion and to seek out cost-effective strategies that complement their current recycling depot program. Given that the costs associated with curbside collection are often prohibitive for municipal programs with low population densities and municipal tax bases, rural depot systems represent an alternative to the efficient and effective capture and collection of available recyclable materials.

It is important for rural municipal programs to recognize the value of maximizing recovery rates for highly marketable and easily processed materials such as paper, cardboard, beverage cans, and PET plastic bottles before considering the implementation of marginal materials such as film plastics, expanded polystyrene, and tubs and lids. These additional materials tend to create hauling cost inefficiencies for small depot programs located in rural locations.

A depot program that has limited recyclable processing options or has access to a limited number of hauling contractors (often the case in rural areas due to the lack of competition) is more likely to be faced with high costs. Based on this information, it is not always effective for depot programs in remote areas with low capture rates to seek out competitive hauling contracts or conduct routine tendering as there is the possibility that the hauling or processing contractor may actually increase costs or cease service due to low volume and high costs associated with collecting the material.

A municipality should not consider expanding its current recycling depot program to accommodate additional materials such as polystyrene, tubs and lids, and plastic film, until an effective communication strategy has been developed to capture the community's available Blue Box material. The program should also be accessible to all participants (both permanent and seasonal residents), and be supported by waste diversion policies that encourage recycling participation.

Based on the present assessment of leading rural recycling depot programs, the following recommendations are intended for municipal depot programs looking to maximize the efficiency and effectiveness of their system:

- Increase capture rate of existing Blue Box material by promotion of the depot program in high traffic areas (i.e. waste disposal site, grocery store, convenience stores, seasonal bait shops, hardware stores, libraries, schools, banks, post offices, etc.).
- Municipalities that rely on the same contractor to provide collection and processing services should require costs to be itemized according to lift fees, hauling fees, and processing fees. Such cost itemization allows municipalities to review specific costs associated with the program and hence to consider changes to improve efficiency.
- Encourage revenue sharing or a revenue rebate from the processing contractor or negotiate a reduction of processing costs for materials that have higher market values such as corrugated cardboard, aluminium beverage cans, and clean newspaper. Information on price trends for post-consumer metals, glass, plastic and fibre is available on a monthly basis from Corporations Supporting Recycling's web site (www.csr.org) and Waste Diversion Ontario's website (www.wdo.ca). Based on WDO data, revenue from the sale of PET plastic and aluminium cans represents 33% of the residential Blue Box revenue stream.
- A responsible depot attendant is the best defence against material contamination. An attendant who promotes the program and encourages proper material separation contributes to the program's success and increases its perceived and actual effectiveness. This in turn, results in higher community participation and overall capture rate. The provision of a depot attendant also supports mandatory recycling by-laws and/or user pay programs as the attendant can regulate and monitor inbound material.
- Compacting and co-mingling material reduces the frequency of collection from the depot site and increases the potential for a municipality to haul a greater distance at a lower cost. This in turn increases the range of processing facility alternatives available to the municipality. Indeed, depot programs located in areas where there are many hauling and processing contractor options can get bids from several contractors which will reduce the risk of inflated costs since the contractors want to remain competitive. It is important, however, to ensure that the processing MRF is equipped with the necessary infrastructure to handle the change in the material preparation.

- One cost-effective compaction alternative municipalities might consider is to retrofit enclosed containers with an on-site generator to power compaction equipment where access to hydro is not available.
- Consider leasing or renting collection containers if initial purchase of capital equipment is cost-prohibitive. Municipal programs currently renting roll-off containers have the convenience of not incurring any maintenance cost and having low monthly payments (\$100 to \$200/month, depending on length of the contract period).
- Ensure the depot site is well maintained to reduce contamination and to increase participation from the public.
- Diversion policies such as mandatory recycling or user pay systems directly impact recycling depot program capture rates. Depot programs can exceed curbside Blue Box collection capture rates by implementing community programs that support the use of the recycling depot site.

8.0 REFERENCES

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EnvirosRIS, 2001. "*The Waste Diversion Impacts of Bag Limit and Pay As You Throw Systems in Selected Communities in North America*".90

McKenzie-Mohr Associates, 2002. *Development of a Social Marketing Strategy for Residential Waste Reduction for the City of Waltham*.



Evaluation of Best Practices of Rural Recycling Depot Programs
Effectiveness & Efficiency Funded Project
Quinte Waste Solutions
SGS Lakefield Reference No.: 10925-001

TABLES

Table No. 1:
Ontario Rural Recycling Depot Program Material Summary
SGS Lakefield Reference No. 10925-001

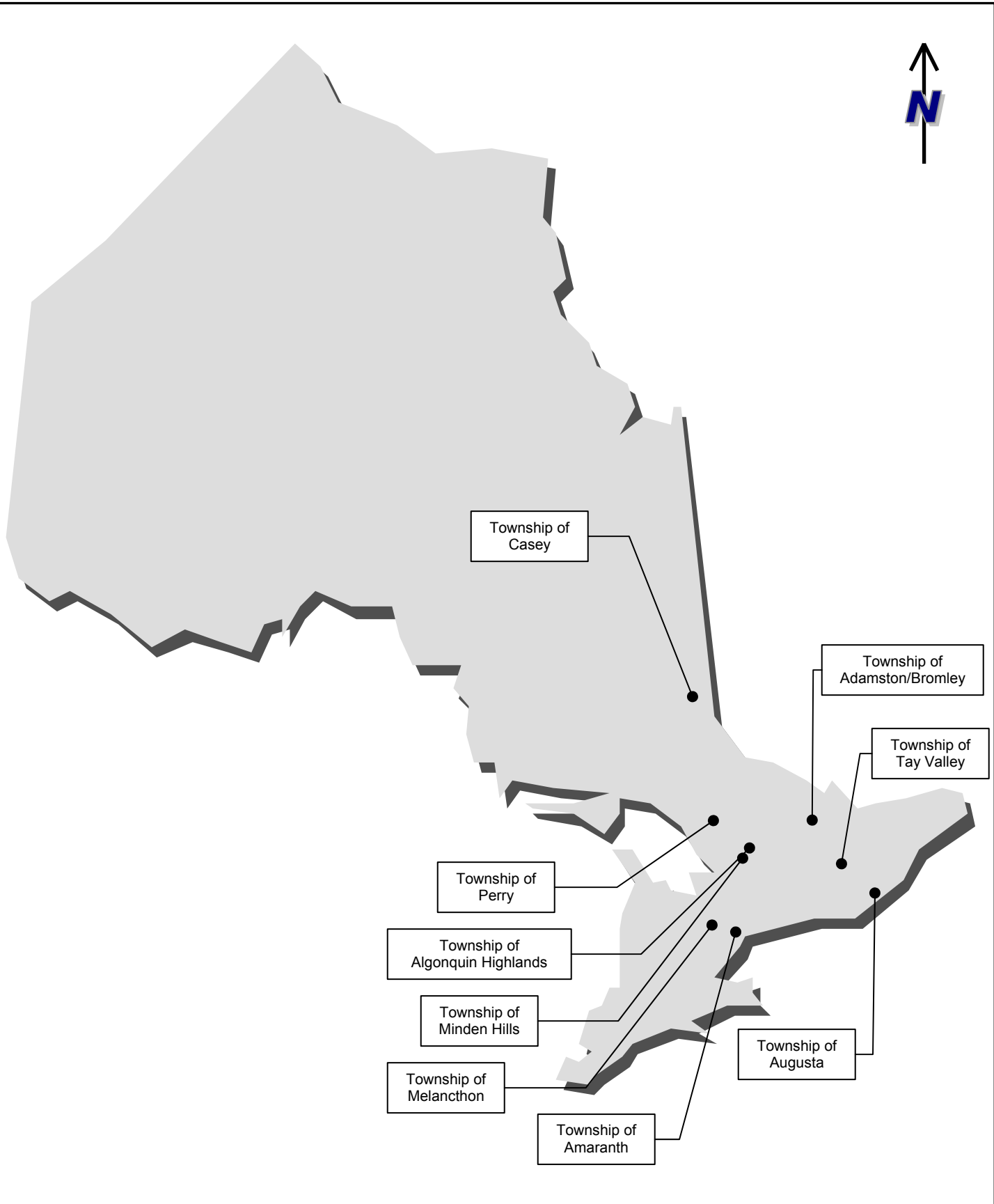
Ranking By Capture Rate	Municipality/Township	District	WDO Program Category	2003 Total Tonnes Marketed	Number of Households Served By Depot	Tonnes Recycled Per Household	Kilograms Recycled Per Household	Rural Recycling Depot Average Recovery Rate (Kg/Household)	Tonnage Variance (%)	Net Cost Per Tonne	Total Cost
1	Amaranth	Dufferin	Rural Depot South	370	1,294	0.29	286	75	281%	\$104	\$38,480
2	Casey	Timiskaming	Rural Depot North	37	151	0.25	245	75	227%	\$107	\$3,959
3	Augusta	Leeds	Rural Depot South	585	2,418	0.24	242	75	223%	\$398	\$232,889
4	Algonquin Highlands	Haliburton	Rural Depot South	348	1,490	0.23	234	75	211%	\$356	\$123,731
5	Minden Hills	Haliburton	Rural Depot South	618	3,048	0.20	203	75	170%	\$272	\$168,238
6	Melancthon	Dufferin	Rural Depot South	209	1,055	0.20	198	75	164%	\$94	\$19,604
7	Perry	Parry Sound	Rural Depot North	236	1,360	0.17	174	75	131%	\$438	\$103,276
8	Admaston/Bromley	Renfrew	Rural Depot South	197	1,293	0.15	152	75	103%	\$301	\$59,265
9	Tay Valley	Lanark	Rural Depot South	485	3,564	0.14	136	75	81%	\$78	\$37,704
10	Frontenac Island	Frontenac	Rural Depot South	115	1,163	0.10	99	75	32%	\$199	\$22,892
11	Leeds & Thousand Islands	Leeds	Rural Depot South	529	5,412	0.10	98	75	30%	\$273	\$144,322
12	Oliver Paipoonge	Thunder Bay	Rural Depot North	191	2,059	0.09	93	75	24%	\$49	\$9,365
13	Seguin	Parry Sound	Rural Depot North	403	4,500	0.09	90	75	19%	\$392	\$157,855
14	Dysart Et AL	Haliburton	Rural Depot South	591	6,668	0.09	89	75	18%	\$187	\$110,493
15	Cochrane Temiskaming	Cochrane	Rural Depot North	1,430	19,457	0.07	73	75	-2%	\$283	\$405,305
16	Johnson	Algoma	Rural Depot North	36	501	0.07	72	75	-4%	\$192	\$6,896
17	Archipelago	Parry Sound	Rural Depot North	211	3,191	0.07	66	75	-12%	\$570	\$120,270
18	Marathon	Thunder Bay	Rural Depot North	98	1,674	0.06	59	75	-22%	\$298	\$29,240
19	Hudson	Timiskaming	Rural Depot North	18	311	0.06	58	75	-23%	\$126	\$2,274
20	Central Frontenac	Frontenac	Rural Depot South	215	3,806	0.06	56	75	-25%	\$324	\$69,561
21	Northern Bruce Peninsula	Bruce	Rural Depot North	252	4,515	0.06	56	75	-26%	\$87	\$21,896
22	Tarbutt and Tarbutt	Algoma	Rural Depot North	195	3,564	0.05	55	75	-27%	\$64	\$12,482
23	Carling	Parry Sound	Rural Depot North	84	1,558	0.05	54	75	-28%	\$678	\$56,938
24	Bonfield	Nipissing	Rural Depot North	51	1,035	0.05	49	75	-34%	\$405	\$20,638
25	Ashfield-Colborne-Wawanosh	Huron	Rural Depot North	142	2,890	0.05	49	75	-34%	\$240	\$34,052
26	McDougall	Parry Sound	Rural Depot North	81	1,672	0.05	48	75	-35%	\$1,282	\$103,870
27	Enniskillen	Lambton	Rural Depot South	53	1,123	0.05	47	75	-37%	\$159	\$8,427
28	Greater Madawaska	Renfrew	Rural Depot South	117	2,558	0.05	46	75	-39%	\$128	\$14,949
29	Brudenell, Lyndoch and Raglan	Renfrew	Rural Depot South	48	1,074	0.04	45	75	-40%	\$664	\$31,849
30	McKellar	Parry Sound	Rural Depot North	61	1,370	0.04	45	75	-41%	\$612	\$37,339
31	Huron Shores	Algoma	Rural Depot South	55	1,254	0.04	44	75	-42%	\$180	\$9,906
32	Carlow Mayo	Hastings	Rural Depot South	26	644	0.04	40	75	-46%	\$609	\$15,840
33	Addington Highlands	Lennox	Rural Depot South	103	2,600	0.04	40	75	-47%	\$619	\$63,737
34	Gore Bay	Manitoulin	Rural Depot North	16	413	0.04	39	75	-48%	\$190	\$3,033
35	Gillies	Thunder Bay	Rural Depot North	7	212	0.03	33	75	-56%	\$301	\$2,110
36	East Ferris	Nipissing	Rural Depot North	53	1,817	0.03	29	75	-61%	\$388	\$20,586
37	Emo	Rainy River	Rural Depot North	12	539	0.02	22	75	-70%	\$1,139	\$13,668
38	Hillard	Timiskaming	Rural Depot North	3	139	0.02	22	75	-71%	\$1,085	\$3,255
39	North Frontenac	Frontenac	Rural Depot South	56	3,126	0.02	18	75	-76%	\$345	\$19,310
40	Sables Spanish Rivers	Sudbury	Rural Depot North	27	1,760	0.02	15	75	-80%	\$300	\$8,113
41	Central Huron	Huron	Rural Depot North	51	3,522	0.01	14	75	-81%	\$123	\$6,257
42	Calvin	Nipissing	Rural Depot North	3	260	0.01	12	75	-85%	\$822	\$2,467
43	Tudor and Cashel	Hastings	Rural Depot South	14	1,376	0.01	10	75	-86%	\$558	\$7,818
44	Whitestone	Parry Sound	Rural Depot North	6	713	0.01	8	75	-89%	\$2,816	\$16,899
45	LaVallee	Rainy River	Rural Depot North	3	380	0.01	8	75	-89%	\$436	\$1,308
46	Sioux Narrows Nestor Falls	Kenora	Rural Depot North	8	1,214	0.01	7	75	-91%	\$1,916	\$15,328
47	Machin	Kenora	Rural Depot North	4	670	0.01	6	75	-92%	\$3,423	\$13,692
48	Alborton	Rainy River	Rural Depot North	2	343	0.01	6	75	-92%	\$1,045	\$2,090
	Totals			8,455	106,756	3.58	3,576			\$25,655	\$2,433,478
	Average			176	2224	0.07	75	75	0%	\$534	\$50,697

Table No. 2:
 2003 High Capture Rate Recycling Depot Program Results
 SGS Lakefield Reference No. 10925-001

Ranking By Capture Rate	Municipality/Township	District	WDO Program Category	2003 Total Tonnes Marketed	Number of Households Served By Depot	Tonnes Recycled Per Household	Kilograms Recycled Per Household	Rural Recycling Depot Average Recovery Rate (Kg/Household)	Recovery Rate Variance (%)	Net Cost Per Tonne
1	Amaranth	Dufferin	Rural Depot South	370	1294	0.29	286	75	281%	\$104
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3	Augusta	Leeds	Rural Depot South	585	2418	0.24	242	75	223%	\$398
4	Algonquin Highlands	Haliburton	Rural Depot South	348	1490	0.23	234	75	211%	\$356
5	Minden Hills	Haliburton	Rural Depot South	618	3048	0.20	203	75	170%	\$272
6	Melancthon	Dufferin	Rural Depot South	209	1055	0.20	198	75	164%	\$94
7	Perry	Parry Sound	Rural Depot North	236	1360	0.17	174	75	131%	\$438
8	Admaston/Bromley	Renfrew	Rural Depot South	197	1293	0.15	152	75	103%	\$301
9	Tay Valley	Lanark	Rural Depot South	485	3564	0.14	136	75	81%	\$78
	Totals		8 Depot South & 1 Depot North Program	3085	15673	1.87	1869	75		\$2,147
	Average			343	1741	0.21	208	75		\$239



FIGURES



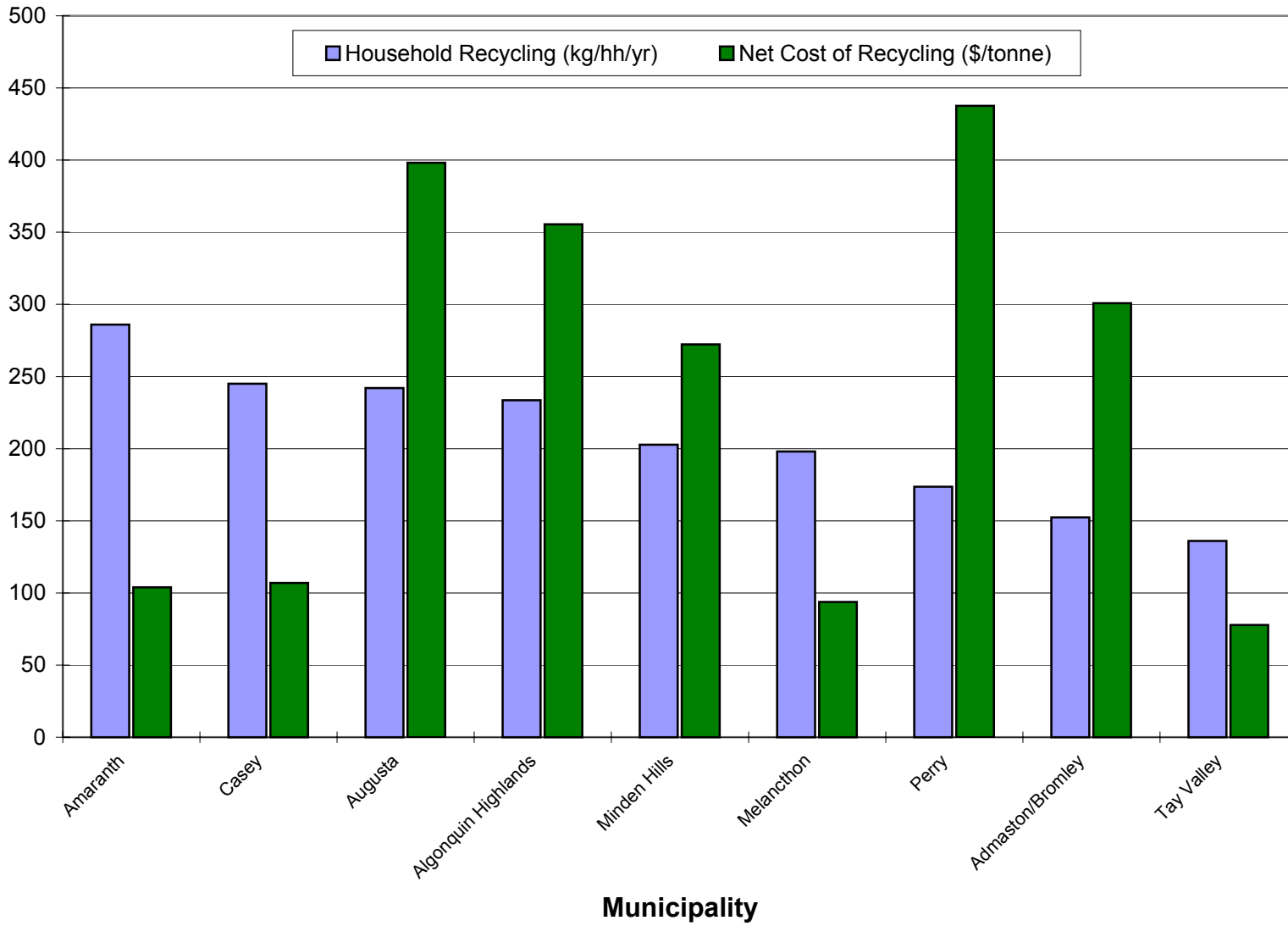
Member of SGS Group (SGS SA)
P.O. Box 4300, 185 Concession Street
Lakefield, Ontario, Canada K0L 2H0
Tel: 705-652-2000 Fax: 705-652-0743
www.sgs.com

Created by:	MBJ	Project No.:	10925-001
Checked by:	CW	Scale:	NTS
Date:	April 2006		

**LEADING RECYCLING DEPOT PROGRAMS
IN ONTARIO (2003)**

Figure No. 2:

Leading Recycling Depot Programs In Ontario (2003)





APPENDIX A

CONTACT INFORMATION FOR TOP PERFORMING RURAL DEPOT PROGRAMS IN ONTARIO



CONTACT INFORMATION FOR TOP PERFORMING PROGRAMS

Township of Admaston/Bromley

RR #2, Renfrew, Ontario K7V 3Z5
Telephone: (613) 432-2885
Fax: (613) 432-4052

Township of Algonquin Highlands

RR #2, North Shore Road
Minden, Ontario K0M 2K0
Telephone: (705) 489-2379
Fax: (705) 489-3491

Township of Amaranth

RR #7, Orangeville, Ontario L9W 2Z3
Telephone: (519) 941-1007
Fax: (519) 941-1802

Township of Augusta

3560 County Road 26
RR #2, Prescott, Ontario K0E 1T0
Telephone: (613) 925-4231
Fax: (613) 925-3499

Township of Casey

P.O. Box 460
Lachapelle Street
Belle Vallée, Ontario P0J 1A0
Telephone: (705) 647-7257
Fax: (705) 647-6373

Township of Melancthon

RR #6 Shelburne, Ontario L0N 1S9
Telephone: (519) 925-5525
Fax: (519) 925-1110

Township of Minden Hills

P.O. Box 359
7 Milne Street
Minden Ontario K0M 2K0
Telephone: (705) 286-1260
Fax: (705) 286-4917



Township of Perry

P.O. Box 70

90 Old Government Road

Emsdale, Ontario P0A 1J0

Telephone: (705) 636-5941

Fax: (705) 636-5759

Township of Tay Valley

217 Harper Road

RR #4 Perth, Ontario K7H 3C6

Telephone: (613) 267-5353

Fax: (613) 264-8516



APPENDIX B

SGS LAKEFIELD RESEARCH LIMITED
QUALIFICATIONS & LIMITATIONS



SGS Lakefield Research Limited – Qualifications and Limitations

Limited Warranty

In performing work on behalf of a client, SGS Lakefield relies on its client to provide instructions on the scope of its retainer and, on that basis, SGS Lakefield determines the precise nature of the work to be performed. SGS Lakefield undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

Reliance on Materials and Information

The findings and results presented in reports prepared by SGS Lakefield are based on the materials and information provided by the client to SGS Lakefield and on the facts, conditions and circumstances encountered by SGS Lakefield during the performance of the work requested by the client. In formulating its findings and results into a report, SGS Lakefield assumes that the information and materials provided by the client or obtained by SGS Lakefield from the client or otherwise are factual, accurate and represent a true depiction of the circumstances that exist. SGS Lakefield relies on its client to inform SGS Lakefield if there are changes to any such information and materials. SGS Lakefield does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. SGS Lakefield will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from SGS Lakefield during the provision of services, work or reports.

Facts, conditions, information and circumstances may vary with time and locations and SGS Lakefield's work is based on a review of such matters as they existed at the particular time and location indicated in its reports. No assurance is made by SGS Lakefield that the facts, conditions, information, circumstances or any underlying assumptions made by SGS Lakefield in connection with the work performed will not change after the work is completed and a report is submitted. If any such changes occur or additional information is obtained, SGS Lakefield should be advised and requested to consider if the changes or additional information affect its findings or results.

When preparing reports, SGS Lakefield considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but SGS Lakefield is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, governmental guidelines and policies is for information only and is not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Site Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that SGS Lakefield's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by SGS Lakefield, are beyond the scope of the work performed by SGS Lakefield and such matters have not been investigated or addressed.

No Reliance

SGS Lakefield's services, work and reports are provided solely for the exclusive use of the client which has retained the services of SGS Lakefield and to which its reports are addressed. SGS Lakefield is not responsible for the use of its work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by SGS Lakefield without SGS Lakefield's express written consent. Any party that relies on services or work performed by SGS Lakefield or a report prepared by SGS Lakefield without SGS Lakefield's express written consent, does so at its own risk. No report of SGS Lakefield may be disclosed or referred to in any public document without SGS Lakefield's express prior written consent. SGS Lakefield specifically disclaims any liability or responsibility to any such party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of any information, recommendation or other matter arising from the services, work or reports provided by SGS Lakefield.

Limitation of Liability

SGS Lakefield is not responsible for any lost revenues, lost profits, cost of capital, or any special, indirect, consequential or punitive damages suffered by the client or any other party in reliance on any SGS Lakefield work or report. SGS Lakefield's total liability and responsibility to the client or any other person for any and all losses, costs, expenses, damages, claims, causes of action or other liability whatsoever which do or may result or arise from or be in relation to SGS Lakefield's services, work (or failure to perform services or work) or reports shall be limited to the invoiced charges for the work performed by SGS Lakefield.

Fiscal Allowances in Canada for Organizations Conducting Experimental Research

SGS Lakefield may apply to CCRA (Canada Customs and Revenue Agency) for fiscal allowances permitted to Canadian laboratories undertaking creditable experimental research and development within Canada. The high success rate of SGS Lakefield in meeting the technological objectives of its clients and in providing quality experimental work and results requires it to undertake internal experimental research. This is done to perfect its technological approaches and methodology, as well as overcome unanticipated or unavoidable technical challenges that occur in the course of much work undertaken for its clients.

It is implicit in this contract that the experimental work performed by SGS Lakefield may sometimes be cited, in an anonymous manner, for the purpose of requesting fiscal credits for risks assumed by SGS Lakefield Research in the course of performing services for its clients.

Notwithstanding the presence of an obligatory agreement of confidentiality between CCRA and SGS Lakefield any information used by the latter to support claims for the assumption of risk in experimental research, will be presented in an anonymous form. For example, no mention will be made of the names of companies, ore bodies or proprietary processes in these claims. Throughout this process, SGS Lakefield will fully respect the trust and the agreements of confidentiality that exist with all of its clients.