

# City of Dryden Transfer Station E & E Fund Project #12

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## Executive Summary

The recycling challenge facing the City of Dryden and other municipalities in Northwestern Ontario is the relative isolation of the communities in this region. Neighbouring communities often exceed a 2 hour travel distance from each other compounded with a low population base, therefore are not mandated to carry out recycling activities. The nearest MRF in Northwestern Ontario is located either in Thunder Bay or Winnipeg, Manitoba, both representing a minimum 4 hour driving distance (one-way).

To reduce operational costs and increase program efficiencies, the City conducted a review of the recycling options for Dryden's recycling program. The decision was made to install two Transtor units and to purchase a compacting trailer to haul blue box material to a larger single stream MRF in Winnipeg. The City applied for and received \$250,000 from Stewardship Ontario's Effectiveness and Efficiency Fund to convert the City's MRF to a transfer facility.

Based on 2007 data, the Transtor units are operating effectively but efficiencies of the new system are not fully realized due to low tonnage quantities. Dryden's hauling weights have increased from 11 to 17 tonnes per load and hauling costs have decreased from \$186/tonne to \$139/tonne per load. The installation of the Transtor units at the Dryden transfer facility has generated additional hauling capacity for the City and has increased the range of Blue Box materials accepted in the program. Preliminary results indicate that the payback period on the City's share of the capital costs (\$200,000) is approximately 6 years. Comparably, payback on the project's full capital costs (\$440,000) is approximately 13 to 15 years, depending on fuel fluctuations.

There are limited blue box processing and marketing options for Northwestern Ontario due to low population density and subsequent low tonnage generation. Economies of scale have been realized with the Transtor unit and compaction trailer and could be further realized with the combined tonnages from other communities and potential backhaul opportunities with the existing compacting trailer.



## 1.0 Introduction

Stewardship Ontario retained 2cg Inc. (2cg), to prepare a final report for the City of Dryden (City). The report documents available information presented by City staff as it relates to the Effectiveness and Efficiency Fund Project #12: Dryden Transfer Station Project.

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.

## 2.0 Background

In 2002 the Northwestern Ontario Recycle Association (NORA), consisting of twenty-eight municipalities in Northwestern Ontario, disbanded as a result of increasing recycling costs. Some of the larger municipalities in the area such as Dryden, Sioux Lookout and Fort Frances unsuccessfully attempted to find a cooperative answer leaving the three municipalities to find their own solutions. The blue box processing MRF that was originally used by NORA group was located in the City of Dryden; therefore the City chose to continue material recovery facility (MRF) operations to manage their own tonnage.

The City is geographically located between Winnipeg and Thunder Bay in the southern half of the Patricia Region representing approximately 1,800 kilometers distance from the Toronto area. To illustrate, it would take approximately 2 full days of driving at 80km/hr (23 hours) to travel from the City of Toronto to the City of Dryden.

The City is accessible on the Trans-Canada Highway located at the end of Highway 502 coming from Fort Frances. The City is the dividing point between traffic going up Highway 105 to Ear Falls and Red Lake and traffic traveling Highway 72 to Sioux Lookout. The City has a permanent population of approximately 8,195 residents (3,482 households) and experiences a seasonal population spike in the summer. The City offers bi-weekly curbside recycling collection to residents and a bag tag program for mixed residential wastes. Source separated fibres and container material (two stream) was collected by a private contractor and delivered to the Dryden MRF for processing. In 2002, after the membership with NORA, approximately 175 tonnes of blue box material was diverted through the City's recycling program at the existing City operated MRF, for a processing cost of close to \$600/tonne.

The recycling challenges facing the City and other municipalities in Northwestern Ontario is the relative isolation of the communities in the area. Neighbouring communities often exceed a 2 hour travel distance from each other and also represent a low population therefore are not mandated to carry out recycling activities. The nearest MRF in Northwestern Ontario is Thunder Bay, representing a minimum of a 4 hour driving distance (one-way). As a result, the City, along with surrounding municipalities (Fort Frances, Sioux Lookout) do not manage container

glass in their blue box program due to the cost inefficiencies associated with hauling material over a large geographic area. Northwestern Ontario has a low population density over a large geographic area where MRF's and end markets are practically non-existent. If the City wants to continue increasing its diversion from disposal, a cost effective and long-term solution is required.

## 2.1 Long-term Solution

In an effort to reduce operational costs and increase program efficiencies, in 2003 the City retained Gartner Lee Ltd. (consultant) to conduct a review of the recycling options for Dryden's recycling program. Various processing and transfer options were examined with a preference toward the recommendation to convert the existing MRF into a transfer facility to reduce recycling operating costs. Ceasing the MRF operations at the Dryden facility would reduce internal operating costs and provide an opportunity for the City to haul recyclables to a larger single stream MRF in Winnipeg, Manitoba (Metro Materials Recovery Inc.). The Winnipeg MRF processes a wider range of recyclable materials than the Dryden MRF or the Thunder Bay MRF, furthering the prospect of increasing overall diversion and participation rates and reducing transportation costs for the City.

The consultant's report also recommended additional capital infrastructure at the transfer station. Several configurations were considered and the decision to use compacting Transtor units for the central collection system complemented with a compacting trailer to transfer was selected.

Potential benefits include;

- Reduction in labour and additional equipment costs associated with material processing;
- Opportunity to increase participation and recovery rates of blue box material with a larger MRF;
- Minimal electrical cost since the equipment uses minimal electricity to open the top of the unit only;
- Elimination of front-end loader and operator for loading open-top trailers, thereby removing 'double handling' of material, emissions and fuel consumption;
- No requirements to maintain Transfer/MRF building;
- Public and small IC& I users can safely deposit recyclable material into the units;
- Material stays dry;
- Allows for expansion of service to outlying municipalities at full cost recovery with the strong potential to reduce everyone's costs;
- Easily expandable if volumes justify the need;
- Easily accessible by commercial contractors with any type of collection

- vehicle; and
- Animal proof.

## 2.2 Interim Recycling Program

Prior to the establishment of the Transtor units at the current transfer site, the City determined that it was not cost effective to continue processing blue box tonnage at the existing MRF. In response to the consultant's report, the City closed the MRF on June 30, 2004 and implemented a temporary transfer station for blue box material at the old MRF site.

The curbside collection contractor deposited the material inside the temporary transfer station until there were sufficient quantities to transfer the material in a walking floor trailer to another MRF. The City opted to send recyclables to a MRF in Winnipeg (a 3 to 4 hour hauling distance). This MRF was selected (Thunder Bay MRF was the other option) because it offered a wider spectrum of divertible materials (milk cartons, boxboard, Tetrapak, and certain metal containers) and could receive recyclables as a single stream.

The City contracted a private hauler to provide walking floor trailers to transfer blue box recyclables to Winnipeg. Prior to making the decision to haul to Winnipeg, V-Quip assisted the City by negotiating with the contractor at Winnipeg to eliminate the processing fee representing an additional savings of approximately \$50/tonne from processing fees. It should be noted that during this interim period, the City opted to segregate corrugated cardboard and haul this material as separate loads to the Winnipeg MRF. The revenue rebate for segregated cardboard was approximately \$75/tonne, and the costs of transferring the material in walking floors resulted in a revenue neutral net cost for processing this material.

The City found that the interim program was less expensive than operating their small MRF however, over time staff found that hauling costs were continuing to increase due to rising fuel surcharges and low to moderate weights on the walking floor trailers. Average truck loads were 10 to 12 tonnes per walking floor trailer at a cost of approximately \$900/load (2004 pricing) representing an average cost of \$75 - \$85/tonne to transfer material. The issue of 'double handling' the material was time consuming and added additional expense to the program. The loading of the trailers required a loader and operator twice per week resulting in a dispersal of labour and equipment from the Public Works department and an associated cost of approximately \$15/tonne.



**Photo 1 – Old Dryden MRF Site  
(Interim storage of recyclables prior to transfer to Winnipeg MRF)**

Also during their interim recycling program, the City implemented a campaign to increase residential participation and to promote information pertaining to the additional divertible materials that were being collected at the curbside. In 2004 the City increased bag tag fees from \$1.50 to \$1.75 per bag and increased tipping fees at the landfill sites. Recycling rates improved however overall costs increased due to the frequency of trips of low load weights to Winnipeg.

### **3.0 Intent of Transtor Transfer Station Project**

The City applied for and received \$250,000 from Stewardship Ontario's Effectiveness and Efficiency Fund to convert the City's MRF to a transfer facility by installing 3 Transtor units and 1 compaction trailer. The total project cost (including capital and operational) was \$560,000. The main objectives of the project were to:

- Eliminate Dryden's inefficient MRF & establish Transfer Facility (no labour, minimal operational costs);
- Change from two stream to an expanded single stream recycling program by participating in a larger municipal program (Winnipeg) to increase participation and reduce hauling costs;
- Increase tonnage and reduce \$/tonne (residential & IC&I); and
- Use Dryden as demonstration project for northern Ontario municipalities as a cost effective alternate for hauling blue box recyclables.

It was anticipated that this project would contribute to an increase in waste diversion over current levels by about 25%. Coupled with a higher recovery rate of IC&I material (at a cost-plus rate), would result in a lower cost for the residential recycling program. Initial projections indicated that an increase of 100 tonnes of IC&I material (primarily cardboard) would reduce the residential program costs by approximately \$70 per

tonne.

It was anticipated that the lifecycle of the Transtor system was at least 15 to 20 years and the payback period of the capital investment would be approximately 10 years.

This project offered the potential to expand service areas to include other municipalities in the Patricia Region.

As well, this project was intended to offer opportunities for surrounding municipalities within a 100 kilometer radius, (Sioux Lookout, Red Lake, and Fort Frances). In this regard the further intent of the project was to:

- Provide more cost-effective hauling;
- Share costs with IC&I materials and other municipal sources;
- Replace aging and limited transfer capacity;
- Reduce labour requirements;
- Possibility of sharing the compaction trailer with Fort Frances to reduce hauling costs; and
- Potential for Sioux Lookout to reduce hauling costs by switching to single stream and shipping material to Dryden;

Although this project represents high capital investment for small incremental tonnes it addresses issues in northern Ontario where costs are generally very high.

## 5.0 Installation

Due to the proprietary nature of the Transtor product, the City did not perform the standard tendering procedure typical to the municipal purchasing requirements for the Transtors. Under normal circumstances where there are a number of suppliers, the City would have submitted formal tendering procedures. Tendering was conducted for electrical and concrete work.

The project was managed by municipal staff and coordinated with the experience of the vendor (V-Quip Inc.). In 2004, the staff person responsible for the project was Brad Johns, P. Eng., Director of Engineering & Public Works Services. Mr. Blake Poole, C.E.T., Operations Manager assumed project management in 2006.

Mr. Doug Vanderlinden, from V-Quip Inc. was involved with coordinating site design for the Transtor units and provided experienced personnel to assist municipal staff with construction of the facility. The project team worked together to determine the site's utility and traffic flow requirements. The equipment was ordered directly from V-Quip Inc. who also coordinated the facility construction. Municipal staff was responsible for hydro installation (three-phase power) and assisted with road construction.



The following chronology depicts the scheduling of events leading to the installation of the Transtor units at the newly constructed transfer station. Photos 2 to 5 visually depict the progression of the installation.

**Step One-Approvals and Equipment Orders- September - December, 2004:**

- Receipt of E&E Funding approval;
- Issue purchase order for two Transtor units and one compaction trailer; and
- Secure electrical contractor for supplying hydro to transfer facility location and to hook up units.

**Step Two -Site Preparations -June - December, 2005:**

- Brush clearing, hydro installation; and
- Pour footings for three Transtors\*.



**Photo 2 – Concrete Footings for Transtors**

**\*Note:** The site was initially constructed to manage three Transtor units in the event that surrounding municipalities may share this system in the future once cost efficiencies are realized for the Dryden project. Currently, two Transtors are on site.

Work shut down in December due to winter weather conditions

**Step Three – Construction April – October 2006**

- Installation of bin walls, upper deck and approach ramps; and
- Construction of retaining walls, and road upgrades.



Photo 3 – Bin Wall Installation

#### Step Four – Equipment delivery and installation June – December 2006

- Transtor units were built and installed on site;
- Electrical and hydraulics to Transtors were hooked up (V-Quip); and
- Access stairs to Transtor units were constructed.



Photo 4 – Transtor Installation

**Note:** In August of 2006, supplier delays for the compaction trailer resulted in the trailer arriving in mid January 2007.

#### Step Five- Commission of Transfer Facility – January 2007

- V-Quip completed installation mid January 2007;
- Staff training for Transtors and compaction trailer January 2007;and
- First load sent to Winnipeg third week of January 2007.



**Photo 5 – Commissioning/Staff Training**

Table 5.1 depicts capital costs associated with the transfer station project.

**Table 5.1 Transfer Station Cost Summary**

Item	Units	Unit Cost	Total Cost
53 Cubic Yard Transtor unit	2	~\$100,000	\$200,000
1,000 Cubic Yard Compaction trailer	1	~\$40,000	\$40,000
Bin walls, concrete, ramps, hydro, signs, fencing, etc.			~\$200,000
<b>Total</b>			<b>~\$ 440,000</b>

## 6.0 Project Findings/Results

Public works staff are spending less operational hours on-site as the Transtor unit can direct load into the compaction trailer without a loader and operator, eliminating the 'double handling' of the previous system. As well there is a reduction in windblown debris of fibre material as the Transtor is self contained. The Transtor units are virtually bear proof and there have been no instances of pest problems on site.

Photos 6 to 10 depict the Transtor unit and compaction trailer at the City's transfer station.

### 6.1 Capture Rate

Table 6.1 depicts monthly loads and tonnages after the installation of the Transtor units. January to May 2007 represented the commissioning phase, where adjustments were made to the compaction trailer. After the commissioning phase trailer weights increased to an average of 17 tonnes per load (May to December).



Photo 6 – Two Transtor Units at Dryden Transfer Station



Photo 7 – Dryden Transtor Unit (Accessible via gravel ramp)



Photo 8 – Comingled Recyclables from Curbside Collection  
(Note rubber mat/bumpers at base of opening)



**Photo 9 – Side view of Transtor Units**  
(Note bin wall configuration and electrical/hydraulic installations)



**Photo 10 – Tipping of Recyclables into Compaction Trailer**  
(Note height requirements for Transtore tipping)

**Table 6.1 2007 Monthly Compaction Loads Hauled to Winnipeg MRF**

Month (2007)	Loads	Tonnage
January	1	14.58
February (depicts additional tonnage from January)	1	13.14
	1	13.19
	1	13.65
	1	12.89
	1	12.19
March	1	13.72
April	1	14.98
	1	15.42
<b>May</b>	<b>1</b>	<b>15.77</b>
	<b>1</b>	<b>21.29*</b>
June	1	18.30
	1	17.54
	1	16.12
July	1	14.04
	1	17.94
	1	19.44
August	1	16.28
	1	16.85
September	1	19.97
	1	14.87
	1	17.53
October	1	17.04
	1	19.52
November	1	17.06
	1	17.86
December	1	20.45
	1	15.90
Total	28 Loads	484.60 Tonnes

\* **Note:** Finalization of trailer modifications and loading adjustments.

Information on inbound material quantities was not available during this time as the electronic weigh scale was not fully operational at the transfer station until mid 2007.

Table 6.2 depicts residential blue box tonnages transferred to Winnipeg since 2002. There has been an increase of approximately 130 tonnes of recyclable material over three years (2005-2007).

**Table 6.2 Blue Box Tonnage Summary (WDO Data call)**

Year	Tonnes	Notes
2002	175	Processed at Dryden MRF
2003	174	Processed at Dryden MRF
2004	453*	Dryden MRF closed, hauling in walking floors to Winnipeg. Bag tag and tipping fees increased.
2005	444	Continue hauling in walking floor trailer to Winnipeg MRF
2006	496	Continue hauling in walking floor trailer to Winnipeg MRF
2007	573	First load shipped from Transtor facility end of Jan 2007; facility was fully operational by February of 2007

**\*Note:** The 2004 WDO data call reports 693 tonnes was marketed during this year. The higher tonnage represents material that was stockpiled at the MRF (glass, cardboard) that was collected in 2003 but shipped in 2004.

It should be noted that after the installation of the Transtors, the City decided to continue segregating the corrugated cardboard and transferring this material separately to the Winnipeg MRF for revenue rebates. The majority of the cardboard that was entering the Dryden transfer site represented material from the I.C. & I. sectors and much of it was a thicker grade of material that caused ‘bridging’ inside the Transtors resulting in a reduction in compaction rates.

## 6.2 Compaction and Transfer

Initially, compaction trailer load weights were lower than anticipated, averaging 13 tonnes per load compared to a projected average load weight of 20 tonnes. One of the initial challenges for City staff was the time spent loading recyclables into the compaction trailer.

During ‘commissioning phase’ of the program, (approximately 6 months) loading time of the compaction trailer was averaging 6 to 7 hours compared to 2 to 3 hours for an open-top walking floor trailer. Staff found that the recyclables were ‘popping up’ in the trailer at the end of each compaction cycle. This was because the ram pressure need to be increased and the packing blade of the trailer needed to be pushed further to the rear of the truck to ensure a full compaction cycle. V-Quip worked with staff to teach them how to coordinate tipping of the Transtors with the cycling of the compaction ram. Additionally, adjustments were made to the compaction trailer to increase the pressure to improve the compaction levels on the trailer. Once adjustments were made, the City realized weights between 18 and 20 tonnes per trailer load (compared to 10-12 tonnes in open-top walking floor trailers) and loading times were reduced to approximately 2 hours.

The Transtor units are complemented with a compaction trailer that maintains the density of the compacted material during transfer. As an initial capital cost saving

measure, the City decided not to purchase the truck to haul the compactor. This is currently contracted out. Although two Transtors were effective for ease of access to the users at the site, the City discovered that by not having the capability to shuttle/move the compacting trailer on-site reduces the effectiveness of using the second Transtor unit. It was anticipated that if additional tonnages were received at the transfer site from other municipalities, a cost sharing opportunity may develop to purchase the truck (~ \$135,000) or to implement a contractual arrangement with the current hauler.

Another challenge that was overcome was the seasonal road restrictions during the spring. To ensure that maximum trailer loads were achieved, particularly due to road restrictions between provinces, the hauling contractor recommended that a lighter truck body with a larger axle spread be incorporated to disperse weights and allow for heavier loads.

### 6.3 Transfer Costs

Since the establishment of the Dryden transfer station at the end of June 2004, tonnages and transfer (i.e. hauling) costs have been steadily increasing (2005-2006). Once the installation of the Transtor system was complete and the commissioning phase was managed, hauling costs began to decrease. It is interesting to note that the City experienced an increase in contract costs combined with fuel surcharges in 2007 during the Transtor implementation period but still realized overall cost savings in the program.

Table 6.3 depicts annualized transfer costs for the City's recycling program.

**Table 6.3 Transfer Cost Summary**

Year	Tonnes	Transfer Costs	Transfer Cost Per Tonne	Notes
2005	444	\$80,800	\$182/tonne	Full year of transfer station operations, using walking floor trailer.
2006	496	\$92,250	\$186/tonne	Second year of transfer station, using walking floor trailer.
2007	573	\$79,700	\$139/tonne	Third year of transfer station, using Transtor units (Feb, 2007)

The transfer costs listed in Table 6.3 include all operational costs associated with the management of the transfer station (utilities, labour, snow removal, etc.). Haulage costs alone from Dryden to Winnipeg were approximately \$30,500 in 2007 or \$53/tonne.

Table 6.4 provides a detailed breakdown of monthly hauling costs from Dryden to the Winnipeg MRF. Extrapolating hauling costs after the commissioning phase (May to December of 2007) it cost approximately \$8,900 to haul 361 tonnes of material representing an average hauling cost of \$24/tonne with loads averaging 17.18



tonnes per trailer. The average cost to haul 496 tonnes of material in 2006 was approximately, \$45,300 or \$91 per tonne for loads averaging 10 tonnes per walking floor trailer.

Based on the cost savings of the last year (which includes 6 months commissioning), it can be anticipated that the approximate payback period for the City's share of the capital investment (\$~200,000) will be a minimum of 6 years. The full capital cost of the project (\$440,000) would experience an estimated 13-15 year payback period, depending on fuel cost variations.

**Table 6.4 Monthly Outbound Blue Box Tonnage Hauling Summary**

Month	Loads	Hauling Costs
January	1	\$ 1,044.08
February	5	\$ 4,395.00
March	1	\$ 928.38
April	2	\$ 2,633.49
May	2	\$ 1,703.16
<b>June</b>	<b>3</b>	<b>\$ 2,495.00*</b>
July	3	\$ 3,105.00
August	2	\$ 2,070.00
September	3	\$ 3,105.00
October	2	\$ 2,070.00
November	2	\$ 2,070.00
December	2	\$ 2,070.00
<b>Total</b>	<b>28</b>	<b>\$30,568.30</b>

\*Note: Hauling contract rates increased in June 2007 from ~\$900/load to \$1035/load to transfer 700 kilometers round trip.

## 6.4 Next Steps

The next steps to this program are to establish partnerships with surrounding municipalities (Fort Frances, Kenora, and Red Lake) to generate additional tonnages to warrant the purchase of the truck portion of the compaction trailer (or to enter into a long term contract with a private hauler) to increase hauling efficiencies/flexibilities for the surrounding communities.

These municipalities have varying programs ranging from single stream to two or more streams. If municipalities are going to change over their recycling system they would need assurances that they would be able to send their recyclables to the Winnipeg MRF in the long term. Although a legitimate concern, other recycling options in remote locations within Northwestern Ontario are limited and often costly.

Currently, partnerships have failed to materialize due to timing of contract termination clauses with existing hauling contractors.

Preliminary discussions with staff at Fort Frances indicate that using a compaction trailer would increase load weights from 11 tonnes per trailer to 18 tonnes however,

stand-by time between shipments from Fort Frances to Dryden and then to the MRF inflate overall transfer costs. By not having control of the timing of the hauling schedule makes the option of Fort Frances sharing with Dryden cost prohibitive. The investment of a truck body and the establishment of a regular hauling route would eliminate the waiting time between shipments. Regular hauling routes require additional municipalities to participate in the program to achieve maximum truck loads to the Winnipeg MRF.

Sioux Lookout initially expressed interest in becoming part of the hauling route but in the fall of 2007 council elected to accept an alternate solution presented by a local business running a small private MRF.

Further investigation into the possible purchase of a truck body along with an additional Transtor unit at another municipal location (Fort Frances or Kenora), is required to reduce internal costs. Prior to purchasing a truck, the City will need to establish agreements with surrounding municipalities to determine available blue box tonnages. Consideration could be made to share the capital costs of a truck and trailer between municipalities. For example, Kenora is roughly half way between Dryden and Winnipeg, therefore it is feasible for Dryden to load a compaction trailer more frequently (with less material) providing the City can share hauling costs with Kenora.

## **7.0 Conclusions**

After extensive background research into alternative transferring and processing systems, the City approved a Transtor system and a compaction trailer. This decision was based on the projected benefits of hauling cost efficiencies which is critical to the remote location of the City. The City sought and received Stewardship Ontario to help defray the costs of this system.

Based on 2007 data, the Transtor units are operating efficiently and effectively. In combination with the compaction trailer the tonnes per load have increased and the costs to send this material to the Winnipeg MRF has decreased. The initial results indicate that the installation of the Transtor units at the Dryden transfer facility has generated additional hauling capacity for the City and increased accessibility to an expanded blue box program.

A key next step is to establish partnerships with surrounding municipalities (Fort Frances, Kenora, and Red Lake) to develop further efficiencies by collecting more recyclables. Additional collection points offers for potential backhauling of the compaction trailer to further reduce hauling costs for all participating municipalities. As tonnages increase perhaps efficiencies can be gained from the purchase of truck for the compaction trailer.

A key challenge facing the City is the reliance of the longevity of processing capacity at the Winnipeg MRF and the assurance that the facility will continue to accept

material from Dryden and surrounding municipalities. To protect the investment of the City, a long term processing contract with Winnipeg should be considered.

There are limited blue box processing and marketing options for Northwestern Ontario due to low population density and subsequent low tonnage generation. Economies of scale have been realized with the Transtor unit and compaction trailer and could be further realized with the combined tonnages from other communities.