



## Volume 4: Eastern Ontario

# A Study of the Optimization of the Blue Box Material Processing System in Ontario *Final Report*

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**STEWARDEDGE**

# Volume 4: Eastern Ontario

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## 1. Introduction

The purpose of this study is to provide Waste Diversion Ontario (WDO), including the Continuous Improvement Fund (CIF), individual municipal owners, the Association of Municipalities of Ontario (AMO) and Stewardship Ontario (SO) with comprehensive independent information on a theoretical optimized MRF and transfer facility network for the province of Ontario.

The Project Team has developed a geographic information system (GIS) model that will:

- Theoretically reflect a cost-effective, efficient and successful recovery system for packaging & printed paper in Ontario, and
- Inform decision-making toward an optimized provincial system for the transfer, hauling and sorting of Blue Box recyclables for market

Volumes 4 through 7 present a range of options for each of four regions of the Province that would represent optimized systems depending on the criteria used for decision-making.

Also presented is a high level transition planning process that can be used in each region, which addresses the situations for each of the facilities and each municipality with respect to its existing infrastructure and the proposed optimized system options. These provide guidance regarding the steps and decisions that must be made.

The combination of the key options for the entire province, i.e. all regions is summarized for after the options for the region.

## 2. Development of Options

### 2.1. General Assumptions

1. The Province has been divided into four regions:

- I. Eastern Ontario (Volume 4)
- II. Central Ontario & GTA (Volume 5)
- III. Southwestern Ontario (Volume 6), and
- IV. Northern Ontario (Volume 7)

2. Modelling excludes collection

- It is acknowledged that there are likely impacts on the haul times from the end-of-route or depot locations.
- Since this project does not model collection systems, the impacts cannot be quantified reliably.
- However, we have assessed a relative measure of the change in direct haul time between the options and variations.

- It should be noted that assumed changes to the existing collection system could yield efficiencies, i.e. a move to automated, single-stream collection, but assessment of these is beyond the scope of this project and they have not been assessed.
- 3. Existing private sector facilities have been identified for possible inclusion in the optimized system, but since no cost and capacity data were available for private sector operations, a greenfield cost estimate has been used where necessary.
- 4. Similarly, some facilities outside Ontario have been identified and included in various options and a greenfield cost estimate has been used.

## 2.2. Steps to Develop Options

The following steps are taken to develop options for an optimized processing and transfer system. Options are developed for each region independently, although some options may involve material flowing across into different regions.

1. Establish a baseline based on the greenfield scenario in the year 2025 under natural growth recovery conditions with lowest number of MRFs.
2. Establish options:
  - Increase the number of MRFs
  - Define the cost implications for natural and high growth scenarios
  - Identify potential benefits, e.g.
    - redundancy - the feasibility to offer sufficient capacity for processing operations within this or neighbouring regions in the event of emergency that doesn't potentially exist at other facilities in this or neighbouring regions
  - If the benefits are not considered significant, do not proceed to next option
3. Assess variations on options:
  - Eliminate small aggregation points (e.g. < ~2,000 tonnes per annum) and where material currently is hauled further than to the nearest alternative
  - Consider using existing facilities:
    - A. Utilize existing public facilities as transfer station or MRFs without increasing the number of aggregation points.
    - B. Add all public facilities that can feasibly handle the tonnes directed to it (based on best available data).
    - C. Utilize all existing public and private facilities to minimize any effect on the existing collection infrastructure.
  - Develop cost estimates to upgrade and use public facilities and use greenfield operating costs for all facilities
    - A. Refer to Volume 3 for details of estimating conversion costs
  - Consider using existing MRFs to minimize impacts on haul distances and construction costs, if they can be upgraded
  - Consider transfer of material from large population centres across provincial and US-Canada border when the distance is small

## 2.3. Presenting Results

- No single system has been recommended for a given region since there were no discussions with municipal officials and to acknowledge the need to consider local factors and criteria and analyse collection impacts

The results for each region are presented with:

- Maps showing the Baseline Greenfield System and options showing:
  - Existing infrastructure, identifying the flow of material to aggregation points and transfer to MRFs
  - The quantity of material handled at each location
  - The total gross cost per tonne for transfer, hauling and processing at each aggregation point
- Tables summarizing:
  - The number of facilities
  - The number of conversions: MRFs to transfer stations and upgrades of MRFs and transfer stations
  - The total annual capital and operating cost of the option
  - The total investment required in new facilities and conversion
  - The implication on neighbouring regions – when material moved from one region to a different region than in the Baseline Greenfield option so that the cost was not counted twice in the province-wide summary
  - The change in direct haul time for each option compared to the Greenfield Baseline
- A commentary briefly describing the key elements of the option, i.e. the number and location of MRFs

### 2.3.1. General Map Description

Each map of the regional Baselines and Options shows key information to inform decisions and metrics spatially. Each map shows three main items:

- Current System:
  - Current Blue Box program boundaries are shown in grey.
  - Blue and green triangles, squares and circles represent existing transfer and processing facilities. Some current facilities are used in variations on the Baseline and Options showing impact of using these facilities in the future system.
  - Direct Haul Collection:
    - Each of the small points represents generation of Blue Box material based on population. (See Volume 2 for more detail).
    - Each of the dissemination area points is coloured based on the maximum end-of-route haul time assumed for the location given its demographic situation
    - Purple lines represent direct hauling from the end of collection routes.
- Greenfield System:
  - Proposed transfer station locations are shown with orange triangles
  - The thicker red lines, in turn, represent the Blue Box tonnes transferred from each transfer station to applicable MRF Locations

### 2.3.2. Description of Summary Tables

The summary tables for each region present the cost of the options, covering the annual capital and operating cost as well as an estimate of the cost of the capital in the system. They also provide an indication of the relative effect of the option on the collection system resulting from changes to the number and location of aggregation points.

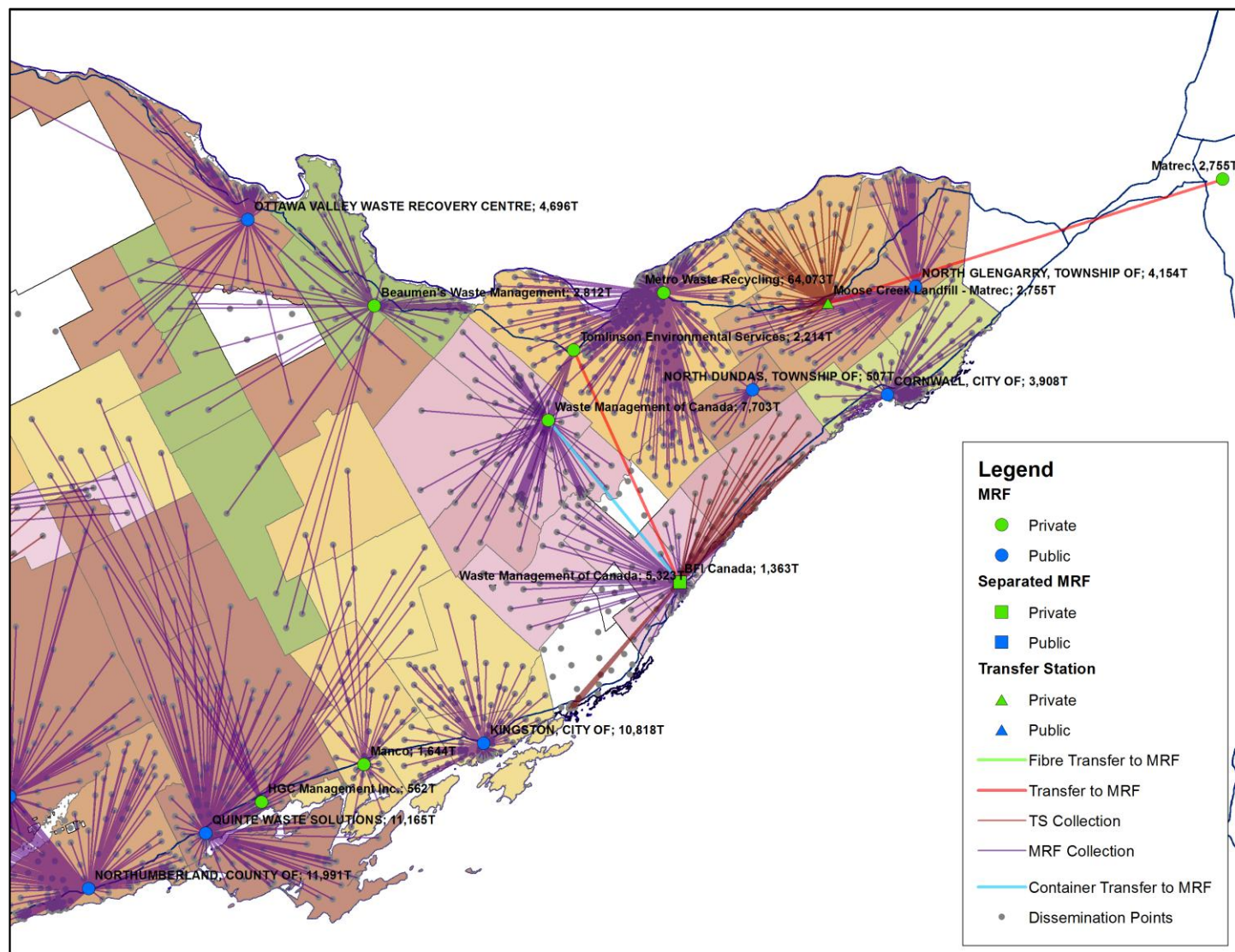
- Annual capital and operating cost:
  - All of the annual costs used are ‘fully loaded’ and include capital amortization, labour with benefits and operating costs. These fully-loaded operating costs are used even if an existing MRF or transfer station (TS) is used to ensure the cost reflects a sustainably financed system
  - These costs are totaled for each regional scenario and divided by the total tonnes handled to determine the regional average cost per tonne
- Capital costs are broken out as follows to provide information about the range of potential investment required, noting that new facilities could be financed through public funds or by the private sector:
  - Total capital in the system
  - Total capital for new MRFs and new TSs
  - Total capital for upgrades to existing MRFs, and
  - Total capital for conversions from existing MRFs to TSs and upgrades to existing TSs
  - No cost has been applied to assets that will be unused given that there likely could be residual value in the equipment and buildings could provide value through repurposing
- Effect on direct haul time:
  - The effect of the different options on the collection system, which is beyond the scope of this analysis, would require a more detailed analysis of the collection operations in each locality because it would need to consider utilization rates of vehicles, numbers of routes, and the specific collection system
  - However, an indication of the relative effect of the option on the collection system resulting from changes to the number and location of aggregation points on the time required for direct haul from the end of collection routes or depot locations has been developed
  - These can be the basis for future analysis as part of more detailed transition planning
  - For each option the sum of the tonnes managed from each dissemination area multiplied by the corresponding time for direct haul between the location of the dissemination area (end of collection route or depot location) and aggregation points, (TS or MRF) is calculated
  - The figures (expressed as tonne-minutes) for each option are compared to those of the baseline and expressed as a percent difference

## 3. Eastern Regional Options

The Eastern Region is characterized by one major population center, Ottawa, and the majority of the population along the Ottawa River and Lake Ontario. The next largest city is Kingston and that generally represents the southwest border with the central region. The current system has 11 MRFs (5 public and 6 private) and two privately-operated transfer stations. One of the MRFs, Brockville, only processes fibre materials and transfers container materials. Additionally, one of the privately-operated transfer stations transfers materials into Quebec. All of the MRFs, except for the private facility in Ottawa, process less than 11,000 tpy with all but three processing less than 5,000 tpy of Blue Box material.



**Figure 1: Existing System**





### 3.1. Summary of Options

In the Eastern Region, the following options and variations were included in the analysis.

- Baseline: 1 MRF in Ottawa (Natural growth recovery) – the minimum number of MRFs for the Region
- Option 1: 1 MRF in Ottawa and 1 in Kingston (Natural growth recovery)
- Variation A on the Baseline: Existing MRFs in Ottawa Valley, Cornwall and Kingston are utilized as Transfer Stations
- Variation B on the Baseline: Existing MRFs in North Dundas and North Glengarry are utilized as Transfer Stations in addition to those used in Variation A
- Variation C on the Baseline: All Existing MRFs and Transfer Stations (except for Metro Waste Recycling in Ottawa) are utilized as Transfer Stations (See Table 6 for full listing).
- High Recovery Baseline: Same as Baseline above but using the High Recovery tonnes
- High Recovery Option 1: Same as Option 1 above but using the High Recovery tonnes
- Variation C on the High Recovery Baseline: Same as Variation C on the Baseline above but using the High Recovery tonnes

**Table 1: Eastern Region Summary**

	Baseline	Option 1	Baseline A	Baseline B	Baseline C
<b>Wasteshed Tonnes</b>	124,700	137,800	124,700	124,700	124,700
<b># of TS</b>	5	5	5	7	11
<b># of MRFs</b>	1	2	1	1	1
<b># of Current MRFs-&gt; TS</b>	0	0	3	5	8
<b># of Current TS Upgrades</b>	0	0	0	0	1
<b># of public MRFs shutdown or repurposed</b>	5	6	2	0	0
<b># of public TS shutdown or repurposed</b>	0	0	0	0	0
<b>Total Capital Investment</b>	\$38,911,000	\$34,178,400	\$35,736,000	\$36,291,000	\$36,641,000
<b>Total Annual Operating Cost</b>	\$12,508,300	\$15,248,800	\$12,446,900	\$12,748,200	\$13,363,000
<b>Average Annual Operating/Tonnes</b>	\$100.32	\$110.64	\$99.83	\$102.24	\$107.17
<b>Relative Effect on Direct Haul % Diff. from Baseline</b>	-	13.6%	-3.2%	-10.3%	-20.6%

Note:

- A. Utilize existing public facilities as transfer station or MRFs without increasing the number of aggregation points.
- B. Add all public facilities that can feasibly handle the tonnes directed to it (based on best available data).
- C. Utilize all existing public and private facilities to minimize any effect on the existing collection infrastructure.

### 3.1.1. Eastern Region Capital Cost Summary

**Table 2: Capital Cost Summary**

Capital Summary	Baseline	Option 1
<b>Total capital in system</b>	\$38,911,000	\$34,178,400
<b>Total capital for new MRFs</b>	\$31,731,000	\$26,998,400
<b>Total capital for new TS</b>	\$7,180,000	\$7,180,000

- In the baseline, it is assumed that a new large MRF is built to handle the 124,687 tonnes of capacity needed in Ottawa. In addition, 3 large and 2 medium transfer stations would be built.
- In Option 1, it is assumed that a new medium MRF is built to handle the 102,572 tonnes of capacity needed in Ottawa, along with a small MRF in Kingston to handle the 35,251 tonnes of capacity. In addition, 2 large and 3 medium transfer stations would be built.
- The combination of the large MRF in Ottawa and small MRF in Kingston results in a lower capital cost than the one larger MRF in Ottawa in the model. This result reflects the level of detail for the modelling at this stage and is due to the limited number of MRFs for which capital costs were developed and used. In the baseline, the large MRF model in Ottawa would have significant excess capacity but in Option 1 the medium MRF model in Ottawa and the small MRF model in Kingston would both have limited excess capacity. In practice, with MRFs sized more precisely and with similar levels of excess capacity, the capital cost would likely be lower for the one large MRF than the two smaller MRFs.

**Table 3: Summary of Capital Costs on Variations for the Baseline**

	Baseline A	Baseline B	Baseline C
<b>Total capital for new MRFs</b>	\$31,731,000	\$31,731,000	\$31,731,000
<b>Total capital for upgrades to Existing MRFs</b>	\$ -	\$ -	\$ -
<b>Total capital for new TS</b>	\$2,000,000	\$2,000,000	\$ -
<b>Total capital for conversions from MRF to TS &amp; upgrades to existing TS</b>	\$2,005,000	\$2,560,000	\$4,910,000
<b>Total Capital Cost</b>	\$35,736,000	\$36,291,000	\$36,641,000

- In all three variations on the baseline, a large MRF is assumed to be built in Ottawa.
- In variation A on the baseline, MRFs in Cornwall, Kingston and Ottawa Valley are converted to transfer stations. Two new medium transfer stations are built as well.

- In variation B on the baseline, additional MRFs in North Glengarry and North Dundas are converted to transfer stations. Two new medium transfer stations are built as well.
- In variation C on the baseline, 11 total existing facilities are upgraded (1 small, 9 medium and 1 large).

## 3.2. Detailed Description of Each Option

### 3.2.1. Baseline

The Baseline for the Eastern Region (see Figure 2) contains 1 MRF and 5 transfer stations which handles 124,700 tonnes per year. The model indicates a total operating cost of \$12,508,300 per year at an average operating cost of \$100.32 per tonne. All facilities are new resulting in a total capital investment cost of \$38,911,000 and the shutdown or repurposing of 5 Public MRFs. Table 1 compares this scenario to others for the region.

In comparison, the Baseline under the High Growth for the Eastern Region (see Figure 3) contains 1 MRF and 5 transfer stations which handle 144,052 tonnes per year at a total gross operating cost of \$13,697,580 per year and an average operating cost of \$95.09 per tonne. Similar to the Natural Growth Scenario, all facilities are new resulting in a total capital investment cost of \$38,911,000 and the shutdown or repurposing of 5 Public MRFs. Table 4 compares this scenario to others for the region.

**Table 4: Baseline under High Growth**

	High Baseline	High Option 1	High Baseline C
<b>Wasteshed Tonnes</b>	144,100	159,300	144,100
<b># of TS</b>	5	6	11
<b># of MRFs</b>	1	2	1
<b># of Current MRFs-&gt; TS</b>	0	0	8
<b># of Current TS Upgrades</b>	0	0	1
<b># of public MRFs shutdown or repurposed</b>	5	6	0
<b># of public TS shutdown or repurposed</b>	0	0	0
<b>Total Capital Investment</b>	\$ 38,911,000	\$ 48,299,000	\$ 44,186,000
<b>Total Annual Operating Cost</b>	\$ 13,697,600	\$ 16,759,600	\$ 14,692,700
<b>Average Annual Operating/Tonnes</b>	\$ 95.09	\$ 105.20	\$ 102.00
<b>Relative Effect on Direct Haul % Diff. from Baseline</b>	6.9%	23.9%	-12.1%

### 3.2.2. Option 1

Option 1 for the Eastern Region (see Figure 4) contains 2 MRFs and 5 transfer stations which handle 137,800 tonnes per year. This option handles more tonnes than the baseline as it pulls material from the Quinte sub-region in the Central Region. The Kingston MRF is now closer to the Quinte region than the MRFs in the Central region. The model indicates a total operating cost of \$15,248,800 per year and an average operating cost of \$110.64 per tonne. All facilities are new resulting in a \$34,178,400 total capital

cost and the shutdown or repurposing of 6 Public MRFs. The effect on haul from collection routes to the aggregation points is an increase of 13.6% due to the extra material attracted from the Quinte area. Table 1 compares this scenario to others for the region.

Based on the significant processing and transfer cost increase of 10% resulting from adding the MRF in the Kingston area and without any obvious regional benefits in terms of redundancy because of the small size of the Kingston MRF, no further options were considered for this region. The variations were only considered for the Baseline, but similar cost differences can be assumed for Option 1 as well.

### **3.2.3. Baseline A**

Baseline A for the Eastern Region (see Figure 5) contains 1 MRF, 5 transfer stations and which handle 124,700 tonnes per year. The model indicates a total processing and transfer operating cost of \$12,446,900 per year at an average operating cost of \$99.83 per tonne. Existing MRFs in Ottawa Valley, Cornwall and Kingston were utilized as Transfer Stations (see Table 6). With the use of the existing Cornwall MRF as a transfer station, many of the end-of-route haul distances are lowered, which lowers the operating costs of transfer stations in the region since there are fewer tonnes going to Cornwall than the equivalent greenfield facility. Since this scenario uses 3 existing facilities, a conversion investment replaces new build prices, therefore the model shows a \$35,736,000 total capital cost and complete shutdown or repurposing of only 2 Public MRFs. Finally, there is a 3.2% decrease in the time for direct haul from collection routes or depots since the current facilities are closer to population centers than the Greenfield Aggregation Points. Table 1 compares this scenario to others for the region.

### **3.2.4. Baseline B**

Baseline B for the Eastern Region (see Figure 6) contains 1 MRF, 7 transfer stations which handle 124,700 tonnes per year. The model indicates a total processing and transfer operating cost of \$12,748,200 per year at an average operating cost of \$102.24 per tonne. Existing MRFs in North Dundas and North Glengarry were utilized as Transfer Stations in addition to those used in Baseline Variation A stations (see Table 6). This scenario uses all public facilities; therefore, two more transfer stations are added to the operating budget. This scenario uses 5 existing facilities, so a conversion investment replaces new build costs, resulting in a \$36,291,000 total capital investment cost. While the scenario has more transfer stations in operation than Variation A, it has the same capital cost since more of the transfer stations are conversions of existing facilities than greenfield facilities. Finally, the effect on haul from collection routes to the aggregation points is a decrease of 10.3% since the current facilities are closer to population centers than the Greenfield Aggregation Points. Table 1 compares this scenario to others for the region.

### **3.2.5. Baseline C**

Baseline C for the Eastern Region (see Figure 7) contains 1 MRF and 11 transfer stations which handle 124,700 tonnes per year. The model indicates a total processing and transfer operating cost of \$13,363,000 per year at an average operating cost of \$107.17 per tonne. All Existing MRFs and Transfer Stations (except for Metro Waste Recycling in Ottawa) are utilized as Transfer Stations (See Table 6 for full listing); therefore, 6 more transfer stations are added to the operating budget. Since this scenario uses 11 existing facilities, a conversion investment replaces new build prices; therefore the model shows a \$36,641,000 total capital investment cost, higher than Variation A and B because of a higher number of facilities. Finally, the effect on haul from collection routes to the aggregation points is a decrease of

20.6% since the current facilities are closer to population centers than the Greenfield Aggregation Points. Table 1 compares this scenario to others for the region.

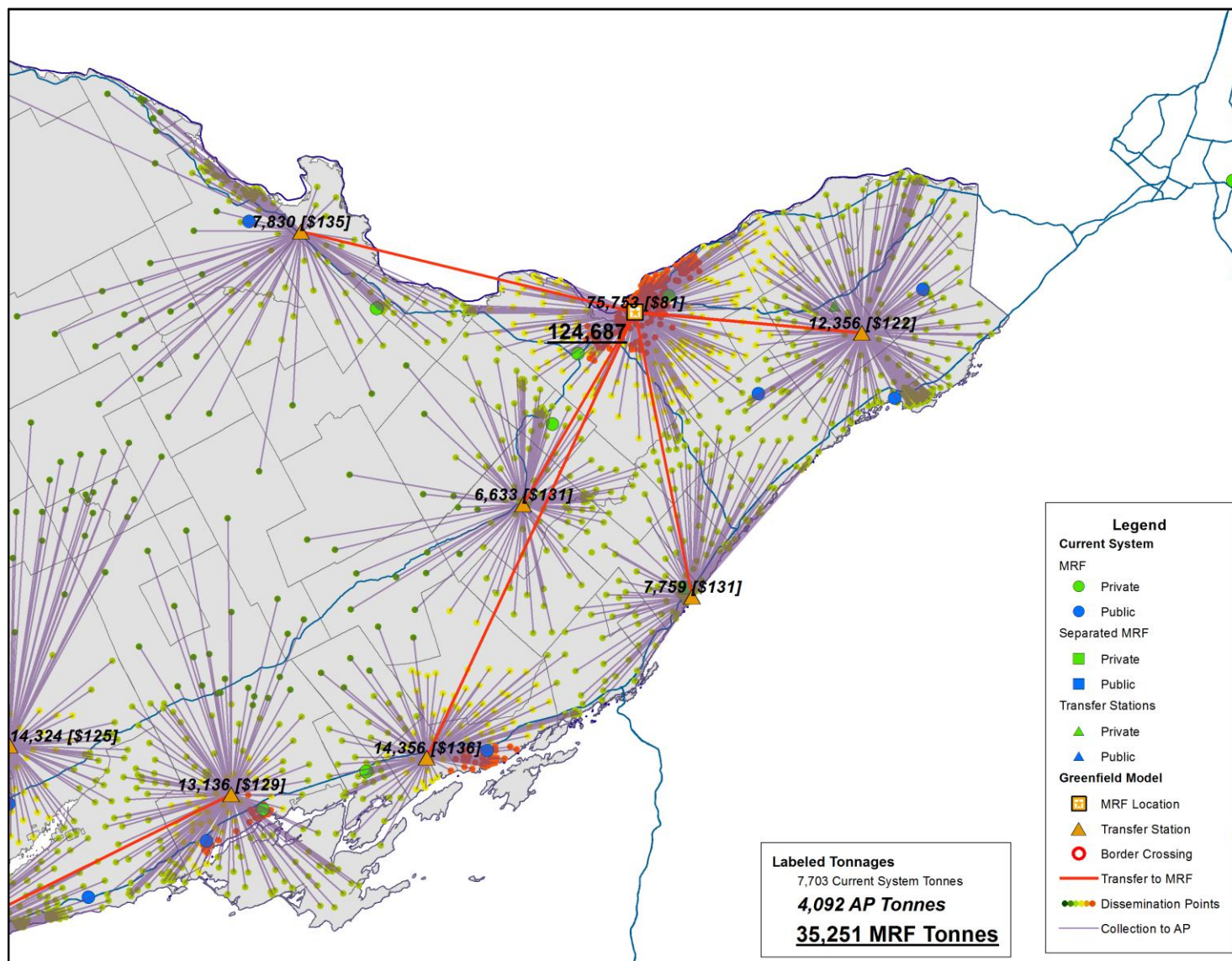
### **3.2.6. Seasonal Tonnes**

The effect of seasonal variation in the quantities of residential material recovered was based on seasonal households reported by municipalities and Stewardship Ontario data on seasonal per-household generation. Given these data and assumptions, the Eastern Region has only one aggregation point that has a significant percentage of seasonal homes. The aggregation point located in Perth may experience seasonal peaks increasing by up to 10%. This increases the average weekly tonnes from about 108 to 132 at the nearest aggregation point. However, this will not significantly affect the design of this transfer station and so the estimated capital cost for the conversion has not been adjusted.

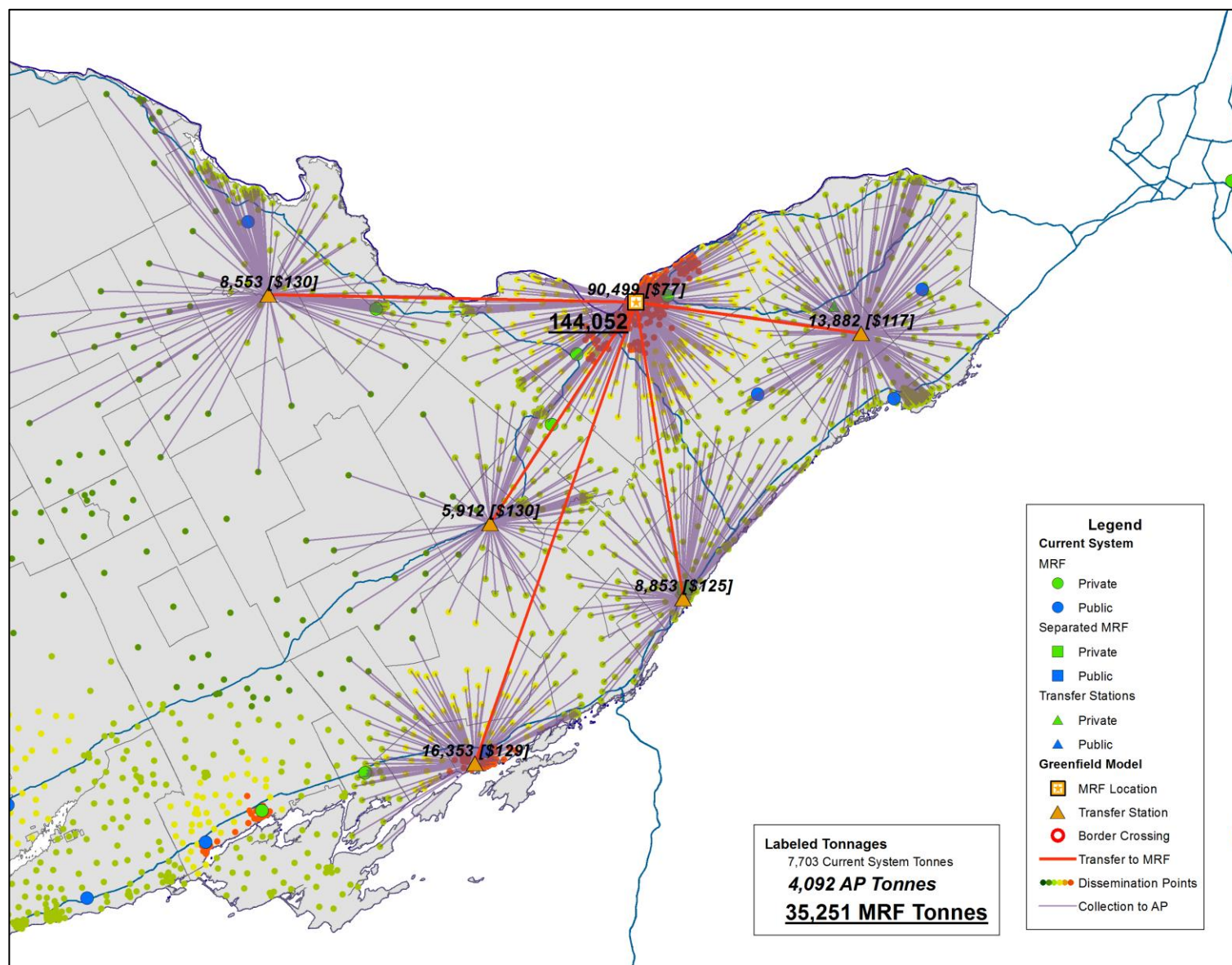
Further analysis of the local data will be required for actual design and sizing of all transfer facilities, noting that other areas also may experience seasonal variation in the quantities of residential material managed.



**Figure 2: Baseline for the Eastern Region**



**Figure 3: Baseline under the High Growth for the Eastern Region**





**Figure 4: Option 1 for the Eastern Region**

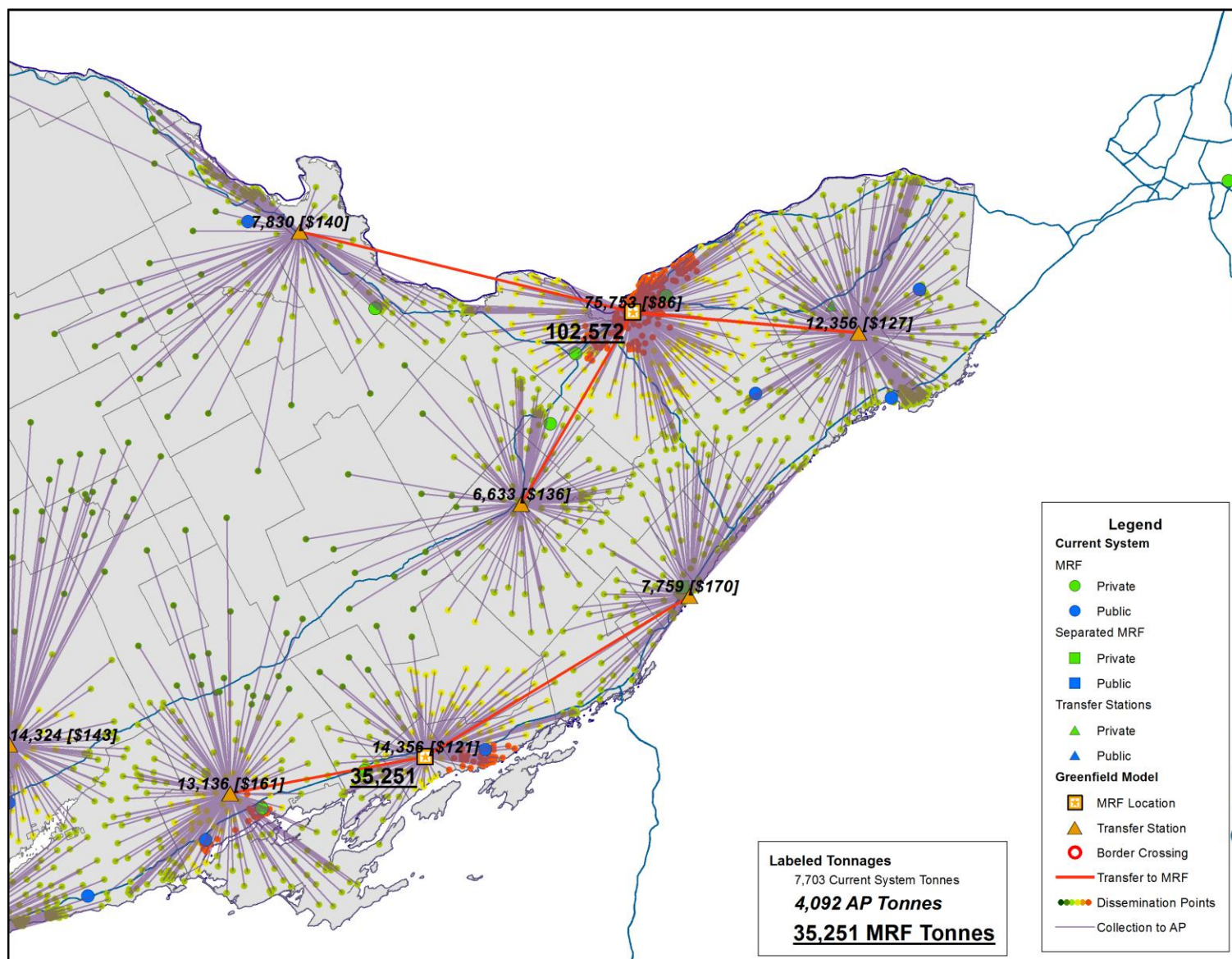


Figure 5: Baseline A for the Eastern Region

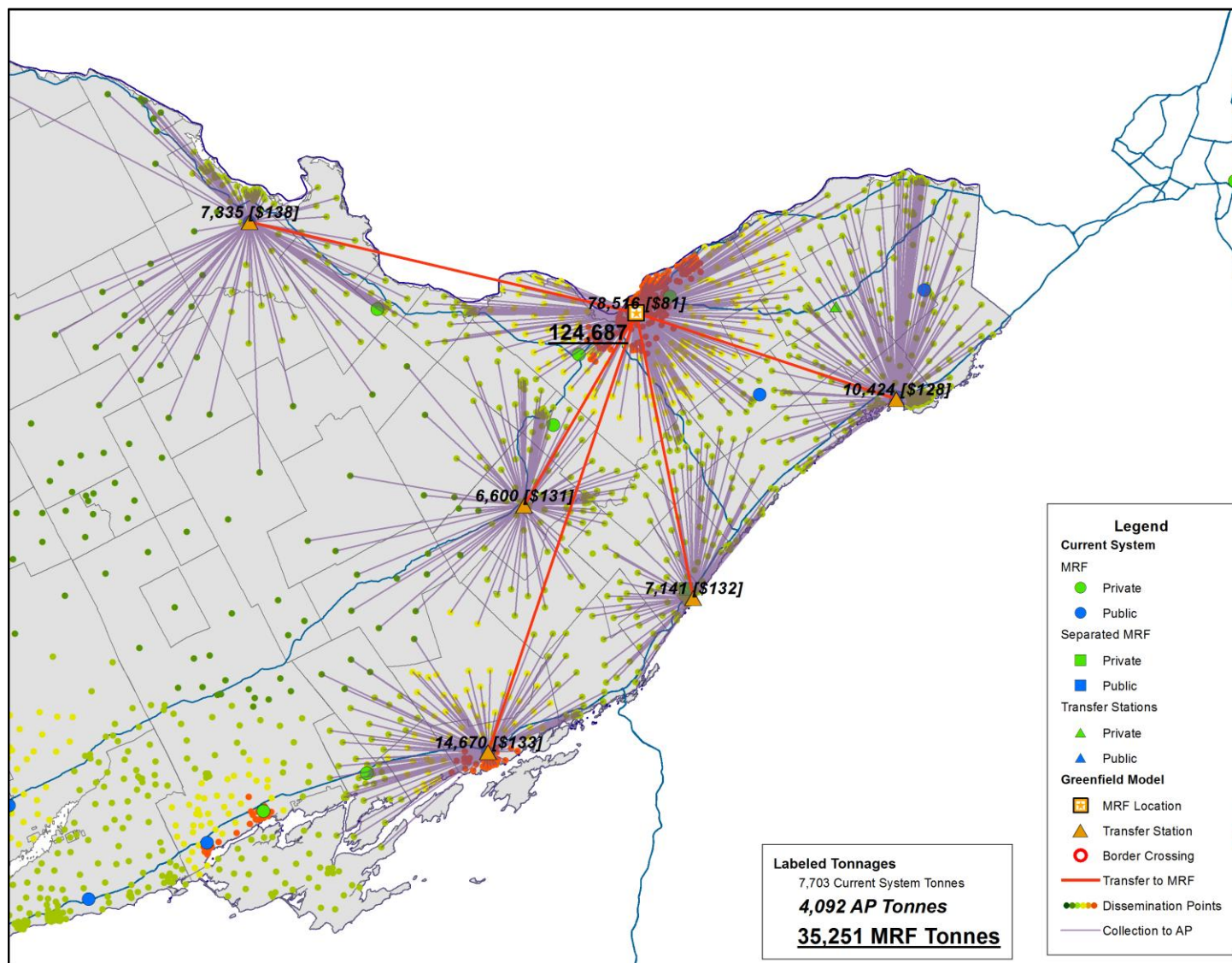




Figure 6: Baseline B for the Eastern Region

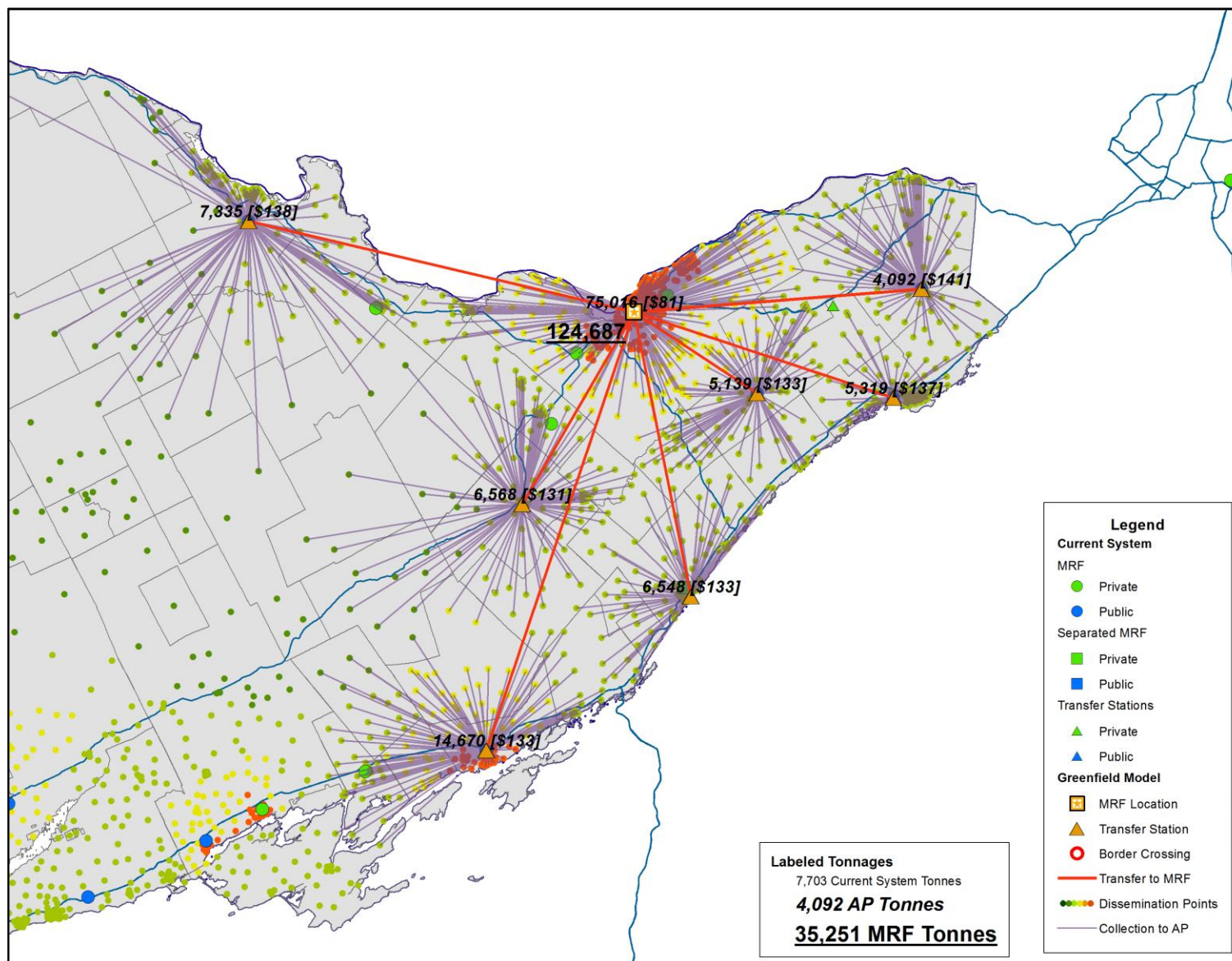
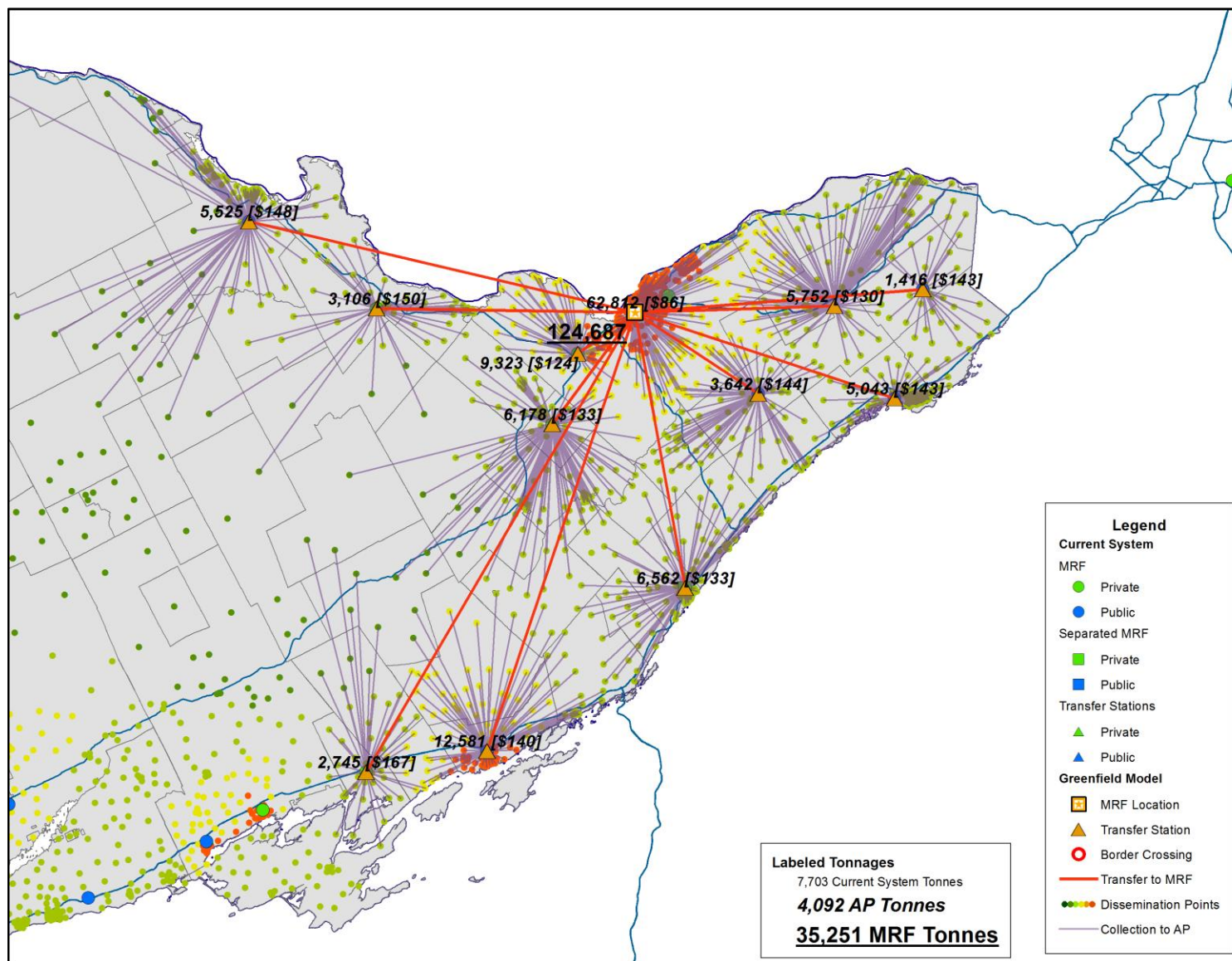




Figure 7: Baseline C for the Eastern Region



### 3.3. Eastern Ontario Conclusions

Conclusions that can be drawn from the analysis for the Eastern region are:

- Savings can be achieved in this region by reducing the number of MRFs from 12 down to 1 state-of-the-art MRF that would anchor the processing and transfer system
- In the Eastern Region, adding a second MRF in Kingston increases costs by 10% but may have some benefits for maintaining competition in the area
- In the Eastern Region, maximizing the use of existing facilities as transfer stations increases operating costs by 7% (higher than the other regions) but has minimal impact on capital costs
  - This is an exception to the general rule that the options with the lowest initial capital investment cost maximize the use of existing facilities and lower the impact on collection costs
  - This is because much of the capital saving typically comes from the use of existing municipal MRFs and no options consider using existing municipal MRFs in the Eastern Region

The optimized Eastern Region system is based on the baseline:

- Having a regional MRF in Ottawa is the recommended solution, and
- Using existing facilities as transfer stations (e.g. RARE and Cornwall) may further optimize the system by minimizing impact on direct haul costs (not quantified in this study) that may offset the 7% increase in operating costs for the processing system

Establishing Ottawa as the hub MRF location and then balancing direct haul costs and the proposed transfer station network cost will be key to moving towards an optimized system for the Eastern Region.

## 4. Transition Plans

Optimization of the Blue Box recycling processing system for the Province of Ontario will take time, require the collaboration of a wide range of stakeholders and decision makers incorporating trade-offs during implementation and be a process of continuous improvement that always looks forward as the material stream changes and technology improves.

The transition path from current facilities, operational arrangements, responsibilities and funding, to more optimized Blue Box recyclables processing will vary for each current municipal MRF and/or transfer station location and for each community that delivers Blue Box material to that location.

Transition plans have been prepared as part of this study to outline the process that these municipal MRF and/or transfer station locations and affected communities may want to move through as options for optimization of the Blue Box recycling processing system are considered and then implemented. The transition road maps are not intended for privately-owned MRFs or transfer stations. However, municipalities should consider contracting with private sector facilities where applicable.

Broadly speaking, the following types of transition plans have been developed, given the most common outcomes for each location:

- An existing municipal MRF will:
  - remain a MRF in current or upgraded form
  - convert to a transfer station
  - no longer have a role in the Blue Box system – to be repurposed or a stranded asset
- An existing municipal transfer station (TS) will:
  - remain a transfer station
  - no longer have a role in the Blue Box system – to be repurposed or a stranded asset

- A new greenfield MRF or TS in a new location may be required and some communities with no facilities or with facilities that will become stranded assets may need to sponsor development of or commit tonnage to that new greenfield MRF or TS

Communities that aren't directly sponsoring a MRF or TS in the new system (called in this report "direct haul communities") will need to choose the MRF or TS facilities to which they will deliver their Blue Box recyclables, i.e. existing municipal facilities, new greenfield facilities or existing private sector facilities. Many factors will drive the process of actual transition for each current municipal MRF and/or transfer station location and its affected communities, some of which will be within the control of the stakeholders and decision makers involved in the process and some of which will not be.

Consider the following factors that will not be able to be controlled:

- Overall structure of the Blue Box system as determined by provincial law
- System funding structure - partial producer responsibility with reimbursement or shift to 100% producer responsibility with greater control
- Status of the location's CoFA – does it allow change to take on a new role
- Private MRFs, existing or new, that may offer viable alternatives
- Timing of decision-making in transition plans for other municipal facilities that may affect your facility and community and your transition process
- Availability of funding from CIF or equivalent future program
- Realities of underlying costs that affect optimization and have been taken into account in this study (fuel costs, direct haul times, transfer costs and distances, MRF operating costs, economies of scale, available technology, etc.)

The best transition process will take into account these realities while integrating the many factors that are in the control of stakeholders and decision makers, including:

- Timing – how soon will the community begin the transition planning process for their facility
- Speed – how quickly will the community move through the transition planning process
- Supply – currently the communities that supply the facility choose where to take their material and are responsible for all arrangements for that delivery
- Cost Share – currently the facility's costs are partially covered by municipal partners
- Vision and Goals – the facility and affected communities must develop their own vision and goals for optimizing their Blue Box system, given the realities presented above, and make choices that best represent their interests and the larger mission.

The transition plans presented in this section for the Eastern Region are designed to build in consideration of these factors. A variety of decision support tools are suggested in order to facilitate the process of both developing and implementing transition plans towards a more optimized Blue Box system for your region.

Some of these tools have already been provided as part of this body of work, including:

- The Blue Box processing optimization model: This CIF-funded study has resulted in the development of a GIS (Geographical Information System) decision support tool. The tool incorporates and analyzes data on the physical realities of your facility and affected communities (location of the households in each community, direct haul times from those locations, transportation routes and time/cost to transport, operating costs for transfer and processing, etc.). This tool is available to support your transition planning process as final solutions for optimization are being considered.

- The preliminary cost assumptions developed with the model: The CIF funded the development of cost data for transfer of recyclables across the province and for processing of recyclables into market ready commodities – cost information that can inform decision making as you move forward in your transition planning process.
- The preliminary options developed with the model: The CIF funded the use of the model to evaluate and present the most promising optimized solutions for each region, each municipal facility and each community – using the best information available to the study team at that time.

This section and Volume 8 include the following additional decision support tools:

- **Decision Tree for Each Municipal Facility and Greenfield Location:** Decision trees have been prepared for the situation of each location and its affected communities that describe a process for sifting through the preliminary options developed with the model and presented in this study. These decision trees identify “go/no-go” decision points at key stages in the process, given the specific options available to that location in an optimized system.
- **“Go/No-Go” Decision Support Tools:** At each of these “go/no-go” decision points the transition plans identify decision support tools and processes that can be used to move through that decision point.

#### 4.1. Transition Plan Summary - Decision Trees and Lookup Tables

Each regional transition plan summary has a set of “lookup tables” that allow each municipal and greenfield facility and affected communities to determine how they fit into the baseline scenario or the options that vary from baseline for that particular region.

These lookup tables help guide each municipal facility or community as it undertakes the process of moving through a series of the “decision trees” that have “go/no-go” decision points for determining the most favourable outcome for their role in an optimized Blue Box recycling processing system.

The lookup tables help the municipal facility or community identify:

- What role it might play in a regional hub and spoke system – as a “hub” MRF, a “spoke” transfer station, or a feeder “direct haul” supply of Blue Box recyclables.
- How these roles might vary under the different options that are under consideration in a region.
- What key drivers will push the decision-making timeline in the hub and spoke system that they may be part of – contract expiration dates for existing MRF arrangements as an example.
- How greenfield MRF or TS development or private merchant capacity might be a factor in the hub and spoke systems they are potentially involved in.

The lookup tables then link with specific decision trees that are matched to that facility or communities’ unique circumstances. These decision trees link, guiding the process in the right direction based on the “go/no-go” decisions that are made by the affected parties.

This series of decision trees move the user through key questions. Are they direct haul only? Do they operate a MRF? Do they operate a transfer station?

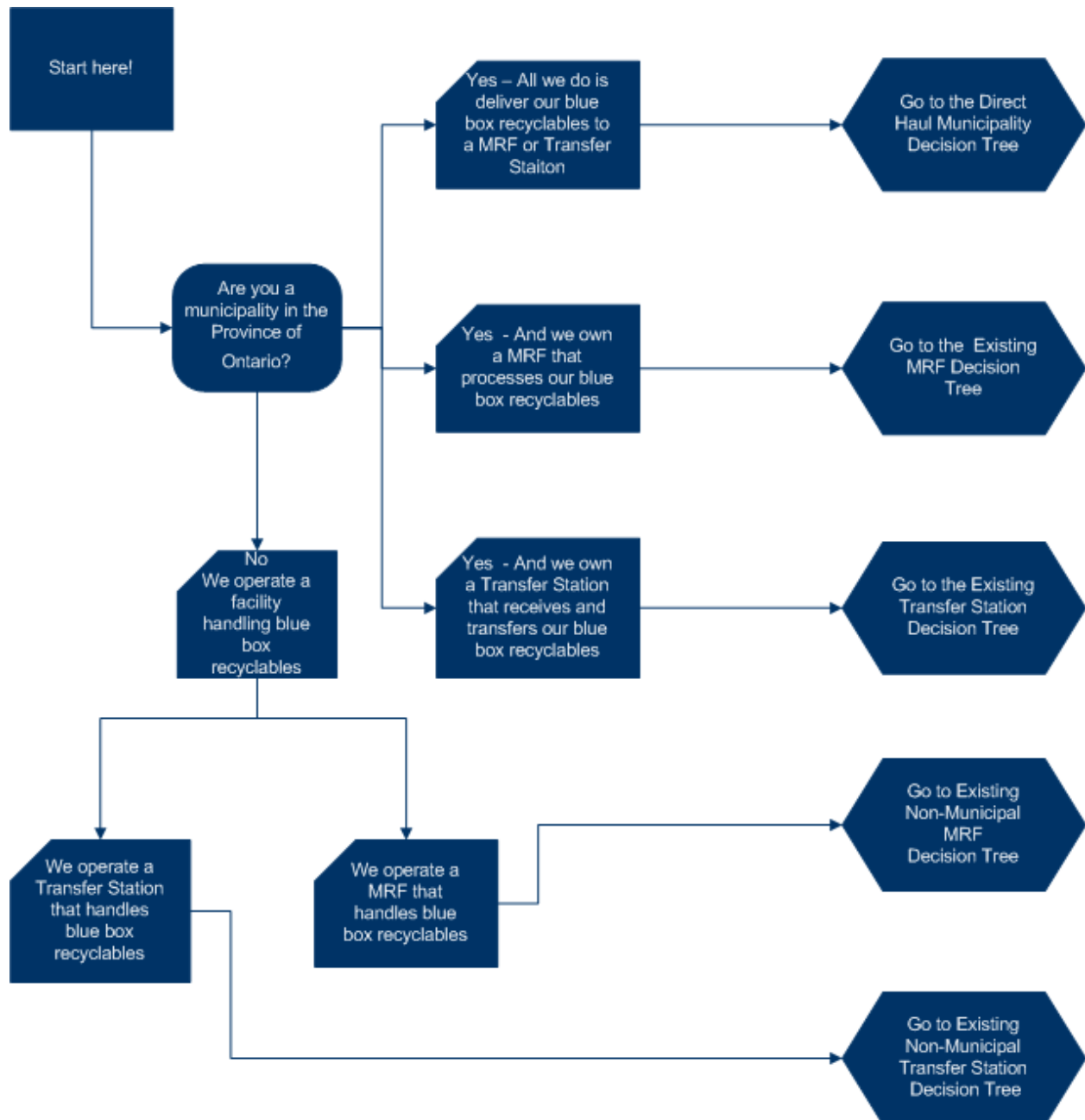
The decision tree then directs the user to the next sequential decision tree. For example:

- A direct haul only community would move to the “Direct Haul Municipality” decision tree that would then provide a road map for the steps and go/no-go decisions applicable to that situation.

- A municipality that operates a MRF would move to the “Existing MRF” decision tree with steps to evaluate its role as either an upgraded MRF, a complete rebuild MRF, a transfer station conversion or no role, i.e. a stranded asset.

These decision trees guide the transition plan for each facility and community and they are iterative. For example, a community with a MRF that will become a stranded asset then becomes a “Direct Haul Municipality” and then moves through that decision tree process.

**Figure 8: Moving Through Your Transition Plan for an Optimized Blue Box Processing System**





There are decision trees for every type of situation and outcome anticipated by the Blue Box processing optimization model.

- Direct Haul Municipality decision trees anticipate their delivery to either an existing or proposed MRF or transfer station, the potential to host a new greenfield MRF or transfer station and the possibility that private merchant capacity or a solid waste authority's capacity may be utilized.
- Existing MRF decision trees anticipate outcomes that include marketing of excess capacity, a major MRF upgrade, a complete MRF rebuild, conversion to a transfer station or the outcome of no role – repurpose or a stranded asset.
- Existing TS decision trees similarly anticipate marketing of excess capacity, a major upgrade, a complete rebuild, or the outcome of no role, i.e. repurpose or a stranded asset.
- New greenfield MRFs or Transfer Stations are accommodated.
- The potential interest of private merchant or other non-municipal (e.g. solid waste authority) capacity is anticipated in the process as well.

The Blue Box processing optimization model informs the transition planning process, as shown in each decision tree. The study results or new runs of the model identify roles and evaluates new variations as they surface. For example:

- Evaluation of an existing site location takes into account site constraints that could include CofA compliance questions, possibility of a successful CofA amendment, or the potential for an alternative site if CofA or other site issues cannot be resolved.
- A technical plan for the proposed project (upgrade, conversion to TS, etc.) is developed and the underlying business case justification is formulated – essentially that next level of technical and cost analysis needed to move forward.
- Negotiations with users, the municipalities whose recyclables (direct haul or transfer) will provide the necessary baseload of materials to allow the project to be financed and thus developed.
- The final stages of go/no-go decision-making as the project is coming together, all supply sources commit, the CofA is amended if required and financing, design, build and operation is authorized.
- Private merchant capacity options are considered.

Details on each type of decision tree, including the different components described above are provided in Volume 8.

## 4.2. Optimized Processing in the Eastern Region

Moving to a more optimized Blue Box processing system in the Eastern Region will require focused effort by the following stakeholders over a long period of time:

- The CIF, or similar champion, will need to provide leadership, direction and resources in the optimization process.
- The Hub MRF(s) and its host communities or sponsoring agencies will need to take responsibility for development of this key component of the optimized hub and spoke system.
- The Spoke Transfer Stations and their host communities or sponsoring agencies will need to take responsibility for development of these key aggregation points in the optimized hub and spoke system.
- The Direct Haul communities will need to take responsibility for any changes in their delivery locations for their Blue Box recyclables in the optimized hub and spoke system.

- All existing locations servicing the current Blue Box processing system will need to transition their facilities to new functions under the optimized hub and spoke system.

The length of time for the transition period to be completed cannot be predicted with any certainty. It could move quicker than anticipated with good coordination, appropriate resources, strong commitment on the part of all stakeholders and perseverance to surmount the many obstacles that will arise. It also could take much longer than needed if good coordination is not provided, if the resources are not available, and if obstacles and other conflicting demands for attention of key stakeholders distract from the goal of moving toward an optimized Blue Box processing system.

#### 4.2.1. Eastern Region Lookup Tables

The results of the optimization model for the Eastern Region presented in this volume provide a robust set of opportunities to achieve optimization. Table 5 identifies the Hub MRFs, development of which will be central to the success of an optimized Blue Box processing system for the region. Both the Baseline and Option 1 scenarios include the greenfield Ottawa Hub MRF. Option 1 includes the additional Kingston Hub MRF.

**Table 5: Lookup Table for Hub MRFs**

Facility	City	Province	Baseline	Option 1
<b>Hub MRF</b>	Ottawa	ON	MRF	MRF
<b>Hub MRF</b>	Kingston	ON		MRF

Table 6 shows the transition of existing locations to transfer station functions in the Baseline A, B and C scenarios. None of these facilities are suggested as locations for the Hub MRFs, but nearly all have potential under at least one scenario for a transfer station role in the optimized system.

**Table 6: Lookup Table for Role in Optimized Processing System for Current System Locations**

Facility Owner - East	City	Province	Current Tonnes	Baseline A	Baseline B	Baseline C
<b>Beaumen's Waste Management</b>	Renfrew	ON	2,812.0			TS
<b>Cornwall, City of</b>	Cornwall	ON	3,907.6	TS	TS	TS
<b>Kingston, City of</b>	Kingston	ON	10,817.6	TS	TS	TS
<b>Manco</b>	Napanee	ON	1,643.6			TS
<b>Metro Waste Recycling</b>	Ottawa	ON	64,072.9			
<b>North Glengarry, Township of</b>	Alexandria	ON	4,153.7	TS	TS	TS
<b>North Dundas, Township of</b>	Winchester	ON	507.3		TS	TS
<b>Ottawa Valley Waste Recovery Centre</b>	Pembroke	ON	4,696.2	TS	TS	TS
<b>Tomlinson Environmental Services</b>	Ottawa	ON	2,213.5			TS
<b>Waste Management of Canada</b>	Beckwith	ON	7,703.2			TS
<b>Waste Management of Canada</b>	Brockville	ON	4,204.2			TS
<b>TS - Moose Creek Landfill - Matrec</b>	Moose Creek	ON	2,755.2			TS

Direct haul communities that do not have existing facilities can use Table 9 to determine which transfer stations and or Hub MRFs are potential delivery points for their Blue Box recyclables under the various options.

#### **4.2.2. Transition Plan Considerations**

As these locations and municipalities move through the transition process of evaluating the future of their facility or the destination for their material in the optimized system they will need guidance in two forms:

- **Leadership and Direction:** We recommend that influential players such as WDO, AMO and Stewardship Ontario work with the government and other stakeholder forums such as the Regional Public Works Commissioners of Ontario (RPWCO) to support and mandate the CIF, or similar champion to take steps to promote and guide the transition process in the Eastern Region. These steps are outlined below.
- **Work Plan:** The sequence of steps in the specific transition plans for each of the above locations and municipalities is rooted in the Decision Tree based transition planning process overview provided in section 4 above – further outlined for each key stakeholder group below.

#### **Leadership**

In order to achieve progress toward an optimized hub and spoke system in the current regulatory context, it is essential that the CIF, or similar champion, be supported and mandated to continue to press forward with region-wide review, discussion and tweaking of the initial results of the optimization model for the Eastern Region. This would require resources and could be accomplished using the CIF staff with technical support to implement decision tree processes and actively use the dynamic GIS hub and spoke model. There are a number of key process outcomes that these leadership activities should include:

- **Individual consultation:** Providing one-on-one review of location specific recommendations
- **Dialogue opportunities:** Most easily achieved by hosting regional optimization summits
- **Updated modelling:** Putting additional analysis together to address remaining issues
- **Transition plan technical and process support:** Helping locations through their transition plans
- **Seed capital resources:** Funding a portion of key investments to seed system development

In the Eastern Region, it is clear that development of the greenfield Ottawa Hub MRF is key to progress in moving towards an optimized hub and spoke Blue Box processing system.

#### **Hub MRF Development**

Towards that end, the Greenfield Hub MRF Decision Tree is the most critical transition plan process that must move forward. A key precedent step will be Ottawa moving through its Direct Haul Municipality Decision Tree to determine if Ottawa, as a potential host community/sponsoring agency, may be in a position to engage with CIF or some other agency in providing regional leadership in development of the Ottawa Hub MRF.

Since Ottawa's contract for processing is due in May of 2013, this presents a unique and critical window of opportunity for the regional plan. Similarly, the Kingston processing contract is due to be re-negotiated in 2012 and this presents an important opportunity to move toward an optimized system.

## **Spoke Transfer Station Development**

The Spoke Transfer Stations for the Eastern Region under each option are driven by existing locations that need to move through transition plans guided by the Transfer Station Conversion for Existing MRF Decision Trees. Some existing locations will need to move through transition plans guided by the Stranded Asset for Existing MRFs Decision Trees. As shown in the Greenfield Hub MRF Decision Tree, the timing of these will need to be coordinated with key stages in the Hub MRF development process such that commitments of tonnage can be made by way of letters of intent followed by long-term intergovernmental agreements – all typically necessary for a “go” decision on the design, build and operation steps for the Hub MRF. The tipping fee price points shown in the optimization model results for the Eastern Region are key decision factors that will strongly influence both Hub MRF and Transfer Station development and their potential to find a win/win agreement needed for Hub MRF development.

## **Direct Haul Supply Development**

The Direct Haul communities are a key for each transfer station and its development path, and thus the development path for the Hub MRF. Their supply commitment will be critical to this sequence of facility development. Again, coordination of these steps with reference to Table 7 is key to the success of this process.

### **4.2.3. Key Drivers, Timing and Phasing**

The WDO has compiled data on contract start and end dates and currently is verifying the data reported by the municipalities. This will be an important tool for the planning and phasing of the transition. According to the data available, contracts come due for nine municipalities in the Eastern Region in 2013, another 8 in 2014. Specifically, Ottawa’s processing contract comes due in May of 2013, and this presents one of the most critical and unique windows of opportunity. It will be important to coordinate with many of the other municipalities whose contracts are up for renewal during this period. The contract for Kingston may have been negotiated in 2012, which will be another important consideration in the development of the transition plan for the Eastern Region.

**Table 7: Direct Haul Lookup Table**

Program	Direct Haul Facility Type	Region	Hub MRF	Multiple Regions	Baseline	Option 1
Brockville	TS	E	Ottawa	No	X	
	TS	E	Kingston	No		X
Quinte West	TS	E	Kingston	C/E		X
Leeds and the Thousand Islands	TS	E	Ottawa	C/E	X	
	MRF/TS	E	Kingston	C/E		X
Rideau Lakes	TS	E	Ottawa	No	X	X
Cornwall	TS	E	Ottawa	No	X	X
Akwesasne, Mohawk Council of	TS	E	Ottawa	No	X	X
Billings	TS	E	Ottawa	No	X	X
Elizabethtown-Kitley	TS	E	Ottawa	No	X	
	TS	E	Kingston	No		X
Prescott	TS	E	Ottawa	C/E	X	
	TS	E	Kingston	C/E		X
Front of Yonge	TS	E	Ottawa	No	X	
	TS	E	Kingston	No		X
North Grenville	MRF/TS	E	Ottawa	No	X	X
	TS	E	Kingston	No		X
Ottawa Valley Waste Recovery	TS	E	Ottawa	No	X	X
Hawkesbury Joint Recycling	TS	E	Ottawa	No	X	X
North Glengarry	TS	E	Ottawa	No	X	X
Gananoque	TS	E	Ottawa	C/E	X	
	MRF	E	Kingston	C/E		X



Program	Direct Haul Facility Type	Region	Hub MRF	Multiple Regions	Baseline	Option 1
Frontenac Islands	TS	E	Ottawa	C/E	X	
	MRF	E	Kingston	C/E		X
Augusta	TS	E	Ottawa	No	X	
	MRF	E	Kingston	No		X
Athens	TS	E	Ottawa	No	X	
	MRF	E	Kingston	No		X
Merrickville-Wolford	TS	E	Ottawa	No	X	X
	TS	E	Kingston	No		X
North Stormont	TS	E	Ottawa	No	X	X
Russell	MRF/TS	E	Ottawa	No	X	X
South Frontenac	TS	E	Ottawa	C/E	X	X
	MRF	E	Kingston	C/E		X
South Stormont	TS	E	Ottawa	No	X	X
North Dundas	TS	E	Ottawa	No	X	X
	TS	E	Kingston	No		X
Kingston	TS	E	Ottawa	C/E	X	
	MRF	E	Kingston	C/E		X
Whitewater Region	TS	E	Ottawa	No	X	X
Stone Mills	TS	E	Ottawa	C/E	X	
	MRF	E	Kingston	C/E		X
Clarence-Rockland	MRF/TS	E	Ottawa	No	X	X
The Nation	TS	E	Ottawa	No	X	X
Greater Napanee	TS	E	Ottawa	C/E	X	
	MRF	E	Kingston	C/E		X

Program	Direct Haul Facility Type	Region	Hub MRF	Multiple Regions	Baseline	Option 1
Brudenell, Lyndoch and Raglan	TS	E	Ottawa	No	X	X
Edwardsburgh/Cardinal	TS	E	Ottawa	No	X	
	TS	E	Kingston	No		X
Ottawa	MRF/TS	E	Ottawa	No	X	X
South Glengarry	TS	E	Ottawa	No	X	X
South Dundas	TS	E	Ottawa	No	X	X
	TS	E	Kingston	No		X
Tay Valley	TS	E	Ottawa	No	X	X
Lanark Highlands	TS	E	Ottawa	No	X	X
Addington Highlands	TS	E	Ottawa	C/E	X	X
	TS	E	Kingston	C/E		X
Admaston/Bromley	TS	E	Ottawa	No	X	X
Arnprior	MRF	E	Ottawa	No	X	X
Greater Madawaska	TS	E	Ottawa	No	X	X
Bonnechere Valley	TS	E	Ottawa	No	X	X
Hastings Highlands	TS	E	Ottawa	C/E	X	X
Horton	TS	E	Ottawa	No	X	X
Killaloe, Hagarty and Richards	TS	E	Ottawa	No	X	X
McNab/Braeside	MRF/TS	E	Ottawa	No	X	X
Renfrew	TS	E	Ottawa	No	X	X
Madawaska Valley	TS	E	Ottawa	No	X	X
Alfred and Plantagenet	TS	E	Ottawa	No	X	X
Central Frontenac	TS	E	Ottawa	C/E	X	X
	MRF	E	Kingston	C/E		X

Program	Direct Haul Facility Type	Region	Hub MRF	Multiple Regions	Baseline	Option 1
North Frontenac	TS	E	Ottawa	No	X	X
Beckwith	TS	E	Ottawa	No	X	X
Carleton Place	TS	E	Ottawa	No	X	X
Casselman	TS	E	Ottawa	No	X	X
Laurentian Hills	TS	E	Ottawa	No	X	X
Deseronto	TS	E	Ottawa	C/E	X	
	MRF	E	Kingston	C/E		X
Drummond/North Elmsey	TS	E	Ottawa	No	X	X
Head, Clara and Maria	TS	E	Ottawa	No	X	X
Mississippi Mills	MRF/TS	E	Ottawa	No	X	X
Montague	TS	E	Ottawa	No	X	X
Perth	TS	E	Ottawa	No	X	X
Smiths Falls	TS	E	Ottawa	No	X	X
Deep River	TS	E	Ottawa	No	X	X
Kingston	TS	E	Ottawa	C/E	X	
	MRF	E	Kingston	C/E		X
Algonquins of Pikwakanagan	TS	E	Ottawa	No	X	X
Mohawks of the Bay of Quinte	TS	E	Kingston	C/E		X
Wollaston	TS	E	Ottawa	C/E	X	X