TORONTO

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NOTE REGARDING NEXT STEPS AND IMPLEMENTATION

This Service Efficiency Study provides advice and recommendations to the City Manager and was conducted in consultation with the Division. The Study identifies actions and directions that could result in more efficient and effective service delivery, organizational and operational arrangements and associated savings.

The City Manager will work closely with senior management to determine which of the actions are feasible and can be implemented, implementation methods and timeframe and estimated savings. In some cases, further study may be required; in other cases the actions may not be deemed feasible. Implementation will be conducted using various methods and may be reported through annual operating budget processes or in a report to Council or an applicable Board, where specific authorities are necessary. In all cases, implementation will comply with collective agreements, human resource policies and legal obligations.

Preliminary estimated savings have been identified in the study by year where possible. In some cases savings have been included in the 2012 budget submission. Achievement of these savings is highly dependent on the viability of these actions as determined by senior management, timeframes, and other implementation considerations.

ADVICE AND RECOMMENDATIONS TO CITY MANAGER

City of Toronto
Solid Waste Management Services Division
Service Efficiency Study

Final Report to City Manager

September 12, 2011

Ernst & Young
Quality In Everything We Do

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Executive Summary

Executive Summary
Introduction

- In July 2011, Ernst & Young LLP ("E&Y") was selected by the City of Toronto (the "City") (reporting to the City Manager through the Strategic and Corporate Policy Division) to conduct a service efficiency study of the Solid Waste Management Services Division (the "SWMS Division" or the "Division").
- E&Y has prepared this report (the "Report") pursuant to our engagement letter dated July 21, 2011 with the City of Toronto (the "Engagement Letter"). This Report provides the City Manager with our assessment for his consideration based on the information received and discussions held as of the date of this Report.
- In preparing this Report, E&Y has been provided with and, in making comments herein, has relied upon unaudited financial information and projections prepared by the City and discussions with management of the SWMS Division. E&Y has not audited, reviewed or otherwise attempted to verify the accuracy or completeness of such information and, accordingly, E&Y expresses no opinion or other form of assurance in respect of such information contained in this Report. Some of the information referred to in this Report consists of forecasts and projections. An examination or review of the financial forecast and projections, as outlined in the Canadian Institute of Chartered Accountants Handbook, has not been performed. Readers are cautioned that, since these projections are based upon assumptions about future events and conditions, the actual results will vary from the projections, even if the assumptions materialize, and the variations could be significant.

Executive Summary
Scope

- The scope of this Report was limited by the extent of the analysis which could be completed during the six week timeline allowed for this engagement, as well as the areas which were included in the scope of the service efficiency study. The scope of this engagement included:
  - A study to identify efficiency savings within the following areas:
    1. Solid Waste Collection
       a) Curbside in Districts 2, 3, 4
       b) Small Commercial Waste collection
       c) Multi-Residential collection
       d) Litter collection
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       f) Customer drop-off
       g) Community Environment Days
       h) Bins and tags
       i) Parks
    2. Transfer Station operations
       a) Receiving (all types of waste) and transport
    3. Processing and Disposal
       a) Processing (Source-Separated Organics, (SSO), Single-Stream Recycled Material (SSRM), Yard Waste)
       b) Green Lane and Former Landfill Site Care
  - Assess SWMS Division's own analysis of:
    - Four free tags
    - Overflow recycling
    - Environment Days
    - Charities, Institutions & Religious Organizations
    - Drop and Load

Deliverables

1. Efficiency Assessment
   - Assessment of targeted areas
   - Address particular areas of focus (validation)
2. Implementation recommendations
   - Stated in terms of
     - Cost-savings
     - Direct Service implications
     - Division resource need implications; and/or
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- As part of the scope of this engagement, the City has advised E&Y as follows:
  - (i) Any service efficiencies or cost savings identified must not negatively impact services / benefits to the residents of the City. As a result, no services efficiencies were assessed if they could negatively affect services to City residents.
  - (ii) Certain areas were also identified by the City as being specifically out of scope for this engagement:
    - Service efficiency study of contractor-provided operations (District 1 single family curbside collection, material recovery facilities, etc.)
    - Reuse centre pilot program, Toxic Taxi
    - Fleet-related operations
    - Analysis or quantification of potential future user fees
    - Analysis of efficiency ideas, whose implementation was already underway by City staff

- This Report identifies a number of areas which may result in potential savings as well as service efficiencies, but further study should be undertaken to not only refine this analysis but to determine if further cost efficiencies could be realized.

Executive Summary
Overview of Operations

- The City is currently divided into 4 collection areas (Districts 1 to 4):
  - District 1: currently under contract with Turtle Island
  - District 2: a tender has been issued for private contractors to provide collection services
  - District 3 & 4: represent the areas of the City east of Yonge Street serviced by the City

- The SWMS Division incorporates all services related to garbage collection and disposal in the City including:
  - Curb side collection from residents and City containers
  - Street cleaning – bag and broom as well as vacuum trucks
  - Transfer station operations
  - Sorting and disposal
  - Processing of recyclable materials, organic waste and yard waste
  - Operations of the Green Lane disposal site
- Any service efficiencies and/or cost savings in this report with respect to the SWMS Division may be subject to collective agreement obligations.

Executive Summary
Summary of Findings

- This report details net financial improvements in two categories:

Category	Cost Reduction or Revenue Gain
Service efficiency opportunities	$7.1 million
Areas identified by SWMS Division and assessed by E&Y	$3.8 million
Total	**$10.9 million**

- The summary of the improvements identified for each these categories are described in the tables below:

Summary of Opportunities Identified

- The following service efficiency opportunities were identified by E&Y as part of our analysis:

Ref ID	Service Efficiency Opportunity	Phase	Est. Timeline to Complete	Potential benefit	Complexity	Page #
C-01	The working day for collection staff is materially shortened due to an incentive program; slightly lengthening routes, while maintaining the incentive program would result in savings in labour and equipment wear	2	9-12 months	$ 4.4M	Medium	31
C-05	Number of supervisors should be reduced in District 2	1	2 months	$ 0.2M	Low	33
C-11	Efficiency gains could be achieved by more fully loading trucks before unloading at transfer stations	2	3 months	$ 0.8M	Medium	34
X-01	Transfer station unloading (City Collection) should be controlled and thereby rebalanced to minimize line-ups at peak times and allow daytime collection trucks to unload faster	2	3 months	$ 0.3M	Medium	37
X-04	Unloading times could be improved at certain transfer stations	3	12- 15 months	$ 0.6M	High	40
P-04	A span of control analysis reveals opportunities to consolidate responsibilities among fewer management staff	1	2 months	$ 0.8M	Medium	42
				$ 7.1M		

Summary of Opportunities Identified

- The following opportunities were identified by the SWMS Division and assessed by E&Y:

Ref ID	SWMS Division Studies	Phase	Est. Timeline to Complete	Potential benefit	Complexity	Page #
VS-01	Discontinuing the practice of allowing four free tags for garbage in excess of residents' chosen garbage bin size	n/a	6 months	$ 0.9M	Low	46
VS-02	Discontinuing the practice of allowing occasional overflow recycling to be set out in clear plastic bags (undermines the automated collection method)	n/a	6 months	$ 0.5M	Medium	50
VS-03	Discontinuing the Environment Days (many services are now available through formal programs, operations, depots, or pick-up for example)	n/a	6 months	$ 0.5M	Low	52
VS-04	Pursuing additional revenue generation through a fee-for-service charge to Charities, Institutions, and Religious Organizations (CIROs) currently exempt from the volume-based waste rate system	n/a	6 months	$ 1.7M	Low	56
VS-05	Additional revenue may be achieved through a review of the drop & load service including the fee charged and strategies to increase this revenue opportunity	n/a	6 months	$ 0.2M	Medium	61
				$ 3.8M		

The opportunities identified in the executive summary are described in greater detail later in this Report. These opportunities represent the result of the analysis which E&Y was able to complete in accordance with the scope of this engagement as well as the timeline for this engagement. We have also noted later in this Report, other items for possible study and areas of study which were specifically excluded from this engagement but which we believe warrant further study as potential areas for additional savings and service efficiencies. The opportunities noted herein have been identified for the City Manager's review and consideration.

Grouping of Opportunities by Phase

Phase	Focus	# of initiatives	Phase Duration	Service efficiencies – Collections	Service efficiencies – Others	Total
1	Initiatives that are expected to be quick/easy to implement yet deliver quantifiable benefits	2	2 months	$0.2M	$0.8M	$1.0M
2	Initiatives that target improvement to operational efficiencies within collections	3	9 to 12 months	$5.2M	$0.3M	$5.5M
3	Initiatives that target continuous improvement within City of Toronto Solid Waste Management to transfer the organization into an industry leader	1	24 to 27 months+	—	$0.6M	$0.6M
Total*				**$5.4M**	**$1.7M**	**$7.1M**

Phase 1 Initiatives: Initiatives include reducing the number of supervisors and balancing the span of control across the organization

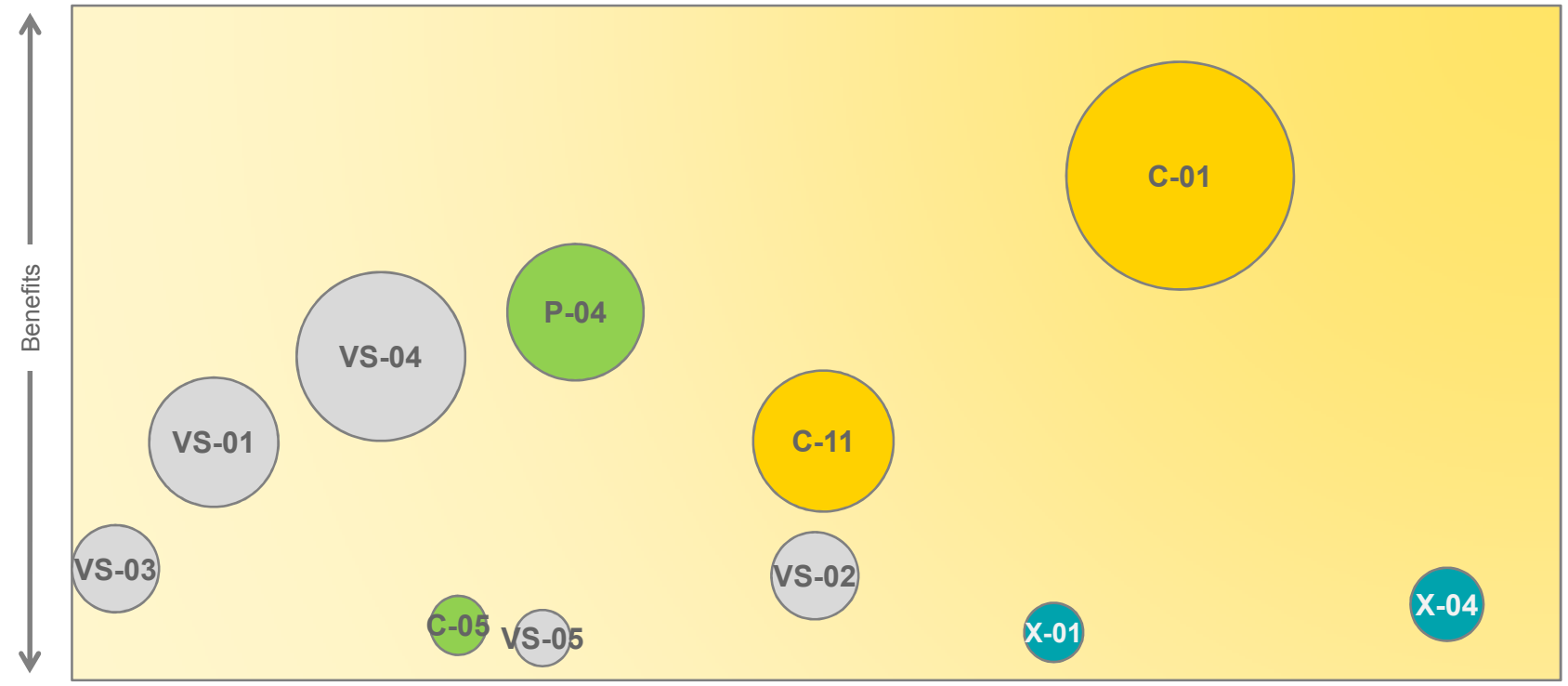
Phase 2 Initiatives: Initiatives include lengthening the collection routes, filling trucks to capacity before visits to transfer stations, rebalancing the off-loading at transfer stations to minimize wait times

Phase 3 Initiatives: Initiatives include improving unload times at transfer stations

* Includes Service Efficiency opportunities only; SWMS Division-identified areas not included

Prioritization of Opportunities

- The benefit vs. complexity profile of each opportunity assists with prioritizing each initiative



SWMS Division identified areas

Size of bubble represents value of initiative

Phase 1 initiative
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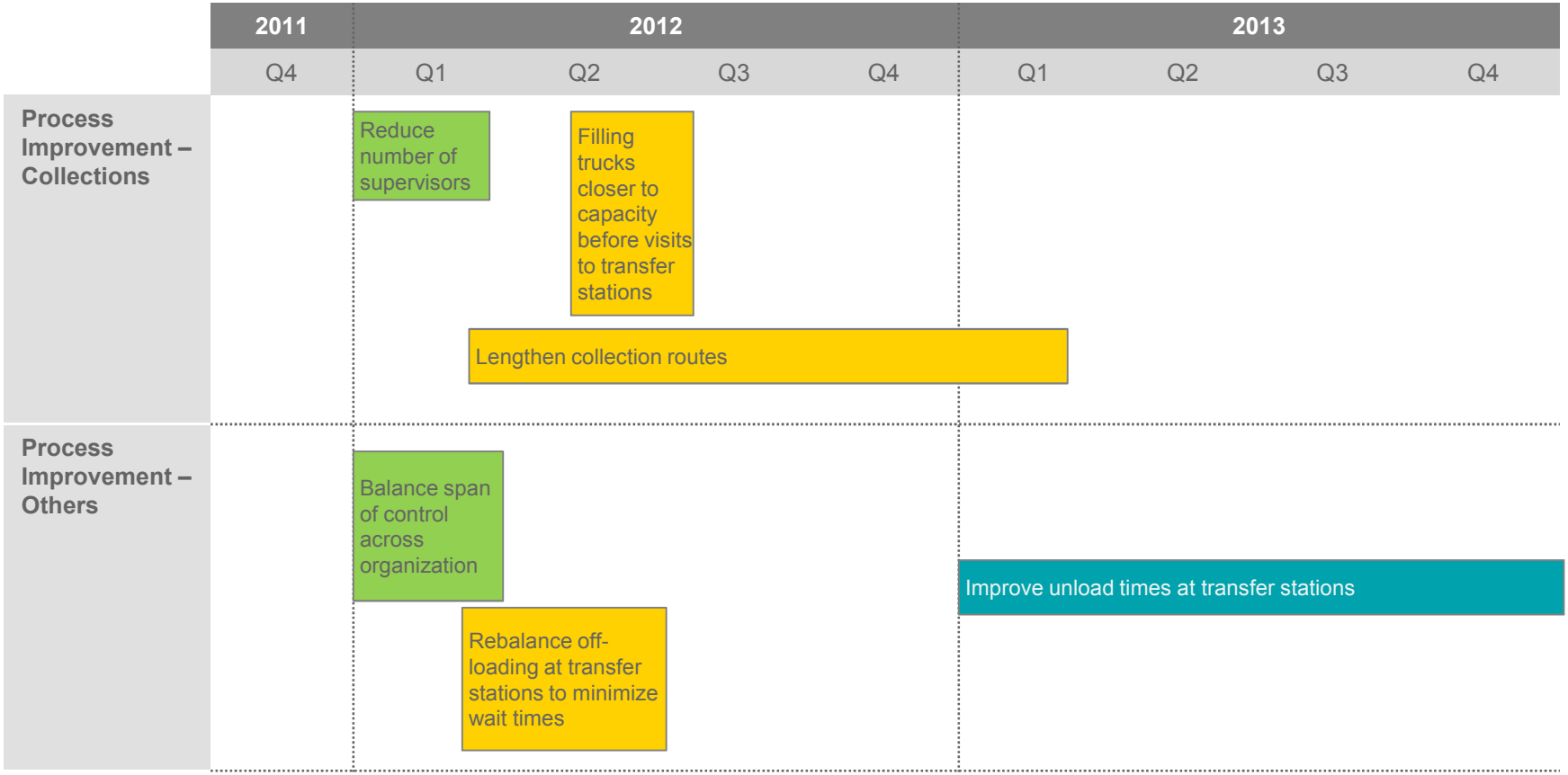
Implementation Timeline



Observations by Service Function

- While not part of the scope of this engagement, E&Y made certain observation during the tours, interviews and review of documentation provided by the SWMS Division. These observations pertain to procedures, policies or other actions that appear to contribute positively to the efficiency of the services provided by the SWMS Division. These observations were not tested and no analysis was undertaken to determine whether the potential benefit outweighed the associated cost of the activity. Readers are cautioned that these observations are anecdotal in nature and the observations are based on untested assertions made by SWMS Division management.

Observations
Collections

Description	Efficiency Implications
✓ Certain drivers leave truck yard prior to start time voluntarily (by-product of incentive program)	► Avoids gridlocks at truck yard ► Workers ready to collect from curbside by 7 a.m.
✓ Use of technology (RouteSmart) to optimize curbside collection routes (to be piloted in September)	► Incorporates historical tonnage data and distance to closest transfer stations ► Balances routes to ensure even distribution of work among beats
✓ 4-day collection week	► Collection schedule changes are rare (thereby improving system simplicity and resident compliance) as statutory holidays do not interfere with 4-day work schedule ► Automated equipment requires twice the amount of maintenance; extra day off allows for time to address equipment issues
✓ Yards have been consolidated down to 3	► Finch, Morningside yards no longer used by SWMS Division as of early 2011 ► Consolidates overhead to fewer locations
✓ Waste is collected at night for commercial properties and residents living over commercial properties	► Avoids gridlocks on major roads during the day time
✓ Volunteers (“3R Ambassadors”)	► On-site representatives disseminate information and encourage diversion ► Managed by only one City staff member
✓ Final stages of testing the use of radio-frequency identification (RFID) to track contractor (Miller) activity	► Less dependence on driver logs and transposition errors into data ► Quick access to summarizeable data
✓ Attempts are made to reach out to multi-family residences to convert to standard bins	► Allows for standardization of equipment and MRO parts, and route consolidation
✓ Rider litter vacuums and “Bag and Broom” team compliments a “Fly Squad” during litter collections	► Dedicated teams to maximize efficiencies and thoroughness of jobs performed
✓ Same collectors operate same beats	► Familiarity with route should improve pick-up thoroughness

Observations
Transfer Stations, Processing and Disposal

Description	Efficiency Implications
✓ Landfill site within 3 hours of Toronto (relative to former Michigan arrangement)	► Trailers to landfill can make 2 runs a day, essentially cutting fleet size in half
✓ Only tilt trucks are allowed to dump garbage between 8 am and 4:30 pm	► Slower manual dumping does not impede City collectors during main collections hour
✓ City garbage trucks are weighed only once every 60 days	► No weigh scale visit on the way out minimizes turnaround time at transfer station
✓ 2 individuals at weigh scales	► Minimizes waiting time and therefore turnaround time at transfer station
✓ Standardized software and procedures at all weigh scales	► Allows for staff transfer and seamless back-filling
✓ Scrap metal moved according to volume rather than schedule	► Efficient use of resources and capacity
✓ Multiple contractors engaged to process yard waste	► Reduces risk of loss of continuity of service ► Encourages competition and lower costs
✓ Organic composting is done through an anaerobic process	► While the process is more expensive, the process does not produce as much odour. As a result, the Dufferin plant is the only organics processing plant that has not been shut down in Ontario
✓ MRF operates on a “just-in-time” basis	► Only ~2-day capacity; transfer stations act as buffer ► Forces efficiency

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Efficiency Assessment Approach

Efficiency Assessment Approach

- Our approach has included:
  - Interviews with key leaders and participants in the SWMS Division's processes
  - Tours of main operations
  - Review of key documents
  - Analysis of weigh scale data
  - Analysis of 2010 internal financial statements
  - Documenting of:
    - Observations
    - Process flows
  - Recording of preliminary areas for potential efficiency savings
  - A jurisdictional scan of costs and practices*
  - Assessment of City analysis with respect to SWMS Division efficiency ideas.

City of Toronto Interviews

Strategic Direction, Policy and Support
- Acting General Manager
- Manager - Waste Diversion
- Senior Coordinator, Communications
- Manager, Employee & Labour Relations

Collections
- Director, Solid Waste Collections
- Manager, Operational Support

Transfer Stations
- Director, Transfer and Disposal Operations
- Manager, Business Operations & Change Initiatives
- Manager, Transfer Operations

Processing
- Director, New Infrastructure & Contracted Services
- Manager, Business Operations & Change Initiatives

Operations Tours

Collections, with examples of:
- D2, D3 and D4 residential pick-up
- Various multi-residential types
- Commercial beats
- Litter (bag & broom ("B&B") and vacuum tools)
- Parks

Transfer Station (Ingram)
- Tipping floor
- Drop off areas including household hazardous waste ("HHW")
- Compactors & haul-away area

Processing
- Dufferin Material Recovery Facility ("MRF")

* Chicago, Houston, Halifax, Melbourne, Montreal, Phoenix, Vancouver

Efficiency Assessment Approach

- Observations were made during tours, interviews and review of documentation provided by the SWMS Division, and ideas for improving service efficiency were indentified for further analysis.
- Each idea was considered for its potential to yield efficiency savings whether an analysis could be completed in the short time frame allotted to this project, and whether the idea was in scope for this engagement.
- Based on the outcome of the analyses, each potential efficiency idea which could yield recurring efficiency savings are detailed in the next section
- Other ideas that were not pursued are listed in Appendix C
  - A subset of these ideas may still form the basis for further studies and research

Revenue and Expense Summary

Revenue & Expense Summary[1]

City of Toronto | City / Contractor | Contractor | Others

Collections

- Curbside Pick-up - Residential
- Curbside Pick-up - Commercial
- Multi-res Pick-up
- Litter Collection
- Residential Drop-off
- Commercial Transfer
- Other Municipalities

Transfer

Transfer Stations

Drop & Load

Processing and Disposal

- MRF Processing (220 K tons)
- Compost Processing (120 K tons)
- Yard Waste Processing (100 K tons)
- Green Lane Landfill (550 K tons)
- Reuse Centres
- Commercial Landfill
- Other municipal processing

Revenue
- Commercial garbage bags - $3.10 each
- Canadian Stewardship Association- $235/ton
- Residential collections – Tiered pricing

Costs

Description	Cost	Components
Litter pickup	$50/hr	Labour, fuel, fleet
Curbside Pickup		Labour, fuel, fleet
▸ D1	$103/tonne	
▸ D2	$150/tonne	
▸ D3	$153/tonne	
▸ D4	$113/tonne	
▸ Night	$160/tonne	
▸ Soft-handling	$400/tonne	
▸ Electronics[2]	~~$500/tonne~~	
▸ Toxic Waste[2]	~~$150K/year~~	

Revenue
- Garbage Drop-off – $100/ton (minimum charge $10)
- Recycle Drop-off - $75/ton (free up to 20 kg)
- Drop & Load Services – $13/ton

Costs
- Labour ($24 to 25/hr)
- Fleet
- Fuel
- Building maintenance
- Material spoilage / theft

Revenue
- Aluminium, plastics, fibre and glass – market price
- Residue return from MRFs - $75/tonne (new contract)
- Waste Diversion Ontario, Ontario Electronic Stewardship, and product stewardship – 50% of operating costs for recycling

Costs

Description	Cost	Components
Green Lane Landfill site	$50/tonne	Amortization of purchase (which includes set-up costs borne by seller)
Green Lane Landfill haulage	$20/tonne	Contract with Verspeeten
Yard waste composting	$48/tonne	Contractor fees, City entitled to 10% of vol
MRF processing		
▸ Dufferin (old contract)	$96/tonne	City owns, 3P runs
▸ Arrow Road	$104/tonne	3P owns and runs
▸ Scarborough	$100/tonne	3P owns and runs
Organics		
▸ Private	$120 to $150/tonne	Includes processing and haulage except one contract, which is processing only
▸ Dufferin	$128/tonne	3P runs, City owns
▸ Disco (future: 2012)	n/a	

Notes
1. Most figures sourced from discussions with SWMS Division management; actual costs may vary slightly
2. These costs are fully recovered by Waste Diversion Ontario programs

Revenue & Expense Summary
Notes

- The revenue and expense summary on the preceding page provides an overview of the SWMS Division processes and the associated costs per tonne for these activities.
- The consolidated costs for each of the main processes (collections, transfer stations and processing/disposal) are included on the following page.
- The three largest cost drivers are:

	Collections	Transfer	Processing & Disposal
Salary & benefits	76%	68%	8%
Inter-divisional charges	17%	4%	2%
Services and Rent	2%	13%	73%

- **"Salary & benefits"** represents the wages, salaries and associated benefits of the SWMS Division staff
- **"Inter-divisional charges"** are primarily comprised of the direct costs to service and maintain the fleet of trucks
- **"Services and Rent"** primarily represent costs in respect of third party freight to Green Lane and processing performed by third parties of recycled and organic materials and yard waste

Expense Summary - Operations

Collections

Cost Drivers	Consolidated Costs	% of Total
Salaries and Benefits	71,698,086	76.22%
Material and Supplies	3,793,190	4.03%
Equipment	198,552	0.21%
Services and Rent	1,874,308	1.99%
Capital Transfers	150,000	0.16%
Inter-divisional charges	16,350,359	17.38%
Other Expenditures	1,919	0.00%
Total	$94,066,413	

Transfer Stations

Cost Drivers	Consolidated Costs	% of Total
Salaries and Benefits	12,809,706	68.16%
Material and Supplies	2,395,824	12.75%
Equipment	36,724	0.20%
Services and Rent	2,425,222	12.90%
Capital Transfers	348,469	1.85%
Inter-divisional charges & Fleet	720,930	3.84%
Other Expenditures	56,314	0.30%
Total	**$18,793,189**	

New Infrastructure and Contracted Services

Cost Drivers	Consolidated Costs	% of Total
Salaries and Benefits	2,566,627	5.41%
Material and Supplies	333,956	0.70%
Equipment	11,235	0.02%
Services and Rent	44,132,976	93.01%
Inter-divisional charges	82,025	0.17%
Other Expenditures	321,688	0.68%
Total	$47,448,507	

Haulage and Disposal

Cost Drivers	Consolidated Costs	% of Total
Salaries and Benefits	5,143,191	8.35%
Material and Supplies	579,667	0.94%
Equipment	12,436	0.02%
Services and Rent	44,661,106	72.51%
Contributions and Transfers	1,044,178	1.70%
Capital Transfers	8,909,568	14.46%
Inter-divisional charges	1,244,717	2.02%
Other Expenditures	2,149	0.00%
Total	**$61,597,012**	

- **Inter-divisional charges**: The most significant component of the inter-divisional charges are the costs for truck maintenance

Service Efficiency Assessment

Summary of Potential Service Efficiencies

Ref ID	Service Efficiency Opportunity	Phase	Est. Timeline to Complete	Potential benefit	Complexity	Page #
C-01	The working day for collection staff is materially shortened due to an incentive program; slightly lengthening routes, while maintaining the incentive program would result in savings in labour and equipment wear	2	9-12 months	$ 4.4M	Medium	31
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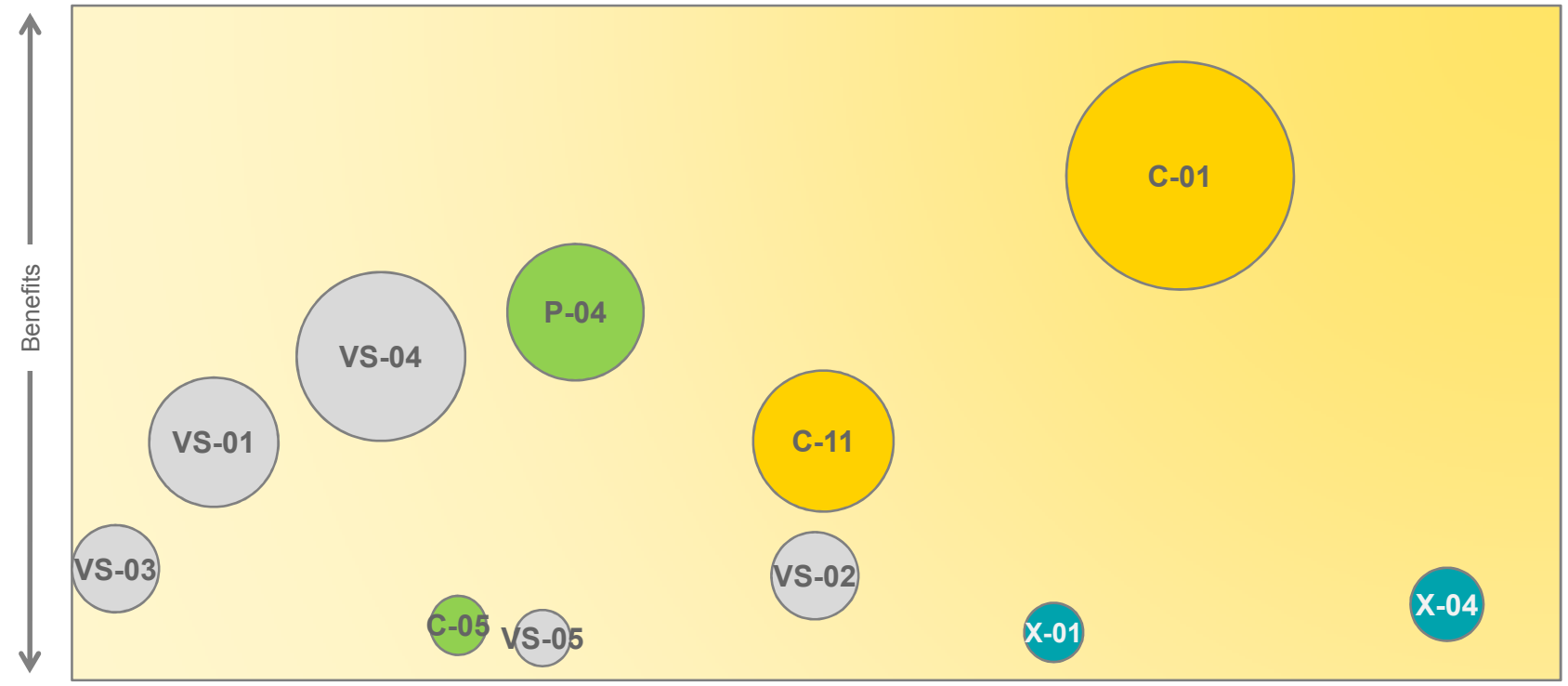

SWMS Division identified areas

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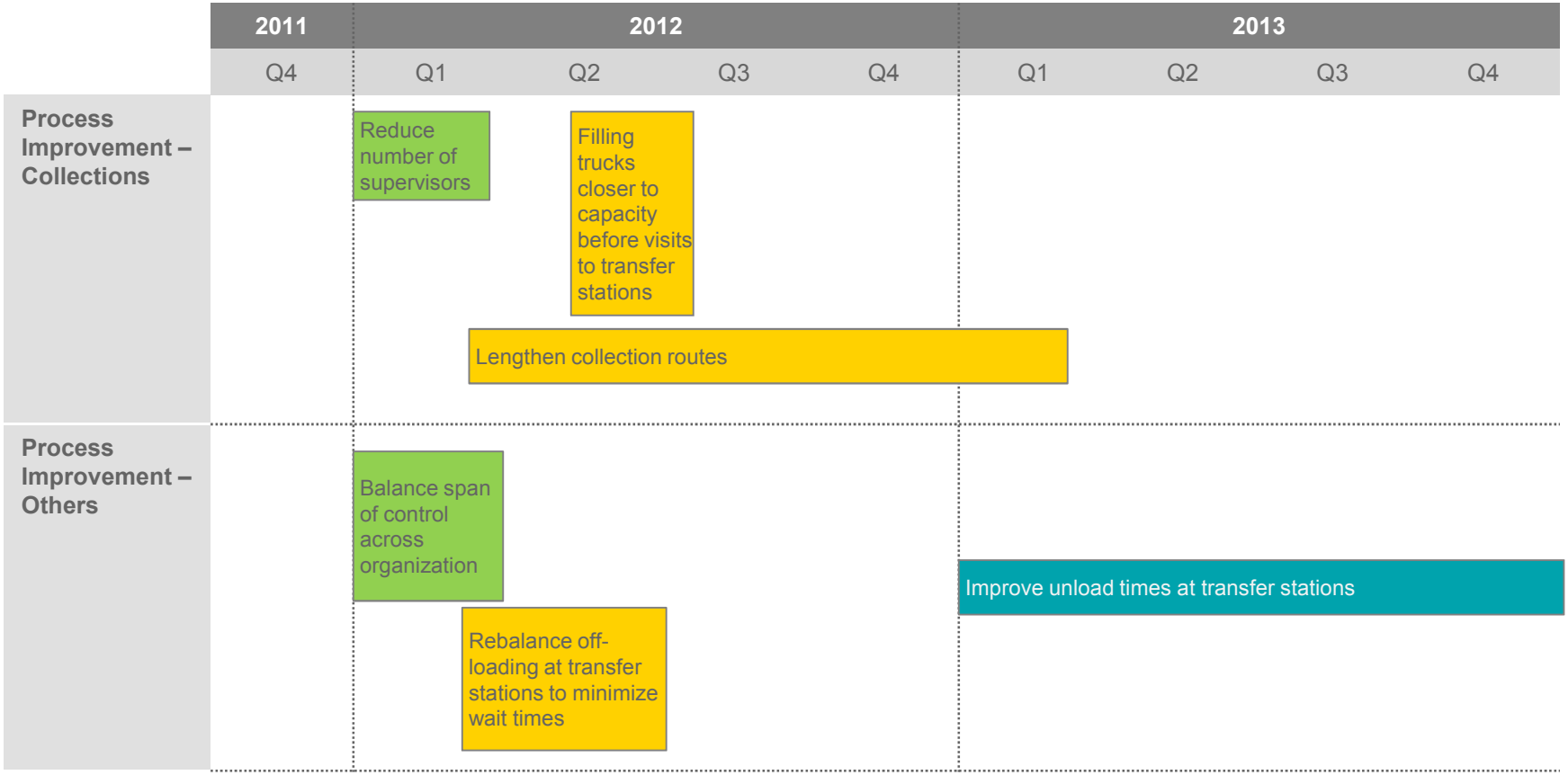
Phase 2 initiative
Initiatives that target improvement to operational efficiencies within collections

Phase 3 initiative
Initiatives that target continuous improvement within City of Toronto Solid Waste Management to transfer the organization into an industry leader

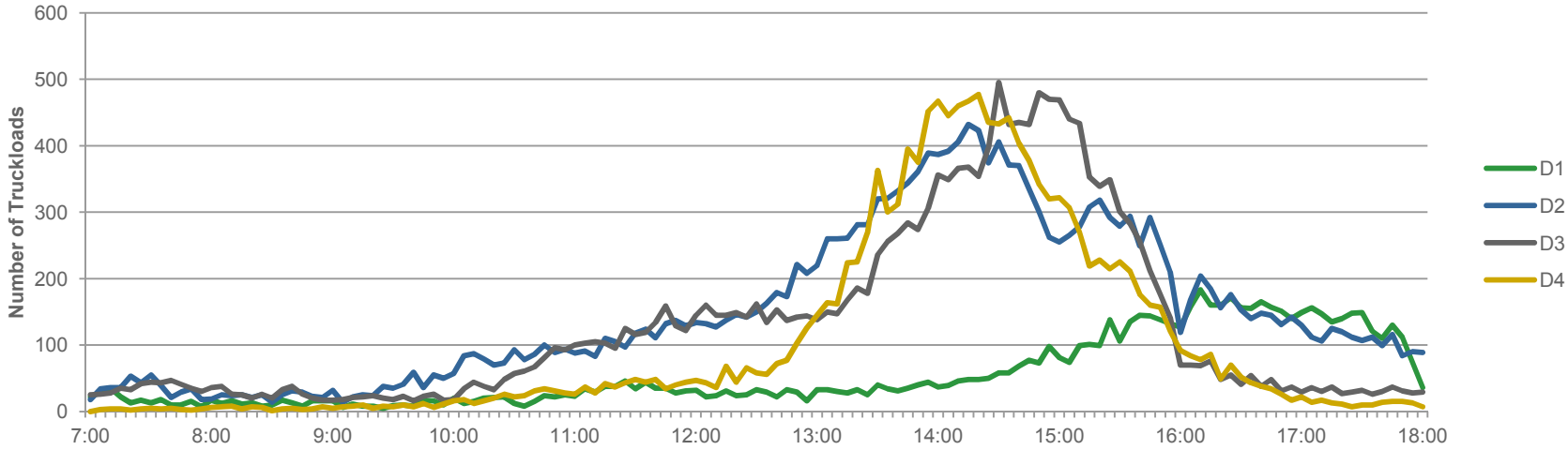
Implementation Timeline



The working day for collection staff is materially shortened due to an incentive program; slightly lengthening routes, while maintaining the incentive program would result in savings in labour, fuel and equipment wear

- Collections staff work four ten-hour days per week operating under an incentive program which allows staff to finish their day once all crews from their respective yard have completed their routes (the City advised only from 3 p.m. onwards), but still be paid for the entire shift
- A review of transfer station data for 2010 indicates that collection trucks, in Districts 2, 3 and 4 (D2, D3 and D4), have their last unloads occurring before 4:00 pm, with most of the traffic coming in between 2:00 pm and 3:30 pm
  - The “last unload time” is the last time at which an individual truck is unloaded during a particular day
  - D1, which is outsourced to Turtle Island, has the last unload time occurring between 3:00 pm and 5:30 pm
  - D2 and D4 see most of the last unload times between 1:30 pm and 3:00 pm, suggesting the possibility that some routes in those districts could be expanded
  - D3 sees most of the last unload times between 2:30 pm and 3:30 pm, which is still much earlier than D1 and could therefore be improved.

Time of Last Unload by Vehicle (all days combined)



The working day for collection staff is materially shortened due to an incentive program; slightly lengthening routes, while maintaining the incentive program would result in savings in labour, fuel and equipment wear (continued)

- Based on the distribution of finish times in each district, and a target finish time of between 4:00 pm and 4:30 pm, the weighted average increase in route size, and the corresponding savings in FTE's is estimated to be (see right):

D2	D3	D4
13%	13%	20%

- As a result of these FTE savings and longer routes noted above, the potential cost savings in dollars would be:

Cost Driver	District 2	District 3	District 4	Total
Salary	$757K	$691K	$751K	**$2.2M**
Benefits	$280K	$256K	$278K	**$813K**
Maintenance costs of vehicles	$573K	$402K	$467K	**$1.4M**
Total	**$1.6M**	**$1.4M**	**$1.5M**	**$4.4**

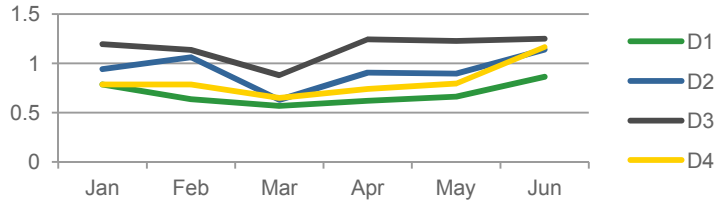
- Additional savings could be achieved through reduction in equipment reserve.
- Assumptions:
  - Route extension provides for final unload time of between 4:00 pm and 4:30 pm
  - This timing will allow 30 minutes for transfer station unloading and truck parking
  - Salary is estimated at $24/hr, and salary represents 73% of total salary & benefits. By extending the routes, fewer trucks and fewer FTE's will be required resulting in savings in both labour and maintenance costs
  - Each truck is operated by an average of 1.55 FTE
- Timeframe for realizing savings that are related to staff redeployment is subject to collective bargaining agreement

Efficiency gains could lead to a total of $4.4M in savings per year

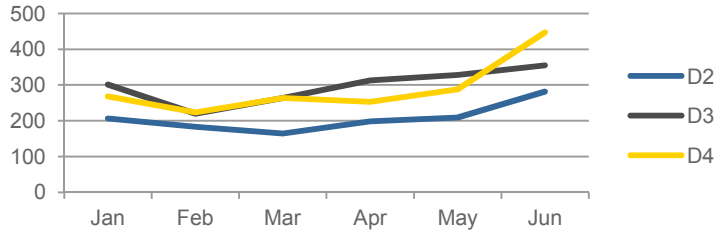
Number of supervisors should be reduced in District 2

- Supervisors in D4 are able to handle a larger number of service requests per supervisor than in D2, and still achieve a higher service level (less service requests per 1,000 households)
- Both D3 and D4 sees a higher number of service requests per supervisor than D2
- If D2 had the same number of supervisors per service request as D3 and D4, it would have 5 instead of 7 supervisors
- Reduction of 2 supervisors translates to a savings of approximately $204,000[1]
- D4, despite being the benchmark amongst the three districts operated by the city, still has improvement opportunities when compared to D1
- D1 routinely sees less service requests per household than the other districts, even when compared to D4, which has a comparable population density and residence type
- D1 is able to achieve a higher service level (lower number of service requests per 1,000 pass-bys) than D4 while achieving this with a lower per tonne cost
  - D1 collection costs are approximately $103/tonne
  - D4 collection costs are approximately $113/tonne
- House count per Supervisor (shown right) further supports the reduction, with D2 having the lowest coverage
- It should be noted that geographical complexity (such as density, parked cars, dead ends, one-way streets, etc.) of each district may have a bearing on Supervisor workload

Number of Service Requests per 1,000 pass-bys (2011 YTD)



Number of Service Request per supervisor



	Single House Count	# of supervisors	Houses/ supervisor
District 1	65,429	2	32,715
District 2	165,407	7	23,630
District 3	117,284	4	29,321
District 4	113,611	4	28,403

Efficiency gains could lead to a total of $204K in savings per year

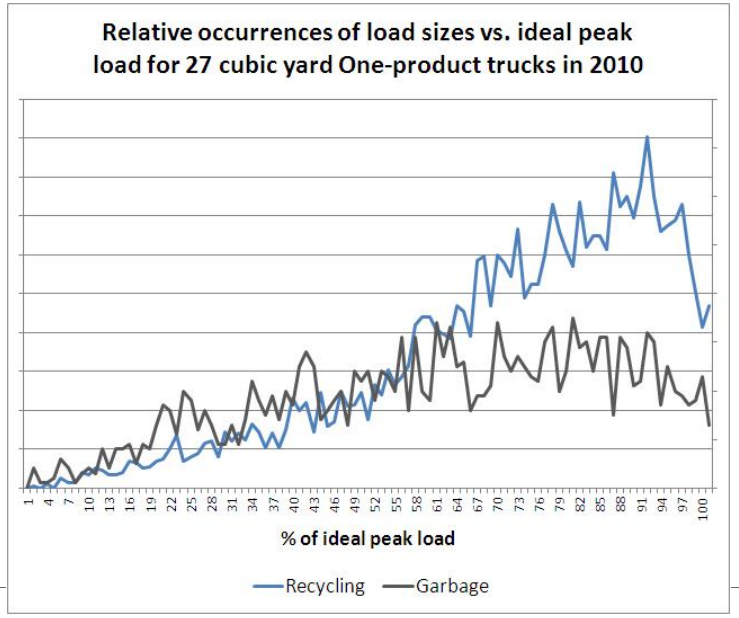
1. Average salary and benefits estimated to be $102,000 per non-hourly FTE (based on 2010 financial statements)

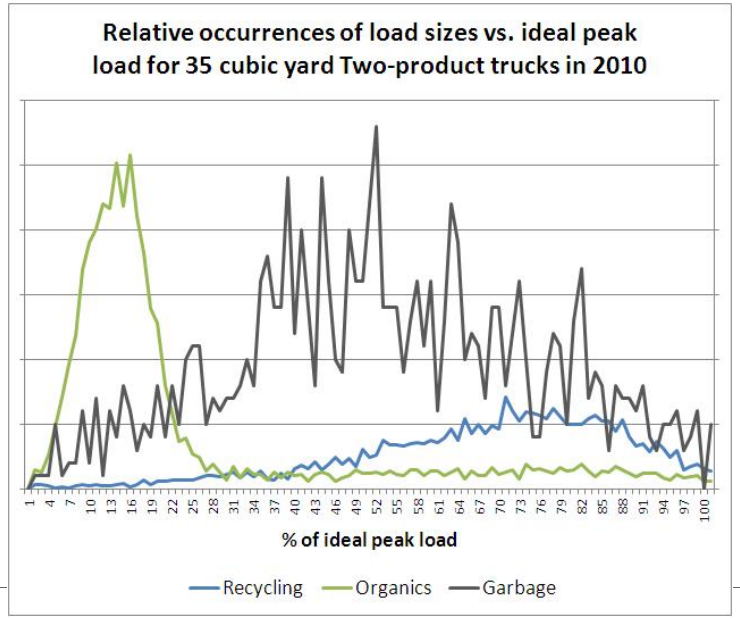
Efficiency gains could be achieved by more fully loading trucks before unloading at transfer stations

- Daytime residential curbside collection vehicles were routinely found to be filled at less than the ideal peak load based on 2010 transfer station data provided by the SWMS Division
- "Ideal peak load" was estimated on a material-by-material, as well as truck type-by-truck type basis. For example, we analyzed recycling loads in 1-product, 25 cubic yard trucks separately from organics loads in 2-product, 25 cubic yard trucks
- "Ideal peak load" was estimated based on actual behaviour in 2010
  - For each material-truck-type combination, we ranked all loads during the year (for example 27,449 recycling loads in single-material trucks crossed the weigh scales at all transfer stations in 2010)
  - We called the highest load of the year, in tonnes, the "actual peak load"
  - We discarded the top 10% of all loads from analysis. The underlying assumption is that 10% of operators over-compact (over-"juice") their truck loads and therefore carried more tonnage than is ideal or recommended.
  - The highest value of the remaining list is the 90th percentile, which we called the **"ideal peak load".** We used this as a more reasonable indicator of what weights trucks can handle and what should be considered "full", i.e. using the capacity of the packer efficiently.

Efficiency gains could be achieved by more fully loading trucks before unloading at transfer stations (continued)

- Opportunities exist to reduce transfer station visits for trucks that visit transfer stations with a load less than the ideal peak load
  - An example opportunity is when a truck is filled to 45% of its ideal peak load at its first unload of the day, then filled to 35% of its ideal peak load at its second and final unload of the day. The truck could have avoided one unload by completing the entire day's route without a visit to a transfer station, filling the truck to 80% (45% + 35%) of its ideal peak load.
- The percentages in the sample histograms below represent the relative load weights as a percentage of the ideal peak load.
  - Loads which are less than 50% full represent the key opportunity (for every 2 loads which are less than half full, 1 unload could have been saved)
  - We acknowledge that it is unreasonable to continue filling the less full compartment of a 2-product truck (e.g. organics) when the fuller compartment (e.g. recycling) is near capacity; this was taken into account and not considered an opportunity for eliminating an unload





Efficiency gains could be achieved by more fully loading trucks before unloading at transfer stations (continued)

- Based on discussions with SWMS Division, the unloading time is estimated to be 1 hour on average
  - 20 minutes to travel to transfer station
  - 20 minutes to unload
  - 20 minutes to travel back to the point of collection
- In 2010:
  - 8,338 one-product truck unloads and
  - 7,329 two-product truck unloads

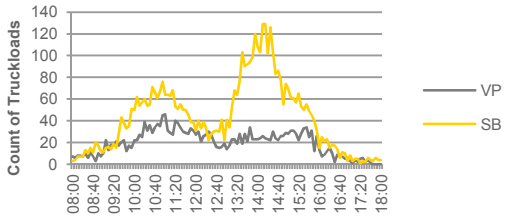
  could have been eliminated from D3 and D4 daytime residential curbside collections by limiting unloading to trucks with load weights closer to their ideal peak load, for a total of 15,667 unloads. This would be the equivalent of a potential savings of 15,667 hours in collection staff time.
- Wages for driver/loader is estimated at $26/hr, with 1.55 FTEs per truck, equating to a wage savings of $630K (include benefits, $820K)

Efficiency gains could lead to a total of $0.8M in savings per year

Transfer station unloading by City collectors should be controlled and thereby rebalanced to minimize congestion during peak times

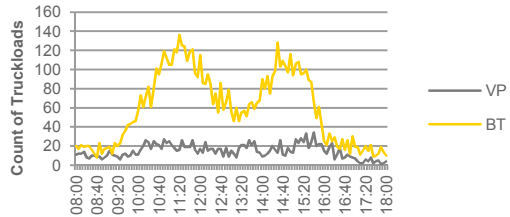
- Six comparisons of transfer stations on the same peak days show opportunities to shift traffic from one transfer station to another

Number of Wednesday Unloads - VP vs. SB



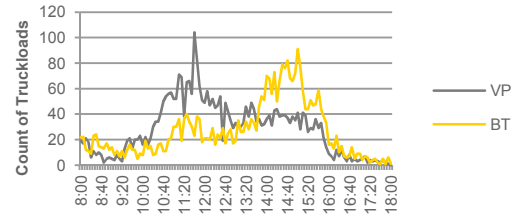
- Divert some traffic from Scarborough to Victoria Park on Wednesdays between 13:15 and 16:00
- Ellesmere yard is only slightly closer to SB vs. VP
- Due to the relative sizes of VP and SB, VP is assumed to be able to take on only ~40% of overall traffic currently taken by both stations

Number of Thursday Unloads - VP vs. BT



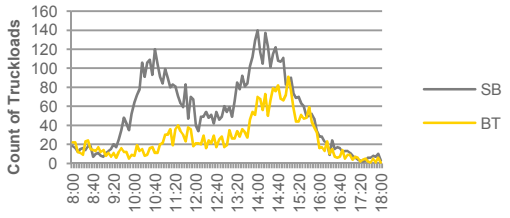
- Divert some traffic from Bermondsey to Victoria Park on Thursdays between 10:00 and 12:30, and then 13:45 and 16:00
- Bermondsey yard is much closer to BT vs. VP
- Ellesmere yard is slightly closer to BT vs. VP

Number of Friday Unloads - VP vs. BT



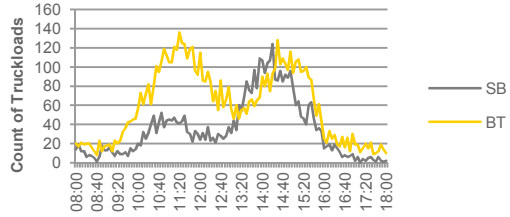
- Divert some traffic from Victoria Park to Bermondsey on Fridays between 10:30 and 12:30
- Divert some Bermondsey to Victoria Park on Fridays between 14:00 and 16:00
- Bermondsey yard is much closer to BT vs. VP
- Ellesmere yard is slightly closer to BT vs. VP

Number of Friday Unloads - SB vs. BT



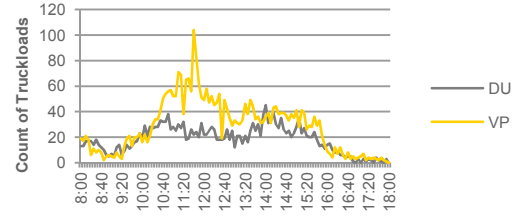
- Divert some traffic from Scarborough to Bermondsey on Fridays between 9:30 and 12:00 and then 13:30 to 15:00
- Bermondsey yard is much closer to BT vs. VP
- Ellesmere yard is slightly closer to SB vs. BT

Number of Thursday Unloads - SB vs. BT



- Divert some traffic from Bermondsey to Scarborough on Thursdays between 10:00 and 12:30 and then 13:30 to 15:00
- Bermondsey yard is much closer to BT vs. VP
- Ellesmere yard is slightly closer to SB vs. BT
- Due to the respective sizes of BT and SB, BT is assumed to be able to take on ~40% of overall traffic

Number of Friday Unloads - DU vs. VP

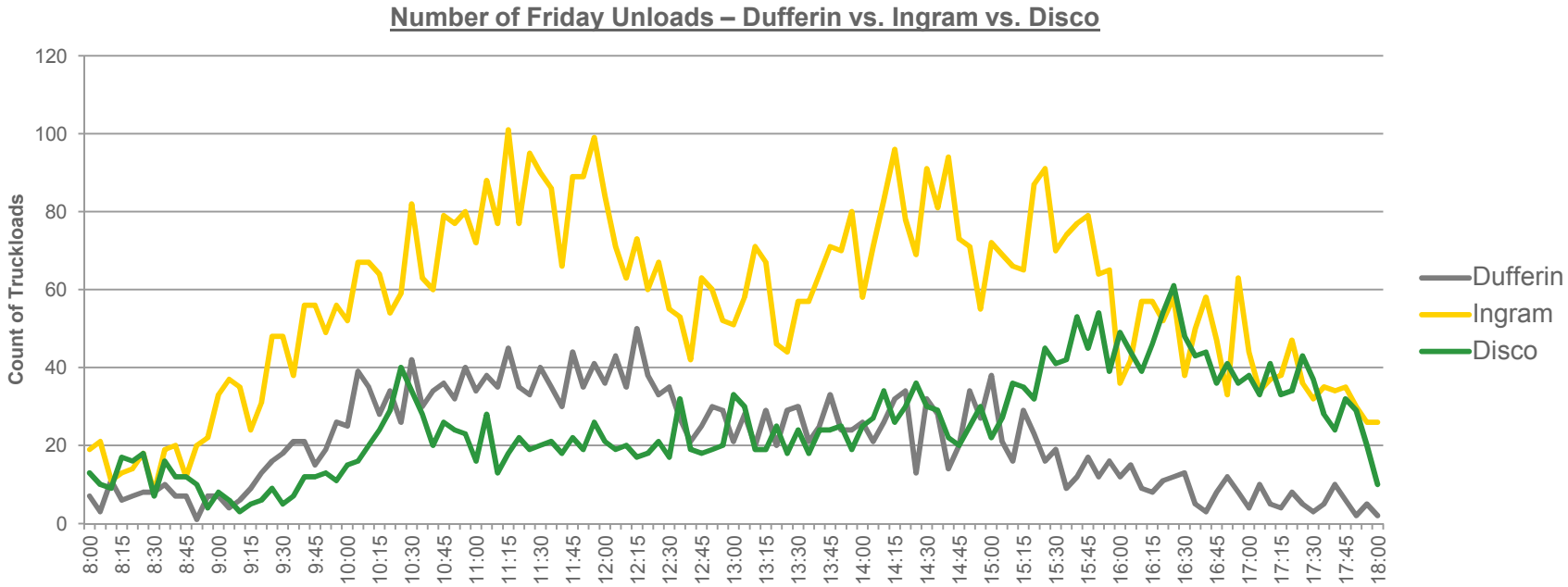


- Divert some traffic from Victoria Park to Dufferin on Fridays between 10:30 and 13:00
- Bermondsey yard is much closer to BT vs. VP

VP = Victoria Park transfer station
BT = Bermondsey transfer station
SB = Scarborough transfer station
DU = Dufferin transfer station

Transfer station unloading by City collectors should be controlled and thereby rebalanced to minimize congestion during peak times (continued)

- A three-way comparison was performed for the Dufferin, Ingram and Disco transfer stations
- These stations can coordinate to help relieve congestion on Fridays due to collection schedules and their close proximity
  - Divert some traffic from Ingram Drive to Disco on Fridays between 10:00 and 12:00
  - Divert some traffic from Ingram Drive to Dufferin on Fridays between 14:00 and 16:00
- Ingram yard is much closer to Ingram Drive than either Disco or Dufferin



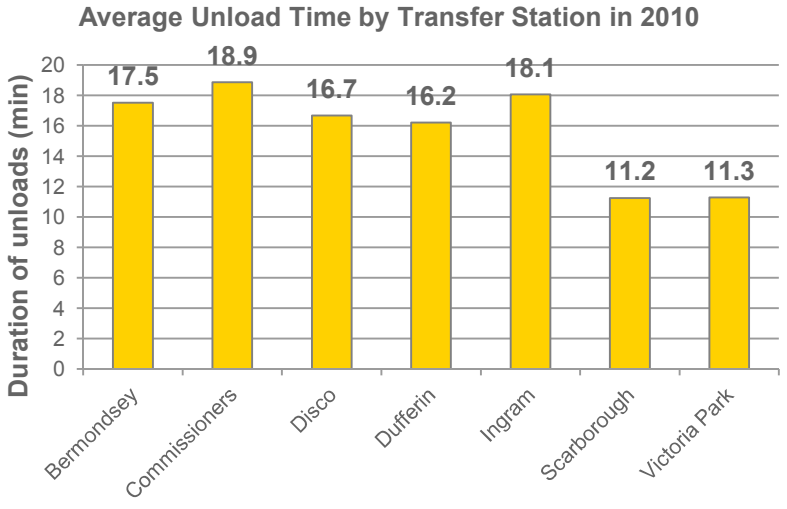
Transfer station unloading by City collectors should be controlled and thereby rebalanced to minimize congestion at peak times (continued)

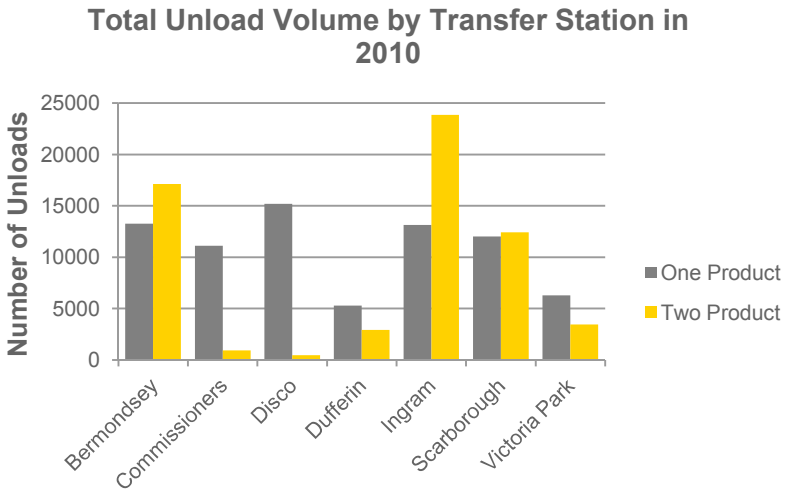
- One other set of transfer stations was analyzed (Dufferin and Ingram), however analysis showed that there is little benefit to diverting traffic between them on Fridays
- As mentioned on the chart entitled “Number of Wednesday Unloads - VP vs. SB”, the relative size of transfer stations has been taken into account
  - A smaller number of unloads (proportional to the relative tipping floor size of each transfer station) are recommended for diversion from Scarborough to Victoria Park than the other scenarios analyzed
- There are a total 17,183 trips that could be diverted between the transfer stations
- Estimated wait time reduction is 20 minutes
- Salary is estimated to be $24/hr and salary is estimated to represent 73% of total salary and benefits
- Each truck has an average of 1.55 FTE
- Further analysis should be done in this area to determine if further savings could be identified as only a small sample of peak times were analyzed.

Efficiency gains could lead to a total of $300K in savings per year

Unloading times could be improved at certain transfer stations by replicating practices in more efficient transfer stations

- Scarborough and Victoria Park both have unload times that are significantly less than the other transfer stations
  - This advantage is not explained by size of the tipping floor
- The opportunity to improve unload times is most evident at Ingram and Bermondsey
  - Both have highest number of unloads
  - Both have among the highest unload times
  - Both see a larger number of two-product trucks than one-product trucks
- On average, one-product City collection trucks have an unload time of 20.5 minutes, while two-product City collection trucks have an unload time of 25.5 minutes





Unloading times could be improved at certain transfer stations by replicating practices in more efficient transfer stations
(continued)

- If all transfer stations can operate at the rate of the Scarborough transfer station, unload times could be improved by 30% overall, which represents approximately 1.7% improvement in total collection time
- A total of approximately 11,000 hours could be saved from transfer station unloads each year
- Salary is estimated to be $24/hr and salary is estimated to represent 73% of total salary and benefits
- Each truck has an average of 1.55FTEs
- Total efficiency savings is approximately $560K
- Unload times are mainly based on 2010 transfer station data for commercial vehicles since unload times for public vehicles are largely not available.

Efficiency gains could lead to a total of $560K in savings per year

A span of control analysis reveals opportunities to consolidate responsibilities among fewer management staff

- A “span of control” analysis was performed on all positions with the SWMS Division
- This analysis seeks to answer “how much management is enough” by looking at the number of direct reports for each supervisor
- Theory:
  - Fewer direct reports may indicate excess capacity and an opportunity to improve operating leverage
  - More direct reports may create an overload situation and introduce risk
- Based on our experience in the public and private sector, as well as industry literature:
  - Approximately 6-10 direct report is ideal for middle and upper management
  - Approximately 30 direct reports is ideal for front line supervisors (supervisors of shop floor personnel)
- Deviations from leading practice are considered in each situation:
  - Job complexity
  - Similarity of subordinate jobs
  - Physical proximity of subordinates
  - Abilities of employees
  - Abilities of manager
  - Technology
  - Environmental stability
  - Experience level / time in role
  - Type of interaction between supervisors and employees

A span of control analysis reveals opportunities to consolidate responsibilities among fewer management staff
(continued)

- The table below summarizes the opportunities for reducing costs

Area	FTE Reduction
Collections	1
Transfer and Disposal Operations	3
Contracts	1
Policy and Planning	3
Total	8
Estimated savings	$816,000

- Estimated savings assume average salary and benefits of $102,000 per non-hourly FTE based on 2010 financial statements. A potential reduction of 8 FTE were determined. E&Y had estimated a higher reduction of FTE, however through discussions with SWMS Division management the City advised that many of these managers were engaged in necessary duties. E&Y did not have time to further analyze SWMS comments so the estimated savings in this Report are $816,000.
- Additional analysis should be undertaken to review the staffing level requirements for support functions including Policy & Planning, and the Operational Support groups which collectively have approximately 110 FTEs representing approximately $11.2 million in annual costs. There may be opportunities to reduce staffing levels in these groups and/or utilize existing support staff in the SWMS Division or other City divisions to more efficiently service the residents of the City. This analysis was not completed due to scope and timeline restrictions for this engagement.

Efficiency gains through non-hourly workforce reduction represent savings of $0.8 million/year

Assessment of SWMS Division Studies

Assessment of SWMS Division Studies
Introduction

- Ernst & Young was asked to examine the analyses prepared by the SWMS Division which identified cost savings and/or revenue opportunities.
- The approach was to:
  - Review and comment on assumptions made in the SWMS Division's analysis
  - Identify additional information needed to complete the analysis
- The SWMS Division studies, and the net financial impact of each (as estimated by the SWMS Division), are as follows:

Short Name	SWMS Division Identified Opportunity	Approximate Net Financial Impact
1. Garbage Bag Tags	Discontinuing the practice of allowing four free tags for garbage in excess of residents' chosen garbage bin size	+$0.9 million
2. Overflow Recycling	Discontinuing the practice of allowing occasional overflow recycling to be set out in clear plastic bags (undermines the automated collection method)	+$0.5 million
3. Environment Days	Discontinuing the Environment Days (many services are now available through formal programs, operations, depots, or pick-up for example)	+$0.5 million
4. CIRO's	Pursuing additional revenue generation through a fee-for-service charge to Charities, Institutions, and Religious Organizations (CIROs) currently exempt from the volume-based waste rate system	+$1.7 million
5. Drop & Load	Additional revenue may be achieved through a review of this service included the fee charged and strategies to increase this revenue opportunity	+$0.2 million
Total		**+$4.0 million**

- All of these SWMS Division studies would benefit from further analysis for the purposes of confirming figures, justifying their implementation, and eliminating alternatives; as such all figures could change if the recommendations regarding analysis mentioned herein are followed

Garbage Bag Tags
Introduction

- Background:
  - In 2007 the City implemented a free bag tag program for all households allowing an extra four bags of garbage to be used throughout the year in addition to the standardized waste bins.
  - Yellow bag tags can also be purchased by households at Canadian Tire for $3.10 per tag (Canadian Tire is paid a commission or each tag sold).
- Issue:
  - The use of the extra bag tag program undermines the automated collection methods used in the most of the City's districts and reduces collection efficiency.
  - Usage rates for the program are very low, making it difficult to justify the costs of producing the free tags.
- Division's Proposal:
  - Cancel the extra bag tag program and only allow homes to purchase yellow tags for additional waste.

Garbage Bag Tags
SWMS Division's Analysis

Based on the Division's prepared financial analysis, the estimated incremental savings from discontinuing the program are approximately $1.3 million.

	2012 Incremental change	Notes
Projected cost changes		
Salaries and benefits	(35,000)	1
Materials, supplies and printing	(350,000)	2
Private providers (Turtle Island)	(208,000)	3
Total change to costs	(593,000)	
Projected revenue changes		
User fees and donations	700,000	4
Total change to revenues	700,000	
Net financial Impact	**$ 1.3 million**	

Notes:

1. Estimated City of Toronto labour savings
2. Based on estimated mailing costs of four bag tags in 2012.
3. The City of Toronto currently has an agreement with Turtle Island that an annual charge of $208,000 will be levied based on the extra work resulting from the bag tag and yellow tag programs. SWMS Division assumed that this charge will be eliminated.
4. Estimate of additional revenues from increased sales of yellow bag tags. SWMS Division assumed that 50% of the 462,000 households in Toronto will purchase one yellow bag tag at $3.10 if the program is discontinued.

Garbage Bag Tags
Comments on SWMS Division's analysis

Based on EY's review of the analysis prepared by the SWMS Division, there are several proposed modifications to the analysis assumptions as detailed in the notes below and subsequent pages.

	Revised EY Incremental Savings		
	Low	High	Notes
Projected cost changes			
Salaries and benefits	0	35,000	1
Materials, supplies and printing	350,000	350,000	2
Private providers (Turtle Island)	0	208,000	3
Total change to costs	350,000	593,000	
Projected revenue changes			
User fees and donations	175,000	700,000	4
Total change to revenues	175,000	700,000	
Net financial Impact	**$0.5 million**	**$1.3 million**	

Notes

1. Unless a position is eliminated, there may be no salary benefits savings.
2. The SWMS Division analysis assumes that the savings realized from printing and mailing will be based on the expected one-time mailing of four bag tags in 2012.
3. The contract with Turtle Island relates to the inefficiencies incurred in District 1 of collecting free bag tags and yellow bag tags. Since it is assumed that revenues relating to yellow bag tags will increase if free bag tags are eliminated, it is likely that the cost savings from Turtle Island will be less than the full fee of $208,000 since Turtle Island will continue to be required to pick up yellow tagged waste.
4. The current usage rate estimate is based on a sample of 3,106 homes during a two week period in December 2010 and January 2011 which concludes that homes use one free bag tag per year. Based on the small sample size, the actual purchase rate of one bag tag per year may vary materially.
   - The SWMS Division should also incorporate the costs associated with producing and collecting the yellow bag tags. It is unclear whether costs of yellow bag tags were considered in the analysis, such as the 12 cent commission paid to Canadian Tire on all sales, the costs associated with producing the yellow tags, and the corresponding collection of the additional waste.
   - E&Y assumes that the net range of revenues generated from eliminating the free bag tag program would be in the range of $175,000 to $700,000.

Garbage Bag Tags
Summary

- The financial analysis of the free bag tag program prepared by the SWMS Division appears to support the savings estimated by the SWMS Division.
  - There will be immediate cost savings incurred in 2012 by discontinuing the program in the amount of the printing/mailing charges for the tags and a potential reduction in fees paid to Turtle Island for elimination of the incremental labour of picking up the additional waste.

Estimated net financial impact of $0.5 million to $1.3 million
Mid point used for summary purposes: **$0.9 million**

Overflow Recycling
Introduction

- Background:
  - The SWMS Division currently provides collection service for extra recycling material set out in clear plastic bags in addition to a household's standardized recycling bin

- Issue:
  - According to the SWMS Division, allowing collection of overflow recycling decreases collection efficiency and undermines the goal of fully automating all collections routes.

- SWMS Division's proposal:
  - Discontinue the practice of allowing collections of overflow recycling and manage residents' needs by providing an upsized bin or an additional blue bin, free of charge.

Overflow Recycling
SWMS Division's Analysis

Based on the SWMS Division's prepared financial analysis, the estimated incremental savings from discontinuing the collection of overflow recycling is $0.5 million annually.

	2012 Incremental change	Notes
Projected cost changes		
Salaries and benefits	(270,000)	1
Program support savings	(25,000)	2
Private providers (Turtle Island)	(208,000)	3
Net Financial Impact	(503,000)	

- Notes:
  1. City of Toronto labour savings associated with discontinuing pickup of overflow recycling. Cost consists of labour for three employees and one truck.
  2. Estimate of cost savings from reduced call centre complaints through 311 from queries relating to recycling.
  3. The City of Toronto currently has an agreement with Turtle Island that an annual charge of approximately $208,000 will be levied based on the extra work that is caused for their employees by the collection of overflow recycling. This estimate is based on a rate of $120/hour and approximately 1.4 hours of work daily.
- E&Y Comments:
  - E&Y is in agreement that the City may save at least the cost of the Turtle Island fee. If overflow recycling is eliminated, there will be no need for this extra levy from Turtle Island in D1. E&Y notes that the Turtle Island fee seems to be inconsistent with the projected salary savings by the SWMS Division and further analysis is suggested.
  - The estimates for "program support savings" and salary reductions should be further analyzed by the City. While there will undoubtedly be reductions, the current reductions are based on high level estimates. It would be beneficial for the City to conduct a more thorough analysis of the time required by collection crew to collect overflow recycling. This could be quantified into an equipment and employee saving for D2, D3 and D4.
  - The capital cost of additional bins must also be addressed.

Estimated net financial impact of **$0.5 million**

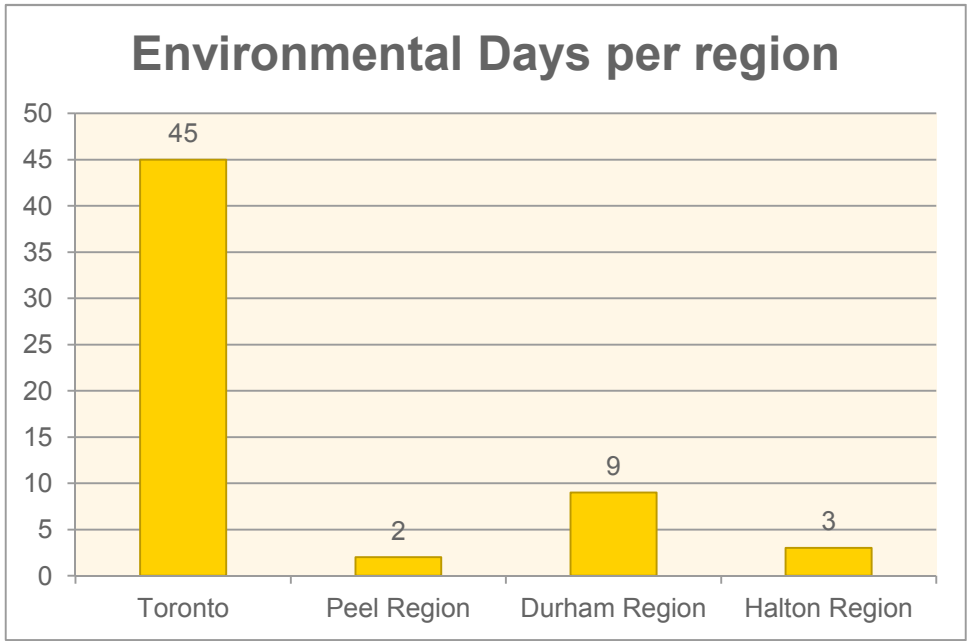
Environment Days
Introduction

- Background
  - Environment Days are a program (established in 1991) whereby the City provides an opportunity for residents to drop off their electronics, hazardous waste and durable/reusable goods, pick-up free compost and learn about City environmental initiatives at a neighbourhood location
  - Currently 45 Environment Day events take place per year (one per ward plus one event for the Mayor).
  - Over time the SWMS Division has introduced programs which provide the same services as those available at Environment Days, such as
    - Expanded hours at depots for drop off have provided additional access and opportunity for City residents to dispose of waste;
    - Expansion of the curbside program for collections of electronics have provided an opportunity for City residents to dispose of unwanted electronic items;
    - The introduction of the Toxic Taxi program has facilitated the removal of hazardous waste products for City residents;
    - Compost pick up programs have been made available at City yards.

- Options under review by the SWMS Division
  - Reduce the number of Environment Days to 22 events per year
  - Eliminate all Environment Days.

Environment Days
Summary

- Comparison to other regions



Region	Population (2006 census)	Environment Days per 1 million residents
Toronto	2,503,281	18.0
Peel Region	1,159,405	1.7
Durham Region	617,975	14.6
Halton Region	439,526	6.8

* Durham Region excludes Compost give away events that take place in the spring.

- From the data above, it can be noted that the number of Environmental Days in Toronto significantly exceeds that of its neighbouring regions, but is comparable to Durham Region on a per capita basis

Environment Days
Summary

- Estimated cost reduction
  - The SWMS Division has estimated that a reduction to 22 events per year would result in a saving of approximately $130,000.

Summary of cost savings if Environment Days reduced to 22 days		
Salaries and Benefits	$	32,500
Materials and supplies	$	70,000
Services and Rents	$	27,000
Total expected savings	$	129,500

  - A reduction in the number of events may result in a cost saving if it results in reduced FTE, but it is uncertain whether any staff reductions would result from a reduction of these events. It is also reasonable to expect that a saving on a materials and supplies, and services and rentals would take place.
  - However, certain expenses such as signage which would be used at all events, vehicle insurance and maintenance costs, and certain labour overheads would not be eliminated if Environment Days were only reduced to 22 days.

Environment Days

- Estimated cost reduction (continued)
  - A complete discontinuation is estimated by the SWMS Division to result in a saving of approximately $509,000.
    - By eliminating the program in its entirety, all overheads related to the program would be completely eliminated allowing for a higher proportional saving.
    - Saving from salaries and benefits are based on the assumption that positions are eliminated.

Summary of cost savings if Environment Days eliminated		
Salaries and Benefits	$	256,000
Materials and supplies	$	279,000
Advertising & Event Promotion	$	44,000
Haulage	$	10,000
Provincial reimbursement for electronic waste and tires that would not be received if the program was eliminated	$	(79,000)
Total expected savings	$	510,000

Estimated net financial impact of +$129,200 to +$510,000
Full elimination used for summary purposes: **+$510,000**

Charities, Institutions & Religious Organizations
Introduction

- Background
  - Charities, Institutions & Religious Organizations (CIROs) are SWM's only customer base that are not being charged for Solid Waste collection
  - CIROs are already subject to charges for water and sewer
  - CIROs consist of approximately 1,100 entities which generate approximately 16,700 tonnes of solid waste per year, comprised of 14,300 tonnes disposed and 2,400 tonnes recycled, currently costing the Division $1.6 million per year*

- The SWMS Division has raised 3 options for review:
  1. Eliminate CIRO City collection services and disband existing collection services;
  2. Provision of City collection services to CIROs for a fee, but exclude hospitals and nursing homes; and
  3. Continue to provide collection services to existing customers without charge, but do not offer service to additional CIROs

* Figures from Report No. 3 of the Works Committee, Clause 4, as adopted by the Council of the City of Toronto at its meeting held on April 14, 15 and 16, 2003)

Charities, Institutions & Religious Organizations

- No evidence of an analysis of options 1 or 2 was provided to E&Y. E&Y recommends the following additional data be prepared to perform analysis of these options:

Suggested Data	Analytical Purpose
Complete listing of CIRO locations by type that matches the total number of collection locations	To segregate the various types of CIRO locations for further analysis. Several factors may differ among the constituent groups and have a bearing on the analysis
Breakdown of the tonnage and cost per ton of collecting solid waste at hospitals and nursing homes	To assess the expected cost savings from excluding the provision of waste collection services to hospitals and nursing homes

Charities, Institutions & Religious Organizations

- Most the analysis provided by the SWMS Division pertained to a proposed rate structure system (as contemplated by option 2).

- SWMS Division believes that any proposed rate structure will provide financial incentive to reduce and divert waste.
  - Revenue received from inviting CIROs to a proposed cost structure would offset costs incurred.
  - A study to determine the number of participants that would opt-in to a for-fee publicly provided service would need to be performed to verify the quantum of revenue that would be affected (all scenarios would be affected)

- 4 sample rate structures were presented by the SWMS Division:
  - Volume-based rate structure based on gross charge;
  - Volume-based rate structure based on gross charge and net of $209.00 per property;
  - School Board rate structure based on current gross charge; and
  - Commercial rate structure based on gross charge.

Charities, Institutions & Religious Organizations

Division's Revenue Creation Analysis

	Sample Rate Structures			
	1	2	3	4
	By Volume	By Volume Less Rebate	School Board Rates	Commercial Rates
Non Billable Miller collections	852,590	852,590	255,606	531,205
Curbside collections	630,420	630,420	457,985	657,293
	1,483,010	1,483,010	713,591	1,188,498
Transfer station tip fee revenue	446,514	446,514	446,514	446,514
	1,929,524	1,929,524	1,160,104	1,635,012
Less: Non-program rebate	N/A	(258,742)	N/A	N/A
Total estimated revenue	1,929,524	1,670,782	1,160,104	1,635,012

- Notes:
  - Sample rate structure 1 and 2 are based on 2009 compacted and uncompacted actual **volume** collected.
  - Sample rate structure 3 and 4 are based on the recorded **number of bins** documented to be on site at each location.

Charities, Institutions & Religious Organizations
Division's Revenue Creation Analysis

- SWMS Division's estimated revenue creation under different price structures range from approximately $1.1M to $1.9M.
- The main variance between the revenue created from the different price structures relates to the Non Billable Miller collections revenue line
- This variance is a result of the calculation using variable price structures and bases i.e. actual volume vs. recorded number of bins on site.
  - Price structures 1 & 2 calculate revenue from waste collection at a fixed rate per cubic yard.
  - Price structures 3 & 4 calculate revenue from waste collection on a sliding scale depending on bin size.
  - Discussions with the SWMS Division have also indicated that an updated listing of the recorded number of bins on site is not actively maintained. As the waste collection service has been provided gratuitously, the number of bins on site would previously not have had any revenue impact.
  - Therefore, additional bins added to a site by the CIRO without the SWMS Division's knowledge or a more frequent than average collection would have been ignored in the calculation for expected revenue for samples 3 and 4.
- It should be recognized that the SWMS Division would realize a financial benefit from a for-fee service regardless of the opt-in rate:
  - If they opt in, the revenue would result in a positive net financial impact
  - If they opt out, the currently unrecovered cost would be eliminated
- While the options and rate structures forwarded by the SWMS Division could result in financial benefits, there may be social reasons for not pursuing the recovery of costs from CIROs

Estimated net financial impact of +$1.1 million to +$1.9 million
"Volume less rebate" scenario used for summary purposes: **+$1.7 million**

Drop & Load
Introduction

- Background
  - The City of Toronto provides a service to private collectors and neighbouring regions which helps facilitate the transfer of waste from private collection vehicles to private haulage trailers for final disposal at landfills other than the city-owned landfill site at Green Lane
  - 2011 volumes were budgeted at 20,000 tonnes @$13 ($260,000 total revenue)
  - The SWMS Division expects to double the volume and revenue in 2012 (40,000 tonnes @$13 for $520,000 total revenue).
- The City of Toronto has asked Ernst & Young to review the analysis prepared on:
  - Current rates charged on the Drop & Load program; and
  - Strategies to increase revenue opportunities associated with the Drop and Load program.
- SWMS Division analysis requires further work including:
  - Rationale for doubling volume from 2011 to 2012 and for rate structure
  - “Up front investment setting up contracts with companies, taking drop & load, inputting into weighscale billing systems for tracking” cited in the Business Case are valid considerations but have not been included in the analysis
  - SWMS Division needs to provide the support for the estimated $25,000 costs of promotion (how it compares to the effectiveness of previous similar campaigns aimed at a similar audience)

Drop & Load
Recommendation

- The effect on volume of raising per tonne fees is a matter of price sensitivity – further analysis is required:
  - Compare the $13/tonne rate charged by the City to rates charged by independent private service providers in the GTA
  - An analysis of the price elasticity of demand, illustrating sensitivities and expected levels of demand at different rate levels including an analysis of historical demand changes based on the previous price increases; and
  - An analysis of the assumptions surrounding the expected increase in tonnage at $13/tonne rate.

- Further analysis is also required:
  - To determine any potential incremental administrative costs (already cited in the Division's business case)
  - To determine the effectiveness of communication campaigns (with spend in the order of magnitude of $25,000) aimed at similar audiences and the related changes in volumes, if any

Estimated net financial impact (excluding administrative costs and a fee change) of **+$0.2 million**

Summary of Potential Opportunities Identified

Summary of Opportunities Identified

Ref ID	Opportunity description	Phase	Est. Timeline to Complete	Potential benefit	Complexity
Service Efficiency					
C-01	The working day for collection staff is materially shortened due to an incentive program; slightly lengthening routes, while maintaining the incentive program would result in savings in labour and equipment wear	2	9-12 months	$ 4.4M	Medium
C-05	Number of supervisors should be reduced in District 2	1	2 months	$ 0.2M	Low
C-11	Efficiency gains could be achieved by more fully loading trucks before unloading at transfer stations	2	3 months	$ 0.8M	Medium
X-01	Transfer station unloading (City Collection) should be controlled and thereby rebalanced to minimize line-ups at peak times and allow daytime collection trucks to unload faster	2	3 months	$ 0.3M	Medium
X-04	Unloading times could be improved at certain transfer stations	3	12- 15 months	$ 0.6M	High
P-04	A span of control analysis reveals opportunities to consolidate responsibilities among fewer management staff	1	2 months	$ 0.8M	Medium
				$ 7.1M	
SWMS Division identified					
VS-01	Discontinuing the practice of allowing four free tags for garbage in excess of residents' chosen garbage bin size	n/a	6 months	$ 0.9M	Low
VS-02	Discontinuing the practice of allowing occasional overflow recycling to be set out in clear plastic bags (undermines the automated collection method)	n/a	6 months	$ 0.5M	Medium
VS-03	Discontinuing the Environment Days (many services are now available through formal programs, operations, depots, or pick-up for example)	n/a	6 months	$ 0.5M	Low
VS-04	Pursuing additional revenue generation through a fee-for-service charge to Charities, Institutions, and Religious Organizations (CIROs) currently exempt from the volume-based waste rate system	n/a	6 months	$ 1.7M	Low
VS-05	Additional revenue may be achieved through a review of this service included the fee charged and strategies to increase this revenue opportunity	n/a	6 months	$ 0.2M	Medium
				$ 3.8M	

Grouping of Opportunities by Phase

Phase	Focus	# of initiatives	Phase Duration	Service efficiencies – Collections	Service efficiencies – Others	Total
1	Initiatives that are expected to be quick/easy to implement yet deliver quantifiable benefits	2	2 months	$0.2M	$0.8M	$1.0M
2	Initiatives that target improvement to operational efficiencies within collections	3	9 to 12 months	$5.2M	$0.3M	$5.5M
3	Initiatives that target continuous improvement within City of Toronto Solid Waste Management to transfer the organization into an industry leader	1	24 to 27 months+	—	$0.6M	$0.6M
Total*				**$5.4M**	**$1.7M**	**$7.1M**

Phase 1 Initiatives: Initiatives include reducing the number of supervisors and balancing the span of control across the organization

Phase 2 Initiatives: Initiatives include lengthen collection routes, filling trucks to capacity before visits to transfer stations and rebalancing off-loading at transfer stations to minimize wait times

Phase 3 Initiatives: Initiatives include improving unload times at transfer stations,

* Includes Service Efficiency opportunities only; SWMS Division-identified areas not included

For Further Consideration

Other Considerations

- Transfer Stations
  - Open Victoria Park to private loads during the day (i.e. between 8 a.m. and 4 p.m.) due to lack of City collection traffic. This would reduce line-ups and congestion at nearby stations e.g. Bermondsey.

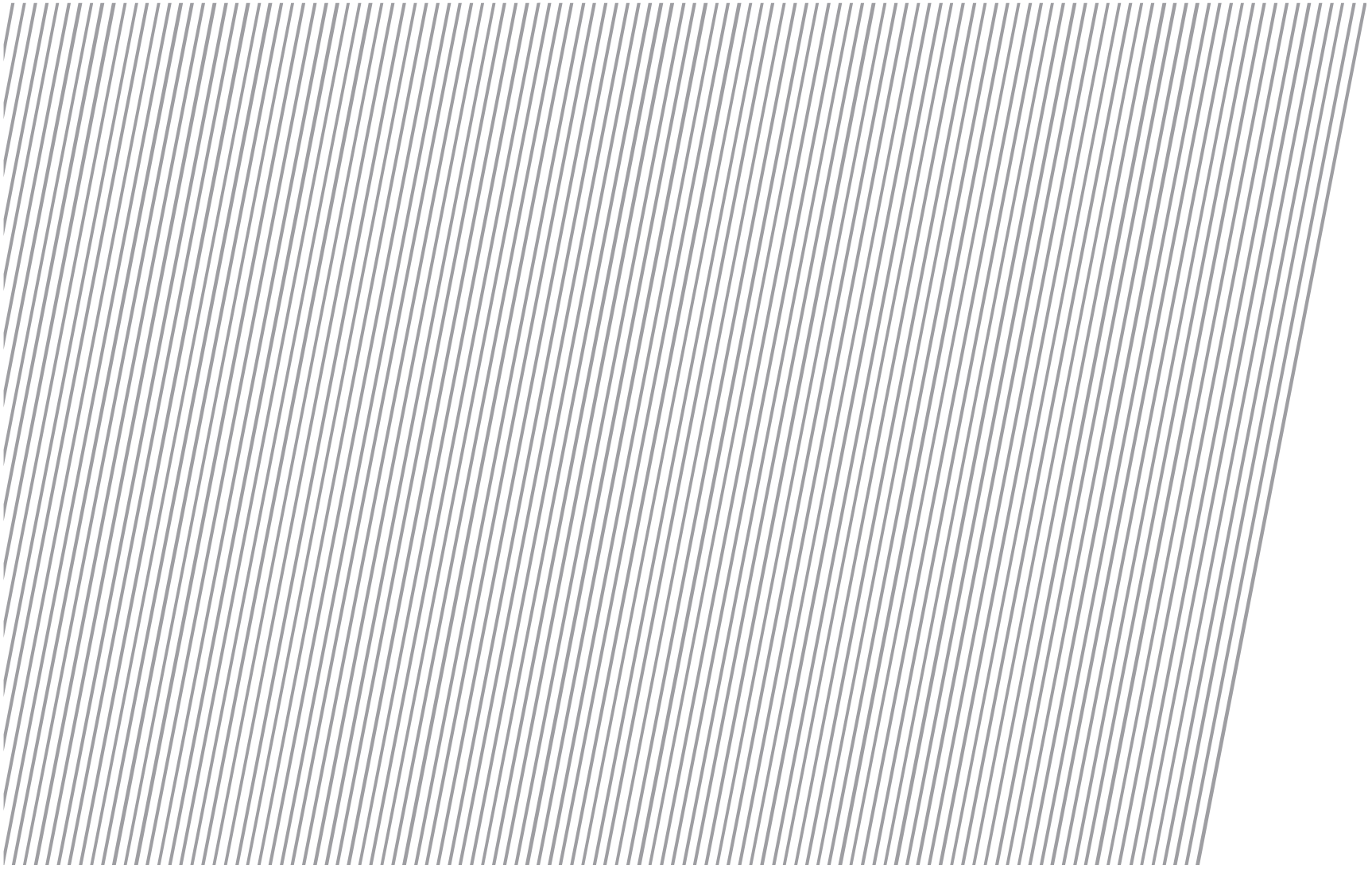
- Procurement
  - Comments have been made by SWMS Division management about challenges with the process of ordering MRO parts
    - Establishing or improving catalogue standardization could serve to accelerate procurement transactions and improve process efficiency
  - There may also be an opportunity to review expenditures related to indirect supplies and services and MRO parts
    - Initiatives to rationalize the vendor base typically yield between 5% and 15% savings (reduction in addressable spend)
    - In the case of contracts that are entered into across multiple divisions, coordination with these other divisions may be necessary

- SWMS Division should consider a review of working capital management practices which may lead to further efficiencies

- There seemed to be a high degree of shared responsibility between different units within SWMS and with Finance. RACI (Responsible, Accountable, Consulted, Informed) analysis should be performed to determine where there is duplication for the execution of duties and roles:
  - Identify all functions (activities, tasks and decisions) that have to be accomplished for effective operation.
  - Clarify roles and individual levels of participation in relation to each activity.
  - Gain agreement on who should be doing what, and the number of FTE's needed to complete the task.

APPENDICES

Appendix A – Key Cost Drivers



Summary of Collection Costs

Cost Drivers	D2	D3	D4
Salaries and Benefits	20,882,319	15,361,630	11,159,860
Material and Supplies:			
Apparel	85,955	109,361	83,784
Medical and Dental	47,615	290	147
Other	22,530	58,276	9,123
Equipment	7,507	69,534	5,369
Services and Rent: *			
Laundry	85,778	85,555	32,796
Telecom	31,600	23,555	9,550
Other	69,501	25,394	22,460
Capital Transfers	-	-	-
Inter-divisional charges			
Fleet	6,205,700	4,379,491	3,342,359
Other	17,723	7,358	8,883
Other Expenditures	(1,344)	-	-
Total	27,454,884	20,120,444	14,674,330

* D2 excludes $7,837,942 of D1 contract costs

Cost Drivers	Night	Litter	Operations / Support
Salaries and Benefits	10,045,017	11,685,283	2,563,976
Material and Supplies			
Apparel	47,614	44,310	1,682
Waste basket/indus.&rec	-	-	2,924,465
Other	54,386	99,249	204,404
Equipment	6,044	9,942	100,155
Services and Rent			
Telecom	13,865	23,451	32,114
Laundry	16,672	42,481	-
Contracted Services	-	1,142,412	70,776
Other	8,356	8,652	129,340
Capital Transfers	-	-	150,000
Inter-divisional charges			
Fleet	613,097	1,613,247	118,796
Other	141	16,891	26,674
Other Expenditures	-	-	3,263
Total	10,805,191	14,685,918	6,325,646

Cost Drivers	Consolidated Costs	% of Total
Salaries and Benefits	71,698,086	76.22%
Material and Supplies	3,793,190	4.03%
Equipment	198,552	0.21%
Services and Rent	1,874,308	1.99%
Capital Transfers	150,000	0.16%
Inter-divisional charges	16,350,359	17.38%
Other Expenditures	1,919	0.00%
Total	$94,066,413	

Summary of Transfer Station Costs

Transfer Stations								
Cost Drivers	Bermondsey	Disco	Ingram	Victoria Park	Dufferin	Scarborough	Commissioner	Total
Salaries and Benefits	2,236,189	1,501,359	2,116,294	1,171,009	1,250,326	2,223,247	1,196,617	11,695,041
Material and Supplies								
Parts	107,995	114,978	79,942	34,924	33,088	61,819	40,100	472,846
Hydro	104,165	192,256	137,031	95,976	263,105	233,629	62,970	1,089,133
Building and reno supplies	23,923	13,292	59,408	10,334	30,045	9,889	14,218	161,108
Other	56,190	60,698	142,360	129,842	53,365	94,177	82,240	618,871
Equipment	3,098	4,048	4,245	1,680	13,767	8,138	1,213	36,190
Services and Rent	270,955	149,963	142,028	132,311	201,366	316,996	80,760	1,294,380
Capital Transfers	114,286	13,995	68,014	47,082	3,135	72,780	29,177	348,469
Inter-divisional charges								
Fleet	84,671	102,524	13,687	12,522	102,742	161,964	53,401	531,511
Other	10,294	13,586	31,410	10,770	14,393	32,063	7,967	120,482
Other Expenditures	17,090	4,373	9,528	7,176	1,759	9,115	7,273	56,314
Total	3,028,857	2,171,072	2,803,946	1,653,626	1,967,090	3,223,818	1,575,937	16,424,346

Other Transfer Station Operations					
Cost Drivers	Waste Rolloff	Recycle Rolloff	Radiation Monitoring	Reuse Centre	Total
Salaries and benefits	583,685	343,848	187,134	-	1,114,666
Materials and supplies	3,130	1,629	7,103	42,002	53,865
Equipment	-	-	534	-	534
Fleet	50,072	9,823	5,887	3,156	68,937
Services and rents	57,355	72,502	43,610	957,374	1,130,842
Total	694,242	427,802	244,268	1,002,533	2,368,844

Cost Drivers	Consolidated Costs	% of Total
Salaries and Benefits	12,809,706	68.16%
Material and Supplies	2,395,824	12.75%
Equipment	36,724	0.20%
Services and Rent	2,425,222	12.90%
Capital Transfers	348,469	1.85%
Inter-divisional charges & Fleet	720,930	3.84%
Other Expenditures	56,314	0.30%
Total	$18,793,189	

Summary of New Infrastructure and Contract Costs

NID&CS								
Cost Drivers	MRF Single Stream Scarborough	RFID Multi Unit Res. Levy	Front End Collection	MRF Single Stream Dufferin	Leaf and Yard Waste	MWPF Dufferin SSO	Operations Support Admin	Operational Planning
Salaries and Benefits	203,101	-	645,467	205,552	(5,166)	111,136	1,030,583	375,953
Material and Supplies	200	-	12,060	262,681	1,195	39,714	16,651	1,455
Equipment	-	1	1,071	462		-	5,465	4,237
Services and Rent	8,956,789	29,731	8,008,220	8,165,023	4,735,138	14,150,484	69,197	18,394
Inter-divisional charges	9,118		54,258	2,100		12,774	3,204	572
Other Expenditures				321,688				
Total	9,169,207	29,732	8,721,076	8,957,506	4,731,168	14,314,108	1,125,100	400,610

Cost Drivers	Consolidated Costs	% of Total
Salaries and Benefits	2,566,627	5.41%
Material and Supplies	333,956	0.70%
Equipment	11,235	0.02%
Services and Rent	44,132,976	93.01%
Inter-divisional charges	82,025	0.17%
Other Expenditures	321,688	0.68%
Total	$47,448,507	

Summary of Haulage and Disposal Costs

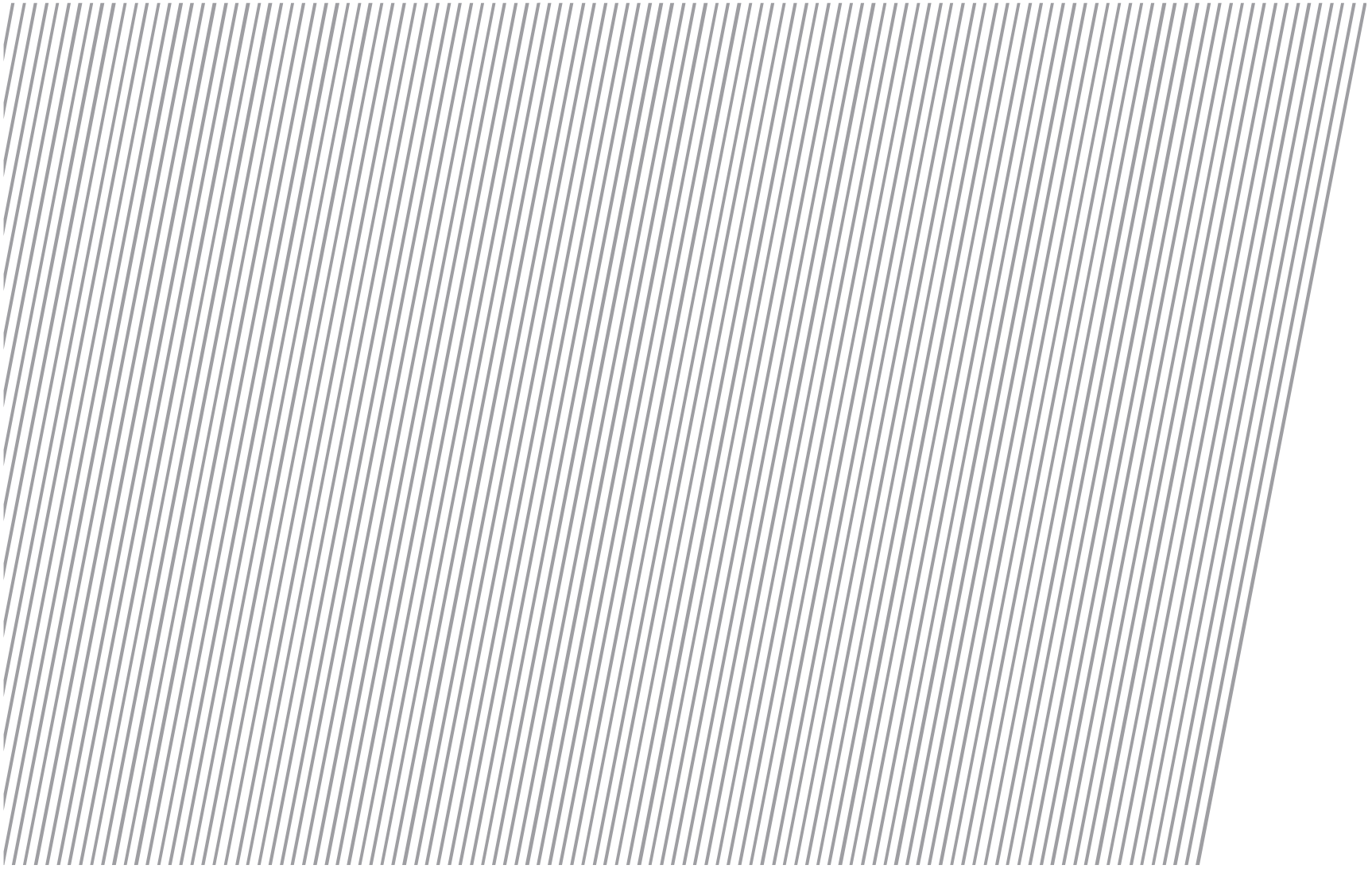
Cost Drivers	Michigan Disposal Contract	Green Lane Landfill	Green Lane Net Disposal Savings	Total
Salaries and benefits	-	137,131	-	137,131
Materials and supplies	-	226,154	-	226,154
Equipment	-	12,436	-	12,436
Services and Rents				
Michigan disposal	11,310,757	-	-	11,310,757
Contracted services - M&E	-	4,542,241	-	4,542,241
Royalty Fees	-	1,409,169	-	1,409,169
Repairs and maintenance		353,080	-	353,080
Green lane disposal	-	-	1,200,048	1,200,048
Other	-	140,477	-	140,477
Contributions and Transfers *				
Payment in lieu of taxes	-	1,044,178	-	1,044,178
Capital Transfers				
Contribution to reserve fund	-	789,583	-	789,583
Debt - principal	-	3,216,395	-	3,216,395
Debt - interest	-	4,903,590	-	4,903,590
Inter-divisional charges	4,120	186,417	-	190,538
Other Expenditures	-	2,149	-	2,149
Total	**11,314,877**	**16,963,000**	**1,200,048**	**29,477,926**

*Excludes intercompany charge and corresponding revenue of $3,308,177

Cost Drivers	Consolidated Costs	% of Total
Salaries and Benefits	5,143,191	8.35%
Material and Supplies	579,667	0.94%
Equipment	12,436	0.02%
Services and Rent	44,661,106	72.51%
Contributions and Transfers	1,044,178	1.70%
Capital Transfers	8,909,568	14.46%
Inter-divisional charges	1,244,717	2.02%
Other Expenditures	2,149	0.00%
Total	**$61,597,012**	

Cost Drivers	Recycle Haulage	Waste Haulage	Michigan Haulage	Total
Salaries and benefits	3,400,281	1,605,779	-	5,006,060
Materials and supplies	234,664	118,848	-	353,513
Equipment	-	-	-	-
Inter-divisional charges				
Fleet	587,168	462,298	-	1,049,466
Other	1,074	3,639	-	4,713
Services and rents	1,171,230	212,644	24,321,460	25,705,335
Total	**5,394,418**	**2,403,208**	**24,321,460**	**32,119,087**

Appendix B – Observations



Observations by Service Function

- While not part of the scope of this engagement, E&Y made certain observation during the tours, interviews and review of documentation provided by the SWMS Division. These observations pertain to procedures, policies or other actions that appear to contribute positively to the efficiency of the services provided by the SWMS Division. These observations were not tested and no analysis was undertaken to determine whether the potential benefit outweighed the associated cost of the activity. Readers are cautioned that these observations are anecdotal in nature and the observations are based on untested assertions made by SWMS Division management.

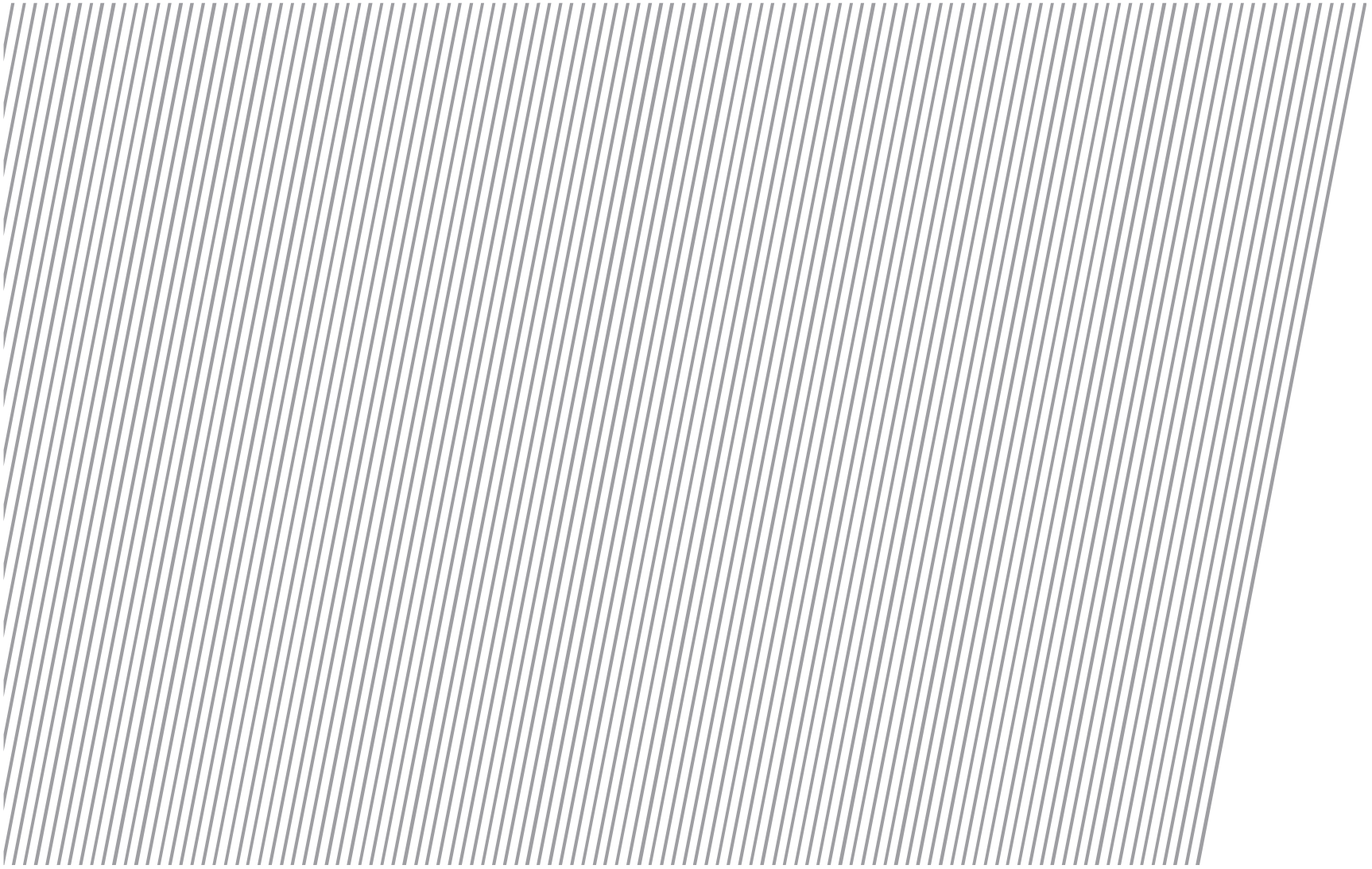
Observations
Collections

Description	Efficiency Implications
✓ Certain drivers leave truck yard prior to start time voluntarily (by-product of incentive program)	► Avoids gridlocks at truck yard ► Workers ready to collect from curbside by 7 a.m.
✓ Use of technology (RouteSmart) to optimize curbside collection routes (to be piloted in September)	► Incorporates historical tonnage data and distance to closest transfer stations ► Balances routes to ensure even distribution of work among beats
✓ 4-day collection week	► Collection schedule changes are rare (thereby improving system simplicity and resident compliance) as statutory holidays do not interfere with 4-day work schedule ► Automated equipment requires twice the amount of maintenance; extra day off allows for time to address equipment issues
✓ Yards have been consolidated down to 3	► Finch, Morningside yards no longer used by SWMS Division as of early 2011 ► Consolidates overhead to fewer locations
✓ Waste is collected at night for commercial properties and residents living over commercial properties	► Avoids gridlocks on major roads during the day time
✓ Volunteers (“3R Ambassadors”)	► On-site representatives disseminate information and encourage diversion ► Managed by only one City staff member
✓ Final stages of testing the use of radio-frequency identification (RFID) to track contractor (Miller) activity	► Less dependence on driver logs and transposition errors into data ► Quick access to summarizeable data
✓ Attempts are made to reach out to multi-family residences to convert to standard bins	► Allows for standardization of equipment and MRO parts, and route consolidation
✓ Rider litter vacuums and “Bag and Broom” team compliments a “Fly Squad” during litter collections	► Dedicated teams to maximize efficiencies and thoroughness of jobs performed
✓ Same collectors operate same beats	► Familiarity with route should improve pick-up thoroughness

Observations
Transfer Stations, Processing and Disposal

Description	Efficiency Implications
✓ Landfill site within 3 hours of Toronto (relative to former Michigan arrangement)	► Trailers to landfill can make 2 runs a day, essentially cutting fleet size in half
✓ Only tilt trucks are allowed to dump garbage between 8 am and 4:30 pm	► Slower manual dumping does not impede City collectors during main collections hour
✓ City garbage trucks are weighed only once every 60 days	► No weigh scale visit on the way out minimizes turnaround time at transfer station
✓ 2 individuals at weigh scales	► Minimizes waiting time and therefore turnaround time at transfer station
✓ Standardized software and procedures at all weigh scales	► Allows for staff transfer and seamless back-filling
✓ Scrap metal moved according to volume rather than schedule	► Efficient use of resources and capacity
✓ Multiple contractors engaged to process yard waste	► Reduces risk of loss of continuity of service ► Encourages competition and lower costs
✓ Organic composting is done through an anaerobic process	► While the process is more expensive, the process does not produce as much odour. As a result, the Dufferin plant is the only organics processing plant that has not been shut down in Ontario
✓ MRF operates on a “just-in-time” basis	► Only ~2-day capacity; transfer stations act as buffer ► Forces efficiency

Appendix C – Other Hypotheses



Other Hypotheses

- This Appendix is comprised of hypotheses that were not tested for various reasons, mainly due to difficulties quantifying the costs and/or benefits

The following ideas may be able to further increase efficiencies of solid waste management, but the benefits cannot be quantified with available data

Hypothesis	Efficiency Implication	Reason why not pursued
Increase diversion	Extends life of current landfill, and therefore reduces need to expend time and resources on the search and set-up (e.g. regulatory) of a new landfill.	City is pursuing, and in some cases succeeding, at expanding current site. Efficiency therefore depends on diversion and expansion ability and timelines.
Re-design and prescribe movements of Collections Loaders through time/motion study	Study could reveal inefficient movements, which even if marginal, could be significant if multiplied by 500 Collections Loaders.	Small sample study's relevance is limited by variations in worker skill, age, health, tenure, and behaviour under observation. Also, movements are simple enough so as to limit number and nature of opportunities.
Increase number of transfer stations	Gives Collection personnel more options for drop-off points.	Impractical in immediate term; capital cost would outweigh near and medium term benefits. Also Toronto is at the higher end of transfer station operating costs among other cities.
Increase number of vehicle yards	Gives Collection personnel more options for starting points.	Finch location and Morningside yards no longer used in order to consolidate operations; cost roughly outweighs benefits
Increase education regarding littering	Reduce the need for Bag and Brooms	Several assumptions needed to correlate communication costs (of which the City's spend is a sub-component of other sources) to behaviour (B&B's are a fixed cost, working regardless of litter situation).
Map pick up sites with traffic data such as curb side parking and congestion to determine optimal pick up time	Increase efficiency during pickup and reduce manual work.	SWMS has the internal expertise to execute this study; note added level of complexity for workers in near term.

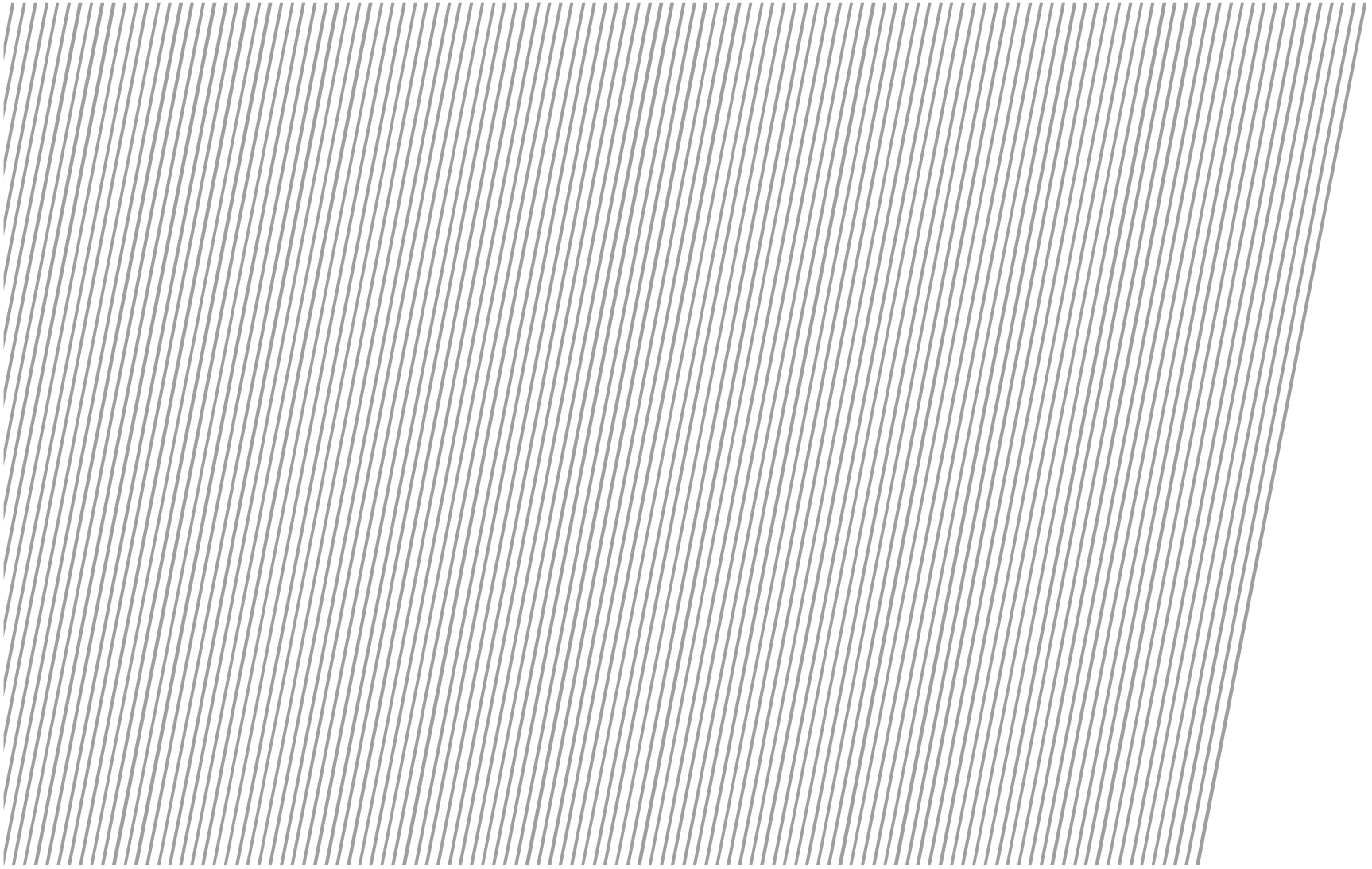
The following ideas may be able to further increase efficiencies of solid waste management, but the benefits cannot be quantified with available data

Hypothesis	Efficiency Implication	Reason why not pursued
Move litter pick-up start time for vacs 4 hours earlier (new shift to begin at midnight and end at 8 a.m.)	Earlier pick-up would avoid interference from and to pedestrians during daylight / rush hour.	Lack of interference offset by imperfect pick-up in darkness (offsetting factor also difficult to quantify); Some districts are still busy after midnight (e.g. entertainment district); remaining impact is marginal (affects 29 machines after 50% are contracted out).
Incent collection workers to minimize complaints by rewarding good/perfect records	Reduces resources needed to resolve missed pick-ups	Program could be construed as unfair in light of invalid calls, and administrative burden of validating calls and associating to collection team
Incent collection workers to minimize sick days by rewarding good/perfect records	Reduces resources needed overall (sick days have increased since changes made in Jan 1, 2009 – Dec 31, 2011 collective agreement)	Analysis depends highly on strength of incentive; incentive must be significant to reverse behaviour or to offset personal benefit
Convert more bag & brooms to litter vacuum	Vacuums can do a job much more efficiently, reducing the need for labour-intensive B&B	Underlying assumption is that vacuums and B&Bs are interchangeable, but B&Bs are known to have a higher level of detail than litter vacuums. Moreover, SWMS has the internal expertise in route conversion if necessary.
Collection automation should be continued (continue automation for two-product trucks, and automating green bin collection)	There would be a net benefit of approximately $5 million per year from converting a subset of the fleet to automated trucks by way of longer routes (and in turn, labour savings), even when compensating for increased maintenance costs	The one-time cost of new green bins that could be handled by automated equipment, and incremental cost of purchasing automated trucks (instead of manual trucks) create a significant one-time capital costs that would make the initial payback period span more than 7 years

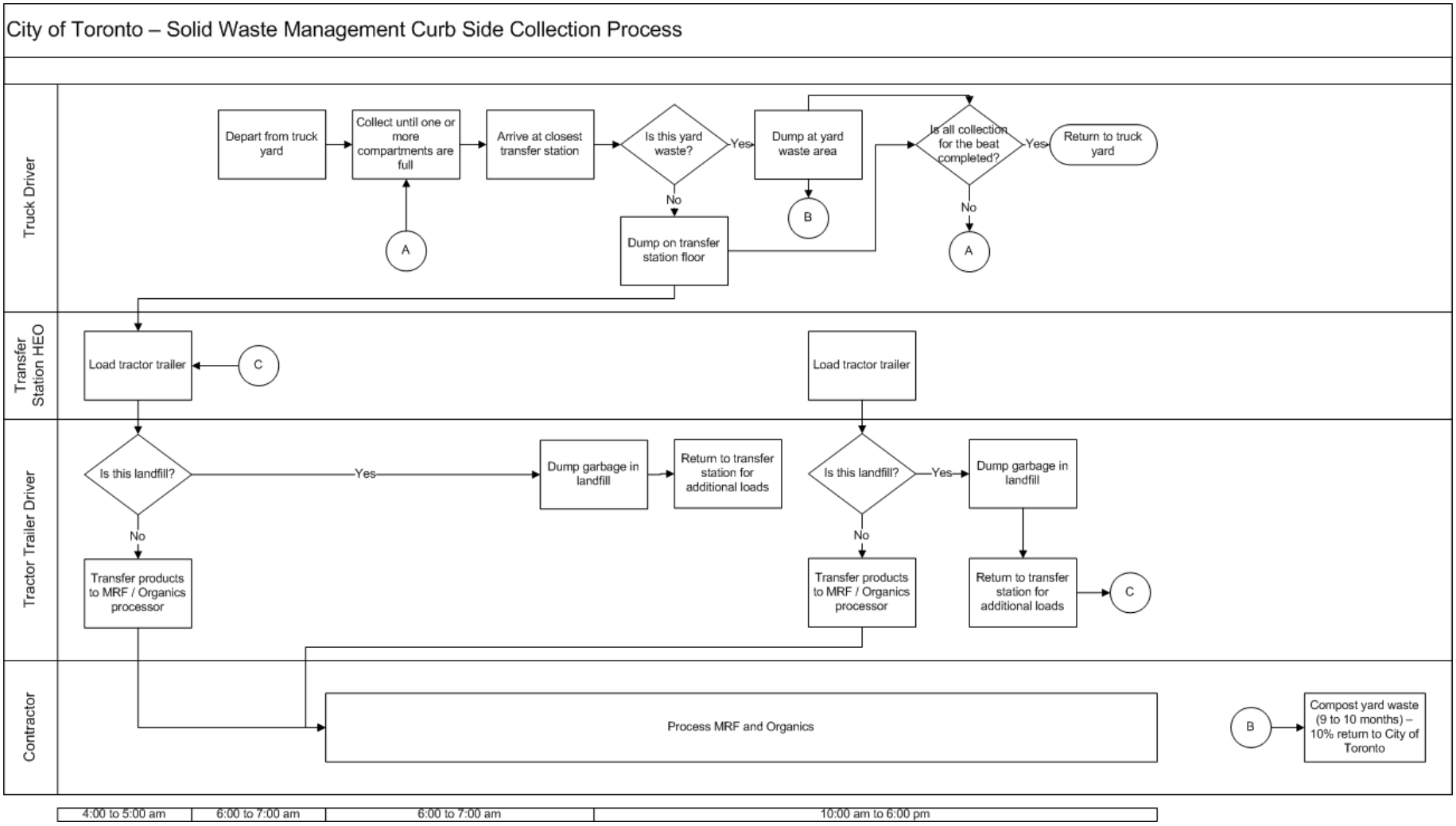
The following ideas may be able to further increase efficiencies of solid waste management, but the benefits cannot be quantified with available data

Hypothesis	Efficiency Implication	Reason why not pursued
Eliminating calendars from multi-res units will have no impact on service, marginal impact on compliance	Savings achieved through reduced number of calendars	Calendars provide more than collection schedules; they are educational tools that contribute to diversion goal. Also calendars contain information that is pertinent to residents of multi-family dwellings (e.g. what is recyclable, how to dispose of HHW, etc.). Hard cost and qualitative benefit difficult to compare.
Discontinue use of moloks in parks for immediate resource savings (labour and special equipment)	Less specialized equipment and staff to collect from moloks	Idea already contemplated by SWMS division.
Reduce number of park bin pick-ups in winter	Reduced number of park visits	Some parks are still in use in the winters, and a reduction in winter pickups would constitute a reduction in service.
The cost of improving compliance outweighs the cost to the City of penalties related to non-compliance imposed by processors	Reduction in residual will decrease the amount of fees the city has to pay MRF operators	By reducing MRF residue from 20% to 5%, the city is projected to save approximately $2.3M a year Several assumptions are needed to correlate education to reduction in residual rates.

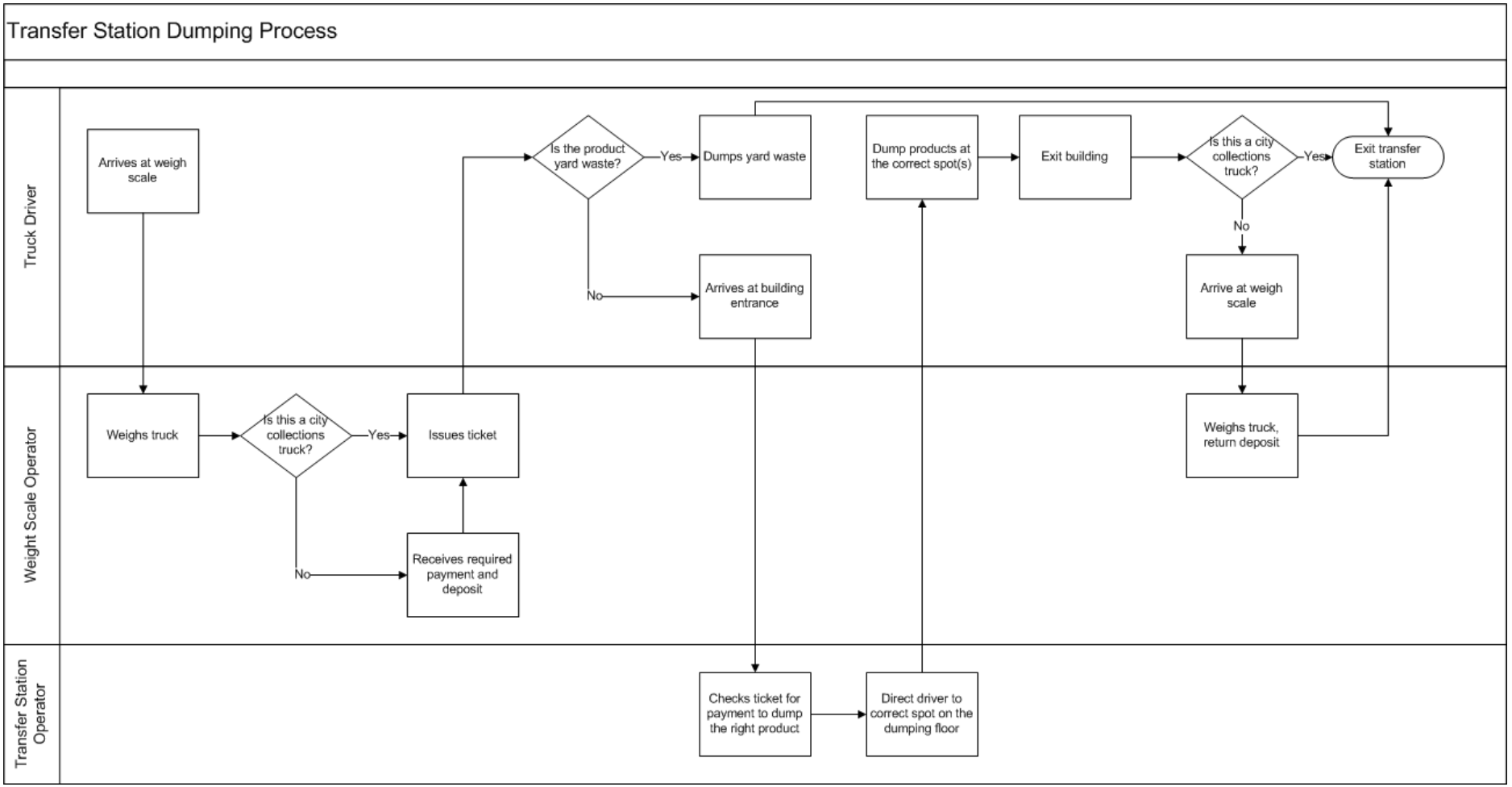
Appendix D – Process Maps



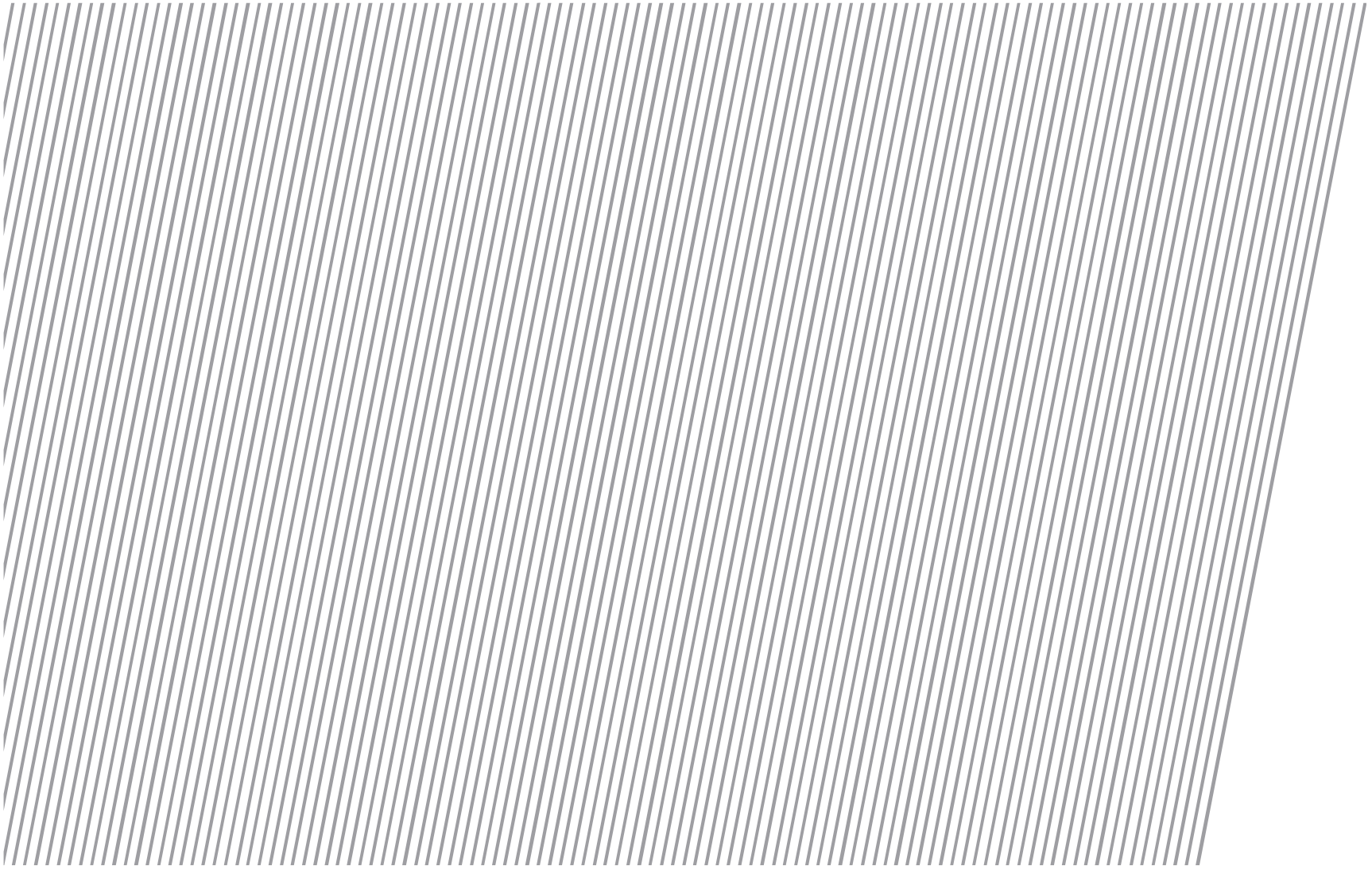
Process Map 1



Process Map 2



Appendix E – Glossary



Glossary

Term	Description
3P	Third party
3R	Reduce, reuse, recycle
B&B	“Bag and broom”: manual litter pick-up
CBA	Collective Bargaining Agreement
CIROs	Charities, Institutions & Religious Organizations
City	City of Toronto
D1	District 1 for curbside collection – Western border to Humber River
D2	District 2 for curbside collection – Humber River to Yonge Street
D3	District 3 for curbside collection – Yonge Street to Victoria Park Avenue
D4	District 4 for curbside collection – Victoria Park Avenue to eastern border
Flying Squad	Mobile collectors of filled litter bags (either from B&B’s or Vacs)
FTE	Full time equivalents
GPS	Global positioning system
Green Lane	City-owned landfill site
hh	Households
HHW	Household Hazardous Waste

Term	Description
Moloks	Large in-ground waste collection units used mostly in parks
MRF	Material Recovery Facility
MRO	Maintenance, repair and operations
Multi-res	Multi-family residential – Buildings with 8 or more residential units
Residue	Non-recyclable materials recovered during processing in MRFs (garbage)
RFID	Radio frequency identification
SSO	Source separated organics (a.k.a. “green bin”)
SSRM	Single stream recyclable materials (a.k.a. “recycling”)
SWMS	Solid Waste Management Services
Vacs	Litter vacuums

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