City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	February 6, 2012
From:	Tom Stewart, AScT. Director, Public Works Operations	**File:**	10-6370-01/2012-Vol 01
Re:	**Public Spaces Recycling Pilot Program - Results**		

Staff Recommendation

1. That the pilot program model be used to further develop and expand public spaces recycling in a graduated manner to City facilities, at City events, and to other City properties, including streetscapes, open spaces and parks.

2. That Nestlé Waters Canada be thanked for their sponsorship of the program and for the donation of the recycling containers to the City of Richmond.

Tom Stewart, AScT.
Director, Public Works Operations
(604-233-3301)

Att. 2

FOR ORIGINATING DEPARTMENT USE ONLY			
ROUTED TO:	**CONCURRENCE**		**CONCURRENCE OF GENERAL MANAGER**
Sustainability Parks & Recreation	Y ☑ N ☐ Y ☑ N ☐		
REVIEWED BY TAG	YES ☑	NO ☐	**REVIEWED BY CAO** YES ☑ NO ☐

Staff Report

Origin

A public spaces recycling pilot program was undertaken from July 28th – October 28th, 2011 in partnership with Nestlé Waters Canada. The pilot area encompassed the Steveston business district, Garry Point Park, the Steveston Community Centre and Hugh Boyd Park. The purpose of the pilot program was to help design a model for public spaces recycling programs and enhance the City's waste diversion efforts. Participation in the pilot program was approved by Council at their February 28, 2011 meeting. This project provided Richmond with the opportunity to host the first pilot public spaces recycling program in British Columbia.

This report presents the results of the pilot program and outlines an approach for expanding public spaces recycling in Richmond.

Analysis

Background

Recycling in public spaces is an important next step in advancing toward 70% waste diversion by 2015. It serves to reinforce the recycling behaviours typically practised in home environments, raises the profile of recycling in the community, and presents a positive statement and image of community pride and environmental responsibility. Challenges with public spaces recycling include contamination, additional servicing requirements associated with handling different recycling streams, scavenging, costs and suitability of containers, space requirements, and appropriate signage/messaging on containers.

The proposal by Nestlé Waters Canada to undertake a pilot public spaces recycling program presented an excellent opportunity to test various approaches to address the identified challenges as well as provide valuable insights in advancing public spaces recycling. The cost for the pilot program recycling containers, various communications aspects and program measurement were funded by Nestlé Waters Canada, the Canadian Beverage Association and Encorp Pacific (Canada). Nestlé Waters retained a consultant, StewardEdge Inc. to support the project. The City managed the implementation and operational aspects of the program and developed the program branding, signage materials and other related items.

The goals of the pilot program were to:

- measure and improve public spaces recycling performance,
- create a model public spaces recycling system for beverage containers and other recyclables,
- create enhanced opportunities for the public to manage recyclables and reduce litter,
- assess the impact of the provincial deposit/refund system for beverage containers on public spaces recycling,
- establish suitable recycling infrastructure based on functional and aesthetically pleasing recycling bins,
- increase public awareness of the opportunities for and convenience of recycling in Richmond.

To measure the program, solid waste audits were conducted prior to implementation of the program to establish a baseline assessment. A further audit was undertaken midway through the pilot to determine the impact of the program. The waste audit included structured observation of behaviour of the pilot area as well as at the Canada Line stations, where the City had previously installed recycling containers.

Waste Audit Taking Place at the Works Yard

Pilot Program Details

The pilot program encompassed three distinct areas, including the Steveston business district, two community parks and a community facility as shown in the following table. In total, Nestlé Waters provided 81 containers at a cost of approximately $50,000. The City undertook container installation, servicing and maintenance.

Table 1: Summary of New Recycling Bins

Location	Bin Type	Quantity
Steveston Village	Eco Media (for boardwalk)	2
	Recycle Duo Metal	42
Garry Point Park	Eco Media	2
	Recycle Duo Metal	20
Steveston Community Centre	Triads	3
	Recycle Duo Metal	8
Hugh Boyd Playing Field	Chevy Lane Macs Two Stream	4
	New Bin Totals	**81**

The City selected the styles of containers to be used as well container instructional signage. City staff also developed the promotional signage as well as the "Go! Recycle" program communications branding, with the tag line, "At home or on the go, recycle!". The program officially launched on July 28, 2011 with a successful media event held at Garry Point Park. Program signage was also installed at key locations to help raise awareness and increase participation. **Attachment 1** contains an overview of the containers, signage and installation locations.

The Steveston Group of 8 (major non-profit groups in the Steveston area) was consulted and supported the project. The Steveston logo was included on the promotional signage on containers based in the Steveston Business District and at Garry Point Park. A Steveston heritage signage was also included on the Eco Media containers. Steveston Community Centre staff were included in our consultations and involved in selecting the containers to be used inside their facility.

Container on Steveston boardwalk with heritage signage.

The outdoor containers were serviced by litter collection crews as part of their normal course of duties. Collected recycling materials were brought to the Recycling Depot. Adjustments were incorporated based on litter staff input as well as comments received from the public generally as the pilot program progressed. Steveston Community Centre managed servicing of the indoor containers at their centre.

While the pilot portion of this program has completed, the containers remain in service for continued public use.

Pilot Program Results

A detailed report on the program was prepared by StewardEdge Consulting (**Attachment 2**), which contains an overview of the pilot as well as detailed audit results by individual pilot area. A summary of the results, key findings and lessons learned are discussed below:

Waste Audit Results

- There was a 35% reduction in overall waste generated (1,422 kg baseline audit vs. 928 kg post-implementation):

Table 2: Waste Generation Summary

	Baseline Generation	Post-Implementation Generation
	kg/week	kg/week
Total Recyclable Fibre	237.8	150.8
Total Recyclable Beverage Containers	29.2	13.9
PET Bottles	*8.2*	*2.6*
Total Recyclable Non Beverage Containers	36.9	18.0
Total Recyclable Containers	**74.3**	**34.5**
Total Recyclables (Fibre + Containers)	**312.1**	**185.4**
Non-Recyclable Material	1,110.3	742.6
Total All Material	**1,422.4**	**927.9**
Percent Change		**-35%**

(Source: StewardEdge Consulting)

- Recyclable beverage containers in the garbage were reduced by 27%. Total recyclable containers in the garbage were reduced by 29%. These materials may have been diverted into the appropriate container and likely taken via scavenging activity. Total recyclables (including fibre and containers) in the garbage were reduced by 9%.

Table 3: Waste Composition Comparison

Material Category	Baseline Composition	Post-Implementation Composition	% Change in Composition
Total Recyclable Fibre	16.7%	16.3%	-3%
Total Recyclable Beverage Containers	2.1%	1.5%	-27%
PET Bottles	*0.6%*	*0.3%*	*-52%*
Total Recyclable Non Beverage Containers	2.6%	1.9%	-25%
Total Recyclable Containers	**5.2%**	**3.7%**	**-29%**
Total Recyclables (Fibre + Containers)	**21.9%**	**20.0%**	**-9%**
Non-Recyclable Materials	78.1%	80.0%	3%

(Source: StewardEdge Consulting)

- The pilot was most successful in Steveston Village, where total recyclable containers in garbage decreased by 41%. Total recyclables (including fibre and containers) decreased by 12%.

Other Findings

- Scavenging is a common activity, where individuals rummage through containers to collect refundable items. In many cases, scavengers will damage container locks in an attempt to access the refund containers. Liner bags can also become dislodged. These issues can present challenges for litter attendants and impact servicing times. There needs to be balance struck between providing security for the containers to avoid any liability concerns (i.e. servicing doors left ajar) and the availability of deposit/refund containers to determined scavengers.

- Effective signage is a critical aspect of public spaces recycling programs. Through structured observation at the Canada Line, there was a 21% increase in the accuracy rate by which individuals place their waste in the appropriate stream where the individuals took the time to look at the signage (96% vs. 75%).

- Some negative comments were received about the brightness of the green colour of the promotional signage on the sides of the containers. This is an issue of balance between ensuring attention is drawn to encourage recycling, while at the same time, not having signage which might be perceived as overwhelming. This can be easily managed by adjusting the colour tones. Staff are working to fine tune the colour scheme for future application and use.

- Very positive feedback about the program was received from many Steveston businesses and the general public. The availability of recycling opportunities in these highly-visible and high-pedestrian traffic areas conveyed a very positive image of Richmond's environmental leadership, and was well received by residents and visitors alike.

Lessons Learned

The pilot program presented a good opportunity to test different styles and types of containers, measure the effects of public spaces recycling, as well as assess the effect of instructional and promotional signage. Key lessons from this pilot were that different styles of containers will be required for expanded public spaces recycling. For example, the Chevy Lane container may be best suited to parks and City streetscape environments, whereas bins such as the Eco Media container are good for high traffic areas where there are wide pathways or walkways. The Recycling Duo and Triad containers are suited to indoor use, i.e. at

Containers for Parks and Streetscape Environments

Containers for Indoor Use

community facilities. Therefore, a variety of containers may be the best approach for any wider-scale program.

Existing Garbage/Recycling Containers

Using recycling containers of similar design to garbage containers does not clearly distinguish or highlight recycling.

Containers should be of a design that is distinct from traditional waste containers to help draw attention to recycling. It is also clear that all containers, including those for waste, must allow individuals to deposit materials 'hands-free' -- in other words, without the requirement to touch a handle or flap.

Clear, concise, effective signage, which is both instructional and promotional, is a must. Images are an important aspect of signage, as is branding. The "Go!Recycle" branding aspect of this program was very successful in helping to draw attention to the program as well as promote recycling in public spaces. It is evident that an overarching communications campaign, which incorporates educational and instructional messaging, is a fundamental component to the successful introduction of a public spaces recycling program.

Scavenging for deposit/refund containers will continue to be an issue and is difficult to prevent. Public safety and operational effectiveness as impacted by scavenging are considerations in container design and selection.

The public spaces recycling program was very successful and was well received. The overall amount of waste generated as well as the amount of recyclable materials in the garbage was reduced, thereby improving public spaces recycling performance. The availability of distinct recycling containers, with clear and effective signage, and coupled with a focused communications and education campaign, played a pivotal role in the success of the pilot program through encouraging recycling and discouraging litter. It was also evident that the deposit/refund system for beverage containers is effective in limiting the amount of beverage containers that end up in the garbage stream.

Next Steps

Although the pilot program has concluded, the donation of the recycling containers to the City by Nestlé Waters and their partners allows public spaces recycling to continue on an on-going basis in the study area. This provides the City with an excellent foundation from which to further grow and develop public spaces recycling. Staff are currently working to make fine-tuning modifications to the containers and the instructional/promotional signage to maximize the program's overall effectiveness and as part of on-going evaluation.

Full scale implementation of a public spaces recycling program of a similar magnitude to that of the pilot, including both indoor (i.e. community facilities) and outdoor (streetscapes, open spaces, parks) environments, would be quite costly if undertaken all at the same time. It is also expected that the cumulative additional workload for litter collection staff could potentially result in the need for additional staffing resources. Therefore, a more graduated implementation approach, which allows for further evaluation, is preferred.

Moving forward, it is proposed that the program be implemented in a phased and opportunity-based approach. For example, community facilities and community event recycling can be targeted initially. City streetscapes, open spaces and parks can be implemented on an opportune basis, i.e. when existing containers become worn and require replacement and/or for new installations. The implementation cost would be managed within existing budget allocations to the degree possible, with any additional funding requirements identified through the budget process, if required.

Financial Impact

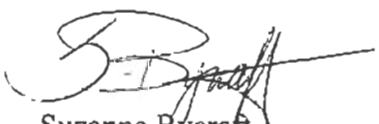
The cost for the recycling containers, waste audits and communications support was borne by Nestlé Waters Canada and their partners (estimated at $50,000 for the recycling containers, plus costs associated with the communication elements, waste audits and final summary report preparation). The City gained considerable benefit by assuming ownership of the containers, as well as valuable information from the waste audit, summary report and communications support. The City incurred costs associated with the promotional aspects of the program and container modifications, estimated at $14,000. These costs were accommodated within existing budget allocations.

Costs associated with expanding the program to community facilities, events, streetscapes, parks and open spaces will be from existing budget allocations, with any additional funding requirements identified through the normal budget process.

Conclusion

The Public Spaces Recycling Pilot Program was successful in helping to establish a model for public spaces recycling. The program was also successful in increasing recycling and reducing overall waste generation in the pilot study area. The City gained value in assuming ownership of the recycling containers as well as from the audit results and communications support. The promotional branding of this program as the "Go!Recycle" program, with the tag line, "At home or on the go, recycle!", was a key success factor in drawing awareness to the program and public spaces recycling in general.

A graduated approach to advancing public spaces recycling in City facilities, at City events and in streetscapes, parks and open spaces is recommended. Information from this pilot program will be very valuable in advancing this initiative, while at the same time raising the profile of recycling in the community and presenting a positive statement of community pride and environmental responsibility.



Suzanne Bycraft
Manager, Fleet & Environmental Programs
(604-233-3338)

SJB:

Attachment 1

Summary of Containers, Signage and Installation Locations

Recycling Duo
Dimension: 22.5" x 23.5" x 40"
42 – Steveston Village (including boardwalk)
20 – Garry Point
8 – outside Steveston Community Centre

Top opening

Side panels

Chevy Lane
Dimension: 24" x 38" 37"
4 - Hugh Boyd Sports Field

Front labels

Top labels

Eco-Media
Dimension: n/a
2 – Garry Point Park
2 – Steveston Village (boardwalk)

Front/back panel poster

Top canopy

Side panels

Front opening

Triad
Dimension: 17.6" x 31.9"
3 - Steveston Community Centre

Attachment 1 (Cont'd)

	Advantages	Disadvantages	Potential Solutions
Recycle Duo 	• Visually appealing and design. • Rain hood prevents liquid from damaging the quality of recycled material (e.g. fibre). • Side panels are spacious allowing for City branding opportunity. • Recycling containers can be seen from a distance. • Container design unique and allows for customization. • No flaps at openings. • Multiple use - outdoor/indoor use, however, best suited to indoor environments.	• Garbage stream has reduced capacity (i.e. less than a traditional garbage container). • Rain hood requires frequent cleaning by litter staff. • Locks are a not tamper proof. • Plastic panels are susceptible to vandalism. • Disposed and recycled materials can be seen through the clear/steel mesh door – looks unsightly. • Requires level surface, mounted on concrete pad.	• Container is available in single stream (eg. garbage only). Two units can be placed side-by-side depending on usage rate. • Redesign locks to discourage vandalism. • Side/front/back panels are available in solid steel. • Doors can be replaced with solid steel or smoked lexan. • Best application may be for indoor use. If used outside, use concrete pad mount.
Triad 	• Containers are well labelled – easy to use at a glance. • Doesn't take up a lot of space. • No flaps at openings. • Bins can be manoeuvred or 'clustered' differently to suit space.	• Suited to indoor use only.	
Eco-Media 	• Altered to remove flaps at openings. • Good capacity, suited to high volume/traffic. • Well labelled. • Front/back panels can be used to promote other recycling initiatives. • Sturdy structure and not easily damaged.	• Requires level surface and concrete pad mount. • Use should be restricted to large areas due to container size. • Susceptible to graffiti if any part of surface area is left vacant.	• Use concrete pad mounts and ensure level surface. • Suitable for boardwalk and wide sidewalk/walkway areas. • Ensure signage and promotional wraps cover all surface areas.
Chevy Lane 	• Container size is not invasive. • Educational labels can be placed at the top opening to remind people what goes where. • Sturdy structure which is less susceptible to damage. • Multiple use - outdoor/indoor • Latch locking system allows staff to put the same locks as other containers (avoid carrying around multiple keys).	• Container openings at top of bin allow water to penetrate waste and recyclables. • Somewhat restricted capacity. • Lack of suitable space to highlight promotional aspects of public spaces recycling. • Well suited to streetscapes, parks and open spaces. Can also be used indoors.	• Review potential to change opening location to front loading style. • Add containers for capacity. • Work with manufacturer to modify bin sides to allow additional promotion.

Attachment 2

STEWARDEDGE

City of Richmond Public Space Recycling Pilot Program Report

December 14, 2011

Prepared for:
Nestlé Waters Canada
Canadian Beverage Association
Encorp Pacific (Canada)
and the City of Richmond

Prepared by:
StewardEdge Inc.

Attachment 2 (Cont'd)

EXECUTIVE SUMMARY

This document is a report on the Public Space Recycling Pilot Program that was implemented in Richmond, British Columbia in the summer of 2011. Funding for the project was provided by Nestlé Waters Canada, the Canadian Beverage Association and Encorp Pacific (Canada) with operational and financial support from the City of Richmond.

The goals of the pilot program were to:

- Measure and improve public space recycling performance;
- Create a model public space recycling system for beverage containers and other recyclables generated in the City of Richmond;
- Create enhanced opportunities for the public to manage recyclables and reduce the amount of litter in public spaces;
- Assess the impact of the provincial deposit/refund system for beverage containers on a public space recycling program;
- In consultation with the City of Richmond, create and validate an enhanced public space recycling infrastructure based on functional and aesthetically pleasing recycling bins;
- Increase public awareness of the opportunities for and convenience of recycling in the City of Richmond.

Solid waste audits were conducted prior to implementation of the pilot program to establish a baseline assessment of the generation of waste and recyclables at the chosen sites. Follow-up audits were conducted after the introduction of new, enhanced recycling bins and supporting communications activities. The waste audits examined garbage and recycling from each bin, with each sample classified according to an established, comprehensive list of material categories. In the data analysis, the material categories were consolidated to arrive at a kilogram/week calculation for 30 material categories. In addition to the audits, structured observation was conducted at four Canada Line transit stations.

The program was supported with a public awareness campaign built on key learnings from pilot projects in Niagara, Sarnia and Halifax. Leveraging existing communications strategies at the City of Richmond, the campaign was a collaborative effort between the project sponsors and City staff. It included new signage, a public launch event, and extensive media coverage through public service announcements and earned media in newspapers, newsletters and social media.

The pilot program was successful in achieving the stated program goals. The enhancement of public space recycling infrastructure reduced the amount of recyclable material in the garbage stream and increased the apparent diversion of recyclables, including beverage containers.

In addition, the program provided a valuable template for the implementation and future expansion of public space recycling initiatives in similar communities.

The selection and strategic placement of more effective recycling bins, coupled with a compelling new brand ("Go!Recycle"), high-impact graphics and strong communications support from the City provided residents and visitors in the Pilot Area with the sense of greater opportunity to recycle – and a disincentive to litter in public spaces.

Attachment 2 (Cont'd)

Analysis of data from the pre- and post-implementation waste audits confirmed that the British Columbia deposit/refund system for beverage containers suppresses the quantity of beverage containers that remain disposed of in public spaces. However, enhancing people's opportunities to recycle in public spaces does improve the diversion of beverage containers discarded on-the-go.

Finally, effective communications and outreach activities raised the level of public awareness and created a platform for further emphasis on ways to expand recycling.

The report contains a number of detailed conclusions to support the proposition that Public Space Recycling can have a significant impact on consumer recycling behaviour. Among these conclusions are:

- While the actual numbers were small (plastic bottles represented only 0.58% of the waste stream prior to implementation), the diversion rate of plastic bottles from the garbage stream increased by 52% (to 0.28%).
- The composition of recyclable beverage containers found in the garbage stream decreased by 27% between the baseline audit and the post-implementation audit, indicating that residents and tourists were putting their beverage containers in the recycling bin.
- Results of the structured observations at the transit stations suggest that scavenging activities were responsible for the low numbers of bottles and cans in recycling bins. This observation was confirmed by City staff and by vandalism to recycling bin locks.
- The composition of recyclable non beverage containers found in the garbage stream decreased by 25% between the two audit periods.
- Effective signage is a critical component of public space recycling programs. The structured observation measured an increase of 21% in the accuracy rate by which individuals place their waste in the appropriate stream.

Given that bins were already in place at the pilot sites prior to program implementation, the results of the program are less dramatic than in pilot programs where no bins existed in the pre-implementation phase. However, the improvements made remain impressive and demonstrate the benefit of incremental improvements in public space recycling bins and signage.

Attachment 2 (Cont'd)

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SECTION I: PLANNING AND METHODOLOGY

1. Introduction

The City of Richmond is a large municipality in the Lower Mainland of British Columbia, with a population of 195,000 people living in an area of 129 square kilometers. The city is characterized by economic and demographic diversity and a mixture of urban, suburban and rural communities as well as commercial and industrial business areas.

Richmond boasts vibrant tourism and recreational facilities owing in part to the significant transportation, sports and other infrastructure investments undertaken in support of the 2010 Olympic Winter Games, for which it was an official venue. Steveston, a historic fishing village in southwest Richmond, is a popular tourist destination and recreational community that provides an ideal geographic focus and platform for the implementation of a public space recycling program focusing on beverage containers and paper products.

Public space recycling captures the "last mile" of recyclables – items otherwise collected through British Columbia's deposit/refund and curbside recycling programs but often left behind by consumers in areas such as parks, streetscapes and other public spaces. Beverage containers specifically are highly visible and often consumed on-the-go. This pilot program aimed to provide the residents and visitors in the Pilot Area (defined below) with the opportunity and infrastructure to recycle more effectively in public spaces, in the process helping to reduce litter and contribute to Metro Vancouver's municipal solid waste diversion target of 70%.

The pilot Public Space Recycling Program was sponsored by Nestlé Waters Canada in conjunction with the Canadian Beverage Association and Encorp Pacific (Canada) and in partnership with the City of Richmond. The purchase of new recycling bins for the pilot sites was funded by the sponsors, as was a significant portion of the accompanying public awareness campaign. StewardEdge Inc., a Canadian packaging and product stewardship program consultancy, was contracted to design and manage the project.

The pilot program was five months in duration[1] and was developed by StewardEdge in collaboration with the City of Richmond. StewardEdge planned the siting of the recycling bins, recommended the quantity and type of bins, provided critical input to promotion and education activities, and measured the overall performance, successes and challenges of the program. The City of Richmond assumed the operating costs of material collection as well as significant costs associated with the public awareness campaign.

2. Project Profile and Waste Streams

Southwest Richmond is a popular destination for locals and tourists alike. The Pilot Area consists of four public spaces in and around Steveston, a historic fishing village located on Richmond's southwestern tip. Each year, Steveston attracts thousands of visitors due to its quaint character,

[1] Initially planned as a three month pilot, the program was extended to five months due to bin design and related matters.

national historic sites, annual maritime festivals, waterfront boardwalks, whale watching tours and views of the Fraser River and Gulf Islands.

2.1. General Overview

By agreement among the project sponsors and the City of Richmond, StewardEdge was asked to implement and manage a Public Spaces Recycling (PSR) Program in the Pilot Area. Based on their popularity with tourists and local recreationists, Steveston Village, Garry Point Park, Steveston Community Centre and the playing fields at Hugh Boyd Community Park were identified as principal sites within the Pilot Area. New recycling bins were allocated to each venue. Collectively, these sites cover a compact area of less than five square kilometres but include a diversity of public space facilities.

The strategy with regard to site and bin selection was determined jointly by StewardEdge and City of Richmond staff, who also provided valuable insights into local consumer behaviour.

- "Triad" bins were placed inside the Steveston Community Centre, replacing the makeshift bins that had been in use prior to the pilot.
- Outside the Community Centre, "Recycle Duo" bins were concentrated in the area east of the building, which was previously under-serviced.
- In downtown Steveston Village, unattractive, tightly concentrated and less visible bins were replaced by fewer, but more effective Recycle Duo bins covering a larger area. In addition, two eye-catching "Eco Media" bins were placed on the boardwalk at Imperial Landing, one of the main attractions of Steveston.
- In Garry Point Park, Recycle Duo bins replaced existing single-stream bins along the main walking path. Eco Media bins were placed at the path entrance and in the parking lot adjacent to the main food concession.
- Chevy Lane Mac's Two Stream bins were placed at the playing fields at Hugh Boyd Community Park, which had previously been served only by small garbage bins.

Bin design improvements included the addition of rain hoods to reduce the impact of precipitation on collected materials, the removal of cover flaps on certain bins (which experience has shown to discourage use by consumers) and the use of single units to house multiple waste streams as opposed to multiple bins which created a disorganized look and tended to confuse consumers. Table 2.1 summarizes the types and quantities of bins selected for each site. Photographs of the bins are presented in Appendix B.

Table 2-1 New Recycling Bin Summary

Location	Bin Type	Quantity
Steveston Village	Eco Media (for boardwalk)	2
	Recycle Duo Metal	42
Garry Point Park	Eco Media	2
	Recycle Duo Metal	20
Steveston Community Centre	Triads	3
	Recycle Duo Metal	8
Hugh Boyd Playing Field	Chevy Lane Macs Two Stream	4
	New Bin Totals	81

2

Attachment 2 (Cont'd)

Goals

The goals of the pilot program were to:

- Measure and improve public space recycling performance;
- Create a model public space recycling system for beverage containers and other recyclables generated in the City of Richmond;
- Create enhanced opportunities for the public to manage recyclables and reduce the amount of litter in public spaces;
- Assess the impact of the provincial deposit/refund system for beverage containers on a public space recycling program;
- In consultation with the City of Richmond, create and validate an enhanced public space recycling infrastructure based on functional and aesthetically pleasing recycling bins;
- Increase public awareness of the opportunities for and convenience of recycling in the City of Richmond.

Objectives

Program objectives included:

- Identifying current recycling and disposal behaviours;
- Assessing the impact of recycling systems already in place including measurement of baseline volumes of beverage containers and fibre being recycled and landfilled;
- Providing effective public awareness and communications support that complemented existing communications related to Richmond's residential recycling programs;
- Implementing effective bin signage;
- Measuring the contamination rate of non-recyclables in the recycling stream pre and post-implementation;
- Measuring the increased rate of recycling achieved;
- Assessing the apparent effects of British Columbia's deposit/refund system for beverage containers on public space recycling;
- Measuring and observing recycling behaviour at four Canada Line stations.

Solid waste audits were conducted prior to installation of the new bins to establish baseline data. Post-implementation audits were conducted two months after the new bins were installed to measure the effectiveness of the initiative. Structured observation was also conducted during the baseline phase to obtain greater insight into the impact of British Columbia's beverage container deposit/refund program on the public's behaviour with regard to used beverage containers.

Collection facilities at four Canada Line transit stations were assessed through structured observation. The stations had previously been outfitted with collection bins but limited performance analysis had been undertaken. The eco-friendly receptacles sited at the transit stations are manufactured by Big Belly Solar and feature a solar powered waste compactor that

reduces collection frequency which saves time and money while reducing greenhouse gas emissions.

3. Waste Audit Methodology

StewardEdge conducted detailed waste composition studies from June 11 to 15 and September 24 to 29, 2011. The studies included detailed waste audits for each of the waste collection sites, during the pre-implementation phase and subsequent to bin implementation and roll-out of the communications strategy. The primary objective of the waste audits was to determine the composition of solid waste disposed of at the pilot sites and specifically, the composition of recyclables within the garbage stream. Waste samples were collected from each of the Pilot Area sites:

1. Steveston Village, including Imperial Landing
2. Garry Point Park
3. Steveston Community Centre
4. Playing fields at Hugh Boyd Community Park

During the baseline phase of the study, structured observation was conducted at four Canada Line transit stations to assess the behavioural impacts on the proper use of waste and recycling bins. The transit stations chosen for structured observation included:

1. Aberdeen Station
2. Bridgeport Station
3. Brighouse Station
4. Lansdowne Station

In terms of traffic, high season in the Pilot Area is from June to September, a time during which public spaces are frequented more often due to an influx of tourists and favourable weather.

Given that both the baseline and post-implementation audits fell within this season, the resultant data may not reflect seasonal variations. However, while generation of waste may be expected to increase during the high season, the composition should not vary substantially throughout the year. Moreover, in follow-up discussion with the City of Richmond, it was noted that the audits actually straddled the Pilot Area's peak season, which was generally considered to start at the beginning of July and end shortly after Labour Day. Thus, to the extent that seasonal variations in composition do occur, they would have been detected in the post-implementation audits.

Given this, the study data provides a reasonable representation of the composition of the public space waste streams in the Pilot Area.

3.1. Waste Sort Methodology

The following tasks outline the work performed during the solid waste composition study.

3.1.1. Composition Study Set Up

This task required City of Richmond staff to arrange for access and space to conduct the waste sorting exercise. City staff collected the waste materials and brought them to the Public Works yard where StewardEdge conducted the audit.

3.1.2. Waste Sort Categories

To provide a useful classification of material types and consistency with previous pilot project results, StewardEdge staff sorted the collected waste into 64 categories. The detailed list of material categories is presented in Table A-1 in the appendix.

3.1.3. Sampling

Each sample was hand-sorted into 64 material categories and weighed. The cumulative weekly weight of each material category was used to develop a profile of the public space waste composition in the Pilot Area.

The baseline audit took place over five days (Friday to Tuesday) while the post-implementation audit was conducted over six days (Friday to Wednesday). These days were specifically chosen to capture data from both peak (Friday to Sunday) and off-peak (Monday to Wednesday) days. A sixth day was added during the post-implementation phase to ensure any major variations would be captured in the dataset. All of the waste and recyclables generated were weighed and hand-sorted to determine the composition of the solid waste stream.

3.2. Data Analysis/Methodology

Waste sort data was compiled and summarized by waste stream and then converted to kilogram (kg) per week estimates. The audit team collected and sorted five days' worth of garbage and recycling from each site in the baseline phase of the project and six days' worth of garbage and recycling from each site in the post-implementation phase. Adjustments were then made to calculate the kg per week estimates.

To make the dataset more manageable and results more meaningful, the original list of material categories was collapsed from 64 to 30 categories focusing on recyclable materials accepted in British Columbia's deposit/refund and curbside recycling programs. Table 3-1 presents the summarized list of materials.

The data were used to generate the tables and chart presented in Section 5, which summarize waste composition and generation for recyclable and non-recyclable materials, as well as contamination rates for the Pilot Area sites.

Attachment 2 (Cont'd)

Table 3-1 Waste Audit Material Categories (summary list)

PRINTED PAPER	
1	Newspaper
2	Telephone Books / Directories
3	Magazines & Catalogues
4	Mixed Fine Paper
5	Books
6	Other Paper
PAPER PACKAGING	
7	Molded Pulp
8	Cardboard
9	Kraft Paper
10	Boxboard / Cores
11	Gable Top Cartons
12	Aseptic Containers
PLASTICS	
13	PET Water Bottles
14	PET Beverage Bottles (other)
15	PET Other Bottles & Jars #1
16	PET Other Packaging #1
17	HDPE Beverage Bottles #2
18	HDPE Other Bottles & Jugs #2
19	PVC Bottles & Jars #3
20	Other Bottles, Jars & Jugs #4 LDPE, #5 PP, & #7
21	Wide Mouth Tubs & Lids # 2 HDPE, #4LDPE, #5PP
METALS	
22	Aluminum Beverage (non-alcohol)
23	Aluminum Beverage (alcohol)
24	Aluminum Food Cans
25	Aluminum Foil & Foil Trays
26	Steel Food & Beverage Cans
GLASS	
27	Glass Containers (non-alcohol)
28	Glass Containers (alcohol)
29	Dairy Containers
30	Food Containers

6

Attachment 2 (Cont'd)

SECTION II: PROGRAM IMPLEMENTATION

4. Public Awareness Campaign

A key component of the Public Spaces Recycling Program was the public awareness campaign and communications strategy that supported the enhanced collection infrastructure. The campaign was designed to increase public awareness about the new recycling program in the Pilot Area and to facilitate a better understanding of which materials were accepted for recycling and which were not.

Building upon the successful communications strategies developed for the Niagara, Halifax and Sarnia public space recycling pilots, the Richmond pilot was customized to appeal to local audiences and to complement existing campaigns for single and multi-family residential waste, yard waste and food scraps. City staff emphasized the importance of design consistency and branding, as many of their other programs are defined by their own unique identities (e.g., Green Cart, Blue Cart, Green Can). Consequently the brand "Go! Recycle" was developed by City staff and used consistently on signage and promotional material to encourage residents and visitors to take part. All of these elements are represented in the photo below.

Mayor Malcolm Brodie and Nestle's director of corporate affairs, John Challinor, unveil the new recycling bins at Garry Point Park. Source: Richmond News

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The main elements of the public awareness campaign were:

- On-bin signage designed to educate consumers about which materials were/were not recyclable and where they should be disposed of. Signage graphics were developed by StewardEdge in keeping with the City's graphic standards and its preference for photographic rather than pictographic images.
- Branded (Go! Recycle) display signage designed to raise the profile of the pilot program and awareness among the general public. Branding and signage graphics were developed and produced by the City of Richmond while sign placement was recommended by StewardEdge.
- A public launch event on July 28, featuring representation from the project sponsors, the Mayor and City of Richmond Councilors, the MLA and other community leaders, to publicize and raise awareness of the initiative. Organized by a public relations consultancy contracted to the sponsors, the launch event received extensive local media coverage and was formally recognized in the province's Legislative Assembly.
- Ongoing media and public relations follow-up by City staff, as well as ongoing community promotion through the City's internal communications network.
- Outreach to community stakeholders: Steveston Community Society, Gulf of Georgia Cannery Society, Steveston Historical Society, Britannia Heritage Shipyard Society, London Heritage Farm, Steveston Rotary Club, Steveston Merchant's Association and the Steveston Harbour Authority.

Planning and implementing strategic communications for recycling is a specialized activity. The success of Richmond 's public awareness campaign is attributable to several factors, most notably the efforts of City staff who contributed municipal funds toward signage and promotion, worked collaboratively with StewardEdge in the placement of signage and proactively promoted the new program to local media outlets and online.

SECTION III: RESULTS

5. Waste Audit Results & Analysis

This section summarizes the results of the structured observation and the waste composition studies as they pertain to waste generation, composition, and diversion. Detailed waste audit results are presented in the tables in Appendix C. The audit data for the playing fields at Hugh Boyd Community Park were excluded from the analysis as waste generation during the June audit was very high (>150kg) and very small during the follow-up study (<50kg) which made statistically valid comparisons difficult for this site.

5.1. Structured Observation Analysis

Structured observation consists of observing the behaviour of individuals in a given environment without attempting to influence that behaviour in any way. Structured observation was conducted at four Canada Line transit stations to assess types of behaviour that could affect waste audit results.

5.1.1. Scavenging Activities

The results of the structured observation indicate that scavenging activities are common in the Pilot Area. Individuals remove containers accepted by British Columbia's beverage container deposit/refund program in order to collect the refunds from containers returned to Return-It depots or retailers.

Pilot program staff observed scavenging activities at Aberdeen Station and Brighouse Station. Several individuals were observed searching garbage bins, most likely for deposit-bearing beverage containers, but left empty-handed. The assumption was that the garbage bin had already been picked over by the time the structured observation was conducted which explains why individuals did not remove any material from the bin. Containers were removed from recycling racks located at Brighouse Station, further supporting the notion that individuals actively remove deposit containers from the waste stream in the City of Richmond.

5.1.2. Improper Disposal

Individuals were observed discarding materials into the wrong waste stream at two transit stations. For instance, a juice box and a bag of household waste were discarded in the garbage stream and coffee cups were discarded in the recycling stream. In some cases the individual looked at the bin signage which depicted the accepted materials and in other cases they did not. This behaviour could be explained by either confusion or lack of awareness regarding the recyclability of different materials or alternatively, apathy or disregard for proper disposal methods.

5.1.3. Use of Signage

Despite a few instances of misdirected waste, the signage displayed at the four transit stations was highly effective in directing consumers to place their waste materials in the appropriate waste stream. Consumers who looked at the signage prior to throwing out their waste directed it into the appropriate stream 96% of the time. In contrast, when consumers did not look at the signage first, their accuracy rate decreased to 75%.

5.1.4. Other Observations of Note

Vandalism of new bins caused by individuals attempting to break into the units to recover deposit-bearing containers was observed by City of Richmond staff. Where locks prevented individuals from accessing the recyclables, they would craft hooks out of coat hangers to remove the containers from the recycling stream of new bins at the pilot sites. These observations were not recorded during structured observation sessions but demonstrate the impact that the behaviour of individuals has on waste composition. There is some debate amongst City staff over the appropriate response to this behaviour, i.e., strengthening the security features (locks) on the bins vs. leaving the bins unlocked to give scavengers easy access and mitigate vandalism.

Also of note were two anomalies that impacted waste composition during the study period:

1) Heavy precipitation led to the discovery of wet fibres in the garbage stream.
2) A swim meet that involved outdoor camping was held at Steveston Community Centre during the audit period resulting in waste materials that would not typically be generated in a public space environment, such as cans of beans and tuna, being discarded in the bins.

The photo below illustrates the materials generated as a result of the swim meet held at Steveston Community Centre.

5.2. Waste Generation

Amenities in the Pilot Area are regularly utilized in the spring and summer months, roughly the period from June to September. This is the period during which the majority of waste is generated.

Weekly waste generation was significant. Based on audit results, 1,422 kilograms of waste per week was generated during the baseline phase of the project (June 2011) and approximately 928 kilograms of waste per week was generated during the post-implementation phase (September 2011). These figures do not include the recyclables that were diverted from the bins prior to collection as a result of scavenging activities. During the two audit periods, waste generation decreased by 35%. Table 5-1 summarizes the quantity of waste generated across all sites included in the analysis for each material category.

Table 5-1 Waste Generation Summary

	Baseline Generation	Post-Implementation Generation
	kg/week	kg/week
Total Recyclable Fibre	237.8	150.8
Total Recyclable Beverage Containers	29.2	13.9
PET Bottles	*8.2*	*2.6*
Total Recyclable Non Beverage Containers	36.9	18.0
Total Recyclable Containers	74.3	34.5
Total Recyclables (Fibre + Containers)	312.1	185.4
Non-Recyclable Material	1,110.3	742.6
Total All Material	1,422.4	927.9
Percent Change		-35%

Attachment 2 (Cont'd)

5.3. Waste Composition Analysis

The waste was sorted and classified into 64 material categories. The data categories were then consolidated for the purpose of analysis.

The baseline audit, coupled with structured observation, provided early confirmation that proportion of deposit-bearing recyclable beverage containers in the waste stream was negligible. Consequently, greater emphasis was placed on examining the composition of the garbage stream. The resulting waste composition analysis provides insight into how recycling behaviour changed subsequent to implementation of the PSR pilot.

The analysis provides evidence of a significant reduction in the weight of recyclables, including recyclable beverage containers (keeping in mind that the numbers are small for beverage containers), in the garbage stream following the implementation of the pilot program.

5.3.1. Waste Composition by Material Category

In the post-implementation phase, recyclable materials comprised approximately 20% (baseline was 22%) of the solid waste found in the garbage stream in the Pilot Area. Table 5-2 and Figure 5-1 compare the composition of each material category during the baseline phase with the composition of the post-implementation phase. The waste audit findings show that the largest component of the waste stream by weight was non-recyclable materials, followed by recyclable paper fibre, recyclable non-beverage containers and recyclable beverage containers.

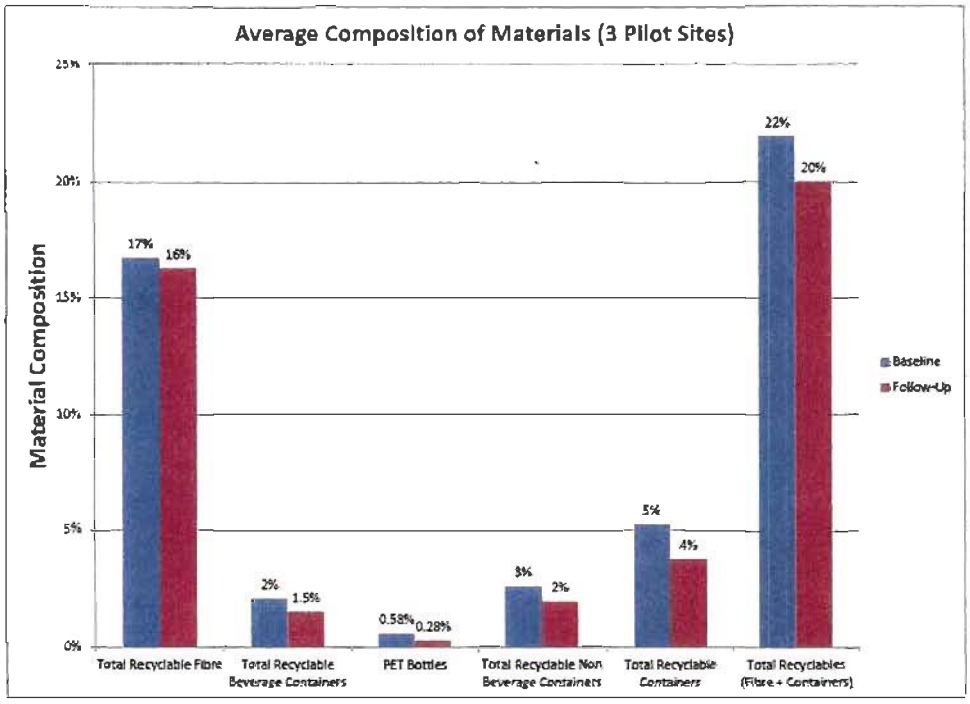
The non-recyclable material category remained fairly consistent across the two audit periods. The greatest change in composition was the recyclable containers category (decreased 29%), specifically PET bottles. The proportion of PET bottles within the garbage stream decreased by 52% between the two audit periods; this finding suggests that individuals may have diverted a greater proportion of their used bottles into the appropriate stream during the post-implementation phase and that scavenging activity may have increased or a combination of both.

Table 5-2 Waste Composition Comparison

Material Category	Baseline Composition	Post-Implementation Composition	% Change in Composition
Total Recyclable Fibre	16.7%	16.3%	-3%
Total Recyclable Beverage Containers	2.1%	1.5%	-27%
PET Bottles	*0.6%*	*0.3%*	*-52%*
Total Recyclable Non Beverage Containers	2.6%	1.9%	-25%
Total Recyclable Containers	**5.2%**	**3.7%**	**-29%**
Total Recyclables (Fibre + Containers)	**21.9%**	**20.0%**	**-9%**
Non-Recyclable Materials	78.1%	80.0%	3%

Attachment 2 (Cont'd)

Figure 5-1 Average Composition of Recyclables (3 Pilot Sites)



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Attachment 2 (Cont'd)

5.3.2. Waste Composition by Pilot Site

This section presents the waste composition by pilot site. As discussed above, the Hugh Boyd playing fields were excluded from the analysis due to statistically insignificant data. The data presented in Table 5-3 demonstrate that composition of recyclable beverage containers decreased significantly at Garry Point Park (-35.5%) and in Steveston Village (-36%). The composition of beverage containers remained virtually unchanged at the Steveston Community Centre. Given that the other two sites showed significant decreases in this category, there may have been an anomaly that occurred at the Community Centre which affected the amount of beverage containers disposed in September 2011. The composition of PET bottles within the garbage stream decreased at all sites, most dramatically in Steveston Village.

Table 5-3 Waste Composition by Pilot Site

	Waste Composition by Pilot Site								
	Garry Point Park			Steveston Community Centre			Steveston Village		
	Baseline	Post-Implementation	% Change	Baseline	Post-Implementation	% Change	Baseline	Post-Implementation	% Change
Total Recyclable Fibre	18.0%	20.2%	12.4%	16.0%	12.0%	-24.9%	16.5%	16.0%	-3%
Total Recyclable Beverage Containers	2.3%	1.5%	-35.5%	1.9%	2.0%	6.9%	2.1%	1.3%	-36%
PET Bottles	*0.7%*	*0.5%*	*-23.0%*	*0.4%*	*0.3%*	*-32.8%*	*0.6%*	*0.1%*	*-77%*
Total Recyclable Non Beverage Containers	1.1%	2.2%	107.5%	3.5%	1.9%	-46.3%	2.8%	1.8%	-35%
Total Recyclable Containers	4.1%	4.3%	4.7%	5.8%	4.2%	-28.2%	5.5%	3.3%	-41%
Total Recyclables (Fibre + Containers)	22.1%	24.5%	10.9%	21.8%	16.2%	-25.8%	22.0%	19.3%	-12%
Non-Recyclable Materials	77.9%	75.5%	-3.1%	78.2%	83.8%	7.2%	78.0%	80.7%	3%
Total All Material	100%	100%		100%	100%		100%	100%	

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Attachment 2 (Cont'd)

6. Conclusions

Implementation of the Public Space Recycling Program in the Pilot Area was successful. The enhancement of the public space recycling infrastructure reduced the amount of recyclable material in the garbage stream and increased the apparent diversion of recyclables, including beverage containers.

In addition, the program provided a valuable template for the implementation and future expansion of public space recycling initiatives in similar communities. A review of the program's performance, conducted in early November with City of Richmond staff, suggested a number of opportunities for refinement (e.g. measures to mitigate the incidence of vandalism on new bins), but overall the partners were very satisfied with the program's design and execution.

The selection and strategic placement of more effective recycling bins, coupled with a compelling new brand ("Go! Recycle"), high-impact graphics and strong communications support from the City provided residents and visitors in the Pilot Area with the sense of greater opportunity to recycle and a disincentive to litter in public spaces.

Analysis of data from the pre- and post-implementation waste audits confirmed that British Columbia's deposit/refund system for beverage containers suppresses the quantity of beverage containers that remain disposed of in public spaces. However, enhancing people's opportunities to recycle in public spaces does improve the diversion of beverage containers that are discarded in public spaces.

Finally, effective communications and outreach activities – much to the credit of staff and elected officials in the City of Richmond – raised the level of public awareness and created a platform for further emphasis on ways to expand recycling.

Detailed Conclusions

- While the actual numbers were small (only 0.58% of the waste stream prior to implementation), the diversion rate of plastic bottles from the garbage stream increased by 52% (to 0.28%).
- Fewer beverage containers going to landfill contribute to Metro Vancouver's 70% diversion target.
- The pilot was most effective in Steveston Village.
- The composition of recyclable beverage containers found in the garbage stream decreased by 27% between the baseline audit and the post-implementation audit indicating that residents and tourists were putting their beverage containers in the recycling bin.
- Results of the structured observations at the transit stations suggest that scavenging activities were responsible for the low numbers of bottles and cans in recycling bins. This observation was confirmed by City staff and by the vandalism to recycling bin locks.
- Even though beverage containers were likely removed from the recycling bin for the purpose of redeeming their deposit through BC's beverage container deposit program, this can still be considered recycling given that all containers returned via the deposit program are recycled.
- Another positive sign is the fact that the composition of recyclable non beverage containers found in the garbage stream decreased by 25% between the two audit periods.

Attachment 2 (Cont'd)

- Effective signage is a critical component of public space recycling programs. The structured observation measured an increase of 21% in the accuracy rate by which individuals place their waste in the appropriate stream.

Given that bins were already in place at the pilot sites prior to program implementation, the results of the program are less dramatic than in pilot programs where no bins existed in the pre-implementation phase. However, the improvements made remain impressive and demonstrate the benefit of incremental improvements in public space recycling bins and signage. Municipal public space recycling programs can be improved over time helping to capture that elusive "last mile" of recyclable material.

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Attachment 2 (Cont'd)

APPENDICES

A. Data Tables

Table A-1 Waste and Recyclables Generation and Composition

Material Category		Material Accepted	Baseline Generation (kg/week)	Post-Implementation Generation (kg/week)	Baseline Composition (%)	Post-Implementation Generation (kg/week)	% Change in Composition
1. PRINTED PAPER			**81.16**	**87.17**	**6%**	**9%**	**64%**
1	Newspaper	Y	62.96	69.43	4%	8%	69%
2	Telephone Books / Directories	Y	5.61	2.23	0%	0%	-39%
3	Magazines & Catalogues	Y	0.82	1.51	0%	0%	181%
4	Mixed Fine Paper	Y	11.33	13.94	1%	2%	88%
5	Books	Y	0.00	0.00	0%	0%	n/a
6	Other Paper	Y	0.45	0.06	0%	0%	-79%
2. PAPER PACKAGING			**385.38**	**151.94**	**27%**	**16%**	**-40%**
7	Coffee Cups	N	78.14	48.68	6%	5%	-5%
8	Tissue/Toweling	N	137.43	37.44	10%	4%	-58%
9	Molded Pulp	Y	23.58	7.50	2%	1%	-51%
10	Cardboard	Y	21.32	7.65	2%	1%	-45%
11	Kraft Paper	Y	70.41	31.94	5%	3%	-31%
12	Boxboard / Cores	Y	41.31	16.58	3%	2%	-39%
13	Laminated Packaging	N	8.87	0.00	1%	0%	-100%
14	Composite Can	N	0.32	0.42	0%	0%	101%
15	Gable Top Cartons	Y	1.36	1.01	0%	0%	14%
16	Aseptic Containers	Y	2.66	0.72	0%	0%	-59%

1

Attachment 2 (Cont'd)

Material Category		Material Accepted	Baseline Generation (kg/week)	Post-Implementation Generation (kg/week)	Baseline Composition (%)	Post-Implementation Generation (kg/week)	% Change in Composition
3. PLASTICS			225.99	119.82	16%	13%	-19%
17	Polyethylene PE Plastic Bags & Film – Packaging	N	83.47	11.45	6%	1%	-79%
18	Polyethylene Plastic Bags & Film - Non-Packaging	N	27.12	57.03	2%	6%	221%
19	PET Water Bottles	Y	2.37	1.41	0%	0%	-9%
20	PET Beverage Bottles (other)	Y	5.86	1.18	0%	0%	-69%
21	PET Other Bottles & Jars #1	Y	19.77	9.02	1%	1%	-30%
22	PET Other Packaging #1	Y	0.64	0.59	0%	0%	41%
23	HDPE Beverage Bottles #2	Y	3.68	1.71	0%	0%	-29%
24	HDPE Other Bottles & Jugs #2	Y	0.91	0.13	0%	0%	-78%
25	PVC Bottles & Jars #3	Y	0.00	0.00	0%	0%	n/a
26	Other Bottles, Jars & Jugs #4 LDPE, #5 PP, & #7	Y	9.51	0.94	1%	0%	-85%
27	Polystyrene #6 PS	N	52.99	17.34	4%	2%	-50%
28	Wide Mouth Tubs & Lids # 2 HDPE, #4LDPE, #5PP	Y	1.14	0.53	0%	0%	-29%
29	Large HDPE & PP Pails & Lids > 4 litres and < 25 litres HDPE & PP pails	N	0.00	0.00	0%	0%	n/a
30	Plastic Laminated Films*	N	5.87	5.58	0%	1%	45%
31	HSW Bottles, Jugs and	N	1.76	0.19	0%	0%	-84%

2

Attachment 2 (Cont'd)

Material Category		Material Accepted	Baseline Generation (kg/week)	Post-Implementation Generation (kg/week)	Baseline Composition (%)	Post-Implementation Generation (kg/week)	% Change in Composition
	Tubs empty HSW containers						
32	Other Rigid Plastic Packaging	N	1.53	7.39	0%	1%	640%
33	Durable Plastic Products	N	9.37	5.33	1%	1%	-13%
4. METALS			**14.21**	**5.79**	**1%**	**1%**	**-38%**
34	Aluminum Beverage (non-alcohol)	Y	3.22	0.36	0%	0%	-83%
35	Aluminum Beverage (alcohol)	Y	1.93	0.52	0%	0%	-59%
36	Aluminum Food Cans	Y	2.24	0.82	0%	0%	-44%
37	Aluminum Foil & Foil Trays	Y	0.71	0.20	0%	0%	-57%
38	Steel Food & Beverage Cans	Y	0.21	0.82	0%	0%	486%
39	Aerosol Cans	N	0.00	1.72	0%	0%	n/a
40	Steel Paint Cans	N	0.00	0.32	0%	0%	n/a
41	Other Metal	N	5.89	1.05	0%	0%	-73%
5. GLASS			**10.81**	**12.06**	**1%**	**1%**	**70%**
42	Glass Containers (non-alcohol)	Y	7.59	1.06	1%	0%	-79%
43	Glass Containers (alcohol)	Y	0.00	5.97	0%	1%	n/a
44	Dairy Containers	Y	0.50	0.00	0%	0%	-100%
45	Food Containers	Y	1.78	4.95	0%	1%	325%
46	Other Glass	N	0.95	0.08	0%	0%	-87%
6. HOUSEHOLD SPECIAL WASTES			**0.13**	**0.33**	**0%**	**0%**	**289%**
47	Batteries	N	0.13	0.00	0%	0%	-100%
48	Paint & Stain cans / tubs	N	0.00	0.00	0%	0%	n/a

3

Attachment 2 (Cont'd)

Material Category		Material Accepted	Baseline Generation (kg/week)	Post-Implementation Generation (kg/week)	Baseline Composition (%)	Post-Implementation Generation (kg/week)	% Change in Composition
49	Motor Oil	N	0.00	0.00	0%	0%	n/a
50	Other HSW liquids	N	0.00	0.32	0%	0%	n/a
51	Other HSW sharps	N	0.00	0.01	0%	0%	n/a
7. ORGANICS			597.56	456.34	42%	49%	17%
52	Food Waste	N	415.96	213.44	29%	23%	-22%
53	Yard Waste	N	26.27	44.96	2%	5%	162%
54	Pet waste	N	155.33	197.95	11%	21%	95%
8. OTHER WASTE MATERIALS			98.89	91.90	7%	10%	42%
55	Diapers and Sanitary Products	N	47.03	15.14	3%	2%	-51%
56	Electronic Waste	N	1.99	4.04	0%	0%	211%
57	Small Kitchen Appliances	N	0.00	0.00	0%	0%	n/a
58	Textiles	N	10.65	8.92	1%	1%	-1%
59	Carpeting	N	0.00	0.00	0%	0%	n/a
60	Construction & Renovation Waste	N	1.58	11.91	0%	1%	1051%
61	Tires and Other Rubber	N	2.56	0.00	0%	0%	-100%
62	Ceramics	N	0.00	0.47	0%	0%	n/a
63	Large Bulky	N	3.78	2.43	0%	0%	-2%
64	Other Waste	N	31.29	50.99	2%	6%	149%
	Grand Total		1,414.13	925.36	100%	100%	

4

Attachment 2 (Cont'd)

B. Pilot Site Photos (Pre and Post Program Implementation)

Pre-Pilot and Post-Implementation Comparisons
The following are images comparing the bins used prior to the pilot and post-implementation.

Steveston Village, Pre-Pilot

Steveston Village, Post-Implementation

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Attachment 2 (Cont'd)

Garry Point Park, Pre-Pilot

Garry Point Park, Post-Implementation

6

Attachment 2 (Cont'd)

Steveston Community Centre, Pre-Pilot

Steveston Community Centre, Post-Implementation

Attachment 2 (Cont'd)

Hugh Boyd Playing Field, Pre-Pilot

Hugh Boyd Playing Field, Post-Pilot

8

Attachment 2 (Cont'd)

Bin Design, Location & Signage Improvements
These images show the improvement made by replacing stand-alone units with a dual-stream bin. Separate units tend to wander and look disorganized over time.

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Attachment 2 (Cont'd)

These images demonstrate the benefit of placing fewer, more attractive bins over a larger area.

10

Attachment 2 (Cont'd)

These images compare the pre-pilot signage with the signage designed for the pilot program by the City of Richmond with assistance from StewardEdge. The communications strategy emphasized consistency, clarity and colour.

Pre-Pilot Signage

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Attachment 2 (Cont'd)

Post-Implementation Signage & Messaging

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