STREETSCAPE RECYCLING

City of Vancouver Pilot

Summary of 2018 Activities

RECYCLEBC™

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Introduction

As part of its program plan commitment, Recycle BC committed to conducting research and development to seek a workable model for streetscape recycling. Since 2014, Recycle BC has conducted three pilot projects to study the feasibility of packaging and paper collection in on-street recycling bins. We continue to perform further research and monitoring through our existing streetscape collection project in the City of Vancouver to determine if a viable recovery of packaging and paper can occur in today's new restricted global marketing conditions.

In the Recycle BC Program Plan, Streetscape recycling, defined as municipal property that is not industrial, commercial or institutional property, comprises the following which are collectively referred to as 'streetscape':

- Sidewalks which are municipal property, which adjoin buildings in an urban commercial area and which are used for pedestrian traffic;
- Plazas or town squares which are municipal property and which are available to the public; and
- Parks which are municipal property.

Starting in 2019, Recycle BC will consult on the program's design and financial offering, and, if proof of concept occurs through testing effective delivery of streetscape collection systems, Recycle BC will implement streetscape collection and recycling services by offering a financial incentive to eligible local governments for the provision of services.

Background Information

2014 Pilot Project

In 2014, Recycle BC conducted 2-week studies in North Vancouver, Penticton, and Richmond. Waste material was collected from containers that were already in place in each of the three communities. Samples indicated that many materials were being placed in the wrong material-specific streetscape bins, resulting in cross contamination of packaging and paper materials and heavy packaging and paper contamination by garbage and organics.

2015 Pilot Project

In 2015, the pilot project included installing a variety of bin designs in North Vancouver, Penticton, and Richmond for a two-week in-market timeframe. The contents were audited in order to compare the impact of bin design on contamination results. The results indicated a bin designed by students from the Emily Carr University of Art + Design and Metro Vancouver had the best results for both the paper and containers recycling streams. The 2014-2015 pilot report can be found at RecycleBC.ca/education/on-street-recycling.

These results influenced Recycle BC's decision to pursue the Emily Carr University of Art + Design and Metro Vancouver bin design for the longer City of Vancouver pilot.

2016-2017 City of Vancouver Pilot Project

In August 2016, Recycle BC partnered with the City of Vancouver for a nine-month pilot project, concluding May 2017. The pilot involved the installation of 26 recycling stations along Denman St, Robson St, and Davie St in the West End, a densely populated residential area of Vancouver. The pilot also included a parkscape element with bins installed at Second Beach in Stanley Park. The majority of the recycling stations have three receptacles which collect mixed paper (yellow), containers (blue), and garbage/landfill materials (black), with select locations offering an organics (green) receptacle option.

During the pilot, three 7-day audits of the material were conducted in September 2016, January 2017, and May 2017. The pilot was extended until the end of the year, with one additional audit completed in July 2017.

The full 2016-2017 pilot report can be found at RecycleBC.ca/education/on-street-recycling.

City of Vancouver Streetscape Activities

In 2017, the City of Vancouver expanded streetscape recycling to other areas of downtown Vancouver using their own custom designed bin. The bin includes a front swivel door and cart-based system for 240 L capacity. Elements of the 2016-2017 pilot project bin style have been incorporated; including painting the entire bin in the designated colour based on the material stream, angling the front of the bin and applying clearly visible decals on this angle for visibility as a resident approaches the bin. Bin openings are smaller, with traditional narrower cut-out openings.

Challenges with Streetscape Recycling

Many factors currently reduce the marketability of the material collected from streetscape recycling. Previous streetscape audits show that residents don't put materials in the correct on-street bin, accounting for high contamination rates of approximately 30%. This contamination level makes finding end-markets to receive the recycling material for processing extremely difficult. China's ban on the import of foreign recyclables in 2018 has exacerbated this challenge.

Also, since receptacles remain outdoors at all times, they are susceptible to weather conditions, particularly rain in cities like Vancouver. Hot beverage cups also contribute a lot to high moisture content of recycling materials, when residents include cups still containing liquids in streetscape recycling. Containers can also be soiled with food waste, making for a much lower quality material available for recycling.

Recycle BC 2018 Streetscape Activities

Bin Design Evaluation

Bin durability

The bins are constructed using a metal exterior and a rigid plastic liner inside the metal exterior. The bins currently installed in the West End and Second Beach areas of Vancouver were originally manufactured to withstand a lifespan of 9-months, for the 2016-2017 pilot. Two years later, wear and tear on the exterior of the bins is showing. In addition, due to weather and use, the plastic liner has become very thin and brittle.

Operational challenges

Additionally, there have been operational challenges identified by the collection crews servicing the bins. The most significant issue is when the bins are almost full, and material starts to overflow. In this instance, material falls into the gap between the bin liner and outer metal shell. Enough material falls into this space and makes it difficult for the collection crews to swivel the back door open and empty the contents. Additional time is then needed to dismantle the bin, clean out the inside, and reassemble it.

Figure 1 Material cleaned out after getting stuck in the bin

Bin liner

Currently, a plastic bag is used inside the bin liner. The plastic bag poses a problem as it doesn't secure to the top of the bin liner, and without an elastic band around it, slides down into the bin liner preventing a likelihood of materials falling in the bag when placed in the bin. Recycle BC would like to remove the need for a single-use plastic bag entirely from the bin design.

Figure 2 Coloured inner bags blowing out of the bin

Recycle BC recommends the bin liner is redesigned to allow the elimination of single-use bags for collection. In addition, a modified design could allow liquids to drain on site rather than liquids being held, and therefore collected, in the bags, resulting in a lower quality of paper products for marketability.

Bin cleanliness

Because of the empty space on the front and sides of the bin, they are prone to getting tagged with graffiti and having stickers applied. When the bins were originally manufactured, an anti-graffiti coating was applied to them so that graffiti could be easily washed off. The decals were also applied with an anti-graffiti coating for the same purpose. Recycle BC regularly works with the City Vancouver to arrange to have the bins power washed to remove graffiti and any additional grime as part of the regular maintenance of their street furniture.

Figure 3 Grime and graffiti on-street bins in pilot area

Promotion and Education

The City of Vancouver adjusted food packaging for their Second Beach concession stand to offer recyclable or compostable takeout options. A decision was also made to remove the paper recycling bins from this area, to reduce confusion about where to place paper products which for the most part would be food soiled in this area. As a result, signage was adjusted for our two recycling stations in the area, and the City's one recycling station in the area. The City and Recycle BC coordinated the messaging, and new decals were printed and installed in late summer to instruct users to place paper in the organics bin.

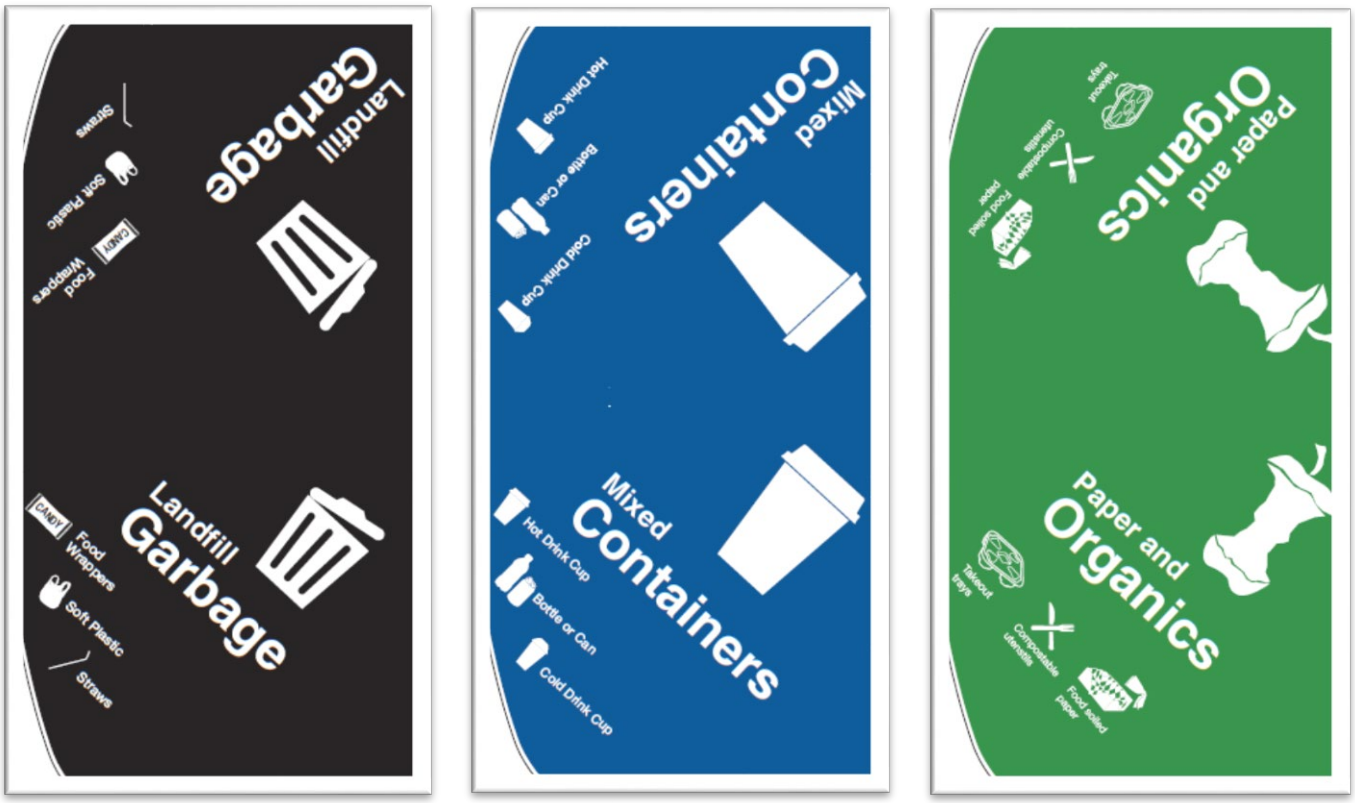


Figure 4 Redesigned Decals Near Second Beach Concession Stand

Collection

The City of Vancouver continues to collect the recycling on behalf of Recycle BC. The current procedure is for materials to be collected in bags, manually, by City crews. The material is stored for consolidation, and then sent for processing by Recycle BC. Total collected tonnage for the paper and containers recycling stream in 2018 was 23,570 kg.

Processing

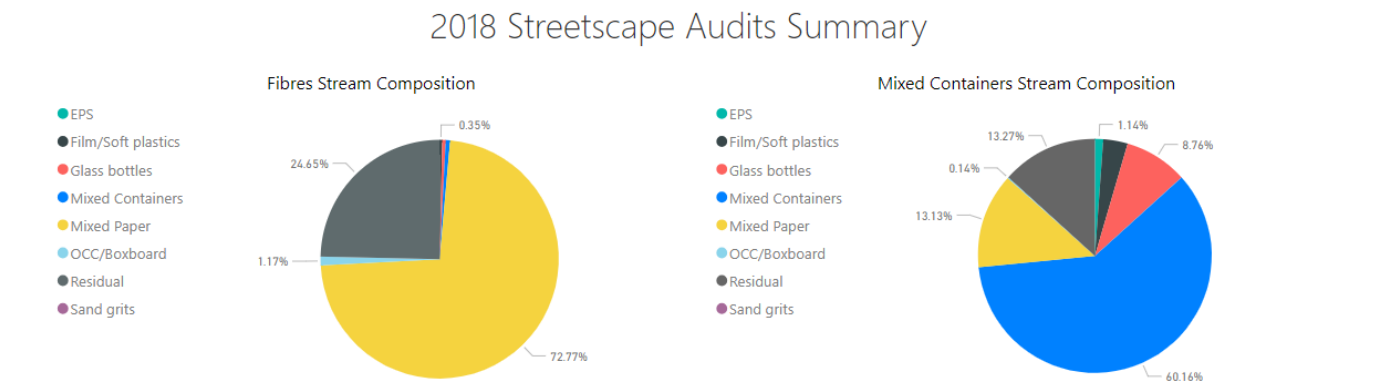
Once material arrives at the processing facility, material is weighed and recorded. Bags are emptied off the truck and separated by colour (blue = containers, yellow = paper). Final end life disposition of the material is as follows:

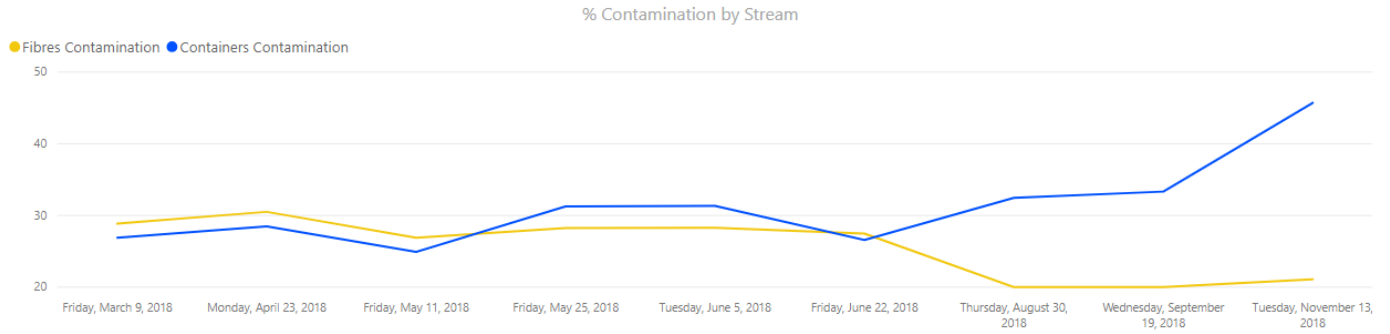
General Refuse	7,620 kg	32.3%
Mixed Paper	9,763 kg	41.4%
Stockpile	6,187 kg	26.2%

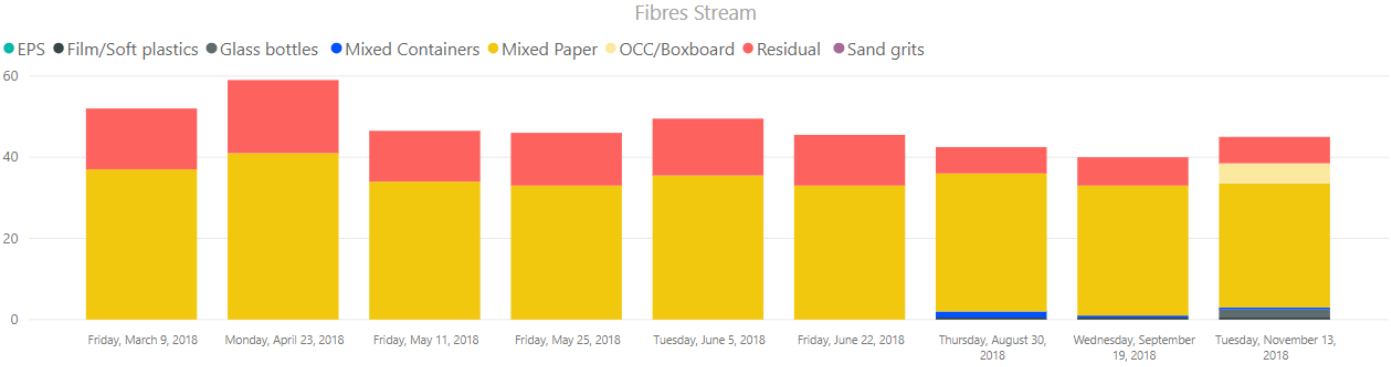
A quantity of containers are currently being held as an end-market cannot be found.

Figure 5 Material Dropped Off at Receiving Facility

Audits


2018 Streetscape Audits Summary
Fibres Stream Composition
EPS
Film/Soft plastics
Glass bottles
Mixed Containers
Mixed Paper
OCC/Boxboard
Residual
Sand grits
0.35%
24.65%
1.17%
72.77%
Mixed Containers Stream Composition
EPS
Film/Soft plastics
Glass bottles
Mixed Containers
Mixed Paper
OCC/Boxboard
Residual
Sand grits
13.27%
1.14%
8.76%
0.14%
13.13%
60.16%


% Contamination by Stream
Fibres Contamination
Containers Contamination
50
40
30
20
Friday, March 9, 2018
Monday, April 23, 2018
Friday, May 11, 2018
Friday, May 25, 2018
Tuesday, June 5, 2018
Friday, June 22, 2018
Thursday, August 30, 2018
Wednesday, September 19, 2018
Tuesday, November 13, 2018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Film/Soft plastics
Glass bottles
Mixed Containers
Mixed Paper
OCC/Boxboard
Residual
Sand grits
60
40
20
0
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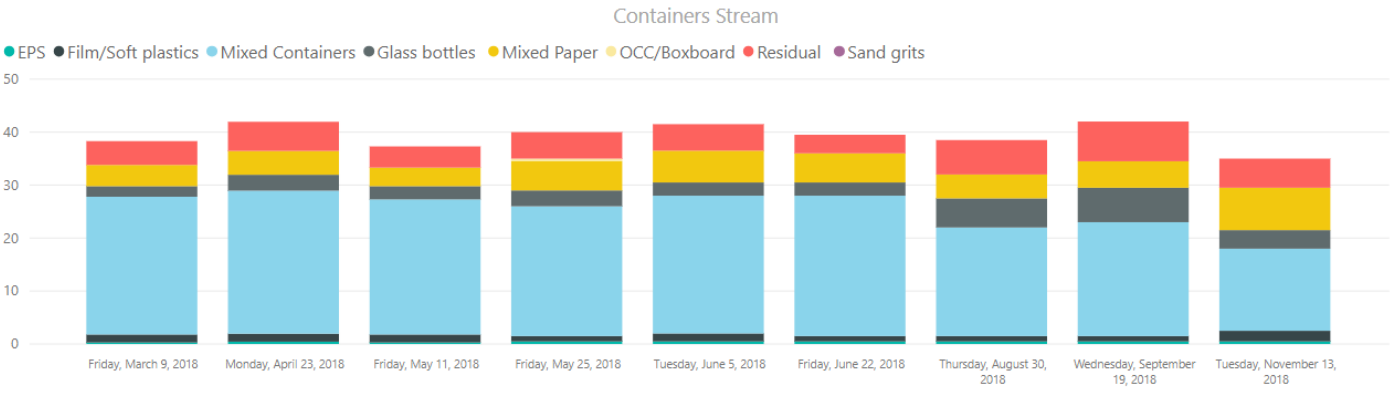
Containers Stream
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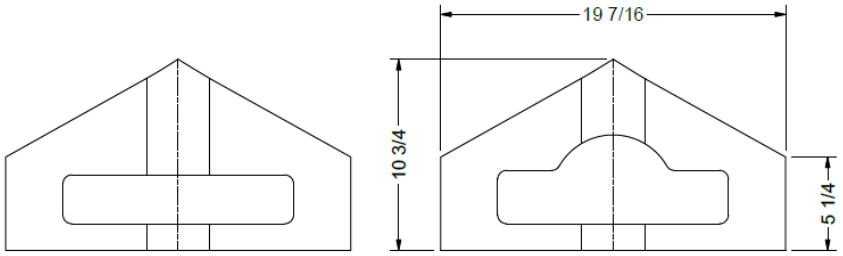
2019 Streetscape Audit

Redesign of West End Recycling Stations

The City of Vancouver has considered swapping out the 2016-2017 pilot project bins in the West End and Second Beach for their own, however the footprint of theirs is much larger. The Denman Street sidewalk is particularly narrow and so would not provide enough space to install the City's new style of recycling station. A narrower version needs to be designed which would maintain the same or more capacity as the bins currently can hold (100 L), and also preferably house a cart for semi-automated cart collection. A commercially available cart also needs to be sourced which could be used for this application. Recycle BC has offered to assist in sourcing a new bin design solution to replace the pilot bins currently in operation.

West End Bin Retrofit

In the short term, a solution was proposed to test out the impact on contamination if the 2016-2017 pilot project bin opening is reduced. New faceplates were affixed onto the bin to narrow the opening, with a horizontal slot for mixed paper and an arced horizontal shape for the mixed containers:



MIXED PAPER FLAT PATTERN

MIXED CONTAINERS FLAT PATTERN

In December 2018, the City manufactured the faceplates from steel, powder coated them in the applicable colour, and installed them for half of the paper and containers bins in the West End area by bolting them to the front.

The impact of this change was assessed during a one week, 7-day audit of each bin by location in January 2019. Results will be reported at a later date.

Conclusion

Recycle BC continues to work with the City of Vancouver to optimize streetscape recycling collection by evaluating and testing different methods and implementing modifications based on learnings. In 2019, Recycle BC is also conducting streetscape roundtable discussions with provincial municipalities to bring consensus to possible best management practices in streetscape recycling.