STREETSCAPE RECYCLING

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Consultation Workshop

NOVEMBER 15 & 16, 2017



WORKSHOP AGENDA

- Presentation #1
 - Overview of the three streetscape pilots: focus on the City of Vancouver West End pilot results.
 - Findings from the City of Vancouver West End behavioural studies.
 - Emily Carr University of Art + Design/Metro Vancouver streetscape bin design.
- Exercise #1
 - Q&A on data presented
 - Discussion on pilot findings.
- Presentation #2
 - Recycle BC's Program Plan regarding streetscape.
 - Streetscape program proposal.
- Exercise #2
 - Round table discussion on the proposed approach.



STREETSCAPE PILOTS

Overview of the Three Pilot Projects



THE VERY BEGINNING

- Metro Vancouver engages Emily Carr UA+D
- Metro Vancouver initiated a collaboration with UBC, Emily Carr UA+D, municipal waste staff, Recycle BC and other stakeholders to improve recycling in the public realm.
- In September, 2013 Metro Van approached Emily Carr UA+D's industrial design students to design a new recycling system as a semester-long project.
- The students researched recycling behaviour (& non-recycling behaviour), spoke to municipalities, developed design criteria and made cardboard prototypes for installation.
- Following the students' observations at their temporary recycling stations, student Emily Chu published their findings and conclusions in a report. <u>http://current.ecuad.ca/a-new-recycling-system</u>



New Westminster Station







THE BEGINNING PART II

- Metro Vancouver Pilots with UBC
- In May, 2014 Metro Vancouver began to test the Emily Carr UA+D design as a Masters project in partnership with a PHD student from UBC's Brain and Attention Research lab (BAR).
- Their main goal was to test how effective the design was in reducing contamination in the recycling streams.
- During the testing process, the stations were first placed on the UBC campus for observation and auditing.
- Next, the bins were made more robust for week-long testing in three municipalities looking at accuracy based on different icon designs.
- Accuracy rates from 75 86% validated the overall concept and design. Recycle BC to further field test this design in field pilots.





o 2014 Overview

- Recycle BC conducted the first pilot project during a twoweek period in three communities: North Vancouver, Penticton and Richmond.
- The intention of this preliminary study was to develop a baseline understanding of the quantity and quality of PPP collected and the level of contamination.
- Waste material was collected and audited from containers that were already in place in each of the three communities.
- Findings: many materials were being placed in the wrong material specific streetscape bins, resulting in cross contamination of PPP materials and heavy PPP contamination by garbage and organics.





o 2015 Overview

- In 2015, Recycle BC revisited the same three communities: North Vancouver, Penticton and Richmond for a two-week period and sampled a total of 10 types of bins.
- The streetscape bin samples were of different designs and configurations in order to determine what bin type was the most effective in collecting non-contaminated PPP.
- Multi-stream and single stream PPP collection bin types were tested. Encorp bins were at some locations. Some locations were new recycling streetscape locations, others existing.
- The waste composition study included recycling and garbage samples from 100 single family households and six multifamily dwellings in each community to compare streetscape results to residential accuracy rates.





- 2015 Findings: Streetscape is highly cross-contaminated
- The recoverable PPP from the garbage collection represents 41% of the total Recycle BC accepted material in the pilot study.
- Almost as much PPP will be left behind in the garbage container as will be collected in the recycling containers.
- This overall view improves when you drill down to specific collection container types and resident experience with sorting recyclables.
- Due to the high contamination rate, streetscape collection should not be mixed with residential collection.
- Residential contamination rates are lower than streetscape, indicating residents are much better at recycling properly in their homes.





- 2015 Findings: Recycling container type influences contamination
- People can put newspapers into a fibre-only bin with accuracy.
- Encorp, with the lowest collection weight, is impacted by scavenging.
- Containers-only is different by pilot community, but overall 25% contamination is concerning.
- Single stream receptacles in all pilot communities had the highest contamination rates.
- Single stream receptacles situated beside garbage cans had the lowest performance – high contamination and low PPP weight.





- o 2015 Findings: Comparison to 2014 baseline
- The recycling container type influences contamination levels: the use of colour keys and icons, as well as the visibility of the recycling stations, were factors in the quantity and quality of PPP collected.
- Container (plastics) collection improved in second year possibly due to new signage and bin design.
- Newspaper readers have been conditioned to recycle. The fibre-only container, which had very low contamination, was almost exclusively newspapers.
- In both years, multi-stream collection performed better than single stream collection recycling stations.
- Cross-contamination with garbage remains a concern particularly when organics are also present in the PPP bin.
- Overall best performing design: Emily Carr UA+D/Metro Vancouver streetscape bins.

Total Study Kg/day View – all recycling receptacles





• Overview

- Nine month pilot: August 2016 May 2017.
- In partnership with the City of Vancouver in the West End.
- 31 recycling stations
 - 26 located along Denman, Robson and Davie (to Cardero)
 - $\circ~~$ 5 located at Second Beach in Stanley Park
- 3 and 4 bin stations
 - o Blue: Containers
 - Yellow: Mixed Paper
 - Green: Organics (limited number)
 - Black: Garbage





- Key Project Objectives
- Increase diversion of solid waste disposed of in the public realm by the city's residents.
- Communicate, reinforce and support waste diversion behaviours with a focus on recycling.
- Determine opportunities and challenges with on-street recycling systems to determine the best course of action for future planning
 - Assess overall capture rate, contamination/marketability of material.
 - Assess changes due to seasonality and over time.
 - Assess operational successes, challenges and constraints.
 - Balance operational needs with diversion goals.
 - Align the pilot with Recycle BC's residential collection program.
- Test opportunities for organics recovery in key locations (COV objective).



Bin Design

- Basic design: Emily Carr UA+D/Metro Vancouver bins
- COV suggested design changes for this pilot such as the addition of a bin liner and adjustments to the rear of the bins for easier access. The city added colour coordinated plastic bags.
- Manufacturing:
 - Bin frames are steel, bent and welded.
 - Powder-coated then an anti-graffiti coating applied.
 - Icons were designed and applied.
- Bin colours aligned with the colours residents are familiar with for curbside collection containers and multi-family cart decals in the City of Vancouver.





Marketing Support

- The pilot project was supported with a media launch and transit shelter ads three times throughout the pilot for four weeks each.
- The bins were also promoted through a Facebook campaign shortly after launch for two weeks, targeting residents in downtown Vancouver.
- Additionally, posters were made available to local business to display in their location.





Denman Street

Vancouverobserver.com



Audit Methodology

- Three material audits and behavioural studies were conducted during the pilot in September 2016, January 2017 and May 2017.
- Each audit study was seven days in duration.
- The material audits evaluated collection volume and material composition. For every day of the audit, the contents from each bin were separated into categories and weighed.
- Information such as capture rate and sorting accuracy by stream could therefore be determined.
- The behavioural studies included two components: observational data and an interactive questionnaire.



Stanley Park yard



- Result Summary West End (three stream)
- Data used is weight (kg/day) to determine the overall performance.
- Data is only from West End three stream as streetscape (not parkscape or organics) was the focus of the Recycle BC pilot. These three stream stations made up 24 of the 31 recycling stations.





Contamination Level in Container & Paper Streams

34%

PPP in the Garbage Stream 24% Represents 47% of total PPP collected in Container & Paper

Streams

Overall Diversion Rate



- Results West End (three stream)
- Sorting accuracy improved over time for PPP.







- Results West End (three stream)
- While sorting accuracy improved, material composition by stream still needs improvement.
 - $\circ~$ 24% of the garbage bin by weight was PPP.
 - 34% of the PPP bins by weight was garbage and other contaminants.
- Did the presence of an organic bin at two of the West End stations improve the contamination of the PPP bins? Yes – but not perfectly (note: small data set).
 - Organics were reduced in the container and paper bins by 50% and 63% respectively.
 - \circ $\,$ The organics bin contained 30% contamination.
 - The garbage bin was 20% organics by weight.





- Results West End (three stream)
- Most common contamination items:
 - Tied plastic bags containing take-out containers and other meal items.
 - Small tied plastic bags containing household garbage.
- Most common miss-sorted items:
 - Coffee cups, coffee cup lids, coffee cup sleeves, cold cup, drink cup, food.
- Books and paperbacks were the dominant non-PPP in the paper bin.
- Liquid was a large element of the container bin (23% by weight).
- Dog waste was put correctly into the garbage bin (17% by weight of garbage).
- Some sharps (needles) and hazardous waste items (oil containers, butane containers) were deposited – any amount is a concern for collection & processing.







2016-17 STREETSCAPE PILOT: STANLEY PARK

- Results Stanley Park (four stream)
- Sorting accuracy over time quite different for park.







2016-17 STREETSCAPE PILOT: STANLEY PARK

- Results Stanley Park (four stream)
- Poor sorting is reflected in the disappointing material composition by bin.
- Key difference parkscape vs. streetscape
 - The West End stations received a collective total average of approx. 6 kg/day while the Stanley Park stations averaged approx. 3 kg/day.
- Issue for park collection: propane canisters left in or beside recycling stations.







- Results
- Generation
 - The total amount of material (kg/day) fluctuated seasonally.
 - West End three stream generation was as follows:







- Behavioural Study Overview
- Study Area & Frequency:
 - Location: Davie, Robson
 & Denman St. up to
 Cardero St.
 - Timeframe: Monday –
 Friday (waste audit week) for each audit (3)
 - Staff:
 - 3 Bin locations per day X 5 days
 - 2 2.5 hours/bin to max 8 hours per day



Recorded data points

Sight Survey

- 1. User recognition point
- 2. Gender
- 3. Estimated age
- 4. Sorted
- 5. Correct bin
- 6. Bin used

Interactive Survey

- 1. How did they determine which bins to use?
- 2. If wrong bin, what would help?
- 3. Is this style of bin familiar to them?
- 4. Do they live or work in the neighbourhood?
- 5. Have they noticed any Ads for the bins?
- 6. If yes, where did they see the advertising?
- 7. Any additional user comments/suggestions?



- Behavioural Study Results
- Did sorting accuracy improve over time?
 - Factor: there was some seasonality in the number of visitors vs. locals (live and/or work in neighbourhood):
 - September study had the highest percentage of visitors at 32%.
 - January and May were each 18% visitors/82% local.
 - $\circ~$ Result as observed and recorded from 272 bin interactions:
 - Sorting accuracy by locals incrementally improved with consistency from September to January to May.
 - Sorting accuracy by visitors/tourists did not have a corresponding improvement pattern.







- Behavioural Study Results
- What influenced correct sorting?
 - The icons were the first choice in the interactive survey for locals, visitors, and across all of the age ranges.
 - The colour of the bins, keyed to the same residential recycling colours for curbside and multi-family homes in the West End, resonated more with locals than with visitors.
 - Colour was picked out most by teen/young adult users and least by 20-30 users. Conversely, text was the highest reference point for the 20-30 age group and least for the teen/young adults using the streetscape bins.
 - Overall, the most accurate sorting was by the 60+ age group.
 Least accurate was the 20-30 age group, but all ages >75%.



data by response count





- Behavioural Study Results
- User Recognition
 - 91% of users only noticed the streetscape bins when they walked directly up to the bin. Just under 9% were observed to head to the bins as a destination from 1m away.
- Ad Recognition
 - 25% of locals said that they had noticed the transit shelter ads vs.
 6% of the visitors.





- Behavioural Study Results
- Selection of comments:
 - "Great to have a place to put recycling on the street".
 - "Easy to use but to be honest would rather use a garbage can. Recycling is so different everywhere that it gets confusing".
 - "Cost a lot of money would be better spent elsewhere".
 - "They look great. Bigger pictures may make it a little easier but over all they are good".
 - "Like the bins but was not paying attention. Not sure what would make me stop and look before throwing stuff away".





- Operational Effectiveness
- The Emily Carr UA+D/Metro Vancouver bin continues to evolve in operational design and communication icons through pilot learning.
- Overall, the recycling stations were effective as the residents reacted positively to the stations and deposited material across all of the streams fairly accurately.
- Operationally, some challenges were encountered with the bin design. The most significant issue was material getting stuck between the bin and liner during collection, particularly if the bin became very full of material.
- There were also issues with the robustness of the bins over time, reflective of the limited lifespan intended for the pilot.





• Operational Challenges



Secure installation



Graffiti



Event Security



Snow days



Extracting small trapped items



Recyclables in tied bags in garbage

Hazardous waste





Liquid left in cups



- Material Processing
- The processor received 17.7 tonnes of material during the ninemonth pilot, an average of 2 tonnes per month.
- This total tonnage by category after processing was
 - Mixed Paper: 8.85 tonnes
 - Glass, metal, plastic: 3.54 tonnes
 - Residuals: 5.31 tonnes
- The processor marketed the processed paper as a 'mixed paper' grade which was sold largely to recycling mills overseas.
- The beverage containers went to the Encorp Return-It system.
- The non-deposit containers were sold to various plastic, glass and metal recyclers in BC and the US.





• Conclusion

- The West End bins performed very well, the quality of recyclables generated was acceptable and the majority of collected material was able to be processed.
- There remains opportunity to improve sorting accuracy across all streams. Residents relied on icons, wording and bin colours to determine where to place their discarded material.
- Sorting improved over time. Resident education should be a key element to increasing accurate sorting and an improved capture rate.
- The pilot report findings will be used to make any operational or promotional modifications to the bin design, collection method and educational programming if further projects like this move forward.



Helping to sort organics from paper

Photo credit: City of Vancouver





EXERCISE #1

Pilot Findings



ROUND TABLE DISCUSSION

- The tables will be set up to discuss the topics below with a facilitator. Move to the table that interests you to provide feedback you are encouraged to visit multiple tables.
- Table 1
 - \circ Streetscape bin design
- Table 2
 - \circ Streetscape bin icons
 - Promotion & education
- Tables 3 & 4
 - \circ $\,$ Audit study findings $\,$
 - Behavioural study findings
- Table 5
 - Operational findings collection & processing

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- Did any findings surprise you?
- Did you particularly like any information you heard?
- Will any of this data influence your streetscape?
- What concerns did this data generate for you?
- What information resonated for you?
- What ideas did this information generate for you?



STREETSCAPE PROGRAM

Recycle BC's Proposal



• Program Plan Requirements

- Municipalities with population of 20,000 or more and a population density of 200 or more per square km.
- Existing garbage streetscape collection service that is run in tandem with streetscape recycling collection, either beside the streetscape recycling containers or integrated within a streetscape collection container/pod.
- The area selected for the streetscape program for the Recycle BC financial incentive must be located in urban areas with business activities that generate large amounts of PPP where the local government operates a litter collection - that is not otherwise collected by retailers, surrounding office buildings or private waste management services i.e., a high-density residential/commercial mixed use area with significant foot traffic and local government garbage/recycling collection containers.





- Requirements based on learning from pilots
- Existing streetscape recycling collection containers that separate paper from containers.
- Sufficient collection containers to accommodate the large amounts of PPP generated by routine pedestrian traffic for the entire high density area, i.e., provide garbage/recycling containers over several blocks, not just in front of a few buildings.
- Be in an area trafficked by residents, as Recycle BC is a residential PPP collection program.





• Operational requirements

- Streetscape collection of PPP materials for which the municipality has an end market, (i.e., Recycle BC will not pay a financial incentive for collected material that cannot be recycled by the local government).
- The local government requesting the Recycle BC financial incentive must collect, transport, process and market the streetscape PPP, (i.e., Recycle BC's streetscape program is a financial incentive program only and does not have any Recycle BC operational components).
- The local government commits to reporting the required information to Recycle BC using an online portal on a quarterly basis. Reporting includes (in tonnes): collected material, material shipped to end markets (by material type and end market), and material rejected by end markets and reasons why.
- The local government audits a representative sample of streetscape collection containers on, at minimum, an annual basis, in order to calculate the amount and type of contamination in the collected material.
- Processing of collected material can be single stream or multi-stream, but in order to maintain quality for endmarkets, cannot be combined with garbage and/or organics.



- Streetscape containers
- Recycle BC will provide a streetscape collection container design based on the results of the streetscape pilot
 projects for use by the local governments. If this design is not used but a financial offer requested, the following key
 elements of the design must be present:
 - Separate containers for paper, containers, and garbage; organics optional.
 - Colour-coded signage and or containers for the separate collection with yellow for paper, blue for containers, black for garbage and green for organics.
 - Openings for collection that do not impede the collection of PPP, i.e., research has shown that people do not like to touch the container when depositing materials (no flap) and large enough for various shapes/sizes of materials.
 - Efficient operational elements for emptying of the containers by the local government workers, and if binners are present, easy access for binners for deposit containers.



- Streetscape containers example
- The City of Vancouver continues to evolve options for their on-street collection of garbage and recyclables.
- A cart-enclosure bin was prototyped, modified, and rolled out.
- 15 on-street recycling stations were installed along Granville Street and at the Vancouver Art Gallery. There are three adjoined receptacles: one for mixed container recycling, one for mixed paper recycling, and one for items destined for the landfill.

Prototype



Launch



Installation

Vancouver.ca





Financial incentive

- Recycle BC is proposing a financial incentive for local governments, who meet the criteria for a streetscape program, to operate a streetscape collection of packaging and printed paper for their community.
- For applicable programs that meet the criteria, Recycle BC will provide a financial incentive of \$400/tonne.
- This incentive will be fully inclusive of all required activities by the local government.
- Recycle BC will be developing a Streetscape Statement of Work (SOW) as part of the revised Agreement package to be offered this coming summer effective January 1, 2019.







Streetscape Program Proposal



OPEN DISCUSSION

- Take a minute to reflect on the information presented and write down any questions you would like to raise.
 - Do you have any questions about the information presented in this workshop?
 - Questions about the pilots and pilot findings/learning?
 - Questions about promotion and education for successful streetscape collection?
 - Do you think streetscape recycling will be feasible for your community?
 - What concerns do you have about streetscape for your community?
 - Feedback on Recycle BC proposal?







Making a difference together.



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