



**DILLON**  
CONSULTING

CITY OF VANCOUVER

# Street Litter Audit

2017 Results



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## Executive Summary

The City of Vancouver retained Dillon Consulting Limited to conduct the City's second round of street litter audits at 108 pre-selected locations within Vancouver. The audits took place from September 18 – 21, 2017. These 108 sites were audited with the purpose of assessing the composition of the accumulated litter present on the streets of Vancouver. Two types of litter were assessed: large litter, which is any litter that is equal to or larger than 4 square inches; and small litter, which is any litter that is smaller than 4 square inches.

Within each site, a site survey and assessments on large litter and small litter were completed. An additional assessment, referred to as a supersite evaluation, was completed at 19 of the pre-selected sites. It should be noted that the baseline audit, two sites were unable to be assessed because they were inaccessible. These sites were therefore not assessed in 2017. Two sites in 2017 were situated immediately adjacent to active construction. In the analysis, these two sites were removed and analyzed separately.

The key findings of the large litter assessment were:

- The average number of large litter items per site was 8.1 pieces for sites with no construction and 8.6 if the sites with construction were included in the overall analysis.
- The most common categories for large litter observed were cups (20%), paper/fibre material (19%) and other miscellaneous (19%).
- The total large litter audited in 2017 was 925 pieces for both non-construction (862) and construction sites (63).

The key findings of the small litter assessment were:

- The average number of small litter items per site was 5.2 pieces for sites with no construction and 5.3 if the sites with construction were included in the overall analysis.
- The most common categories of small litter observed were cigarette butts/debris (37%) and chewing gum (25%).
- The total small litter audited in 2017 was 571 pieces for both non-construction (554) and construction sites (17).

Supersite audits were completed within 19 sites. The key findings of the supersite assessments were:

- The average number of small litter items per site was 193.9 pieces of small litter.
- The most common categories of small litter observed in the supersites were chewing gum (47%) and cigarette butts/debris (40%).
- The total small litter audited in the 2017 supersites was 3,685 pieces.

## 1.0

# Introduction

The City of Vancouver (City) is home to over 603,000 residents across an area of 114 km. A bold initiative of Vancouver is to be recognized as the *Greenest City* in the world by the year 2020 and effective management of waste is an integral part of achieving this initiative. The City's *Greenest City Action Plan 2015-2020* (GCAP) was approved by City Council in 2011 along with high priority actions to work towards achieving the 10 goals and targets outlined in the GCAP. Of relevance to the street litter audit, *Goal 4: Zero Waste* of the GCAP aims to reduce solid waste going to landfill and incinerator by 50% from 2008 levels. More specifically, the litter audit is an important step towards achieving Action 4.3 of the GCAP which targets the reduction of street litter and abandoned garbage in public spaces including illegal dumping, and an increase in the diversion of these materials by implementing a comprehensive litter management strategy. While the overall tonnage of street litter across the City is fairly small, reducing street litter can have a great impact on individual behaviour and public perception as street litter is such a visible component of a waste management system.

The City retained Dillon Consulting Limited (Dillon) to conduct street litter audits at 108 pre-selected locations within the public realm across the City. The audits took place from September 18 – 21, 2017. This is the second round of audits completed for the City. A baseline assessment was completed in the fall of 2015. These 108 sites were audited with the purpose of assessing the composition of the accumulated litter present on the streets of Vancouver. The types of litter were classified into two categories: large litter (equal to or larger than 4 square inches) and small litter (smaller than 4 square inches). Within each site, a site survey, large litter assessment and small litter assessment were completed. Within 19 of the pre-selected sites a supersite audit was also completed. It should be noted that in 2015 two sites were unable to be assessed due to lack of access (Site 29 and Site 99). These sites were therefore not included in the 2017 audits. The site distribution map is provided in **Appendix A**.

The main objectives of the street litter audits included:

- A detailed analysis of large litter items within the survey area;
- A detailed analysis of small litter items that fell within the small subsections of the survey area;
- A detailed analysis of small litter items as supersites found within the survey area; and
- Analysis and reporting of results with a focus on a comparison to the 2015 baseline results and other municipalities.

Dillon staff were asked to note if any sites had immediately adjacent construction occurring. There were two sites where this transpired (Sites 44 and 89). In the analysis, these two sites were removed and analyzed separately.



## 2.0 Methodology

Dillon staff completed litter assessments on the same 108 sites that were selected for the baseline street litter audits in 2015. This section of the report provides a brief overview of the street litter audit methodology; a detailed methodology is provided in **Appendix B**.

### 2.1 Conducting the Litter Audit

Dillon staff followed the same standard litter audit methodology used in the 2015 audits. Areas were measured to be 200 feet x 18 feet, whenever possible. When an audit area was full sized (i.e., 200 feet x 18 feet), it was termed a “fixed site”. The site width may have been less than 18 feet in certain cases. This included scenarios such as when residential property lines exist or when a commercial storefront was less than the prescribed distance. In these cases, each site was 200 feet in length by available width. These sites are termed “variable sites”.

From the beginning of the pre-selected site, the team used a measuring device to measure 50 feet ahead of the start of the site. Using a temporary marking method (e.g., pylons), a mark was made on the pavement ahead to denote the starting point of the audit site. From this point the team measured 100 feet, marking the roadway with another temporary identifier to show the mid-point of the site. A final measurement of an additional 100 feet denoted the end of the audit site.

The width measurements were taken at the start, midpoint and end of the site. The width of the site was measured 1.5 feet from inside the curb or the start of the pavement, towards the outer edge of the site. The maximum width was 18 feet and marked to indicate the boundary.

#### 2.1.1 Site Survey

Before any litter audits were initiated, a site survey was completed. During the site survey Dillon staff recorded relevant information about the litter site and the surrounding vicinity. Information collected on these forms included:

- Date and time;
- Audit team;
- Site identification;
- Audit area size;
- Characteristics and type of adjacent road;
- General attributes of the area; and
- Visual rating of the site.

This detailed information is provided in **Appendix C**.

### 2.1.2 Classifica. on of Large Litter

To maintain continuity with the previous litter audits, large litter was defined as any litter that was greater than or equal to 4 square inches in size. In order to assist the team completing the audit, a template was created to illustrate what 4 square inches was in multiple shapes. Large litter audits took place throughout the entire site. A first and second pass was completed on the site and litter observed was recorded on a large litter data form (**Appendix D**). An average number of litter items for the first and second passes were used as the value for the amount of large litter observed on a site.

### 2.1.3 Classification of Small Litter

Small litter was defined as observed litter that was less than 4 square inches in size. The small litter audit involved examining three sections within the audit site. Dillon staff constructed a small litter frame using PVC plastic tubing. Measuring one foot wide and six feet long to serve as the template. Up to three consecutive “flips” of the template frame were completed to cross the 18 foot boundary of the site. The litter auditor observed and counted all of the small litter contained within the template at three locations within each site: at the start, midpoint and end of the site. All data was recorded on the small litter form provided in **Appendix D**.

### 2.1.4 Supersite

The supersite audits entailed having Dillon staff record all the small litter observed within the fixed or variable site for a more thorough assessment of small litter. This was accomplished by having one team member record data while the other is counting small litter within the site. Supersite audits were completed at the 19 pre-determined sites already selected by the City. Supersite forms are also provided in **Appendix D**.

### 2.1.5 Photographic Record of the Site

During the site survey, the litter audit team took photographs of the site from three points. The first photograph was taken from the beginning of the site looking towards the end of the site. The second photograph was taken from the mid-point of the site looking into the site (towards the boundary) and the final photograph was taken from the end of the site looking towards the start. **Figure 1 to Figure 4** provides an example of the photographs taken at each site.

Date 12/07/2017 ID# EDM5477 Start Time 10:57 (AM/PM) End Time \_\_\_\_\_  
 Town ID A Surveyors Name N/A  
 Site ID Number 8 Street Name 201 N 2nd Ave  
 Site Description (hurdled stone, street, wall, etc.) \_\_\_\_\_  
 Hurdled Stone 2,300 Street Name W 2nd \_\_\_\_\_ Side of Street (R/L) \_\_\_\_\_  
 GPS Location of Center of Site N/A  
 Site type: Fenced ☐ Variables ☐ Site length: Always 200 feet long  
 If variable \_\_\_\_\_  
 Width - Start \_\_\_\_\_ ft (up to 100 ft)  
 Width - Middle \_\_\_\_\_ ft (up to 100 ft)  
 Width - End \_\_\_\_\_ ft (up to 100 ft)  
 Road type (check one): Major City Street ☐ Minor City Street ☒ Labeled ☐  
 Is roadway divided? ☒  
 Number of Lanes: 2 ☒ 4 ☐ 6 ☐ Other (specify) \_\_\_\_\_  
 Area Attributes:  
 Commercial ☐ Residential ☐ Industrial ☐ Parkland ☐ Institutional ☐  
 Tree Height (Check one): N/A ☐ < 3 inches ☐ 3'-8" ☒ over 8" ☐  
 Fast food within sight? ☒ Name of Fast Food Facility \_\_\_\_\_  
 Convenience store within sight? ☒ \_\_\_\_\_  
 Bus Stop within sight? ☐ \_\_\_\_\_ Bus stop within survey area? ☒  
 Traffic Camera visible within survey area? (median bulge etc.) \_\_\_\_\_ yes then describe? \_\_\_\_\_  
 Air-traffic controller bin within 500 yard radius from site boundary? ☒

### Figure 1: Site Survey Sheet



### Figure 2: Start of Site



### Figure 3: Middle of Site



### Figure 4: End of Site

## 3.0 Summary of Litter Results

### 3.1 Visual Assessments of Litter Sites

During the audits, Dillon staff collected information about the area and adjacent roads of the audit sites. As a part of the site survey, Dillon staff would visually assess the site and rank it on a scale from 1 to 4. This was termed the visual litter index. In this index, 1 represented sites that were clean (less than five pieces of large litter visible) and 4 represented sites that were considered dirty (more than 20 pieces of large litter visible). **Figure 5** illustrates the results of this visual index for all 108 litter sites. Overall, 69% of sites were considered to be clean (and given a ranking of 1). An additional 24% were ranked as a 2, 6% were ranked as a 3 and only 1% was ranked as having a visual index of 4. The two sites where construction was observed were both given a litter index ranking of 2. **Table 1** provides a breakdown by site type and the average visual rating observed.

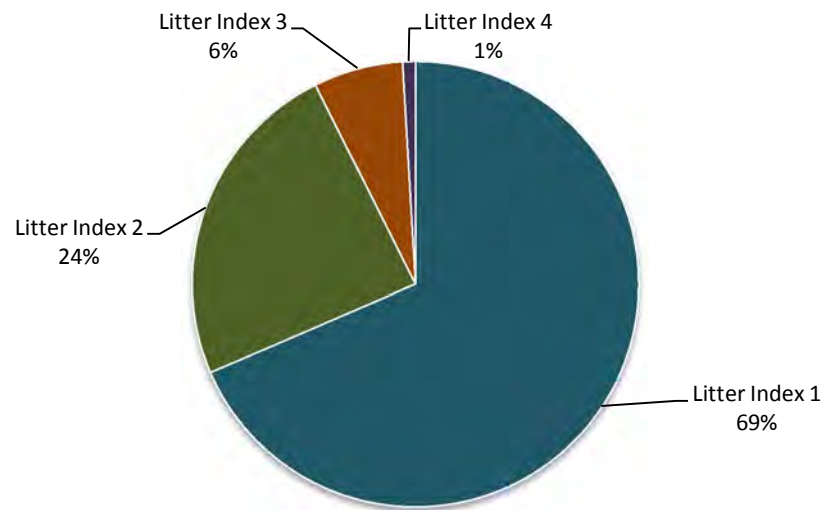


Figure 5: Visual Assessment Ranking of all Sites

Table 1: Average Visual Ranking by Site Type

Site Type	Average Visual Rating
Commercial	1.5
Industrial	1.3
Institutional	1.7
Multi-Family	1.7
Single- Family	1.2
Mixed Use	2.0

The remainder of the results (**Subsections 3.2 to 3.4**) are representative of the 106 sites that were not immediately adjacent to construction. The two sites that did have construction activities are analyzed in **Subsection 3.5**.

## 3.2 Large Litter Results

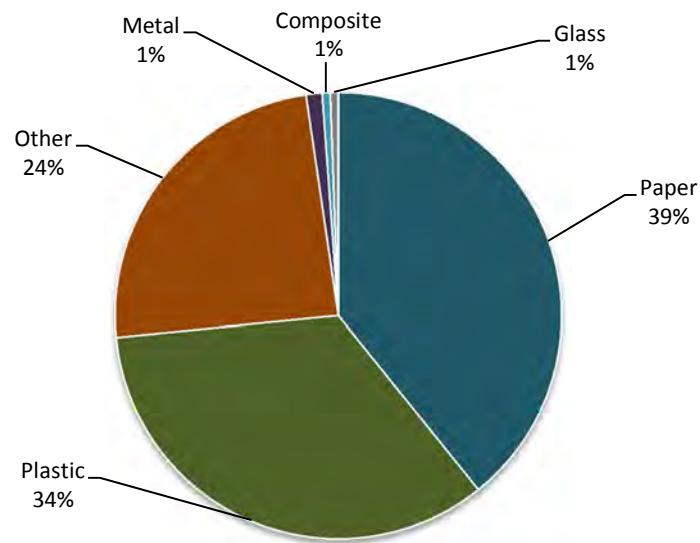
Large litter is any piece litter that is equal or greater than 4 square inches. This section of the report provides results for large litter by material type, category and subcategory. In 2017, the average number of large litter items per site was 8.1 pieces. The most common sub-category of large litter observed was cup lids, pieces. This litter represented 10% of all litter surveyed. **Table 2** illustrates the 20 most common large litter items observed (by sub-category) in the 2017 street litter audits. The complete list of items is provided in **Appendix E**.

**Table 2: Top 20 Large Litter Items**

Number	Large Litter Item	Number Observed	% of Total Large Litter Items Observed	Cumulative Total (%)
1	Cup Lids, Pieces	90	10%	10%
2	Non-Brand Towels/Napkins	78	9%	19%
3	Tobacco other	60	7%	26%
4	Misc. Plastic	55	6%	33%
5	Receipts (business forms, bus tickets)	53	6%	39%
6	Snack Food Packaging	41	5%	44%
7	Paper Cups (hot)	36	4%	48%
8	Misc. Paper	32	4%	52%
9	Paper Food Wrap	29	3%	55%
10	Plastic Drink Cups	26	3%	58%
11	Printed Material	26	3%	61%
12	Plastic Wrap	24	3%	64%
13	Home Articles	23	3%	66%
14	Food	23	3%	69%
15	Branded Napkins / Serviettes	16	2%	71%
16	Paper Cups (cold)	15	2%	73%
17	Plastic Packaging Other	15	2%	74%
18	Zipper Bags/Sandwich Bags	12	1%	76%
19	Candy Bar Wrappers	12	1%	77%
20	Vehicle & Metal Road Debris	11	1%	79%
<b>Total Top 20</b>		<b>677</b>	<b>79%</b>	
<b>Total All Litter</b>		<b>862</b>	<b>100%</b>	

### 3.2.1 Large Litter by Material Type

Items within the large litter categories were composed of different material types (paper, plastic, glass, metal, composite and other). These items were classified based on their known composition. **Figure 6** illustrates the breakdown by material type of all 862 pieces of large litter observed in the 2017 street litter audits. The largest material type observed was paper (39%), followed by plastic (34%) and other (24%). Metal, composite and glass materials each represented 1% of the materials observed.



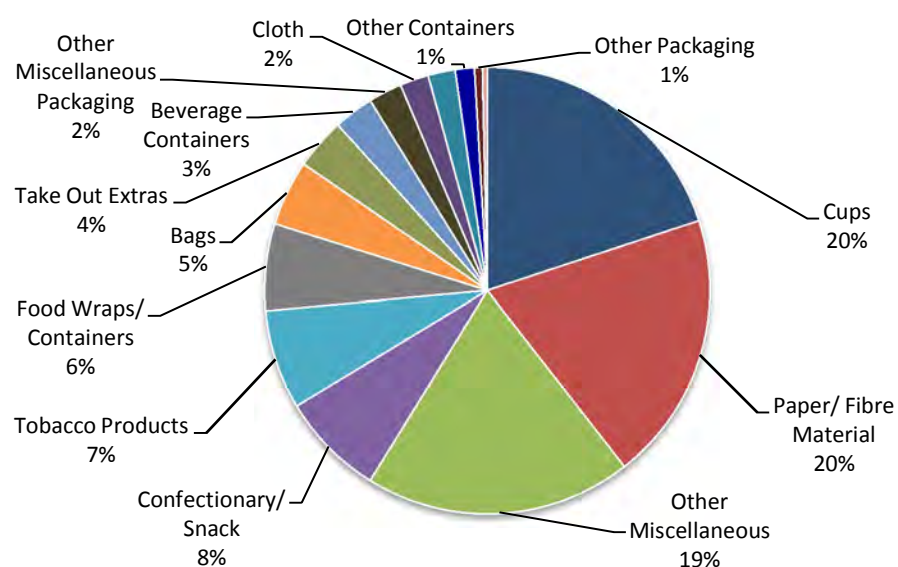
**Figure 6: Large Litter by Material Type**

### 3.2.2 Large Litter by Category

Each of the large litter items were classified into 15 categories and 120 sub-categories. **Table 3** provides a summary of the total amount of large litter observed for each of the 15 categories. In 2017, the most common category of litter observed was cups (20%), paper/fibre material (19%) and other miscellaneous (19%). Miscellaneous litter included items such as miscellaneous paper, plastic, as well as vehicle and road debris. **Figure 7** illustrates these results.

**Table 3: Large Litter Totals by Category**

Category	Observed Number of Items	Percentage of Large Litter Observed
Beverage Containers	25	3%
Other Packaging	5	1%
Cups	172	20%
Bags	41	5%
Other Packaging (Boxes)	17	2%
Other Containers	12	1%
Food Wraps/ Containers	54	6%
Take Out Extras	32	4%
Trays	3	0%
Confectionary/Snack	65	8%
Cloth	18	2%
Other Miscellaneous Packaging	21	2%
Paper/Fibre Material	168	19%
Tobacco Products	62	7%
Other Miscellaneous	167	19%
<b>Total</b>	<b>862</b>	<b>100%</b>

**Figure 7: Large Litter Items by Category**

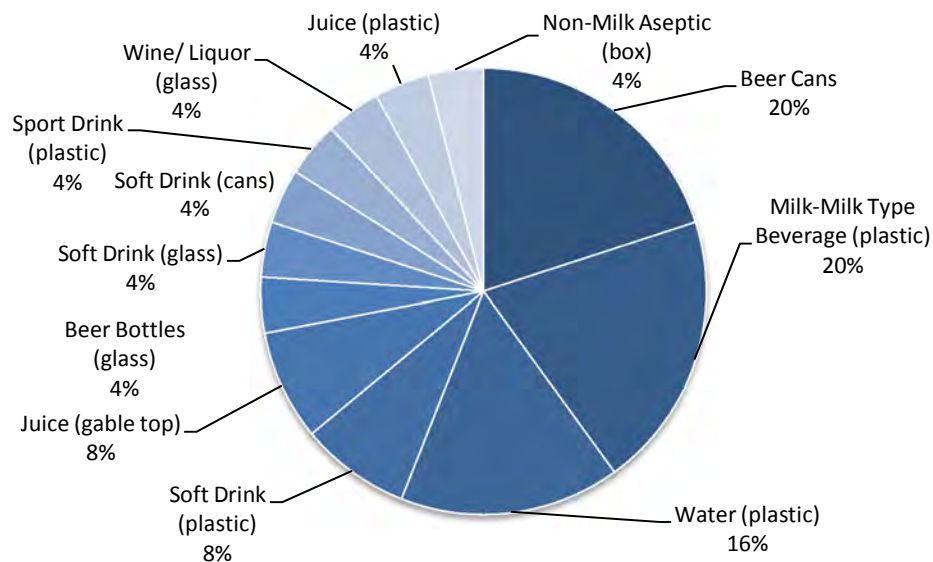


### 3.2.3 Large Litter by Sub-Category

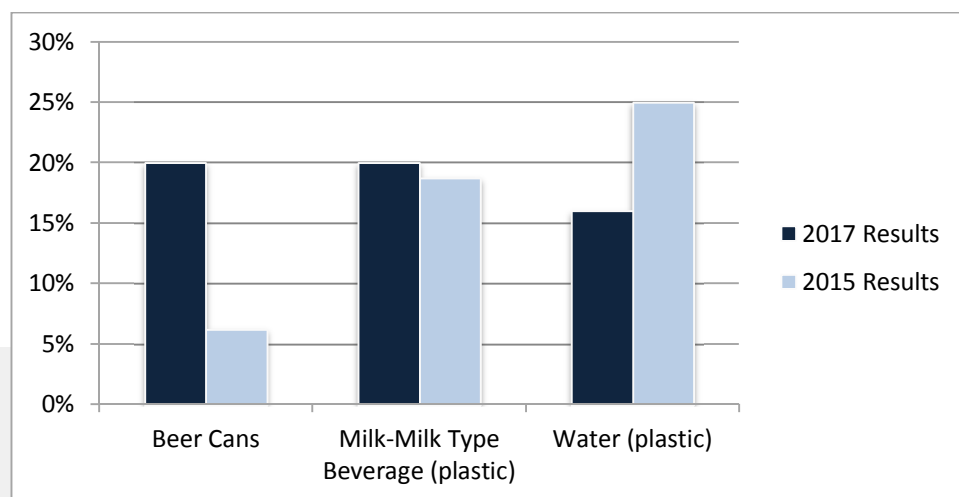
Each of the 15 large litter categories has several subcategories within them. The breakdown of litter by sub-categories is provided below.

#### Beverage Containers:

Beverage containers accounted for 3% of all large litter observed in the 2017 audits. The largest sub-category evaluated for beverage containers was beer cans (20%) and milk –milk type beverage (plastic) (20%), followed by water (plastic) (16%). **Figure 8** illustrates the breakdown of the beverage container category. **Figure 9** compares the highest three sub-categories from 2017 to the 2015 baseline litter audits.



**Figure 8: Beverage Container Composition 2017**

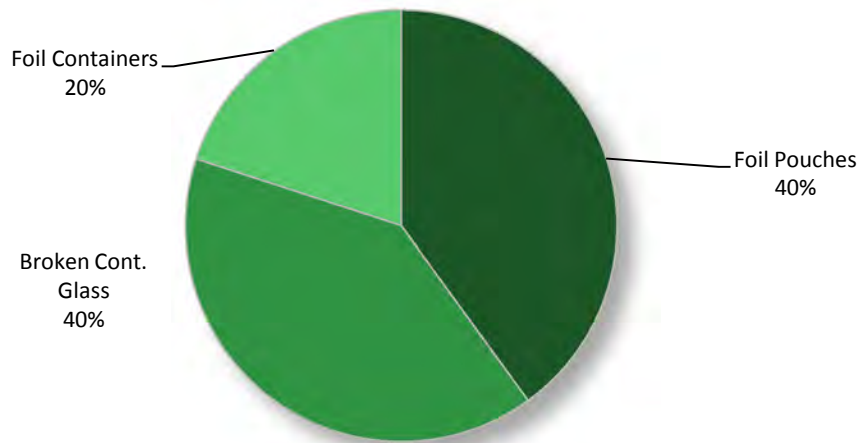


**Figure 9: Beverage Containers 2017 vs. 2015 Comparison**

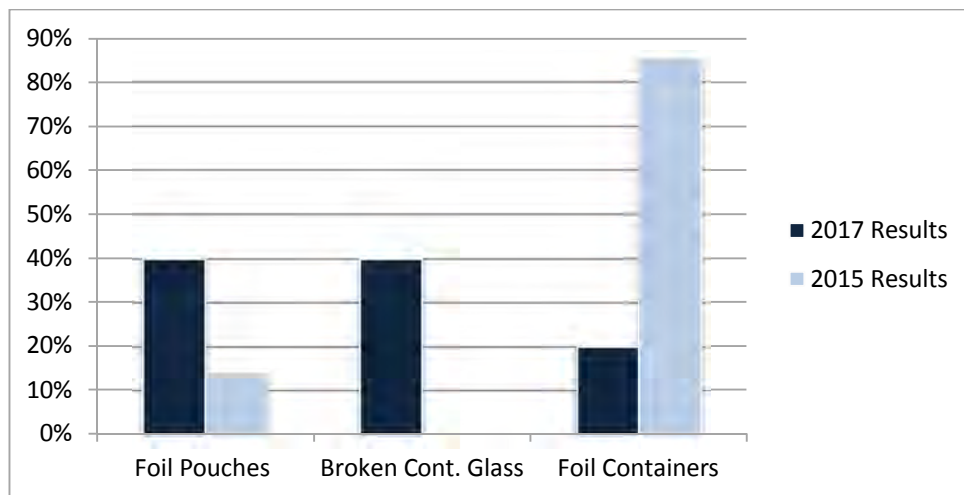


**Other Packaging:**

Other packaging accounted for 1% of the overall large litter observed for the City's 2017 audits. Foil pouches (40%), broken container glass (40%) and foil containers (20%) comprise the other packaging category, entirely. **Figure 10** illustrates the results of the other packaging category. **Figure 11** compares the highest three sub-categories from 2017 to 2015.



**Figure 10: Other Packaging Composition 2017**

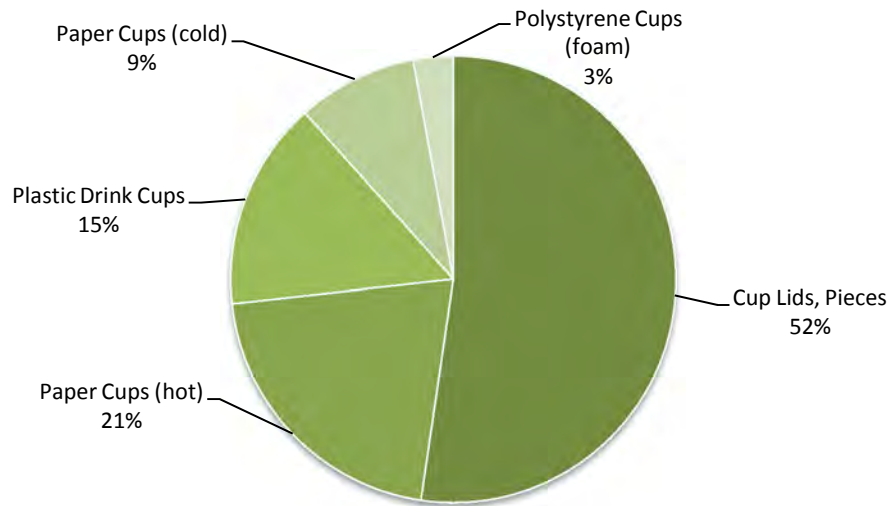


**Figure 11: Other Packaging 2017 vs. 2015 Comparison**

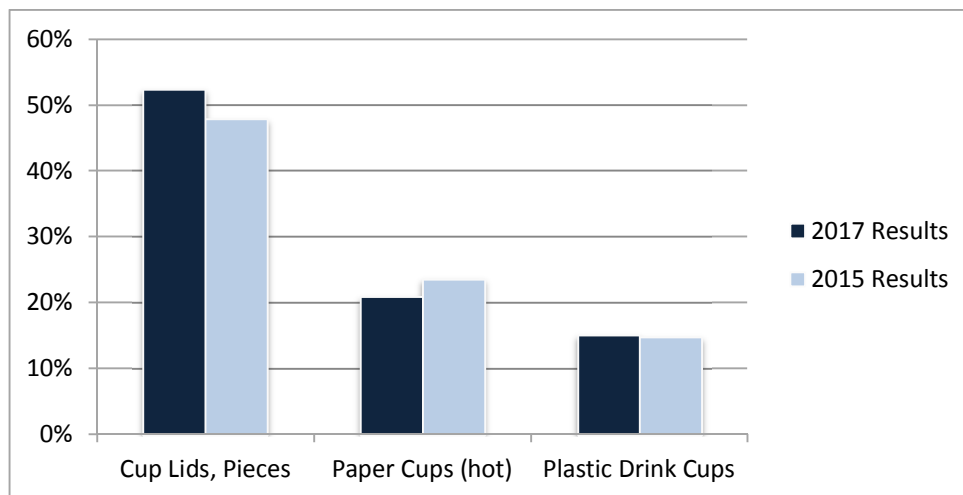
**Cups:**

Cups were the largest category observed in the 2017 street litter audits and represented 20% of all large litter observed. Cup lids, pieces were the largest subcategory (52%), followed by paper cups (hot) (21%).

**Figure 12** illustrates the breakdown of the cups category while **Figure 13** compares the highest three sub-categories from the 2017 to 2015 audits.



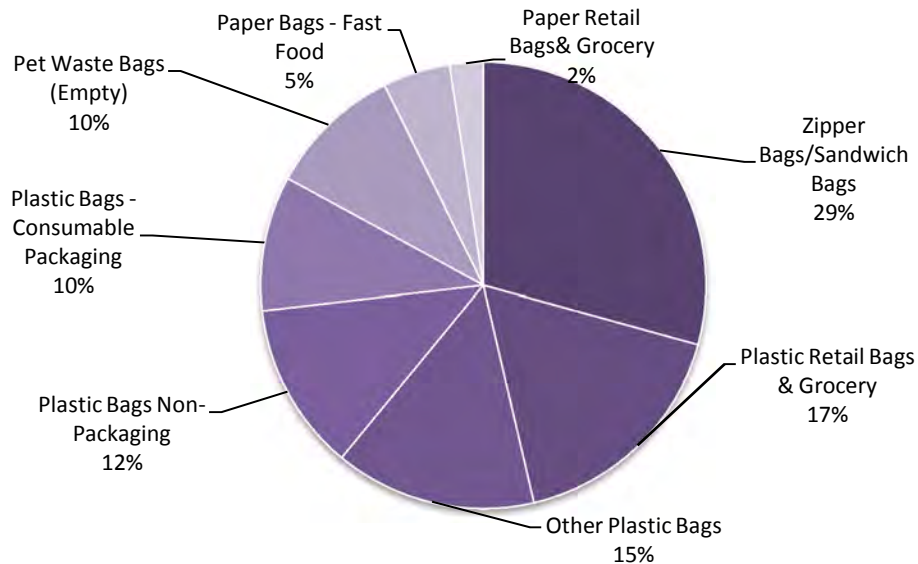
**Figure 12: Cups Composition 2017**



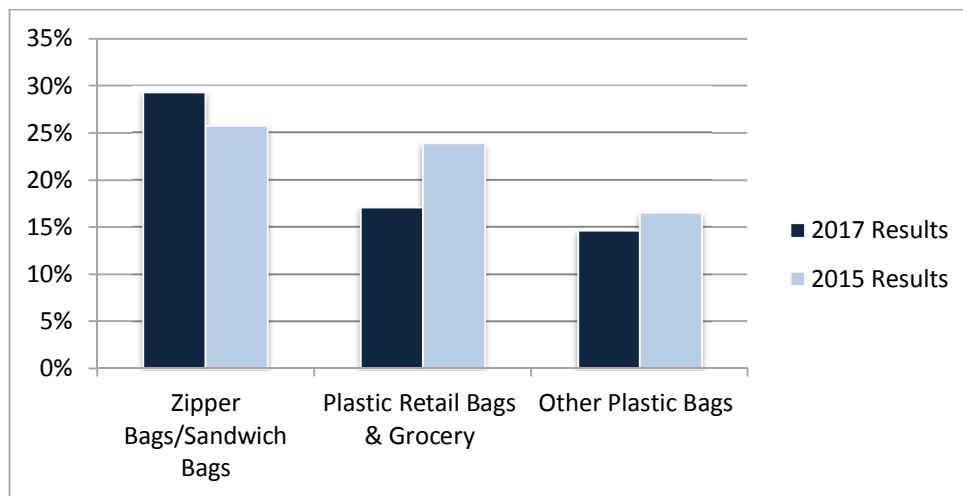
**Figure 13: Cups 2017 vs. 2015 Comparison**

**Bags:**

Bags represented 5% of all large litter observed. This category comprised primarily of zipper bags/sandwich bags (29%) and plastic retail bags and grocery (15%). **Figure 14** illustrates the 2017 composition of the bags category; **Figure 15** compares the highest three sub-categories from 2017 to 2015.



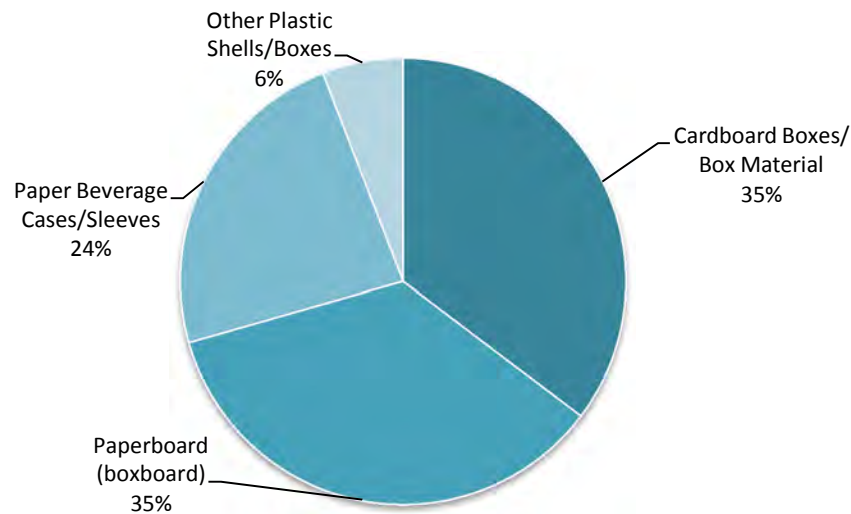
**Figure 14: Bags Composition 2017**



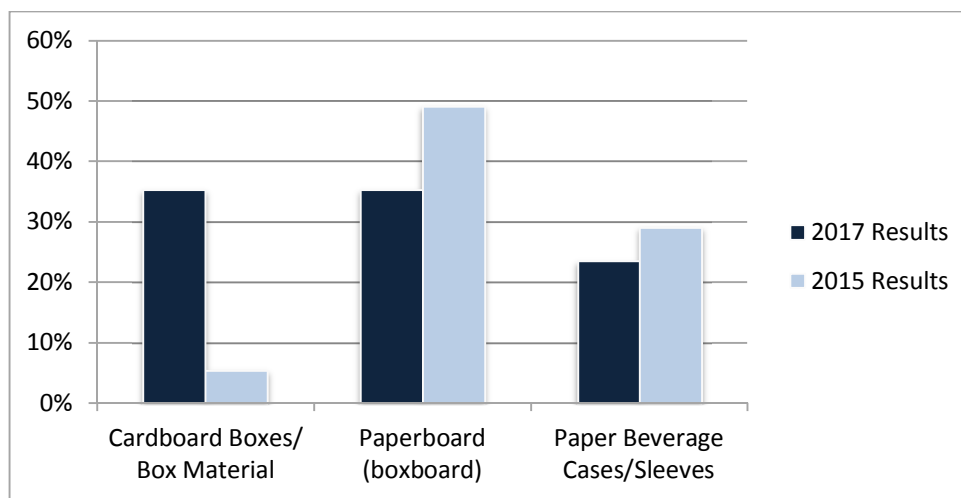
**Figure 15: Bags 2017 vs. 2015 Comparison**

### Other Packaging (Boxes):

Within the 2017 audits other packaging (boxes) represented 2% of the accumulated large litter. This category consisted of cardboard boxes/box material (35%), paperboard (35%), paper beverage cases/sleeves (24%) and other plastic shells/boxes (6%), as illustrated in **Figure 16**. **Figure 17** compares the highest three sub-categories from 2017 to 2015.



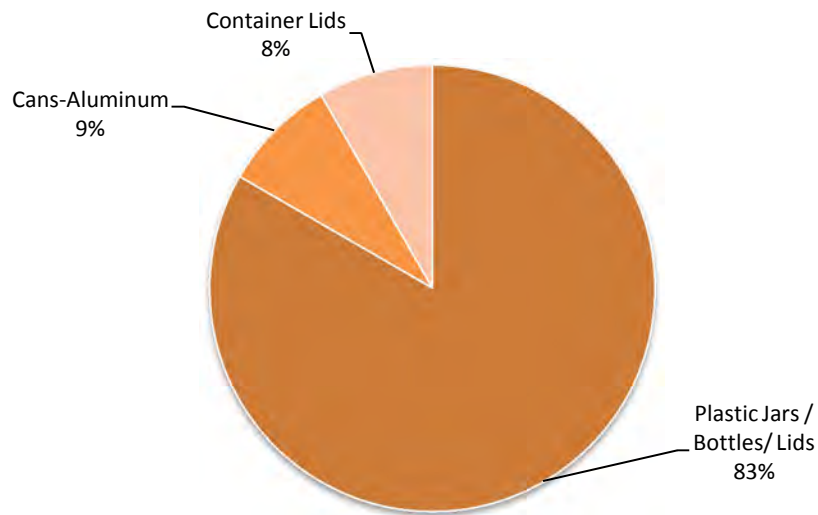
**Figure 16: Other Packaging (Boxes) Composition 2017**



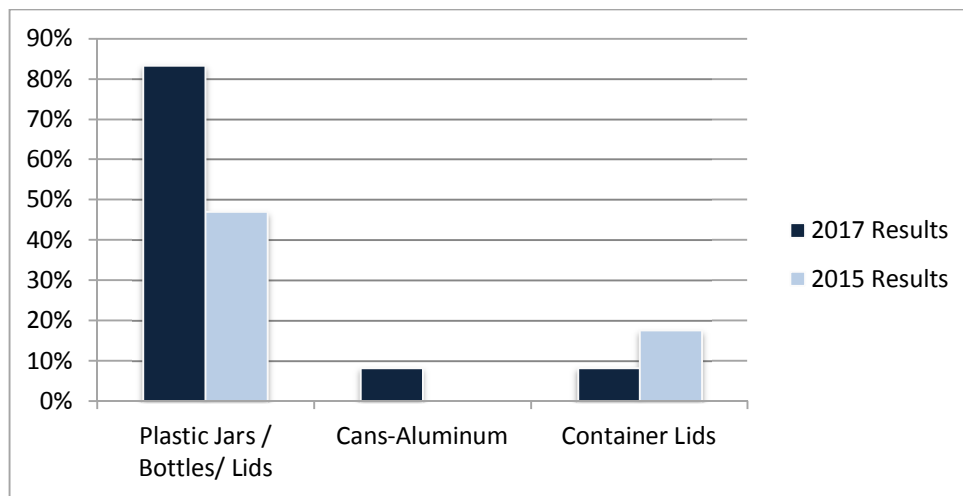
**Figure 17: Other Packaging (Boxes) 2015 vs. 2017 Comparison**

**Other Containers:**

Other containers represented 1% of all large litter observed in 2017. The breakdown of this category was plastic jars/bottles/lids (83%), cans-aluminum (9%) and containers lids (8%). This composition is illustrated in **Figure 18** while a comparison of the highest three sub-categories from 2017 to 2015 is illustrated in **Figure 19**.



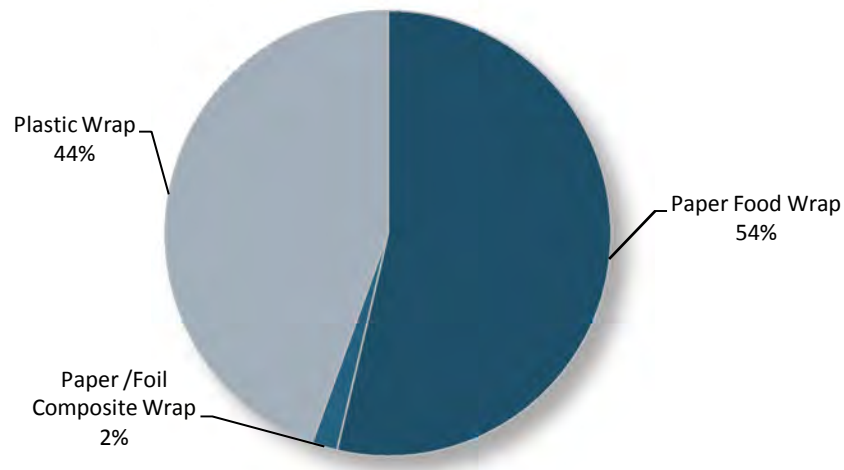
**Figure 18: Other Containers Composition 2017**



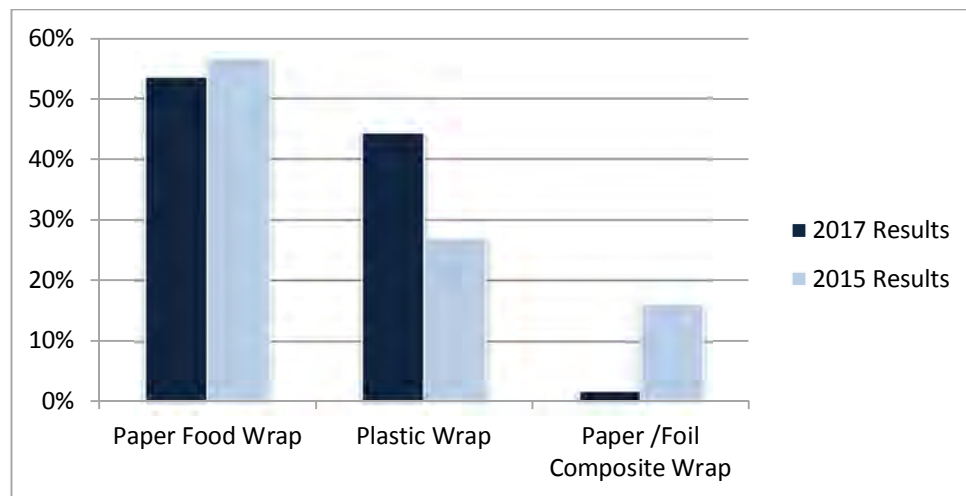
**Figure 19: Other Containers 2017 vs. 2015 Comparison**

**Food Wraps/Containers:**

Food wraps/containers represented 6% of the litter observed in this audit. **Figure 20** illustrates the breakdown of this category. The sub-categories that comprised food wraps/containers included: paper food wrap (54%), plastic wrap (44%) and paper/foil composite wrap (2%). **Figure 21** compares the three sub-categories from 2017 to 2015.



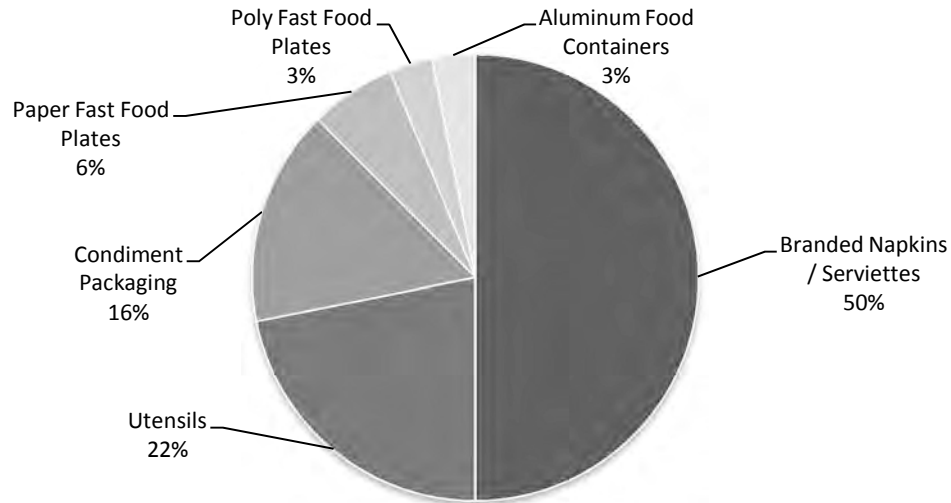
**Figure 20: Food Wraps/Containers Composition 2017**



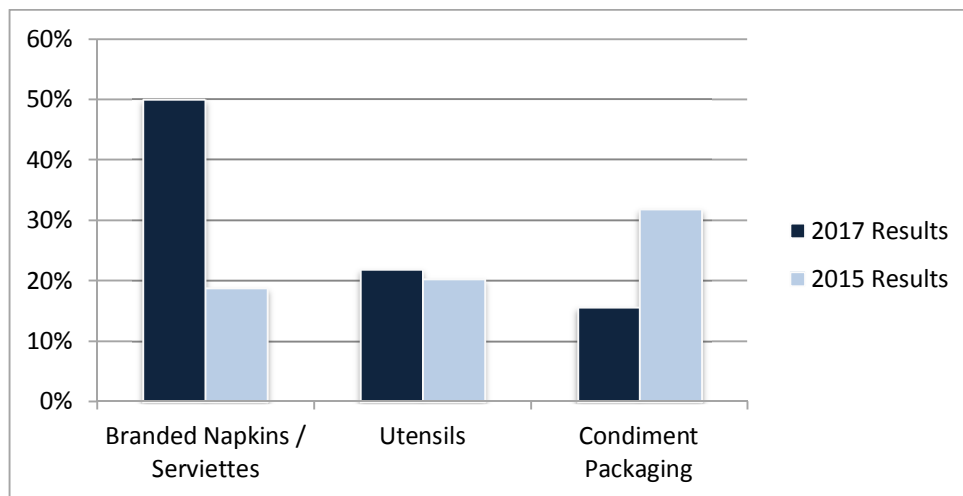
**Figure 21: Food Wraps/Containers 2017 vs. 2015 Comparison**

**Take out Extras:**

Take out extras accounted for 4% of the large litter observed. Half of the liter in this category was comprised of branded napkins/serviettes. **Figure 22** illustrates the breakdown of this category while **Figure 23** compares the highest three sub-categories from 2017 to 2015.



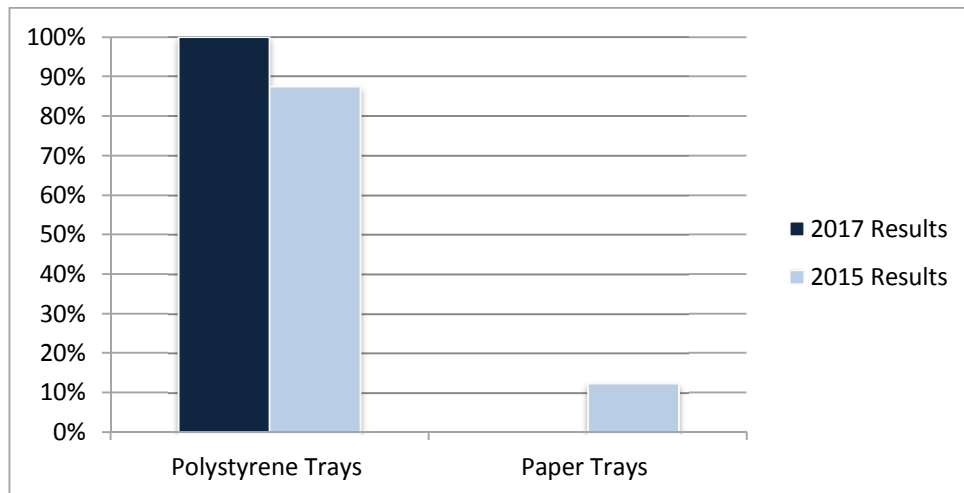
**Figure 22: Take Out Extras Composition 2017**



**Figure 23: Take Out Extras 2017 vs. 2015 Comparison**

**Trays:**

Trays represented less than 1% of all litter observed and was 100% polystyrene trays. **Figure 24** compares sub-categories from 2017 to 2015.

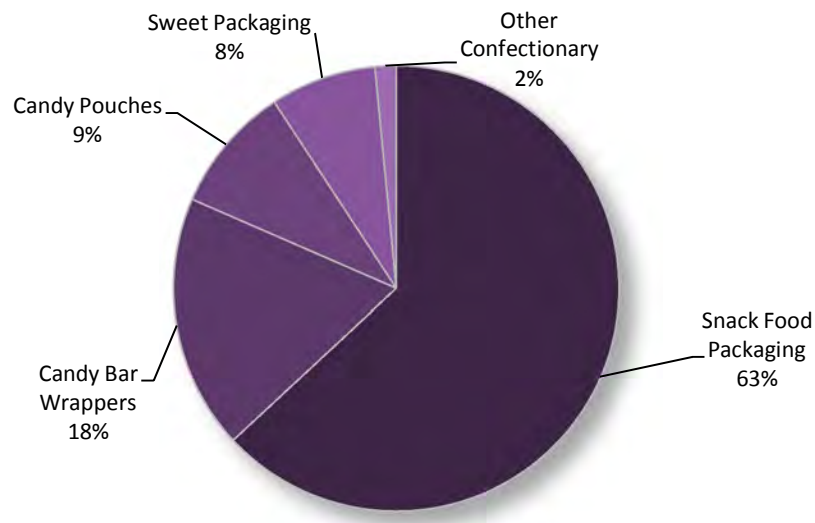


**Figure 24: Trays 2017 vs. 2015 Comparison**

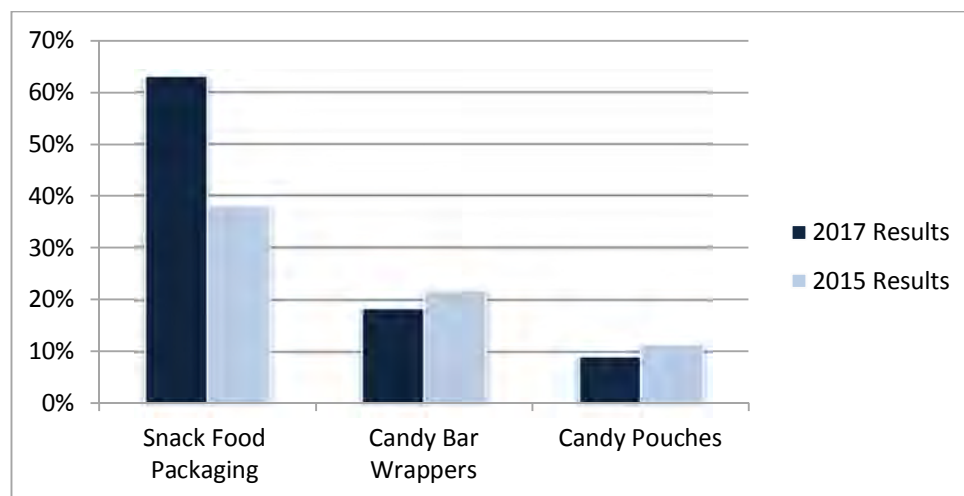


**Confectionary/Snacks:**

This category represented 8% of all large litter observed in 2017. The most frequent observed sub-categories for large litter were snack food packaging (63%) and candy bar wrappers (18%). **Figure 25** illustrates the results of the confectionary/snacks category breakdown. **Figure 26** compares the highest three sub-categories from 2017 to 2015.



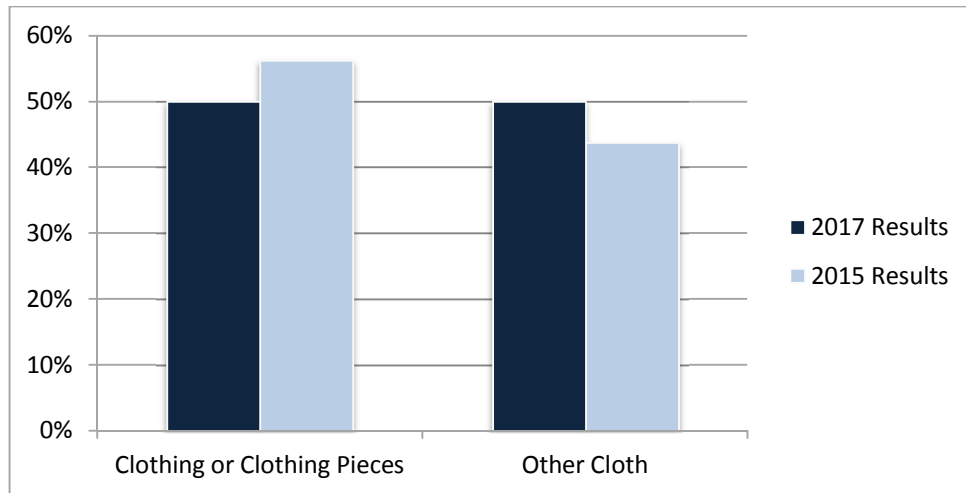
**Figure 25: Confectionary/Snacks Composition 2017**



**Figure 26: Confectionary/Snack 2017 vs. 2015 Comparison**

**Cloth:**

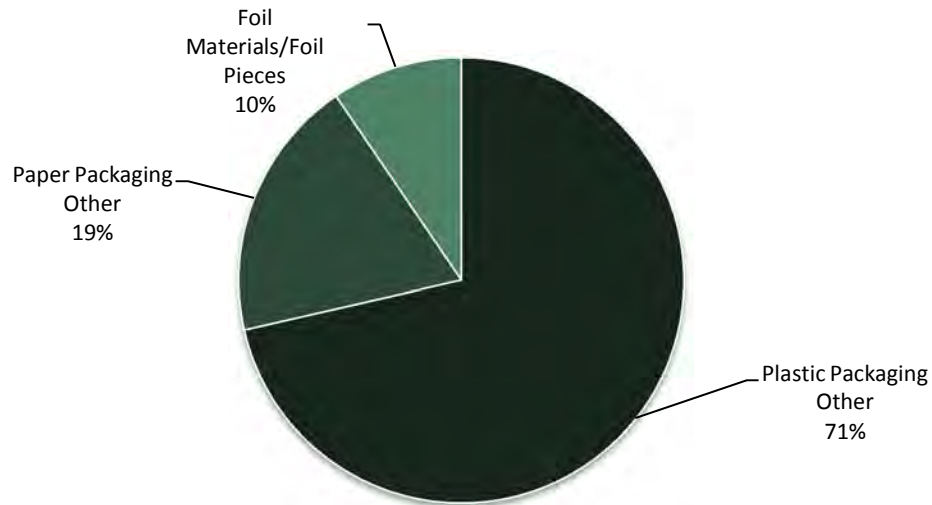
Cloth was split 50/50 between other cloth and clothing or clothing pieces. Cloth represented 2% of all large litter observed in 2017. **Figure 27** compares the sub-categories observed in the 2017 and 2015 audits.



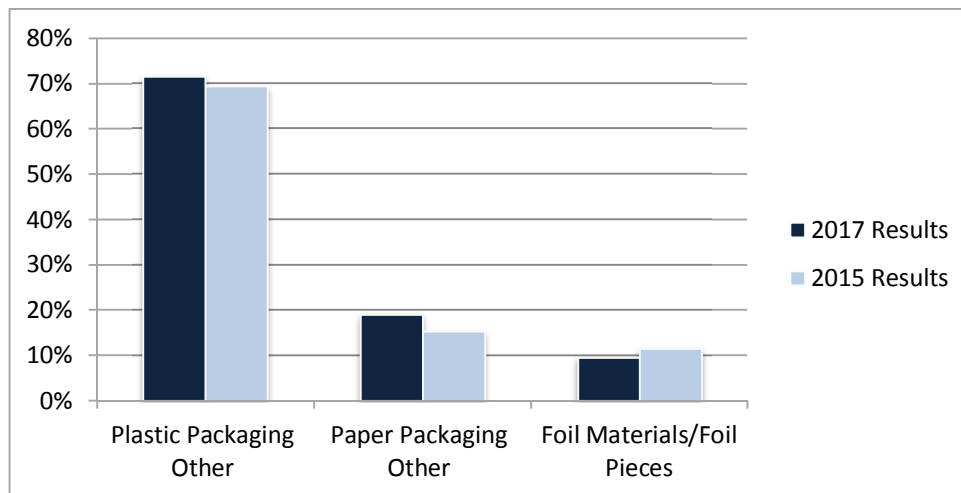
**Figure 27: Cloth 2017 vs. 2015 Comparison**

**Other Miscellaneous Packaging:**

Other miscellaneous packaging represented 2% of the large litter. The majority of other miscellaneous packaging was plastic packaging other (71%). **Figure 28** illustrates the breakdown of this category and **Figure 29** compares the highest three sub-categories from 2017 to 2015.



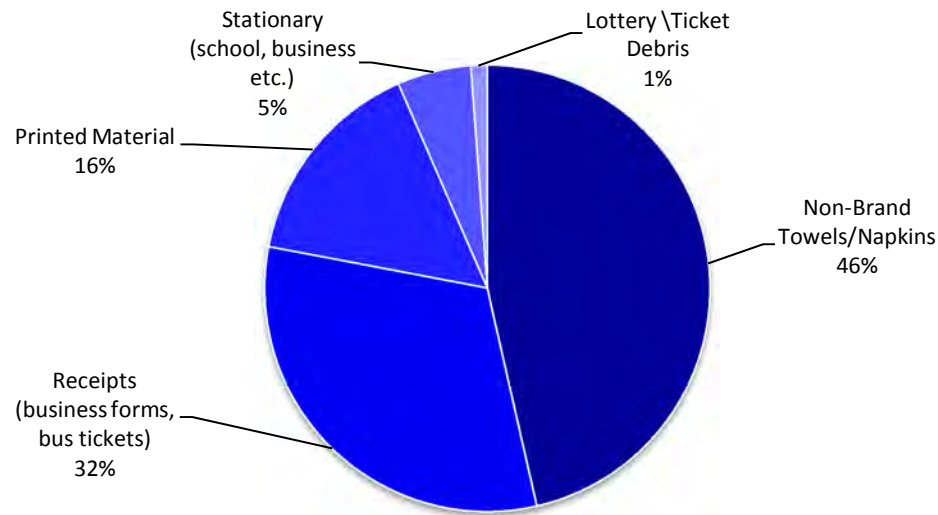
**Figure 28: Other Miscellaneous Packaging Composition 2017**



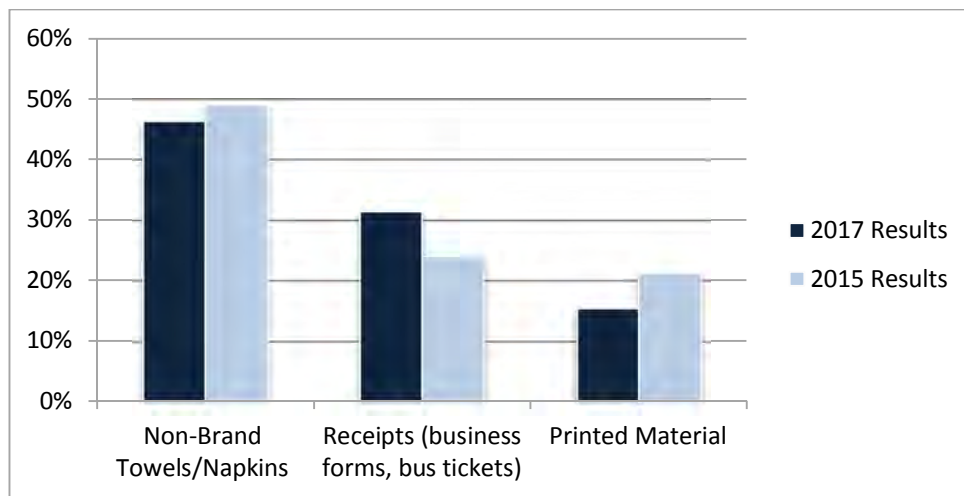
**Figure 29: Other Miscellaneous Packaging 2017 vs. 2015 Comparison**

**Paper/Fibre Materials:**

This category represented 19% of all large litter observed in 2017. The majority of the paper/fibre materials category was non-brand name towels/napkins (46%) and receipts (32%). **Figure 30** provides the detailed breakdown of this category. **Figure 31** compares the highest three sub-categories from 2017 to 2015.



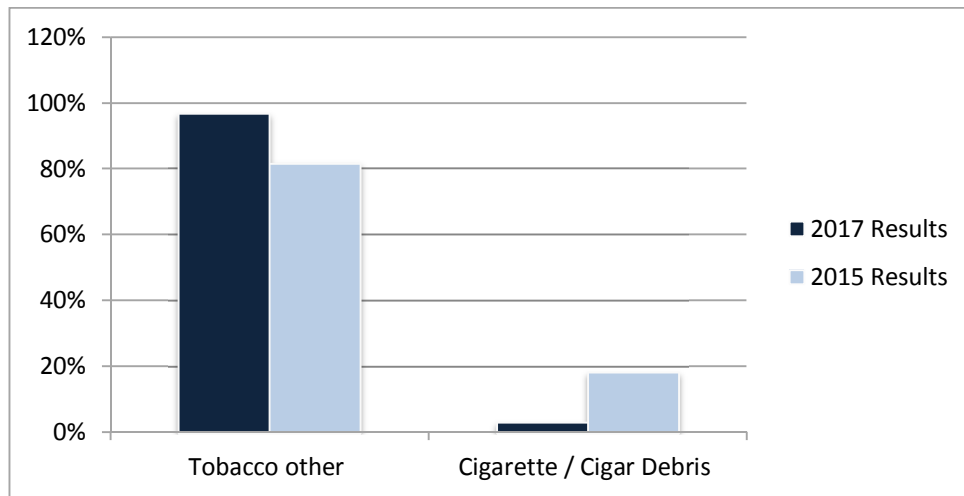
**Figure 30: Paper/Fibre Composition 2017**



**Figure 31: Paper/Fibre Material 2017 vs. 2015 Comparison**

**Tobacco Products:**

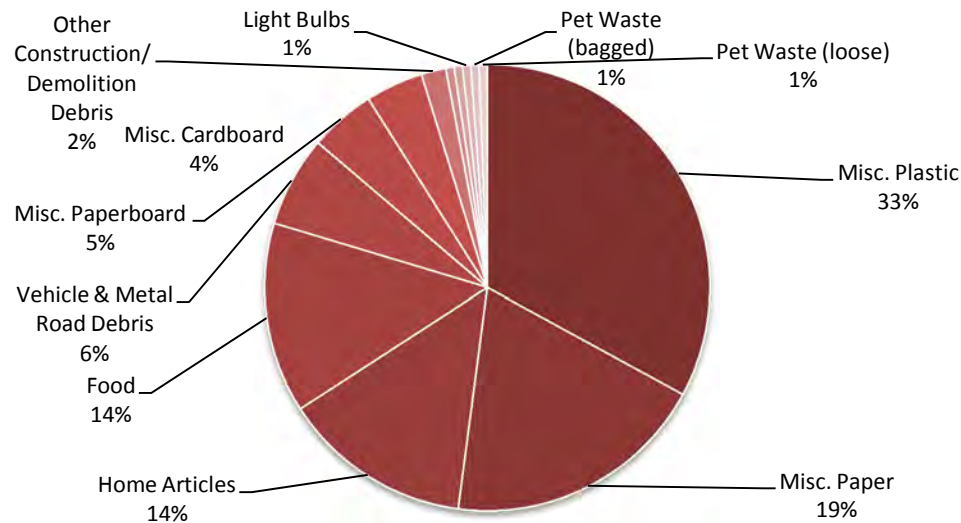
Tobacco products were 7% of the large litter items surveyed in 2017. Within this category, 97% was tobacco other and 3% cigarette/cigar debris. **Figure 32** compares the two sub-categories from 2017 to 2015.



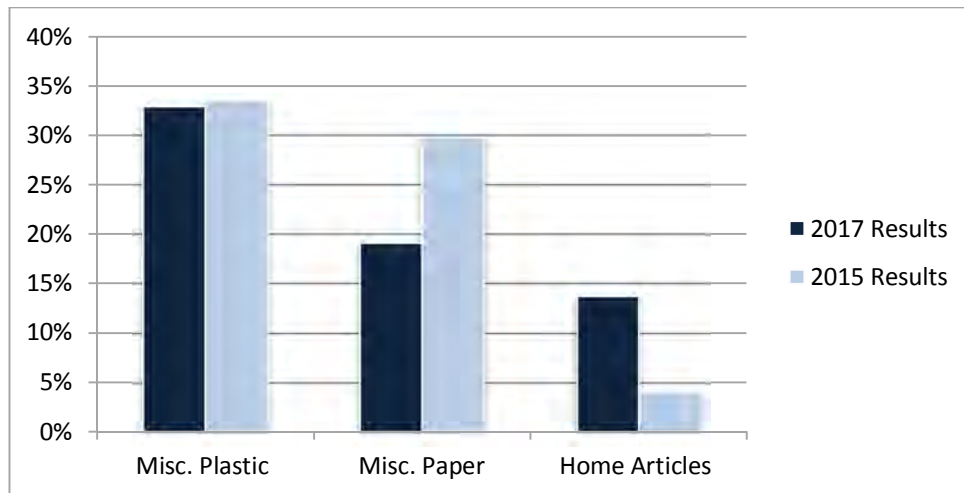
**Figure 32: Tobacco Products 2017 vs. 2015 Comparison**

### Other Miscellaneous:

This category represented 19% of all large litter observed in 2017. The primary sub-categories assessed in 2017 included: miscellaneous plastic (33%), miscellaneous paper (19%), home articles (14%) and food (14%). **Figure 33** illustrates the breakdown of this category while **Figure 34** compares the highest three sub-categories from 2017 to 2015.



**Figure 33: Other Miscellaneous Composition 2017**



**Figure 34: Other Miscellaneous 2017 vs. 2015 Comparison**

### 3.2.4 Large Litter by Sites

The ten litter sites having the highest number of large litter pieces are listed below in **Table 4**. The site with the most accumulated large litter in 2017 was Site 107 with 43 pieces of litter observed. This site was multi-family residential. The majority of sites in the “top 10” were residential with the exception of Site 41 (commercial) and Site 52 (industrial). A full ranking of sites is provided in **Appendix F**. Site 41 was also one of the sites with the highest number of large litter pieces in the 2015 baseline street litter audits.

**Table 4: Large Litter Site Rankings**

Site Number	Number of Pieces of Large Litter	Hundred Block	Street Name
107	43	600	Powell Street
41	35	300	Terminal Avenue
17	31	2100	Renfrew Street
52	27	600	Evans Street
77	25	5500	Main Street
60	24	7200	Dumfries Street
67	22	2100	Yew Street
10	21	3400	Wellington Street
11	21	3400	East 29 Avenue
58	20	5700	Berkeley Street

### 3.2.5 Large Litter Results Compared to 2015 Baseline

Results from the 2015 audit were established as the baseline against which future litter audit results (e.g., 2017) can be compared. Visual ratings for the litter index were completed for each site in 2015. **Table 5** compares the results of the 2017 results to the baseline 2015 visual litter index ratings.

**Table 5: Visual Litter Index Ranking 2017 vs. 2015**

Visual Litter Index Rating	Percentage of Sites Ranked (%) 2017	Percentage of Sites Ranked (%) 2015
1	69%	74%
2	24%	18%
3	6%	7%
4	1%	1%

The composition and accumulation from the 2015 baseline to the 2017 results by category are compared in **Table 6**. Overall, there was a 34% decrease in the amount of large litter observed in 2017. It should be noted that these values do not include the two sites that were immediately adjacent to construction activity. All categories with the exception of beverage containers, food wraps/containers and tobacco products were lower for 2017 when compared to the 2015 baseline results.

**Table 6: 2017 vs. 2015 Large Litter Comparison**

Category	2017 Results (106 Sites)		2015 Baseline Results (108 Sites)		% Change
	# Litter Items	% of Total	# Litter Items	% of Total	
Beverage Containers	25	3%	16	1%	56%
Other Packaging	5	1%	7	1%	-29%
Cups	172	20%	284	22%	-39%
Bags	41	5%	54.5	4%	-25%
Other Packaging (Boxes)	17	2%	55	4%	-69%
Other Containers	12	1%	17	1%	-29%
Food Wraps/ Containers	54	6%	37	3%	46%
Take Out Extras	32	4%	34.5	3%	-7%
Trays	3	0%	8	1%	-63%
Confectionary/Snack	65	8%	77.5	6%	-16%
Cloth	18	2%	32	2%	-44%
Other Miscellaneous Packaging	21	2%	26	2%	-19%
Paper/ Fibre Material	168	19%	311.5	24%	-46%
Tobacco Products	62	7%	49	4%	27%
Other Miscellaneous	167	19%	291.5	22%	-43%
<b>Total</b>	<b>862</b>	<b>100%</b>	<b>1,300.5</b>	<b>100%</b>	<b>-34%</b>

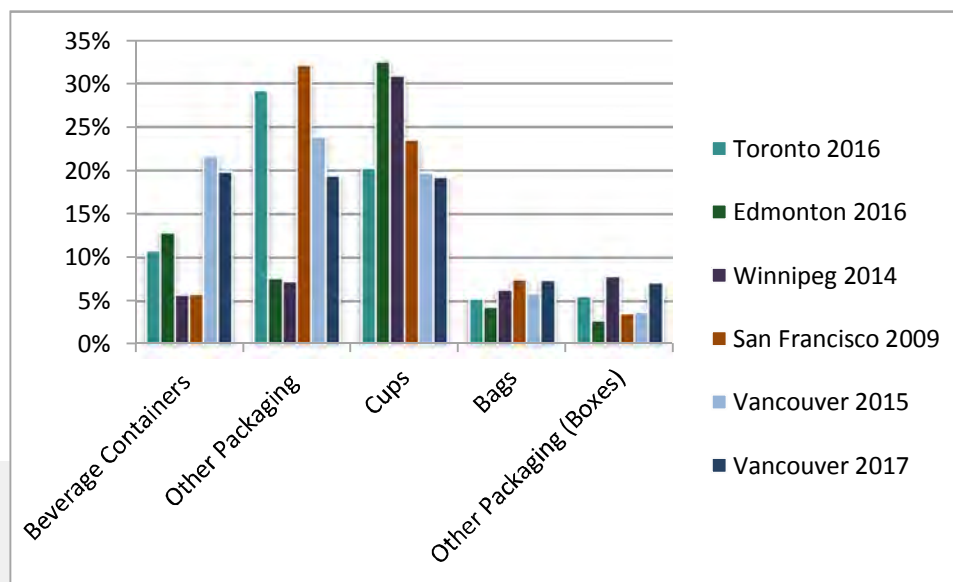
**3.2.6****Large Litter Results Compared to Other North American Municipalities**

Large litter audits are completed in several North American Municipalities. These assessments audit large litter in similar categories using the same methodology. **Table 7** illustrates the percentage breakdown per large litter item category for each municipality. **Figure 35** illustrates the top five large litter categories observed in the 2017 Vancouver street litter audits to the results for each municipality. **Table 8** illustrates the average number of items counted per site based on category. **Figure 36** illustrates these results graphically.



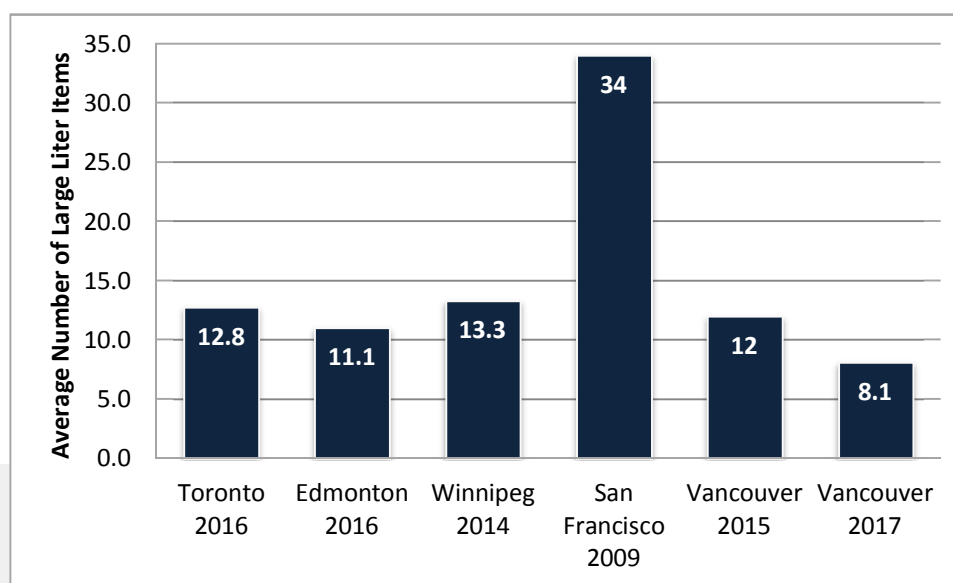
**Table 7: Vancouver Large Litter Audit Results Compared with Audit Results of Other Cities (by Percent Breakdown)**

Category	Toronto 2016	Edmonton 2016	Winnipeg 2014	San Francisco 2009	Vancouver 2015	Vancouver 2017
Beverage Containers	6%	2%	10%	3%	1%	3%
Other Packaging	1%	0%	5%	3%	1%	1%
Cups	11%	13%	6%	6%	22%	20%
Bags	4%	2%	6%	6%	4%	5%
Other Packaging (Boxes)	9%	3%	2%	3%	4%	2%
Other Containers	1%	5%	1%	2%	1%	1%
Food Wraps/ Containers	3%	4%	1%	4%	3%	6%
Take Out Extras	2%	8%	13%	4%	3%	4%
Trays	0%	0%	N/A	0%	1%	0%
Confectionary/Snack	5%	4%	6%	8%	6%	8%
Cloth	2%	0%	1%	1%	3%	2%
Other Miscellaneous Packaging	0%	0%	0%	0%	2%	2%
Paper/ Fibre Material	29%	8%	7%	32%	24%	19%
Tobacco Products	6%	3%	8%	4%	4%	7%
Other Miscellaneous	20%	33%	31%	24%	20%	19%
Additional Categories	0%	1%	0%	0%	3%	0%
Household Articles	0%	16%	0%	0%	0%	0%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Figure 35: Comparison of Top Large Litter Categories by Municipality**

**Table 8: Vancouver Large Litter Audit Results Compared with Audit Results of Other Cities (Average Number of Items per Site)**

Category	Toronto 2016	Edmonton 2016	Winnipeg 2014	San Francisco 2009	Vancouver 2015	Vancouver 2017
Beverage Containers	0.7	0.2	1.5	1.3	0.2	0.2
Other Packaging	1.2	0	0.8	1.9	0.1	0.0
Cups	1.4	1.4	1.0	3.0	2.6	1.6
Bags	0.6	0.2	0.8	1.4	0.5	0.4
Other Packaging (Boxes)	0.1	0.3	0.3	0.7	0.5	0.2
Other Containers	0.1	0.6	0.1	0.7	0.2	0.1
Food Wraps/ Containers	0.4	0.4	1.8	1.2	0.3	0.5
Take Out Extras	0.3	0.8	0.0	1.4	0.3	0.3
Trays	0.1	0%	0%	0.2	0.1	0.0
Confectionary/Snack	0.7	0.5	0.9	3.2	0.7	0.6
Cloth	0.2	0	0.2	0.4	0.3	0.2
Other Miscellaneous Packaging	0	0	0	0	0.2	0.2
Paper/ Fibre Material	3.7	0.9	1.0	7.8	2.9	1.6
Tobacco Products	0.7	0.3	1.1	1.4	0.5	0.6
Other Miscellaneous	2.6	3.6	4.1	9.5	2.4	1.6
Additional Categories	0	0.1	0	0	0.3	0
Household Articles	0	1.7	0	0	0	0
<b>Total</b>	<b>12.8</b>	<b>11.1</b>	<b>13.3</b>	<b>34</b>	<b>12</b>	<b>8.1</b>

**Figure 36: Average Large Litter Items per Site**

### 3.2.7 Large Litter Statistical Analysis

The average number of large litter items per site in the 2017 audits was 8.1 pieces. There were three sites that had no large litter accumulation. Of the 106 sites surveyed, five sites had an average of eight pieces of large litter within the site, 65 sites had fewer than eight pieces and 36 sites had more than eight pieces of large litter.

### 3.3 Small Litter Results

Small litter is any piece of litter that is less than 4 square inches. Small litter is divided into 26 categories. This section reviews small litter by category, site and compared to the baseline 2015 results. In 2017, the average number of small litter items per site was 5.2 pieces with no construction. The most common categories of small litter observed were cigarette butts/debris (37%) and chewing gum (25%). **Table 9** provides these results.

**Table 9: Small Litter Data 2017**

Category	Total Number of Items	% of Total
Cigarette Butts/Debris	207	37%
Other Tobacco	1	0%
Bottle Caps	3	1%
Straws	5	1%
Candy Packaging and Wrappers	10	2%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0	0%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	7	1%
Glass	12	2%
Paper	65	12%
Cup Sleeves	0	0%
Plastic Film	26	5%
Hard Plastic	36	6%
Aluminum/Foil Debris	21	4%
Rubber	1	0%
Metal (not aluminum)	7	1%
Chewing Gum (stuck on pavement)	140	25%
Food & Food Scraps	0	0%
Pet Waste (bagged)	0	0%
Pet Waste (loose)	3	1%
Needles/Syringes	0	0%
Medications	0	0%
Cell Phones	0	0%
Audio-Visual Devices	0	0%
Batteries	1	0%
Other Electronic Waste	0	0%
Other Material	9	2%
<b>Total Site Small Litter</b>	<b>554</b>	<b>100%</b>

### 3.3.1 Small Litter by Sites

The ten small litter sites with the most observed small litter are listed below in **Table 10**. The site with the most accumulated small litter in 2017 was Site 107 with 33 pieces of small litter observed. This site was multi-family residential. The majority of sites in the “top 10” were commercial. A full ranking of sites is provided in **Appendix F**. Sites 41, 75, 106, 107 and 110 were all sites with the highest observed small litter in the 2015 baseline audit as well.

**Table 10: Small Litter Site Rankings**

Site Number	Number of Pieces of Small Litter	Hundred Block	Street Name
107	33	600	Powell Street
108	32	2400	Main Street
15	20	600	East Broadway
75	19	400	Homer Street
13	18	3500	Euclid Avenue
104	17	1100	Denman Street
106	16	1000	Burrard Street
110	15	400	Main Street
41	14	300	Terminal Avenue
109	14	1100	Kingsway

### 3.3.2 Small Litter Results Compared to 2015 Baseline

Results from the 2015 audit were established as the baseline against which future litter audit results (e.g., 2017) can be compared. **Table 11** compares the composition and accumulation from the 2015 baseline to the 2017 results. Overall, there was a 30% decrease in the small litter observed in 2017. It should be noted that these values do not include the two sites that were immediately adjacent to construction. All categories with the exception of other polystyrene debris, plastic film and other materials were lower than the 2015 baseline results.

**Table 11: 2017 vs 2015 Small Litter Comparison**

Category	2017 Results (106 Sites)		2015 Baseline Results (108 Sites)		% Change
	# Small Litter Items	% of Total	# Small Litter Items	% of Total	
Cigarette Butts/Debris	207	37%	243	31%	-15%
Other Tobacco	1	0%	1	0%	0%
Bottle Caps	3	1%	0	0%	-
Straws	5	1%	0	0%	-
Candy Packaging and Wrappers	10	2%	20	3%	-50%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0	0%	42	5%	-100%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	7	1%	1	0%	600%
Glass	12	2%	13	2%	-8%
Paper	65	12%	121	15%	-46%
Cup Sleeves	0	0%	2	0%	-100%
Plastic Film	26	5%	18	2%	44%
Hard Plastic	36	6%	39	5%	-8%
Aluminum/Foil Debris	21	4%	24	3%	-13%
Rubber	1	0%	4	1%	-75%
Metal (not aluminum)	7	1%	8	1%	-13%
Chewing Gum (stuck on pavement)	140	25%	231	29%	-39%
Food & Food Scraps	0	0%	10	1%	-100%
Pet Waste (bagged)	0	0%	0	0%	-
Pet Waste (loose)	3	1%	4	1%	-25%
Needles/Syringes	0	0%	0	0%	-
Medications	0	0%	0	0%	-
Cell Phones	0	0%	0	0%	-
Audio-Visual Devices	0	0%	0	0%	-
Batteries	1	0%	2	0%	-50%
Other Electronic Waste	0	0%	0	0%	-
Other Materials	9	2%	4	1%	125%
<b>Total Site Small Litter</b>	<b>554</b>	<b>100%</b>	<b>787</b>	<b>100%</b>	<b>-30%</b>

### 3.3.3 Small Litter Results Compared to Other North American Municipalities

Small litter audits are completed in several North American Municipalities. These audits record small litter in similar categories using the same methodology. **Table 12** illustrates the percentage breakdown per small litter item category for each municipality. **Figure 37** illustrates the top five small litter categories observed in the 2017 Vancouver street litter audits to the results for each municipality.

**Table 13** illustrates the average number of items counted per site based on category. **Figure 38** illustrates these results graphically.

**Table 12: Vancouver Small Litter Audit Results Compared to Other Cities**

Category	Toronto 2016	Edmonton 2016	Winnipeg 2014	San Francisco 2009	Vancouver 2015	Vancouver 2017
Cigarette Butts/Debris	22%	28%	43%	13%	31%	37%
Other Tobacco	1%	0%	1%	2%	0%	0%
Bottle Caps	1%	0%	1%	0%	0%	1%
Straws	0%	0%	1%	0%	0%	1%
Candy Packaging and Wrappers	3%	3%	0%	2%	3%	2%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	1%	1%	0%	2%	5%	0%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	1%	7%	3%	1%	0%	1%
Glass	7%	12%	8%	23%	2%	2%
Paper	21%	23%	15%	8%	15%	12%
Cup Sleeves			n/a	n/a	0%	0%
Plastic Film	3%	5%	8%	3%	2%	5%
Hard Plastic	7%	7%	11%	6%	5%	6%
Aluminum/Foil Debris	2%	3%	4%	1%	3%	4%
Rubber	0%	1%	1%	1%	1%	0%
Metal (not aluminum)	2%	0%	1%	2%	1%	1%
Chewing Gum (stuck on pavement)	25%	6%	4%	32%	29%	25%
Food & Food Scraps	1%	1%	0%	0%	1%	0%
Pet Waste (bagged)	0%	0%	0%	0%	0%	0%
Pet Waste (loose)	0%	0%	0%	0%	1%	1%
Needles/Syringes	0%	0%	0%	0%	0%	0%
Medications	0%	0%	0%	0%	0%	0%
Cell Phones	0%	0%	0%	0%	0%	0%
Audio-Visual Devices	0%	0%	0%	0%	0%	0%
Batteries	0%	0%	0%	0%	0%	0%
Other Electronic Waste	0%	0%	0%	0%	0%	0%
Other Material	5%	2%	1%	5%	1%	2%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

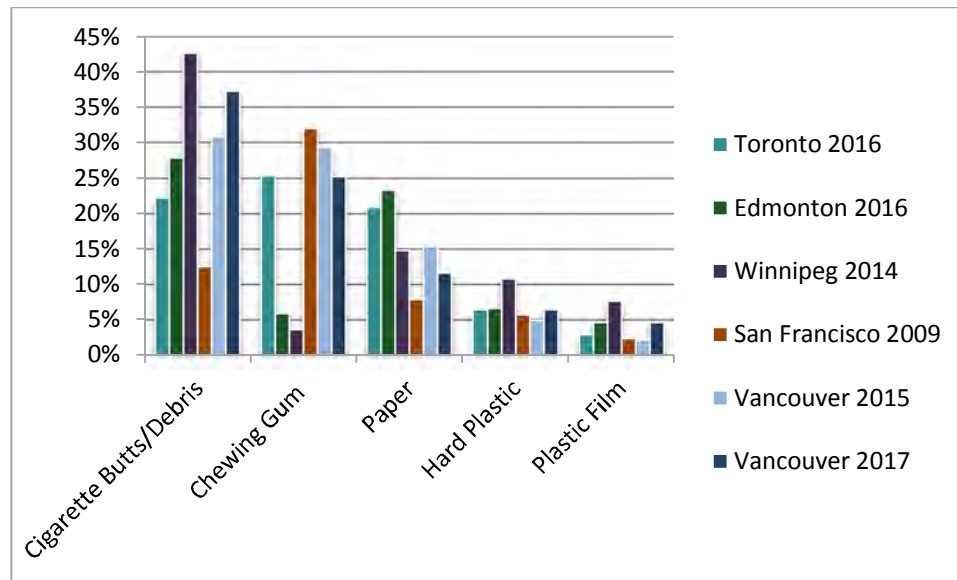


Figure 37: Comparison of Top Small Litter Categories by Municipality



**Table 13: Vancouver Small Litter Results Compared to Other Cities (Average Number of Items per Site)**

Category	Toronto 2016	Edmonton 2016	Winnipeg 2014	San Francisco 2009	Vancouver 2015	Vancouver 2017
Cigarette Butts/Debris	2.6	2.6	3.5	3.2	2.3	2.0
Other Tobacco	0.1	0.0	0.0	0.5	0.0	0.0
Bottle Caps	0.1	0.0	0.1	0.1	0.0	0.0
Straws	0.0	0.0	0.1	0.1	0.0	0.0
Candy Packaging and Wrappers	0.3	0.3	0.0	0.4	0.2	0.1
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0.1	0.1	0.2	0.2	0.4	0.0
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.1	0.7	0.0	0.4	0.0	0.1
Glass	0.8	1.2	0.6	6.0	0.1	0.1
Paper	2.4	2.2	1.2	2.1	1.1	0.6
Cup Sleeves			n/a	n/a	0.0	0.0
Plastic Film	0.4	0.4	0.6	0.6	0.2	0.2
Hard Plastic	0.8	0.6	0.9	1.5	0.4	0.3
Aluminum/Foil Debris	0.2	0.3	0.3	0.3	0.2	0.2
Rubber	0.0	0.0	0.1	0.1	0.0	0.0
Metal (not aluminum)	0.2	0.0	0.1	0.6	0.1	0.1
Chewing Gum (stuck on pavement)	3.0	0.6	0.3	8.2	2.1	1.3
Food & Food Scraps	0.2	0.1	0.0	0.0	0.1	0.0
Pet Waste (bagged)	0.0	0.0	0.0	0.0	0.0	0.0
Pet Waste (loose)	0.0	0.0	0.0	0.0	0.0	0.0
Needles/Syringes	0.0	0.0	0.0	0.0	0.0	0.0
Medications	0.0	0.0	0.0	0.0	0.0	0.0
Cell Phones	0.0	0.0	0.0	0.0	0.0	0.0
Audio-Visual Devices	0.0	0.0	0.0	0.0	0.0	0.0
Batteries	0.0	0.0	0.0	0.0	0.0	0.0
Other Electronic Waste	0.0	0.0	0.0	0.0	0.0	0.0
Other Material	0.0	0.2	0.1	1.2	0.0	0.1
<b>Total</b>	<b>11.1</b>	<b>9.4</b>	<b>8.1</b>	<b>25.5</b>	<b>7.3</b>	<b>5.2</b>

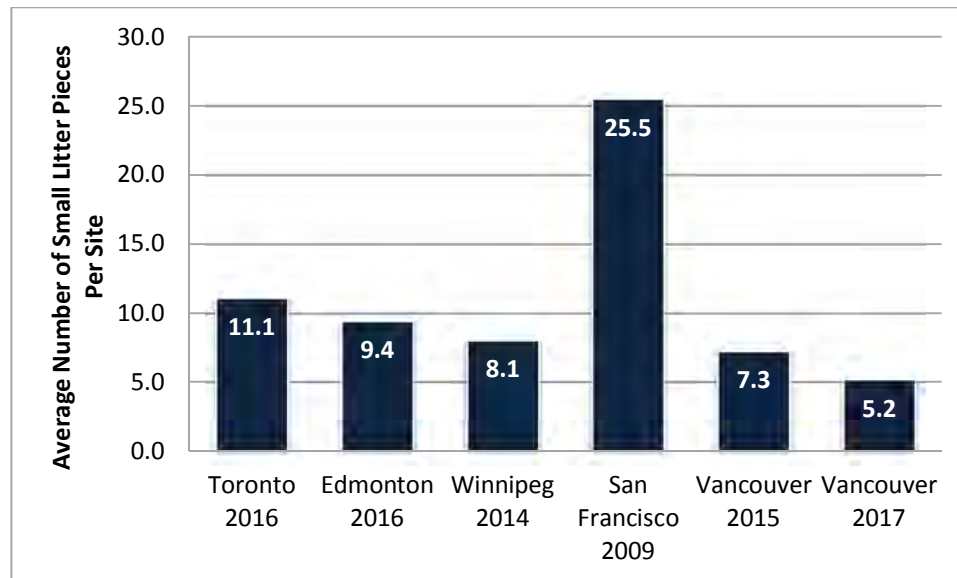


Figure 38: Average Small Litter Items per Site

### 3.3.4

#### Small Litter Statistics

The average number of small litter items per site in the 2017 audits was observed at 5.2 pieces with no construction adjacent. There were eight sites that had no small litter accumulation. Of the 106 sites surveyed, five sites had an average of five pieces of small litter within the site, 66 sites had fewer than five pieces and 35 sites had more than five pieces of small litter.

### 3.4

#### Small Litter Supersites Result

A supersite is when all observed small litter is observed within a site. This assessment was completed at 19 pre-determined sites. In 2017, the average number of small litter items per supersite was 193.9 pieces. The most common categories of small litter observed were chewing gum (47%) and cigarette butts/debris (40%). **Table 14** provides these results.

**Table 14: Supersite Litter Data 2017**

<b>Category</b>	<b>Total Number of Items</b>	<b>% of Total</b>
Cigarette Butts/Debris	1,469	40%
Other Tobacco	0	0%
Bottle Caps	21	1%
Straws	10	0%
Candy Packaging and Wrappers	29	1%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0	0%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	4	0%
Glass	19	1%
Paper	175	5%
Cup Sleeves	2	0%
Plastic Film	44	1%
Hard Plastic	96	3%
Aluminum/Foil Debris	62	2%
Rubber	6	0%
Metal (not aluminum)	10	0%
Chewing Gum (stuck on pavement)	1,716	47%
Food & Food Scraps	5	0%
Pet Waste (bagged)	0	0%
Pet Waste (loose)	0	0%
Needles/Syringes	0	0%
Medications	0	0%
Cell Phones	0	0%
Audio-Visual Devices	0	0%
Batteries	0	0%
Other Electronic Waste	1	0%
Other Material	16	0%
<b>Total Supersite Small Litter</b>	<b>3,685</b>	<b>100%</b>

### 3.4.1 Small Litter by Supersites

All 19 supersites are ranked in **Table 15**. The site with the most accumulated litter in 2017 was Site 108 with 492 pieces of small litter observed.

**Table 15: Supersite Rankings**

Site Number	Number of Pieces of Small Litter	Hundred Block	Street Name
108	492	2400	Main Street
38	478	1000	West Georgia Street
41	418	300	Terminal Avenue
106	385	1000	Burrard Street
109	299	1045	Kingsway
104	293	1100	Denman Street
54	210	1100	Clark Drive
18	153	800	Hornby Street
52	141	600	Evans Street.
56	134	2900	Horley Street
97	126	800	Commercial Drive
101	116	1700	West Broadway
31	109	2700	East Hastings Street
77	92	5500	Main Street
26	84	2300	Wall Street
32	67	1800	Yew Street
42	49	1700	West 3 Avenue
82	26	900	East 24 Avenue
21	13	300	East 39 Avenue

### 3.4.2 Supersite Small Litter Results Compared to 2015 Baseline

Results from the 2015 audit were established as the baseline against which future litter audit results (e.g., 2017) can be compared. **Table 16** provides the comparison in composition and accumulation from the 2015 baseline to the 2017 results for supersite small litter. Overall, there was a 28% decrease in the litter accumulated at the supersites in 2017. **Table 17** compares the 2017 and 2015 results based on site.

**Table 16: 2017 vs. 2015 Supersite Litter Comparison**

Category	2017 Results		2015 Results		% Change
	# Small Litter Items	%	# Small Litter Items	%	
Cigarette Butts/Debris	1,469	40%	1,923	38%	-24%
Other Tobacco	0	0%	5	0%	-100%
Bottle Caps	21	1%	14	0%	50%
Straws	10	0%	-	0%	-
Candy Packaging and Wrappers	29	1%	49	1%	-41%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0	0%	3	0%	-100%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	4	0%	1	0%	300%
Glass	19	1%	35	1%	-46%
Paper	175	5%	312	6%	-44%
Cup Sleeves	2	0%	-	-	-
Plastic Film	44	1%	38	1%	16%
Hard Plastic	96	3%	84	2%	14%
Aluminum/Foil Debris	62	2%	69	1%	-10%
Rubber	6	0%	16	0%	-63%
Metal (not aluminum)	10	0%	9	0%	11%
Chewing Gum (stuck on pavement)	1,716	47%	2,475	48%	-31%
Food & Food Scraps	5	0%	27	1%	-81%
Pet Waste (bagged)	0	0%	1	0%	-100%
Pet Waste (loose)	0	0%	1	0%	-100%
Needles/Syringes	0	0%	0	0%	-
Medications	0	0%	0	0%	-
Cell Phones	0	0%	0	0%	-
Audio-Visual Devices	0	0%	0	0%	-
Batteries	0	0%	2	0%	-100%
Other Electronic Waste	1	0%	1	0%	0%
Other Materials	16	0%	57	1%	-72%
<b>Total Site Small Litter</b>	<b>3,685</b>	<b>100%</b>	<b>5,122</b>	<b>100%</b>	<b>-28%</b>

**Table 17: Supersite 2017 vs. 2015 Percent Change by Site Comparison**

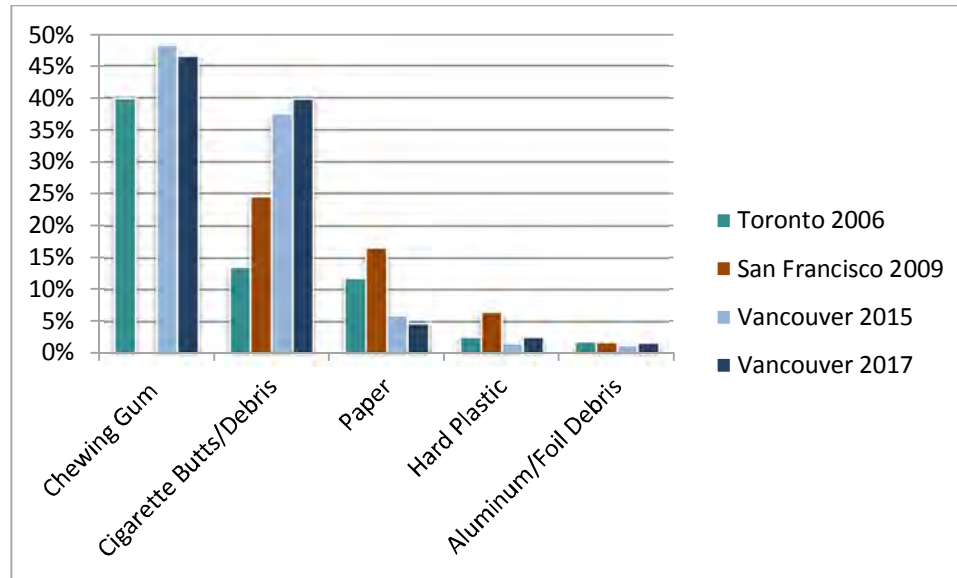
Site Number	2017 Number of Pieces of Small Litter	2015 Number of Pieces of Small Litter	% Change
108	492	470	5%
38	478	561	-15%
41	418	533	-22%
106	385	368	5%
109	299	369	-19%
104	293	196	49%
54	210	248	-15%
18	153	344	-56%
52	141	71	99%
56	134	77	74%
97	126	282	-55%
101	116	502	-77%
31	109	461	-76%
77	92	211	-56%
26	84	69	22%
32	67	160	-58%
42	49	126	-61%
82	26	37	-30%
21	13	37	-65%
<b>Total Small Litter</b>	<b>3,685</b>	<b>5,122</b>	<b>-28%</b>

### 3.4.3 Supersite Results Compared to Other North American Municipalities

Supersite assessments are completed in a few North American Municipalities. These assessments audit small litter in similar categories using the same methodology. **Table 18** illustrates the percentage breakdown per small litter item category for each municipality. **Figure 39** compares the top five supersite categories in the 2017 Vancouver street litter audits to other municipalities. **Table 19** illustrates the average number of items counted per site based on category. **Figure 40** illustrates these results graphically.

**Table 18: Vancouver Supersite Small Litter Comparison to Other Cities**

<b>Category</b>	<b>Toronto 2006</b>	<b>San Francisco 2009</b>	<b>Vancouver 2015</b>	<b>Vancouver 2017</b>
Cigarette Butts/Debris	14%	25%	38%	40%
Other Tobacco	1%	0%	0%	0%
Bottle Caps	1%	1%	0%	1%
Straws	0%	1%	0%	0%
Candy Packaging and Wrappers	1%	4%	1%	1%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	1%	1%	0%	0%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	3%	0%	0%	0%
Glass	17%	38%	1%	1%
Paper	12%	17%	6%	5%
Cup Sleeves	n/a	n/a	0%	0%
Plastic Film	3%	3%	1%	1%
Hard Plastic	3%	7%	2%	3%
Aluminum/Foil Debris	2%	2%	1%	2%
Rubber	0%	1%	0%	0%
Metal (not aluminum)	1%	2%	0%	0%
Chewing Gum (stuck on pavement)	40%	not included	48%	47%
Food & Food Scraps	0%	0%	1%	0%
Pet Waste (bagged)	0%	0%	0%	0%
Pet Waste (loose)	0%	0%	0%	0%
Needles/Syringes	0%	0%	0%	0%
Medications	0%	0%	0%	0%
Cell Phones	0%	0%	0%	0%
Audio-Visual Devices	0%	0%	0%	0%
Batteries	0%	0%	0%	0%
Other Electronic Waste	0%	0%	0%	0%
Other Material	1%	1%	1%	0%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>



**Figure 39: Comparison of Top Supersite Litter Categories by Municipality**



**Table 19: Vancouver Supersite Small Litter Comparison to Other Cities (Average Number of Items per Site)**

<b>Category</b>	<b>Toronto 2006</b>	<b>San Francisco 2009</b>	<b>Vancouver 2015</b>	<b>Vancouver 2017</b>
Cigarette Butts/Debris	176.6	83.8	101.2	77.3
Other Tobacco	14.6	0.0	0.3	0.0
Bottle Caps	8.6	2.0	0.7	1.1
Straws	4.7	1.7	0.0	0.5
Candy Packaging and Wrappers	16.9	12.2	2.6	1.5
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	39.2	3.3	0.2	0.0
Other Polystyrene Debris, (i.e., Poly Foam Pieces)	14.5	0.5	0.1	0.2
Glass	218.7	128.1	1.8	1.0
Paper	154.3	56.8	16.4	9.2
Cup Sleeves	n/a	n/a	0.0	0.1
Plastic Film	35.7	10.3	2.0	2.3
Hard Plastic	34.1	22.5	4.4	5.1
Aluminum/Foil Debris	24.9	6.2	3.6	3.3
Rubber	5.4	1.8	0.8	0.3
Metal (not aluminum)	15.3	8.2	0.5	0.5
Chewing Gum (stuck on pavement)	518.5	0.0	130.3	90.3
Food & Food Scraps	0.0	0.0	1.4	0.3
Pet Waste (bagged)	0.0	0.0	0.1	0.0
Pet Waste (loose)	0.0	0.0	0.1	0.0
Needles/Syringes	0.0	0.0	0.0	0.0
Medications	0.0	0.0	0.0	0.0
Cell Phones	0.0	0.0	0.0	0.0
Audio-Visual Devices	0.0	0.0	0.0	0.0
Batteries	0.0	0.0	0.1	0.0
Other Electronic Waste	0.0	0.0	0.1	0.1
Other Material	13.0	4.0	3.0	0.8
<b>Total</b>	<b>1,294.8</b>	<b>341.5</b>	<b>269.6</b>	<b>193.9</b>

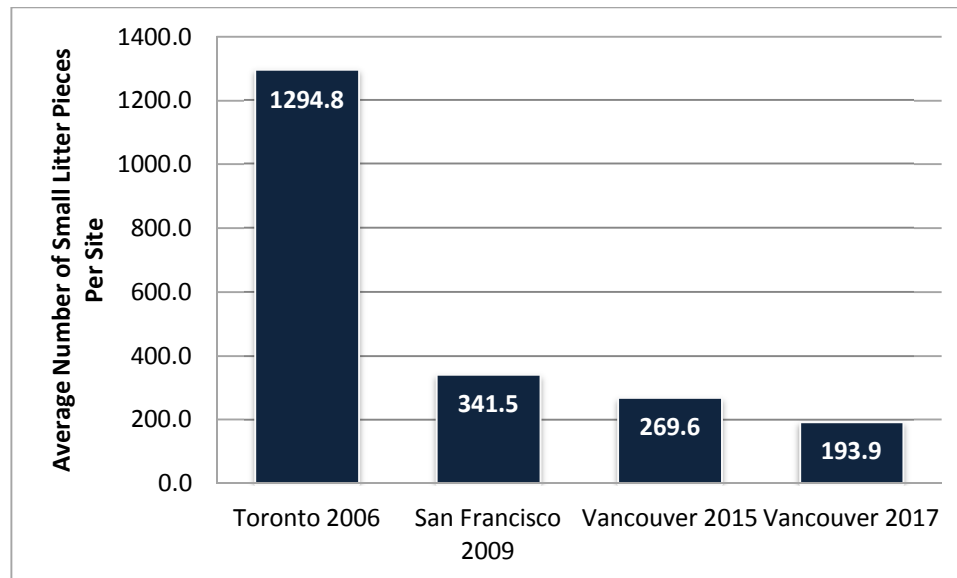


Figure 40: Average Supersite Small Litter Items per Site

#### 3.4.4 Supersite Small Litter Statistics

The average number of small litter items per site in the 2017 audits was 193.9 pieces. All sites observed had small litter accumulated. Of the 19 sites surveyed, 12 sites had less than 194 pieces of small litter and seven sites had more than 194 pieces of small litter.

#### 3.4.5 Overall Litter Accumulation on Supersites

When a site is observed as a supersite every piece of litter is recorded. **Table 20** illustrates the combined results of small and large litter for each site. Of all the supersites, Site 108 has the most accumulated litter with 495 pieces of litter counted.

**Table 20: Overall Combined Small and Large Litter for Supersites**

Site Number	Number of Pieces of Small Litter	Number of Pieces of Large Litter	Total Litter
108	492	3	495
38	478	2	480
41	418	35	453
106	385	15	400
109	299	4	303
104	293	6	299
54	210	15	225
52	141	27	168
18	153	5	158
56	134	17	151
97	126	3	129
101	116	6	122
77	92	25	117
31	109	3	112
26	84	8	92
32	67	11	78
42	49	3	52
82	26	8	34
21	13	4	17

### 3.5 Sites Immediately Adjacent to Construction

Dillon staff were asked note if any sites had immediately adjacent construction occurring. There were two sites where this occurred in 2017 (Sites 44 and 89). These two sites were analyzed separately because the construction activities were expected to increase accumulation of litter.

#### 3.5.1 Large Litter Results

Within the two sites that were immediately adjacent to construction, the average number of large litter items per site was 31.5 pieces of litter. This was, on average 289% more litter than the sites that did not have construction. The breakdown by material did not differ dramatically from these sites. Overall, 46% of material was paper, 30% other and 24% plastic.

The general composition of material did differ between the sites that had construction and the sites that did not. **Figure 41** illustrates the composition of litter found within the construction sites. **Table 21** provides a comparison of large litter observed on sites with and without construction based on category. Overall, the largest increase was in the cloth category which represented 21% of large litter for sites with construction and 2% of large litter for sites without.

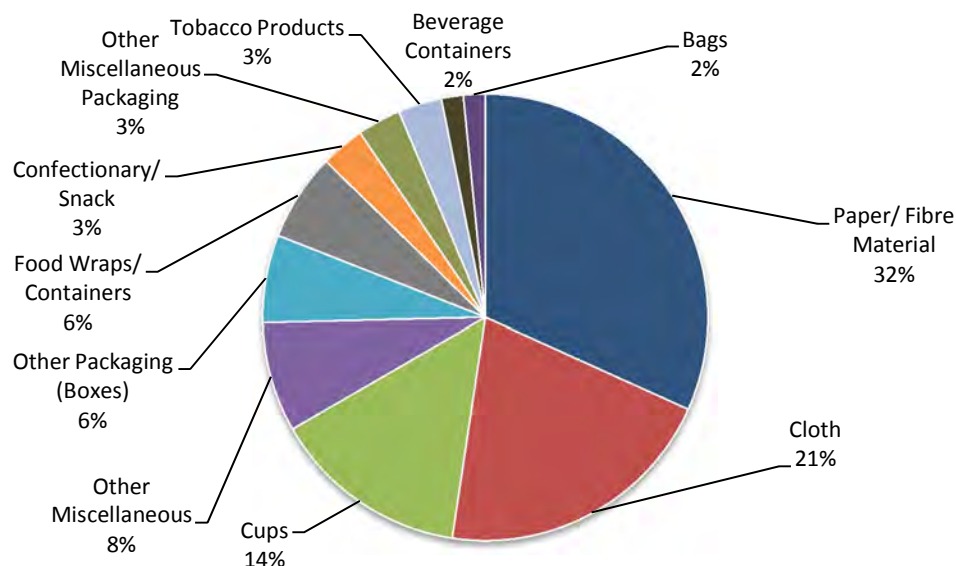


Figure 41: Litter Sites with Immediately Adjacent Construction Large Litter by Category

Table 21: Large Litter Categories Comparison for Sites with and without Construction

Category	Sites with Construction	Sites without Construction
Paper/ Fibre Material	32%	19%
Cloth	21%	2%
Cups	14%	20%
Other Miscellaneous	8%	19%
Other Packaging (Boxes)	6%	2%
Food Wraps/ Containers	6%	6%
Confectionary/Snack	3%	8%
Other Miscellaneous Packaging	3%	2%
Tobacco Products	3%	7%
Beverage Containers	2%	3%
Bags	2%	5%
Other Packaging	0%	1%
Other Containers	0%	1%
Take Out Extras	0%	4%
Trays	0%	0%
<b>Total</b>	<b>100%</b>	<b>100%</b>

### 3.5.2 Small Litter Results

Within the two sites that were immediately adjacent to construction, the average number of small litter items per site was 8.5 pieces of litter. This was, on average, 63% more small litter than the sites that did not have construction.

The general composition of material did differ slightly between the sites that had construction and the sites that did not. **Table 22** provides a comparison of small litter observed on sites with and without construction based on category. Overall, the comparison is quite similar from one category to the next. The most significant change is the increase in chewing gum (53% with construction, 25% without).

**Table 22: Small Litter Comparison for Sites with and without Construction**

Category	Sites with Construction	Sites without Construction
Cigarette Butts/Debris	47%	37%
Other Tobacco	0%	0%
Bottle Caps	0%	1%
Straws	0%	1%
Candy Packaging and Wrappers	0%	2%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0%	0%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0%	1%
Glass	0%	2%
Paper	0%	12%
Cup Sleeves	0%	0%
Plastic Film	0%	5%
Hard Plastic	0%	6%
Aluminum/Foil Debris	0%	4%
Rubber	0%	0%
Metal (not aluminum)	0%	1%
Chewing Gum (stuck on pavement)	53%	25%
Food & Food Scraps	0%	0%
Pet Waste (bagged)	0%	0%
Pet Waste (loose)	0%	1%
Needles/Syringes	0%	0%
Medications	0%	0%
Cell Phones	0%	0%
Audio-Visual Devices	0%	0%
Batteries	0%	0%
Other Electronic Waste	0%	0%
Other Material	0%	2%
<b>Total Site Small Litter</b>	<b>100%</b>	<b>100%</b>

## 4.0 Additional Observations

Currently the City is running multiple public spaces waste receptacle pilots. The Emily Carr receptacles are three stream (garbage, paper and containers) receptacles that are being tested in the West End and promote waste diversion in the public realm. Another program is the downtown on-street recycling project which started in summer 2017 with 15 new three stream waste receptacles being installed in the downtown core. These receptacles support the GCAP and are a part of the ongoing zero waste initiatives that aim to promote diversion and reduce litter. Dillon staff would note if there were any City waste receptacles within 50m of the site. There were several types of receptacles that were noticed within and around the litter sites as illustrate in **Figure 42** to **Figure 44**.



Figure 42: City Receptacles in the Downtown Core



Figure 43: Emily Carr Receptacles



Figure 44: City Single Stream Receptacles

There were 90 sites (83%) where City litter bins were not within 50 m of the site and 18 sites (17%) where there were City litter receptacles within 50 m. Sites with waste receptacles had on average 11.9 pieces of large litter while sites without had an average of 7.9 pieces of large litter. Small litter was, on average higher where there were waste receptacles (11.3 pieces) versus when there were no waste receptacles (4.1 pieces). These results are illustrated in **Figure 45**.

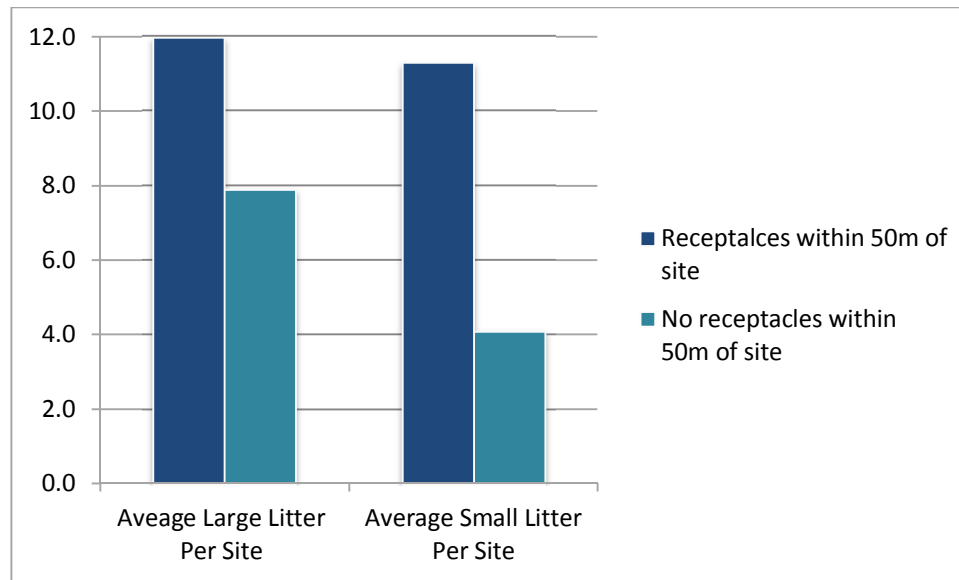


Figure 45: Average Large and Small Litter Pieces per Site based on the Presence of Waste Receptacle

## 5.0 Site Ranking and Attributes

Dillon staff ranked each of the 108 audited sites in three different ways, as follows:

1. Total number of large litter items audited within each site;
2. Total number of small litter items audited within each site; and
3. Total number of combined large and small litter items within each site.

**Table 23** provides the sites having the most accumulated large and small litter combined. A full list of all sites is provided in **Appendix F**.

In an effort to examine the audit results further, various attributes which may contribute to litter levels were examined. Attributes associated with the ten sites having the highest amount of combined litter sites are provided in **Table 23**. Of these sites, 70% do not have fast food within sight, 80% do not have a convenience store within sight, 90% do not have a bus stop within the survey area and 60% do not have a City litter receptacle within 50 m of the site.

**Table 23: Combined Ranking for Large and Small Litter**

Site #	All Litter	Hundred Block	Street Name	Fast Food	Conv. Store	Bus Stop	Litter Bin
107	76	600	Powell Street	N	N	Y	Y
44	52	2800	Woodland Drive	N	N	N	N
41	49	300	Terminal Avenue	Y	N	N	N
17	36	2100	Renfrew Street	N	N	N	Y
60	35	7200	Dumfries Street	Y	Y	N	N
108	35	2400	Main Street	Y	N	N	Y
52	34	600	Evans Street	N	N	N	N
67	32	2100	Yew Street	N	N	N	N
13	31	3500	Euclid Avenue	N	N	N	N
106	31	1000	Burrard Street	N	Y	N	Y



## 6.0 Conclusions

It is important to note that the information contained within this report outlining the litter audit results is a “snapshot” in time. These results only reflect the conditions of the period of time in which they were collected. Seasonal variability, among other factors, can affect the amount of litter within an area. The litter audit results for the assessments that took place September 18 to September 21, 2017 are reflected in this report.

### 6.1 Key Findings of the Large Litter Audits

Large litter was observed at all 108 sites. Two of these audits are analyzed separately as they were immediately adjacent to construction. The key findings of the large litter audits were:

- The average number of large litter items per site was 8.1 pieces for sites with no construction and 8.6 if the sites with construction were included in the overall analysis. This litter accumulation is less than the baseline audits in 2015 (12 pieces/site) and less than other North American Municipalities which range from 11.1 – 34 pieces of large litter per site.
- The total large litter observed in 2017 was 862 pieces for sites without construction.
- The total large litter observed in 2017 was 63 pieces for sites immediately adjacent to construction.
- In 2017, the most common category of litter observed was cups (20%), paper/fibre material (19%) and other miscellaneous (19%).
- The most commonly found items in the 2017 were cup lids, pieces (10%) and non-brand name napkins and towels (9%).

### 6.2 Key Findings of the Small Litter Audits

Small litter was observed at all 108 sites. Two of these assessments are analyzed separately as they were immediately adjacent to construction. The key findings of the small litter audits were:

- The average number of small litter items per site was 5.2 pieces for sites with no construction and 5.3 if the sites with construction were included in the overall analysis. This litter accumulation is less than the baseline audits in 2015 (7.3 pieces/site) and less than other North American Municipalities which range from 8.1 – 25.5 pieces of small litter per site.
- The total small litter audited in 2017 was 554 pieces for sites without construction.
- The total small litter audited in 2017 was 17 pieces for sites immediately adjacent to construction.
- In 2017, the most common category of small litter observed was cigarette butts/debris (37%) and chewing gum (25%).

### 6.3 Key Findings of the Supersite Audits

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Supersite audits were completed within 19 sites. The key findings of the supersite assessments were:

- The average number of small litter items per site was 193.9 pieces of small litter. This litter accumulation is less than the baseline audits in 2015 (269.6 pieces/site) and less than other North American Municipalities which range from 341.5 – 1,294.8 pieces of small litter per site.
- The total small litter audited in the 2017 supersites was 3,685 pieces.
- In 2017, the most common category of small litter observed in the supersites was chewing gum (47%) and cigarette butts/debris (40%).

## 7.0 Recommendations

Success in combating litter is not an easy task. Reviews completed on jurisdictional litter abatement practices and policies for litter management show that the best practices for reducing litter and illegal waste include litter campaigns and education. It is recommended that follow-up litter audits are completed to assess the success of litter abatement practices and City wide litter programs.

### 7.1 Campaigns and Education

The City has several programs and initiatives in place to reduce litter. Currently, the City is working on a Single Use-Item Reduction Strategy. This strategy is designed to explore the ways in which residents can reduce single-use items from going to landfill. During the 2017 street litter audits it was determined that 20% of large litter observed were cups. These are all single-use items. A campaign that targets key litter groups, such as single-use items could positively impact litter abatement within the City and promote the Single-Use Reduction Strategy.

Should the City create more of a targeted approach to litter abatement it is recommended that the campaigns focus on:

- Cups;
- Chewing gum;
- Cigarette butts/debris;
- Napkins; and
- Printed material such as receipts and transit stubs.

Focusing campaigns and educational outreach on areas with high litter accumulation could impact litter management within these areas. It is also recommended that these campaigns be targeted on specific items.