DILLON CONSULTING

75 YEARS

CITY OF VANCOUVER

Street Litter Audits

2020 Results

November 2020 – 20-3506

November 30, 2020

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Attention: Stephanie MacKinnon
Solid Waste Program Management

Street Litter Audits – 2020 Results

Dear Stephanie:

Dillon Consulting Limited is pleased to present the City of Vancouver with the 2020 street litter audit results. This report summarizes the information collected during the street litter audits that took place September 28 – October 1, 2020. Through this report, we believe that we have efficiently provided an overview of the current accumulation and composition of litter at the City of Vancouver's 124 pre-selected litter site locations. These results have been compared to the baseline audits completed in 2015 and follow-up audits that occurred from 2017 to 2019.

Thank you for the opportunity to assist you once again with this important assignment. We look forward to discussing this report with you and supporting your ongoing litter and waste management initiatives.

Sincerely,

DILLON CONSULTING LIMITED

Klaryssa Lawrie, B.Sc, EPt
Project Manager

Our file: 20-3506

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Executive Summary

The City of Vancouver (City) recently retained Dillon Consulting Limited to conduct the City's fifth round of street litter audits since the 2015 initiation, at 124 pre-selected locations within Vancouver. Of the sites audited, 108 were identical to those audited in the baseline (2015), 2017 and 2018 audits. Two additional sites were added in 2019 as it was recognized that there were no sites in the Marpole neighbourhood of the City. In 2020, 14 additional sites were added into the overall analysis to provide a better representation of street litter throughout the City's diverse neighbourhoods.

The audits took place from September 28 – October 1, 2020. The 124 sites were audited with the purpose of providing a 'snapshot' assessment of the composition and amount of accumulated litter present on the streets of Vancouver. Two types of litter were assessed:

- Large litter - any litter that is equal to or larger than four square inches; and
- Small litter - any litter that is smaller than four 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 20 of the pre-selected sites (approximately 1 out of 6). The purpose of the supersite audit is to provide a comprehensive review of small litter accumulation and help the City expand its knowledge on small litter type and occurrences. As this process is quite time consuming and labour intensive, it is not completed at all of the sites. Of the 20 pre-selected sites, 19 supersites audited were the same as those analyzed in the previous 2015 and 2017 through 2019 audits. One new supersite location was added in 2020.

It should be noted that during the baseline audit, two sites were unable to be audited (Site 29 and 99) because they were inaccessible. These sites are also excluded from the follow-up audits that occurred in 2017 to 2020. Seven sites in 2020 were situated immediately adjacent to active construction. In the analysis, these seven sites were removed and analyzed separately.

More recently, Vancouver's Single-Use Item (SUI) Reduction Strategy has been developed as a priority action within the City's Zero Waste 2040 Plan. The Strategy was created through consultation and input of over 8,000 people from October 2016 to April 2018, with actions to 2025. The objective of the Strategy is to reduce the use of plastic and paper shopping bags, expanded polystyrene foam take-out containers and cups, disposable hot and cold drink cups, take-out food containers, and single-use straws and utensils. Many of these SUIs are identified in this and previous litter audits. The Strategy has recently led to five approved SUI bylaws including bans, requirements for businesses, and actions that (among other priorities) are intended to minimize litter and garbage resulting from single-use items. Ongoing street litter audits are a valuable means to monitoring progress towards this goal. SUIs targeted by Vancouver's by-laws to reduce SUIs (shopping bags, disposable cups, foam cups and take-out

containers, plastic straws, and utensils) made up 18% of all observed large litter items. The largest observed SUI category was disposable cups (non-foam) which was 9.9% of all observed large litter items.

The key findings of the large litter assessment were as follows:

- There were six sites that had no large litter accumulation, compared to three sites in 2019 five sites in 2018, three sites in 2017 and seven sites in 2015.
- The average number of large litter items per site was 10.3 pieces for sites with no adjacent construction and 8.7 if the sites with construction were included in the overall analysis. Below are the number of pieces of litter accumulated per site in the previous audits (with no adjacent construction):
    - 2015: 12.0 pieces per site;
    - 2017: 8.1 pieces per site;
    - 2018: 9.7 pieces per site; and
    - 2019: 10.7 pieces per site.
- Total large litter observed in 2020 was 1,201 for sites without construction (117) and 61 for sites immediately adjacent to construction (7).
- Within the seven sites immediately adjacent to construction, the average number of large litter items per site was 8.7 pieces of litter. This was, on average 15.5% less large litter than the sites that did not have construction directly adjacent.
- In 2020, the most common primary categories for large litter observed were 'other miscellaneous' (31%), paper/fibre materials (20%) and cups (10%).
- The largest number of material type observed was plastic (38%), followed by paper (35%) and 'other' (25%).
- Of the 1,201 pieces of large litter audited, 5% were PPE and other medical waste items (disposable masks, gloves, and disinfecting wipes).

The key findings of the small litter assessment include the following:

- There were 13 sites that had no small litter accumulation, compared to 18 sites in 2019, 17 sites in 2018, eight sites in 2017 and nine sites in 2015.
- The average number of small litter items per site was 8.2 pieces for sites with no adjacent construction and 10.9 if the sites with construction were included in the overall analysis. Below are the number of pieces of litter accumulated per site in the previous audit:
    - 2015: 7.3 pieces per site;
    - 2017: -5.2 pieces of litter;
    - 2018: 8.1 pieces of litter;
    - 2019: 7.3 pieces of litter.
- The total small litter audited in 2020 was 954 for sites without construction (117) and 76 for sites immediately adjacent to construction (7).

- Within the seven sites that were immediately adjacent to construction, the average number of small litter items per site was 10.9 pieces of litter. This was, on average, 24% more small litter than the sites that did not have construction directly adjacent (at 8.2 pieces).
- The most common categories of small litter observed were cigarette butts/debris (24%), chewing gum (19%) and paper (17%).

Supersite audits were completed within 20 sites. The key findings of the supersite assessments were:

- The average number of small litter items per site was 234.85 pieces of small litter.
- The most common categories of small litter observed in the supersites were cigarette butts/debris (37%) and chewing gum (35%).
- The total small litter audited in the 2020 supersites was 4,697 pieces.
- The most common categories of small litter observed were cigarette butts/debris (37%) and chewing gum (35%), which accounted for a combined 72% of all small litter observed on the supersites.

1.0 Introduction

The City of Vancouver (City) is home to over 630,000 residents across an area of 114 km^2. A bold initiative of Vancouver was to be recognized as the *Greenest City* in the world by the year 2020; 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. This includes illegal dumping, and increased diversion of these materials through implementation of a comprehensive litter management strategy. Specifically, the City would like to target commonly disposed and difficult to recycle materials which would be identified as a part of the street litter audits.

More recently, Vancouver's Single-Use Item (SUI) Reduction Strategy has been developed as a priority action within the City's Zero Waste 2040 Plan. The Strategy was created through consultation and input of over 8,000 people from October 2016 to April 2018, with actions to 2025. The objective of the Strategy is to reduce the use of plastic and paper shopping bags, expanded polystyrene foam take-out containers and cups, disposable hot and cold drink cups, take-out food containers, and single-use straws and utensils. Many of these SUIs are identified in this and previous litter audits. The Strategy has recently led to five approved SUI bylaws including bans, requirements for businesses, and actions that (among other priorities) are intended to minimize litter and garbage resulting from single-use items. Ongoing street litter audits are a valuable means to monitoring progress towards this goal.

The Cleanliness Index, developed by Dillon in partnership with the City, is a parallel project with similar objectives. To date, two Cleanliness Index surveys have been completed by the City. Methodology of the litter audit was amended slightly this year to ensure consistent terminology regarding initial visual assessment/rankings of sites.

The City retained Dillon Consulting Limited (Dillon) to conduct street litter audits at 124 pre-selected locations within the public realm across the City. The audits took place from September 28 - October 1, 2020. This is the fifth round of audits completed for the City. In the audits conducted in 2015, 2017 and 2018, 108 sites were assessed for street litter. In 2019, two new sites were added as it was observed that no litter sites were in the Marpole neighbourhood. In 2020, 14 additional sites were added into the overall analysis to provide a better representation of street litter throughout all Vancouver neighbourhoods.

Two new large litter sub-categories were added to the "Take out Extras" category in 2019. These sub-categories included straws and stir sticks. In response to the COVID-19 pandemic, "Medical Waste" was

added as new large litter category in 2020 to capture litter items such as disposable gloves, masks and disinfecting wipes. These additions will assess the impact of COVID-19 (and this new source of SUIs) on littered waste.

A baseline assessment was completed in the fall of 2015. The 108 sites were audited with the purpose of providing a 'snapshot' assessment of the composition of the accumulated litter present on the streets of Vancouver. 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.

Since the 2015 baseline, 16 sites have been added for a new total of 126 sites. Within each site, a site survey (relevant information about the litter site and the surrounding vicinity), a large litter assessment and a small litter assessment were completed. Within 20 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 subsequently excluded from any of the follow-up audits. The site distribution map is provided in **Appendix A**.

The main objectives of the street litter audits include:

- A detailed analysis of large litter items within the survey area;
- A detailed analysis of small litter items that fell within three small subsections of each survey area;
- A detailed analysis of small litter items in 'supersites' found within the entirety of 20 of the survey sites;
- Analysis and reporting of results with a focus on a comparison to the 2015 baseline results and results from other municipalities, and
- Analysis and reporting of results with a focus on a comparison to the follow-up results from 2017 to 2019.

Dillon staff were asked to note if any sites had construction occurring immediately adjacent the pre-selected site. There were seven sites noted (Sites 9, 31, 48, 71, 78, 84 and 103). In the analysis, these seven 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, and audited again in 2017 and 2018. Two additional litter sites were added in 2019 (sites 111 and 112). As noted, these were added to ensure representative litter sites were included for the neighbourhood of Marpole. Fourteen additional sites were added into the overall analysis in 2020 (sites 113 to 126) to provide a better representation of street litter throughout all Vancouver neighbourhoods and align more closely with the City's Cleanliness Index Program. This section of the report provides a brief overview of the street litter audit methodology. The 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, and 2017 through 2019 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 the 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 to denote the starting point of the pre-selected audit site. From this point the team used a measuring device to measure 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;
- If the site was immediately adjacent to construction; and
- Cleanliness Index Rating.

In 2020, the Site Survey had a slight change in Methodology. Previous to 2020, sites were ranked on a scale of 1-4 based entirely on the number of large litter items that were seen. This ranking was completed in the 2015, 2017, 2018 and 2019 audits and is consistent with the methodology used in other North American Municipalities. As an extension to the 2017 litter audits for the City of Vancouver, Dillon was asked to assist in the development of a city-wide Cleanliness Index (CI) and prior to the launch of the 2020 audits, this CI had only been field tested by the City. In an effort to link the projects and to understand how CI rankings and overall litter accumulation correspond to one another, the CI rankings were used as a visual ranking of all litter sites in 2020. A detailed overview of the CI rankings is provided in **Appendix B** along with the detailed Methodology.

2.1.2 Classification of Large Litter

To maintain consistency 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 equated to in multiple shapes (**Appendix B**). 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. A new large litter category, “Medical Waste” was added in 2020 and includes the following sub-categories: disposable gloves, masks and disinfecting wipes. There were a total of 125 large litter sub-categories. These categories are provided in **Appendix D** with the large litter data form.

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**. This form also describes the 26 small litter categories used in the litter audits.

2.1.4 Supersite

The supersite audits involved 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 20 pre-determined sites as selected by the City. The same 19 sites as all previous audits were examine plus one additional supersite, added in 2020 (Site 65). Supersite evaluation forms and categories are additionally 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 from the road) and the final photograph was taken from the end of the site looking towards the start. **Photo 1** to **Photo 4** provide an example of the photographs taken at each site.

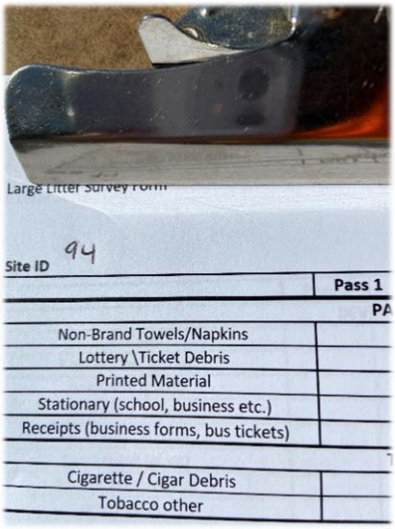

Photo 1: Site Location Photo

Photo 2: Beginning of Litter Site

Photo 3: Middle of Litter Site

Photo 4: End of Litter Site

3.0 Summary of Litter Results

This section of the report provides both the detailed results of the 2020 litter audit results as well as a comparison to the baseline litter assessment completed in 2015 and all follow-up litter audits completed thereafter. This section of the report also assesses Vancouver results against other municipalities. Visual Assessments of litter sites are provided in **Section 3.1**. **Sections 3.2, 3.3 and 3.4 provide** Large Litter Results, Small Litter and Supersite Results, respectively, for the 117 sites without immediately adjacent construction. Sites that were determined to be immediately adjacent to construction have results summarized in **Section 3.5**.

3.1 Visual Assessments of Litter Sites

As a part of the site survey, Dillon staff collected information about the area and adjacent roads of the audit sites. Dillon staff visually assessed the site and ranked it on a scale from 1 to 4 based on the Cleanliness Index Developed for the City following the 2017 Litter Audits. Sites were ranked using the following criteria:

- Ranking of 1 – No Noticeable Litter or Very Little;
- Ranking of 2 – Noticeable Litter in Certain Areas;
- Ranking of 3 – Consistent Noticeable Litter or Large Items or a Concentrated Pile of garbage/Litter; and
- Ranking of 4 – Requires More than One Person for Cleaning and Required City Attention.

Overall, 41% of sites were given the cleanest ranking of 1. An additional 43% were ranked as a 2, 16% were ranked as a 3 and no sites were ranked as having a Cleanliness Index Ranking of 4. **Table 1** provides a breakdown by site type and the average visual rating observed. The sites where construction was observed were given a ranking of 1 (site 84), 2 (sites 9, 48, 71, 78, 103) and 3 (site 31).

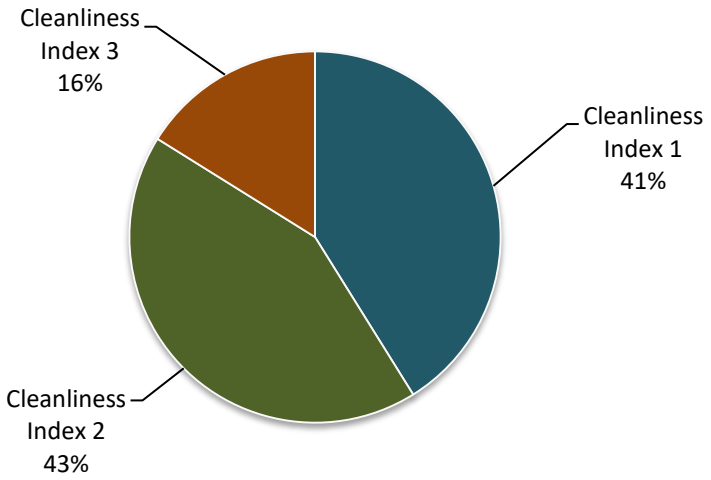

Figure 1: Visual Assessment Ranking of All Litter Sites

Table 1: Average Visual Ranking by Site Type

Site Type	Average Visual Rating
Commercial	2.3
Industrial	2.0
Institutional	2.0
Multi-Family	1.8
Single- Family	1.5
Mixed Use	2.2

3.2 Large Litter Results

Large litter is any piece of 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 2020, the average number of large litter items per site was 10.3 pieces. The most common sub-category of large litter observed was Miscellaneous Plastic which included pieces of plastic that were not identifiable in any other category. Miscellaneous Plastic represented 11.2% of all large litter surveyed in 2020.

Table 2 illustrates the 20 most common large litter items observed (by sub-category) in the 2020 street litter audits. These 20 item types accounted for 76% of the total large litter items observed. The complete list of items is provided in **Appendix E.** As noted in **Section 2.0** the large litter methodology requires two passes of an entire site. These passes are averaged for the total number of litter items observed. Due to this, there may be items that are observed on only one pass and therefore are averaged to 0.5 pieces of litter.

Table 2: Top 20 Large Litter Items

Number	Large Litter Item	Number Observed	% of Total Large Litter Items Observed	Cumulative Total (%)
1	Misc. Plastic	134.5	11%	11%
2	Non-Brand Towels/Napkins	129	11%	22%
3	Home Articles	99	8%	30%
4	Misc. Paper	73	6%	36%
5	Receipts (business forms, bus tickets)	65.5	5%	42%
6	Straws	50.5	4%	46%
7	Cup Lids, Pieces	46	4%	50%
8	Snack Food Packaging	44	4%	53%
9	Printed Material	35.5	3%	56%
10	Tobacco other	35	3%	59%
11	Plastic Drink Cups	31	3%	62%
12	Masks	25	2%	64%
13	Paper Cups (hot)	23.5	2%	66%
14	Plastic Retail Bags & Grocery	19	2%	67%
15	Food	19	2%	69%
16	Disposable Gloves	19	2%	71%
17	Plastic Bags -Consumable Packaging	17	1%	72%
18	Disinfecting Wipes	17	1%	73%
19	Paper Food Wrap	15	1%	75%
20	Plastic Jars / Bottles/ Lids	14	1%	76%
Total Top 20		**911.5**	**76%**	
Total All Litter		**1,201**	**100%**	

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 2** illustrates the breakdown by material type of all 1,201 pieces of large litter observed in 2020. The largest material type observed was plastic (38%), followed by paper (35%) and 'other' (25%). "Other" material types included rubber, electronics, pet waste, etc. Metal and glass materials each represented 1% of the materials observed. Three composite material pieces were recorded in 2020, representing zero percent of the total pieces of large litter observed.

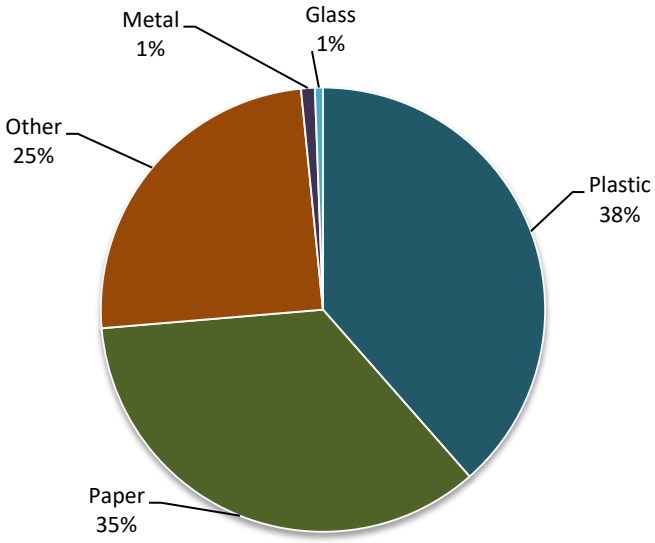

Figure 2: Large Litter by Material Type

3.2.2 Large Litter by Category (16)

Each of the large litter items were classified into 16 categories (one additional category "Medical Waste" was added in 2020) and 125 sub-categories (two additional sub-categories were added in the "Take out Extras" category in 2019 and three in 2020 under the new category "Medical Waste"). **Table 3** provides a summary of the total amount of large litter observed for each of the 16 categories. The most common category of litter observed was 'other miscellaneous' (31%). Miscellaneous litter included items such as miscellaneous paper, plastic, as well as household items. Paper/fibre material (20%) and cups (10%) were the next most common categories of litter recorded in 2020.

Table 3: Large Litter Result Totals by Category (16)

Category	Observed Number of Items	Percent of Large Litter Observed
Beverage Containers	34	3%
Other Packaging	10	1%
Cups	117.5	10%
Bags	75	6%
Other Packaging (Boxes)	29	2%
Other Containers	16	1%
Food Wraps/ Containers	28	2%
Take Out Extras	91.5	8%
Trays	2	0%
Confectionary/Snack	69	6%
Cloth	12	1%
Other Miscellaneous Packaging	4	0%
Paper/ Fibre Material	244.5	21%
Tobacco Products	39	3%
Other Miscellaneous	368.5	31%
Medical Waste	61	5%
Total	**1,201**	**100%**

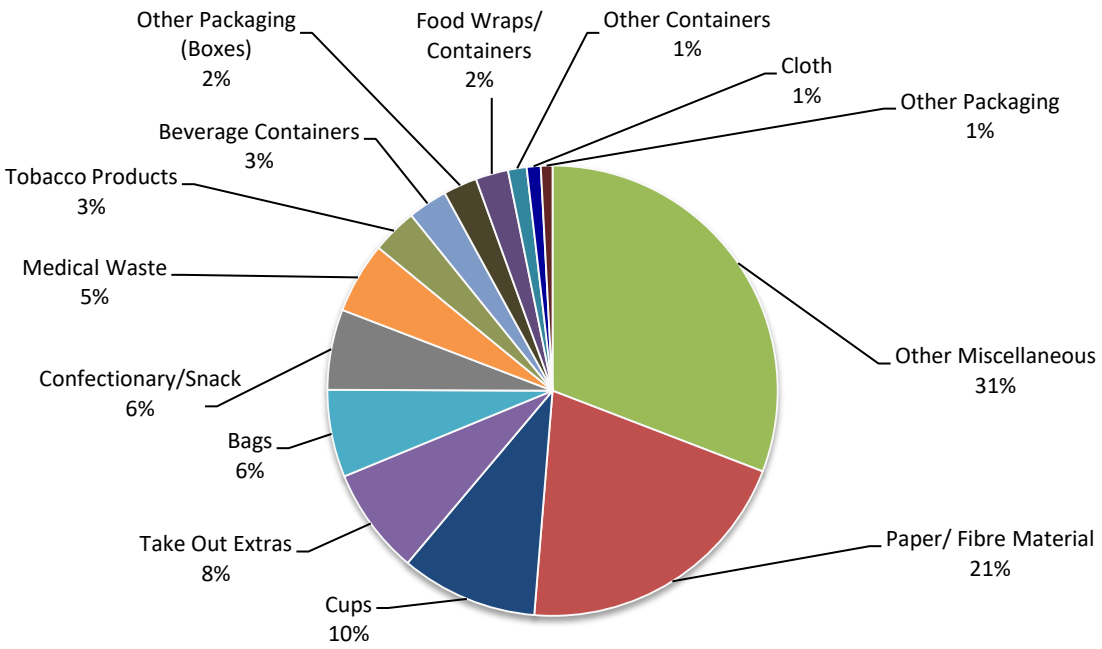

Figure 3: Large Litter Items by Category

3.2.3 Large Litter Results by Sub-Category (125)

There are several sub-categories within each of the 16 major categories. The breakdown of litter by each of the 125 sub-categories is provided in the sub-sections below.

Beverage Containers

Beverage containers accounted for 3% of all large litter observed in the 2020 audits. The largest sub-categories evaluated for beverage containers in 2020 were water (plastic) (26%) and beer cans (14%). **Figure 4** illustrates the breakdown of the beverage container category. **Figure 5** compares the highest five sub-categories from 2020 to the 2015 baseline and subsequent follow-up audits.

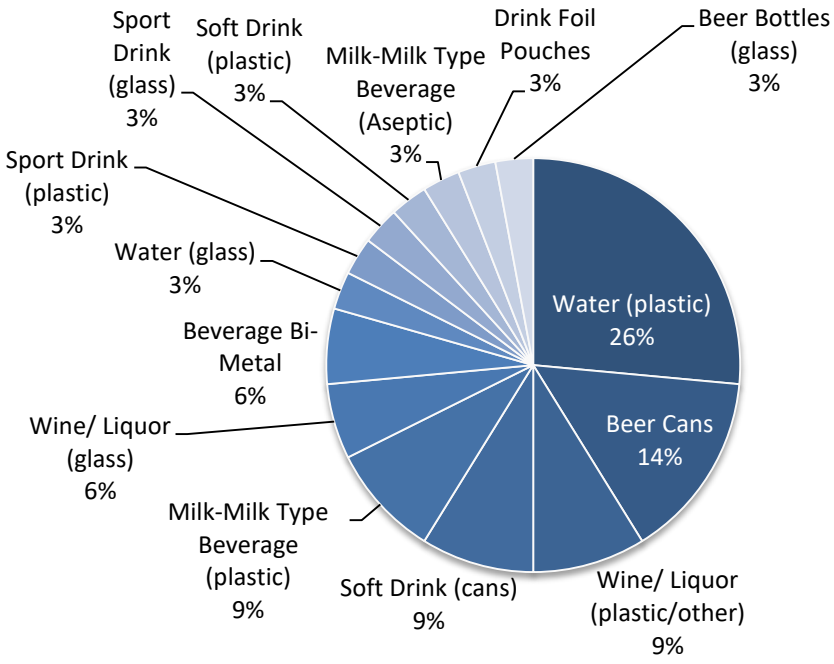

Figure 4: Beverage Containers Composition 2020

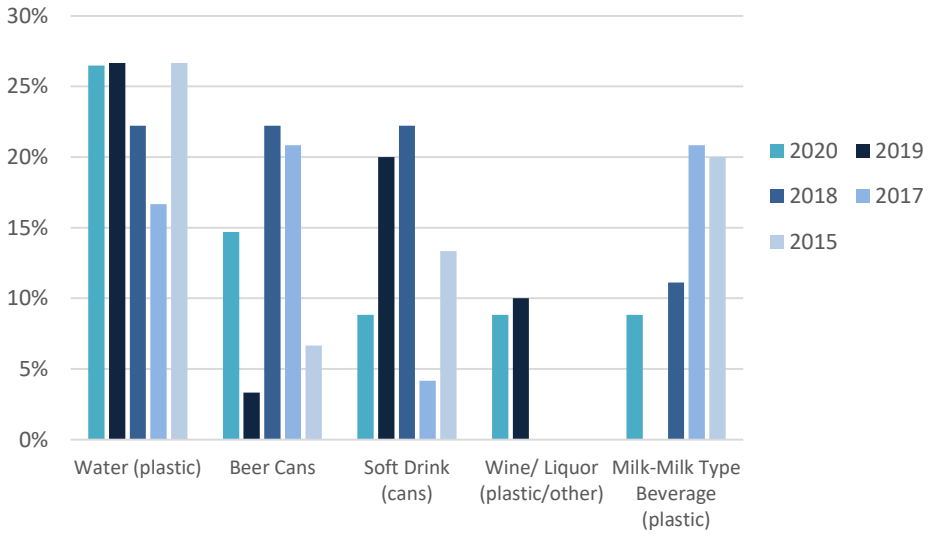

Figure 5: Beverage Containers Previous Audit Comparison

Other Packaging

'Other packaging' accounted for less than 1% of the overall large litter observed for the City's 2020 audits. The largest sub-categories evaluated for other packaging in 2020 were six pack plastic rings (40%) and foil pouches (30%). **Figure 6** illustrates the results of the other packaging category. **Figure 7** compares the highest four sub-categories from the 2020 audits compared to all litter audits completed to date.

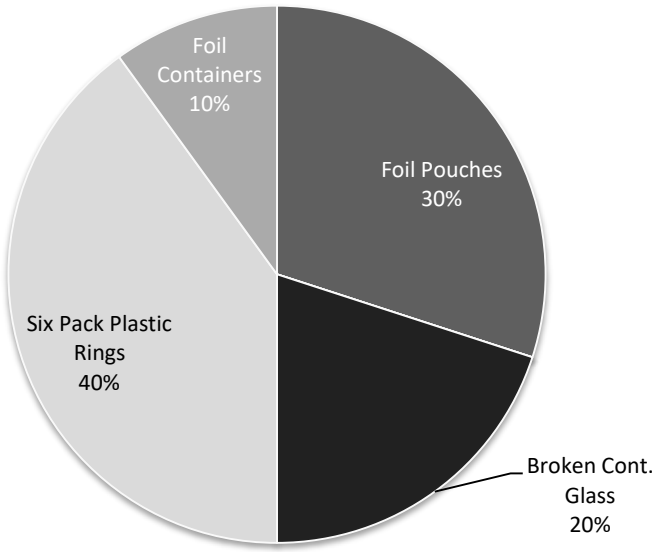

Figure 6: Other Packaging Composition 2020

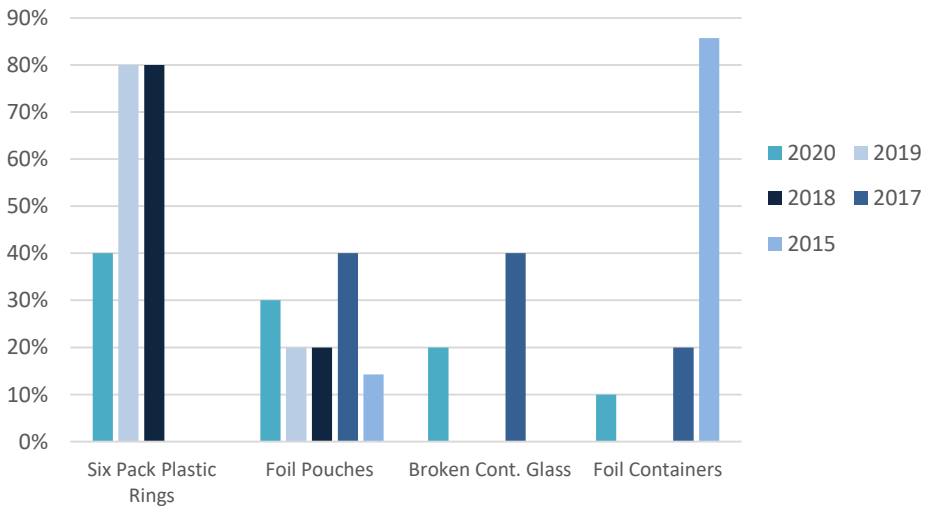

Figure 7: Other Packaging Previous Audit Comparison

Cups

Cups were the third largest category observed in the 2020 street litter audits and represented 10% of all large litter observed. Cup lids and/or pieces were the largest subcategory (39%), followed by plastic drink cups (27%), and paper cups (hot) (20%). **Figure 8** illustrates the breakdown of the cups category while **Figure 9** compares the largest four sub-categories from the five completed litter audits.

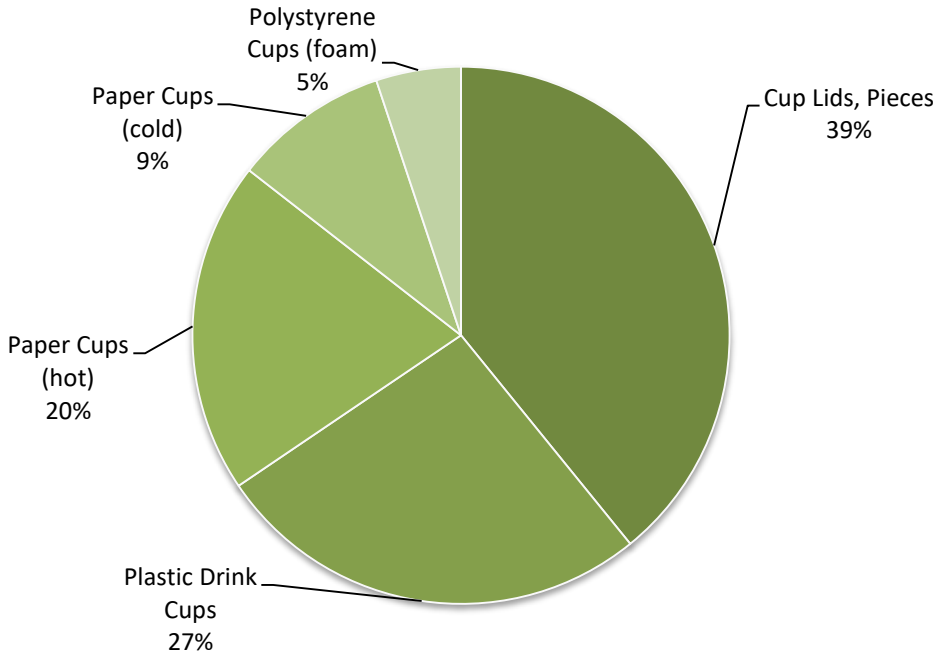

Figure 8: Cups Composition 2020

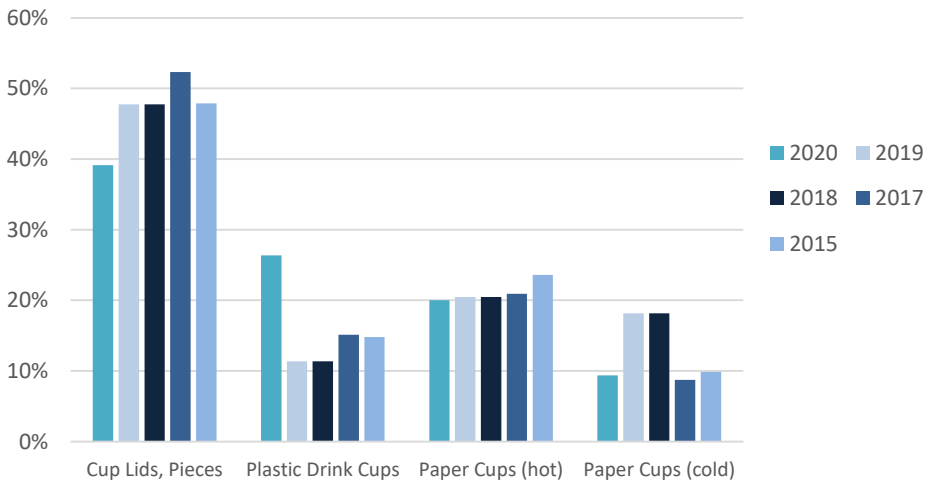

Figure 9: Cups Previous Audit Comparison

Bags

Bags represented 6% of all large litter observed in 2020. This category predominantly consisted of plastic bags – consumables packaging (23%), plastic retail bags and grocery (25%) and zipper bags/sandwich bags (17%). **Figure 10** illustrates the 2020 composition of the bags category while **Figure 11** compares the highest five sub-categories from all completed audits.

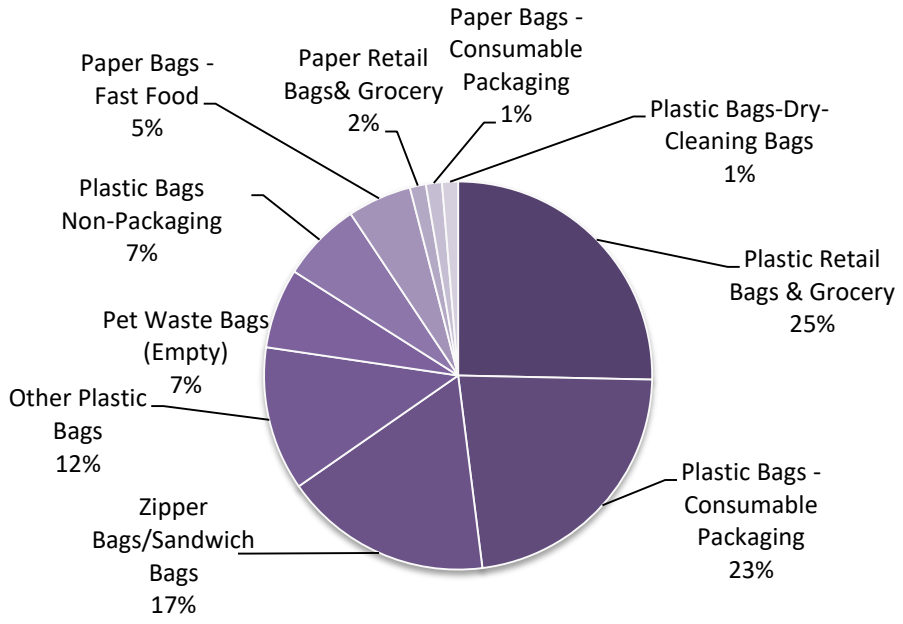

Figure 10: Bags Composition 2020

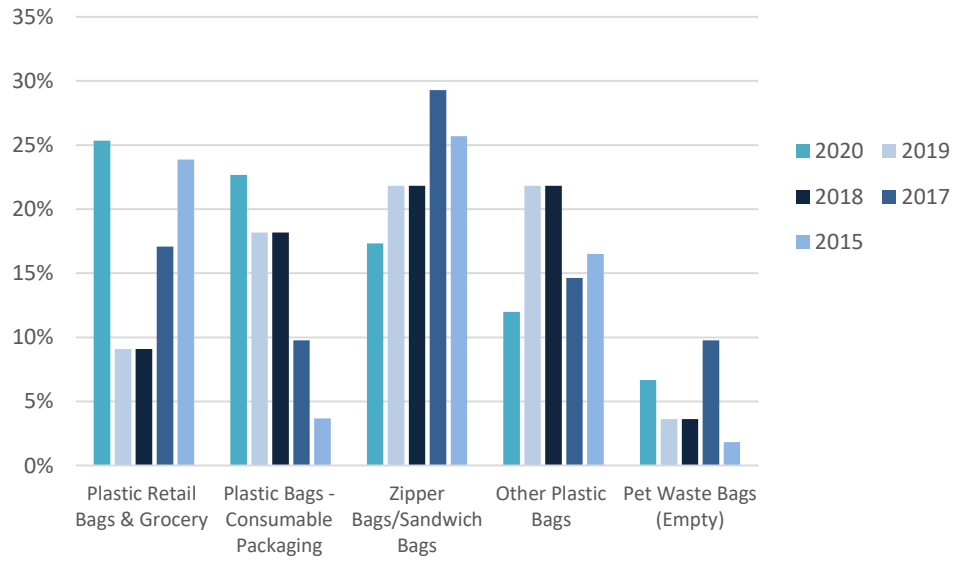

Figure 11: Bags Previous Audit Comparison

Other Packaging (Boxes)

Other packaging (boxes) represented 2% of the accumulated large litter in the 2020 street litter audits. The largest sub-categories evaluated for other packaging (boxes) consisted of paperboard (boxboard) (24%), paper beverage cases/sleeves (24%) and cardboard boxes/box material (21%) as illustrated in **Figure 12**. The highest four sub-categories observed in 2020 are compared to the 2019, 2018, 2017 and 2015 results as illustrated in **Figure 13.**

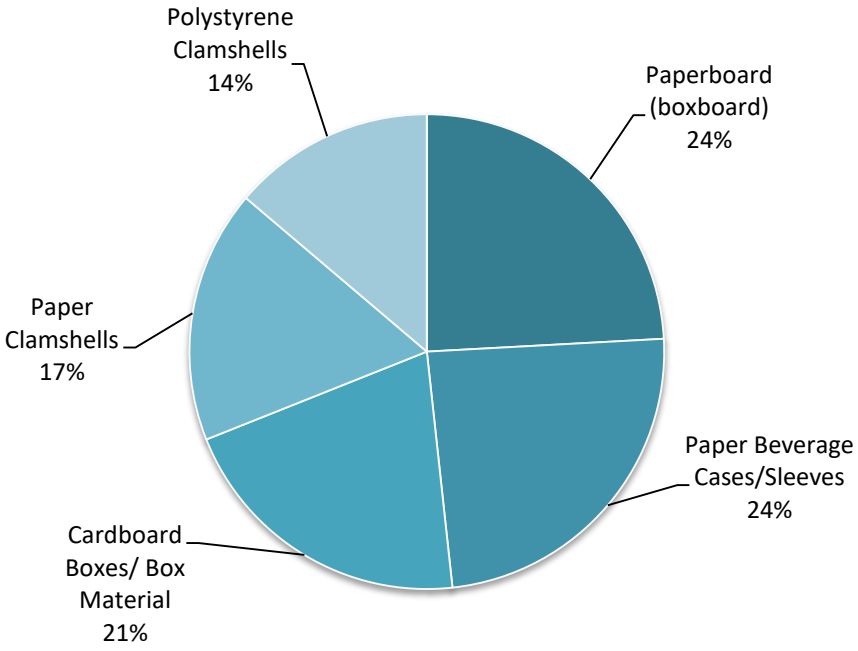

Figure 12: Other Packaging (Boxes) Composition 2020

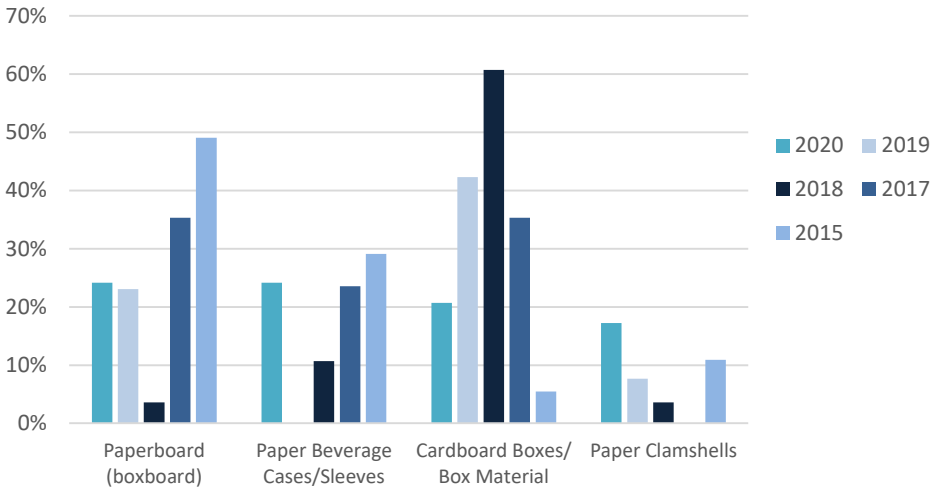

Figure 13: Other Packaging (Boxes) Previous Audit Comparison

Other Containers

In the 2020 audits, other containers represented 1% of all large litter observed. The breakdown of this category was mostly plastic jars/bottles/lids (88%). The composition of other containers is illustrated in **Figure 14** while a comparison of the largest three sub-categories from 2020, 2019, 2018 to 2017 and 2015 results is illustrated in **Figure 15**.

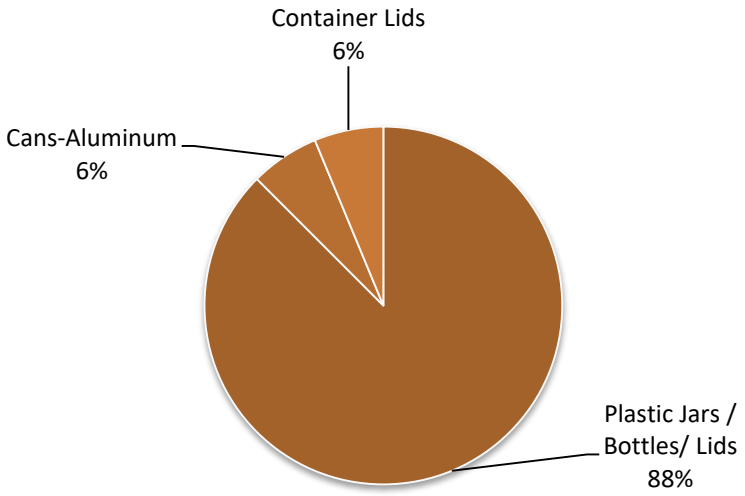

Figure 14: Other Containers Composition 2020

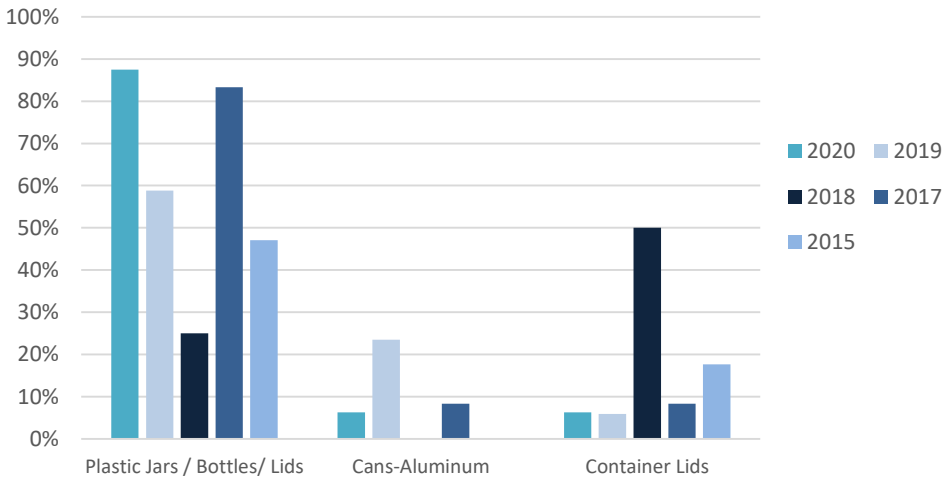

Figure 15: Other Containers Previous Audit Comparison

Food Wraps/Containers

Food wraps/containers represented 2% of the litter observed in this audit. **Figure 16** illustrates the breakdown of this category. The sub-categories that comprised the majority of the food wraps/containers were paper food wrap (53%) and plastic wrap (36%). **Figure 17** compares all sub-categories from 2020 to 2017 and 2015 results.

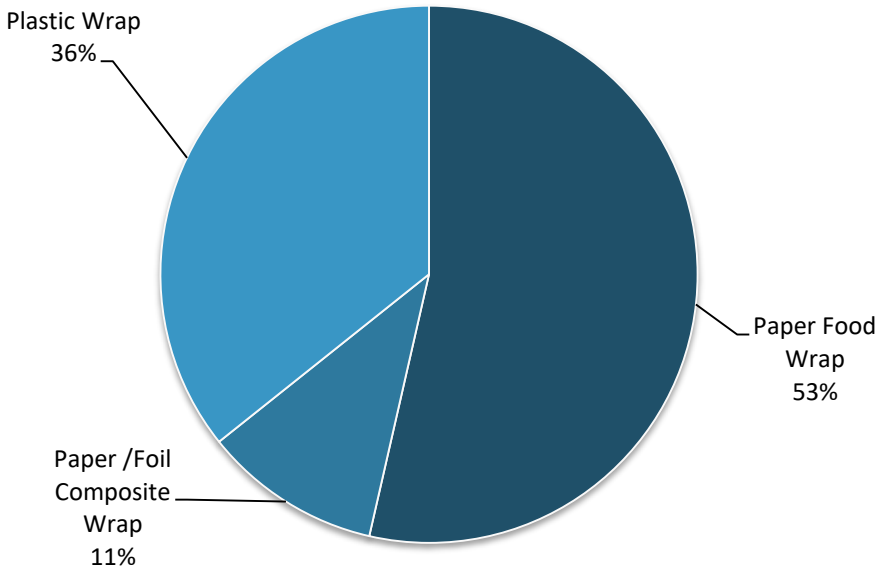

Figure 16: Food Wraps/Containers Composition 2020

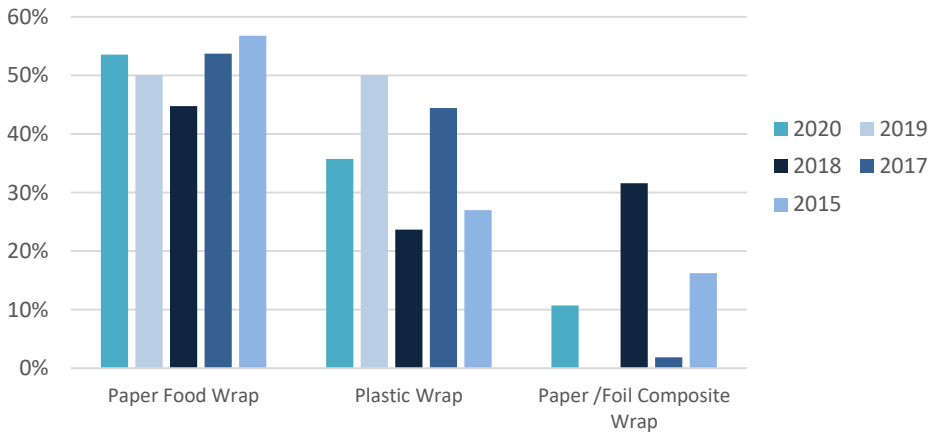

Figure 17: Food Wraps/Containers Previous Audit Comparison

Take out Extras

Take out extras accounted for 8% of the large litter observed. In 2019, two new sub-categories were added to this category. These included straws and stir sticks. Take out extras was largely comprised of straws (56%), condiment packaging (12%) and utensils (12%). **Figure 18** illustrates the breakdown of this category while **Figure 19** compares the highest four sub-categories from the completed audits.

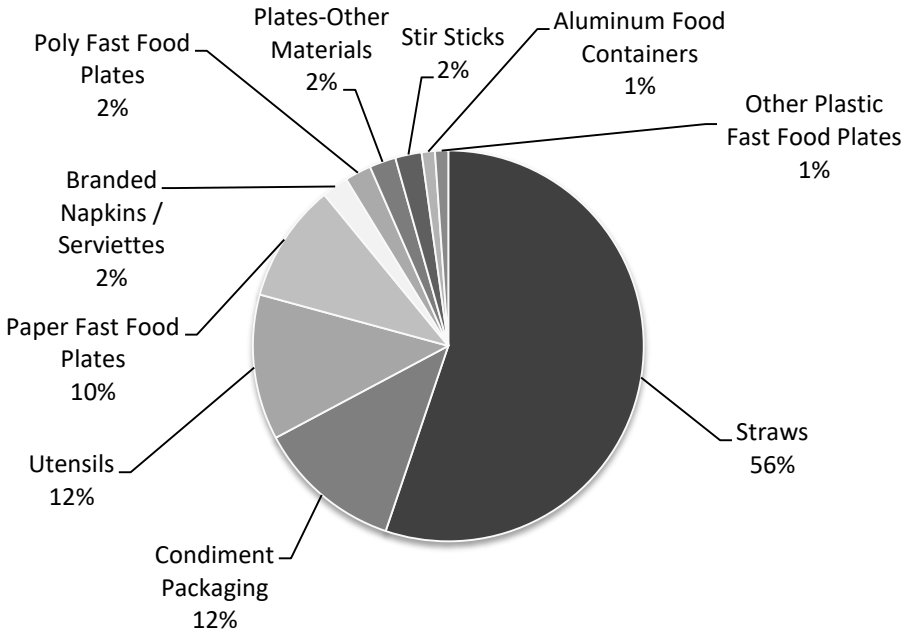

Figure 18: Take Out Extras Composition 2019

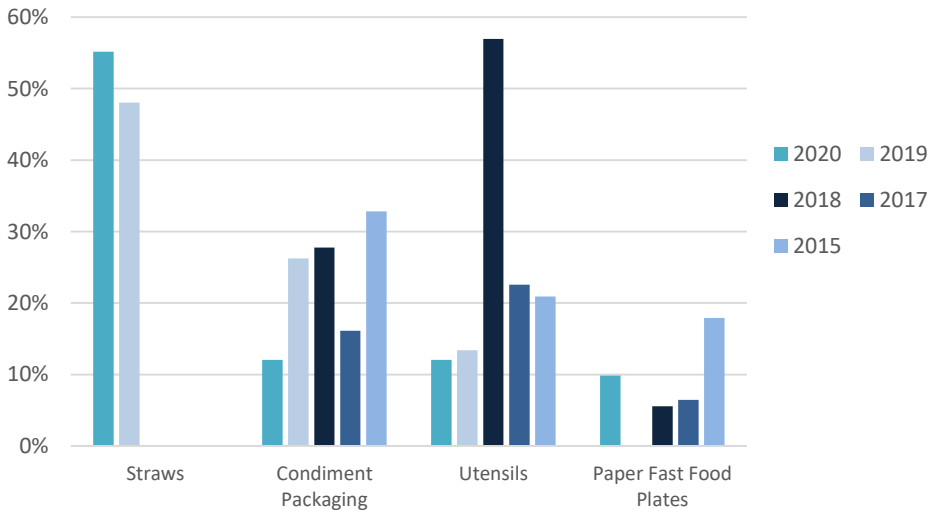

Figure 19: Take Out Extras Previous Audit Comparison

Trays

Trays represented less than 1% of all litter observed (100% polystyrene trays) (**Figure 20**). **Figure 21** compares sub-categories from all previous City of Vancouver Litter Audits.

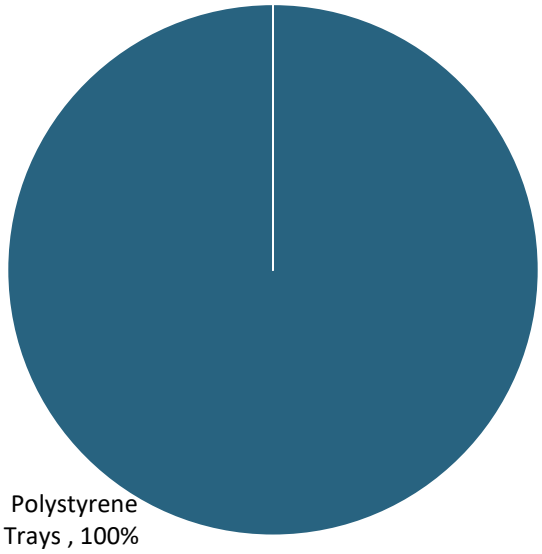

Figure 20: Trays Composition 2020

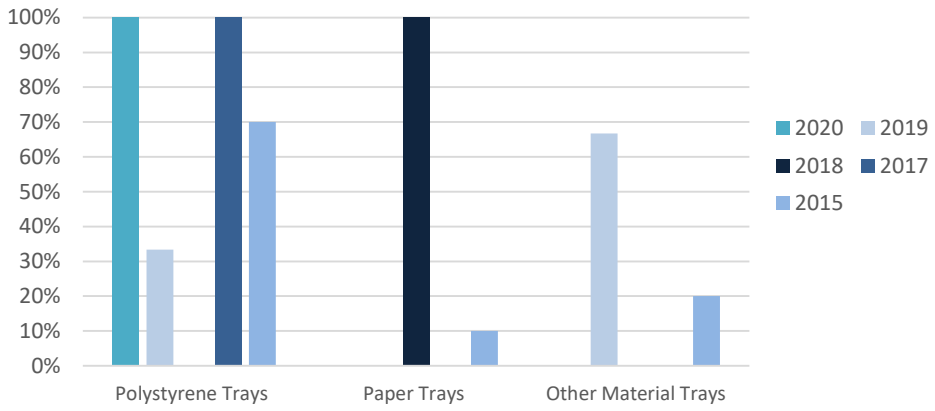

Figure 21: Trays Previous Audit Comparison

Confectionary/Snacks

This category represented 6% of all large litter observed in 2020. The most frequently observed sub-categories for large litter were snack food packaging (64%) and candy bar wrappers (19%).

Figure 22 illustrates the results of the confectionary/snacks category breakdown. **Figure 23** compares the highest four sub-categories from 2020 to the four previous litter audits.

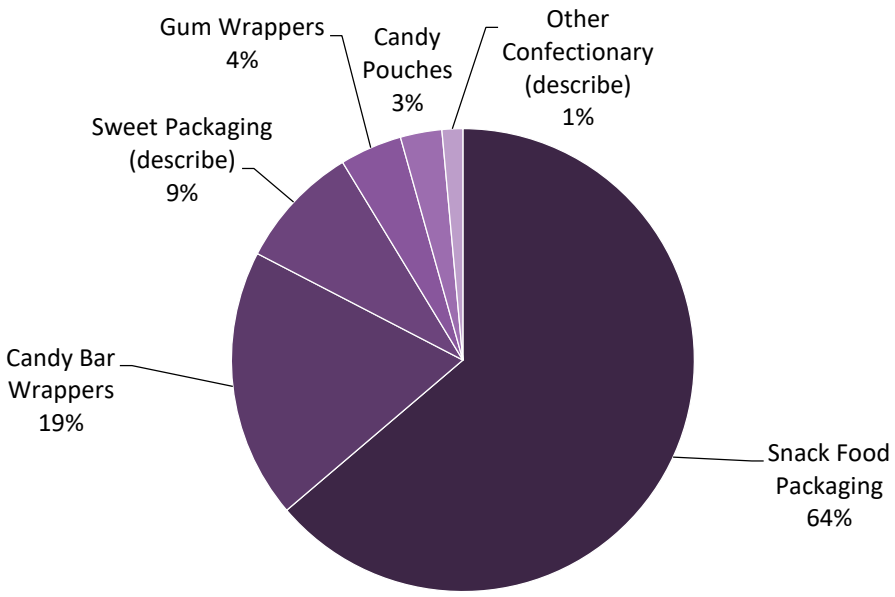

Figure 22: Confectionary/Snacks Composition 2020

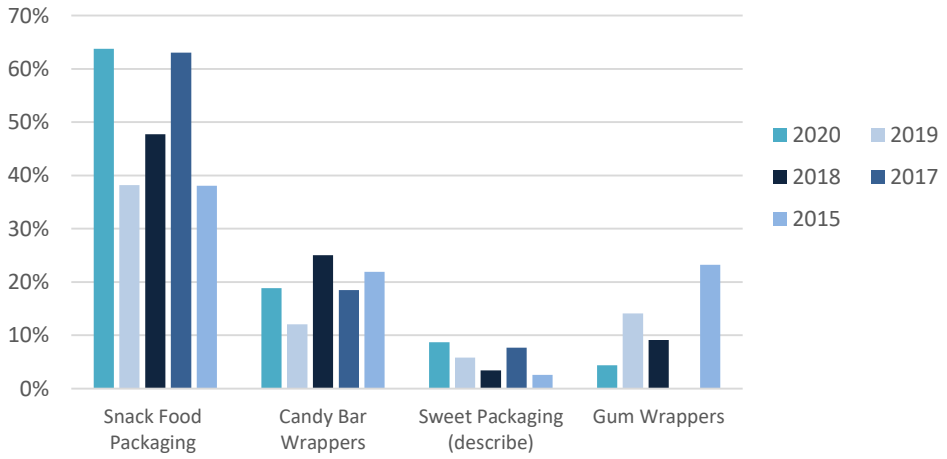

Figure 23: Confectionary/Snack Previous Audit Comparison

Cloth

The cloth category was split 58% for clothing or clothing pieces and 42% for other cloth. Cloth represented 1% of all large litter observed in 2020 (**Figure 24**). **Figure 25** compares the sub-categories observed in the most recent audit to the previously completed audits.

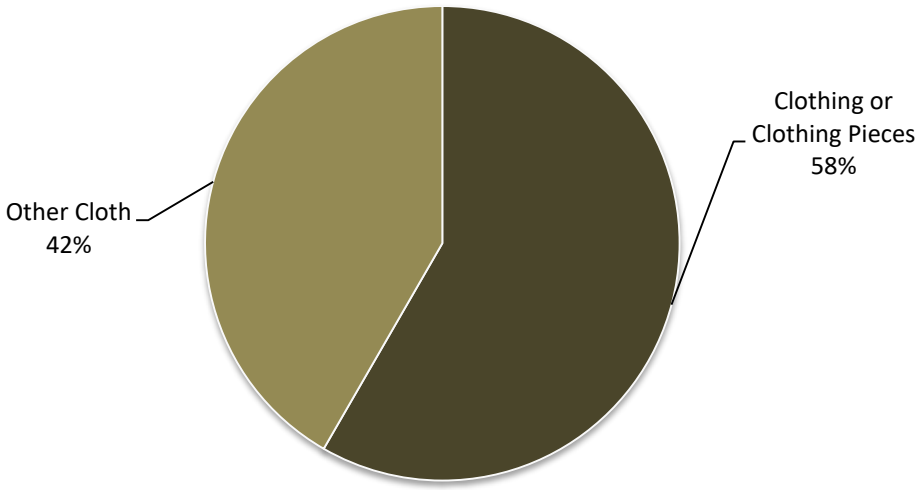

Figure 24: Cloth Composition, 2020

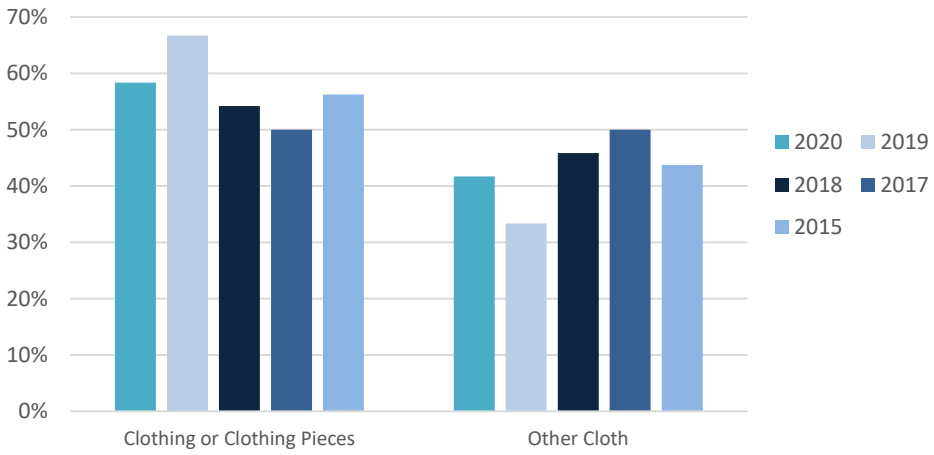

Figure 25: Cloth Previous Audit Comparison

Other Miscellaneous Packaging

Other miscellaneous packaging represented less than 1% of the large litter observed in 2020. Plastic packaging other (50%) and foil materials/foil pieces (50%) comprised the 'other miscellaneous packaging' category, entirely. **Figure 26** illustrates the breakdown of this category and **Figure 27** compares the sub-categories observed in 2020 to all previous audits.

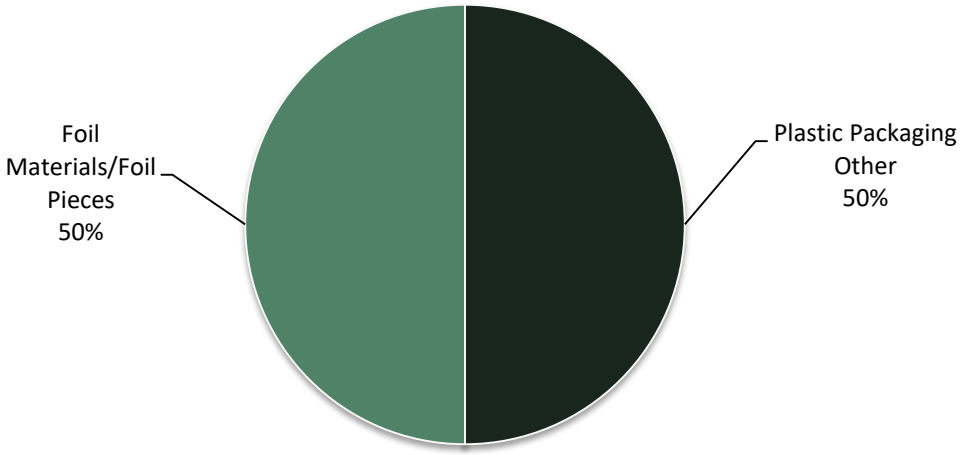

Figure 26: Other Miscellaneous Packaging Composition 2020

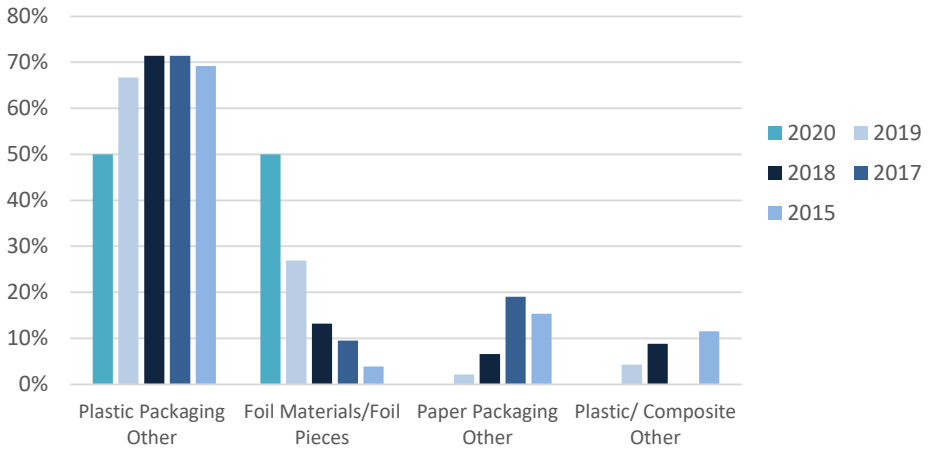

Figure 27: Other Miscellaneous Packaging Previous Audit Comparison

Paper/Fibre Materials

Paper/Fibre Materials were the second highest in terms of items most littered and represented 20% of all large litter observed in the 2020 street litter audits. The majority of the paper/fibre materials category was non-brand name towels/napkins (53%), receipts (27%) and printed material (14%). Figure 28 provides the detailed breakdown of this category. **Figure 29** compares the highest three sub categories from all the audits.

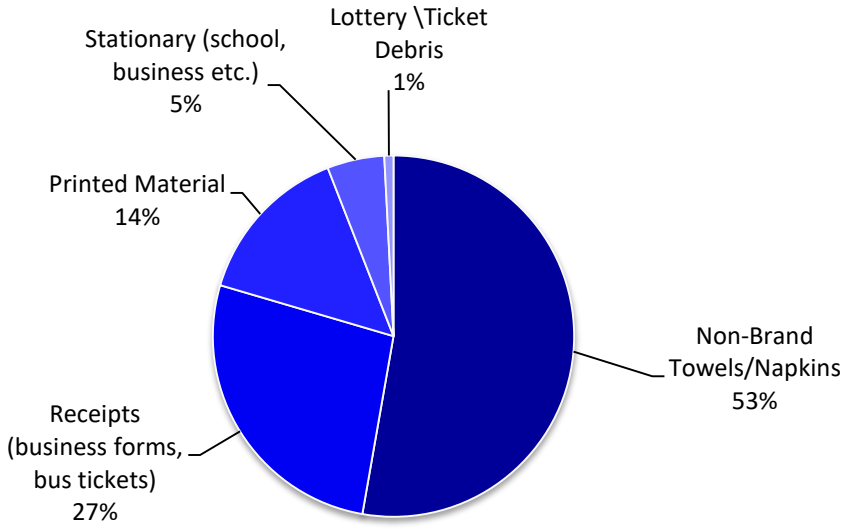

Figure 28: Paper/Fibre Composition 2020

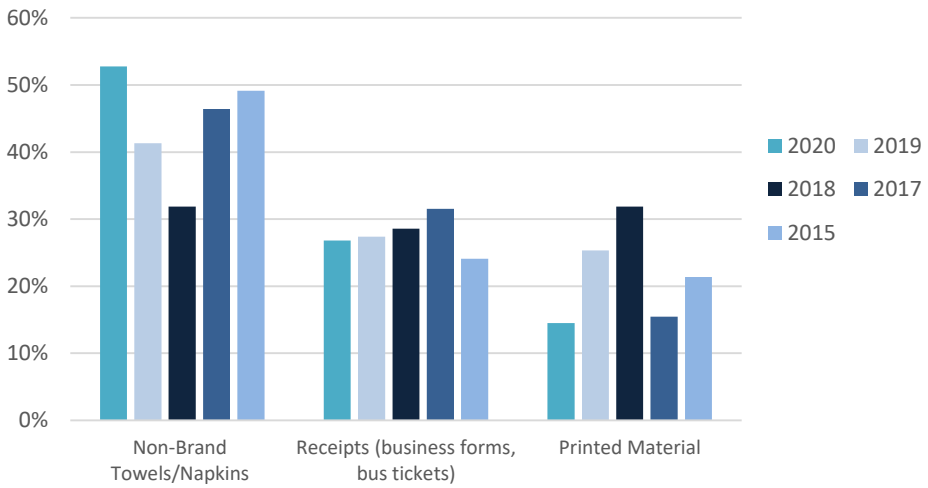

Figure 29: Paper/Fibre Material Previous Audit Comparison

Tobacco Products

In 2020, tobacco products were 3% of the large litter items surveyed. Within this category, 90% was 'tobacco other' and 10% cigarette/cigar debris. Tobacco other includes cigarette packaging and cellophane wrapping (**Figure 30**). **Figure 31** compares the two sub-categories from the all completed audits.

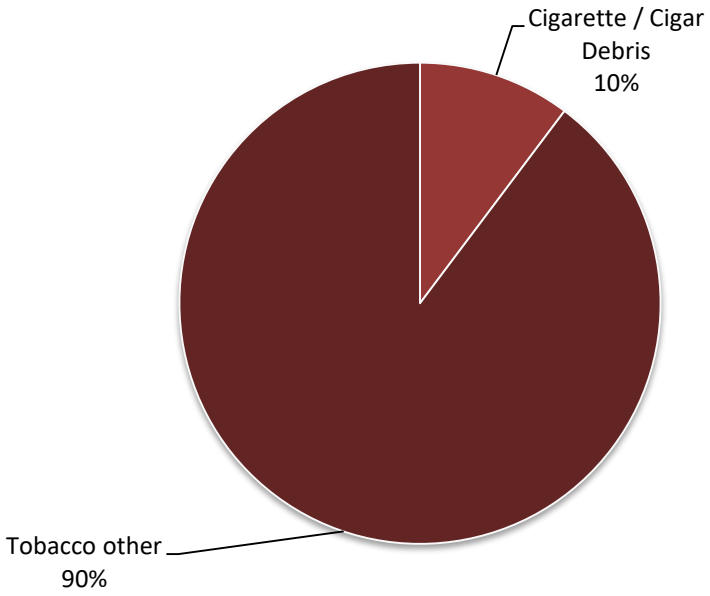

Figure 30: Tobacco Products Composition, 2020

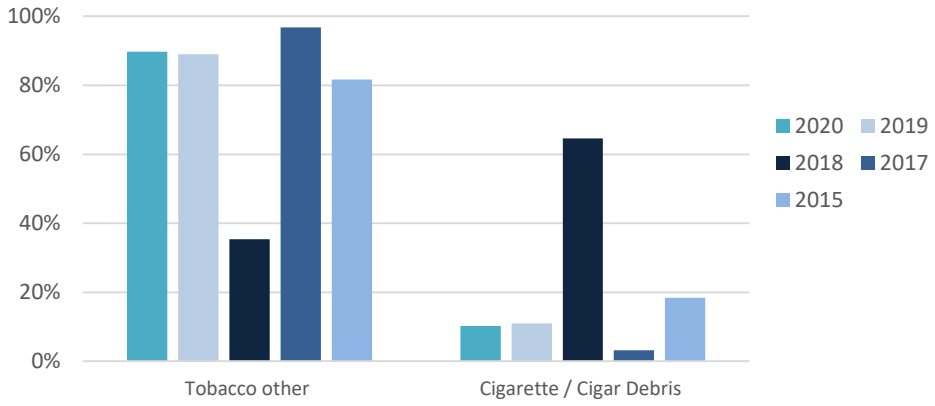

Figure 31: Tobacco Products Previous Audit Comparison

Other Miscellaneous

'Other miscellaneous' was the largest category observed in 2020 which represented 31% of all large litter. The primary sub-categories assessed in 2020 included: miscellaneous plastic (36%) and home articles (27%). It should be noted miscellaneous plastic are made of plastic that did not fit into any other category or could not be identified as such. Household items were items observed that did not fit into other categories such as composite hangers and pictures. **Figure 32** illustrates the breakdown of this category while Error! Reference source not found. compares the highest four sub-categories observed in he 2020 audits to the previous studies.

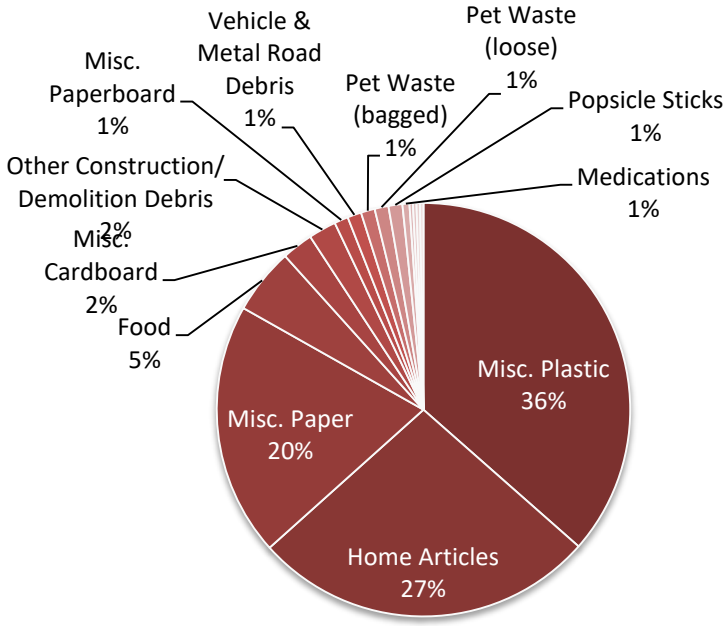

Figure 32: Other Miscellaneous Composition 2020

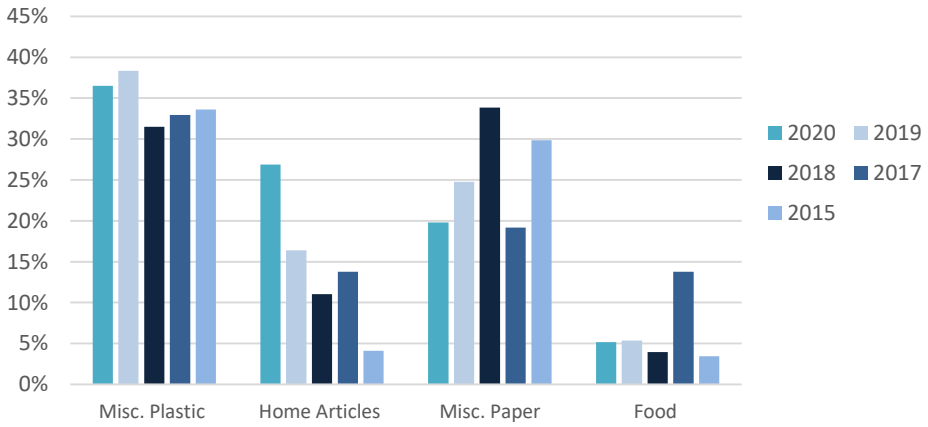

Figure 33: Other Miscellaneous Previous Audit Comparison

Medical Waste

Medical waste accounted for 5% of the large litter observed. In 2020, medical waste was added as a new category to track litter related to the COVID-19 pandemic. This included disinfecting wipes, disposable gloves and masks. **Figure 18** illustrates the breakdown of this category. No comparison to previous audits is available.

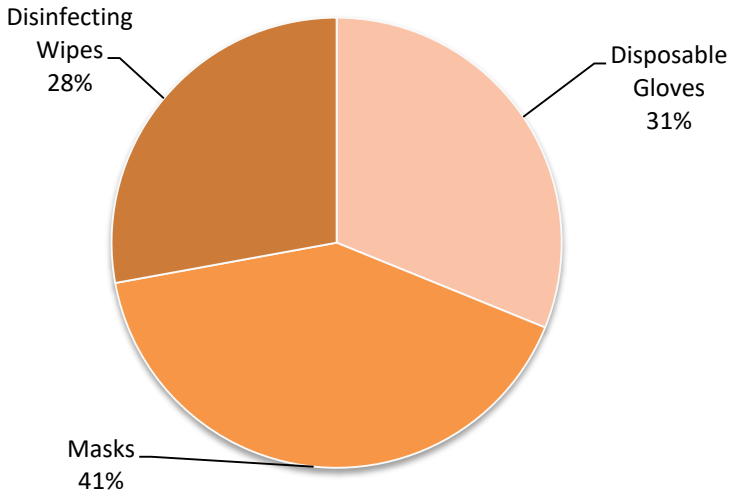

Figure 34: Medical Waste Composition 2020

Single-Use Items

Of the 1,201 pieces of large litter audited, 27% (328) of these items were considered Single-Use Items (SUIs). **Figure 35** illustrates these results. Of the 328 SUIs, the majority were disposable cups (non-foam) (36%), medical waste (19%), other SUI's (plastic food wrap, paper and poly fast food plates, plastic stir sticks, etc.) (16%) and straws (15%). **Figure 36** illustrates the breakdown of this category.

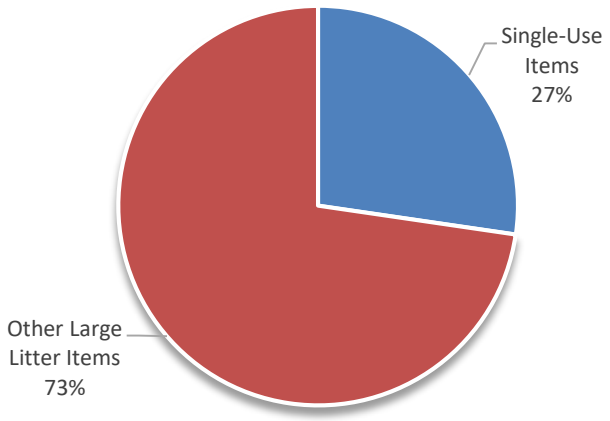

Figure 35: Single-Use Items Comparison

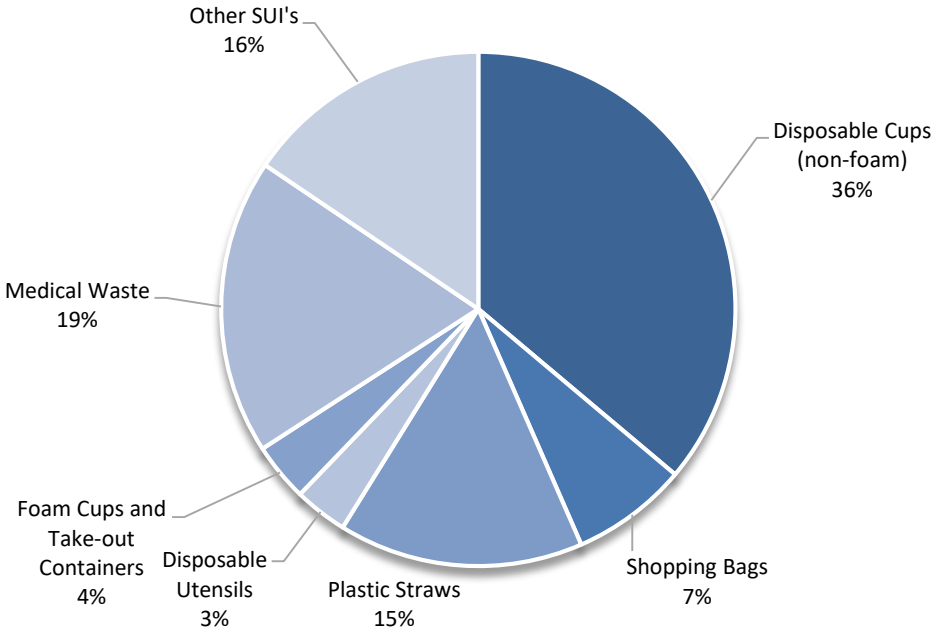

Figure 36: Single-Use Items by Category

3.2.4 Large Litter by Sites

The ten litter sites having the greatest number of large litter pieces are listed below in **Table 4**. The site with the most accumulated large litter in 2020 was Site 4 with 84 pieces of large litter observed, largely related to illegal dumping present within the survey area. This site is zoned single-family residential. In total, 50% of sites in the "top 10" were residential (sites 4, 11, 60, 77 and 107). An additional 20% were mixed use sites (sites 15 and 97) and 30% of sites were commercial (sites 110, 112 and 124). A full ranking of sites is provided in **Appendix F. Of note, 2 of the top 10 sites - Sites 97 and 110 were also litter sites with the highest number of large litter pieces in the 2019 audits.**

Table 4: Large Litter Site Rankings

Site Number	Number of Pieces of Large Litter	Hundred Block	Street Name
4	84	2000	Stainsbury Ave
107	62.5	600	Powell St
124	59	6500	Oak St
110	38	400	Main St
112	34.5	6400	Cambie St
77	30	5500	Main St
60	27	7200	Dumfries
11	24	3400	E 29th Ave
15	21	600	E Broadway
97	21	800	Commercial Dr

3.2.5 Large Litter by Zoning

Sites were zoned by their typical land-use. Zones used to categorize sites included: Commercial, mixed-use, single-family, multi-family, institutional and industrial. A breakdown of the number of sites per zone is provided in **Table 5**.

Table 5: Number of Litter Sites per Zoning

Zoning Type	Number of Litter Sites	Avg. # of Large Litter Items per Site
Industrial	3	4.7
Institutional	3	7.3
Single-Family	64	9.0
Multi-Family	17	10.2
Mixed Use	5	12.8
Commercial	25	14.1

A breakdown of large litter composition per zoning type is provided in **Table 6** and illustrated in **Figure 37** .

Table 6: Large Litter Composition by Zoning Type

Large Litter Category	Overall	Commercial	Mixed Use	Single-Family	Multi-Family	Institutional	Industrial
Avg. # of Large Litter per Site	10.3	14.1	12.8	9.0	10.2	7.3	4.7
Beverage Containers	3%	3%	5%	3%	1%	9%	7%
Other Packaging	1%	1%	2%	0%	2%	0%	0%
Cups	10%	9%	16%	10%	10%	0%	7%
Bags	6%	4%	8%	7%	9%	0%	0%
Other Packaging (Boxes)	2%	2%	2%	2%	5%	5%	14%
Other Containers	1%	1%	3%	1%	2%	5%	0%
Food Wraps/ Containers	2%	3%	3%	2%	4%	0%	7%
Take Out Extras	8%	10%	3%	7%	6%	9%	0%
Trays	0%	0%	0%	0%	1%	0%	0%
Confectionary/ Snack	6%	6%	8%	5%	6%	5%	14%
Cloth	1%	1%	2%	1%	1%	9%	0%
Other Miscellaneous Packaging	0%	0%	0%	0%	2%	0%	0%
Paper/ Fibre Material	20%	23%	25%	18%	24%	9%	21%
Tobacco Products	3%	4%	5%	2%	4%	23%	0%
Other Miscellaneous	31%	27%	13%	38%	19%	27%	29%
Medical Waste	5%	6%	8%	5%	5%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

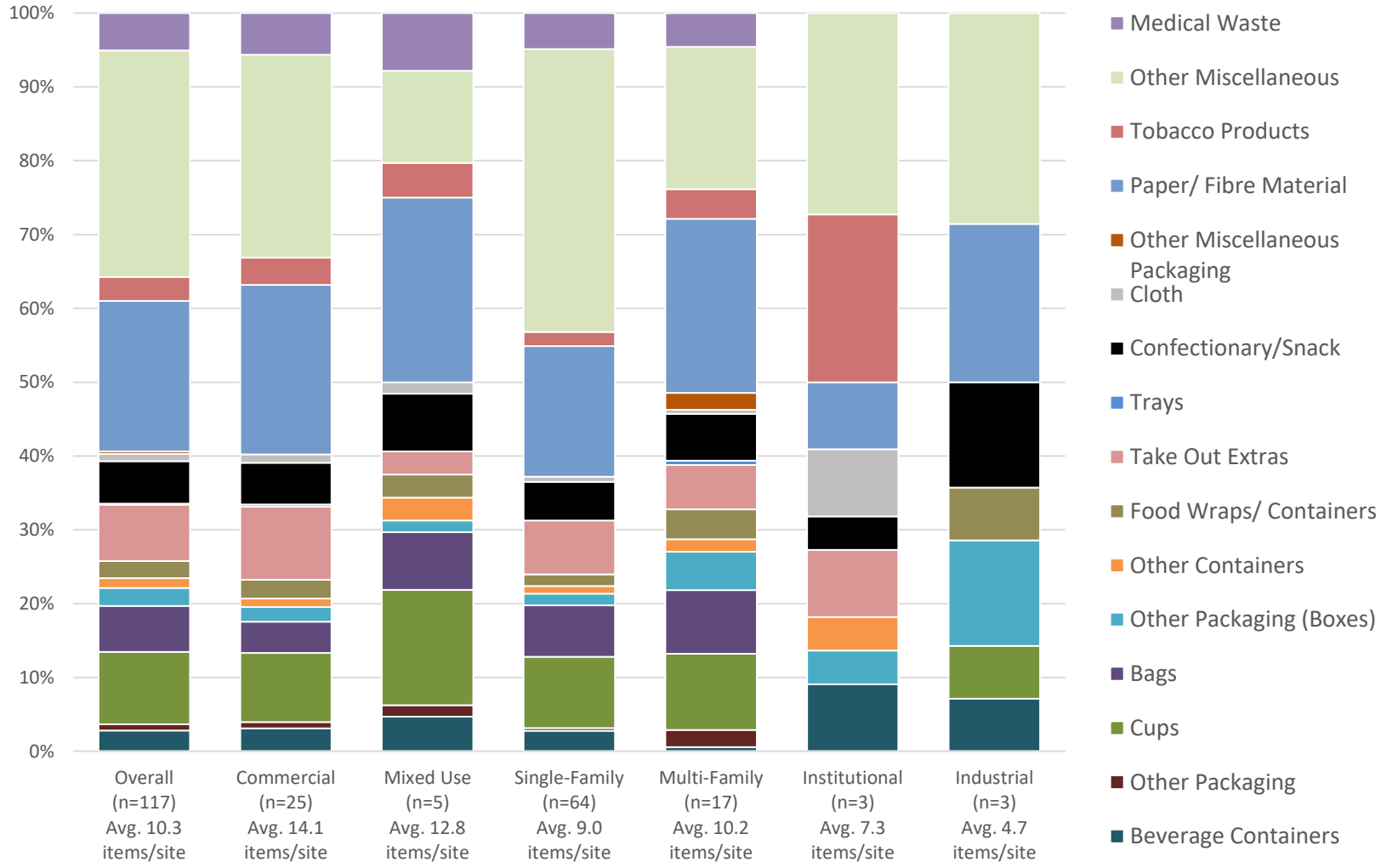

Figure 37: Large Litter Composition by Zone Type

3.2.6 Large Litter Results Compared to 2015 Baseline, 2017 to 2019 Follow-Up Studies

Results from the 2015 audit were established as the baseline against which future litter audit results (i.e., 2017 through 2020) would be compared. It should be noted medical waste was not assessed as a separate category in the baseline audit study, having only been added this year. The composition and average accumulation from the 2015 baseline to the 2020 results by category are compared in **Table 7**.

Overall, there was a 15% decrease in the average amount of large litter observed in 2020 from the baseline assessment in 2015. It should be noted these values do not include the seven sites that were immediately adjacent to construction activity. All categories with the exception of beverage containers, other packaging, bags, take out extras and other miscellaneous decreased from the 2015 baseline assessment. Take out extras had the largest increase of 145% (an average of 0.32 pieces per site in the baseline to 0.78 in 2020) followed by beverage containers, with an increase of 96% (an average of 0.15 pieces in 2015 to 0.29 in 2020).

Table 7: 2020 vs. 2015 Large Litter Comparison

Category	2020 Results (117 Sites)		2015 Baseline Results (108 Sites)		% Change
	Avg. # Litter Items per Site	% of Total	Avg. # Litter Items per Site	% of Total	
Beverage Containers	0.3	3%	0.1	1%	96%
Other Packaging	0.1	1%	0.1	1%	32%
Cups	1.0	10%	2.6	22%	-62%
Bags	0.6	6%	0.5	4%	27%
Other Packaging (Boxes)	0.2	2%	0.5	4%	-51%
Other Containers	0.1	1%	0.2	1%	-13%
Food Wraps/ Containers	0.2	2%	0.3	3%	-30%
Take Out Extras	0.8	8%	0.3	3%	145%
Trays	0.0	0%	0.1	1%	-77%
Confectionary/Snack	0.6	6%	0.7	6%	-18%
Cloth	0.1	1%	0.3	2%	-65%
Other Miscellaneous Packaging	0.0	0%	0.2	2%	-86%
Paper/ Fibre Material	2.1	20%	2.9	24%	-28%
Tobacco Products	0.3	3%	0.5	4%	-27%
Other Miscellaneous	3.1	31%	2.7	22%	17%
Medical Waste	0.5	5%	0.0	-	-
Total	**10.3**	**100%**	**12.0**	**100%**	**-15%**

The composition and accumulation from the 2017 follow-up audit to the 2020 results by category are compared in **Table 8**. **There was a 26% increase in the amount of large litter observed in 2020 from 2017.** It should be noted that these values do not include the six sites that were immediately adjacent to construction activity in 2020 or the two sites in 2017. Compared to 2017, almost all categories, with the exception of cups, food wraps/containers, trays, confectionary/snack, cloth, other miscellaneous packaging and tobacco products, increased in 2020. There was an increase at or over a 100% in the take out extras (159%) and other miscellaneous packaging (100%) categories.

Table 8: 2020 vs. 2017 Large Litter Comparison

Category	2020 Results (117 Sites)		2017 Follow-Up (106 Sites)		% Change
	Avg. # Litter Items per Site	% of Total	Avg. # Litter Items per Site	% of Total	
Beverage Containers	0.3	3%	0.2	3%	23%
Other Packaging	0.1	1%	0.0	1%	81%
Cups	1.0	10%	1.6	20%	-38%
Bags	0.6	6%	0.4	5%	66%
Other Packaging (Boxes)	0.2	2%	0.2	2%	55%
Other Containers	0.1	1%	0.1	1%	21%
Food Wraps/ Containers	0.2	2%	0.5	6%	-53%
Take Out Extras	0.8	8%	0.3	4%	159%
Trays	0.0	0%	0.0	0%	-40%
Confectionary/Snack	0.6	6%	0.6	8%	-4%
Cloth	0.1	1%	0.2	2%	-40%
Other Miscellaneous Packaging	0.0	0%	0.2	2%	-83%
Paper/ Fibre Material	2.1	20%	1.6	19%	32%
Tobacco Products	0.3	3%	0.6	7%	-43%
Other Miscellaneous	3.1	31%	1.6	19%	100%
Medical Waste	0.5	5%	0.0	-	-
Total	**10.3**	**95%**	**8.1**	**100%**	**26%**

The composition and accumulation from the 2018 follow-up audit to the 2020 results by category are compared in **Table 9**. There was a 6% increase in the amount of large litter observed in 2020 from 2018. It should be noted that these values do not include the six sites that were immediately adjacent to construction activity in 2020 or the five sites in 2018. Compared to 2018, almost all categories, with the exception of cups, food wraps/containers, confectionary/snack, cloth, miscellaneous packaging and tobacco products, increased in 2020. There was over a 100% increase in the beverage containers (233%) category from 2018 to 2020.

Table 9: 2020 vs. 2018 Large Litter Comparison

Category	2020 Results (117 Sites)		2018 Follow-Up (103 Sites)		% Change
	Avg. # Litter Items per Site	% of Total	Avg. # Litter Items per Site	% of Total	
Beverage Containers	0.3	3%	0.1	1%	233%
Other Packaging	0.1	1%	0.0	1%	76%
Cups	1.0	10%	1.3	13%	-22%
Bags	0.6	6%	0.5	6%	20%
Other Packaging (Boxes)	0.2	2%	0.3	3%	-9%
Other Containers	0.1	1%	0.1	1%	76%
Food Wraps/ Containers	0.2	2%	0.4	4%	-35%
Take Out Extras	0.8	8%	0.7	7%	12%
Trays	0.0	0%	0.0	0%	76%
Confectionary/Snack	0.6	6%	0.9	9%	-31%
Cloth	0.1	1%	0.2	2%	-56%
Other Miscellaneous Packaging	0.0	0%	0.4	5%	-92%
Paper/ Fibre Material	2.1	20%	1.8	18%	18%
Tobacco Products	0.3	3%	0.5	6%	-39%
Other Miscellaneous	3.1	31%	2.5	25%	28%
Medical Waste	0.5	5%	-	-	-
Total	**10.3**	**100%**	**9.7**	**100%**	**6%**

The composition and accumulation from the 2019 follow-up audit to the 2020 results by category are compared in **Table 10**. **There was a 4% decrease in the amount of large litter observed in 2020 from 2019.** It should be noted that these values do not include the six sites that were immediately adjacent to construction activity in 2020 or the four sites in 2019. Compared to 2019, almost all categories, with the exception of cups, bags, other containers, trays, confectionary/snacks, cloth and tobacco products, increased in 2020. There was over a 100% increase in the food wraps/containers (534%) and cloth (625%) categories.

Table 10: 2020 vs. 2019 Large Litter Comparison

Category	2020 Results (117 Sites)		2019 Follow-Up (106 Sites)		% Change
	Avg. # Litter Items per Site	% of Total	Avg. # Litter Items per Site	% of Total	
Beverage Containers	0.3	3%	0.3	3%	3%
Other Packaging	0.1	1%	0.0	0%	81%
Cups	1.0	10%	1.3	12%	-25%
Bags	0.6	6%	1.0	10%	-39%
Other Packaging (Boxes)	0.2	2%	0.2	2%	1%
Other Containers	0.1	1%	0.2	1%	-15%
Food Wraps/ Containers	0.2	2%	0.0	0%	534%
Take Out Extras	0.8	8%	0.8	8%	-7%
Trays	0.0	0%	0.0	0%	-40%
Confectionary/Snack	0.6	6%	1.1	11%	-48%
Cloth	0.1	1%	0.0	0%	625%
Other Miscellaneous Packaging	0.0	0%	0.4	4%	-92%
Paper/ Fibre Material	2.1	20%	2.1	19%	1%
Tobacco Products	0.3	3%	0.4	4%	-14%
Other Miscellaneous	3.1	31%	2.6	25%	19%
Medical Waste	0.5	5%	0.0	-	-
Total	**10.3**	**100%**	**10.7**	**100%**	**-4%**

The average number of litter items per year and the composition of those materials has changed throughout each year of the audit. **Figure 38** illustrates the annual results of litter composition throughout each audit year based on average number of litter items per site.

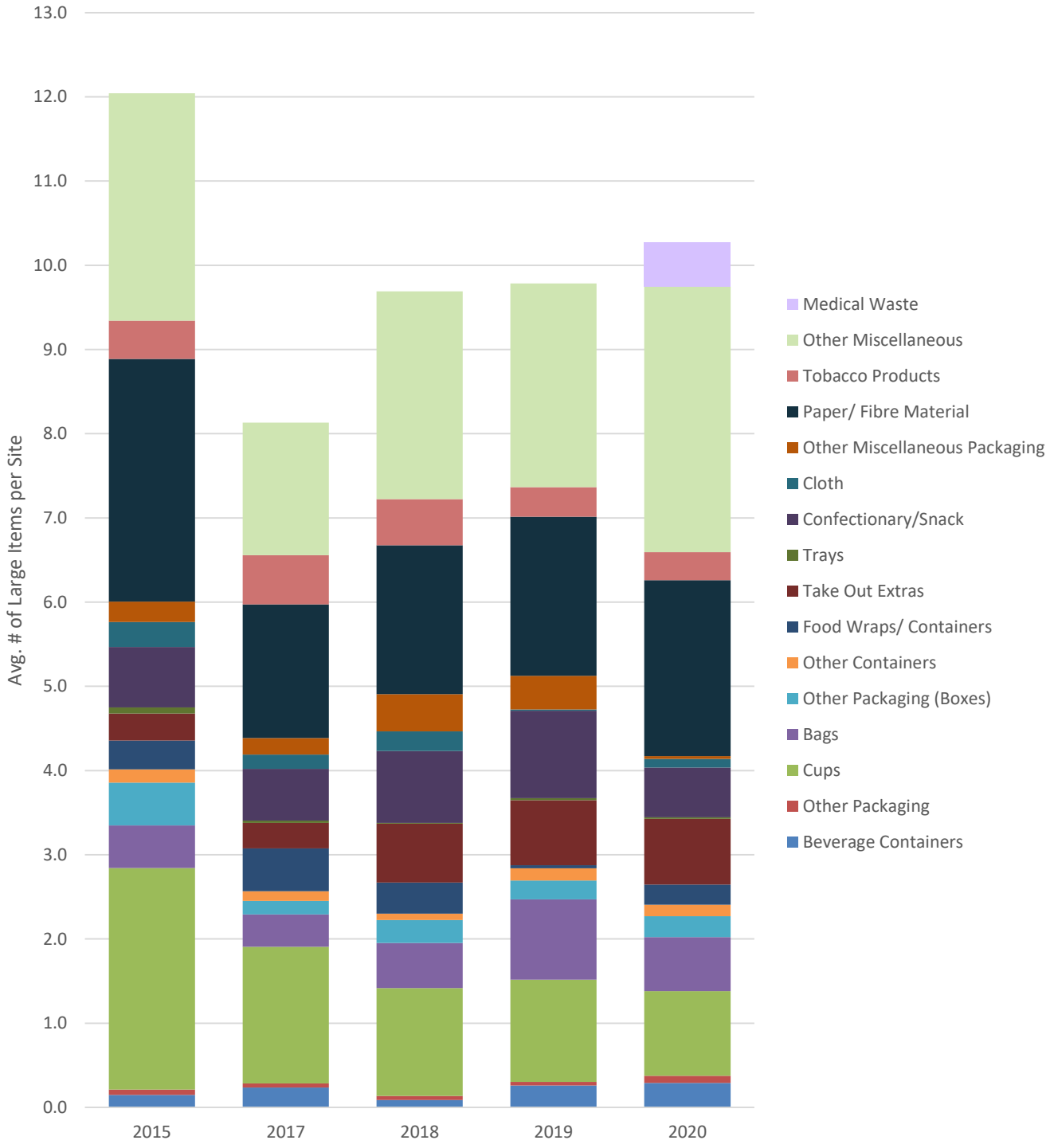

Figure 38: Comparison of Large Litter Categories by Year

3.2.7 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 as this study. **Table 11** illustrates the percentage breakdown per large litter item category for each municipality. **Figure 39** illustrates the top three large litter categories observed in the 2020 Vancouver street litter audits to the results for each municipality (as well as Vancouver in previous years).

Table 12 illustrates the average number of items counted per site based on category. **Figure 40** illustrates these results graphically.

Table 11: Vancouver Large Litter Audit Results Compared with Audit Results of Other Cities (by Percent Breakdown)

Category	Toronto 2016	Edmonton 2016	Edmonton 2017	Winnipeg 2014	San Francisco 2009	Vancouver 2015	Vancouver 2017	Vancouver 2018	Vancouver 2019	Vancouver 2020
Beverage Containers	6%	2%	1%	10%	3%	1%	3%	1%	3%	3%
Other Packaging	1%	0%		5%	3%	1%	1%	1%	0%	1%
Cups	11%	13%	18%	6%	6%	22%	20%	13%	12%	10%
Bags	4%	2%	3%	6%	6%	4%	5%	6%	10%	6%
Other Packaging (Boxes)	9%	3%	4%	2%	3%	4%	2%	3%	2%	2%
Other Containers	1%	5%	8%	1%	2%	1%	1%	1%	2%	1%
Food Wraps/ Containers	3%	4%	4%	1%	4%	3%	6%	4%	0%	2%
Take Out Extras	2%	8%	9%	13%	4%	3%	4%	7%	8%	8%
Trays	0%	0%	N/A	N/A	0%	1%	0%	0%	0%	0%
Confectionary/ Snack	5%	4%	6%	6%	8%	6%	8%	9%	10%	6%
Cloth	2%	0%	N/A	1%	1%	3%	2%	2%	0%	1%
Other Miscellaneous Packaging	0%	0%	N/A	N/A	N/A	2%	2%	5%	4%	0%
Paper/ Fibre Material	29%	8%	7%	7%	32%	24%	19%	18%	19%	20%
Tobacco Products	6%	3%	5%	8%	4%	4%	7%	6%	3%	3%
Other Miscellaneous	20%	33%	19%	31%	24%	20%	19%	25%	26%	31%
Medical Waste	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5%
Additional Categories	0%	1%	1%	N/A	N/A	3%	0%	N/A	N/A	N/A
Household Articles	0%	16%	15%	N/A	N/A	0%	0%	N/A	N/A	N/A
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

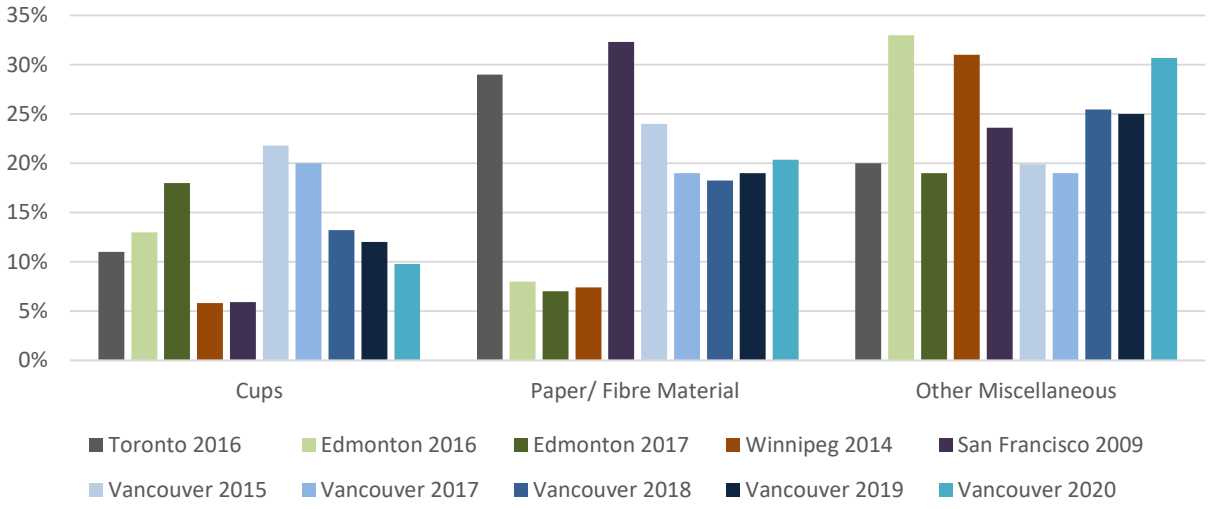

Figure 39: Comparison of Top Large Litter Categories by Municipality

Table 12: Vancouver Large Litter Audit Results Compared with Audit Results of Other Cities (Average Number of Items per Site)

Category	Toronto 2016	Edmonton 2016	Edmonton 2017	Winnipeg 2014	San Francisco 2009	Vancouver 2015	Vancouver 2017	Vancouver 2018	Vancouver 2019	Vancouver 2020
Beverage Containers	0.7	0.2	0.1	1.5	1.3	0.2	0.2	0.1	0.3	0.3
Other Packaging	1.2	0		0.8	1.9	0.1	0.0	0.0	0.0	0.1
Cups	1.4	1.4	1.3	1.0	3.0	2.6	1.6	1.3	1.3	1.0
Bags	0.6	0.2	0.2	0.8	1.4	0.5	0.4	0.5	1.0	0.6
Other Packaging (Boxes)	0.1	0.3	0.3	0.3	0.7	0.5	0.2	0.3	0.2	0.2
Other Containers	0.1	0.6	0.6	0.1	0.7	0.2	0.1	0.1	0.2	0.1
Food Wraps/ Containers	0.4	0.4	0.3	1.8	1.2	0.3	0.5	0.4	0.0	0.2
Take Out Extras	0.3	0.8	0.6	0.0	1.4	0.3	0.3	0.7	0.8	0.8
Trays	0.1	0			0.2	0.1	0.0	0.0	0.0	0.0
Confectionary/Snack	0.7	0.5	0.4	0.9	3.2	0.7	0.6	0.9	1.1	0.6
Cloth	0.2	0		0.2	0.4	0.3	0.2	0.2	0.0	0.1
Other Miscellaneous Packaging	0	0				0.2	0.2	0.4	0.4	0.0
Paper/ Fibre Material	3.7	0.9	0.5	1.0	7.8	2.9	1.6	1.8	2.1	2.1
Tobacco Products	0.7	0.3	0.4	1.1	1.4	0.5	0.6	0.5	0.4	0.3
Other Miscellaneous	2.6	3.6	1.4	4.1	9.5	2.4	1.6	2.5	2.6	3.1
Medical Waste										0.5
Additional Categories	0	0.1	0.1			0.3	0			
Household Articles	0	1.7	1.1				0			
Total	**12.8**	**11.1**	**7.2**	**13.3**	**34.0**	**12.0**	**8.1**	**9.7**	**10.7**	**10.3**

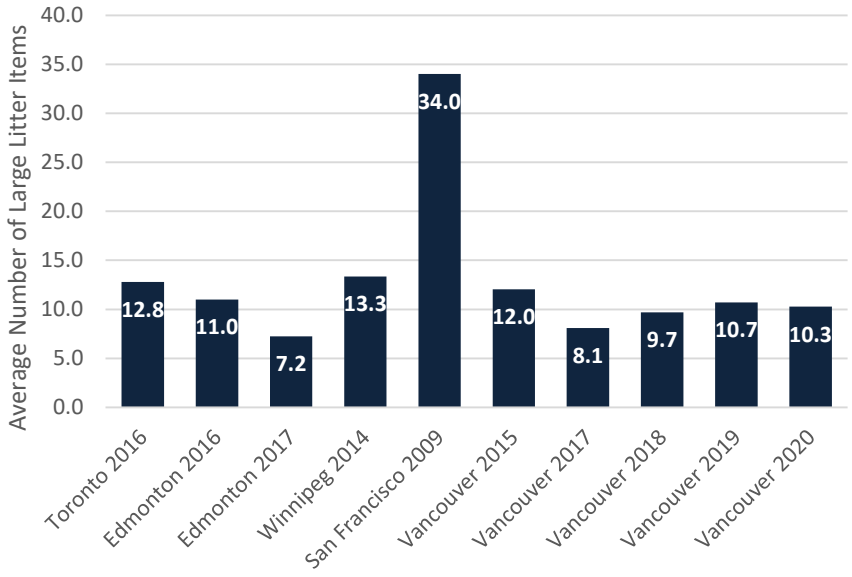

Figure 40: Average Large Litter Count

3.2.8 Large Litter Statistical Analysis

The average number of large litter items per site in the 2020 audits was 10.3 pieces. There were six sites that had no large litter accumulation whatsoever. Of the 124 sites surveyed, four sites had an average of 10 pieces of large litter within the site, 73 sites had fewer than 10 pieces and 41 sites had more than 10 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. As noted previously, the small litter audit involved examining three sections within the audit site, not the entire site (Supersite audit). This section reviews small litter by category, site and as compared to the baseline 2015 results and follow-up 2017 through 2019 results. In 2020, the average number of small litter items per site with no construction adjacent was 8.2 pieces. The most common categories of small litter observed were cigarette butts/debris (24%), chewing gum (19%), and paper (17%). **Table 13** provides these results (illustrated graphically in **Figure 41**).

Table 13: Small Litter Data 2020

Category	Total Number of Items	% of Total
Cigarette Butts/Debris	231	24%
Other Tobacco	4	0%
Bottle Caps	1	0%
Straws	0	0%
Candy Packaging and Wrappers	31	3%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	19	2%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	12	1%
Glass	106	11%
Paper	163	17%
Cup Sleeves	4	0%
Plastic Film	20	2%
Hard Plastic	80	8%
Aluminum/Foil Debris	40	4%
Rubber	4	0%
Metal (not aluminum)	13	1%
Chewing Gum (stuck on pavement)	183	19%
Food and Food Scraps	12	1%
Pet Waste (bagged)	1	0%
Pet Waste (loose)	2	0%
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	28	3%
Total Site Small Litter	**954**	**100%**

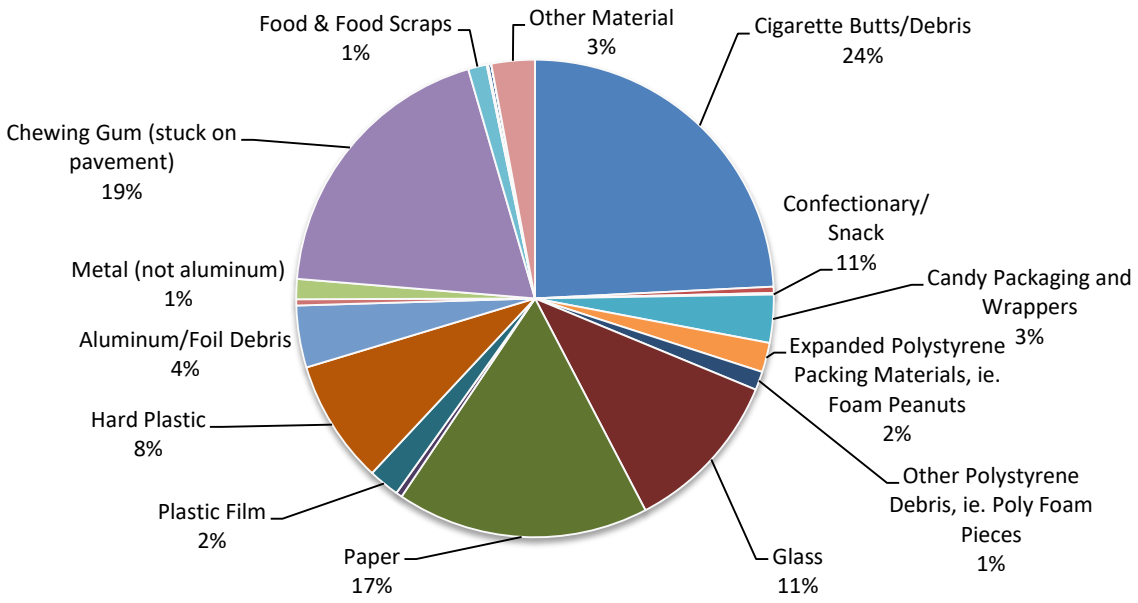

Figure 41: Small Litter Composition, 2020

3.3.1 Small Litter by Sites

The ten small litter sites with the most observed small litter are listed below in **Table 14.** The site with the most accumulated small litter in 2020 was Site 107 with 63 pieces of small litter observed. This site is zoned residential. In total, 60% of sites are zoned commercial, 20% multi-family residential, 10% mixed use and 10% institutional. A full ranking of sites is provided in **Appendix F**. **Of note, 7 of the top 10 sites - Sites 15, 19, 55, 75, 106, 107 and 110 were also litter sites with the highest number of large litter pieces in the 2019 audits.**

Table 14: Small Litter Site Rankings

Site Number	Number of Pieces of Small Litter	Zoning	Hundred Block	Street Name
107	63	Multi-Family	600	Powell St
110	41	Commercial	400	Main St
106	40	Institutional	1000	Burrard St
108	38	Commercial	2400	Main St
38	31	Commercial	1000	W Georgia St
55	27	Multi-Family	3400	Vanness St
75	27	Commercial	400	Homer St
19	26	Commercial	700	Granville St
124	26	Commercial	6500	W 23rd Ave
15	23	Mixed Use	600	E Broadway

3.3.2 Small Litter by Zoning

Sites were zoned by their typical land-use. Zones used to categorize sites included: Commercial, mixed-use, single-family, multi-family, institutional and industrial. A breakdown of the number of sites per zone is provided in **Table 15.**

Table 15: Number of Litter Sites per Zoning

Zoning Type	Number of Litter Sites	Avg. # of Small Litter Items per Site
Single-Family	64	3.1
Industrial	3	10.7
Multi-Family	17	12.7
Institutional	3	13.7
Mixed Use	5	14.2
Commercial	25	15.7

A breakdown of small litter composition per zoning type is provided in **Table 16** and illustrated in **Figure 42** .

Table 16: Small Litter Composition by Zoning Type

Small Litter Category	Overall	Commercial	Mixed Use	Single-Family	Multi-Family	Institutional	Industrial
Avg. # of Small Litter per Site	8.2	15.7	14.2	3.1	12.7	13.7	10.7
Cigarette Butts/Debris	24%	21%	24%	29%	22%	39%	28%
Other Tobacco	0%	0%	0%	1%	0%	0%	0%
Bottle Caps	0%	0%	0%	0%	0%	0%	0%
Straws	0%	0%	0%	0%	0%	0%	0%
Candy Packaging and Wrappers	3%	2%	3%	6%	3%	5%	0%
Expanded Polystyrene Packing Materials, i.e. Foam Peanuts	2%	1%	3%	1%	6%	0%	0%
Other Polystyrene Debris, i.e. Poly Foam Pieces	1%	2%	0%	1%	0%	0%	0%
Glass	11%	9%	11%	4%	14%	20%	47%
Paper	17%	21%	25%	16%	11%	12%	6%
Cup Sleeves	0%	1%	0%	1%	0%	0%	0%
Plastic Film	2%	1%	7%	4%	2%	0%	0%
Hard Plastic	8%	7%	3%	16%	7%	0%	3%
Aluminum/Foil Debris	4%	5%	0%	4%	6%	0%	0%
Rubber	0%	1%	0%	0%	0%	0%	3%
Metal (not aluminum)	1%	2%	1%	0%	2%	0%	3%
Chewing Gum (stuck on pavement)	19%	25%	14%	8%	22%	17%	6%
Food & Food Scraps	1%	2%	1%	1%	0%	0%	3%
Pet Waste (bagged)	0%	0%	0%	0%	0%	0%	0%
Pet Waste (loose)	0%	0%	0%	1%	0%	0%	0%
Needles/Syringes	0%	0%	0%	0%	0%	0%	0%
Medications	0%	0%	0%	0%	0%	0%	0%
Cell Phones	0%	0%	0%	0%	0%	0%	0%
Audio-Visual devices	0%	0%	0%	0%	0%	0%	0%
Batteries	0%	0%	0%	0%	0%	0%	0%
Other Electronic Waste	0%	0%	0%	0%	0%	0%	0%
Other Material	3%	1%	7%	5%	4%	7%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

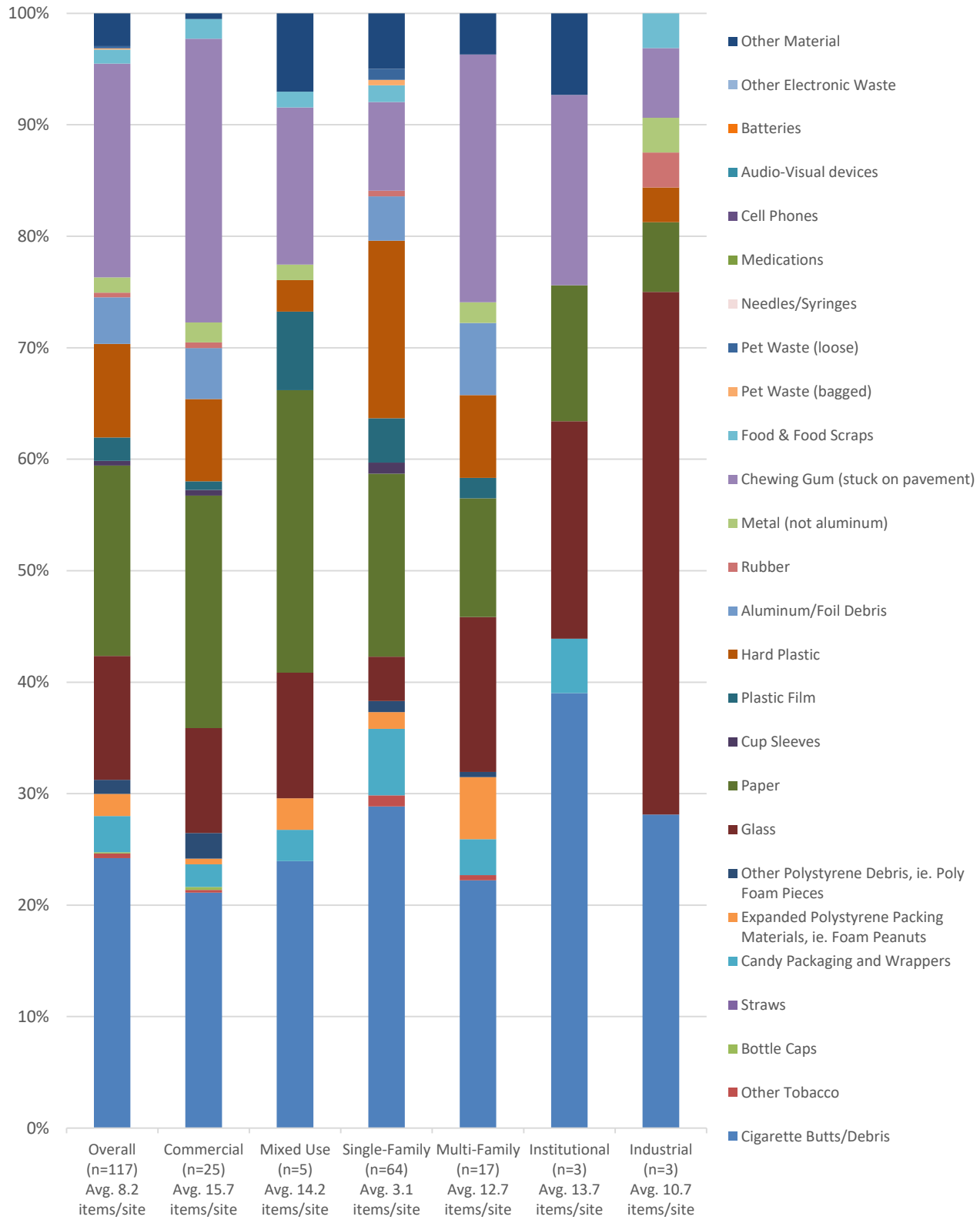

Figure 42: Smaller Litter Composition by Zone Type

3.3.3 Small Litter Results Compared to 2015 Baseline, 2017 to 2019 Follow-Up Studies

Results from the 2015 audit were established as the baseline against which future litter audit results (e.g., 2017 through 2020) would be compared. **Table 17** compares the composition and average accumulation from the 2015 baseline to the 2020 results while **Table 18, Table 19** and **Table 20** compare the composition of average accumulated small litter to the 2017, 2018 and 2019 follow-up audits, respectively. A comparison of the average accumulated small litter by year is presented in **Figure 43**.

Overall, there was a 12% increase in the average number of small litter per site observed in 2020 from the baseline audit, a 56% increase from the 2017 audit, a 0.5% increase from the 2018 audit and a 9% increase from the 2019 audit. It should be noted these values do not include the six sites that were immediately adjacent to construction in 2020, the four sites in 2019, the five sites in 2018 or the two in 2017.

Of note, compared to the 2015 baseline, small litter increases were predominantly seen in the other polystyrene debris i.e. polyfoam pieces (1008%), glass (653%), 'other material' (546%) and other tobacco (269%) categories.

Table 17: 2020 vs 2015 Small Litter Comparison

Category	2020 Results (117 Sites)		2015 Baseline Results (108 Sites)		% Change
	Avg. # Small Litter Items per Site	% of Total	Avg. # Small Litter Items per Site	% of Total	
Cigarette Butts/Debris	2.0	24%	2.3	31%	-12%
Other Tobacco	0.0	0%	0.0	0%	269%
Bottle Caps	0.0	0%	0.0	0%	-
Straws	0.0	0%	0.0	0%	-
Candy Packaging and Wrappers	0.3	3%	0.2	3%	43%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0.2	2%	0.4	5%	-58%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.1	1%	0.0	0%	1008%
Glass	0.9	11%	0.1	2%	653%
Paper	1.4	17%	1.1	15%	24%
Cup Sleeves	0.0	0%	0.0	0%	85%
Plastic Film	0.2	2%	0.2	2%	3%
Hard Plastic	0.7	8%	0.4	5%	89%
Aluminum/Foil Debris	0.3	4%	0.2	3%	54%
Rubber	0.0	0%	0.0	1%	-8%
Metal (not aluminum)	0.1	1%	0.1	1%	50%
Chewing Gum (stuck on pavement)	1.6	19%	2.1	29%	-27%
Food and Food Scraps	0.1	1%	0.1	1%	11%
Pet Waste (bagged)	0.0	0%	0.0	0%	-
Pet Waste (loose)	0.0	0%	0.0	1%	-54%
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%	-100%
Other Electronic Waste	0.0	0%	0.0	0%	-
Other Materials	0.2	3%	0.0	1%	546%
Total Site Small Litter	**8.2**	**100%**	**7.3**	**100%**	**12%**

Table 18: 2020 vs. 2017 Small Litter Comparison

Category	2020 Results (117 Sites)		2017 Results (106 Sites)		% Change
	Avg. # Small Litter Items per Site	% of Total	Avg. # Small Litter Items per Site	% of Total	
Cigarette Butts/Debris	2.0	24%	2.0	37%	1%
Other Tobacco	0.0	0%	0.0	0%	262%
Bottle Caps	0.0	0%	0.0	1%	-70%
Straws	0.0	0%	0.0	1%	-100%
Candy Packaging and Wrappers	0.3	3%	0.1	2%	181%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0.2	2%	0.0	0%	-
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.1	1%	0.1	1%	55%
Glass	0.9	11%	0.1	2%	700%
Paper	1.4	17%	0.6	12%	127%
Cup Sleeves	0.0	0%	0.0	0%	-
Plastic Film	0.2	2%	0.2	5%	-30%
Hard Plastic	0.7	8%	0.3	6%	101%
Aluminum/Foil Debris	0.3	4%	0.2	4%	73%
Rubber	0.0	0%	0.0	0%	262%
Metal (not aluminum)	0.1	1%	0.1	1%	68%
Chewing Gum (stuck on pavement)	1.6	19%	1.3	25%	18%
Food and Food Scraps	0.1	1%	0.0	0%	-
Pet Waste (bagged)	0.0	0%	0.0	0%	-
Pet Waste (loose)	0.0	0%	0.0	1%	-40%
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%	-100%
Other Electronic Waste	0.0	0%	0.0	0%	-
Other Materials	0.2	3%	0.1	**2%**	182%
Total Site Small Litter	**8.2**	**100%**	**5.2**	**100%**	**56%**

Table 19: 2020 vs. 2018 Small Litter Comparison

Category	2020 Results (117 Sites)		2018 Results (103 Sites)		% Change
	Avg. # Small Litter Items per Site	% of Total	Avg. # Small Litter Items per Site	% of Total	
Cigarette Butts/Debris	2.0	24%	2.8	34%	-29%
Other Tobacco	0.0	0%	0.0	0%	-
Bottle Caps	0.0	0%	0.0	0%	-
Straws	0.0	0%	0.0	0%	-100%
Candy Packaging and Wrappers	0.3	3%	0.3	3%	-3%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0.2	2%	0.0	0%	-
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.1	1%	0.1	1%	32%
Glass	0.9	11%	0.3	3%	259%
Paper	1.4	17%	1.5	19%	-7%
Cup Sleeves	0.0	0%	0.0	0%	-
Plastic Film	0.2	2%	0.5	7%	-69%
Hard Plastic	0.7	8%	0.3	3%	152%
Aluminum/Foil Debris	0.3	4%	0.4	5%	-16%
Rubber	0.0	0%	0.0	0%	17%
Metal (not aluminum)	0.1	1%	0.1	1%	-5%
Chewing Gum (stuck on pavement)	1.6	19%	1.5	19%	4%
Food and Food Scraps	0.1	1%	0.1	1%	17%
Pet Waste (bagged)	0.0	0%	0.0	0%	-71%
Pet Waste (loose)	0.0	0%	0.0	0%	-12%
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 Materials	0.2	3%	0.2	3%	12%
Total Site Small Litter	**8.2**	**100%**	**8.1**	**100%**	**0.5%**

Table 20: 2020 vs. 2019 Small Litter Comparison

Category	2020 Results (117 Sites)		2019 Results (106 Sites)		% Change
	Avg. # Small Litter Items per Site	% of Total	Avg. # Small Litter Items per Site	% of Total	
Cigarette Butts/Debris	2.0	24%	1.6	21%	25%
Other Tobacco	0.0	0%	0.0	0%	262%
Bottle Caps	0.0	0%	0.0	1%	-77%
Straws	0.0	0%	0.0	0%	-100%
Candy Packaging and Wrappers	0.3	3%	0.3	4%	-3%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0.2	2%	0.1	1%	91%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.1	1%	0.0	0%	262%
Glass	0.9	11%	0.3	4%	243%
Paper	1.4	17%	1.5	20%	-7%
Cup Sleeves	0.0	0%	0.0	0%	262%
Plastic Film	0.2	2%	0.6	8%	-72%
Hard Plastic	0.7	8%	0.5	7%	34%
Aluminum/Foil Debris	0.3	4%	0.1	2%	142%
Rubber	0.0	0%	0.1	1%	-60%
Metal (not aluminum)	0.1	1%	0.1	1%	47%
Chewing Gum (stuck on pavement)	1.6	19%	1.9	26%	-18%
Food and Food Scraps	0.1	1%	0.1	1%	-1%
Pet Waste (bagged)	0.0	0%	0.0	0%	-9%
Pet Waste (loose)	0.0	0%	0.0	0%	-40%
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 Materials	0.2	3%	0.2	3%	15%
Total Site Small Litter	**8.2**	**100%**	**7.5**	**100%**	**9%**

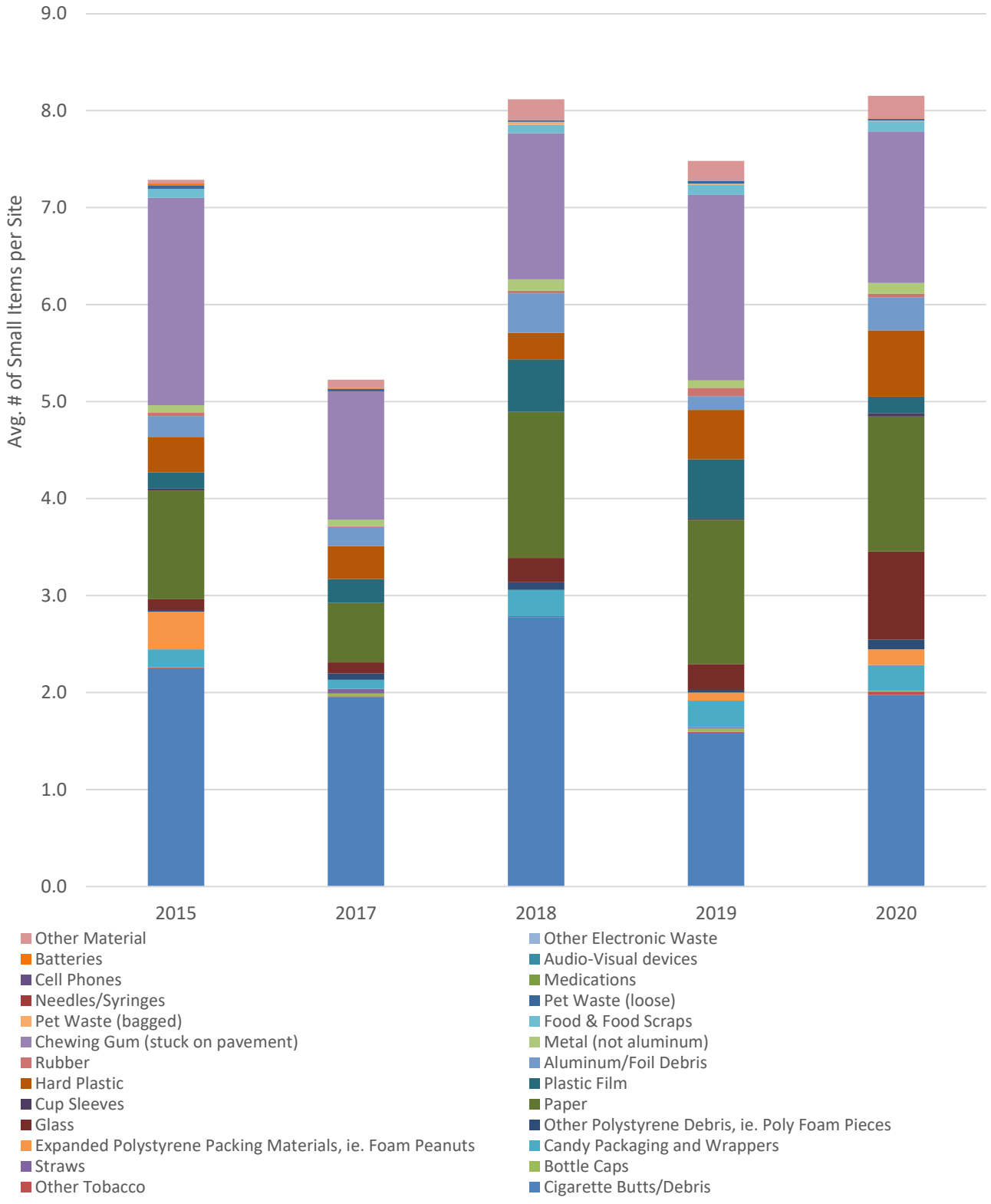

Figure 43: Comparison of Small Litter Categories by Year

3.3.4 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 used for the City of Vancouver audits. **Table 21** illustrates the percentage breakdown per small litter item category for each municipality (as well as Vancouver in previous years). **Figure 44** illustrates a comparison of the top three small litter categories observed in the 2020 Vancouver street litter audits to the results for each municipality.

Table 22 illustrates the average number of items counted per site based on category. **Figure 45** illustrates these results graphically.

Table 21: Vancouver Small Litter Audit Results Compared to Other Cities

Category	Toronto 2016	Edmonton 2016	Edmonton 2017	Winnipeg 2014	San Francisco 2009	Vancouver 2015	Vancouver 2017	Vancouver 2018	Vancouver 2019	Vancouver 2020
Cigarette Butts/Debris	22%	28%	34%	43%	13%	31%	37%	34%	21%	24%
Other Tobacco	1%	0%	0%	1%	2%	0%	0%	0%	0%	0%
Bottle Caps	1%	0%	1%	1%	0%	0%	1%	0%	1%	0%
Straws	0%	0%	1%	1%	0%	0%	1%	0%	0%	0%
Candy Packaging and Wrappers	3%	3%	6%	0%	2%	3%	2%	3%	4%	3%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	1%	1%	2%	0%	2%	5%	0%	0%	1%	2%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	1%	7%	6%	3%	1%	0%	1%	1%	0%	1%
Glass	7%	12%	6%	8%	23%	2%	2%	3%	4%	11%
Paper	21%	23%	18%	15%	8%	15%	12%	19%	20%	17%
Cup Sleeves				n/a	n/a	0%	0%	0%	0%	0%
Plastic Film	3%	5%	3%	8%	3%	2%	5%	7%	8%	2%
Hard Plastic	7%	7%	9%	11%	6%	5%	6%	3%	7%	8%
Aluminum/Foil Debris	2%	3%	1%	4%	1%	3%	4%	5%	2%	4%
Rubber	0%	1%	1%	1%	1%	1%	0%	0%	1%	0%
Metal (not aluminum)	2%	0%	0%	1%	2%	1%	1%	1%	1%	1%
Chewing Gum (stuck on pavement)	25%	6%	11%	4%	32%	29%	25%	19%	26%	19%
Food and Food Scraps	1%	1%	0%	0%	0%	1%	0%	1%	1%	1%
Pet Waste (bagged)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pet Waste (loose)	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%
Needles/Syringes	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medications	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cell Phones	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Audio-Visual Devices	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Batteries	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Electronic Waste	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Material	5%	2%	1%	1%	5%	1%	2%	3%	3%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

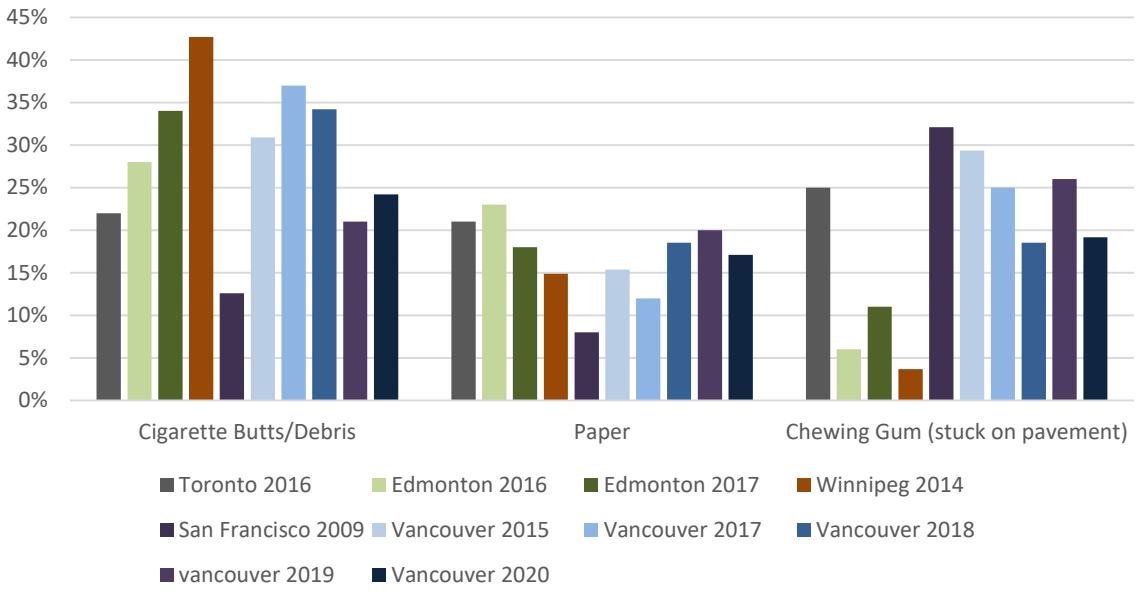

Figure 44: Comparison of Top Small Litter Categories by Municipality

Table 22: Vancouver Small Litter Results Compared to Other Cities (Average Number of Items per Site)

Category	Toronto 2016	Edmonton 2016	Edmonton 2017	Winnipeg 2014	San Francisco 2009	Vancouver 2015	Vancouver 2017	Vancouver 2018	Vancouver 2019	Vancouver 2020
Cigarette Butts/Debris	2.6	2.6	2.4	3.5	3.2	2.3	2.0	2.8	1.6	2.0
Other Tobacco	0.1	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
Bottle Caps	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Straws	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Candy Packaging and Wrappers	0.3	0.3	0.4	0.0	0.4	0.2	0.1	0.3	0.3	0.3
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0.1	0.1	0.1	0.2	0.2	0.4	0.0	0.0	0.1	0.2
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.1	0.7	0.4	0.0	0.4	0.0	0.1	0.1	0.0	0.1
Glass	0.8	1.2	0.4	0.6	6.0	0.1	0.1	0.3	0.3	0.9
Paper	2.4	2.2	1.3	1.2	2.1	1.1	0.6	1.5	1.5	1.4
Cup Sleeves			0.0	n/a	n/a	0.0	0.0	0.0	0.0	0.0
Plastic Film	0.4	0.4	0.2	0.6	0.6	0.2	0.2	0.5	0.6	0.2
Hard Plastic	0.8	0.6	0.7	0.9	1.5	0.4	0.3	0.3	0.5	0.7
Aluminum/Foil Debris	0.2	0.3	0.0	0.3	0.3	0.2	0.2	0.4	0.1	0.3
Rubber	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0
Metal (not aluminum)	0.2	0.0	0.0	0.1	0.6	0.1	0.1	0.1	0.1	0.1
Chewing Gum (stuck on pavement)	3.0	0.6	0.8	0.3	8.2	2.1	1.3	1.5	1.9	1.6
Food and Food Scraps	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1
Pet Waste (bagged)	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0
Needles/Syringes	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0
Cell Phones	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0
Batteries	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0
Other Material	0.0	0.2	0.1	0.1	1.2	0.0	0.1	0.2	0.2	0.2
Total	**11.1**	**9.4**	**7.0**	**8.1**	**25.5**	**7.3**	**5.2**	**8.1**	**7.5**	**8.2**

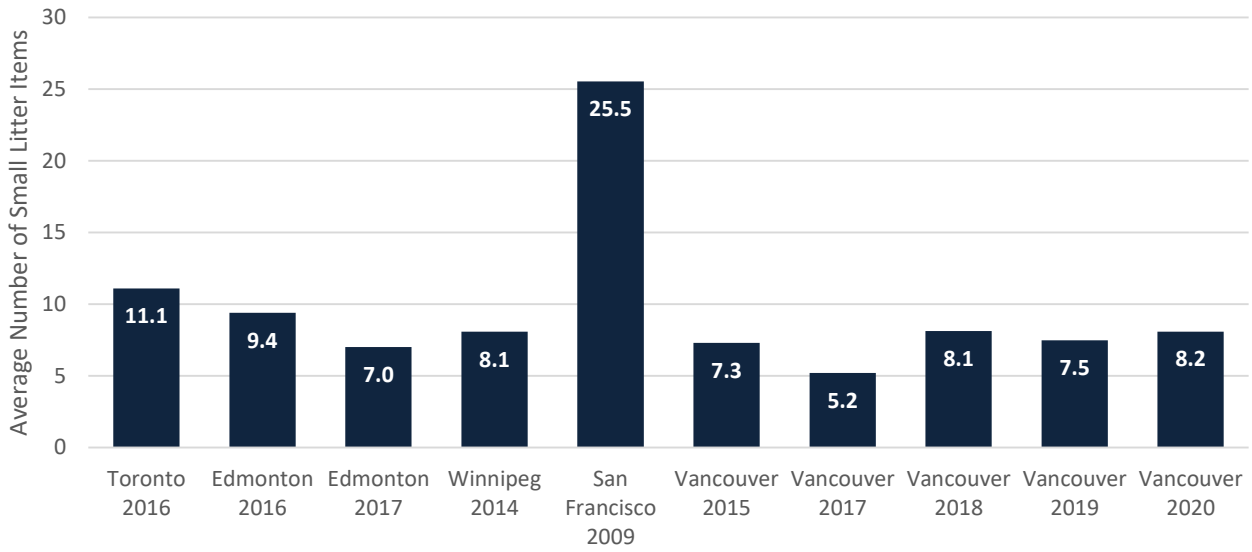

Figure 45: Average Small Litter Items per Site

3.3.5 Small Litter Statistical Analysis

The average number of small litter items per site in the 2020 audits was observed at 8.2 pieces with no construction adjacent. There were 13 sites that had no small litter accumulation whatsoever. Of the 117 sites surveyed, three sites had an average of eight pieces of small litter within the site, 79 sites had fewer than eight pieces and 22 sites had more than eight pieces of small litter.

3.4 Small Litter Supersite Results

A site is considered a supersite is when *all* small litter within the site is observed and counted, not only the three segmented portions of the site (beginning, end and mid-point). This assessment was completed at 20 pre-determined sites (same 19 sites for all previous audits done for the City and one additional site in 2020). In 2020, the average number of small litter items per supersite was 234.85 pieces. **The most common categories of small litter observed were cigarette butts/debris (37%) and chewing gum (35%), which accounted for a combined 72% of all small litter observed on the supersites. Table 23** provides these results.

Table 23: Supersite Litter Data 2020

Category	Total Number of Items	% of Total
Cigarette Butts/Debris	1,761	37%
Other Tobacco	3	0%
Bottle Caps	8	0%
Straws	2	0%
Candy Packaging and Wrappers	71	2%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	65	1%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	7	0%
Glass	135	3%
Paper	475	10%
Cup Sleeves	2	0%
Plastic Film	69	1%
Hard Plastic	222	5%
Aluminum/Foil Debris	79	2%
Rubber	12	0%
Metal (not aluminum)	33	1%
Chewing Gum (stuck on pavement)	1,643	35%
Food and Food Scraps	69	1%
Pet Waste (bagged)	0	0%
Pet Waste (loose)	2	0%
Needles/Syringes	1	0%
Medications	0	0%
Cell Phones	0	0%
Audio-Visual Devices	0	0%
Batteries	0	0%
Other Electronic Waste	0	0%
Other Material	38	1%
Total Supersite Small Litter	**4,679**	**100%**

All 20 supersites are ranked in **Table 24**. The site with the most accumulated litter in 2020 was Site 106 with 594 pieces of small litter observed. Site 106 was the site with the most accumulated small litter in the 2019 and2018 audit as well.

Table 24: Supersite Rankings 2020

Site Number	Number of Pieces of Small Litter	Hundred Block	Street Name
106	594	1000	Burrard Street
97	524	800	Commercial Dr
54	500	1100	Clark Dr
31	438	2700	E Hastings St
108	435	2400	Main St
38	423	1000	W Georgia St
104	341	1100	Denman St
101	243	1700	W Broadway
41	240	300	Terminal Ave
109	214	1045	Kingsway
52	154	600	Evans St
32	132	1800	Yew St
18	117	800	Hornby St
77	98	5500	Main St
26	77	2300	Wall St
56	66	2900	Horley St
42	49	1700	W 3 Ave
82	30	900	E 24 Ave
21	15	300	E 39 Ave
65	7	7500	Selkirk St

3.4.1 2020 Supersite Small Litter Results Compared to Other Audits

Results from the 2015 audit were established as the baseline against which future litter audit results (e.g., 2017, 2018 and 2019) would be compared. **Table 25** provides the comparison in composition and accumulation from the 2015 baseline to the 2020 results for supersite small litter; **Table 26 - Table 28** compare the small litter accumulation from the 2020 supersite audits to the 2017 – 2019 follow-up audits.

Overall, there was a 13% decrease in the litter accumulated at the supersites in 2020 from the baseline. There was a 21% increase from the 2017 audits, 37% decrease from the 2018 audits and a 5% decrease from 2019. **Table 29** compares the 2019, 2018, 2017 and 2015 results based on site.

Table 25: 2020 vs. 2015 Supersite Litter Comparison

Category	2020 Results (20 Sites)		2015 Results (19 Sites)		% Change
	Avg. # Small Litter Items per Site	%	Avg. # Small Litter Items per Site	%	
Cigarette Butts/Debris	88.1	37%	101.2	38%	-13%
Other Tobacco	0.2	0%	0.3	0%	-43%
Bottle Caps	0.4	0%	0.7	0%	-46%
Straws	0.1	0%	0.0	0%	-
Candy Packaging and Wrappers	3.6	2%	2.6	1%	38%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	3.3	1%	0.2	0%	1958%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.4	0%	0.1	0%	565%
Glass	6.8	3%	1.8	1%	266%
Paper	23.8	10%	16.4	6%	45%
Cup Sleeves	0.1	0%	0.0	0%	-
Plastic Film	3.5	1%	2.0	1%	73%
Hard Plastic	11.1	5%	4.4	2%	151%
Aluminum/Foil Debris	4.0	2%	3.6	1%	9%
Rubber	0.6	0%	0.8	0%	-29%
Metal (not aluminum)	1.7	1%	0.5	0%	248%
Chewing Gum (stuck on pavement)	82.2	35%	130.3	48%	-37%
Food and Food Scraps	3.5	1%	1.4	1%	143%
Pet Waste (bagged)	0.0	0%	0.1	0%	-100%
Pet Waste (loose)	0.1	0%	0.1	0%	90%
Needles/Syringes	0.1	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%	0.1	0%	-100%
Other Electronic Waste	0.0	0%	0.1	0%	-100%
Other Materials	1.9	1%	3.0	1%	-37%
Total Site Small Litter	**234.9**	**100%**	**269.6**	**100%**	**-13%**

Table 26: 2020 vs. 2017 Supersite Litter Comparison

Category	2020 Results (20 Sites)		2017 Results (19 Sites)		% Change
	Avg. # Small Litter Items per Site	%	Avg. # Small Litter Items per Site	%	
Cigarette Butts/Debris	88.1	37%	77.3	40%	14%
Other Tobacco	0.2	0%	0.0	0%	-
Bottle Caps	0.4	0%	1.1	1%	-64%
Straws	0.1	0%	0.5	0%	-81%
Candy Packaging and Wrappers	3.6	2%	1.5	1%	133%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	3.3	1%	0.0	0%	-
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.4	0%	0.2	0%	66%
Glass	6.8	3%	1.0	1%	575%
Paper	23.8	10%	9.2	5%	158%
Cup Sleeves	0.1	0%	0.1	0%	-5%
Plastic Film	3.5	1%	2.3	1%	49%
Hard Plastic	11.1	5%	5.1	3%	120%
Aluminum/Foil Debris	4.0	2%	3.3	2%	21%
Rubber	0.6	0%	0.3	0%	90%
Metal (not aluminum)	1.7	1%	0.5	0%	214%
Chewing Gum (stuck on pavement)	82.2	35%	90.3	47%	-9%
Food and Food Scraps	3.5	1%	0.3	0%	1211%
Pet Waste (bagged)	0.0	0%	0.0	0%	-
Pet Waste (loose)	0.1	0%	0.0	0%	-
Needles/Syringes	0.1	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%	0.1	0%	-100%
Other Materials	1.9	1%	0.8	0%	126%
Total Site Small Litter	**234.9**	**100%**	**193.9**	**100%**	**21%**

Table 27: 2020 vs. 2018 Supersite Litter Comparison

Category	2020 Results (20 Sites)		2018 Results (19 Sites)		% Change
	Avg. # Small Litter Items per Site	%	Avg. # Small Litter Items per Site	%	
Cigarette Butts/Debris	88.1	37%	141.1	38%	-38%
Other Tobacco	0.2	0%	0.0	0%	-
Bottle Caps	0.4	0%	0.3	0%	52%
Straws	0.1	0%	0.5	0%	-79%
Candy Packaging and Wrappers	3.6	2%	6.2	2%	-42%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	3.3	1%	0.0	0%	-
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.4	0%	0.9	0%	-63%
Glass	6.8	3%	5.5	1%	23%
Paper	23.8	10%	26.3	7%	-10%
Cup Sleeves	0.1	0%	0.0	0%	-
Plastic Film	3.5	1%	6.9	2%	-50%
Hard Plastic	11.1	5%	12.6	3%	-12%
Aluminum/Foil Debris	4.0	2%	5.9	2%	-33%
Rubber	0.6	0%	0.5	0%	14%
Metal (not aluminum)	1.7	1%	2.1	1%	-20%
Chewing Gum (stuck on pavement)	82.2	35%	156.5	42%	-48%
Food and Food Scraps	3.5	1%	1.7	0%	105%
Pet Waste (bagged)	0.0	0%	0.2	0%	-100%
Pet Waste (loose)	0.1	0%	0.2	0%	-37%
Needles/Syringes	0.1	0%	0.1	0%	-5%
Medications	0.0	0%	0.1	0%	-100%
Cell Phones	0.0	0%	0.0	0%	-
Audio-Visual Devices	0.0	0%	0.0	0%	-
Batteries	0.0	0%	0.1	0%	-100%
Other Electronic Waste	0.0	0%	0.0	0%	-
Other Materials	1.9	1%	4.7	1%	-59%
Total Site Small Litter	**234.9**	**100%**	**372.1**	**100%**	**-37%**

Table 28: 2020 vs. 2019 Supersite Litter Comparison

Category	2020 Results (20 Sites)		2019 Results (19 Sites)		% Change
	Avg. # Small Litter Items per Site	%	Avg. # Small Litter Items per Site	%	
Cigarette Butts/Debris	88.1	37%	67.0	27%	31%
Other Tobacco	0.2	0%	0.0	0%	-
Bottle Caps	0.4	0%	0.7	0%	-46%
Straws	0.1	0%	0.0	0%	-
Candy Packaging and Wrappers	3.6	2%	3.7	2%	-5%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	3.3	1%	0.0	0%	-
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0.4	0%	0.1	0%	233%
Glass	6.8	3%	9.7	4%	-31%
Paper	23.8	10%	18.0	7%	32%
Cup Sleeves	0.1	0%	0.0	0%	-
Plastic Film	3.5	1%	5.5	2%	-38%
Hard Plastic	11.1	5%	4.8	2%	132%
Aluminum/Foil Debris	4.0	2%	2.5	1%	56%
Rubber	0.6	0%	0.4	0%	43%
Metal (not aluminum)	1.7	1%	1.4	1%	16%
Chewing Gum (stuck on pavement)	82.2	35%	128.9	52%	-36%
Food and Food Scraps	3.5	1%	3.6	1%	-5%
Pet Waste (bagged)	0.0	0%	0.1	0%	-100%
Pet Waste (loose)	0.1	0%	0.2	0%	-53%
Needles/Syringes	0.1	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%	0.1	0%	-100%
Other Electronic Waste	0.0	0%	0.0	0%	-
Other Materials	1.9	1%	0.3	0%	622%
Total Site Small Litter	**234.9**	**100%**	**247.2**	**100%**	**-5%**

Table 29: Supersite Audit Results by Site and Year

Site Number	2020 Number of Pieces of Small Litter	2019 Number of Pieces of Small Litter	2018 Number of Pieces of Small Litter	2017 Number of Pieces of Small Litter	2015 Number of Pieces of Small Litter
106	594	808	779	385	368
97	524	324	409	126	282
54	500	332	661	210	248
31	438	396	485	109	461
108	435	287	636	492	470
38	423	695	622	478	561
104	341	336	581	293	196
101	243	218	283	116	502
41	240	273	764	418	533
109	214	171	476	299	369
52	154	102	170	141	71
32	132	92	159	67	160
18	117	332	384	153	344
77	98	129	210	92	211
26	77	37	206	84	69
56	66	41	61	134	77
42	49	41	114	49	126
82	30	61	52	26	37
21	15	22	18	13	37
65	7	-	-	-	-
Total Small Litter	**4,697**	**4,697**	**7,070**	**3,685**	**5,122**

3.4.2 Supersite Results Compared to Other North American Municipalities

Supersite assessments are completed in a few North American municipalities. These assessments audit small litter throughout the entire site in similar categories using the same methodology. **Table 30** illustrates the percentage breakdown per small litter item category for each municipality. **Figure 46** compares the top four supersite categories in the 2020 Vancouver street litter audits to other municipalities that complete supersite audits. **Table 31** illustrates the average number of items counted per site based on category. **Figure 47** illustrates these results graphically.

Table 30: Vancouver Supersite Small Litter Comparison to Other Cities

Category	Toronto 2006	San Francisco 2009	Vancouver 2015	Vancouver 2017	Vancouver 2018	Vancouver 2019	Vancouver 2020
Cigarette Butts/Debris	14%	25%	38%	40%	38%	27%	37%
Other Tobacco	1%	0%	0%	0%	0%	0%	0%
Bottle Caps	1%	1%	0%	1%	0%	0%	0%
Straws	0%	1%	0%	0%	0%	0%	0%
Candy Packaging and Wrappers	1%	4%	1%	1%	2%	2%	2%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	1%	1%	0%	0%	0%	0%	1%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	3%	0%	0%	0%	0%	0%	0%
Glass	17%	38%	1%	1%	1%	4%	3%
Paper	12%	17%	6%	5%	7%	7%	10%
Cup Sleeves	n/a	n/a	0%	0%	0%	0%	0%
Plastic Film	3%	3%	1%	1%	2%	2%	1%
Hard Plastic	3%	7%	2%	3%	3%	2%	5%
Aluminum/Foil Debris	2%	2%	1%	2%	2%	1%	2%
Rubber	0%	1%	0%	0%	0%	0%	0%
Metal (not aluminum)	1%	2%	0%	0%	1%	1%	1%
Chewing Gum (stuck on pavement)	40%	not included	48%	47%	42%	52%	35%
Food and Food Scraps	0%	0%	1%	0%	0%	1%	1%
Pet Waste (bagged)	0%	0%	0%	0%	0%	0%	0%
Pet Waste (loose)	0%	0%	0%	0%	0%	0%	0%
Needles/Syringes	0%	0%	0%	0%	0%	0%	0%
Medications	0%	0%	0%	0%	0%	0%	0%
Cell Phones	0%	0%	0%	0%	0%	0%	0%
Audio-Visual Devices	0%	0%	0%	0%	0%	0%	0%
Batteries	0%	0%	0%	0%	0%	0%	0%
Other Electronic Waste	0%	0%	0%	0%	0%	0%	0%
Other Material	1%	1%	1%	0%	1%	0%	1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

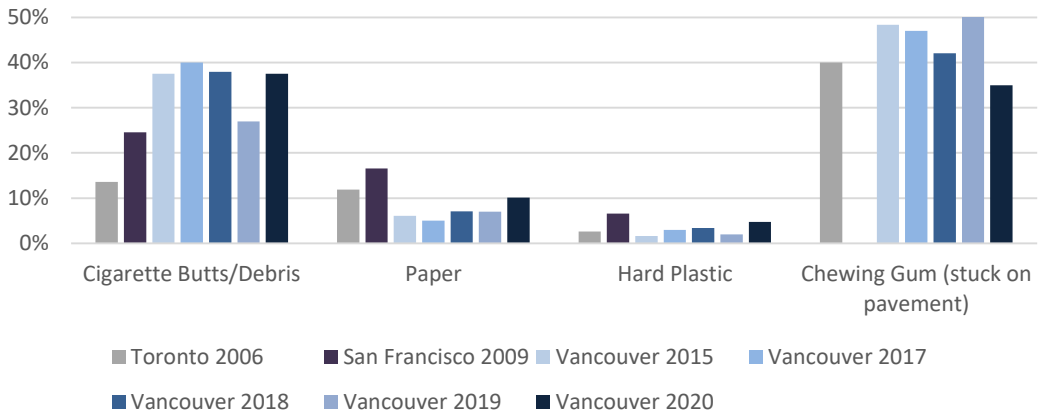

Figure 46: Comparison of Top Supersite Litter Categories by Municipality

Table 31: Vancouver Supersite Small Litter Comparison to Other Cities (Average Number of Items per Site)

Category	Toronto 2006	San Francisco 2009	Vancouver 2015	Vancouver 2017	Vancouver 2018	Vancouver 2019	Vancouver 2020
Cigarette Butts/Debris	176.6	83.8	101.2	77.3	141.1	67.0	88.1
Other Tobacco	14.6	0.0	0.3	0.0	0.0	0.0	0.2
Bottle Caps	8.6	2.0	0.7	1.1	0.3	0.7	0.4
Straws	4.7	1.7	0.0	0.5	0.5	0.0	0.1
Candy Packaging and Wrappers	16.9	12.2	2.6	1.5	6.2	3.7	3.6
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	39.2	3.3	0.2	0.0	0.0	0.0	3.3
Other Polystyrene Debris, (i.e., Poly Foam Pieces)	14.5	0.5	0.1	0.2	0.9	0.1	0.4
Glass	218.7	128.1	1.8	1.0	5.5	9.7	6.8
Paper	154.3	56.8	16.4	9.2	26.3	18.0	23.8
Cup Sleeves	n/a	n/a	0.0	0.1	0.0	0.0	0.1
Plastic Film	35.7	10.3	2.0	2.3	6.9	5.5	3.5
Hard Plastic	34.1	22.5	4.4	5.1	12.6	4.8	11.1
Aluminum/Foil Debris	24.9	6.2	3.6	3.3	5.9	2.5	4.0
Rubber	5.4	1.8	0.8	0.3	0.5	0.4	0.6
Metal (not aluminum)	15.3	8.2	0.5	0.5	2.1	1.4	1.7
Chewing Gum (stuck on pavement)	518.5	0.0	130.3	90.3	156.5	128.9	82.2
Food and Food Scraps	0.0	0.0	1.4	0.3	1.7	3.6	3.5
Pet Waste (bagged)	0.0	0.0	0.1	0.0	0.2	0.1	0.0
Pet Waste (loose)	0.0	0.0	0.1	0.0	0.2	0.2	0.1
Needles/Syringes	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Medications	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Cell Phones	0.0	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	0.0
Batteries	0.0	0.0	0.1	0.0	0.1	0.1	0.0
Other Electronic Waste	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Other Material	13.0	4.0	3.0	0.8	4.7	0.3	1.9
Total	**1,294.8**	**341.5**	**269.6**	**193.9**	**372.1**	**247.2**	**234.9**

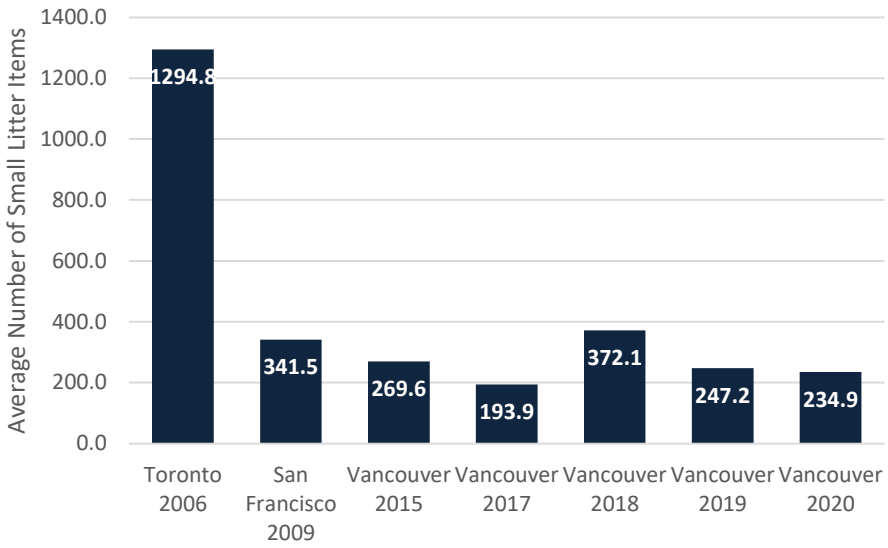

Figure 47: Average Supersite Small Litter Items per Site

3.4.3 Supersite Small Litter Statistical Analysis

The average number of small litter items per supersite in the 2019 audits was 234.9 pieces. All sites observed had some amount of small litter accumulated. Of the 20 sites surveyed, 11 sites had less than 235 pieces of small litter and nine sites had more than 235 pieces of small litter.

3.4.4 Overall Litter Accumulation on Supersites

When a site is observed as a supersite every piece of litter is recorded. **Table 32** illustrates the combined results of small and large litter for each site. Of all the supersites, Site 106 had the most accumulated litter with 607pieces of litter counted. This site had the most accumulated litter in both 2019 and 2018.

Table 32: Overall Combined Small and Large Litter for Supersites

Site Number	Number of Pieces of Small Litter	Number of Pieces of Large Litter	Total Litter
106	594	13	607
97	524	21	545
54	500	2	502
31	438	7	445
108	435	14	449
38	423	16	439
104	341	6	347
101	243	13	256
41	240	19	259
109	214	9	223
52	154	4	158
32	132	19	151
18	117	2	119
77	98	30	128
26	77	6	83
56	66	2	68
42	49	12	61
82	30	6	36
21	15	8.5	23.5
65	7	3	10

3.5 Sites Immediately Adjacent to Construction

Dillon staff were asked to note if any sites had construction occurring immediately adjacent to the site being studied. There were seven sites where this occurred in 2020 (Sites 9, 31, 48, 71, 78, 84, 103). These seven sites were analyzed separately as the construction activities were expected to increase accumulation of litter.

3.5.1 Large Litter Results

Within the seven sites immediately adjacent to construction, the average number of large litter items per site was 8.7 pieces of litter. This was, on average 15.5% **less litter** than the sites that did not have construction directly adjacent. The breakdown by material did not differ dramatically from these sites. Overall, 46% of material was plastic, 31% other and 23% paper.

The general composition of material did not drastically differ between the sites that had construction adjacent and the sites that did not. **Figure 48** illustrates the composition of litter found within the construction-adjacent sites. **Table 33** provides a comparison of large litter observed on sites with and without construction adjacent, based on category.

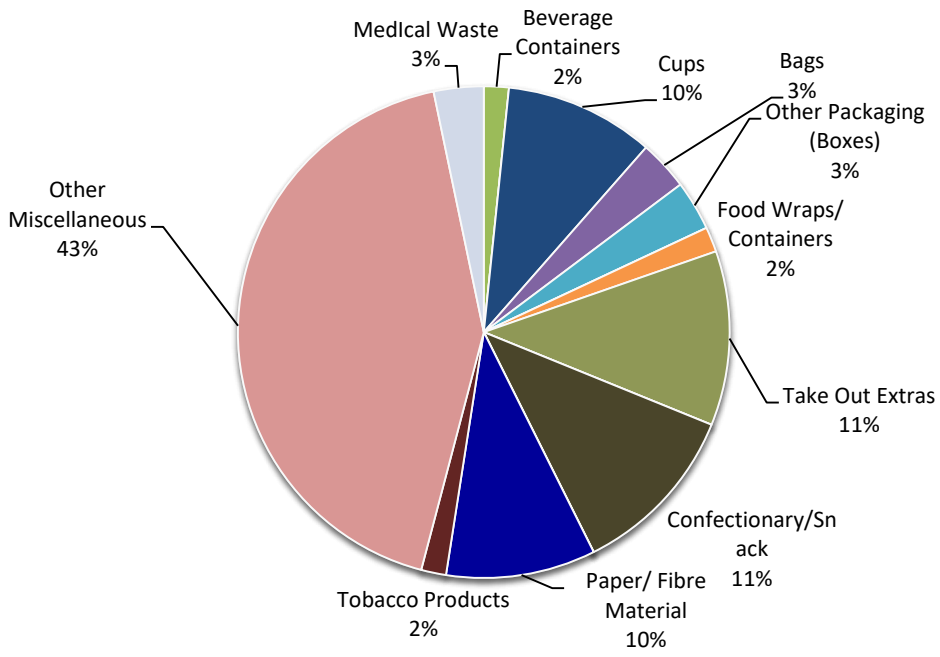

Figure 48: Litter Sites with Immediately Adjacent Construction - Large Litter by Category

Table 33: Large Litter Categories Comparison for Sites with and without Construction Adjacent

Category	Sites with Construction	Sites without Construction
Avg. Items per Site	10.3	8.7
Other Miscellaneous	43%	31%
Take Out Extras	11%	8%
Confectionary/Snack	11%	6%
Cups	10%	10%
Paper/ Fibre Material	10%	20%
Bags	3%	6%
Other Packaging (Boxes)	3%	2%
MedIcal Waste	3%	5%
Beverage Containers	2%	3%
Food Wraps/ Containers	2%	2%
Tobacco Products	2%	3%
Other Packaging	0%	1%
Other Containers	0%	1%
Trays	0%	0%
Cloth	0%	1%
Total	**100%**	**100%**

3.5.2 Small Litter Results

Within the seven sites that were immediately adjacent to construction, the average number of small litter items per site was 10.9 pieces of litter. This was, on average, 24% more than small litter

accumulated at the sites that did not have construction (at 8.2 pieces). **Table 34** provides a comparison of small litter observed on sites with and without construction adjacent, based on category. Overall, the comparison is quite similar from one category to the next. The most significant difference is the increase in cigarette butts/debris (7% with construction adjacent, 24% without construction) and a decrease in gum (11% on construction sites and 19% on sites without construction).

Table 34: Small Litter Comparison for Sites with and without Construction Adjacent

Category	Sites with Construction	Sites without Construction
Avg. Items per Site	8.2	10.9
Cigarette Butts/Debris	7%	24%
Other Tobacco	0%	0%
Bottle Caps	0%	0%
Straws	0%	0%
Candy Packaging and Wrappers	3%	3%
Expanded Polystyrene Packing Materials (i.e., Foam Peanuts)	0%	2%
Other Polystyrene Debris (i.e., Poly Foam Pieces)	0%	1%
Glass	4%	11%
Paper	21%	17%
Cup Sleeves	0%	0%
Plastic Film	8%	2%
Hard Plastic	7%	8%
Aluminum/Foil Debris	3%	4%
Rubber	0%	0%
Metal (not aluminum)	1%	1%
Chewing Gum (stuck on pavement)	11%	19%
Food and Food Scraps	5%	1%
Pet Waste (bagged)	1%	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	0%	0%
Other Material	30%	3%
Total Site Small Litter	**100%**	**100%**

4.0 Additional Observations

Within the City of Vancouver there are a variety of ongoing public spaces programs promoting waste diversion in the public realm. These programs support the GCAP and are a part of ongoing zero waste initiatives that aim to promote diversion and reduce litter (particularly of SUIs).

During the litter audits, Dillon staff would note if there were any City waste receptacles within 50 m of the site. There were several different types of receptacles noticed within and around the litter sites as illustrated in **Figure 49 - Figure 52.**

The downtown on-street recycling project started in the summer of 2017 with 15 new three stream waste receptacles being installed in the downtown core. In 2018 there were 28 more receptacles installed, 10 in the summer and 18 in the winter. It is our current understanding that there has not been any analysis done to determine if the installation of these receptacles has assisted in reducing curbside littering.

Figure 49: Single Stream Garbage Receptacle

Figure 50: Single Stream Receptacle and Recyclable Beverage Container

Figure 51: Emily Carr Three Stream Receptacles

Figure 52: Downtown Core Three Stream Receptacles

There were 95 sites (77%) where City litter bins were *not* within 50m of the site being audited and 29 sites (23%) where there were City litter receptacles within 50m. Sites in proximity to waste receptacles had on average 15.1 pieces of large litter while sites without had an average of 8.7 pieces of large litter. Small litter also, was on average higher where there were waste receptacles (15.3 pieces) versus when there were no waste receptacles (6.1 pieces). These results are illustrated in **Figure 53.** It should be noted that the City installs waste receptacles in high-traffic areas, and in some instances, waste receptacles are installed because of litter issues in specific areas. Thus, the fact that there typically is more litter accumulation near waste receptacles is not necessarily due to the presence of the receptacle itself. The increase in litter accumulation near waste receptacles may simply be due to the nature of the area where receptacles are installed.

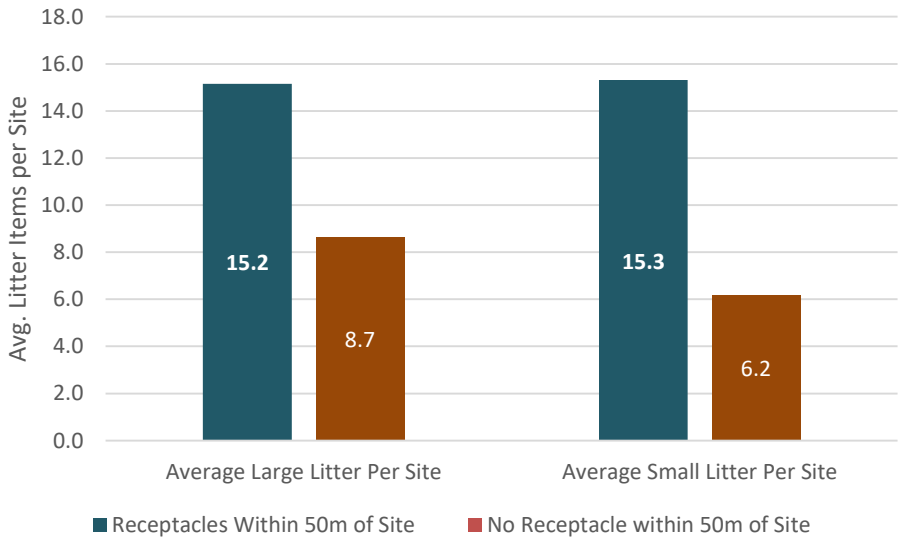

Figure 53: Average Large and Small Litter Pieces per Site based on the Presence of Waste Receptacle

5.0 Site Ranking and Attributes

Dillon staff ranked each of the 124 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 35 indicates the top ten sites, demonstrating the greatest accumulation of 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 potentially associated with the ten sites having the highest amount of combined litter are provided in **Table 35.** Of these sites 30% had a fast food restaurant within sight. A convenience store was noted within sight in 20% of the sites. There was a bus stop within the survey area of 50% of the sites and City litter receptacles were within 50 m of 50% of the sites.

Table 35: Combined Ranking for Large and Small Litter

Site #	All Litter	Hundred Block	Street Name	Fast Food	Conv. Store	Bus Stop	Litter Bin
107	125.5	700	Powell	N	Y	N	Y
4	91	2000	Stainsbury	N	N	Y	N
124	85	6500	Oak	Y	Y	Y	Y
110	79	400	Main	Y	N	N	N
106	53	1000	Burrard	N	N	N	N
108	52	2400	Main	N	N	N	N
112	50.5	6400	Cambie	N	N	N	Y
103	50	1200	Broughton	N	N	N	N
75	47.5	400	Homer	N	N	Y	Y
38	47	1000	W Georgia	Y	N	Y	Y

6.0 Conclusions

It is important to note the information contained within this report, detailing the 2020 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 and weather, among other factors, can affect the amount of accumulated litter within an area. The litter audit results for the assessments that took place September 28 to October 1, 2020 are those reflected in this report.

6.1 Key Findings of the Large Litter Audits

Large litter was observed at 118 of 124 sites. Seven of these audits are analyzed separately as they were immediately adjacent to construction sites. The key findings of the large litter audits were:

- There were six sites that had no large litter accumulation whatsoever.
- The average number of large litter items per site was 10.3 pieces for sites with no adjacent construction and 8.7 if the sites with construction were included in the overall analysis. This number (of pieces of litter accumulated) was less than the baseline audit in 2015 (12 pieces per site) and the 2019 audits (10.7) but more than the 2017 follow-up audit (8.1) and 2018 follow-up audit (9.7).
- Total large litter observed in 2020 was 1,201 for sites without construction (117).
- Total large litter observed in 2020 was 61 for sites immediately adjacent to construction (7).
- Within the seven sites immediately adjacent to construction, the average number of large litter items per site was 8.7 pieces of litter. This was, on average **15.5% less large litter** than the sites that did not have construction directly adjacent.
- In 2020, the most common **primary categories** for large litter observed were 'other miscellaneous' (31%), paper/fibre materials (20%) and cups (10%).
- The most common **sub-category** of large litter observed was Miscellaneous Plastic which included pieces of plastic that were not identifiable in any other category. Miscellaneous Plastic represented 11.2% of all large litter surveyed in 2020.
- **The largest material type observed was plastic (38%), followed by paper (35%) and 'other' (25%).**
- Of the 1,201 pieces of large litter audited, 5% were PPE and other medical waste items (disposable masks, gloves, and disinfecting wipes).

6.2 Key Findings of the Small Litter Audits

Small litter was observed at 111 of the 124 sites. Four of these assessments are analyzed separately as they were immediately adjacent to construction. The key findings of the small litter audits were:

- There were 13 sites that had no small litter accumulation whatsoever.
- The average number of small litter items per site was 8.2 pieces for sites with no adjacent construction and 10.9 if the sites with construction were included in the overall analysis. This

was more than any other litter audit done for the City of Vancouver (7.3 – 2015, 5.2 – 2017, 8.1 – 2018 and 7.3 – 2019).

- **Overall, there was a 21% increase in the small litter observed in 2020 from the baseline audit, a 72% increase from the 2017 audit, a 14% increase from the 2018 audit and a 20% increase from the 2019 audit.**
- The total small litter audited in 2020 was 954 for sites without construction (117).
- The total small litter audited in 2020 was 76 for sites immediately adjacent to construction (7).
- Within the seven sites that were immediately adjacent to construction, the average number of small litter items per site was 10.9 pieces of litter. This was, on average, **24% more small litter** than the sites that did not have construction directly adjacent (at 8.2 pieces).
- The most common categories of small litter observed were cigarette butts/debris (24%), chewing gum (19%) and paper (17%).

6.3 Key Findings of the Supersite Audits

Supersite audits were completed within 20 sites. The key findings of the supersite assessments were:

- The average number of small litter items per site was 234.85 pieces of small litter. This was less than the 2015 baseline audits (269.6), the 2018 follow-up audits (372.1) and 2019 follow-up audit (247.2) but more than the2017 follow-up audits (193.9).
- The total small litter audited in the 2020 supersites was 4,697 pieces.
- **The most common categories of small litter observed were cigarette butts/debris (37%) and chewing gum (35%), which accounted for a combined 72% of all small litter observed on the supersites.**

7.0 Recommendations

Dillon has completed reviews of jurisdictional litter abatement practices and policies for previous litter and illegal dumping work. Our team understands the best practices to combat litter and illegal waste. These practices include:

- Bylaw Enforcement;
- Staffing;
- Reporting;
- Education;
- Community Engagement;
- Responsibility;
- Campaigns; and
- Infrastructure.

Success in combating litter and illegal waste is not an easy task for municipalities. It is recommended that follow-up litter audits be completed to assess the success of litter abatement practices and City-wide litter and SUI diversion programs.

7.1 Focus for Campaigns and Education

The City has several programs and initiatives in place to reduce litter. Currently, the City is implementing a Single Use-Item Reduction Strategy with five new by-laws, including bans, approved by Council in 2019. This strategy was designed to explore 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 was cups. Progressive reduction has been noted in this category as 13% of the large litter was observed in 2018, 12% in 2019 and now 10% in 2020! Continuing to target key litter groups, such as single-use items should positively impact litter abatement within the City and/or endorse the SUI Reduction Strategy.

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

- Chewing gum; and
- Cigarette butts/debris.

We noted in 2020 of the 1201 pieces of large litter audits, 5% (61) were PPE and other medical waste items (disposal masks, gloves and disinfecting wipes. Medical waste is an unfortunate result of the pandemic and continued proper disposal should be encouraged and advertised. Targeted litter campaigns on large litter items (including all SUIs) are also recommended that focus on:

- Cups;
- Bags; and

- Take out extras with a focus on straws and utensils.

The City notes it costs taxpayers $2.5 million a year for the City to collect disposable cups and takeout containers from public waste bins and litter. Focusing campaigns and educational outreach on targeted items and possibly in specific areas of the City noted for high litter accumulation could decrease the requirement for litter management within these areas.