

The City of Edmonton

LITTER AUDIT

2013

PREPARED FOR

**City of Edmonton
Community Services Department**

Executive Summary Report

PREPARED BY

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Osoyoos, BC
250-495-4592

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Executive Summary

The City of Edmonton retained MGM Management, a British Columbia based environmental consulting firm to conduct a baseline litter audit throughout the city in 2007. This base-line litter audit was followed with repeat litter audits in 2009, 2010, 2011, 2012 and in 2013. In completing these six litter audits Edmonton has assembled a litter database consisting of 14,413 large litter observations categorizing litter on city streets.

MGM Management has conducted 27 litter audits for North American municipalities and provincial authorities since 2002, including this litter audit for Edmonton in 2013. MGM Management has accumulated a litter database of nearly 90,850 large litter observations from these litter audits.

The City of Edmonton conducted its sixth litter audit in July of 2013. Within this study litter is classified as “large” for those items over 25 sq. cm. (4 square inches) in size or as “small” litter for items less than 25 sq. cm. (4 sq. in.). Eighty-four sub-categories of large and sixteen sub-categories of small litter were examined.

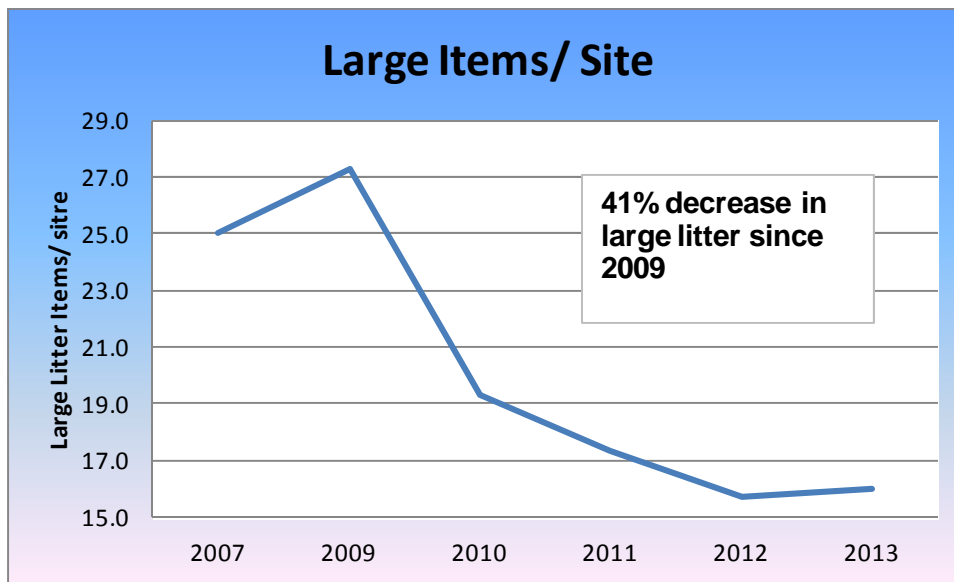
A total of 1,957 items of large litter were observed by auditors on Edmonton streets during the 2013 audit, an increase of 2% from 2012 observations. The same one hundred and twenty three sites that were audited in 2009, 2010, 2011 and 2012 were re-examined during those audits, but in 2013 one site (site # 118, 199 Street NW) was dropped due to extensive road construction at the site. This audit was conducted from July 2 – 9, 2013. The 2013 litter audit averaged 16.0 large litter items per site, compared to 15.7 large litter items per site in 2012, 17.3 items per site in 2011, 19.3 items per site in 2010, 27 items per site in 2009 and 25 items of large litter items per site observed in 2007.

Auditors noted that in 2013 there were 15 sites where no large litter was observed, compared to 12 such sites in 2012, and 9 sites with no large litter on them in 2011.

Table ES 1 – 2013 Litter vs. Previous Audits

Summary of Large Litter Results (2007 - 2013)						
	2013	2012	2011	2010	2009 ^{1.}	2007
Total Large Litter	1,957	1,933	2,134	2,378	3,361	2,650
Number of sites audited ^{2.}	122	123	123	123	123	106
Average large items / site	16.0	15.7	17.3	19.3	27.3	25.0
Reduction in Large Litter from 2012						
		-2.1%				
2013 vs. 2011			7.5%			
2013 vs. 2010				17.0%		
2013 vs. 2009					41.3%	
2013 vs. 2007						35.8%
Notes : 1. Since 2009, the same 123 sites have been audited in repeat audits. 2009 is now deemed as the baseline year.						
2. One site could not be audited in 2013, due to construction.						

Figure ES 1 – 2013 Litter vs. Previous Audits



The litter audit in 2007 examined 106 randomly selected sites. In preparation for the 2009 litter audit City staff requested that the consultant add ten high incident litter areas for closer examination. The consultant then proceeded to randomly select these 10 sites from the high incident litter areas suggested by staff. Seven additional sites, which were randomly generated by the computer, were also added by the auditor as to increase the sample size thus improving the validity of the audit data.

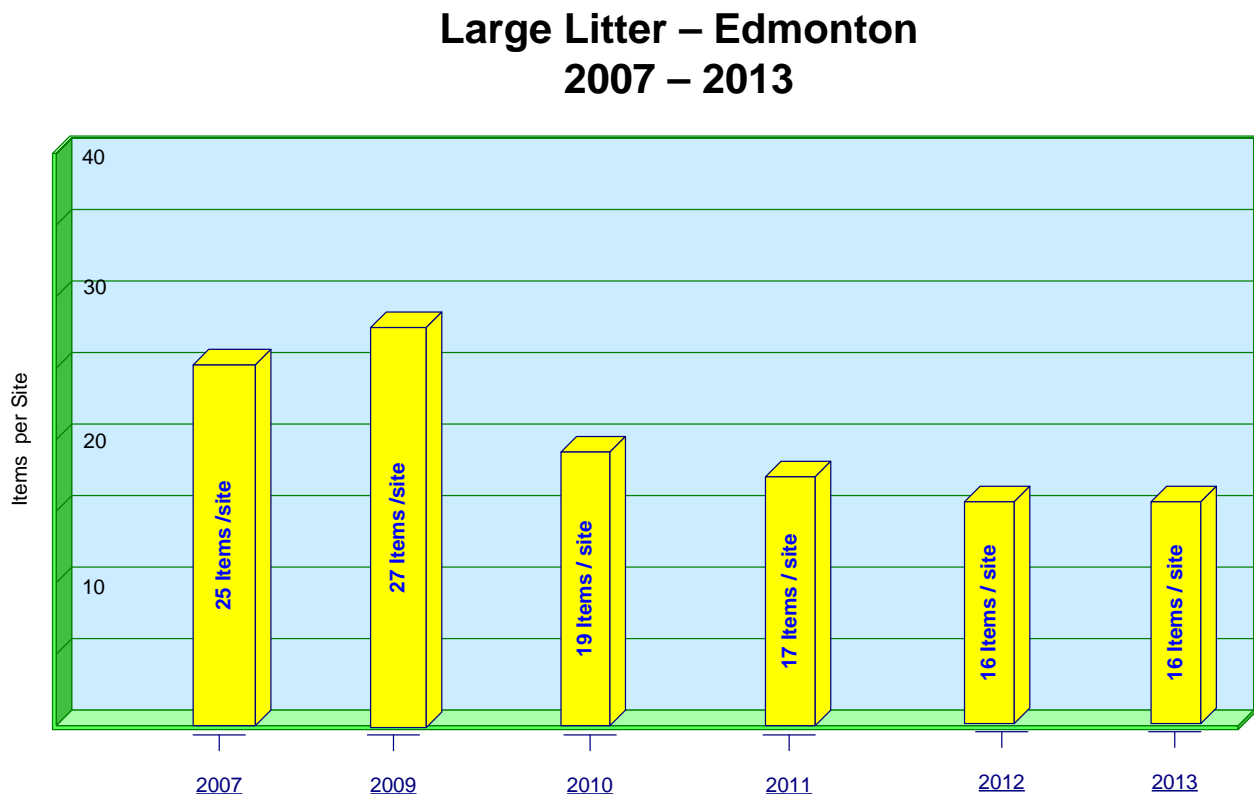
The 2009 litter audit was conducted examining a total of 123 sites randomly selected sites. This sample size was repeated in 2010, 2011, and 2012 at the same 123 sites. In 2013, it was not possible to audit one site due to extensive construction at that location, hence the total sites audited this year was 122 sites.

Table ES 2 - Litter Sites Audited

	Random Sites Selected	Additional Sites Requested by COE	Additional sites audited from 2007 list not previously audited	Yellowhead Hwy Corridor Sites	Total Sites Audited
2007	106	0	0		106
2009	106	10	7	0	123
2010	106	10	7	20	143
2011	106	10	7	0	123
2012	106	10	7	20	143
2013	105	10	7	0	122

Note: One audit site could not be observed in 2013, due to construction.

Figure ES 2 – Edmonton vs. Other Litter Audit Results



Paper napkins that were not associated with any particular brand accounted for 188 items (156 items in 2012), or 9.6% of total large litter in 2013, compared to 8.1% 2012 audit, which is an increase from the 2012 and 2011 and similar to the 9.7% measured in 2010 (11.6% in 2009, and 8.2% in 2007).

Miscellaneous paper continues to be a significant contributor to large litter in Edmonton at 7.6% of total litter, down from 8.4% of total large litter in 2012, 9.3% in 2011, 7.6% in 2011, and 12.7% in 2010.

Miscellaneous plastic was 7.9 % of total large litter in 2013, compared to 7.7% in 2012 and 6.6% of total litter for this sub-category in 2011.

Tobacco packaging continues to be the significant sub-category of large litter observed at 147 items or 7.5% in 2013, compared to 183 items or 9% of total large litter in 2012, 10.8% in 2011 and 10.4% of total large litter in 2010. Tobacco litter was observed to be at the lowest amount of items on the audit sites in the past five years (310 items in 2009 vs. 147 in 2013, a reduction of 53%).

These four sub-categories combined, provide a similar result in 2013 as that observed in previous audits, in which these sub-categories contribute about 1/3 (32.6% in 2013) of all large litter observed in Edmonton during this audit.

Table ES 3 – Top 20 Subcategories of Litter

	2013	2012	2011	2010	2009	2007
	Results	Results	Results	Results	Results	Baseline
Large Litter	Total Items	Total Items	Total Items	Total Items	Total Items	Total Items
No Brand Name Towels / Napkins	188.0	156	162.5	232.5	389.5	217
Misc. Plastic	154.0	149	140	164.5	326	374
Misc. Paper	148.5	163	166	137.5	337.5	296
Tobacco packaging	147.0	183.5	229.5	248.5	310	197
Printed material (newspapers etc.)	118.5	150	128.5	171.5	220	137.5
Construction debris	109.0	43	81.5	82	69	111.5
Home Articles	85.5	78.5	97	105	135	91.5
Vehicle & Metal Road Debris	69.5	48	76	61.5	Not Top 20	Not Top 20
Misc. Paperboard	68.0	62.5	34	42	88.5	63.5
Plastic packaging other	66.0	80.5	79.5	69.5	125	53.5
Candy bar wraps	64.0	58.5	110	161	160	106
Cup Lids, Pieces lids	51.5	54	81	60.5	86.5	97.5
Misc. Cardboard	51.0	41.5	36	73.5	76	50
Paper Cups (Hot)	47.0	43	67	73.5	79.5	59.5
Paper cups (cold)	46.0	32.5	54	Not Top 20	51	Not Top 20
Plastic bags - not retail	39.5	55.5	Not Top 20	Not Top 20	Not Top 20	Not Top 20
Plastic drink Cups	39.0	30	Not Top 20	Not Top 20	Not Top 20	Not Top 20
Receipts (forms, bus tickets etc.)	37.5	66	54.5	55.5	60.5	84
Sweet packaging	33.0	50.5	Not Top 20	Not Top 20	Not Top 20	Not Top 20
Condiment packaging	31.5	29.5	43.5	46	66	47.5
Paper packaging other			30.5	Not Top 20	Not Top 20	Not Top 20
Gum Wrappers			42	38	76	44
Paper food wrap			31.5	Not Top 20	Not Top 20	Not Top 20
Items in Top 20 Sub-categories	1,594	1,575	1,745	1,823	2,656	2,030
% of Total Large Litter (Top 20)	81%	81%	82%	77%	79%	84%

Large Litter

Fibre and plastic material litter together, accounted for 76% of the large litter observed. See following tables for details.

Fibre litter

Fibre litter is comprised of miscellaneous paper, paper packaging, printed paper, paperboard, cardboard, newspapers and advertisement flyers which all combine to make fibre litter a significant contributor to the litter on Edmonton streets. Twenty-two sub-categories of fibre litter account for 48% of total large litter, down from 53% of the total large litter observed in 2012.

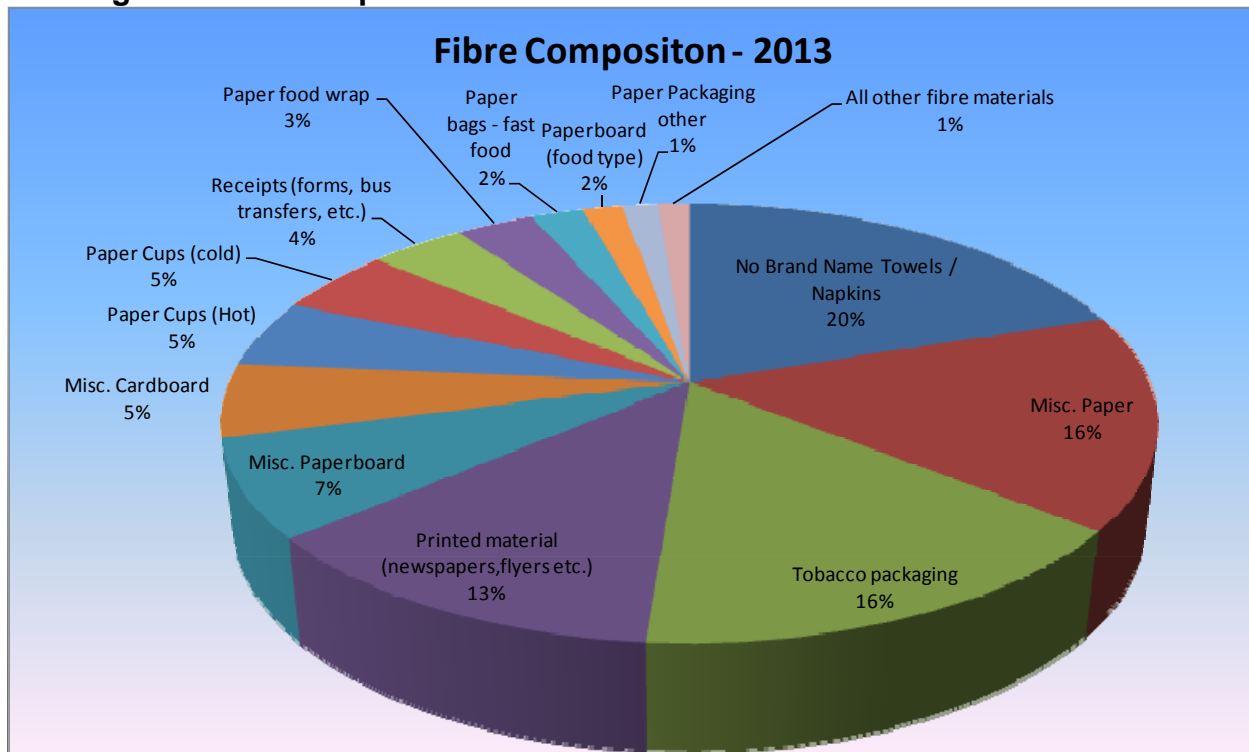
As seen in Table ES-4 and Figure ES-3 below, the proportion of total litter composed of fibre materials has remained consistent from past audits to the 2012 survey at between 53% - 55% of total large litter.

Table ES 4 - Composition of Fibre Litter

2013 Composition of Fibre Litter													
	2013	2013	2013	2012	2012	2011	2011	2010	2010	2009	2009	2007	2007
	Item Counts	% of total Fibre	% of Total Litter	Item Counts	% of Fibre Litter	Item Counts	% of Fibre Litter	Item Counts	% of Fibre Litter	Item Counts	% of Fibre Litter	Item Counts	% of Fibre Litter
No Brand Name Towels / Napkins	188	19.9%	9.6%	156	15.3%	162.5	14.0%	232.5	18.6%	389.5	21.0%	217	15.5%
Misc. Paper	148.5	15.7%	7.6%	163	16.0%	166	14.3%	137.5	11.0%	337.5	18.2%	296	23.3%
Tobacco packaging	147	15.6%	7.5%	183.5	18.0%	229.5	19.7%	248.5	19.9%	310	16.7%	197	17.1%
Printed material (newspapers,flyers etc.)	118.5	12.6%	6.1%	150	14.7%	128.5	11.0%	171.5	13.7%	220	11.9%	138	10.9%
Misc. Paperboard	68	7.2%	3.5%	62.5	6.1%	34	2.9%	42	3.4%	88.5	4.8%	64	6.6%
Misc. Cardboard	51	5.4%	2.6%	41.5	4.1%	36	3.1%	73.5	5.9%	76	4.1%	50	5.0%
Paper Cups (Hot)	47	5.0%	2.4%	43	4.2%	67	5.8%	73.5	5.9%	79.5	4.3%	60	4.7%
Paper Cups (cold)	46	4.9%	2.4%	32.5	3.2%	54	4.6%	32.5	2.6%	51	2.8%	65	3.9%
Receipts (forms, bus transfers, etc.)	37.5	4.0%	1.9%	66	6.5%	54.5	4.7%	55.5	4.4%	60.5	3.3%	84	3.5%
Paper food wrap	30.5	3.2%	1.6%	20	2.0%	31.5	2.7%	35	2.8%	27	1.5%	11	5.1%
Paper bags - fast food	20.5	2.2%	1.0%	20.5	2.0%	21	1.8%	23.5	1.9%	30.5	1.6%	12	0.9%
Paperboard (food type)	15.5	1.6%	0.8%	20.5	2.0%	20	1.7%	42	3.4%	40	2.2%	9	0.7%
Paper Packaging other	14	1.5%	0.7%	13.5	1.3%	30.5	2.6%	24.0	1.9%	15.5	0.8%	14.5	0.9%
All other fibre materials	12	1.3%	0.6%	38	3.7%	118	10.1%	53.5	4.3%	118.5	6.4%	44	1.1%
Stationary				6.5	0.6%	11.5	1.0%	6	0.5%	8	0.4%	9	0.7%
Total Fibre large litter	795.5	100%		1,017	100.0%	1,165	100%	1,251	100%	1,852	100%	1,271	100%
% of total large litter			48.2%	53%		55%		53%		55%		48%	
Change from previous audit	-21.8%			-12.7%		-6.9%		-32.5%		45.8%			
Other fibre materials	Item Counts												
Paper retail bags	0.5												
Paper fast food plates	1												
Paper bags - not retail	2.5												
Milk / Juice (gable)	0.0												
Pepr trays	3												
Paper beverage case	3.5												
Aseptic box	1												
Lottery debris	0.5												
	12												
	Items in all remaining fibre litter												
	Notes: 1. Fractions of counts can occur due to averaging of observations												

It is noteworthy that total fibre related large litter has consistently dropped since 2009, with 1,852 items counted in that year compared to 944 in 2013, a reduction of 49%.

Figure ES 3 - Composition of Fibre Litter



As illustrated in Figure ES 3 above, the most significant contributors to fibre litter are no-brand name napkins, miscellaneous paper, printed materials (newspaper, advertisements & flyers), miscellaneous paperboard, and miscellaneous cardboard.

Plastic Litter

Plastic litter is the second most significant material type of large litter observed in Edmonton. These materials include, candy bar wrappers, other plastic packaging, condiment packaging, plastic cups and plastic bags, contributing 28% of total large litter observed during the audit.

As illustrated by Table ES 5 and Figure ES 4 below, we see that the contribution to total litter attributed to plastic litter has also remained consistent when compared to previous litter audits in Edmonton (see next page).

Similar to fibre litter, it is equally noteworthy that total plastic related large litter has consistently dropped since 2009, with 933 items counted in that year compared to 555 in 2013, a reduction of 40%.

Table ES 5 - Composition of Plastic Litter

2013													
Composition of Plastic Litter													
	2013	2013	2013	2012	2012	2011	2011	2010	2010	2009	2009	2007	2007
	Item Counts	% of Plastic Litter	% of Total Litter	Items	% of Plastic Litter	Items	% of Plastic Litter	Item Counts	% of Fibre Litter	Item Counts	% of Fibre Litter	Item Counts	% of Fibre Litter
Misc. Plastic	154.0	27.7%	7.9%	149	24.5%	140	22%	164.5	21%	326	35%	374	42%
All remaining plastic	88.0	15.9%	4.5%	58	9.5%	77	7%	114.5	15%	66	7%	97	11%
Plastic packaging other	66.0	11.9%	3.4%	80.5	13.3%	79.5	12%	69.5	9%	75	8%	53.5	6%
Candy bar wraps	64.0	11.5%	3.3%	58.5	9.6%	110	17%	161.0	21%	160	17%	106	12%
Cups, lids and pieces	51.5 ¹	9.3%	2.6%	54	8.9%	81	13%	60.5	8%	86.5	9%	97.5	11%
Plastic drink cups	39.0	7.0%	2.0%	30	4.9%	29	4%	35.0	5%	53.5	6%	27	3%
Sweet packaging	33.0	5.9%	1.7%	50.5	8.3%	22.5	3%	28.5	4%	11.5	1%	34	4%
Condiment pkg (ketchup, vinegar etc.)	31.5	5.7%	1.6%	29.5	4.9%	43.5	7%	46.0	6%	62.5	7%	47.5	5%
Zipper bags	17	3.1%	0.9%	20	3.3%	19.5	3%	16.5	2%	61	7%	18	2%
Snack food packaging	8.5	1.5%	0.4%	22	3.6%								
Plastic bags - not retail	2.5	0.5%	0.1%	55.5	9.1%	28.5	4%	42.5	5%	0	0%	26	3%
Plastic retail bags	In Other			In Other		23.5	4%	12.5	2%	30.5	3%	9.5	1%
Plastic Jars / Bottles/ Lids	In Other			In Other		22.5	3%	24.0	3%	0	0%	8	1%
Total plastic large litter	503.5	100%	28.4%	607.5	100%	676.5	100%	775.0	100%	932.5	100%	898	100%
% of total large litter	25.7%			31%		32%		33%		28%		34%	
Change from previous audit	-17.1%			-10.2%		-12.7%		-16.9%		3.8%			
All remaining plastic litter	Item Counts												
Utensils	15.0												
Plastic retail bags	0.5												
Polystyrene cups	5.5												
Candy pouches	9.0												
Container lids	9.5												
Plastic Jars / Bottles/ Lids	6.5												
Polystyrene fast food plates	0												
Water (plastic)	16.0												
Polystyrene trays	3.5												
Plastic jars/ bottles	6.5												
Wine/ Liquor (Plastic)	0												
Milk/ Juice (Plastic)	1.0												
Six pack rings	3.0												
Soft drink (plastic)	4.0												
Sport drink (plastic)	1.0												
Polystyrene clamshells	7.0												
	88	Items in all remaining plastic litter											
	Notes: 1. Fractions of counts can occur due to averaging of observations												

Figure ES 4 - Composition of Plastic Litter

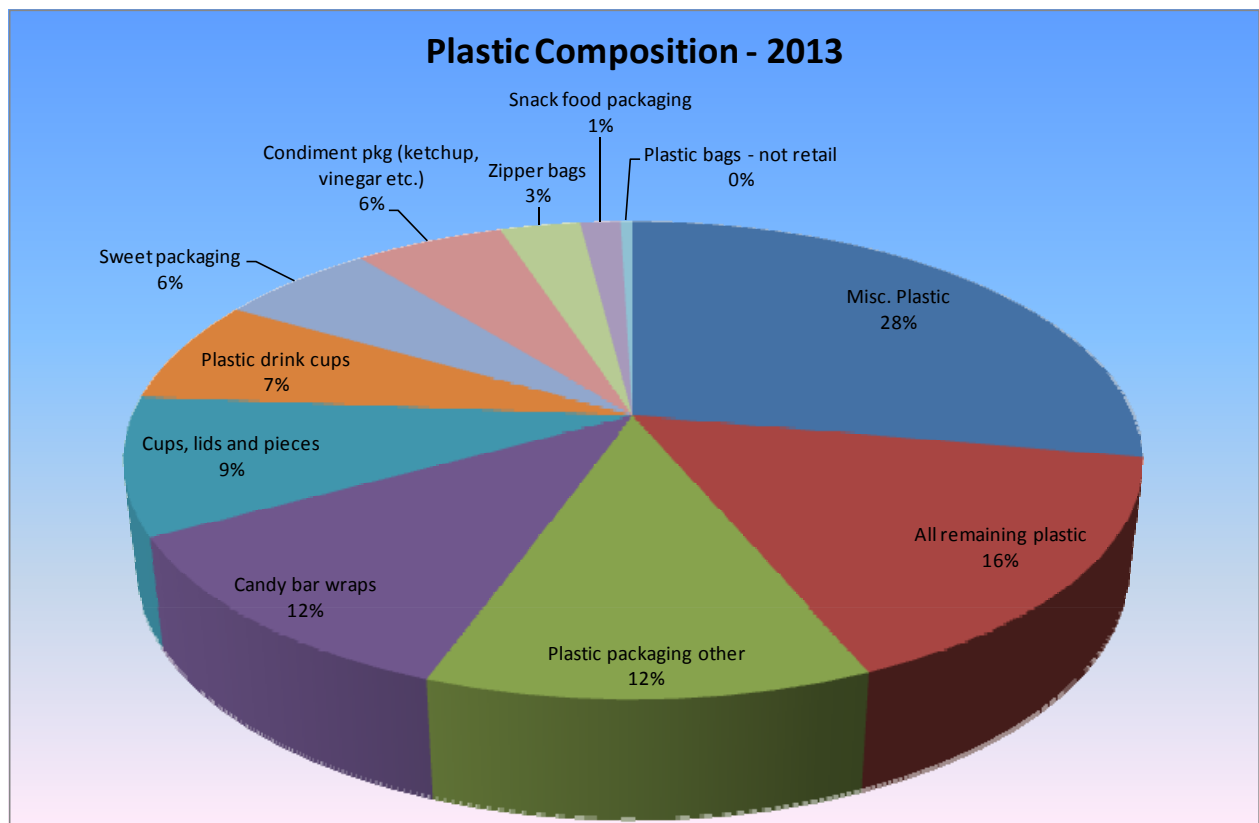


Table ES 6: Edmonton Large Litter - Six Litter Audits

Edmonton Litter Audits - by Major Category (2007 - 2013) ¹								
	Edmonton Large Litter Counts - 2007 to 2013 (6 litter audits)	Average % of Total Litter 2007 to 2013 (Edmonton audits)	July 2013 Edmonton	July 2012 Edmonton	July 2011 Edmonton	June 2010 Edmonton	June 2009 Edmonton	June 2007 Edmonton
	Items	% of total large litter	% of total large Litter	% of total large litter	% of total large litter	% of total large litter	% of total large litter	% of total large litter
		Average - 6 Audits	2013					
Other Miscellaneous ²	4,765	33.1%	29.9%	30.5%	29.7%	28.4%	33.1%	39.9%
Printed & Fiber Mat'l	2,700	18.7%	17.9%	16.9%	16.8%	19.6%	20.3%	17.4%
Cups	1,367	9.5%	9.7%	8.8%	11.6%	9.0%	8.4%	9.8%
Confectionary	1,253	8.7%	6.8%	8.4%	8.6%	10.2%	9.1%	8.0%
Other Packaging	1,002	7.0%	10.7%	5.1%	6.2%	6.4%	6.7%	4.6%
Bags	583	4.0%	4.4%	5.5%	4.6%	4.4%	3.5%	2.7%
Tobacco Products	1,316	9.1%	7.5%	9.5%	10.8%	10.4%	9.2%	7.4%
Take-Out litter	349	2.4%	2.4%	5.2%	2.5%	2.3%	2.4%	2.4%
Beverage Containers	410	2.8%	2.8%	2.7%	3.7%	2.5%	1.8%	3.8%
Wraps	234	1.6%	2.0%	1.4%	1.9%	1.9%	1.3%	1.3%
Other Containers ³		0.0%	1.0%	1.7%	1.4%	1.3%	1.3%	0.7%
Boxes	210	1.5%	1.9%	1.8%	1.0%	1.9%	1.4%	1.0%
Textiles	213	1.5%	2.5%	2.0%	1.2%	1.4%	1.3%	0.8%
Trays	14	0.1%	0.3%	0.5%	0.0%	0.1%	0.0%	0.1%
Total Litter Edmonton	14,413	100%	100%	100%	100%	100%	100%	100%
<p>1. Aggregated large litter audit data from conducted by MGM Management in City of Edmonton, Canada (2007, 2009, 2010, 2011, 2012, 2013)</p> <p>2. Other miscellaneous sub-category includes: Miscellaneous paper, Miscellaneous plastic, Construction debris, Home articles, Vehicle & Metal Road debris, Miscellaneous Paperboard, Miscellaneous cardboard, Miscellaneous Glass and Tire & Rubber debris.</p> <p>3. Includes plastic jars, cans, container lids, plastic packaging other, foil packaging & materials</p>								

Small Litter Observations

Observations of small litter made during the 2013 Edmonton audit continue to reveal a relatively low occurrence of small litter on city streets, at 10.4 items per site in 2013.

When contrasted against the 41 small litter items / site observed for the City of Toronto in 2005, or the 26 items per site reported in San Francisco in 2007; the small litter occurrence in Edmonton continues to be impressively low.

The small litter results for the Edmonton audit sites are reported in the table and charts below (Table ES 7, Figures 5, 6, & 7).

Table ES 7 - Small Litter Summary

2013 Edmonton Small Litter Summary						
Description of Sub-Category	2013 Edmonton Small Items Observed	2012 Edmonton Small Items Observed	2011 Edmonton Small Items Observed	2010 Edmonton Small Items Observed	2009 Edmonton Small Items Observed	2007 Edmonton Small Items Observed
Cigarette Butts	556	788	613	572	961	479
Small Paper	171	259	190	164	383	279
Other Polystyrene Pieces	73	149	57	49	113	108
Plastic Film Small	103	136	93	67	108	107
Hard Plastic	119	130	183	104	232	103
Chewing Gum	60	112	48	76	40	61
Alum Pieces Small	67	107	74	47	72	17
Polyfoam Peanuts		58	0	13	7	2
Small Glass	52	36	40	16	90	101
Metal (not Aluminium)	12	18	9	13	7	8
Other Materials	22	11	0	19	33	24
Straws	10	10	15	11	16	11
Bottle Caps	6	10	9	12	9	4
Rubber	7	7	5	5	10	7
Candy Pack. < 25 sq. cm.	6	2	36	42	31	6
Other Tobacco Small		1	4	10	2	24
Small litter items observed	1,264	1,834	1,376	1,220	2,114	1,341
Average small litter per site	10.4	15	11	10	17	13
Sites audited	122	123	123	123	123	106

Table ES 8 - Comparative Small Litter Results

2013 Edmonton Small Litter vs. Other Cities			
Year	City	Small Items / site	Average Items/ site
2013	Edmonton, AB	10	13
2012	Edmonton, AB	15	
2011	Edmonton, AB	11	
2010	Edmonton, AB	10	
2009	Edmonton, AB	17	
2007	Edmonton, AB	13	
2013	Brandon	8.0	9.8
2012	Brandon	10.8	
2010	Brandon	10.5	
2013	Winnipeg	10.5	11.5
2012	Winnipeg	12	
2010	Winnipeg	12	

Figure ES 5 - Small Litter Summary

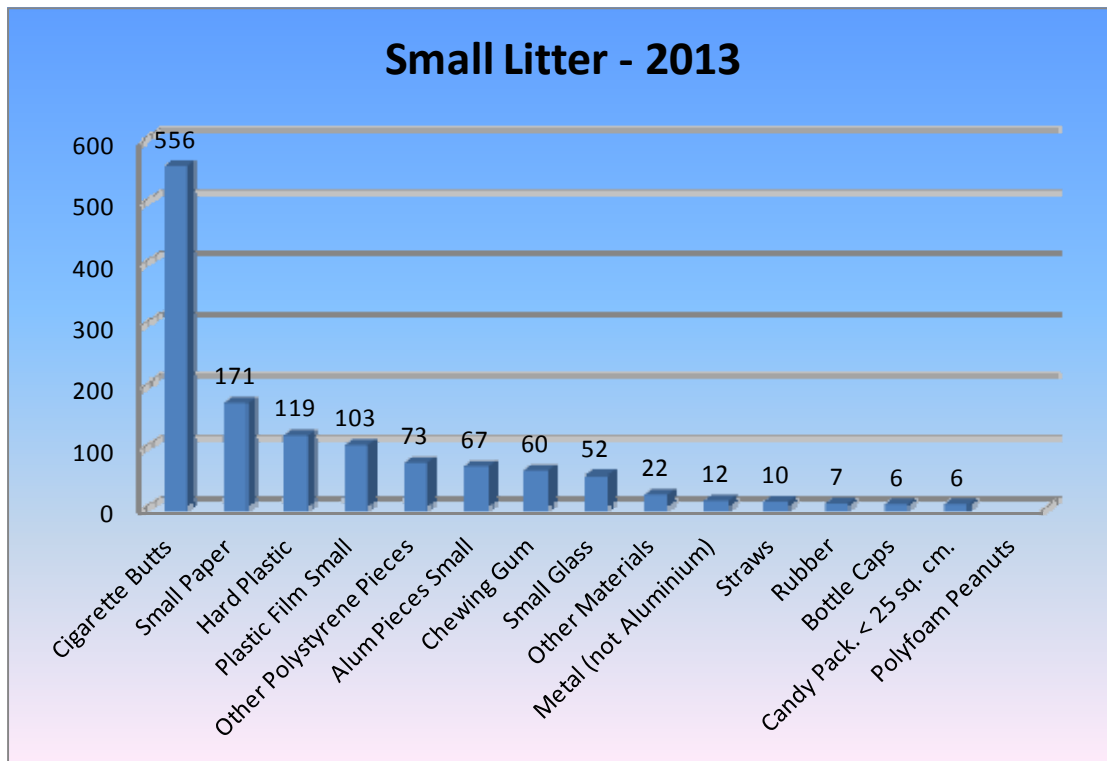


Figure ES 6 - Small Litter Items per Site in 2013

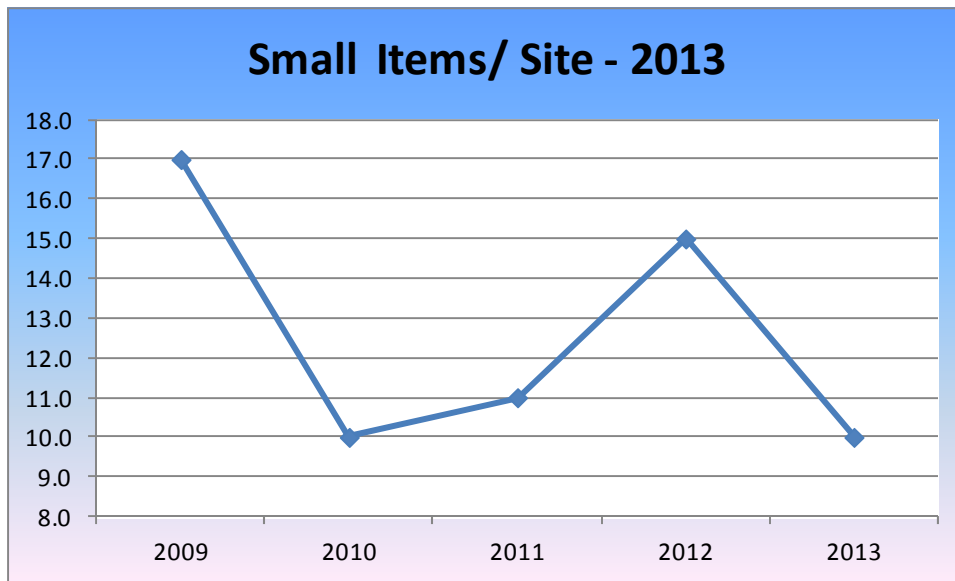
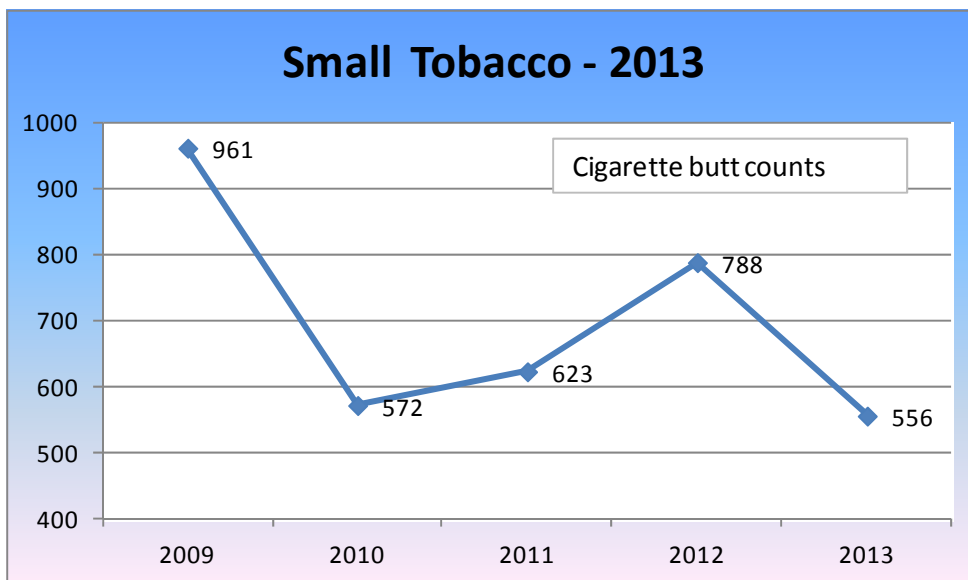


Figure ES 7 - Small Tobacco Litter



Small tobacco litter continues to be an issue but progress is being made with this small litter sub-category, with cigarette butts counted at 556 in 2013, down from 961 in 2009.

Conclusions

Since the first litter audit was conducted in Edmonton in 2007, 14,413 large litter observations; and 9,149 small litter observations have been made by auditors. This 23,562 observations has allowed the City of Edmonton to understand the composition of both large and small litter.

It is clear from the 2013 litter audit data that significant progress is being achieved in Edmonton in the reduction of litter.

Of the 79 sub-categories of large litter observed in 2013, 62% of audit sites presented fewer large litter items than in 2009. The audit of 2009 is used as a "base year" because since that audit the identical 123 audits sites have been examined (note: one site could not be audited in 2013 due to construction). The table below summarizes this trend.

Table ES 9 - Subcategory Changes Since 2009

Changes 2013 vs 2009	# of Subcategories Decreased	# of Subcategories Increased	# Subcategories No Change
	52	17	10
% of Subcategories	62.0%	21.5%	16.5%

Several types of large litter have shown significant reductions in litter counts when comparing 2013 results with 2009 data.

Table ES 10 - Significant Subcategory Changes Since 2009

Sub-categories with significant* reductions 2013 vs. 2009								
	2013	2012	2011	2010	2009	2007	Total	(Sub-category total / total items observed in all Edmtn audits)
	Edmonton	Edmonton	Edmonton	Edmonton	Edmonton	Edmonton		% of Total
	Litter Count	Litter Count	Litter Count	Litter Count	Litter Count	Litter Count	Total Items	% Change in Period
Candy bar wraps	64	58.5	110	161	160	106	660	-60%
Misc. Paper	148.5	163	166	137.5	338	296	1,249	-56%
Misc. Plastic	154	149	140	164.5	326	374	1,308	-53%
Tobacco (packaging)	147	183.5	229.5	248.5	310	197	1,316	-53%
No Brand Towels / Napkins	188	156	162.5	232.5	390	217	1,346	-52%
Plastic packaging other	66	80.5	79.5	69.5	125	54	475	-47%
Printed Mat'l (newspapers, ads, flyers)	118.5	150	128.5	171.5	220	138	927	-46%
Paper Cups (Hot)	47	43	67	73.5	80	60	371	-41%
Cup Lids, Pieces lids	51.5	54	81	60.5	87	98	432	-41%
Receipts (business forms)	37.5	66	54.5	55.5	61	84	359	-39%
Home Articles	85.5	78.5	97	105	135	92	593	-37%
Misc. Paperboard	68	62.5	34	42	89	64	360	-24%
Sub-categories with significant* increases 2013 vs. 2009								
Vehicle & Metal Road Debris	69.5	48	76	61.5	33	60	348	111%
Construction debris	109	43	81.5	82	69	112	497	58%

* Note: "significant" defined as a sub-category consisting of > 2.0% of total large litter observed 2007-2013

Vehicle and metal road debris and construction debris were observed as increasing in 2013. The consultant noted that at some sites in 2013 litter was observed that appeared to have fallen from moving vehicles and were on the audit site during the observation period.

For the most part small litter counts have trended lower since 2009, with the exception of 2012, when a spike in small litter was observed.

Small tobacco litter, namely cigarette butts, continue to be an issue but progress is being made with cigarette butts counted at 556 in 2013, down 42% from 961 in 2009.

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