



**Committee of the Whole Report
For the Meeting of May 19, 2016**

To: Committee of the Whole **Date:** May 19, 2016
From: Fraser Work, Director, Engineering and Public Works
Subject: Single-Use Plastics Retail Bags – Waste Management Review

RECOMMENDATIONS

That Council direct staff to:

1. Convene initial discussions / meetings with key business and waste management stakeholders, before the end of June 2016, to better understand perspectives and issues related to a voluntary retail bag fee, at a cost of no less than 10 cents per bag, to incentivise the adoption of sustainable reusable bags, with the City's recommendation to re-invest those funds to improve business packaging and sustainability programs and future packaging reduction initiatives;
2. Develop and report on a preliminary work-plan and resource assessment, by July 2016, for the future analysis, engagement, and communications of any related initiatives to reduce single-use packaging;
3. Based on those findings, continue development of a more detailed, longer term, work-plan and the associated resource implications, needed to:
 - a. Work with local businesses and retailers in order to promote a voluntary fee for both plastic and paper bags;
 - b. To convene or promote a working group with local and regional stakeholders (CRD, MMBC, Province, neighbouring municipalities, waste managers, local retailers and other key stakeholders) to collaboratively develop strategies and initiatives to improve the sustainable management of single-use retail bags, single-use beverage containers, food packaging, and plastic film products, towards an overall goal of zero-waste, and sustainable, circular-economy model.

EXECUTIVE SUMMARY

Several cities around the world and in Canada are regulating the use of single-use grocery bags in effort to reduce the impacts of excessive consumption habits, litter problems, and poor recycling diversion rates. In some regions, plastic bag bans and levies have resulted in dramatic decreases in usage rates. These policy tools aim to change consumer behaviours, forcing shoppers to adopt more sustainable habits, and switch to reusable, long-life bag alternatives.

Reducing the waste accumulated from single-use shopping bags will prevent litter and its associated downstream environmental, economic and social costs. In certain parts of the world, much of the consumer plastic 'leaks' from poorly controlled waste management systems, and can enter the ocean environment, where it never completely degrades, but only breaks into smaller portions and can potentially harm the food chain. Science is only just beginning to understand the scope of harm imposed by what is known to be a dramatic increase in ocean plastic pollution. Ocean health concerns are fuelling bag-ban campaigns by ocean advocacy groups. While it is accurate to suggest

that the problems of waste 'leakage' is most prevalent in coastal nations in the developing world, the environmental leadership from more advanced nations can send strong socio-economic signals to local and international consumers, as to the need for dramatic reductions in wasteful habits and more conscientious consumer decisions.

Proponents view plastic retail bags as a powerful symbol of a wasteful culture and unsustainable behaviour, while industry and critics suggest that bag regulations hinder customer convenience and risk creating more negative environmental impacts, than benefits.

Careful consideration of the total life-cycle impacts of plastic bags and their alternatives is necessary to ensure that bans or levies do not create unintended environmental consequences. Numerous scientific studies state that conventional, high-density polyethylene (HDPE) shopping bags are more environmentally friendly than other single use bags, and can be less harmful than reusable, shopping bags, unless they are used a "sufficient" number of times. Re-usable bags made from recycled materials are the most environmentally friendly alternative, but only if they are used numerous times and are responsibly managed at the end of life. Policy alternatives should attempt to minimize any adoption of less environmentally friendly bag alternatives.

Plastic film, including bags, are currently managed under provincially led programs that delegate responsibility for waste-recovery to industry stakeholders. While the performance of these programs shows clear opportunities for improvement, plastics-use is rising quickly and reduction strategies should continually be explored, alongside improved recycling and reuse initiatives. Partnering with these stakeholders is critical to improve diversion and recycling rates. Further, and more intensive liaison with these organisations is recommended to cooperatively shift to a more sustainable and effective waste management model that best promotes zero-waste goals, specific to packaging wastes that currently escapes City and regional recycling systems.

The volume and landfill issues related to single-use packaging suggest that staff efforts should be focussed on improving recovery rates of a wider range of single-use packaging (including plastic bags, food containers, single-use beverage containers, plastic packaging and plastic film). Initiatives that address overall packaging wastes, not just bags, could potentially deliver more significant total improvement to diversion rates, reduction schemes and consumer behaviour shifts.

Various policy makers suggest that the unsustainable business practice of providing free plastic carrier bags is a main driver behind excessive use, and the most important lever for change. An imposed levy or fee structure, while more complex than an outright ban, may be the most promising scheme to reduce environmental impacts and avoid unintentionally forcing consumers to adopt less-sustainable options.

Staff recommend promoting a voluntary fee structure as an effective first-step to incentivise local retailers and consumers to adopt more sustainable packaging decisions. This course of action may optimise staff outputs in effort to reduce packaging waste, while also maintaining productive working relationships with key industry, commercial, public and regional partners.

PURPOSE

This report aims to provide Council with an overview of the waste management considerations specific to single-use plastic retail bags, and provide a recommendation for reduction-measures and next steps to better manage single use packaging materials.

BACKGROUND

On November 5, 2015 GPC, Council directed staff to investigate and report on the issues and considerations pertaining to a ban on single use plastic bags, and since passed a motion to include introducing a ban on single-use plastic bags, as part of the 2016 Strategic Plan amendment, made

during the COTW meetings on February 4, 2016.

ISSUES AND ANALYSIS

The regulation of plastic grocery bags is an attempt to reduce unsustainable consumer behaviour using strong policy levers. Bans or levies on plastic retail bags have been met with some criticism due to their impacts on customer convenience, their discontinuity with region/provincial waste management strategies, and their potential unintended negative environmental consequences, caused by shifts to less environmentally friendly alternative bag types. These regulations must address or consider a number of issues related to the intended consequences of any bag-regulation, which could potentially:

- Create improved social awareness and reduce wasteful-norms;
- Achieve quick and drastic reduction of both waste and litter;
- Address any sub-standard recycling and diversion rates of plastic bags; and
- Not constitute a major factor affecting ocean/marine health in the region. More information is required as to the full life-cycle of regional plastic waste pathways, to better understand if our plastic bags are ending-up in the oceans, wither abroad or locally; and

Actions to restrict plastic bag use could also cause a number of unintended or undesirable consequences, which need to be carefully considered, as they could potentially:

- Negatively impact consumer choice;
- Fail to address the wider sustainability issues related to retail packaging overall;
- Lack relevant regional information and statistics about plastic grocery bags, recycling rates, contamination issues, diversion rates, overseas destinations – all of which could compromise the quality of related policy-decisions;
- Inadvertently increase the use of more environmentally harmful, bag alternatives;
- Cause incoherence or inconsistency with provincial recycling programs, thereby imposing confusion and waste-management inefficiencies;
- Cause shoppers to migrate across municipal boundaries to purchase goods at less restrictive retail locations;
- Cause undesirable market forces that negatively impact industry health;
- Impact personal health due to the transmission of germs via reusable bags; and
- Risk impacting long-term, waste management stakeholder relationships, which will rely on positive interaction across the complete value-chain.

Any policy option that the City considers, should address or treat the above risks and considerations to ensure that the intended impacts are reached, and the unintended consequences are mitigated or avoided.

Single Use Plastic Grocery Bags

Plastic grocery bags are lightweight, have a high strength-to-weight ratio, and are inexpensive, convenient, durable and watertight. However, if plastic bags are discarded as litter or escape collection or recycling systems, their durability means that bags may persist in the environment for more than a century, posing undesirable aesthetic, environmental and economic impacts.

The production of conventional plastic bags relies on petroleum feed-stocks (normally natural gas) and, like all bag alternatives, pose environmental impacts over their lifecycle, including greenhouse gas (GHG) emissions, eco-toxicity, resource depletion, and potential detriment to aquatic and terrestrial ecosystems, especially when discarded as litter. Plastics waste volumes remain a concern in many countries, where the volume of plastics has doubled in the last 50 years, and is expected to

double again in the next 20 years¹. Policy measures taken to address increasing plastic waste and improve management schemes will help to alleviate any negative impacts associated with increased resource intensity, waste, and pollution.

For many people, plastic carrier bags represent a powerful symbol of unchecked, wasteful consumer habits. Introducing regulations to limit the use of single use plastics is an effort to avoid the downstream undesirable social and environmental impacts that are imposed by wasteful consumer decisions.

Plastic bags represent an estimated 1-2% of the total landfill waste stream, with per-capita usage rates estimated at 200 bags used per capita, which equates to 17 million bags used annually by City residents, with approximately 160,000 to 330,000 bags reaching landfill each year, and unknown proportions littered and escaping collection. See Annex A for more details and applicable references.

Alternative Grocery Bags – Relative Impacts and Environmental Performance

Different alternatives to plastic grocery bags exist, and have been assessed as to their harm on the environment in a number of life cycle assessments. The common types of grocery/carrier bags include the following:

- Conventional grocery bags made from High Density Polyethylene (HDPE),
- Paper bags;
- Sturdier, glossy, plastic retail bags made from Low-Density Polyethylene (LDPE);
- Reusable, Non-Woven Polypropylene (NWPP) bags,
- Reusable, cotton carrier bags (not shown below), and
- Biodegradable/degradable bags (not shown below, see Annex A for more information).



Figure 1. Grocery Bag Types (assessed in Clemson University LCA Study).

Environmental Considerations and Clarifications (See Annex A for more details)

The life cycle impacts of all bag options depends mainly on production processes, their material properties, how often they are used, and how they are managed at the end of life (ie. litter, recycling, energy conversion etc).

A PriceWaterhouseCoopers study of plastic and paper bags concludes that the production of paper bags causes 14 times the impact on water quality and consumes 4 times the water, has 3 times the

¹ Ellen Macarthur Foundation, World Economic Forum, and the McKinsey & Company. (2016). The New Plastics Economy: Rethinking the Future of Plastics.

waste generation, and 3 times more greenhouse gas emissions than HDPE plastic bags². This study also highlights the environmental benefit of the heavier duty plastic bags (LDPE), which are preferred to many alternatives, but only if reused 4 or more times.

A 2011 UK government LCA study compared several bag types, and determined that a cotton bag had to be re-used 131 times³ to match the equivalent greenhouse gas emissions from the production of a single use HDPE bag. This study stated that LDPE and NWPP bags posed 3, 4 and 11 times more global warming potential, (respectively), than a HDPE bag⁴. The NWPP bags are designed to be used more than 100 times, and if reused, would pose the least overall environmental impact.

Each analysis highlights that the key to reducing the environmental impacts of ANY bag type is to reuse it as many times as possible. The following important summary points⁵ pertain to life cycle impacts of the various bag types:

- There is no ideal carrier bag option. All bag types have advantages and disadvantages, but some bag types pose more significant impacts than others.
- Recycled content in any bag-type greatly improves its environmental performance;
- Overall plastic bag environmental impacts are dominated by the resource-use phase (ie. fossil fuel extraction), production phases and end-of-life scenario.
- Plastic bags pose more of a litter problem, due to their mobility (ie. subjected to wind and water forces, more so than other bags).
- Free, lightweight HDPE bags are more likely to be littered than any reusable bag.
- Even paper bags, made from 100% recycled materials, may pose more environmental impacts than plastic bags, in all categories except litter⁶, due to pulp production energy use, its generation of solid waste, and acid-slurry, water pollution impacts.

Plastic Bag Ban Impacts

A handful of Canadian municipalities have regulated plastic bag-use in recent years, mainly in Quebec and Manitoba, as well as the Wood Buffalo Regional Municipality, in Alberta. The Wood Buffalo Regional Municipality banned single-use plastic bags in 2010, but does not advertise the impact or the statistical information related to this initiative. Vancouver and Montreal Councils are currently considering bans on plastic bags.

San Francisco imposed the first ban on plastic bags in a major North American city, but very little information is available as to the impact or lessons learned from this city's experience. San Francisco currently enforces a mandatory charge of 10 cents per checkout bag. Many cities in California have adopted bans or fees. The city of Napa, California, does advertise that bag bans and fees on paper bags have resulted in 95% reduction in plastic bags, 30% reduction in paper bags and 60% reduction in marine litter, one year after adoption⁷. Seattle, who originally failed to impose a 20 cent fee on single use plastic bags in 2008, implemented an outright ban in 2012, with an accompanying fee on paper bags. Many bag-ban cities do not report the overall impact of their bans,

² PwC/Ecobilan (2004) Impact assessment of Carrefour plastic carrier bags, Carrefour, France, as cited in www.scotland.gov.uk/Publications/2005/08/1993259/33039.

³ Ibid.

⁴ Ibid.

⁵ European Commission. (2011). Assessment of impact of options to reduce the use of single use plastic carrier bags. 12 Sep 2011. Bio Intelligence Service.

⁶ This particular LCA assumes a 50% recycling rate of the paper bags.

⁷ City of Napa. Plastic bag ordinance, FAQ. Available online at:

http://www.cityofnapa.org/?option=com_content&view=article&id=1783:plastic-bag-ordinance-faq&catid=15:city-departments-and-divisions&Itemid=121

which may be due to reduced administrative book-keeping, as bans favour a less intensive administrative burden, but do require enforcement/regulation.

Bag Levy/Fee Impacts

In 2013, the town of Boulder, Colorado introduced a 10 cent fee on both paper and plastic bags, achieving a 68% reduction in the first 6 months. The store keeps 4 cents per bag, and the remaining is meant to cover City administrative fees.

In 2002, the government of the Republic of Ireland implemented a 15 cent euro plastic tax on grocery bags to address plastic litter concerns, which resulted in a 90% reduction in bag usage in the first year. Prior to the tax, a survey of Irish adults suggested that there was no support to pay for bags (40%) and only an 8% willingness to pay up to a 7 cent euro charge⁸. Interestingly, the government imposed an initial price well above the comfort level of consumers, at two times the highest rate surveyed, and successfully raised the levy once more, to 22 cents in 2007. The bag levy is considered very popular with the Irish population; so popular in fact, that it "would be considered politically damaging to remove it"⁹. The current bag usage rates are at 14 bags per capita, from the 328 per person rates before the levy was implemented (a 96% decrease)¹⁰. Revenues from the program are used to fund environmental initiatives, with a 3% cost to administer the program. The author's note that such a levy comes with an administrative burden that alternative bans avoid¹¹. Their paper also suggests that extensive consultation with industry and commercial representatives prior to enactment was a key to success, and that the involvement of both government treasury and champions were critical to overall effectiveness and adoption of the levy, vice the initially favoured, voluntary tax-scheme¹². Critics of the Irish levy suggest that kitchen bin-bag and paper bag rates increased due to the reductions in plastic bags use¹³.

European Union Bag Fee Scheme

The European Commission study¹⁴ highlights some of the key policy considerations, including ease of implementation, overall impact on bag usage rate reduction, and other associated implications. They note the relative ease of implementing voluntary reduction strategies as well as bans, but caution against the "blunt instrument that gives little flexibility to producers, retailers or consumers". Their report recommends a combination of regional targets and a pricing scheme, to achieve the best balance in reduction potential, without the unintended consequences, and provide the combination of endorsed targets and financial incentives to improve consumer behaviour.

The EU report states that a pricing scheme is potentially most attractive to policy makers since it provides a pricing mechanism that **aims to prevent the unsustainable and free distribution of material that is commonly transformed into waste, and poses downstream financial, social and environmental penalties on all City tax-payers**. The report also clearly states the simple fact that "many retailers still distribute plastic carrier bags for free, is the main driver behind excess use and thus an important lever for change"¹⁵. In the case of the EU and other jurisdictions, fee-based incentives have been centrally controlled by larger national or state government bodies, and have recovered funds to pay for the administration of the levy.

⁸ Convery, F., McDonnell, S., and Ferreria, S. (2006). The most popular tax in Europe? Lessons from the Irish plastic bags levy. *Environmental and Resource Economics*.

⁹ Ibid.

¹⁰ Irish government website. Available at: <http://www.environ.ie/environment/waste/plastic-bags/plastic-bag-levy>

¹¹ Convery et al (2006).

¹² Ibid.

¹³ <http://www.allaboutbags.ca/irelandandlitter.html>

¹⁴ European Commission. (2011). Assessment of impact of options to reduce the use of single use plastic carrier bags. European Commission – DG Environment. 12 Sep 2011. Bio Intelligence Service.

¹⁵ Ibid.

Stakeholder Considerations (more detail at Annex B)

Plastic industry and provincial recycling representatives argue that any proposed ban removes customer choice, and work counteractively with provincially funded, extended producer responsibility programs. These stakeholder communities remain largely in favour of strong recycling programs but perhaps deliver slower-than-desired reduction rates, and remain interested in the valuable resources provided by recycled plastics.

Industry views are consistent with future plastic 'circular economy' models, which rely on well-established resource recovery schemes to re-introduce plastic waste back into the production loop. The most recent and governing studies on the future of plastic and packaging support the importance of working with all industry, recycling and consumer groups to establish efficient and effective systems for recovery in all cities.

Environmental advocacy groups petition for more stringent regulations on consumption habits and the regulation of wasteful practices. Ocean conservancy groups warn of the dangerous levels of plastics in the ocean, and tie wasteful consumer habits and poor waste management as key drivers of ocean litter and debris.

The CRD and the Province's position on single-use plastic bag management is to extend responsibility for recovery and recycling to industry players as outlined in the BC Recycling Regulation, and applied by Multi-Materials BC (MMBC) as the agency for managing plastic film recycling schemes around BC.

Overall Packaging Waste Management Considerations

A recent City of Vancouver waste audit has revealed that approximately 18% of single-family and 12% of multi-family residential waste is comprised of single use plastic, packaging, and plastic film products. Recent waste composition observations within the City align with the Vancouver assessments, although detailed home waste audits in the City or CRD have not been completed in several years (2009/10). Much of these types of waste are managed under the province's MMBC program, but significant percentages continue to reach the landfill. Reduction efforts that focus only on plastic bags and fail to address all prevalent single-use waste products, could be considered misallocation of finite staff resources that aim to achieve the largest possible improvements. A broader and more comprehensive approach to reducing the waste from single-use packaging (including coffee and beverage containers, packaging materials etc) should be addressed as a priority to promote meaningful waste-reduction outcomes in the City.

OPTIONS AND IMPACTS

The European Union's 2011 review of plastic grocery bag policy options included five main options for consideration to address waste-reduction of retail grocery bags:

- a. Status Quo ("do nothing" option);
- b. Voluntary commitment in support of reusable bags;
- c. Setting prevention target for bag reduction;
- d. Bag levy or fee; and
- e. Ban on single use plastic bags.

Additional options could be introduced, as follows:

- f. Education and Awareness; and
- g. Combination (ban/tax combination, or reduction targets with education and a phased approach on pricing, for example).

As Council has already expressed its intent to regulate the use of plastic retail bags, the following select options are presented for consideration, where it is generally understood that establishing reduction targets and incorporating education and awareness should be part of any future waste

reduction initiative.

Option 1: Do Nothing (not recommended)

This option relies on market forces and regional/provincial recycling schemes to drive improvements in plastic bag and packaging reductions. Given Council's expressed intent to introduce restrictions on retail bag use in the City, this option is not recommended.

Option 2: Voluntary Bag Fee (recommended as initial action)

A voluntary program (item b, above) could be implemented with City support to local businesses. This strategy could to avoid much of the resource requirements and legal risks associated with any imposed regulatory action. Recent action at local retailers (Hillside Mall, MEC, Thrifty's) are strong examples of voluntary action, and with City support, could help generate the required momentum to deliver meaningful reduction to bag usage, especially if coupled with education and awareness programs. Voluntary fees or bans are also seeing success in Granville Island, and Whistler, BC when initiated by local retail and grocery outlets.

A voluntary scheme could allow retail outlets to raise capital to invest in more sustainable business practices (better collection facilities, improve education and awareness signage, purchase sustainable food containers etc), and reward sustainable consumer behaviours (ie. a "fee-bate" system where fees pay rebates for customers with reusable bags). The City can work with retailers that own businesses in multiple municipalities to increase the benefits of improved waste management outside of the City.

As was the case in Ireland, a meaningful price per bag was imposed to promote a shift in behaviours, now at 22 cents euro per bag. The common price in many cities worldwide is 5 cents, which may be too low to achieve the desired shift to reusable bags. A more meaningful fee and rebate system (a minimum 10 cents, as is in place in San Francisco) or even higher, may be most effective and appropriate. The initial voluntary scheme will potentially realise less overall impacts than a mandatory fee, but does not require significant resources to manage, and may prevent confusion across municipal boundaries and potentially avoids the legal risks to the City associated with any imposed regulation.

Option 3a: Regulated Plastic Bag Ban

An outright ban on plastic bags represents a relatively easy regulation to implement and enforces, which poses immediate reduction of the City's plastic bag recycling and waste products. The ban would apply to municipal retailers only, and could negatively impact retailer customer loyalties, in favour of neighbouring community stores. Such a ban could also create negative responses from industry and recycling, CRD and provincial program representatives and rate-payers, and proponents of convenience-first bag alternatives. A ban of only plastic bags could also proportionally raise paper bag and alternative plastic bag usage rates, thereby creating an unfavourable net-environmental effect.

Option 3b: Regulated Ban / Ban Combination for Plastic and Paper Bags

This option is not recommended due to the removal of consumer options at the checkout line.

Option 4: Regulated Plastic Bag Levy or Fee

A suitable fee on plastic bags could provide incentives for improvements in customer behaviour, to adopt reusable bag alternatives that favour improved environmental performance. Fees retain customer choice, and generate revenues that could be applied to stewardship or related environmental programs, or even cover administrative costs of the program. This option will allow a certain number of bags in circulation, and not immediately interrupt MMBC and other recycling programs. This option may not receive the same criticism from industry as a ban, since it still provides for plastic bag use, via customer choice. This option may better promote future

collaboration and cooperation with retailers and other important industry stakeholders on future waste management initiatives. Administration of the program is more comprehensive than any zero tolerance legislation, and would require City or contracted resources to manage.

Option 5: Regulated Ban / Fee Combination for Plastic and Paper Bags

This option is common in many jurisdictions and incorporates both a plastic bag ban, and an additional a fee to deter a proportional rise in paper bag use. This option is not recommended due to the lack of customer choice and the misalignment in logic caused by banning a bag with less environmental impact. This combination could be supported if the plastic bags were creating a much worse local litter problem, when compared to other bag alternatives, but the evidence to support such a claim has not been identified in the City.

Option 6: Regulated Fee / Fee Combination for Paper and Plastic Bags (recommended for future consideration)

The combination of fees for both plastic and paper bags maintains consumer choice, and establishes incentives for reusable bags, without contributing to a rise in alternative bag usage rates. The benefits of a fee scheme on single-use retail bags are as follows:

- Can create significant reductions in bag use (ex. Ireland's 90% reduction in one year);
- Aligns with waste-management hierarchy for focus on waste-reduction methods;
- Can provide incentive and promote improvement of social awareness of individual waste generation;
- Can be seen as leadership in waste-management;
- Can still be coupled with improved recycling programs that align with provincial objectives and investment;
- Can be allocated to prevent corresponding increases of all bag alternatives that pose negative environmental impacts (ie. paper bags);
- Maintains customer choice;
- May promote continued industry-governmental liaison towards further improvements and other important waste-management improvement programs;
- Maintains some, albeit reduced, HDPE and paper bags in circulation for reuse and recycling, minimizing associated increases in alternative bag purchases (ie. bin liners);
- Provides social and marketing capital for individual stores to improve image and brand strength through environmental stewardship programs;
- Could be coupled with a 'fee-bate' system to award those who bring re-usable bags to the checkout line;

This type of scheme has to be carefully administered due to complications in the following areas:

- Price setting at a level that creates the intended behaviours without promoting conflict;
- Obtaining the legal jurisdiction to require retailers to charge for these products;
- Administrative burden to manage a complex program that requires accurate and timely information and resources to drive policy, data/information, education, administration, communications and regulatory programs to support the initiative;
- Discontinuities with neighbouring municipality retailers could cause confusion and polarisation of the issues/debate/concerns;
- Additional fees may be seen as negative taxation, and unless properly communicated and supported, could create discontent within communities; and
- Various fee/tax schemes on plastic bags have been criticised in the past for disadvantaging those with affordability concerns, which should be a consideration of the policy, with sufficient mechanisms to allow an affordable bag option.

Planning, Financial and Resource Implications

Detailed planning and resource estimates have not yet been completed against the above option sets. With Council's direction, staff will assess and report on the estimated resources, available strategies, and their associated impacts.

COHERENCE WITH CITY STRATEGIES

Official Community Plan

Reduction of waste, litter and marine debris are consistent with the OCP and the development of vibrant, healthy communities.

2015-2018 Strategic Plan

Reduction of consumer waste and incentivising improved sustainable behaviours is consistent with the City's Strategic Plan, as is stewarding the City's waterways and ensuring they are free from plastic debris. These recommendations are consistent with Council's expressed intent to "phase-in" a ban on plastic bags in the 2016 strategic plan review.

2016-2020 Financial Plan

Financial estimates for the recommended course of action have not been completed, nor are any funds currently earmarked for plastic bag management initiatives in the future.

NEXT STEPS

In order to address the number of issues presented in this report, a comprehensive strategy should be developed to minimise risks and optimise benefits related to plastic and packaging waste management. It should be noted that the enclosed recommendations represent a significant amount of staff resources to implement. Staff recommend that Council consider widening the focus of future efforts, to address larger and more impactful waste-reduction policies related to plastic and single-use packaging, single use beverage containers, retail bags and plastic film products.

A general strategy is outlined below to address the reduction of single-use, packaging and retail bag waste:

- Convene initial discussions / meetings with key retail/business/waste stakeholders to understand their perspectives and issues related to a voluntary bag levy and future packaging reduction initiatives (June 2016);
- Develop a preliminary work-plan and resource assessment for future analysis, engagement, and communications of any related initiatives to reduce single-use packaging (July 2016);
- Report back to Council with initial considerations and findings and resource assessment (July 2016);
- Based on those findings, staff could define a more detailed strategy to include the following (September – Dec 2016):
 - Convene or join a working group / 'task force' to collaborate on issues related to single-use packaging and retail bag management, with representatives from all key stakeholder communities, including the City, retailers, CRD, MMBC, waste operators, environmental groups, and residents, working under a formal terms of reference to reach recommendations on policies, regulation, implementation, consultation and communication requirements, timings, plans and other pertinent issues
 - Work with key stakeholders to obtain and discuss accurate and timely data pertaining to all aspects of the City's single-use waste management and areas for improvement (CRD, MMBC, retailers, etc);
 - Work with retailers to better understand their concerns and desires as to any future regulatory actions by the City;
 - Begin developing a comprehensive engagement plan to communicate accurate and

meaningful information to concerned stakeholders (shoppers, public, store owners etc) and introduce an education and awareness program across the City;

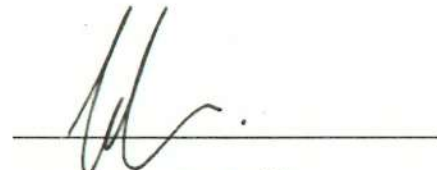
- Ongoing Work (2017 onwards):
 - Work collaboratively with other surrounding municipalities regarding this initiative to determine how to collectively realise the most regional benefits;
 - Work collaboratively with key stakeholders to identify exemplary standards for labelling and materials for both single use and reusable packaging in the City;
 - Work collaboratively with the province, CRD, municipal waste management representatives and other key industry stakeholders to improve plastic packaging and bag recycling and diversion rates and determine how to best reduce unsustainable practices;
 - Work with stakeholders to integrate this program into the City's long-term, waste-management strategy; and
- Report back to Council with salient information, plans and strategies that may inform any future regulations on retail bag use.

Respectfully submitted,



Fraser Work, Director
Engineering and Public Works

Report accepted and recommended by the City Manager:



Date:

May 20, 2016

Annex A: Environmental Life Cycle Considerations of Bag Alternatives

Annex B: Stakeholder Perspectives

ANNEX A: Environmental Life Cycle Considerations of Bag Alternatives

Plastic Bags – Waste Stream Information

The following information or estimates are related to plastic bag waste, with applicable, regional, information, where appropriate. It should be noted that much of the required statistics are not current or readily attainable.

- Plastic bag as a percent of overall waste (CRD and City of Vancouver): 0.79%¹⁶ - 2.11%¹⁷
- Estimated bags used per capita in Canada: 200¹⁸
 - Estimated bags used per capita in Seattle and the UK: 120¹⁹- 450²⁰
- Annual City plastic bag usage
 - Estimated based on Globe and Mail (2012) totals: 17 million
- Portion of City bags recycled: Unknown
 - California and other US cities²¹: estimate 3-12%
- Portion of City bags littered: Unknown
 - EU estimates of 4.6%²² of bags end up as litter. If similar rates were experienced in the City, more than 780,000 bags would escape collection yearly (based on the 200 per capita rate, above).
- Estimated Percent Reused Before Disposal (ex. bin liners or dog waste bags): >50%²³
- Portion of City bags made from recycled content: Unknown.

While overall waste proportions are low due to the density of plastic bags (ie. approximately 5 grams for a typical grocery bag), the very high usage rates, low recycling rates and high litter potential, are largely undefined and are cause for concern. Accurate, local or regional information is required to make informed and intelligent management decisions. Working collaboratively with local, regional and leading stakeholders should be pursued to ensure the strongest and most positive City policy outcomes.

Alternative Grocery Bags – Relative Impacts and Environmental Performance

Different alternatives to plastic grocery bags exist, and have been assessed as to their harm on the environment in a number of life cycle analyses (LCAs). The common types of grocery/carrier bags include the following:

- Conventional grocery bags made from High Density Polyethylene (HDPE),
- Paper bags;
- Sturdier, glossy, plastic retail bags made from Low-Density Polyethylene (LDPE) bags;
- Reusable, Non-Woven Polypropylene (NWPP) bags, and

¹⁶ CRD (2011). Report to roundtable on the environment, 9 Dec 2011.

¹⁷ City of Vancouver, Waste Audit 2015 data. Total plastic film in single family garbage equals approximately 10%.

¹⁸ The battle of the bag. The Globe and Mail, 7 June 2012. Available online at:

<http://www.theglobeandmail.com/news/toronto/the-battle-of-the-bag/article4241011/?page=all>

¹⁹ UK per person estimates (http://www.earth-policy.org/plan_b_updates/2014/update123)

²⁰ Seattle per person estimate (<http://cnsnews.com/news/article/seattle-s-new-ban-plastic-bags-pushes-people-less-environmentally-friendly-options>)

²¹ <http://www.motherjones.com/environment/2014/09/california-bans-plastic-bags> and <http://calrecycle.ca.gov/plastics/atstore/AnnualRate/2009Rate.htm>

²² UK Environmental Agency (2011). *Life Cycle Assessment of supermarket carrier bags: review of the bags available in 2006*. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291023/scho0711buan-e-e.pdf

²³ PwC/Ecobilan (2004) Impact assessment of Carrefour plastic carrier bags, Carrefour, France, as cited in www.scotland.gov.uk/Publications/2005/08/1993259/33039.

- Reusable, cotton carrier bags.

Biodegradable bags

Numerous bio-based plastics have been applied to carrier bags, and can be either biodegradable or non-biodegradable. Some polymers used to make bags are manufactured using compostable polymers, and are designed to be processed in industrial composting facilities, using controlled temperature, oxygen levels and processing times.

Biodegradable bags would have to be certified and labelled properly to avoid confusion with conventional plastic bags. To be an effective alternative, these biodegradable bags would have to be managed separately from plastic recycling streams, and be recovered in industrial composting facilities at the end of life. Adopting any biodegradable bag alternative may not result in a shift to more sustainable habits, and worse, could actually result in more littering due to a common misperception that the bag will degrade more quickly and pose little environmental damage.

Life Cycle Assessments (LCAs)

A better understanding of the relative, local environmental impacts of different carrier bags is required in order to adequately compare alternatives, and also to better understand any unintended consequences related to restricting the use of any one bag type. An LCA can be used to provide a scientific and repeatable measure of a product's performance across a range of environmental impact categories, such as global warming potential, ecosystem impacts, water use / contamination, toxicity, eutrophication, and waste generation. Each LCA must make unique assumptions about a product's manufacturing phases, use phase, material composition and end of life.

A peer reviewed, 2004 Price Waterhouse Coopers study compared paper and plastic grocery bags for a French supermarket chain (Carrefour) and indicated the following comparisons, which was subsequently used for policy guidance in the European Union.

Table 1. PwC / Ecobilan (2004) Impact Assessment of Carrefour Plastic Carrier Bags

Indicator of environmental impact	HDPE bag (lightweight)	Reusable LDPE bag (used X ₃)	Reusable LDPE bag (used X ₄)	Reusable LDPE bag (used X ₃₀)	Paper bag (single use)
Consumption of non-renewable primary energy	1.0	1.4	0.7	0.1	1.1
Consumption of water	1.0	1.3	0.6	0.1	4.0
Emission of greenhouse gases	1.0	1.3	0.6	0.1	3.3
Atmospheric acidification	1.0	1.5	0.7	0.1	0.9
Ground level ozone formation	1.0	0.7	0.3	0.1	1.3
Eutrophication	1.0	1.4	0.7	0.1	14.0
Solid waste production	1.0	1.4	0.7	0.1	2.7
Risk of litter	1.0	0.4	0.4	0.4	0.2

The PwC comparison of plastic and paper bags, suggests that the production of paper bags causes 14 times the impact on water quality and consume 4 times the water, has 3 times the waste generation, and 3 times more greenhouse gas emissions than HDPE plastic bags²⁴. This study also highlights the environmental benefit of the heavier duty plastic bags (LDPE), which are preferred to many alternatives, but only if reused 4 or more times.

A 2011 UK government LCA study compared several bag types, and determined that a cotton bag had to be re-used 131 times²⁵ to match the equivalent greenhouse gas emissions from the production of a single use HDPE bag. This study stated that LDPE and NWPP bags posed 3,4 and 11 times more global warming potential, (respectively), than a HDPE bag²⁶. The NWPP bags are designed to be used more than 100 times, and if reused, would pose the least overall environmental impact.

Life Cycle Analysis Commentary

All of these studies suggest that HDPE plastic grocery bags pose less environmental risks than other single-use, bag types, especially if recycled at end of life. These studies also conclude that single use paper bags are less environmentally friendly due to the large impacts on energy use, and water contamination during processing. These studies all conclude that in order to maximize the environmental benefits of reusable bag alternatives, a bag should be made from enviro-friendly or recycled materials, avoid landfill, and be used a "sufficient" number of times²⁷.

Specific bag impact results have to be carefully considered, since each study makes unique and numerous assumptions that define the bag material, size/volume, usage rates, manufacturing processes, recycled content, system boundaries, production and transportation energy mix, and end-of-life scenarios. All of these assumptions pose different environmental impacts in each category. During this review, no local study was found that contained a representative mix for BC made and used materials, which could potentially modify the comparative impacts between single-use bag alternatives.

Ocean Plastic Pollution Concerns

The Surfrider Foundation is an international coastal and ocean environmental advocacy group with a strong presence in the Pacific Northwest. Surfrider has locally championed their corporate "ban the bag" campaign, which is nominally targeted at eliminating plastic bags at retailers, in support of reducing ocean litter.

According to recent ocean-plastics report from the Ocean Conservancy, the amount of plastic waste in the ocean is rising past dangerous levels, with significant impact to ocean ecosystems, food chains and global health²⁸. Most plastic enters the ocean from landfills or littering, and is especially a problem in coastal nations suffering poor-quality waste management systems. The Ocean Conservancy report highlights the urgency of the ocean-plastic problem, which states that by 2025, there will be one ton of plastic debris in the ocean, for every three tons of finfish, quickly rising from 12.7 Mt to 250 Mt - an order of magnitude more than in 2015²⁹. Science magazine's 2015 report

²⁴ PwC/Ecobilan (2004) Impact assessment of Carrefour plastic carrier bags. Carrefour, France, as cited in www.scotland.gov.uk/Publications/2005/08/1993259/33039.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Note: Seattle states 20 reuses as an acceptable minimum²⁷, while the UK is suggesting that heavier duty LDPE bags must be used 4 times to be considered as a suitable alternative to conventional grocery bags. San Francisco states that any reusable grocery bag must be designed to last at least 125 times to be considered an environmentally preferred option.

²⁸ The Ocean Conservancy. (2015). *Stemming the Tide. Land Based Strategies for a plastic-free ocean.* McKinsey Center for Business and the Environment. September 2015.

²⁹ Jambeck J.R., et al. (2015). Plastic waste inputs from land into the ocean. *Science* 347(6223):768–771;

states that roughly 2-5% of all plastic waste generated in 192 coastal countries is ending up in the ocean, which represents 32% of all plastic packaging escaping collection and management systems. This report also states that over half of this waste comes from just five rapidly growing economies – China, Indonesia, the Philippines, Thailand and Vietnam, and 83% of all waste, coming from 20 nations³⁰. Canada is not on the list of top 20 plastic-ocean-polluters, and has one of the lowest instances of mismanaged plastic “leakage” into the ocean.

Ocean plastic facts, taken directly from *Science*'s report are as follows:

- Plastics do not biodegrade in the ocean, but merely fragment into smaller and smaller pieces as a result of weathering and exposure to ultraviolet light.
- Plastic debris has been found in all areas of the ocean, from the ocean gyres to the deep sea, on coastal shores and frozen in Arctic sea ice.
- Impacts from plastic debris has been documented in more than 660 species, from entanglement and ingestion.
- Plastics can concentrate toxic chemicals from seawater up to 1 million-fold. Ingestion of these contaminated plastic particles may deliver these chemicals to the ocean animals which eat them, potentially resulting in negative effects on their health and survival.
- A direct link between plastics input to the ocean and human health through consumption of contaminated seafood has not yet been made. Seafood toxicity from plastics is an area of active research.

An Ocean Conservancy 2015 report suggests that plastic bags make up approximately 3% of the all litter collected during global, organized beach clean-up events, with the most prevalent items being cigarette butts, plastic food wrappers and bags, beverage containers, straws and screw caps³¹.

Risks of Exporting Pollution to Overseas Markets

While statistics suggest that Canada maintains ‘tight’ waste management systems and is not a major contributor to ocean plastic debris, concerns have been raised that any exportation of local recycling to buyers in overseas markets may mean that Canadian materials could potentially leaking from mismanaged, foreign landfills. China's “Green Fence” policy of 2011 was implemented to prevent the importation of other nation's wastes not suitable for their own domestic recycling markets. Since the implementation of these restrictions, exported wastes are supposed to be blocked from entering China, and returned to the originating country, under potential penalty.

This staff review has not been able to determine if Victoria's plastics enter foreign landfills that may have ‘leakage’ problems. More investigation would be required in order to understand if there is any risk that Canadian wastes may be entering the ocean environment via overseas recycling or waste markets.

Consumer Behaviour Trends (USA Study 2014)

A Clemson University study in 2014 reviewed the life cycle impacts of different carrier bag alternatives, and summarized a national USA survey of over 3000 residents, which revealed the following trends in grocery bag usage³²:

- 28% of people had acquired a reusable grocery bag;
- 87% of those had used reusable bags for groceries;

doi:10.1126/science.1260352

³⁰ Ibid.

³¹ Ocean Conservancy. (2015). Trash Free Seas and International Coastal Cleanup Report.

³² Kimmel, Robert M., et al. (2014). Life Cycle Assessment of Grocery Bags in Common Use in the United States. Clemson University.

- Consumers forgot to bring their reusable bags 40% of the time;
- LDPE grocery bags are designed for approximately 125 uses, but are used on average, only 3.1 times, which poses greater consumption rates and higher environmental impacts than a conventional plastic retail bag;
- Less than 10% of people are using the LDPE the recommended number of times (125);
- Between 25-40% of people are reusing their NWPP bags enough times to warrant the per-bag environmental impact³³; and
- 15% of consumers wash their reusable bags, and 23% never wash them.

These results show actual data pertaining to the bag re-use trends in the United States. Lower re-use rates continue to trend below the intended targets, due to less consistent adoption of reusable bag alternatives. These conclusions suggest that a ban on HDPE plastic bags could potentially pose an overall environmental penalty rather than benefit, unless usage rates can be lifted above desired levels.

³³ Assumed plastic bag is made from 30% recycled content (ibid).

ANNEX B: STAKEHOLDER CONSIDERATIONS

Multi-Materials British Columbia (MMBC) - Extended Producer Responsibility

MMBC, working with the province, municipalities and regional governments, has ensured the availability of depot collection for film plastics, including plastic bags. MMBC, on behalf of the BC Ministry of the Environment, contracts the collection and management of post-consumer waste film plastics, to processing and recycling facilities in the lower mainland. In the City, MMBC has worked with local retailers and collection facilities to provide a drop-off network for consumers to recycle bags.

MMBC's 2014 report suggests their contracted target has been reached, but remain unclear as reporting volumes for total plastic production entering the economy remain unknown³⁴. MMBC also makes reference to their commitment to improve the amount of recycling content in plastic bags, ranging from 15-100%. MMBC also references the importance of education and awareness in reducing the amount of plastic bags used by consumers, through encouraging the use of reusable bags, more efficient packing by store employees, and querying customers on the requirement for bags at the checkout line. MMBC also states their commitments in reducing the impacts of plastic bag use, through optimization of material properties of the bags themselves, but does not reference any successes in this domain. The status of their efforts to reduce plastic recycling content, and education and awareness campaigns remain unknown at this time.

Industry Representatives

Canadian Plastics Industry Association (CPIA) supports provincial recycling and extended producer responsibility programs and suggest plastic bags are the more environmentally friendly bag alternative. CPIA suggests current bag recycling rates are near 35% (actual reference not provided), and remain important options for reuse bin liners or pet waste. CPIA further states that recycled plastic bags are an important resource for local reprocessing industry, recycled plastic product manufacturing, and job creation. CPIA highlights recent increases in the public's access to collection depots to improve film plastics via the MMBC programs.

The Retail Council of Canada has prepared several statements (online) that support continued use of plastic bags, and argue against any proposed ban on plastic bags, with the following key points³⁵:

- *RCC is opposed to the current proposals regarding the outright ban of plastic bags... since voluntary initiatives being taken by industry are successful in reducing distribution of plastic bags.*
- *Assuming consumers will entirely replace plastic bags with reusable bags is not realistic. Consumers want these bags for their garbage rather than buy new ones.*
- *Plastic bags are recyclable and the retail industry compensates municipalities for the collection, transportation and sorting (blue box) of this material. In addition, this material is valuable to recyclers and is resold to help offset costs associated with running recycling programs.*

The Canadian Federation of Independent Grocers suggests that ongoing education and awareness campaigns, coupled with the inclusion of curbside regional recycling schemes, are adequate for addressing the litter problem, and suggest a collaborative approach to any legislation (letter to Mayor and Council, 2 Feb 2016). Note that the CRD does not currently have curbside plastic film recycling.

³⁴ The 2014 MMBC annual report suggests that 80.1% of all plastic materials under the program were collected, out of the 145,351 tonnes of plastics produced by suppliers who have registered with the program. No estimates have been found which attempt to quantify what portion of the total plastics this represents.

³⁵ ³⁵ <http://www.retailcouncil.org/advocacy/plastic-bags>.

CRD Regional Waste Management

The CRD has introduced the Extended Producer Responsibility (EPR) program, as mandated by the BC Recycling Regulation. In 2014, Multi-Materials BC (MMBC) took responsibility for the life-cycle management of film plastics and printed paper in the City. The regulation stipulates an intended recovery rate of 75%. In 2008, costs to include the plastic bags in the blue-box program were deemed excessive, and the responsibility for the collection of these items was transferred to the user. CRD has determined that they do not have the authority to tax or ban the use of plastic grocery bags. The actual recovery rates of plastic bags and plastic film in BC or the City is not yet known. The CRD is planning on updated waste stream analysis in 2016 that will inform the City's statistical information needed to make quality policy decisions and potentially highlight the effectiveness and considerations related to the performance of the MMBC program. The CRD bans the landfilling of plastic grocery bags but is unable to practically enforce.

Environmental Advocacy Groups / Surfrider International

Surfrider Foundation Vancouver Island chapter is advocating for ocean health and the global reduction of ocean plastic. The following text is taken from their online petition webpage³⁶:

- *Plastic bags are polluting our oceans, killing tens of thousands of birds and marine animals each year. They are typically used once or twice for short time before they become waste, and often litter. The idea behind banning single use plastic bags is to promote the use of re-useable shopping bag.*

The New Plastics Economy – 2016 Report from the Ellen MacArthur Foundation

Economic Impacts and Considerations

After an initial short use phase, 95% of plastic packaging material is lost to the economy; a value of 80-120 billion USD annually, plus the cost of greenhouse gas emissions from its production – estimated at 40 billion USD per year³⁷, plus marine ecosystem degradation impacts, estimated conservatively at 40 billion USD, annually³⁸. At current expansion rates, the complete plastics industry will account for 20% of total oil consumption and 15% of annual carbon emissions by 2050³⁹. These figures clearly show the importance of reducing plastic waste, use and recycling.

Circular Economy Model

The overarching vision of the circular economy is that plastics never become waste, but instead are treated as a valuable resource and essential nutrients for industry. The circular model aims to greatly optimise the economic and environmental outcomes by stimulating and promoting a plastics economy with drastically improved services and reduced negative externalities "nevertheless, reduction should be pursued where possible and beneficial, by dematerialising, moving away from single-use as the default, and substituting by other materials"⁴⁰.

Design Labelling and Engineering Considerations

Consistent labelling, use of safe and effective material properties, and innovative and widely adopted processing and collection schemes are required in order to effectively leverage widespread innovation and reduce plastic's overall negative impacts.

³⁶ <https://www.change.org/p/ask-victoria-city-council-to-ban-single-use-plastic-bags>

³⁷ The New Plastics Economy. Rethinking the Future of Plastics. Ellen MacArthur Foundation. WEF. McKinsey Centre for Business and the Environment, 2016.

³⁸ Ibid.

³⁹ Ibid.

⁴⁰ Ibid.