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REDUCING CONTAMINATION IN EDMONDS SINGLE-STREAM RECYCLING COLLECTION

Executive Summary

Contamination in single-stream recycling systems is an issue of significant concern. Unlike contamination seen in other types of curbside recycling, which is primarily caused by improper recycling practices, materials in single-stream collection pose an added obstacle, in that they are also largely contaminated by other, "properly" recycled materials. That being said, the degree to which contamination is observed in single-stream recycling systems is unique, in that someone can follow instructions with perfect accuracy and still potentially affect parts of the recycling process in a negative way. Glass bottles and jars, for example, are accepted in the single-stream curbside system, yet poses one of the biggest threats to material recovery when collected this way.

When done right, recycling is an effective way for a community to reduce their energy consumption, decrease spending on raw materials, and support their local economy simultaneously. With that in mind, it is important that all measures are taken to allow a community to do so to their fullest potential. Studies have indicated that there are ways to greatly reduce contamination as well as many of the harmful effects and inefficiencies that come with it. Our goal is to explain how the use of alternative disposal methods for some of the larger contributors to the issue, such as glass, plastic bags, and plastic film address material recovery more effectively than what is currently in place, and how educating the public can powerfully supplement a transition to more accurate and effective recycling practices.

Statement of Need

Contamination in the commingled recycling system caused by plastic bags, plastic film and glass bottles and jars reduces the amount of material that can be recovered, lowers the value of marketable recyclables, and causes additional inefficiencies in the recycling process. The Washington State Department of Ecology's Northwest Region Report (Nov. 2016) demonstrated that plastic film, plastic bags, and glass are major contributors to contamination in the commingled systems in northwest Washington. Members of the Edmonds City Council, the Washington Department of Ecology (DOE), and Recycling Coordinator for the City of Edmonds, Steve Fisher, have directly identified these sources of contamination in recycling as a major concern for the City of Edmonds.

Plastic Bags and Film

People are confused about how to recycle plastic film and bags

It is not entirely clear to people that plastic bags and film are not accepted in the curbside system because plastic bags and film *are* recyclable materials. There are systems in place that collect plastic bags and film separately from commercial sources and public bins in larger grocery stores. However, plastic bags and film serve strictly as contaminants when mixed in with curbside materials. That means that the Material Recovery Facilities (MRFs) are receiving contaminated material, despite the fact that they are receiving materials with potential for recovery. This misunderstanding on what to do with these materials is what leads to the improper disposal of these materials, as well as the eventual waste of what could have been usable.

Sorting machineries at the Material Recovery Facilities (MRFs) are not designed to work with plastic bags and film

When plastic bags and film enter sorting machinery that is designed for materials of a different nature, it can mean a complete shut-down of the entire facility in order to "unclog" the gears. It goes without saying that this is an inefficient use of time and labor for those working in the MRFs. In fact, the DOE's Northwest Regional Report states that the removal of plastic bags and film from sorting machinery makes up 20-30% of labor - labor which could and should be focused elsewhere.

The nature of these materials makes them highly prone to intermingling with other recyclable materials

Paper and cardboard are especially vulnerable to contamination by plastic bags and film for this reason. If paper bales are contaminated by plastic bags and film, they are considered landfill material.

Glass

Recycling glass saves energy and reduces carbon emissions

According to the Northwest Region Report, every 6 tons of recycled glass used results in a reduction of CO_2 emissions by one ton. In addition to that, other pollutants such as particulates, nitrogen oxides, and sulfur oxides which result from glass production can be reduced when cullet is used in place of newly produced glass. Using recycled glass over newly produced glass can be a big player in climate change progress as well as preservation of air quality. More information on the environmental benefits of recycling glass can be found in the Northwest Region Report mentioned above (see sources).

Glass breaks throughout the entire collection process

Due to the fragile nature of glass, as it is collected, transported, and sorted, it can continuously break into smaller pieces. Small glass shards contaminate other recyclables, especially paper and cardboard, by easily adhering to these materials. The shards also pose a danger to workers. Since glass itself has a small market value, the larger issue is that broken glass contaminates recyclables that do have a high market value, such as paper.

Proper disposal of glass does not guarantee proper recovery

The current single-stream system puts all recyclables at risk for contamination, even with proper participation from the residents, strongly implying that the system is at least one the main problems.

Project Description

Goal: To reduce contamination rates in Edmonds' single-stream recycling system by removing glass bottles and jars, plastic bags, wrap and film from the commingled curbside recycling.

Objective 1*:* Begin a city wide campaign for the City of Edmonds, reminiscent of Vancouver, Washington's "Recycling Done Right" that addresses the issue of contamination by means of conducting a characterization study to measure the progress of the newly implemented systems, improving communication with the MRF's and haulers, providing educational resources, incentivizing the citizens of Edmonds and providing direct feedback.

Through the use of tools provided by the Recycling Partnership[1], temp workers and collaboration with the haulers, this objective can be accomplished in the following parts.

Initiate a baseline characterization study of the materials being received

The city of Vancouver and Clark county hired the environmental consulting firm, Green Solutions, in an effort to gain an adequate idea of the amount and types of recycling being collected (Code Green). A similar process is recommended in order to gather information. The study will include information from the transfer stations and haulers, as well as a survey of materials being received at the transfer stations. This study will result in data regarding the composition of the commingled recycling and create a baseline from which to measure progress in subsequent years.

Educating the public and providing incentives for good recycling practices

The educational outreach should include a user friendly and interactive web page. Boulder County, CO and Clark County, WA demonstrate good examples of effective web resources (links posted below). Additionally, the public is informed through bill-inserts and posters on the recycling carts themselves. The Recycling Partnership provides free templates which would allow for a cost effective resource to quickly implement these

[1] Recycling Partnership is a non-profit organization which forms private/public partnerships to improve recycling nationwide

tools. In order to evaluate the effectiveness of the posters, we propose initially only adding these to a sample of the carts to get a sense of their effectiveness.

http://www.ecocycle.org/recycle-compost-reuse

http://clarkgreenneighbors.org/

Direct feedback on recycling practices through cart tagging

Residents can receive direct feedback through the increased usage of cart tagging. This process is completed by workers glancing into the tops of residents carts on pickup day, looking for obvious signs of misplaced materials and then leaving an "Oops tag" if a source of contamination is observed. While this process can be completed by the haulers, all three of which have utilized this tool selectively in the past, it may be more effective to send temp workers out ahead of time to ensure that this is completed without decreasing the efficiency of the haulers. The Recycling Partnership provides the template for an "Oops tag" which would help create uniformity between the different hauling districts. While this can be a labor-intensive aspect of the solution to the contamination issue, Vancouver saw a large reduction in contamination after utilizing this effective tool (Clean Cart Campaign 2015). Vancouver was able to provide feedback to 20% of the recycling households in the city by tagging carts. Within the carts of households who received "Oops tags" there was an observed 40% reduction in plastic bag contamination and a 22% reduction in overall contamination (Clean Cart Campaign 2015). Customers may not always be aware that they are using the commingled system incorrectly, which means education is an important step in the solution. The Recycling Partnership recommends, "Direct feedback to residents is extremely powerful. Update these "Oops Tags" with the top materials that are causing your MRF problems, and print enough for every household you service." (RecyclingPartnership)

Incentive programs

The City of Vancouver, WA utilized an informational video in order to inform citizens on correct recycling habits. This video provides a quick and fun way for citizens to gain the appropriate information. After watching the video, the citizens were able to take a quiz and receive direct feedback on their knowledge. There is also the incentive of moderately priced prizes for participation.

The City of Bellingham also utilized a useful incentive program that could be modified to work for recycling. In the Smart Trips program, citizens are rewarded for trips taken using alternative modes of transportation. Based on the number of trips taken, people are able to be entered to win prizes and be eligible for a discount card for local businesses. A similar program would be effective for recycling in Edmonds.

Given that the tools have already been provided by the Recycling Partnership, it is reasonable to believe that all of this could be in place by 2018.

Objective 2: Implement uniform plastic bag/film recycling bins at all five grocery stores in Edmonds and increase public awareness through the use of the Wrap Recycling Action Program (W.R.A.P) campaign tools in order to increase proper recycling of plastic bags, wrap and film.

The Wrap Recycling Action Program is a campaign that would facilitate a partnership between the grocery stores in Edmonds, Trex[2], and plasticfilmrecyling.org to increase knowledge on the correct and most effective ways to recycle plastic bags, wrap and film while providing a uniform design for receptacle bins through the folloiwng steps:

Facilitate cooperation between the five grocery stores in Edmonds

Implement uniform recycle bins in all of the grocery stores in Edmonds. It is important for the bins to all look the same, so people are familiar with the process and can easily participate at any of the active locations.

Increasing Educational Outreach

Flyers posted at grocery stores, on recycling bins, on web-pages, and as bill-inserts will educate residents on how to recycle plastic bags and film correctly.

The City of Vancouver, WA found a 75% decrease in contamination from plastic bags and film after implementing the "Recycling Done Right" campaign (Vancouver W.R.A.P. Report, 2015). Additionally, there was an increase in reported awareness that "beyond bags" materials[3] can be recycled at the stores from 44% to 51%. Also, an increase from 41% to 53% of customers who reported that they knew these materials should not be put in the curbside carts. Acknowledging Vancouver's success, we recommend getting Edmonds involved with W.R.A.P to educate residents on how to correctly recycle plastic bags and film, we recommend getting Edmonds involved with W.R.A.P to educate residents on how to correctly recycle plastic bags and film, which will then improve efficiency at the MRFs.

Partnering with a dependable buyer, TREX

Trex combines recycled materials from plastic bags, wraps and film with sawdust to make plastic composite lumber which is a more sustainable, long-lasting product than traditional wood lumber. Trex also involves elementary schools in proper recycling of plastic bags, wrap and film by facilitating competitions between school called, "Trex Plastic Film Recycling Challenge." Between 21 schools, 11,800 pounds of plastic was collected over a five month period (City of Vancouver).

The City of Vancouver was able to implement W.R.A.P bins in their grocery stores and

[2] Trex is a manufacturer of plastic composite lumber products. More information under "Partnering with a dependable buyer"

[3] "Beyond Bags" is the phrase Vancouver, WA used in their campaign to refer to materials other than bags which can be recycled, such as the film that wraps a 24-pack of soda.

all over town within six weeks of starting the process. We believe that Edmonds has equal potential, if not more, to get involved with this project and to see results quickly, if all goes as planned, by 2018.

Objective 3: Update the city recycling ordinance to remove glass bottles and jars from the current list of collectable materials in the curbside system and by means of alternative disposal methods. Options to keep glass containers collected as recyclables are outlined here.

By no means is this objective an easy one. However, an overwhelming part of the issue is caused by the current system. If the issue is to be taken seriously, a change in the system is absolutely crucial. Below are several potential solutions:

Re-introduce a dual stream curbside recycling system

Studies show that dual-stream systems generate significantly less contamination rates from glass than single-stream systems, meaning more material is actually recycled. On average, only 60% of glass from single-stream recycling gets recycled. In comparison, 90% of the glass is recycled in dual-stream systems, and bottle drop systems on average recycle 98% of their yield into new glass bottles and containers (Container Recycling Institute 2009, p.6).

Implement a bottle-drop facility

Establishing glass drop-off locations throughout Edmonds will remove glass from the curbside collection and increase quality of clean, recycled glass material. Quality is preserved in two ways. First, contamination of other materials (paper, cardboard) from glass is reduced, producing marketable products. Second, glass that may have shattered and contaminated other material is now recycled, as glass cannot contaminate itself. Additionally, haulers will save money from the reduced damage to their truck beds from breaking glass and employee injuries sustained from glass (Department of Ecology 2015, p.28-29).

Include redemption incentives

Edmonds could offer monetary reimbursement of glass recycling to households that prove their residency when dropping their glass bottles and jars off at a bottle-drop facility. A monthly cap for reimbursement (for example, $20) would prevent exploitation of the offer and would allow the City to calculate the exact budget prior to implementing the program. For example, the City would multiply the number of households who are currently recycling customers by the reimbursement cap to find the greatest possible cost of reimbursement each month in total.

Lobby for a statewide bottle-bill

States that have a bottle-bill in place have significantly reduced contamination rates when compared to states without a bottle-bill. Contamination rates for states with bottle-bills have on average 2-3% contamination rates, compared to 15-25% contamination for states that collect glass curbside (Department of Ecology 2015, p.31). Therefore, we strongly recommend that Edmonds support legislation that proposes a state-wide bottle bill.

Glass is contaminating otherwise clean recyclable material in the single stream system. By removing glass bottles and jars from the curbside, we can lower contamination rates. In addition, by establishing bottle-drop facilities, Edmonds can ensure increased quality from the now separated glass. The success of this project could serve as a model for the rest of the county and state, potentially leading to a state-wide bottle bill.

Annual Expenses Estimate:

**These numbers are based on budget information collected by the city of Vancouver, tailored to fit a city the size of Edmonds*

Baseline Audits:	$4400.00
"Oops" tags:	$900.00
W.R.A.P. Collection Bins:	$550.00
Outreach Materials:	$5600.00
TOTAL	**$11,450.00**

Baseline audits

If Edmonds follows through with the baseline audit recommended in objective 1, the city can expect to spend about $4400.00 to pay temp workers to go out to do it. The materials these workers will need to give direct feedback to the residents will probably cost an additional $900. These numbers are based on information collected from Vancouver's Recycling Done Right campaign, adjusted to fit the population of the City of Edmonds (a breakdown of these numbers can be seen in the image below) .

Plastic Bags and Film Collection Bins

Involving Edmonds with the W.R.A.P. campaign will mean purchasing new, uniform bins for the grocery stores around the city. A 95-gallon recycling bin costs about $110 a piece on average. Because Edmonds has five major grocery stores, we can estimate a cost of about $550.

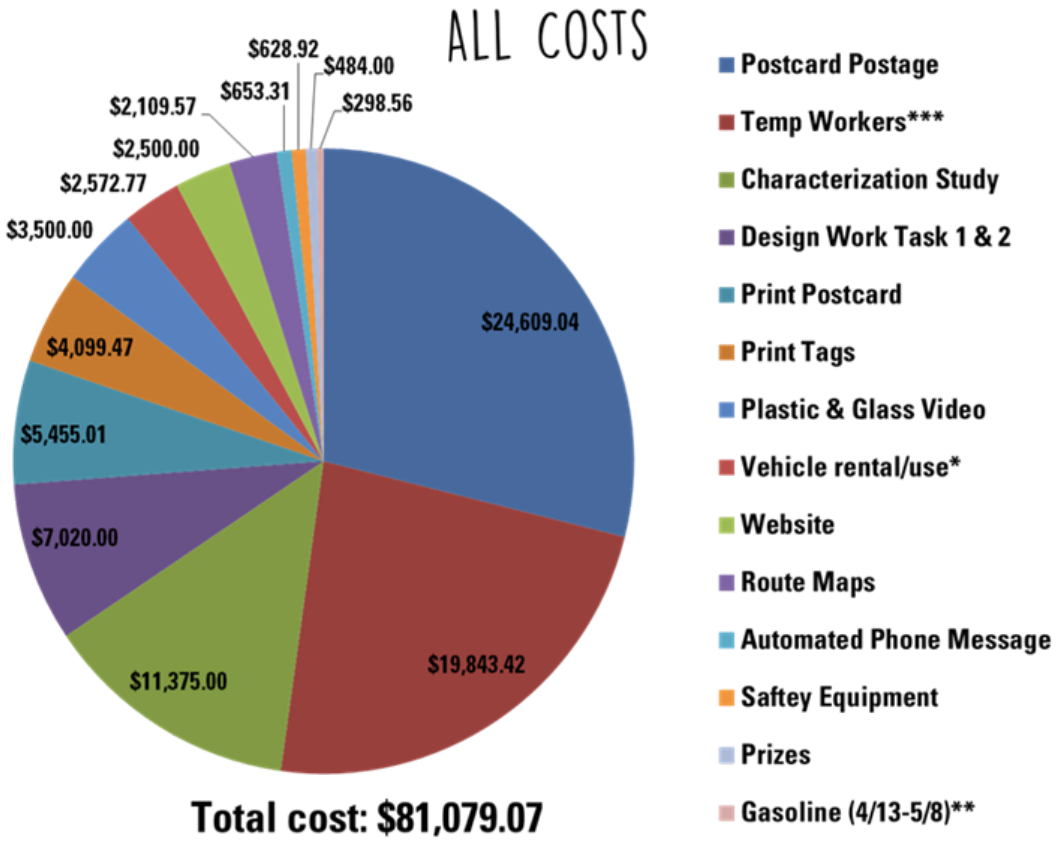
Outreach materials

Educational materials such as posters, bill inserts, and flyers are a necessary part of the outreach program. We can expect a cost of about $5620.00 for the city of Edmonds. Again, the cost of these materials is based on the numbers collected by the City of Vancouver's Recycling Done Right program.

Glass Bottles and Jars:

For the issue of alternative disposal methods for glass bottles and jars, further investigation will be necessary. As for the parameters of this project, too many variables were discovered. Questions about the feasibility of each option prevailed over any numbers that were useful.

Some foreseen expenses for glass collection will include: glass collection storage containers to be placed outside of grocery stores, residential collection bins to allow separated glass disposal and outreach materials to inform citizens of correct recycling practices.



Conclusion

As the population in Edmonds continues to grow, the infrastructure must progress simultaneously. Transiting to a more proficient recycling system will contribute to the accomplishment of a zero waste future and more sustainable community. By involving Edmonds in W.R.A.P. and removing glass bottles and jars from the curbside while encouraging legislation for a state bottle bill Edmonds is preserving the future health of its population and environment and creating a model for surrounding cities, including the rest of Snohomish County. Edmonds has the potential to brand itself as a city of progressive environmental stewardship despite its smaller size.

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