

Plastics Reduction Challenge

Municipality of Dysart et al

FINAL REPORT

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1 - Introduction

Banning of single use PET water bottles has become a growing trend across Canada (Jerema, 2010). There are several reasons as to why this trend has continued to grow, with the bulk of them surrounding the environmental impacts of the PET bottle. The utilization of single-use plastic water bottles is not a sustainable option as it can lead to water shortages since the manufacturing process for a single 1L bottle of water consumes 3-5L of water (The Council of Canadians, 2014). Furthermore, the manufacturing and transportation of single-use PET water bottles is significantly contributing to climate change as they require a massive amount of fossil fuel to produce the plastic and generate significant greenhouse gas emissions to transport (The Council of Canadians, 2014). Another issue associated with single-use plastic bottles and why banning their sales is becoming more significant is that a large number are ending up in landfills, which is resulting in a loss of landfill spaces as well as the loss of the resources that have gone into the production process (The Council of Canadians, 2014). Through the implementation of a ban of single-use water bottle sales in municipal spaces, the municipality can improve their ecological footprint and ultimately become one of the Blue Communities in Canada (The Council of Canadians, 2014) should they desire to take this step.

The objective of this report is to provide information to support the Municipality of Dysart et al's desire to ban the sale of plastic-bottled water in its municipal buildings and public spaces along with the provision of suitable alternatives and appropriate communication, education and engagement to ensure the public is aware of and adopts the use of these alternatives.

2 - Data Analysis

When a municipality is attempting to ban a material from their facilities and all public spaces, there needs to be some established statistics to back up the claim and increase the bans effectiveness as well as the effectiveness of the additional culture shift that is expected to occur afterwards. A large movement that has seen increased activity is banning of single use PET water bottles, as there is an easy alternative available. The largest barrier that is presented when finding the appropriate statistics to back up the water bottle ban was ensuring that the statistics are surrounding the appropriate material you are targeting, in this case PET bottles. In addition to this barrier PET bottles are used for a large number of products, which then leads to an issue of determining what portion of PET bottles are used for water products. PET materials are most commonly used in the packaging sector in the forms for

films, trays, or bottles, with its most common use being in bottles (EFBW, 2013). Looking specifically at PET bottled products, water products account for 33.8% (EFBW, 2013), which is a factor that has been utilized when making assumptions regarding statistics that are not 100% specific to water bottles.

To put the statistics and the assumptions that have been made into perspective, a high-level look into the PET water bottle problem within the entire province of Ontario has been made. Ontario, which is the most populated province in Canada with a population of 14.19 million as of 2017 (Statistics Canada, 2017), has a Blue Box program in place that serves 13,465,269 (98%) people, and 5,427,113 households (Stewardship Ontario, 2017). With numbers such as these and such a large availability of the program, it is expected that recycling and capture rates for materials such as PET water bottles would be quite high. However, this does not seem to be the case, as a report by Environmental Defense stated that in Ontario less than half of the plastic bottles sold within the province's boundaries are collected for recycling (Wallis, 2017). This statistic transfers into a staggering number approximately one billion single use plastic bottles ending up in the landfill or littered in the environment on an annual basis which equals a total weight of more than 18,000 tonnes of PET bottles (Wallis, 2017). To put this into perspective, in 2012, 35,063 tonnes of PET bottles were generated, from which 16,611 tonnes were recovered which leaves a total of 18,452 tonnes not recovered. Using an estimated weight of 18.9 grams per bottle, that means that 976,296,296 bottles were not recycled (Wallis, 2017). Since the reported numbers were regarding PET bottles in general, the factor above of 33.8% of PET bottles being composed of water bottles (EFBW, 2013), it can be assumed that of these non-recycled PET bottles approximately 329,988,148 are plastic water bottles.

After seeing how the province of Ontario is performing with respect to single use water bottle recovery, the next question surrounds how Dysart et al as a municipality is performing along the same metrics. In order to determine where to search for data surrounding the municipality of Dysart et al, it would have to be determined what type of a municipality it is and determine what type of collection occurs. According to the RPRA Datacall, the municipality of Dysart et al is classified as a Rural Depot South community (RPRA Datacall, 2017) and thus they do not have a collection service provided, meaning that residents bring all of their waste to a local depot/transfer station. This added some difficulty into the collection of reliable data as their waste materials would not be included in waste audit reports such as those conducted by the Continuous Improvement Fund. This limitation, combined with the proprietary nature of the depot collection company and the lack of available information, has forced us to make several assumptions. This includes determining which type of municipality is most similar to Dysart et al

that would be present in the CIF/SO Terms of Reference Year 2 4 Season Residential Waste Composition Study Results (Summary Report). When making these assumptions, it was crucial to focus on a municipality with similar demographics and similar number of serviced households. In the end, it was decided that the assumptions that will be made below will come from data collected around municipalities that are classified as Rural Collection North, as it most similarly represented Dysart et al with municipalities such as the City of Elliot Lake and the City of Brockville which have a similar number of serviceable households being included (RPRA Datacall, 2017).

Looking into the statistics about PET water bottles for Rural Regional Classification would also include a number of assumptions, as a large majority of the data available was presented as PET bottles in general. In order to counteract this and follow along with the analysis of the provincial data, all local data has also been factored to the 33.8% of PET bottles accounting for water bottles specifically (EFBW, 2013). The information that is presented below compares the amount of PET bottles that were present in the garbage and recycling streams with measure kg per household per week (kg/hh/wk) (CIF, 2018). According to the CIF Summary Report, municipalities classified as Rural Collection North possess 0.075 kg/hh/wk in the garbage stream and 0.154 kg/hh/wk in the recycling stream (CIF, 2018). With the understanding that these numbers account for all PET bottles, the 33.8% has been applied resulting in 0.025 kg/hh/wk in the garbage stream, and 0.052 kg/hh/wk in the recycling stream. All though these numbers do not represent Dysart et al 100%, they can still be effectively utilized to obtain an understanding of how Dysart et al is performing and how it compares to the province.

After further analysis of these statistics for PET water bottles in the garbage and recycling stream, the total PET water bottles generated is 0.077 kg/hh/wk. From this it can be concluded municipalities within the Rural Collection North classification divert approximately 67.5% (0.052 kg of 0.077 kg) of their PET water bottles from landfill. Compared to the approximately 50% diversion on the provincial level, it can be concluded that municipalities similar in demographics to Dysart et al are currently performing better at recycling their PET water bottles than the province is at a whole. Overall, these numbers are not 100% accurate and a number of assumptions have been made in order to be able to effectively understand each set of data, as well as factor the data such that it can be compared more confidently and accurately. The data may not be 100% accurate because the curbside collection available to the Rural Collection North communities allows for certain bag and weight limitations, as well as inspection at the time of pick up allowing for materials to be left behind, which is not available to Rural Depot communities. As a result, to ensure a more accurate and reliable set of statistics, it is suggested that

water bottle sales within municipal facilities are collected and compared to a set of institutional audits to determine how Dysart et al is truly performing.

3 - Behavioural Analysis: Why Consumers Choose Bottled Water

There are numerous factors which influence a consumer's decision to drink bottled water over municipally tested water. The two main aspects that influence this decision are quality of water and demographics. The main influences surrounding the quality of water include taste, colour and odour, and the main influences surrounding demographics include age, gender, education level, income, health, water quality, past outbreak experiences and trust in the municipal water supply.

The trend of drinking bottled water has been increasing worldwide. Even in those areas where the quality of tap water is good and safe enough for drinking purposes, the demand of bottled water is increasing. Reasons which influence a consumer's decision to drink bottled water are advertisements through various media, increased standard of living, physical location and deterioration in the quality of tap water due to urbanization. Other reasons that influence the use of bottled water is the perceived risk of using tap water due to information provided by mass media about past problems that have been created by low tap water quality. Trust in the supplier and their products also influences the consumer's decision in buying bottled water. Education level also affects a consumer's behaviour in selection of water. A study shows that educated people with environmental-related education are less likely to consume bottled water (Yao, 2011).

The perception of risk associated with drinking water has influenced the trend of adoption of bottled water. The risk factors associated with the quality of ground and surface water and type of water supply system where the consumer lives has influenced the decision of consumers to buy bottled water. Small water systems such as small towns, rural districts etc., violates regulations of federal drinking water due to inadequate funding and facilities which influence the residents to choose bottled water over tap water. Factors such as gender and education affect one's perception of environmental risk and thus affect their preference of bottled water. Factors such as complicated social, cultural, and psychological factors as well as objective information results in consumer's risk perception and prevention behaviour. This study suggests that due to different economic, social, and environmental contexts, consumers of different areas and regions have different behaviour towards selection of bottled water. Regional differences are results of community size, local water quality problems, or water supply systems and these factors affect resident's behaviour to use tap water. In those areas where problems related to

water quality are greater and local water is not considered safe for drinking purpose, people are more likely to use bottled water for drinking. Also, in communities where population is large, people consume more bottled water i.e., more are dependent on bottled water for drinking purposes (Hu, Morton, & Mahler, 2011).

Furthermore, the perception of risk associated with drinking water results in the consumption of bottled water regardless of whether the supply of drinking water is from large municipal water supply system or small water supply system. Factors like commercial campaigns on bottled water by different companies, information provided by media on water quality problems, ease-of-use or peer pressure to choose a fashionable way of drinking results in high consumption of bottled water over tap water. This study shows that age and gender are also important factors in choosing bottled water, older people and male are less likely to consume bottled water than younger one and female. Because companies use advertisements to promote bottled water and young people are generally more attracted by advertisements (Hu, Morton, & Mahler, 2011).

The convenience of a single-use water bottle which can be easily purchased and carried generates a strong influence on consumers. Price is another main factor. As living standards grow, people prefer to choose a high-quality and fashionable product and bottled water may provide this option for them (Cheng, 2015).

In North America, the main factors influencing people's decision to drink bottled water are their dislike toward the taste and colour and their perception of health issues associated with tap water (Doria, 2006). A high proportion (44%) of the Canadians sampled during a study by Grondin et al. (1996) considered bottled water to be healthier than tap water. Dysart et al is a municipality in North America, and these factors can create questions for the people of this community as to what extent their tap water is safe, and they may ask the question; "Does the water quality which people expect match the actual water quality of what the municipality is supplying?" According to the 2016 Canadian Infrastructure Report Card, 35% of potable water infrastructure (pipe assets) is in the range of fair to very poor condition (CIRC, 2016). This provides an indication of the potential for drinking water to become contaminated while in the distribution system.

Members of the Walkerton community were interviewed 16 years after the event to discuss their perceptions and memories of the tragedy. Several participants disclosed that they were afraid of drinking tap water because of their memories of the tragedy (Lisnyj & Dickson-Anderson, 2018). Dysart

et al is also a rural community similar to Walkerton and has an aging population. The average age of the population of Dysart et al is about 51 years with 32.5% over the age of 65, according to the Canadian 2016 census (Statistics Canada, 2019). This indicates that the majority of the population remembers the Walkerton tragedy. Remembering the tragedy and residing in a similar area (rural community), members of Dysart et al may also be afraid or hesitant to drink tap water.

4 - Legislative Requirements to Ban Bottled Water in Municipal Spaces

There is not much in the way of existing legislation that affect or limit plastic use in Ontario. After researching and consulting with a few cities and communities that have banned the sale of single-use plastic water bottles within their municipal spaces, the conclusion is that their banning methods were purely internal procurement policy and therefore legislation was *not* required to enact a municipal office ban.

However, if there is a desire to consider a more wide-spread ban within the community in the future, such as preventing businesses from selling bottled-water, the Municipal Act governs the ability for a municipality to do this in terms of the matters and spheres of jurisdiction for which it has the right to create by-laws.

Section 8 of the Municipal Act grants municipalities the authority to pass by-laws that regulate or prohibit, require persons to do things, or provide a system of licenses in respect of a particular matter. The “matters” for which a two-tiered municipality can pass by-laws are outlined in Section 11(2) of the Act and include “Economic, social and environmental well-being of the municipality, including respecting climate change” as well as “Health, safety and well-being of persons”. These matters must fall within one of the “spheres of jurisdiction” in Section 11(3), which includes waste management (Ontario Government, 2018).

It’s important to be cognizant of the rules stipulated in Section 11(4) that dictate which tier in a two-tier municipality has the power to pass by-laws within a sphere of jurisdiction: the upper, lower or in some cases, both tiers (Ontario Government, 2018). This was clarified during discussions with Mallory Bishop, where she indicated that the Municipality of Dysart et al has jurisdiction to regulate the environment's well-being and its waste management.

Section 11(6) speaks to the services or things provided by others (Ontario Government, 2018). It states that the power of a municipality to pass a by-law *does not* include the power to pass a by-law respecting

services or things provided by a person other than the municipality or a municipal service board of the municipality (Ontario Government, 2018). Therefore, the Municipality of Dysart et al may not be able pass a by-law if it hinders or stops a person other than the municipality and its offices from selling or providing these services or things to the public. Additionally, Section 11(7) stipulates that a municipality cannot pass by-laws respecting services or things provided by the other tier within a two-tier system (Ontario Government, 2018).

The Municipality of Bluewater has recently created an environmental committee of council that may develop legislation in the near future to improve the well-being of their environment. Currently they are establishing themselves before any further progress can be made (R.Letheren, personal communication, February 6, 2019).

4.1 - Legislation Related to Tap and Bottled Water Testing

To provide some context to the argument that bottled water is believed to be safer than tap water in Canada, research was conducted to understand and provide information regarding the legislation that governs the standards and testing that both must undergo.

In Canada, bottled water is regulated under the Food and Drugs Act and Regulations, whereas tap or drinking water in Ontario is governed by the Safe Drinking Water Act and Regulations. In summary, the testing and quality standards for tap water currently are much more stringent than for those of bottled water, although it appears that bottlers belonging to the Canadian Bottled Water Association are adhering to a stricter set of requirements. The details of this research can be found in Appendix C.

5 - Alternatives to Bottled Water

In order to ensure that the water bottle ban is successful, there needs to be viable and effective alternatives available to the public. These alternatives need to come from sustainable and safe water resources, as well as account for those who do not own a reusable water bottle. When considering all of the alternative options, it is extremely important that the municipality provides a wide range of alternatives to ensure that all demographics are accounted for. At this time, there have been several locations identified where alternatives are required. These locations include the hockey arena, community centres, skate park, and main public park. Since these locations cover indoor and outdoor areas, the alternative provided will need to cover a wide range of functionality. In addition to

alternative water sources, there will need to be a wide range of affordable reusable water bottles available to the public as this will be key to ensuring that the alternative water sources are being used.

There are many options available with a broad range of pricing that can be considered for these spaces. Below are looking specifically at fixed outdoor options, there is a large selection of product features such as: single-level, bi-level, and tri-level; have pet options; and/or has freeze resistant capabilities. The alternatives that are presented below are from Elkay, however, there are cross reference guides available that link their models to similar versions from companies such as Haws, Halsey Taylor, and Oasis. Since these cross-reference manuals are available with pricing information, the focus of the proposed alternatives will be on Elkay products.

5.1 - Outdoor Options:

There are a few main factors to consider including accessibility, winterization, and functionality for all demographics. For the main park, it was decided that options with bi-level capabilities were prioritized to ensure proper accessibility and traffic flow, whereas for the skate park, single level options were looked at. Another aspect were systems that included bottle refilling stations especially near recreational-use. A final aspect for the main park was being able to be mounted from the base (freestanding), which would increase the ability to install the systems wherever necessary and did not limit potential installation options. Below is a list, and justification of the proposed alternatives from Elkay that range from as low as \$1,460 to as high as \$10,407.

Of the reviewed options, the stainless steel and stone options are perfect for outdoor areas such as the main park in Municipality of Dysart et al as they check all the boxes from accessibility, to functionality. All the stainless steel options are constructed from a corrosion-resistant stainless steel type-316 base material that is more than capable in protecting these products from the elements. All stainless steel models can be powder coated in 12 different colours which can allow for the municipality to purchase a colour custom to their liking. The systems are constructed with tamper-resistant screws that are stain and corrosion resistant. The systems' bubblers are vandal-resistant, chrome plated integral hood guards that help prevent contamination from other users, airborne deposits and tampering. The models that are equipped with a pet station feature, have a fountain that is at ground level and is equipped with a slow drain system that allows for easier drinking. As for systems that are equipped with freeze resistant capabilities, these are designed to minimize ground water contamination and prevents drain water from

mixing with fresh water. Elkay also has options that are similar to the stainless steel products but have a durable stone aggregate finish that is better suited to withstand the elements.

5.2 - Indoor Options:

Looking at indoor options, there is a large selection of options available with a variety of features available including multi-level fountains, bottle filling fountains, and combination units. Similar to outdoor options the indoor alternatives need to address a number of critical factors including accessibility and functionality for all demographics and traffic flow. For areas that have a high traffic flow such as the arena, options that will be best suited include a multi-level fountains with built in bottle filling stations. Whereas places such as the community centre where the traffic flow may not be as constant, options that are single level may be more preferred. To see the full breakdown of indoor and outdoor water fountains/bottle filling stations, please see Appendix A.

5.3 - Preparing the Units for the Winter:

Depending on the units selected, the winterization requirements will vary. For units that are equipped with freeze resistant technology where the bury valve is installed below the frost line, and is equipped with a freeze resistant button, winterization is not required. Similarly, units that are wall mounted and contain a freeze valve box with piping within the wall that is maintained above a temperature greater than 10 degrees Celsius, no winterization will be needed. However, for units that do not have freeze resistant capability, or do not have the appropriate freeze resistant accessories, they should be winterized as per the owner's manual instructions.(Haws, 2017)

5.4 - Reusable Water Bottles:

As mentioned above a key aspect that needs to be considered when thinking about alternatives is ensuring that a selection of reusable water bottles is available to the public. This aspect is crucial because if residents are going to leave the reusable bottles at the store the need to have the alternative in their hand to utilize at the refill stations. There is a very large selection available for reusable water bottles from a wide type of materials. The two most common material types are stainless steel bottles and plastic materials. With each type of material there is also a large range of prices and quality which makes determining which type is most well suited very difficult to determine. Looking at both stainless steel and plastic options, there is a large range of sizes and features available. Stainless steel options, although they are more expensive, offer a higher quality of features such as extending temperature control and highly durable. As for reusable plastic options, the durability is material dependent, which

means that some options may have the potential to become damaged and no longer useful. Some of the plastic options such as Brita come equipped with filtration technology for the consumers that do not like the taste, or ultimately do not fully trust the water source, which is not seen on the stainless steel options. In the end, plastic options are more affordable with a price range of \$0.65 to \$21.45, whereas stainless steel options typically range from \$18.95 to \$39.95. One key item to note is that the size of water bottle will affect these price ranges. For a full breakdown of reusable water bottle options please see Appendix B.

6 - Impacts of Banning Plastic-Bottled Water

Municipality of Dysart et al will encounter various reactions and impacts once the ban of plastic water bottles within municipal spaces occur. The following is a breakdown of different impacts classified within the categories of Financial, Health, Environmental and Social.

6.1 – Financial Impacts:

According to reports provided by other Ontario municipalities, such as the City of Peterborough, City of London and the City of St. Catherine's, a common key consideration is the impact the ban has on revenue generated from these sales as well as any penalties stated in the contracts with beverage suppliers that may be applicable if water is no longer sold. For example, in their 2010 staff report on regarding the ban, the City of Peterborough calculated that they would lose \$38,000 in net revenue related to eliminating the sale of bottled water (Peterborough, 2010). They also indicate that their agreements with Pepsi include the sale of bottled water, thus breaching these agreements could result in fines of greater than \$200,000 (Peterborough, 2010). In a 2018 report regarding the ban, St. Catherine's did not indicate specifics related to bottled water, but they received 35% of vending machine sales and therefore revenue could be negatively impacted if the water bottles were removed from the machines (St. Catherine's, 2018). Additionally, they receive an annual lump sum sponsorship from Coca-Cola, which could impact the amount of sponsorship received as the ban would be limiting the products that the supplier can provide. When this report was written, they had not yet determined the full impact (St. Catherine's, 2018). Peterborough and London chose to phase in their bans to align with the expiry of their agreements with the beverage suppliers in order to avoid any penalties and renegotiate the agreements to exclude water (Peterborough, 2010) (London, 2008).

Along with the potential for lost revenues is the cost of purchasing and installing the bottle-filling stations. The City of Peterborough estimated in 2010 that the cost for the Haws filling stations could be as high \$7,550 each, installed, depending on the location of the installation and existing water supply infrastructure to support the station (Peterborough, 2010). It was also estimated that there would be an annual cost of approximately \$200 to replace the filters and maintain the stations (Peterborough, 2010). In 2018, the City of St. Catherine's estimated that 5 outdoor filling stations would cost \$50,000 to install and indoor stations could range from \$4,000 to \$5,000 (St. Catherine's, 2018). It should be noted that there could be additional costs associated with keeping the stations clean, especially in outdoor locations, as well as the need for winter protection. In the case of the City of Hamilton, which intends to phase-out both bottled water and sugary drinks over three years, the potential revenue loss for both is about \$64,000, comprised of about \$20,000 for bottled water (Craggs, 2018).

Finally, the cost of developing and delivering an educational and promotional campaign, both initially and on an ongoing basis, needs to be established. This cost will vary depending on the elements to be included in the campaign. For example, the City of London has installed "London Tap Water – The Clear Choice" signs on all their public facilities where municipal tap water is available and filling stations have been installed (per Anne Boyd, City of London Manager, Waste Diversion Programs).

6.2 – Health Impacts:

A predominant theme regarding health-related impacts of plastic-bottled water bans is that a healthy beverage choice is being removed from the shelves and thus consumers who wish to buy a portable bottled product loses the option to buy a healthy beverage such as water. If the ban occurs, vending machines and cafeterias will only be offering other types of beverages, forcing consumers to likely spend more money than they would have on bottled water and get something potentially less healthy, either because of higher caloric content or the nature of the ingredients themselves. A prime example of this occurred at the University of Vermont (UVM) following their January 2013 ban on the sale of plastic-bottled water. In a comparison of the Spring 2012 semester to the Spring 2013 semester it was found that the per capita number of plastic-bottled products sold had increased from about 24 to 26, meaning that consumers had opted to purchase other beverages in replacement of water, such as sugar-free or sugar-sweetened beverages (Berman et al, 2015). The banning of bottled water had not reduced the quantity of plastic bottles, rather it had increased. Calories per bottle also increased by 8.76 from Spring 2012 to Spring 2013 (Berman et al, 2015). The City of St. Catherine's also cites in their 2018 report that Coca-Cola plans to replace bottled water in the vending machines with other products (St. Catherine's,

2018). In this kind of situation, not only are there health impacts but ultimately the ban does not reduce the overall plastic waste being generated (Berman et al, 2015). Because of this problem, the University of Vermont has made some changes, such as: offering a greater percentage of healthy alternative beverages; adding free, filtered cold water to fountain beverage machines in dining outlets; and introducing Coca-Cola Freestyle machines with a free water option and making Freestyle reusable bottles available for sale (UVM Office of Sustainability, n.d.). Freestyle machines do not have bottled products, but rather allow customers to fill their own container with a personalized beverage selection. This reduces plastic-waste for those who want something other than water as well as providing a water option, which a traditional vending machine would not offer following a water bottle ban.

A key message in UVM's experience is that it is essential to continue to provide water as an option through a variety of formats, and additionally, ensure that it is promoted. Fleming College has vending machines in the hallways with no bottled-water option. Thus, for visitors or anyone who doesn't have a reusable bottle with them, the lack of bottled water in the vending machines potentially forces them to buy a less healthy product. Not only that, but there is a lack of signage to advise of the ban and indicate the existence of filling stations or fountains. This is something that needs to be considered for vending machines – ensure consumers know where to get water if they want it, if it is not available in the machine itself.

In an effort to combat this side-effect of bottled water bans, the City of Hamilton has not only decided to phase-out the sale of bottled water in its municipal facilities, but, as mentioned in the Financial impacts, they also plan to phase-out the sale of bottled sugary beverages (Hamilton, 2018) (Craggs, 2018) (Council of Canadians, 2018).

6.3 – Environmental Impacts:

The banning of the sale of plastic-bottled water will have positive impacts on the environment as it will reduce the reliance on natural resource extraction, product and packaging production, transportation and waste management, as well as reduced plastic going to landfill or otherwise escaping into the environment (Council of Canadians, 2014). It also helps to protect water supplies against shortages (Council of Canadians, 2014). However, as discussed within health impacts, this depends on if the consumption of bottled-water is in-fact, replaced using reusable bottles and filling stations, or if it is replaced with the purchase of other plastic-bottled beverages. The provision of appropriate alternatives to bottled water and the promotion of these options are key to overall reduction of not just plastic

waste, but all the other environmental impacts that occur upstream to make and deliver the product and package. That said, the City of Peterborough notes in their report that if any type of bottled beverages are continued to be sold within municipal facilities, the greenhouse gas emissions associated with the delivery of these products will not be reduced because a delivery will still need to be made, with or without bottled water (Peterborough, 2010). They also acknowledge that the move to ban plastic-bottled water within their municipal facilities will not generate any significant environmental improvements, but it is necessary for the City to demonstrate leadership on sustainability (Peterborough, 2010).

If plastic-bottled products other than water will continue to be sold at municipal facilities, it will be important to ensure there are enough recycling bins to capture the waste and as such, reduce the potential for it to end-up in the environment or landfill. The City of Peterborough makes note of this in their report as well as budgetary considerations to provide additional recycling bins (Peterborough, 2010).

6.4 – Social Impacts:

A key theme within the realm of social impacts of bottled water bans is the removal of the consumer's right to choose what type of water they wish to drink and in what format. This aligns with the health-related concerns of removing a healthy beverage option. Perhaps an option to consider in terms of dealing with this concern is to follow the example set by the Village of Bayfield, whereby the reduction in the use of plastic-bottled water was a community-driven initiative as opposed to a government-imposed ban; in other words, work towards changing the mindset within the municipality without removing the consumer's right to choose.

Municipally-treated water taste and safety concerns are also social factors that drive people to purchase bottled-water. Taste can be dealt with through the provision of filling stations that filter the water, such as the City of Peterborough decision (Peterborough, 2010). Municipal water safety must be dealt with through an appropriate education and awareness campaign.

7 - Potential Funding Programs

There are different funds and award recognition programs for the municipalities, businesses and organizations that make significant efforts to reduce the use of plastic water bottles.

The goal of the municipality of Dysart et. al is to reduce the amount of plastic waste, specifically plastic water bottles, entering the landfill or in the environment. Plastic water bottles are being targeted as the first step in an overall plastic waste reduction objective as there is a suitable alternative that can be provided, namely municipally tested drinking water.

To address the question of the Municipality of Dysart et al. regarding funds and award recognition programs for municipalities, businesses and organizations that make significant efforts to reduce the use of plastic water bottles, some research was conducted, and they are categorized into three levels: federal, provincial and municipal awards.

Federal Government

The Government of Canada funds different environmental programs such as the Eco Action Community Funding Program (Environmental funding programs, 2018). This program provides financial support to non-profit and non-government organizations for local action-based projects that produce measurable and positive effects on the environment. This year, projects address freshwater environmental priorities listed in the Call for Proposals. Funding is available for new projects that: engage Canadians to contribute to the improvement of water quality through the diversion and reduction of harmful substances and plastic waste in fresh water and involve Canadians' contribution to the conservation and sustainable use of Canada's fresh water.

Clean Water and Wastewater Fund (CWWF)

The Clean Water and Wastewater Fund (CWWF) is a federal program designed to accelerate short-term community investments, while supporting the rehabilitation and modernization of drinking water, wastewater and stormwater infrastructure, and the planning and design of future facilities and upgrades to existing systems (The Clean Water and Wastewater Fund, 2017). The CWWF funds community capital projects that address immediate drinking water, wastewater and stormwater needs fostering economic growth and supporting a cleaner and healthier environment for communities. (The Clean Water and Wastewater Fund, 2017).

One of the objectives of the CWWF is to improve reliability of drinking water, wastewater and stormwater systems and meet legislated standards and guidelines. All municipalities, communities and organizations located in Ontario are eligible to receive CWWF funding (The Clean Water and Wastewater Fund, 2017).

Federation of Canadian Municipalities (FCM)

The Federation of Canadian Municipalities is an organization with no formal power, created by a group of mayors, councilors and other elected municipal officials and represents over 2000 Canadian municipalities. It negotiates with the Government of Canada's departments and agencies on behalf of municipalities and administers several funds (Federation of Canadian Municipalities, 2018). FCM's Green Municipal Fund (GMF) supports municipalities across the country in their sustainable community development goals, improving the quality of air, water and land, as well as reducing greenhouse gas (GHG) emissions (Annual report: Green Municipal Fund, 2019).

Ontario Municipal Water Association (OMWA)

The Ontario Municipal Water Association (OMWA) represents more than 180 Municipalities and Public Drinking Water Authorities in Ontario. OMWA is focused on ensuring the best possible safety, quality, reliability, and sustainability of drinking water in Ontario.

The OMWA has different awards that are given annually for recognition to recipients who have contributed to the OMWA and the waterworks industry, recognizes the contribution of those individuals or public water authorities who have demonstrated outstanding and dedicated service in support of the principles of the Ontario Municipal Water Association (Drinking water – Wastewater – Stormwater, n.d.).

The Ontario Trillium Foundation (OTF)

The Ontario Trillium Foundation is an agency of the Government of Ontario, and one of Canada's leading granting foundations. OTF awarded more than \$120 million to some 700 projects last year to build healthy and vibrant communities in Ontario (Investment Stream, n.d.). Their focus is providing grants for community-based initiatives that help build healthy communities throughout Ontario. They award different types of grants such as:

- Seed Grants: Starting projects at the idea or conceptual stage
- Grow Grants: Building on the success of a proven model or program
- Capital Grants: Broadening access to & improving community spaces
- Transform Grants: Tackling complex community issues and creating lasting change

It is important to note that OTF does not provide funding directly to municipalities, rather, funding is provided to non-profit organizations. However, partnerships can be formed between municipalities and non-profit organizations to achieve desired objectives. An example of this is Scout Environmental's

Mercury Roundup program which received OTF funding. Scout is partnering with municipalities, such as the City of Peterborough, to run this program.

8 - Potential Award Programs

Based on research done, different non-for-profit organizations in Ontario provide award recognition programs to support initiatives in reduction of plastic bottle use, diversion program, recycling etc. With these programs in place, organizations encourage municipalities, organizations, residents to build awareness of the issue of waste, share their experience, make an important impact by assisting in finding and implementing environmentally sustainable alternatives and improving the environmental health of the municipalities.

Recycling Council of Ontario (RCO)

The Recycling Council of Ontario is a not-for-profit environmental organization directly involved in programs focused on building awareness of the issues of waste and the opportunities to eliminate it through the 3Rs (Recycling Council of Ontario, n.d.). One of the programs they are running is The Plastic Bag Grab Challenge, awarded (Plastic Bag Grab challenge, n.d.) a waste reduction program for elementary schools across Canada that engages schools and students on the 3Rs hierarchy: reduce, reuse, and recycle. A range of different amounts can be awarded (Plastic Bag Grab challenge, n.d.)

➤ Plastic Bag Grab Challenge

Elementary schools from across Canada are challenged to collect as many plastic bags as they can for recycling (Plastic Bag Grab challenge, n.d.). Top schools in each province and territory that collect the most plastic bags for recycling are eligible to win cash prizes that can be used for schools' environmental initiatives. The council will award \$3000 for first place and \$2000, \$1000 for second and third place.

The Municipal Waste Association (MWA)

The Municipal Waste Association is a not-for-profit organization formed by Ontario municipal waste management professionals to facilitate the sharing of municipal waste reduction and recycling information and experience (MWA, n.d.). They give awards to support municipal promotional campaigns related to any municipal waste management or diversion program, project or event, including but not limited to recycling, organics, plastic reduction and household hazardous waste (2019 MWA Promotion & education Awards, n.d.).

9 - Communications, Outreach and Engagement

Communications, outreach and engagement to the public is a very important factor to the success of this ban. The acceptance and participation of the public will help contribute to the success of this ban and movement. Actions need to be taken to ensure that residents know about the plastic water bottles ban.

9.1 - Effective education and communication tools used by other municipalities

Some of the effective tools used for public communication are listed in the table below. Some of these are specific to a plastic water bottle ban and others are other effective concepts which could be used in any context as per the need. These examples are throughout Canada with special emphasis on Ontario municipalities.

Table 9.1: Effective Tools for Public Communication

Region	Means Used	Description of Program
Toronto	Water Trailers	Two water trailers were used to educate people about municipal tap water, and these were used at events during the summers. (City of Toronto, 2017)
Hamilton	Partnerships with agencies	Partnerships with organizations such as Green Venture that is a not-for-profit organization who educates residents about the benefits of municipal water over bottled water. (City of Hamilton, 2013)
Vancouver	Tap Map - Smartphone App	An app named Tap Map was launched which allows its users to locate water refilling stations within the city. (City of Vancouver, 2013)
University of British Columbia	Signing Petition	3,200 university students signed a petition saying they would not use plastic water bottles which encouraged a change in behaviour. (City of Vancouver, 2013)
Peterborough	Mobile municipal water refill stations	A mobile water station named Quench Buggy can be booked for various events during the summer months. This would encourage the use of municipal tap water over the bottled water. (Peterborough Utility Group, 2017)

Region	Means Used	Description of Program
Peterborough	Member-based business Refill program: includes Window Decal and map app	A community-based program called Blue W Peterborough can help people easily locate a place (shops/restaurants) that offers free water refilling on the go with the help of a sticker placed at their main door. (Peterborough Green-Up Association, n.d.). See www.bluew.org for more information.
Niagara Falls	Education Institute Plastic Water bottle ban	A ban was put in place in Niagara college in the year 2012 so that the students would carry their own refillable bottles and drink the tap water instead of bottled water. Other educational institutions have also followed this such as Fleming College and Queens University. (Niagara College Sustainability, 2012)
Hamilton	Poster making Competition	Poster making competitions are conducted in schools with the topics such as save water. Likewise, a competition saying, “no to plastic water bottles”. This could lead towards a cultural change. (City of Hamilton, 2010)
Kitchener	Social networking sites such as Facebook, Twitter, and YouTube	The City of Kitchener has effectively used these online platforms to communicate their initiatives and plans with the residents. This is a helpful tool in today’s digital market. (City of Kitchener, 2010)
London, ON	Use of “The Clear Choice” branding	The City of London, Ontario has installed signage where bottled water has been banned and filling stations provided that utilizes a consistent brand “London Tap Water – The Clear Choice”. They also have a webpage dedicated to promoting their tap water utilizing The Clear Choice branding (City of London, 2018).
FindTap.com	Tap – Find Water Anywhere	A phone app that helps people locate water stations across the country. (Tap Projects Inc., 2019)

Social awareness and education are both aspects that are essential to shape and encourage change in peoples’ behavior; but a gradual and transformational process is necessary. A long-standing change in cultural attitudes towards environmental matters is often not successful through brief or stand-alone awareness campaigns, but it is instead best achieved through inserting messaging in regular moral

practices and school curriculums from a very young age. Public awareness strategies can include a wide range of activities designed to assure and educate the residents. (UN environment, 2018)

Voluntary reduction strategies and agreements reduction strategies are another option to reduce the number of plastic bottles, as opposed to bans and taxes, the value of voluntary strategies does not attempt to force sudden changes in the market but allow natural adoption and acceptance throughout the community (Canadian Plastics Industry Association, 2012). It has been proven that the behavioural change is more long-lasting (Canadian Plastics Industry Association, 2012). Producers and retailers act as truly critical partners in effective behavioral change by building awareness and providing alternatives to the public (UN environment, 2018). An example is the Blue W Peterborough voluntary reduction program where local companies can become a member to provide free water refills to the local people. They can identify themselves as a Blue W member with a window decal and a presence on the tap water app provided by the City. It should be noted that Blue W is not exclusive to Peterborough. It's free to register a refill station location online at www.bluew.org. There is no phone-based app at this time to find refill stations, however a phone's web browser app can be used to search for locations on the map by postal code. Engagement of businesses within Dysart et al would be required to encourage them to participate in this program and add their locations.

Overall, the Blue W program was considered an effective tool as it allows participation and engagement of the whole community, not just municipal spaces, by promoting the access to safe and free drinking water on the go and sends a consistent message that the community supports drinking tap water and the use of refillable bottles. Moreover, in today's digital era the use of social networking sites and mobile applications for the purpose of locating a water refilling station or promoting the use of municipal tap water is an effective tool. The younger generations are a key target for promoting behavioural and cultural change and thus the use of social media and networking sites are imperative. This can be achieved by driving their focus towards the use of municipal tap water instead of plastic-bottled water through the appropriate medias and use of effective tools.

9.2 - Communication Strategies Implemented by Ontario Cities:

In order to understand current communication methods used, a few cities were reviewed and compared to identify their communication decisions during the implementation of single-use plastic water bottle ban and/or reduction within their municipal-run facilities. There were three Cities that were reviewed: City of Niagara Falls, City of Toronto, and City of Hamilton.

City of Niagara Falls

The City of Niagara Falls banned the sale of plastic-bottled water in their Municipal facilities in 2009 including all City owned arenas through concessions and vending, recreational centers, parks and through associated community groups using such parks and facilities (City of Niagara Falls, 2009).

To implement this sizable ban, they first held two Community Information forums to collect appropriate feedback and host a question period for their community regarding the possibility to eliminate the sale of plastic bottled water from the selected areas (City of Niagara Falls, 2009). This effectively helped outline the barriers and acceptance of certain methods to this ban within the community. They advertised these events in local newspapers three times leading up to the event (City of Niagara Falls, 2009).

The following table provides their implementation strategy actions and time line.

Table 9.2 City of Niagara Falls' Implementation Strategy

Phase	Location/ Equipment	Action	Implementation Dates
1	Outdoor parks & playing fields	- Inform and educate all users bottled water will not be sold at City facilities	March 2009
2	Arenas	- Review contractual requirements and inform beverage providers City will be eliminating sale of bottled water - Eliminate sale of bottled water	March 2009 May 1, 2009
3	Vending Machines and contracted food services at the MacBain community centre	- Review contractual requirements - Create education and awareness materials - Eliminate sale of bottled water - Eliminate the use of bottled water in all meeting rooms for all bookings	March 2009 May 1, 2009
4	Coronation Centre	- Inform and educate all users bottled water will not be sold at City facilities - Eliminate sale of bottled water	March 2009 May 1, 2009
5	Indoor Facilities & Sport Parks	- Review access to public drinking water including fountains - Install on existing fountains long spigots/goose neck to allow people to fill reusable bottles; - Budget as required for new fountains	March 2009 Review 2009/2010 Budget & Install

(City of Niagara Falls, 2009)

City of Toronto

City of Toronto banned single-use plastic water bottles within their Civic Centers in 2009 and later the rest of the City facilities by 2011 (City of Toronto, 2008). They had proposed a public education/ promotion budget of approx. \$700,000 that would be used towards communication tactics such as research, advertising, website, media relations, displays and print materials, including translation of key materials in order to communicate the reason for the ban and how to adapt with these changes to the public and employees (City of Toronto, 2008). They strongly highlight that their drinking water (tap water) is of highest standard and should be available to the public at all City facilities (City of Toronto, 2008).

The City encountered barriers and backlash initially after their first immediate ban at their Civic Centers as they did not communicate to the suppliers of whom they are in contractual obligations with in respect to bottled water. During these troubling times, the City decided to slow the banning process and shift to installing bottle filling stations, committing the City to making water accessible as widely as possible through drinking water stations (City of Toronto, 2017). “Since 2013, Parks, Forestry and Recreation (PFR) has installed 68 new or replacement drinking water stations in 63 different parks across the city. In order to continue to improve access to drinking water, another 44 installations are expected to be installed in 2017 and 2018 in another 38 locations. As the lease agreements for vendors in PFR parks and facilities expire, new or re-negotiated agreements are made in compliance with the water bottle ban” (City of Toronto, 2017).

In addition, the Toronto Water operates and provides two HTO To Go water trailers at city-wide events from May 1 to September 30th to increase awareness and accessibility to their community (City of Toronto, 2017). Parks, Forestry and Recreation (PFR) continues to focus on improving access to drinking water in their parks and parks facilities by replacing or installing new stations as-needed across the city (City of Toronto, 2017).

City of Hamilton

The City of Hamilton examined the City of Toronto and other Cities that had banned single-use plastic water bottles and concluded that, instead, the best option would be to build a strategy that focusses on reducing reliance on bottled water (not banning) at City facilities and events through social awareness campaigns, thus continuing to sell bottled water but at the same time increasing access to municipal drinking water in City Recreation facilities (City of Hamilton, 2010). In addition, they are focusing on developing plans for other corporate facilities, locations and events to install and facilitate access to

municipal drinking water (City of Hamilton, 2010). In order to attain this broad goal, they have implemented various tools and strategies: a social marketing campaign; outreach and promotional programs through partnerships with a number of agencies such as Green Venture, school boards, and community organizations; installation of water filling stations/fountains; selling refillable water bottles; host Council, committee, public and staff meetings; promotion of the use of mobile water tankers at City events.

The City of Hamilton has used a social marketing campaign that educates residents and consumers about the value and safety of municipal drinking water, the importance of source water and watershed protection, and the environmental implications of non-recyclable bottles (City of Hamilton, 2010).

The City's Public Works Department staff work with a number of agencies to create awareness about waste and litter reduction, recycling, water conservation and the value of municipal water. They also have strong partnerships with agencies such as Green Venture, the school boards, and community organizations that continue to be an effective way for the City to advocate for environmental responsibility. Public Works conducts outreach to the community with the goal of environmental stewardship relating to waste reduction and water conservation (City of Hamilton, 2010).

Overall all three Cities have decided to install several water refill stations throughout the City at municipal facilities and parks, and they have implemented an Education and Outreach Program that teaches the public and staff about the purposes and impacts of the reduction and/or ban of single-use plastic bottles. All of these strategies were implemented within a 5-year time frame.

City of London, Ontario

Information on London's single-use bottled water ban was obtained through direct communication with Anne Boyd, Waste Diversion Programs Manager at the City of London in early February 2009.

The City of London initiated their ban on the sale of single-use bottled water in August 2008 through a public participation meeting held in conjunction with the Environmental & Transportation Committee meeting, and subsequently Council voted in favour of the ban in the same month. The implementation began in September 2008 and by August 2009 sales of single-use bottled water had ceased in City-owned buildings, arenas, community centres (15) and golf courses. Additionally, the Clear Choice signs had been installed in the arenas and community centres. Phase-out of bottled water for any remaining facilities was done as vendor contracts were renewed. As of February 2019, the ban has been completed in 23 community centres and arenas, aquatic centre and pool, city-owned golf courses, and Storybook Gardens.

Libraries are still to be converted pending vendor negotiations (Boyd, A., 2019). Key actions identified in the minutes of the Council meeting when the ban was approved were:

- The need to develop a City staff and public awareness campaign to support the rational for the changes and the need for Londoners to do their part
- Ensure that appropriate signage is posted to identify the location of water fountains
- Bottled water should not be purchased and provided at meetings where easy access to municipal water exists
- Ask Boards and Commissions to review their bottled-water practices.

(City of London, 2008)

The importance of providing appropriate signage should be highlighted and consideration should be given to having such signs in close proximity to vending machines, so that the public is made aware of where they can obtain water once the vending machines no longer provide that option. This could counteract the impact of people buying other types of potentially less-healthy drinks.

Blue Bayfield: A Blue Communities Project

Blue Communities Project is a project initiated by the Council of Canadians, the Blue Planet Project, and the Canadian Union of Public Employees (CUPE) that adopts a concept called the “water commons framework” where it recognizes that water is a shared resource amongst all people (The Council of Canadians, n.d.). In order to support this concept, they have passed 3 main resolutions for members to follow:

- Recognizing water and sanitation as human right
- Banning or phasing out the sale of bottled water in municipal facilities and at municipal events
- Promoting publicly financed, owned and operated water and waste water services.

(The Council of Canadians, n.d.).

Blue Bayfield is an environmental group within the Municipality of Bluewater who is a member of the Blue Communities Project. To clarify, the municipality is not a Blue Communities member (R. Letheren, personal communication, February 7, 2019).

It is important to grasp an understanding of the current behaviour and mindsets of the community before initiating any promotional programs. Blue Bayfield had analyzed the Municipality of Bluewater’s mindsets in order to adapt programs that fits with the current culture. The community’s mindset at the time of

inception (20 years ago) was uneducated and unaware of the plastic issues. It was a very slow process to gain the population's acceptance to learn about and resolve the issue. Currently at this time less than 10% believe that the tap water is still tainted, thus their programs have been very effective since inception. They still have troubles communicating their movement with the high tourism traffic (although they are beginning to see improvements because of the environmental movements on mainstream media) (R. Letheren, personal communication, February 7, 2019).

Blue Bayfield began their influence with hosting beach cleanups and issuing educational forums regarding their water projections alongside Vancouver Aquariums Great Canadian Shoreline Cleanup. These forums educated and pushed the concept of "abuse of water". They expanded on the diversification of their forums through radio, television and print media advertisements to increase their awareness. Later they began to work with Blue Communities as they realized that plastic water bottles were of major concern during their cleanups (R. Letheren, personal communication, February 7, 2019).

Over time they realized that the best form of communication was hosting meetings with multiple organizations in their community where they were able to explain the problem and solution directly and be able to gain feedback. Direct contact with the people was a very effective way to quickly change mindsets. Their communication strategies included many face-to-face concepts: they ran a market stall where they were able to directly influence and engage the public in high traffic areas; they provided what is called the Blue Betty hydration tricycle where it provided tap water to people on the beach. This Blue Betty tricycle had two communication forums where it had signage explaining the importance of properly disposing of their waste; and they had a trained staff member who would educate the participants; they also conducted door-to-door methods where their team would knock on the communities' doors and explain to each resident about the problem and asked if they were interested in joining them in solving the problem. This method was one of their main sources of funding. They used this funding to install five (5) refill stations throughout the village, provided 2,500 refillable water bottles to the public, provided eateries with table water bottles, planted trees, and hosted speakers to talk about relatable issues and solutions (R. Letheren, personal communication, February 7, 2019).

Overall it is imperative to communicate to the public through community meetings, face-to-face discussions, social media, and provide signage and advertisements for the provided refill stations. Without these tools it will be ineffective as the people will not be properly educated on the matter and have no knowledge of the existing infrastructure.

9.3 Other Suggested Engagement Initiatives

The City of Peterborough currently has a rebate program in place for the purchase of low-flow toilets to replace less efficient toilets (City of Peterborough, 2019). Dysart et al could consider implementing a rebate program to incentivize the use of tap water, such as providing rebates for the purchase of water filtration systems, or alternatively, consider providing residence with a Brita water filter pitcher – perhaps in conjunction with attending an educational event related to the municipal ban on the sale of plastic-bottled water.

Appendix A – Water Fountain/Bottle Filling Station Options

Outdoor Options:

- **Elkay Outdoor Fountain, Bi-Level Pedestal with Pet Station, Non-Filtered Non-Refrigerated, Freeze Resistant.**



This is one of the top options for the municipality as it provides accessibility for all users and in addition appeals to pet owners that utilize the outdoor spaces. These units' range in price from \$6,648 for a unit that does not have freeze-resistant capabilities to \$9,776 for units that are equipped with freeze resistant capabilities.

- **Elkay Outdoor ezH2O Bottle Filling Station, Bi-Level Pedestal with Pet Filling Station, Non-Filtered Non-Refrigerated, Freeze Resistant**



This is another top option for the municipality as it is accessible to all and it allows for functionality for refilling reusable water bottle with ease. These units' range in price from \$7,338 for those without freeze resistant capabilities to \$9,792 for those equipped with freeze resistant capabilities.

- **Elkay Outdoor Fountain Bi-Level Pedestal Non-Filtered, Non-Refrigerated Freeze Resistant**



Another ideal option that is available is this bi-level fountain as it is accessible to all and can manage the potential high traffic flow that events can provide. These units can range in price from \$5,031 for those without freeze resistant capabilities to \$7,439 for those that are equipped with freeze resistant capabilities.

- **Elkay Outdoor ezH2O Bottle Filling Station Bi-Level Pedestal, Non-Filtered Non-Refrigerated Freeze Resistant**



Another ideal option is this bi-level fountain, filling station combination. This unit provides accessible drinking fountains and refill stations for those who have reusable water bottles. These units can range in price from \$5,721 for units without freeze resistant capabilities, to \$8,145 for units that are equipped with freeze resistant capabilities.

- **Elkay Outdoor Fountain Pedestal with Pet Station, Non-Filtered Non-Refrigerated, Freeze Resistant**



This option would be good for the municipality as it still provides functionality for those with pets as well as other users of the public spaces. These units range in price from \$5,179 for units without freeze resistant capabilities to \$7,754 for units that are equipped with freeze resistant capabilities.

- **Elkay Outdoor Fountain Pedestal, Non-Filtered, Non-Refrigerated, Freeze Resistant**



This option would be best suited for the skate park as there will be a lower traffic flow and thus will not need multiple levels. These units can range in price from \$4,157 for units without freeze resistant capabilities to \$5,664 for units that are equipped with freeze resistant capabilities.

- **Elkay Outdoor Fountain Wall Mount, Non-Filtered, Non-Refrigerated, Freeze Resistant**



This unit would be ideal for the skate park as it can be attached to the side of the Arena or any wall that is set up by the facility, and would meet the traffic flow, and accessibility requirements. These units can range in price from \$2,714 for units without freeze resistant capabilities to \$3, 507 for those equipped with freeze resistant capabilities.

- **Elkay Outdoor Stone Fountain Pedestal Non-Filtered, Non-Refrigerated, Freeze Resistant**

This is a great option for the municipality as it offers accessible options and it can handle a higher traffic flow. These units' range in price from \$4,992 without freeze resistant capabilities to \$8,993 for units that have freeze resistant capabilities.



- **Elkay Outdoor Stone Fountain Pedestal, Non-Filtered, Non-Refrigerated, Freeze Resistant**

This is a great option for the skate park as it is set up for easy accessibility and flexible installation locations. These units' range in price from \$2,835 for units without freeze resistant capabilities to \$6,115 for units equipped with freeze resistant capabilities.



- **Elkay Outdoor Stone Fountain Wall Mount, Non-Filtered, Non-Refrigerated, Freeze Resistant**



Like the stainless steel wall mount option, this stone option is great for the skate park as it could be mounted to the wall of the arena or any wall surface located around the skate park. These units' range in price from \$1,643 for units that are not freeze resistant to \$2,519 for units equipped with freeze resistant capabilities.(Eklay, 2017)

Indoor Options:

- **Elkay EZH2O LZS8WSLK Filtered Water Bottle Refilling Station, Wall Mount, Gray** (Avenue Industrial Supply, 2019)



This water bottle refilling station has price around \$1600. This refilling station has drinking water fountain as well. So it is multipurpose water bottle refilling station which can help in saving space and money as well. This is much needed water bottle refilling which should be installed in the arenas, parks, colleges and school.

- **Elkay LZSTL8WSLK Water Refilling Station, Bi-Level Reversible, W/Filter, Light Gray** (Avenue Industrial Supply, 2019)



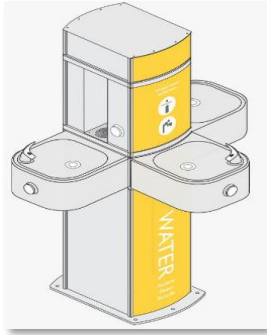
This water bottle refilling station has two drinking water fountains so that more than one person at a time has the access to this refilling station. The price of this water bottle refilling station is \$2300.

- **Elkay EZH2O Surface Mount, Single Level, Stainless Steel, EZWSSM** (Avenue Industrial Supply, 2019)



The price of this water bottle refilling station is \$913. This is in-wall type of water bottle refilling station. This type of refilling station accommodates less space. These refilling stations can easily be installed in multiple area.

- **Pulse Tri Refill Station and Drinking Fountain** (Aquafil refresh your life, 2012)



This system is a great idea for either indoor or outdoor applications, as it increases accessibility and allows functionality for those with reusable bottles and those without. This unit also allows success in high traffic areas.

Appendix B – Reusable Water Bottle Options

Material Option	Price	Features
Plastic		
Value Sport Bottle with Push Pull Lid - 20 oz. - Colours (4Imprint Canada, 2019)	65c- \$ 1.25	Can be recycled under symbol# 2 20 oz. BPA Free HDPE plastic bottle Availability in attractive colours Can be ordered in bulk
Brita Fill & Go Vital bottle, 600ml(Amazon, 2019)	\$17.24	BPA free plastic Sturdy, durable, hard Attached filter to avoid nasty- tasting tap water Leakage proof
Joseph Dot Hydration Tracker Water Bottle(Spencer Hart, 2019)	\$21.45	Designed to track hydration level Dishwasher safe Much lighter than stainless steel bottles Made from Tritan (plastic)
Thermos Intak (Spencer Hart, 2019)	\$10.99	Dishwasher safe tough
Camelbak Podium(Amazon, 2019)	\$9.78 - \$13.09	The plastic doesn't taint the taste easy to fill with ice and water and it has a self-sealing valve to prevent spills. double-wall insulation to keep drinks cool for twice
Stainless Steel		
S'well (17oz) (S'well, 2019)	\$35	Keeps beverages cold for 24 hours and hot beverages warm for 12 hours. BPA free and highly eco-friendly Triple-walled vacuum-insulated high-grade stainless steel Condensation free (exterior will remain dry)
Hydro Flask (18 oz) (Hydro Flask, 2019)	\$29.95	TempShield insulation eliminating condensation Keeps beverages cold for 24 hours and warm for 12 hours Durable stainless steel construction BPA and Phthalate free Life time warranty

Klean Kanteen (18 oz) (Klean Kanteen, 2019)	\$18.95	Single wall design making it lightweight and easy to bring anywhere Made from durable stainless steel Powder coat finish makes it 4X more durable, chip resistant, and safe for people and the planet BPA free
4Ocean (25 oz) (4Ocean, 2019)	\$39.41	Double-walled, vacuum sealed stainless steel for hot and cold beverages Rubberized seal to help insulate and prevent leakage Stainless steel handle for easy carry Sustainable-sources bamboo top for ergonomic function Removes 1lb of trash from oceans Shows support for global ocean movement

Appendix C: Legislation for Drinking and Bottled Water Testing

Municipally-tested Water

A key aspect of achieving greater participation in the use of the bottle filling stations in municipal facilities is to provide education and information regarding the safety of municipally tested water. Since Dysart et al relies on individual on-site well water for each of its facilities or spaces, it may be even more important to provide reassurance that this water is safe to drink, in comparison to a municipality that has a centralized water treatment plant where it may be perceived as having more robust testing and treatment methods.

Ontario's Safe Drinking Water Act was established in 2002 as a result of the Walkerton Tragedy that occurred in 2000, where 7 people died and 2300 became ill from drinking water contaminated with E.coli bacteria (CELA, 2011). The purpose of this Act is "To recognize that the people of Ontario are entitled to expect their drinking water to be safe" and "To provide for the protection of human health and the prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing".

The Act's definition of a drinking water system means "a system of works, excluding plumbing, that is established for the purpose of providing users of the system with drinking water and includes "a well or intake that serves as the source or entry point of raw water supply for the system" (SWDA, 2018). This ensures that drinking water provided by wells are included within the scope of this act. Additionally, the Act's definition of "drinking water tests" includes tests in respect of "small drinking water systems" defined under Ontario's Health Protection and Promotion Act, Regulation 319/08 – Small Drinking Water Systems, by which Dysart's individual on-site well systems may be governed. According to Ontario Regulation 170/03 – Drinking Water Systems, the definition of a small municipal drinking water system means "a municipal drinking water system that does not serve a major residential development, is not capable of supplying drinking water at a rate of more than 2.9 litres per second and serves a designated facility or public facility".

For a small drinking water system, the Ontario Drinking Water Quality Standards (O.Reg 169/03, 2018) under the Safe Drinking Water Act must be met (O.Reg 319/08, 2018). There are 150 strict, health-based standards (MECP, 2018) within the Ontario Drinking Water Quality Standards, including microbiological standards that dictate there shall be *no detectable* levels of E.coli or total coliforms, along with chemical and radiological standards that need to be met. Additionally, the owner of a drinking water system is

obligated to prepare an annual report about the system and provide a copy of this report to anyone who requests it, without charge (O.Reg 170/03, 2018). If drinking water safety is to be included in the educational campaign, information about the availability of this report could be provided to residents.

An excellent indicator of the safety of Ontario drinking water is the annual Minister of the Environment's Annual Report on Drinking Water. Key findings from the 2018 report are the following (MECP, 2018):

Test and inspection results for 2017-18 show that Ontario's municipal residential drinking water systems and licensed laboratories follow the rules to protect people's health.

- Drinking water supplied by municipalities was tested over 518,000 times and 99.8 per cent of tests met Ontario's drinking water quality standards.
- *All municipal drinking water systems* were inspected once and laboratories that test drinking water were inspected twice.
- Seventy-five per cent of municipal systems scored 100 per cent on their inspection.
- Sixty-six per cent of laboratory inspections scored 100 per cent.

The Minister's Report also indicates that Ontario works with Health Canada to ensure that drinking water standards are kept up-to-date with the best scientific findings and advice available and any required changes to the legislation are made in consultation with the Ontario Advisory Council on Drinking Water Quality and Testing Standards, which was put in place by the Safe Drinking Water Act (MECP, 2018).

Health Canada's Water Quality and Health Bureau plays a leadership role in science and research and has a mandate to protect the health of Canadians by developing the *Guidelines for Canadian Drinking Water Quality* in partnership with the provinces and territories (Health Canada, 2018). These guidelines provide the quality parameters that should be met for microbial, chemical and physical elements in water along with the common sources and health considerations (Health Canada, 2017). They are subsequently used by provinces and territories as the basis for their own standards (Health Canada, 2013).

Health Canada indicates that water safety is a shared responsibility between the federal, provincial and municipal governments (Health Canada, 2018). They also discuss the fact that water protection takes a multi-barrier approach which means it is necessary to understand each water supply from the source

through to the consumer and the possible sources of contamination along this path and methods of treatment required (Health Canada, 2018). As an example of this, the Ontario Clean Water Act of 2006 addresses the requirements to protect sources of municipal drinking water supplies.

Bottled Water Testing

In Canada, bottled water is regulated as a food and therefore must comply with the Food and Drugs Act and Regulations. The regulation of bottled water sold in Canada is shared by Health Canada and the Canadian Food Inspection Agency. There are specific microbiological standards, acceptable treatments and labelling required under the Food and Drug Regulations (Health Canada, 2009).

Bottled water can be represented as mineral or spring water which means it must be obtained from an underground source and not from a public water supply or just “water” if it does not originate from an underground source. Mineral or spring water must not contain any coliform bacteria (of which E.coli is one type) and cannot have its composition modified by chemical means, although it may contain added carbon dioxide, fluoride in less than 1 ppm and added ozone (used as a disinfectant) (Food and Drug Regulations, 2019). Mineral and spring water labels must indicate whether ozone or fluoride has been added, among other requirements (Health Canada, 2013). Water other than mineral or spring water also must not contain any coliform bacteria nor can it contain more than 100 total aerobic bacteria per millilitre (Food and Drug Regulations, 2019) and the label must include a description of any treatment the water has undergone (Health Canada, 2013). It should also be noted that imported bottled water must comply with the Food and Drugs Act and its regulations (Health Canada, 2013).

In August 2002, Health Canada published “Making it Clear – Renewing the Federal Regulations on Bottled Water: A Discussion Paper”. In this paper it indicates the following in terms of why the regulations need to be updated:

Apart from setting limits on arsenic and lead, the current Regulations do not contain specific, detailed parameters for chemical and radiological contaminants in bottled water, so the Government uses the *Guidelines for Canadian Drinking Water Quality* as a benchmark to assess the safety of bottled water. But nothing in the Regulations obliges manufacturers to observe the *Guidelines* during the production of bottled water. The Government wants to bring the Regulations in line with the *Guidelines*. When referenced in the Regulations, the *Guidelines* will, in effect, become law for bottled water (Health Canada, 2002).

It also states that it wants to improve consumer protection and reduce confusion by considering stricter limits on some microbiological and chemical contaminants. Other proposed changes will give consumers more useful information on which to base buying decision (for example, by making the declaration of Total Dissolved Solids more meaningful and applying it to all types of bottled water), and reduce buyers confusion, by limiting the variety of common names that can be used to describe bottled water products, for example (Health Canada, 2002).

There is no evidence at this time to indicate that these proposed changes have been made to the regulations and this document has been archived. Thus, as it stands, the regulations for bottled water are much less strict than what Ontario requires under the Safe Drinking Water Act, although any water bottling company that is drawing water from a municipal drinking water source would, in essence, be covered by this act and regulations.

A more stringent set of standards exists for bottled water produced by companies that are members of the Canadian Bottled Water Association. According to the CBWA, these standards exceed those of federal and provincial governments and additionally, members follow a multi-barrier approach which could include source protection and monitoring as well as multi-stage filtration including micro filtration, reverse osmosis, distillation, ozonation, the application of ultraviolet light or other appropriate processing measures (CBWA, n.d.).

CBWA bottlers are also subjected to independent inspections and testing, including an annual unannounced inspection by an internationally recognized organization as well as an annual water analysis administered by a government certified laboratory (CBWA, n.d.).

In summary, the testing and quality standards for tap water currently are much more stringent than for those of bottled water, although it would appear that bottlers belonging to the Canadian Bottled Water Association are adhering to a stricter set of requirements.

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