



MORRISON HERSHFIELD

FINAL REPORT

Transfer Station Operations and Service Review – Study Report with Recommendations

Kelowna, BC

Presented to:

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1. BACKGROUND AND SCOPE OF REVIEW

To service the residents of Trader’s Cove and along Westside Road, north of Kelowna, the RDCO operates two transfer stations for recycling and garbage collection: the Trader’s Cove Transfer Station (TCTS) and the North Westside Transfer Station (NWTS). Both transfer stations collect household waste/garbage, yard waste, and various recyclable materials such as packaging and printed paper (PPP) for Recycle BC. Refer to Table 1 for a list of materials collected at each of the transfer stations.

Only registered residents are allowed to drop off garbage and recyclables at these sites. Residents are allowed to drop-off up to two bags per household per week. The requirement for residents to be registered applies to the transfer stations at Trader’s Cove and North Westside to enable the RDCO to charge the facility users. These two facilities serve 266 and 935 residents, respectively.

Table 1 Materials accepted at Trader’s Cover and North Westside Transfer Stations

Material	Trader’s Cove	North Westside
Household waste / garbage (up to 2 bags per household per week)	X	X
Yard Waste (maximum load of 250 kg - 10 bags or one pick-up load)	X	X
Household recyclables: paper, cardboard, mixed containers, plastic bags, glass, and Styrofoam	X	X
Metal		X
Mattresses, furniture		X (limited) ¹
Large appliances		X (limited) ¹
Household Hazardous Waste (HHW)		X (limited) ²
Lead-acid batteries		
Clothing	X	X

¹ There is a Bulky Items Collection organized at NWTS twice a year. The following items are considered bulky waste: mattresses, box springs, furniture, major appliances, scrap metal, lawn mowers and other motorized parts, household and lawn furniture.

² There is a Hazardous Waste and Electronic Recycling Collection organized once per year at the NWTS. Facility users can drop-off HHW, electronic and electrical waste (e-waste), batteries, and lights and light fixtures.

Morrison Hershfield was engaged to conduct an operations and service review of the two transfer stations. The work involved developing and analyzing a customer satisfaction survey of facility users and identifying opportunities to improve facility services. This technical memorandum (memo) presents the findings and recommendations of improvements for both sites.



2. EXISTING FACILITIES

2.1 Trader's Cove Transfer Station

The TCTS is located just north of Kelowna at the intersection of Bear Lake Main and Westside Road. The site is owned by the RDCO. OK Environmental Waste Systems operates the site and hauls the garbage on behalf of the Regional District. The recycling area of the facility relating to PPP is operated on behalf of Recycle BC.

The TCTS is open on Wednesdays (6:30 am – 10:30 am) and Sundays (9:00 am – 1:00 pm) throughout the year with extended hours during the summer (Wednesday - 6:30 am – 11:30 am, and Sunday - 9:00 am – 5:00 pm). The facility is closed Christmas Day and New Year's Day. An operator staffs the site during opening hours.

In 2017, a total of 107 tonnes of garbage and 46 tonnes of yard waste were accepted at this site from registered users (266 in total). During 2017, the average quantity of garbage collected per month was 8.9 tonnes, with a peak of approximately 16 tonnes during January, 2017. During 2018, July was the peak month with 15 tonnes. During 2017, the monthly average for yard waste was 3.8 tonnes, with a peak month of 9 tonnes in May. In 2018, May was also the peak month at 6.3 tonnes. Based on this review, there appear to be seasonal fluctuations with waste dropped off at the transfer station.

Garbage and yard waste are transported to the Glenmore Landfill.

Figure 1 shows an overview of the site. Pictures of the site are included in Appendix A. There are two 40 yard roll-off bins located at the site: one for garbage and one for yard waste. There are two areas for PPP material drop-off into mega bags:

1. Located on the same side as the yard and garbage drop-off for mixed containers, paper and cardboard (Photo 1 in Appendix A).
2. Located along the fence on the same side as the attendant booth for Styrofoam (white, coloured), glass, plastic bags and overwrap, and other flexible packaging (OFP), as per Recycle BC definitions (Photo 8 in Appendix A).

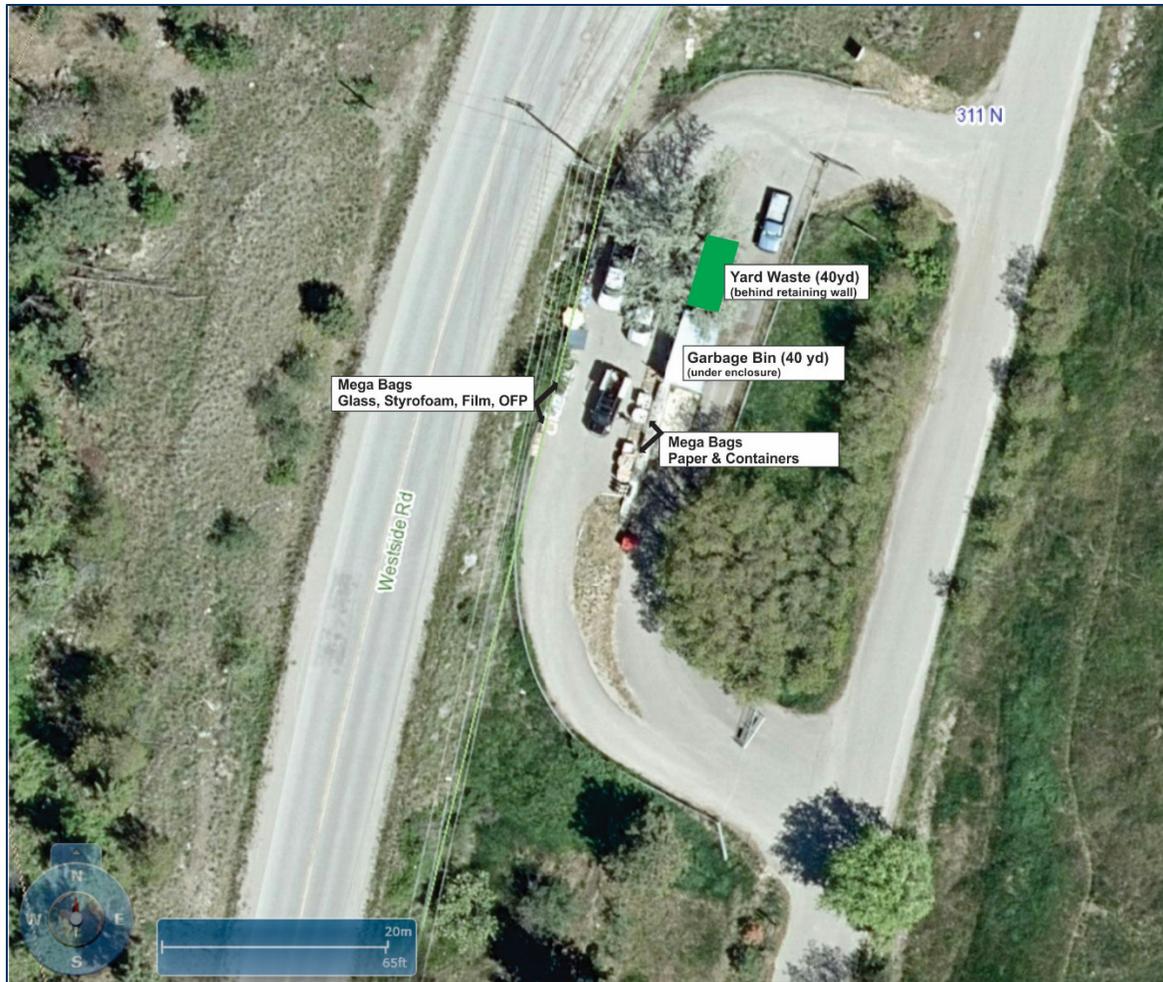


Figure 1 Trader's Cove Transfer Station

No waste audits have been completed at this facility since 2013, where one load was audited. A total of 31% of divertible materials were found during this audit. The five largest categories of divertible materials (by percentage of sample) were:

- Yard waste (9%)
- Plastic Film (5%)
- Soil (4%)
- Mixed paper (2%)
- Scrap metal pipes, wire, white goods and empty paint cans (1%)

2.2 North Westside Transfer Station

The NWTS is located along the Sugarloaf Mountain/Whiteman Creek Forest Service Road, which is approximately 3.2 km past the fire hall on Udell Road in Killiney Beach. The facility is located approximately 45 km north of Kelowna. OK Environmental Waste Systems operates the site and hauls the garbage on behalf of the Regional District. The recycling area of the facility relating to PPP is operated on behalf of Recycle BC.

The site is open at 8:00 am – 12:00 noon on Mondays, Wednesdays, Saturdays and Sundays. An operator staffs the site during opening hours. The facility is closed on Christmas Day, Boxing Day and New Year’s Day and Easter Sunday.

In 2017, a total of 237 tonnes of garbage and 150 tonnes of yard waste were accepted at this site from registered users (935 in total). During 2017, the average quantity of garbage collected per month was 19.7 tonnes, with a peak of approximately 24.6 tonnes during June, 2017. During 2018, July was the peak month with 30 tonnes. During 2017, the monthly average for yard waste was 12.5 tonnes, with a peak month of 21.5 tonnes in April. In 2018, April was also the peak month at 25.7 tonnes. Similar to the TCTS, there are seasonal fluctuations of waste and yard waste quantities dropped off at the transfer station.

Figure 2 shows an overview of the site. Pictures of the site are included in Appendix A. This facility has five 40 yard roll-off bins located onsite for:

1. PPP materials - Mixed fibres (cardboard/paper) and mixed containers (via two roll-off bins),
2. Garbage (via two roll-off bins),
3. Yard waste (via one roll-off bin).

Additional PPP materials, including Styrofoam (white, coloured), glass, plastic bags and overwrap, are collected in mega bags behind the garbage roll-off bins (north side of the bins). Other flexible packaging (e.g. stand up pouches, zipper lock bags, etc.) was added to the site January 1, 2019. A donation bin for clothing is located adjacent to the attendant booth (office).

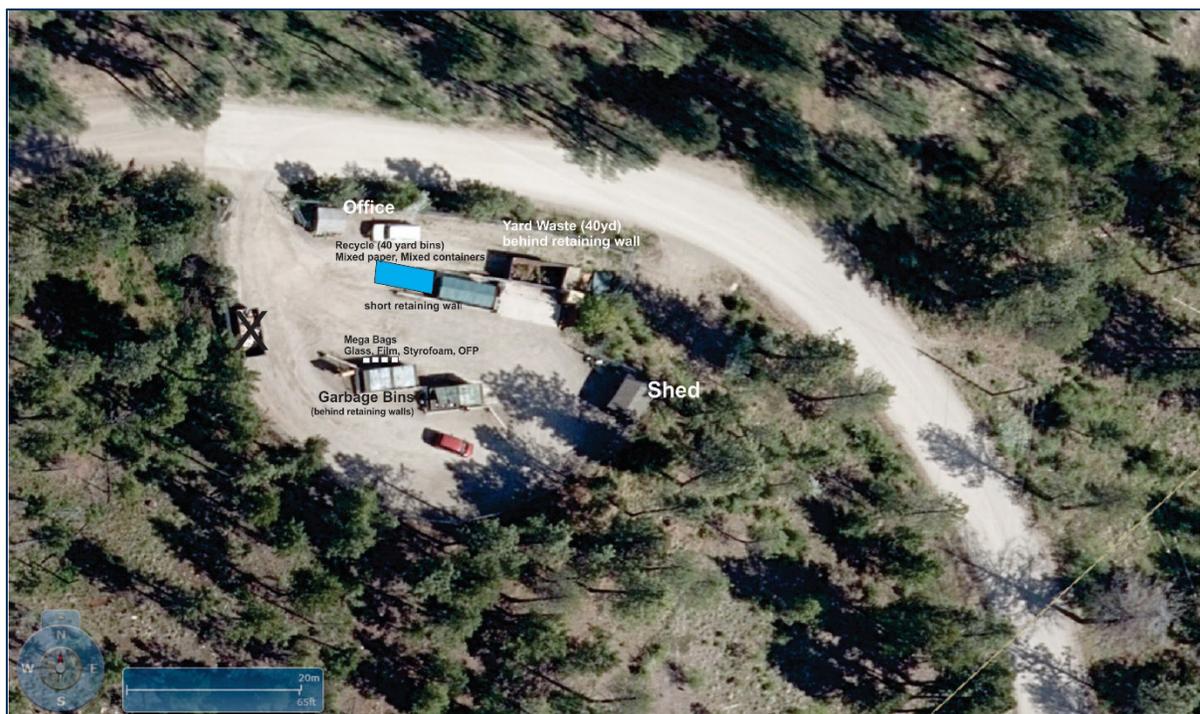


Figure 2 North Westside Transfer Station Site Overview

Bulky item collection takes place once in the spring and once in the fall. During a week-long event, facility users can dispose of large household items for a minimal cost (\$20 per truckload in 2018). Unwanted fridges and freezers are accepted at \$15 per item, which covers Freon decommissioning. The bulky wastes are collected in 40 yard roll-off bins (metal separated from other bulky items). Bulky items are collected around the storage shed on the south side of the garbage drop-off area.

In 2017, facility users dropped off 11.6 tonnes of bulky waste and 8.8 tonnes of major appliances (as scrap metal) during the bulky item collection days. The collection can be managed by the existing facility attendant during the events. The RDCO has reported some space constraints during the events, but believes that they are being managed adequately.

Garbage, yard and bulky waste are transported to the Glenmore Landfill. Freon is removed from major appliances at the Glenmore landfill.

The hazardous waste and electronic recycling collection takes place once a year in July. Items accepted include household paint, flammable liquids, aerosols, pesticides, gasoline, liquid adhesives, undercoat and tars, pool and hot tub chemicals, batteries, electronics, computers, small appliances, light bulbs and fixtures. The collection does not accept propane tanks, used oil, other chemicals, or commercial HHW. A contractor (Battery Doctors) has one staff member onsite during the event and collects HHW with a 5 tonne truck. The contractor is responsible for ensuring only accepted materials are dropped off.

The RDCO has not analyzed the composition of waste collected at the NWTS, and there is no waste audit data available for this facility.

3. CUSTOMER SATISFACTION RESULTS

A customer satisfaction survey was developed to gauge general customer experience at the two facilities. The survey was conducted via the RDCO website during a three-month period (June 26 to September 7, 2018). Survey results were logged via Survey Monkey. Paper copies of the survey were provided at both transfer facilities during the same period, and residents were able to provide responses via mail. The survey was also available online to capture those residents who are unable to access the facilities (e.g. owners of seasonal homes). A total of 96 responses were mailed in and 98 were submitted via Survey Monkey.

The survey had a total of 194 respondents, representing approximately 16% of all registered users. The response rates are broken down by the respective facility in Table 2.

Table 2 Response Rates for the Customer Satisfaction Survey

Facility	No. of Respondents	% of Registered Users
Trader's Cove	94	35%
North Westside	100	11%



3.1 Profile of Respondents

Approximately 89% of respondents using Trader's Cove and 90% of respondents using North Westside drop off waste from their permanent homes. The majority of the remaining respondents drop off waste from their seasonal homes.

The majority of respondents (93% for Trader's Cove and 90% for North Westside) are regular facility users who visit the facility weekly or monthly. Approximately 6% of respondents only use the facility a few times a year, and the remaining respondents rarely use the facility or have never used the facility.

3.2 Overall Survey Results

The survey asked respondents to specify which types of materials they dropped off at the facility during their last visit. At Trader's Cove, 99% of respondents dropped off garbage, 94% dropped off recycling, and 70% dropped off yard waste. For the respondents of North Westside, 99% dropped off garbage, 94% dropped off recycling, and only 50% dropped off yard waste during their most recent visit.

The respondents had the opportunity to provide final comments in response to the following question: "Do you have any other comments or improvements to suggest for the transfer station?" More than half of all respondents offered comments (66% of the 194 responses). Comments were grouped into the following categories in order to determine whether there were any general trends or themes:

- Customer Service (e.g. helpfulness of transfer station attendant)
- Cleanliness and Organization (e.g. odours, tidiness, general site maintenance)
- Material Types (e.g. types of materials accepted or not accepted at the facility)
- Material Quantities (e.g. amount of garbage bags accepted per visit, number of bins available)
- Collection Services (e.g. hazardous waste and bulky waste round-up, curbside collection)
- Operation Hours (e.g. hours per day and days per week)
- Layout and Site Condition (e.g. site design, facility size, site road conditions, bin arrangement)
- Accessibility (e.g. location, signs, road conditions)
- Cost (e.g. user costs, seasonal home vs. permanent home costs)
- General (e.g. overall comments on the facility or waste management system)

Survey results for each facility are summarized in the sections below.

3.3 Trader’s Cove Transfer Station

Approximately 59% of the Trader’s Cove respondents provided additional comments or suggestions for improvement with their survey submission.

Table 3 summarizes the number of positive and negative comments provided for each category by users of the Trader’s Cove Transfer Station. Based on the survey comments, the areas of highest priority for Trader’s Cove are the types of materials accepted at the facility and the hours of operation.

Table 3 Summary of Survey Comments from Users of Trader’s Cove

Response Categories	No. of Respondents	No. of Positive Responses	No. of Negative Responses*
Customer service	32	32	0
Cleanliness/organization	3	3	0
Material types	11	0	11
Material quantities	2	0	2
Collection services	4	1	3
Operation hours/days	10	0	10
Layout/site condition/size	4	0	4
Accessibility	1	0	1
Cost	1	0	1
General comments (system and facility)	9	9	0
* Red indicates high priority issues (i.e. more than 8 negative comments)			
* Yellow indicates low priority issues (i.e. less than 8 negative comments)			

Approximately 98% of respondents think that the site operator at the transfer station is helpful and the transfer station is kept tidy enough.

The majority of respondents (68%) have stated that the items accepted during opening hours are adequate for their needs. However, the remaining respondents have indicated that they would like an area to drop off reusable items (i.e. for a free store), and they would like the facility to accept additional materials, such as organics, hazardous waste, electronics, lightbulbs, batteries, oil, propane tanks, tires, scrap metal and construction waste. Particular interest was shown for hazardous waste and electronics/small appliances. There were 4 respondents that dislike the additional effort involved with sorting recyclables into various streams at the depot, as opposed to dropping off commingled recyclables.

Of the Trader’s Cove respondents, 68% are satisfied with the current facility hours. Approximately 16% of respondents have requested that the facility be open more days per week, with multiple comments indicating a preference for Saturday. The remaining 16% would like the facility to increase the hours of operation on opening days.



There were 3 comments suggesting the Trader’s Cove site should be expanded to reduce traffic congestion. However, the majority of respondents believe there is no issue with traffic flow, as 49% say the facility lineup is usually short and 49% say it is usually reasonable. Respondents appear to think that the existing signage is sufficient, with 74% thinking signage is clear and helpful, 22% thinking it is somewhat clear, and 4% not having an opinion on the subject.

The majority of users (93%) feel safe at the Trader’s Cove facility, while the remaining feel that the site could be made more safe to users. Some specific safety concerns among users include the narrow vehicle lane that inhibits vehicles from passing and causes congestion, the placement of recycling bins that forces pedestrians to pass between cars, and the yard waste bins that are difficult to reach.

3.4 North Westside Transfer Station

Approximately 60% of the North Westside respondents provided additional comments or suggestions for improvement with their survey submission.

Table 4 summarizes the number of positive and negative comments provided for each category by users of the North Westside Transfer Station. The North Westside Transfer Station respondents had more suggestions for improvement of the facility in comparison to Trader’s Cove. Based on the survey comments, the high priority categories for North Westside are the customer service, types and quantities of material accepted at the facility, hours of operation, layout of the site, and the collection services provided.

Table 4 Summary of Survey Comments from Users of North Westside

Response Categories	No. of Respondents	No. of Positive Responses	No. of Negative Responses
Customer service	21	12	9
Cleanliness/organization	8	6	2
Material types	9	0	9
Material quantities	9	0	9
Collection services	10	0	10
Operation hours/days	13	0	13
Layout/site condition/size	15	0	15
Accessibility	2	0	2
Cost	2	0	2
General comments (system and facility)	14	13	0
* Red indicates high priority issues (i.e. more than 8 negative comments)			
* Yellow indicates low priority issues (i.e. less than 8 negative comments)			

There is some concern regarding customer service at the transfer station, where customers have indicated that the attendant was unaccommodating. However, 75% of respondents



have stated that the site operator is helpful. Additionally, 95% of users think the Transfer Station is kept tidy enough.

Approximately 57% of respondents think the items accepted during opening hours are adequate for their needs, while 42% think they are not adequate. Respondents have indicated that they would like an area to drop off reusable items (e.g. suitable for a free store), and they would like the facility to accept additional materials, such as organics, hazardous waste, more plastic items, electronics, lightbulbs, batteries, oil, propane tanks, tires, scrap metal and construction waste. There were 3 comments that expressed interest in a year-round bulky waste drop off area for reusable items.

There were 6 comments indicating a need for increased number of bins for yard waste and cardboard, since the current bins are frequently at capacity. Additionally, 3 respondents would like an increase in the number of garbage bags permitted per visit.

Almost half (41%) of respondents have never used the bulky item collection system. Of those who have never used the system, 46% say they have not had the need, 19% say they did not know about it, 16% say it is too expensive, and 19% do not have an opinion on the subject. Approximately 30% of those using the bulky item collection system think the service is not adequate. Of those who think the system can be improved, 54% think items should be collected more frequently, 5% think more types of bulky materials should be collected, and 24% think the service cost should be reduced.

More than half (56%) of respondents have never used the hazardous waste and electronic roundup system. Of those who never used the system, 25% say they have not had the need, 56% say they did not know about it, and 19% do not have an opinion on the subject. Approximately 25% of those using the hazardous waste roundup system think the service is not adequate. Of those who think the system can be improved, 64% think items should be collected more frequently and 12% think more types of hazardous waste should be collected.

There were 5 comments indicating that users were unaware of the hazardous waste and electronic roundup system or the bulky waste collection program. They have requested that more information be provided regarding these services. Another 3 respondents would like to see the frequency of collection services increased for hazardous/electronic waste and bulky waste, specifically in the summer months for seasonal residents. One respondent emphasized the need to be able to drop off the garbage at other facilities, such as in Kelowna, so people do not have to make dedicated journeys to drop off garbage.

Regarding operation hours, 58% of North Westside respondents are satisfied with the current facility hours. However, 25% think the operation hours are only somewhat adequate, and would prefer longer hours on current operation days, specifically the addition of afternoon and evening hours. The remaining 17% think the operation hours are inadequate and would like the facility open more days of the week.

An area of high concern to the respondents is the layout and condition of the site, where negative comments for this category make up approximately 15% of the total comments received for North Westside Transfer Station. There were 4 respondents who have

experienced issues dropping off yard waste with a trailer and would like to adjust the layout so a trailer can be backed up beside the yard waste bins. There were 8 comments stating that the facility needs to be expanded in order to mitigate congestion around the disposal bins. Due to the location of the yard waste bins, users are unable to access other disposal bins when someone is unloading yard waste. Additionally, 3 respondents mentioned that the road near the recycling area is in bad condition and needs to be improved or paved.

Most respondents are satisfied with the transfer station lineup, where 42% say it is usually short and 53% say it is usually reasonable. The majority of respondents also think there is adequate signage at the transfer station, where only 3% find the signage confusing.

The majority of respondents (85%) feel safe at the facility, while the remaining feel that the site could be made more safe to users.

4. ASSESSMENT OF ON-SITE COMPOSTING SYSTEMS

The RDCO asked MH to review suitable technologies for processing yard (and potentially also food) waste at either TCTS, NWTs, or at both locations. The objectives with a small-scale compost is to provide an effective and sustainable option to reduce current hauling costs and processing fees and produce a good quality compost for local use. Yard waste is currently sent to Glenmore Landfill, and food waste is disposed as residual waste at Glenmore Landfill.

An on-site compost would need to process yard and food waste quantities generated by users of these transfer stations. Table 5 presents the estimated feedstock quantities. The yard waste estimate is based on quantities sent to Glenmore. The food waste estimate is based on the waste audit data from Trader’s Cove (2013), which showed a 30% food waste (including meat, Kleenex, paper towels, paper plates). A conservative capture rate of 60% was assumed.

Table 5 Estimated Organic Waste Available for On-site Composting

	Trader’s Cove	North Westside
Yard waste kg per day	137	411
Food waste kg per day	42	113
Total Organics to process (kg per day)	186	543
Total Organics to process (Tonnes per year)	65	191

The following section provides a brief overview of on-site composting systems that may be suited for use at these facilities. Generally, an on-site compost solution will require electricity and access to water. Currently, it is our understanding that neither of the two facilities have these utilities.

There are numerous organics processing options that may be suited for the facilities (provided there is access to electricity).



Earth Flow System. The Earth Flow System is an automated in-vessel composting system designed for on-site composting. Mixing, aeration and moisture addition is automated; therefore, this system requires very little labour beyond loading and unloading. The earth flow system can either be placed in a custom vessel, a site-built concrete vessel with a variety of options for an enclosure, or in an intermodal stainless steel vessel with a greenhouse roof enclosure¹. Each of these options require a biofilter to manage odours from the process.

The Earth Flow System requires space for the vessel and biofilter. For a custom-built vessel, the RDCO is likely to need a footprint of approximately 5 x 2 meters, and for the intermodal unit, a foot print of approximately 6 x 2.5 m.

In addition, a biofilter takes up approximately half of the footprint of the processing unit (i.e. the biofilter is likely to take up at least 1.5 x 3 m).

Aerated Static Pile. The simplest and most inexpensive option is to process organic waste in an aerated static pile. It is generally only appropriate for feedstocks, such as leaves and branches, and when there is an abundance of space available. Capital costs depend on whether a concrete pad is needed for the composting area and the level of aeration required.

Table 6 identifies costs per site for the three different composting options and their benefits and disadvantages.

Table 6 Costs, benefits and disadvantages of different composting options.

Technology	Costs per site	Advantages	Disadvantages
Earth Flow - custom built vessel	\$67,000 - \$80,000 capital with annual maintenance costs estimated at 3% of the capital costs.	<ul style="list-style-type: none"> ▪ Low labour costs ▪ Automated processing ▪ Can process food and yard waste 	<ul style="list-style-type: none"> ▪ Not bear proof (but it can be at a higher cost) ▪ Shredding needed for woody items
Earth Flow - intermodal unit	\$79,000 - \$95,000 with annual maintenance costs	<ul style="list-style-type: none"> ▪ Bear proof ▪ Increased odour management control 	<ul style="list-style-type: none"> ▪ Shredding needed for woody items
Aerated static pile (ASP)	\$10,000 - \$50,000 per site, depending on design.	<ul style="list-style-type: none"> ▪ Simple ▪ Works well if only yard waste is processed 	<ul style="list-style-type: none"> ▪ Shredding needed for woody items ▪ Not suited for food waste ▪ Require a bucket loader onsite. ▪ Labour intensive

¹ <https://compostingtechnology.com/earth-flow/>

In summary, composting of yard and food waste can only take place at TCTS and NWTS if these sites have access to electricity (and preferably water) and a shredder. Due to space constraints, a composting unit and associated biofilter will be difficult to accommodate within the current footprint of TCTS; however, space may be sufficient at NWTS if the site layout is reconfigured. Accurate costs can only be developed when a reconfigured facility design has been finalized.

In the customer satisfaction survey, no specific questions were posed on whether users wanted composting onsite. In response to general comments on suggested improvements, there were only two comments (one for each of the transfer stations) that wanted the addition of onsite composting. The RDCO may not want to establish onsite composting due to the likely high cost and the relatively low public interest.

5. OPPORTUNITIES TO IMPROVE FACILITY SERVICES

5.1 Traders Cove

Based on the review and customer satisfaction results, this facility appears to have an efficient layout and functions well. Generally, it has clear signage and operating staff on hand who are available to direct users to appropriate bins for waste placement. MH has only identified three areas for improvement.

Safety

The mega bags for PPP drop-off are on the opposite sides of the traffic flow through the site, and is an increased safety risk to users walking between the two areas. This was not flagged as a risk by the facility users, based on the customer satisfaction survey. Due to the sloped nature of the site, the drop-off area would need to be significantly reconfigured to provide drop-off areas for all accepted materials on the same side of the site and the high cost would be difficult to justify. Therefore, MH suggests the RDCO focus on managing the risk to users walking across the area where cars travel by use of signs and communication by the attendant onsite. The operator can enforce a policy that prevents facility users from using headphones while at site.

It is important to highlight that there was recently (during Fall 2018) an incident when a facility user sprained an ankle after dropping off yard waste. The injury was caused when the user stepped down from the retaining wall by the yard waste drop-off area (Figure 3 below shows the wall, which is made up of highway blocks). The paving below is sloped in relation to the retaining wall.



Figure 3 Hazardous retaining wall where user is required to step down from yard waste drop-off area.

MH recommends the RDCO ensures the area that residents use when dropping off yard waste is level. The current design makes the user “step up” to effectively offload materials into the bin. A level drop-off area leading up to the safety rails can be created by placing a lock block against the existing lock-block wall and filling the area to eliminate the step up and create a level drop-off area.

The RDCO may also want to consider extending the drop-off area along the entire lock-block wall (Figure 4) to allow sufficient space for two users to drop off yard waste side by side. A safety rail will be required to prevent users from stepping off the side (on the left side of the drop-off area). The estimated cost for this work is \$15,000 - \$20,000, depending on local access to lock-blocks and fill material and RDCO’s preference for paving (i.e. gravel only would be a cheaper option).



Figure 4 Recommended work to level ground by yard waste drop-off area shown in computer generated image

Opening Hours

TCTS is currently open Wednesdays (6:30 am to 10:30 am) and Sundays (9:00 am to 1:00 pm) throughout the year, with extended hours during the summer (Wednesdays, 6:30 am to 11:30 am and Sundays, 9:00 am to 5:00 pm). Of the customer satisfaction respondents, a total of 32% wanted either longer opening hours or more opening days. Multiple comments indicated a preference for opening on Saturdays. Based on current costs to operate this site, the additional annual operational costs are likely between \$9,000 (assuming four additional hours mid-week) to \$14,000 (if opening four hours on a Saturday, assuming 50% higher staffing costs on weekends).

Improvements to Drop-Off Area Using Mega Bags

Ideally, the collection of recyclables using mega bags should be covered from the elements. Recycle BC specifies in the depot statement of work that the contractor must ensure that PPP is adequately protected from rain, snow and other inclement weather.

The RDCO can improve protection from the elements by providing a wooden structure with a roof to cover the mega bag drop-off area (Figure 5). Given there are two separate areas using mega bags at TCTS and the site would need to be reconfigured significantly in order to provide the collection of all materials along one site of the site, MH suggests covering

only the mega bags where paper is collected. The cost for this type of pre-fabricated wooden structure is up to \$20,000.



Figure 5 Wooden structure providing cover for recyclable drop-off into mega bags

5.2 North Westside Transfer Station

Based on the review and customer satisfaction results, this facility appears to be working well in managing garbage and recyclables; however, there is a need for increased capacity to receive yard waste.

The site appears well signed and has operating staff on hand who are available to direct users to appropriate bins for waste placement.

MH has identified three areas for improvement, which are described below.

Public Education

The RDCO has been providing bulky item collection and hazardous waste and electronic roundup services for many years. Many residents who use this facility are now aware of these services. The RDCO may need to reconsider methods used to communicate available services. There may be opportunities to piggyback on other RDCO communications, such as mailers, utility bills, billboards, etc. Residents would benefit from having the information in hard copy up to a month before the collection takes place.

Opening Hours

The site is currently open from 8:00 am to 12:00 noon on Mondays, Wednesdays, Saturdays and Sundays. A total of 42% of the customer satisfaction respondents believed that the

operation hours are only 'somewhat adequate' or 'inadequate'. Respondents would prefer longer hours on current operation days, specifically the addition of afternoon and evening hours, and some would like the facility open more days of the week. Based on current costs to operate this site, the additional annual operational costs are estimated to be between \$13,000 (assuming four additional hours mid-week) to \$20,000 (if extending opening hours by four hours on the weekend, assuming 50% higher staffing costs at weekends). Extending the opening hours may also reduce onsite congestion that some residents have commented on during the survey process.

Improvements to Yard Waste Drop-Off Area

There is only one 40 cubic yard roll-off bin for yard waste, and this is often not sufficient according to both users and the operator of the facility. According to the operator, yard waste is hauled from the site to the Glenmore compost facility twice a week during peak season and biweekly during the low season.

The facility has experienced large quantities of incoming material, particularly following storms (involving lake debris, etc.). We recommend increasing the capacity to two bins for yard waste. Users have also reported limited space for vehicle movement, leading to increased congestion. Customer satisfaction respondents noted issues dropping off yard waste with a trailer and would like to adjust the layout so a trailer can be backed up beside the yard waste bins.

Option 1: Reconfiguring the Site within the Existing Footprint

The site currently has two 40 cubic yard roll-off bins next to each other for PPP materials: one for cardboard/paper and the other for mixed containers (Photo 15 in Appendix A). Option 1 proposes to maximize the space at the south end of the site (opposite the garbage disposal area) as follows:

- Convert the existing mixed container roll-off bin to a second yard waste bin (i.e. purchasing a new roll-off bin at an approximate cost of \$10,000).
- Keep the existing cardboard/paper bin in the same location.
- Move the roll-off bin for mixed containers to the south end of the site against the fence.
- Move the existing recycling mega bags to the south end of the site against the fence.

We understand that this space at the south end of the site is currently only being used on a temporary basis for the annual bulky waste collection events. The RDCO will need to consider space requirements for the bulky waste in order to determine whether this collection can be placed elsewhere or whether the site could be reconfigured with the current design (with only one bin for yard waste) during the bulky collection event.

Option 2: Reconfiguring the Site with an Expanded Footprint

A more costly option is to expand the existing site footprint. There are two suitable options for an expansion, both involving using the area on the west side of the site entrance.

The capital estimates provided in this section are for budgeting and discussion purposes only. As the design progresses, the contingency amount will also become lower and it will be possible to consider ways of lowering the capital costs.

It should be noted that a detailed review of the tonnages handled at the transfer station was not completed as part of this study. An analysis of existing tonnages is recommend to determine the appropriate bin sizes and estimated haul frequency for any proposed option. This analysis should be completed before detailed design of any of the proposed options begins.

Option 2A: Establish Yard Waste Drop-Off in Area Adjacent to the Site Entrance

Yard waste drop-off can be provided at roll-off bins in a saw tooth arrangement before the user reaches the garbage drop-off as shown in Figure 6. The site expansion needs to allow sufficient space so the user can pull up beside the roll-off bins to unload materials.

The existing yard waste area can instead be used for recyclables drop-off and there should be sufficient space to have all types of recyclable streams on the same side to eliminate the need for foot traffic across the traffic flow.



Sugarloaf Mountain / Whiteman Creek Forest Service Road

Trailers will back up to service bins.

New Yard Waste Area (Approx. Clearing 225m²)

Residents can drop off yard waste at top of wall into bins below.

Office

Recycling

Recycling

Mega Bags

Garbage

Garbage

Shed

P:\2018\180097500-RDCO Transfer Station Operations\09. CAD\09. Sketches\Option 2A.dwg Plotted by Warren Pore



North Westside Transfer Station Option 2A

SCALE 1:250

Dec 13, 2018

The high-level conceptual design and cost estimate includes the following costs:

- Site preparation (site grading, clearing, and grubbing).
- Surfacing, barriers and signs (compacted gravel over the entire extension consisting of a 300 mm thick sub-base and 150 mm thick gravel road base).
- Fencing.
- Two 40 cubic yard bins.
- Lock-block retaining wall to create saw tooth with space for two 40 cubic yard roll-off bins.
- Concrete pads for roll-off bins.
- Structural fill behind block walls.
- An allowance for traffic barriers and concrete curbing.

Engineering (geotechnical and structural assessments) is required to inform the detailed design.

The estimated cost for this work is \$140,000, based on information available at this time. The cost estimate is considered a Class D preliminary cost estimate ($\pm 50\%$) and is based on the high-level conceptual base plan.

Option 2 B: Establish Recyclables Drop-Off area Adjacent to the Site Entrance

If the drop-off area for recyclables were placed adjacent to the site entrance, the yard waste drop-off can remain in its current location. The capacity can be doubled if one of the roll-off bins that currently provides drop-off for PPP materials takes yard waste. Refer to Figure 7 for a visual site plan showing Option 2A.

The drop-off area for recyclables needs to allow sufficient space so the user can pull up beside the roll-off bins to unload materials. The site footprint does not require as much expansion as Option 2 A described above. The expansion will need to accommodate the placement of two roll-off bins (side by side) for mixed containers and mixed fibres and an area for canvas bags.



Sugarloaf Mountain / Whiteman Creek Forest Service Road

New Recycling Area
(Approx. Clearing 145m²)

- Mega
- Bags

Mixed Fibres

Mixed Containers

Office

Yard Waste

Yard Waste

Garbage

Garbage

Shed

P:\2018\180097500-RDCO Transfer Station Operations\09. CAD\09. Sketches\Option 2B.dwg Plotted: by Warren Pore



North Westside Transfer Station
Option 2B

SCALE 1:250

Dec 18, 2018

The high level conceptual design and cost estimate includes the following costs:

- Site preparation (site grading, clearing, and grubbing).
- Surfacing, barriers and signs (compacted gravel over the entire extension consisting of a 300 mm thick sub-base and 150 mm thick gravel road base).
- Fencing.
- One 40 cubic yard roll-off bin for additional yard waste.
- Concrete pads for roll-off bins.
- Structural fill behind retaining walls.
- An allowance for traffic barriers and concrete curbing.
- Engineering (geotechnical and structural assessments is required to inform the detailed design).

The estimated cost for this work is \$110,000, based on information available at this time. The cost estimate is considered a Class D preliminary cost estimate ($\pm 50\%$) and is based on the high-level conceptual base plan.

Improvements to Drop-Off Area using Mega Bags

The RDCO may want to provide a simple wooden structure to cover the drop-off area with the mega bags (refer to Figure 5, as also proposed for Trader's Cove). As mentioned in Section 5.1., for Traders Cove improvement, Recycle BC specifies in the depot statement of work that the contractor must ensure PPP is adequately protected from rain, snow and other inclement weather. Due to space constraints at the current location, provision of a covered area is better suited if the RDCO wants to reconfigure the site as described in Option 2B, with the recyclables drop-off area adjacent to the site. The cost for this type of pre-fabricated wooden structure is in the range of \$20,000-\$30,000.

Material Management

When MH looked into the possibilities of rearranging the existing site plan, we noted an option to increase material management efficiency. Based on information from the operator, the approximate hauling frequency for cardboard/paper (mixed fibres) is approximately weekly throughout the year.

The RDCO can consider using a cardboard compactor, which could reduce hauling frequency from weekly to biweekly or every three weeks. Typically, a compactor bin can almost quadruple the amount of material hauled in one trip. A recycling compactor and bin typically costs approximately \$50,000.

The RDCO should correspond with Recycle BC to make sure that any changes to the current bin system is acceptable to them.

Site Improvement

In a discussion with the operator², site drainage was brought up as an issue. Potholes frequently form across the site and annual regrading is necessary. Paving the site is likely to improve site operation and the cleanliness of site, reduce any ponding and simplifying snow removal.

6. NEXT STEPS

As described above, there are a number of opportunities to improve TCTS and NWTS. The key improvement identified for Trader's Cove is the step-up to the retaining wall, where facility users are required to step up and down from yard waste drop-off area. There is an imminent need to level the ground at this drop-off area, and MH recommends the RDCO address this hazard as soon as possible.

MH also identified a number of improvements for the North Westside Transfer Station. The most pressing issue at this facility is congestion, especially around the yard waste drop-off area. The current 40 cubic yard roll-off bin for yard waste is often not sufficient during peak drop-off times. MH has identified three options to address the issue that vary in capital investment. The option to rearrange the current layout is the lowest cost and may be a short-term option until a time when the site is expanded. MH identified two different options for a site expansion, either placing the yard waste or recyclables drop-offs at the area adjacent to the site entrance. Both of these options require significant capital investments of over \$100,000. The RDCO will need to consider whether this capital investment is feasible given current budgeting restrictions. Should the RDCO choose to proceed with an expansion of the NWTS, MH would be pleased to provide facility planning and design support, if required.

The report also identifies some operational improvements to the facilities. Many customer satisfaction respondents wanted either longer opening hours or more opening days, and MH has identified the cost to extend the facility opening hours at both facilities. MH suggests the RDCO review the operational cost increases internally to determine whether increased operating hours can be supported.

² As per personal communication between Curtis Jung, Morrison Hershfield and RJ from OK Environmental on December 17, 2018.

APPENDIX A: Additional Photos of the Transfer Stations

Photos from Traders Cove TS:



Photo 1: Drop-off areas for yard waste and garbage



Photo 2 Drop-off bins for garbage



Photo 3 40 Cubic yard roll-off bins for Yard Waste and Garbage From Below



Photos 4, 5 and 6 Trip Hazard Noted at Yard Waste Drop-Off





Photo 7 Attendant Booth



Photo 8 PPP drop off by attendant booth



Photo 9 Clothing Donation Bins By Exit

Photos from North Westside TS



Photo Entrance for the Site



Photo 10 Drop-off bin 1 for garbage (40 cubic Yard Roll-Off Bin)



Photo 11 Drop-off bin 2 for garbage (40 cubic Yard Roll-Off Bin)



Photo 12 View of Both Drop-off bins for garbage



Photo 13 PPP Recycling Areas Below Garbage Drop-Off



Photo 14 PPP drop off Into Mega Bags Below Garbage Drop-Off



Photo 15 PPP drop off into Two 40 Cubic Yard Roll-Off Bins



Photo 16 Yard Waste Drop-Off Bin



Photo 17 Clothing Donation Bins Next to Attendant Booth



Photo 18 Storage Shed in East Corner of the Site

APPENDIX B: Implementation Schedule

Appendix B: Recommended Implementation Schedule for Improvements to the Trader's Cove and North Westside Transfer Stations

Aspect	Proposed Improvement	Priority Ranking (Low to High)
Trader's Cove		
Safety	1. Improve safety by reconfiguring the site and providing drop-off areas for all accepted materials on one side of the site	Low
	2. Improve safety by providing better signage and implementing a no-headphones policy onsite to reduce risk to facility users crossing vehicle lanes	High
	3. Improve design to allow a level drop-off at the yard waste area	High
Opening Hours	4. Improve service level by increasing the facility hours or the number of days the facility is open	Medium
North Westside		
Public Education	1. Increase public awareness of existing bulky item collection and hazardous waste and electronic roundup services	Medium
Opening Hours	2. Improve service level by increasing the facility hours or the number of days the facility is open	Medium
Improvements to Drop-Off Areas	3. Double the capacity for yard waste drop-off by reconfiguring the site without expanding the existing footprint	High
	4. If the existing footprint is insufficient, double the capacity for yard waste drop-off by reconfiguring the site with the expansion of the footprint	Medium
	5. If the site is reconfigured, improve recyclables drop-off area by providing a simple wooden structure to cover the mega bags	Low
Material Management	6. Reduce cardboard hauling frequency by using a compactor	High
Site Improvement	7. Improve site operation and cleanliness by paving	High