

**Waste and Recyclable Materials Report
Q1 2020
(Jan, Feb, Mar)
Thompson Rivers University
Kamloops, British Columbia**

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Executive Summary

TRU demonstrates leadership in waste management, managing 18 different waste streams generated by students, faculty, staff and visitors on campus and diverting those materials into markets. TRU has overcome challenges by thinking creatively and continuously striving to achieve waste diversion targets.

While the overall waste diversion rate increased significantly in Q1 of 2020 (January, February and March) to 77.1%, so did expenses to almost \$68,000. The overall waste diversion rate in 2019 was 61% and 60% in 2018.

The following report shows the weight and cost data for the types of waste managed by TRU for, as well as historical data for 2019.

The table below is a summary of these weights and costs for each waste stream based on actual and estimated data. Total waste stream managed by TRU for Q1 of 2020 was 144,541 kgs. Some numbers in this report differ from previous quarterly reports as additional data was provided.

For readability, waste streams have been grouped. The garbage, packaging, and food waste groups are described as follows:

Garbage includes material collected by the City and by Waste Connections.

Packaging includes mixed recycling, cardboard, refundable beverage containers, plastic bags, and Styrofoam.

Organic waste includes meat scraps, coffee grounds, food waste from kitchens, and Zero Waste Stations, as well as cooking oil.

Table 1a Waste Stream Weights and Costs Total 2020, Q1 through Q4

Reporting Period		
Stream	Weight (kg)	Cost
Total 2020		
Garbage		
Wood & metal		
Yard waste		
Packaging		
Food waste		
Reuse		
Batteries, electronics and hazardous		
Consulting		
Capital		
Q1 - 2020	144,541 kgs	\$67,822.25
Yard waste	76,042	\$0
Landfill Garbage	33,100	\$16,504.97
Wood & metal	19,109	\$4100.55
Packaging (mixed recycling, cardboard, refundables, plastic bags, Styrofoam)	7027	\$26,620.14
Food waste	7782	\$11,149.40
Reuse	1386	0
Batteries, electronics and hazardous	95	0
Consulting and Management Fees	n/a	\$6724.77
Capital Expenditures	n/a	\$2722.72
Q2 - 2020		
Garbage		
Wood & metal		
Yard waste		
Packaging		
Food waste		
Reuse		
Batteries, electronics and hazardous		
Consulting		
Q3 - 2020		
Garbage		
Wood & metal		
Yard waste		
Packaging		

Food waste
Reuse
Batteries, electronics and hazardous
Q4 - 2020
Garbage
Wood & metal
Packaging
Food waste
Reuse
Batteries, electronics and hazardous
Yard waste

Table 2b Waste Stream Weights and Costs Total 2019, Q1 through Q4

Reporting Period		
Stream	Weight (kg)	Cost
Total 2019	689130	\$172,286.18
Garbage	266233	\$52,287.21
Wood & metal	175596	\$22,086.51
Yard waste	119176	\$0.00
Packaging	72407	\$60,183.33
Food waste	47001	\$17,028.80
Reuse	6349	\$0.00
Batteries, electronics and hazardous	2368	\$8,000.00
Consulting	0	\$12,000.00
Capital	0	\$700.33
Q4 - 2019	147,237	\$54,954.16
Yard waste	45225	\$0.00
Garbage	39868	\$12,809.04
Wood & metal	29491	\$5,945.65
Packaging	16592	\$15,558.98
Food waste	14011	\$5,245.00
Reuse	1686	\$0.00
Batteries, electronics and hazardous	364	\$8,000.00
Waste Consulting and Management Fees	0	\$6,695.16
Capital	0	\$700.33
Q3 - 2019	187075	\$45,557.30
Garbage	72713	\$12,628.84

Wood & metal	49269	\$6,239.36
Yard waste	31387	\$0.00
Packaging	22522	\$15,127.30
Food waste	9412	\$5,561.80
Reuse	1473	\$0.00
Batteries, electronics and hazardous	299	\$0.00
Consulting	0	\$6,000.00
Q2 - 2019	216910	\$36,417.88
Garbage	76196	\$12,216.08
Wood & metal	70532	\$7,457.50
Yard waste	42564	\$0.00
Packaging	15956	\$15,012.80
Food waste	9260	\$1,731.50
Reuse	1485	\$0.00
Batteries, electronics and hazardous	917	\$0.00
Q1 - 2019	137908	\$36,052.00
Garbage	77456	\$14,633.25
Wood & metal	26304	\$2,444.00
Packaging	17337	\$14,484.25
Food waste	14318	\$4,490.50
Reuse	1705	\$0.00
Batteries, electronics and hazardous	788	\$0.00
Yard waste	0	\$0.00

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1 Introduction

Background

Thompson Rivers University (TRU) has recognized the importance of leadership in environmental sustainability since making it a pillar of its Strategic Plan in 2007. Since adopting the strategic goal of becoming the 'University of Choice for Environmental Sustainability, TRU went on in 2009 to create a department dedicated to improving campus sustainability. Through the TRU Sustainability Office, actions are continuously taken to increase campus sustainability.

In 2014, TRU adopted a goal of becoming a zero waste campus. To accomplish this goal, the Sustainability Office has implemented several waste reduction and diversion initiatives, such as diverting waste to composting, recycling and energy conversion. TRU collects and diverts a growing number of materials, and counts almost 20 separate waste streams.

While the overall waste diversion rate increased significantly to 78.1%, so did expenses to almost \$68,000.

A waste audit performed in March 2018 showed that TRU diverted roughly 60% of waste generated on campus through recycling and composting programs, a slight reduction over the 2017 audit diversion rate of 64%. In 2018, approximately 643 tonnes of waste was generated, an increase from 519 tonnes in 2017.

Deliverables

The objectives of the audit are to provide TRU with the following information:

- Types and quantities of waste generated on campus; and
- Financial costs associated with waste handling, collection, and disposal.

Methodology and Assumptions

The data included in this report is based on actual records provided by TRU and its contractors as well as estimates based on limited actual records and/or historic estimations. Further details on data collection methodology are provided in the sections below for each waste stream.

2 Types of Waste

TRU diverts many types of waste generated on campus through reuse, recycling, composting and conversion to energy. The following section reports the quarterly diversion weights for January, February and March 2020, and discusses the methods of diverting the many waste streams generated on campus.

Reuse

TRU has three reuse streams: textbooks, textiles, and the TRU program to sell a variety of unwanted campus items to others through the BC Bids site (data unavailable at this time).

Textbooks

Textbooks are collected from the on-campus community, and the general public. A textbook collection bin is located outside the campus bookstore. Ancillary Services collects the books from the bins on an as-needed basis and donates them to a program called *Textbooks For Change*. Approximately five pallets of books are donated through the program on an annual basis. For more information about the program, visit their website [here](#).

Below are the quarterly weights for textbook diversion. There were no textbooks shipped out in Q4 2020 and therefore no data. In 2019 TRU diverted nearly 6 tonnes of textbooks. There is no cost to divert this waste stream. Weights are reported based on an average weight per box of 20 kgs (45 lbs).

Table 3 – Textbooks

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Textbooks	Jan-Mar 20	0	\$- 0
Q2-20	Textbooks	Apr-Jun 20		\$-
Q3-20	Textbooks	Jul-Sep 20		\$-
Q4-20	Textbooks	Oct-Dec 20		\$-
2019 Total	Textbooks	Jan-Dec 20		\$-

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Textbooks	Jan-Mar 19	1356	\$-
Q2-19	Textbooks	Apr-Jun 19	1356	\$-
Q3-19	Textbooks	Jul-Sep 19	1473	\$-
Q4-19	Textbooks	Oct-Dec 19	1391	\$-
2019 Total	Textbooks	Jan-Dec 19	5594	\$-

Textiles and Household Items

In 2018, TRU partnered with Diabetes Canada to place textile reuse and recycling bins on campus to help divert the usable items that make their way into the campus waste stream, such as clothing, shoes, books, office supplies, and other durable goods. The bins are located in high traffic areas in Old Main, the CAC and IB. Weights are provided by Diabetes Canada on a monthly basis.

Below are the quarterly weights for textile diversion. In Q4 of 2020, TRU diverted 1384 kg of textiles. There is no cost to divert this waste stream.

Table 4 - Textiles

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Textiles	Jan-Mar '20	1386.4	\$- 0
Q2-20	Textiles	Apr-Jun 20		\$-
Q3-20	Textiles	Jul-Sep 20		\$-
Q4-20	Textiles	Oct-Dec 20		\$-
YTD Total	Textiles	Jan-Dec 20		\$-

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Textiles	Jan-Mar 19	340	\$-
Q2-19	Textiles	Apr-Jun 19	120	\$-
Q3-19	Textiles	Jul-Sep 19	0	\$-
Q4-19	Textiles	Oct-Dec 19	295	\$-
YTD Total	Textiles	Jan-Dec 19	755	\$-

Organic Waste Diversion

TRU diverts organic waste into several channels for composting or animal feed. The Culinary Arts and Meat Processing Departments send their scraps to a local dog breeder. Food scraps and coffee grounds collected through zero waste stations and kitchens by TRU janitors are picked up by a local farmer for livestock feed. (The scraps are fed to black soldier fly larvae, which then grow into full size flies, which are then fed to ducklings. Once they grow into full size, the ducks are harvested and sold in the community, some of which the TRU Culinary Arts department buys to be prepared by its student chefs and served to patrons at the TRU Scratch Café). Yard waste from TRU grounds is sent to the Cinnamon Ridge Composting Facility.

Feed Animals - Meat Trimmings and Bones

The Retail Meat Processing Program (RMP) began sending their meat trimmings and bones to a local dog breeder in 2016. The trimmings are weighed, then

stored in their fridge and collected on a weekly basis. The RMP program estimates that they produce approximately 273 kg per week. The RMP runs from September - June. Over 11 tonnes of meat scraps were diverted through this program in 2019. There is no cost to divert meat scraps.

Table 5 - Meat scraps

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Meat scraps	Jan-Mar 20	2542	\$- 0
Q2-20	Meat scraps	Apr-Jun 20		\$-
Q3-20	Meat scraps	Jul-Sep 20		\$-
Q4-20	Meat scraps	Oct-Dec 20		\$-
YTD Total	Meat scraps	Jan-Dec 20		\$-

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Meat scraps	Jan-Mar 19	3273	\$-
Q2-19	Meat scraps	Apr-Jun 19	2182	\$-
Q3-19	Meat scraps	Jul-Sep 19	1417	\$-
Q4-19	Meat scraps	Oct-Dec 19	4366	\$-
YTD Total	Meat scraps	Jan-Dec 19	11238	\$-

Compost – From Onsite Zero Waste Stations and Campus Kitchens

TRU implemented onsite composting in 2014 with the purchase of a Jora 5100 in-vessel compost machine. In 2016, TRU expanded onsite-composting capacity with the purchase of a second Jora 5100, and further expanded in 2017 with the acquisition of another in-vessel composter, The Rocket, which was installed outside the Campus Activity Centre (CAC) in order to process food waste from the largest source on campus, the CAC kitchen.

In April 2019, the farmer collecting food scraps from Culinary Arts also began collecting food scraps from the CAC. The farmer comes from a farm called Caspian Acres from Cherry Creek, BC. The farmer feeds the food scraps to black soldier fly larvae, which are used as feedstock for ducks that are sold back to the CA program and local restaurants. TRU Culinary Arts student chefs prepare and serve them to patrons at the TRU Scratch Café. The CA program runs from September until April. In July 2019 the farmer approached the Sustainability Office about the possibility of collecting all pre and post-consumer food waste from the entire campus. A pilot project was started which ended successfully.

The Sustainability Office then entered into an arrangement with this farmer since the arrangement was much better for the Sustainability Office than managing all aspects of running the three in-vessel composters. Managing the three machines required constant over-sight to make sure the balance of

nitrogen and carbon was correct in order to produce quality compost, and to avoid foul smells from poorly balanced compost. There were also regular maintenance issues with the machines that needed attention. The office decided that the nominal pick-up fee charged by the farmer was well worth it.

During Q1 2020, the farmer picked up all food waste from the entire campus. This includes pre-consumer food waste from the Culinary Arts Department kitchen and the CAC kitchen, post-consumer food waste collected in the approximately 120 compost bins around campus, and coffee grinds from all campus cafes. Besides Culinary Arts food waste, all material is brought to a sea can on the CAC loading dock and put in totes, which the farmer transports to his farm.

Table 5 below shows the food waste totals, which include the fee charged by the farmer for 'food waste pick-up', and the fee charged by the L&J Diamond janitorial service for 'food waste collection' from campus compost bins*, which includes collecting coffee grinds from campus cafes. In Q1 2020, TRU diverted over 5 tonnes of food waste (as measured by the farmer during pick-up). The total cost for collection was \$11,149.40.

*In February 2020, the L&J Diamond contract was renewed and, as a result, the fee charged for collecting food waste was invoiced directly to the Sustainability Office. Prior to that it was part of their over-all contract with TRU.

Table 6 - Food waste

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20 Total	Food waste pick-up and collection	Jan-Mar 20	5240	\$11,149.40
Q1-20	Food waste pick-up	Jan-Mar 20	5240	\$175.00
Q1-20	Food waste collection	Jan-Mar 20	(included in 'pick-up' above)	\$10,974.40
Q2-20	Food waste	Apr-Jun 20		
Q3-20	Food waste	Jul-Sep 20		
Q4-19	Food waste	Oct-Dec 20		
YTD Total	Food waste	Jan-Dec 20		
Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Food waste	Jan-Mar 19	6813	\$100.00
Q2-19	Food waste	Apr-Jun 19	5500	\$387.50

Q3-19	Food waste	Jul-Sep 19	7995	\$925.00
Q4-19	Food waste	Oct-Dec 19	8705	\$925.00
YTD Total	Food waste	Jan-Dec 19	29013	\$2,600.00

Compost - Coffee Grounds

Historically, a TRU faculty member collected coffee grounds on a volunteer basis from the campus cafes to amend the soil on his farm. He charged nothing for this pick-up service. In January 2019, janitorial staff took over the operation of coffee ground collection from the campus cafes, and billed the Sustainability directly on a monthly basis.

In February 2020, the L&J Diamond contract was renewed and, as a result, the fee charged for collecting food waste was invoiced directly to the Sustainability Office. Prior to that it was part of their over-all contract with TRU. Then in March 2020, coffee collection services and food waste collection services were included on the same invoice. As a result of all charges appearing on the same invoice, all fees and weights for coffee grind collection will appear above under 'Compost - From Onsite Zero Waste Stations and Campus Kitchens'.

Table 7 - Coffee grounds

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Coffee grounds	Jan-Mar 20	(in Compost totals)	(in Compost totals)
Q2-20	Coffee grounds	Apr-Jun 20		
Q3-20	Coffee grounds	Jul-Sep 20		
Q4-20	Coffee grounds	Oct-Dec 20		
YTD Total	Coffee grounds	Jan-Dec 20		

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Coffee grounds	Jan-Mar 19	3528	\$4,128.00
Q2-19	Coffee grounds	Apr-Jun 19	1059	\$1,344.00
Q3-19	Coffee grounds	Jul-Sep 19	(in food waste totals)	\$4,636.80
Q4-19	Coffee grounds	Oct-Dec 19	(in food waste totals)	\$4,320.00
YTD Total	Coffee grounds	Jan-Dec 19	4587	\$14,428.80

Compost - Yard Waste

The largest source of organic waste comes from maintaining the campus grounds. The head of the TRU Grounds crew estimated 500 loads of yard waste brought to the Bunker Road Yard Waste site over a year. Each load is estimated at 227 kilograms, based on an average estimated by the head of Grounds based on a series of loads weighed on a nearby scale.

Table 7 below shows the total yard waste diverted in Q1 2020 was approximately 76 tonnes. There is no cost to divert this waste stream.

Table 8 - Yard waste

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Yard waste	Jan-Mar 20	76,042	\$- 0
Q2-20	Yard waste	Apr-Jun 20		\$-
Q3-20	Yard waste	Jul-Sep 20		\$-
Q4-20	Yard waste	Oct-Dec 20		\$-
YTD Total	Yard waste	Jan-Dec 20		\$-

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Yard waste	Jan-Mar 19	0	\$-
Q2-19	Yard waste	Apr-Jun 19	42564	\$-
Q3-19	Yard waste	Jul-Sep 19	31387	\$-
Q4-19	Yard waste	Oct-Dec 19	45225	
YTD Total	Yard waste	Jan-Dec 19	119176	\$-

Recycling

TRU diverts a number of waste materials through recycling. Trades and Technology Department and Facilities Services generate scrap metal. Scrap wood is also heavily recycled, with collection bins at the Warehouse and the Trades and Technology building. Mixed recycling and refundable beverage containers are collected across campus in Zero Waste Stations. Cardboard is mostly generated by staff and collected in outdoor bins and indoor carts. There are also bins in most buildings to collect batteries, Styrofoam, and plastic bags, as well as electronics recycling bins in two buildings (Old Main and CAC).

Recycling - Scrap Metal Trades & Facilities Services

Scrap metal is collected in the Trades and Warehouse areas. The Trades and Technology Department has had a scrap metal recycling program through Richmond Steel for many years and uses several bins to sort different types of metals, for which they are compensated. In 2017, the TRU Sustainability Office placed a mixed scrap metal bin at the Warehouse. The cost for the metal bin includes bin rental and hauling. The bin is hauled to Mission Flats Landfill and put in the scrap metal pile.

TRU diverted almost 10 tonnes of scrap metal in Q1 2020, which cost \$772.30.

Table 9 - Scrap metal

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20 Total	Total Metal	Jan-Mar- 20	9489	\$772.30
Q1-20	Trades metal	Jan-Mar- 20	8754	\$ paid for by Trades (\$402.30)
Q1-20	Facilities metal	Jan-Mar- 20	735	\$370
Q2-20	Trades metal	Apr-Jun 20		\$
	Facilities metal			\$
Q3-20	Trades metal	Jul-Sep 20		\$
	Facilities metal			\$
Q4-20	Trades metal	Oct-Dec 20		\$
	Facilities metal			\$
YTD Total	Trades metal	Jan-Dec 20		\$
	Facilities metal			\$

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Scrap metal	Jan-Mar 19	22529	\$940.00
Q2-19	Scrap metal	Apr-Jun 19	42741	\$1420.00
Q3-19	Scrap metal	Jul-Sep 19	38769	\$875.00
Q4-19	Scrap metal	Oct-Dec 19	18025	\$765.00
YTD Total	Scrap metal	Jan-Dec 19	122064	\$3,235.00

Recycling - Mixed Recycling

Mixed (co-mingled) recycling includes paper and packaging materials (plastic, paper, metal). Mixed recycling is collected across campus from Zero Waste Stations and directly placed into City recycling carts from offices, cafes, kitchens, and occasionally from events. Janitors are responsible for placing mixed recycling from the Zero Waste Stations into 245-litre recycling 2-wheel carts distributed across campus. Carts are placed at the curb on a weekly basis by staff and contractors to be picked up by City trucks. Mixed recycling is also collected in a 6-yard bin outside the Campus Activity Centre and picked up by Waste Connections.

In January 2018, the world recycling markets were highly impacted by what is known as China's National Sword, a policy by the Chinese government which limited and then later stopped imports of foreign waste. This disruption caused a great shift towards prioritizing reduced contamination in mixed recycling around

the world. TRU's mixed recycling waste stream, specifically material collected from Zero Waste Stations showed high contamination rates, upwards of 50%. As a result, in December 2018, TRU employed a janitor who's sole job it is to remove contaminants from recycling carts prior to collection. Contamination rates, as measured by random checks by the City, are now around 2%.

Data presented in the table below was provided by this janitor for sorted recycling carts. Since no data was collected in March due to the Covid-19 situation, an average from the previous two months (and adjusted based on the fact that the campus emptied out dramatically just after the first week) is used. (January, 444 kgs – February, 921 kgs – March, 200 kgs)

TRU diverted almost 5.5 tonnes of mixed recycling in Q1 2020. Total cost for mixed recycling was \$13,117.04.

Table 10 - Mixed recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20 Total	Total Recycling	Jan-Mar- 20	5335	\$13,117.04
Q1-20	Mixed recycling – L&J sorting	Jan-Mar 20	1535	\$10,368
Q1-20	Mixed recycling – City carts pick-up	Jan-Mar 20	(listed above, 1535)	\$1887.50
Q1-20	Mixed recycling – CAC Waste Connection bin	Jan-Mar 20	3800 (estimate based on past weights)	\$861.54
Q2-20	Mixed recycling	Apr-Jun 20		
Q3-20	Mixed recycling	Jul-Sep 20		
Q4-20	Mixed recycling	Oct-Dec 20		
YTD Total	Mixed recycling	Jan-Dec 20		

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Mixed recycling	Jan-Mar 19	7764	\$13,279.40
Q2-19	Mixed recycling	Apr-Jun 19	7199	\$13,279.40
Q3-19	Mixed recycling	Jul-Sep 19	14552	\$13,317.90
Q4-19	Mixed recycling	Oct-Dec 19	8644	\$13,737.58
YTD Total	Mixed recycling	Jan-Dec 19	38159	\$53,614.28

Recycling – Cardboard

During Q1 2020 the cardboard collection process was in transition from using City four and six yard bins outside five buildings on campus, and using small

hallway carts in all major buildings on campus; which are emptied by janitors and brought to the TRU baling machine. Cardboard is placed in bins and carts by staff and contractors. Weights for Q1 2020 were not measured for City bins. Weights of bales only took place in April when the first eight bales were transported off campus for processing at the Emterra plant, where weights were measured. The weight of Q1 2020 cardboard is estimated to be an average of weights measured over a one-week period by the City in Q2 and Q3 2019. Cost data for cardboard collection was in utility statement transactions provided by City staff, and by the janitorial contractor.

TRU purchased and installed a baler and in Q4 2019 TRU began baling cardboard. The first eight bales (3270 kgs) were delivered to Emterra for processing in April 2020. All City bins were removed from campus in March 2020.

Table 10 below shows a summary of cost and estimated weights for cardboard diversion.

Table 11 - Cardboard recycling and baling

*Costs for cardboard collection and baling also include garbage collection and compacting as well, since both are performed at the same time by the same janitor, and are grouped together by the janitor contractor on monthly invoices.

City cardboard dumpsters were reduced during Q1 2020 from five bins to zero. One bin was added to the Bandstra site in case there are problems with the cardboard baler and over-flow space is needed in a bin. These costs will be reflected in the Q2 report. Rental cost for one 4-yard bin for cardboard is \$54.60/month.

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20 Total	Cardboard sorting and baling	Jan-Mar 20	0	\$13,503.10*
Q1-20	Cardboard sorting and baling	Jan-Mar 20	0	\$11,928*
Q1-20	Cardboard baler maintenance, repair, supplies	Jan-Mar 20	n/a	\$922.30
Q1-20	City Cardboard bin tips (no charge for bin rental)	Jan-Mar 20	7000 kgs (estimate)	\$652.08
Q2-20	Cardboard, pick-up by Norewest	Apr-Jun 20	3270 kgs (first eight bales brought)	

to Emterra on
April 21, 2020.

Q3-20	Cardboard	Jul-Sep 20
Q4-20	Cardboard	Oct-Dec 20
YTD Total	Cardboard	Jan-Dec 20

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Cardboard	Jan-Mar 19	7872	\$932.85
Q2-19	Cardboard	Apr-Jun 19	7056	\$1557.40
Q3-19	Cardboard	Jul-Sep 19	6240	\$1557.40
Q4-19	Cardboard	Oct-Dec 19	6240	\$1557.40
YTD Total	Cardboard	Jan-Dec 19	21188	\$5605.05

Recycling - Refund Beverage Containers

A special autism program class from Kamloops School of the Arts is responsible for collecting and recycling refundable beverage containers as part of their class curriculum. The students and staff collect beverage containers from Zero Waste Stations, twice per week.

Data is not collected for this waste stream. Estimates presented in Table 11 below for Q1-Q3 are based on historic data. TRU diverted about 6600 kg of refund beverage containers in 2019. There is no cost for this waste stream.

Table 12 - Refundable beverage containers

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Refund containers	Jan-Mar 20	1650 (estimate based on past data)	\$-0
Q2-19	Refund containers	Apr-Jun 20		\$-
Q3-19	Refund containers	Jul-Sep 20		\$-
Q4-19	Refund containers	Oct-Dec 20		\$-
YTD Total	Refund containers	Jan-Dec 20		\$-

Period	Item	Month/Year	Weight (kg)	Cost (\$)
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Q1-19	Refund containers	Jan-Mar 19	1644	\$-
Q2-19	Refund containers	Apr-Jun 19	1644	\$-
Q3-19	Refund containers	Jul-Sep 19	1644	\$-
Q4-19	Refund containers	Oct-Dec 19	1664	\$-
YTD Total	Refund containers	Jan-Dec 19	6576	\$-

Recycling - Plastic Bags & Overwrap

In September 2017, TRU removed the bins for plastic bags from the other bins of the zero waste stations. This was done due to heavy contamination of the plastic bag bins. Once done, the contamination of these bins has improved to almost zero percent, according to TRU staff. TRU janitors collect the plastic bags monthly or as needed and brought to the Warehouse where it is stored until sufficient volume is amassed, at which time a truck from the Lorne Street Bottle Depot collects it for transport to the Lower Mainland for final recycling. Data for the plastic bags waste stream is based on an average weight per bag of 3 kg, with one bag of bags recycled each month. Costs for plastic bag are from collection by the janitors.

TRU diverted 33 kg of plastic bags in 2019. The cost to collect bags was \$1092.00.

Table 13 - Plastic bag recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Plastic bag	Jan-Mar 20	9	\$288
Q2-20	Plastic bag	Apr-Jun 20		
Q3-20	Plastic bag	Jul-Sep 20		
Q4-20	Plastic bag	Oct-Dec 20		
YTD Total	Plastic bag	Jan-Dec 20		

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Plastic bag	Jan-Mar 19	9	\$285.60
Q2-19	Plastic bag	Apr-Jun 19	9	\$268.80
Q3-19	Plastic bag	Jul-Sep 19	9	\$268.80
Q4-19	Plastic bag	Oct-Dec 19	6	\$268.80

YTD Total	Plastic bag	Jan-Dec 19	33	\$1092.00
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Recycling - Styrofoam

TRU began recycling Styrofoam in 2016. It's collected in bright yellow totes in key buildings around campus and then the janitorial or Facilities staff brings it to the Warehouse where its final life mirrors that of Plastic Bags (mentioned above). Data for Styrofoam recycling is based on an average weight per bag of 1 kg, with an estimated 16 bags recycled per month. Cost for Styrofoam collection is part of general fees charged by the janitors.

TRU diverted 231 kg of Styrofoam in 2019.

Table 14 - Styrofoam recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Styrofoam	Jan-Mar 20	33	0
Q2-20	Styrofoam	Apr-Jun 20		
Q3-20	Styrofoam	Jul-Sep 20		
Q4-20	Styrofoam	Oct-Dec 20		
YTD Total	Styrofoam	Jan-Dec 20		

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Styrofoam	Jan-Mar 19	48	0
Q2-19	Styrofoam	Apr-Jun 19	48	0
Q3-19	Styrofoam	Jul-Sep 19	77	0
Q4-19	Styrofoam	Oct-Dec 19	58	0
YTD Total	Styrofoam	Jan-Dec 19	231	0

Recycling - Batteries

Batteries are collected in 20 bins across all major buildings on campus. Batteries are emptied on a monthly (or so) basis by Facilities Services. Call2Recycle collects the batteries and sends monthly reports with details of the types of batteries and total weights. The following table details the weights for collection of batteries, there is no cost for collection.

TRU diverted 172 kg of batteries in 2019. There is no cost to divert this stream.

Table 15 - Battery recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
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Q1-20	Battery	Jan-Mar 20	95	\$- 0
Q2-20	Battery	Apr-Jun 20		\$-
Q3-20	Battery	Jul-Sep 20		\$-
Q4-20	Battery	Oct-Dec 20		\$-
YTD Total	Battery	Jan-Dec 19		\$-

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Battery	Jan-Mar 19	0	\$-0
Q2-19	Battery	Apr-Jun 19	32	\$-0
Q3-19	Battery	Jul-Sep 19	71	\$-0
Q4-19	Battery	Oct-Dec 19	69	\$-0
YTD Total	Battery	Jan-Dec 19	172	\$-

Recycling - Electronics

In 2017, TRU partnered with the Electronics Recycling Association (ERA) to recycle the e-waste from campus. ERA set up two collection bins for personal electronics (cell phones, laptops, and other small devices), one in the Campus Activity Centre and the other in Old Main. ERA also picks up TRU's e-waste that is collected by Facilities Services and brought to the Warehouse for storage until sufficient volume requires an ERA truck to collect it. ERA provides certificates with descriptions and weights for material recycled through the program.

Data presented in the table below represents weights provided by the ERA. There is no cost for this waste stream. TRU diverted 1234 kg of electronics in 2019. Nothing was collected during Q1 2020.

Table 16 - Electronics recycling

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Electronics	Jan-Mar 20	0	\$-0
Q2-20	Electronics	Apr-Jun 20		\$-
Q3-20	Electronics	Jul-Sep 20		\$-
Q4-20	Electronics	Oct-Dec 20		
YTD Total	Electronics	Jan-Dec 20		\$-

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Electronics	Jan-Mar 19	601	\$-
Q2-19	Electronics	Apr-Jun 19	405	\$-
Q3-19	Electronics	Jul-Sep 19	228	\$-
Q4-19	Electronics	Oct-Dec 19	0	
YTD Total	Electronics	Jan-Dec 19	1234	\$-

Converted to Energy

Several waste streams are converted to energy or incinerated, which includes wood waste and hazardous waste.

Wood Waste

In September 2016, the Sustainability Office placed a wood-recycling bin outside Facilities Services building, increasing the weekly recycling rate for diversion in 2017. In 2018, TRU further expanded the wood-collection program, sourcing a woodbin for the Theatre and Fines Arts programs to fill at three or four times throughout the year (during after-performance/project dates when sets and projects needed disposing of).

In September 2019, a wood waste bin was placed at the Trades building, at which time one of the garbage dumpsters was removed. The hauler, Norewest Concrete, takes the wood to Mission Flats Landfill where it is chipped and sent to electricity co-generation plants in B.C. The hauler provides cost and weight data for wood waste, as presented in the table below.

TRU diverted 42 tonnes of wood waste in 2019 at a cost of \$18,086.51, which includes hauling and bin rentals. Disposal fees are included in the hauling costs (costs don't vary with the amount of wood waste disposed).

Table 17 - Wood waste diversion

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Wood waste	Jan-Mar 20	9620	\$3328.25
Q2-20	Wood waste	Apr-Jun 20		
Q3-20	Wood waste	Jul-Sep 20		
Q4-20	Wood waste	Oct-Dec 20		
YTD Total	Wood waste	Jan-Dec 20		

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Wood waste	Jan-Mar 19	3775	\$1504.00
Q2-19	Wood waste	Apr-Jun 19	27791	\$6037.50
Q3-19	Wood waste	Jul-Sep 19	10500	\$5364.36
Q4-19	Wood waste	Oct-Dec 19	11466	\$5180.65
YTD Total	Wood waste	Jan-Dec 19	42066	\$18,086.51

Cooking Oil

The Culinary Arts building and the Campus Activity Centre kitchens collect used cooking oil. The oil is collected by McLeod's Byproducts in Armstrong and is used to make animal feed. The hauler provided weights for each collection. There are

no costs for this waste stream. A total of 2163 kg of cooking oil was diverted from TRU in 2019.

*Despite several emails and calls, the hauler would not return enquiries regarding weights of oil collected during Q1 2020. This may be because of the onset of Covid-19 in early March.

Table 18 - Cooking oil diversion

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Cooking oil	Jan-Mar 20	*Not provided	\$-0
Q2-20	Cooking oil	Apr-Jun 20		\$-
Q3-20	Cooking oil	Jul-Sep 20		\$-
Q4-20	Cooking oil	Oct-Dec 20		\$-
YTD Total	Cooking oil	Jan-Dec 20		\$-

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Cooking oil	Jan-Mar 19	704	\$-
Q2-19	Cooking oil	Apr-Jun 19	539	\$-
Q3-19	Cooking oil	Jul-Sep 19	0	\$-
Q4-19	Cooking oil	Oct-Dec 19	940	
YTD Total	Cooking oil	Jan-Dec 19	2163	\$-

Hazardous Waste

The TRU Safety Office manages the hazardous waste generated through various departments (Trades, campus medical centre, and Science labs). Data provided in this report was provided on hazardous waste manifests. The liquids from the manifests recorded in volumes were converted to weights on a one to one ratio of litres to kilograms. Cost data was provided for Q4, with a total of \$8000. TRU diverted 962 kg of hazardous waste in 2019. There was nothing collected during Q1 2020.

Table 19 - Hazardous waste diversion

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Hazardous waste	Jan-Mar 20	0	\$-0
Q2-20	Hazardous waste	Apr-Jun 20		
Q3-20	Hazardous waste	Jul-Sep 20		
Q4-20	Hazardous waste	Oct-Dec 20		
YTD Total	Hazardous waste	Jan-Dec 20		

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Hazardous waste	Jan-Mar 19	187	\$-

Q2-19	Hazardous waste	Apr-Jun 19	480	\$-
Q3-19	Hazardous waste	Jul-Sep 19	0	\$-
Q4-19	Hazardous waste	Oct-Dec 19	295	\$8000.00
YTD Total	Hazardous waste	Jan-Dec 19	962	\$8000.00

Landfill Garbage

Landfill waste consists of material not diverted from the waste stream. The City of Kamloops and Waste Connections collected landfill waste from dumpster bins across campus on a daily basis during most of Q1 2020, and janitorial staff collected garbage in the electric ATV on a nightly basis to be put in the garbage compactor. Like the cardboard waste stream, the landfill waste stream was in a time of transition during Q1 2020 from using bins to using 2-wheel garbage carts that are managed and picked up by janitors and brought to the TRU compactor. The transition will result in cost-savings and almost eliminate the noise and air pollution caused by diesel garbage trucks on campus.

Data for the weights of City collection was estimated based on a previous audit that measured it over a one-week period. Weights for the CAC bin are estimated based on a volume to weight conversion factor of 161 kg/cu.y, and the compactor weights are provided on monthly invoices.

Costs were provided with quarterly City utility statements, and monthly invoices provided by Waste Connections and L&J Diamond (janitors).

Waste Connections collects landfill waste in one bin located at the CAC, and also hauls away the compactor when full.

The table below shows quarterly data for City, Waste Connections and janitor collection. The costs include bin rental, hauling and extra tips. Disposal fees are included in hauling costs.

TRU landfilled approximately 30 tonnes of waste during Q1 2020. Around 15 tonnes was collected by the City and slightly less was collected by Waste Connections; both in the compactor and in the CAC bin. The total cost for landfilling in Q1 2020 was \$15,804.97.

City garbage bins around campus were reduced during Q1 2020 from nine to three. However, one 6-yard bin was added to the Bandstra site in case there are problems with the garbage compactor and over-flow space is needed. Rental cost for one 6-yard bin for garbage is \$72.30/month.

Table 20 - Landfill

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-20	Landfill - Totals	Jan-Mar 20	33,100	\$16,504.97

Q1-20	Landfill – City (bin service; tips & rental)	Jan-Mar 20	*17,330 (approx.)	\$11,120.85
Q1-20	Landfill – J&J Diamond (janitor service)	Jan-Mar 20	Reflected in compactor tips weights)	**n/a
Q1-20	Landfill - Waste Connections (compactor tips; x2 in March)	Jan-Mar 20	6770	\$1246.25
Q1-20	Landfill - Waste Connections (CAC bin service)	Jan-Mar 20	***9000 (estimate)	\$2121.77
Q1-20	Landfill - Waste Connections (compactor repairs & maintenance)	Jan-Mar 20	n/a	\$2016.10
Q2-19	Landfill - City	Apr-Jun 19		\$
Q2-19	Landfill - Waste Connections	Apr-Jun 19		\$
Q3-19	Landfill - City	Jul-Sep 19		\$
Q3-19	Landfill - Waste Connections	Jul-Sep 19		\$
Q3-19	Landfill - DLC (wood bin)	Jul-Sep 19		\$
Q4-19	Landfill - City	Oct-Dec 19		\$
Q4-19	Landfill - Waste Connections	Oct-Dec 19		\$
YTD	Landfill - City	Jan-Dec 19		\$
YTD	Landfill - Waste Connections	Jan-Dec 19		\$
YTD	Landfill - DLC (wood bin)	Jan-Dec 19		\$
YTD	Landfill - Total	Jan-Dec 19		\$

Period	Item	Month/Year	Weight (kg)	Cost (\$)
Q1-19	Landfill - City	Jan-Mar 19	80418	\$12,285.21
Q1-19	Landfill - Waste Connections	Jan-Mar 19	10143	\$2,348.04
Q2-19	Landfill - City	Apr-Jun 19	73443	\$9,868.04
Q2-19	Landfill - Waste Connections	Apr-Jun 19	10143	\$2,348.04
Q3-19	Landfill - City	Jul-Sep 19	62040	\$9,942.30
Q3-19	Landfill - Waste Connections	Jul-Sep 19	10143	\$2,386.54

Q3-19	Landfill - DLC (wood bin)	Jul-Sep 19	530	\$300.00
Q4-19	Landfill - City	Oct-Dec 19	28920	\$9898.50
Q4-19	Landfill - Waste Connections	Oct-Dec 19	10948	\$2348.04
YTD	Landfill - City	Jan-Dec 19	218820	\$41,994.05
YTD	Landfill - Waste Connections	Jan-Dec 19	46883	\$9430.66
YTD	Landfill - DLC (wood bin)	Jan-Dec 19	530	\$300
YTD	Landfill - Total	Jan-Dec 19	266233	\$51,724.71

*14,920 kgs of waste for City bin service was arrived at by using the following calculation since the City does not provide weights. The figure from the previous three months (Q4 2019; 28,920 kgs) provides an accurate estimate of weights for Q1 2020 since campus activities regarding number of people are very similar. A two month average of this figure for January and February (19,280 kgs) is added to an estimated figure for March, which is 4820 kgs (this March weight is half the monthly figure for January or February since March had far fewer people on campus for the last part of the month as a result of Covid-19). When added together the weights for January (9640), February (9640) and March (4820) add to 24,100. Then 6770 kgs (from the weight of the compactor tips in March) is subtracted from 24,100 resulting in 17,330 kgs.

**Costs for garbage collection and compacting are combined with cardboard collection and baling, since they are performed at the same time by the same janitor and are reported together by the janitor contractor on monthly invoices. These are reported above in Table 10 under Cardboard.

***Waste Connection weight for CAC bin is an estimate based on an average from monthly weights in Q1 2019, and the fact that there was less waste in March 2020 due to the drop in campus population caused by Covid-19.

Waste Consulting and Management Fees

Mr Ken Horne, of Waste Logic, performed waste consulting services on an ongoing basis to help Sustainability Office staff better understand waste services and how to make operations as efficient as possible. Monthly waste management fees were also charged for the garbage and recycling dumpsters at the CAC.

Table 20 - Waste Consulting and Management Fees

Period	Item	Month/Year	Cost (\$)
Q1-20	Waste consulting & Management Fees	Jan-Mar 20	\$6724.77
Q1-20	Waste consulting (\$2000/month)	Jan-Mar 20	\$6000
Q1-20	Waste management fee	Jan-Mar 20	\$724.77

Q4-19	Waste consulting (\$2000/month)	Oct-Dec 2019	\$6000
Q4-19	Waste management fee	Oct-Dec 2019	\$695.16

Table 21 - Capital Fees for Waste Related Expenses

Period	Item	Month/Year	Cost (\$)
Q1-20 Total	Capital Items for Waste Program	Jan-Mar 20	\$2722.72
Q1-20	2-wheel garbage carts (16)	Jan-Mar 20	\$2166.72
Q1-20	Pallett jack to move cardboard bales	Jan-Mar 20	\$556.00

Recommendations (from Q1 2020 and Q4 2019)

While the scope of this report was only to summarize and report data for waste streams on campus, staff requested some basic recommendations to help guide future initiatives. The following recommendations are from previous waste audit reports.

Source /Target Audience	Policy	Outreach	Infrastructure
Orientations for students and staff	Greatly Expanded 'Zero Waste' education sessions	Many other universities and colleges have far more in-depth sessions for their new students and staff members and these pay great dividends regarding engagement with the zero waste program, leading to better use of the waste bins.	- More time and resources dedicated to orientation sessions for all students and staff.

Zero waste stations / students		<ul style="list-style-type: none"> - Waste station ambassadors at events and in classes - Educate international students about waste management in BC/ Kamloops/ TRU 	<ul style="list-style-type: none"> - 3D signage in each building
Trades / trades administration		<ul style="list-style-type: none"> - Why source separating DLC waste matters - Promote/ encourage lessons in deconstruction 	<ul style="list-style-type: none"> - Investigate diversion of sawdust bin
Offices / staff and administration	<ul style="list-style-type: none"> - 'Kick the can' - staff are responsible for taking waste to central collection (office-based mini Zero Waste Stations) 	<ul style="list-style-type: none"> - 'What goes where' - short video clips or presentations to staff and administration 	<ul style="list-style-type: none"> - Centralized zero waste stations in offices - Remove garbage bins from desks and provide recycling bins as required
Kitchen & Café / Aramark	<ul style="list-style-type: none"> - Include language in new contracts for waste diversion targets - Create incentives or penalties for target thresholds 	<ul style="list-style-type: none"> - Training contract staff on 'what goes where' - Presentations to contract staff (staff meetings) on "what goes where and why" - Encourage Scratch Café to become a Zero Waste Kitchen 	<ul style="list-style-type: none"> - Engage and support contract staff to set up internal waste diversion systems - Student food bank
Stores / Facility staff and administration		<ul style="list-style-type: none"> - Why waste matters presentation to staff - Host repair cafes in partnership with local repair café group 	