



Demolition, Land Clearing, and Construction (DLC) Waste Management Handbook



Canada's Tournament Capital

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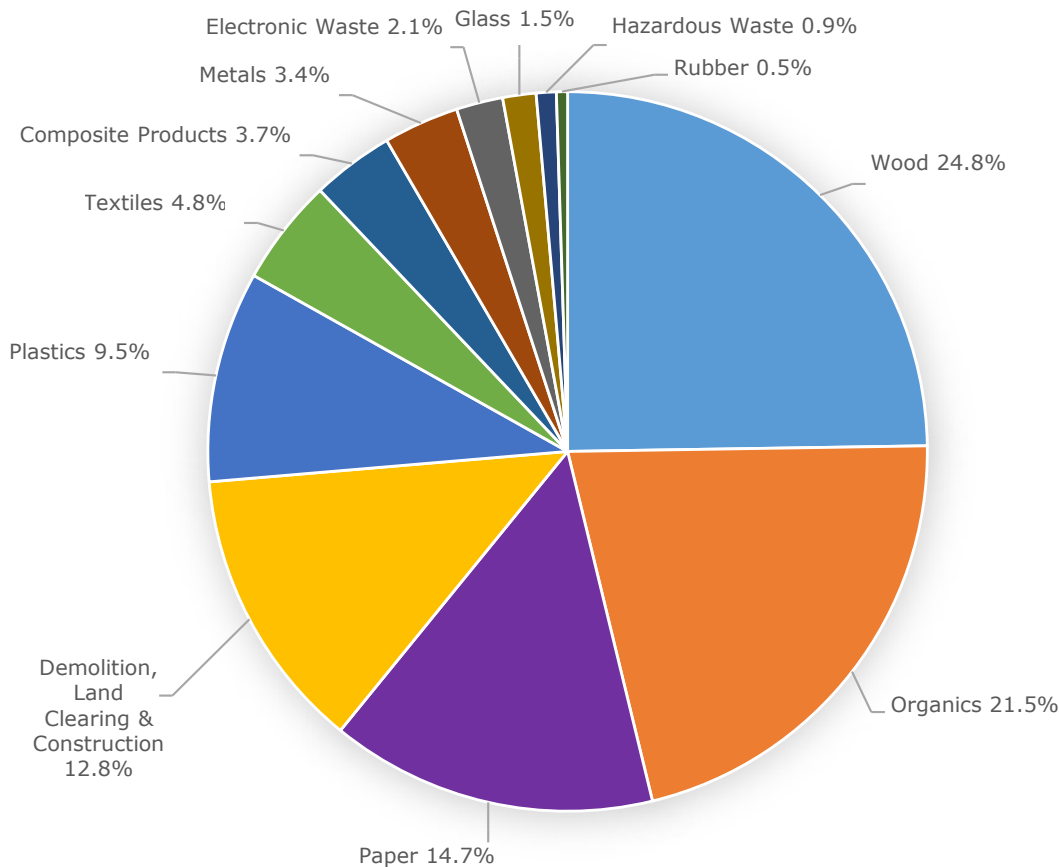
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The Purpose of This Handbook

Whether you are a contractor, designer, disposal company, or homeowner, this handbook will provide reference material necessary for you to manage your projects for demolition, land clearing, and construction (DLC) waste; maximize the salvage and recycling of materials; and reduce the amount of waste headed to landfills.

Kamloops: Our Waste Profile

Did you know that DLC materials, including wood waste, account for almost 40% of our city's waste stream? Wood alone accounts for almost 25% of disposed waste. Reusing and recycling these materials will dramatically reduce the quantity of disposed waste and save valuable landfill space.



Why You Need a Waste Management Program

1. Compliance

Certain materials have restrictions for disposal at City landfills. Follow a plan to make sure you comply with the regulations. By setting up a program, you can ensure materials will be separated at the source, saving time and money when you reach the landfill.

2. Reduced Costs

Items disposed of in City landfills are charged different disposal fees based on the type of material. Mixed loads are charged considerably higher fees because the materials are not readily diverted and recycled. If you sort and separate your materials, you will pay significantly lower tipping fees than if you dispose of mixed waste loads. This just makes good business sense! See page 11 for a case study with examples on how to reduce your fees.

3. Reduced Environmental Impact

Reduce the impact of your project by conserving natural resources, reducing greenhouse gas emissions and energy consumption, and saving precious space in our landfills.

4. Positive Marketing

Customer demand for contractors using environmentally responsible practices is on the rise. Diverting construction waste and increasing recycling opportunities provides a distinct marketing advantage for your company.

5. Certification Opportunities

Many green building rating systems will require you to implement some form of a construction waste management and recycling program in order to meet certification requirements. For example, Leadership in Energy and Environmental Design (LEED®) for New Construction awards points for reusing existing structures, diverting DLC waste from the landfill, redirecting recyclables back to the manufacturing process, and using salvaged building materials.

DLC Disposal Fees

Fees for DLC disposal at the City's landfills provide an incentive to reduce and recycle while saving valuable landfill space. In this way, the cost of running solid waste disposal is moved away from the taxpayer and onto users of the service.

Depending on how you organize your waste generation and collection, disposal fees for DLC waste can vary greatly. A waste management program will allow you to plan ahead to sort your materials and significantly reduce your disposal and recycling fees. This handbook outlines how to reduce your waste and save money through deconstruction, salvage, recycling, and effective waste management.

Disposal Fees at Mission Flats Landfill

Material	Price per Tonne
Unseparated DLC	\$160
Separated DLC	
Wood waste	\$100
Gypsum	\$100
Asphalt shingles	\$100
Yard waste	\$100
Crushable aggregate (concrete, asphalt, HardiPlank® siding, etc.)	\$20
Clean fill	\$10/dump body
Scrap metal	FREE
Cardboard	FREE

Deconstruction and Salvage

Deconstruction

Deconstruction is the process of removing a building by selective disassembly of its components. Think of it as "construction in reverse". Deconstruction can yield large amounts of reusable building materials.

Salvage

Non-structural items, such as appliances, doors, flooring, and light fixtures can be salvaged, reused in new construction projects, sold, donated, or recycled.

Donation or Sale

Is a building that is slated for demolition still structurally sound? If so, consider donating it or selling the structure to be used at another location by a different organization or individual. The components can be reused, and you will save on waste disposal fees.



Michael Pouliot, Pacific Community Resources



Salvageable and Recyclable Materials

The following are examples of materials that can be salvaged, resused, and/or recycled. See Common Construction Waste: Methods and Locations to Reuse or Recycle in the Appendices for recycling uses and locations in Kamloops.

Examples of Salvageable Materials	Examples of Recyclable Materials
Dimensional lumber	Structural concrete
Heavy timber	Cinder blocks
Steel beams and studs	Asphalt pavement
Wainscotting	Metal piping
Insulation	Gypsum wallboard
Siding	Electrical cable
Heating ducts	Aluminum siding
Electrical equipment	Metal window frames
Bricks and blocks	Rebar
Light fixtures	Cement-based stucco
Plumbing fittings	Metal deck railings
Faucets	Dimensional lumber
Interior doors and frames	
Appliances	
Flooring	

Recommended Steps for Salvage, Reuse, and Recycling

1. Plan Ahead

Since deconstruction is more labour intensive than conventional demolition, make sure to allow contractors the necessary time to properly complete a deconstruction and/or salvage. This will reduce disposal costs and increase revenue from the sale of salvaged materials.

2. Consult a Contractor

Consult a professional contractor experienced in the salvage of both structural and non-structural building materials. Make sure that the contractor is qualified, bonded, and/or insured.

3. Conduct an Audit

Identify salvage and recycling opportunities at your site through an audit. Ideally, a team consisting of the owner, architect, general contractor, and salvage expert should survey the building. See the Appendices for a sample DLC Project Inventory Form.

4. Create a Deconstruction and Salvage Plan

The salvage or deconstruction contractor should create a plan that outlines what work needs to be done. A list of items to consider is as follows:

- Assess hazardous materials (e.g., asbestos, combustibles, etc.). See the next page for a list of common hazardous materials.
- Determine the type and quantity of materials to be salvaged and reused.
- Determine the type and quantity of materials to separate for recycling (e.g., asphalt shingles, gypsum, concrete, bricks, wood, and metal).
- Arrange on-site set-up and procedures for sorting and separating recyclables from the waste stream (e.g., what type of bin will be used for recyclables).
- Estimate the quantities of waste to be disposed of.
- Research the names and addresses of used building material businesses and licensed recycling and disposal facilities in the City accepting the materials generated by your project. See Appendix B, Common Construction Waste: Methods and Locations to Reuse or Recycle.

Hazardous Materials

The following is a list of common hazardous materials found in deconstruction and demolition projects. Consult a professional to test for, remove, and properly dispose of hazardous materials.

Visit www.worksafebc.com and www.kamloops.ca to learn more about the identification and disposal of asbestos.

Hazardous Materials	Possible Sources
Asbestos	Siding, pipe insulation, pipe tape, ceiling tile, drywall joint compound, vinyl sheet flooring, vinyl tiles, lag pipe, insulation, asbestos board, and linoleum.
Underground storage tanks	Fuel tanks for heating/cooling systems. Look for fill and vent pipes. If a tank is found during excavation, work must cease until the tank, its contents, and contaminated soils are remediated or removed as required.
PCBs	Fluorescent lighting ballasts, power transformers, generators, and other power supply and management equipment.
Abandoned chemicals	Paint, solvents, oils, cleaning products, flammable/combustible substances such as gasoline and pesticides, and medications.
Others	Freon from cooling equipment, mercury switches, and other sources.

Source: Metro Vancouver

DLC Waste Management

A waste management program will allow you to set up a plan to organize your waste and recyclables and reduce disposal fees during the renovation, expansion, or construction of a building.

How to Set Up a Waste Management Program

Step 1 - Estimate your waste and recyclables

What type and quantity of materials will be generated by your project? Estimate what waste will be generated on site through deconstruction, salvage, renovation, and/or construction. You can use disposal records from similar previous projects as a guide or complete a new audit of your site. Use the sample DLC project inventory form (Appendix A) to get started. Use the Common Construction Waste: Methods and Locations to Reuse or Recycle table (Appendix B) as a reminder of the materials that might be generated by your project.

Step 2 - Choose recycling options

What type of collection and hauling options are appropriate for your project and site?

Collection options

Source separation is when recyclables such as wood, gypsum, cardboard, and metal are separated on site. The materials can be put into separate bins, a dual (or multi) compartment bin, or stored in piles on the site.

Co-mingled or mixed collection is when recyclable materials are collected in one bin and sorted at a later date. Although this method usually requires fewer bins on site, it will result in a greater amount of time to sort the materials later. If not sorted completely (or at all), fewer items will be recycled and higher tipping fees will apply at the landfill.

Options for space-constrained sites:

- 1. Target materials at certain phases of construction.**
For example, you can use a dedicated wood bin during the framing stage to collect the majority of the wood.
- 2. Request a front-end bin (instead of a roll-off bin) from your waste hauler.**
These can vary in size from 2 to 8 cubic yards. Front-end bins take up much less space than the more regularly used 40-yard waste containers. Consider using a front-end bin to recycle cardboard.

Hauling options

Self hauling can reduce your costs and result in lower fees, or depending on the material, no fees at the landfill, or even revenue at the recycling depots. For example, some companies will pay you for your scrap metal.

Contracted hauling services can be the most convenient option, especially for larger sites. Choose a hauling company that can help you set up a job site recycling program. This can be as simple as providing different bins for different materials.

Ask these questions when deciding on a hauler:

- What recyclable materials do you pick up?
- What are your requirements for separating recyclable materials?
- How much contamination is acceptable for different waste streams?
- What type and size of bins do you offer?
- Does your company provide help on how to set up job site recycling and help educate the workers?
- Do you supply signs for recycling bins?
- Can you provide the itemized waybills and invoices that document the type and quantity of materials recycled, and where?

Step 3 - Create an official waste management plan

The plan will be a document that provides all the necessary information needed by any worker on site to be able to achieve the project's waste diversion and reduction goals. To get started, see the Appendices for a sample DLC project inventory form.

The plan should include:

1. The project's waste diversion goals.
2. Name(s) and contact information of person(s) responsible for waste management on site, waste haulers, used building materials yards, licensed recycling and disposal facilities, and landfills.
3. An estimate of the types and quantities of materials generated on site.
4. Methods and strategies for salvaging materials and removing recyclable materials.
5. Methods for collecting and separating recyclable materials.
6. Estimated costs and revenues from salvageable/recyclable/disposable items.
7. Methods of assessment, abatement, and safe disposal of hazardous materials.
8. Plans for training and communication on site (e.g., education for workers and subcontractors and site setup and identification of collection areas).
9. Reporting and record keeping, including cost/revenue data and waste diversion rate calculations.

Step 4 - Implement your waste management plan

Designate someone who will be responsible for overseeing the plan and monitoring the site. For larger projects, consider sharing the responsibility between more than one person or use a team approach.

Implementation of the plan will include:

1. On-site set up
 - Locate bins near the spot(s) where materials will be generated
 - Place garbage and recycling bins next to each other to discourage contamination of recycling bins
2. Use of proper signage
 - Use large, moveable, weatherproof signs to clearly show what belongs in each bin
 - It is often useful to post lists of accepted and prohibited items
3. Education of workers and subcontractors
4. Prevention of contamination
 - Inspect bins regularly
 - Remove contaminants
 - Schedule bin pickup with haulers or self-haul
 - Keep an eye out for scavenging
5. Record-keeping and reporting
 - Collect and file recycling and disposal waybills and invoices for tracking volumes and costs/revenues

NO FOOD WASTE!

Do NOT put food waste and disposable food containers in construction waste bins. Ensure small garbage bins are placed throughout the site for collection of food waste. If you or your employees compost at home, that's even better! Designate a food waste bin for compostable organic waste.

Benefits of Deconstruction and Separation of Materials: A Case Study

The Project

In 2013, Metro Vancouver worked with Light House, a not-for-profit company dedicated to advancing green building (www.sustainablebuildingcentre.com), to test a deconstruction and recycling program on a real-life renovation project. The team selected a single-family home renovation undertaken by reVISION Custom Home Renovations (www.revisionrenovations.com). The renovation included removal of the existing roof and the addition of a third storey, as well as renovation of approximately 50% of the main floor and 60% of the basement.

A deconstruction consulting firm conducted a walk-through of the building prior to demolition work to:

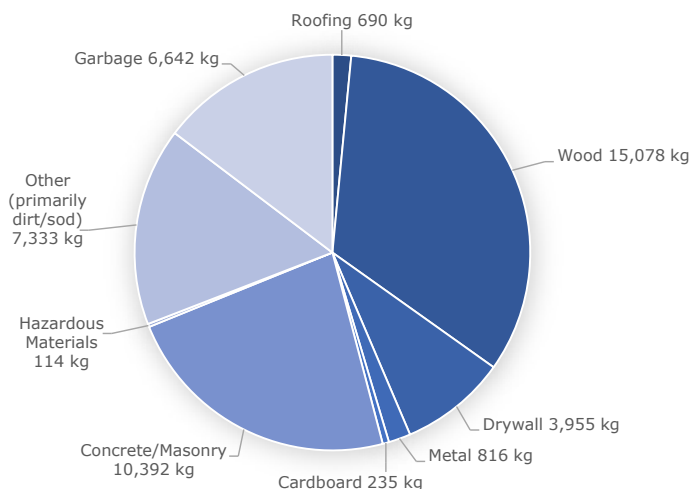
1. Assess the relative value of the various materials compared to the amount of labour required to remove them intact.
2. Provide training on efficient removal of materials with the goal of preserving them for salvage or separating them for recycling.
3. Demonstrate the use of some key tools for deconstruction.

A construction waste management plan was created, and a hauler that provided on-site sorting services without the use of large roll-off bins was selected.

Results

Overall, of the 45,255 kg of waste generated by the project, **85% was diverted from the landfill**. Of the 6,756 kg of waste not recycled, at least 1,622 kg consisted of insulation and at least 1,100 kg consisted of asphalt shingles (note: there are recycling options for shingles in Kamloops). The remainder of the waste consisted of new construction materials such as plastic sheets, PVC, and polystyrene.

**Waste generation
breakdown from
the Light House
project**



The total actual cost of tipping fees for the Light House project was **\$1,508.57**. If the materials were taken un-separated (with the exception of drywall) to the closest transfer station, the cost of tipping fees would have been **\$4,599.31**.

Separated (actual project costs)	\$1,508.57
Unseparated (hypothetical)	\$4,599.31
Savings	\$3,090.74

Of course, using a sort and haul service model can come with added costs compared to using larger roll-off bins, but the reduction in tipping fees may make your efforts more than worthwhile. In addition to saving money, by separating your construction waste, you will be providing a new life for recycled materials and saving valuable landfill space.

A Kamloops Perspective

So what would the costs have been if this project was located in Kamloops? Take a look at the following table for a material and cost breakdown of the disposal fees associated with each material and quantity, and the final savings in tipping fees. In this case, tipping fees would be reduced by **\$4,501.06** if materials were separated before disposal.



	Quantity		Disposal Fee per Tonne at Mission Flats Landfill		Final Cost	
Material from Case Study	Kg	Tonnes	Mixed	Separated	Mixed	Separated
Roofing	690	0.69	\$160	\$100	\$110.40	\$69.00
Wood	15,078	15.078	\$160	\$100	\$2,412.48	\$1,507.80
Drywall	3,955	3.955	\$160	\$100	\$632.80	\$395.50
Metal	816	0.816	\$160	FREE	\$130.56	\$0
Cardboard	235	0.235	\$160	FREE	\$37.60	\$0
Concrete/Masonry	10,392	10.392	\$160	\$20	\$1,662.72	\$207.84
Hazardous Materials	114	0.114	n/a	\$180*	n/a	\$20.52
Other (primarily dirt/sod)	7,333	7.333	\$160	\$10/dump body	\$1,173.28	\$10.00**
Garbage	6,642	6.642	\$160	\$80	\$1,062.72	\$531.36
Total					\$7,243.08	\$2,742.02
Savings from separating materials					\$4,501.06	

* Assumes that the material contains asbestos
** Assumes one load

Useful Links

City of Kamloops Recycling and Garbage webpage: www.kamloops.ca/garbage

- Information on DLC waste and tipping fees, materials that are accepted at City landfills, landfill and composting facility locations, and DLC Waste Reduction Toolkit.

Habitat for Humanity (Kamloops Restore): www.habitatkamloops.com/restore

- Accepts clean, used building supplies that are in good working order.

Light House: www.sustainablebuildingcentre.com

- A not-for-profit company dedicated to advancing green building. Provides training and resources, including The Little Green Site Book - a handy pocket guide to green building and coordinating a green construction site, as well as information on construction waste management. You can also find information about deconstruction.

LightRecycle: www.lightrecycle.ca

- Find a depot near you where you can recycle light bulbs, tubes, fixtures, and ballasts free of charge. Options are available for large volume generators.

Recycling Council of British Columbia (RCBC) Recyclepedia: www.rcbc.ca

- Find a location to recycle a certain material.

Recycling Council of British Columbia (RCBC) Materials Exchange Program (MEX): www.bc.reuses.com

- A free, province-wide service facilitating the reuse and recycling of discarded products and materials.

Thrift Stores: www.kamloops.ca/environment/pdfs/13-ThriftStores.pdf

- A list of Kamloops thrift stores and organizations that may accept salvageable materials or appliances.

References

Construction in Reverse: Lessons from a Residential Renovation Pilot. Helen Carruthers, Light House Sustainable Building Centre Society, Vancouver, BC (2013). www.sustainablebuildingcentre.com/wp-content/uploads/2013/07/July-2013_Construction-in-Reverse.pdf

DLC Waste Management Toolkit: A Guide for the Construction Industry. Metro Vancouver (2008). www.metrovancouver.org/buildsmart

Appendix A - Sample DLC Project Inventory Form

Company Name	Contact Person	Phone
Project Site/Location	Project Type <input type="checkbox"/> New construction <input type="checkbox"/> Renovation <input type="checkbox"/> Partial deconstruction <input type="checkbox"/> Complete deconstruction	Estimated Start Date
Total Area	Building Type <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial	Estimated Completion Date

Pre-project Audit		Project Summary					
Material	Estimated generation (e.g., cubic yards, tonnes)	Salvaged	Recycled	Disposed	Facility	Date	Comments
Signature		Title				Date	

Appendix B - Common Construction Waste:

Material	Includes	Recycle or Reuse Method	City Recycling Locations*
Debris from land clearing	Stumps, branches, green waste	Chip on site and use for mulch or haul to composting facility	Stumps: Cinnamon Ridge Compost Facility (max. 24 in. diameter - split larger items) Other: Cinnamon Ridge Compost Facility, Barnhartvale Compost Site, McGill Road Yard Waste Depot (max. 6 in. diameter), and Mission Flats Landfill (accepted, but not composted at this location)
Vegetation	Shrubs, small trees, plants, and sod	Replant and reuse sod on the same site during the landscaping phase or replant on another site	Sod, turf, and soil: Mission Flats Landfill Other: Cinnamon Ridge Compost Facility (max. 24 in. diameter - split larger items), Barnhartvale Compost Site, McGill Road Yard Waste Depot (up to 6 in. diameter), and Mission Flats Landfill (accepted, but not composted at this location)
Concrete/ asphalt/ aggregates	Structural concrete, cinder blocks, asphalt pavement, bricks, washout from mixer trucks	Crush on site and use as fill or recycle	Mission Flats Landfill

* Check www.kamloops.ca/garbage for addresses and hours of operation.

** Please note this is not an exhaustive list.

Methods and Locations to Reuse or Recycle

Fee	Other Recycling Locations in Kamloops (contact for fees, incentives, and details)**
<p>Cinnamon Ridge, Barnhartvale Compost Site, and McGill Road Yard Waste Depot: Free</p> <p>Mission Flats: \$100/ tonne</p>	<p>Numerous landscaping companies will haul for a fee.</p>
<p>Mission Flats: Clean fill as sod, turf, and soil, \$10 per dump body. Other, \$100/tonne.</p> <p>Cinnamon Ridge, Barnhartvale Compost Site, and McGill Road Yard Waste Depot: Free (shrubs, small trees, grass clippings, garden waste only - no sod, turf, soil, or rocks)</p>	<p>Dawson Construction (clean fill \$15/tonne), 250-374-3657 Metro Reload (clean fill \$5/tonne), 250-372-3036. Numerous landscaping companies will haul for a fee.</p>
<p>\$20/tonne</p>	<p>KRM Recyclers (concrete blocks, patio stones in useable condition), 250-374-4437. Metro Reload (concrete, \$20/tonne; asphalt, \$10/tonne), 250-372-3036.</p>

Material	Includes	Recycle or Reuse Method	City Recycling Locations*
Asphalt	Asphalt roofing shingles	Recycle	Mission Flats Landfill
Wood	Forming lumber	Reuse on next project, sell, or recycle	Mission Flats Landfill
	Dimensional lumber off cuts, 2x4s	Reuse on site or recycle	Mission Flats Landfill
	Painted wood, composite	Reuse on site or recycle	Mission Flats Landfill
	Pallets	Reuse or recycle (nails okay)	Mission Flats Landfill
Gypsum	Gypsum/drywall wallboard offcuts	Recycle	Mission Flats Landfill
Paper	Cardboard from packaging, office paper, newspaper	Recycle	Mission Flats Landfill
Metals	Piping, aluminum siding, banding, wires, cable, and rebar	Recycle	Mission Flats Landfill
Plastics	Empty, clean pails and containers, plastic film, and pipes	Recycle	Mission Flats Landfill

* Check www.kamloops.ca/garbage for addresses and hours of operation.

** Please note this is not an exhaustive list.

Fee	Other Recycling Locations in Kamloops (contact for fees, incentives, and details)**
\$100/tonne	Intercity Recycle Ltd. (asphalt shingles, all roofing and siding felt), 250-317-9873. Habitat for Humanity Restore (new or unused), 250-828-7867.
\$100/tonne	Habitat for Humanity Restore (new or gently used construction material), 250-828-7867. KRM Recyclers , 250-374-4437.
\$100/tonne	Habitat for Humanity Restore (new or gently used construction material), 250-828-7867. KRM Recyclers , 250-374-4437.
\$100/tonne	
\$100/tonne	
\$100/tonne	New West Gypsum Recycling Inc. (in New Westminster, pickup is available for large loads), 604-534-9925. Sivan Enterprises Ltd. , 250-470-2824.
Free	General Grant's (packaging, printed paper, cardboard in small loads - call ahead for large loads), 250-376-9600. Lorne Street Bottle Depot (packaging, printed paper, cardboard in small loads - call ahead for large loads), 250-372-3721.
Free	Central Salvage Ltd. (Heffley Creek), 250-319-2691. KRM Recyclers (piping, siding, roofing, in useable condition), 250-374-4437. North West Metal Recycling , 250-374-8522. Richmond Steel Recycling , 250-554-3491.
Free as Mixed Recycling	General Grant's (plastic overwrap and packaging - call ahead for large loads), 250-376-9600. Lorne Street Bottle Depot (plastic overwrap and packaging- call ahead for large loads), 250-372-3721. KRM Recyclers (pails and piping in useable condition), 250-374-4437.

Material	Includes	Recycle or Reuse Method	City Recycling Locations*
Household fixtures	Light fixtures, bulbs, thermostats, batteries, sinks, windows, and other items from salvage	Recycle	Mission Flats Landfill
Chemicals	Paint, flammable liquids, aerosols, and domestic pesticides	Recycle	Mission Flats Landfill (Household quantities of paint only. Industrial paint not accepted)
Beverage and food containers	Plastic, metal, and glass bottles and containers	Separate and recycle	Mission Flats Landfill
MIXED DLC WASTE			Mission Flats Landfill

* Check www.kamloops.ca/garbage for addresses and hours of operation.

** Please note this is not an exhaustive list.

Fee	Other Recycling Locations in Kamloops (contact for fees, incentives, and details)**
<p>Light bulbs and fixtures, electronics, small appliances, power tools, thermostats, batteries, non-freon-containing white goods (e.g., ovens), propane tanks, metal sinks: Free</p> <p>Freon-containing appliances (e.g., fridges and freezers): \$15/item</p> <p>Porcelain bathroom fixtures: \$20/tonne</p>	<p>Canadian Tire (batteries - automotive ok), 250-374-9747.</p> <p>Canadian Energy (batteries- automotive ok), 250-374-8914.</p> <p>KRM Recyclers (doors, windows, appliances, light fixtures, toilets, and most other household fixtures in working order), 250-374-4437.</p> <p>General Grant's (light bulbs, fixtures, batteries), 250-376-9600.</p> <p>Lorne Street Bottle Depot (light bulbs, fixtures, batteries), 250-372-3721.</p> <p>Habitat for Humanity ReStore (fixtures, cabinets, plumbing items, appliances, and more, in working order), 250-828-7867.</p> <p>Home Hardware (light bulbs), 250-377-7234.</p> <p>North West Metal Recycling (appliances, bath tubs, lighting, furnaces, plumbing, hot water tanks, batteries, metal fencing), 250-374-8522.</p> <p>Summerhill's Switch the Stat Program (thermostats), www.switchthestat.ca.</p>
Free	<p>RONA (paint), 250-372-2236.</p> <p>Lorne Street Bottle Depot (paint in small quantities, call ahead for large loads), 250-372-3721.</p> <p>Habitat for Humanity ReStore (paint cans that are mostly full), 250-828-7867.</p>
Free as Mixed Recycling	Return beverage containers for deposit to General Grant's , 250-376-9600, Lorne Street Bottle Depot , 250-372-3721, and Full Refund Bottle Depot , 778-471-3109.
\$160/tonne	



Contact us

Public Works and Utilities
955 Concordia Way
Kamloops BC V2C 6V3
Phone: 250-828-3461
Email: publicworks@kamloops.ca