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DLC TOOLKIT

DEMOLITION, LAND CLEARING, AND CONSTRUCTION WASTE

REGIONAL DISTRICT
of Fraser-Fort George

TABLE OF CONTENTS

INTRODUCTION

Who is this toolkit for?

This Demolition, Land Clearing and Construction (DLC) Waste Toolkit is a reference guide for contractors, design professionals and building owners, to help them maximize the amount of construction and demolition waste diverted from disposal through salvage, reuse and recycling.

This toolkit is developed by the Regional District of Fraser-Fort George as part of the waste reduction component of the Regional Solid Waste Management Plan to reduce the per capita disposal rate to 570 kg.

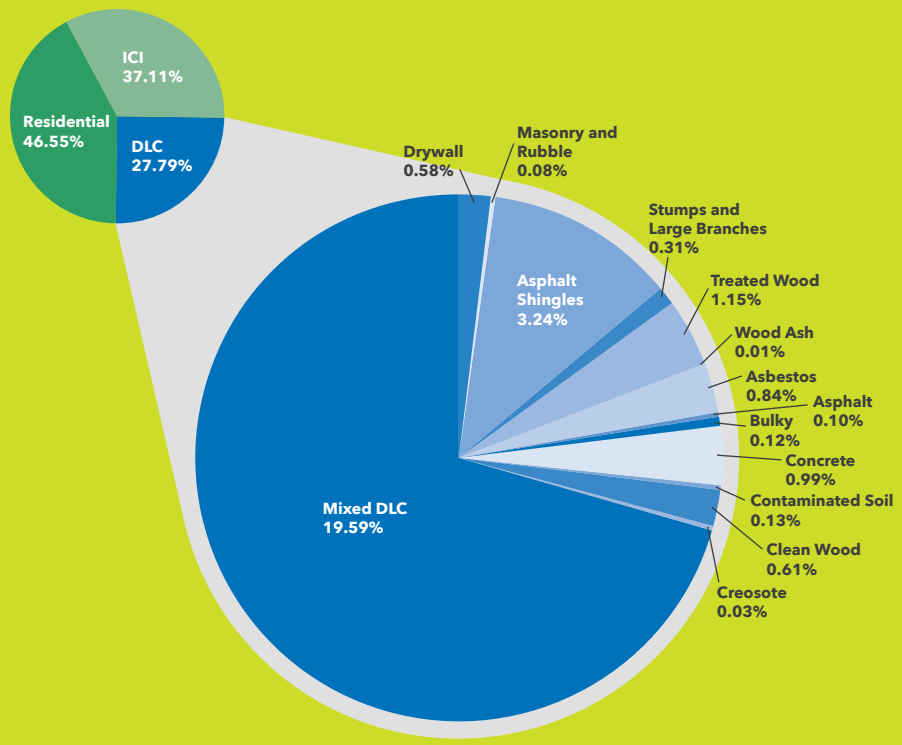
The RDFFG wants to thank and acknowledged Metro Vancouver for their help in creating this toolkit. This toolkit was recreated with their permission.

For further information contact the Environmental Services Department:

Phone: **250-960-4433**
Email: **environment@rdffg.bc.ca**

Regional District of Fraser-Fort George Waste

Waste from the demolition, land clearing, and construction waste sectors contribute just under 28% of the region's waste. In the pie graph below you can see the different percentages of DLC wastes landfilled at the Foothills Boulevard Regional Landfill in 2019. Many of these wastes have value and can be recycled or reused instead of landfilled.



FIVE GREAT REASONS TO SET UP A CONSTRUCTION WASTE MANAGEMENT PROGRAM

Besides making a measurable difference in the amount of materials being sent to a landfill there are other reasons for setting up a construction waste management program.

1. Compliance

The following materials have established take back locations in the Regional District:

- Old corrugated cardboard (fees associated for commercial loads)
- Mixed paper and cardboard
- Blue bin recycling (includes metal and plastic Type 1-7 containers)
- Glass containers
- Yard and garden waste
- Electronic Waste (personal computers, printers and TVs)
- Refundable beverage containers
- Paint, solvents, flammable liquids, gasoline and pesticides
- Oil, oil filters and empty oil containers
- Antifreeze and empty antifreeze containers,
- Lead-acid (automotive) batteries
- Household batteries
- Medications/pharmaceuticals
- Scrap tires
- Major household appliances
- Lightbulbs and fixtures
- Smoke and CO_2 alarms
- Thermostats
- Soft plastic overwrap (grocery bags etc.)
- Styrofoam

In addition to the easily recyclable materials, some materials fall under the controlled waste and prohibited waste categories in the Solid Waste Tipping Fee and Regulation Bylaw. These waste categories restricted from landfill disposal can be found by visiting **www.rdffg.bc.ca.**

Any hazardous or banned materials must be identified, properly removed, and disposed of by qualified persons prior to any salvage or demolition work.

Some examples of hazardous materials commonly found in building demolition projects include:

- Asbestos
- Underground storage tanks
- PCBs
- Abandoned chemicals such as solvents, paints, pesticides, and gasoline
- Mercury switches

2. Reduced costs

Tipping fees for source separated recyclable materials are considerably lower than mixed waste loads, in some cases free of charge. Recycling scrap metal should generate revenue and recycling old corrugated cardboard avoids surcharges. Over the course of a project the savings make good business sense for doing the right thing.

3. Marketing opportunity

Achieving high construction waste diversion rates provides a distinct marketing advantage for companies, as a growing number of customers are looking for contractors using environmentally responsible practices.

4. Certification

If your building project is seeking certification under a green building rating system (see examples below), implementing an effective construction waste management plan is key.

Leadership in Energy and Environmental Design (LEED®) for New Construction awards – www.cagbc.org/leedcanada

- Up to 3 points for reusing existing structures on-site
- Up to 2 points for diverting between 50% and 75% of demolition, land clearing and/or construction waste from the landfill and redirecting recyclables back to the manufacturing process and reusable materials to appropriate sites
- Up to 2 points for using 5% - 10% salvaged or reused building materials.

BuiltGreen™ residential green building rating system awards – www.builtgreencanada.ca

- More than 27 points are available for waste reduction initiatives on single family residential construction sites; a minimum of 7 points are required as part of the BuiltGreen™ designation
- Up to 4 points for reusing an existing structure
- Up to 16 points for waste reduction initiatives on single family residential construction sites
- 1 point for every salvaged building product used on the project

BOMA Go Green – www.bomacanada.com

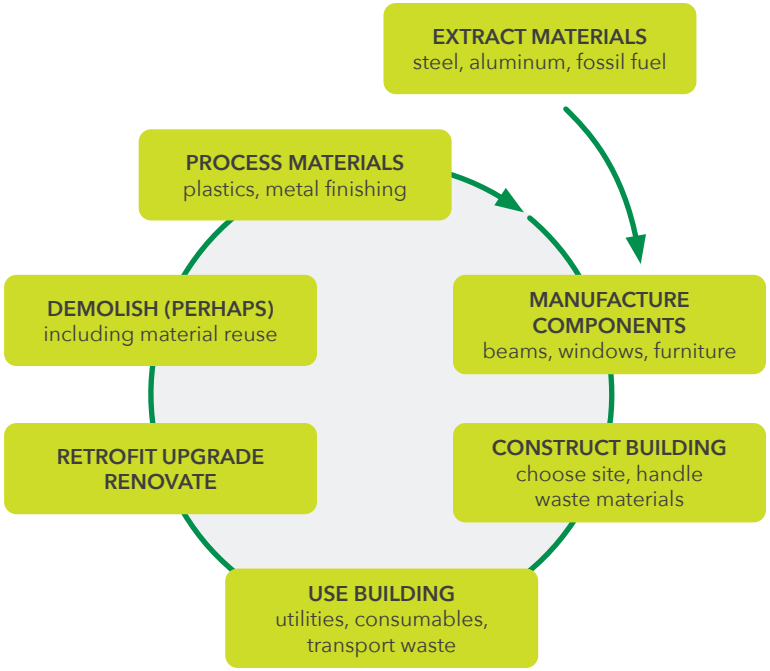
- One of the program requirements under Waste Reduction and Recycling is to have a written policy on how building management intends to reduce construction waste sent to landfills

Some municipalities are implementing mandatory green building practices and/or compulsory construction waste management on job sites.

5. Reduced impact on the environment

Through waste reduction and more efficient use of resources, you will be reducing the impact from your project on the environment by:

- Conserving natural resources
- Reducing consumption on energy and water and creating less air pollution, greenhouse gases and solid waste when extracting, transporting, and manufacturing virgin materials.



DECONSTRUCTION

Demolishing existing buildings by knocking them down and sending waste to landfill is no longer the most cost-effective and environmentally responsible option.

If your site has an existing structure that is slated for demolition, consider the following options:

- Selling or donating the structure for reuse at another location
  - » If a building is at the end of its useful life, because it is no longer needed at the site it sits on, it could still be structurally sound and used on another site.
- Deconstructing the building
  - » Deconstruction is "construction in reverse"; it is the process of removing a building by selective disassembly of structural and non-structural building components. This process can yield a significant amount of valuable, reusable building materials.
- Salvaging building materials for reuse in new construction
  - » If the building is not to be deconstructed, you can still salvage valuable non-structural building components prior to demolition. This can include appliances, doors, hardwood flooring, light fixtures, siding, etc.

The following is a list of materials that can be salvaged for reuse and/or recycling from buildings slated for demolition:

Examples of Salvageable Building Materials	Examples of Recyclable Demolition Materials
Dimensional lumber	Structural concrete
Heavy timbers	Cinder blocks
Steel beams and studs	Asphalt pavement
Wainscoting	Dimensional lumber
Insulation	Metal piping
Siding	Metal deck railings
Heating ducts	Electrical cable
Electrical equipment	Aluminum siding
Brick and block	Metal window frames
Light fixtures	Rebar
Plumbing fittings	Cement based stucco
Faucets	Asphalt Shingles
Interior doors and frames	Clean Wood

Recommended steps for salvage, reuse and recycling

The following steps are recommended to successfully reuse, salvage, and recycle building structures:

1. Start planning for deconstruction early

Deconstruction is more labour-intensive than conventional demolition. Allowing contractors the necessary time to deconstruct will result in more materials being salvaged and recycled. This reduces disposal costs and increases revenues from the sale of salvaged materials.

2. Consult a contractor

Consult contractors to determine if they are willing to properly deconstruct your building instead of demolishing it. Ensure the contractor is professionally qualified, bonded and/or insured. Consult the Directory section on page 25 for more information.

3. Conduct an on-site audit to identify salvage and recycling opportunities

A team consisting of the owner, architect, and general contractor should survey the building for materials that can be salvaged and recycled. The amount and type of materials salvaged and recycled depends on:

- The time available to the contractor to do the work
- The type and size of building to be taken down
- The condition of the building
- The existing markets for the materials

4. Create a Deconstruction Plan

Ask your contractor to draw up a plan specifying the work to be done, including:

- Assessment and abatement of hazardous materials (see table on the next page)
- Type and number of materials to be salvaged for reuse
- Quantities or volumes of materials to be separated for recycling
- On-site procedures for separating recyclables from other waste materials
- Site setup if materials are recycled on site
- Quantities or volumes of waste to be disposed of
- Name and address of used building materials yards, licensed recycling and disposal facilities accepting the materials generated by your project

See page 30 for a sample Deconstruction Pan.

Hazardous materials typically found in buildings	Possible Source
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. Should a tank be found during excavation, then 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 management equipment
Abandoned Chemicals	Paint, solvents, oils, cleaning products, flammable and combustible substances like gasoline, pesticides, herbicides, and medications
Others	Other hazardous materials may include Freon from cooling equipment and mercury switches

Source: City of Vancouver

For listings of companies that test for, remove and properly dispose of hazardous materials ask your contractor or check your phone book under Asbestos Abatement & Removal, Oil Tank Removal, Environmental Consultants & Services.

Proper removal and disposal of hazardous materials are crucial for the health and safety of your workers, the community and environment. Ensure a hazardous materials survey is completed by a qualified professional prior to the start of any renovation or deconstruction work. For more information on restoration, renovation and demolition WorkSafe BC guidelines visit: **https://www.worksafebc.com/en/health-safety/industries/construction/types/restoration-renovation-demolition**

5. Monitor progress

Monitor the salvaging and recycling activities on an ongoing basis to ensure materials are salvaged, recycled, and disposed of as specified. Make sure to keep a record of disposal receipts and credits from the sale of materials.

6. Evaluate your project to determine the outcome

Ask your contractor to provide you with the following information:

- List and quantity of materials salvaged, recycled and disposed of
- The name and location of the recycling and disposal facilities
- A copy of receipts from recycling and disposal facilities and from material sales

CONSTRUCTION WASTE MANAGEMENT

Construction of a New Building, Renovation or Expansion

These are the steps to take to set up a construction waste management (waste diversion and recycling) program:

Step 1:

Estimate your waste and recyclables

Based on the type and size of your project, estimate the type and quantity of waste materials that will be generated on site, using either waste disposal records from similar previous projects or the Demolition, New Construction and Renovation Projects Waste Generation Rates table on page 32.

Step 2:

Choose a diversion program that best fits your site

Decide what type of collection is appropriate for your site, and identify your hauling options.

Collection options

- Source separation is when recyclables such as clean wood, cardboard, and scrap metal are separated on-site and either put into separate bins, a dual (or multi) compartment bin, or stored in piles on the site. The bins are transported to recycling facilities by your contracted waste hauler or site workers.
- Mixed load collection is when recyclable materials such as clean wood, cardboard and scrap metal are collected in one bin. At this time, mixed loads will be landfilled and will result in a higher fee associated with this route of waste disposal.

Comparison of Source Separation and Mixed Loads Recycling

	Pros	Cons
Source separation	• Lower tipping fees at recycling facilities • Revenue generation from recyclables such as scrap metal • Higher recycling rates and more accurate account of each material recycled	• Multiple bins on-site • More sorting required
Mixed loads collection	• Fewer bins required – good for sites with space constraints • Less sorting required	• Lower recycling rates if any • Higher tipping fees

RECYCLING CAN REPRESENT COST SAVINGS IN EXCESS OF 50%

Make sure recyclable materials are separated properly; otherwise the disposal facilities may reject the materials or charge you more.

Options for Space-Constrained Sites

Small sites can target materials at certain phases of construction.

For example, place a dedicated wood bin on site during the framing stage to collect the majority of the wood; and for the remainder of the project use a mixed load bin that includes collection of wood.

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 office paper from the site office or cardboard.

Note: For onsite storage of construction bins permits are required in most municipalities (i.e. temporary storage on City streets and lanes).

Hauling Options

Contracting Hauling Services

Contracting a hauler to pick up recyclables generated on your site is the most convenient option. Most haulers can recommend the number and size of bins you will require, and might help you set up a job site recycling program.

Ask the following questions when looking for a hauler:

- What recyclable materials do you pick up?
- What are your requirements for separating recyclable materials?
- Do you provide mixed loads recyclable collection?
- 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 which document the type and quantity of materials recycled, and where?

Self-Hauling

Using your own company workers and trucks to collect and haul recyclable materials works best on smaller sites. Self-hauling can reduce your costs and allow you to take advantage of the lower fees – or in some cases, no fees – at recycling and disposal facilities.

Step 3: Create a Waste Management Plan

The waste management plan is a document that contains all the information needed by any worker on site to be able to achieve the project's waste diversion goals and targets. For more information see Construction Waste Management Plan on page 29.

Step 4: Organize your diversion program

Designate a person who will be responsible for implementing the program and monitoring the site; for larger projects, this could be a waste management team.

This designated person will be responsible for:

Setup of the program on-site

- Be sure to locate recycling bins close to where materials are generated.
- Place recycling bins and garbage bins next to each other to prevent garbage, especially food waste, from ending up in recycling bins.

Note to contractors: Food waste and disposable food containers should NOT go in construction waste recycling bins. Construction waste loads contaminated with food waste may have a surcharge applied to them when received at recycling and disposal facilities or rejected. Ensure small garbage bins are placed throughout the site for collection of food waste.

Use proper signage

- Use large, removable, weatherproof signs for all bins, which clearly show what belongs in each bin.
- Post lists of what can and cannot be diverted in visible locations around the site.

Educate all workers including subcontractors

- Workers are vital to the success of any diversion program. Communicate the importance of a job site construction waste management program to the company and the success of the project.
- Use weekly site meetings to introduce the program and inform workers which materials to recycle, how to separate them, and where bins are located.

Prevent contamination and monitor the program

- Inspect bins on a regular basis to identify contamination problems.
- Remove contaminants from bins.
- Schedule bin pick-up with haulers.
- Consider using bins with lids or added security (fencing/locks) to avoid contamination or scavenging.

Record keeping and reporting

- Collect and file recycling and disposal waybills and invoices for tracking volumes and costs.

Where to take it?

See the directories in the following section for a list of salvage contractors, structural moving companies, local recycling depots and waste haulers.

The following is a list of construction and demolition waste materials that can be recycled in Prince George.

Construction Waste Material	Includes	Reuse or Recycle Method
Existing vegetation	Shrubs, small trees, plants and sod	Replant on another site or on the same site at the landscaping stage
Land clearing debris	Stumps, large branches, green waste	Can be chipped on site and used for mulch, or hauled to a recycling facility
Concrete/ Asphalt/ Aggregates	Structural concrete, cinder blocks, asphalt pavement, bricks, washout from mixer trucks	Crush on site and use as fill material or recycle
Wood	Forming lumber	Reuse on next project, sell or recycle
	Dimensional lumber off cuts, 2X4	Reuse on site or recycle
	Painted wood, composite	Reuse on site or recycle
	Pallets	Reuse or recycle if damaged (nails okay)
Paper	Cardboard from packaging, office paper, newspaper	Recycle
Metals	Piping, aluminum siding, banding, wires, cable, rebar	Recycle
Beverage and food container	Plastic, metal and glass bottles and containers	Recycle
Plastics	Empty pails and containers, plastic film, pipes	Recycle

DIRECTORY

Hauling Contractors

Below you will find a list of waste haulers in the area, this is by no means exhaustive and more companies may be available to you.

Company	Contact Information
Westbin Waste	250-563-2467 **www.westbinwaste.ca**
Blue Bin Recycling & Disposal	250-563-2273 **www.bbrd.ca**
WJ Trash & Go	250-981-5008 **www.wjtrashandgo.com**
Cascades Recover+	250-563-0233 **recovery.cascades.com**
Waste Management	250-962-8898 **www.wm.com**
SS Dynamic Services Junk and Odour Removal	250-614-9511 **www.ssdyns.ca**

General Contractors

For general contractor needs please visit the following groups for a more comprehensive list:

Canadian Home Builders' Association, Northern BC
250-563-3306
www.chbanorthernbc.ca

Northern Regional Construction Association (NRCA)
250-563-1744
www.nrca.ca

Prince George Chamber of Commerce
250-562-2454
www.pgchamber.bc.ca

Local Recyclers

The following businesses in town accept select clean source separated materials for recycling. For more details regarding hours of operation, quantities and specific materials accepted, please call ahead.

Business	Asphalt	Asphalt Shingles	Clean Wood	Concrete	Masonry/ Rubble	Painted Wood	Scrap Metal	Stumps/ Large Branches
ABC Recycling 250-963-6766 www.abcrecycling.com							•	
Allen's Scrap & Salvage LTD. 1-877-566-1177 www.allensscrap.com							•	
Canada Recycles Corp. 250-564-7263 www.canadahazmat.ca/concretewood-recycling	•		•	•	•	•		•
Lafarge Canada 250-562-1514 www.lafarge.ca	•							
Richmond Steel 250-563-6000 www.richmondsteel.ca							•	
Wall to Wall 250-561-2994 Visit them on Facebook at Wall to Wall	Accepts all usable construction materials. No Paint.							

APPENDICES

Summary of Roles

The following is a summary of the roles that all parties must play to maximize the amount of construction and demolition waste that is diverted from disposal.

General Contractor

- Estimate waste generation, salvage and recycling opportunities
- Identify a recycling program that is best suited for the site
- Select a waste hauler with experience in job site recycling
- Setup the program on site
- Educate workers
- Monitor waste management program day-to-day
- Record keeping and reporting

Developers, Property Owners and Managers

- Make waste reduction a priority from the start of the project
- Set waste diversion goals for the project
- Support the waste management program, during the duration of the project

Architects/Designers

- At the design stage try to prevent waste by:
  - » Selecting standard sizes for all building materials to minimize waste on site (i.e. off cuts)
  - » Designing spaces that would be flexible to changing uses
  - » Designing for deconstruction
- Identify material reuse and waste reduction opportunities
- Select a contractor with established experience in job site recycling
- Include a construction waste management specification
- Write a waste management plan
- Monitor the job site recycling program
- Report on the program's success

Construction Waste Management Plan

A construction waste management plan is a document that contains all the information needed by any worker on site to be able to achieve the project's goals and targets.

That plan needs to contain information about:

1. Project's waste diversion goals and targets goals.
2. Name(s) and contact information of person(s) responsible for waste management on site.
3. An estimate of the types and quantities of materials generated.
4. List of how and where each material will be removed and salvaged or recycled.
5. Costs and revenues from salvaged and recycled materials.
6. Methods and techniques for collecting, separating and recycling materials.
7. Methods of assessment, abatement and safe disposal of hazardous materials.
8. Plans for training, meetings and other communications related to job site waste management, including:
   - **a.** Procedures for educating workers and sub-contractors
   - **b.** Site setup and identification of collection areas
9. Troubleshooting instructions and contact information for:
   - **a.** Waste haulers
   - **b.** Used building materials yards
   - **c.** Licensed recycling and disposal facilities
10. Reporting and record keeping including:
    - **a.** Collect and record all cost and revenue data
    - **b.** Calculate waste diversion rate
    - **c.** Report on any new opportunities, not previously identified, to minimize waste on site through reuse, salvage or recycling

Deconstruction Projects Material Inventory Form

This form can be used to track and report construction and/or deconstruction waste management amounts.

Company Name	Contact Person	Phone
Project Site/Location	**Project Type** ☐ New Construction ☐ Renovation ☐ Partial Deconstruction ☐ Complete Deconstruction	**Estimated Completion Time**
Building Construction ☐ Combustible ☐ Noncombustible ☐ Combination (Specify:_____)	**Building Type** ☐ Residential ☐ Commercial ☐ Industrial	**Total Area** (Sq.FT. or Sq.M.)

Pre-Project Audit	Project Summary For period: To:

Material	Estimated Generation	Salvaged	Recycled	Disposed	Facility	Remarks/ Comments

Signature	Title	Date

Explanatory Notes: _____

Column 1 **Materials:** enter materials targeted for salvage, recycling, and/or disposal

Column 2 **Estimated Generation:** enter the estimated volumes, quantities, or number of salvageable, recyclable, and waste materials generated (e.g., cu. yd. tonnes, board ft.)

Columns 3, 4, 5 **Salvaged, Recycled and Disposed:** enter the volumes, quantities, or number of materials handled (e.g., cu. yd. tonnes, board ft.)

Column 6 **Facility:** enter the end-destination of salvaged, recycled, and disposed materials

Column 7 **Remarks/Comments:** enter any additional comments or details as required

Demolition, New Construction and Renovation Projects Waste Generation Rates

Type of Building	Activity*	Waste Generation Rates	Composition (by weight)					
			Wood	Drywall	Metals	Concrete/ Asphalt	Corrugated Cardboard	Misc
Residential	D	Single Family 547 kg/m^2 (111 lbs/sq ft) (including concrete)	44%	2%	3%	25%	N/A	26%
		Multi-Family 626 kg/m^2 (127 lbs/sq ft)						
	NC	Single Family 23.7 kg/m^2 (4.8 lbs/sq ft)	65%	21%	1%	2%	2%	9%
		Multi-Family 16.3 kg/m^2 (3.3 lbs/sq ft)						
	R	84 kg/m^2 (17 lbs/sq ft)*	Renovation waste is highly variable in its make-up depending on the type and extent of renovation work undertaken					
Commercial	D	764 kg/m^2 (155 lbs/sq ft)	16%	N/A	5%	6%	N/A	11%
	NC	Low-rise 12.3 kg/m^2 (2.5 lbs/sq ft)	60%	4%	N/A	N/A	12%	24%
		High-rise 51.7 kg/m^2 (10.5 lbs/sq ft)	9%	19%	2%	38%	N/A	32%
	R	39 kg/m^2 (8 lbs/sq ft)**	Renovation waste is highly variable in its make-up depending on the type and extent of renovation work undertaken					

D: Demolition **NC:** New Construction **R:** Renovation

* This is an average calculated from a wide range of renovation projects such as kitchen, bathroom, deck and roof

** This rate was calculated from a range of commercial retrofits and tenant improvement projects

Source: Squamish-Lillooet Regional District Construction and Demolition Waste Management Study, October 2003

Characterization of Building-Related Construction and Demolition Debris in the United States, June 1998

Controlled Waste

The following wastes are considered controlled waste under Municipal Solid Waste Tipping Fee and Regulation bylaw. Restriction and special handling fees may apply.

- Appliances containing Ozone Depleting Substances
- Asbestos – Friable
- Asbestos – Non Friable
- Biosolids (waste sludge from municipal treatment plants and screening stations)
- Bulky Waste
- Camp Waste
- Concrete
- Condemned Foods
- Contaminated Soils
- Creosote Treated Wood
- Dead Animals
- Food Processing Waste
- Gypsum Board or Wallboard (Drywall)
- International Waste
- Pumpings
- Screenings from municipal treatment plants and pumping stations
- Sterilized biomedical waste received from certified sterilization facilities
- Vehicle Hulks
- Wood ash from industrial operations

Prohibited Waste

The following wastes are considered prohibited waste under Municipal Solid Waste Tipping Fee and Regulation bylaw. They shall not be disposed of at any facility.

- Alum pond or lime sludge in dewatered form
- Automotive Batteries expect as permitted by the bylaw
- Cattle Carcasses
- Empty steel and plastic drums, unless they are crushed, shredded or similarly reduced in volume to the maximum practical extent
- Explosives
- Fencing wire
- Fuels
- Hazardous Waste
- Household batteries except as permitted within the bylaw
- Ignitable Waste
- Industrial chemical waste
- Lithium-Ion batteries over 5 kg
- Liquids
- Lubricants
- Material that is on fire or smoldering
- Material that was previously on fire and has not been extinguished for at least 30 days except with a letter from a recognized Municipal, local or volunteer fire department stating it has been fully extinguished and is ready for disposal
- Ozone depleting substances except as permitted within the bylaw
- Paints and solvents
- Passenger and Light Truck tires, medium truck tires and off road tires mounted on rims
- Radioactive Waste
- Reactive Waste
- Restaurant grease
- Slurry, except as permitted within the bylaw
- Wire rope

Sort Smart

RECYCLING

Put waste in its proper place!

Visit SortSmart.ca to find out more or call 250-960-4433

REGIONAL DISTRICT
of Fraser-Fort George