REGIONAL DISTRICT OF NANAIMO

STAFF REPORT

TO:	Larry Gardner Manager, Solid Waste	**DATE:**	March 9, 2016
		MEETING:	RSWAC, March 17, 2016
FROM:	Sharon Horsburgh Senior Solid Waste Planner, Solid Waste	**FILE:**	5365-00

SUBJECT: Construction and Demolition Waste – Current State & Future Options

RECOMMENDATION

That the Regional Solid Waste Advisory Committee (RSWAC) receives this report for information.

PURPOSE

To provide background on the current state of the Construction and Demolition (CD) Waste and future options and to estimate additional waste diversion potential from this sector of the waste stream.

BACKGROUND

In the RDN there are a variety of CD waste disposal options available at the Regional Landfill and Church Road Transfer Station (CRTS) as well as at numerous private waste facilities located throughout the region. Please see map in Appendix 1 that provides an overview of waste and recycling facilities located in the RDN.

CD material includes waste from renovation projects that generate a wide range of materials, approximately between 75%-90% is reusable or recyclable. Building materials as referred to in the 2012 Waste Composition study include concrete, asphalt, wood, gypsum wallboard, metal, cardboard, asphalt roofing and plastic. As part of the RDN's Zero Waste Plan, the Construction/Demolition Waste Strategy was approved by the RDN Board in 2007. A copy of the RDN's CD Diversion Strategy is attached as Appendix 2.

Key initiatives in the CD strategy include:

- In January 2008, the RDN banned loads of wood delivered in roll-off bins from RDN Solid Waste Facilities;
- Increased the tipping fee for clean wood waste at RDN Solid Waste Facilities to create incentives to divert this material to licensed recycling facilities; and
- Wood waste received at the Regional Landfill and CRTS is shipped to third party recycling facilities or processed for on-site beneficial use at the Regional Landfill.

This strategy has attracted private sector investment and now the majority of the CD waste is managed at private sector facilities in the RDN and clean wood waste is no longer buried as garbage in the Regional Landfill.

CONSTRUCTION/DEMOLITION WASTE STRATEGY

The RDN promotes diversion of CD materials through disposal bans on cardboard, gypsum (drywall), metal and wood, and high tipping fees on loads of CD waste arriving at the regional facilities. (Roll-off containers of CD materials cannot be delivered to the Regional Landfill or CRTS).

Private sector recycling facilities manage the majority of CD waste in the Region and it is processed as follows:

- Wood waste is chipped and used as hog fuel (fuel substitute) at pulp mills on Vancouver Island;
- Gypsum is recycled into new gypsum wallboard;
- Metal is recycled;
- Concrete and asphalt are recycled; and
- Asphalt shingles are recycled on a limited basis.

There is also significant reuse of building materials and fixtures through salvage operations and retail stores such as Demxx and Habitat for Humanity's ReStore.

In addition to the wood waste ban that was introduced in 2008, the Province cancelled the burn permit for wood waste and the land clearing waste burn site on Weigles Road in Nanaimo. With limited options for disposal, the private sector wood waste drop-off sites are essential to the RDN's waste diversion goals.

LAND CLEARING WASTE MANAGEMENT

Land clearing (LC) waste refers to trees and stumps removed when land is cleared for development. Because of the large and bulky nature of this material, it is difficult to manage at municipal solid waste landfills and composting facilities. There are three private operations in the RDN that receive and process LC waste: Pacific Coast Waste Management, DBL Disposal Services Ltd., and Earth Bank Resource Systems.

In areas of the RDN where LC waste can be disposed of through on-site burning, all fires must be managed in accordance with the BC Open Burning Smoke Control Regulation and the local fire authority.

ALTERNATIVE OPTIONS FOR CD WASTE IN THE REGION

In 2006, the RDN introduced the Waste Stream Management Licensing Bylaw that was part of the CD Waste Management Strategy. There are now several facilities in the RDN dedicated to accepting CD materials and source-separating loads for recycling. Table 1 provides a list of these facilities.

Table 1 - Material & Facility Name

Material	Facility Name
Asphalt	Haylock Bros. Hub City Paving
Asphalt Shingles	DBL Disposal Services Ltd. Pacific Coast Waste Management
Concrete	DBL Disposal Services Ltd. Hub City Paving Haylock Bros. Mayco Mix Pacific Coast Waste Management Parksville Heavy Equipment
Metal	ABC Recycling Alpine Annex Auto Bull Dog Auto Parts Carl's Metal Salvage DBL Disposal Services Ltd. Nanaimo Recycling Exchange Schnitzer Steel
Land Clearing (LC)	DBL Disposal Services Ltd. Earthbank Resource Systems Pacific Coast Waste Management
Wood (lumber)	Alpine Coast Environmental Services DBL Disposal Services Ltd. Gabriola Island Recycling Organization Nanaimo Recycling Exchange Pacific Coast Waste Management

FUTURE DIVERSION POTENTIAL

In 2004, the RDN waste composition study found that building materials, essentially CD waste, was 12% of the total waste stream. In 2012, the proportion of CD waste has remained virtually the same at 11%. The respective tonnage of CD is approximately 2,500 tonnes from the commercial sector and 3,000 tonnes from the self-haulers.

Table 2 outlines the amount of CD materials disposed of by all sectors and provides detailed data of the types of building materials by category and the volumes received from the residential, commercial and self-haul sectors.

Table2: Detailed Data by Waste Category from 2012 Waste Composition Study

Material Category	Residential		Commercial		Self-Haul		Totals	
	Waste Stream Percentage	Estimated Tonnes Disposed	Waste Stream Percentage	Estimated Tonnes Disposed	Waste Stream Percentage	Estimated Tonnes Disposed	Waste Stream Percentage	Estimated Tonnes Disposed
Building Materials	**0.7%**	**347**	**4.6%**	**2,438**	**5.6%**	**2,963**	**10.8%**	**5,748**
Clean Wood	0.3%	145	1.0%	509	0.8%	403	2.0%	1,057
Treated or Painted Wood	0.2%	88	1.4%	759	0.0%	6	1.6%	853
Gypsum/drywall/plaster	0.0%	0	0.3%	186	1.2%	652	1.6%	838
Masonry/bricks	0.0%	0	0.2%	91	0.5%	241	0.6%	332
Asphalt products	0.0%	0	0.1%	52	0.0%	0	0.1%	52
Carpet & Underlay	0.0%	0	0.8%	437	1.9%	1,004	2.7%	1,441
Flooring (non-wood)	0.0%	0	0.0%	0	0.1%	54	0.1%	54
Other (fiberglass insulation)	0.2%	114	0.8%	404	1.1%	604	2.1%	1,122

Depending on the quality of the building materials listed in Table 2, most could have been recycled locally and this would include: gypsum, brick and asphalt, clean wood waste, concrete, and asphalt shingles. Coated/painted wood and asbestos materials (e.g. pre-1990 drywall) have limited potential for recycling. For an overview on the challenges of managing treated or painted wood in the waste stream please see Appendix 3 which is a copy of material presented at the 2015 Coast Waste Management Association jointly by Tauseef Waraich, Cowichan Valley Regional District and Dan Lazaro, Coast Environmental Services.

At the current time, there are no viable markets on Vancouver Island for carpet, flooring and insulation. It is estimated that of the approximately 5,700 tonnes of the CD materials in the waste stream, about 2,300 tonnes may be available for recycling.

The RDN is now well served by private sector facilities and this has contributed to the RDN's high diversion. Table 3 highlights that building materials in the waste stream has decreased overall from 46.8kg's per capita to 37.8kg's per capita between 2004 and 2012 respectively.

Table 3: Comparison of Kg's per capita results from 2004 and 2012 RDN waste composition study

Material Category	Residential				ICI				Self-Haul				Waste Stream Summary			
	2004 Waste Stream %	2004 KG/Cap	2012 Waste Stream %	2012 KG/Cap	2004 Waste Stream %	2004 KG/Cap	2012 Waste Stream %	2012 KG/Cap	2004 Waste Stream %	2004 KG/Cap	2012 Waste Stream %	2012 KG/Cap	2004 Waste Stream %	2004 KG/Cap	2012 Waste Stream %	2012 KG/Cap
Building Materials	0.9%	3.9	0.7%	2.3	5.4%	23.7	4.6%	16.0	4.3%	19.2	5.3%	19.5	**10.6%**	**46.8**	**10.6%**	**37.8**

The largest decrease was from the IC&I sector that represented 7% of the waste stream in 2012 as compared to 16% in 2004. Diverting roll off containers from RDN waste facilities has contributed to a significant decrease in tonnage from the IC&I sector.

However, the amount of materials independently disposed or recycled at out-of-region facilities is unknown. Increased regulatory authorities could restrict movement of waste and recyclables outside our region. Waste migration presents challenges and opportunities. Waste sent for disposal at public and private facilities within our region is subject to our Zero waste Plan. Waste that migrates from our of our region is not counted in our waste composition study. The material that migrates creates lost economic opportunities for the private sector operators in our region and the RDN facilities lose revenue. Additional regulatory authorities could potentially create economic incentives to keep material in our region that helps to create local economic opportunities.

In 2015, RDN staff were made aware of two demolition projects where the waste migrated to other jurisdictions and staff estimate that these projects would have generated roughly 1,000 tonnes. It was reported that this CD material was landfilled out of region. Based on local industry reports approximately; 70% of the material was wood, metal, gypsum, and aggregate which could have been recycled locally. The practice of exporting demolition waste out of region is not uncommon. It is estimated that a typical 1970's two storey basement home would yield roughly 25-30 tonnes and commercial building on average between 400 – 600 tonnes. The residual waste from projects demolished locally could see the residual being brought to the Regional Landfill. Increased regulatory authorities could ensure this type of waste is recycled instead of landfilled. RDN waste diversion calculations would not change as this material is currently not counted.

POTENTIAL UPDATES TO REVISE THE CD STRATEGY

The 2012 Waste Composition results show there are still opportunities to divert wastes in the building materials category to increase diversion. Of this material, it is assumed that 2,300 tonnes is recyclable According to companies specializing in demolition between 70% - 90% is potentially divertible.

To create the business environment to encourage diversion to follow is a combination of policy tools their estimated diversion potential. The policy tools range from increased education, enhanced regulatory measures and economic incentives:

TYPE OF MEASURE	POLICY TOOL	Diversion Potential of Remaining CD	Diversion Potential of Total Waste Stream
Education & Communication	• Educate development community about Demolition and Land Clearing (DLC) recycling at construction/demolition sites. • Commence information campaign to make CD waste generators and haulers aware of alternate facilities. • Encourage the role of building supply retailers and producers in the collection of DLC material for recycling. • Provide technical assistance to municipalities that introduced demolition recycling requirements, based on a sample municipal bylaw.	20%	1%
Enhanced Regulation Within Existing Authorities	• Work with municipalities to develop a process to require DLC recycling at construction/demolition sites. RDN & municipalities to introduce policies to manage waste through building and demolition permits to manage waste and recycling from the construction and demolition industry. • Review Demolition permit requirements in the Region and work with those that do not have any permitting processes for requiring waste management plans as a condition of such permits.	40%	2%
Additional Regulatory Authorities	• Expand RDN authorities for economic incentives or regulatory instruments to further promote waste diversion (e.g. source separation, flow management, licensing of haulers).	90%	4%

FINANCIAL IMPLICATIONS

Increased Education & Communication	Enhanced education and communication would be an estimated cost of $20,000.
Enhanced Regulation Within Existing Authorities	Enhanced regulation would be carried out in conjunction with increased education with an estimated cost of : $20,000 Education $20,000 Regulation Total: $40.000
Additional Regulatory Authority	No financial estimate is available at this time as cost projections would be dependent on the type of additional regulatory authority which was granted.

SUMMARY/CONCLUSIONS

The policies and programs included in the RDN's Construction and Demolition Strategy has contributed significantly to the region's 68% diversion rate. The CD waste stream makes up approximately 11% of the overall waste stream, however, due to contaminants in the material (e.g. asbestos, lead) not all of the CD is waste recyclable. It is estimated that with increasing education and communications we could potentially expect 20% diversion of the remaining CD waste representing 1% of the overall waste stream. It is estimated with increased regulation within existing authorities there is the potential to see a 40% increase in the amount of CD being recycled or 2% of the overall waste stream. If additional regulatory authorities are introduced between 70-90% of CD could potentially be diverted and this represents 4% of the over-all waste stream.

The amount of materials independently disposed or recycled at out-of-region facilities is unknown. Increased regulatory authorities could restrict movement of waste and recyclables outside our region. Waste being exported is not counted in our waste composition study. RDN staff is aware of two such recent projects which staff estimate would have generated around 1,000 tonnes which was landfilled.

The landfill bans have created feedstock for local recycling businesses and this has been reinforced through our material bans and applying fines to heavily contaminated loads. This regulatory framework has promoted diversion of CD waste. Measures designed to increase diversion that range from education to additional regulatory authorities and economic tools would help to prevent waste migrating out of our region.

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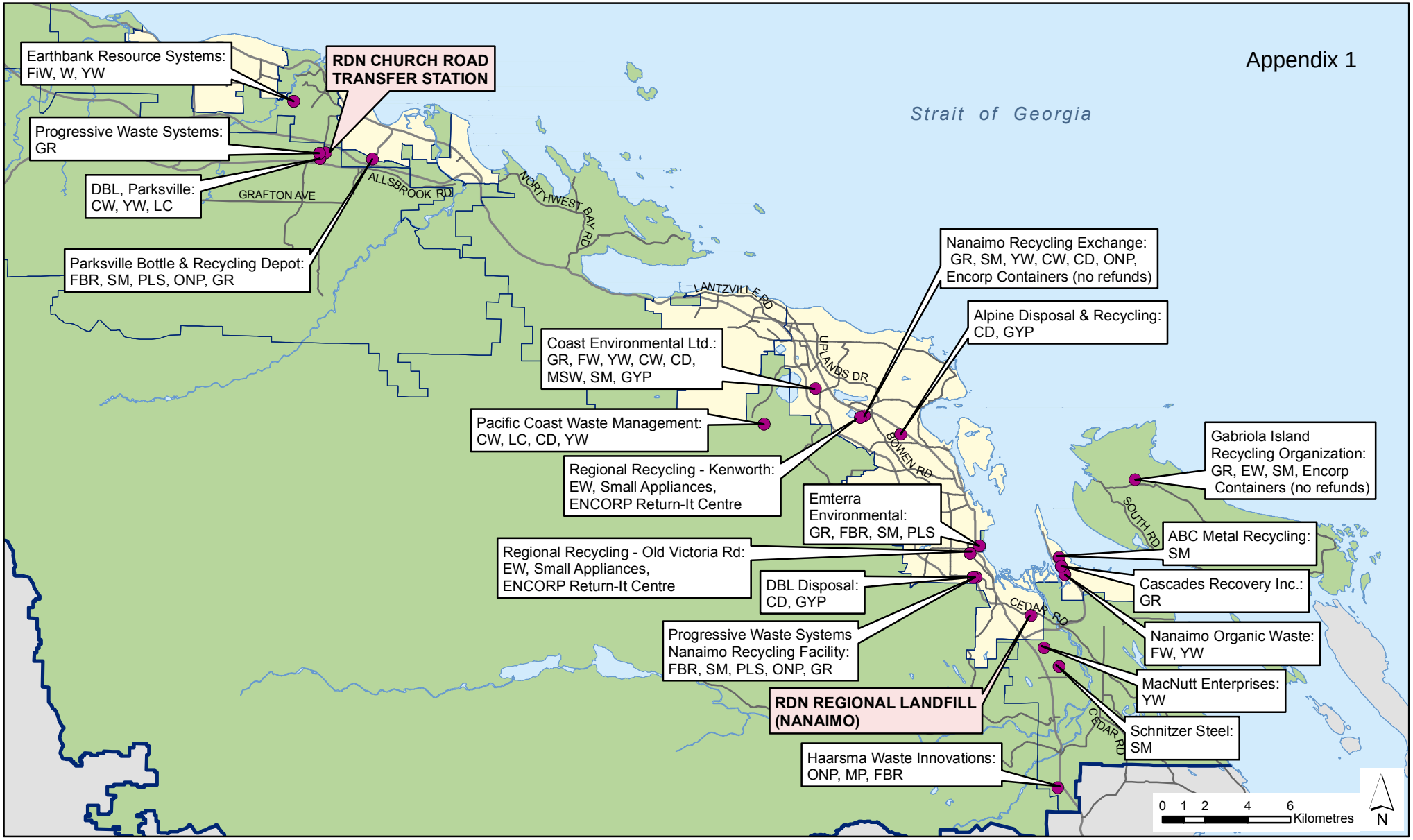


REGIONAL DISTRICT OF NANAIMO

RDN Solid Waste & Recycling Facilities

Legend

Recycling Facility | Highway | Electoral Area | Municipality | RDN Boundary

Materials

General Recycling (Blue Box Materials, Re-used Items)	GR	Scrap Metal	SM	Construction Demolition	CD	Gypsum	GYP
News Print	ONP	Fibre	FBR	Food Waste	FW	Biosolids	BS
Mixed Paper	MP	Land Clearing	LC	Yard Waste	YW	E Waste	EW
Plastics	PLS	Clean Wood	CW	Asphalt Shingles	ASHG	Fish Waste	FW
		Municipal Solid Waste	MSW				

Mar. 2016

Mapping the Way to Zero Waste

Construction/Demolition Waste Diversion Strategy

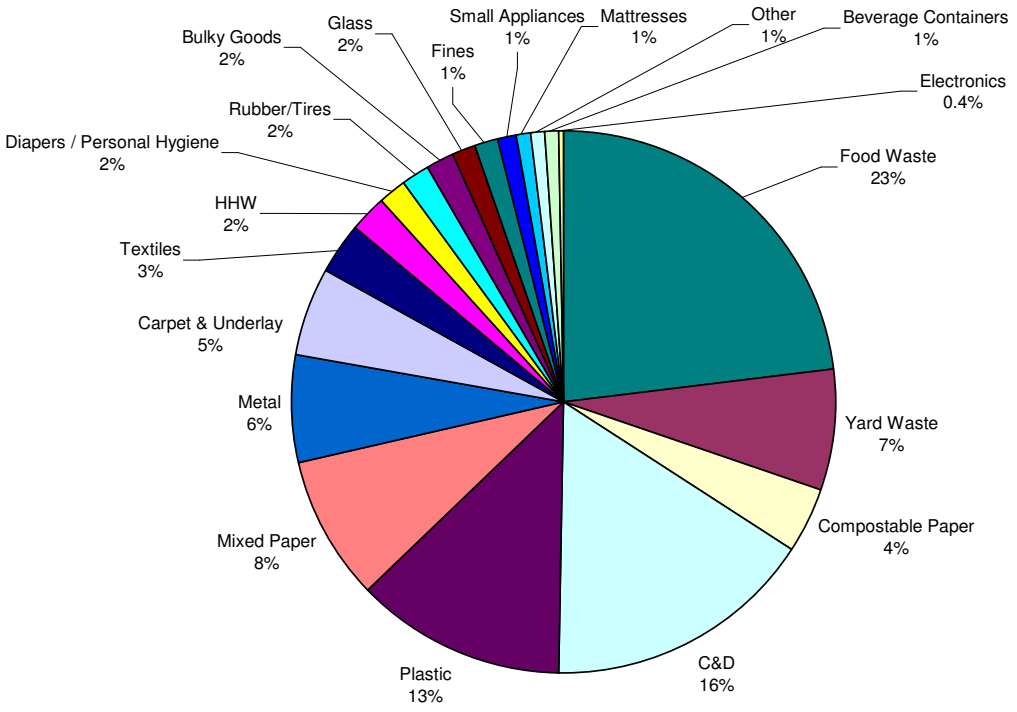
Why Divert Construction/Demolition Waste From Disposal?

It's in the Plan!

When we reduce the amount of waste that goes into the landfill or other disposal sites, we save resources, reduce costs and minimize our footprint on the environment. That's why the RDN adopted the Zero Waste diversion target in 2002 as its long-term goal. Zero Waste builds on the significant successes of the earlier 3Rs Plan (Reduce, Reuse, Recycle), under which, by 2003, we were diverting 57 percent of our solid waste from the landfill. That was more than the 50 percent target set in 1989 by the provincial environment ministry for all regional districts, but it's still too much. The updated Solid Waste Management Plan (SWMP) approved by the RDN Board in 2004 aims to increase this diversion rate to 75 percent by 2010 by diverting additional materials away from landfill. Construction/Demolition Waste (C/D) diversion is an important element of the RDN Zero Waste plan.

C/D is the Second Largest Component of Solid Waste

The following chart shows that C/D comprises 16% of all waste landfilled in the RDN, and next to compostable organics, C/D is the largest component of landfilled waste in the RDN.



C/D Diversion Leads the Way to Zero Waste

In 2005, the RDN Board approved an organics diversion strategy that, when fully implemented, should divert an additional 15% of the overall waste stream from landfill. That leaves C/D waste as the most significant portion of the overall waste stream in the RDN. In 2006, 11,000 tonnes of C/D was landfilled: about 8,000 tonnes of wood waste and 3,000 tonnes of asphalt shingles. The projected RDN diversion rate of 70% after organics diversion is fully implemented would increase to up to 75% by diverting C/D from disposal.

Economic and Infrastructure Development

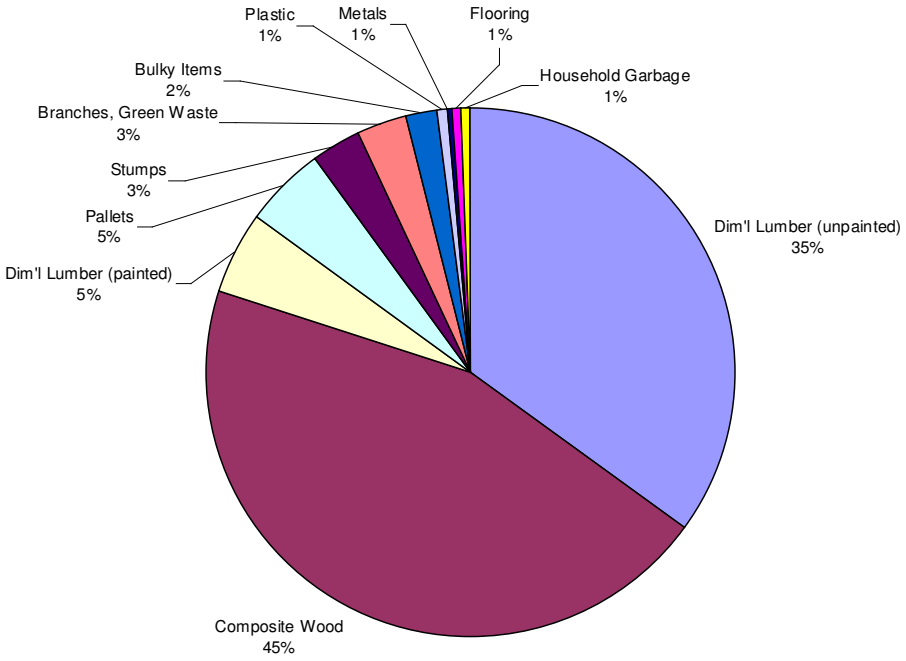
The vision of turning waste into feedstock for a new and beneficial product that creates wealth from waste is a supporting theme of the RDN Zero Waste Plan. That is why the RDN adopted the Waste Stream Management License (WSML) bylaw which not only regulates recycling and waste management facilities but also creates economic activity and jobs.

Diverting C/D to facilities licensed under WSML provides the feedstock to build and maintain sustainable private waste management infrastructure and correctly shifts the financial and physical responsibility for waste away from the public facilities to the generators and receivers of the waste.

What is Construction/Demolition Waste?

Construction/demolition waste (C/D), is wood and mixed waste from demolition and construction activities. It can contain many different types of materials including clean, treated and painted wood waste, plastics and vinyl, carpet, brick and rubble, glass, metal, asphalt roofing and any other material that may be found in construction and demolition.

In terms of C/D received at RDN solid waste facilities, the chart below shows that it is mainly wood waste. Wood waste can be used for a number of other purposes from providing an alternative fuel for pulp mill boilers to a bulking agent for composting and soil manufacture.



The Current Situation for Managing C/D

There are currently two facilities in the RDN that can manage the wood waste component of C/D, one in School District 69, near the Church Road Transfer Station and one at Duke Point in Nanaimo. Two additional facilities under development in Nanaimo will be able to manage C/D in the near future. All of the current and planned facilities in the RDN are recycling wood waste into boiler fuel for heat generation in pulp mills. There is a facility in the Cowichan Valley Regional District that is recycling asphalt shingles into a material that can be used as a supplement in traditional asphalt production.

Clean wood waste is also accepted at the Regional Landfill and is ground, at considerable expense to the RDN, and mixed with soil for landfill operations. The wood waste consumes limited space available at the landfill and the grinding presents safety and liability considerations due to the large numbers of commercial and residential customers in relatively close proximity to the grinding operation. There is a need for some ground wood waste at the landfill, however the supply greatly exceeds the demand.

As the prices of natural gas and hog fuel increase, pulp and paper mills are increasingly interested in C/D as fuel. The market for C/D is expected to strengthen as lumber companies close and consolidate sawmills across BC, eliminating the traditional sources of hog fuel. The price of natural gas is not expected to drop for a sustained period, further strengthening the C/D market over time.

Who Would Divert C/D?

C/D is delivered to the landfill and transfer station from three main sources, commercial haulers hauling for the construction industry, small to medium-sized construction contractors hauling their own waste and residential self-haul customers. Approximately 63% of C/D comes from commercial haulers and 27% from miscellaneous self-haulers, including residential and commercial customers.

The commercial haulers generally deliver larger, homogenous loads of C/D. The construction contractors usually bring pick up loads of C/D while the self-haul customer usually brings a mixed load of waste and recyclables, with C/D comprising a small portion of the load.

How Will We Divert C/D?

For the purposes of developing an effective C/D diversion strategy, the individual components of the C/D waste stream must be dealt with separately. There are facilities available licensed to receive and process wood waste and asphalt roofing material. No open burning of waste is allowed in the SWMP. Most of the materials in C/D can be recycled. With licensed facilities in place, diversion of C/D from the landfill is simply a matter of banning C/D from disposal. When this occurs, the majority of C/D will be processed for recycling and other beneficial uses such as energy production.

What is the Plan?

Tipping Fees

Setting the disposal tipping fees to insure full cost recovery and encourage use of alternate facilities creates a powerful incentive to divert C/D from RDN facilities.

Disposal Bans

Banning C/D from disposal has two parts. The first is to ban large commercial loads (larger than a pick up truck) and commercial customers that haul waste in pick up trucks that are frequent users of the RDN disposal facilities and cumulatively, dispose of large quantities of C/D. The purpose of the large loads and commercial ban is to divert the largest, continuous C/D waste stream to private licensed facilities.

To allow residential customers with small loads of C/D to continue to enjoy the convenience of using the RDN facilities, C/D will continue to be received from these customers. Some of this C/D can be utilized for operational purposes at the landfill. Contracts with licensed facilities can be established to manage any C/D in excess of operational needs.

There are no facilities in the RDN licensed to recycle asphalt roofing, therefore the RDN would continue to receive asphalt roofing, keep it separated and, pending an acceptable contract price, ship it to the asphalt roofing recycling facility in the CVRD.

Next Steps and Implementation

2007

- Commence information campaign to make C/D waste generators and haulers aware of alternate facilities.
- Amend Solid Waste Facilities Bylaw 1428 to include C/D disposal bans and to adjust the tipping fees to insure full cost recovery and encourage use of alternate facilities.
- Establish contracts with licensed, private facilities to accept and process C/D received by the RDN that cannot be utilized for operational purposes at RDN facilities.
- Implement bans.

2008

- Analyze diversion resulting from strategy, adjust strategy as required.
- Analyze cost recovery for program, adjust fees as required.

Appendix 3

CWMA presentation - Protocols for managing painted wood - Dan Lazaro, Coast Environmental

C&D Woodwaste - Challenges and Opportunities for Diversion

Why use biomass?

- Sustainably harvested biomass is carbon neutral.
- One tonne of dry biomass (bdt) can displace between 1.5 and 3 barrels of oil, depending on the application, technology and process efficiency applied. (envirochem, 2004)
- Wood to electricity (large scale steam) can produce 900 kWh/bdt
- C&D Wood 7,000-8,200 btu / lb – consider as a fuel, not a waste.
- As comparison, Hog Fuel ~5,500 btu / lb

Regulatory Perspective

Provincial
- BC Energy Plan
- BC Bioenergy Strategy
- Agricultural Waste Control Regulation
- Environmental Management Act
- Waste Discharge Regulation
- Small Electrical Power Generating Facility Code of Practice
- Safety Authority - Pressure vessels and boilers

Regional and Municipal
- Waste stream management licenses
- Local air quality regulations (Metro Vancouver)

Biomass Definition in Various Regulations
- Includes industrial residue of wood that has "not been treated with glue, paint or preservative, or contain substances harmful to humans, animals or plants"

Painted wood issue

- Estimated upwards of 15,000MT available as potential biomass on Vancouver Island.
- CVRD / Coast – cost sharing for consultant to perform "burn test" analysis on clean wood vs. painted wood samples to determine if painted wood impacts on emissions.

Kiln dried post consumer woodwaste is drier (6-12% moisture) and therefor burns "hotter" than hog fuel (30-60% moisture) and could contribute to lower overall emissions at biomass facilities.

CVRD & Wood Waste – Historically

The CVRD does not have a regional landfill or incinerator. All garbage is shipped with truck, barge and rail to Rabanco Roosevelt Regional Landfill in WA.

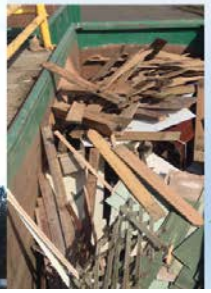
Waste Wood Diversion:

In the past, the CVRD diverted all wood waste products from waste disposal with the exception of: *treated wood, wood with lead-based paint, arborite, melamine, etc.*

Waste Wood Quantitates:

In 2014, CVRD recycling centers collected 1,500 MT of waste wood. Roughly 8,000 MT of waste wood was collected and diverted regionally (private + CVRD facilities). Similar quantities were diverted in earlier years.

CVRD & Wood Waste – Today



As a result of MoE's recent review of local paper mill permits, the CVRD and private facilities can no longer divert painted wood or composite wood products (like particle board/plywood) from landfill.

Painted Wood Waste Bin at Bings Creek Recycling Centre

CVRD & Wood Waste – Today

Wood Diversion:

Based on CVRD 2015 scale data, it is estimated that the CVRD Recycling Centres will divert 800 MT of 'clean wood', while ~700 MT of 'painted wood' will be landfilled.

The CVRD estimates that regionally 4,000 MT of painted wood waste will be landfilled this year.

CVRD – Looking for New Solutions for Painted Wood!

Potential for Code of Practice ?

Suggested screening and sorting procedures to allow partial painted wood inclusion into biomass:

1. Continue to sort out known contaminants: creosote, treated lumber, melamine, laminates, etc.
2. Sort out heavier weighted to low paint ratio wood, example: single sided painted wood, pallets (typically in the 40-60lbs range with a light paint coating).
3. Exclude low weighted to high paint ratio wood, example: <1/2 painted plywood, painted wood shingles (not enough wood weight to painted surface area), wood painted on all sides.
4. Exclude pre 1980's painted wood due to potential for lead contamination (HealthLinkBC).

EPA – Non Hazardous Secondary Material Rule

- C&D can be re-classified from a solid waste to a fuel if it can pass the "legitimacy criteria"

1) Must be managed as a valuable commodity.
2) Have a meaningful heating value.
3) Used as a fuel that recovers energy.
4) Contain contaminants at levels comparable to traditional fuels.

- Properly screened/sorted C&D wood meets all these requirements and the Construction and Demolition Recycling Association (CDRA) developed C&D wood derived product specifications for grading C&D wood for suitable fuel burn (based on 3 grades (contaminant levels) and 4 sizing categories).