REGIONAL DISTRICT OF NANAIMO

TECHNICAL MEMORANDUM

TO:	Larry Gardner Manager, Solid Waste Services	**DATE:**	March 3, 2015
FROM:	Meghan Larson Special Projects Assistant	**FILE:**	5365-00

SUBJECT: REGIONAL DISTRICT OF NANAIMO WASTE GENERATION PROJECTIONS

Issue: Forecasting future waste quantities is fundamental for planning waste management programs and services.

Background:

The Regional District of Nanaimo (RDN) is currently reviewing and updating the Solid Waste Management Plan. Ministry of Environment guidelines, for developing Solid Waste Management Plans, suggest a minimum of a 10 year planning horizon; therefore, forecasting waste generation until at least 2025 is fundamental in developing the Plan.

This *Technical Memorandum* first reviews forecasting of waste generation carried out by the province for the period between 2010 and 2015 and documented in the BC Stats report *Solid Waste Generation in British Columbia, 2010-2025 Forecast*, *June 2012.* Secondly, the memorandum considers where the RDN currently fits in with the provincial model. And lastly, the memorandum discusses where the RDN might vary with respect to future forecasting.

Discussion:

1. Provincial Forecasting of Waste Generation

The BC Stats report defined key sectors for waste generation and recycling/diversion as follows:

> *Residential* - Residential waste is solid waste produced by all residences and includes waste that is picked up by the municipality (either using its own staff or through contracting firms), and waste from residential sources that is self-hauled to depots, transfer stations and disposal facilities.
>
> *Industrial, Commercial and Institutional* - IC&I wastes include: industrial materials, which are generated by manufacturing, and primary and secondary industries, and are managed off-site from the manufacturing operation; commercial materials, which are generated by commercial operations, such as shopping centres, restaurants, offices and others; and institutional materials that are generated by institutional facilities, such as schools, hospitals, government facilities, seniors homes, universities, and others.

Construction, Renovation & Demolition - CR&D wastes refer to wastes generated by construction, renovation and demolition activities. It generally includes materials such as wood, drywall, certain metals, cardboard, doors, windows, wiring and others. It excludes materials from land clearing on areas not previously developed as well as materials that include asphalt, concrete, bricks and clean sand or gravel.

Local Government Recycling/Diversion - Local government recycling/diversion programs include material recycling, organics composting and other waste diversion programs offered by local governments. Recycling is the process whereby a material (for example, glass, metal, plastic, paper) is diverted from the waste stream and potentially remanufactured into a new product or used as a raw material substitute. Local government recycling/diversion figures do not include industry product stewardship, which is measured separately. For instance, it does not include materials picked up under stewardship programs such as materials picked up by local government under contract to Multi-Material BC (MMBC).

Industry Product Stewardship Recycling/Diversion - Industry product stewardship is another form of diversion of waste from landfills. It refers specifically to the collection of materials for reuse or recycling that may offer some sort of incentive for the consumer. Many manufacturers now provide programs to their consumers to recycle or safely dispose of their products. In some cases, consumers pay environmental fees to recover the costs of these programs, and deposits as incentives to participate in the return programs. This term most frequently refers to the return of materials such as beverage containers, tires, paints, batteries, pesticides and motor oil.

The report highlights three projection scenarios with varying degrees of measures taken to divert waste from disposal:

Scenario 1 - 2010 diversion and recycling programs continue as planned; plans for new industry product stewardship programs proceed as expected (e.g. Printed Paper and Packaging); and, enhanced construction, renovation and demolition (CR&D) waste programs do not materialize as quickly as expected.

Scenario 2 – Diversion and recycling programs increase collection rates; construction and demolition waste programs are implemented; and, organic material diversion programs expand significantly.

Scenario 3 – Diversion and recycling programs significantly increase collection rates; high performing construction demolition waste programs are implemented; and, organic material diversion programs expand dramatically.

Under all Scenarios overall waste generation in BC will continue to rise (+17.7%). Refer to the BC Stats report for full details on how their projections were calculated.

Scenario 1 findings:

"Current and planned diversion and recycling programs continue as planned, but enhanced construction and demolition waste programs do not materialize as quickly as expected"

- Assumes maintenance of current programs plus the addition of new programs already identified for implementation (i.e. Packaging and Printed Paper).
- More waste will be generated and, although diversion will remain at 43%, the total amount of waste requiring disposal will increase by 17.5% over 15 years.
- Materials recycled by local government will decline by 16.4% as responsibility is transferred to industry stewards. (i.e. Packaging and Printed Paper; although that material is largely collected by local government through curbside programs, the responsibility rests with the industry steward).

Scenario 2 findings:

"Current and planned diversion and recycling programs increase collection rates, construction and demolition waste programs are implemented and organic material diversion programs expand significantly"

- Assumes a stewardship program for construction, renovation and demolition (CRD) waste and moderately stronger growth in collection from newer programs.
- Assumes greater diversion of organics by local government.
- Assumes a provincial diversion rate of 62% by 2025.
- Results in a projected decline in waste disposal by 21.8% between 2010 and 2025.
- States: *"Given the trend toward increased recycling, stewardship and other practices, a scenario whereby waste diversion efforts experience moderate expansion appears to be a fairly realistic one."*

Scenario 3 findings:

"Current and planned diversion and recycling programs increase collection rates, construction and demolition waste programs are implemented and organic material diversion programs expand significantly"

- Assumes significant advancement of all diversion strategies.
- Assumes the main driver for increased diversion over Scenario 2 is further advancement of organics programs by local government.
- Assumes a provincial diversion rate of 81% by 2025.
- Results in a projected decline in waste disposal by 61.6% between 2010 and 2025.
- "While this may seem a somewhat unlikely scenario, it is nonetheless worth examining as something for BC to strive for."

2. Waste Generation Trends

Over the 20 year period from 1990 to 2010 the total waste generation for the province increased by 40%. What this means is that while great strides were made in increasing waste diversion, per capita waste disposal was not decreasing. The BC Stats report shows a linear projection for waste generation trends over the next 10 years i.e. waste generation increases at the same rate as population. This indicates the province is projecting that per capita waste generation will remain relatively static over the next 10 years.

3. RDN Waste Generation in Relation to the Provincial Model

Applying the provincial model to local waste management practices, the RDN is considered to currently fall within the scope of Scenario 2. Scenario 2 is based on stewardship programs for CRD waste, organics diversion programs by local government and that a stewardship program for packaging and printed paper is in place. The following describes how RDN waste management practices are consistent with Scenario 2:

- *Construction, Renovation and Demolition (CRD) Waste Diversion by Local Government:*

  A 2004 waste composition study determined that after organics, CRD waste was the largest component of solid waste disposed of in the Regional Landfill. The RDN's Zero Waste Plan identified the need to divert the clean wood waste from construction demolition sites from the landfill.

  In February 2007, the Regional Board approved a Construction/Demolition Waste Strategy. Key initiatives in the strategy included:

  - Increasing the tipping fee for clean wood waste at RDN Solid Waste Facilities to create incentives to divert this material to licensed recycling facilities;
  - A ban on disposal of clean wood waste in the Regional Landfill and roll-off containers of wood waste at RDN Solid Waste Facilities; and
  - Arranging contracts with third party wood waste recycling facilities to manage wood waste received at the landfill and transfer station from small self-haulers.

  Effective January 1, 2008, the RDN banned clean wood waste from disposal in the Regional Landfill and roll-off containers of wood waste at RDN Solid Waste Facilities. The initiatives of the RDN are believed to largely meet the diversion goals of what a provincially mandated CRD strategy might look like.

- *Organics Diversion by Local Government:*

  The RDN currently has a two-step approach to organics diversion; Commercial Food Waste Diversion and Green Bin Residential Food Waste Collection.

  In June 2005, the RDN banned disposal of food and other organic waste from commercial and institutional sources at the region's solid waste facilities, putting the first phase of its organics diversion strategy into action.

  The ban on commercial food waste in the Regional Landfill followed the opening of International Composting Corporation in Nanaimo, the first composting facility licensed under the RDN Waste Stream

Management Licensing Bylaw. The International Composting Corporation is currently under the ownership of Nanaimo Organic Waste.

Extensive consultation preceded the commercial food waste and organics disposal ban in 2005 with follow-up site visits to over 200 businesses and organizations. Landfill disposal of compostable organic waste from a commercial or institutional facility is not permitted under Bylaw 1531.

The expectation is for all commercial and institutional facilities such as restaurants, grocery stores, and school and hospital cafeterias to have food waste diversion systems in place. Commercial food waste includes raw and cooked food and other compostable organic material from commercial and institutional premises.

The RDN has encouraged participation in the commercial food waste ban with little regulatory enforcement to date. The strategy has allowed affected businesses and organizations to comply using the most cost-effective and efficient methods for their operations. The second step, providing region-wide Green Bin residential food waste collection, was accomplished in October 2011. Again, the driver was the 2004 waste composition analysis which showed that food waste and compostable paper made up approximately 50 per cent of household garbage. The residential Green Bin Program enables households to help divert all food waste in the region from the landfill for processing into compost and potentially renewable fuels.

The green bin goes beyond what can be composted at home. Not just fruit and vegetable scraps but cooked food, meat, fish, bones, food soiled paper and paper packaging such as waxed fast food cups and milk cartons will be accepted in your green bin. Currently, the green bin program diverts an estimated 106kg per household of food waste from the Regional Landfill each year from the residential curbside collection program.

- *Packaging and Printed Paper Provincial Stewardship Program*

The curbside collection programs operated by the RDN and the City of Nanaimo (City) are funded through user fees sent out on their utility bills, not through taxes. By partnering with MMBC in May 2014, the City and the RDN became Packaging and Printed Paper collectors on MMBC's behalf and receive appropriate financial incentives from MMBC. As a result, the recycling portion of annual user fees charged to single family residential households has been reduced. Prior to partnering with MMBC, the RDN and the City provided residential recycling collection to all single family residential homes in the region. So far, there has been no measurable difference in the amount of recyclable material collected through the curbside collection program before and after the partnership with MMBC.

Since 1991, the RDN has progressively banned materials from landfill disposal as local recycling and processing facilities became available.

In 2010, household plastic containers were added to recyclable paper, cardboard, and metal already banned from the landfill.

Thanks to the cooperation of waste haulers and the owners and management of multi-family dwellings, 86% of complexes in the region are now meeting the requirements of the ban on landfill disposal of

household recyclable materials. All multi-family complexes should have a system in place to collect and recycle all household recyclables subject to the landfill disposal bans.

Currently, the RDN is at a diversion rate of 68% which is above the provincial diversion rate of 49% by 2014 for Scenario 2. However, the BC Stats projections are based on a provincial average which includes many districts that have less mature and developed programs such as exist in the RDN. In other words, Scenario 2 is a composite of regions having both lower and higher diversion rates yielding a provincial average of 49%. However, in considering the description of programs of Scenario 2, they mirror almost exactly what exists in the RDN.

4. Future Waste Generation

The following section discusses future waste generation in the RDN relative to provincial Scenarios 2 and 3. The RDN is considered to currently fall within Scenario 2, so this is really a "status quo" future option. Scenario 3 anticipates significant advancements in diversion strategies particularly in regards to organics management. Such advancements do apply to the RDN.

Scenario 2

Under Scenario 2, it is projected that the RDN would see an increase (+8%) in the amount of waste disposed to landfill with yearly tonnages increasing from 52,635 metric tonnes in 2014 to 56,629 metric tonnes in 2025. This increase is largely due to an increase in population in the region and the assumption that waste diversion rates nominally increase.

Scenario 2 Projections												
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Population	**151,687**	**153,551**	**155,540**	**157,629**	**159,730**	**161,831**	**163,922**	**165,996**	**168,049**	**170,087**	**172,094**	**174,077**
Per capita waste disposal (kg)	**347**	**336**	**325**	**325**	**325**	**325**	**325**	**325**	**325**	**325**	**325**	**325**
Waste Disposal (m/t)	**52,635**	**51,617**	**50,599**	**51,279**	**51,962**	**52,646**	**53,326**	**54,001**	**54,668**	**55,331**	**55,984**	**56,629**
Total Recycled (m/t)	**111,850**	**114,890**	**118,065**	**119,650**	**121,245**	**122,840**	**124,427**	**126,001**	**127,560**	**129,107**	**130,630**	**132,135**
Total Generated (m/t)	**164,486**	**166,507**	**168,664**	**170,929**	**173,207**	**175,485**	**177,753**	**180,002**	**182,228**	**184,438**	**186,614**	**188,765**
Diversion Rate	**68%**	**69%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**

Note: Baseline waste generation for 2014 had not been calculated at the time of this report. A per capita waste disposal rate of 347kg was assumed for the purposes of future projections.

Scenario 3

Under Scenario 3 it is projected that the RDN would see a decline (-32%) in the amount of waste disposal to landfill with yearly tonnages decreasing from 52,635 metric tonnes in 2014 to 35,865 metric tonnes in 2025. This Scenario assumes provincially recycling/diversion rates increase dramatically including both government recycling/diversion as well as industry product stewardship recycling/diversion causing the volume of waste disposed of in landfills to shrink drastically. For the RDN specifically, reductions would be realized through improvements to the organics diversion programs with only a modest increase from provincial stewardship programs. This is because current RDN policies are believed to largely achieve the same results of a provincial CRD stewardship program.

Scenario 3 Projections												
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Population	**151,687**	**153,551**	**155,540**	**157,629**	**159,730**	**161,831**	**163,922**	**165,996**	**168,049**	**170,087**	**172,094**	**174,077**
Per capita Waste disposal (kg)	**347**	**336**	**325**	**304**	**293**	**282**	**271**	**260**	**249**	**239**	**228**	**206**
Waste Disposal (m/t)	**52,635**	**51,617**	**50,599**	**47,860**	**46,766**	**45,626**	**44,438**	**43,200**	**41,912**	**40,576**	**39,189**	**35,865**
Total Recycled (m/t)	**111,850**	**114,890**	**118,065**	**123,069**	**126,441**	**129,859**	**133,315**	**136,801**	**140,316**	**143,862**	**147,425**	**152,899**
Total Generated (m/t)	**164,486**	**166,507**	**168,664**	**170,929**	**173,207**	**175,485**	**177,753**	**180,002**	**182,228**	**184,438**	**186,614**	**188,765**
Diversion Rate	**68%**	**69%**	**70%**	**72%**	**73%**	**74%**	**75%**	**76%**	**77%**	**78%**	**79%**	**81%**

Note: Baseline waste generation for 2014 had not been calculated at the time of this report. A per capita waste disposal rate of 347kg was assumed for the purposes of future projections.

Data Limitations

It is important to keep in mind that these are projections only and there are a number of factors that can change these projected outcomes as well as influence the type of service that might be provided:

- Regional Growth – aging population, increased densification in some areas
- Industry Product Stewardship programs – rate of successful diversion
- Waste Export – where is the waste in our region being disposed of
- Consumerism – Are individual buying habits staying the same or are individuals buying more or less

All of these factors will play a role in how much waste is actually produced in the future.

Conclusion:

Applying the Provincial model for waste generation suggests the following:

- Under a status quo scenario of 70% diversion over the next 10 years forecasts a per capita waste disposal of 325kg with at total amount of residuals of 56,629 metric tonnes annually by 2025
- Under the Province's most optimistic forecast of 81% diversion over the next 10 years forecasts a per capita waste disposal of 206kg with a total amount of residuals of 35,865 metric tonnes annually by 2025

The Province states in reference to an 81% diversion that *"While this may seem a somewhat unlikely scenario, it is nonetheless worth examining as something for BC to strive for"*. It is important to note that this level of diversion is based on a Provincial average with different areas having high and lower diversion. Although the report is not explicit that all areas of the province would have to have high levels of diversion to reach this target, it definitely implies such.

Nevertheless, given that the RDN has a mature waste management system and currently has all of the elements to promote further levels of diversion, 81% diversion appears to be achievable in the context of the provincial forecast.