RDN Solid Waste Management System Overview:

Zero Waste to Residuals

Regional Solid Waste Advisory Committee

May 16, 2013

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Presentation Outline

1. RDN System
   - Background
   - System Characteristics
   - System Cost
2. Zero Waste Plan
   - Performance Objectives
   - Performance
3. Residual Waste Management Plan
   - Performance Objectives
   - Performance
4. Issues and Opportunities

RDN Solid Waste Management System

BACKGROUND

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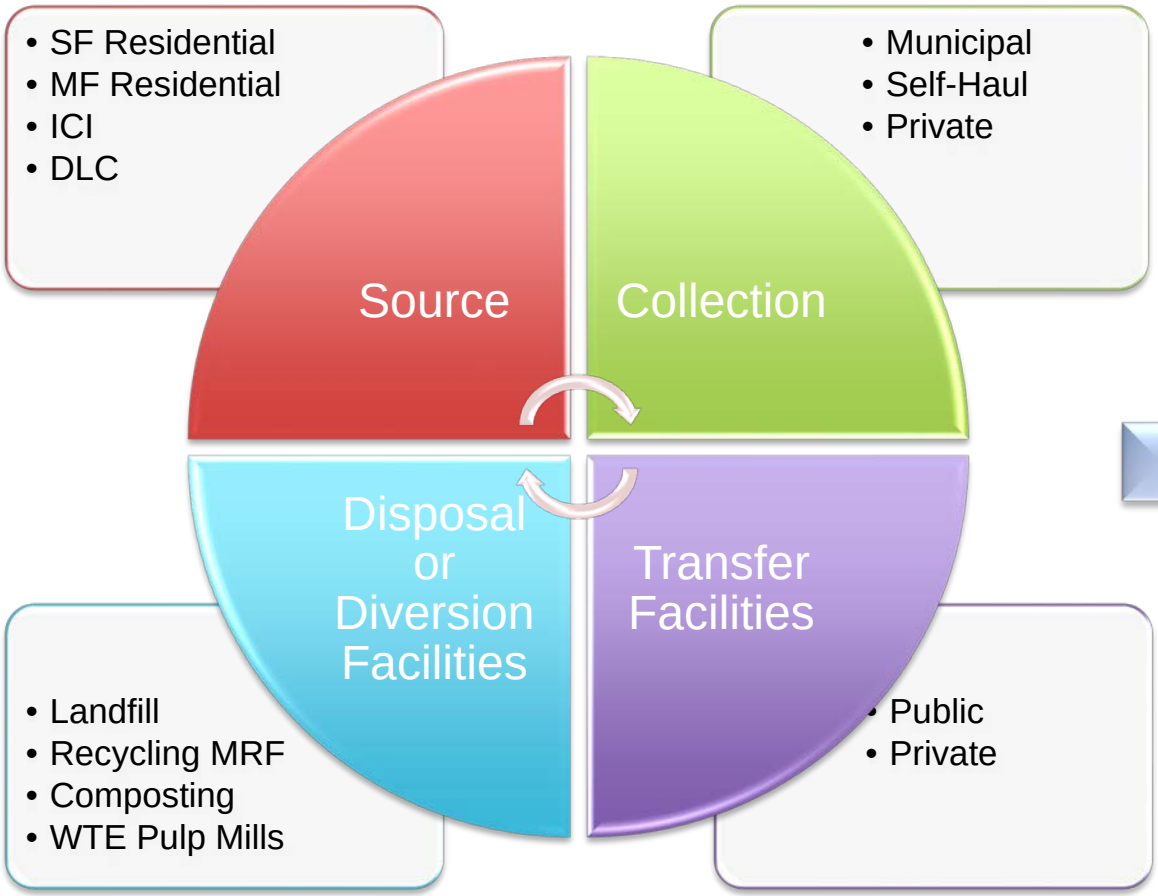
System Characteristics



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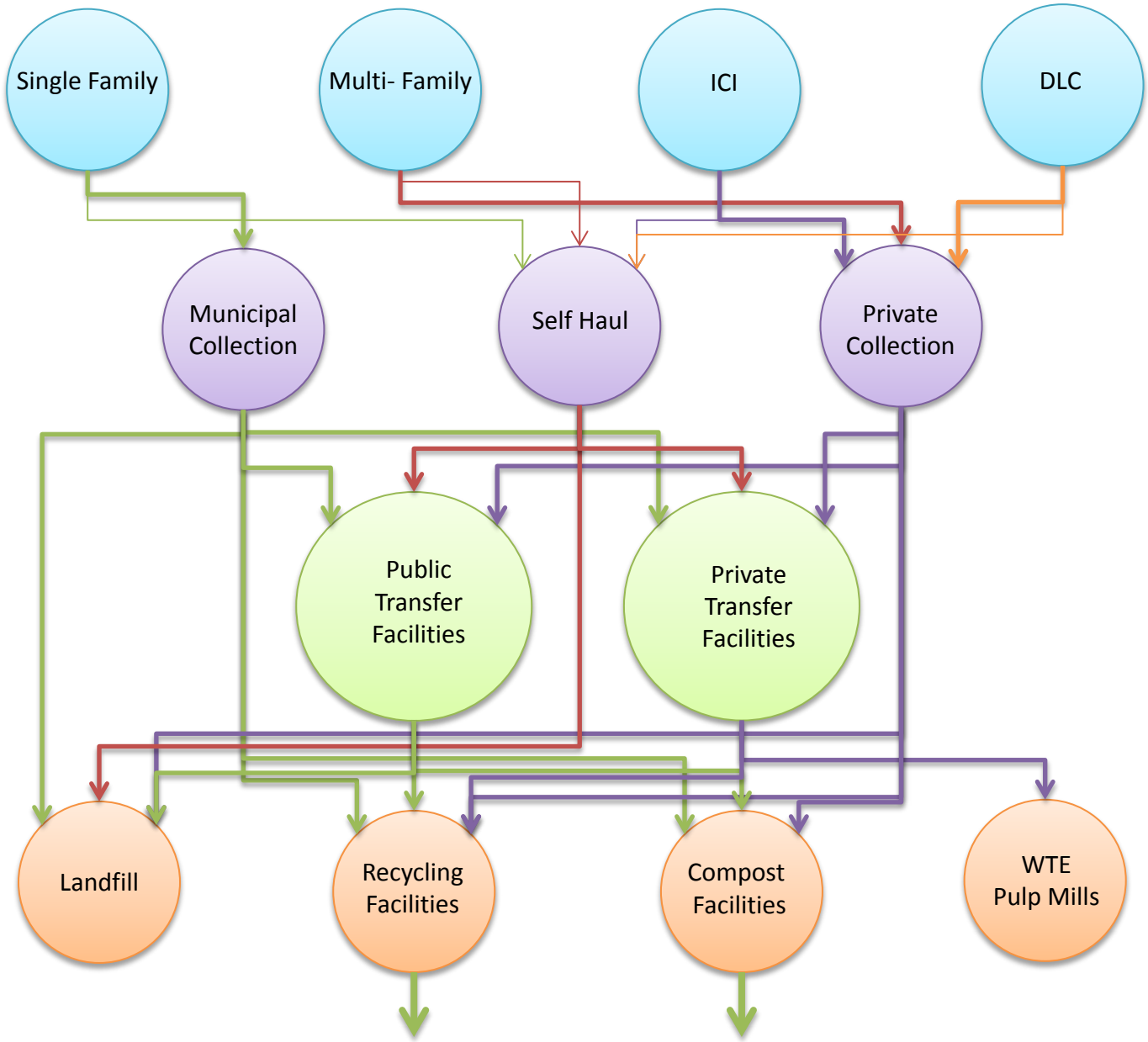
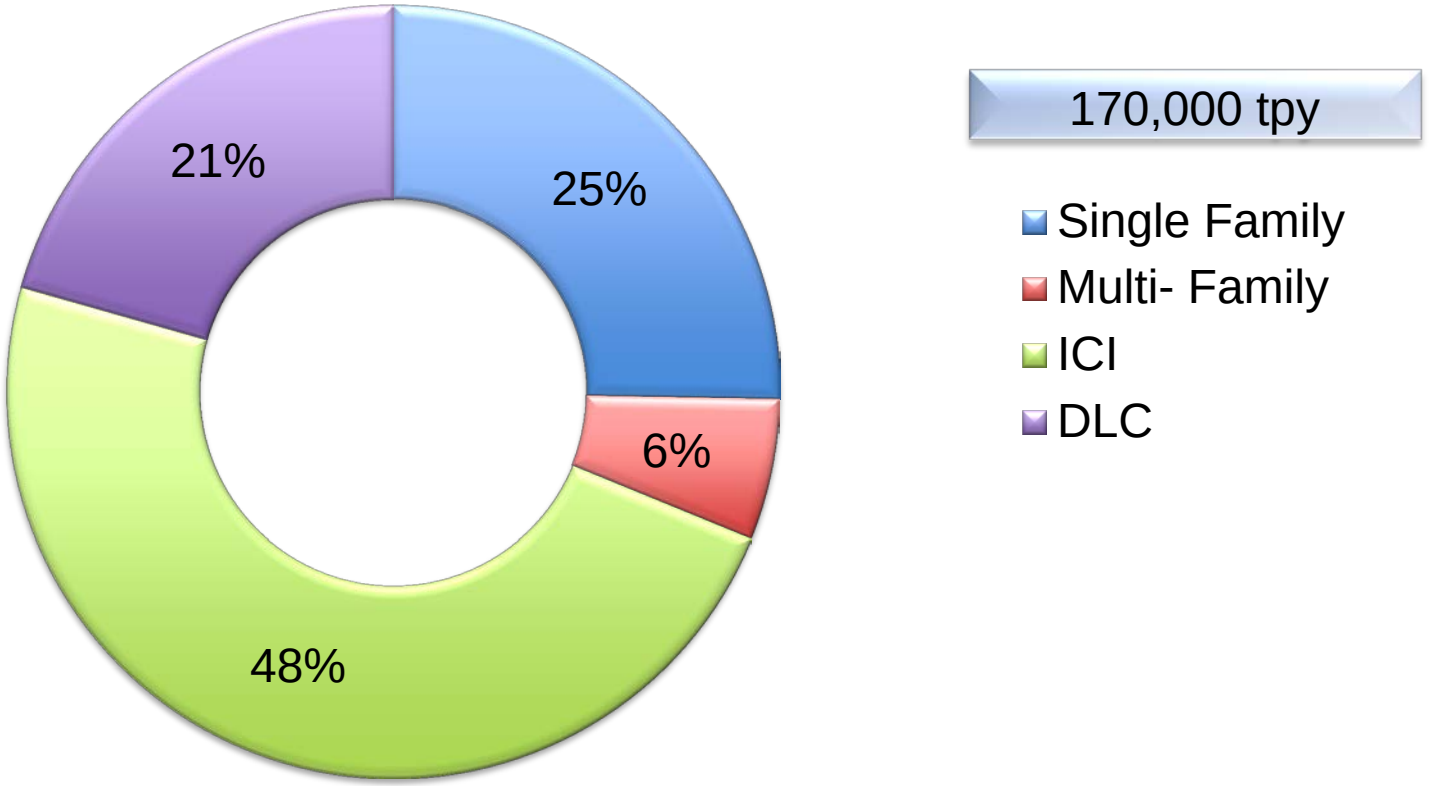
RDN Solid Waste Management System



Waste Source (Generators)



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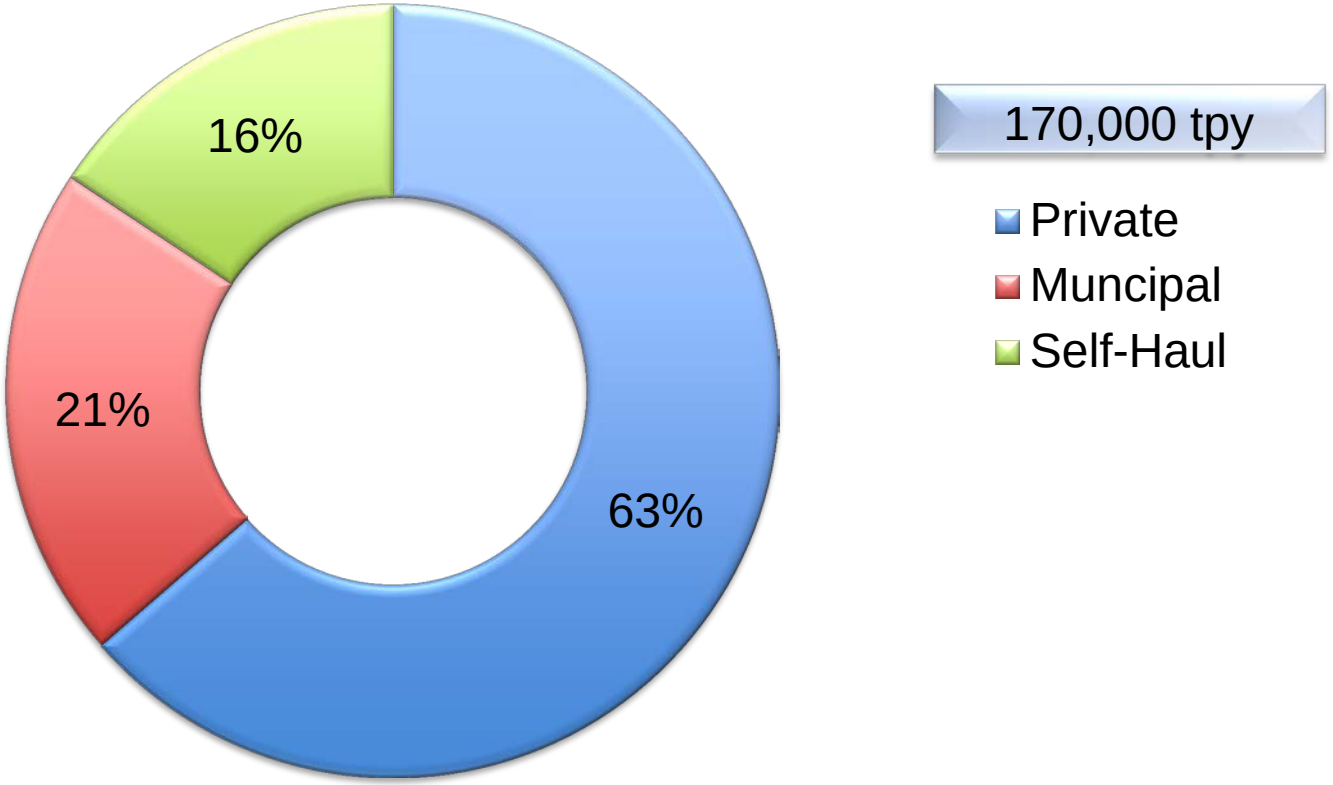
Waste Collection



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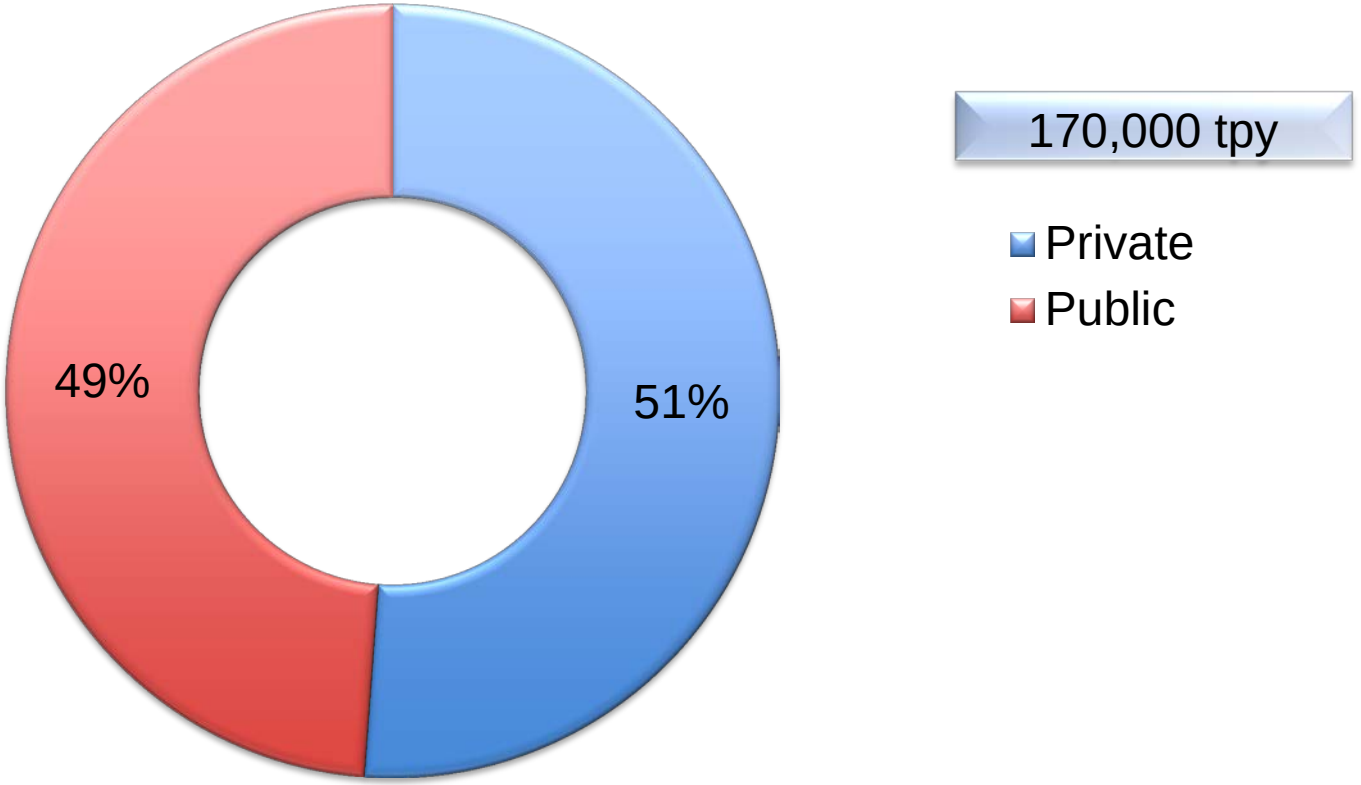
Waste Transfer Facilities



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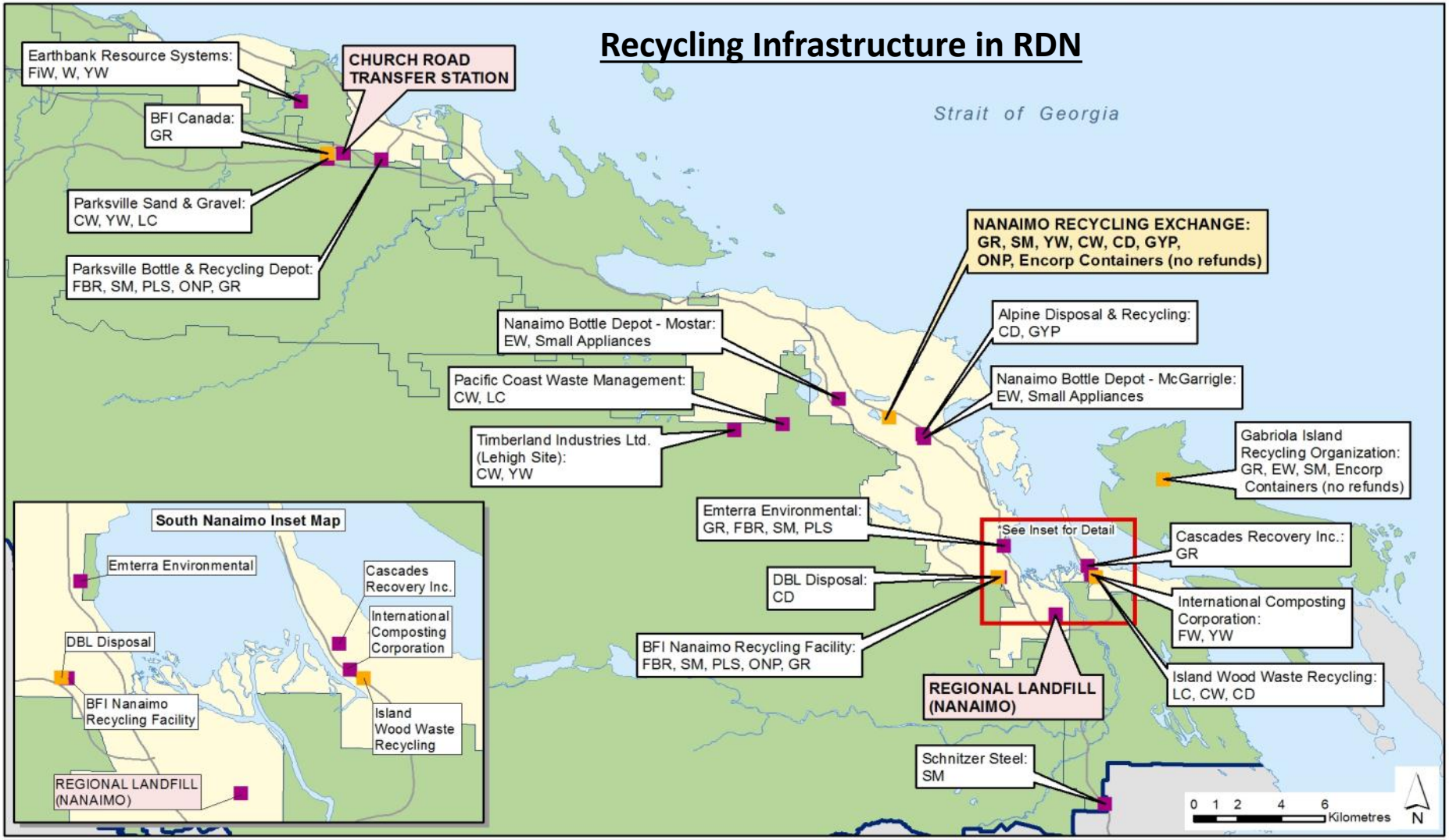
Recycling Infrastructure in RDN



RDN Recycling Facilities

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Legend

Licenced | Application in Process | Highway | Electoral Area | Municipality | RDN Boundary

Materials

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

Waste Transfer Facilities

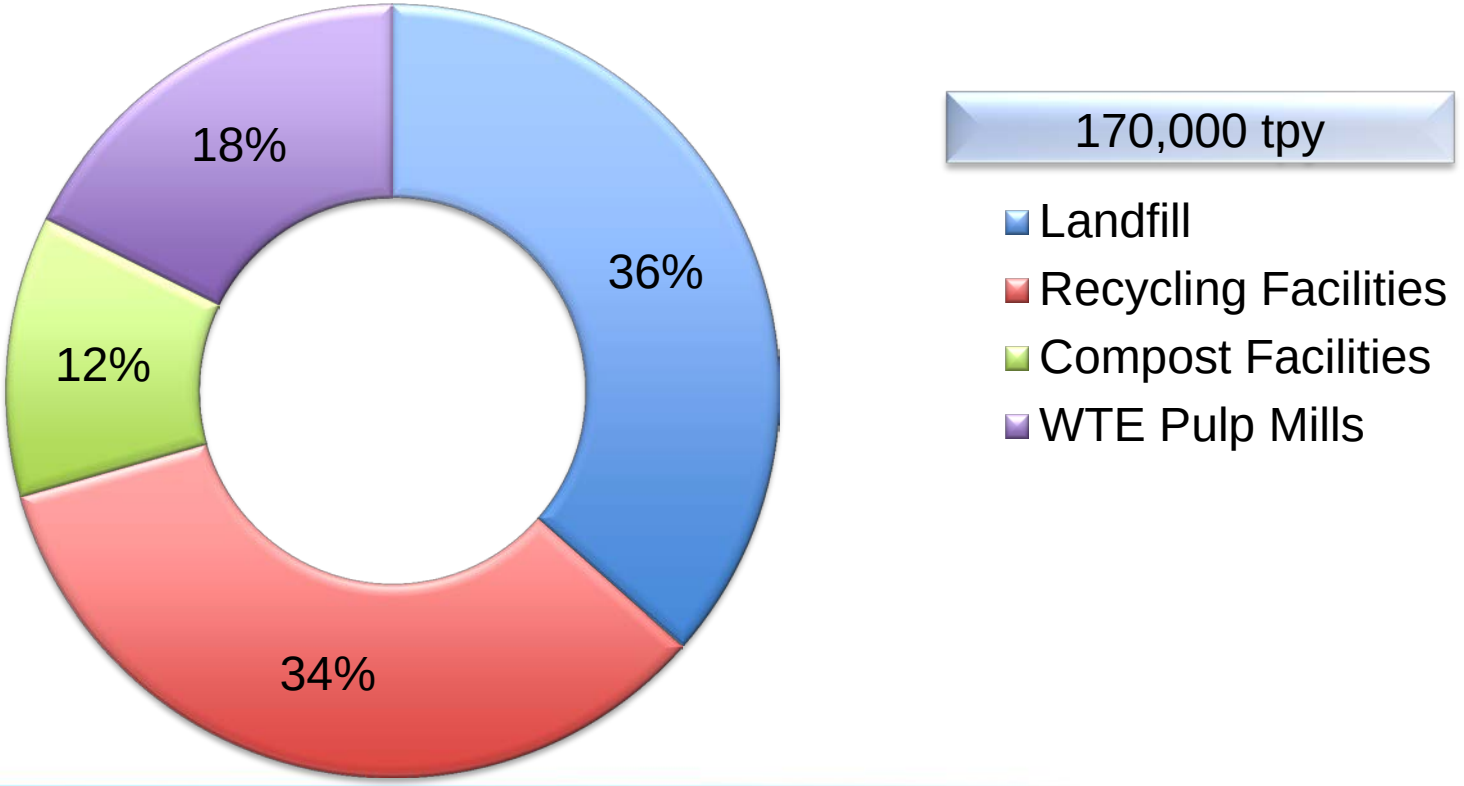
Public

- Church Road Transfer Station
- Regional Landfill

Private

- Porter Wood Recycling
- Parksville Bottle & Recycling Depot
- BFI Springhill
- Alpine Disposal & Recycling
- Pacific Coast Waste Management
- DBL Disposal
- Nanaimo Recycling Exchange
- GIRO

Disposal & Diversion Facilities



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Disposal & Diversion Facilities

Disposal

- Regional Landfill

Diversion

- Schnitzer Steel
- BFI Tenth Street
- Emterra Environmental
- Cascades Recovery
- ICC Group
- Earthbank
- Harmac/Catalyst

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System Cost-Public Disposal

Service Area	Budget
Residential Collection	
RDN Curbside Collection	$3,775,651
CON Curbside Collection	$3,769,634
TQB Garbage Collection	$173,859
Sub-Total	$7,719,144
Region-Wide Disposal	
Overhead & Administration	$1,162,920
Zero Waste Programs	$514,394
Scale & Transfer Services – Cedar	$1,507,215
Scale & Transfer Services - CRTS	$2,008,190
Disposal Operations	$4,387,105
Sub-Total	$9,579,824
Total	$17,298,968

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System Revenues

Revenue Source	Amount	Percentage
Tax Requisition	$342,035	2%
Tipping Fees	$9,237,789	53%
Utility Fee	$7,719,144	47%
Total	$17,298,968	

RDN Zero Waste Plan

PERFORMANCE OBJECTIVES

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Disposal Crisis

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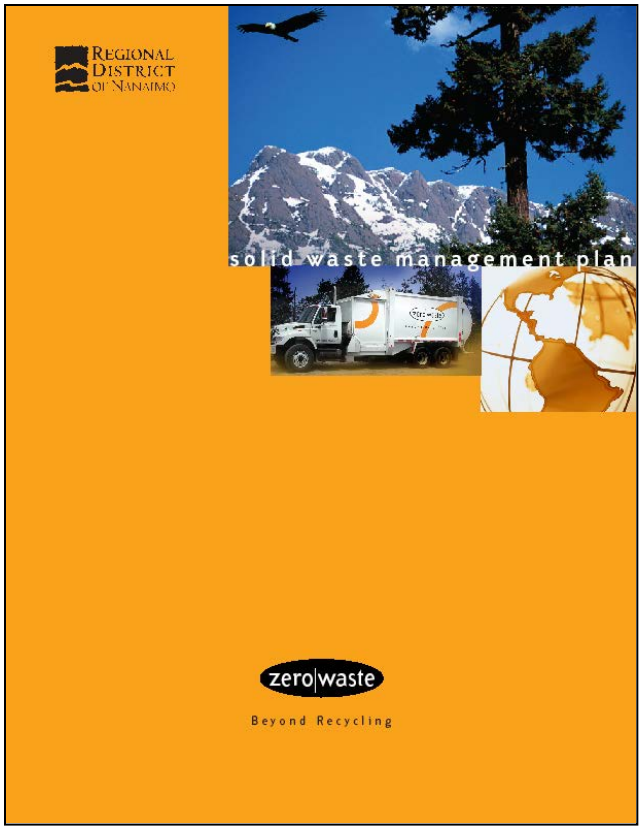
Solid Waste Management Plan



- Mandated by Province (EMA)
- RDN SWMP
  - Prepared 1988
  - Amended 1996 – 3R's Plan
  - Amended 2004
- Zero Waste Plan (75%)
  - Demand Management
  - WSML Bylaw
- Residual Waste Management Plan
  - Disposal infrastructure - supply

1995 3RS Plan

50%

- Phase 1
- Residential/ICI Recycling; Disposal Bans

60%

- Phase 2
- Construction/Demolition Waste Bans

77%

- Phase 3
- Regional Compost Facility; ICI/Residential Collection

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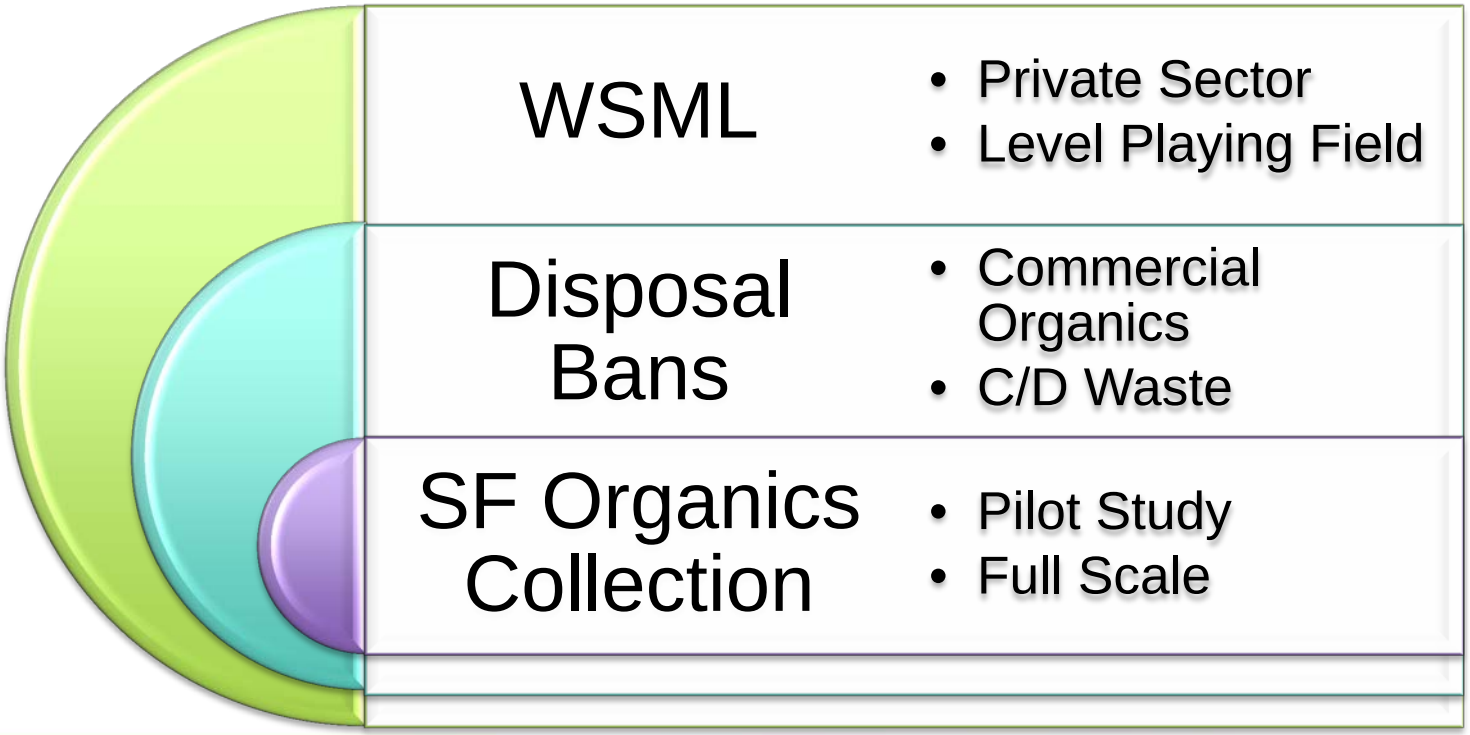
2004 Zero Waste Plan

"…continuously strive to reduce the amount of waste requiring disposal."



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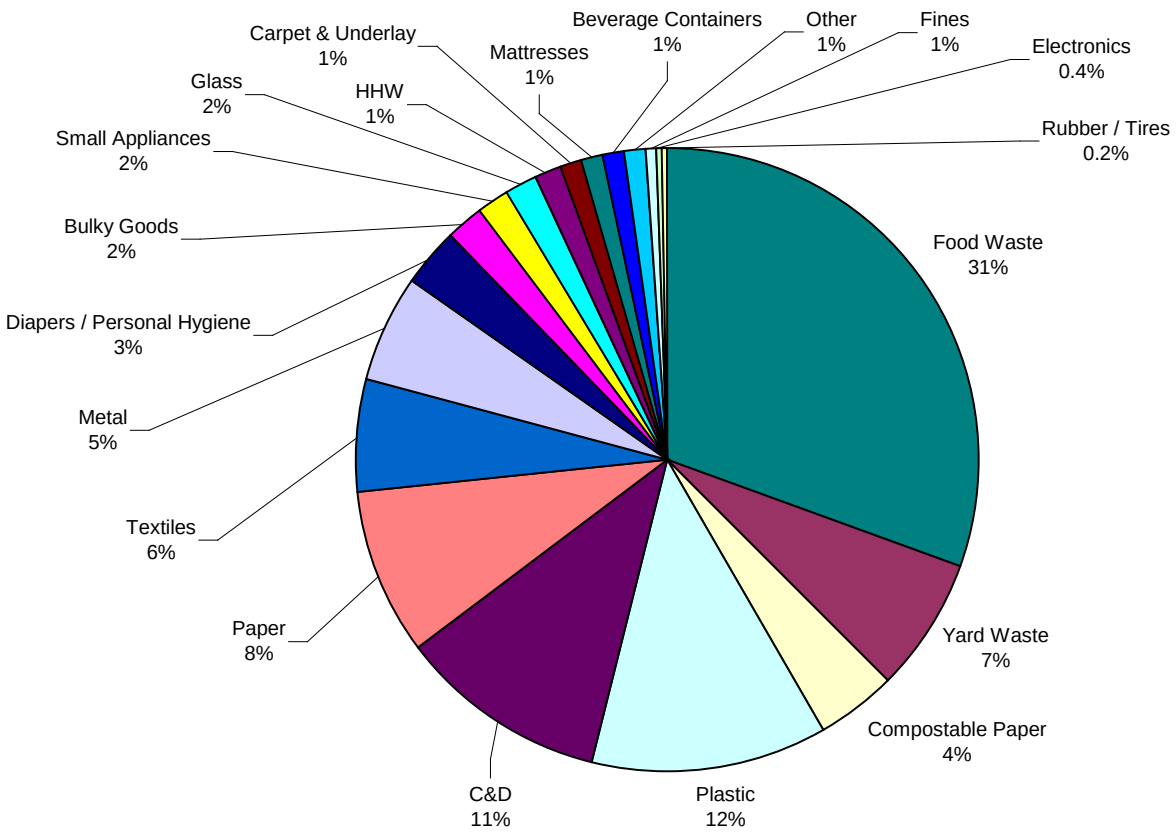
2004 Waste Composition



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RDN Zero Waste Program

- Waste Stream Management Licensing
  - Private sector infrastructure
  - Level playing field
- Landfill Disposal Bans
  - Regulate
  - Collaborate
  - Educate
  - Enforce
- Single Family Food Waste Collection
  - User fees
  - Can limits
- Zero Waste Education & Promotion

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WSML Bylaw

- Environmental protection
- Encourage private sector investment
- High standards in the operation of recycling facilities
- Common regulatory framework
- Illegal dumping prevention

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Landfill Disposal Bans

- Gypsum (1991)
- Land clearing waste (1992)
- Corrugated cardboard (1993)
- Recyclable Paper (1997)
- Scrap Metal (1997)
- Tires (1997)
- Commercial organic waste (2005)
- Garden waste (2007)
- Wood Waste (2007)
- Stewardship Materials (2007)
- Household Plastic Containers (2009)
- Metal Food & Beverage Containers (2009)

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Bans – Collaborate & Educate

- Collaborate with haulers
  - Regular meetings
  - Build trust
- Educate generators
  - Create data base
  - Workshops
  - Promotion/education materials
  - Follow-up

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Enforcement

- Load inspection
- Violation notices
  - Issue to Hauler
  - 3x tipping fee

- Zero Waste Compliance Officer
  - Collaborate with hauler to educate generator
  - Site visits
  - Monitor violations

User Pay Garbage Collection

- Full user-pay
- Utility bill $147.50/yr
- Food waste weekly
- Garbage & recycling alternating bi-weekly
- Tags for extra garbage- $2.00 per can

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Illegal Dumping

- ***Observe, record, report***
  - Investigate complaints
  - Identify responsible party
  - Responsible for clean-up
  - Contractor clean up for sites with no identification
  - Signage posted

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RDN Zero Waste Plan

PERFORMANCE

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2012 Disposal & Diversion

Waste Stream	Quantity (tonnes)	Data Source
Landfill	53,000	Scale Records
Disposal Rate (kg/c/yr)	350	
Diversion		
Recycling	78,156	WSML Reports
Organics (FW + YW)	21,145	Scale Records
EPR Programs	9,552	Stewards Reports
Backyard Composting	4,000	Estimate (250 kg x 16,000)
Total Diversion	112,850	
Tonnes Generated	166,000	
Diversion Rate	68%	

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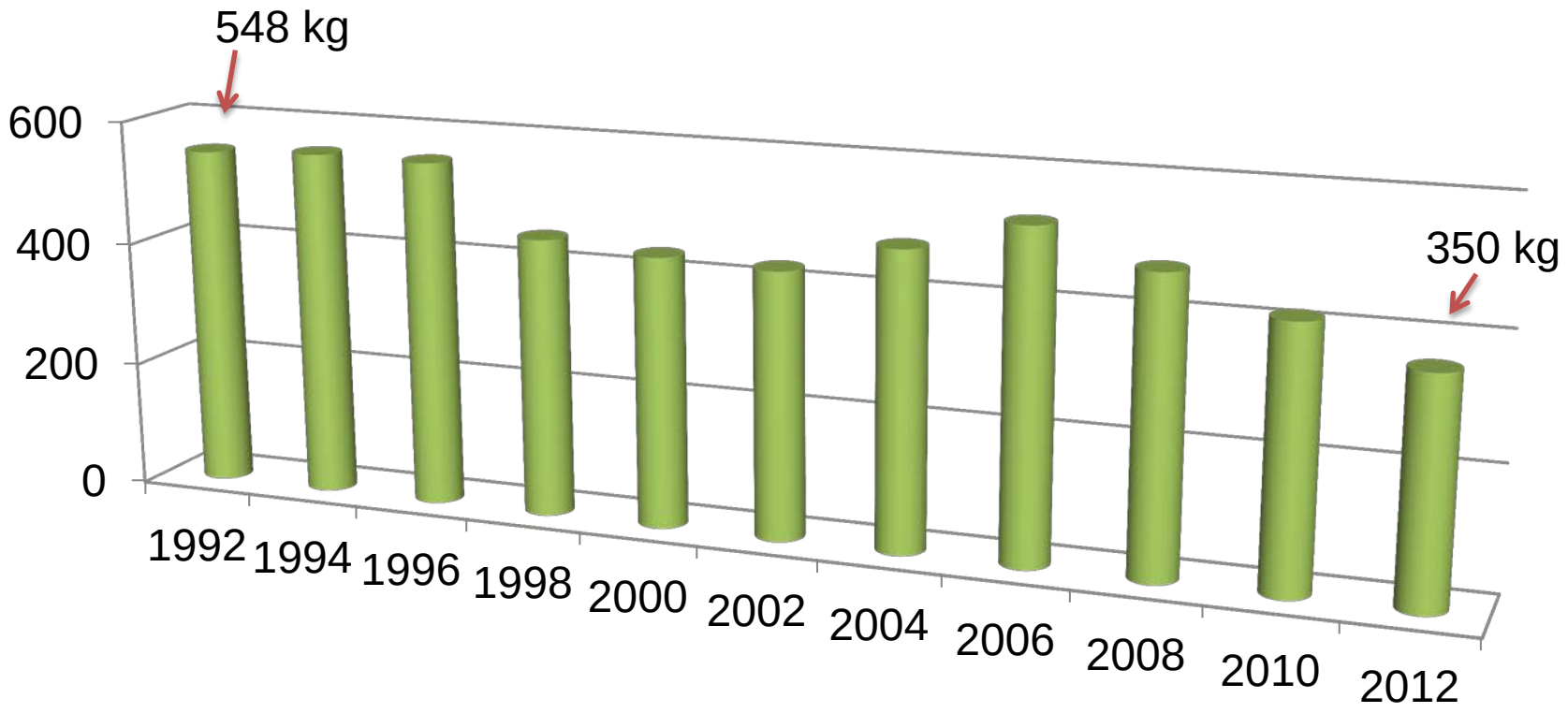
Annual Disposal Rate



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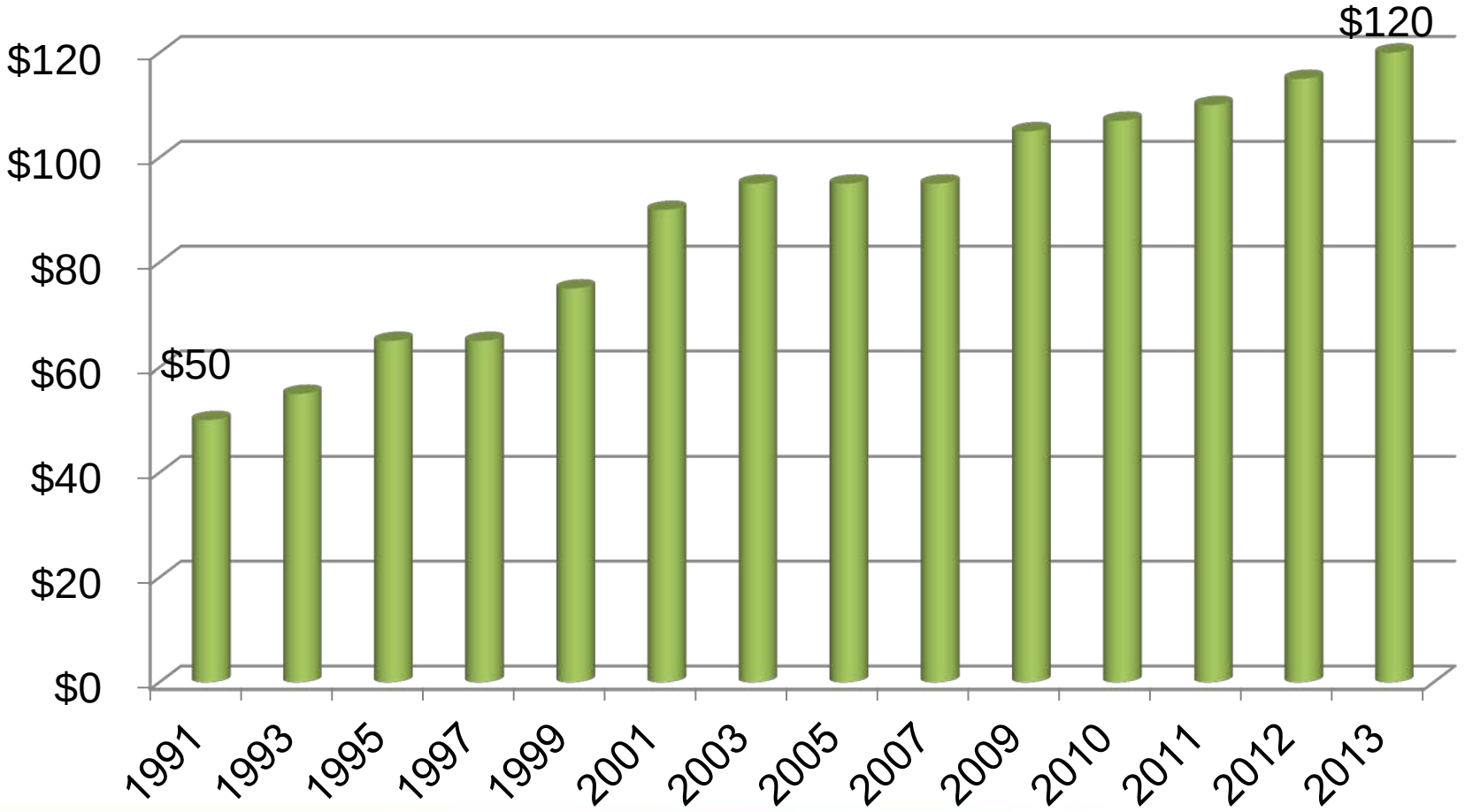
RDN Tipping Fees



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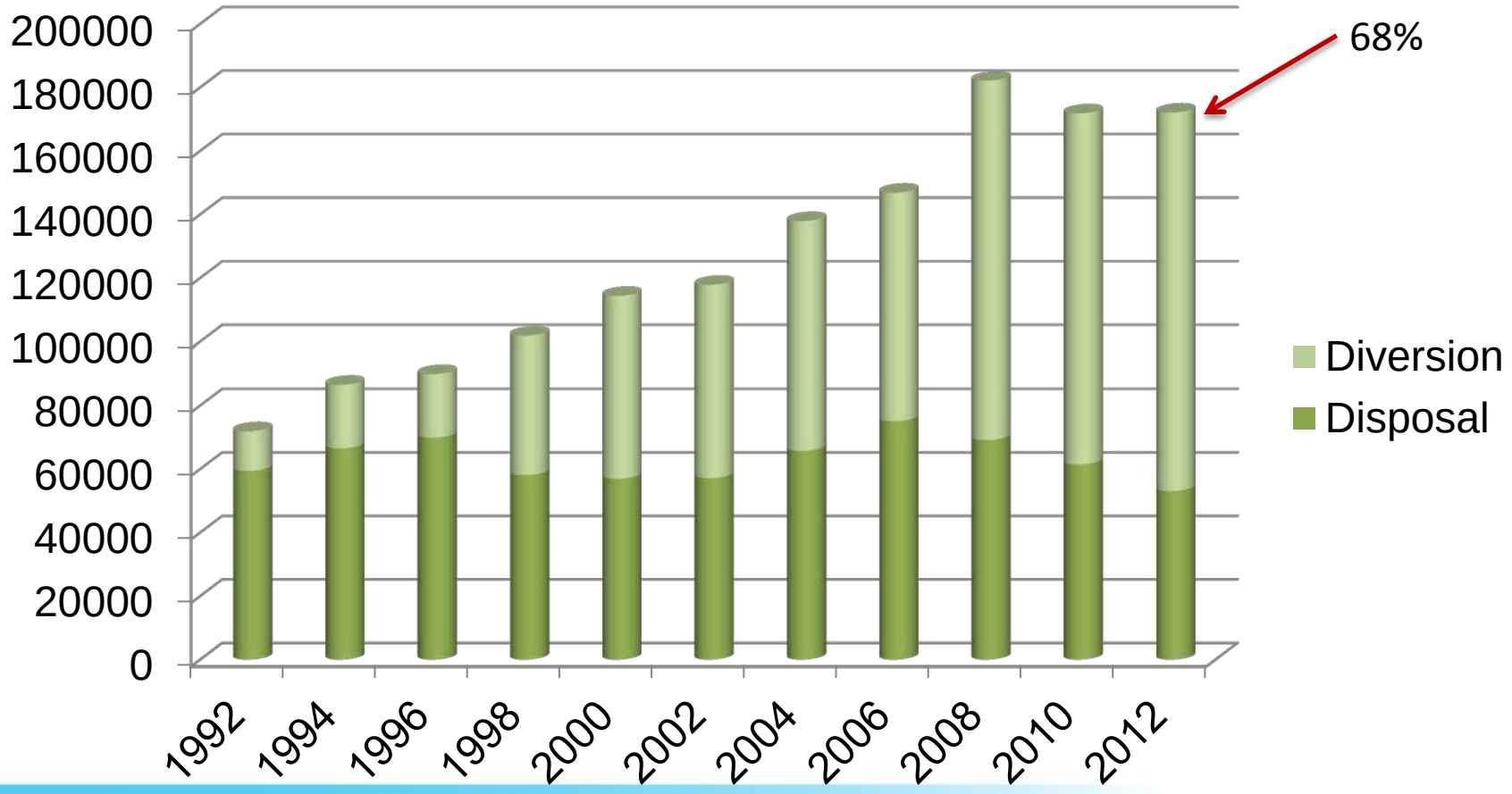
RDN Waste Generation



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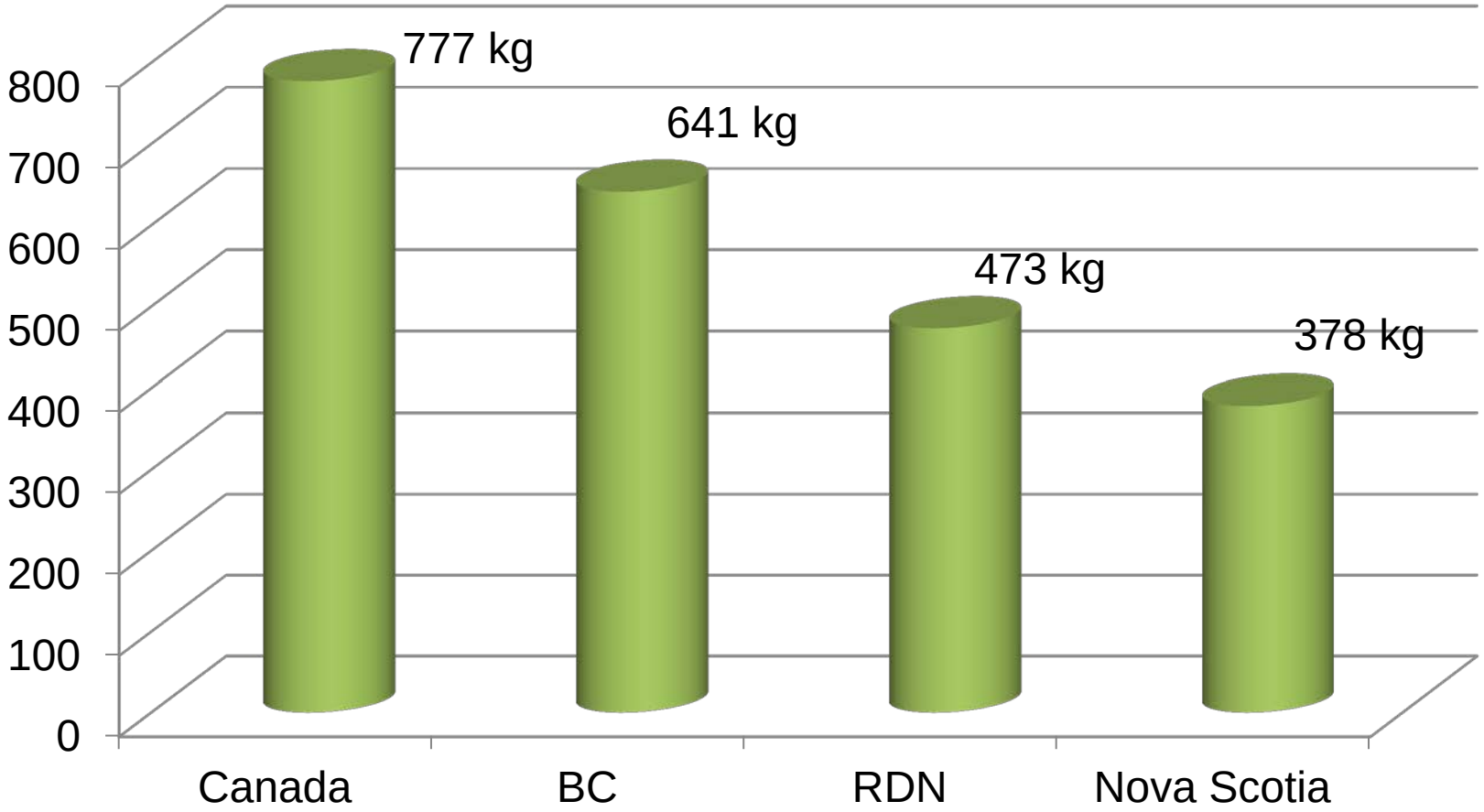
Disposal Rate Comparison



Statistics Canada 2008

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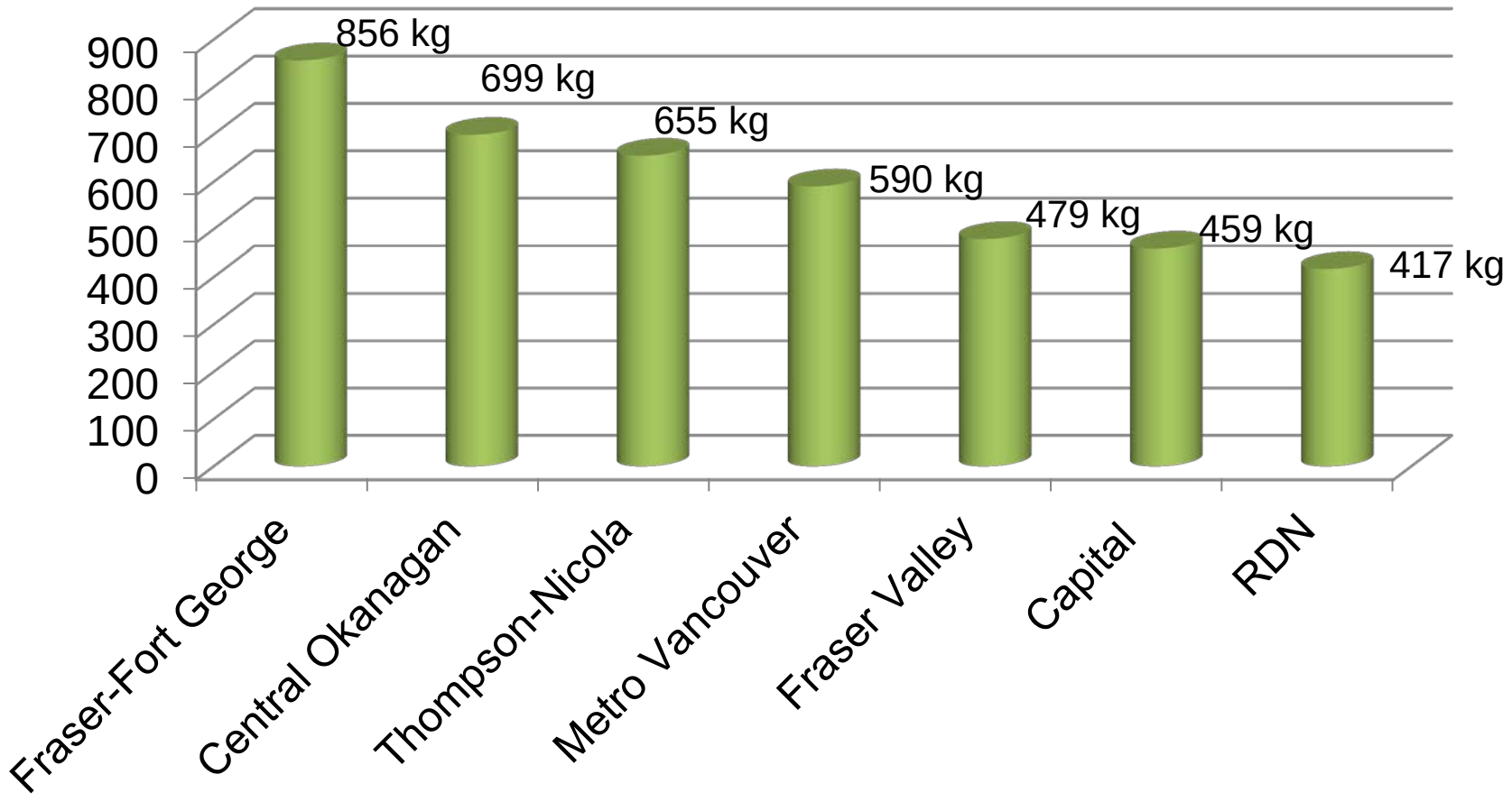
Disposal Rate Comparison BC



BC Ministry of Environment 2010

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RDN Residual Waste Management Plan

PERFORMANCE OBJECTIVES

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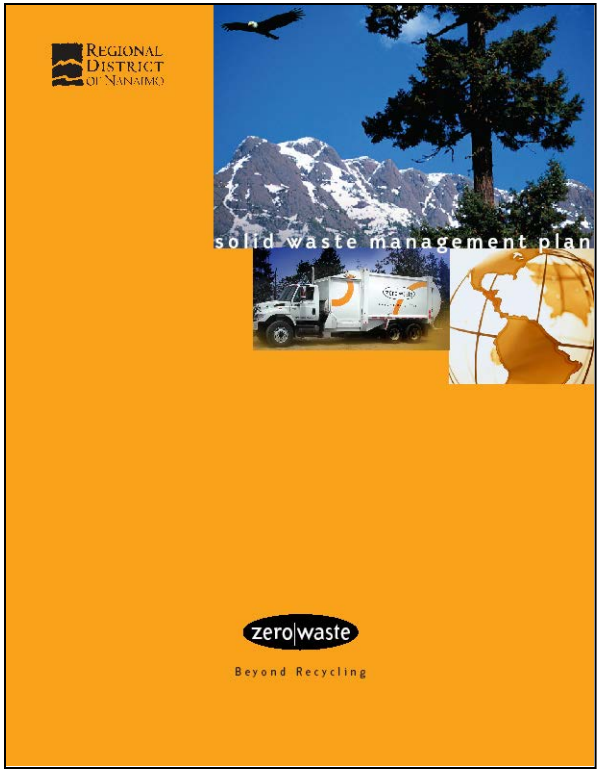
Residual Waste Management Plan (1)

- ☑ Continued use of CRTS
  - ☑ Export CRTS waste to Cache Creek
  - ☑ Review alternative waste export options 2006
- ☑ Continued use of Regional Landfill
  - ☑ Optimize capacity by constructing geogrid toe berm on south side of landfill
  - ☑ Extend landfill lifespan by 7 to 10 years (2012)
- ☑ Closure & Maintenance
- ☑ Post-Closure Planning



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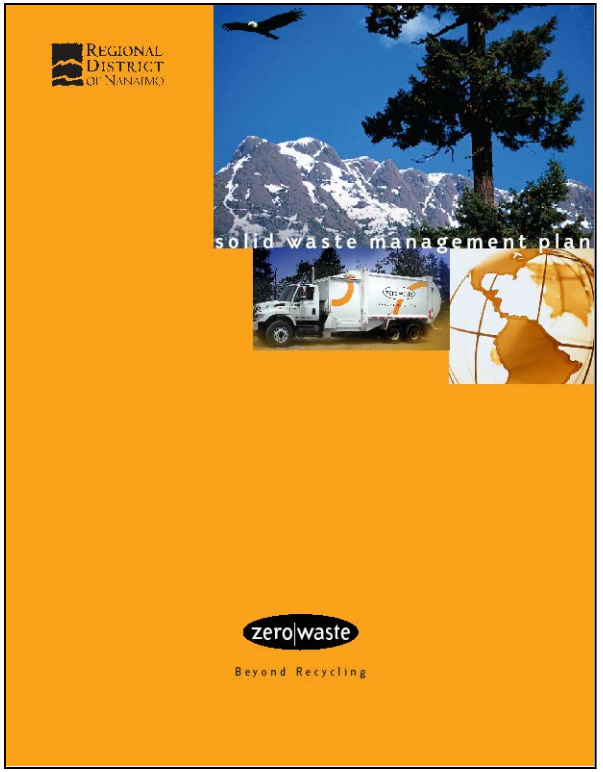
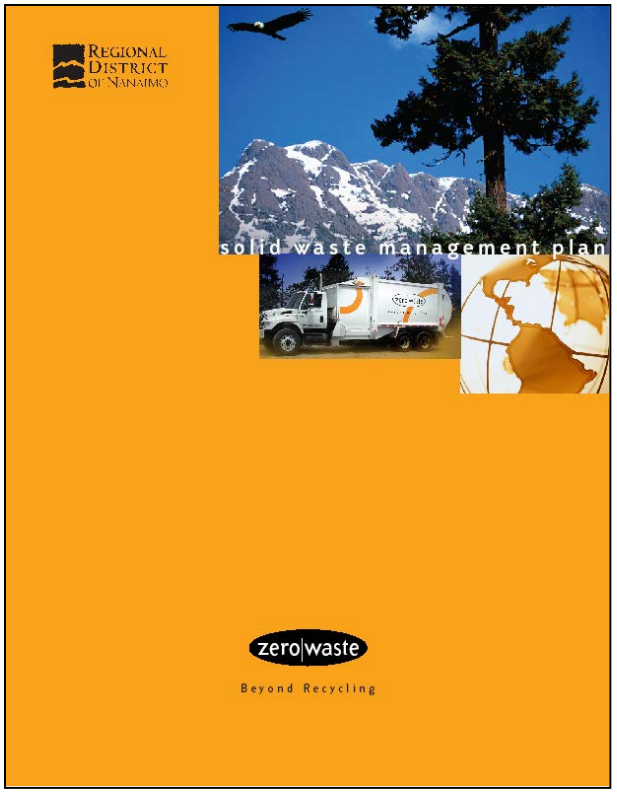
Residual Waste Management Plan (2)

- ☑ Household Hazardous Waste
  - ☑ Promote existing Provincial and private stewardship programs for hazardous waste
  - ☑ Encourage new stewardship programs
- ☑ Land clearing Waste
- ☑ Discontinuation of stump burn site on Doumont Road



Residual Waste Management Plan (3)

- ☑ Secure a suitable transfer station/processing site
- ☑ Review new & emerging technologies
- ☑ Discuss cooperative strategies
- ☑ Reconsider disposal options by December 2006
- ❑ Phase 2 Berm construction in 2014 if required



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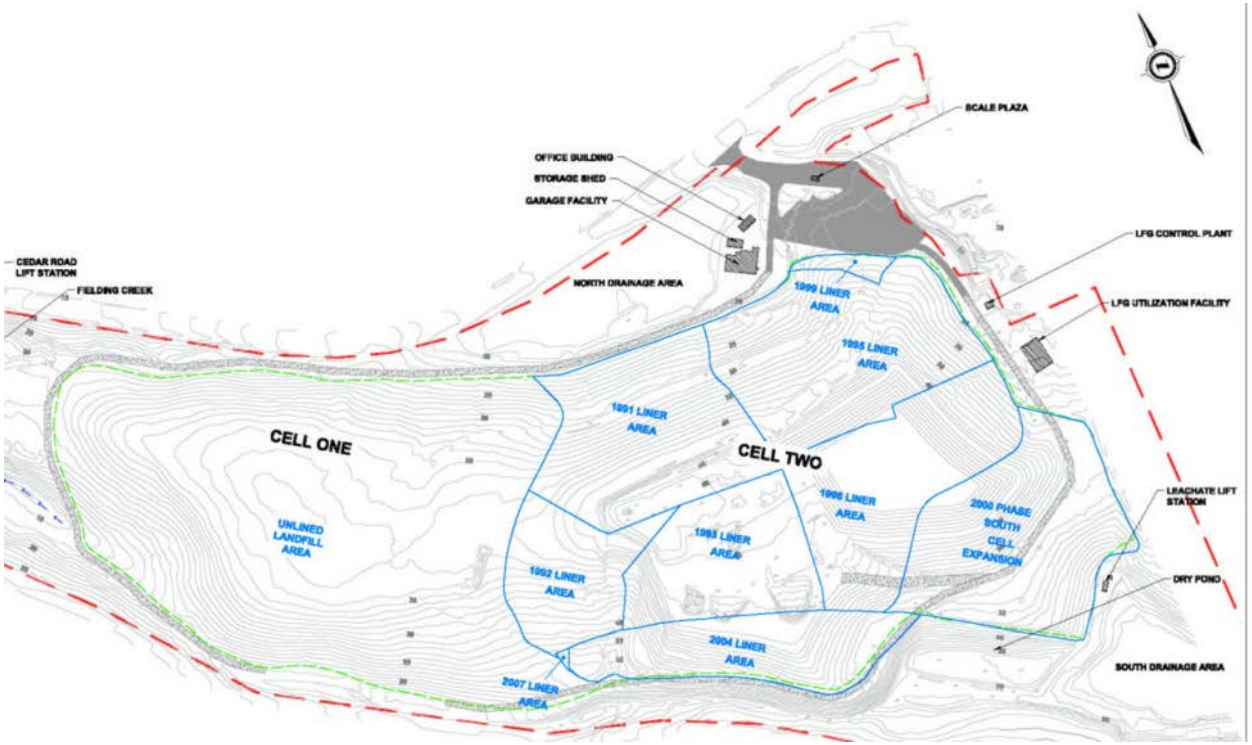
Operational Certificate (1)

- Issued April 2004
- Waste discharge to engineered landfill (Cell One)
- No discharge on closed landfill (Cell Two)



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Operational Certificate (2)

- Plans required
  - ☑Design & Operations
  - ☑Leachate management
  - ☑Storm water management
  - ☑Landfill gas management
  - ☑Closure
  - ☑Post-closure
- Annual monitoring program

RDN Residual Waste Management Plan

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Church Road Transfer Station

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New Construction

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Green Features (1)

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Green Features (2)

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Regional Landfill

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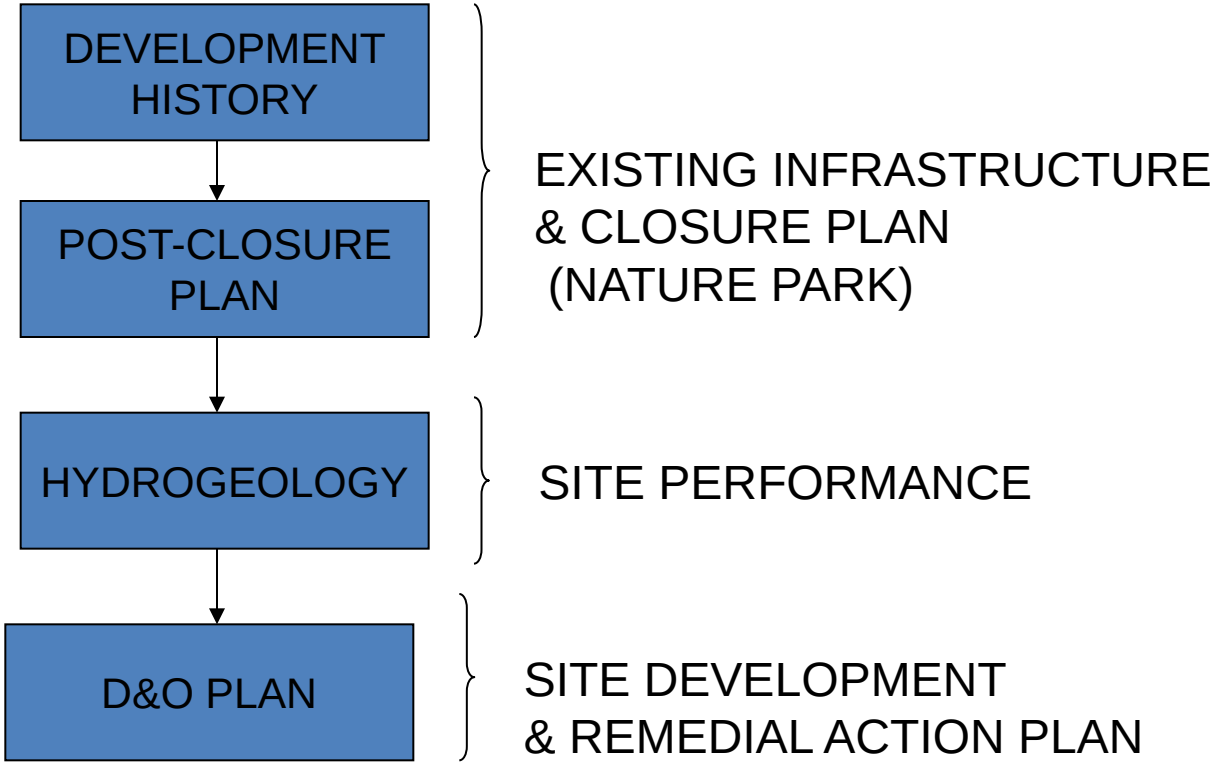
Design & Operations Plan



Site History Summary

CELL ONE (8.6 Ha) – NATURAL ATTENUATION CELL

1946 - Filling operations commence at the site.

1968 - The RDN is formed.

1971- RDN takes over the legal function of municipal waste disposal.

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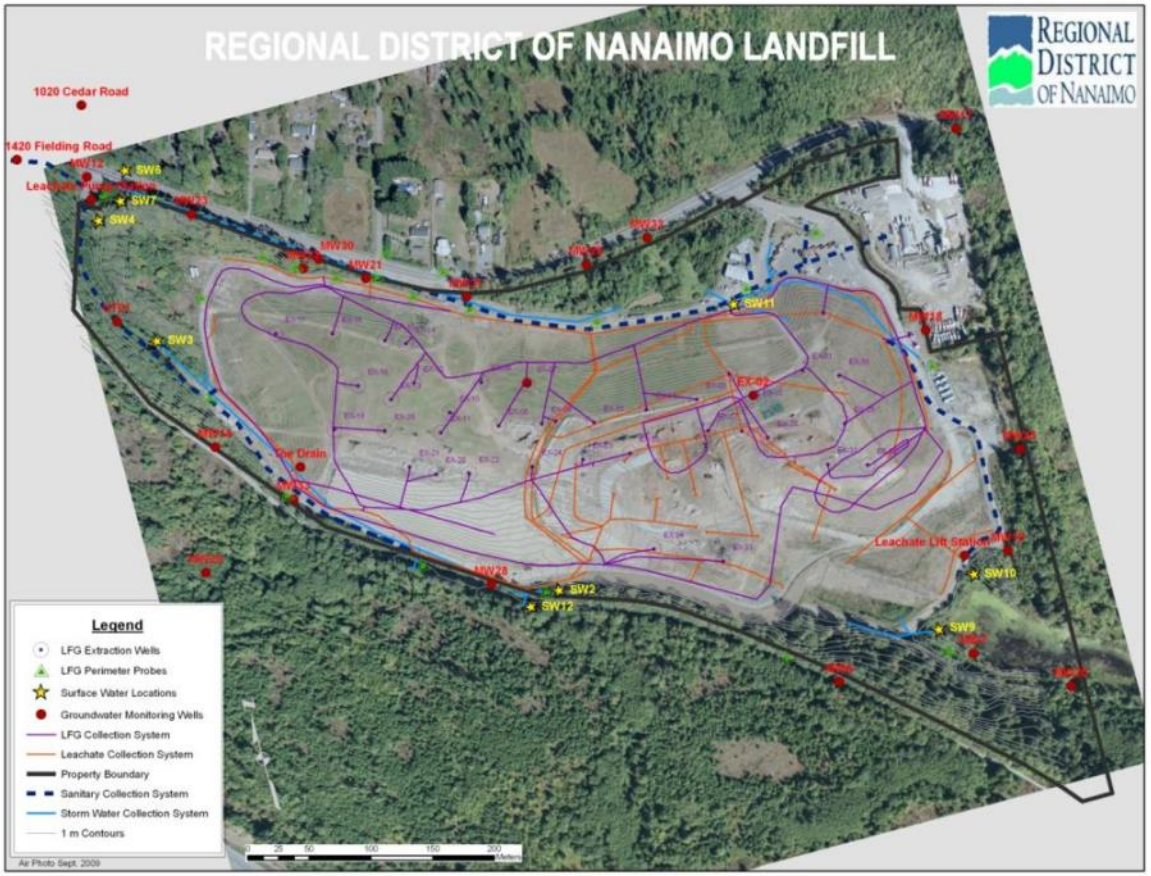
Regional Landfill September 2009



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Public Park Concept – Phase 1

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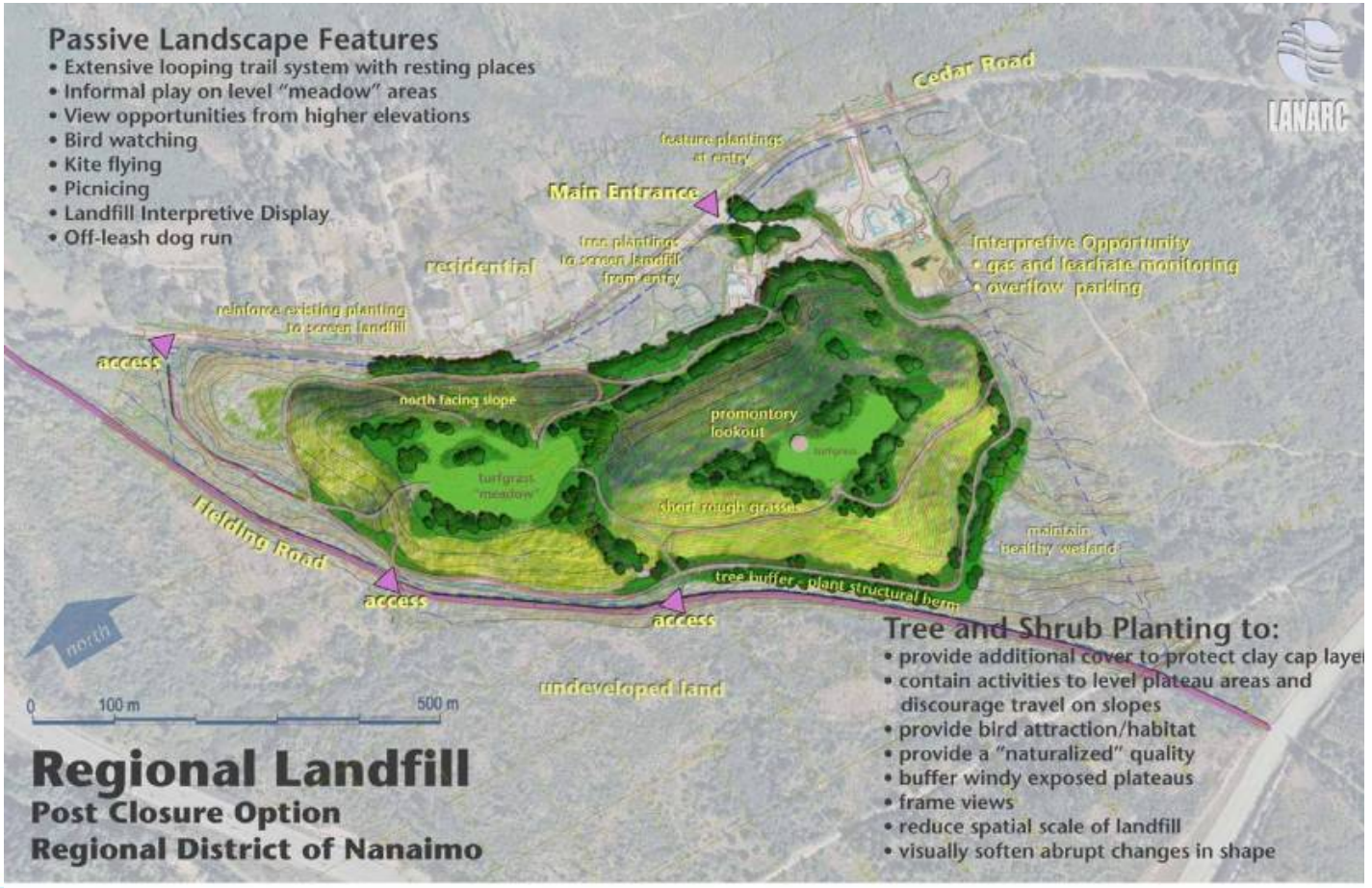
Public Park Concept Final Closure



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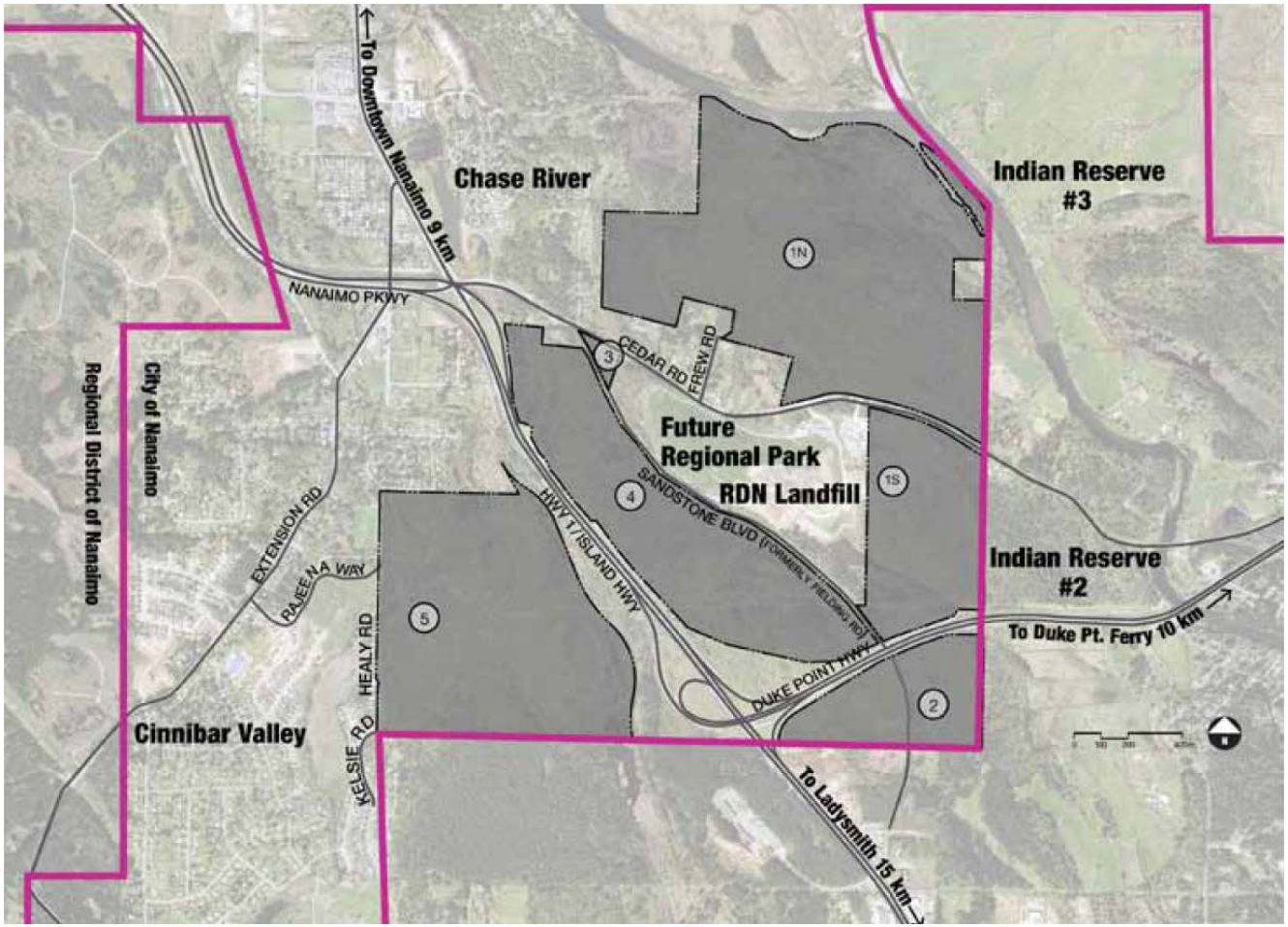
Sandstone Master Plan



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Sandstone Eco-Industrial Park

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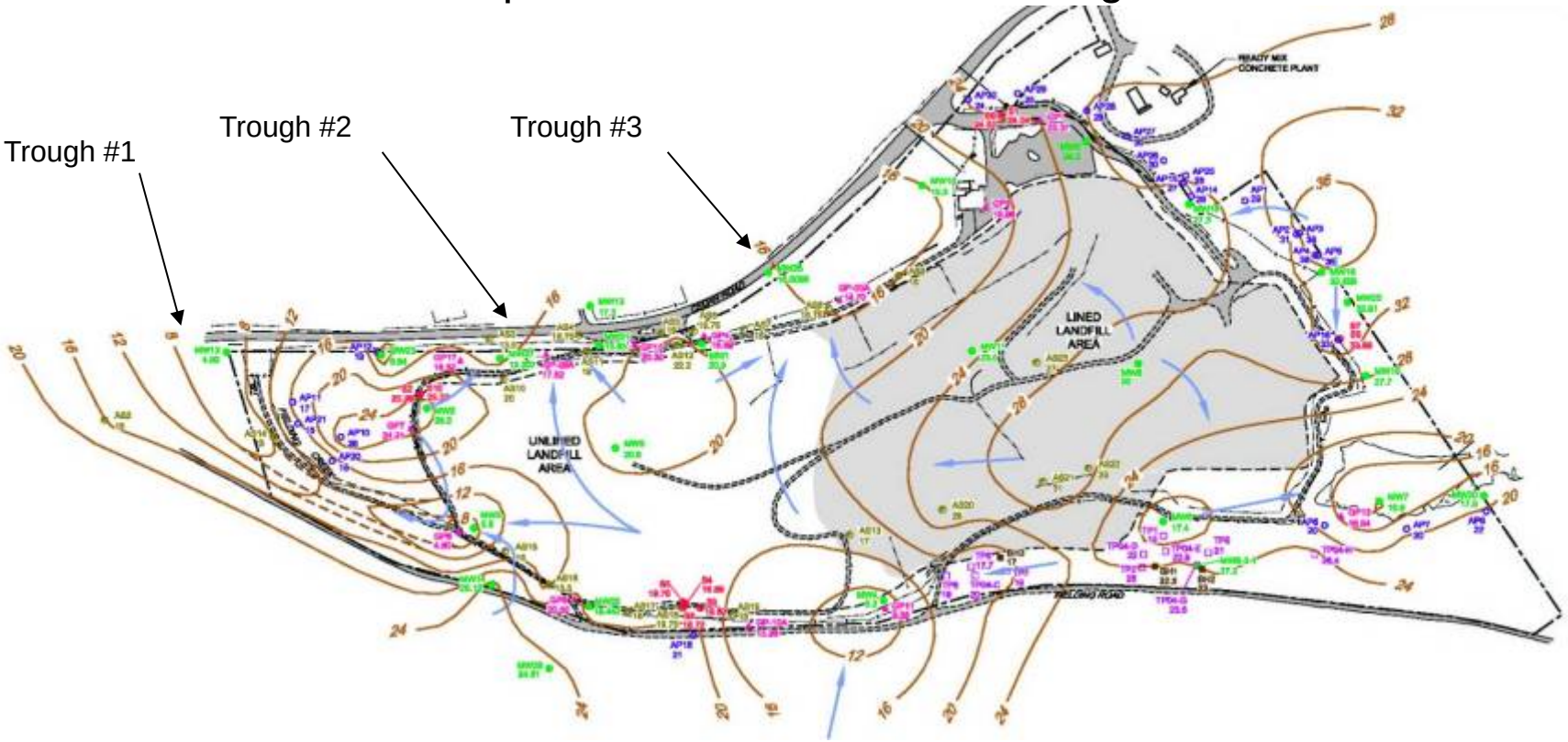
Hydro Geological Study

- Undertaken in 2006 in support of the post-closure implementation plan.
- Three “windows” for potential shallow leachate migration identified.



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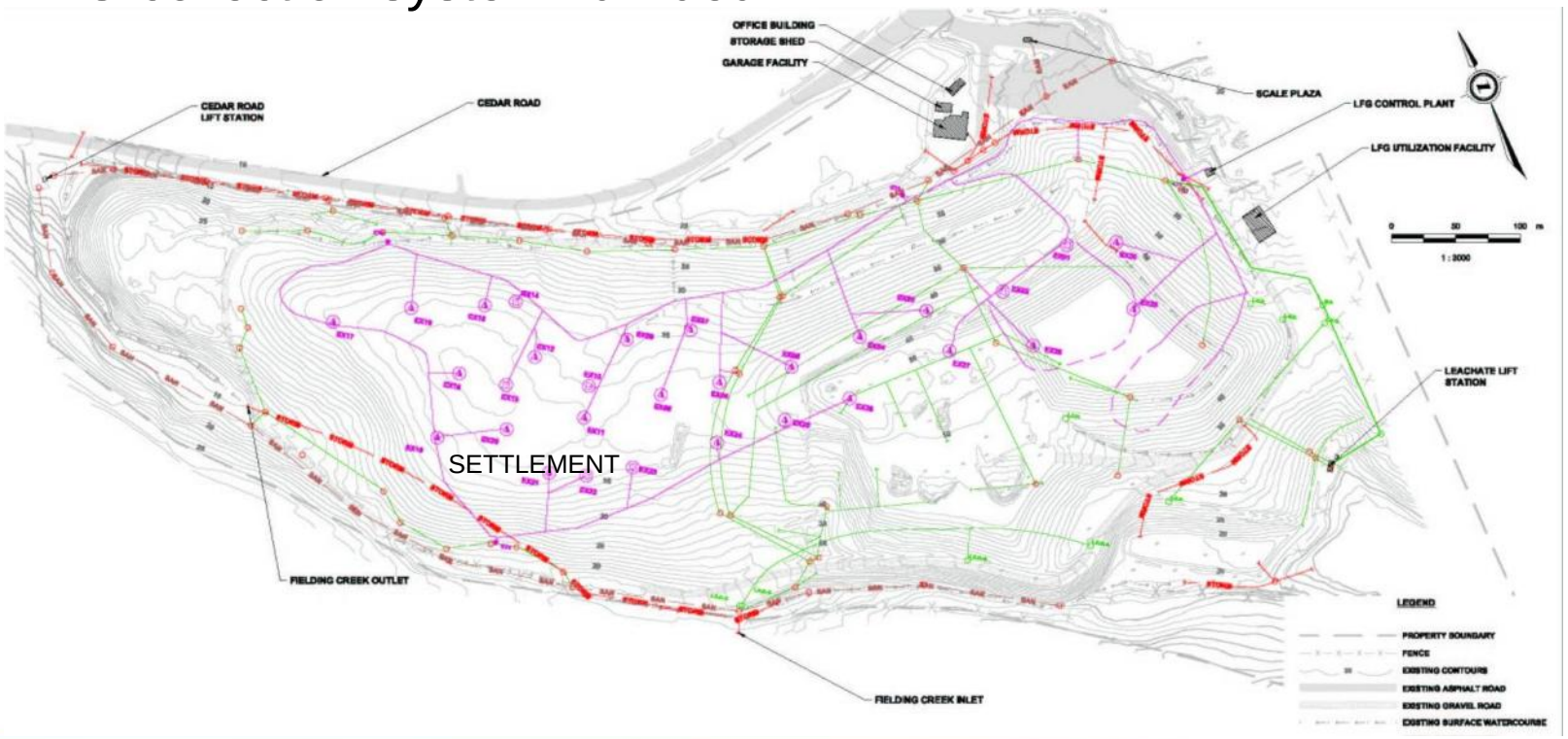
Design & Operations Plan Objectives

- Provide a long-term development plan for the site which addresses known issues.
- Identify and quantify key capital projects.
- Integrate existing environmental management systems.
- Update environmental controls.

Key Issues Identified in Cell One

- Excessive differential settlement in Cell One
- Leachate mounding
- LFG collection system “blinded”



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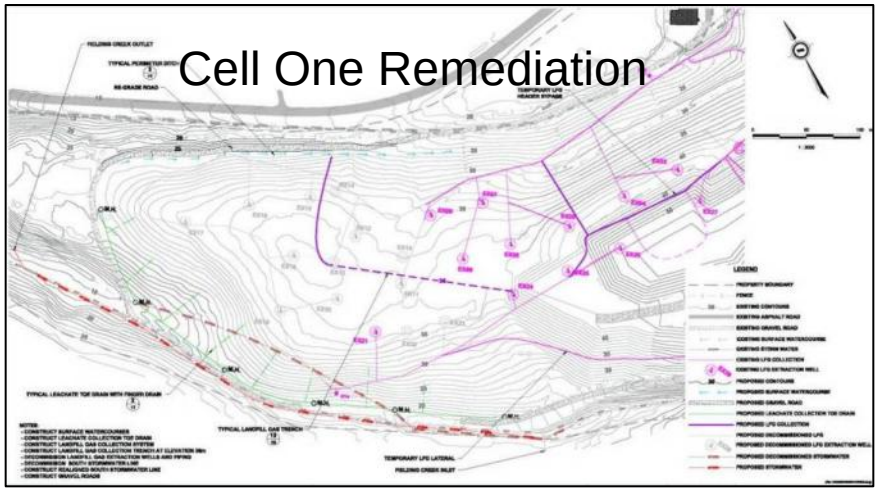
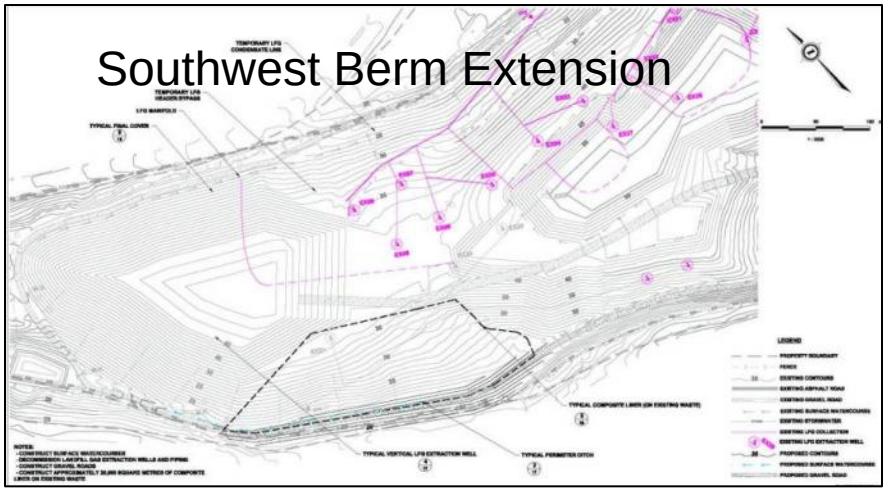
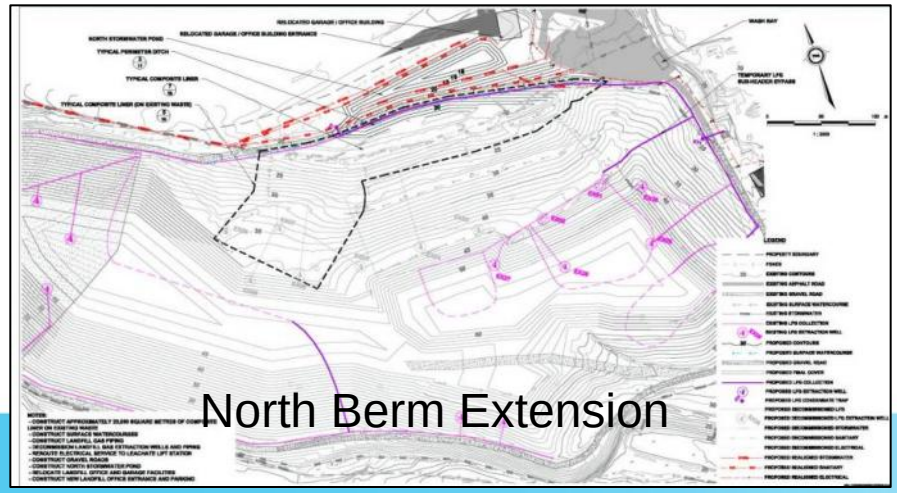
D & O Plan Overview

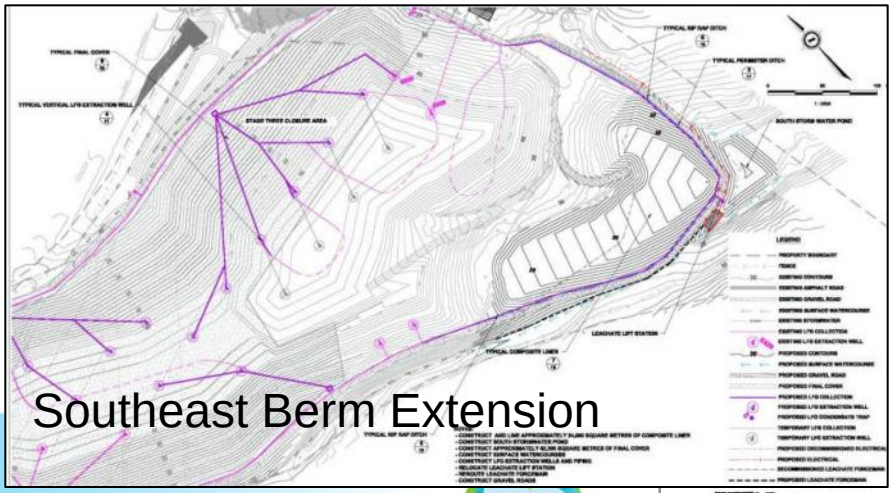
- Address the above stated issues and substantially reduce leachate impacts to the environment (Remedial Action Plan).
- Provide an additional 1.4 million cubic metres of airspace for a net total available airspace of 2.4 million cubic metres.
- Integrate the public park concept into the final closure plan.
- Update the environmental monitoring program.
- Optimize LFG collection.

Capital Infrastructure Projects









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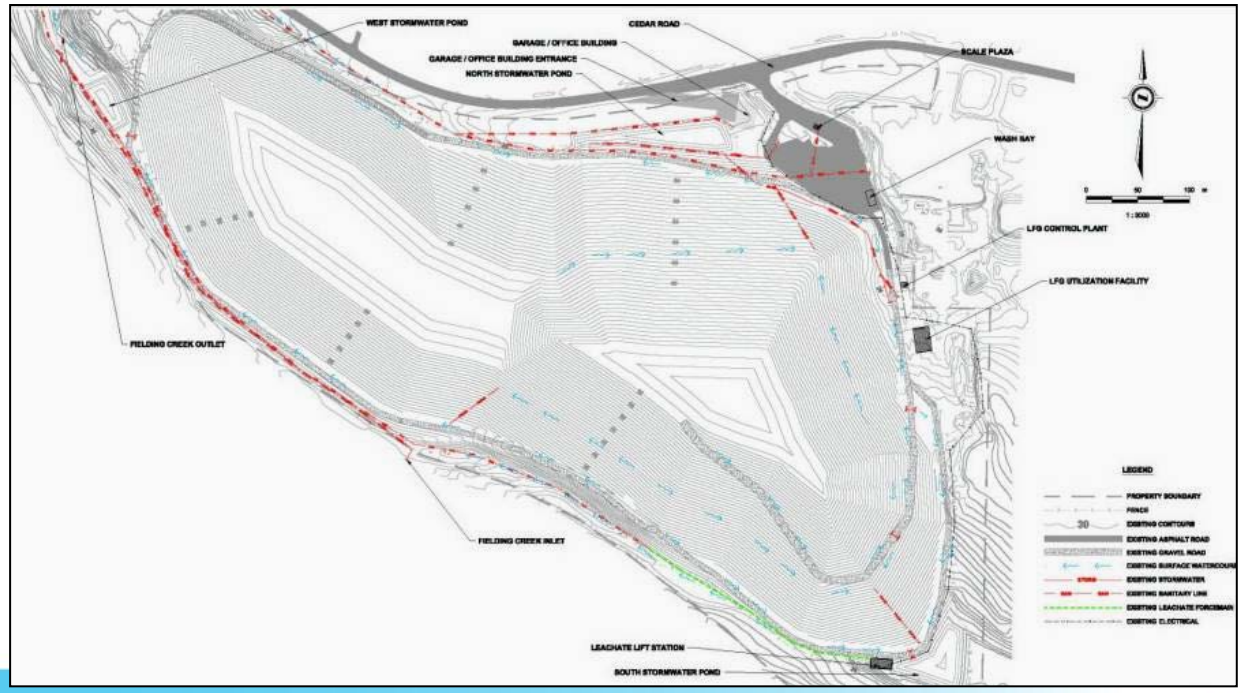
Final Closure

- Total capital cost estimate of $37 million (including final closure and public park).
- Per tonne capital cost of approx. $22 per tonne of waste landfilled.



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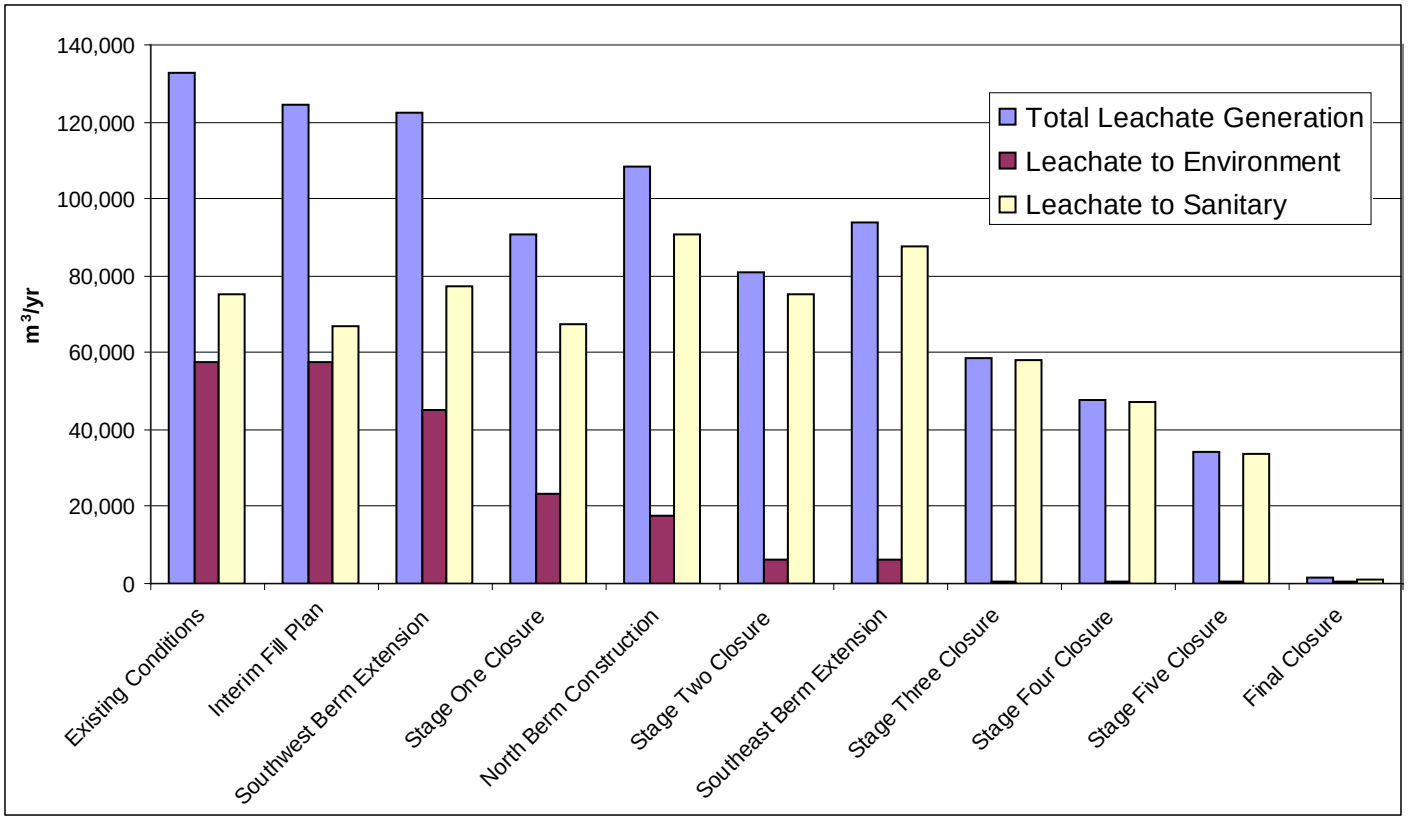
LEACHATE GENERATION



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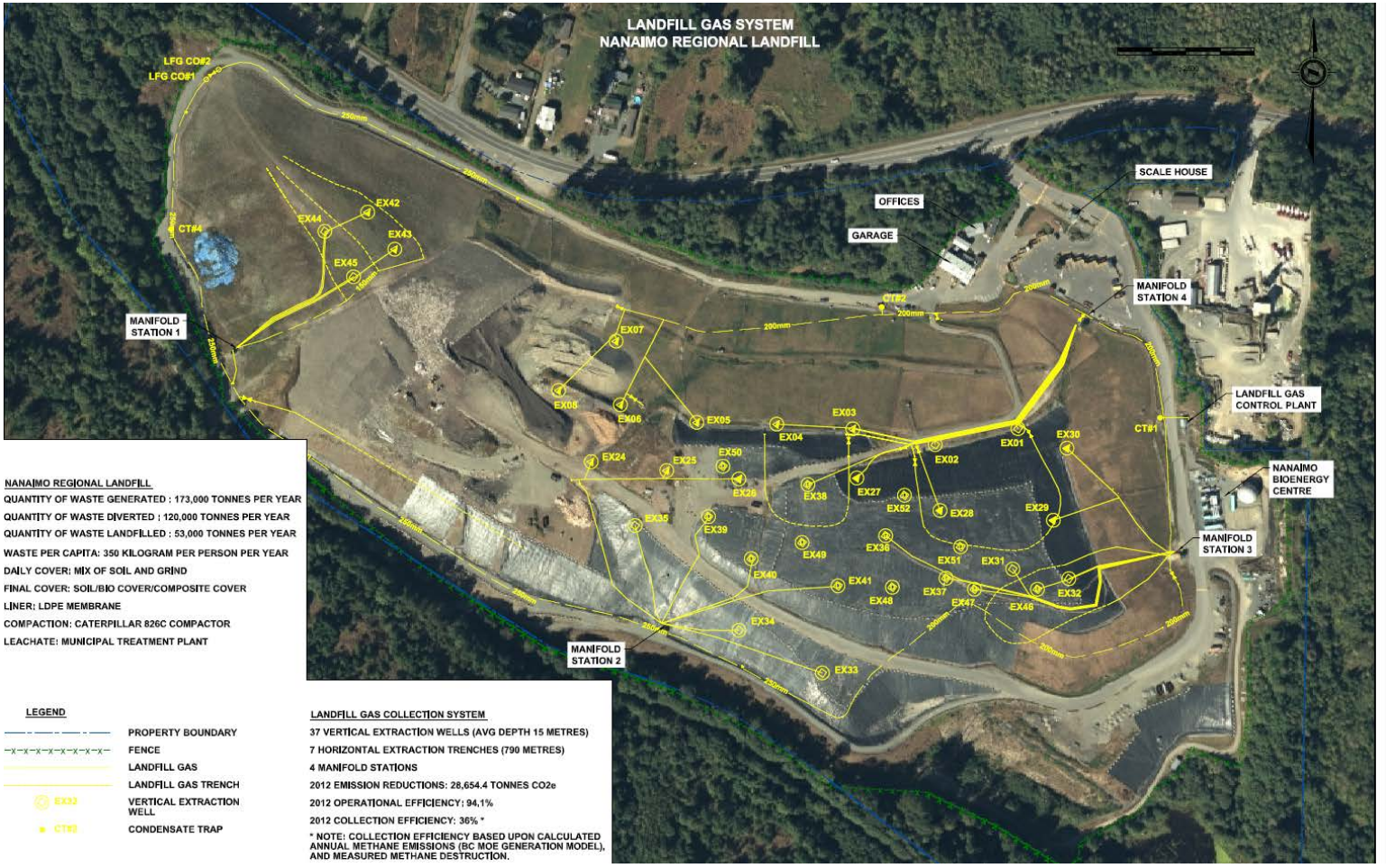
Summary

- Additional 1.4 million cubic metres airspace
- Site life extended from 2021 to 2026
- Significantly reduced environmental impacts:
  - Leachate generation
  - LFG fugitive emissions
- Storm water management
- Integration with Sandstone Master Plan
  - Nature Park
  - Eco-Industrial Park
- Optimize LFG collection
- Required SWMP Amendment

Landfill Environmental Controls

- **Leachate Management**
  - 4.4 km buried collection system
  - 1.9 km sanitary line
  - 2 lift stations with chemical addition
  - 13 h. closure
- **Storm Water Management**
  - Storm water diversion system
- **Ground/Surface Water Monitoring**
  - 10 surface water sampling stations
  - 20 ground water stations with 38 wells
  - 2 leachate sampling stations

Landfill Gas System



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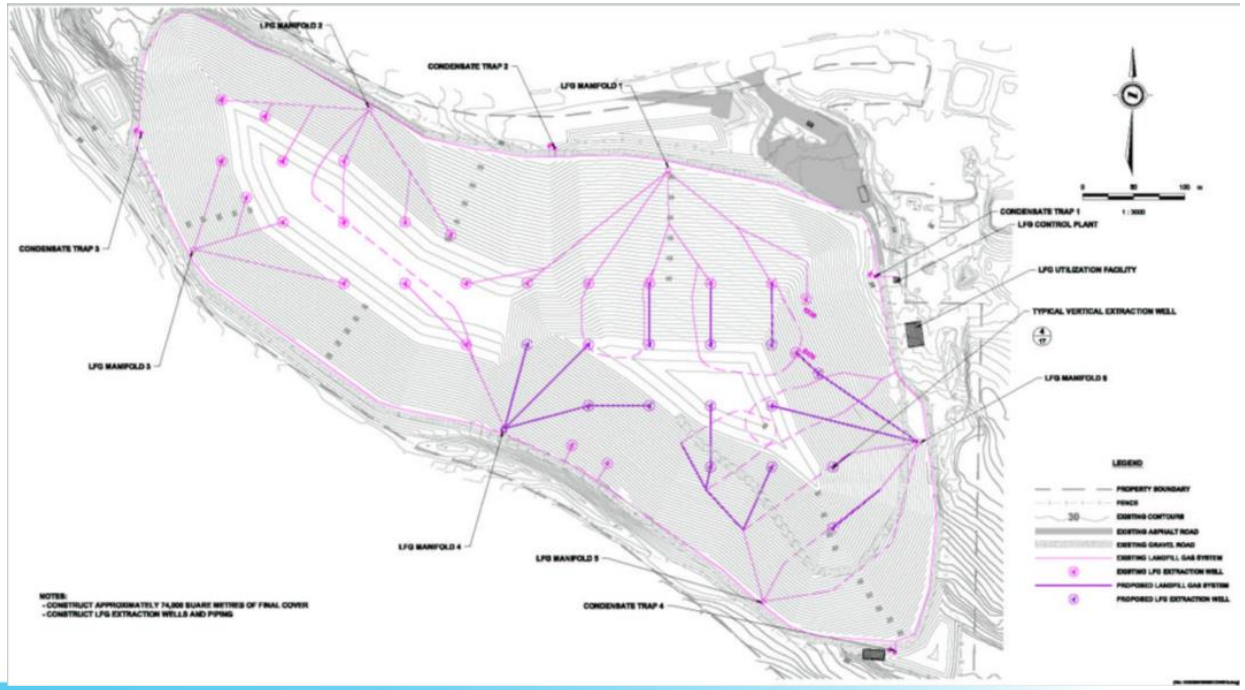
Current LFG Collection System

- Hybrid collection system concept.
- 7 horizontal trenches.
- 37 vertical collection wells
- 4 Manifold Stations
- 36% collection efficiency (calculated)



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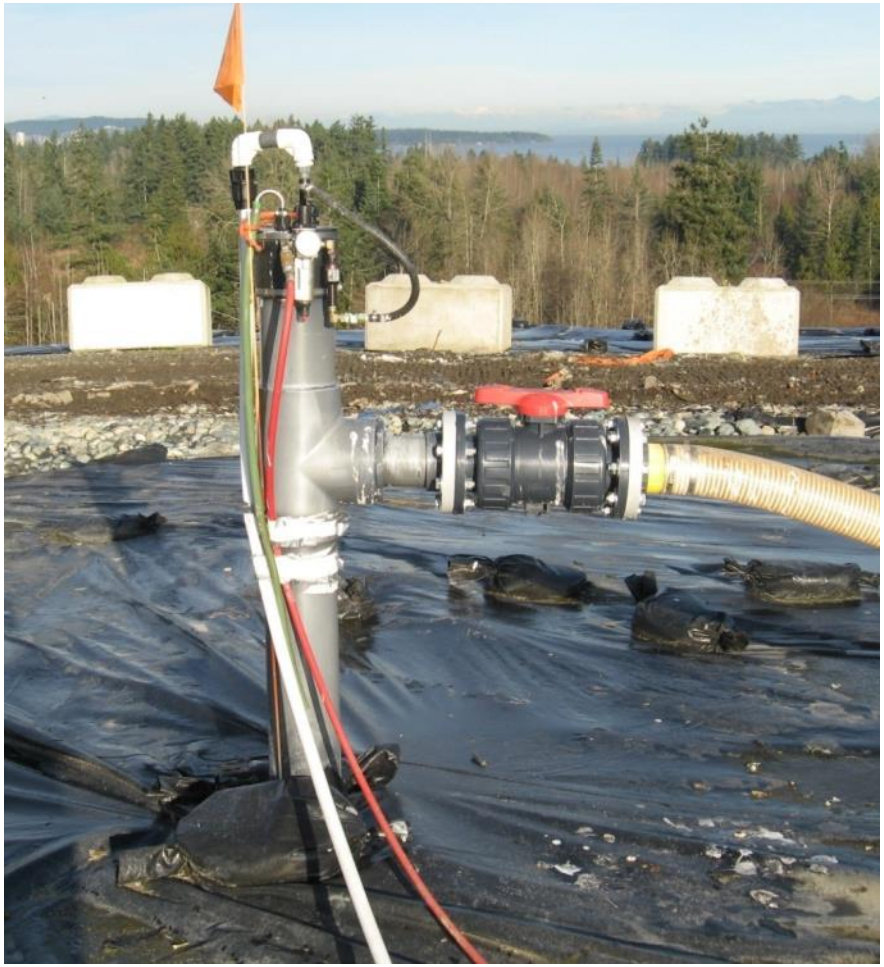
Vertical LFG Extraction Wells



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LFG Manifold Station

LFG Control Plant

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GHG Emissions Reduction

Year	Methane Emission Rate (tonnes/yr)	Methane Destruction Rate (tonnes/yr)	Efficiency
2004	3,078	928	30%
2005	3,091	1,029	33%
2006	3,133	1,220	40%
2007	3,281	1,011	31%
2008	3,448	1,376	40%
2009	3,549	1,060	30%
2010	3,624	1,131	31%
2011	3,704	1,338	36%
2012	3,789	1,365	36%

Gas Utilization Facility – Phase 1

- RFP December 2004
- Cedar Road LFG – 2005
  - Demonstration project
  - Detailed legal agreements
  - Cost borne by developer
  - Royalty to RDN
- Phase 1 Project - 2010
  - 1.4 MW
  - $3.6 Million
  - 2 GE Jenbacher engines
  - BC Hydro EPA

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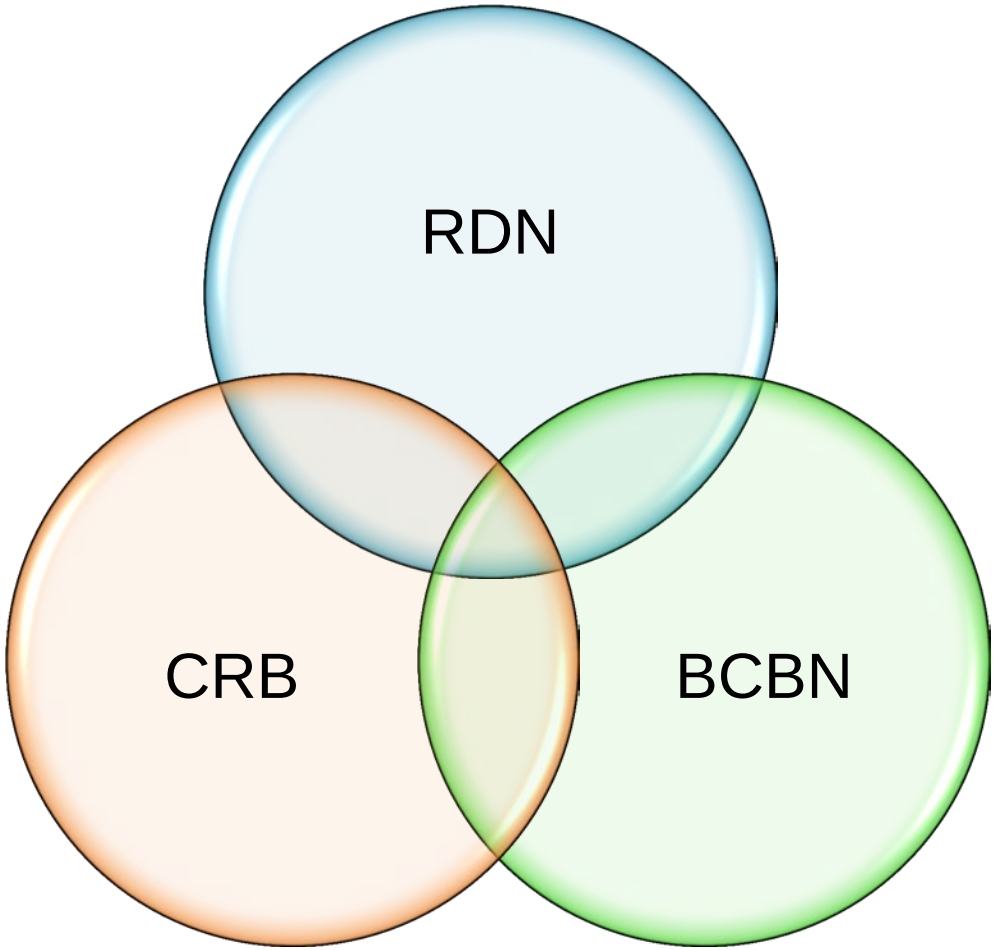
BCBN Collaboration



Nanaimo Bioenergy Centre

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Gas Utilization Facility – Phase 2

- 2012-2015
- $2.3 million
- Improve efficiency and economics by:
  - LFG storage
  - Battery electricity storage
  - Above grade geothermal
  - LFG cleaning and processing
  - Waste heat recovery system
  - Gas processing and compression plant

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Methane Gas Holder

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RDN Solid Waste Management System

ISSUES & OPPORTUNITIES

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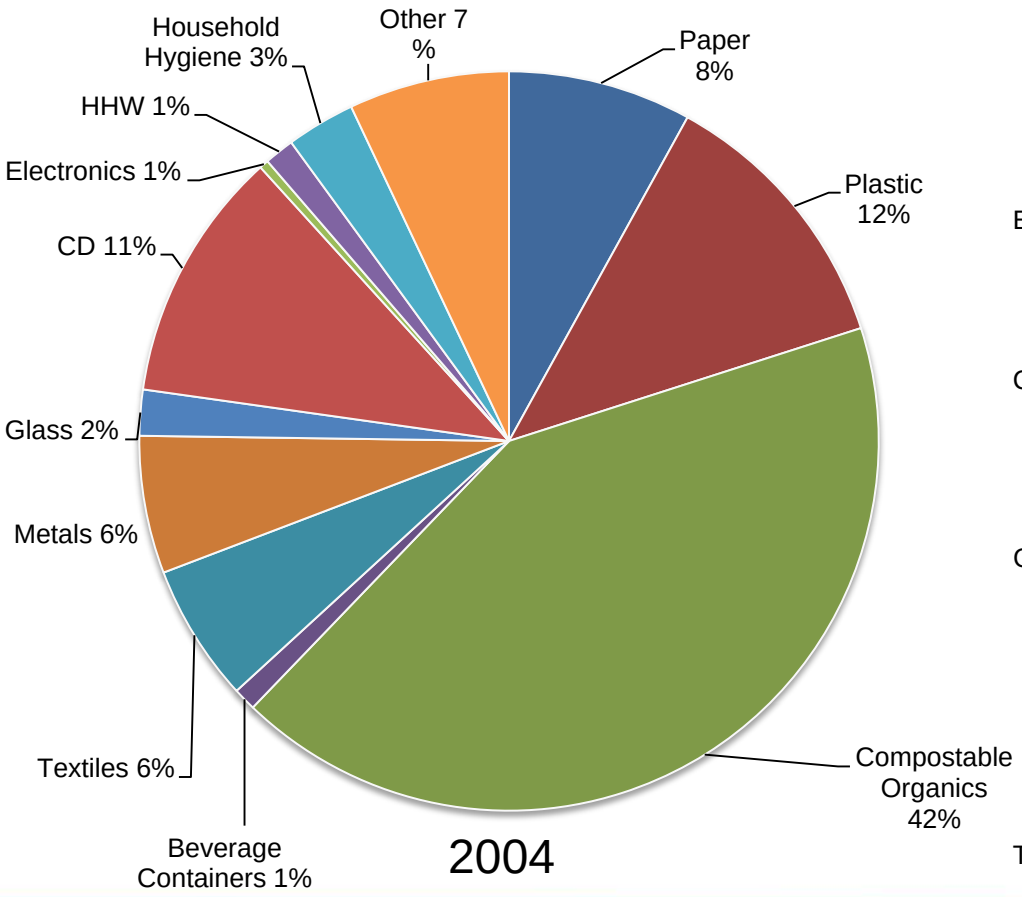
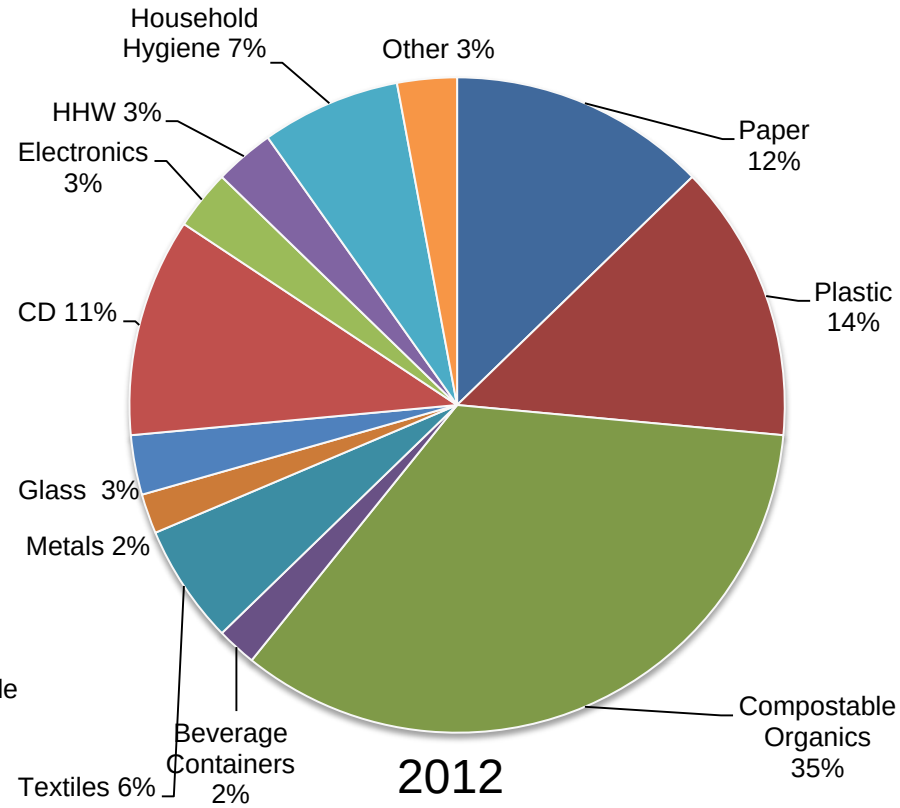
Waste Composition





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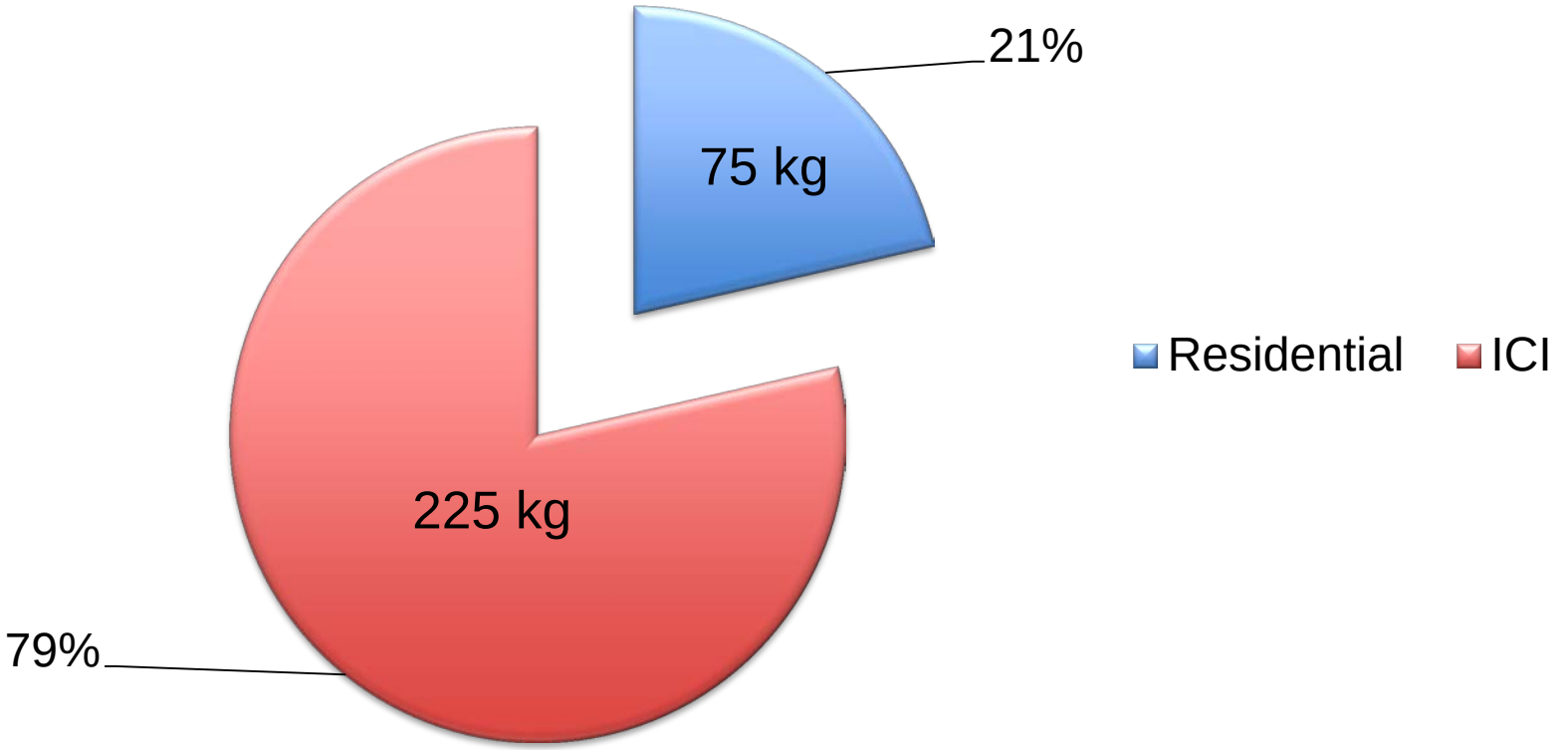
350 Kg Per Capita Disposal Rate



To 75% and Beyond!

Extended Producer Responsibility (EPR)

- BC Recycling Regulation
  - Printed Paper & Packaging - MMBC
- CCME Action Plan for EPR
  - CD materials
  - Furniture
  - Textiles & carpet

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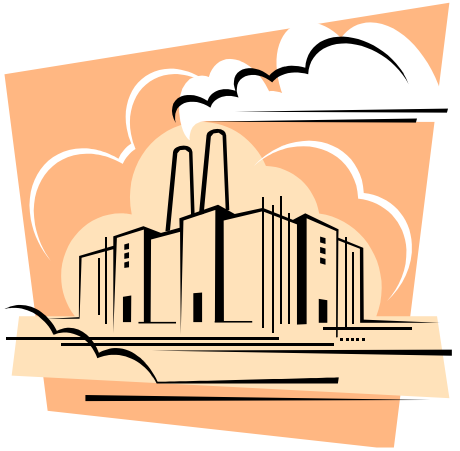
To 25% or Less!

- Waste to Energy
  - Counts as recovery if 60% energy recovery
- Metro Vancouver Zero Waste Plan
  - In-region WTE
  - Out-of Region WTE
- RDN WTE



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Questions

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