INFRASTRUCTURE SERVICES COMMITTEE

Thursday, July 20, 2017
SCRD Boardroom, 1975 Field Road, Sechelt, B.C.

AGENDA

CALL TO ORDER: 9:30 a.m.

AGENDA

1. Adoption of Agenda

PETITIONS AND DELEGATIONS

2.	Well Protection Plan I. Associated Environmental Delegation **II.** Staff Report **(Voting – A, B, D, E, F, Sechelt)**	Annex A pp 1 – 112
3.	Draft Regional Organics Diversion Strategy I. McIver & Associates Delegation II. Staff Report **(Voting – All)**	Annex B pp 113 – 147

REPORTS

4.	Manager, Solid Waste Services - Public Engagement Results – Organic Waste Diversion **(Voting – All)**	Annex C pp 148 – 192
5.	2017-Q2 Quarterly Report – Infrastructure **(Voting – All)**	Annex D pp 193 – 202

COMMUNICATIONS

NEW BUSINESS

IN CAMERA

THAT the public be excluded from attendance at the meeting in accordance with Section 90 (1) (e) and (k) of the *Community Charter* – "the acquisition, disposition, or expropriation of land or improvements…" and "negotiations and related discussions respecting the proposed provision of a municipal service…".

ADJOURNMENT

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee - July 20, 2017

AUTHOR: Dave Crosby, Manager, Utility Services, Special Projects
Trevor Rutley, Engineering Technician

SUBJECT: **WELL PROTECTION PLAN**

RECOMMENDATION(S)

THAT the report titled Well Protection Plan be received;

AND THAT recommendations from the Well Protection Plan be brought forward to the 2018 Budget process.

BACKGROUND

Well Protection Plans are a specified requirement in the Regional District's Operating Permits as issued by Vancouver Coastal Health Authority. In October, 2016 the Regional District awarded Contract No.16 265 to Associated Environmental Consultants Inc. (Associated) to develop a Well Protection Plan for all well sources operated by the SCRD.

DISCUSSION

The overall goal of the Well Protection Plan is to improve the safety of the drinking water systems for Langdale, Chaster, Soames, Granthams, and Eastbourne (Keats Island) water supply sources. The purpose of developing a Well Protection Plan is to identify the hazards that may threaten the quality of the groundwater supply source, rank the hazards according to risk, and develop an action to either reduce the chances that the hazards will occur, or mitigate the risk from the hazards if unavoidable.

The recommendations in the Plan include Capital Works such as improvements to well heads, pump houses and operational changes such as increased monitoring and sampling

Representatives from the Vancouver Coastal Health Authority, Associated and SCRD staff held an Open House at Eric Cardinal Hall on June 13, 2017 to present the Well Protection Plan to the public.

Associated will be presenting the Plan to the Infrastructure Services Committee at the July 20, 2017 meeting. Recommendations from the Plan that require funding will be brought forward through the 2018 Budget process if the Board adopts the Plan.

STRATEGIC PLAN AND RELATED POLICIES

The Well Protection Plan directly links to the set of values identified in the Strategic Plan.

More specifically, the Well Protection Plan aligns with the following Strategic Priorities:

Strategic Priority: Enhance Collaboration with shíshálh and SKwxwu7mesh Nations by respecting their review/comment process and their rights.

Strategic Priority: Embed Environmental Leadership through the responsible management of the regions' water supply.

CONCLUSION

The Well Protection Plan will improve the protection of the groundwater supply for the Regional Water Systems by identifying hazards that may threaten the groundwater supply source as well as actions that, if implemented, will reduce the chances of occurrence or mitigate the risk if the hazards are unavoidable.

Staff will prepare budget proposals for consideration to the 2018 budget that are recommended in the Well Protection Plan.

Attachment: Well Protection Plan – July 2017

Reviewed by:			
Manager	X- D. Crosby	Finance	X- T. Perreault
GM		Legislative	
CAO	X. J. Loveys	Other	

Associated Environmental

REPORT

Sunshine Coast Regional District

Well Protection Plan

July 2017

ISO 9001 and 14001 Certified | An Associated Engineering Company

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Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 PROJECT BACKGROUND

The Sunshine Coast Regional District (SCRD) operates five water supply systems in the Gibsons area. The systems, which include Chaster, Soames, Granthams, Langdale, and Eastbourne, are sourced by eight groundwater wells. The SCRD is required to complete a Well Protection Plan for those wells as one of the conditions of the Permit to Operate a Water Supply System with Vancouver Coastal Health.

In October 2016, Associated Environmental Consultants Inc. (Associated) was retained by the SCRD to complete the Well Protection Plan in accordance with the BC Ministry of Health Living and Sport (MHLS) Comprehensive Drinking Water Source-to-Tap Assessment Guideline (Source-to-Tap Guideline) Modules 1, 2, 7, and 8 (MHLS 2010). This Well Protection Plan addresses those four modules.

1.2 PROJECT OBJECTIVES

The overall goal of the Well Protection Plan is to improve the safety of the drinking water systems. The objectives of developing a Well Protection Plan are to:

- Identify the hazards that may threaten the quality of the groundwater supply source;
- Rank the hazards according to risk;
- Develop recommendations to either reduce the chances that the hazards will occur, or mitigate the risk from the hazards if unavoidable; and
- Provide costs and timelines associated with the recommendations.

All eight wells in the five water supply systems are addressed in this Well Protection Plan. This approach recognizes that the SCRD manages each system; therefore, similarities exist in management, system operation, land use planning, and emergency response coordination.

1.3 PROJECT SCOPE AND GENERAL PROJECT APPROACH

The Source-to-Tap Guideline provides a structured and consistent approach to evaluating risks to drinking water (MHLS 2010). It serves as a tool for water systems to: (a) develop a more comprehensive understanding of risks to drinking water safety and availability, (b) operate effectively, and (c) produce the best possible water quality. The four Source-to-Tap Guideline modules are:

- Module 1: Delineate and characterize drinking water sources
- Module 2: Conduct contaminant source (‘hazard’) inventory
- Module 7: Characterize risks from source to tap
- Module 8: Recommended actions to improve drinking water protection.

As mentioned above, the scope of this Well Protection Plan includes Modules 1, 2, 7, and 8. Modules 3, 4, 5, and 6 are related to engineering and governance, and are not required by the SCRD at this time.

The general approach of the Well Protection Plan is summarized in Table 1-1. The methods used for each module, including details on the risk analysis procedure, are described in Sections 2 through 5.

Table 1-1
General approach of the Well Protection Plan

Module Number	Module Name	Tasks
1	Delineate and Characterize Drinking Water Sources	• Characterized the water source by collecting and reviewing available data including previous groundwater reports, geological and groundwater mapping, flow records, and water quality data • Delineated the 200-day and 10-year well capture zones
2	Conduct Contaminant Source (Hazard) Inventory	• Reviewed existing records to identify potential hazards • Conducted a field survey to identify hazards and inspect the well heads • Lead a workshop with the TAC (Workshop 1) to identify hazards not found during the records review • Created maps showing all identified hazards
7	Characterize Risks from Source to Tap	• Lead a second workshop with the TAC (Workshop 2) to complete a hazard assessment of each identified hazard and ranked each as low risk, moderate risk, high risk, or very high risk • Completed a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis with the SCRD
8	Recommend Actions to Improve Drinking Water Protection	• Provided recommendations for all identified moderate, high, and very high risk hazards • Summarized the results of Modules 1, 2, 7, and 8 in the Well Protection Plan • Reviewed the SCRD emergency response plans and provided some hydrogeology related suggestions for improvements

1.4 TECHNICAL ADVISORY COMMITTEE

The Source-to-Tap Guideline recommends assembling a multi-disciplinary Technical Advisory Committee (TAC) to identify potential hazards to the drinking water system and assess the associated risks. In partnership with the SCRD, Associated facilitated the formation of a TAC whose members are listed in Table 1-2.

Table 1-2
Technical Advisory Committee members

Organization	Name	Title
SCRD	Dave Crosby	Manager of Utility Services Special Projects
SCRD	Kevin Johnson	Senior Water Operator
SCRD	Trevor Rutley	Engineering Technician
SCRD	Beth Brooks	Environmental Technician
Associated	Marta Green	Hydrogeologist
Vancouver Coastal Health	Darren Molder	Senior Environmental Health Officer

Additional SCRD staff (planners, operators) contributed to various components of the workshops. Records of meetings are in Appendix A.

1.5 DEFINITIONS

The following definitions are reproduced from the BC Well Protection Toolkit (BC MOE 2000). The planning team should become familiar with technical terms that will be used throughout the development of the Well Protection Plan. Figure 1-1 is a general model that shows many of these concepts.

Hydrogeology: Hydrogeology is the study of the flow of water and chemicals through the geological formations.

Aquifer: An aquifer is a permeable geological deposit (such as sand and gravel or fractured bedrock) that holds and yields a supply of water (Figure 1-1). The well may draw water from a large portion of the aquifer or only part of it.

Aquifer Protection Area: The aquifer protection area is the land area on which protection measures are taken. In most cases, this will be the area defined as the capture zone. However, it may include an area larger than the capture zone (e.g., the water district boundary). The aquifer protection area should be reviewed every year and revised as necessary.

Aquifer Transmissivity: Aquifer transmissivity refers to the rate that water can be transmitted to a pumping well.

Aquitard: An aquitard is a geological formation that does not transmit a significant amount of water to wells and springs. Some examples of aquitards are layers of finer grained sediments such as silts, clays, and compact tills.

Confined Aquifer: A confined aquifer occurs when an aquitard overlies an aquifer. The low permeability of the aquitard can help in protecting the underlying aquifer from impacts of human activities at the land surface. In those cases, an aquifer is said to be “confined.”

Unconfined Aquifer: Where no aquitards overlie the aquifer, the aquifer is said to be “unconfined” and is vulnerable to impacts from human activities at the land surface, particularly if the water table is shallow. Knowing which areas of the aquifer are most vulnerable can help in focusing the greatest effort into the areas that need most protection.

Water Table: The water table is the level of standing water in the ground (Figure 4-1) and is the upper boundary of the unconfined aquifer. Where the water table comes to the surface, lakes and wetlands form.

Drawdown Cone: When water is pumped from a well, the water table close to the well drops in a cone-shape (Figure 4-1). The area influenced by the pumping well is called the “drawdown cone.” Its shape will vary; it is circular only where the geology is uniform and the water table is level.

Time of Travel: The time it takes for a particular contaminant to be transported through groundwater flow to a specified location. Time of travel is commonly used to relate the distance of a contaminant source to a drinking water well (e.g. “that gas station is located within a one-year time of travel distance from the community well”).

Capture Zone: The capture zone is the land area that contributes water to the community well. A generic example of capture zone is shown in Figure 1-1. Any precipitation (rain or snow) that lands in this area may eventually end up in your well water. So may any fertilizers, oils, spills, or other contaminants.

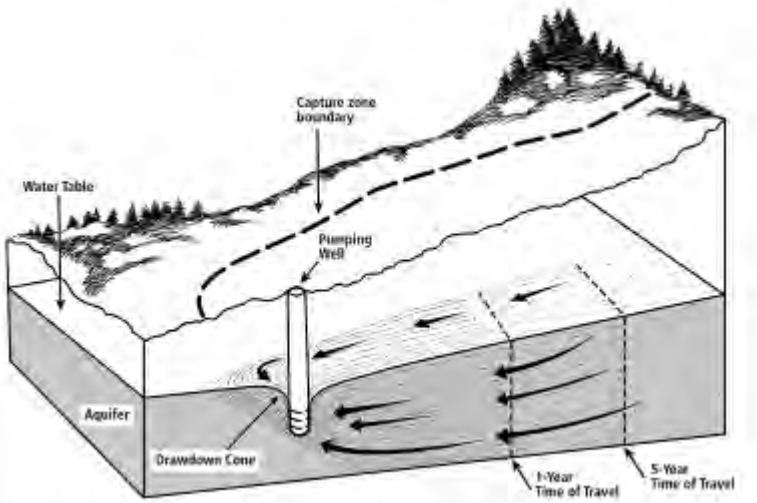

Figure 1-1
Schematic of a capture zone

2 Module 1: Delineation and Characterization of Water Source

Module 1 includes characterizing the water source and delineating the capture zones. The key outcome of Module 1 is a definition of the capture zones for the wells during regular operating conditions. The capture zone is the area around a well that contributes water to the well. To determine this area, an understanding of the water source (including a description of the wells, well sites, and hydrogeological setting) is first required.

2.1 CHARACTERIZATION OF WATER SOURCE

Table 2-1 lists the five water supply systems and eight wells that are included in this Well Protection Plan. The Soames, Granthams, and Langdale systems serve between 80 and 220 connections each. The Chaster system is part of the larger Chapman system, whose main supply is Chapman Creek, but up to 1500 connections within the Chapman system are supplemented by the Chaster well in summer. The Eastbourne system serves 160 connections.

Table 2-1
Well systems, wells, and associated aquifers

System	Well	General Location
Chaster	Chaster Road Well	Gower Point area
Granthams	Granthams Well	Soames Point and Granthams Landing (because the capture zones for these two wells overlap [Section 2.2], they are discussed together in this report).
Soames	Soames Well	
Langdale	Langdale Well	Langdale Ferry Terminal
Eastbourne (on Keats Island)	Drilled Well Gordon Well Collector Well Old East Well	Keats Island

2.1.1 Hydrogeological Setting

All groundwater is recharged from water that falls on the surface of the earth as rain or snow. The hydrogeological setting in which water supply wells are installed will dictate the vulnerability of the wells to contamination from surface, and the time it will take for contaminants to transport through the aquifer.

In confined aquifers, there is a layer of less permeable material, such as clay or silt, overlying the aquifer. This layer helps to protect the aquifer from contamination directly above because contaminants will take a very long time to percolate through, if at all. Unconfined aquifers do not have this overlying layer of less permeable material and are therefore more susceptible to contamination from the surface.

The rate of transport for contaminants in groundwater is dependent upon several factors, but primarily on the aquifer characteristics. Groundwater and contaminants will move quicker through coarse-grained sediments such as sand and gravel than through fine-grained sediments.

Provincial mapping occurred in 2002. The Chaster well is mapped within the Gibsons Lower Aquifer (MOE aquifer 560IIC), an aquifer within Pre-Vashon gravel, sand, and silt sediment. Langdale is mapped within the Langdale/Hopkins Landing Aquifer (MOE aquifer 552IIB), which is composed of more recent fluvial sand and gravel of the Salish sediments. Both aquifers are confined, with moderate productivity, low vulnerability to contamination, and moderate demand. Granthams and Soames are not within any MOE mapped aquifer. The three shallow wells of the Eastbourne system (Gordon, Old East, and Collector) are situated in MOE aquifer 547IIIB, which is a confined sand and gravel aquifer associated with glacio-marine environments (mostly shallow dug wells in till). The Drilled Well on Keats Island indicates 4.6 m of sand and gravel overlying 8.8 m of till, which overlies bedrock. The bedrock aquifer (MOE aquifer 548IIIB) is composed of igneous intrusive or metamorphic fractured rock. Both aquifers on Keats Island are low in productivity, with moderate vulnerability to contamination, and low demand (MOE 2017).

In 2013, a large aquifer mapping study was completed in the Gibsons area (Waterline 2013). Based on our review of the study and our understanding of the lithology of the SCRD wells, the Gibsons Lower Aquifer likely extends even farther than what was mapped by MOE, and likely extends from the base of Mt. Elphinstone to the west and all along the Sunshine Coast from north of Langdale well to south past Chaster well. Based on our review of available reports and well logs, all four wells (not including the four Eastbourne system wells) are likely situated in this larger, regional, confined aquifer.

The majority of recharge to the Gibsons Lower Aquifer is likely occurring at the base of Mt. Elphinstone, where the confining layer is not present (Waterline 2013). However, recharge is also possible at other locations closer to the well sites, including stratigraphic windows (i.e., where the confining layer is absent or thin), “losing” streams, and, to a lesser extent (orders of magnitude less), from confining layers “leaking” water to the aquifer.

Figure 2-1 shows the boundaries of the MOE mapped aquifers. However, based on the limitations on the MOE mapped aquifers described above, MOE mapped aquifers are not shown on figures after Figure 2-1.

2.1.2 Description of Wells and Well Sites

Tables 2-2 and 2-3 summarize the wells on the mainland and Keats Island, respectively. Available well logs are provided in Appendix B and well locations are shown on Figure 2-1.

Table 2-2
Summary of wells on Mainland

Well ID		Chaster Road Well	Soames Point Well	Granthams Landing Well	Langdale Well
Well Tag Number (WTN)		23421	65967	78231	24390
Well Plate ID (WPID)		n/a	n/a	n/a	n/a
Year of Construction		1970	1979	1990	1971
Maximum Supply Capacity (L/s)		17[A]	41[B]	2.8[C]	23[D]
Location	Easting (m) (Zone 10 U))	460374	464290	464236	465350
	Northing (m) (Zone 10 U)	5471238	5473657	5473615	5475842
	Ground Elevation (masl)	100	37	31	30
Construction Data	Static Water Level (m btoc)	70.7	9.4	flowing artesian	0.9
	Well Depth (m bgs)	108.2	36.9	15.8	44.5
	Screened Interval(s) (m bgs)	99.1 to 108.2	unknown	12.6 to 15.8	35.4 to 44.5
	Casing Diameter (mm)	203.2	254.0	203.2	304.8
	Screen Diameter (mm)	177.8	unknown	177.8	203.2

Notes:
masl – metres above sea level. Source: Google Earth digital elevation model.
m btoc – metres below top of casing
m bgs – metres below ground surface
A – Sustainable yield from the March 2014 flow test (Rutley, personal communication, 2016).
B – Alluvia (2004a). Reported maximum pumping rate at 650 US gpm.
C – Alluvia (2004b). Well is flowing artesian at 45 US gpm; well is not pumped
D – Alluvia (2004c). Well is pumped at 223 US gpm when operating at 60% capacity. Pumping rate at 100% was extrapolated from this value.
E - Langdale construction details source: Dayton Knight (1971). All other well construction details from well logs.

Table 2-3
Summary of Eastbourne wells (Keats Island)

Well ID		Gordon Well	Old East Well	Collector Well	Drilled Well
Well Tag Number (WTN)		749	7997	n/a	92987
Well Plate ID (WPID)		n/a	n/a	n/a	n/a
Year of Construction		unknown	unknown	unknown	2004
Maximum Supply Capacity (L/s)		unknown	unknown	unknown	0.13
Location	Easting (m) (10 U)	468270	468411	468379	468406
	Northing (m) (10 U)	5471445	5471739	5471743	5471762
	Elevation (masl)	40	63	70	65
Construction Data	Static Water Level (m bgs)	unknown	2.4	n/a	unknown
	Well Depth (m bgs)	6.1	6.1	n/a	74.7
	Screened Interval(s) (m bgs)	open hole - unknown interval	open hole from 1.2 to 6.1	n/a	open hole from 17.7 to 74.7
	Casing Diameter (mm)	1524	2134	n/a	152.4
	Screen Diameter (mm)	n/a	n/a	n/a	n/a

Notes:
masl – metres above sea level. Source: Google Earth digital elevation model.
m btoc – metres below top of casing
m bgs – metres below ground surface
Drilled well construction details source: Piteau (2005). All other well construction details from well logs.

2.1.3 Water Quality

Associated reviewed water quality data provided by the SCRD. The available data, average concentrations of key parameters, and comments about any noted increases in concentrations are provided in Table 2-4

Table 2-4
Summary of available water quality data

Well	Available Data	Average Concentrations		Raw water bacteria results	Comments
Chaster Road Well	General parameters, nutrients, and total metals: June 2008, May 2009, June 2010, May 2012, and May 2015. Additional nitrate, nitrite, and total phosphorus data from 2001 and 2002.	Chloride = 4.6 mg/L Sodium (total) = 8.24 mg/L Sulphate = 5.2 mg/L TDS = 114 mg/L	Turbidity = 1.6 NTU Nitrate = 0.71 mg/L Hardness = 45.0 mg/L	None available	• Minor indication of increasing nitrate-N. Between 2001 and 2002, nitrate-N was around 0.6 mg/L. Between 2008 and 2012, it was around 0.7 mg/L. In the most recent sample (2015), it was 1.01 mg/L. Also minor increase in chloride (4 mg/L in 2008 to 6 mg/L in 2016). • One sample (2008) of total iron (0.576 mg/L) was above the aesthetic objectives (0.3 mg/L) out of five samples collected.
Soames Point Well	General parameters, nutrients, and total metals tested yearly or bi-annually from 2008 to 2016. Additional nitrate, nitrite, and total phosphorus data from 2001, 2002, 2003, and 2007. Total coliforms and *E. coli* tested twice monthly in 2011 and 2013.	Chloride = 3.8 mg/L Sodium (total) = 5.8 mg/L Sulphate = 7.5 mg/L TDS = 98 mg/L	Turbidity = 0.2 NTU Nitrate = 0.66 mg/L Hardness = 39.6 mg/L	Neither total coliforms nor *E. coli* were detected in any of the 46 samples from 2011 and 2013.	• Minor indication of increasing chloride (3.2 mg/L in 2008 to 4.8 mg/L in 2016) and sodium (5.11 mg/L in 2008 to 6.8 mg/L in 2016).
Granthams Landing Well	General parameters, nutrients, and total metals tested yearly or bi-annually from 2009 to 2015. Total coliforms and *E. coli* tested monthly (occasionally twice per month) in 2013. Some additional data from 2011.	Chloride = 3.2 mg/L Sodium (total) = 5.3 mg/L Sulphate = 7.8 mg/L TDS = 92.5 mg/L	Turbidity = 0.8 NTU Nitrate = 0.45 mg/L Hardness = 35.6 mg/L	Total coliforms were detected in four of 18 samples in 2013 (at 3 counts maximum) and *E. coli* were not detected. Neither *E. coli* nor total coliforms were detected in the six samples from 2011.	• Turbidity exceeded 1 NTU periodically (2011, 2012).
Langdale Well	General parameters, nutrients, and total metals tested yearly or bi-annually from 2008 to 2016. Additional nitrate, nitrite, and total phosphorus data from 2001, 2002, 2003, 2005, and 2007. Total coliforms and *E. coli* tested twice monthly in 2011 and 2013.	Chloride = 2.9 mg/L Sodium (total) = 5.9 mg/L Sulphate = 10.0 mg/L TDS = 81.4 mg/L	Turbidity = 0.4 NTU Nitrate = 0.34 mg/L Hardness = 34.5 mg/L	Neither total coliforms nor *E. coli* were detected in any of the 24 samples from 2013. In 2011, total coliforms were detected once out of 23 samples (at 1 count) and *E. coli* were not detected.	• Total copper and iron have increased. Total copper increased from 1.9 µg//L in 2008 to 2.33 µg/L in 2016. Total iron increased from 0.053 mg/L to 0.0908 mg/L in 2016. • Total sodium increased from 5.43 mg/L in 2008 to 6.99 mg/L in 2016. • One elevated nitrate result (2.19 mg/L in 2005). Otherwise, nitrate remained below 0.4 mg/L.

Table 2-4
Summary of available water quality data

Well	Available Data	Average Concentrations		Raw water bacteria results	Comments
Eastbourne Drilled Well	General parameters, nutrients, and total metals tested yearly to three times annually from 2007 to 2016. Total coliforms and *E. coli* tested twice monthly in 2011 and 2013.	Chloride = 7.9 mg/L Sodium (total) = 67.8 mg/L Sulphate = 24.5 mg/L TDS = 231.1 mg/L	Turbidity = 0.4 NTU Nitrate = 0.042 mg/L Hardness = 26.2 mg/L	Neither total coliforms nor *E. coli* were detected in any of the 26 samples from 2013. In 2011, total coliforms were detected in three of 22 samples (at 36.4 counts maximum). *E. coli* were not detected.	• Total arsenic frequently exceeded the MAC guideline of 10 µg/L. Total manganese exceeded the AO guideline of 50 µg/L once. The well is treated for arsenic. • Chloride increased from 4.2 mg/L in 2007 to 10 mg/L in 2016. Total sodium also increased from 27.1 mg/L in 2007 to 74.3 mg/L in 2016, with the exception of 79 mg/L in 2008.
Mixed raw water (Eastbourne System)	General parameters, nutrients, and total metals tested yearly to three times annually from 2007 to 2016. Total coliforms and *E. coli* tested twice monthly in 2011 and 2013 in the Collector Well, Old East Well, and Gordon Well.	Chloride = 7.4 mg/L Sodium (total) = 16.8 mg/L Sulphate = 9.9 mg/L TDS = 84.7 mg/L	Turbidity = 0.2 NTU Nitrate = 0.6 mg/L Hardness = 20 mg/L	**Collector Well** – Total coliforms were detected in four of 26 samples in 2013 (at 10 counts maximum) and six of 27 samples in 2011 (at 410.6 counts maximum). *E. coli* were not detected in 2013, but were detected once in 2011 (at 1 count). **Old East Well** – total coliforms were detected frequently (over 75% of the time) in 2011 and 2013. *E. coli* was detected once each in 2011 and 2013, at 2 counts and 1 count, respectively. **Gordon Well** – total coliforms were detected over frequently (over 80% of the time) in 2011 and 2013. *E. coli* was detected twice in 2013 and once in 2011 (at 2 counts maximum)	• Lead exceeded the MAC guideline of 10 µg/L once in September 2013 (14.7 µg/L).

Notes:
TDS = Total dissolved solids

2.2 DELINEATION OF CAPTURE ZONES

Table 1-4 in Module 1 of the Source-to-Tap Guideline summarizes the different capture zone delineation methods, from simple to more complex, and recommends which one to follow depending on the size of the water system and the hydrogeologic setting (MHLS 2010). The number of connections each well is used for ranges from 80 (Soames Well) to 1,500 (the Chapman water system up to Gower Point, which is augmented by the Chaster well in summer only). For water systems with 100 to 10,000 connections, the Source-to-Tap Guideline recommends using analytical equations and hydrogeological mapping to delineate the capture zones. Therefore, we used a combination of hydrogeological mapping and the analytical equation method outlined by Ceric and Haitjema (2005), which includes a mathematical approach to justify the method selection between the circular, eccentric circular, and boat-shaped capture zone analytical equations that are presented in the BC Well Protection Toolkit (MOE 2000). The analytical equations required estimating the aquifer's hydraulic conductivity (m/s), thickness (m), hydraulic gradient (unitless), and porosity (unitless) as well as the pumping rate of the well (m^3/s) and the timeframe of interest.

For this assignment, capture zones are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate. This is to allow for an increase in pumping rate, if the SCRD so chooses, without re-doing the capture zones. Following this approach, we mapped the 200-day and 10-year capture zones for each well. A 200-day capture zone represents the survival time of pathogens (including viruses) and is consistent with the new version of the BC Ministry of Health's Guideline for Determining Groundwater at Risk of Containing Pathogens (MoH 2015)[1]. A 10-year capture zone represents the time it would take to remediate a chemical spill or leak. In addition to 200-day and 10-year capture zones, well protection zones of 100 m were applied to all wells. The well protection zone represents the area of greatest risk to source water, and is a recommendation from the Source-to-Tap Guideline. Herein, the capture zones are referred to as Aquifer Protection Areas (APAs). The 100 m well protection zone is referred to as APA A, the 200-day capture zone is referred to as APA B, and the 10-year capture zone is referred to as APA C. An overview of the delineated APAs for all wells is shown on Figure 2-1, and Table 2-5 lists the parameters that were used to delineate the capture zones.

[1] Pathogens are disease causing organisms. There are three types of water-born pathogens of concern to humans: viruses, bacteria, and protozoa, each with different sizes, life cycles, and characteristics.

Table 2-5
Parameters used to delineate the capture zones for Chaster, Soames, Grantham, and Langdale Wells

		Chaster Well (WTN 23421)	Soames Well (WTN 65967)	Granthams Well (WTN 78231)	Langdale Well (WTN 24390)
Aquifer description based on well logs		Confined, fine sand aquifer	Confined, coarse sand and gravel aquifer		Confined, fine sand aquifer
Analytical equation used	200-day	Eccentric circular	Boat-shaped	Boat-shaped	Circular
	10-year	Boat-shaped	Boat-shaped	Boat-shaped	Eccentric circular
Hydraulic conductivity (m/s)[1]		$3x10^{-5}$	$2x10^{-3}$ m/s	$2x10^{-3}$ m/s	$1x10^{-5}$ m/s
Aquifer thickness (m)[2]		32.3	7.3	8.2	22.3
Porosity[3]		0.25	0.25	0.25	0.25
Hydraulic gradient[4]		0.02	0.02	0.02	0.035
Pumping rate		270 US gpm (17 L/s) [5]	650 US gpm (41 L/s) [6]	45 US gpm (2.8 L/s) [7]	373 US gpm (23 L/s) [8]
Changes to analytical equation results based on hydrogeological mapping		No changes made to the analytical equation results.	The individual capture zones coincided, so the 200-day and 10-year zones were combined. These capture zones were large and extended beyond Mt. Elphinstone so they were ended at what is estimated to be the contact of the bedrock and the surficial sediments.		No changes made to the analytical equation results.

Source:
[1] Waterline (2013) for Chaster and Soames Point. Granthams is assumed to be the same as Soames Point. For Langdale, the hydraulic conductivity was estimated based on the well lithology and values in Freeze and Cherry (1979).
[2] Waterline (2013) and the well log for Chaster, and from the well logs for Soames Point, Granthams, and Langdale.
[3] Freeze and Cherry (1979) for all wells.
[4] Waterline (2013) and topography for Chaster, Soames Point, and Granthams and from topography for Langdale.
[5] Sustainable yield from the March 2014 flow test (Rutley, personal communication, 2016).
[6] Alluvia (2004a). Reported maximum pumping rate at 650 US gpm.
[7] Alluvia (2004b). Well is flowing artesian at 45 US gpm; well is not pumped
[8] Alluvia (2004c). Well is pumped at 223 US gpm when operating at 60% capacity. Pumping rate at 100% was extrapolated from this value.

The Drilled Well (WTN 92987), Old East Well (WTN 7997), and Collector Well (no WTN) are located around the Eastbourne water treatment plant. The Drilled Well is 74.7 m deep and installed in fractured granite. Piteau (2005) estimated the hydraulic conductivity of the aquifer to be $1x10^{-7}$ m/s. The porosity of fractured rock aquifers is assumed to be 0.1 (Freeze and Cherry 1979). Based on topography, the hydraulic gradient is approximately 0.08. Piteau (2005) indicated that the sustainable well yield was approximately 2 US gpm ($1.3x10^{-4}$ m^3/s). These variables indicated that an eccentric circular method would be the most suitable for the 10-year capture zone. The result was a circle with a radius of 50 m shifted upgradient 4 m. Since this area is smaller than the well protection zone (100 m radius), the well protection zone was used for the 10-year capture zone. The Collector Well is a shallow, dug trench lined with drain rock that collects surface

water and pumps it into raw water tanks for treatment. Because this trench collects surface water, the capture zone is ultimately the catchment area for surface water. For the 1 and 10-year aquifer protection areas, we therefore delineated the catchment area of the 100m well protection zone (Figure 2-1). The Old East Well is a shallow dug well (6.1 m deep) about 30 m from the Collector Well. Therefore, the aquifer protection areas for the Old East Well is combined with those of the Collector Well.

The Gordon Well (WTN 749) is located approximately 350 m south of the Eastbourne water treatment plant. It is a dug well approximately 6.1 m deep. Very little information exists regarding the lithology or construction of the well. Similar to that used for the Collector Well, and because the well is so shallow, the 1 year and 10-year aquifer protection areas for the Gordon Well is the catchment area for surface water of the well protection zone (100 m radius around the well).

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Associated Environmental

Well Location

SCRD Water Mains

MOE Aquifer

Aquifer Protection Area

A - 100m Well Protection Zone

B - 200 Day Time of Travel

C - 10 Year Time of Travel

Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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FIGURE 2-1: CAPTURE ZONE OVERVIEW - ALL WELLS

Sunshine Coast Regional District

Well Protection Planning

3 Module 2: Contaminant Source Inventory

Module 2 includes a contaminant source inventory that identifies the inherent risks to water quality as well as describing land uses, human activities, and other potential hazards that could affect source water quality within the APAs. In this Well Protection Plan, potential contaminant sources are referred to as "hazards."

3.1 TYPES OF HAZARDS

3.1.1 Point Source and Non-Point Source Hazards

The term hazards are defined in the Source-to-Tap Guideline to mean both actual/existing and potential hazards. Hazards are typically categorized as point source or non-point source. Point sources of contamination arise from a single, identifiable location (e.g., a wastewater treatment plant). Non-point sources arise from multiple diffuse sources over an area (e.g., runoff from agricultural land, septic tanks).

There are seven main types of land uses that can cause a point source or non-point source hazard. Examples of hazards from each type of land use are as follows:

- Naturally occurring: pathogens from wildlife including bacteria (*E. coli*), and protozoa such as *Giardia lamblia.* Bacteria die off in a matter of weeks, but protozoa can remain active for months because of a protective shell.
- Agricultural: nitrates, phosphates, pesticides, automotive wastes from farm machinery
- Forestry-related: phenolics from decomposing woodwaste, turbidity, nitrates, motor fuel and pathogens from camp wastewater
- Municipal: fertilizers and pesticides from fields/parks, stormwater run-off, salt (sodium chloride)
- Commercial: contaminants from airports, auto repair shops, dry cleaners
- Industrial: specific contaminants from specific industrial land uses
- Residential: pathogens from septic tanks, heating oil, pesticides, solvents

3.1.2 Climate Change

In recent years we have experienced extreme weather and weather-related events across Canada, including storms, flooding, drought, wind, and wildfires. Water system infrastructure, including water quality from water supply wells, is vulnerable to the changing climate. For example, virus detection and concentrations appear to be associated with groundwater recharge events (Bradbury et al. 2013), and more precipitation systematically increased childhood gastrointestinal illness in municipalities accessing untreated water, including both groundwater and surface water sources (Uejio et al 2014). In that case, the relative risk of contracting gastrointestinal illness was 240% higher in very wet weeks with 12 cm of precipitation (Uejio et al 2014). This suggests that with a changing climate and more extreme storm events, groundwater supplies may not be as protected from surface contaminants as once thought.

3.2 HAZARDS INVENTORY

To determine potential hazards, the following tasks were conducted:

1. A review of existing records, including:
   - MOE Site Registry of contaminated sites
   - Historical aerial photographs of the area
   - Zoning maps
   - Utility maps
   - MOE waste management database
   - BC Water Resource Atlas to identify all registered wells
   - Relevant past reports
2. A field survey; and
3. A workshop (Workshop 1) with the TAC members who added and removed hazards based on their knowledge of the water supply systems.

3.2.1 Records Review

3.2.1.1 Site Registry

The Site Registry is a database administered by the MOE that pertains to the environmental condition of land in the province (MOE 2016b). This registry is not a complete database of contaminated sites in BC, but it does provide a record of sites that the MOE has documented as contaminated or as having undergone a contaminated sites investigation. Search results typically provide a record of current or past contamination, spills, or environmental works at registered sites.

Associated conducted a large area search (i.e., 100 km^2 from the approximate centre of the study area), which returned 23 records of surrounding properties. Of these 23 records, only four were for properties within the designated capture zones (Site IDs 8414, 9116, 9449, and 18124). Detail Reports were obtained for these four properties and are summarized below. The Site Registry search and Detail Reports are provided in Appendix C.

Langdale Ferry Terminal (Site ID 8414): Located in the Langdale Well Capture Zone
This site has been registered with the MOE since 2003. The Detail Report indicates that a Notice of Independent Remediation Completion was submitted to the MOE in 2003. The owner of the site was listed as BC Ferries. The site is currently listed as Inactive- No Further Action.

1281 Marine Drive, Gibsons (Site ID 9116): Located in the Langdale Well Capture Zone
This site has been registered with the MOE since 2004. The Detail Report indicates that a Certificate of Compliance (COC) was issued by the MOE in 2014. This COC was issued after remediation was undertaken and completed following the decommissioning of the former Hopkins Landing Bulk Plant. The site is currently listed as Active- Remediation Complete. Based on this information, it is unlikely that this site will pose environmental concern in the capture zone.

1170 Stewart Road, Gibsons (Site ID 9449): Located in the Granthams and Soames Well Capture Zone
This site has been registered with the MOE since 2005. The Detail Report indicates that a Site Profile was submitted to the MOE in 2004 for a property that was used for ship building or boat repairs. It was

determined by the MOE that no further investigation was required. The site is currently listed as Inactive- No Further Action. Based on this information, this site is not expected to pose significant environmental concern for the capture zone.

1196 Stewart Road, Gibsons (Site ID 18124): Located in the Granthams and Soames Well Capture Zone
This site has been registered with the MOE since 2015. The Detail Report indicates that a Site Profile was submitted to the MOE in 2015 for a welding and machine shop and industrial wood waste disposal operation. The Site Profile indicated that the site had fill material that could potentially have come from a contaminated source, and that there were above-ground fuel or chemical storage tanks present at the site. This triggered the MOE to determine that further investigation was required. This determination does not necessarily mean there is contamination present at the site, but rather that the operations at the site warrant further investigation (i.e. a Stage 1 or 2 Preliminary Site Investigation). There is no other information available in the Detail Report as to whether any further investigative work has been conducted at the site. The site is currently listed as Active- Under Assessment. To date, there have been no updates to the status of this report since it was registered in 2015. Associated spoke with Ms. Jennifer Samways, Site Information Advisor with the MOE on March 14, 2017. She indicated that there is no further information available for this site, and if there have been updates to the status of the site (i.e. notice of contamination, or migration of contamination off-site) that it would have been listed in the Detail Report (J. Samways, pers. comm. 2017). She also stated that any changes to the status of sites is updated once a week. Since there have been no updates to this report since 2015, it is difficult to definitively conclude whether the site poses a risk of contamination in the capture zone or not. However, new information on this site may become available over time, which could help determine the level of risk (if any) that the site poses to the drinking water supply wells.

3.2.1.2 Historical Aerial Photographs

Associated reviewed historical aerial photographs and Google Earth images for the area dating back to 1967. A summary of the findings of the review is provided in Table 3-1.

Table 3-1
Historical aerial photograph review

Date	Description			
	Chaster	Granthams and Soames	Langdale	Eastbourne
1967, 1968, 1972, 1978	The capture zone is mainly undeveloped forested land.	The capture zone is mainly undeveloped or small-scale residential and agricultural properties. An industrial area is being developed in the north portion of the capture zone	The capture zone is mainly undeveloped land and small-scale residential properties. The Langdale Ferry Terminal is located in the centre of the capture zone.	The capture zone is mainly undeveloped forested land.
1982, 1986, 1990, 1994, 1998	The capture zone is mainly small-scale residential properties or undeveloped forested land. There is a cleared area in the northwest portion of the capture zone, which appears to be used as a cement plant. Arial photographs were not available for 1986 for this capture zone.	The capture zone is generally the same as 1978, except the industrial zone in the north is more developed and there are more residential properties in the south and central portions of the capture zone. Aerial photographs were not available for 1986 or 1982 for this capture zone.	The capture zone is generally the same as 1978, except for slightly more development of residential properties. Prior to the 1998 air photo, the highway ran directly east of the Langdale Well, by the Langdale Ferry Terminal. Between 1994 and 1998, it appears that a highway bypass was constructed further west of the well. The area between the old highway and the new bypass was converted into a paved parking lot.	The capture zone is generally the same as 1978 except for a small increase in residential properties.

Date	Description			
	Chaster	Granthams and Soames	Langdale	Eastbourne
2005, 2009, 2012, 2013, 2014, 2016	The capture zone is generally the same as in 1998, except there is more development of residential properties in the south end of the capture zone. The cement plant is still visible in the northwest corner.	The capture zone is a mixture of commercial, industrial, and residential properties. The industrial area is in the north portion of the capture zone, while the main residential areas are in the south and centre portions of the capture zone.	The capture zone is a mixture of medium-density residential properties and undeveloped forested land. The Langdale Ferry Terminal is located in the centre of the capture zone.	The capture zone is mainly undeveloped forested land. There are some small-scale residential properties and unpaved access roads located throughout.

3.2.1.3 Zoning Information

Current (2016) zoning information was publicly available through the SCRD's and Islands Trust website. The zoning in the capture zones are mainly agricultural, residential, and parkland land use. However, some commercial and industrial land use is present, specifically in the Granthams and Soames well capture zone. Areas within the capture zones that are zoned for commercial and industrial land use present a higher risk for contamination to occur. An overview of the zoning for each of the capture zones is summarized below:

- Chaster – Zoning is a mixture of residential, park/assembly, and rural. There are no areas with commercial or industrial zoning.
- Granthams and Soames – There is an industrial area located in the north portion of the capture zone, where there are a number of potential hazards. The remaining area is zoned for rural, residential, and park/assembly land use.
- Langdale – The capture zone is a mixture of residential, park/assembly, and rural zoning. The Langdale Ferry Terminal is located in this capture zone, which could be considered as commercial or light industrial land use.
- Keats Island – The capture zone is a mixture of residential, institutional, and rural zoning.

Zoning information of interest is shown on Figures 3-1, 3-2, 3-3, and 3-4.

3.2.1.4 Utility Maps

The SCRD provided maps of water lines (Figures 3-1, 3-2, 3-3, and 3-4). Some information was provided for two private sanitary systems, and any relevant information was added to the list of hazards. No other utility information was provided. We assume that there are private utilities in the area (e.g., natural gas and cable), and have made some assumptions based on their location when developing recommendations.

3.2.1.5 Waste Management Database

A search of the Waste Management Database (MOE 2016c) included the Authorization Management System Database (AMS) and the Environmental Violations Database (EVD). All relevant information was included during Module 7, Characterization of Risk.

3.2.1.6 BC Water Resource Atlas

A search of the BC Water Resource Atlas revealed all registered water wells within the water supply systems (MOE 2016a). Registered water wells are shown on Figures 3-1, 3-2, 3-3, and 3-4.

3.2.1.7 Review of Relevant Reports

Associated reviewed the following previous reports to identify potential water well hazards:

- Alluvia Environmental Services. 2004. Sunshine Coast Regional District Langdale Water System: Drinking Water Source Assessment Report. Prepared for: Coast Garibaldi Health, Vancouver Coastal Health Authority.
- Alluvia Environmental Services. 2004. Sunshine Coast Regional District Soames Point Water System: Drinking Water Source Assessment Report. Prepared for: Coast Garibaldi Health, Vancouver Coastal Health Authority.
- Dayton & Knight. 1996. Aquifer Protection Plan. Sunshine Coast Regional District. This includes a report from Piteau Associates. 1996. Re: West Howe Sound Public Water Supply Well's Capture Zones.
- Opus Dayton Knight Consultants Ltd. 2013. Comprehensive Regional Water Plan. Prepared for: Sunshine Coast Regional District.
- Piteau Associates. 1998. Sunshine Coast Aquifer Protection Plan, Monitoring Well Installation.
- Piteau Associates. 1999. Sunshine Coast Aquifer Protection Plan, Monitoring Well Update and SCRD Production Well Instrumentation Costs
- Piteau Associates Engineering Ltd. 2005. Eastbourne Well Protection Study. Prepared for: Sunshine Coast Regional District.
- Sunshine Coast Regional District and Enerficiency Consulting. 2012. Sunshine Coast Renewable Energy Atlas.

All relevant information is included in the appropriate table list of hazards.

3.3 FIELD SURVEY

Marta Green, P.Geo., of Associated performed the field survey on November 14 and 15, 2016. Ms. Green was accompanied by Trevor Rutley, Codi Abbott, and Kevin Johnson on November 14, and by Paul Sheridan on November 15. At the Eastbourne sites, we were joined by water operators Alex Laidlaw, Andrew Nadler, and Scott Benson. All relevant information was included during Module 7, Characterization of Risk.

3.4 TAC WORKSHOP 1

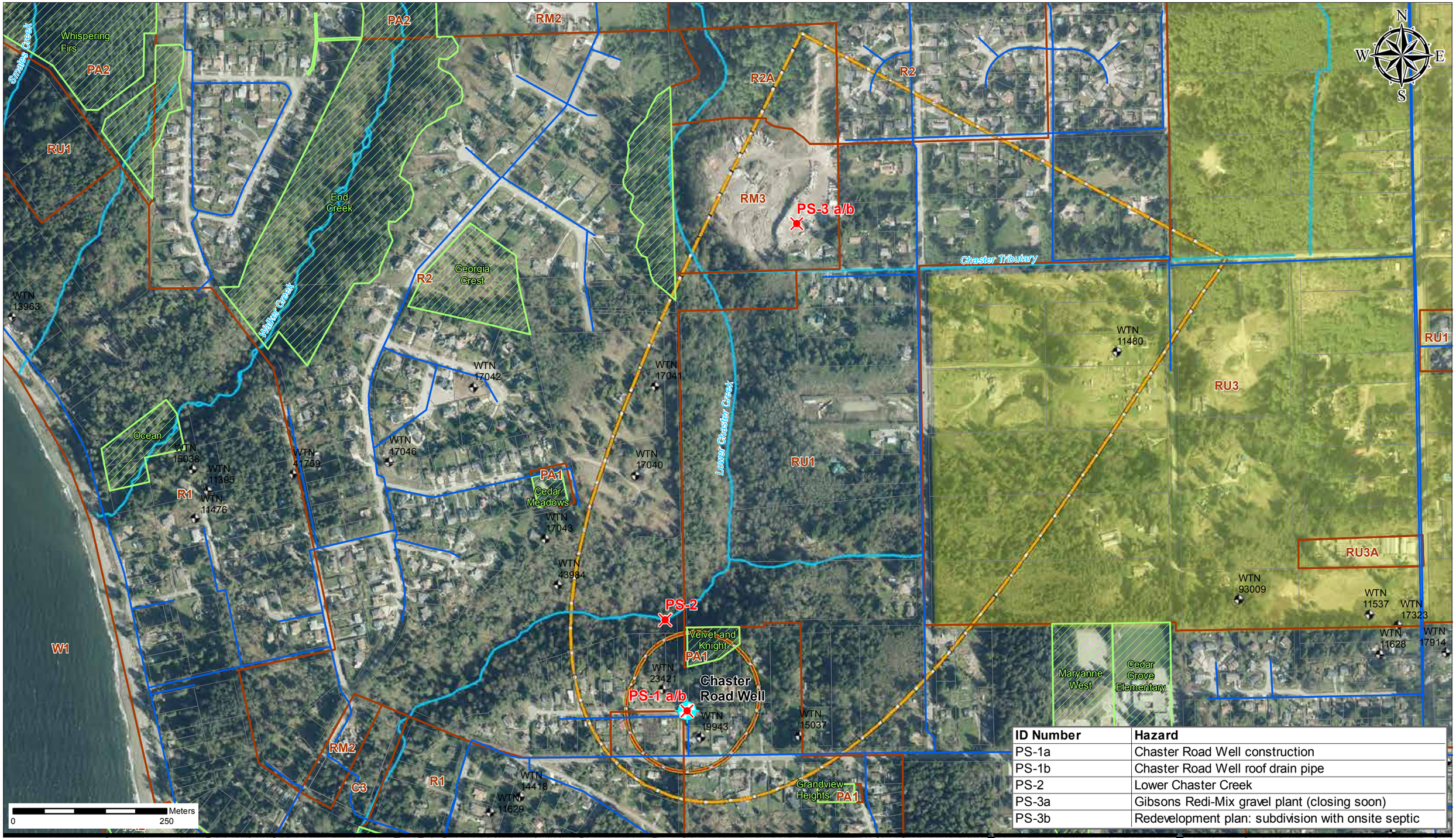
On November 14, 2016, Associated led TAC Workshop 1 to identify hazards not found during the records review and to obtain more information on the hazards that were identified by Associated during the records review. The workshop was attended by TAC members (Table 1-1). The TAC reviewed the hazards identified during the records review. The TAC then added and removed hazards based on local knowledge. In total, 26 potential point-source hazards and 8 non-point source hazards were identified. The hazards are separated into point sources and non-point sources.[2]

The hazards identified during the records review, field survey, interviews, and TAC Workshop 1 were used to produce the list of hazards (Table 3-2). The locations of the identified point source contaminants are shown in Figure 3-1.

[2] Point sources of contamination arise from a single, identifiable location (e.g., a wastewater treatment plant). Non-point sources arise from multiple diffuse sources over an area (e.g., agricultural land, septic tanks).

Table 3-2
Drinking water hazards – Chaster Well

Hazard No.	Hazard	Owner/ Jurisdiction	Location	Contaminants of Concern	Transport Mechanism and other notes
Point Sources					
PS-1a	Well site Hazard 1a: Well is located in a concrete pit.	SCRD	At wellhead	Pathogens	Direct to groundwater via annular space to screen intake
PS-1b	Well site Hazard 1b: Roof drain discharges to pipe - unknown where the pipe drains to.	SCRD	At wellhead	Pathogens	Short circuit to below ground surface and within 1 m of well casing.
PS-2	Lower Chaster Creek	Public	At edge of APA A and B, upgradient of well.	Pathogens, nitrates	Infiltration to groundwater
PS-3a	Gibsons Redi-Mix Ltd. gravel plant. The gravel plant is closing down soon.	Private owner	740 m north. 1327 Fitchett Road	Elevated pH from possible cement wastewater, hydrocarbons from possible above-ground storage tanks and under-ground storage tanks, antifreeze from chemical release.	Deposits and runoff to groundwater, or to Chaster Creek and then to groundwater.
PS-3b	Gibsons Redi-Mix Ltd. Redevelopment plan: subdivision and 60 trailer pads with onsite septic. Two subdivided lots, both under 22,700 L/day. However, the SCRD is requiring the wastewater treatment facility to meet the Municipal Wastewater Regulations.	Private owner	740 m north. 1327 Fitchett Road	Nitrates (pathogens are not considered a hazard because site is outside of the 200-day capture zone)	Infiltration to groundwater, or to Chaster Creek and then to groundwater.
Non-point Sources					
NPS-1	Poorly constructed existing wells in capture zone - monitoring wells, irrigation wells, domestic wells, or geoexchange wells	Various owners	Throughout all capture zones	Poorly constructed existing wells or wells drilled pre-2005 may not have been constructed with a surface seal and therefore could act as a direct pathway to the aquifer, and then the contaminant would travel horizontally through aquifer.	Inside the 200-day capture zone, pathogens and chemical contaminants are of concern. Outside of 200 day the concern would be on chemical contaminants.
NPS-2	Underground or above-ground residential heating oil storage tanks	Private owners	Throughout all capture zones	BTEX, VOCs, Diesel, MTBE, petroleum hydrocarbons, waste oil	Leaks and spills, and then infiltration to groundwater
NPS-3	Residential properties	Private owners	Directly across from well	Pesticides, herbicides, household cleaners, automotive wastes	Deposits and runoff to groundwater
NPS-4	Agricultural operations	Private owners	About 25% of Aquifer Protection Area C is within the ALR	Nitrates, pesticides, herbicides, pathogens	Runoff, seepage to groundwater
NPS-5	Natural gas lines and other private utilities (preferred pathways)	Fortis BC and others	Throughout capture zone area	Utility lines and the bedding sands used to install the utility lines can act as preferred pathways carrying surface contaminants longer distances than through native ground.	Spills, runoff, leaks infiltrating to groundwater
NPS-6	Roads and other transportation infrastructure including storm drains and discharge points (like dry wells)	SCRD/MOTI	Velvet Road, directly adjacent to well	Automotive wastes, sodium chloride, pesticides, herbicides, solid and liquid spills and runoff	Spills, runoff, leaks infiltrating to groundwater
NPS-7	Animals and pests	Various owners	In green space throughout study area	Pathogens	Deposits to soil and groundwater
NPS-8	Septic systems/septic tanks	Private owners	Closest upgradient residential area is 23 m away (to front lawn). About 8 homes are within APA B.	Pathogens (coliform and non-coliform bacteria and viruses), chloride, sulphate, nitrates, phosphate, heavy metals, and PCPs (pharmaceuticals and personal care products). Tetrachloroethylene, dichlorobenzene, and methylene chloride are present in some septic tank/cesspool cleaners.	Infiltration to groundwater



ID Number	Hazard
PS-1a	Chaster Road Well construction
PS-1b	Chaster Road Well roof drain pipe
PS-2	Lower Chaster Creek
PS-3a	Gibsons Redi-Mix gravel plant (closing soon)
PS-3b	Redevelopment plan: subdivision with onsite septic

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Associated Environmental

Potential Hazard

Well Location

MOE Registered Well

SCRD Water Mains

Zoning* Boundary

ALR Land

Park

*Zoning Codes: R** = residential,I** = industrial, C** = commercial, P** = parks, W** = water

Aquifer Protection Area

A - 100m Well Protection Zone

B - 200 Day Time of Travel

C - 10 Year Time of Travel

Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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FIGURE 3-1: DRINKING WATER HAZARDS – CHASTER WELL

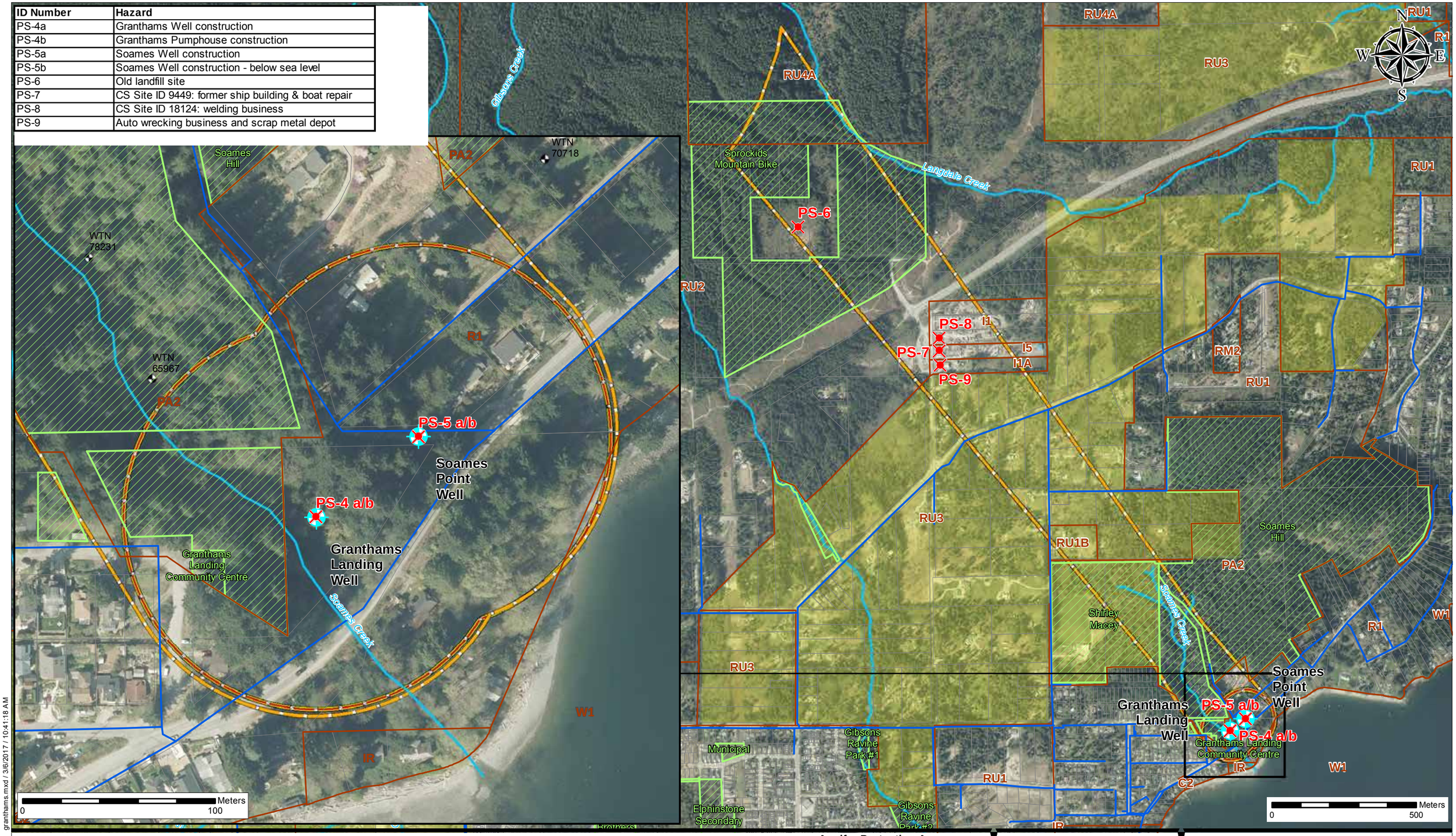
Sunshine Coast Regional District

Well Protection Planning

Table 3-3
Drinking water hazards – Granthams and Soames Wells

Hazard No.	Hazard	Owner/ Jurisdiction	Location	Contaminants of Concern	Transport Mechanism and other notes
Point Sources					
PS-4a	Granthams well construction and uncontrolled flowing artesian conditions.	SCRD	At wellhead.	Pathogens.	Annular space is present, and being held open by artesian pressure. When pump is turned on, water level drops, potentially pulling in surface contaminants along annular space and directly into the well.
PS-4b	Granthams pumphouse construction and related piping	SCRD	At wellhead.	Pathogens.	Infiltration to groundwater
PS-5a	Soames well construction - well head in an underground chamber below a road	SCRD	At wellhead.	Any surface contaminant. Most likely pathogens, and road run-off (hydrocarbons).	Directly into well
PS-5b	Soames well construction below sea level.	SCRD	At wellhead	Sodium and chloride	Horizontal migration through aquifer
PS-6	Old landfill site	Unknown	North of corner of Mountain Bike Park Road	Solvents, gasoline, diesel, oils, lubricants, paints, other chemicals	Leaks and spills at surface and then infiltration to groundwater
PS-7	CS Site ID 9449, 1170 Stewart Road: Registered with the MoE since 2005 (previous use ship building & boat repair, current use unknown).	Private owner	1170 Stewart Road. Approximately 1.5 km north	Solvents, gasoline, diesel, oils, lubricants, paints, other chemicals	Infiltration to groundwater
PS-8	CS Site ID 18124, 1196 Stewart Road: Registered with the MoE since 2015 (currently a welding business).	Private owner	1196 Stewart Road. Approximately 1.5 km north	The report from MoE indicates fill materials were brought onto this site from a contaminated source.	Leaks and spills at surface and then infiltration to groundwater
PS-9	Auto Wrecking Business and Scrap Metal Depot	Private owner	1178 Stewart Road. Approximately 1.5 km north	Solvents, gasoline, diesel, oils, lubricants, paints, other chemicals	Leaks and spills at surface and then infiltration to groundwater
Non-point Sources					
NPS-9	Poorly constructed existing wells in capture zone - monitoring wells, irrigation wells, domestic wells, or geoexchange wells	Various owners	Throughout all aquifer protection areas. Nearest is on edge of APA A/B	Inside the 200-day capture zone, pathogens and chemical contaminants are of concern. Outside of 200 day the concern would be on chemical contaminants.	Existing wells could act as a direct pathway to the aquifer, and then the contaminant would travel horizontally through aquifer.
NPS-10	Underground or above-ground storage tanks Granthams and Soames	Private owners	Nearest home is 200 m away	BTEX, VOCs, Diesel, MTBE, petroleum hydrocarbons, waste oil	Leaks and spills at surface and then infiltration to groundwater
NPS-11	Residential properties Granthams and Soames	Private owners	Two homes within APA A and B for Granthams Well. About 4 homes within APA A and B for Soames well.	Pesticides, herbicides, household cleaners, automotive wastes,	Deposits and runoff to groundwater
NPS-12	Agricultural operations.	Private owners	Closest ALR is over 500 m away, within APA C. ALR land comprises about half of the APA C.	Nitrates, pesticides, herbicides, pathogens	Runoff, seepage to groundwater
NPS-13	Natural gas lines and other private utilities (preferred pathways)	Fortis BC and others	Throughout residential areas	Various contaminants	Spills, runoff, leaks infiltrating to groundwater
NPS-14	Roads and other transportation infrastructure including storm drains and discharge points (like dry wells)	SCRD/MOTI	Busy road (Marine Drive) only 27 m away from Soames Well. Storm management includes ditching is along Marine Drive 27 m away from Soames well.	Automotive wastes, sodium chloride, pesticides, herbicides, solid and liquid spills and runoff	Leaks and spills at surface and then infiltration to groundwater.
NPS-15	Animals and pests	Various owners	In green space throughout	Pathogens	Deposits to soil and groundwater
NPS-17	Septic systems/septic tanks	Private owners	Throughout aquifer protection areas. At least 4 homes are within APA B	Pathogens (coliform and non-coliform bacteria and viruses), chloride, sulphate, nitrates, phosphate, heavy metals, tetrachloroethylene, dichlorobenzene, methylene chloride, and Pops (pharmaceuticals and personal care products).	Leaks, spills and infiltration to groundwater

ID Number	Hazard
PS-4a	Granthams Well construction
PS-4b	Granthams Pumphouse construction
PS-5a	Soames Well construction
PS-5b	Soames Well construction - below sea level
PS-6	Old landfill site
PS-7	CS Site ID 9449: former ship building & boat repair
PS-8	CS Site ID 18124: welding business
PS-9	Auto wrecking business and scrap metal depot



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Associated Environmental

Potential Hazard
Well Location
MOE Registered Well

SCRD Water Mains
Zoning* Boundary
ALR Land
Park

*Zoning Codes: R** = residential,I** = industrial, C** = commercial, P** = parks, W** = water

Aquifer Protection Area
A - 100m Well Protection Zone
B - 200 Day Time of Travel
C - 10 Year Time of Travel
Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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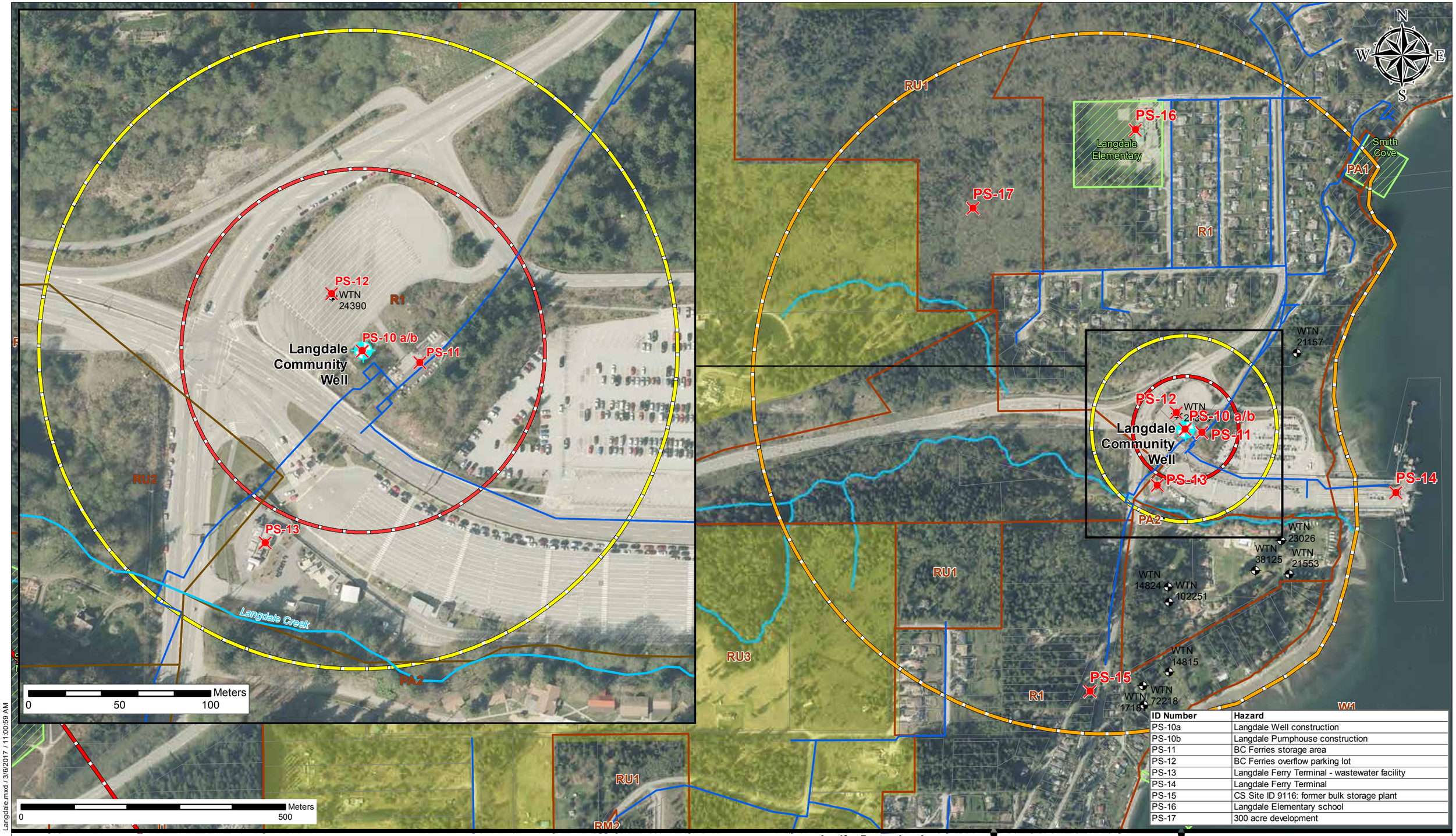
FIGURE 3-2: DRINKING WATER HAZARDS - GRANTHAMS AND SOAMES WELLS

Sunshine Coast Regional District

Well Protection Planning

Table 3-4
Drinking water hazards – Langdale Well

Hazard No.	Hazard	Owner/ Jurisdiction	Location	Contaminants of Concern	Transport Mechanism and other notes
Point Sources					
PS-10a	Saltwater Intrusion	SCRD	At wellhead	Sodium and chloride	Horizontal travel through aquifer
PS-10b	Langdale pumphouse construction	SCRD	At wellhead	Pathogens.	Direct to well from wellhead
PS-11	BC Ferries Storage Area	SCRD/MOTI/BC Ferries	18 m east of the well	Depends on what is stored	Infiltration to groundwater
PS-12	BC Ferries Overflow parking lot and ditch adjacent to pumphouse	SCRD/MOTI/BC Ferries	adjacent to well	Surface water contaminants, spills from motor vehicle accidents	Infiltration to groundwater
PS-13	Langdale Ferry terminal - wastewater facility	BC Ferries	Within APA B	Pathogens.	Infiltration to groundwater
PS-14	Langdale Ferry Terminal.	BC Ferries	Well is on edge of ferry terminal	Diesel, petroleum hydrocarbons, chlorophenols, PAHs	Spills and runoff from parking lot, and then infiltration into ground
PS-15	CS Site ID 9116: Former bulk storage plant that was decommissioned.	Private owner	1281 Marine Drive. Approximately 500 m south	BTEX, diesel, VOCs, petroleum hydrocarbons, waste oil	Infiltration to groundwater
PS-16	Langdale Elementary school	BC Government.	School is at Johnson Road. Approximately 450 m north	Fertilizer, pesticides, nitrates from septic field	Leaks and spills and then infiltration to groundwater
PS-17	300-acre proposed development	Private owner	Located outside of APA A and B but within APA C.	Nitrates if they have their own wastewater facility. Typical city run-off.	Infiltration to groundwater
Non-point Sources					
NPS-19	Poorly constructed existing wells in capture zone - either monitoring wells, domestic wells, geoexchange wells.	Various owners	Nearest is on edge of APA A/B	Inside the 200-day capture zone, pathogens and chemical contaminants are of concern. Outside of 200 day the concern would be on chemical contaminants.	Existing wells could act as a direct pathway to the aquifer, and then the contaminant would travel horizontally through aquifer.
NPS-20	Underground or above-ground storage tanks	Private owners	Nearest home is 200 m away, within APA C.	BTEX, VOCs, Diesel, MTBE, petroleum hydrocarbons, waste oil	Leaks and spills, and then infiltration to groundwater
NPS-21	Residential properties	Private owners	Nearest home is 200 m away, within APA C.	Pesticides, herbicides, household cleaners, automotive wastes,	Deposits and runoff to groundwater
NPS-22	Agricultural operations.	Private owners	About 120% of APA C is within the ALR, but no current agricultural activities are evident.	Nitrates, pesticides, herbicides, pathogens	Runoff, seepage to groundwater
NPS-23	Natural gas lines and other private utilities (preferred pathways)	Fortis BC and others	Nearest home is 200 m away, within APA C.	Various contaminants	Spills, runoff, leaks infiltrating to groundwater
NPS-24	Roads and other transportation infrastructure including storm drains and discharge points (like dry wells)	SCRD/MOTI	Very busy roads (Ferry Ramp/Sunshine Coast Highway and Hwy Port Mellon) are located 30 and 80 m away from the well house, respectively.	Automotive wastes, sodium chloride, pesticides, herbicides, solid and liquid spills and runoff	Runoff, leaks, and spills will infiltrate to groundwater. Lots of ditching.
NPS- 25	Animals and pests	Various owners	In green space throughout	Pathogens	Infiltration to groundwater
NPS-26	Septic systems/septic tanks	Private owners	Nearest homes are outside of APA B but within 300 m GARP guideline screening. Only nitrates and chemicals are a concern.	Pathogens (coliform and non-coliform bacteria and viruses), chloride, sulphate, nitrates, phosphate, heavy metals, tetrachloroethylene, dichlorobenzene, methylene chloride, and Pops (pharmaceuticals and personal care products).	Leaks and spills at surface and then infiltration to groundwater



ID Number	Hazard
PS-10a	Langdale Well construction
PS-10b	Langdale Pumphouse construction
PS-11	BC Ferries storage area
PS-12	BC Ferries overflow parking lot
PS-13	Langdale Ferry Terminal - wastewater facility
PS-14	Langdale Ferry Terminal
PS-15	CS Site ID 9116: former bulk storage plant
PS-16	Langdale Elementary school
PS-17	300 acre development

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Associated Environmental

- Potential Hazard
- Well Location
- MOE Registered Well
- SCRD Water Mains
- Zoning* Boundary
- ALR Land
- Park

*Zoning Codes: R** = residential,I** = industrial, C** = commercial, P** = parks, W** = water

Aquifer Protection Area

- A - 100m Well Protection Zone
- B - 200 Day Time of Travel
- C - 10 Year Time of Travel

Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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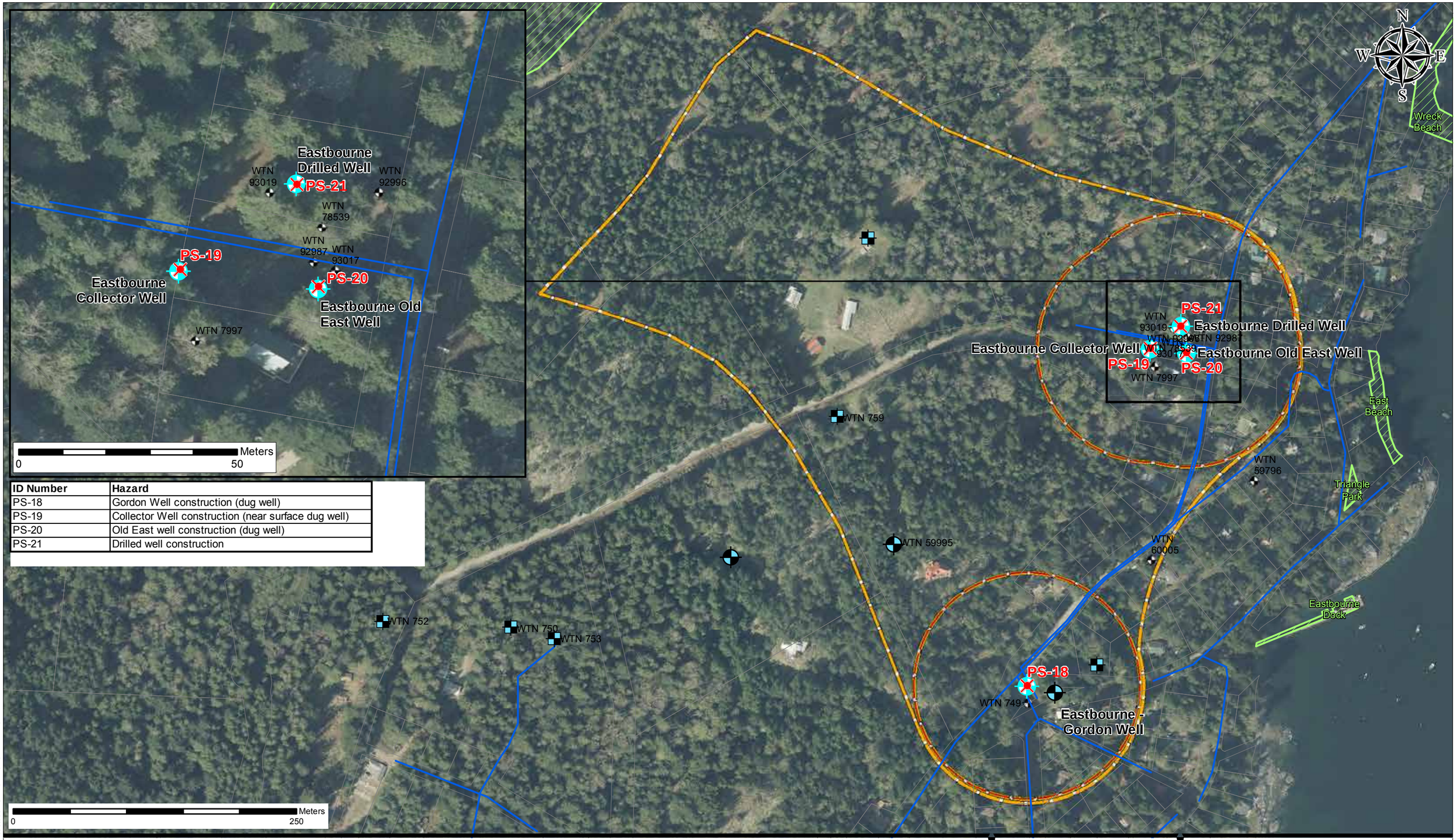
FIGURE 3-3: DRINKING WATER HAZARDS – LANGDALE WELL

Sunshine Coast Regional District

Well Protection Planning

Table 3-5
Drinking water hazards – Eastbourne Well System

Hazard No.	Hazard	Owner/ Jurisdiction	Location	Contaminants of Concern	Transport Mechanism and other notes
Point Sources					
PS-18	Construction of Gordon Well (dug well)	SCRD	At wellhead	Any surface contaminant (chemical and pathogens)	Infiltration to groundwater or direct to well
PS-19	Construction of Collector well (near surface dug well).	SCRD	At wellhead	Any surface contaminant (chemical and pathogens)	Infiltration to groundwater or direct to well
PS-20	Construction of Old East well (dug well).	SCRD	At wellhead	Any surface contaminant (chemical and pathogens)	Infiltration to groundwater or direct to well
PS-21	Drilled well construction and saltwater intrusion.	SCRD	At wellhead	Sodium and chloride	Horizontal migration through aquifer
Non-point Sources					
NPS-25	Poorly constructed existing wells in capture zone - either monitoring wells, domestic wells, geothermal wells.	Private	Throughout all capture zones.	Existing wells could act as a direct pathway to the aquifer, and then the contaminant would travel horizontally through aquifer.	Inside the 200-day capture zone, pathogens and chemical contaminants are of concern. Outside of 200 day the concern would be on chemical contaminants.
NPS-26	Underground or above-ground storage tanks	Private	Throughout all capture zones.	BTEX, VOCs, Diesel, MTBE, petroleum hydrocarbons, waste oil	Leaks and spills, and then infiltration to groundwater
NPS-27	Residential properties	Private	Nearest home is within 30 m and is within all APAs.	Pesticides, herbicides, household cleaners, automotive wastes,	Deposits and runoff to groundwater
NPS-28	Roads and other transportation infrastructure including storm drains and discharge points (like dry wells)	SCRD/MOTI	Gordon Well located adjacent to Gordon Road, other wells located adjacent to Keats Road	Automotive wastes, sodium chloride, pesticides, herbicides, solid and liquid spills and runoff	Spills and infiltration to groundwater
NPS-29	Animals and Pests	Various owners	In green space throughout study area	Pathogens	Deposits to soil and groundwater
NPS-30	Septic Systems/Septic Tanks.	Private owners	Nearest residents to each well may be around, and possibly less than, 30 m away.	Pathogens (coliform and non-coliform bacteria and viruses), chloride, sulphate, nitrates, phosphate, heavy metals, tetrachloroethylene, dichlorobenzene, methylene chloride, and Pops (pharmaceuticals and personal care products).	Leaks, spills and infiltration to groundwater



ID Number	Hazard
PS-18	Gordon Well construction (dug well)
PS-19	Collector Well construction (near surface dug well)
PS-20	Old East well construction (dug well)
PS-21	Drilled well construction

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Associated Environmental

Potential Hazard
Well Location
MOE Registered Well
Drilled Well
Dug Well

SCRD Water Mains
Zoning* Boundary
ALR Land
Park

*Zoning Codes: R** = residential,I** = industrial, C** = commercial, P** = parks, W** = water

Aquifer Protection Area
A - 100m Well Protection Zone
B - 200 Day Time of Travel
C - 10 Year Time of Travel
Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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FIGURE 3-4: DRINKING WATER HAZARDS - EASTBOURNE WELL SYSTEM

Sunshine Coast Regional District

Well Protection Planning

4 Module 7: Characterize Risks from Source to Tap

The purpose of Module 7 is to critically assess the adequacy of water protection barriers and assign risk levels to each hazard identified in Module 2. The TAC completed this step during TAC Workshop 2 (risk assessment). First, the risk matrix provided in Module 7 of the Source-to-Tap Guideline was used to assign each hazard as low risk, medium risk, high risk, or very high risk (Section 4.1). Then a SWOT (Strengths, Weakness, Opportunities, and Threats) analysis was completed (Section 4.2).

4.1 TAC WORKSHOP 2

According to the Source-to-Tap Guideline, risk is defined as, "the combination of the likelihood that a hazard will occur and cause harm, and the extent and degree of that harm" and can be quantitatively evaluated by multiplying the likelihood of a hazard occurring by the consequence of that hazard (MHLS 2010). To determine potential risks, two ratings were applied to each hazard:

1. The likelihood of occurrence (i.e., the probability the event occurs, and that if it occurs the contaminant will migrate to the well intake); and
2. The magnitude of consequence if that event was to occur.

Tables 4-1 and 4-2 summarize how each level of risk is assigned using the likelihood of occurrence and magnitude of consequence matrices, respectively.

Table 4-1
Assignment of risk categories – likelihood of occurrence

Level	Description	Probability of Occurrence in Next 10 Years
A	Almost certain – is expected to occur in most circumstances	>90%
B	Likely – will probably occur in most circumstances	71–90%
C	Possible – will probably occur at some time	31–70%
D	Unlikely – could occur at some time	10–30%
E	Rare – may only occur in exceptional circumstances	<10%

Source: Source-to-Tap Guideline (MHLS 2010)

Table 4-2
Assignment of risk categories – magnitude of consequence

Level	Description
1	Insignificant – no illness, little disruption to normal operation, and/or little or no increase in normal operating costs.
2	Minor – small population, mild illness moderately likely, some manageable operation disruption, and/or small increase in operating costs.
3	Moderate – minor impact for large population, mild to moderate illness probable, significant moderation to normal operations but manageable, operating costs increased, and/or increased monitoring.
4	Major – impact for small population, severe illness probable, systems significantly compromised and abnormal operation if at all, and/or high level monitoring required.
5	Catastrophic – major impact for large population, severe illness probable, and/or complete failure of system.

Source: Source-to-Tap Guideline (MHLS 2010)

The likelihood of occurrence and magnitude of consequence are then used to determine the risk to drinking water (Table 4-3).

Table 4-3
Risk (likelihood-consequence) matrix

Likelihood	Consequence				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A (almost certain)	Moderate	High	Very High	Very High	Very High
B (likely)	Moderate	High	High	Very High	Very High
C (possible)	Low	Moderate	High	Very High	Very High
D (unlikely)	Low	Low	Moderate	High	Very High
E (rare)	Low	Low	Moderate	High	High

Source: Source-to-Tap Guideline (MHLS 2010)

During Workshop 2, the TAC assigned a likelihood of occurrence and magnitude of consequence score to each hazard identified in Module 2, and then determined risk using the risk matrix (Table 4-3). In total,

seven very high, seven high, seven moderate, and five low risk point-source hazards were identified. Of the seven very high point-source hazards, three each were in the Granthams and Soames and Eastbourne APAs, and one was in the Langdale APA. Of the seven high point-source hazards, one was in the Chaster APA, five were in the Langdale APA, and one was in the Eastbourne APA.

Eight non-point source hazards were also identified for the four systems. Risk rankings for the non-point source hazards vary for each well system. The Chaster, Granthams and Soames, and Langdale APAs had no very high risk non-point source hazards, and the Eastbourne APA had one. All four systems had two high risk non-point source hazards.

Table 4-4 lists each hazard, the likelihood of occurrence and magnitude of consequence score, the risk rating based on that score, and the rationale behind each assigned risk. The locations of the hazards are shown on Figures 4-1, 4-2, 4-3, and 4-4.

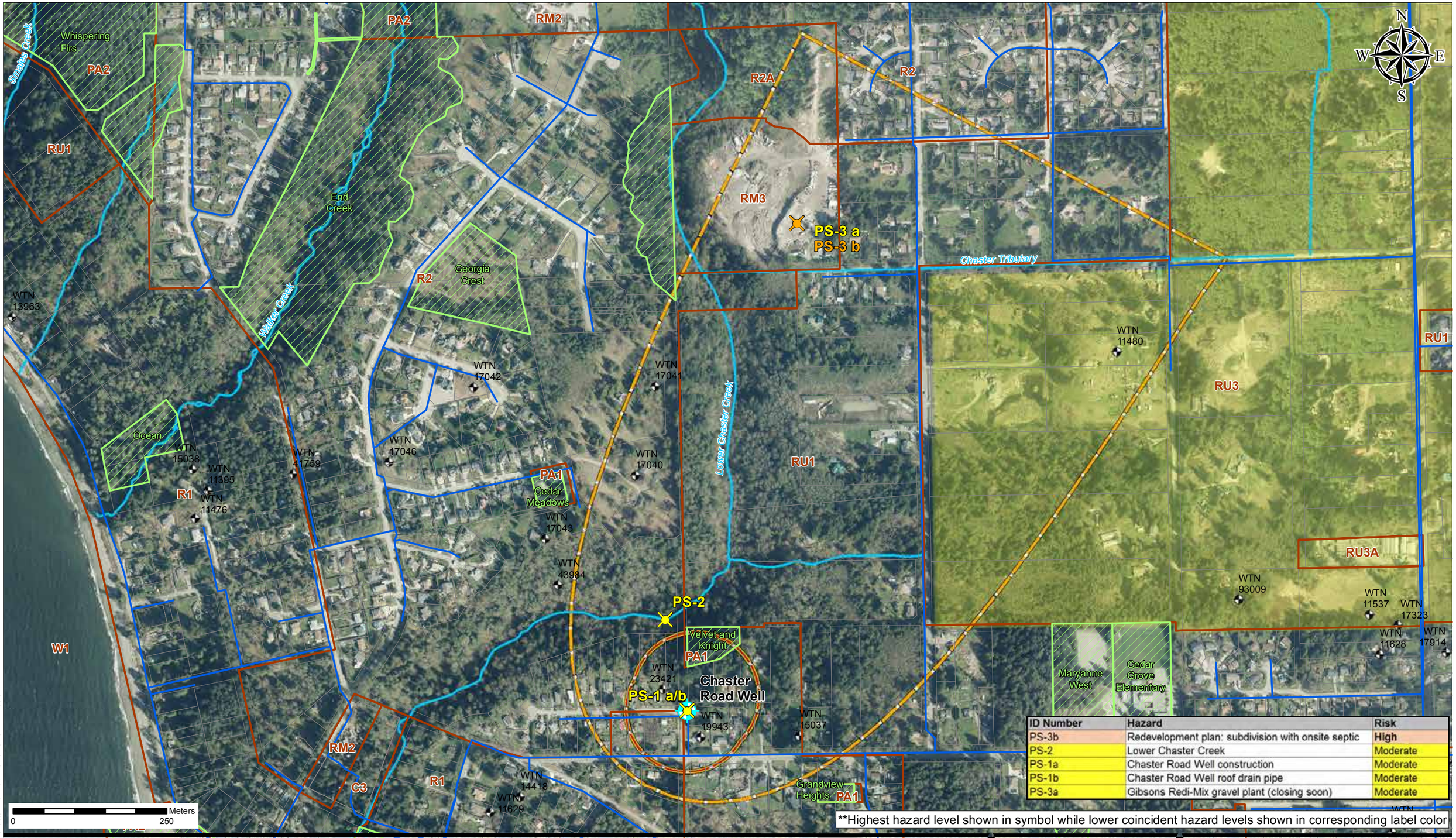
Table 4-4
Hazard risk assessment – Chaster Well

Hazard No.	Hazard	Owner/ Jurisdiction	Contaminants of Concern	Likelihood of Occurrence		Magnitude of Consequence[1]		Risk	Preliminary Action Item No.[2]
Point Sources									
PS-3b	Gibsons Redi-Mix Ltd. Redevelopment plan: subdivision and 60 trailer pads with onsite septic.	Private owner	Nitrates (pathogens are not considered a hazard because site is outside of the 200-day capture zone)	D (unlikely)	Concentrations of Nitrate-N in the well have risen from 0.56 mg/L in April 2001, to 1.010 mg/L in May 2015 (compared to a drinking water guideline of 10 mg/L). Groundwater from septic fields at this location will likely discharge naturally to Lower Chaster Creek. Based on the Gibsons Aquifer Mapping project, recharge is likely from the base of Mt. Elphinstone, but other sources of recharge are possible, such as where the till layer is thin, and losing streams (Waterline 2013). The till layer is thick in this vicinity and therefore, the volume of recharge from the vicinity of this Hazard is likely low.	4	If the sanitary system is well maintained and meets the Sewerage System Regulations at a minimum, the concentrations of nitrate in Chaster Well are likely to remain similar to what they are now due to the confining layers, and the “perched” nature of Chaster Creek. Monitoring costs; however, could increase.	High	4,5,7
PS-2	Lower Chaster Creek	Public	Nitrates (pathogens are not considered a hazard because site is outside of the 200-day capture zone)	D (unlikely)	Based on the Gibsons Aquifer Mapping project, recharge is likely from the base of Mt. Elphinstone, but other sources of recharge are possible, such as where the till layer is thin, and losing streams (Waterline 2013). The till layer is thick in this vicinity and although the watershed for Chaster Creek includes residential (with septic fields) and agricultural land uses, and some recharge from “losing streams” is possible, the volume of recharge from this source is likely very low.	3	As long as the agricultural operations follow best management practices and the sanitary systems are maintained, the concentrations of nitrate are likely to remain similar to what they are now due to the confining layers, and the “perched” nature of Chaster Creek. Monitoring costs; however, will increase.	Moderate	3,4,5
PS-1a	Well site Hazard 1a: Well is located in a concrete pit.	SCRD	Pathogens	D (unlikely)	The well does not have a surface seal and is located in a well pit. The well pit cover is a metal steel lid, locked, is likely vermin proof. The top of the well casing is only about 10 cm above bottom of pit. The well pit does not appear to be water-tight: water flows into the concrete pit from the inline chlorine meter and exits the pit through a drain in the bottom of the pit, which is connected to piping that discharges away from the well at an unknown distance away from the well. Roots are visible growing in the drain, and water is ponding at the bottom of the pit at the location of the drain. There appears to be cracks in the concrete floor of the pit. There are two potential conduits: the electrical conduit to the submersible well pump inside well and the water level meter conduit (sounding tube). Pathogens could migrate directly into the well during a large rainstorm event via the annular space if the concrete pit is compromised (which it appears it may be). However, this configuration has likely been like this for a long time, and any contaminants would have already reached the well, the well is deep (allowing for many zones for the natural soils to seal tightly against the well casing) and the bacteriological water quality on this well is excellent (although no protozoa sampling has occurred).	3	If pathogens reached the well, the only protection is chlorine, which will inactive viruses and bacteria, but not protozoa.	Moderate	1
PS-1b	Well site Hazard 1b: Roof drain discharges to pipe - unknown where the pipe drains to.	SCRD	Pathogens	D (unlikely)	Roof drain is located on the closest side of the pumphouse to the well. Roof drain pipe might go right by well. Bedding sand of pipe might be coarse, acting as a preferred pathway if pipe is perforated or not well connected to roof drain. Well does not have a surface seal. If the perforated pipe is located near the well, surface water could go down the annular space of the well. However, this configuration has likely been like this for a long time, and any contaminants would have already reached the well, the well is deep (allowing for many zones for the natural soils to seal tightly against the well casing) and the bacteriological water quality on this well is excellent (although no protozoa sampling has occurred).	3	If pathogens reached the well, the only protection is chlorine, which will inactivate viruses and bacteria, but not protozoa.	Moderate	1,2
PS-3a	Gibsons Redi-Mix Ltd. gravel plant. The gravel plant is closing soon.	Private owner	Elevated pH from possible cement wastewater, hydrocarbons from possible above-ground storage tanks and under-ground storage tanks, antifreeze from chemical release.	E (rare)	No hydrocarbons have been sampled at the well. However, the earliest available air photos indicate that the area was cleared by at least 1982, and the site has likely been operating as a gravel pit since that time. The estimated travel time between the gravel plant and the Chaster well is 7-8 years, it has been in operation since the mid 80’s, and hazardous materials handling has probably improved over time. Therefore, those contaminants that are not readily attenuated would be expected to have shown up at the Chaster well by now. Based on the Gibsons Aquifer Mapping project, recharge is likely from the base of Mt. Elphinstone, but other sources of recharge are possible, such as where the till layer is thin, and losing streams (Waterline 2013). The till layer is thick in this vicinity and although some recharge from “losing streams” is possible, the volume of recharge from this source is likely very low.	3	All but the most mobile hydrocarbons (e.g. benzene, naphthalene) are attenuated short distances along the groundwater flow path. If these mobile hydrocarbons reached the well, their concentrations would be likely very low because the volumes would be very small and dilution would occur. However, very little information is known about the exact types of contaminants. Routine monitoring would be required at a minimum.	Moderate	6
Non-point Sources									
NPS-4	Agricultural operations	Private owners	Nitrates, pesticides, herbicides, pathogens	D (unlikely)	Farming operations have been known to cause nitrate-N to exceed drinking water guidelines in community wells in Canada. Nitrate-N in Chaster well has been increasing, even though the well is over 100 m deep, indicating it is susceptible to surface land uses.	4	Treatment costs are very high for nitrate. If nitrate increased to above the drinking water guideline of 10 mg/L (right now nitrate-N at Chaster Well is at 1 mg/L), the well infrastructure may be lost.	High	24

Table 4-4
Hazard risk assessment – Chaster Well

Hazard No.	Hazard	Owner/ Jurisdiction	Contaminants of Concern	Likelihood of Occurrence		Magnitude of Consequence[1]		Risk	Preliminary Action Item No.[2]
NPS-8	Septic systems/septic tanks	Private owners	Pathogens (coliform and non-coliform bacteria and viruses), chloride, sulphate, nitrates, phosphate, heavy metals, tetrachloroethylene, dichlorobenzene, methylene chloride, and PPCPs (pharmaceuticals and personal care products).	C (possible)	Closest upgradient residential area is 23 m away (to front lawn) and upslope. The exact location of the septic field is not known. If the septic field is closer than 30 m away, the setback to a drinking water supply does not meet the Health Hazard Regulation. Well has no surface seal and a glacial till layer starts at 1.5m, meaning if the septic tank is not properly maintained, there is a potential that water from the septic tank could be passing by the well casing and travelling down annular space of the casing. The Drinking Water Protection Regulation requires that groundwater at risk of containing pathogens (GARP) must be disinfected. The Ministry of Health published a guideline document for determining GARP in December 2015, which suggests a GARP determination be completed. No GARP determination has been completed. No raw coliform data is available for Chaster well. Due to lack of data, the likelihood is possible.	3	If pathogens reached the well, the only protection is chlorine, which will inactivate viruses and bacteria, but not protozoa.	High	1,8,33
NPS-2	Underground or above-ground residential heating oil storage tanks	Private owners	BTEX, VOCs, Diesel, MTBE, petroleum hydrocarbons, waste oil	E (rare)	Natural gas came to Sunshine Coast in the mid 1990s, since that time, most homes are heated using electricity, wood, or natural gas. Heating oil is made up of heavier hydrocarbons, which are less mobile in groundwater. Any contamination from historical use of heating oil would already have been apparent. Moreover, the screen intake is 40 m below the water table, and varying layers of glacial till are present at shallower depths: any hydrocarbon plume would stay near the surface.	4	If a contaminant reached the well, major infrastructure may be lost.	Moderate	11,22
NPS-3	Residential properties	Private owners	Pesticides, herbicides, household cleaners, automotive wastes	E (rare)	Pesticide use is not prevalent on the Sunshine Coast. Chaster Well is surrounded by larger holding residences that could allow hobby farms; therefore, small scale agricultural practices can be expected. Nitrate-N in Chaster well has been increasing, even though the well is over 100 m deep.	3	The majority of contaminants of concern related to residential homes are detectable at trace amounts, and can be observed through regular monitoring.	Moderate	23
NPS-1	Poorly constructed existing wells in capture zone (monitoring, irrigation, domestic or geoexchange wells)	Various owners	Inside the 200-day capture zone, pathogens and chemical contaminants are of concern. Outside of 200 day the concern would be on chemical contaminants.	D (unlikely)	There are 3 registered wells within the APAs but the BC Ministry of Environment's Wells database is a voluntary registration process and some other wells may exist; however, none are known to exist within 100 m (APA A).	2	Types of contaminants of concern would be at very low loads since residential area.	Low	20
NPS-5	Natural gas lines and other private utilities (preferred pathways)	Fortis BC and others	Any surface contaminant. Most likely pathogens, and road run-off (hydrocarbons).	E (rare)	The well is located about 5 m from the centre of the driveway of the nearest home. A natural gas connection to the home is likely, and may be present within a few meters of the well. However, the fine geological deposits provide protection confining layers between the surface and the well intake, and the surrounding land use is low density residential. Therefore, the likelihood a contaminant would reach the well intake from a preferred pathway is rare.	2	Types of contaminants of concern would be at very low loads since residential area.	Low	25
NPS-6	Roads and other transportation infrastructure including storm drains and discharge points (like dry wells)	SCRD/MOTI	Automotive wastes, sodium chloride, pesticides, herbicides, solid and liquid spills and runoff	E (rare)	Typical winters are mild and do not require salt application. Lots of ditching in this area, but residential neighborhood in vicinity, with green space nearby.	2	Types of contaminants of concern would be at very low loads since residential area.	Low	26, 27, 28, 29, 30, 31
NPS-7	Animals and pests	Various owners	Pathogens	E (rare)	No main dog parks in aquifer protection area, and well intakes are set below thick protective layers. Well cover and well house adjacent to well appeared to be vermin-proof.	1		Low	32

Notes:
[1] 1 = Insignificant; 2 – Minor; 3 – Moderate; 4 – Major; 5 – Catastrophic (Section 4.1, Table 4-2)
[2] See Section 5, Table 5-2 for Action Item details.



ID Number	Hazard	Risk
PS-3b	Redevelopment plan: subdivision with onsite septic	High
PS-2	Lower Chaster Creek	Moderate
PS-1a	Chaster Road Well construction	Moderate
PS-1b	Chaster Road Well roof drain pipe	Moderate
PS-3a	Gibsons Redi-Mix gravel plant (closing soon)	Moderate

**Highest hazard level shown in symbol while lower coincident hazard levels shown in corresponding label color

Chaster Well risk.mxd / 3/15/2017 / 11:30:31 AM

Associated Environmental

Well Location

MOE Registered Well

SCRD Water Mains

Zoning* Boundary

ALR Land

Park

*Zoning Codes: R** = residential,I** = industrial, C** = commercial, P** = parks, W** = water

Hazard Level**

Very High

High

Moderate

Low

Aquifer Protection Area

A - 100m Well Protection Zone

B - 200 Day Time of Travel

C - 10 Year Time of Travel

Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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FIGURE 4-1: DRINKING WATER HAZARDS AND RISK LEVEL – CHASTER WELL

Sunshine Coast Regional District

Well Protection Planning

Table 4-5
Hazard risk assessment – Granthams and Soames Wells

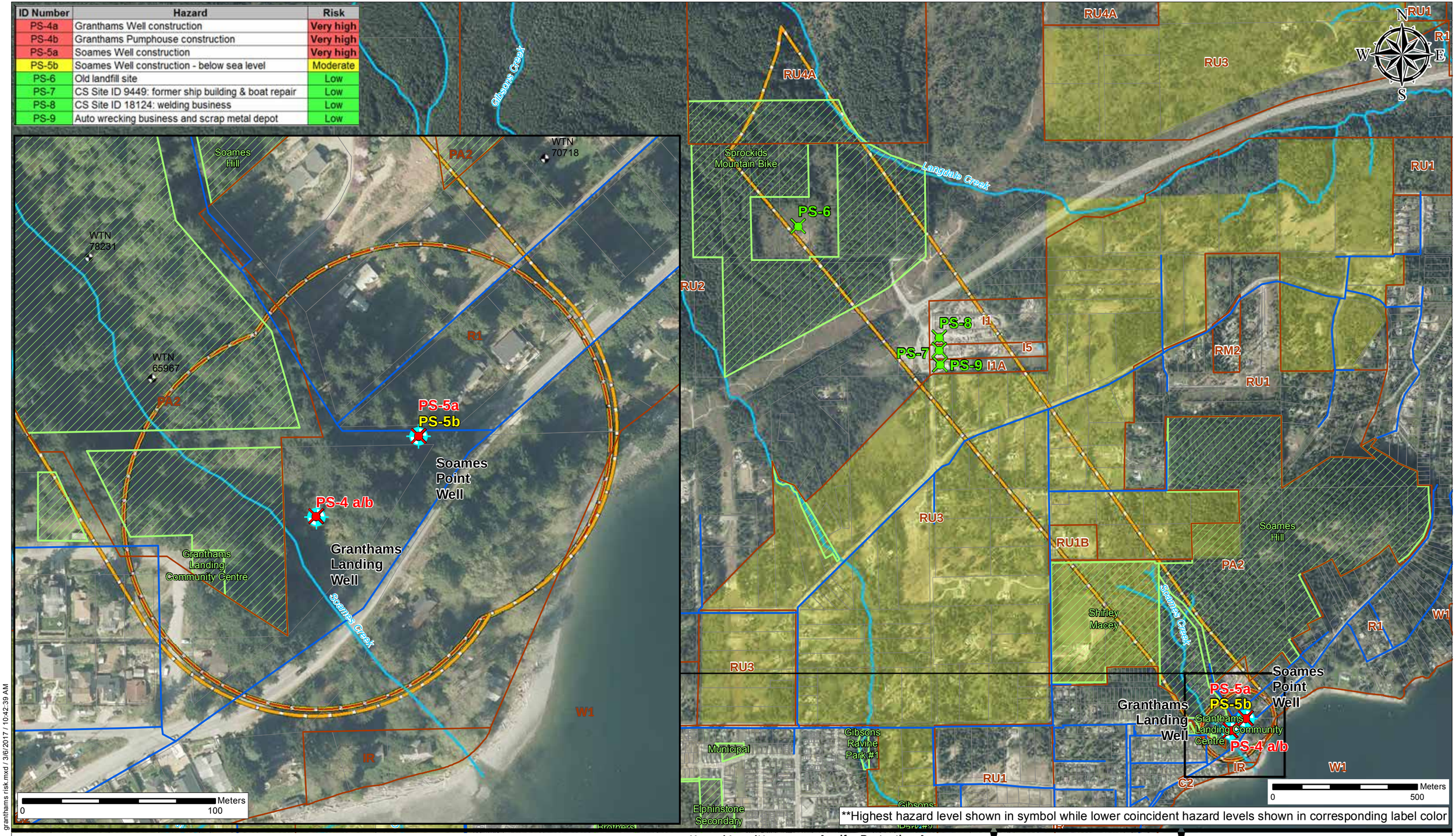
Hazard No.	Hazard	Owner/ Jurisdiction	Contaminants of Concern	Likelihood of Occurrence		Magnitude of Consequence[1]		Risk	Preliminary Action Item No.[2]
Point Sources									
PS-4a	Granthams well construction and uncontrolled flowing artesian conditions.	SCRD	Pathogens.	A (almost certain)	The Granthams wellhead is a sealed above-ground steel casing located inside a locked concrete culvert above ground. The bottom of the concrete culvert box is coarse gravel. No surface seal is present and ponded water is visible around the concrete culvert. This indicates uncontrolled flowing artesian well conditions, and does not meet Groundwater Protection Regulation (must control flowing conditions). Bacteriological tests were completed monthly in 2013 and 4 samples contained total coliform out of a total of 18 samples.	4	The potential loading from surface contaminants such as pathogens is unknown, but if pathogens are found in the well, significant treatment costs or well upgrades would be required.	**Very High**	8,9
PS-4b	Granthams pumphouse construction and related piping	SCRD	Pathogens.	A (almost certain)	This is the location of an old fish hatchery. The outlets of many underground piping networks are visible, and the pumphouse has a wet well. The pumphouse is not vermin proof. Bacteriological tests were completed monthly in 2013 and 4 samples contained total coliform out of a total of 18 samples.	4	The potential loading from surface contaminants such as pathogens is unknown, but if pathogens are found in the well, significant treatment costs or well upgrades would be required.	**Very High**	8
PS-5a	Soames well construction - well head in an underground chamber below a road	SCRD	Any surface contaminant. Most likely pathogens, and road run-off (hydrocarbons).	B (likely)	The Soames wellhead is located on a steep paved road in an underground concrete box. No surface seal but well log says "casing to 20m" - this may be a surface seal. Difficult to identify the till layer by well log but appears well protected from surface: "compact sandy gravel 26-83 ft" and "very compact silty coarse gravel: from 83-94 ft, and "compact clayey gravel possibly till" 94-97 ft. Well depth 121 ft (no screen given). Water quality appears to be excellent (no total coliforms detected in when tested for in raw water in 2011 and 2013), although there have been no tests for protozoa.	4	The potential loading from surface contaminants such as pathogens is unknown, but if pathogens are found in the well, significant treatment costs or well upgrades would be required.	**Very High**	8,11
PS-5b	Soames well construction below sea level.	SCRD	Sodium and chloride	E (rare)	Bottom of well is at 0.3 m below sea level; therefore, concern with drawing in salt water. Gradient is strong; therefore, significant pumping would be required to draw in salt water and likelihood is rare.	3	Most likely contaminant to reach this far would be soluble metals. Additional minor monitoring would be required until the contaminant source is removed, but it is unlikely that the supply would be lost.	Moderate	12
PS-6	Old landfill site	Unknown	Solvents, gasoline, diesel, oils, lubricants, paints, other chemicals	E (rare)	The hazard is farther than 500m away, consistent with CSR Protocol 21 for drinking water receptors (Water Use Determination) and more than 40 m of clayey and silty deposits (till) provides protection to contaminant transport, as shown by the lithology described in well tag number 6805.	2	Most likely contaminant to reach this far would be soluble metals. Additional minor monitoring would be required until the contaminant source is removed, but it is unlikely that the supply would be lost.	Low	11
PS-7	CS Site ID 9449 - Previous use ship building & boat repair, current use unknown	Private owner	Solvents, gasoline, diesel, oils, lubricants, paints, other chemicals	E (rare)	MoE requires no further action and the hazard is farther than 500m away, consistent with CSR Protocol 21 (Water Use Determination) for a drinking water receptor. Moreover, more than 40 m of clayey and silty deposits (till) is present, provides protection to contaminant transport, as shown by the lithology described in well tag number 6805.	2	Most likely contaminant to reach this far would be soluble metals. Additional minor monitoring would be required until the contaminant source is removed, but it is unlikely that the supply would be lost.	Low	11
PS-8	CS Site ID 18124 - Currently a welding business	Private owner	The report from MoE indicates fill materials were brought onto this site from a contaminated source.	E (rare)	This is an ongoing case with MoE, they determined that further investigation was required; however, the hazard is farther than 500m away consistent with CSR Protocol 21 (Water Use Determination) for a drinking water receptor and more than 40 m of clayey and silty deposits (till) is present above the aquifer, acting as a barrier to contaminant transport, as shown by the lithology described in well tag number 6805.	2	Most likely contaminant to reach this far would be soluble metals. Additional minor monitoring would be required until the contaminant source is removed, but it is unlikely that the supply would be lost.	Low	11
PS-9	Auto Wrecking Business and Scrap Metal Depot	Private owner	Solvents, gasoline, diesel, oils, lubricants, paints, other chemicals	E (rare)	This hazard is farther than 500m away consistent with CSR Protocol 21 (Water Use Determination) for a drinking water receptor and more than 40 m of fine geological deposits (till) acting as a barrier to contaminant transport, as shown by the lithology described in well tag number 6805.	2	Most likely contaminant to reach this far would be soluble metals. Additional minor monitoring would be required until the contaminant source is removed, but it is unlikely that the supply would be lost.	Low	11
Non-point Sources									
NPS-14	Roads and other transportation infrastructure including storm drains and discharge points (like dry wells)	SCRD/MOTI	Automotive wastes, sodium chloride, pesticides, herbicides, solid and liquid spills and runoff	E (rare)	Speed limit on Marine Drive is 50 km/hr. Road is narrow and winding. However, the fine geological deposits provide protection above the aquifer and any spill from a Motor Vehicle Accident would be cleaned up quickly.	4	If a hydrocarbon contaminant reached the well intake, major infrastructure may be lost.	High	26, 27, 28, 29, 30, 31

Table 4-5
Hazard risk assessment – Granthams and Soames Wells

Hazard No.	Hazard	Owner/ Jurisdiction	Contaminants of Concern	Likelihood of Occurrence		Magnitude of Consequence[1]		Risk	Preliminary Action Item No.[2]
NPS-17	Septic systems/septic tanks	Private owners	Pathogens (coliform and non-coliform bacteria and viruses), chloride, sulphate, nitrates, phosphate, heavy metals, tetrachloroethylene, dichlorobenzene, methylene chloride, and PPCPs.	C (possible)	Nearest home from Soames well is about 30 m away. Nearest home from Granthams well is 60 m away and on other side of Soames Creek. Well has no surface seal and a glacial till layer starts at 1.5m, meaning septic water could be passing by well casing and travel down annular space outside of the casing. The Drinking Water Protection Regulation requires that groundwater at risk of containing pathogens (GARP) must be disinfected. The Ministry of Health published a guideline document for determining GARP in December 2015, which suggests a GARP determination be completed. No GARP determination has been completed. Since the risk is unknown, the likelihood is possible.	3	If pathogens reached the well, the only protection is chlorine, which will inactivate viruses and bacteria, but not protozoa.	High	1, 8, 33
NPS-10	Underground or above-ground storage tanks Granthams and Soames	Private owners	BTEX, VOCs, Diesel, MTBE, petroleum hydrocarbons, waste oil	E (rare)	Natural gas came to Sunshine Coast in the mid 1990s, since that time, most homes are heated using electricity, wood, or natural gas. Any contamination from historical use of heating oil would already have been apparent. Moreover, the screen intake is 40 m below the water table, and varying layers of glacial till are present at shallower depths: any hydrocarbon plume would stay near the surface.	4	If a contaminant reached the well, major infrastructure may be lost.	Moderate	11, 22
NPS-11	Residential properties Granthams and Soames	Private owners	Pesticides, herbicides, household cleaners, automotive wastes,	E (rare)	See rationale for NPS-10	4	If a contaminant reached the well, major infrastructure may be lost.	Moderate	11,23
NPS-9	Poorly constructed existing wells in capture zone (monitoring, irrigation, domestic or geoexchange wells)	Various owners	Inside the 200-day capture zone, pathogens and chemical contaminants are of concern. Outside of 200-day the concern would be on chemical contaminants.	D (unlikely)	Right now, there are 5 registered wells within the APAs but the BC Ministry of Environment's Wells database is a voluntary registration process and some other wells may exist; however, none are known to exist within 100 m (APA A). Although there is no surface seal, many fine geological deposits are present above the aquifer which starts at 30 m. With this low number of wells in the area, and the fine formation above the aquifer, the likelihood is unlikely (could occur at some time).	2	Types of contaminants of concern would be at very low loads since residential area.	Low	20
NPS-12	Agricultural operations.	Private owners	Nitrates, pesticides, herbicides, pathogens	E (rare)	Only small scale gardens are visible.	2	The majority of contaminants of concern related to small scale gardens are detectable at trace amounts, and can be observed through routine monitoring. Therefore, the magnitude is minor.	Low	24
NPS-13	Natural gas lines and other private utilities (preferred pathways)	Fortis BC and others	Various contaminants	E (rare)	Soames Well is on a driveway and there could be a natural gas line that follows the driveway. So, a natural gas line is likely present within a few meters of the well. No underground utilities expected to be near Granthams Well. However, there are many protective confining layers between the surface and the well intakes, and the surrounding land use is low density residential. Therefore, the likelihood a contaminant would reach the well intake from a preferred pathway is rare.	2	Types of contaminants of concern would be at very low loads since residential area.	Low	25
NPS-15	Animals and pests	Various owners	Pathogens	E (rare)	Although dog owners frequent Soames Park, the well intakes are set below thick protective confining layers.	1	The concentrations of any contaminant of concern (nitrates, chlorides) will be well within acceptable limits and are easily managed through routine monitoring.	Low	32

Notes:
[1] 1 = Insignificant; 2 – Minor; 3 – Moderate; 4 – Major; 5 – Catastrophic (Section 4.1, Table 4-2)
[2] See Section 5, Table 5-2 for Action Item details.

ID Number	Hazard	Risk
PS-4a	Granthams Well construction	Very high
PS-4b	Granthams Pumphouse construction	Very high
PS-5a	Soames Well construction	Very high
PS-5b	Soames Well construction - below sea level	Moderate
PS-6	Old landfill site	Low
PS-7	CS Site ID 9449: former ship building & boat repair	Low
PS-8	CS Site ID 18124: welding business	Low
PS-9	Auto wrecking business and scrap metal depot	Low



**Highest hazard level shown in symbol while lower coincident hazard levels shown in corresponding label color

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Associated Environmental

Well Location

MOE Registered Well

SCRD Water Mains

Zoning* Boundary

*Zoning Codes: R** = residential,I** = industrial, C** = commercial, P** = parks, W** = water

ALR Land

Park

Hazard Level**

Very High

High

Moderate

Low

Aquifer Protection Area

A - 100m Well Protection Zone

B - 200 Day Time of Travel

C - 10 Year Time of Travel

Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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DRAWN BY: DA

FIGURE 4-2: DRINKING WATER HAZARDS AND RISK - GRANTHAMS AND SOAMES

Sunshine Coast Regional District

Well Protection Planning

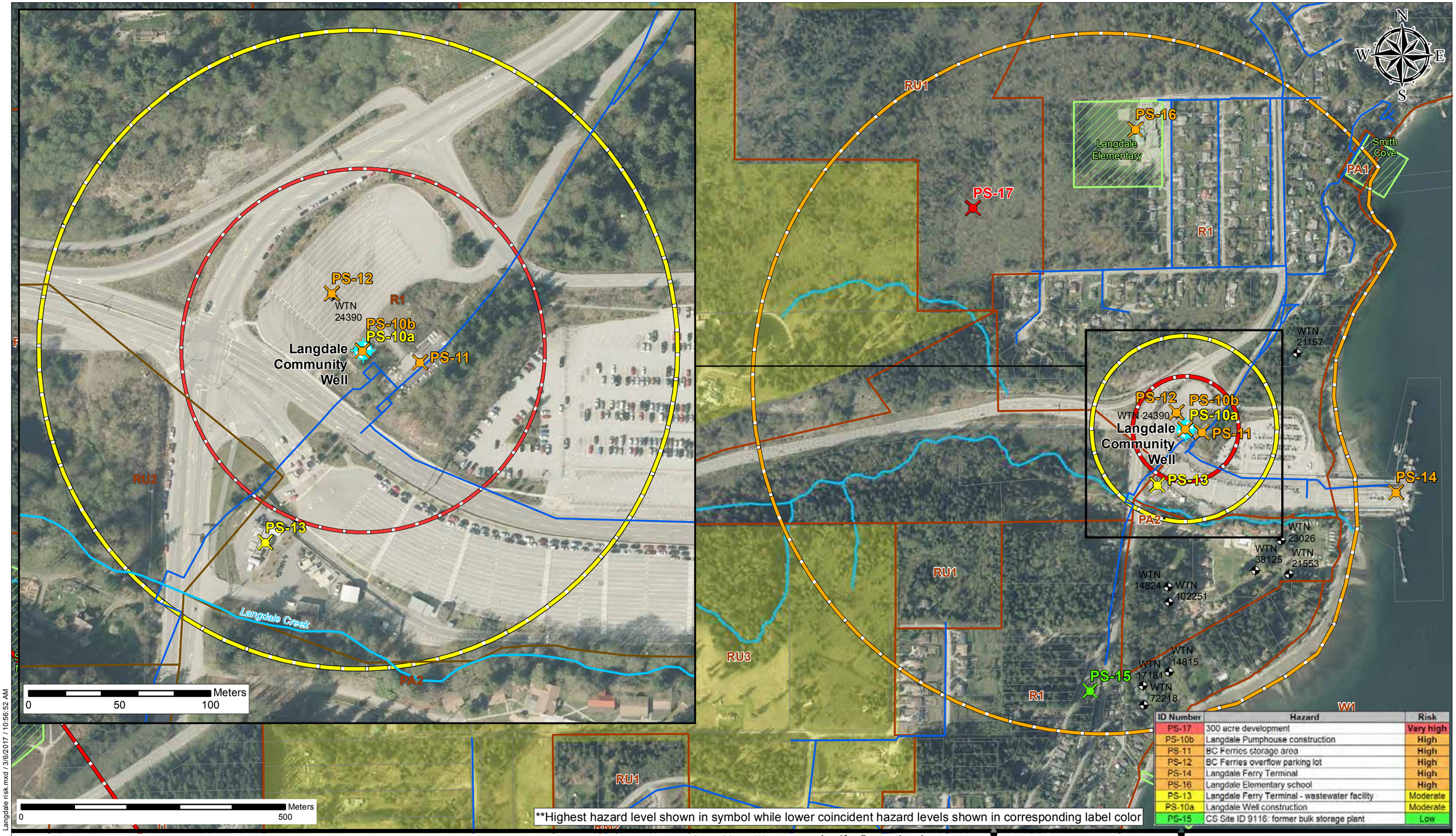
Table 4-6
Hazard risk assessment – Langdale Well

Hazard No.	Hazard	Owner/ Jurisdiction	Contaminants of Concern	Likelihood of Occurrence		Magnitude of Consequence[1]		Risk	Preliminary Action Item No.[2]
Point Sources									
PS-17	300-acre proposed development	Private owner	Nitrates if they have their own wastewater facility. Typical city run-off.	C (possible)	A 300-acre proposed mixed residential and commercial development has been proposed for the hillside northwest of Langdale well. It is difficult to assess the risk at this stage, but a community sanitary system with discharge to ground may be a consideration for a large residential development.	4	Treatment costs are very high for nitrates. If nitrates increased to above the drinking water guideline of 10 mg/L (right now nitrate-N is at 1 mg/L) at the well, the well infrastructure would be lost. The Langdale well is the only supply for the Langdale community and the Langdale Ferry terminal. Although an emergency connection to the private Hopkins Landing System is possible, water shortages would be experienced.	**Very High**	11, 18, 19
PS-10b	Langdale pumphouse construction	SCRD	Pathogens.	B (likely)	During the site visit, the well cap was not sealed. The pumphouse has gaps that allow vermin to enter and there was evidence of vermin droppings. Raw bacteriological data was collected generally twice per month in 2011 and 2013. The results were 1 total coliform out of 23 samples in 2011 and zero total coliforms out 24 samples in 2013. These results indicate excellent water quality. The majority of the water is likely flowing horizontally into the well from the coarsest aquifer section at the well screen at a depth of 45 m below ground. No raw water has been collected since 2013, and no chlorination is completed.	3	If coliforms were detected, a boil water notice would be issued, until the well was flushed.	High	8,13
PS-11	BC Ferries Storage Area	SCRD/MOTI/ BC Ferries	Depends on what is stored	E (rare)	There is a large fenced and locked storage area is located very close to the well. Although no contaminants of concern were identified in this storage area, the potential for storage of hazards (road salt, waste oil, for example) exists. There are many protective layers above the well screen; however, the potential still existing for contaminants to make its way into the aquifer.	4	If a contaminant like a hydrocarbon were detected in the well, the well infrastructure would be lost for a period of time until the remediation was complete.	High	14
PS-12	BC Ferries Overflow parking lot and ditch adjacent to pumphouse	SCRD/MOTI/ BC Ferries	Surface water contaminants, spills from Motor vehicle accidents	E (rare)	The ditch along the pumphouse carries significant flow during precipitation events. The flow originates from the large parking lot, and from the highway on the other side of the parking lot. The ditch is in need of repair. Many protective layers are present above the well screen. However, if a motor vehicle accident occurred, significant fuel could flow adjacent to the well and may pond in the area next to the well.	4	If hydrocarbons were detected in the well, the well infrastructure may be lost for a period of time until the remediation was complete.	High	15
PS-14	Langdale Ferry Terminal.	BC Ferries	Diesel, petroleum hydrocarbons, chlorophenols, PAHs	E (rare)	This is a registered contaminated site CS Site ID 8414 registered as the Langdale Ferry Terminal. However, the Ferry Terminal is downslope and there are many protective layers between the surface and the aquifer.	4	If a contaminant reached the well, well infrastructure may be lost and an alternative water supply may need to be connected (connection to Hopkins is complex), or a new well drilled. Water shortages would result.	High	17
PS-16	Langdale Elementary school	BC Government.	Fertilizer, pesticides, nitrates from septic field	D (unlikely)	There is no shop at the school, but there is a large playing field with a significant population of geese that use the fields (Knight, Duncan, 2016). The school is on a septic field and there are 106 students that attend the school. The school is outside of the APA B and therefore only nitrates are a concern. Nitrate-N concentrations have been sampled once or twice a year since at least 2001 and have ranged between 0.2 to 0.3 mg/L except for one sample on November 7, 2005 that showed 2.19 mg/L. This result may be an error because it is an outlier from the other data points. No upwards trend is evident.	4	Treatment costs are very high for nitrate. If nitrate-N increased to above the drinking water guideline of 10 mg/L, the well infrastructure would be lost, and a connection with Chapman water system would need to be made through Hopkins Landing.	High	18
PS-10a	Langdale well construction and saltwater Intrusion	SCRD	Any contaminant	E (rare)	Bottom of well is about 10 m below sea level, and with quite a flat gradient estimate, the concern is that pumping could draw in salt water. However, pumping at existing rate provides very good water quality, and monitoring would pick up any indication of over pumping.	3	At current pumping rates, sodium and chloride are not elevated indicating no salt water intrusion. However, if the pumping rate is increased and saltwater is drawn into the well (evidenced by increases in sodium and chloride), the consequence would be drilling a new well.	Moderate	12
PS-13	Langdale Ferry terminal - wastewater facility	BC Ferries	Pathogens.	E (rare)	The wastewater treatment plant for the ferry terminal is located within the aquifer protection area for pathogens. A pressurized line carries raw effluent to the wastewater treatment plant and the treated effluent is discharge to the ocean. The discharge line follows the same trench as the pressurized raw effluent line. The plant was constructed in 2010, is inspected twice a week, and is registered with the Ministry of Environment. Raw water bacteriological data from the Langdale well was collected generally twice per month in 2011 and 2013and is excellent (one total coliform in 23 samples in 2011 and zero total coliforms in 2013). This indicates the fine soils above the well intake are likely providing adequate protection from pathogens.	3	If pathogens reached the well, the only protection is chlorine, which will inactivate viruses and bacteria, but not protozoa.	Moderate	8,16

Table 4-6
Hazard risk assessment – Langdale Well

Hazard No.	Hazard	Owner/ Jurisdiction	Contaminants of Concern	Likelihood of Occurrence		Magnitude of Consequence[1]		Risk	Preliminary Action Item No.[2]
PS-15	CS Site ID 9116: Former bulk storage plant that was decommissioned.	Private owner	BTEX, diesel, VOCs, petroleum hydrocarbons, waste oil	E (rare)	Certificate of Compliance was issued for this site in 2014 indicating site was remediated to applicable standards.	1		Low	None
Non-point Sources									
NPS-22	Agricultural operations.	Private owners	Nitrates, pesticides, herbicides, pathogens	D (unlikely)	Agricultural land is present throughout most aquifer protection areas. Farming operations have been known to cause nitrate-N to exceed drinking water guidelines in community wells in Canada. Nitrate-N in Chaster well has been increasing, even though the well is over 100 m deep.	4	Treatment costs are very high for nitrate. If nitrate-N increased to above the drinking water guideline of 10 mg/L, the well infrastructure may be lost.	High	24
NPS-26	Septic systems/septic tanks	Private owners	Pathogens (coliform and non-coliform bacteria and viruses), chloride, sulphate, nitrates, phosphate, heavy metals, tetrachloroethylene, dichlorobenzene, methylene chloride, and PPCPs.	C (possible)	No GARP determination has been completed. Since the risk is unknown, the likelihood is possible.	3	If pathogens reached the well, the only protection is chlorine, which will inactivate viruses and bacteria, but not protozoa.	High	1, 8, 33
NPS-20	Underground or above-ground storage tanks	Private owners	BTEX, VOCs, Diesel, MTBE, petroleum hydrocarbons, waste oil	E (rare)	Natural gas came to Sunshine Coast in the mid 1990s, since that time, most homes are heated using electricity, wood, or natural gas. Any contamination from historical use of heating oil would already have been apparent. Moreover, the screen intake is 40 m below the water table, and varying layers of glacial till are present at shallower depths: any hydrocarbon plume would stay near the surface.	4	If a contaminant reached the well, major infrastructure may be lost.	Moderate	11, 22
NPS-21	Residential properties	Private owners	Pesticides, herbicides, household cleaners, automotive wastes,	E (rare)	Pesticide use is not prevalent on the Sunshine Coast. Langdale Well is surrounded by larger holding residences that could allow hobby farms; therefore, small scale agricultural practices can be expected.	3	The majority of contaminants of concern related to residential homes are detectable at trace amounts, and can be observed through regular monitoring.	Moderate	23
NPS-24	Roads and other transportation infrastructure including storm drains and discharge points (like dry wells)	SCRD/MOTI	Automotive wastes, sodium chloride, pesticides, herbicides, solid and liquid spills and runoff	E (rare)	Ditches carrying stormwater from the highways passes within 20 m of the well. Moreover, the Sunshine Coast Highway rises steeply away from the well, and any fuel from a MVA would quickly enter the ditch system. However, the protective confining layers above the well intake would slow the speed at which the fuel would reach the well intake.	4	If a contaminant reached the well, major infrastructure may be lost.	Moderate	26, 27, 28, 29, 30, 31
NPS-19	Poorly constructed existing wells in capture zone (monitoring, irrigation, domestic or geoexchange wells)	Various owners	Inside the 200-day capture zone, pathogens and chemical contaminants are of concern. Outside of 200 day the concern would be on chemical contaminants.	D (unlikely)	Right now, there are 5 registered wells within the APAs but the BC Ministry of Environment's Wells database is a voluntary registration process and some other wells may exist; however, none are known to exist within 100 m (APA A). Although there is no surface seal, many fine units are present above the aquifer which starts at 30 m. With this low number of wells in the area, and the fine formation above the aquifer, the likelihood is unlikely (could occur at some time).	2	Types of contaminants of concern would be at very low loads since residential area.	Low	20
NPS-23	Natural gas lines and other private utilities (preferred pathways)	Fortis BC and others	Various contaminants	E (rare)	No natural gas or other private utility lines are expected to be near the well. Moreover, there are many protective confining layers between the surface and the well intake, and the surrounding land use is low density residential.	2	Types of contaminants of concern would be at very low loads since residential area.	Low	25
NPS-25	Animals and pests	Various owners	Pathogens	E (rare)	One dog park is present in APA C, but the well intake is set below protective confining layers.	1	The concentrations of any contaminant of concern (nitrates, chlorides) will be well within acceptable limits and are easily managed through routine monitoring.	Low	32

Notes:
[1] 1 = Insignificant; 2 – Minor; 3 – Moderate; 4 – Major; 5 – Catastrophic (Section 4.1, Table 4-2)
[2] See Section 5, Table 5-2 for Action Item details.



ID Number	Hazard	Risk
PS-17	300 acre development	Very high
PS-10b	Langdale Pumphouse construction	High
PS-11	BC Ferries storage area	High
PS-12	BC Ferries overflow parking lot	High
PS-14	Langdale Ferry Terminal	High
PS-16	Langdale Elementary school	High
PS-13	Langdale Ferry Terminal - wastewater facility	Moderate
PS-10a	Langdale Well construction	Moderate
PS-15	CS Site ID 9116: former bulk storage plant	Low

**Highest hazard level shown in symbol while lower coincident hazard levels shown in corresponding label color

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Associated Environmental

Well Location
MOE Registered Well
SCRD Water Mains
Zoning* Boundary
ALR Land
Park

*Zoning Codes: R** = residential,I** = industrial, C** = commercial, P** = parks, W** = water

Hazard Level**
Very High
High
Moderate
Low

Aquifer Protection Area
A - 100m Well Protection Zone
B - 200 Day Time of Travel
C - 10 Year Time of Travel

Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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DATE: November 2016
DRAWN BY: DA

FIGURE 4-3: DRINKING WATER HAZARDS AND RISK – LANGDALE WELL

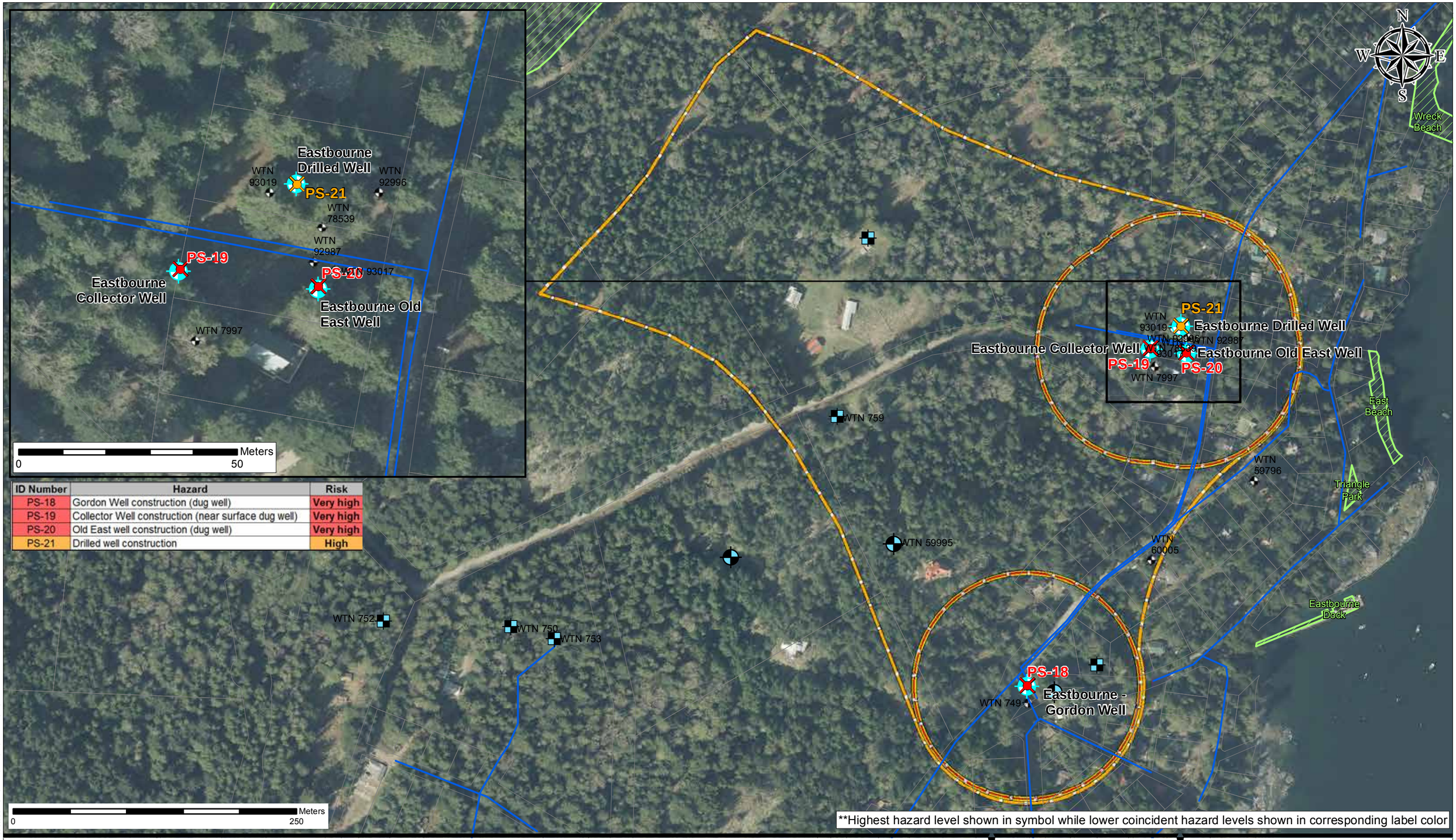
Sunshine Coast Regional District

Well Protection Planning

Table 4-7
Hazard risk assessment – Eastbourne Well System

Hazard No.	Hazard	Owner/ Jurisdiction	Contaminants of Concern	Likelihood of Occurrence		Magnitude of Consequence[1]		Risk	Preliminary Action Item No.[2]
Point Sources									
PS-18	Construction of Gordon Well (dug well)	SCRD	Any surface contaminant (chemical and pathogens)	C (possible)	Well is locked, but area is not fenced. Operators live on Keats Island and do regular inspections. Well is GARP - groundwater at risk of protozoa, and treated with chlorine and UV disinfection.	4	If a contaminant reached the well, major infrastructure may be lost.	**Very High**	21
PS-19	Construction of Collector well (near surface dug well).	SCRD	Any surface contaminant (chemical and pathogens)	C (possible)	The Collector Well is a shallow sand-filled trench with a collector pipe at the bottom of the trench that collects near-surface water that intersects with the trench. The collector pipe feeds into a shallow wet well. The water system operators live on Keats Island and do regular inspections. The trench depth is not known. That water table in the wet well during the site visit on November 14, 2016 was 0.6 m below ground. However, in wet months, the entire area can be ponded. The water is treated as surface water with both chlorinated and UV-treatment. The drilled well water also gets treated for arsenic removal.	4	If a contaminant reached the well, major infrastructure may be lost	**Very High**	21
PS-20	Construction of Old East well (dug well).	SCRD	Any surface contaminant (chemical and pathogens)	C (possible)	Well-head is located below ground surface in a wooden crib box. Well-head does not have a well cap; however, well is GARP - groundwater at risk of protozoa, and treated accordingly. Some refuse is stored next to pumphouse 5 m away from this well.	4	If a contaminant reached the well, major infrastructure may be lost.	**Very High**	21
PS-21	Drilled well construction and saltwater intrusion.	SCRD	Sodium and chloride	C (possible)	Bottom of well is 8 m below sea level, and therefore there is a potential to draw in salt water. Well is only 12 years old – it may take a few years to draw in salt water based on aquifer characteristics.	4	If a contaminant reached the well, major infrastructure may be lost, thus magnitude of consequence is major.	High	12
Non-point Sources									
NPS-30	Septic Systems/Septic Tanks.	Private owners	Pathogens (coliform and non-coliform bacteria and viruses), chloride, sulphate, nitrates, phosphate, heavy metals, tetrachloroethylene, dichlorobenzene, methylene chloride, and PPCPs.	B (likely)	Keats Island is not serviced by any municipal sanitary sewer system, so homes have either septic systems or outhouses. Nearest homes are about 20 m away, so it is difficult to assess if the well sites meet the Health Hazards Regulation (well needs to be located at 30 m away from any source of contamination, including septic fields). Bacteriological is poor based on a review of raw water in 2011 and 2013: of 105 samples collected from the wells in 2011, 3 samples contained *E. coli,* and 59 samples contained total coliforms.	4	The well is disinfected; however, it is uncertain whether the contact time meets the 4-log inactivation of viruses. If not, the small population could become ill.	**Very High**	8,32
NPS-27	Residential properties	Private	Pesticides, herbicides, household cleaners, automotive wastes,	C (possible)	Pesticide use is not prevalent however, homes on Keats Island may tend to store quantities of fuel, and other chemical hazards like unused cars and trucks. Since the wells are shallow, they are not protected by any infiltration of contaminants on the surface.	4	If a contaminant reached the well, major infrastructure may be lost.	High	23,34,35
NPS-28	Roads and other transportation infrastructure including storm drains and discharge points (like dry wells)	SCRD/MOTI?	Automotive wastes, sodium chloride, pesticides, herbicides, solid and liquid spills and runoff	E (rare)	There are minimal vehicles on Keats Island (there is no car ferry). The one road north of the Gordon Well is steep. The ditch along the road carries stormwater and the flow can sometimes be quite substantial. There is a possibility of the ditch overflowing and water running across the road and past the area immediately around the well.	4	If a contaminant reached the well, major infrastructure may be lost.	High	25, 26, 27, 28, 29, 30.
NPS-26	Underground or above-ground storage tanks	Private	BTEX, VOCs, Diesel, MTBE, petroleum hydrocarbons, waste oil	E (rare)	No natural gas is on Keats Island. The main source of heat is electrical and wood. came to Sunshine Coast in the mid 1990s, since that time, most homes are heated using electricity, wood, or natural gas. Any contamination from historical use of heating oil would already have been apparent. Moreover, the screen intake is 40 m below the water table, and varying layers of glacial till are present at shallower depths: any hydrocarbon plume would stay near the surface. Therefore, the likelihood is rare.	4	If a contaminant reached the well, major infrastructure may be lost.	Moderate	11, 22
NPS-25	Poorly constructed existing wells in capture zone - either monitoring wells, domestic wells, geothermal wells.	Private	Existing wells could act as a direct pathway to the aquifer, and then the contaminant would travel horizontally through aquifer.	E (rare)	No other wells besides the SCRD wells are registered on the Ministry of Environment's Water Resources Atlas. One non-registered well is known to exist within 30 m of Gordon Well, but is welded shut. Other non-registered wells could exist. Based on this low number of wells, and because a community water system is present and therefore new wells drilled is unlikely, the likelihood is rare.	2	Types of contaminants of concern would be at very low loads since residential area.	Low	20
NPS-29	Animals and Pests	Various owners	Pathogens	E (rare)	There are no dog parks in the area.	1		Low	31

Notes:
[1] 1 = Insignificant; 2 – Minor; 3 – Moderate; 4 – Major; 5 – Catastrophic (Section 4.1, Table 4-2)
[2] See Section 5, Table 5-2 for Action Item details.



ID Number	Hazard	Risk
PS-18	Gordon Well construction (dug well)	Very high
PS-19	Collector Well construction (near surface dug well)	Very high
PS-20	Old East well construction (dug well)	Very high
PS-21	Drilled well construction	High

**Highest hazard level shown in symbol while lower coincident hazard levels shown in corresponding label color

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Associated Environmental

Well Location
MOE Registered Well
Drilled Well
Dug Well

SCRD Water Mains
Zoning* Boundary

*Zoning Codes: R** = residential,I** = industrial, C** = commercial, P** = parks, W** = water

ALR Land
Park

Hazard Level**
Very High
High
Moderate
Low

Aquifer Protection Area
A - 100m Well Protection Zone
B - 200 Day Time of Travel
C - 10 Year Time of Travel

Aquifer protection areas are based on the maximum (sustainable) well pumping rate, not the actual well pumping rate

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FIGURE 4-4: DRINKING WATER HAZARDS AND RISK LEVEL - EASTBOURNE SYSTEM

Sunshine Coast Regional District

Well Protection Planning

4.2 STRENGTH, WEAKNESSES, OPPORTUNITIES, AND THREATS ANALYSIS

One of the major objectives of the Source-to-Tap Guideline is to incorporate information generated on the water supply system into a comprehensive assessment that identifies the strengths and weaknesses of the overall water system as an integrated whole. The TAC achieved this objective by conducting a SWOT analysis on November 15, 2016. The minutes from that meeting are included in Appendix A.

5 Module 8: Recommended Actions to Improve Drinking Water Protection

The outcome of Module 8 is a series of recommendations for each medium and high risk hazard identified in Module 7. The recommended risk management actions follow the SMART (Specific, Measurable, Achievable, Realistic, Time-bound) principles outlined in Module 8 of the Source-to-Tap Guideline and are based on the **multiple barrier** framework[3] for source protection defined by the Canadian Council of Ministers of the Environment (CCME 2004), which considers practical and cost-effective methods to improve existing barriers or implement new ones, where warranted.

The barriers introduced through source protection augment the natural barriers (or filters) that are already in place in watersheds or aquifers. For aquifers, these include the presence of confining layers and the properties of soils or bedrock that can attenuate contaminant concentrations in groundwater.

The Source-to-Tap Guideline recommends that the TAC, water supplier, and Drinking Water Officer develop risk management actions that are specific, measurable, achievable, realistic, and time-bound, following the principle outlined in Module 8 (MHLS 2010). The suggested timeframes for risk management actions are presented in Table 5-1; however, the Source-To-Tap Guideline suggests that risk level is not the only factor to consider when prioritizing actions; ease of implementation can also be a factor.

Table 5-1
Suggested time categories for risk management actions

Category	Timeframe	Type of Risk Management Action
Immediate	Within 3 months	Actions addressing regulatory violations, imminent public health threats, or water shortages.
Short Term	Within 1 year	Actions that are easy to implement or those addressing significant public health concerns or water quantity issues, enhancement or weak barriers.
Medium Term	1 to 3 years	Actions addressing moderate water quality or quantity concerns, broad systemic issues.
Long Term	3 years +	Actions addressing hazards representing chronic health implications or long-term threats to water availability, broad systemic issues.

Source: BC Ministry of Healthy Living and Sport 2010

[3] The multi-barrier approach is an integrated system of procedures, processes, and tools that collectively prevent or reduce the contamination of drinking water from source to tap in order to reduce risks to public health.

The recommendations to protect drinking water are included in Table 5-2 and are designed to reduce the potential for future source water contamination. It is important to consider all of these recommendations to improve the safety of the water supply systems. To help with this, we have categorized our recommendations as: engineering/capital works, planning, or operational.

Table 5-2
Recommended actions to protect drinking water

Action No.	System	Action	Action Type and rough cost estimate if applicable	Action Timeframe
1	Chaster	Replace pit with pitless adaptor and add surface seal set 1.0 m into till, which starts at 1.5 m.	Engineering/capital works $30,000.	Medium term (1-3 years)
2		When replacing the pit with a pitless adaptor, if the storm drain is found, consider re-routing it to discharge farther away from the well.	Engineering/capital works	Medium term (1-3 years)
3		Continue to allow for a certain percentage of development be dedicated as SCRD parkland, as development occurs along Chaster Creek. This will enhance protection of the aquifer protection areas for the Chaster well.	Planning	Long term (>3 years)
4		Sample Chaster Creek and Chaster well two times per year for three years, and then re-assess frequency at that time. Test for common list of wastewater and agriculture related parameters: ammonia, nitrate, nitrite, organic nitrogen, total Kjeldahl nitrogen, total nitrogen, total phosphorus, total dissolved phosphorus, orthophosphate, chloride, sodium, pH (field), conductivity (field and lab), total coliforms, *E. coli*., biological oxygen demand, dissolved oxygen (field), and temperature (field).	Operational	Short term (within 1 year)
5		Install a datalogger in Chaster well to continuously monitor changes in water levels compared to rainfall/snowmelt events, to better assess the groundwater-surface water interaction.	Engineering/capital works	Long term (>3 years)
6		Sample for hydrocarbons three times for one year and then re-evaluate risk to hydrocarbons, and re-evaluate frequency at that time, depending on the results.	Operational	Short term (within 1 year)
7		Require development to show that it will meet water quality guidelines, including drinking water, at Chaster Creek, because Chaster Creek may be a recharge source to Chaster Road Well.	Planning	Short term (within 1 year)
8		Conduct a study to assess if the groundwater is at risk of containing pathogens (GARP) following the Ministry of Health's GARP Guideline (MOH 2015).	Engineering/capital works $5000 for four wells (Chaster, Granthams, Soames, Langdale)	Immediate (within 3 months)
9	Granthams and Soames	Bring uncontrolled flowing artesian conditions under control or close the well to meet the Groundwater Protection Regulation (BC Reg. 39/2016). Steps involved in controlling flow include drilling a dewatering well, dewatering the area, adding a closure plug using suitable materials such as bentonite and cement grout, pulling the casing, and drilling a new replacement well. Costs are ball-park and a detailed cost estimate should be developed.	Engineering/capital works $200,000+new well	Medium term (1-3 years)
10		Make the Granthams pumphouse vermin-proof.	Engineering/capital works	Immediate (within 3 months)
11		Test raw water for a wider range of contaminants twice per year for the first three years, and then assess frequency at that time. General parameters (including nutrients and wastewater) include total metals, Langelier Index, total coliforms, *E. coli*, LEPH, HEPH, PAHs, VOCs, and DOC. Once every five years, also test pesticides, herbicides, phenols, THM formation potential, cyanide, and gross alpha/beta and other isotope analysis as needed.	Operational	Short term (within 1 year)
12		Measure temperature, TDS, and conductivity in the field when doing bacteria testing and regularly review the quarterly monitoring results of sodium and chloride. Plot the results to assess trends over time.	Operational	Short term (within 1 year)
13	Langdale	Make pumphouse improvements: a) Machine a custom well cap that provides vermin-proof seal. b) Ensure the pumphouse is vermin-proof. For example, seal the gap below the door and cover windows with a finer mesh. c) Extend the roof drains further away from the well area, especially the southeast corner roof drain, which is closest to the well.	Engineering/capital works	Immediate (within 3 months)
14		Add signage to the Storage Area fence stating that this is part of an APA and that storage of chemicals including road salt is not allowed.	Operational	Short term (within 1 year)
15		Keep the ditch maintained and install a solid section of culvert to carry runoff away from the well area	Engineering/capital works	Medium term (1-3 years)
16		Provide a copy of the Source Protection Plan to BC Ferries, and ask BC Ferries for a copy of their annual reports submitted to Ministry of Environment. Review the report annually, and ask that BC Ferries report any leaks or spills immediately to the SCRD.	Operational	Short term (within 1 year)
17		Establish a connection to the Chapman water system via the Hopkins so that a connection can be done more easily in an emergency. Alternatively, install a second well in a different location in the Langdale area, to provide some redundancy to the system.	Operational	Short term (within 1 year)
18		Sample Langdale twice a year for common wastewater parameters for three years and then re-assess frequency at that time: ammonia, nitrate, nitrite, organic nitrogen, total Kjeldahl nitrogen, total nitrogen, total phosphorus, total dissolved phosphorus, orthophosphate, chloride, sodium, pH (field), conductivity (field and lab), total coliforms, *E. coli*., biological oxygen demand, dissolved oxygen (field), and temperature (field). Use a database management tool, such as Wireless Water or Watertrax, which can set up automatic alerts that email or text selected people if a concentration exceeds pre-established guidelines.	Operational	Short term (within 1 year)
19		For a new large development within the APA, implement aquifer protection measures, including: a) Provide APA maps to the developers. b) Once development plans are better understood, conduct additional studies on APA mapping to better delineate groundwater flow paths from potential hazards. The Source-to-Tap Drinking Water Assessment Guide (MOH 2010) provides guidance on different levels of scope for aquifer mapping depending on the size of the population. For 10,000 connections or more, conduct numerical modelling.	Planning	Short term (within 1 year)

Table 5-2
Recommended actions to protect drinking water

Action No.	System	Action	Action Type and rough cost estimate if applicable	Action Timeframe
20		Use planning tools to better manage installation and closure of wells. Actions could include: a) Require all wells drilled in capture zone to be registered with MOE's wells database, including detailed lithology. b) Require a surface seal to be installed on all monitoring wells, from top of screen to surface, and to be extended to at least 1 m into the first competent till layer for all water supply wells. c) Require all exploratory boreholes to be backfilled with bentonite all the way from bottom to surface (this is above and beyond the *Groundwater Protection Regulation* and *Water Sustainability Act*, but is prudent to protect the drinking water source). See Okanagan Basin Water Boards' Groundwater Bylaws toolkit for more information at http://www.obwb.ca/library/groundwater-bylaws-toolkit/. In this toolkit is an example Well Closure Bylaw that the City of Merritt put in place to increase the protection of its drinking water wells.	Planning	Medium term (1-3 years)
21	Eastbourne	Eastbourne shallow wells actions include: a) Check that contact time for 4-log inactivation of viruses and 3-log inactivation of protozoa is being met by reviewing storage capacity and chlorine concentrations. b) Continue regular inspections of well area and well itself. c) Do not store chemicals in the area of the wells including spent arsenic treatment material, and keep the area tidy. d) Share Source Protection Plan with land owners and discuss potential hazards, and consequences of spills/leaks. e) If doing underground works in the area, backfill with fill that has a finer hydraulic conductivity than surrounding area, and compact to avoid ponded areas forming. f) Add a vermin-proof well cap to the well-head within the wet well end of the Collector Well.	Operational	Immediate (within 3 months)
22	General	Improve groundwater protection from leaking fuel storage tanks through various planning tools. For example: a) In new developments, do not allow USTs, and require a permit to allow covered and contained ASTs in capture zones. b) When significant renovations occur on existing homes in capture zones, require removal of UST or AST. See Groundwater Bylaws Toolkit at http://www.obwb.ca/fileadmin/docs/groundwater_bylaws_toolkit.pdf for more ideas on how to complete this as part of planning.	Planning	Medium term (1-3 years)
23	General	Review acceptable practices for each zoning within each APA. See Groundwater Bylaws Toolkit at http://www.obwb.ca/fileadmin/docs/groundwater_bylaws_toolkit.pdf for more ideas on how to complete this as part of planning.	Planning	Medium term (1-3 years)
24	General	Improve management of groundwater at agricultural operations within APA to help protect the aquifers using various planning tools (Bylaws, Community Plans, etc.). For example: a) Provide information to farms within APA C about Source Protection and potential impacts of nutrients on drinking water if not properly managed. b) Recommend Environmental Farm Plans and Nutrient Management Plans for large-scale operations within APA A and B. b) Require an environmental assessment prior to approval of large-scale agricultural operations such as composting operations, dairies and feedlots with, for example, more than 50 cow, and intensive agricultural operations larger than 20 acres. See Groundwater Bylaws Toolkit at http://www.obwb.ca/fileadmin/docs/groundwater_bylaws_toolkit.pdf for more ideas on how to complete this as part of planning.	Planning	Medium term (1-3 years)
25	General	Consider the proximity to water supply wells when evaluating the alignment of future underground utility corridors. Provide a copy of the Source Assessment and Protection Plan to each utility company in the area.	Planning	Short term (within 1 year)
26	General	Present the Aquifer Protection Plan to First Responders and conduct regular meetings (i.e., annually) to discuss Source Protection.	Operational	Short term (within 1 year)
27	General	Improve signage at the wellhouse.	Operational	Short term (within 1 year)
28	General	Improve access to the well house for First Responders.	Operational	Short term (within 1 year)
29	General	Practice disaster response with First Responders.	Operational	Short term (within 1 year)
30	General	Keep ditches well maintained.	Operational	Short term (within 1 year)
31	General	When making improvements to roads in the APAs, consider bioswales or ditches, and avoid installing dry wells. In this way, surface water will receive some polishing from natural processes.	Engineering/capital works	Medium term (1-3 years)
32	General	Conduct frequent visits to the well site to ensure cleanliness in the pumphouse and around the vicinity of the well.	Operational	Immediate (within 3 months)
33	Eastbourne	Use planning tools to increase groundwater protection related to septic tanks in the APA. For example: a) Prepare a guide on "How to Maintain your Septic Tank" and provide to home owners within each APA. b) Consider having a grant program for maintenance and replacement of septic tanks to encourage owners to follow a maintenance plan. c) Review zoning in APA A and APA B, and move towards protecting the area or allow only low density development. d) For APA C, the contaminant of concern is nitrates. Consider requiring a nitrogen mass balance calculation and assessment of groundwater flow from the subdivision as part of the requirements of any subdivision application within all APAs.	Planning	Medium term (1-3 years)
34	Eastbourne	Present the Source Protection Plan at the annual Keats Island Owners' meeting.	Operational	Short term (within 1 year)
35	Eastbourne	Work with the homeowners in Eastbourne APA to clean up any unwanted stored fuel and other potential hazards (e.g., scrap cars).	Operational	Short term (within 1 year)

Notes: APA = Aquifer Protection Area, LEPH = Light extractable petroleum hydrocarbons, HEPH = Heavy extractable petroleum hydrocarbons, PAHs = polycyclic aromatic hydrocarbons, VOCs = volatile organic compounds, DOC = dissolved organic carbon

6 Contingency Plans

In 2016 the SCRD updated the Emergency Response Plans for each of their water supply systems including:

- Chapman Creek (including Chaster Well, which is used in summer months to augment supply)
- Granthams
- Soames
- Langdale
- Eastbourne

Each SCRD Emergency Response Plan generally follows the format of an emergency plan, as suggested in the BC Well Protection Toolkit. We reviewed the SCRD Emergency Response Plans and provide our comments in Table 6-1, organised by item from the BC Well Protection Toolkit.

Table 6-1
Review of SCRD Emergency Response Plans

Item in an Emergency Response Plan	Section Covered in SCRD ERPs	Comments
1) Roles and responsibilities of the Well Emergency Response Team within the District's overall Emergency Plan.	ERP Table 4-1 and Table 4-2	Consider adding Well Protection Consulting Team Members to the team. These are experts that understand the well and aquifer systems, and can help the SCRD and emergency responders understand the implications of a spill, for example, at different locations within the aquifer protection areas. Example additions: Well Protection Consulting Team Members • Project Hydrogeologist: Marta Green, P.Geo.. Associated Environmental Consultants Ltd., 250-545-3672 • Water System Operator Contractors: Scott Benson, Keats Island Contracting, 604-741-7561 • Engineering System: Shane Walkey, SCRD, 604-885-6806 • Pump Contractors: Pika Pump and Compressor Sales, 250-929-9401 • Drilling Contractors: Paul Anderson, Canwest Well Drilling, Powell River, 604-485-4250
2) An outline of specific response scenarios for each of the most likely and most	ERP Table 3-1	Consider adding specific response scenarios for some additional most likely and likely threats to groundwater sources. Table 6-2 provides some specific response scenarios

Item in an Emergency Response Plan	Section Covered in SCRD ERPs	Comments
significant threats to local water supplies.		for the very high risk hazards that are related to an emergency event. Consider adding Well Protection Consulting Team Members below “Contractors” to the Chain of Command Tree in Figure 4-1
3) An outline of specific response scenarios to unexpected threats and contamination events.	ERP Table 3-1	Provide a copy of aquifer protection area maps in each ERP, and provide a GIS data to each Well Emergency Response Team Member, to allow for the addition of their respective geographic information system.
4) Identification of contacts names and responsibilities for the Well Emergency Response Team, including community members that would be part of the team. For example, providing phone numbers of where to contact neighbours that are out of town in the event of an emergency.	Table 4-2	See Item 1 comments
5) Train the Well Emergency Response Team.	Section 1.5.1	When completing the next training event, provide a summary of the aquifers and wells, and how contaminants move from the surface to the well intake. Discuss the aquifer protection areas and the results of the hazard inventory.
6) Develop a specific communication plan for water contamination events.	Tab 5	Tab 2 provides a description of the engineering components of the system. In Tab 2, How the System Works, consider providing a simple explanation of how water moves through groundwater and the vulnerability at each system.
7) Prepare a schedule and process to update maps and contact information.	Not included	Consider developing a schedule to update the ERPs. Complete an annual review of existing ERPs and a detailed review once every 5 years. The last ERPs were developed in 2016, so consider a detailed review in 2021.
8) Secure alternate water supplies.	Tab 6	Consider an alternate source (a second well) for Langdale, or improve the connection to the Chapman system through Hopkins system (a private water system sourced by a well). Test the backup pump that connects Langdale to Hopkins.

Item in an Emergency Response Plan	Section Covered in SCRD ERPs	Comments
9) Identify and secure funding to implement the Well Emergency Response Plan.	Not included	See Item 7 comments.

Table 6-2 provides some specific response scenarios for the very high and high risk hazards that are related to an emergency event. Consider adding some of these to the SCRD ERPs.

Table 6-2
Response scenario of very high and high risk hazards

Very High and High Risk Hazards	Potential Triggers	Potential Contingency Activity (depends on actual event)	Contacts
Gordon Well, Collector Well, and Old East Well Construction (PS-18, 19, 20) **Examples of contaminants:** Gasoline, antifreeze, oils and solvents	• Complaint of odour • Report of fuel spill in area • Vandalism	1. Determine extent of spill/vandalism. 2. If necessary issue Public Advisory. 3. Provide alternate drinking water source. 4. Expand monitoring to pinpoint source. 5. Contact Well Protection Consulting Team for containment and/or clean up management.	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer 4. Well Protection Consulting Team 5. Business or homeowner responsible
Grantham Well and Pumphouse Construction, Soames Well Construction (PS4a, PS-4b, and PS-5) **Examples of contaminants:** Pathogens	• Coliforms in raw water samples • Reports of gastro-intestinal illness in serviced community	1. If necessary issue Public Advisory. 2. Provide alternate drinking water source. 3. Expand monitoring to pinpoint source. 4. Contact Well Protection Consulting Team for containment and/or clean up management.	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer 4. Well Protection Consulting Team 5. Business or homeowner responsible
Langdale Pumphouse Construction (PS-10b) **Examples of contaminants:** Pathogens	• Coliforms in raw water samples	1. If necessary issue Public Advisory. 2. Provide alternate drinking water source. 3. Expand monitoring to pinpoint source.	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer

Very High and High Risk Hazards	Potential Triggers	Potential Contingency Activity (depends on actual event)	Contacts
		4. Contact Well Protection Consulting Team for containment and/or clean up management.	4. Well Protection Consulting Team 5. Business or homeowner responsible
Gibsons Redi-Mix Ltd. Redevelopment plan: subdivision and 60 trailer pads with onsite septic (PS-3b) **Examples of contaminants:** Pathogens, hydrocarbons, metals, salts, herbicides and pesticides	• Nitrates increasing over time in Chaster Well	1. If necessary issue Public Advisory. 2. Provide alternate drinking water source. 3. Expand monitoring to pinpoint source. 4. Contact business or homeowner responsible.	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer 4. Well Protection Consulting Team 5. Business responsible
BC Ferries Overflow Parking Lot (PS-10b) **Examples of contaminants:** Hydrocarbons, metals, salts, herbicides, and pesticides	• Flooding in the area of Langdale Pumphouse • Report of backup in stormwater system • Coliforms in well	1. If necessary issue Public Advisory. 2. Provide alternate drinking water source. 3. Expand monitoring to pinpoint source. 4. Contact Well Protection Consulting Team for containment and/or clean up management. 5. Contact MOTI and BC Ferries.	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer 4. Well Protection Consulting Team 5. Business or homeowner responsible
Poorly constructed existing Wells (either monitoring wells, domestic wells, or geoexchange wells) **Examples of contaminants:** Hydrocarbons, metals, salts, herbicides, and pesticides	• Complaint of odour in well water • Coliforms in raw water results	1. If necessary issue Public Advisory. 2. Provide alternate drinking water source. 3. Expand monitoring to pinpoint source. 4. Contact Well Protection Consulting Team for containment and/or clean up management. 5. Contact business or homeowner responsible.	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer 4. Well Protection Consulting Team 5. Business or homeowner responsible
Agricultural Operations **Examples of contaminants:** Hydrocarbons, metals, salts, herbicides, and pesticides	• Complaint of odour or colour in customer's water • Coliforms in raw water results	1. If necessary issue Public Advisory. 2. Provide alternate drinking water source. 3. Expand monitoring to pinpoint source. 4. Contact Well Protection Consulting Team for	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer

Very High and High Risk Hazards	Potential Triggers	Potential Contingency Activity (depends on actual event)	Contacts
	• Nitrates increasing over time	containment and/or clean up management. 5. Contact business or homeowner responsible.	4. Well Protection Consulting Team 5. Business or homeowner responsible
Roads and Transportation Systems including Drainage Pits and Storm Drainage Mains **Examples of contaminants:** Pathogens, hydrocarbons, metals, salts, herbicides and pesticides	• Flooding within aquifer protection areas • Report of backup in stormwater system • Coliforms in well • Incidents of dead animals reported • Incidents of illness reported • Home or business owner use of prohibited substance.	1. If necessary issue Public Advisory. 2. Provide alternate drinking water source. 3. Expand monitoring to pinpoint source. 4. Contact Well Protection Consulting Team for containment and/or clean up management. 5. Contact business or homeowner responsible.	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer 4. Well Protection Consulting Team 5. Business or homeowner responsible
Septic systems/septic tanks **Examples of contaminants:** Pathogens, hydrocarbons, metals, salts, herbicides and pesticides	• Complaint of odour or colour in customer's water • Coliforms in raw water results • Nitrates increasing over time	1. If necessary issue Public Advisory. 2. Provide alternate drinking water source. 3. Expand monitoring to pinpoint source. 4. Contact Well Protection Consulting Team for containment and/or clean up management. 5. Contact business or homeowner responsible.	1. General Manager, Infrastructure Services/Regional Manager 2. Emergency Program Coordinator 3. Drinking Water Officer 4. Well Protection Consulting Team 5. Business or homeowner responsible

Notes: Pink highlighting are very high risk hazards and orange highlighting are high risk hazards

7 Summary, Conclusions, and Recommendations

Associated completed a Well Protection Plan for the SCRD's five water supply systems (Chaster, Soames, Granthams, Langdale, and Eastbourne) in the Gibsons area. The assessment followed Modules #1, 2, #7, and #8 of the Source-To-Tap Guideline. The other modules, which relate to financial and governance areas of the water systems, are not addressed in this Well Protection Plan.

The identified potential sources of groundwater contamination (hazards) were based on our review of available information, our discussions with SCRD personnel, and our Senior Hydrogeologist's site visit to each well area. A technical advisory committee assigned a likelihood rating for each contaminant to reach the well and a consequence rating if the contaminant made it to the well. A risk rating for each hazard was based on the combination of likelihood and consequence.

Of the 26 potential point-source hazards and eight non-point source hazards, eight were rated as very high risk and 15 as high risk. The very high hazards are as follows:

- Granthams Well construction, uncontrolled flowing artesian conditions, and pumphouse construction (PS-4a/b, Granthams Well);
- Soames Well construction (PS-5a, Soames Well);
- A 300-acre proposed development (PS-17, Langdale Well);
- Gordon Well, Collector Well, and Old East Well construction (PS-18, PS-19, and PS-20, Eastbourne Well System); and
- Septic systems and tanks on Keats Island (NPS-30, Eastbourne Well system).

Based on our conclusions, Associated recommends the following:

1. The SCRD complete the action items listed in Table 5-2. To manage public health risk and to adequately maintain the SCRDs valuable infrastructure, the recommended action items should be completed within the timeframe listed in Table 5-2. Some action items do not involve capital funds, such as sharing the Well Protection Plan, which shows the aquifer protection areas, with First Responders. Others will require some level of planning and incorporation into annual capital budgets beginning in 2017. In summary, these recommendations:
    a. further assess the risk of pathogens through "Groundwater At Risk of Containing Pathogens" studies;
    b. improve emergency preparedness through better communication and training of First Responders;
    c. reduce the chance that various contaminants enter the aquifer by educating the key business owners, institution managers (schools, and BC Ferries), and SCRD staff about the aquifer protection areas, potential sources of contamination, and an understanding of how contaminants move through aquifers;

d. provide the SCRD with examples of planning tools that can be used to help minimise future land use conflicts;

e. address the management and upgrades of infrastructure in ways that reduce the risk of source water contamination; and

f. implement security and detection systems that improve protection and monitoring of the source water.

2. The SCRD update each water system's Emergency Response Plan as described in Table 6-1 and Table 6-2. Attach a copy of the Well Protection Plan to each Emergency Response Plan.

3. If groundwater supply is expanded in the future, consider developing some redundancy to Langdale well, and consider source protection when selecting future well sites. The SCRD may wish to consider reducing the number of wells used in the system, to be able to place more resources on continuously improving the safety of the remaining sources. For example, Soames and Granthams wells could be permanently closed and replaced with a new well near the Soames reservoir, which is located 50 m west of Soames well. The Soames reservoir site is ideal from a source protection point of view because it is surrounded by a large undeveloped park owned by SCRD.

4. As part of the multiple barrier approach, continue best management practices, including ongoing operator training, reviewing chlorine residual and coliform results in a timely fashion, and limiting activity around the well areas. Promoting a multi-barrier approach and continued improvement is the key to a safe water supply.

Closure

This Well Protection Plan was prepared for the Sunshine Coast Regional District to improve the safety of the water supply systems.

The services provided by Associated Environmental Consultants Inc. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,
Associated Environmental Consultants Inc.

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Appendix A – Records of Meetings

Date:	November 14, 2016	**File:**	2016-8167
Time:	9am	**Page:**	1 of 3
Project:	SCRD Well Protection Plan		
Subject:	Workshop minutes		
Client:	SCRD		
Location:	SCRD Field Road Office		
Present:	Marta Green (Associated Environmental) Darren Molder, Drinking Water Officer, Coastal Health Authority (Day 2) Shane Walkey, Manager of Utility Services (part of Day 1 SWOT) Codi Abbott, Utilities Operations Superintendent Kevin Johnson, Senior Water Technician Trevor Rutley, Engineering Technician (Day 1) Beth Brooks, Environmental Technician Paul Sheridan, Water Technician (Day 2) Andrew Nadler, Keats Island Construction (Day 2) Dave Crosby, Special Projects Manager, Utility Services (Day 2) Dale Sapach, SCADA tech (Day 2) Ron Hunter, Water Technician (Day 2) Andrew Allen, Planner (part of Day 2)		
Distribution:	Those Present		

RECORD OF MEETING

This Record of Meeting is considered to be complete and correct. Please advise the writer within one week of any errors or omissions, otherwise this Record of Meeting will be considered to be an accurate record of the discussions

Action By:	**Discussion:**	
Marta	1	DAY 1: MONDAY, NOVEMBER 14, 2016: SITE VISIT AND TECHNICAL ADVISORY COMMITTEE (TAC) WORKSHOP 1 - IDENTIFY POTENTIAL CONTAMINANT SOURCES, AND SWOT ANALYSIS

Marta Green, Kevin Johnson, and Trevor Rutley visited Eastbourne and Chaster Sites. Met Alex, Scott, and Andrew Nadler from Keats Island Construction at Eastbourne. Marta discussed the goals of the project, the Source to Tap modules, an overview of groundwater flow, and introduced the SWOT exercise. In the afternoon, strengths, weakness, opportunities and threats were done for the water system as a whole and for each well system. See SWOT Memo Attached.

Action By:		Discussion:
Marta	2	TUESDAY, NOV 15, 2016: TAC WORKSHOP 2 (HAZARD SCREENING ASSESSMENT AND RISK CHARACTERIZATION).

Introductions were completed, and then Marta discussed the goals of the project, the Source to Tap modules, an overview of groundwater flow, and introduced the Workshop 2 exercise. A table with a draft list of hazards were given out and risk assignment (see attached tables) were discussed.

Rank likelihood of occurrence

Level	Description	Probability of Occurrence in Next 10 Years
A	Almost certain - is expected to occur in most circumstances	>90%
B	Likely - will probably occur in most circumstances	71-90%
C	Possible - will probably occur at some time	31-70%
D	Unlikely – could occur at some time	10-30%
E	Rare - may only occur in exceptional circumstances	<10%

Rank magnitude of consequence

Level	Description
1	Insignificant - no illness, little disruption to normal operation, little or no increase in normal operating costs.
2	Minor - small population, mild illness moderately likely, some manageable operation disruption, small increase in operating costs.
3	Moderate - minor impact for large population, mild to moderate illness probable, significant moderation to normal operations but manageable, operating costs increased, increased monitoring.
4	Major - impact to small population, severe illness probably, systems significantly compromised and abnormal operation if at all, high level monitoring required.
5	Catastrophic - Major impact for large population, severe illness probable, complete failure of system.

Agree on risk assignments (very high, high, moderate, low).

Likelihood	Consequence				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A (almost certain)	Moderate	High	Very High	Very High	Very High
B (likely)	Moderate	High	High	Very High	Very High
C (possible)	Low	Moderate	High	Very High	Very High
D (unlikely)	Low	Low	Moderate	High	Very High
E (rare)	Low	Low	Moderate	High	High

Associated Environmental

Date: November 18, 2016 **File:** 2016-8167

To: Dave Crosby

From: Marta Green, P.Geo

Project: SCRD Well Protection Planning

Subject: SWOT minutes

MEMO

On November 14, 2016, we completed a SWOT of the wells and the system as a whole. In attendance were: Marta Green (Associated Environmental), Shane Walkey, Manager of Utility Services (part of Day 1 SWOT), Codi Abbot, Utilities Operations Superintendent; Kevin Johnson, Senior Water Technician; Trevor Rutley, Engineering Technician; Beth Brooks, Environmental Technician

Table 1: Strengths, weaknesses, opportunities and threats for the SCRD Wells Systems Overall

	SCRD Wells Systems Overall
Strengths	• Wells backup each other • No large industrial or agricultural sources • Good operators (8 operators, EOCP Class 1 to 4 (two level 4s) • Geology: there is a protective till layer on top of all well sites • Analyze for parameters regularly and review lab results as soon as they arrive • Complete aggressivity/corrosivity testing for all wells: this will allow SCRD to review the lead-leaching potential of its water sources • Great water quality
Weaknesses	• Natural gas arrived to the Sunshine Coast in early 2000s. Therefore, heating oil tanks may have been used up until recently as main mode of heat, although electric heat and wood is quite popular. • Cross connection between Hopkins Landing is a bit complicated, leaving Langdale having a complex back-up system. • The SCRD doesn't own all of the land that its infrastructure is on: all rights of ways from MOTI. • No education campaign.
Opportunities	• Put water quality data into a database that compares to Guidelines, and sends alerts, freeing up Operator's time. Or putting into existing Cityworks for other uses. • Water tastes really good and this is of great value to the consumers. This is an opportunity because SCRD should have an easier time selling the water at a higher price, bringing in more revenue. • There is no drill rig on the Sunshine Coast, and little intensive agriculture yet: therefore, the till aquitard remains intact for the most part. This is an opportunity to protect it now before its integrity is compromised by too many improperly closed boreholes or over application of nutrients, for example. • If completed connection to Hopkins Landing, then the entire system would have more redundancy.
Threats	• There is very little groundwater data and this makes it difficult to make sound decisions related to aquifer protection. • Many urban growth pressures.

Table 2: Strengths, weaknesses, opportunities and threats for the Chaster Well

	Chaster Well
Strengths	• Great protective layers above intake • Low population density • Great water quality • Deep well • Electrical and chlorine and piping all in separate buildings/structures • Alarmed and keyed.
Weaknesses	• Well in concrete pit: confined space: making any kind of maintenance including emergency repair very difficult and potentially dangerous. • Roof drain: where does it go? • No surface seal = annular space = direct pathway. • At least 1 septic field up-gradient within about 30 m.
Opportunities	• With a bit of work, you could have lots of improvements. • Could purchase u-g home when comes for sale. • Can develop policy around ALR land in capture zone. • If sample port is put in, can sample raw water for indicators for septic field influence and saltwater intrusion (conductivity, temperature, TDS, pH) easily when weekly bacteria samples are taken
Threats	• Lots of urban growth and ALR land pressures in the capture zone.

Table 3: Strengths, weaknesses, opportunities and threats for the Granthams and Soames Wells

	Granthams and Soames
Strengths	• SCRD owns the large park (Soames Park) that surrounds the majority of the Aquifer Protection Area, and the area in the vicinity of the wells.
Weaknesses	• Soames and Granthams are over 100 years old: therefore, there may be old contaminants. • These originally were privately run systems. Soames was taken over by SCRD in 1990, and Granthams in 2012. Therefore, original well logs, pumping tests, and engineering drawings may not be available. • Uncontrolled flowing well. • Soames well under a road. • Industrial park in upper reaches of capture zone
Opportunities	• Protecting these aquifer protection areas will be easier because the majority is a park and is owned by SCRD. Needs to be coordinated with Parks Division.
Threats	• Road.

Table 4: Strengths, weaknesses, opportunities and threats for the Langdale System

	Langdale
Strengths	• Designed by a professional Engineer and has engineering drawings • Very low density nearby
Weaknesses	• Land around the well not controlled by SCRD: controlled by MOTI or BC Ferries. • Septic fields on north and south sides: • Langdale community • Langdale school • BC Ferries wastewater treatment plant • Salvation Army • Steep slope carrying lots of stormwater from large highway sections to ditches that pass near the well.
Opportunities	• Geology still provides some protective capping but not as good as Chaster. • Backup to the well is through Hopkins Landing, another water supplier. • BC Ferries is likely to be a very good partner in aquifer protection
Threats	• A very large 300-acre residential complex development is planned upgradient of the well. • Very large relatively unused overflow parking lot right next to well: what if BC Ferries changes and starts using it more?

Table 5: Strengths, weaknesses, opportunities and threats for the Eastbourne System

	Eastbourne
Strengths	• No industrial uses, all residential. • Own lots or easements for infrastructure. • Great operators that are also local. • Advanced treatment system
Weaknesses	• These originally were privately run systems. Therefore, original well logs, pumping tests, and engineering drawings may not be available. • Septic fields nearby.
Opportunities	• 100 year lease of other community on Keats Island is coming up.
Threats	• Low water availability, climate change

Appendix B – Well Logs

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 23421

Owner: SUNSHINE COAST REGIO

Address: CHASTER ROAD

Area:

WELL LOCATION:
NEW WESTMINSTER Land District
District Lot: 909 Plan: Lot:
Township: Section: Range:
Indian Reserve: Meridian: Block:
Quarter:
Island:
BCGS Number (NAD 83): 092G033343 Well: 16

Class of Well:
Subclass of Well:
Orientation of Well:
Status of Well: New
Licence General Status: UNLICENSED
Well Use: Unknown Well Use
Observation Well Number:
Observation Well Status:
Construction Method: Drilled
Diameter: 12.0 inches
Casing drive shoe:
Well Depth: 364 feet
Elevation: 0 feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag:
File Info Flag:
Sieve Info Flag:
Screen Info Flag:

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 1970-04-01 00:00:00

Driller: Rural Well Drillers
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 240 (Driller's Estimate) U.S. Gallons per Minute
Development Method:
Pump Test Info Flag: Y
Artesian Flow:
Artesian Pressure (ft):
Static Level: 232 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag:
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag:
Material:
Method:
Depth (ft):
Thickness (in):

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
MX. PUMPING RATE 240 USGPM.

LITHOLOGY INFORMATION:

From	0	to	5 Ft.	Sand and gravel
From	5	to	20 Ft.	Glacial till
From	20	to	82 Ft.	Fine - medium sand occasional gravel
From	82	to	84 Ft.	Sand and water
From	84	to	182 Ft.	Glacial till
From	182	to	235 Ft.	Medium - coarse sand
From	235	to	247 Ft.	Organic silt
From	247	to	255 Ft.	Sand with some silt
From	255	to	258 Ft.	Silt
From	258	to	291 Ft.	Fine sand (W.B.)
From	291	to	296 Ft.	Sandy silt - no water
From	296	to	316 Ft.	Sand - some silt and wood chips W.B.
From	316	to	333 Ft.	Medium clean sand, silt fraction
From	333	to	364 Ft.	Fine sand (W.B.)

- Return to Main
- Return to Search Options
- Return to Search Criteria

Information Disclaimer
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Report 1 - Detailed Well Record

Well Tag Number: 78231	Construction Date: 1990-08-24 00:00:00
Owner: GRANTHAMS LANDING IM	Driller: Nor-West Drilling
	Well Identification Plate Number:
Address: SOAMES CREEK	Plate Attached By:
	Where Plate Attached:
Area: GIBSONS	
	PRODUCTION DATA AT TIME OF DRILLING:
WELL LOCATION:	Well Yield: 0 (Driller's Estimate)
NEW WESTMINSTER Land District	Development Method:
District Lot: 693 Plan: 1119 Lot:	Pump Test Info Flag: N
Township: Section: Range:	Artesian Flow:
Indian Reserve: Meridian: Block: D	Artesian Pressure (ft):
Quarter:	Static Level: 75 feet
Island:	
BCGS Number (NAD 83): 092G043213 Well: 8	WATER QUALITY:
	Character:
Class of Well:	Colour:
Subclass of Well:	Odour:
Orientation of Well:	Well Disinfected: N
Status of Well: New	EMS ID:
Licence General Status: UNLICENSED	Water Chemistry Info Flag:
Well Use:	Field Chemistry Info Flag:
Observation Well Number:	Site Info (SEAM):
Observation Well Status:	
Construction Method:	Water Utility:
Diameter: 8 inches	Water Supply System Name:
Casing drive shoe:	Water Supply System Well Name:

Well Depth: 52 feet	
Elevation: 0 feet (ASL)	SURFACE SEAL:
Final Casing Stick Up: inches	Flag: N
Well Cap Type:	Material:
Bedrock Depth: feet	Method:
Lithology Info Flag: N	Depth (ft): 0 feet
File Info Flag: N	Thickness (in):
Sieve Info Flag: N	Liner from To: feet
Screen Info Flag: Y	
	WELL CLOSURE INFORMATION:
Site Info Details:	Reason For Closure:
Other Info Flag:	Method of Closure:
Other Info Details:	Closure Sealant Material:
	Closure Backfill Material:
	Details of Closure:

Screen from	to feet	Type	Slot Size
41.5	52		40
0	0		60
0	0		0
0	0		0

Casing from	to feet	Diameter	Material	Drive Shoe
0	0	0	null	null

GENERAL REMARKS:
SOAMES CREEK GIBSONS BC

LITHOLOGY INFORMATION:

From	0 to	9 Ft.	ROCK FILL
From	9 to	19 Ft.	SILTY BROWN SAND
From	19 to	25 Ft.	STONEY HARD PAN
From	25 to	52 Ft.	WATER BEARING SAND & GRAVEL

- Return to Main
- Return to Search Options
- Return to Search Criteria

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Report 1 - Detailed Well Record

Well Tag Number: 65967	Construction Date: 1979-10-17 00:00:00
Owner: SOAMES POINT WATER W	Driller: Rural Well Drillers
	Well Identification Plate Number:
Address:	Plate Attached By:
	Where Plate Attached:
Area:	
	PRODUCTION DATA AT TIME OF DRILLING:
WELL LOCATION:	Well Yield: 0 (Driller's Estimate)
NEW WESTMINSTER Land District	Development Method:
District Lot: 693 Plan: Lot:	Pump Test Info Flag: Y
Township: Section: Range:	Artesian Flow:
Indian Reserve: Meridian: Block:	Artesian Pressure (ft):
Quarter:	Static Level: 31 feet
Island:	
BCGS Number (NAD 83): 092G043213 Well: 9	WATER QUALITY:
	Character:
Class of Well:	Colour:
Subclass of Well:	Odour:
Orientation of Well:	Well Disinfected: N
Status of Well: New	EMS ID:
Licence General Status: UNLICENSED	Water Chemistry Info Flag: Y
Well Use:	Field Chemistry Info Flag:
Observation Well Number:	Site Info (SEAM):
Observation Well Status:	
Construction Method: Drilled	Water Utility:
Diameter: 10.0 inches	Water Supply System Name:
Casing drive shoe:	Water Supply System Well Name:

Well Depth: 121 feet	
Elevation: 0 feet (ASL)	SURFACE SEAL:
Final Casing Stick Up: inches	Flag: N
Well Cap Type:	Material:
Bedrock Depth: feet	Method:
Lithology Info Flag: N	Depth (ft):
File Info Flag: N	Thickness (in):
Sieve Info Flag: N	
Screen Info Flag: N	WELL CLOSURE INFORMATION:
	Reason For Closure:
Site Info Details:	Method of Closure:
Other Info Flag:	Closure Sealant Material:
Other Info Details:	Closure Backfill Material:
	Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
CASING 0.0 TO 20.0, STAINLESS STEEL,PUMP TEST RATE 51 USGM,51.39 FT AFTER 24 HRS

LITHOLOGY INFORMATION:

From	0 to	3 Ft.	SANDY GRAVEL
From	0 to	0 Ft.	UP PIPE YIELD BY BLOWING GREATER THAN 10
From	7 to	10 Ft.	BOULDERS & COMPACT GRAVEL
From	10 to	17 Ft.	COMPACT SILTY SAND & COARSE GRAVEL FEW B
From	17 to	26 Ft.	MEDIUM SAND COMPACT
From	26 to	83 Ft.	COMPACT SANDY GRAVEL WITH SOME SILT OCCA
From	0 to	0 Ft.	BOULDERS
From	83 to	94 Ft.	VERY COMPACT SILTY COARSE GRAVEL
From	94 to	97 Ft.	COMPACT CLAYEY GRAVEL POSSIBLY TILL VERY
From	0 to	0 Ft.	WATER
From	97 to	101 Ft.	LOOSE COARSE CLEAN SANDY GRAVEL VERY HIG
From	0 to	0 Ft.	WATER CLEARED IN MINUTES
From	101 to	121 Ft.	VERY COARSE CLEAN SANDY GRAVEL VERY PROD
From	0 to	0 Ft.	WATER BEARIANG CAPACITY COARSE MATERIAL

From	3 to	7 Ft.	FINE DRY SAND

- Return to Main
- Return to Search Options
- Return to Search Criteria

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BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 24390	Construction Date: 1971-01-01 00:00:00
Owner: SUNSHINE COAST REGIO	Driller: Rural Well Drillers
	Well Identification Plate Number:
Address:	Plate Attached By:
	Where Plate Attached:
Area: LANGDALE	
	PRODUCTION DATA AT TIME OF DRILLING:
WELL LOCATION:	Well Yield: 240 (Driller's Estimate) U.S. Gallons per Minute
NEW WESTMINSTER Land District	Development Method:
District Lot: 1401 Plan: Lot:	Pump Test Info Flag: Y
Township: Section: Range:	Artesian Flow:
Indian Reserve: Meridian: Block:	Artesian Pressure (ft):
Quarter:	Static Level: 3 feet
Island:	
BCGS Number (NAD 83): 092G043231 Well: 1	WATER QUALITY:
	Character:
Class of Well:	Colour:
Subclass of Well:	Odour:
Orientation of Well:	Well Disinfected: N
Status of Well: New	EMS ID:
Licence General Status: UNLICENSED	Water Chemistry Info Flag: Y
Well Use: Unknown Well Use	Field Chemistry Info Flag:
Observation Well Number:	Site Info (SEAM):
Observation Well Status:	
Construction Method: Drilled	Water Utility:
Diameter: 12.0 inches	Water Supply System Name:
Casing drive shoe:	Water Supply System Well Name:
Well Depth: 150 feet	
Elevation: 0 feet (ASL)	SURFACE SEAL:
Final Casing Stick Up: inches	Flag:
Well Cap Type:	Material:
Bedrock Depth: feet	Method:
Lithology Info Flag:	Depth (ft):
File Info Flag:	Thickness (in):
Sieve Info Flag:	

Screen Info Flag:	WELL CLOSURE INFORMATION:
	Reason For Closure:
Site Info Details:	Method of Closure:
Other Info Flag:	Closure Sealant Material:
Other Info Details:	Closure Backfill Material:
	Details of Closure:

Screen from	to feet	Type	Slot Size	
Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:

LITHOLOGY INFORMATION:

From	0 to	28 Ft.	Coarse sand and gravel
From	28 to	34 Ft.	Medium fine sand
From	34 to	38 Ft.	Coarse sand and gravel
From	38 to	44 Ft.	Silty sand and gravel
From	44 to	47 Ft.	Med. fine sands and gravel
From	47 to	77 Ft.	Silt gravel and stones - no water
From	77 to	95 Ft.	Silt gravel and stones (W.B.)
From	95 to	141 Ft.	Fine sand
From	141 to	146 Ft.	Coarse sand and gravel
From	146 to	150 Ft.	Till
From	150 to	0 Ft.	Possible bedrock

- Return to Main
- Return to Search Options
- Return to Search Criteria

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 749

Owner: EASTBOURNE COMMUNITY

Address:

Area:

WELL LOCATION:
NEW WESTMINSTER Land District
District Lot: 1595 Plan: Lot:
Township: Section: Range:
Indian Reserve: Meridian: Block:
Quarter:
Island: KEATS
BCGS Number (NAD 83): 092G033443 Well: 6

Class of Well:
Subclass of Well:
Orientation of Well:
Status of Well: New
Licence General Status: UNLICENSED
Well Use: Commercial and Industrial
Observation Well Number:
Observation Well Status:
Construction Method: Dug
Diameter: 60.0 inches
Casing drive shoe:
Well Depth: 20 feet
Elevation: 0 feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag:
File Info Flag:
Sieve Info Flag:
Screen Info Flag:

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date:

Driller: Unknown
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 0 (Driller's Estimate)
Development Method:
Pump Test Info Flag:
Artesian Flow:
Artesian Pressure (ft):
Static Level: 8 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag:
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag:
Material:
Method:
Depth (ft):
Thickness (in):

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size	
Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
THIS WELL IS NOT CASED TO THE BOTTOM, BUT WAS OBSERVED TO BE CASED BELOW THE H2O LEVEL IN WELL.HEAVY USE ON SUMMER WEEKENDS DEPLETES WELL.

LITHOLOGY INFORMATION:

From 0 to 0 Ft. fine silty

From 0 to 0 Ft. water enters well through grey gravelly

From 0 to 0 Ft. seams in till

- Return to Main
- Return to Search Options
- Return to Search Criteria

Report 1 - Detailed Well Record

Well Tag Number: 7997	Construction Date: 1950-01-01 00:00:00
Owner: EASTBOURNE COMMUNITY	Driller: Unknown
	Well Identification Plate Number:
Address:	Plate Attached By:
	Where Plate Attached:
Area: EASTBOURNE	
	PRODUCTION DATA AT TIME OF DRILLING:
WELL LOCATION:	Well Yield: 0 (Driller's Estimate)
NEW WESTMINSTER Land District	Development Method:
District Lot: 1595 Plan: 10378 Lot: 2	Pump Test Info Flag:
Township: Section: Range:	Artesian Flow:
Indian Reserve: Meridian: Block: 19	Artesian Pressure (ft):
Quarter:	Static Level:
Island: KEATS	
BCGS Number (NAD 83): 092G033443 Well: 3	WATER QUALITY:
	Character:
Class of Well:	Colour:
Subclass of Well:	Odour:
Orientation of Well:	Well Disinfected: N
Status of Well: New	EMS ID:
Licence General Status: UNLICENSED	Water Chemistry Info Flag:
Well Use: Commercial and Industrial	Field Chemistry Info Flag:
Observation Well Number:	Site Info (SEAM):
Observation Well Status:	
Construction Method: Dug	Water Utility:
Diameter: 84.0 inches	Water Supply System Name:
Casing drive shoe:	Water Supply System Well Name:

Well Depth: 20 feet	
Elevation: 0 feet (ASL)	SURFACE SEAL:
Final Casing Stick Up: inches	Flag:
Well Cap Type:	Material:
Bedrock Depth: feet	Method:
Lithology Info Flag:	Depth (ft):
File Info Flag:	Thickness (in):
Sieve Info Flag:	
Screen Info Flag:	WELL CLOSURE INFORMATION:
	Reason For Closure:
Site Info Details:	Method of Closure:
Other Info Flag:	Closure Sealant Material:
Other Info Details:	Closure Backfill Material:
	Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
REPORTED: 7 FT.SQUARE CEDAR CRIBBED FOR 1ST 4 FT THEN OPEN HOLE GOOD QUALITY,

LITHOLOGY INFORMATION:

From 0 to 20 Ft. till, water enters in grey gravelly

From 0 to 0 Ft. seams in till

- Return to Main
- Return to Search Options
- Return to Search Criteria

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BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 92987	Construction Date: 2004-07-14 00:00:00
Owner: SUNSHINE COAST REGIONAL DISTRICT	Driller: Nor-West Drilling
	Well Identification Plate Number:
Address:	Plate Attached By:
	Where Plate Attached:
Area: KEATS ISLAND	
	PRODUCTION DATA AT TIME OF DRILLING:
WELL LOCATION:	Well Yield: 2 (Driller's Estimate) Gallons per Minute (U.S./Imperial)
Land District	Development Method:
District Lot: 1595 Plan: 10378 Lot: 3	Pump Test Info Flag: N
Township: Section: Range:	Artesian Flow:
Indian Reserve: Meridian: Block: 19	Artesian Pressure (ft):
Quarter:	Static Level:
Island:	
BCGS Number (NAD 83): 092G033443 Well:	WATER QUALITY:
	Character:
Class of Well: Water supply	Colour:
Subclass of Well: Domestic	Odour:
Orientation of Well: Vertical	Well Disinfected: N
Status of Well: New	EMS ID:
Licence General Status: UNLICENSED	Water Chemistry Info Flag: N
Well Use: Private Domestic	Field Chemistry Info Flag:
Observation Well Number:	Site Info (SEAM):
Observation Well Status:	
Construction Method:	Water Utility:
Diameter: inches	Water Supply System Name:
Casing drive shoe: N	Water Supply System Well Name:
Well Depth: feet	
Elevation: feet (ASL)	SURFACE SEAL:
Final Casing Stick Up: 24 inches	Flag: N
Well Cap Type:	Material:
Bedrock Depth: feet	Method:
Lithology Info Flag: N	Depth (ft): 15 feet
File Info Flag: N	Thickness (in):
Sieve Info Flag: N	Liner from To: feet
Screen Info Flag: N	
	WELL CLOSURE INFORMATION:
Site Info Details:	Reason For Closure:
Other Info Flag:	Method of Closure:

Other Info Details:	Closure Sealant Material: Closure Backfill Material: Details of Closure:

Screen from	to feet	Type	Slot Size	
Casing from	to feet	Diameter	Material	Drive Shoe
0	58	6	null	N

GENERAL REMARKS:
RIG #: AR#1.

LITHOLOGY INFORMATION:

From	0 to	15 Ft.	SAND & GRAVEL	
From	15 to	25 Ft.	CLAY & LAYERS OF TILL	grey
From	25 to	44 Ft.	TILL & SAND, LAYERS OF GRAVEL	
From	44 to	60 Ft.	SAND & GRAVEL	
From	60 to	65 Ft.	BROKEN ROCK	
From	65 to	140 Ft.	LAYERS OF DARK GREEN	
From	140 to	160 Ft.	WITH LAYERS OF GREY GRANITE	green
From	160 to	180 Ft.	MULTI COLOURED GREY WITH LAYERS OF GREEN	
From	180 to	245 Ft.	GREYISH GREEN WITH LAYERS OF GREEN	

- Return to Main
- Return to Search Options
- Return to Search Criteria

Appendix C – BC Contaminated Site Registry Search

As Of: OCT 16, 2016 BC Online: Site Registry 16/11/02
For: PK57542 ASSOCIATED ENVIRONMENTAL CONSULTANT 13:32:33
Folio: 2016-8167 Page 1

23 records selected for 5.0 km from latitude 49 deg, 24 min, 20.1 sec and Longitude 123 deg, 29 min, 56.7 sec

Site Id	Lastupd	Address / City
0001142	03FEB06	524 MARINE DRIVE GIBSONS
0001589	16JUN02	263 GOWER POINT RD & 1157 SCHOOL RD (MOLLYS LANE) GIBSONS
0003440	05JAN27	400 GOWER POINT ROAD GIBSONS
0004012	02OCT24	910 HIGHWAY 101 GIBSONS
0004021	04NOV30	1012 SEAMOUNT WAY GIBSONS
0007154	09JAN13	1118 SUNSHINE COAST HIGHWAY GIBSONS
0007902	14MAR25	694 GIBSONS WAY GIBSONS
0008375	04DEC13	895 GIBSONS WAY GIBSONS
0008414	13NOV12	LANGDALE FERRY TERMINAL LANGDALE
0009116	14NOV18	1281 MARINE DRVE GIBSONS
0009449		1170 STEWART ROAD GIBSONS
0009458	15DEC09	883 GIBSONS WAY GIBSONS
0009770	13NOV14	1028 GIBSONS WAY - RR7 GIBSONS
0010870		1413 SUNSHINE COAST HIGHWAY GIBSONS
0015070	14JUN12	969 KEITH ROAD GIBSONS
0016296		632 SHAW ROAD GIBSONS
0016759	16MAY20	377 TO 385 GOWER POINT ROAD GIBSONS
0016864	15APR10	875 GIBSONS WAY GIBSONS
0018124		1196 STEWART ROAD GIBSONS
0018194	16JUN02	647 SCHOOL ROAD GIBSONS
0018198	16JUN02	MOLLY'S LANE, GOWER POINT ROAD AND SCHOOL ROAD GIBSONS
0018199	16JUN02	PORTION OF SEA WALK SW OF SCHOOL ROAD GIBSONS
0018218	16JUN02	643 & 645 SCHOOL ROAD GIBSONS

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 As of: OCT 16, 2016       BC Online: Site Registry                    16-11-03
                      For: PK57542  ASSOCIATED ENVIRONMENTAL CONSULTAN 08:42:09
 Folio: 2016-8167                                                      Page    1
                                 Detail Report
SITE LOCATION
      Site ID:        8414                             Latitude:  49d 26m 03.3s
 Victoria File:                                       Longitude: 123d 28m 44.1s
 Regional File: 26250-20/8414
        Region: SURREY, LOWER MAINLAND

 Site Address: LANGDALE FERRY TERMINAL
         City: LANGDALE                          Prov/State: BC
  Postal Code: V0N 1V0

 Registered: SEP 24, 2003  Updated: NOV 12, 2013  Detail Removed: NOV 01, 2013

 Notations:   2   Participants:   3   Associated Sites:   0
 Documents:   0 Susp. Land Use:   0 Parcel Descriptions:   0

Location Description: LAT/LONG CONFIRMED USING GOOGLE EARTH 2013-11-01

Record Status: INACTIVE - NO FURTHER ACTION
 Fee category: UNRANKED

 = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
NOTATIONS

  Notation Type: NOTICE OF INDEPENDENT REMEDIATION COMPLETION SUBMITTED (WMA
                 28(2))
 Notation Class: WASTE MANAGEMENT ACT: CONTAMINATED SITES NOTATIONS
      Initiated: SEP 16, 2003                        Approved: SEP 16, 2003

 Ministry Contact: DUNDAS, KERRI (SURREY) L

 Notation Participants                               Notation Roles
 EBA ENGINEERING CONSULTANTS LTD (NANAIMO)           SUBMITTED BY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Notation Type: NOTICE OF INDEPENDENT REMEDIATION INITIATION SUBMITTED (WMA
                 28(2))
 Notation Class: WASTE MANAGEMENT ACT: CONTAMINATED SITES NOTATIONS
      Initiated: MAR 13, 2003                        Approved:

 Ministry Contact: DUNDAS, KERRI (SURREY) L

 Notation Participants                               Notation Roles
 EBA ENGINEERING CONSULTANTS LTD (NANAIMO)           SUBMITTED BY
 BC FERRIES (VICTORIA)                               RECEIVED BY
 = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
SITE PARTICIPANTS

   Participant: BC FERRIES (VICTORIA)
       Role(s): PROPERTY OWNER
    Start Date: MAR 13, 2003                            End Date:
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   Participant: DUNDAS, KERRI (SURREY) L
       Role(s): MAIN MINISTRY CONTACT
```

SITE PARTICIPANTS

Start Date: MAR 13, 2003 End Date:

- -

Participant: EBA ENGINEERING CONSULTANTS LTD (NANAIMO)
Role(s): ENVIRONMENTAL CONSULTANT/CONTRACTOR
Start Date: MAR 13, 2003 End Date:

No activities were reported for this site

End of Detail Report

```
 As of: OCT 16, 2016        BC Online: Site Registry                    16-11-03
                     For: PK57542  ASSOCIATED ENVIRONMENTAL CONSULTAN 08:42:25
 Folio: 2016-8167                                                      Page   1
                                   Detail Report
SITE LOCATION
       Site ID:        9116                               Latitude:  49d 25m 47.6s
 Victoria File: 26250-20/9116                            Longitude: 123d 28m 48.9s
 Regional File: 26250-20/9116
        Region: SURREY, LOWER MAINLAND

 Site Address: 1281 MARINE DRVE
         City: GIBSONS                          Prov/State: BC
  Postal Code: V0N 1V0

 Registered: SEP 23, 2004  Updated: NOV 18, 2014  Detail Removed: NOV 13, 2014

 Notations:   9   Participants:  14    Associated Sites:   0
 Documents:   9 Susp. Land Use:   1 Parcel Descriptions:   5

Location Description: SITE CREATED BY SITE PROFILE, ENTERED 2004-09-07.
 LAT/LONG CONFIRMED USING GOAT BY MINISTRY STAFF

Record Status: ACTIVE - REMEDIATION COMPLETE
 Fee category: UNRANKED

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NOTATIONS

  Notation Type: CERTIFICATE OF COMPLIANCE ISSUED USING RISK BASED STANDARDS
 Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
      Initiated: NOV 07, 2014                         Approved: NOV 07, 2014

 Ministry Contact: LOCKHART, DAVE

 Notation Participants                                Notation Roles
 IMPERIAL OIL LTD                                     RECEIVED BY
 KICKHAM, PETER                                       ISSUED BY
 GOLDER ASSOCIATES LTD.                               APPROVED PROFESSIONAL

 Note: ISSUED ON THE RECOMMENDATION OF AN APPROVED PROFESSIONAL (ROBERT
 MCLENEHAN) UNDER PROTOCOL 6 OF THE CONTAMINATED SITES REGULATION
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Notation Type: CERTIFICATE OF COMPLIANCE REQUESTED
 Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
      Initiated: OCT 01, 2014                         Approved: OCT 01, 2014

 Ministry Contact: LOCKHART, DAVE

 Notation Participants                                Notation Roles
 GOLDER ASSOCIATES LTD.                               APPROVED PROFESSIONAL
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Notation Type: NOTICE OF INDEPENDENT REMEDIATION COMPLETION SUBMITTED
 Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
      Initiated: NOV 09, 2010                         Approved: NOV 09, 2010

 Ministry Contact: SAMWAYS, JENNIFER
```

NOTATIONS

Notation Participants — Notation Roles
GOLDER ASSOCIATES — SUBMITTED BY

Note: COMPLETED: 2010-09-21

- -

Notation Type: SITE RISK CLASSIFIED - SITE IS NON-HIGH RISK
Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
Initiated: SEP 21, 2010 Approved: SEP 21, 2010

Ministry Contact: O'GRADY, TYLER

Notation Participants — Notation Roles
GOLDER ASSOCIATES — SUBMITTED BY

- -

Notation Type: NOTICE OF INDEPENDENT REMEDIATION INITIATION SUBMITTED
Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
Initiated: SEP 17, 2010 Approved: SEP 17, 2010

Ministry Contact: SAMWAYS, JENNIFER

Notation Participants — Notation Roles
GOLDER ASSOCIATES — SUBMITTED BY

Note: START: 2010-09-15

- -

Notation Type: SITE PROFILE - FURTHER INVESTIGATION REQUIRED BY THE MINISTRY
Notation Class: WASTE MANAGEMENT ACT: CONTAMINATED SITES NOTATIONS
Initiated: SEP 20, 2004 Approved:

Ministry Contact: HANEMAYER, VINCENT (SURREY) C

Note: SITE DECOMMISSIONING. MINISTRY PERMISSION GRANTED TO RELEASE THE DEMOLITION PERMIT BECAUSE IN THE OPINION OF THE DIRECTOR THE ISSUANCE OF THE DEMOLITION PERMIT WOULD NOT POSE SIGNIFICANT THREAT OR RISK

Required Actions: PRELIMINARY SITE INVESTIGATION REQUIRED.

- -

Notation Type: SITE PROFILE REVIEWED - FURTHER INVESTIGATION REQUIRED BY THE MINISTRY
Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
Initiated: SEP 20, 2004 Approved:

Ministry Contact: HANEMAYER, VINCENT (SURREY) C

Note: SITE DECOMMISSIONING. MINISTRY PERMISSION GRANTED TO RELEASE THE DEMOLITION PERMIT BECAUSE IN THE OPINION OF THE DIRECTOR THE ISSUANCE OF THE DEMOLITION PERMIT WOULD NOT POSE SIGNIFICANT THREAT OR RISK

Required Actions: PRELIMINARY SITE INVESTIGATION REQUIRED.

As of: OCT 16, 2016 BC Online: Site Registry 16-11-03
For: PK57542 ASSOCIATED ENVIRONMENTAL CONSULTAN 08:42:25
Folio: 2016-8167 Page 3

NOTATIONS

Notation Type: SITE PROFILE RECEIVED
Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
Initiated: SEP 07, 2004 Approved:

Ministry Contact: HANEMAYER, VINCENT (SURREY) C

Notation Participants	Notation Roles
IMPERIAL OIL LIMITED	SITE PROFILE SUBMITTED BY
IMPERIAL OIL LIMITED	SITE PROFILE SUBMITTED BY

Notation Type: SITE PROFILE RECEIVED
Notation Class: WASTE MANAGEMENT ACT: CONTAMINATED SITES NOTATIONS
Initiated: SEP 07, 2004 Approved:

Ministry Contact: HANEMAYER, VINCENT (SURREY) C

Notation Participants	Notation Roles
IMPERIAL OIL LIMITED	SITE PROFILE SUBMITTED BY
IMPERIAL OIL LIMITED	SITE PROFILE SUBMITTED BY

SITE PARTICIPANTS

Participant: GOLDER ASSOCIATES
Role(s): ENVIRONMENTAL CONSULTANT/CONTRACTOR
Start Date: SEP 17, 2010 End Date:

Participant: GOLDER ASSOCIATES LTD.
Role(s): ENVIRONMENTAL CONSULTANT/CONTRACTOR
Start Date: OCT 10, 2014 End Date:

Participant: GOLDER ASSOCIATES LTD.
Role(s): ENVIRONMENTAL CONSULTANT/CONTRACTOR
Start Date: JAN 11, 2007 End Date:

Participant: HANEMAYER, VINCENT (SURREY) C
Role(s): MAIN MINISTRY CONTACT
Start Date: SEP 07, 2004 End Date:

Participant: HAZCO ENVIRONMENTAL
Role(s): ENVIRONMENTAL CONSULTANT/CONTRACTOR
Start Date: SEP 07, 2004 End Date:

Participant: IMPERIAL OIL LIMITED

Role(s): SITE PROFILE COMPLETOR
SITE PROFILE CONTACT
Start Date: SEP 07, 2004 End Date:

SITE PARTICIPANTS

Participant: IMPERIAL OIL LIMITED (NORTH YORK)
Role(s): PROPERTY OWNER
Start Date: SEP 07, 2004 End Date:

Participant: IMPERIAL OIL LTD
Role(s): PROPERTY OWNER
Start Date: NOV 07, 2014 End Date:

Participant: KICKHAM, PETER
Role(s): MINISTRY CONTACT
Start Date: NOV 07, 2014 End Date:

Participant: LOCKHART, DAVE
Role(s): MINISTRY CONTACT
Start Date: OCT 01, 2014 End Date:

Participant: MORROW ENVIRONMENTAL CONSULTANTS INC (BURNABY (COMMERCE COURT))
Role(s): ENVIRONMENTAL CONSULTANT/CONTRACTOR
Start Date: MAR 04, 2005 End Date:

Participant: O'GRADY, TYLER
Role(s): ALTERNATE MINISTRY CONTACT
Start Date: SEP 21, 2010 End Date:

Participant: SAMWAYS, JENNIFER
Role(s): ALTERNATE MINISTRY CONTACT
Start Date: SEP 17, 2010 End Date:

Participant: SUNSHINE COAST REGIONAL DISTRICT (BUILDING DEPARTMENT)
Role(s): MUNICIPAL/REGIONAL CONTACT
Start Date: SEP 07, 2004 End Date:

DOCUMENTS

Title: ADDENDUM REPORT 1281 MARINE DRIVE, GIBSONS,
Authored: JUL 22, 2014 Submitted: JUL 22, 2014
Participants Role
GOLDER ASSOCIATES LTD. AUTHOR

Title: STAGE 1 PRELIMINARY SITE INVESTIGATION UPDATE, FORMER HOPKINS LANDING BULK PLANT, 1281 MARINE DRIVE, GIBSONS, BC.
Authored: MAR 18, 2014 Submitted: MAR 18, 2014
Participants Role

GOLDER ASSOCIATES LTD. AUTHOR

Title: PERFORMANCE VERIFICATION PLAN FOR CERTIFICATE OF COMPLIANCE FOR SITE ID 9116
Authored: MAR 18, 2014 Submitted: MAR 18, 2014
Participants Role
GOLDER ASSOCIATES LTD. AUTHOR

DOCUMENTS

Title: DETAILED SITE INVESTIGATION AND CONFIRMATION OF REMEDIATION REPORT, FORMER HOPKINS LANDING BULK PLANT, 1281 MARINE DRIVE, GIBSONS, BC.
Authored: MAR 18, 2014 Submitted: MAR 18, 2014
Participants Role
GOLDER ASSOCIATES LTD. AUTHOR

Title: RELIANCE 1281 MARINE DRIVE, GIBSONS, BC. CORRESPONDENCE
Authored: MAR 17, 2014 Submitted: MAR 17, 2014
Participants Role
GOLDER ASSOCIATES LTD. AUTHOR

Title: SUMMARY OF SITE CONDITION.
Authored: MAR 17, 2014 Submitted: MAR 17, 2014
Participants Role
GOLDER ASSOCIATES LTD. AUTHOR

Title: SITE MONITORING AND SAMPLING REPORT, FORMER HOPKINS LANDING BULK PLANT, 1281 PORT MELLON HIGHWAY, HOPKINS LANDING, BC
Authored: NOV 15, 2005 Submitted: NOV 15, 2005
Participants Role
MORROW ENVIRONMENTAL CONSULTANTS INC (BURNABY (COMMERCE COURT)) AUTHOR

Title: SITE INVESTIGATION, FORMER IMPERIAL OIL BULK PLANT, 1281 PORT MELLON HIGHWAY, HOPKINS LANDING, GIBSONS, BC
Authored: MAR 04, 2005 Submitted: MAR 04, 2005
Participants Role
MORROW ENVIRONMENTAL CONSULTANTS INC (BURNABY (COMMERCE COURT)) AUTHOR

SUSPECTED LAND USE

Description: PETRO. PROD., WHOLESALE BULK STORAGE OR DISTRIBUTION
Notes: INSERTED FOR SITE PROFILE DATED 2004-08-26(described on Site Profile dated 04-08-26)

PARCEL DESCRIPTIONS

Date Added: AUG 26, 2004 Crown Land PIN#:
LTO PID#: 010620613 Crown Land File#:

```
  Land Desc: LOT 13 BLOCK 12 DISTRICT LOT 1402 PLAN 7429
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Date Added: AUG 26, 2004                    Crown Land PIN#:
    LTO PID#: 010620737                     Crown Land File#:
  Land Desc: LOT 14 BLOCK 12 DISTRICT LOT 1402 PLAN 7429
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Date Added: AUG 26, 2004                    Crown Land PIN#:
    LTO PID#: 010620770                     Crown Land File#:
  Land Desc: LOT 15 BLOCK 12 DISTRICT LOT 1402 PLAN 7429
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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PARCEL DESCRIPTIONS

  Date Added: AUG 26, 2004                    Crown Land PIN#:
    LTO PID#: 010620800                     Crown Land File#:
  Land Desc: LOT 16 BLOCK 12 DISTRICT LOT 1402 PLAN 7429
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Date Added: AUG 26, 2004                    Crown Land PIN#:
    LTO PID#: 010620851                     Crown Land File#:
  Land Desc: LOT 17 BLOCK 12 DISTRICT LOT 1402 PLAN 7429
= = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
CURRENT SITE PROFILE INFORMATION (Sec. III to X)
                               Site Profile Completion Date: AUG 26, 2004

Local Authority         Received:

Ministry Regional Manager Received: SEP 07, 2004        Decision: SEP 20, 2004
   Decision: INVESTIGATION REQUIRED

Site Registrar        Received:                          Entry Date:

III  COMMERCIAL AND INDUSTRIAL PURPOSES OR ACTIVITIES ON SITE
       Schedule 2
    Reference            Description
        F8         PETRO. PROD., WHOLESALE BULK STORAGE OR DISTRIBUTION

AREAS OF POTENTIAL CONCERN


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     _       Đ    ‡   -            <-  Þ  0  Đ     hT
 Petroleum, solvent or other polluting substance spills to the environment
    greater than 100 litres?.............................................NO
 Residue left after removal of piled materials such as chemicals, coal,
    ore, smelter slag, air quality control system baghouse dust?............NO
 Discarded barrels, drums or tanks?.......................................NO
 Contamination resulting from migration of substances from other
    properties?...........................................................NO

FILL MATERIALS
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Fill dirt, soil, gravel, sand or like materials from a contaminated site or from a source used for any of the activiities listed under Schedule 2?.....NO
Discarded or waste granular materials such as sand blasting grit, asphalt paving or roofing material, spent foundry casting sands, mine ore, waste rock or float?.....NO
Dredged sediments, or sediments and debris materials originating from locations adjacent to foreshore industrial activities, or municipal sanitary or stormwater discharges?.....NO

WASTE DISPOSAL

Materials such as household garbage, mixed municipal refuse, or demolition debris?.....NO
Waste or byproducts such as tank bottoms, residues, sludge, or flocculation precipitates from industrial processes or wastewater treatment?.....NO
Waste products from smelting or mining activities, such as smelter slag, mine tailings, or cull materials from coal processing?.....NO
Waste products from natural gas and oil well drilling activities, such as drilling fluids and muds?.....NO
Waste products from photographic developing or finishing laboratories; asphalt tar manufacturing; boilers, incinerators or other thermal facilities (eg. ash); appliance, small equipment or engine repair or salvage; dry cleaning operations (eg. solvents); or automobile and truck parts cleaning or repair?.....NO

TANKS OR CONTAINERS USED OR STORED

Underground fuel or chemical storage tanks?.....NO
Above ground fuel or chemical storage tanks?.....YES

SPECIAL (HAZARDOUS) WASTES OR SUBSTANCES

PCB-containing electrical transformers or capacitors either at grade, attached above ground to poles, located within buildings, or stored?....NO
Waste asbestos or asbestos containing materials such as pipe wrapping, blown-in insulation or panelling buried?.....NO

Paints, solvents, mineral spirits or waste pest control products or pest control product containers stored in volumes greater than 205 litres?...NO

LEGAL OR REGULATORY ACTIONS OR CONSTRAINTS

Government orders or other notifications pertaining to environmental conditions or quality of soil, water, groundwater or other environmental media?.....NO

Liens to recover costs, restrictive covenants on land use, or other charges or encumbrances, stemming from contaminants or wastes remaining onsite or from other environmental conditions?.....NO

Government notifications relating to past or recurring environmental violations at the site or any facility located on the site?.....NO

X ADDITIONAL COMMENTS AND EXPLANATIONS

SITE DECOMMISSIONING

End of Detail Report

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 As of: OCT 16, 2016       BC Online: Site Registry                     16-11-03
                       For: PK57542  ASSOCIATED ENVIRONMENTAL CONSULTAN 08:42:40
 Folio: 2016-8167                                                       Page   1
                                    Detail Report
SITE LOCATION
       Site ID:         9449                          Latitude:  49d 23m 46.4s
 Victoria File: 26250-20/9449                        Longitude: 123d 30m 42.4s
 Regional File:
        Region: SURREY, LOWER MAINLAND

 Site Address: 1170 STEWART ROAD
         City: GIBSONS                         Prov/State: BC
  Postal Code: V0N 1V0

 Registered: JUL 08, 2005  Updated:                 Detail Removed:

 Notations:    4   Participants:   3    Associated Sites:   0
 Documents:    0 Susp. Land Use:   1 Parcel Descriptions:   1

Location Description: SITE CREATED BY SITE PROFILE, ENTERED 2005-07-08

Record Status: INACTIVE - NO FURTHER ACTION
 Fee Category: NOT APPLICABLE

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NOTATIONS

   Notation Type: SITE PROFILE REVIEWED - NO FURTHER INVESTIGATION REQUIRED BY
                  THE MINISTRY
  Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
       Initiated: JUL 08, 2005                        Approved:

 Ministry Contact: WARD, JOHN E H
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   Notation Type: SITE PROFILE - NO FURTHER INVESTIGATION REQUIRED BY THE
                  MINISTRY
  Notation Class: WASTE MANAGEMENT ACT: CONTAMINATED SITES NOTATIONS
       Initiated: JUL 08, 2005                        Approved:

 Ministry Contact: WARD, JOHN E H
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   Notation Type: SITE PROFILE RECEIVED
  Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
       Initiated: JUN 14, 2004                        Approved:

 Ministry Contact: WARD, JOHN E H

 Notation Participants                                Notation Roles
 GATEWAY SELF STORAGE                                 SITE PROFILE SUBMITTED
                                                      BY
 GATEWAY SELF STORAGE                                 SITE PROFILE SUBMITTED
                                                      BY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   Notation Type: SITE PROFILE RECEIVED
  Notation Class: WASTE MANAGEMENT ACT: CONTAMINATED SITES NOTATIONS
       Initiated: JUN 14, 2004                        Approved:
```

NOTATIONS

Ministry Contact: WARD, JOHN E H

Notation Participants	Notation Roles
GATEWAY SELF STORAGE	SITE PROFILE SUBMITTED BY
GATEWAY SELF STORAGE	SITE PROFILE SUBMITTED BY

SITE PARTICIPANTS

Participant: GATEWAY SELF STORAGE
Role(s): PROPERTY OWNER
SITE PROFILE COMPLETOR
Start Date: JUN 14, 2004 End Date:

Participant: MCINTOSH, WILLIAM
Role(s): SITE PROFILE CONTACT
Start Date: JUN 14, 2004 End Date:

Participant: WARD, JOHN E H
Role(s): MAIN MINISTRY CONTACT
Start Date: JUN 14, 2004 End Date:

SUSPECTED LAND USE

Description: DRY DOCKS, SHIP BUILDING OR BOAT REPAIR INCL. PAINT REMOVAL
Notes: INSERTED FOR SITE PROFILE DATED 2004-06-14(described on Site Profile dated 04-06-14)

PARCEL DESCRIPTIONS

Date Added: JUN 14, 2004 Crown Land PIN#:
LTO PID#: 012448834 Crown Land File#:
Land Desc: LOT 5 BLOCK 6 DISTRICT LOT 692 PLAN 3633

CURRENT SITE PROFILE INFORMATION (Sec. III to X)
Site Profile Completion Date: JUN 14, 2004

Local Authority Received:

Ministry Regional Manager Received: Decision: JUL 08, 2005
Decision: INVESTIGATION NOT REQUIRED

Site Registrar Received: JUN 14, 2004 Entry Date: JUL 08, 2005

III COMMERCIAL AND INDUSTRIAL PURPOSES OR ACTIVITIES ON SITE
Schedule 2

Reference	Description
G4	DRY DOCKS, SHIP BUILDING OR BOAT REPAIR INCL. PAINT REMOVAL

AREAS OF POTENTIAL CONCERN

Petroleum, solvent or other polluting substance spills to the environment greater than 100 litres?.....NO
Residue left after removal of piled materials such as chemicals, coal, ore, smelter slag, air quality control system baghouse dust?.....NO
Discarded barrels, drums or tanks?.....NO
Contamination resulting from migration of substances from other properties?.....NO

FILL MATERIALS

Fill dirt, soil, gravel, sand or like materials from a contaminated site or from a source used for any of the activiities listed under Schedule 2?.....NO
Discarded or waste granular materials such as sand blasting grit, asphalt paving or roofing material, spent foundry casting sands, mine ore, waste rock or float?.....NO
Dredged sediments, or sediments and debris materials originating from locations adjacent to foreshore industrial activities, or municipal sanitary or stormwater discharges?.....NO

WASTE DISPOSAL

Materials such as household garbage, mixed municipal refuse, or demolition debris?.....NO
Waste or byproducts such as tank bottoms, residues, sludge, or flocculation precipitates from industrial processes or wastewater treatment?.....NO
Waste products from smelting or mining activities, such as smelter slag, mine tailings, or cull materials from coal processing?.....NO
Waste products from natural gas and oil well drilling activities, such as drilling fluids and muds?.....NO
Waste products from photographic developing or finishing laboratories; asphalt tar manufacturing; boilers, incinerators or other thermal facilities (eg. ash); appliance, small equipment or engine repair or salvage; dry cleaning operations (eg. solvents); or automobile and truck parts cleaning or repair?.....NO

TANKS OR CONTAINERS USED OR STORED

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As of: OCT 16, 2016 BC Online: Site Registry 16-11-03
For: PK57542 ASSOCIATED ENVIRONMENTAL CONSULTAN 08:42:40
Folio: 2016-8167 Page 4
Underground fuel or chemical storage tanks?.....NO
Above ground fuel or chemical storage tanks?.....NO

SPECIAL (HAZARDOUS) WASTES OR SUBSTANCES

m m [i U8 : - T K Y
– Ð ‡ - <- Þ 0 Ð hT
PCB-containing electrical transformers or capacitors either at grade, attached above ground to poles, located within buildings, or stored?....NO
Waste asbestos or asbestos containing materials such as pipe wrapping, blown-in insulation or panelling buried?.....NO
Paints, solvents, mineral spirits or waste pest control products or pest control product containers stored in volumes greater than 205 litres?...NO

LEGAL OR REGULATORY ACTIONS OR CONSTRAINTS

m m [i U8 : - T K Y
– Ð ‡ - <- Þ 0 Ð hT
Government orders or other notifications pertaining to environmental conditions or quality of soil, water, groundwater or other environmental media?.....NO
Liens to recover costs, restrictive covenants on land use, or other charges or encumbrances, stemming from contaminants or wastes remaining onsite or from other environmental conditions?.....NO
Government notifications relating to past or recurring environmental violations at the site or any facility located on the site?.....NO

X ADDITIONAL COMMENTS AND EXPLANATIONS

End of Detail Report

As of: OCT 16, 2016 BC Online: Site Registry 16-11-03
For: PK57542 ASSOCIATED ENVIRONMENTAL CONSULTAN 08:42:51
Folio: 2016-8167 Page 1

Detail Report

SITE LOCATION
Site ID: 18124 Latitude: 49d 25m 35.0s
Victoria File: 26250-20/18124 Longitude: 123d 30m 10.8s
Regional File:
Region: SURREY, LOWER MAINLAND

Site Address: 1196 STEWART ROAD
City: GIBSONS Prov/State: BC
Postal Code: V0N 1V6

Registered: JUL 10, 2015 Updated: Detail Removed:

Notations: 4 Participants: 3 Associated Sites: 0
Documents: 0 Susp. Land Use: 2 Parcel Descriptions: 1

Location Description: LAT/LONG VERIFIED USING GOOGLE EARTH ON JULY 8, 2015.

Record Status: ACTIVE - UNDER ASSESSMENT
Fee category: NOT APPLICABLE

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NOTATIONS

Notation Type: SITE PROFILE REVIEWED - FURTHER INVESTIGATION REQUIRED BY THE MINISTRY
Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
Initiated: JUL 08, 2015 Approved:

Ministry Contact: LARSEN, KELLI

Note: RELEASED DEVELOPMENT PERMIT FOR INSTALLATION OF TELUS COMMUNICATIONS TOWER UNDER SCENARIO 2. FUTURE PERMITS WOULD BE REQUIRED TO REDEVELOP THE SITE.

Required Actions: PRELIMINARY SITE INVESTIGATION

- -

Notation Type: SITE PROFILE - FURTHER INVESTIGATION REQUIRED BY THE MINISTRY
Notation Class: WASTE MANAGEMENT ACT: CONTAMINATED SITES NOTATIONS
Initiated: JUL 08, 2015 Approved:

Ministry Contact: LARSEN, KELLI

Note: RELEASED DEVELOPMENT PERMIT FOR INSTALLATION OF TELUS COMMUNICATIONS TOWER UNDER SCENARIO 2. FUTURE PERMITS WOULD BE REQUIRED TO REDEVELOP THE SITE.

Required Actions: PRELIMINARY SITE INVESTIGATION

- -

Notation Type: SITE PROFILE RECEIVED
Notation Class: ENVIRONMENTAL MANAGEMENT ACT: GENERAL
Initiated: JUN 24, 2015 Approved:

NOTATIONS

Ministry Contact: LARSEN, KELLI

Notation Participants	Notation Roles
VAN HUIZEN CONSULTANTS LTD	SITE PROFILE SUBMITTED BY
VAN HUIZEN CONSULTANTS LTD	SITE PROFILE SUBMITTED BY

Notation Type: SITE PROFILE RECEIVED
Notation Class: WASTE MANAGEMENT ACT: CONTAMINATED SITES NOTATIONS
Initiated: JUN 24, 2015 Approved:

Ministry Contact: LARSEN, KELLI

Notation Participants	Notation Roles
VAN HUIZEN CONSULTANTS LTD	SITE PROFILE SUBMITTED BY
VAN HUIZEN CONSULTANTS LTD	SITE PROFILE SUBMITTED BY

SITE PARTICIPANTS

Participant: ENEVOLDSON, JOHN
Role(s): PROPERTY OWNER
SITE PROFILE CONTACT
Start Date: JUN 24, 2015 End Date:

Participant: LARSEN, KELLI
Role(s): MAIN MINISTRY CONTACT
Start Date: JUN 24, 2015 End Date:

Participant: VAN HUIZEN CONSULTANTS LTD
Role(s): SITE PROFILE COMPLETOR
Start Date: JUN 24, 2015 End Date:

SUSPECTED LAND USE

Description: INDUSTRIAL WOODWASTE (LOG YARD WASTE, HOGFUEL) DISPOSAL
Notes: INSERTED FOR SITE PROFILE DATED 2015-06-05(described on Site Profile dated 15-06-05)

Description: WELDING OR MACHINE SHOPS (REPAIR OR FABRICATION)
Notes: INSERTED FOR SITE PROFILE DATED 2015-06-05(described on Site Profile dated 15-06-05)

PARCEL DESCRIPTIONS

Date Added: JUN 05, 2015 Crown Land PIN#:
LTO PID#: 005742714 Crown Land File#:
Land Desc:

As of: OCT 16, 2016 BC Online: Site Registry 16-11-03
For: PK57542 ASSOCIATED ENVIRONMENTAL CONSULTAN 08:42:51
Folio: 2016-8167 Page 3

CURRENT SITE PROFILE INFORMATION (Sec. III to X)
Site Profile Completion Date: JUN 05, 2015

Local Authority Received: JUN 09, 2015

Ministry Regional Manager Received: JUN 24, 2015 Decision: JUL 08, 2015
Decision: INVESTIGATION REQUIRED

Site Registrar Received: Entry Date:

III COMMERCIAL AND INDUSTRIAL PURPOSES OR ACTIVITIES ON SITE
Schedule 2

Reference	Description
C6	WELDING OR MACHINE SHOPS (REPAIR OR FABRICATION)
H13	INDUSTRIAL WOODWASTE (LOG YARD WASTE, HOGFUEL) DISPOSAL

AREAS OF POTENTIAL CONCERN

Petroleum, solvent or other polluting substance spills to the environment greater than 100 litres?.....NO
Residue left after removal of piled materials such as chemicals, coal, ore, smelter slag, air quality control system baghouse dust?.....NO
Discarded barrels, drums or tanks?.....NO
Contamination resulting from migration of substances from other properties?.....NO

FILL MATERIALS

Fill dirt, soil, gravel, sand or like materials from a contaminated site or from a source used for any of the activiities listed under Schedule 2?.....YES
Discarded or waste granular materials such as sand blasting grit, asphalt paving or roofing material, spent foundry casting sands, mine ore, waste rock or float?.....NO
Dredged sediments, or sediments and debris materials originating from locations adjacent to foreshore industrial activities, or municipal sanitary or stormwater discharges?.....NO

WASTE DISPOSAL (QUESTIONS AS OF JANUARY 1 2009)

Materials such as household garbage, mixed municipal refuse, or demolition debris?.....NO
Waste or byproducts such as tank bottoms, residues, sludge, or flocculation precipitates from industrial processes or wastewater

treatment?.....NO
Waste products from smelting or mining activities, such as smelter slag, mine tailings, or cull materials from coal processing?.....NO
Waste products from natural gas and oil well drilling activities, such as drilling fluids and muds?.....NO
Waste products from photographic developing or finishing laboratories; asphalt tar manufacturing; boilers, incinerators or other thermal facilities (eg. ash); appliance, small equipment or engine repair or salvage; dry cleaning operations (eg. solvents); for from the cleaning or repair of parts of boats, ships, barges, automobiles or trucks, including sandblasting grit or paint scrapings?.....NO

TANKS OR CONTAINERS USED OR STORED, OTHER THAN TANKS USED FOR RESIDENTIAL HEATING FUEL

Underground fuel or chemical storage tanks other than storage tanks for compressed gases?.....NO
Above ground fuel or chemical storage tanks other than storage tanks for compressed gases?.....YES

HAZARDOUS WASTES OR HAZARDOUS SUBSTANCES

PCB-containing electrical transformers or capacitors either at grade, attached above ground to poles, located within buildings, or stored?....NO
Waste asbestos or asbestos containing materials such as pipe wrapping, blown-in insulation or panelling buried?.....NO
Paints, solvents, mineral spirits or waste pest control products or pest control product containers stored in volumes greater than 205 litres?...NO

LEGAL OR REGULATORY ACTIONS OR CONSTRAINTS

Government orders or other notifications pertaining to environmental conditions or quality of soil, water, groundwater or other environmental media?.....NO
Liens to recover costs, restrictive covenants on land use, or other charges or encumbrances, stemming from contaminants or wastes remaining onsite or from other environmental conditions?.....NO

Government notifications relating to past or recurring environmental violations at the site or any facility located on the site?.....NO

X ADDITIONAL COMMENTS AND EXPLANATIONS

End of Detail Report

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – July 20, 2017

AUTHOR: Robyn Cooper, Manager, Solid Waste Services

SUBJECT: **DRAFT REGIONAL ORGANICS DIVERSION STRATEGY**

RECOMMENDATION(S)

THAT the report titled Draft Regional Organics Diversion Strategy be received;

AND THAT the Draft Regional Organics Diversion Strategy be adopted;

AND THAT recommendations from the Draft Regional Organics Diversion Strategy that require funding be brought forward to the 2018 and 2019 budgets.

BACKGROUND

Diversion of organics has been identified as a priority to extend the lifespan of the Sechelt Landfill and to meet the targets in the SCRD's Solid Waste Management Plan (SWMP).

As part of the 2016 Budget Process, $25,000 was approved from the Regional Solid Waste Operating Reserves to develop a Regional Organics Diversion Strategy.

After a public tender process, Carey McIver and Associates Ltd. was awarded contract #16-271 to complete the Strategy.

The purpose of this report is to present the Strategy and seek adoption by the Board in order to begin implementation of the Strategy.

DISCUSSION

The goal of the Strategy is to develop a financially sustainable road map that will lead to a robust, region-wide organics diversion program.

Currently, upwards of 44% (by weight) of what is disposed of as garbage is organic material that could be diverted from the landfill. Organic is defined as green waste, food scraps and food soiled paper.

With the Sechelt Landfill having an estimated lifespan of ten to twelve years, diverting organic material represents the largest opportunity for extending its lifespan.

The 2018 recommendation is to implement a commercial food waste ban. In 2019, to implement a food waste reduction campaign, an at-home compost coaching program, investigate a backyard composting subsidy program and for the SCRD to implement a curbside residential food waste collection for all residences that currently receive garbage collection.

Carey McIver is presenting the Strategy to the July 20, 2017 Infrastructure Services Committee meeting. Recommendations from the Plan that require funding will be brought forward to the 2018 and 2019 Budgets should be Board adopt the Strategy.

Timeline for next steps

The next step after Board adoption of the Strategy is to develop an implementation plan including a comprehensive timeline. The implementation plan is anticipated to be completed in Q4 2017.

Communications Strategy

A communication plan will be developed for each component of the Strategy and will be incorporated into the implementation plan.

STRATEGIC PLAN AND RELATED POLICIES

A Regional Organics Diversion Strategy supports the Strategic Priority of Embed Environmental Leadership.

The Strategy is in support of the SCRD's Solid Waste Management Plan's target of 65%-69% diversion and organics diversion is one of the SWMP's reduction initiatives.

CONCLUSION

The Draft Regional Organics Diversion Strategy was developed in response to a need to extend the lifespan of the Sechelt Landfill and help meet the targets in the SCRD's Solid Waste Management Plan.

After Board adoption of the Strategy, an implementation plan will be developed and budget proposals will be brought forward to the 2018 and 2019 Budget process respectively.

Attachment: Draft Regional Organics Diversion Strategy

Reviewed by:			
Manager	X-R. Cooper	Finance	X- T. Perreault
GM		Legislative	
CAO	X-J. Loveys	Other	

Carey McIver & Associates Ltd.

ENVIRONMENTAL CONSULTANTS

Sunshine Coast Regional District

Regional Organics Diversion Strategy

Draft for Discussion

Prepared by:

Carey McIver & Associates Ltd.

In Collaboration with:

Maura Walker & Associates

Date: July 12, 2017

Table of Contents

List of Figures

List of Tables

Appendices

1 Introduction

Diverting organic waste from landfill disposal is a significant solid waste management issue in BC. This is because organic waste, comprised primarily of yard and garden waste (green waste), food waste and food-soiled paper from businesses and households, not only represents the largest component of landfilled waste (35%-40%), but also generates methane, a potent greenhouse gas, during decomposition in a landfill.

Accordingly, the BC Ministry of Environment (MOE) has established new solid waste management goals as part of its Service Plan: to lower the provincial municipal solid waste (MSW) disposal rate to 350 kilograms per person annually and to have 75% of BC's population covered by organic waste disposal bans by 2020. To meet these goals the MOE is proposing that regional districts, as part of their solid waste management planning process, adopt as a guiding principle, "preventing organic waste including food waste from going into the garbage wherever practical."

The Sunshine Coast Regional District (SCRD) recognized this principle in 2011, when the Board approved and adopted the current Solid Waste Management Plan (SWMP). This plan includes a series of initiatives related to diverting yard and food wastes from disposal that, if implemented, would contribute to meeting the plan's target diversion rate of 65%-69% (315 to 279 kilograms per person) within five years.

Although there has been substantial diversion of green waste from landfill disposal, there has been limited progress with respect to the diversion of food waste (kitchen waste, food scraps and food-soiled paper). This was confirmed in the 2014 SCRD Waste Composition Study which identified food waste as representing 45% of the residential waste stream with green waste at only 2%. Accordingly, the current regional diversion rate sits at 56%, with a corresponding disposal rate of 434 kilograms per person in 2016.

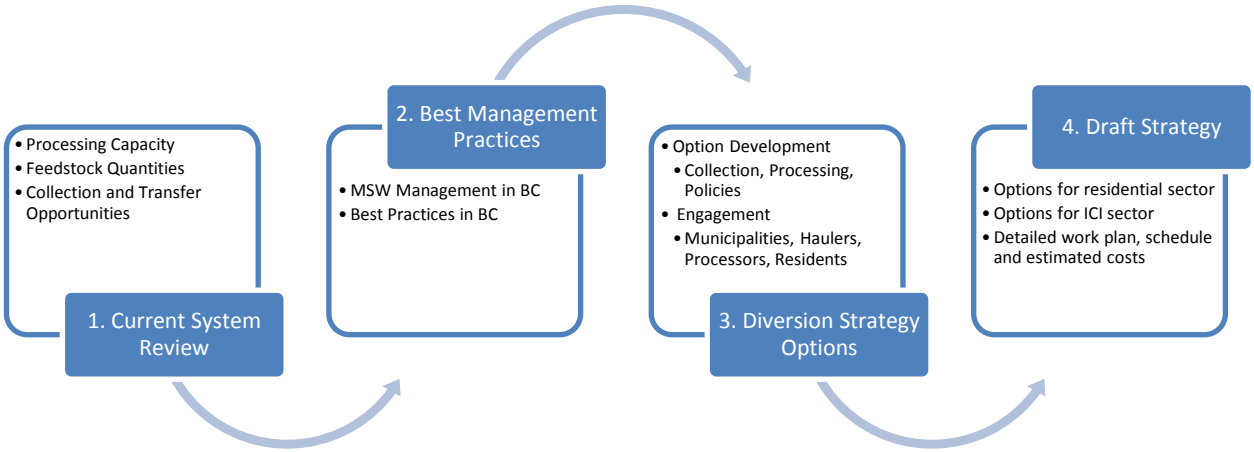
In recognition of the need to increase the diversion of food wastes, the SCRD engaged Carey McIver & Associates Ltd., in collaboration with Maura Walker & Associates (the Project Team), to develop a Regional Organics Diversion Strategy. Building on the initiatives identified in the 2011 SWMP, the objective of this strategy is to provide a financially sustainable road map that will lead to a robust, Sunshine Coast-wide full organics diversion program.

1.1 Objectives and Methodology

To develop a strategy that details the "who, what, where and when" for organics diversion in the SCRD the Project Team undertook two concurrent and intertwined processes: the technical process and the community engagement process.

As indicated in Figure 1-1, the technical process was organized into four key stages: a review of the current system for managing organic wastes in the SCRD; a scan of best practices and innovations in other BC jurisdictions; the development of realistic and practical diversion options for the SCRD and the development of a draft regional organics diversion strategy.

Figure 1-1: Project Methodology



The community engagement process was interwoven throughout the technical process, beginning with individual contacts with key stakeholders during the current system review, an SCRD coordinated meeting with municipal partners to provide a high-level overview of the strategy development and timelines as well as telephone interviews with hauling companies providing collection services throughout the region.

With respect to engagement with residents, the SCRD included a questionnaire on organics management as part of their series of Community Dialogues held in May 2017 and was made available online from May 8 to June 2, 2017. The feedback from this process has provided valuable insights into the development of the draft strategy contained in this report.

1.2 Overview and Structure of the Report

The report is structured as follows:

Section 2 outlines the organics diversion initiatives outlined in the 2011 SWMP as well as a description of the current organics management system including existing reduction and collection programs as well as drop-off, processing and disposal facilities.

Section 3 provides examples of best practices in organics management in BC which have informed the new Ministry of Environment (MOE) Service Plan targets for organic waste management. This section also updates the feedstock estimate provided in the 2011 SWMP based on actual data.

Section 4 describes the results of the community and stakeholder engagement process designed to inform the development of organic management options.

Section 5 outlines practical and realistic scenarios to increase organic waste diversion in the SCRD informed by best practices as well as the results of community and stakeholder engagement.

Section 6 outlines the draft regional organics diversion strategy including a workplan, schedule and estimated cost implications.

2 Current System Review - Organic Waste Management in the SCRD

This section summarizes the current system for managing organic wastes in the SCRD including the status of organics diversion initiatives included in the 2011 SWMP.

2.1 Organic Diversion Initiatives in the 2011 SWMP

In British Columbia, regional districts develop solid waste management plans (SWMP) as required under the provincial Environmental Management Act. These plans are long term visions of how each regional district would like to manage its solid wastes and are updated on a regular basis so that they reflect current needs, local priorities, market conditions, technologies and regulations.

The SCRD's current SWMP was approved and adopted in 2011. The objective of the 2011 SWMP was to adopt zero waste as a guiding principle, to outline a roadmap of practical measures toward the goal, and to achieve the highest level of environmental and human health protection. The plan contains major reduction, reuse, recycle and diversion initiatives that, if fully implemented, would increase diversion from 50% in 2011 to between 65% and 69% in 2016.

Table 2-1 outlines the organic diversion initiatives for yard and food wastes that are included in the 2011 SWMP.

Table 2-1: 2011 SWMP Organics Diversion Initiatives

Initiatives
Reduction
➢ Incentive Based Tipping Fees
➢ Grass-Cycling and Backyard Composting Education
Recycling and Diversion
➢ Curbside Collection of Food Scraps
➢ Yard Waste Composting
➢ Processing Capacity for Food Scraps and Yard Waste

The following sections summarizes the implementation status of these initiatives.

2.2 Current Reduction Programs

Incentive Based Tipping Fees

Tipping fees are the charges that are applied to discarded materials deposited in landfills. The 2011 SWMP outlined how incentive based tipping fees are structured to provide financial incentives that discourage discarding waste into landfills, provided that there are more economical options to divert that material. As indicated in Table 2-2, the current tipping fee structure in the SCRD provides a significant financial incentive to divert yard and garden waste from landfill. The quantities of yard and garden green waste delivered by residents and business to SCRD drop off locations is discussed in Section 2.4.

Table 2-2: Current SCRD Incentive Based Tipping Fee Structure for Organics

Material for Disposal	Tipping Fee
Municipal Solid Waste	$150 per tonne
Yard and Garden Green Waste	
-Residential self-haul loads less than 5 tonnes	NO CHARGE
-Residential self-haul loads more than 5 tonnes	$45 per tonne
-Commercial loads	$45 per tonne

Grass-Cycling and Backyard Composting

Grass-cycling and backyard composting are options that reduce the generation of organic waste. Grass-cycling and backyard composting are considered one of the most sustainable methods for managing organic waste. The 2011 SWMP proposes that the SCRD will promote backyard composting, offer compost training courses, operate a compost demonstration garden and encourage grass-cycling. The SCRD currently promotes its Guide to Backyard Composting and grass-cycling online and at community outreach events and has hosted a limited number of compost training courses. A compost demonstration garden and regular compost training sessions have yet to be implemented

2.3 Current Collection Programs

Although the 2011 SWMP recommended that municipal and SCRD operated curbside collection services be expanded to include food waste within five years, there has been limited progress to date. As indicated in Table 2-3, except for the pilot project in the Davis Bay community of Sechelt, there are currently no permanent curbside collection services in place for organics, either food waste or green waste on the Sunshine Coast.

Table 2-3: Curbside Collection Services in the Sunshine Coast

Area	2016 Census		Curbside Collection Services			
	Population	Households	Households	Garbage	Recycling	Organics
Municipal						
Sechelt District Municipality	10,216	4,855	4,305	Yes	Yes	No
Town of Gibsons	4,605	2,220	2,056	Yes	No	No
Sechelt Indian Government District	671	290	273	Yes	Yes	No
Municipal Sub-Total	*15,492*	*7,365*	*6,634*			
Electoral Areas						
SCRD Collection Service						
EA B - Halfmoon Bay	2,726	1,250		Yes	No	No
EA D - Roberts Creek	3,421	1,505		Yes	No	No
EA E - Elphinstone	3,664	1,550		Yes	No	No
EA F - West Howe Sound	2,043	945		Yes	No	No
SCRD Service Sub-Total	*11,854*	*5,250*	*5,675*			
EA A - Pender Harbour/Egmont	2,624	1,385	-	No	No	No
Electoral Area Sub-Total	14,478	6,635				
Regional Total	**29,970**	**14,000**	**12,309**			

Table 2-3 provides the population and household count according to the 2016 Census. The household count for curbside collection was provided by each individual service provider. Although the Census household count is not consistent with the service household count, overall the numbers indicate that the majority of households on the Sunshine Coast (roughly 90%) are currently receiving curbside garbage collection services.

While curbside collection programs on the Sunshine Coast are operated by local governments, collection service is provided by private sector contractors, except for the Sechelt Indian Government District. Table 2-4 outlines the contractors and expiry dates for current contracts within the Sunshine Coast.

Table 2-4: Curbside Collection Service Providers 2016

Service Provider	Households 2016	Contractors		
		Garbage	Recycling	Expiry Date
Sechelt	4,305	Direct Disposal	Direct Disposal	February 28, 2019
Gibsons	2,056	Grayco Ventures	NA	February 28, 2019
SIGD	273	In-House	In-House	
SCRD	5,675	Direct Disposal	NA	February 28, 2019

District of Sechelt Organics Collection Pilot Project

The District of Sechelt (DOS) has been operating a small food and green waste collection pilot project to around 500 single family homes in Davis Bay since May 23, 2014. According to the DOS web site, DOS staff will be developing a proposal for Council consideration on District-wide curbside organics collection based upon an analysis of the multi-year project. Under contract to DOS, Grayco Disposal collects the food waste and green waste from Davis Bay and delivers the material to the Salish Soils composting facility at a processing cost of $80 per tonne.

2.4 Current Drop-Off Facilities

As discussed in Section 2.2, the SCRD provides three locations for residents to drop-off green waste and two locations for businesses to drop-off their green waste.

Residents can drop-off their green waste at the Pender Harbour Transfer Station, Salish Soils in Sechelt or on the South Coast at the drop-off located on the site of the Town of Gibsons Public Works Yard. The residential program is funded from taxation, so the residents are not charged at the time of drop-off. Commercial green waste can be dropped off at the Pender Harbour Transfer Station or the Sechelt Landfill at the current rate of $45 per tonne. Alternatively, commercial green waste can be delivered to Salish Soils or other private facilities.

Salish Soils also accepts residential and commercial food waste at a cost of $80 per tonne for larger quantities delivered by commercial hauling companies and $85 per tonne for self-haul customers. However, clean food waste in 5 gallon buckets and under is free of charge to residential customers.

Figure 2-1 indicates the tonnes of green waste that has been accepted to these facilities over the last five years. In 2016, 4,343 tonnes of green waste was delivered these facilities.

Figure 2-1: Total Green Waste Diverted at SCRD Sites/Services 2012-2016

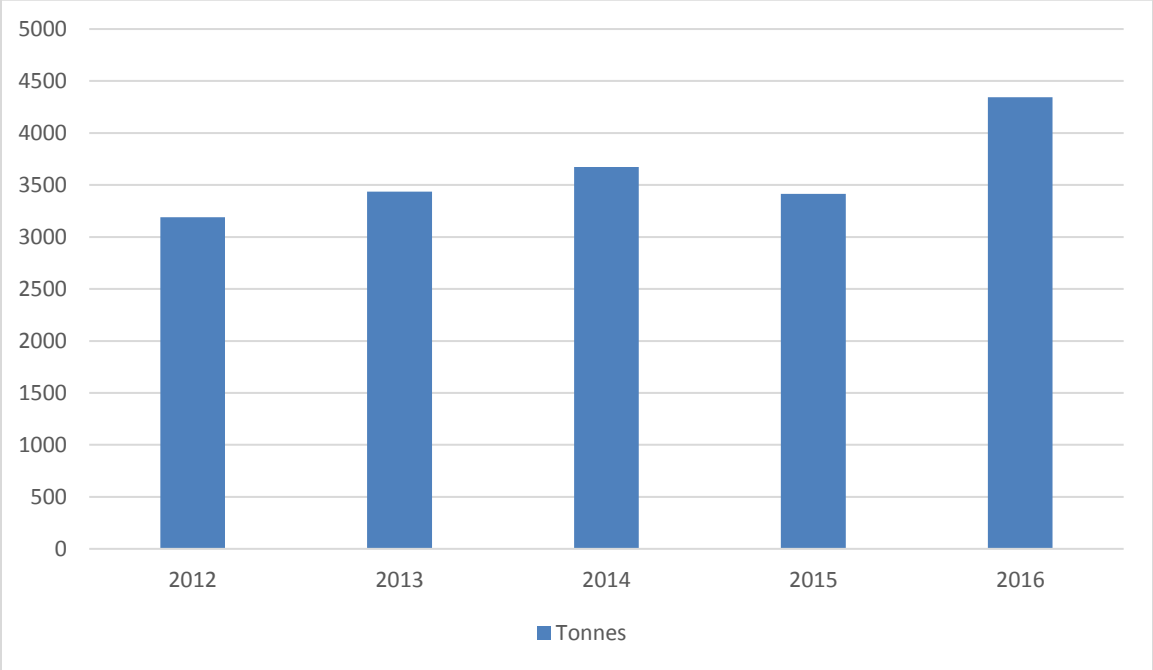
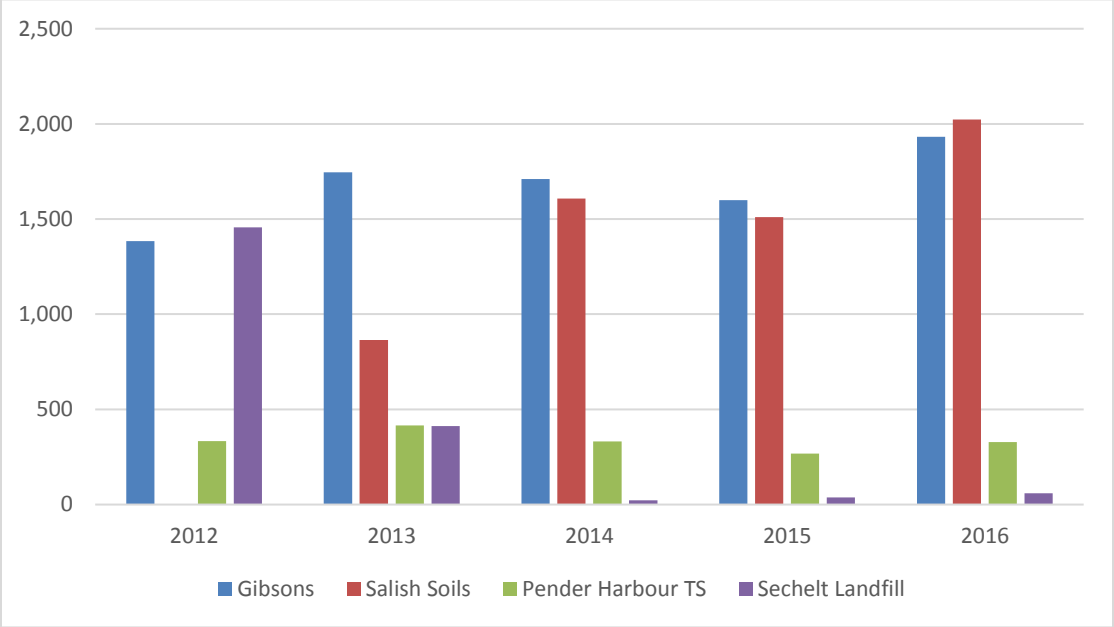


Figure 2-2 indicates the quantity accepted by individual facility. As illustrated in Figure 2-2, Salish Soils began accepting residential and commercial yard waste in 2012 and has since replaced the Sechelt Landfill as the main drop-off facility in the Sechelt area.

Figure 2-2: Total Green Waste Diverted by SCRD Drop-Off Facility – 2012-2016



Note: Does not include commercial green waste delivered to Salish Soils. Pender Harbour Transfer Station is a combination of residential and commercial green waste.

2.5 Current Processing Capacity

Prior to 2012, the SCRD chipped and hauled green waste to Howe Sound Pulp and Paper in Port Mellon, to be used as fuel. However, the 2011 SWMP recognized that establishing local processing capacity for composting green waste would provide the SCRD with the opportunity to also compost food scraps and soiled paper in the future. Consequently the 2011 SWMP recommended that the SCRD continue to support and enhance local composting operations through green waste collection and contracts with private sector operators.

In January 2011, Salish Soils Inc. submitted a notification under the provincial Organic Matter Recycling Regulation (OMRR) that they planned to construct and operate a composting facility on property owned by the Sechelt Indian Band at 5800 Black Bear Road in Sechelt. The OMMR governs the production, quality and land application of certain types of organic matter. Although the Salish Soils facility is not subject to OMRR, the company has met all the requirements of the regulation for a facility of its size.

Salish Soils operates a covered aerated static pile compost facility using the Gore Cover System to produce a Class A compost under the OMRR. The production design capacity of the Salish Soils composting facility is 12,000 tonnes per year of compost made from organic materials including fish waste and green waste. However, the facility is currently processing roughly 6,500 tonnes of compost made from green waste and fish waste, with limited quantities of food waste from the Davis Bay pilot, from residential food waste drop-off as well as from a pilot program in the Powell River Regional District.

2.6 Sechelt Landfill Capacity

The Sechelt Landfill is located approximately 6.5 kilometres northeast of the District of Sechelt, at 4904 Dusty Road. The site is located on Crown Land under a License of Occupation. According to the Notes to the Financial Statements attached to the SCRD's 2016 Financial Audit Report (Appendix 1), the Sechelt Landfill is expected to reach its capacity in 2027. Given the difficulties and costs associated with siting and constructing a new landfill, conserving the capacity of this existing facility is imperative.

3 Best Practices Review

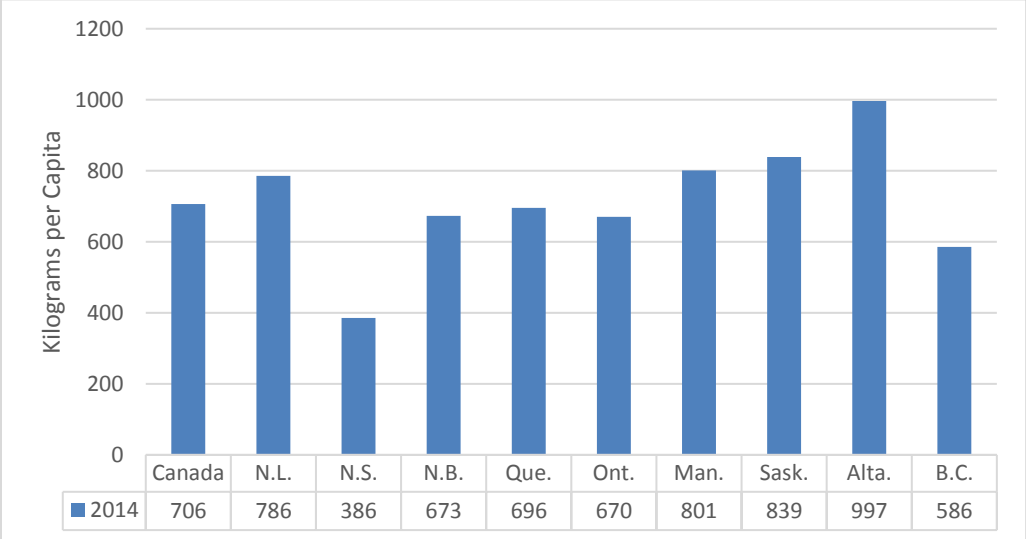
The SCRD does not need to look beyond BC to find examples of best practices in organic waste management. Municipal solid waste management (MSW) is an important environmental issue in BC. Over the last twenty-five years a dynamic system has evolved that provides efficient and effective MSW management services in the province. The following sections provide data on how the MSW management system in BC outperforms systems in similar jurisdictions as well as examples of best practices implemented by local governments in BC that could be applicable to the SCRD.

3.1 MSW Management System Performance in BC

This MSW management system in BC is guided by goals established by the Ministry of Environment (MOE) that aim to maximize waste reduction and diversion in the province. These ambitious goals, initially to reduce MSW disposal by 50% by the year 2000, and currently to reduce the provincial disposal rate to 350 kilograms per capita by 2020, have resulted in a MSW disposal rate that is significantly lower than systems in other provinces.

According to the Statistics Canada Waste Management Industry Survey for 2014, BC has the second lowest per capita MSW disposal rate in Canada. As indicated in Figure 3-1, the only province with a lower disposal rate was Nova Scotia, where organics have been banned from landfill disposal for the last decade.

Figure 3-1: Per Capita Disposal Rates for Canada and Selected Provinces 2014

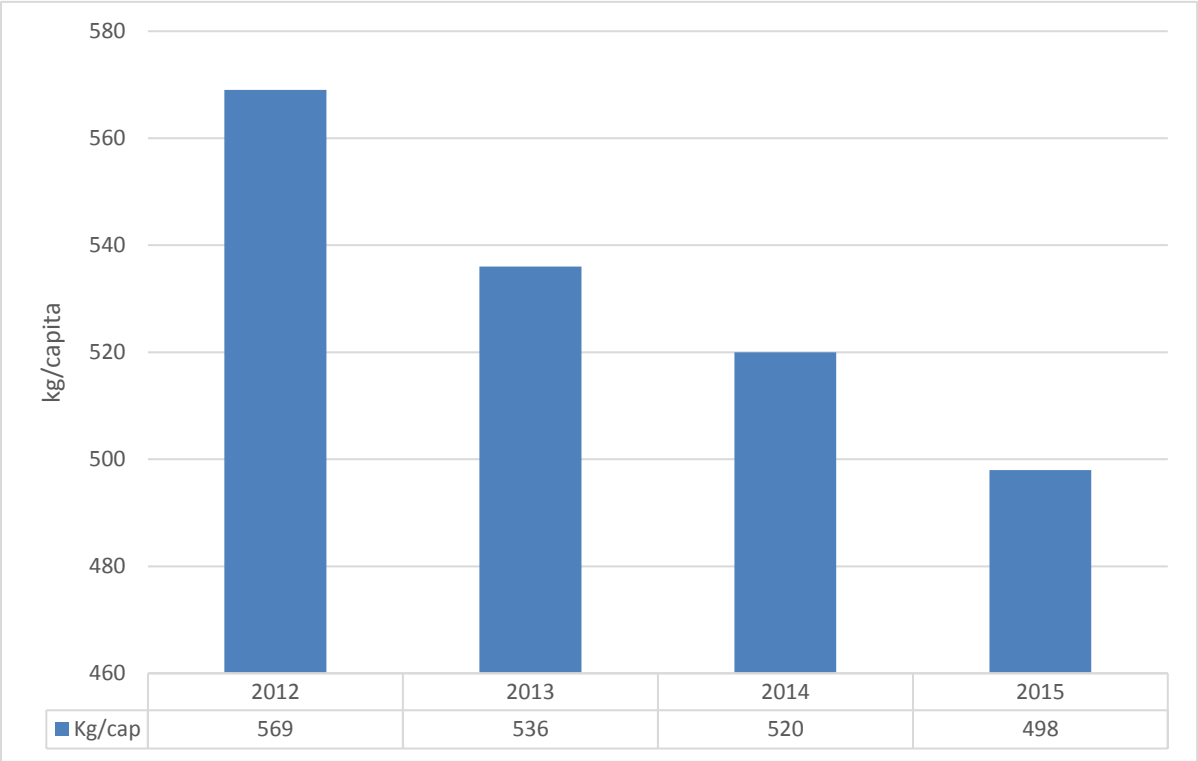


Source(s): Statistics Canada Disposal and Diversion of waste, by province and territory (Waste Disposal Per Capita) CANSIM tables 051-0001 and 153-0041(accessed May 2017)

Statistics Canada collects the BC disposal data from regional districts every two years and aggregates the results to the provincial level. Individual regional district data is not provided in the bi-annual reports. To provide more reliable and consistent annual data on MSW disposal by regional district, the MOE developed the BC Waste Disposal Calculator. The reporting methodology in the BC Calculator is identical to that used by Statistics Canada to ensure comparability between systems.

The BC Waste Disposal Calculator is an on-line reporting tool that has so far collected MSW disposal data for 2012, 2013, 2014 and 2015. The results of each year's data call are posted on Environmental Reporting BC. Figure 3-2 illustrates the results reported to date.

Figure 3-2: Per Capita Disposal Rate for BC 2012-2015



Although there is little variation between the Statistics Canada and BC MOE disposal rates for 2012 (573 and 569 kilograms per capita respectively), there is significant variation between Statistics Canada and BC MOE disposal rates for 2014 (586 and 520 kilograms respectively). This is likely due to the quality control exercised by the BC MOE with respect to ensuring that regional districts are meeting the reporting requirements correctly and consistently.

Individual regional district data for 2015 is presented in Figure 3-3 and indicates that at a reported 421 kilograms per capita, the 2015 disposal rate in the SCRD was less than the provincial average of 498.

Figure 3-3: Regional District Disposal Rates for BC 2015

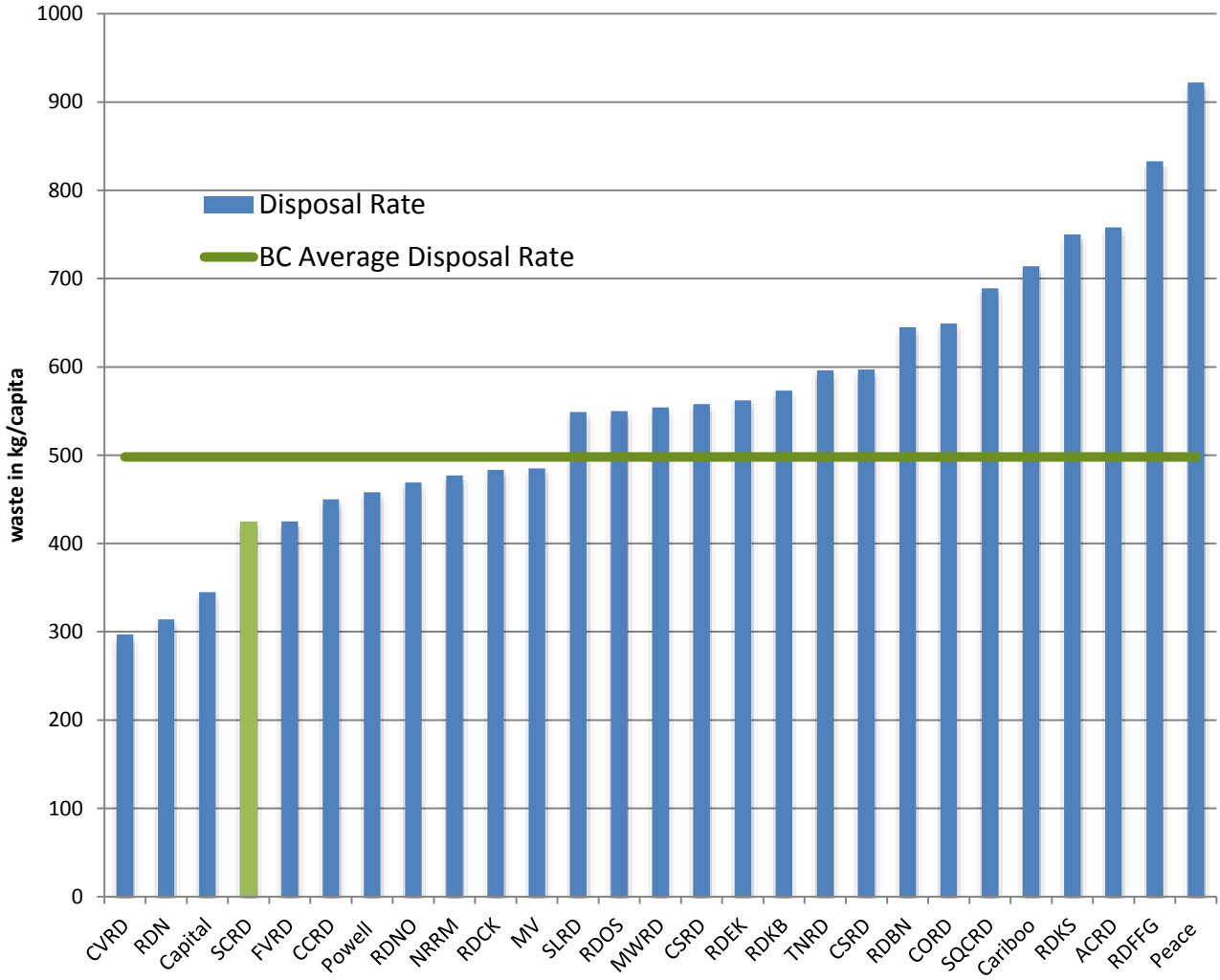
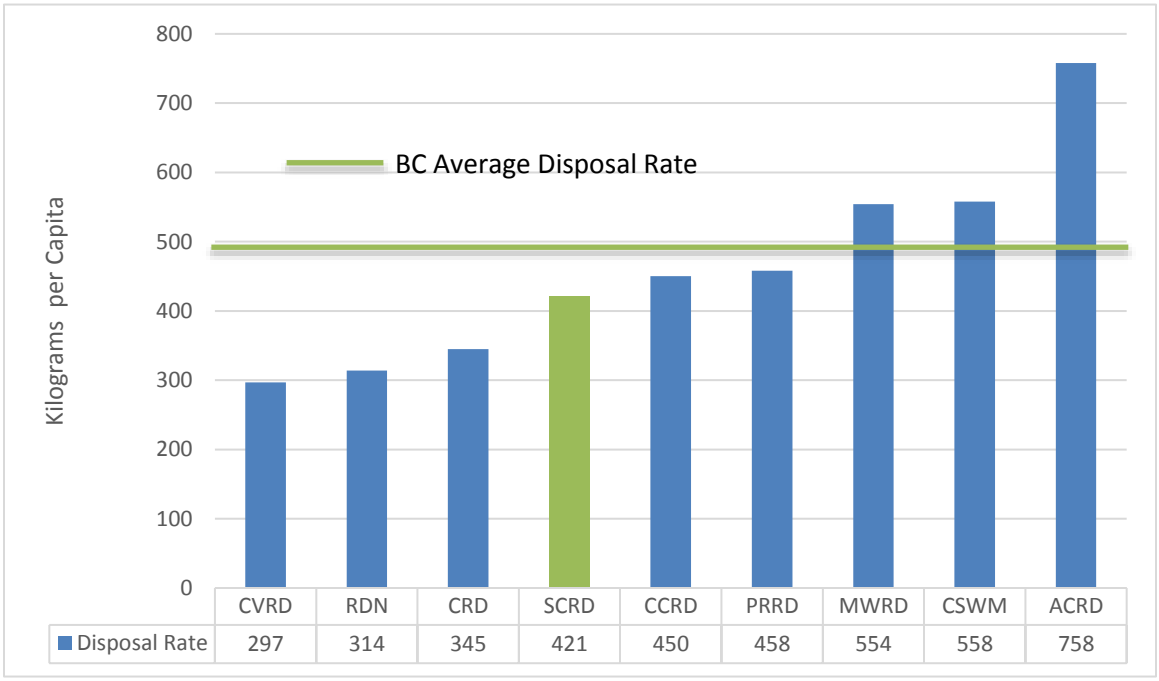


Figure 3-4 presents disposal rates for regional districts belonging to the Association of Vancouver Island Coastal Communities (AVICC) from lowest to highest. As indicated in Figure 3-4, the Cowichan Valley Regional District (CVRD), the Regional District of Nanaimo (RDN), and the Capital Regional District (CRD), all have significantly lower per capita disposal rates than the SCRD. The Central Coast Regional District (CCRD) and the Powell River Regional District (PRRD) have comparable rates while the Regional District of Mount Waddington (RDMW), the Comox Strathcona Waste Management (CSWM) service and the Alberni-Clayoquot Regional District (ACRD) all have disposal rates above the provincial average of 498 kilograms per capita.

Figure 3-4: Disposal Rates for AVICC Regional Districts 2015



	CVRD	RDN	CRD	SCRD	CCRD	PRRD	MWRD	CSWM	ACRD
Disposal Rate	297	314	345	421	450	458	554	558	758

The lower disposal rates in the CVRD, RDN and CRD can be attributed, in large part, to the implementation of organics diversion strategies in these three Vancouver Island regional districts. In 2006, both the CVRD and RDN introduced bans on the disposal of commercial organic wastes to reduce GHG emissions, preserve landfill capacity and reduce waste export disposal costs. Residential collection programs followed roughly 5-7 years later in both those regional districts. In 2015, the CRD introduced a ban on the disposal of both residential and commercial organics. More detailed information on programs and policies in comparable AVICC regional districts is provided in Appendix 2.

In 2015, Metro Vancouver also implemented a ban on the disposal of organics from both the commercial and residential sector. As a result, in 2015 roughly 66% of the population of BC was covered by an organic waste disposal ban. There are also numerous municipal curbside food waste collection programs in regional districts that have not implemented disposal bans (e.g. Grand Forks, Abbotsford, and Comox). Consequently, with respect to best practices in organic waste management, these BC local governments can provide practical and effective examples to other regional districts.

3.2 Best Management Practices and Innovations in BC

In 2014, on behalf of the MOE, Maura Walker & Associates (MWA), developed a set of case studies on innovative and effective best management practices by local governments in BC to reduce and recycle organic wastes. Applicable best practices with respect to reduction programs, disposal policies and collection programs are summarized below to provide input to the development of organic waste management options in the SCRD. Best management practices that have been introduced since the development of the MOE case studies are also included. More detailed information on each of the selected case studies is posted on the MOE website (http://www2.gov.bc.ca/gov/content/environment/waste-management/recycling/organics/organics-case-studies)

3.2.1 Reduction Programs

Metro Vancouver Love Food Hate Waste

Based on research in Europe and North America, Canadians may be wasting approximately 25 percent of all the food and drinks that they purchase. Metro Vancouver's Love Food Hate Waste Program aims to change this behaviour by educating consumers about meal planning, and careful cooking and storage. This program is modelled on WRAP United Kingdom's initiatives of the same name, which has seen a 21% reduction in avoidable food waste since its launch in 2007. Metro Vancouver has stated publicly that they are willing to share this program with other regional districts. The BC Ministry of Environment will also provide the US EPA's "Food Too Good to Waste" toolkit to regional districts at no charge. The SCRD could implement either one of these programs at a relatively low cost.

North Shore Recycling Program Compost Coaching

The former North Shore Recycling Program (NSRP) focused on waste reduction, recycling and composting under contract for the three municipalities along the North Shore in Vancouver.

The Compost Coaching program was started in 2007 to reduce organics in the waste stream. A pilot program was conducted in 2008–2009 with full implementation in 2011–2013. The program was developed to address the Metro Vancouver goal of 70% diversion by 2015.

Compost Coaching is an outreach program that focuses on helping residents compost in their own backyards through at-home training which is a Community-Based Social Marketing (CBSM) approach. The program looked at how much material was composted before and after the training, as well as how much waste was produced per household. In the first year, 156 residents received at-home coaching. This coaching resulted in an additional 36 kg/capita/year of organic material composted on site for households that were already composting and 190 kg/capita/year for households that had not composted before. Households that participated in the program improved their composting skills, produced higher quality compost in a shorter time and reduced hazards from bears and pests. This program invests in sustainable behaviour change instead of the provision of free or subsidized composters.

3.2.2 Disposal Policies

Regional District of Nanaimo Commercial Food Waste Ban

A waste composition study completed in 2004 for the Regional District of Nanaimo (RDN) confirmed that 35% of total waste sent to landfill was compostable organic material. Consequently, in June 2005, in accordance with the RDN's Zero Waste Plan (2004) and the Organics Diversion Strategy (2005), the RDN introduced a landfill ban on the disposal of food waste from all commercial premises.

This ban was developed and implemented in collaboration with waste haulers, commercial food waste generators and composting companies. This collaborative approach ensured that all stakeholders had at least six months advanced notice.

In particular, waste haulers and their customers were encouraged to devise cost effective systems to comply with the ban that met their individual situation. The RDN's role was to facilitate communication, innovation, competition and compliance, but not get involved in direct program delivery. Enforcement consists of load inspections and surcharges at disposal facilities by RDN staff as well as on-site education and compliance checks by the RDN's Zero Waste compliance officer.

Program results have been positive and economical. In 2006 (the first year of the disposal ban on commercial food waste), over 4,200 tonnes of commercial food waste was diverted from disposal representing a reduction of 30 kg per capita. As a regulator, the RDN does not pay for collection or processing costs, consequently, at an in-house cost of $15 per tonne per year, the commercial organics ban has been an extremely cost-effective local government waste diversion initiative.

Diverting this waste from disposal also contributed to reducing the RDN disposal rate from 553 kg per capita in 2005 to 517 kg per capita in 2006. However, since then this amount has levelled off to an average of 3,400 tonnes annually, which represents a recovery rate of 33% and a reduction of 21 kg per capita per year. Nevertheless, the commercial food waste ban and the organics diversion strategy are recognized as one of the most significant contributors to the RDN's per capita disposal rate of 350 kg in 2012.

Capital Regional District Kitchen Scraps Diversion Strategy

In 2012, the Capital Regional District (CRD) approved a Kitchen Scraps Diversion Strategy that applied to both residential and commercial sectors. The strategy was phased-in over two years. From 2013-2014 the CRD offered a $20 per tonne incentive for haulers to deliver kitchen scraps to approved facilities. In January 2015, the strategy culminated with a full disposal ban on kitchen scraps delivered to the Hartland Landfill. For the ICI sector, private haulers are required to provide food scraps collection services while the residential sector is serviced by a mixture of municipal and private collection services.

Although the CRD had originally secured processing capacity at a private facility in the region, due to odour concerns this option was discontinued and instead food waste is currently transferred to several out-of-region processing facilities. In the meantime, the CRD is investigating options for processing food wastes at the Hartland Landfill. Due to the introduction of the CRD Kitchen Scraps Diversion Strategy, the disposal rate in the CRD declined from 394 kilograms per capita in 2012 to 345 kilograms per capita in 2015.

Metro Vancouver Organics Disposal Ban

Metro Vancouver (MV) also introduced a disposal ban on organics in 2015. From 2012 to 2013 MV staff undertook stakeholder engagement and readiness surveys to inform their detailed planning for an organics disposal ban. In 2014, they announced the Organics Ban Implementation Strategy and continued consultation initiatives prior to the ban effective date of January 2015.

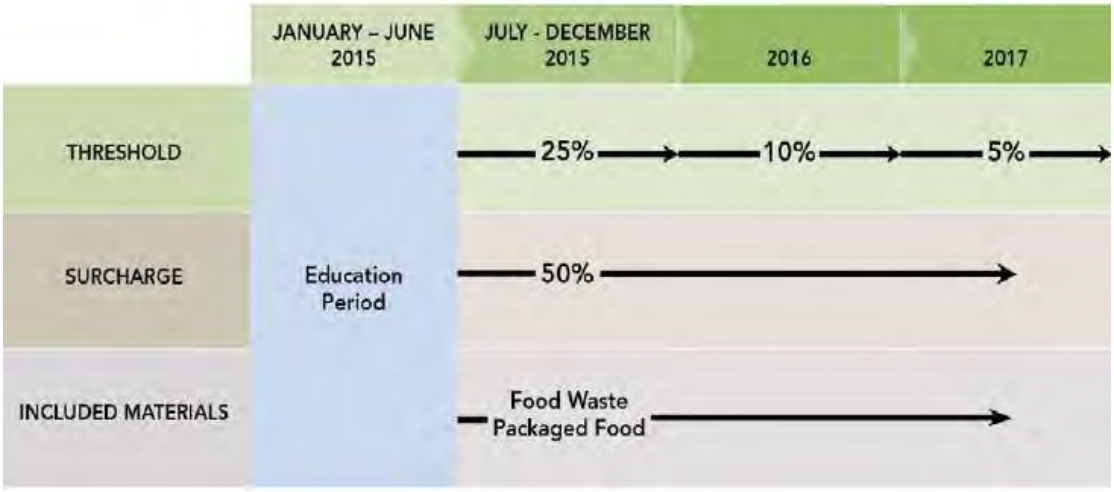
One of the successful components of the Metro Vancouver organics ban was the phased implementation schedule. As indicated in Figure 3-6, for the first six months after the ban was effective, there were no surcharges or penalties applied to loads containing any amount of food waste.

However, following this six-month education period, for the next six months of 2015 any loads containing more than 25 percent food waste were subject to a surcharge of 50% of the MSW tipping fee. The threshold was then reduced to 10 percent in 2016 and 5 percent in 2017.

This declining threshold concept was fully supported by private sector haulers in Metro Vancouver because it allowed them to market their food waste collection services as a “carrot” with the declining threshold as a “stick” to ensure that their customers added separate food waste collection to existing garbage collection service.

Because of the Organics Disposal Ban the per capita disposal rate in Metro Vancouver declined from 520 kilograms per capita in 2014 to 485 kilograms per capita in 2015.

Figure 3-5: Metro Vancouver Organics Disposal Ban Phased Implementation Schedule



3.2.3 Collection Programs

Regional District of Nanaimo Green Bin Collection Program

The Regional District of Nanaimo (RDN) 2004 Zero Waste Plan identified organics diversion as the primary means to reach the goal of 75% diversion from landfill. Commercial and residential food waste diversion programs were essential to achieving this target.

The Green Bin Program, a partnership of the RDN and its member municipalities, was launched in 2010 and provides curbside collection service for food scraps and food soiled paper to over 55,000 single-family households throughout the region, including urban and rural residents.

This was the first large scale residential food waste collection program implemented in BC. Under this program, residents receive weekly collection of food waste and bi-weekly collection of garbage and recyclables on alternating weeks. For garbage, residents can set out one can every other week. For more than one can, residents must purchase tags to set out up to two additional cans every other week.

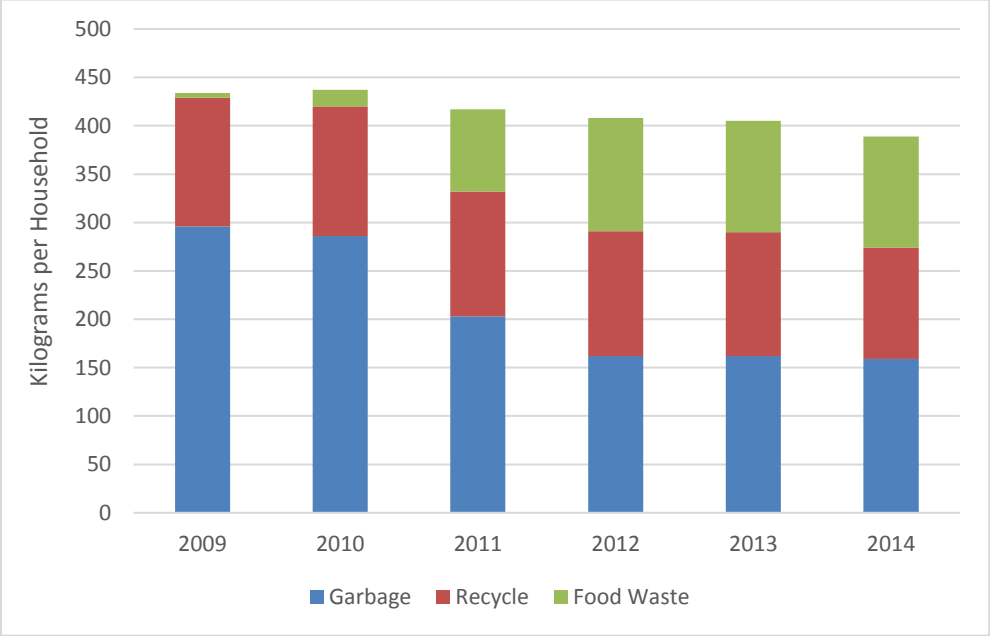
To save on collection costs as well as greenhouse gas emissions, garbage, food waste and recyclables are collected in split packer trucks, whereby food waste and garbage is collected in the same truck one week and food waste and recyclables are collected in the same truck the next week.

In 2012, the program collected 6,247 tonnes of kitchen scraps from 53,500 households. This represents 117 kg of food scraps per household or 43% reduction in waste sent to disposal. This material is processed at a privately owned and operated composting facility in Nanaimo under a long-term contract with the RDN.

With respect to total waste disposal, in 2012 the RDN Green Bin Program diverted 42 kg per capita from landfill, contributing to a region-wide disposal rate of 350 kg per capita.

Figure 3-6 illustrates the reduction in residential garbage disposal per household from 2009 before the program was introduced to 2014 as result of the Green Bin Program.

Figure 3-6: RDN Annual Curbside Tonnage Per Household 2009-2014



Grand Forks Food Scraps Collection Service

The City of Grand Forks and the Regional District of Kootenay Boundary (RDKB) were one of the first BC local governments outside of Lower Mainland/Vancouver Island to provide residents with a Green Bin Food Scraps curbside collection service. The weekly curbside collection service became available to 1,830 City of Grand Forks' households in October 2012. The organic materials are processed in open windrows at the Grand Forks Landfill.

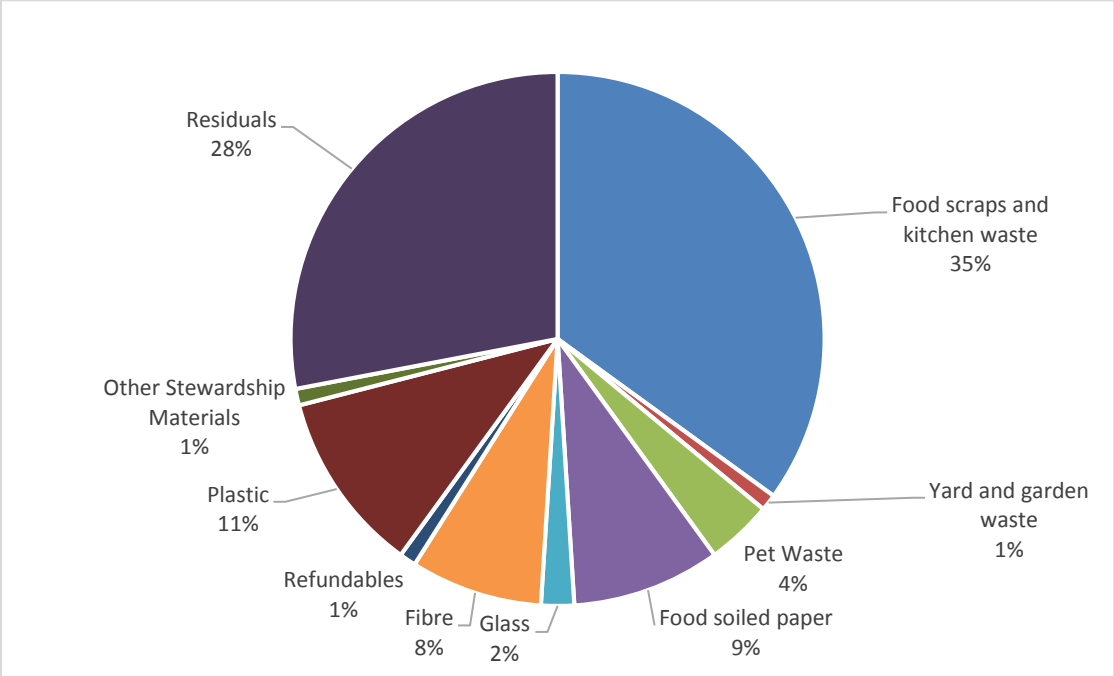
Prior to implementing the green bin program, Grand Forks collected an average of 264 kg of garbage per household per year. After implementation of the program, garbage collected at the curb decreased to 119 kg per household per year. This equates to a 55% reduction in waste sent to disposal. With the collection of 123 kg of food waste per household annually, the overall diversion rate increased from 18% with recycling collection only to 62% with recycling and food waste collection.

3.2.4 Food Waste Diversion Estimate and Impact to Sechelt Landfill

Prior to the implementation of the programs described in previous sections, program designers relied on waste composition data to estimate the quantity of organic waste that could be diverted from disposal. This method relies on two factors: the percentage of residential and ICI organics in the regional district waste stream and the potential recovery rate for both sectors.

While the SCRD has recent waste composition data for the residential waste stream, as illustrated in Figure 3.7, this 2014 study did not assess the composition of the ICI waste stream. This is important since ICI waste represents 50% of total waste disposal in the SCRD. Although ICI waste composition can be extrapolated from other similar regional district studies, actual diversion data from the programs and policies described in this section on best practices can provide a much more reliable estimate of diversion potential.

Figure 3-7: SCRD Residential Waste Composition All Areas 2014



Appendix 3 provides actual food waste data for residential curbside programs operating in the CVRD and RDN. As indicated in Figure 3-3, in 2015 these two regional districts on Vancouver Island had the lowest disposal rates in BC at 297 and 314 kilograms per capita respectively.

Both regional districts implemented disposal bans on commercial sector food waste in 2006, and all households in the RDN and most of the households in the CVRD have curbside food waste collection service. Based on this data it is reasonable to expect that curbside collection of residential organics in the SCRD would divert 52 kilograms per capita of food waste annually.

In lieu of curbside collection, a drop off depot for food waste can be provided. Using data from a pilot drop-off program in the Powell River Regional District, the recovery rate from a residential drop-off program is estimated to be 10 kilograms per capita per year.

With respect to food waste from the ICI sector, based on data from the RDN, it is reasonable to expect that implementation of a ban on disposal of food waste from this sector would divert an additional 30 kilograms per capita per year.

Table 3-1 applies the recovery rate of 52 kilograms per capita for curbside and 10 kilograms per capita for drop-off from the residential waste sector and 30 kilograms per capital from the ICI sector under three scenarios.

Scenario 1

Scenario 1 assumes that the municipalities will proceed with curbside collection service while all the SCRD Electoral Areas will use a drop-off facility. This equates to 877 tonnes of residential food waste and 899 tonnes of ICI food waste for total diversion of 1,776 tonne per year.

Scenario 2

Scenario 2 assumes that the municipalities will proceed with curbside collection service while the SCRD Service will expand to include food waste collection in Electoral Areas B and D, while Electoral Areas A, E, and F will rely on a food waste drop-off site. In this scenario, residential food waste diversion increases to 1,152 tonnes per year which combined with ICI food waste represents a total diversion of 2,051 tonnes of food waste annually.

Scenario 3

Scenario 3 assumes that the municipalities will proceed with curbside collection service while SCRD Service will expand to include food waste collection in Electoral Areas B, D, E and F while Electoral Area A relies on a food waste drop-off site. In this scenario, residential food waste diversion increases to 1,400 tonnes per year, which combined with ICI food waste represents a total diversion of 2,300 tonnes per year.

Consequently, the total amount of food waste that could be diverted as feedstock to the Salish Soils composting facility could range from between 1,776 tonnes per year for Scenario 1, to 2,050 for Scenario 2, an up to 2,300 tonnes per year for Scenario 3.

Impact to Sechelt Landfill

The SCRD's landfill engineers, XCG Environmental Consultants (XCG) project that the diversion estimates under these three scenarios would provide eleven, thirteen and fifteen months respectively of additional site life at the Sechelt Landfill.

Table 3-1: Food Waste Diversion Scenarios and Impact to Sechelt Landfill

Sector	Households	Persons/ HH	Est. Pop	Scenario 1 (tonnes)	Scenario 2 (tonnes)	Scenario 3 (tonnes)
Residential						
Municipal						
Sechelt District Municipality	4,305	2	9,041	470	470	470
Town of Gibsons	2,056	2	4,318	225	225	225
Sechelt Indian Government District	273	2	628	33	33	33
Municipal Sub-Total				727	727	727
Electoral Areas						
EA B - Halfmoon Bay	1,351	2	2,973	30	155	155
EA D - Roberts Creek	1,627	2	3,579	36	186	186
EA E - Elphinstone	1,675	2	3,686	37	37	192
EA F - West Howe Sound	1,022	2	2,247	22	22	117
EA A - Pender Harbour/Egmont	1,385	2	2,493	25	25	25
Electoral Area Sub-Total				*150*	*425*	*674*
Residential Total				**877**	**1,152**	**1,401**
ICI (@30 kg per capita)						
ICI Total			**29,970**	**899**	**899**	**899**
TOTAL All SECTORS				**1,776**	**2,051**	**2,301**

	Scenario 1 (Months)	Scenario 2 (Months)	Scenario 3 (Months)
Additional Site Life at the Sechelt Landfill	11	13	15

4 Community and Stakeholder Engagement Process

A successful regional organics diversion strategy requires input from all stakeholders including processors, haulers, local governments, and waste generators in the area. This section summarizes the results of the stakeholder engagement process undertaken to date to inform the development of the strategy.

4.1 Processors

As discussed in Section 2.5, Salish Soils operates a composting facility in Sechelt. The Project Team has visited the site and has had several conversations with the Chief Executive Officer, Aaron Joe. Salish Soils is currently operating under capacity and would welcome the additional feedstock that would be available as result of the final SCRD Regional Organics Diversion Strategy.

Although Salish Soils has adequate processing capacity for food and green waste from residential and commercial sources, they would appreciate the added support provided by disposal bans and long-term contracts for feedstock supply. This is the case with most private sector operators. Without adequate feedstocks to operate at design capacity, cash flows are insufficient to provide the necessary funds for equipment maintenance and repair let alone any return on investment. Without long-term processing contracts private facilities have difficulty borrowing funds required for facilities upgrades and improvements, particularly with respect to odour control. These concerns are shared by Salish Soils.

4.2 Haulers

The Project Team contacted three garbage hauling companies operating in the Sunshine Coast, Grayco, Direct Disposal and Harbour Disposal. Both Grayco Disposal and Direct Disposal expressed support for increased organics diversion programs and are confident that their firms could provide food waste collection services for both the residential and ICI sectors. However, Harbour Disposal advised that if commercial food waste was banned from disposal region-wide they would need to purchase a new truck and would require a drop-off option at the Pender Harbour Transfer Station, given their unwillingness at this point to haul food waste to Sechelt.

Although Direct Disposal voiced support for a ban on commercial food waste, they are concerned that any additional feedstock to the Salish Soils composting facility will exacerbate odour issues at the facility. This is a legitimate concern and will need to be addressed in the development of the regional organics diversion strategy. See Section 5.3 for more details.

4.3 Local Governments

In May 2017, the SCRD coordinated a meeting with staff from the District of Sechelt, the Town of Gibsons and the Sechelt Indian Government District to discuss the development of the regional organics diversion strategy. At this meeting, the Project Team provided a high-level overview of the strategy development process and timelines while the member municipalities provided an update on their plans to implement curbside collection of food waste in their respective jurisdictions.

At the meeting Town of Gibsons staff mentioned that they were drafting a survey for residents to obtain input on curbside or depot collection of food waste.

Since the meeting the Town has issued a residential survey and a request for proposals (RFP) for a residential organic waste diversion program. The survey closed on June 30, 2017. The RFP, which closes July 14, 2017, is for a turnkey collection program whereby the successful proponent provides: a communication strategy, an education awareness program, collection methods, equipment required including kitchen and curbside containers, hauling methods and costs, and identifies the permitted processing facilities.

The Town of Gibsons anticipates awarding a contract by September 1, 2017 with service to commence the first week of October 2017. The expiration of the contract arising from this RFP is to coincide with expiration of the Town's curbside garbage collection contract in February 28, 2018.

As discussed in Section 2.3, the District of Sechelt has been operating a food waste collection pilot in the Davis Bay area for several years. District staff present at the meeting advised that Davis Bay residents support the service but may not be willing to pay the extra costs associated with a full roll-out. Due to resource constraints, staff have not been able to proceed with developing a proposal for Council consideration on District-wide curbside organics collection. This should be addressed within the next year.

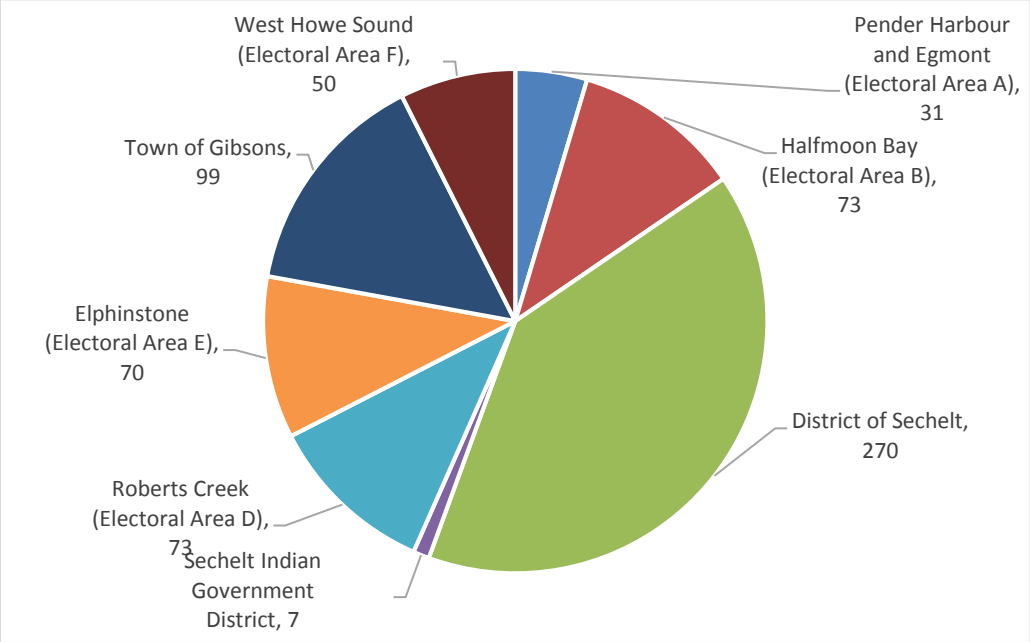
The Sechelt Indian Government District Council approved a Zero Waste plan last year and will be hiring an educator to support the initiative. The SIGD currently provides weekly garbage and weekly recycling services to their residents. However, SIGD staff are currently reviewing options for weekly collection of food waste and bi-weekly collection of garbage and recyclables.

Based on this meeting, municipalities within the SCRD are considering the provision of curbside collection of food waste to their residents. However, with respect to green waste, municipal partners have not expressed an interest in collecting this material at the curb and are content to continue the current system of self-haul to SCRD drop-off depots.

4.4 Residents

From May 8, 2017 to June 2, 2017, the SCRD asked residents to respond to a questionnaire about their current organic waste management practices, their willingness to participate in depot and curbside organic waste collection services, and their concerns about these collection methods. A total of 673 people responded. The distribution of responses by area is illustrated in Figure 4.1

Figure 4-1: Distribution of Questionnaire Response by Area



The questionnaire results indicate a high level of current participation in green waste diversion, including backyard composting and drop-off depots. Detailed information on the questionnaire is outlined in the Public Engagement Report – Organics Diversion Questionnaire.

For food waste management, a wide variety of solutions are used –ranging from backyard composting to feeding animals to using drop-off depots. Table 4.1 shows the prevalence of backyard composting of acceptable food scraps (fruits, vegetables, coffee grounds etc.) and depot use (all food scraps), by area, based on the responses to the questionnaire. There is a significant difference in the prevalence of backyard composting between the Electoral Area respondents (over 50%) and the municipal respondents (36% or less). Depot participation ranged from 3% in Electoral Area A (Pender Harbour) to 14% in the SIGD.

Table 4-1: Backyard Composting and Depot Use by Area

	Backyard Compost Food Scraps (% of area respondents)	**Take Food Scraps to Depot** (% of area respondents)	**Put Food Scraps in the Garbage** (% of area respondents)
Area A	55%	3%	65%
Area B	52%	11%	82%
Area D	55%	7%	77%
Area E	57%	6%	86%
Area F	54%	6%	66%
SIGD	0%	14%	86%
Gibsons	36%	6%	91%
Sechelt	32%	7%	82%

The respondents' willingness to participate in curbside organic waste collection services was high in all areas. Table 4.2 shows the percentage of respondents in each area that indicated that their participation would be "highly likely" or "maybe". Except for respondents in Areas A and F, there was generally a higher level of support for curbside collection over depot-based collection.

Table 4-2: Questionnaire Respondents Willingness to Participate in Organic Waste Collection

	Depot Collection			Curbside Collection		
	Highly likely	Maybe	Total	Highly likely	Maybe	Total
	% of respondents, by area					
Area A	61	26	87	55	16	71
Area B	27	36	63	75	14	89
Area D	36	30	66	67	14	81
Area E	46	33	79	66	19	85
Area F	52	24	76	56	16	72
SIGD	57	14	71	86	0	86
Gibsons	49	30	79	83	7	90
Sechelt	29	36	65	82	9	89

The most common concern expressed by respondents was the creation of animal attractants, particularly for bears. Many respondents suggested a willingness to participate in curbside collection if an animal-proof bin could be provided. The other commonly expressed concerns were the cost of the service and the potential for odour, although these concerns were identified with much less frequency than concerns related to attracting animals.

5 Considerations for Strategy Development

To ensure that a sustainable and robust organics diversion program is implemented in the SCRD, environmental, economic and social issues must be given full consideration in the development and selection of a regional organics diversion strategy. The following section outlines the Project Team's understanding of these issues in the SCRD as well as their implications on strategy development.

5.1 Sechelt Landfill Considerations

Landfill Capacity

According to the 2016 Annual Report prepared by XCG Consulting Limited, the Sechelt Landfill will reach capacity in 2027 based on current disposal rates, diversion initiatives, and population projections. If the SCRD fully implements all of the diversion initiatives outlined in the 2011 SWMP, landfill capacity could be extended another 5 years to early 2032. In either case, the SCRD will need to identify additional long-term disposal capacity and in the Project Team's experience this will be a challenging process that will inevitably result in higher disposal costs.

A lack of or shortage of landfill capacity was one of the main drivers for the CVRD and the RDN to implement their organics diversion programs. The CVRD currently exports their residual wastes in response to an unsuccessful landfill siting process. Given the high cost associated with waste export, the

CVRD has pursued a full range of diversion initiatives to reduce their residual disposal costs. The RDN also faced a landfill capacity crisis and after a controversial and failed landfill siting process, chose to conserve existing capacity by promoting maximum waste diversion.

Greenhouse Gas Emissions

As discussed in the 2011 SWMP, the Sunshine Coast Regional District, Town of Gibsons, District of Sechelt and the Sechelt Government District are committed to reducing greenhouse gas (GHG) emissions for the region. An emissions inventory completed in 2009 shows that the Sechelt Landfill contributes roughly 7% of GHG emissions on the Sunshine Coast. Since food waste generates methane, a potent greenhouse gas, during decomposition in a landfill, diverting this waste to a composting facility provides not only a significant reduction in GHG emissions, but also provides residents a low-cost and easy option to address climate change by reducing their household GHG emissions. Consequently, from an environmental perspective, the region wide organics diversion strategy should aim to maximize the diversion of food waste as an effective and efficient means to reduce GHG emissions.

5.2 Supporting Policy Considerations – Disposal Bans

Organic waste disposal bans have proven to be an effective and low-cost policy tool to divert waste and reduce GHG emissions in Metro Vancouver, Capital, Cowichan Valley and Nanaimo regional districts. However, the application of disposal bans for the ICI and residential sectors has varied between regional districts for the reasons discussed below.

In 2005 the RDN and CVRD were the first regional districts in BC to implement disposal bans on food wastes. In both cases the bans applied to commercial food waste and not food waste from the residential sector. This was due to two factors: the availability of privately owned and operated composting facilities and the fact that commercial food waste generators and private haulers could move faster to implement collection programs than local government service providers in the residential sector.

In the RDN, the commercial organics ban achieved significant and early diversion success while providing staff the opportunity to study collection options for the residential sector. This included implementation of a successful curbside collection pilot project. As a result, curbside collection services operated by the City of Nanaimo and the RDN expanded to include food waste in 2010. However, the commercial disposal ban has not been expanded to apply to residential waste since collection services were implemented voluntarily.

In Metro Vancouver and the CRD, the organics disposal bans, effective in 2015, apply to both the commercial and residential sectors. However, because these regional districts do not provide residential curbside garbage collection programs, they allowed for a two-year consultation process with their municipal partners and commercial generators to ensure support for their initiatives. Once municipal support was confirmed, the effective date for the ban was established and implemented in a phased process. In effect, these bans applied to commercial and residential organics because member municipalities were supportive and were given sufficient time to design and implement their collection systems.

5.3 Odour Management at Salish Soils

As discussed in Section 2.5, the Salish Soils composting facility meets the requirements of the Organic Matter Recycling Regulation (OMRR), which falls under the Environmental Management Act. The OMRR governs the production, quality and land application of certain types of organic matter. OMRR sets requirements for compost facilities with respect to:

- Construction and operation;
- Leachate management;
- Odour management;
- Capacity, and,
- Process and quality criteria.

For facilities that process less than 20,000 tonnes per year, OMRR requirements are not too stringent. For facilities that process more than that amount, requirements become more rigorous. Nevertheless, because OMRR requirements were not site specific at the time, the RDN, CVRD, Metro Vancouver and the CRD have all applied their Waste Stream Management Licensing Bylaws or Composting Code of Practice Bylaw to set higher performance standards than OMRR for composting facilities in their regions. This was primarily due to concerns over odour management, which is crucial to successful organic diversion.

In 2016, with more composting facilities expected to come online, OMRR was amended to ensure effective protection of the environment and public health. The amended OMRR requires all compost facilities that process food waste or biosolids, and have a production design capacity to produce 5,000 tonnes of compost or more per year to also apply for a Permit. These new permit requirements include completion by the applicant of an Environmental Impact Study, an Operating Plan, an Odour Management Plan, a Leachate Management and a Public Notification Process.

Although the Salish Soils facility is not subject to OMRR, the company has met all the requirements of the regulation for a facility of its size. And even though its production design capacity is less than 5,000 tonnes of compost per year, Salish Soils has advised the Project Team that they would be willing to apply for a permit under OMRR. Although this would be in the best interests of the SCRD, the permit requirements are expensive and Salish Soils would need to see a corresponding increase in feedstock and associated revenue. Consequently, the regional organics diversion strategy must consider due diligence requirements with respect to environment and public health protection as well ensuring that Salish Soils has the financial ability to meet these requirements.

With respect to processing costs, it is likely that the current Salish Soils tipping fee of $80 per tonne for large quantities will increase to meet permit requirements. The tipping fees at similar composting facilities in BC are closer to $100 per tonne to cover higher operating and maintenance and equipment replacement costs, particularly with respect to odour control.

5.4 Geography and Demographics

Communities and settlements in the SCRD are primarily strung out along a long and linear corridor that runs along the southern coastline. This has an impact on waste management infrastructure with respect to the need for drop-off and transfer facilities for communities outside of a reasonable hauling distance to the Sechelt Landfill or, for organics, to the Salish Soils composting facility in Sechelt. There is also the need to consider access to drop-off facilities for island residents as well as tourists and other seasonal visitors. Geography also dictates the need to mitigate bear human conflict with respect to garbage collection and disposal.

5.5 Community Support

Community support is essential to a successful organics diversion program. As discussed in Section 4.4, based on the results of the community questionnaire there is a high-level support for curbside collection of food waste in the SCRD. Nevertheless, residents have expressed concern over cost and wildlife concerns. The regional organics diversion strategy should take these concerns into consideration to ensure that most residents and businesses support food waste diversion.

6 Draft Regional Organics Diversion Strategy

Based on the considerations discussed above, the Project Team recommends the following strategy to divert food waste from the Sechelt Landfill. This strategy contains initiatives related to, commercial sector diversion, reduction and residential sector diversion. The estimated costs and implementation schedule is provided in Table 6-1.

Commercial Food Waste Ban

1. Implement a commercial food waste ban.
2. Implement food waste drop-off at the Pender Harbour Transfer Station.
3. Continue feasibility work on developing a South Coast site that includes food waste drop-off.

Reduction Programs

4. Implement a Food Waste Reduction Campaign.
5. Implement an at-home Compost Coaching Program.
6. Investigate a Backyard Composter Subsidy Program.

Residential Food Waste Collection

7. Implement curbside collection of food waste for all SCRD residences receiving garbage collection for a March 1, 2019 start.

Table 6-1: Regional Organics Diversion Strategy Costs and Implementation Schedule

	Action	Cost Estimate	Schedule
1.	Implement a commercial food waste ban.	Staff	2018
2.	Implement food waste drop-off at the Pender Harbour Transfer Station.	$10,000	2018/2019
3.	Continue feasibility work on developing a South Coast site that includes food waste drop-off.	TBD	2019
4.	Implement a Food Waste Reduction Campaign.	$10,000	2019
5.	Implement at-home Compost Coaching Program.	$10,000	2019
6.	Investigate a Backyard Composter Subsidy Program.	TBD	2019
7.	Implement curbside collection of food waste for all SCRD residences receiving curbside collection of garbage for a March 1, 2019 start.	TBD	2019

Appendix 1: Notes to the Financial Statements for the Years Ended December 31, 2016 and 2015.

Sunshine Coast Regional District

Notes To The Financial Statements
For the Years Ended December 31, 2016 and 2015

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9. Provision for Landfill Future Closure and Post-Closure Care Costs:

The Regional District is responsible for the closure and post-closure care costs related to two landfill sites - one in Sechelt and the other in Pender Harbour. The Regional District's estimated liability for these costs is recognized as the landfill site's capacity is used. The recorded liability of $5,245,705 (2015 - $4,803,825) represents the portion of the estimated total future costs recognized as at December 31, 2016. The Regional District has set aside funding for future landfill closure and post-closure care costs. The balance of this funding as at December 31, 2016 is $506,745 (2015 - $208,109) resulting in a current funding shortfall of $4,736,960 (2015 - $4,595,716).

The Sechelt landfill site is expected to reach its capacity in 2027 and the Pender Harbour landfill site reached its capacity and was converted to a transfer station in 2015. The remaining liability to be recognized for the Sechelt landfill site is estimated to be $1,534,086 (2015 - $1,632,509) based on the remaining capacity of 212,428 cubic meters, which is 24.17% of the total capacity. As the Pender Harbour landfill site reached its capacity in 2015, there is no remaining liability to be recognized.

The reported liability is based on estimates and assumptions with respect to events extending over the remaining life of the landfill. The liability and annual expense is calculated based on the ratio of usage to total capacity and the discounted estimated future cash flows associated with closure and post-closure activities. In 2016, the Regional District updated the basis for estimating future cash flows to reflect long-term average inflation and discount rates applicable to the Regional District. The impact of this change was a decrease to the recorded liability in 2016 of $225,382.

In 2016, the BC Ministry of Environment issued updated landfill criteria increasing the minimum post closure care period from 25 years to 30 years. As such, post closure care costs are now expected to continue for 30 years following the year of closure at both the Pender Harbour and Sechelt Landfill sites. The impact of this change was an increase to the recorded liability in 2016 of $247,426.

Appendix 2: Organics Diversion Programs in Comparable AVICC Regional Districts

A2 1: Organics Diversion Programs in Comparable AVICC Regional Districts

Program Characteristics	CRD	CVRD	RDN	SCRD	PRRD
2016 Population	382,645	84,014	157,599	29,243	20,328
Population Density (Pop/km^2)	154	23	72	8	4
2015 Per Capital Disposal (kg)	345	297	314	421	458
MSW Tipping Fee	$110	$140	$125	$150	$220
Green Waste Tipping Fee	$59	Free	$55	$0/$45	$45
Food Waste Tipping Fee	$120	$90	$110	$80	Pilot/Free
Curbside Collection Services:					
Garbage	Bi-Weekly	Bi-Weekly 1 can	Bi-Weekly 1 can	Weekly 1 can	Weekly Tag Based Powell River Only
Food Waste	Weekly/Bi-Weekly Varies by Municipality	Weekly	Weekly	Pilot Pick-up Sechelt only	Pilot Drop-Off
Green Waste	Varies by Municipality	Depot	Depot	Depot Pilot Pick-up Sechelt only	Depot
Recycle	Bi-Weekly	Bi-Weekly	Bi-Weekly	Bi-weekly Sechelt & SIGD only	Bi-Weekly Powell River Only
Depot – recycle	Yes	Yes	Yes	Yes	Yes
In-region compost facility	No	Yes	Yes	Yes	No
Organics Ban – ICI	Yes	Yes	Yes	No	No
Organics Ban – Residential	Yes	No	No	No	No
Organics Strategy/Plan	Yes	Yes	Yes	In development	In development

Appendix 3: Food Waste Diversion Estimates

Table A3-1 provides actual food waste diversion data for residential curbside programs operating in the CVRD and the RDN. As indicated in Figure 3-3, these two regional districts on Vancouver Island have the lowest disposal rates in BC at 297 and 314 kilograms per capita respectively. Both regional districts implemented disposal bans on commercial sector food waste in 2006, and all households in the RDN and most of the households in the CVRD have curbside food waste collection service. Based on this data it is reasonable to expect that curbside collection of organics in the SCRD would result in similar diversion results.

Table A3 1: Residential Food Waste Diversion Data in the CVRD and RDN

Curbside Program	Households	Person/HH	Est. Pop	Food Waste		
				Tonnes/yr	kg/hh/yr	kg/cap/yr
RDN						
City of Nanaimo	27,600	2.3	63,480	3,505	127	55
RDN Service Area	28,130	2.2	61,886	3,151	112	51
Total	55,730		125,366	6,656	119	53
CVRD						
Town of Ladysmith	3,410	2.3	7,843	436	128	56
District of North Cowichan	10,640	2.3	24,472	1,075	101	44
Total	14,050		32,315	1,511	108	47
				Average	**117**	**52**

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – July 20, 2017

AUTHOR: Robyn Cooper, Manager, Solid Waste Services

SUBJECT: **PUBLIC ENGAGEMENT RESULTS - ORGANIC WASTE DIVERSION**

RECOMMENDATION(S)

THAT the report titled Public Engagement Results - Organic Waste Diversion be received.

BACKGROUND

Diversion of organics has been identified as a priority to extend the lifespan of the Sechelt Landfill and to meet the targets in the SCRD's Solid Waste Management Plan (SWMP).

As part of the development of the Draft Regional Organics Diversion Strategy, public consultation was conducted.

The purpose of this report is to outline the process and to present the findings from the Organic Waste Diversion.

DISCUSSION

Staff conducted a public engagement process to determine current practices related to organic waste and to allow the community an opportunity to provide comment and input with respect to organic waste collection options. Organic is defined as green waste, food scraps and food soiled paper.

From May 8, 2017 to June 2, 2017 residents on the Sunshine Coast had the opportunity to complete a questionnaire either in-person at the SCRD's Community Engagement sessions or online.

In addition to the promotion at the Community Engagement sessions, the questionnaire was promoted in the Coast Reporter, on the SCRD website and social media.

A total of 673 people responded.

To date, no comments were received after the closing date of June 2, 2017. This report is therefore considered inclusive of all comments received.

The results of the questionnaire were utilized to inform the development of the SCRD's Draft Regional Organics Diversion Strategy. The Strategy is being presented at the July 20, 2017 Infrastructure Services Committee meeting.

Attached is a copy of the Organic Waste Diversion Public Engagement Report.

STRATEGIC PLAN AND RELATED POLICIES

This report is in support of the SCRD's Public Participation Program.

A Regional Organics Diversion Strategy supports the Strategic Priority of Embed Environmental Leadership.

The Strategy is in support of the SCRD's Solid Waste Management Plan's target of 65%-69% diversion and organics diversion is one of the SWMP's reduction initiatives.

CONCLUSION

Staff conducted a public engagement process to determine current organic waste management practices and to allow the community an opportunity to provide feedback and comments related to organic waste collection options.

The report is for the Board's information.

The results were incorporated into the Draft Regional Organics Diversion Strategy. The Strategy is being presented at the July 20, 2017 Infrastructure Services Committee meeting.

Attachment: Organic Waste Diversion Public Engagement Report.

Reviewed by:			
Manager	X-R. Cooper	Finance	
GM		Legislative	
CAO	X-J. Loveys	Other	

Sunshine Coast Regional District

Organic Waste Diversion Questionnaire

Public Engagement Report

Report to the Infrastructure Services Committee

July 20, 2017

Solid Waste Services

Sunshine Coast Regional District

SUNSHINE COAST REGIONAL DISTRICT

PUBLIC ENGAGEMENT REPORT

Organic Waste Diversion Questionnaire
Sunshine Coast, British Columbia

Public Consultation Summary Report

This report serves as a summary of the key findings of the Organic Waste Diversion Questionnaire which formed part of the public engagement process of the Sunshine Coast Regional District (SCRD) Draft Organic Diversion Strategy.

About the Organic Diversion Strategy

In 2017, the SCRD engaged Carey McIver & Associates Ltd., in collaboration with Maura Walker & Associates, to develop a Draft Regional Organics Diversion Strategy. Building on the initiatives identified in the 2011 Solid Waste Management Plan (SWMP), the objective of this strategy is to provide a financially sustainable road map that will lead to a robust, Sunshine Coast-wide full organics diversion program.

In developing options for the strategy, the consultants engaged with staff from each of the SCRD municipalities in addition to local haulers and processors and the SCRD developed and released a questionnaire from Monday, May 8, 2017 to Friday, June 2, 2017 to solicit input from residents in the region. This report provides an overview of the questionnaire results. Feedback from the municipalities, haulers and processors is outlined in the Draft Regional Organic Diversion Strategy, Section 4 "Community and Stakeholder Engagement".

Structure of the Report

- Overview of the Organic Waste Diversion Questionnaire
    - Opening and Closing Dates
    - Total number of respondents
    - Method of Promotion
    - Questionnaire Objectives
    - General Observations
- Summary of Results
- Overarching Themes from Questionnaire
- Curbside Pick-Up of Food Scraps and Food Soiled Paper
    - Concerns Expressed
    - Support/Suggestions Expressed
- Depot Drop-Off of Food Scraps and Food Soiled Paper
    - Concerns Expressed
    - Support/Suggestions Expressed
- Other Comments Related to Organic Waste Diversion
- Other Comments Related to Solid Waste Management in the region

- Supporting Documents
    - Appendix 1: Summary Results of the Organic Waste Diversion Questionnaire
    - Appendix 2: Coast Reporter Bulletin Board Advertisements
    - Appendix 3: Poster to Promote Organic Waste Diversion Questionnaire at Community Bulletin Boards and SCRD Recreation Facilities

Overview of the Organic Waste Diversion Questionnaire

Dates, Total Number of Respondents, Method of Promotion

The SCRD developed and released a questionnaire from Monday, May 8, 2017 to Friday, June 2, 2017 for residents in the region to provide input on organic waste diversion including current organic management practices and willingness to participate in either depot or curbside services for organic waste. In total, 673 residents completed the questionnaire: 33 paper copies and 640 online.

Residents were able to complete the questionnaire:

- In person at the SCRD Community Dialogues which were held in each community in the region throughout the month of May 2017.
- Through an online questionnaire which the SCRD promoted via:
    - The SCRD website from May 8 to June 2
    - Paid Facebook ads from May 11 to June 2 with an estimated reach to 4200 - 5300 SCRD-based Facebook users
    - Coast Reporter Bulletin Board Ad promoting the questionnaire on May 5 and May 19, 2017
    - Coast Reporter Bulletin Board Ad thanking residents for completing the questionnaire on July 14, 2017
    - 28 paid radio ads which ran from May 24 – June 2 on 91.7 Coast FM
    - Direct email promotion to the three member municipalities (District of Sechelt, Town of Gibsons and Sechelt Indian Government District) and 14 community associations from West Howe Sound to Egmont
    - Posters at 44 community bulletin boards from West Howe Sound to Pender Harbour
    - At the five SCRD recreation facilities: Sechelt Aquatic Centre, Gibsons & Area Community Centre, Sunshine Coast Arena, Gibsons Aquatic Facility, Pender Harbour Aquatic and Fitness Centre

Appendices 2 and 3 show supporting documents used in the promotion of the questionnaire.

Questionnaire Objectives

There were overarching objectives of the Organic Waste Diversion Questionnaire. The first was to get a sense of how residents currently dispose of various organic waste for: 1) green waste, 2) raw peelings and coffee grounds, and 3) other kitchen scraps such meat, seafood and bones, dairy and bread. The second objective was to seek residents' input on the likelihood of them disposing of organic waste at a depot or at the curb. The final objective was to understand residents' concerns around collecting organic waste at a depot or at the curb through an open-ended text question.

General Observations

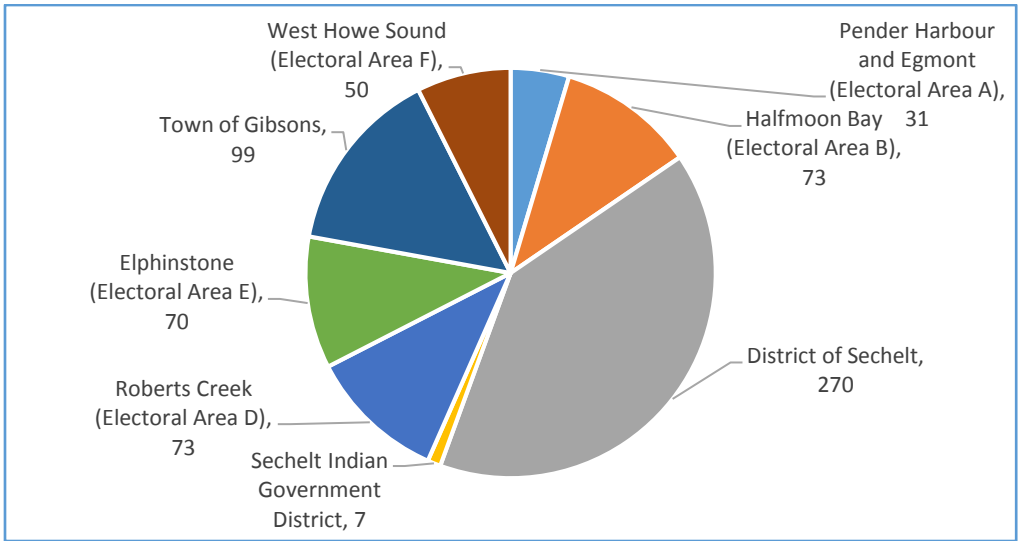
Overall, SCRD staff is very pleased with the number of respondents to the Organic Waste Questionnaire. Of the 673 residents who completed the questionnaire, 462 completed the final open-ended question in Question #8 which asked residents to provide any concerns they have about disposing organic waste at a depot or at the curb. Responses were constructive and thoughtful in nature and provide the SCRD with excellent insight into concerns and support for various disposal methods for organic waste.

In addition, the paid Facebook ad generated an online community discussion about the topic of organic waste diversion, with 48 comments on the Facebook page and 99 Facebook 'shares' to other Facebook users and community groups such One Coast, Pender Harbour & District, Sunshine Coast Community Concerns and FYI Posts, FYI Sunshine Coast, Sunshine Coast Farmers Network Forum, Sunshine Coast Farm/Garden Swap & Talk, Sunshine Coast BC Community News, One Straw Society and Local Food Sunshine Coast. These social media comments were not integrated into the questionnaire results.

Summary of Results

The questionnaire included eight questions listed on page 3. A detailed questionnaire summary of all 673 responses from residents across the Sunshine Coast is included in Appendix 1. The distribution of responses by area is illustrated in Figure 1.

Figure 1: Response Distribution by Area



Questions in the Organic Waste Diversion Questionnaire

1. Which community do you live in?
2. What do you do with your green waste (e.g. leaves, yard clippings)? Circle all that apply.
    - Drop off at: Gibsons Green Waste Facility, Salish Soils, Pender Harbour Transfer Station
    - Backyard compost
    - Garbage
    - Other: _____
3. What do you do with your leftover raw food (e.g. peelings, coffee grounds)? Circle all that apply.
    - Drop off at depot
    - Backyard compost
    - Digester (e.g. Green Cone or Bokashi)
    - Worm compost
    - Garbage
    - Other: _____
4. What do you do with other food scraps such as bread, dairy, meat, seafood, bones or cooked foods? Circle all that apply.
    - Drop off at depot
    - Backyard compost
    - Digester (e.g. Green Cone or Bokashi)
    - Worm compost
    - Garbage
    - Other: _____
5. Do you use a garburator for your food scraps?
    - Yes or No
6. Would you be willing to use a depot for your food scraps and food soiled paper?
    - Highly likely
    - Maybe
    - Not likely
7. Would you be willing to use a weekly curbside collection program for your food scraps and food soiled paper?
    - Highly likely
    - Maybe
    - Not likely
8. Do you have any concerns with the idea of collecting food scraps and food soiled paper at a depot or curbside? If so, please list here.

General Results

The questionnaire results indicate a high level of current participation in green waste diversion, including backyard composting and drop-off depots.

For food waste management, a wide variety of solutions are used – ranging from backyard composting to feeding animals to using drop-off depots. Table 1 shows the prevalence of backyard composting of acceptable food scraps (fruits, vegetables, coffee grounds etc.) and depot use (all food scraps), by area, based on the responses to the questionnaire. There is a significant difference in the prevalence of backyard composting between the Electoral Area respondents (over 50%) and the municipal

respondents (36% or less). Depot participation ranged from 3% in Electoral Area A (Pender Harbour) to 14% in the SIGD.

Table 1: Backyard Composting and Depot Use by Area

	Backyard Compost Food Scraps (% of area respondents)	Take Food Scraps to Depot (% of area respondents)
Area A	55%	3%
Area B	52%	11%
Area D	55%	7%
Area E	57%	6%
Area F	54%	6%
SIGD	0%	14%
Gibsons	36%	6%
Sechelt	32%	7%

The respondents' willingness to participate in curbside organic waste collection services was high in all areas. Table 2 shows the percentage of respondents in each area that indicated that their participation would be "highly likely" or "maybe". Except for respondents in Areas A and F, there was generally a higher level of support for curbside collection over depot-based collection.

Table 2: Survey Respondents Willingness to Participate in Organic Waste Collection

	Depot collection			Curbside collection		
	Highly likely	Maybe	Total	Highly likely	Maybe	Total
	% of respondents, by area					
Area A	61	26	87	55	16	71
Area B	27	36	63	75	14	89
Area D	36	30	66	67	14	81
Area E	46	33	79	66	19	85
Area F	52	24	76	56	16	72
SIGD	57	14	71	86	0	86
Gibsons	49	30	79	83	7	90
Sechelt	29	36	65	82	9	89

Overarching Themes from Questionnaire

There were many common themes recorded from the open-ended Question #8: "Do you have any concerns with the idea of collecting food scraps and food soiled paper at a depot or curbside?"

A total of 462 out of 673 residents (69%) entered a text response for this question.
The following themes were heard repeatedly, and are not in order of priority.

- General support for taking action on organic waste diversion in the region
- Many respondents had no concerns about organic waste collection at a depot or curbside
- Majority of concerns around wildlife/animals being attracted to neighbourhoods or impacted
- Many concerns about depot drop-off of food scraps being inconvenient and unpleasant
- Some program cost concerns and questions

- Curbside concerns and suggestions regarding proper bin maintenance, animal-resistant bins, consistent scheduling, where/how or limited options available to securely store bins from wildlife and odour
- A few concerns/questions around processing organic waste – what would be done with it and how will odour be managed at Salish Soils
- A few comments about barriers faced by multi-family residences

The methodology the SCRD used to analyze the text responses from the open-ended Question #8 was to place each comment into a 'support', 'concern' or 'other comment' category. For the support and concern categories, the SCRD placed comments into categories for curbside pick-up and depot drop-off and noted down the themes and frequency mentioned. These main themes are outlined below.

CURBSIDE PICK-UP OF FOOD SCRAPS AND FOOD SOILED PAPER

Concerns Expressed

- 155 concerns about a curbside program attracting or harming more animals/wildlife
    - Most commonly listed wildlife were: bears, raccoons, rats, dogs, ravens, coyotes
- 27 directly concerned about cost of curbside program and some not willing to have an increase in taxes or utilities
- 43 comments regarding improper bin maintenance/handling resulting in animals drawn to neighbourhoods, maggots/bugs, bin odours
- 30 comments related to storage of food scraps at home – no secure location to store bins, concerned about odours while waiting for bin pick-up
- 10 out of the 462 responses noted were not in favour of a curbside collection program

Support/Suggestions Expressed

- 97 comments specifically supporting curbside pick-up – more convenient, progressive, positive experience from District of Sechelt Davis Bay curbside organic pilot or from a community where they previously lived that had curbside collection, higher likelihood of participation and accessible for residents with mobility issues (e.g. seniors, residents without vehicles, residents with a disability)
    - Of these 97 comments, 8 residents noted they were willing to pay for service
- Majority of residents who had a concern about attracting wildlife with a curbside program suggested a need for animal-resistant bins
- A few suggestions around education, freezing food scraps before pick-up and compliance and bylaw enforcement to address curbside concerns related to bin maintenance and storage
- 26 responses had questions or suggestions around curbside scheduling – preferred weekly and consistent schedule to limit wildlife being attracted

DEPOT DROP-OFF OF FOOD SCRAPS AND FOOD SOILED PAPER

Concerns Expressed

- 55 concerns about depot being inconvenient – too far to transport, may forget to bring and then will throw in garbage, depot hours currently not convenient, residents may not have transportation to get to a depot, accessibility issues for seniors and those with a disability, smelly/unpleasant to transport in own car and odour while storing at home
- 5 out of the 462 responses were not in favour of using a depot to drop of organic waste
- 3 concerns about rats at depots

Support Expressed

- 12 comments supporting depot drop-off as long as locations are easy to get to
- 13 responses made suggestions to have neighbourhood drop-off locations – at mailboxes, schools, malls, any convenient location

OTHER COMMENTS RELATED TO ORGANIC WASTE DIVERSION

- 16 requests for composter subsidy program or increased education regarding home composting options
- 5 requests for curbside green waste pick-up
- 1 request for curbside wood chipping program
- 1 request for mulch for community
- 1 request for food waste reduction
- 1 request for commercial organics program
- 1 request regarding a solution for composting pet waste

OTHER COMMENTS RELATED TO SOLID WASTE MANAGEMENT IN THE REGION

- 13 requests for a curbside recycling service

Supporting Documents

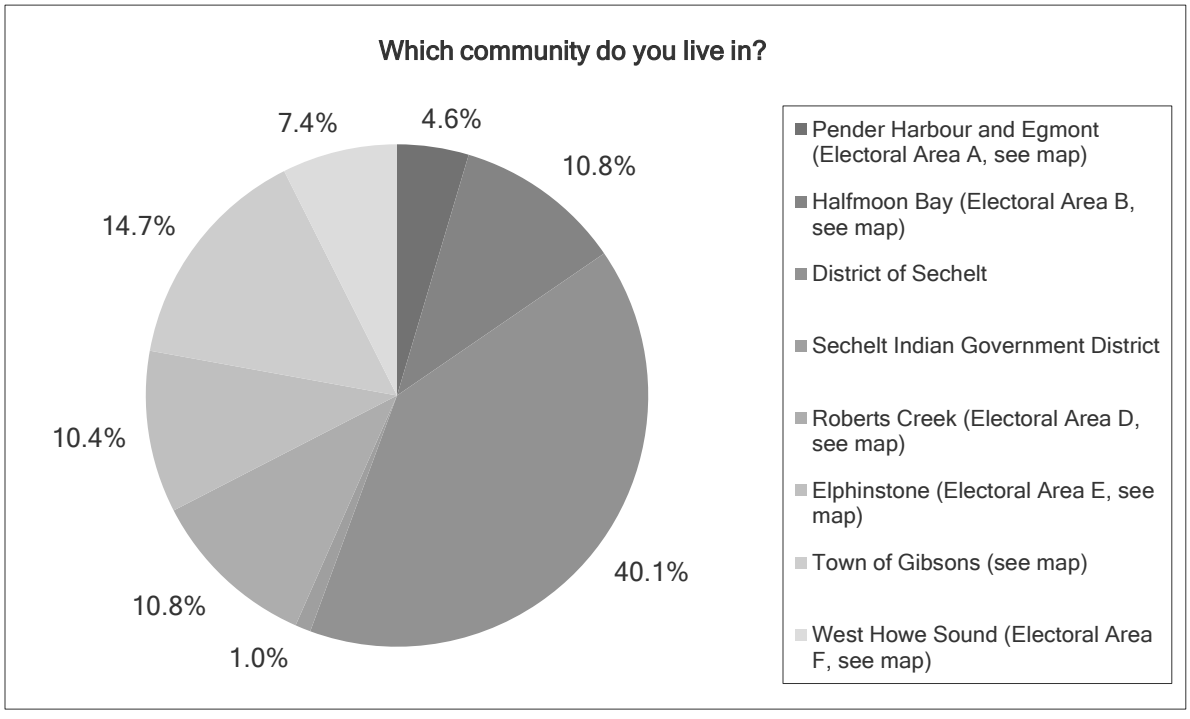
The following supporting documents are attached to this report:

Appendix 1: Summary Results of the Organic Waste Diversion Questionnaire
Appendix 2: Coast Reporter Bulletin Board Advertisements
Appendix 3: Poster to Promote Organic Waste Diversion Questionnaire

Results of the SCRD's
Organic Waste Diversion Questionnaire
Summary – All Areas Combined

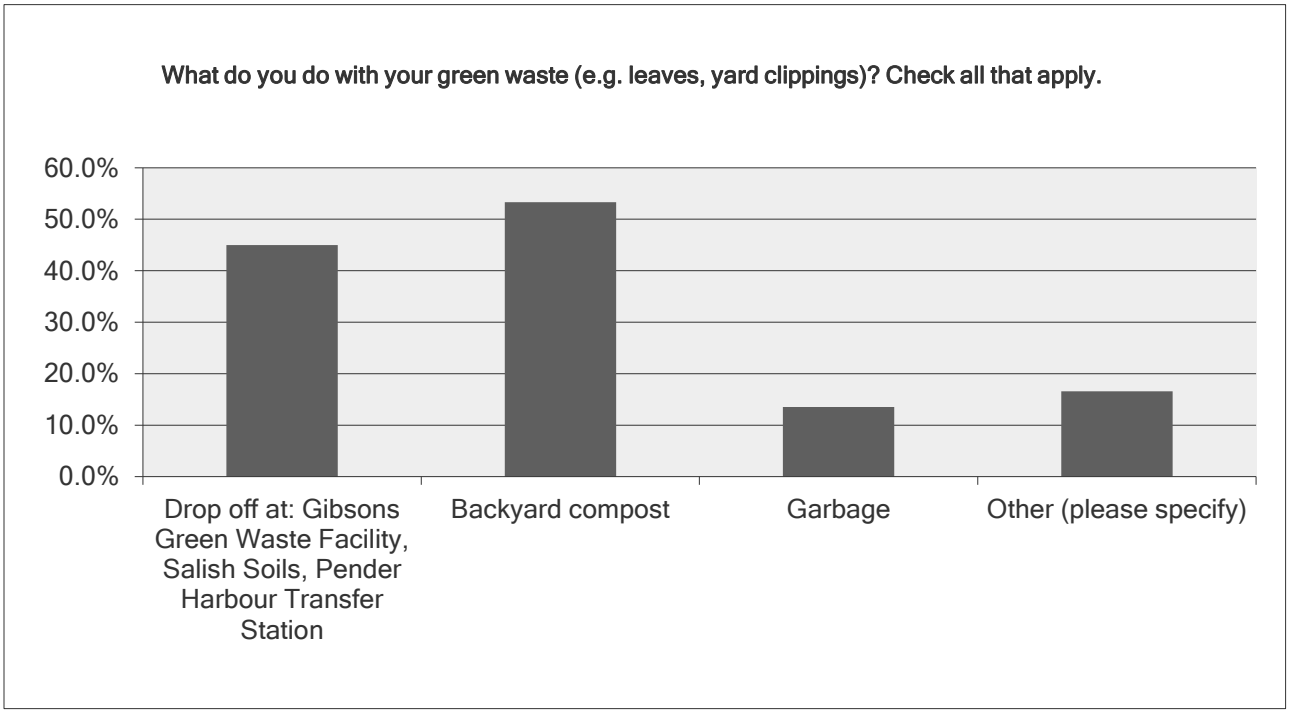
Question #1:
Which community do you live in?

Answer Options	Response Percent	Response Count
Pender Harbour and Egmont (Electoral Area A)	4.6%	31
Halfmoon Bay (Electoral Area B)	10.8%	73
District of Sechelt	40.1%	270
Sechelt Indian Government District	1.0%	7
Roberts Creek (Electoral Area D)	10.8%	73
Elphinstone (Electoral Area E)	10.4%	70
Town of Gibsons	14.7%	99
West Howe Sound (Electoral Area F)	7.4%	50
answered question		673



Question #2:
What do you do with your green waste (e.g. leaves, yard clippings)? Check all that apply.

Answer Options	Response Percent	Response Count
Drop off at: Gibsons Green Waste Facility, Salish Soils, Pender Harbour Transfer Station	45.0%	303
Backyard compost	53.3%	359
Garbage	13.5%	91
Other (please specify)	16.6%	112
answered question		673
skipped question		0



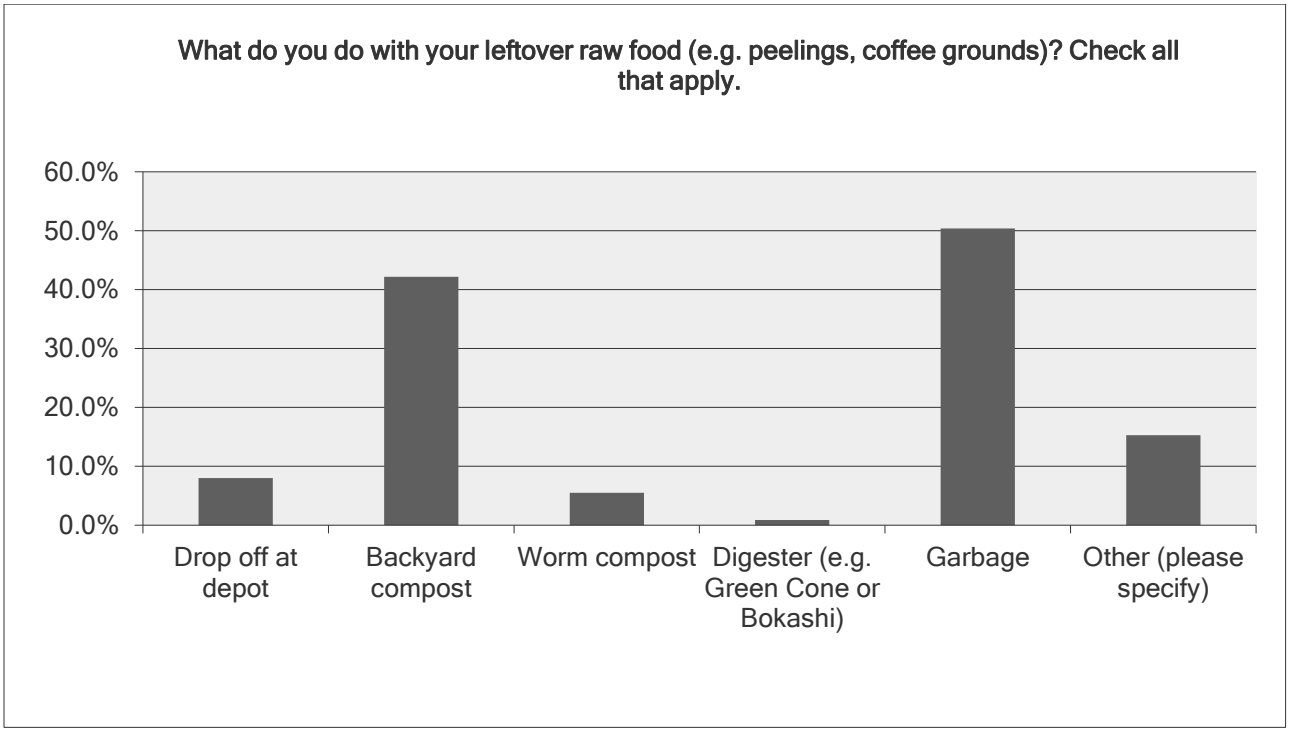
Question #2: Other (please specify). 112 text responses listed below.		
Sechelt green bin (Davis Bay)	Live in apartment don't have any.	I live on the edge of a ravine I let all yard waste, branches, grass clippings, berry bush cut backs fall into the ravine. I do not have a car.
Green waste pick-up	Davis Bay picks up compostable material	Green Bins are picked up once a week
use grass clippings as mulch	Large amounts taken to green waste facility in Gibsons	Do not produce any - live in condo
Not applicable	Removed by gardener	Shred them and spread on our property
Burn pile	Worm compost	in the summer I compost

We throw them into the trees that surround our yard.	Composter at our home	burn in the fall/winter
Pace in corner of the yard	Curbside pickup	Sechelt green bin (Davis Bay)
Leave them where they are	garburetor	Nothing, just leave in piles in yard
In the bushes !	I also chip branches for garden mulch	Both garbage and backyard compost, depends on season. Compost in winter, garbage in summer as it attracts wildlife
Salish soils	Leave it on the lawn, leave it in the shrubs and trees.	Nothing
And a small pile on property.	Not applicable	Burn it
Leave it on the ground as nature intended	I'm part of Davis Bay curbside pickup pilot project.	burn them
Live in a condo	I compost non smelly items and garden waste, garbage for the rest because the bears won't leave it	Burn
Forest beside house	Gets picked up/green bin	Was dropping at Gibsons until shut down,but now garbage
Or to Salish Soils green waste @ 30% / 70% backyard compost	Make a pile in a corner and hope it rots down.	Mulch.
Burn it	I have a green box	Invasive species only to garbage as there is really no safe management yet for this
I was using Backyard Compost but there is a significant nuisance bear issue in my area that the Conservation Office will not deal with. These bears need to be relocated.	Leave in the forest around our home	leave it to nature where is as is
green bin	Dump in forest	Larger clippings, sod etc taken by yard work contractor for drop off.
Empty lot across the street	put in the long grass. have no yard, hardly any green waste.	Berm garden waste
Being picked weekly	spread in nearby forest	dump in pile where easy
Roadside pickup	dump in forest	Neighbour drops off for me
i live in Davis Bay and enjoy the friday green bin p.u., compost what is good for the garden	Nothing. I live in a strata building and they hire people to do the yard work.	Hire someone to remove, on a pension this cuts into my food budget
Green waste pickup for Davis Bay pilot project D. of S. Before that drop off.	Removed by commercial landscaping company	We are in Davis Bay and we have roadside green waste pick up. It is wonderful and we are thankful for it.
Davis Bay organic disposal pilot - green bin.@	We have grayco pick up service	n/a as I live in condo
I own a townhome and don't do the gardening	Illegally dumping	Salish soils
We also have a worm compost in our shed.	garburetor	Throw it in a big pile in the bush
I live in Davis Bay..have weekly pickup of organics	Leave it on the lawn or throw it into the bushes around the house	Davis Bay green bins

Leave them on the ground.	Stockpiling until the district of Sechelt decides to offer yard ware pickup.	We have too many bears around to compost. I don't want to attract them to my yard.
Throw them in a pile located on the land we live on	Dump in green space	lucky to live in Davis Bay so we have green pickup
Put into the neighbours empty lot.	Don't have much	We do not have a truck for transporting branches from windfall so a lot of stuff is dragged into the bush and left to rot there. We live on an one acre property that produces a lot of green waste and it is always a challenge to dispose of it since we can no longer burn.
Compost leaves and clippings but not kitchen waste	RDN Zero Waste Program	Apartment living! Not allowed to compost, have to take to a friend's house to use their backyard compost.
Area of my backyard	I have two composts where I usually only deposit "organic" matter.	Leave grass on lawn, burn wood in fireplace
Only use green waste for larger items that cannot be composted	We don't have leaves in our yard. Leave the grass clippings on lawn	Local farmer takes green waste.
Davis bay green bin pick up	Davis Bay weekly green waste pick up	Hugelkulture and grow vegs in bed
Burn	Drag it to back of the property	Pile in backyard
Burn	Give away to others	burn
Take across the street	We also burn larger pieces and weeds.	
Burn	Used to drop off in gibsons but they stopped that.	

Question #3:
What do you do with your leftover raw food (e.g. peelings, coffee grounds)?
Check all that apply.

Answer Options	Response Percent	Response Count
Drop off at depot	8.0%	54
Backyard compost	42.2%	284
Worm compost	5.5%	37
Digester (e.g. Green Cone or Bokashi)	0.9%	6
Garbage	50.4%	339
Other (please specify)	15.3%	103
answered question		673
skipped question		0



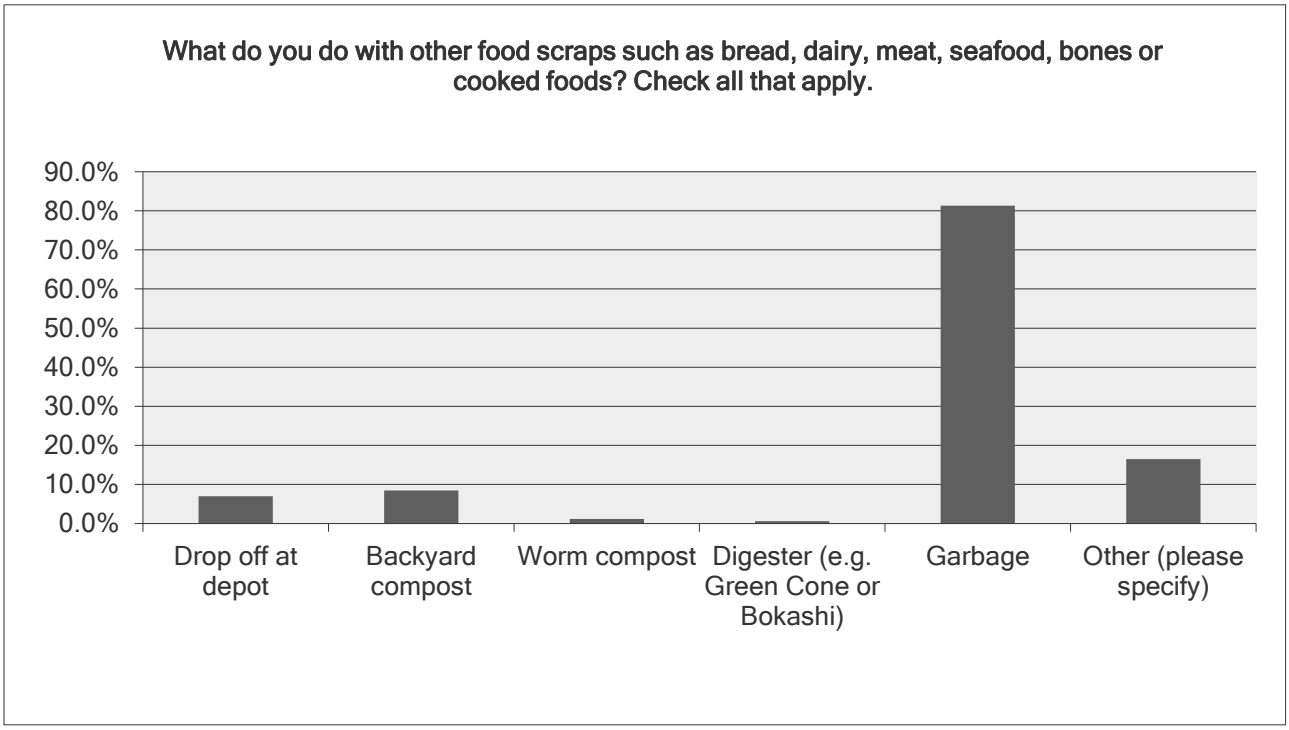
Question #3: Other (please specify). 103 text responses listed below.		
RDN Zero Waste Program	Sechelt green bin (Davis Bay)	Put coffee grinds on plants
Only when organic; or it goes in the garbage.	Bunny and chicken	Composter at our home, compost & use for fertilizer
Davis Bay green waste P/U	Drop off to other people's compost	Used to drop off at recycling centre, but they no longer take it
Give to others that want it	Coffee grounds are put on our hydrangeas	Curbside pickup

Garburator	garburator	In green organic compost bags after Garberators in our condo were causing problems!
Chickens	Best problems	garburetor
Apartment living! Not allowed to compost, have to take to a friend's house to use their backyard compost.	Garburater	Drop off at Salish Soils
Green bin pick up	Salish Silus	I'm part of Davis Bay curbside pickup pilot project.
Insinkerator	Salish soils	Feed to chickens
Non-toxic paper is used in compost and sheet mulching.	coffee grounds spread in garden	Drop off at Salish Soil facility.
Garburator	Feed to animals	Used to compost but now dispose in garbage because it's too dirty in the house, it attracts bears and raccoons.
Cooked food with oils, meat and bones. Less than .5 l. per week only in garbage.	Garberator	Coffee grinds go in the garden
We dig our compostable kitchen waste directly into holes or trenches in our tiny veggie garden, chop it and cover with soil. If ground is frozen, we just store it in sealed buckets until we can dig it in.	Unfortunately we aren't allowed to compost in our complex	O
I put it in my green bin that is picked up weekly.	Friends Compost when mine is full	Corn cobs and husks-take too long to break down
Garburator	Backyard Compost only plant materials, balance to garbage	Parents compost on another property
We freeze it until garbage collection day to avoid wildlife foraging, but it goes into the regular garbage bin.	sechelt green bin pickup	garburator
Food scraps in garbage. Very little per week .	green bin	I try to save anything I can dye with, like onion skins. Also occasionally make stuff like art.
Davis Bay green bins	We used to use the facilities at Gibsons Recycling Depot, but sadly that's no longer available	feed animals
See above. I WANT to compost, but I don't want bears.	see above	Friend takes for goats (if suitable and timing works out)
pickup green waste	Green bin pick up Davis Bay	dump them out window
Coffee grounds in garden, ALL food to green waste @ Salish Soils. We've had bear issues in the neighbourhood and can't compost food.	Davis Bay organic pilot	Community Garden compost site at SCCSS
Worm compost	See 2 above.	We give some peeling to our chickens, and pets
I do not have proper composter. can't afford one and am concerned about furry critters..some are quite big...lol. I do not have a car.	Davis Bay pick up	Salish Soils

indoor electric composter and jora	Have weekly pickup of organic waste	Green bin
love the curbside pickup I have weekly	Bury in garden.	Combination of compost and garbage.
I try to compost as much as possible but it is a hassle and attracts wildlife	Used to take to Gibsons Recycling but not accepted there anymore so the majority being put in garbage now.	I am handicapped and do not drive so I cannot bring it to the nearest facility. Breaks my heart everytime I throw out compostables.
two large dogs eat leftover edible food, dogs eat vegetables and fruit. Coffee grounds into covered composter for the garden.	leftover food garbage, peelings coffee grounds compost	Coffee goes down the sink
Sechelt green bin (Davis Bay)	Garburator	Drop off at Salish Soils
Mostly garbage	We used Gibsons Recycling depot however they no longer accept compost material	compost but inside a secure shed (due to bears)
Depending on food type (i.e. strawberry top) - give to rabbit	Used to take it to GRD - not accepted anymore	We are part of the test area in Davis Bay and we think it's great
quit backyard composting when bugs got too bad	as per above	Compost pickup
some go in the compost and some to the garbage	Chickens	Green bin, im in the Davis Bay trial area for green bin pickup.
Was taking to Gibsons Recycle but they no longer take it. Now I take it to a friends compost because mine is full	Garburate	as above
Used to take to Gibsons Re-cycle. So disappointed they are no longer able to take.	Composts attract wildlife and being bear aware, composting is not always the answer in residential grounds	
Save food waste and make weekly trip to Sechelt to compost since Gibsons compost is no longer.	i dont put meat in it due to animals	

Question #4:
What do you do with other food scraps such as bread, dairy, meat, seafood, bones or cooked foods? Check all that apply.

Answer Options	Response Percent	Response Count
Drop off at depot	7.0%	47
Backyard compost	8.5%	57
Worm compost	1.2%	8
Digester (e.g. Green Cone or Bokashi)	0.6%	4
Garbage	81.3%	547
Other (please specify)	16.5%	111
	answered question	673
	skipped question	0



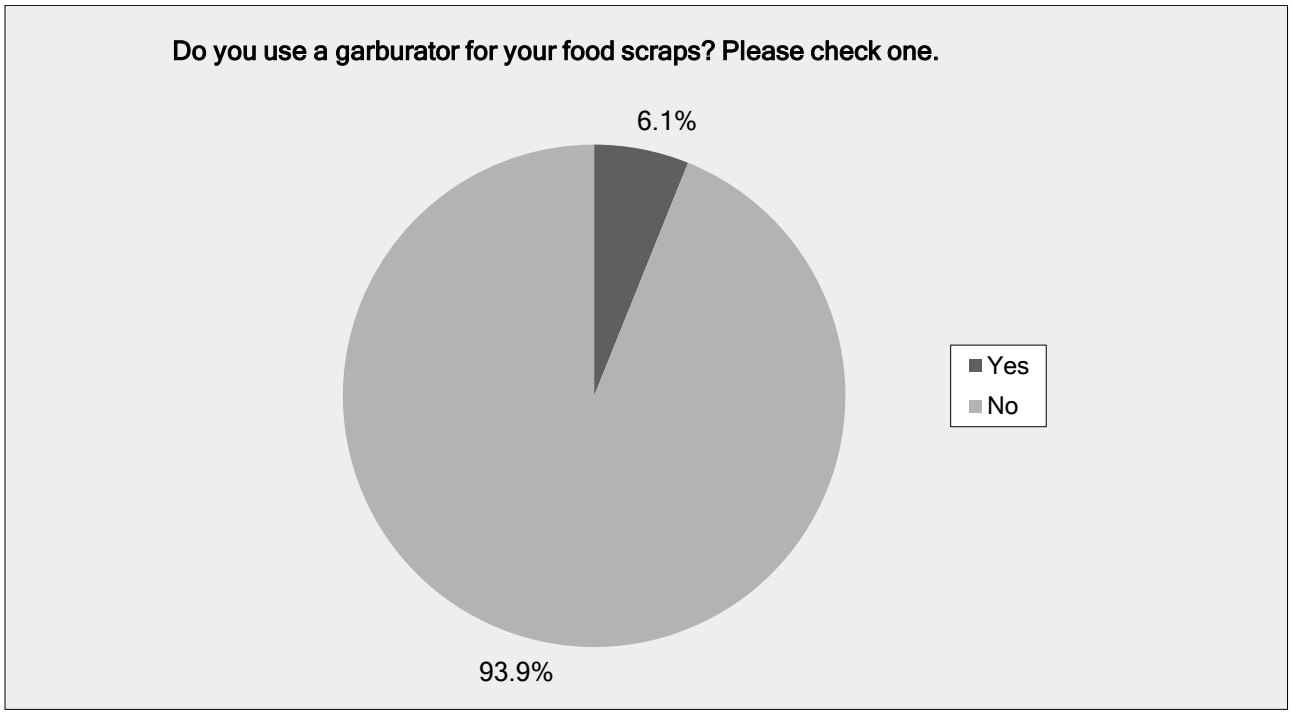
Question #4: Other (please specify). 111 text responses listed below.		
Sechelt green bin (Davis Bay)	Green bin, in in the Davis Bay trial area for green bin pickup.	Same as above
I am vegetarian so don't have much of food scraps listed. Dogs eat some that are appropriate. The rest goes in a bag in my freezer and goes in the garbage that I put out about once a month.	Bones I often burn	as per above
Chickens food	no bones,meat,seafood	Garburate

Store in freezer to hold for the next run to the transfer station	I am vegan. We don't have any	I do not buy food that gives rise to this.
I am vegetarian and therefore have no meat or bones to dispose of. I sometimes eat fish but only at restaurants for the specific reason of not having to deal with the skin and bones of the fish.	RDN Zero Waste Program	I used to collect food waste (bones / meat etc..) and take to Gibsons recycling. They no longer accept it - so back to the garbage
I sometimes burn it.	DB green waste p/u	See note above...same answer.
Drop off at Salish	Dogs	We eat or compost all but the bones & the occasional bone goes in the garbage.
Some are used to make further meals, like bone broth.	Garburator	Used to drop off at recycling centre, but they no longer take it
Salish soils	Meat and bones go in garbage. Very little food waste, so not an issue.	Want household green buckets for all our condo units and each take to Salish soils.
take materials not suitable for compost to City of Vancouver's food bins where I work	Only represents a very small portion of our garbage--which itself is very small.	We have very little of this.
Used to drop off at depot - now transporting into Vancouver weekly and put in organics bin at work	Green bin pick up	My resident raven gets a few scraps too
Have very little leftovers with food costs these days - anything left goes to animals	We have ample space so meat/fish overage is left out in morning for ravens.	Drop off at Salish Soils
sechelt green bin pickup	Garburator	I'm part of Davis Bay curbside pickup pilot project.
Garburator	We eat vegetarian so there are no meat, seafood or bone scraps.	Feed to chickens
green bin	Single person semi-veg household with composting so way less than 1 l. per week now.,	Salish Soil
chickens, in winter thrown in the fire we have going for heat	We're vegetarian -- bread, dairy, seafood scraps, cooked food, gets buried deep into the little urban veggie patch year-round.	We compost bread and egg shells
Sometimes I flush soups or other more liquid foods down the toilet if they have spoiled.	Feed to animals	Some goes to the dog
see above	I put it in my green bin that is picked up weekly.	mostly the garbage, but some for some animals when practical/appropriate.
Green bin pick up Davis Bay	Everything pretty much goes down the garburator except bones.	eat everything and anything spoiled is fed to animals
I would like to have these composted, but would not put in mine because of bears.	same as above	Vegetarian household
Dogs get what is still good	feed crows	Bones - an increasingly vegan diet diminishes this too - go into the garbage.
green bin pu in davis bay	Davis Bay green bins	2 med. size dogs

Davis Bay organically pilot	pickup green waste	Green Cone not installed yet.
Burn on woodburner for items which would smell in garbage in winter and double wrap and store in garage garbage can until pickup day.	I do try to compost some, make greens into a bucket of garden compost tea.But again, no composter, no car.	we have dogs who love some scraps and then we freeze the bones to burn on a once a month bonfire. when safe to do so. Or Gargabe
Mostly vegetarian but return seafood scraps to the ocean. I don't throw out food.	Green bin	Feed to chickens
See 2 above.	Feed to chickens	feed to dogs
Took it out to Salish Soil	indoor electric composter and jora composter	Burn some bones
Davis Bay pick up	Feed the birds, flush	burn in my woodstove and use the ash in my garden or down the toilet if not too big
See above	Used to go to Gibson's Recycling before the grinder was broken	To the chickens
Feed to my dogs.	place in the curbside pickup bin - easy to follow program. love it!	Dogs. The rest goes in the freezer and then garbage on pick up day.
We have a large number of birds: crows, ravens, etc. That help themselves to food scraps from the compost.	2 large dogs eat left over edible food	Green bin
no bread waste, dairy if any goes into septic, seafood goes into ocean, dog usually gets the rest, only non-edibles hit the garbage can	Sechelt green bin (Davis Bay)	as above. Sometimes I flush it. Not bones, though.
Gibsons Recycling no longer accepts this material.	Dog	Green box Davis Bay
Depending on the scraps, our dog digests some of them / We put bread products in the compost	again, some compost, some garbage and some to the dog	We have a bear
most in composter but not oil or bones. they go in garbage.	Burn fish bones and prawn tails in the wood stove.	Meat in garbage
Pick up in Davis Bay	chickens	Drop off at Salish Soils
Compost pick up	feed crows	I am vegan so there is only veg matter to compost - I never waste food - a piece so stale bread would be fed to my dogs!

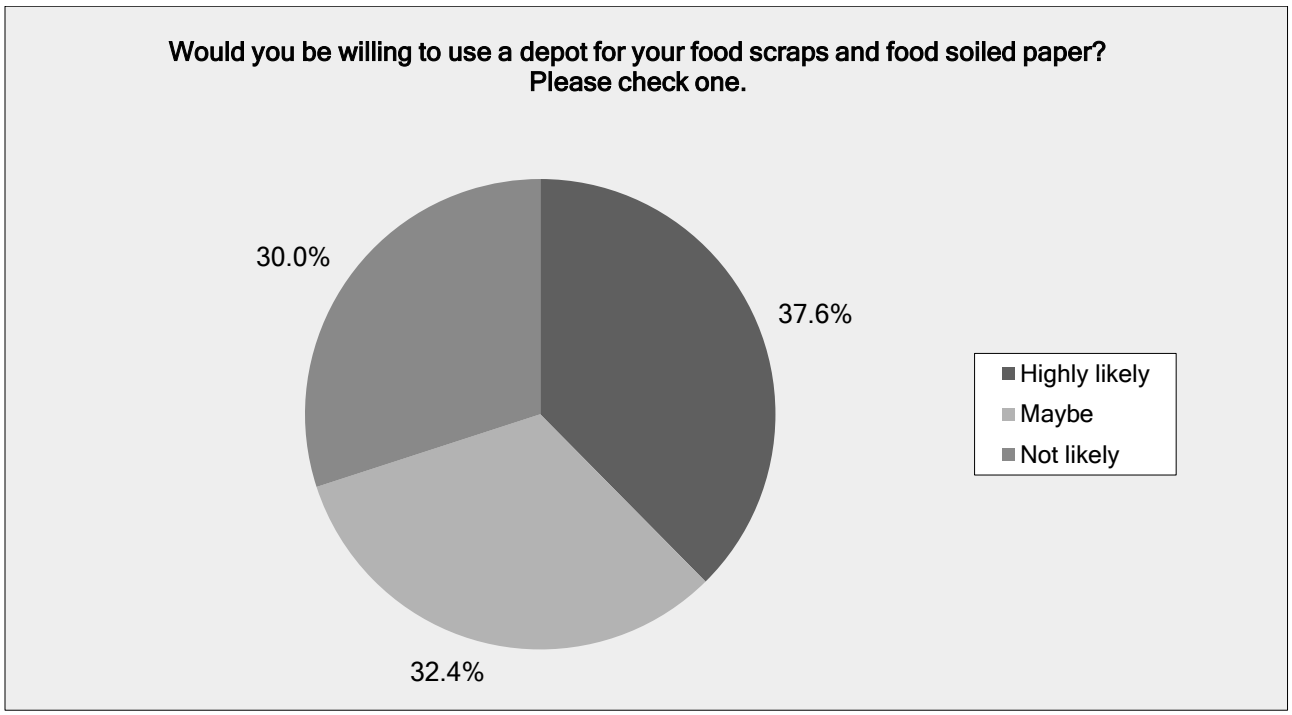
Question #5:
Do you use a garburator for your food scraps? Please check one.

Answer Options	Response Percent	Response Count
Yes	6.1%	41
No	93.9%	632
	answered question	673
	skipped question	0



Question #6:
Would you be willing to use a depot for your food scraps and food soiled paper? Please check one.

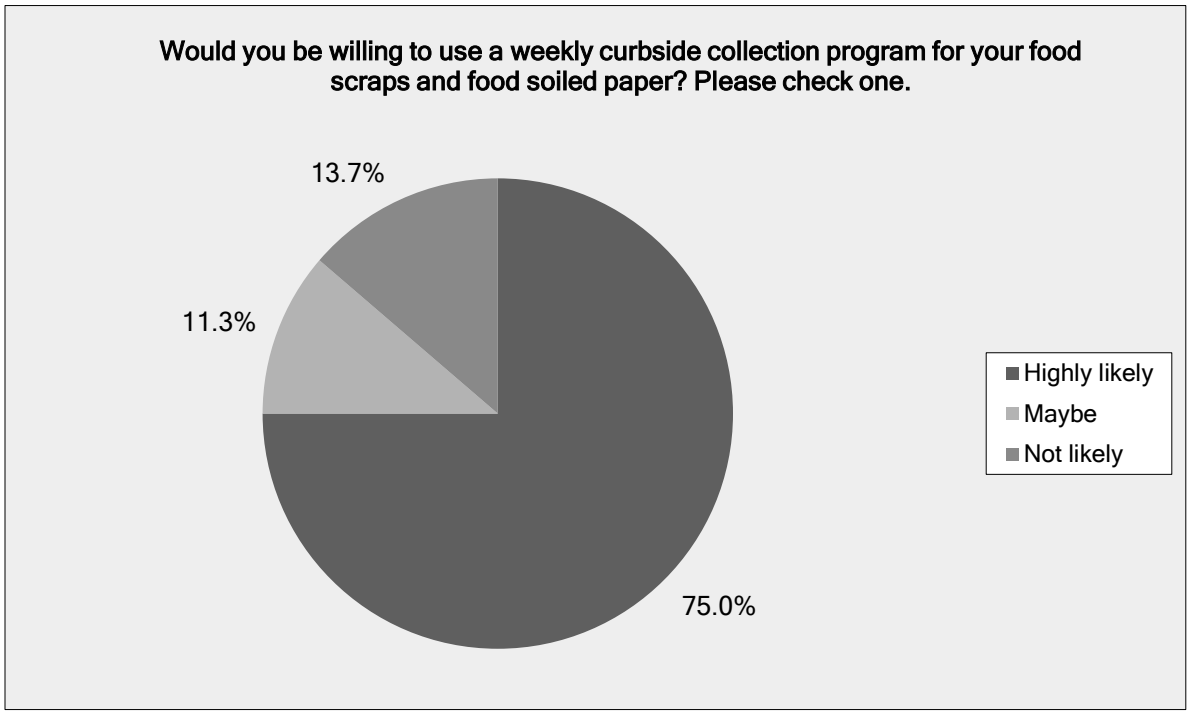
Answer Options	Response Percent	Response Count
Highly likely	37.6%	253
Maybe	32.4%	218
Not likely	30.0%	202
	answered question	673
	skipped question	0



Question #7:

Would you be willing to use a weekly curbside collection program for your food scraps and food soiled paper? Please check one.

Answer Options	Response Percent	Response Count
Highly likely	75.0%	505
Maybe	11.3%	76
Not likely	13.7%	92
	answered question	673
	skipped question	0



Question #8:

Do you have any concerns with the idea of collecting food scraps and food soiled paper at a depot or curbside? If so, please list here.

Answer Options	Response Count
	462
answered question	462
skipped question	211

Question #8: Text Response.
Creating new problems ie animal attractants, transportation costs, lack of personal responsibility for our own waste
No concerns, great idea.
I am willing to follow the above only if it doesn't cost a lot. I used to drop off leftover raw food scraps at the recycling depot in Gibsons but they are closed door. I freeze other food scraps (meat etc.) and on garbage day put it in the garbage.
No
Need curbside green waste collection.
Some concern with curbside if people put container out the night before (same as with garbage). We drop garbage off at transfer station.
Depot - good. Curbside - not good, not enough waste to justify cost; concern with animals getting into it.
Sudbury ON has a green waste program that supplies people with kitchen counter-top bins and certified biodegradable insert bags. Please, allow us to compost this way in the curb-side pick up locations.
No concern. This is a great idea!
Attracting wild animals if ppl put bin out night before. Also, lack of space for extra bin in garage as we live in a townhouse. (When I lived in Langley, we couldn't just use a small bucket...we needed to use a full on garbage can, even if we had a litre or 2 of compost).
Yes I am worried about the bear, raccoon and rats. I don't want to see them led to the neighbourhood anymore than they are. Perhaps there could be a separate garbage bin for garbage day that could be used to separate and recycle the contents? I am sure there is a solution.
I am concerned about insufficiently responsible maintenance and operation of curbside collection being a vermin attractant.
Bears, raccoons, rats.
Even Toronto and the small towns surrounding has curbside pickup. With all the wildlife around us, it seems crazy that we don't have it here.
Bears and other wildlife.
Cut side is much preferable
Bears! This should be an obvious one. I also object to being told how to conduct myself on a daily basis. I am an environmently conscious person and I willl do what I choose with my trash. I don't need to be dictated to.
Issues with animals, bears, dogs,etc that may be drawn to this waste on the street.
It should not be necessary to collect garbage weekly. Just put food scraps in bag in freezer till garbage goes out.
Bears, raccoons

wild life (ie: bear attractant) and bugs
The problem with living in area B is it very far for us ti bring things to the depot. We cannot leave things outside because of bears . So the only option for any garbage is to put it out only on that one morning the day the garbage truck comes. Having to drive so far to a depot to recycle is not energy efficient and is inconvenient . I would not want to drive to sechelt to drive food scraps : and I am worried about a pick up of food scraps being on a different day or time than the current garbage pick up . We have weekly problems as it is with the system with dogs birds and bears . I do not want the extra cost of a separate pick up service as our taxes have gone up in the past year and I do not want another increase due to this . Thanks
Trouble with backyard composting, rats, mice & elephants
i do not care to pay taxes for this service in roberts creek
I would like all green waste picked up at the curb
The depot would depend on where it is located.
Bears and animals attracted?
Depends on collection containers. Need to be animal and bird proof.
For curbside I would be concerned about attracting bears and other wildlife. A suggestion is instead of individual household green waste bins the local governments could install large bear-proof neighbourhood bins (one per ?# households) where people can bring there garbage: e.g. http://tyedeebin.com/purchase/tyedee-bin-citee.html. Maybe these could be located next to the community mail boxes in rural areas for easy drop off.
None!
We don't use a compost due to bears, racoons and other rodents, would like a compost curbside recycling program
Curbside collection would attract bears, raccoons, and the like. Not a good idea.
It is a worthwhile proposal but home composting should be the main push.
bears, rats, where to store until pick up day that won't attract critters or stink up my home.
Bears, raccoons, rats and mice, coyotes and wolves in our area make this idea untenable. Most homeowners would not have secure facilities to keep wildlife out of scrap bins.
What kind of container would it placed in to not attract animals before pickup?
No
Please don't force any more mandatory programs. If it is optional, fine but not forced.
Bears
We have way more recyclables than food scraps that are not compostable. We drive a 1 hour return trip to drop off plastics, papers, containers, etc. Think of all of the cumulative greenhouse gases created by our and others fuel plus our time. Everyone is ageing and it is difficult to recycle as much as we'd like. There is no private recycling service available here that we can turn to. Can you imagine how difficult it is getting to the Salish Soils depot if you don't drive and have to take transit or Handidart or ride a bike with your bags of recyclables? A very long time ago everyone took care of there own garbage then the local government decided to bring in curbside pickup for garbage. Yeah! At that time it included what we now know are recyclable items. Why does the knowledge that an item is recyclable make it disqualify for curbside pickup? Why can't we alternate week-to-week with garbage and recyclables curbside pickup? Or at the very least why can't the SCRD provide recycling depots within a 15 minute walk of each of its 1/2 acre, or less, residential property clusters. Lets really GO GREEN!

Bears and other animals being attracted.
Not if it is placed in tightly fastened containers, otherwise it would Only if it is not placed in tightly fastened containers, otherwise the odor would attract animals and it may end up strewn all around.
People attracting rodents, bears by having the container outside.
Cost of curbside pickup is prohibitive, considering that alternatives such as on- site composting exist.
Concerned over costs to taxpayers and attracting bears and other animals.
Yes, attracting bears and raccoons even left out for a short time.
Bears and other animals
More likely to do it if its curbside. I would also like to see curbside recycling across the whole coast
Wildlife especially bears is my only concern. If the food waste is not collected responsibly it would be a big attraction to unwanted wildlife.
We just started composting at our business and we are diverting tons of compost from the landfill
Yes animals
Curbside pickup would be great for all compostables. Can't compost now cause the bears are here
Used to live in Coquitlam and had a green can program. Was fantastic. Love this idea!
Only that it's not mixed with other recyclables.
Only concern is wildlife but that's what garages are for right
with curbside, impacts on wildlife, specifically bears. Unless we have 100% compliance with proper methods, bears will inevitably get into food scrap bins and become habituated and ultimately killed.
It's not always convenient to get to the depot on a regular basis. Curbside pickup could be a problem with bears as we have a bear that walks down out street into lower gibsons daily
Just when
Yes, it will attract bears, coyotes, racoons and all the wildlife!
Yes the Coast needs curbside recycling first!
No
Bears,raccoons,dogs and crows.
Smells and deterring animals
I would be concerned about attracting wild life such as bears and rodents with curbside collection
I think door to door pick up is the best idea. A drop off in Halfmoon Bay would be great, but having to go to Sechelt is very inconvenient. Much like it is with recycling. But at least with recycling it doesn't rot, so it can be kept outside.
Yes
Cost of collection
Curbside collection may attract bears. They already get into the garbage.
Yes. This stuff attracts rats, raccoons, bears and wild life
Proper monitoring of people who place garbage out in improper non-animal proof containers.
Nope what so ever
Bears
I live in an apartment building, there is no recycling. I also don't drive. You make recycling really difficult in these situations. Couldn't keep smells in building, so in the garbage it goes.
None
Would it affect weekly garbage pick up.?
Provide animal and rodent proof collection bins. Encourage people to still backyard compost Pickup food scraps on a weekly basis and garbage biweekly. Charge for garbage pickup and not for food scrap pick up

Curbside recycling YES. Other recyclables is far more of a concern than organics recycling. We live in Halfmoon Bay. Takes about 1 hour of time and driving a car pollution to take recycling to Salish. I bet many seniors, rather than drive, put Salish recycling into the garbage for Sechelt landfill. If you want to divert recyclable garbage from the landfill , look at NON organic recyclables. I would be willing to pay a little more on our annual utility bill to pay my share. You Never ask what we would be willing to pay for.
Too much wildlife in the area. There are already enough wildlife problems with regular garbage.
The bins are smelly and attract wildlife
There is a bear problem in Halfmoon Bay that isn't being dealt with. If curbside collection were to be pursued it would become a much bigger issue, as people wouldn't store their scraps properly and they would be difficult to pick up in time before bears become used to the idea. This could become a significant widespread problem if the Conservation department isn't involved now to deal with the bears that are already habituated to finding food in residential areas, even if no food is available.
It would be ideal if this was picked up on garbage day as well. I think it's a fabulous program and would help my family alot as we are over on our weekly garbage limit every week due to a large family, with diapers and regular household garbage.
None
For the same reason I don't compost....my concern is rodents in my yard.
I already compost most, garburator some of food scraps and soiled paper. I am concerned with animals scrounging curbside for food. I make sure my scraps are not accessible to animals. I don't want to pay more to have another collection method at curbside or depot. People need to become knowledgable regarding how to recycle scraps into compost.
living alone it would take to long to accumulate enough to make it worth my while to take it to a depot. I use the green bin and really like it.
None whatsoever. It's absolutely essential to stop this ridiculous waste of precious compost.
Outside of all the known technical issues...
We must always be cautious about attracting bears, rats, and other scavengers.
No concerns. I envy communities that do. I don't compost because of rodents and I don't like depots. I love my blue bin and I want a green bin and an willing to pay for it. Go to bi weekly garbage collection to offset the cost. With no food to go rotten, I wouldn't need my garbage picked up as often.
There should be no extra cost to the homeowner. I make and use compost from my scraps, I do not want to give away my compost and then have to buy compost from somewhere else to use in my yard.
smell? rodent attractant?
Food scraps are probably the worst material to have to transport to a depot. Beyond the committed, how many would chose this. Collection in urban areas and nearby depots for rural areas is the way to go. Get on with it! This decision has been avoided for far too long.
none at all, its progressive. do it!
Present system works very well. Take yard waste as well as food scraps etc.
No concerns.
Depot is not convenient - having weekly curbside pick up preferred. Backyard composting not possible because of bears. Green bin works very well. Fortunate to live in an area where green bin service offered.
Attracting rodents, bears, raccoons, crows, eagles at curbside is a big concern.
Just don't want wildlife at risk because of people's stupidity. Should definitely be a bin that is animal proof like the new garbage cans at Davis Bay beach and the duck marsh.
Absolutley not worried. Awesome
None
Storing until collection day. Encouraging wildlife. Probably would not use depot because of necessary drive.
Odours in bin til pick-up. Bear attractant.

Of course curbside collection involves securing such items against animals which is already a problem with the garbage collection. I have tried putting a stick through the handles of my garbage can, which does work, but seems to offend to the extreme the garbage collectors! I have even stayed at the bin until it is collected to explain why I do this, but short term memory seems to a problem for this person, as now the sticks are left broken in half as if I can't find another. But it is high time we lived up to the mindset of the Sunshine Coast and did more to recycle and reduce our garbage and throw aways. Thank you.
Yes, attracts rodents and insects. Bad luck when utilized previously in the City.
would the curbside be critter proof?
No. Sounds like a great idea.
I would be concerned about bears with a curb side system. We already have bears regularly in our neighbourhood.
Curbside organic pickup I feel would get a much better response. The easier it is to do the more likely people will comply. It works in Vancouver.
Cost for curbside vs depot - not sure which would be more economical. Also, availability/cost for bear proof container to ensure separated food scraps don't attract animals.
Is this another service to increase our taxes and pay for hefty management salaries? Why don't you do a survey to reduce management and wages?
I have recently moved to the sunshine coast from a municipality with a green bin program and we were very active users of that program. By having a curbside recycling & green bin pickup we generated very little garbage per week (maybe 10 to 20% of waste went to garbage). Definitely would love to see similar programs here so as to increase our landfill diversion rate. I think curbside is much more effective for actual use, if we have to pack it up and take it to a depot (especially for food waste) we probably wouldn't do it as there is no easy way to transport wet waste in our car.
Need to be be bear proof!!
Bears, raccoons, etc. Could be problematic...?
Depot does not work if one does not own a car.
rodents
Bears & raccoons
Time of day as regarding animals and Crows.....What kind of container and how often?
Animal proof containers?
Would love if garbage and compost would be picked up curbside in Pender Harbour for free just like the rest of the coast considering we pay the same taxes
No concerns with dropping off at depot, especially if one is located in Gibsons. Not in support of curbside pick-up at all. The risk of attracting wildlife is too high, would not want bears, etc killed due to food waste being left out on the curb. It's bad enough with the people that don't secure their garbage right now, would be worse if people left food scraps at the curb for pick up.
The depot is close, but storage until we have enough to make a run attracts wildlife and pests. I would be very pleased to see weekly curbside pick up!
would prefer curbside collection
People don't want rotten waste in their vehicles, me being one of them. Curbside would be preferable and actually used.
food scraps attract animals
My only concern is that we are in a largly forested area and the collection of food waste at our house may incourage bears, wolves etc more then they already are. To have a space at the house where we could store this until ready for pick up etc could potentially cost us a fair amount of money.
Bears and wilderness in general.
bears, rats and other animals may make a mess with them. also concerned with rodents nesting/breeding at depot.
The cost! everyone who has the available property should be required to compost. We produce next to no garbage. Garbage pick up should be no more than twice a month. Get people motivated towards zero waste. I relize you cannot credit those who do not make trash, as you would have the white trash up here throwing their garbage in the forest which they already do. Put signs on the highway to encourage people to be responsible for their waste and more signs that littering is illegal and enforce the $2000 fine. Since moving here almost three years ago, I am surprized at how lazy people are here

about recycling and the like. In New York City, there are bylaw enforcers checking garbage and if you are caught throwing out recyclables you are fined. Thank you for reading and I will continue to try and inspire people to be responsible about their waste! Cheers
odour,rats,racoons, and bears will be attracted
Hopefully not paying for another bin
Is there an additional cost to our taxes.
Depends where it is located for convenience
As long as the pick up was a regular one as the storage of this is not always possible and therefore will attract wildlife and then sadly our wildlife will be killed.
No providing animal resistant containers used
If it's depot drop off, need to have several locations--coast communities are so spread out. People are less likely to use it if they have to drive far. ALSO please address garbage dumped in streams and trails. Surely we can make it easier/cheaper for people to dump their couches, tvs, etc. at the landfill rather than destroying our beautiful backyard!
If we did not have a functionning compost then I think the idea of a curbside collection program being a really good one. It would be great for more people to be more efficient with waste !
Depot..I wouldn't keep it around long enough...easier to throw out. Pick up..awesome...just the bears (of course) are a concern.
Wildlife issues if people leave the container assesible
Concerns with animals and garbage already. Cannot always be home waiting to catch the garbage truck. Any chance there will be a depot closer to Langdale - for non-drivers?
Only that people need to be well informed and animal aware. I've recently moved from Davis Bay to West Sechelt and I really miss the curb side pick up. My garbage is at least twice the size now that i don't have a compostible curb side pick up. We've thought about a backyard compost but we've seen a couple rats in the yard/ neighbourhood as well as a visiting raccoon every night so I don't feel comfortable going that route.
bears :-)
Food waste management is necessary for sechelt.
We lived in Nova Scotia and had curbside composting it is no big deal, but we didn't have bears. We also lived in a community in Ontario that provided heavily subsidized composers (similar to your toilet program) to get people started. This would be preferable to driving compost yo Salish soils. The majority of people will not be bothered.
Bears might be put at risk
None
Curbside is the way to go!
Yes, we have many wild animals roaming our neighborhood at night and early morning, and sometimes in daytime hours.
Storing foodscraps such as meat and bones might be smelly and unhygenic. We already have so much trouble with bears in fall and having to keep our garbage stored indoors somewhere it wont stink. Seems like this will just be an extra thing to deal with.
Only concern would be people not freezing their food scraps before collection. A question I have is why has the gibsons recycling food scraps collection stopped and had very few people using it?
Potential smell. Attraction of flies/insects
in Davis Bay pick up is weekly, I use my freezer to make it thru the week, as we cannot leave compostable matter outside, as bears and rats do abound. Weekly pickup is required
The only issue I see with curbside pick up is the likelihood of animals making a mess
Bears and raccoons
I'm on disability and can't afford to buy one of the containers for under the sink to put the compost in. Since I rent I wouldn't have access to the main bin until day of.
Bears!!!!!
Pick up on same day as regular garbage would be practical.
animals

Would have to have animal proof containers. I have no enclosed space to store until pickup. I am much more likely to collect food scraps if there is curbside pickup, and would be willing to (actually would expect) and increase in fees.
We already have a bear problem , this would only provide a large meal train , I see a very large problem happening with curbside drop off.
Must provide a vessel that is easy to clean, rat proof
Lots of bears, raccoons, crows, etc in W. Sechelt - would need to be animal-proof. Vancouver folks worried about rats for same reason...
None! The sooner the better!
Worry about rats
Maybe we could combine green waste and recycling together for the areas that dont have curbside recycling pick up along with green waste.
Curbside container should be suitable for holding food scraps for one week before becoming 'smelly'.
Far too expensive plus since we rarely have anything for this kind of pick-up we would be paying more than 95% of our share of the cost!!!
Bears, Raccoons, Ravens and Crows
Curbside - animal problems
Garburators cannot be used on a septic system which the vast majority of the coast is on so why ask this question? You would think you would know!
Multiple units (100 units) would be a lot of food but our garbage contract truck could add two big green movable carts to be picked up on days that our neighbors are serviced.
We have bears, coyotes, rats raccoons. Raw food would be an attractant. I would prefer a dept for such things rather than curbside.
yes rodents and insects and odors not a good idea for this community
I do have concerns about home composting - it attracts bears and especially rats, no matter what good intentions a homeowner may have, rats are always present.
I would be concerned that it would attract dogs, bears and coyotes, which would create a potential danger and a mess
Bears will create a mess
Attracting animals. We have bears and raccoons that are a nuisance WITHOUT curbside pick up.
Attracting unwanted atrention from animals (rats, mice, bears) as we live next to the forest. We already have a rat problem this year, so having more food waste around will only be more attractive.
I don't want to have any service that is going to increase our taxes. Use your energy to get the water situation fixed. I am tired of government interfering in my life.
I do not want to pay for curbside pickup. I have minimal food waste after composting - perhaps as much as a cup a week at the most.
1.Attracts wildlife 2. Cost
Great program for town and apartment dwellers, but I live on ALR acreage with marginal soil so all my compost goes towards soil building.
Curbside is great, had it in North Van. A bit worried about animals but if we knew what day/time to expect pickup it would be amazing.
We already drop off at Salish Soils and have been doing so for over a year. It is fine but not as convenient as curbside pickup. We are in Tuwanek, which is very rural and so I would be a bit concerned about wildlife getting in to curbside bins so they would have to be bear-proof and raccoon-proof. Otherwise no concerns and we would be early adopters!
I 100% support diverting compostable waste from the landfill and making it as easy as possible for others to do so.
curb side you bet- the animals (bears, racoons, birds)
good idea - maybe subsidized compost units could be provided as well?
Vancouver and the North Shore has an amazing model of green bin and recycle weekly, and garbage bi-weekly. this service needs to be extended up the coast. it is truly sad to see we have garbage pickup but not recycle pickup in halfmoon bay and north.

collection should be weekly, containers should be vermin and large animal proof. containers only to be set out morning of pickup, not left overnight.
Smell, therefore can not keep indoors. Rodent, Bears and Racoon attraction outdoors
No concerns with curbside and thankful to be part of curbside pilot in Davis Bay. No problems with program from my point of view if bin is only out on collection day (manage wildlife issues). I only wish processor could manage pet waste too. I value having a finished compost supplier in my community - great for gardening and soil building. Pleased to see SCRD is investigating ways to manage landfill emissions and future costs (environmental, social and especially financial) of landfill expansion.
Wildlife. I'm afraid that composting or curbside collection would attract the local bears (we had trouble all summer with 4 different bears two years ago - it was so bad that we had to wait until we saw the garbage man or right before his regular pick up to bring out bin outside). Raccoons are another issue.
The depot would be much safer for the bears and cougars, and raccoons as they're at risk from continued interactions with humans and vice versa.
It needs to to be kept secure from bear and birds and must have a good secure lid.
None. It would be amazing!
No concerns
Curbside containers would need to be animal proof and not put out until the morning of pickup.
In condo complex so communal setup might work but not taking to outside site.
I've heard that the city of Victoria has had a lot of trouble with their food waste collection and composting program. Many complaints of smell.
Rodents, bears, coyotes, dogs, messes that people won't clean up, the extra work to keep a composting system clean in my house, the extra work I'm not compensated for (read DO NOT CHARGE EXTRA because I'm already washing my garbage and sorting it and driving it to the depot for recycling while caring for a senior/children), the extra cost in $ that the SCRD plans to charge. I'm already close to giving up recycling because I don't have the time or the energy. You're making this too hard.
Animals getting into the containers, attracting bears/raccoons/rats
Curbside will bring animals out so, if there was a way to eliminate that then bring it on! If there were public bins to drop off at if we had a mini counter one, I would gladly do it!
Curbside collection would be great, and it may attract wildlife!
It's a Great Idea who knows we might make the news for being Greener
Only that it should have started here years ago! I'm from Ottawa where they've been collecting food waste for a central composting program for over a decade. It meant we only had garbage pickup every other week and often we didn't even have a full can. But here you will need bearpoof containers for people to use. Here We've been freezing our food waste before we take it to depot. That might be something you could have people do, and just put out the containers w frozen waste on pick up day.
Only concern with curbside collection is the bear community; we've had a few visitors over the past month. Besides that, any effort to increase compost on the coast would be sincerely valued!
Wildlife
Worked well in last place we lived. Depot would mean longer storage at home- more risk of bears, rats, smell. Curbside was great.
our friends in oakville, ontario say that food scraps get collected along with recycling more frequently than garbage service. it has been working well there for a number of years. perhaps their system would be worth looking into.
Attracting wildlife, bears, raccoons, Ravens.
Bear safety. Would need to make the containers bear safe. We can keep them locked up all we like, but on pick up days the bins are curbside for hours. A lot of people have to put bins out early before going to work
Frequency of collection, attracting pests
More in favour of curbside pick-up for convenience's sake
I am disabled and cannot always make it to a depot so a curbside program would be great!
Curbside collection will just attract rodents and animals to the street. It seems the Board is not going to any depth in your discussions anymore - very disappointed and next election will reflect the level of dissatisfaction in the community.

Curbside is an idea that I have been waiting years for... But just recently I've heard that in some communities they've diverted so much food/green waste from the landfills that now they aren't decomposing properly and we're ending up with plastic mountains... I'd like to know long-term plans and understand the big-picture thought processes. Without food in the landfills, how will our eagles, bears, crows, ravens, etc. be affected?
you should be encouraging less waste and packaging instead of looking for ways to increase taxes by offering this bull just another way for the scrd to pay for politicians and biggy wig staff salary increases
Rodents
The bins for collecting become a disgusting maggot infestation unless properly cleaned on a regular basis. I lived in Ottawa where curbside household waste was implemented and saw the effect of unclean bins 😷 I backyard compost but have a large yard so the rodents it attracts aren't too close to my living space. But that is a huge concern for most backyard composters here on the coast. If it had to be closer to my physical home I may have to reconsider using one due to rats and other creatures.
Summer collection needs to be frequent (at least once a week). Education about management of food scraps is important to minimize smell, especially in densely populated communities.
Yes to a municipaly owned and operated service finance suplimented through municipal taxes and generated end-sales of composted product - soils and soil booster...providing less expensive soils for backyard gardeners.
OK in the winter maybe but with the Bears definitely not. I would love to be able to drop it off at the dump in our area .In England they compost at the dumps then sell it back at a good price.
Any containers for scraps of meat get increasingly smelly over time, I'm curious how much tax will increase in an effort to make this an efficient service when an everyday drop off would be a better solution. I heard there is a group called urban prospectors who know how this can make a profit.
I wish I could compost. I feel like most of our garbage is food scraps. I've purchased two bins for the backyard and followed all the guidelines. It still attracted racoons and bears. (we live close to the forest edge in Wilson creek) I don't feel that I can do backyard composting since our cat was killed by racoons. They also attack the dog often. Also the bear destroyed our bins.
Curbside Concern: birds, coyotes, bears
I think good for those without a yard for composting etc. or health doesn't let them do so. I freeze the smelly garbage so not sure how that will compost afterwards; otherwise, no real concerns with the idea.
I would love it if they picked up in our area
I wouldn't want to pay for a service that I didn't use.
why bother
I am concerned about attracting animals.
Would participate in depot drop-off for organics if it was easily and centrally located in Gibsons area. I will not drive to Sechelt to do this. Depot must be centrally located and accessible via transit and for those with mobility issues. Wildlife - needs secure containers. Smell.
Curbside yes!
No, but depends on how frequent the collection will be if at curbside.
Yes, attracting critters during times before pick-up.
Perhaps timing pick up for late in the day would make it less tempting to people to put out the night before and thus reduce the risk of attracting vermin, bears etc. Dropped food scraps off at Gibsons Recycling Depot until discontinued. Started backyard composting since.
Concern for curbside is bears. I am entering what I am doing since the Gibsons Depot stopped accepting organics.
We live in a townhouse strata and it is not likely that curbside collection would work. There is a communal garbage container that is used and individual garbage cans are not picked up.
Attracting wildlife.
Depot would have to be an easy process or people won't use it. Curbside I worry about attracting bears and dogs and having to clean it up when they knock it over.....and i worry about making animals sick from eating it

Yes. Wildlife Attractants (Bears). The District of Sechelt Bins were not certified bear resistant; they also smelled by the second week as most people do not bother to clean/deodorize their containers. Please reconsider using bins that are appropriate to use in bear country.
No. We lived in Surrey and they do curbside collection and it was great. I don't like backyard composting with food because of the bears and other animals it attracts. Please get us a curbside program
There is a lot of wild life in our area. Bears, coyotes, raccoons. Would the means of collection ensure animal proofing?
Rather than curbside pickup I would love to have a proper composter in my yard. Either a significant discount on one or some other purchasing incentive from the district.
No concerns let's do it!
YES!!!!!!!! Outdoor composts in our area have attracted RATS!!!! We do not want rats!!!
Attracting bears and raccoons.
I would be blissful if we had curbside recycling of any kind but especially food waste. I get someone to pick up my other stuff for a small fee. The problem with once a week collection of food stuff is that it stinks to high heaven by the time it's collected. It would have to be twice a week for it to work. A depot would not work for me.
Already doing it, model customer! I freeze stinky stuff untill my pick up morning. I keep my raw organics for my own worm compost
Animals are always a concern, but certainly not insurmountable - lots of other communities serve as effective examples of composting in a way that is bear aware! I'm a huge supporter of this idea and sincerely hope it happens!
As long as it does not increase my taxes then no.
Animals in containers
No I would really like to have this service and would be okay with paying for it
None. Very excited about the idea!
No
My concern is "why" in Halfmoon Bay we don't have regular recycling pick up, and yet you want to explore this type of recycling? I do recycle, and take "everything" into Sechelt. If this idea is put into place, I would like to see this in Halfmoon Bay as well as "regular" recycling pick up! It's time.....
My only concern is that storage containers for curbside collection be animal proof, otherwise let's take a step into the future and get this program up and running . ASAP
Excellent idea! We don't have the time/energy to have a compost bin, so curbside collection would be an excellent way for a busy family to go a bit greener and contribute to less landfill.
I freeze all foods like meat, and food which would start to smell before placing in garbage on pickup day. My concern would be animals getting in and starting to become a problem in the neighbourhood.
No it is great. We need curbside recycling in the scrd is it a descrace that we do not have recycling pick up in 2017!
Wildlife getting into curbside bins, but we would likely freeze food scraps until pickup day. Guidelines/suggestions on how families can manage this would be appreciated.
Not at all, we welcome the idea and would be immensely pleased with the curb-side program as is being done in so many other communities. Thank you.
No
I would only consider using this service if bear proof containers would be provided.
Needs an educational program that is aimed at a wide variety of households, from those who are waste-savvy to those who hate the idea, and using multi channels of delivery. The sessions that were held a couple of years ago on knotweed were a good example of waste - only those who knew a fair bit attended, and the presenter knew much less! For success, you will need to reach far more people in meaningful ways. Team up with likely adopters - botanical garden, garden clubs, service clubs, elementary schools (so kids can teach their parents), ask for local volunteers in the way Block Watch can work, so their is an expert down the street when needed.

Otherwise, might as well forget it.
Bears, one of the main reasons we stopped composting food scrapes, and no we did no throw bones,meat etc in!
No concerns. Think it is a wonderful idea and would save on the amount that goes to the dump.
Would it be a community collection box it is sealed to protect the Bears from getting at it? Maybe with a number code to unlock it? We need to protect the Bears number one, and of course We do not have enough waste from my husband and myself to require our own compost bin.
I tried composting in my backyard but all it did was increased the rats, bears and racoons. If i had curtsied pickup i would probably go for that. Otherwise i will continue to use garbage
I worry a drive to a depot would deter me. It's one thing when my recycling become a mountain, but if my food scrap heap got too big and smelly I might be tempted to throw it away rather than make a specific car trip.
No as came from an area that had curbside pick up and it was excellent
No concern, I think It would be great to decrease garbage amount. PLease do it.
Curbside pick up has more likelyhood of attracting animals. The bins provided for this service will need to be animal tamper proof and plenty of information about placing bins out the morning of collection provided, so as to keep the animals safe and wild where they belong.
Curbside worries me that bears would be attracted. We had green waste pick up in White Rock years ago. - I have been here 5 years and can't understand why things are so slow to happen.
Because we have wildlife that larger cities do not, I suggest that people(especially restaurants - it was required in Burlington, On.) freeze their organics and put it into the bin in pick up day. Or you try to establish a local drop off i.e. schools, rec. centres, post office. Places people frequent so dropping it off wouldn't be a hassle.
I think its great...but we need curb side recycling more!
Container and having it animal proof but picked up
bears
Wildlife scavengers
Animal attraction
I think more people would use curbside than a depot, and thus I would support this initiative.
1. Cost (transport expenses, wages) in rural areas 2. Potential raid of food scrap stash by birds, bears, deer, racoons 3. What will the SCRD do with the scraps? 4. SCRD should help people access composters & education so residents can do it themselves.
No
I worry that having a compost or green waste container would attract too many animals and I am not prepared to deal with that.
if curbside, mostly animals getting into it and spilling it all over.
Bears, ravens, ect. I'm sure the danger of those differ from more to less dense areas of the coast. Do other semi rural areas have curbside composting or just cities?
Would this be a bear attractant?
Time consuming. Inconvenient. Curbside or Deucalion on how to create your own compost if you have space and also in order to avoid attracting animals such as bears.
Attracting bears
Coming from Ontario we were accustomed to doing this both in Toronto and in the small town of Midland. We also had extensive curbside recycling. We were surprised Sechelt was not as progressive. Please work on this, so important to get people to minimize garbage by having excellent systems in place for organic waste and for many kinds of recycled material.
Definitely a curbside program with critter tamper-proof containers! I hate throwing out this waste in my garbage! Not keen on transporting smelly, wormy compost anywhere in my car though.

No
I've heard you may alternate pick ups of garbage collection one week with to green bin pick ups the following week. This can be an issue when/if people are away on pick up day as they then are waiting almost a full month between pickups (of the one they missed).
This is would be amazing! We have too many bears to compost in our yard with out an expensive lock box. I would love to be able to compost. It is a large portion of our current garbage. This is important!
If you ask people to go to a depot, there are going to be people who just don't do it. Upon moving to Gibsons, I was surprised to learn that there was no organics collection, being in such an eco-conscious area. It only makes sense to have curbside collection.
It will be breakfast time for the bears, raccoons and other critters in our rural area by leaving food in unsecured containers in early morning. Better to subsidize home compost bins for home composting.
On a bear run I am fortunate that I can wait u too I hear the truck before I run out but I'd hate to start seeing overturned bins and food distributed without being able to be properly cleaned so we would need animal proof bins the ones with good clips there's bear teeth in ours but he hasn't opened it lol
Cutbside compost pickup is a great idea. So many other citites/areas already do it. This would be tax dollars well used.
Stinky bins will attract bears and other animals, but best practice (freeze scraps first) should mitigate the problem.
Expensive. Bad idea. Mess. Pests. Attracts wildlife, nothing but expense & headaches, forget it. Completely against it.
Animals getting into it, dogs, crows, bears
Animals, bears, if it was instead of regular garbage pickup, summer heat, animals
Animal proof containers
Curbside would be so much easier. My food scraps go in the garbage when I'm too busy to get to the depot and my buckets are full.
Bears and other wildlife, smell.
Pretty please curbside! It will be easier for seniors and young families participate. I would definitely pay more taxes to pay for that.
Bears and other wildlife.
Why hasn't this happened yet??? We are trying to be a green part of the province this should've happened before. Same with recycling.
not unless it was animal/rodent proof. otherwise, it will attract rats, mice, animals which there are plenty already. i use my food, grass clippings leaves for compost as i rely on my veggie garden for food.
Animal proof containers that block smell would be essential to the program.
Just bears??
Attracting unwanted wildlife
I would not likely drive to a drop off location with food scraps.
I've been waiting for this programme for a long time. It's dearly needed. I just want to make sure the containers will be wildlife proof.....
Wildlife attractant. Depot is fine, but is another effort in an already busy schedule. Pick up would be great and I would use it, but residents would need specialty bins to keep out animals
I would be concerned with animal welfare. Leaving compost out would attract animals thereby creating a larger problem. Animal proof bins may be a viable option.
A curbside option could attract wildlife that could damage the bin, make a mess and cause unwanted animal-human conflicts. Multiple drop off depots may be more economic and safer for all, although more inconvenient for some.
I used to live in Langley BC and their curbside food scrap collection worked wonderfully. I am excited at the idea we might have a similar program here in Sechelt.
I just bought a house in Halfmoon. Am moving from Gabriola Island. The Nanaimo Regional District contracts with Zero Waste. Absolutely great program. The amount of my garbage going into the landfill has honestly been reduced by 80%. Everything else is recycled or composted.
Bears

Happy to do it, but need to be able to drop off either where I drop off my waste (bin at Langdale). I don't always drive up to recycling depot (recyclables can wait longer than food waste). If you make it convenient--including for residents of Keats and Gambier Islands--people will participate.
I guess it depends on how it is processed and what is done with it afterwards.
No
Curbside pick up is great. Grayco disposal is doing a really great job and I hope it continues on this program
I will never drive to a depot with food scraps in my vehicle. Curbside is my choice. Secure containers are a must. Crows and ravens are tenacious scavengers.
Not always home to put out the compost.... So if that was the only option for disposal it wouldn't work for recreational properties
Wildlife magnet
Bears and other wildlife. The bins would need to have appropriate locks, curbside would be best if you want people to do it.
I don't think curbside organics pick up is the answer, needs to be more community neighbourhood based.
Sounds like a hell of a good idea!
Is curbside feasible, will the bears wait
Too many bears on my street
curbside I'd worry about bears attracted to it.
Would like to collect mulch for gardens at community landfill station
Attracting wildlife, odour concerns.
Curbside collection for food scraps attracts crows, ravens, bears
Great Idea!!
Yes, bear/raccoon attractant. Even though they may not get into bins - I'm worried the animals would be attracted to the area.
Those collection containers would have to be absolutely bear and rat proofed, otherwise the system wouldn't work.
Only concern is cost. I do not want to pay more taxes for curbside collection. Salish Soils sells the compost so I should not have to pay for collection.
As We live in a rural area I would have concerns about attracting wildlife with curbside collection
We have bears in our neighbourhood. We also have neighbours who are idiots and put their regular garbage out the night before garbage pickup instead of the morning of.
wild animals, but other than that I think it would be awesome!
animals - bears, dogs etc
Bears, of course, for curbside. As long as the collection times are reasonable and regular though, and the collection containers secure then it could be great. I don't think depot collection will be enough as we already have to drive in so much from Halfmoon Bay there isn't much incentive to add more things to drive in.
I would love weekly curbside pick up, but would bother if I had to take to a depot
Bears
No to curbside collection as raccoons, bears and other animals will be attracted to it and come to our neighbourhoods looking for a food source.
Bears, dogs and raccoons
Bears
having each resident take food scraps to a depot is very environmentally unfriendly re the carbon footprint. Why its taken so long for the district to conduct this survey and get a regional food scrap curbside pick up program in effect is unknown but it is ridiculous when most municipalities in the lower mainland have had these programs for many years. Lets get going!
Bear and other large animal attractant.
Bears, coyotes, and raccoons. What is your plan for all the compost that will be created?
Cost! I would not use this service enough to justify the added cost.

PLEASE implement weekly Curbside pick-up!
Bears
This will need to be done in animal-proof containers and hopefully any smells emanating from the containers don't attract animals to the roads.....
I think curb side pick up is wonderful. We are in Davis bay and have been participating in the sechelt pilot project and it is great. I produce so little garbage that I don't use garbage pick up any more. I bring a small bag of garbage to work every 1-2 weeks. It is a great program!
yes: how to prevent attracting rats, raccoons, bears
Making the bins wildlife safe.
It is very difficult to store these things in strata properties. We have spent approx. $30,000 at ours to make bear-proof garbage storage so that we don't have any scents attracting bears or other wildlife.
Just that containers are animal proof so wildlife can't get into them
I would rather ongoing community centre-like workshops- to learn how to compost appropriately so that I can benefit in my own back yard. To learn proper and beneficial gardening, harvesting and canning and so on and so forth. A small price to pay vs increase in annual taxes to afford this service. Rather than my land taxes go up to provide this service and then have to buy back the compost to nourish my dirt to attempt to grow some vegetables... Give a man a fish and he'll eat for a day; Teach a man to fish, and you fred him for a lifetime. I haven't a green thumb- but I'd rather learn and reap the benefits of my own hard work, and share the abundance with my neighbours and community.
Not here, we have no such services; but in town I imagine concern would be about odours, vermin and wildlife.
Cost is always a factor as well as collection times, and enforcement of bylaws if people dont follow. Dont need more wildlife in my yard.
Bears at curbside. Thank you so much for looking at this issue!
I would be happy to pay for a curbside collection service for food waste
Bears are always an issue when putting out garbage roadside.
Yes, I would be concerned that wildlife might eat this food stuff if it was curbside.
BEARS!!!! (For curbside)
Bears and other wildlife getting into curbside collection. The smell of food scraps in my car if I have to bring it to a depot.
It's very challanging to store food waste in the summer. Can't keep it outside because of bears. Can't keep it inside because of bugs. Can't freeze it as my freezer is full. If there was a drop off close to my place that I could drop off for free that had long hours, I would try and use that.
The smell of keeping food scraps until I go to a depot will mean probably not using it because we usually only have time to go 1-2 times a month. Curb side pick up would be great!
No I think it's a fantastic idea!
I think a depot can be a problem (unpleasant and so unlikely for people to use). However, curbside has been common in most parts of the lower mainland for a couple years and highly successful. It was great!!
Bears, birds, raccoons, rats and time limits on working people being able to put out containers for pick-up early in morning before leaving for work, many hours before it gets collected. Limited weekend depot hours also are problems for working people. Consider current demographic data, (# people in households, # working people) and household dwelling unit types, (maybe 40% of Gibsons in multi-family units) in planning!
I am new to country living and am unfamiliar with how to compost correctly to not draw wildlife, and as single parent on disability; it would be nice to have some support/training/assistance to purchase or build to get things like this going. I recycle, almost everything I can, so would like to be able to compost as well.
Why should we pay for a service we don't need? We suggest a pay-as-you-go coupon system for those who are not fully committed as we are to managing their own food waste onsite. We do support a regional program, for those who want to access and pay for it. We have worked out a household food

management system that handles all our waste on-site in our small back yard, as well as small scale yard clippings. We also dispose of our dog's waste in a buried bin that fully composts. We are also very concerned that green bins will be a wildlife attractant in urbanized areas of the Coast.
Bears, another garbage can/wheelie bin to track up a long driveway.
I would happily pay a bit more in taxes to get compost pick up!! Love love love the idea.
Bears and other animals. Also storage. Where to store that is safe from animals but not smelling up the house
Would be a great addition to our curbside recycling program here in Sechelt. Would need less garbage collection then.
I think curbside would work better. I believe more people would use it. And no, there are no concerns
Money
I have concerns with bears and raccoons! As this is why garbage is always suppose to be inside it locked up how can an outside compost (without being metal and locked) be bear proof? Not too sure it can be. I have had compost bins before and the bears always win!
Garberator not a solution due to our septic system. Bears are a problems here re food waste.
I would like to do a weekly recycling pickup too
Bear safety. Could we have community bear safe containers at community central locations (eg at the mailboxes).
Do not like the idea of saving scraps until pick up day. Would rather have green waste pick up
I lived in Squamish and we had curtsied pickup there. It took a while for residents to learn to use the receptacles properly (and they should have been smaller than the garbage/recycling totes), but then it was great. Weekly pick up in the summer. Go for it!!!!!
No concerns. We have participated in the Davis Bay pilot program since it started and love the program. We have cut down our amount of garbage and we now rely on this service.
Concern that many will not be responsible with curbside and would be wildlife attractant. As well as failing to clean-up if disturbed or spilled.
The rat population will flourish
Animal attractant.
Animals are my only concern.
A good container, and timing it so it is not sitting outside too long
Depot is not a practical solution for the majority of residents, curb side is much more 'user friendly', easy, and efficient. I would have no issues paying a fee for curbside pick up and would do it privately if the option was available. It is rather surprising and a little shocking that this type of service is not offered.
No concerns, I find this a great initiative! I would also be happy to bring my frozen stack to a regular event, like the Farmers' market - like it's done in Vancouver WestEnd. But not fond of having to go to the depot as I'm sure it wouldn't be open after working hours on weekdays and I have other things to do over the weekend. Thank you!
What kind of containers?? They must be animal proof. Will there be a charge.
I'd love to see a curbside pickup program!
Storage for garbage and recycling is difficult. We are paying for curbside recycling and put a lot of effort into composting. With the wildlife that passes through, it can be a problem. Most of our composting is worm culture as there is less odor to attract bears.
If there was curbside pick up that would be amazing! I am sure that if curbside was offered that lots of residents would start composting.
No

Now that we can no longer drop off at Gibsons it is a real pain to go all the way to Salish every week. I would love it if curb side pick up was offered like garbage pick up is. I think it would encourage a lot more people to divert compostable items from the landfill.
A depot is fine but, please, not curbside; too much of an attractant for rats, bears, dogs and other opportunistic beasts. Plus it will reek in warm weather.
Animal-proof containers would need to be used
No
Attracting bears and rats and other rodents.
The smell, maggots as it decomposes(for raw meat or cooked scraps), animal attractants
containers would need to be wildlife proof
Curbside would be fantastic! I use to live in port coquitlam and they have an organic waste curbside collection (yard trimmings and food scraps) Its in the bins similar to the ones our recycling is picked up in but green and it makes cutting down what goes in the garbage easy.
As long as i can keep the smell down while waiting for either pick-up or drop off.
We haul green waste up to Salish Soils and then pay HUGE amounts to get it back in a plastic bag. Why not give us all a composter that would take food scraps.
The crows would miss their lunch except for the paper
The green bins are an Excellent idea and should be expanded to entire Coast. If you ask people to drop off it won't get done
Just bears for the curbside, but if pick up is at the same time every week, I can get it out just a little beforehand.
People putting it out too soon. Crows and bears currently dumping garbage to get at tasty treats. Also do not want increase in utilities and taxes already pay too much
curbside pickup is wonderful, we have less than one garbage can a month for other stuff ... i.e. can't be recycled or green waste.. would suggest garbage and curbside green waste pickup every 2 weeks - not necessary to do it weekly as it is now
Curbside concerns are that they are attractants for wildlife and would have to be frozen and put out just before pick up. You kind of need everyone in the neighbourhood to be on the same page.
Storing certain food scraps for a week requires they be kept in the freezer. This takes up a considerable amount of space. Having the compost sit at curbside on the day it is picked up will attract bears to my yard. I would only be using the collection for items I do not put in my own compost pile. Meat, bones, etc. I already pay $145.00 a year for garbage pickup and I usually only have a small bag per week because we compost and recycle. I do not want to pay any more!
Wildlife is a concern. Great idea!
Containing compostables would need to be smell proof throughout the week and wildlife proof on pickup day
No
We have been unable to have a home compost system due to bears. Would have similar concern with curbside.
Bears
Need a good system for animal-proofing for curbside pickup, even if it's only out for a short time.
I don't want to store and transport food scraps to a depot
As i do not drive, curb side would be wonderful. I feel so horrible throwing out the food that i do. I used to compost but no longer can. No longer have a composter. Bear visitors, small yard.
I have no concerns. Great idea, I think!
curbside: animal or bird interference. Scrap container would have to be securely closable and only put out on the day of the collection
I think it would be great and why dont i use other means then garbage lets say bears.
Wildlife attractant

No monitoring around what goes in Lack of information about EXACTLY how the collected waste will be processed (do policy makers have any expertise in this area or will it wind up being garbage collection with a different name?)
Only concerns would be similar to those of garbage collection - if a curbside pick-up - and that is the attraction of wildlife if bins are set out too soon/not picked up promptly. Otherwise, this is an idea that is long overdue.
I do not want to pay for a curbside system that I will not use
The smell if we have to wait a week.
My only worry with curbside pickup is bears.
Bear and vermin attractant
Where to store it until going to the depot.
No, if people follow guidelines. Other communities do it.
Bears, raccoons
no concerns. the curbside pickup we have now is great.
My first concern would be wildlife. I already have to put my garbage out as close to collection time as possible (4 hours or less), as the local ravens, bears, dogs and possibly other critters can make a mess fast - even with a supposedly wild-safe garbage can. It would have to be a very secure, scent-free container to keep the critters out filled with smelly, week-old food. I compost, recycle and reuse as much as possible, as well as being a responsible consumer. I have no desire to pay more taxes for the people too lazy to do so by having this kind of pick-up. Anyone can compost in their home with a worm bin if they don't have space or safety to do so outside, and the by-product can be used in houseplants if not for gardens. I would be far more interested in seeing the SCRD fund workshops and print pamphlets to teach our local polulation how to do this than pay more taxes for garbage pick-up.
Depot would have same issues as recycling depots - does not make any sense! Why send out thousands and thousands of vehicles to do what a garbage truck can.
We already have bears and raccoons around here, so most of us put our garbage etc out just before the truck comes, so this may be problematic for some.
Curbside food scrap pick-up would be a Curbside Buffet for Animals until it's picked up!
I would only want to have collection of the scraps that I cannot compost myself, e.g. bread and large bones
Yes, animals getting into it if curbside and also the cost. We had this when we lived in Surrey 3 bins, garbage every week and a green bin for food scraps and a blue bin for recycleables alternating every 2nd week and it worked great. I,wish we had recycling avaialable in Halfmoon Bay.
already have problem with bears, raccoons and ravens in my neighbourhood learning to open trash cans, so would not support open recycling at curbside. Also have rat issues and those of us without garage already have to store trash in house all week until pickup. Here's my offer: fix the water problem and bring us up to other area's standard curbside recycling maybe I'll cooperate with more recyling. We already have to haul our recyling to Sechelt.. no pick up for us when others get it. How about providing more support to my area B. tired of "social engineering" on the part of SCRD and being overgoverned without parity with other areas.
For curb side: odours and maggots if the organics are not collected frequently enough. It is the processing of organics that causes more concern. This past winter I was able to smell Salish Soils in downtown Sechelt on a number of occasions. Sometimes it was a very strong sour compost odour, a smell that is indicative of composting organics that have gone anaerobic and are possibly being pushed through the process too quickly. Salish Soils are currently near capacity and any significant increase to their inputs would create odour issues in the District that would destroy the joys of living in Sechelt.
Because of bears I wouldn't use curbside collection. It's difficult enough putting out the garbage. In fact I'm unable to unless I happen to be home within an hour of collection. I would drop food waste off at recycle but I find it silly to be asked for change to drop it off now so it goes to the garbage. The administration cost to collect change, count it at the end of the day, roll it and deposit it and enter it into

their books is far more than what they are collecting. If it can't be done at the recycle location, please consider a dumpster in a central location and I'd gladly use it .
Highly likely to use depot if did not have dogs. Never for curbside. Curbside is a bear coyotes attractant.
Wildlife is definitely an issue. Not likely to use depot as transport of organics in vehicle is not feasible. For garburator, made a note that the residence is on septic.
Salish Soils in en route from my home to work so drop-off is somewhat convenient. Depots hours are a limiting factor for drop-off. However, would much prefer a curbside pick-up of my organics (including yard waste). I have young kids, too busy & want convenience! Concerned about attracting bears though.
Thank you for the opportunity to provide my input.
I love the concept of collecting food waste on curbside. My concern would be how to keep crows away/bears/wildlife away.
Had curb side green waste collection in New Westminster. Loved it. Hope it comes to Sechelt.
Bears and other wildlife will have a field day if there is to be roadside collection of food wastes; in our area, weekend visitors often put out their garbage on Sunday before leaving. Much better idea to have people bring their food waste to a secured depot or transfer station; there could be several in various neighbourhoods. Our compost bins are well-secured against racoons, rats and other wildlife but we have had rat problems in the past, so you really need to educate people before encouraging backyard composting - otherwise there will be a rat infestation. One thing that could become implemented immediately is food waste collection from restaurants, and if someone were willing to raise hogs with restaurant meal left-overs then that would be an even better idea. Roadside collection of green waste, i.e. yard clippings etc just not food would be a great idea. SCRD could possibly sell large paper bags for yard waste for road-side pick-up.
Our biggest block at the moment is having to take compost somewhere, we just haven't made it a habit or priority. But highly support a curbside collection program and fees associated (taxation or subscription).
No concerns; great idea!
Depot is a pain. Curbside - just bears
Wildlife (bears), odours, cost, frequency of pick ups if curbside
I'd like to have curbside collection of food waste. It's more convenient than saving it up to bring to a depot.
it takes too long to go to a depot and it's gross to carry around garbage. prefer curbside but worry about bears and dogs
No concerns. We moved here from Burnaby and they have an awesome free curbside collection program. I feel that there should be no charge for deposit or pickup of food waste.

Coast Reporter Advertisements for the Organic Waste Diversion Questionnaire

SUNSHINE COAST REGIONAL DISTRICT

Bulletin Board

May 5, 2017

2017 Annual Utility Invoices

Annual utility invoices have been mailed to owners of properties serviced with water, sewer or garbage collection by the Sunshine Coast Regional District.

Payments are due no later than 4:30 p.m. on Thursday June 15, 2017. Outstanding balances as of the close of business on June 15th will be subject to interest charges. Balances that remain unpaid as of December 31, 2017 will be transferred to property taxes.

If you have not received your 2017 invoice by mid-May please contact the Infrastructure Services department at 604-885-6806 or infrastructure@scrd.ca.

Organics Diversion Strategy Questionnaire

The SCRD is developing a regional Organics Diversion Strategy.

Why? Over 44% of what is in our residential garbage can be composted instead of sent to the Sechelt Landfill. Diverting organic material such as food scraps is the biggest opportunity to reduce the amount of garbage in our region.

We want your input! Complete a questionnaire at one of the upcoming Community Dialogue sessions or online between May 8, 2017 and June 2, 2017. Visit www.scrd.ca/Yard--Food-Waste

Drinking Water Week

Drinking week is taking place from May 7 to 13. The SCRD invites residents to the following event:

- Friday, May 12, 1:00 p.m. to 2:00 p.m. Members of the public are invited to take a free guided tour of the SCRD's Chapman Water Treatment Plant. Come meet the facility's operators and see what it takes to get safe, clean water to your taps. Please RSVP with Raphael Shay at raph.shay@scrd.ca or at 604-885-6800 ext. 6481.

To learn more about your water, go to www.scrd.ca/Treatment.

SUNSHINE COAST REGIONAL DISTRICT
1975 Field Road Sechelt, B.C. V0N 3A1 | 604-885-6800
www.scrd.ca | Office Hours: Mon. - Fri. 8:30 a.m. - 4:30 p.m.

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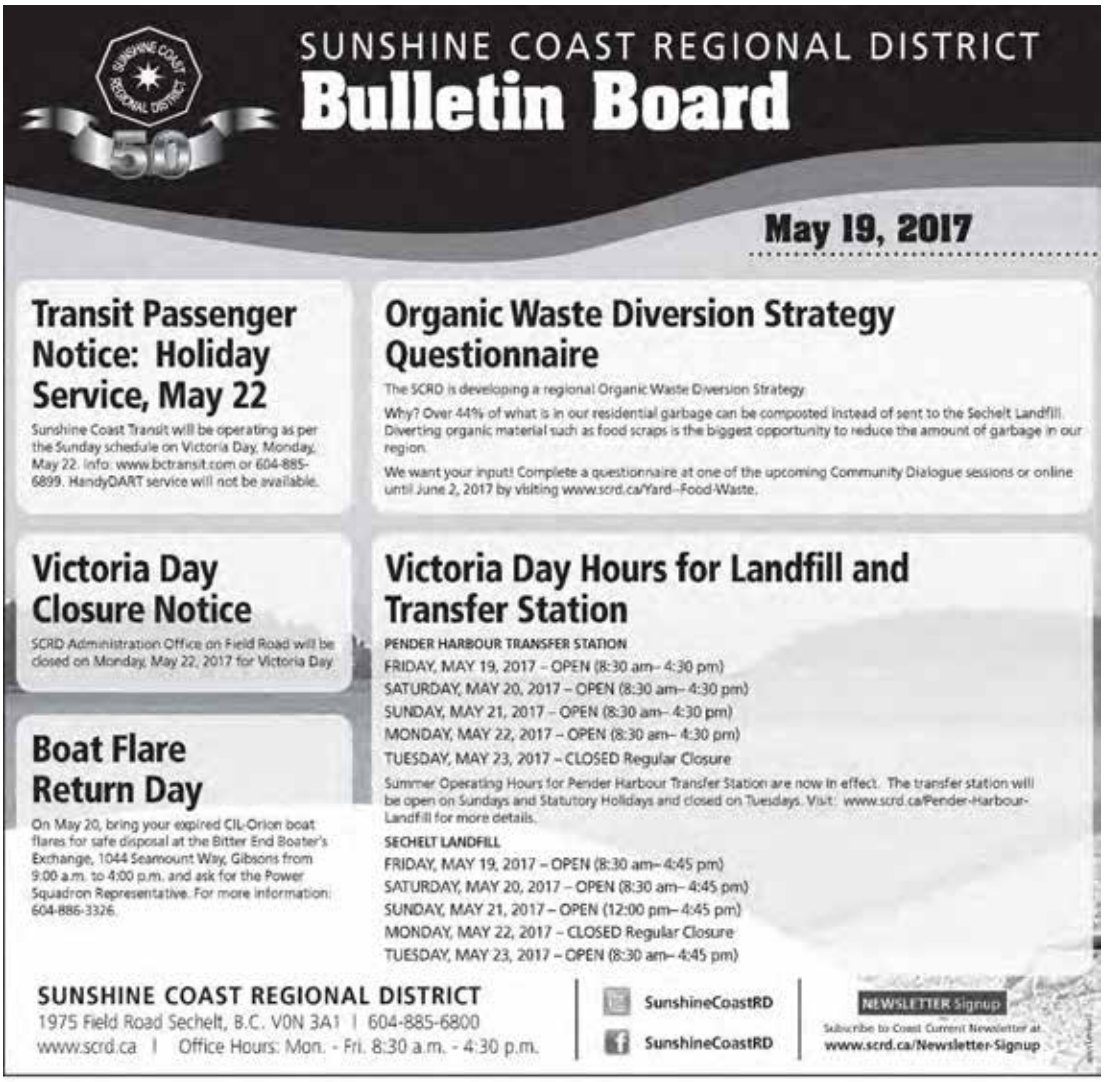

SUNSHINE COAST REGIONAL DISTRICT

Bulletin Board

May 19, 2017

Transit Passenger Notice: Holiday Service, May 22

Sunshine Coast Transit will be operating as per the Sunday schedule on Victoria Day, Monday, May 22. Info: www.bctransit.com or 604-885-6899. HandyDART service will not be available.

Organic Waste Diversion Strategy Questionnaire

The SCRD is developing a regional Organic Waste Diversion Strategy.

Why? Over 44% of what is in our residential garbage can be composted instead of sent to the Sechelt Landfill. Diverting organic material such as food scraps is the biggest opportunity to reduce the amount of garbage in our region.

We want your input! Complete a questionnaire at one of the upcoming Community Dialogue sessions or online until June 2, 2017 by visiting www.scrd.ca/Yard--Food-Waste.

Victoria Day Closure Notice

SCRD Administration Office on Field Road will be closed on Monday, May 22, 2017 for Victoria Day.

Boat Flare Return Day

On May 20, bring your expired CIL-Orion boat flares for safe disposal at the Bitter End Boater's Exchange, 1044 Seamount Way, Gibsons from 9:00 a.m. to 4:00 p.m. and ask for the Power Squadron Representative. For more information: 604-886-3326.

Victoria Day Hours for Landfill and Transfer Station

PENDER HARBOUR TRANSFER STATION

FRIDAY, MAY 19, 2017 – OPEN (8:30 am– 4:30 pm)
SATURDAY, MAY 20, 2017 – OPEN (8:30 am– 4:30 pm)
SUNDAY, MAY 21, 2017 – OPEN (8:30 am– 4:30 pm)
MONDAY, MAY 22, 2017 – OPEN (8:30 am– 4:30 pm)
TUESDAY, MAY 23, 2017 – CLOSED Regular Closure

Summer Operating Hours for Pender Harbour Transfer Station are now in effect. The transfer station will be open on Sundays and Statutory Holidays and closed on Tuesdays. Visit: www.scrd.ca/Pender-Harbour-Landfill for more details.

SECHELT LANDFILL

FRIDAY, MAY 19, 2017 – OPEN (8:30 am– 4:45 pm)
SATURDAY, MAY 20, 2017 – OPEN (8:30 am– 4:45 pm)
SUNDAY, MAY 21, 2017 – OPEN (12:00 pm– 4:45 pm)
MONDAY, MAY 22, 2017 – CLOSED Regular Closure
TUESDAY, MAY 23, 2017 – OPEN (8:30 am– 4:45 pm)

SUNSHINE COAST REGIONAL DISTRICT
1975 Field Road Sechelt, B.C. V0N 3A1 | 604-885-6800
www.scrd.ca | Office Hours: Mon. - Fri. 8:30 a.m. - 4:30 p.m.

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SUNSHINE COAST REGIONAL DISTRICT

Bulletin Board

July 14, 2017

Upcoming Meetings

Regional Hospital District
July 17 at 1:00 p.m.

Infrastructure Services Committee
July 20 at 9:30 a.m.

Policing Committee
July 20 at 1:30 p.m.

Transportation Committee
July 20 at 2:45 p.m.

Corporate and Administrative Services Committee
July 27 at 9:30 a.m.

Regular Board
July 27 at 1:30 p.m.

Our meetings are held in the SCRD Board Room at 1975 Field Road in Wilson Creek. Agendas for these meetings are available at www.scrd.ca/Agendas-2017

Volunteers Needed - Sunshine Coast Agricultural Advisory Committee

Volunteers are needed for a two-year term to serve on the Sunshine Coast Agricultural Advisory Committee (AAC). The purpose of the AAC is to advise the SCRD Board on agricultural issues on the Sunshine Coast.

AAC members shall include diverse representation from each Electoral Area and municipality, and shall have knowledge and/or experience in one or more of the following topics:

• agriculture • agri-tourism • soils • processing and distribution • water management

AAC members will raise awareness of agriculture, enhance an understanding of agriculture's role in the local and /or regional economy; address demand for Non-Farm Use or Exclusion of the agricultural land base; examine legislation and amendments to legislation to identify improvements to support agriculture; advise on opportunities for irrigation works, specifically the safe use of non-potable water; examine the impacts of park and recreation proposals on agriculture; and examine the impact of transportation and utility corridors on agriculture.

How to Get Involved

The Terms of Reference are available online at www.scrd.ca/AAC or from the Planning and Development Division. Please submit a brief statement clearly indicating:

• location of residence,
• ownership of farm or ALR property, and
• qualifications and experience.

Applications may be submit by email to Andrew Allen, Manager, Planning and Development, Andrew.Allen@scrd.ca or by mail to Sunshine Coast Regional District, 1975 Field Road, Sechelt, BC, V0N 3A1. Applications will be received until Friday, August 11, 2017 at 4:30 pm.

Organic Waste Diversion Questionnaire – Thank you!

The SCRD would like to thank the residents who completed the recent Organic Waste Diversion Questionnaire. The results were incorporated into a Regional Organics Diversion Strategy.

The Strategy will be presented at the July 20, 2017 Infrastructure Services Committee meeting.

For more information, please visit www.scrd.ca/organics, email infrastructure@scrd.ca or call 604-885-6806.

Volunteers Needed - Natural Resources Advisory Committee

Volunteers are needed for a two-year term to serve on the Sunshine Coast Natural Resources Advisory Committee (NRAC). The purpose of the committee is to advise the SCRD Board on resource issues and developments that may have an impact on the Sunshine Coast Regional District. Committee members should represent a diversity of community interests. We are seeking individuals with the follow interests and/or expertise:

• natural resources issues • community development • watershed issues
• outdoor recreation • biodiversity • tourism • economic development

An effort will be made to ensure that a wide range of interests, expertise and diverse representation from each Electoral Area and Municipality are represented on the Committee. The Terms of Reference are available online at www.scrd.ca/NRAC.

Please submit your application letter with qualifications and experience by email to Andrew Allen, Manager, Planning and Development, Andrew.Allen@scrd.ca or mail to Sunshine Coast Regional District, 1975 Field Road, Sechelt, BC, V0N 3A1. Applications will be received until Friday, August 11, 2017, 4:30 p.m.

SUNSHINE COAST REGIONAL DISTRICT
1975 Field Road Sechelt, B.C. V0N 3A1 | 604-885-6800
www.scrd.ca | Office Hours: Mon. - Fri. 8:30 a.m. - 4:30 p.m.

SunshineCoastRD
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Promotional Poster

We want your input!

The SCRD is developing a region-wide Organic Waste Diversion Strategy.

Why? Over 44% of what is in our residential garbage can be composted instead of sent to the Sechelt Landfill. Diverting food scraps and other organics is the biggest opportunity to reduce the amount of garbage on the Sunshine Coast.

Please complete the Organic Waste Diversion Questionnaire

Online until Friday, June 2, 2017 at:
www.scrd.ca

www.scrd.ca

SUNSHINE COAST REGIONAL DISTRICT

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – July 20, 2017

AUTHOR: Michael Day, GM Infrastructure Services / Regional Engineer

SUBJECT: **INFRASTRUCTURE SERVICES DEPARTMENT – 2017 Q2 REPORT**

RECOMMENDATION(S)

THAT the report titled Infrastructure Services Department – 2017 Q2 Report be received.

BACKGROUND

The purpose of this report is to provide an update on activities in the Infrastructures Services Department for the Second Quarter (Q2) of 2017: April 1 to June 30.

The report provides information from the following divisions: Water, Waste Water, Solid Waste, Recycling, Green Waste, Transit and Fleet.

Utilities Division [365, 366, 370]

PROJECTS - CAPITAL WORKS

- **Water main replacement program**
  - Pool Road
    - Water line installation complete.
    - Surveying and ROW documents required.
  - Mason Road
    - Scheduled for September construction.
  - Nor-West Bay Road
    - Ready for construction, awaiting crew availability.
  - Reed Road
    - Water line design underway.
  - South Pender Harbour
    - Surveying and Engineering underway.
  - North Pender Harbour
    - Surveying and Engineering underway.
  - Soames Point twinning
    - Water line installation complete.
  - Eastbourne
    - A RFP for construction and maintenance of the water system is under development.

- **Wastewater**

  - YMCA/Langdale
    - Langdale collection system maintenance underway. A community communication regarding best practices for using a sewer system will take place in July.

  - Square Bay
    - RFP awarded to EcoFluids on June 26, kickoff meeting with staff held June 27, 2017.

  - Canoe Road
    - Initial communication with property owners (mail-out) advising of upcoming work.
    - Preliminary archaeological investigations have been completed; minimal findings.
    - Survey of site has been scheduled; RFP development to follow.

  - Merrill Crescent
    - Initial communication with property owners (mail-out) advising of upcoming work.
    - Preliminary archaeological investigations have been completed; nothing found.
    - 3rd party condition assessment of existing septic field has been completed.
    - Survey of site has been scheduled; RFP development to follow.

Universal Metering Phase 2 Electoral Areas:

Rural Metering Project – Installation Progress Summary as of July 7						
Area	**Egmont/ Cove Cay**	**Halfmoon Bay**	**Roberts Creek**	**Elphinstone**	**West Howe Sound**	**Total**
Completed Installs	81	1315	989	1099	601	**4085**
Total to Complete	6	69	129	285	193	**682**
Percentage Complete	91%	95%	88%	78%	75%	**86%**

Groundwater Investigation Study Phase 1:

Staff participated in a Webex with our consultant, Waterline Resources Inc., on May 24, 2017 to discuss their findings to date regarding the Groundwater Investigation Study. Upon completion of the Webex further information was requested by our consultant regarding three of our existing wells (Chaster, Soames & Granthams) along with some other data requests. The information request for the three wells did require some draw-down testing and this was completed by staff on June 26, 2017. The information will be sent to the consultant shortly and they anticipate completing their report by late July or early August 2017. Staff are targeting the September, 2017 Infrastructure Services Committee meeting for presentation of the report by the consultant.

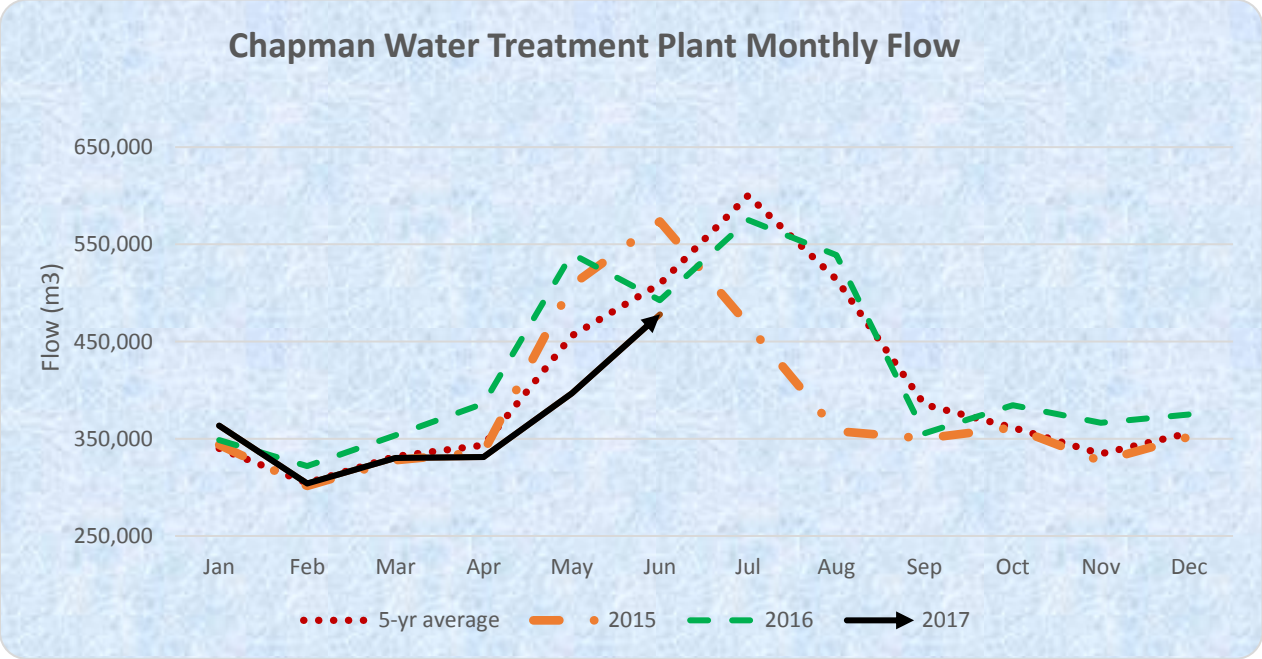
OPERATIONS

Statistics - Water

WATER DISTRIBUTION SYSTEM

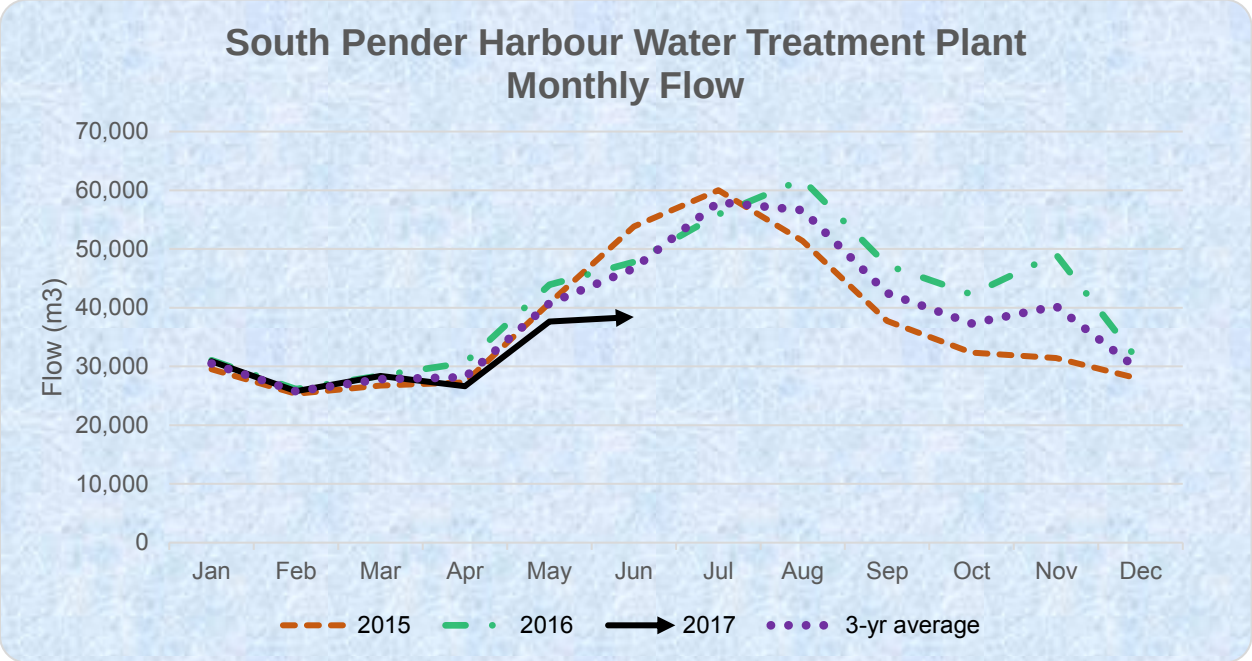
CHAPMAN WATER TREATMENT PLANT

In the second quarter, the Chapman Creek Water Treatment Plant produced and supplied 1,205,800m^3, an 8.5% decrease over the five year average.

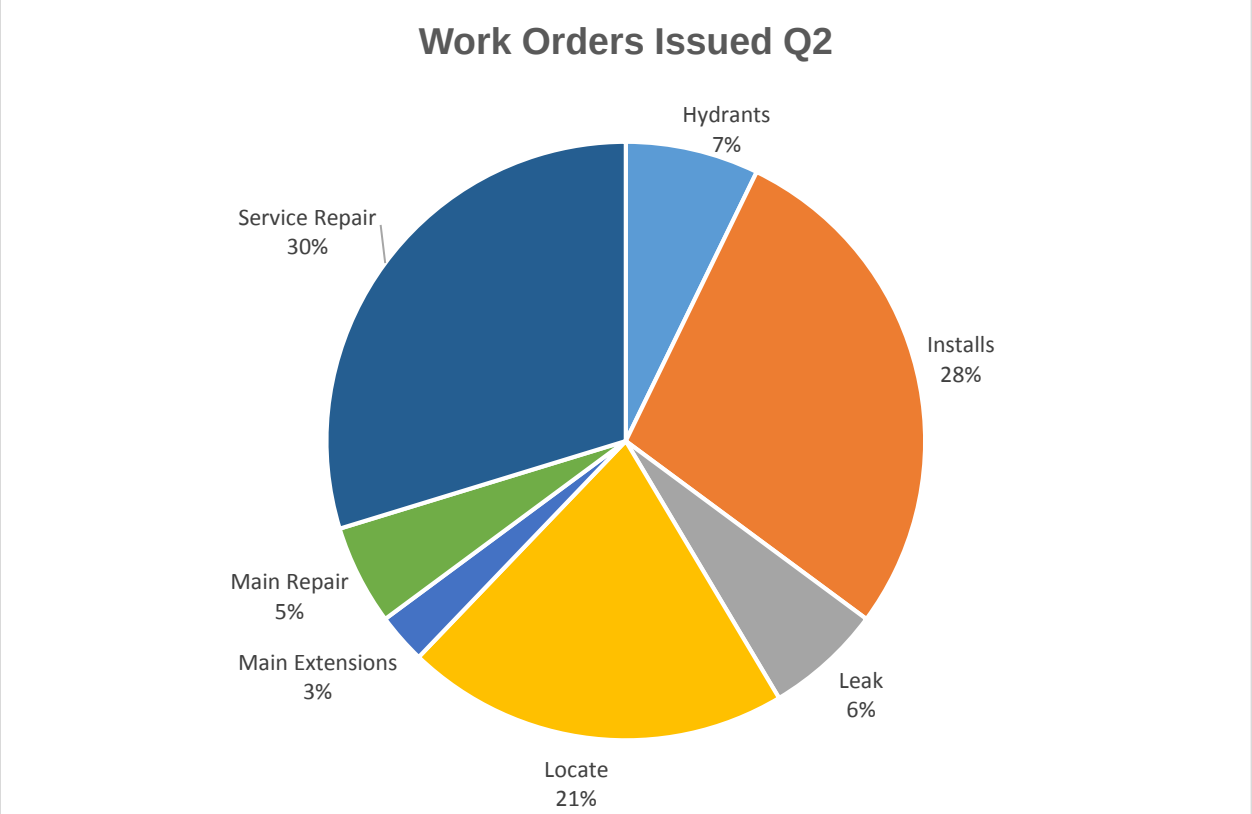


SOUTH PENDER WATER TREATMENT PLANT

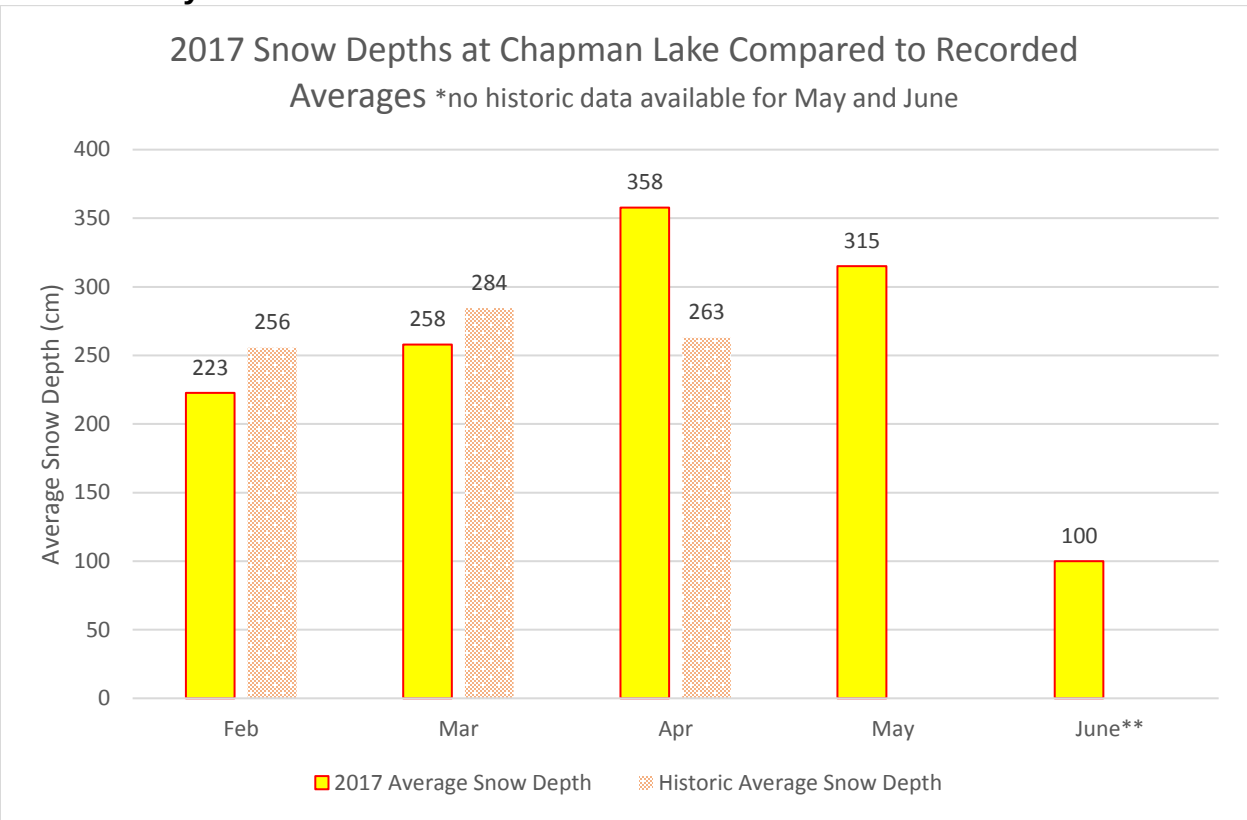
In the second quarter, the South Pender Water Treatment Plant produced and supplied 102,663 m^3, a 19.1% decrease from last year.



Regional Maintenance Work Orders Issued for the Q2 2017



Snow Survey Results



**Depth based on extrapolation from visual observation of snow depth at Chapman weir on June 14th.

Transportation and Facilities [310, 312, 345, 350]

PROJECTS

Transit

In addition to the provision of regular transit service, a number of activities have been underway in preparation for transit expansion. These include events intended to raise the public profile of transit, such as:

- Co-promotional days with Recreation in April, May and June, where a monthly bus pass would allow entry to a facility as a MyPass.
- Transit Customer Appreciation Day on May 16th, with 400 cookies provided to transit riders along with expansion information.
- Bus and operator providing customer information at the Sechelt Business Fair.
- Transit shuttle provided for Earth Day celebrations in Roberts Creek.

Transit schedules for September have been finalized, and promotional materials are now being prepared. All drivers recently completed a half-day workshop emphasizing customer service and professionalism, proper pre-trip procedures and conflict resolution strategies. All drivers have also been sized for a slightly updated uniform, shifting to a gray shirt and incorporating the SCRD logo. Interviews for additional drivers have been conducted and the driver selection

process is underway. Several internal process changes are being piloted to improve administrative efficiencies. The process of hiring of additional part-time staff has been initiated.

Fleet Maintenance
BC Transit has begun their body refurbishment of SCRD buses, with two vehicles currently in Calgary receiving new paint and a number of other improvements; buses will be on rotation for this process for the remainder of the year. The six-month BC Transit Fleet inspection was completed with no issues raised. Work on the budget projects for gas line lowering and yard grading has been completed, and heavy hoist refurbishment is now underway. The Engine Diagnostic Equipment has also been purchased and is now in use. These activities will ensure the Fleet facilities are prepared for increased activity, with new Vicinity buses are planned to arrive in early August. New buses will be equipped with CCTV camera equipment as a tool to increase driver safety. Mechanic orientation on the new buses is scheduled to occur shortly after their arrival, with in depth training in September.

OPERATIONS

Statistics – Transit

Due to delays at BC Transit in the completion of the Annual Performance Summary, statistics cannot be updated at this time. Updated information is planned for a future Infrastructure Services Committee meeting.

Solid Waste [350, 351, 352, 353, 355]

PROJECTS

Organics Diversion Strategy
Work on the Organics Diversion Strategy continues. On May 2, the SCRD hosted a stakeholder engagement session with our member municipalities. The consultants conducted engagement via conference calls with the local haulers as well as visiting the composting facility, Salish Soils. Public engagement was conducted in May and June in conjunction with the SCRD's Community Dialogues and an online questionnaire was open from May 8 to June. 673 responses were received. The Organics Diversion Strategy including a summary of the public feedback is to be presented at the July 20, 2017 ISC.

Stewardship Plan Updates
There are several stewardship plans undergoing updates in 2017 including the plans for printed paper & packaging (RecycleBC, formerly MMBC), lamps and lighting equipment (Light Recycle), paint and household hazardous waste (Product Care) and major appliances (MARR). Solid Waste staff will be reviewing the proposed plan updates to the agency administering each stewardship plan.

Feedback was submitted in Q2 to Light Recycle, Product Care and MARR.

BC Product Stewardship Council
The British Columbia Product Stewardship Council (BCPSC) is a coalition of regional districts, provincial agencies, and trade organizations that contributes to the success of extended product stewardship (EPR) in BC. The SCRD is a member of BCPSC.

In Q2, the Manager, Solid Waste Services and the Waste Reduction Coordinator attended the BCPSC AGM (June 21) that was held during the Recycling Council of BC's annual conference. The AGM was followed by a meeting with the Ministry of Environment who provided a status update regarding the many EPR programs undergoing updates in 2017.

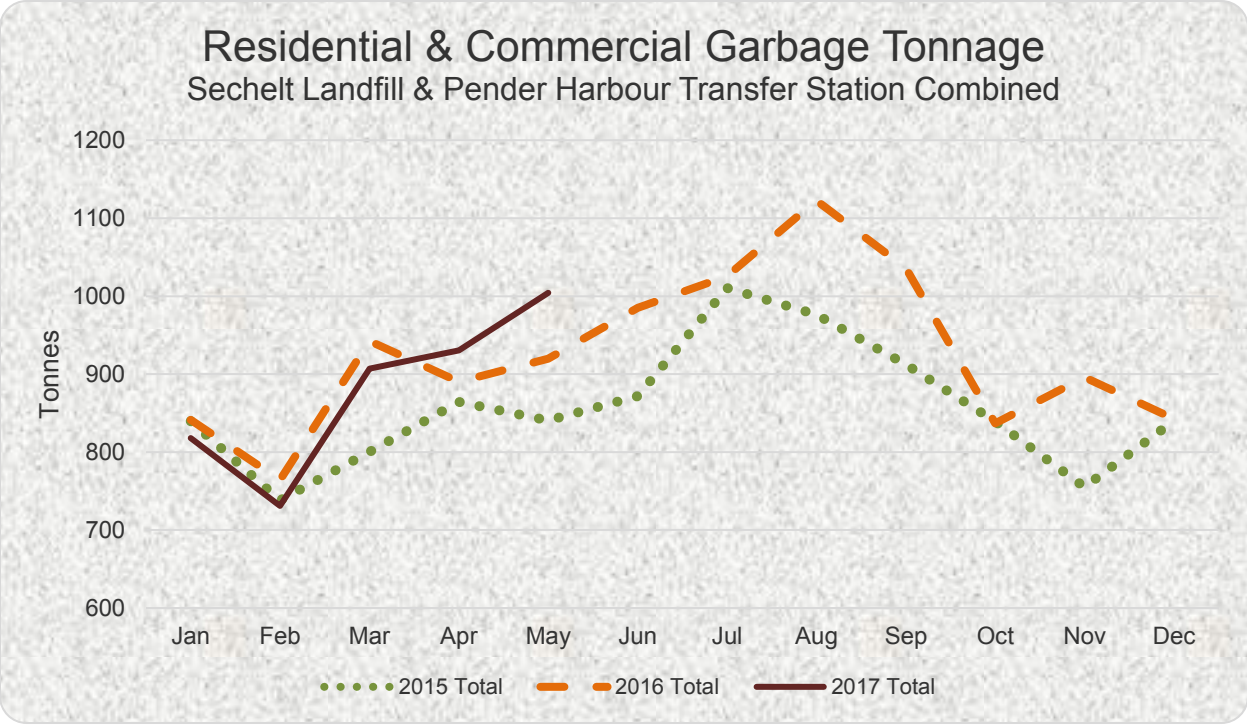
The BCPSC facilitated a number of webinars with product stewards in Q2 including, Health Products Stewardship Association (April 25), Recycle BC (May 9), and BC Used Oil Management Association (May 16). For each webinar, the product steward provided a summary of their stewardship plan. Either the Manager, Solid Waste Services and/or the Waste Reduction Coordinator participated in all of these informational webinars.

National Food Waste Reduction Strategy

The Waste Reduction Coordinator participated in a webinar on May 23 for the National Food Waste Reduction Strategy. The webinar was hosted by the National Zero Waste Council.

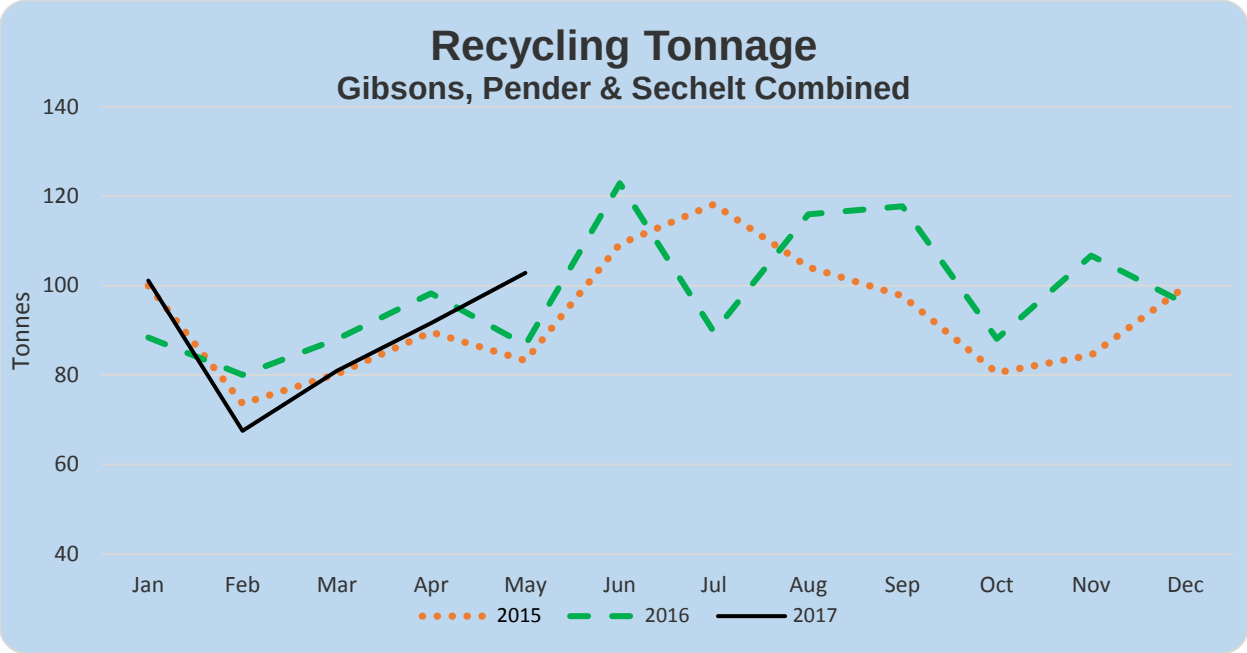
OPERATIONS

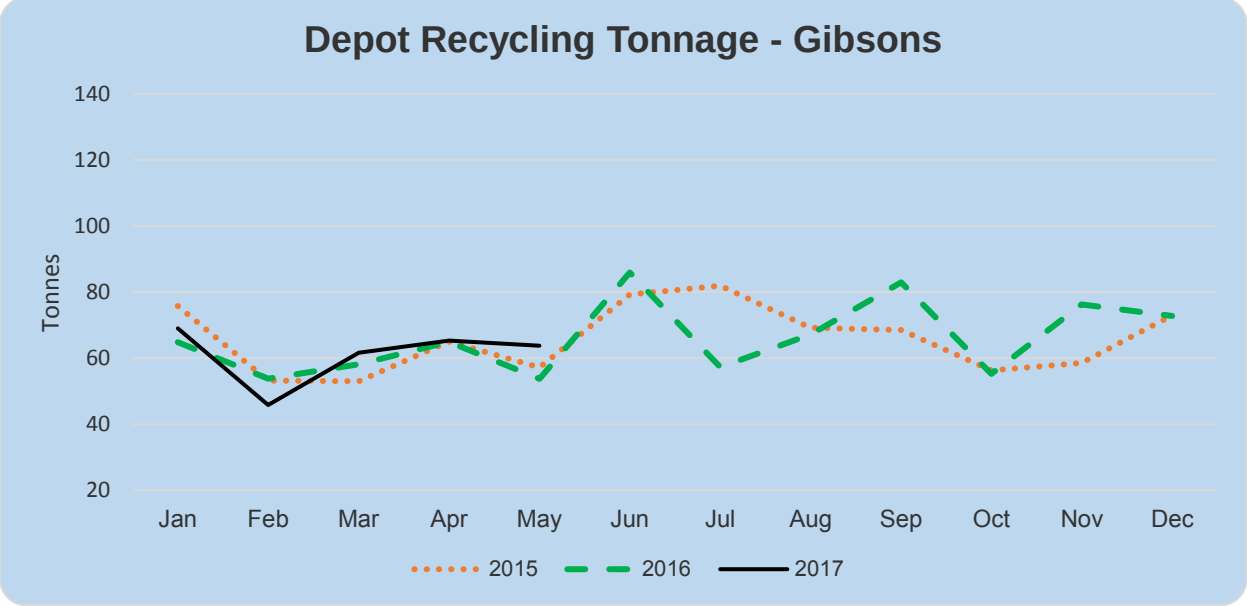
Statistics - Landfill

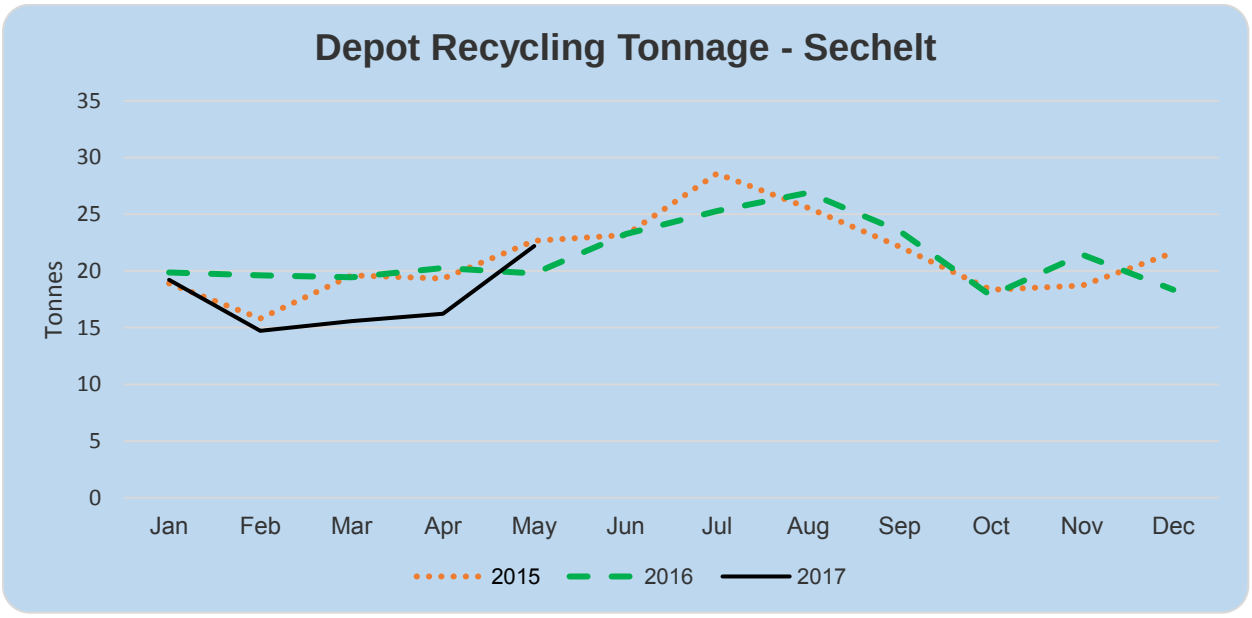


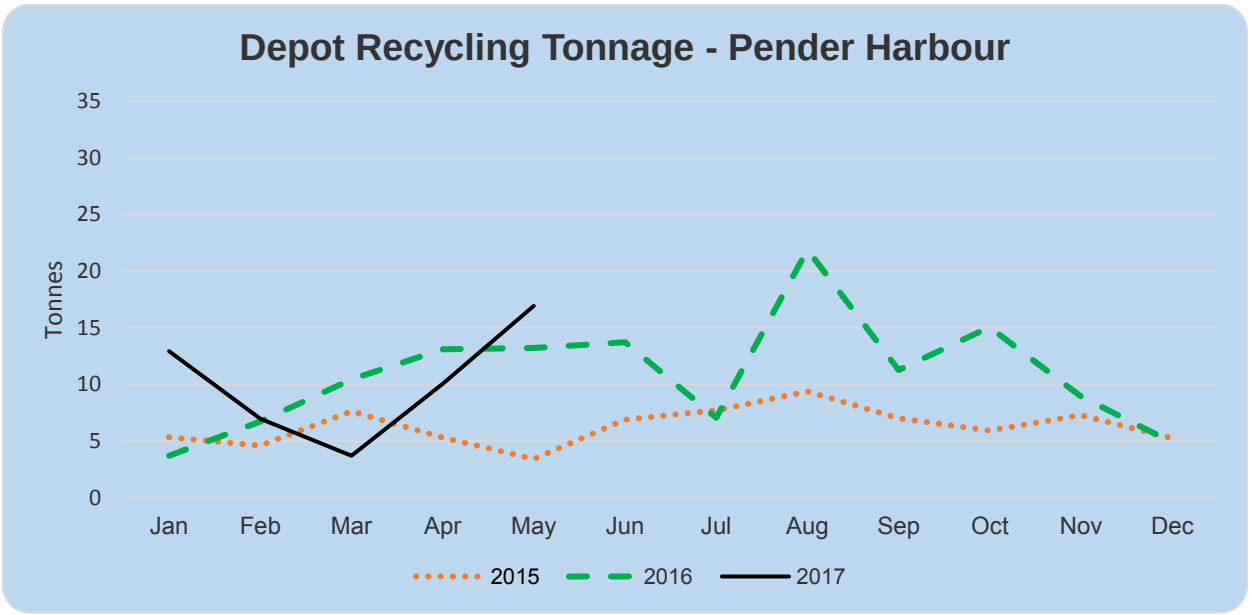
**Does not include other landfilled items such as construction waste, asbestos or furniture.*

Statistics - Recycling



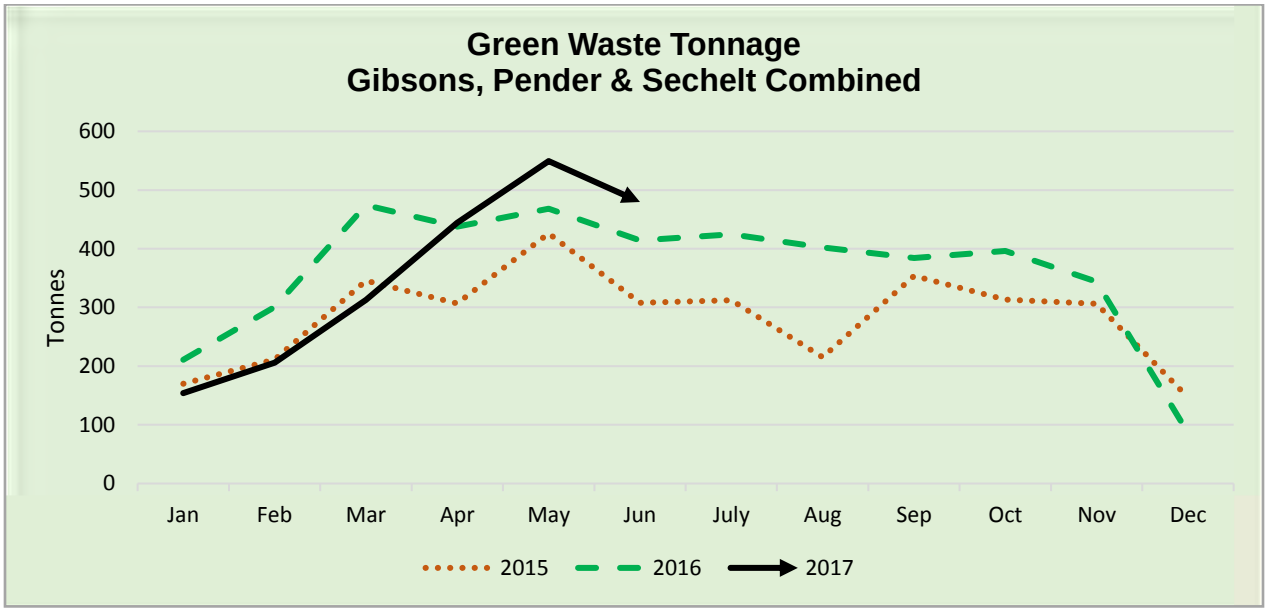






** Data provided by RecycleBC (formerly called MMBC) and is updated as data is received.*

Statistics - Green Waste



**Combined totals for Sechelt Landfill, Pender Harbour Transfer Station, Town of Gibsons Green Waste Facility and residential self-haul at Salish Soils.*

Infrastructure Community Events/Outreach

Date	Community Event	Topic
April 22, 2017	Roberts Creek Earth Day	Water, Solid Waste
May 3, 2017	West Howe Sound Water Metering Open House (Area F)	Water Meters
May 7, 2017	Sunshine Coast Botanical Garden Annual Plant Sale – for Compost Awareness Week	Food Waste Reduction, Composting
May 10, 2017	West Howe Sound Community Association (Area F)	Solid Waste
May 12, 2017	Chapman Water Treatment Plant Public Tour	Water
May 8 to July 8	Community Dialogues	Water, Water Meters, Solid Waste, Transit
June 10, 2017	Sunshine Coast Home Show	Water, Solid Waste
June 13, 2017	Well Protection Plan Open House	Drinking Water Safety

Reviewed by:			
Manager	X - R. Cooper X - G. Dykstra X - D. Crosby X - S. Walkey	Finance	
GM	X - M. Day	Legislative	
CAO	X – J. Loveys	Other	