



PLANNING AND COMMUNITY DEVELOPMENT COMMITTEE

Thursday, May 14, 2020
SCRD Boardroom, 1975 Field Road, Sechelt, B.C.

AMENDED AGENDA

CALL TO ORDER 9:30 a.m.

AGENDA

1. Adoption of Agenda

PRESENTATIONS AND DELEGATIONS

2. Angela Boss, Regional Agrologist (Sunshine Coast/Central Fraser Valley), BC Ministry of Agriculture and Stephanie Tam, Water Management Engineer, BC Ministry of Agriculture
Regarding Agriculture Land Use Inventory and Agriculture Water Demand Model Results Presentation **INSERT ⇨
Delegation
Materials**
3. Lorna Vanderhaeghe, Owner/Applicant, 4355 Lake Road, Pender Harbour
Regarding Development Variance Permit Application DVP00054 (Vanderhaeghe) Annex A
pp 1 - 3
4. Dr. Martin Aidelbaum, Adjacent Property Owner, 4343 Lake Road, Pender Harbour
Regarding Development Variance Permit Application DVP00054 (Vanderhaeghe) Verbal

REPORTS

5. Planning Technician – Development Variance Permit DVP00054 (Vanderhaeghe)
Electoral Area A (Rural Planning Service) (Voting – A, B, D, E, F) Annex B
pp 4 - 66
6. Acting Chief Building Official - Removal and Re-application of Bylaw Contravention
Notice – District Lot 696 Keats Island
Building Inspection Services (Voting – A, B, D, E, F, SIGD) Annex C
pp 67 - 70
7. Senior Planner – West Howe Sound Official Community Plan Amendment Bylaw
No. 640.3, 2020 and Zoning Amendment Bylaw No. 310.188, 2020 (O'Toole) –
Consideration of First and Second Readings
Electoral Area F (Rural Planning Service) (Voting – A, B, D, E, F) Annex D
pp 71 - 133
8. Senior Planner – Zoning Amendment Bylaw No. 310.189 – Consideration for First,
Second and Third Readings – 7470 Redrooffs Road, Halfmoon Bay
Electoral Area B (Rural Planning Service) (Voting – A, B, D, E, F) Annex E
pp 134 - 140
9. Senior Planner – Telus Telecommunication Tower at Cawley Point – Request for
Local Government Concurrence
Electoral Area B (Rural Planning Service) (Voting – A, B, D, E, F) Annex F
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10. Senior Planner – District of Sechelt Official Community Plan and Zoning Bylaw
Amendment Referral 3360-2019-06 (Trellis Seniors Services)
Regional Planning (Voting – All) Annex G
pp 163 - 220

11. Planner 1 / Senior Planner – Provincial Referral CRN000105 for a Private Moorage 2412248 (Watton)
Electoral Area A (Rural Planning Service) (Voting – A, B, D, E, F) Annex H
pp 221 - 245
12. Planner 1 / Senior Planner – Provincial Referral CRN000107 for a Strata Moorage 2412342 (Sunaccess William Island Investment Inc)
Electoral Area A (Rural Planning Services) (Voting – A, B, D, E, F) Annex I
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13. **REMOVE** ⇨ ~~Planning Technician – Development Variance Permit DVP00053 (Plows)~~
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14. Planning Technician – Development Variance Permit DVP00057 (Magnuson-Ford)
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15. Planning Technician - Development Variance Permit DVP00058 (Mulligan for Corbett)
Electoral Area B (Rural Planning Service) (Voting – A, B, D, E, F) Annex L
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16. Planning Technician - Development Variance Permit DVP00059 (Mulligan for Corbett)
Electoral Area B (Rural Planning Service) (Voting – A, B, D, E, F) Annex M
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17. Manager, Protective Services and Bylaw Enforcement – Cell Tower Project Management Services – Planetworks Consulting Contract Amendment
911 Service (Voting – All) Annex N
pp 316 - 317
18. Parks Superintendent – Homesite Creek Secret Cove Recreation Site (Secret Cove Falls Trail, Rec 0383) Partnership Agreement and Stewardship Memorandum of Understanding
Community Parks (Voting – A, B, D, E, F) Annex O
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Electoral Area A (Rural Planning) (Voting – A, B, D, E, F) Annex P
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20. Electoral Area B (Halfmoon Bay) APC Minutes of April 28, 2020
Electoral Area B (Rural Planning) (Voting – A, B, D, E, F) Annex Q
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21. Electoral Area E (Elphinstone) APC Minutes of April 22, 2020
Electoral Area E (Rural Planning) (Voting – A, B, D, E, F) Annex R
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22. Electoral Area F (West Howe Sound) APC Minutes of April 28, 2020
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COMMUNICATIONS

23. Christina Clark, 924 Henry Road, dated April 16, 2020
Regarding Reed Road Forest (DL 1313) Annex T
pp 388 - 389
24. Rory Kulmala, Chief Executive Officer, Vancouver Island Construction Association and Kerriann Coady, Executive Officer, Canadian Home Builders' Association Vancouver Island, dated April 20, 2020
Regarding COVID-19 and Construction Annex U
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NEW BUSINESS

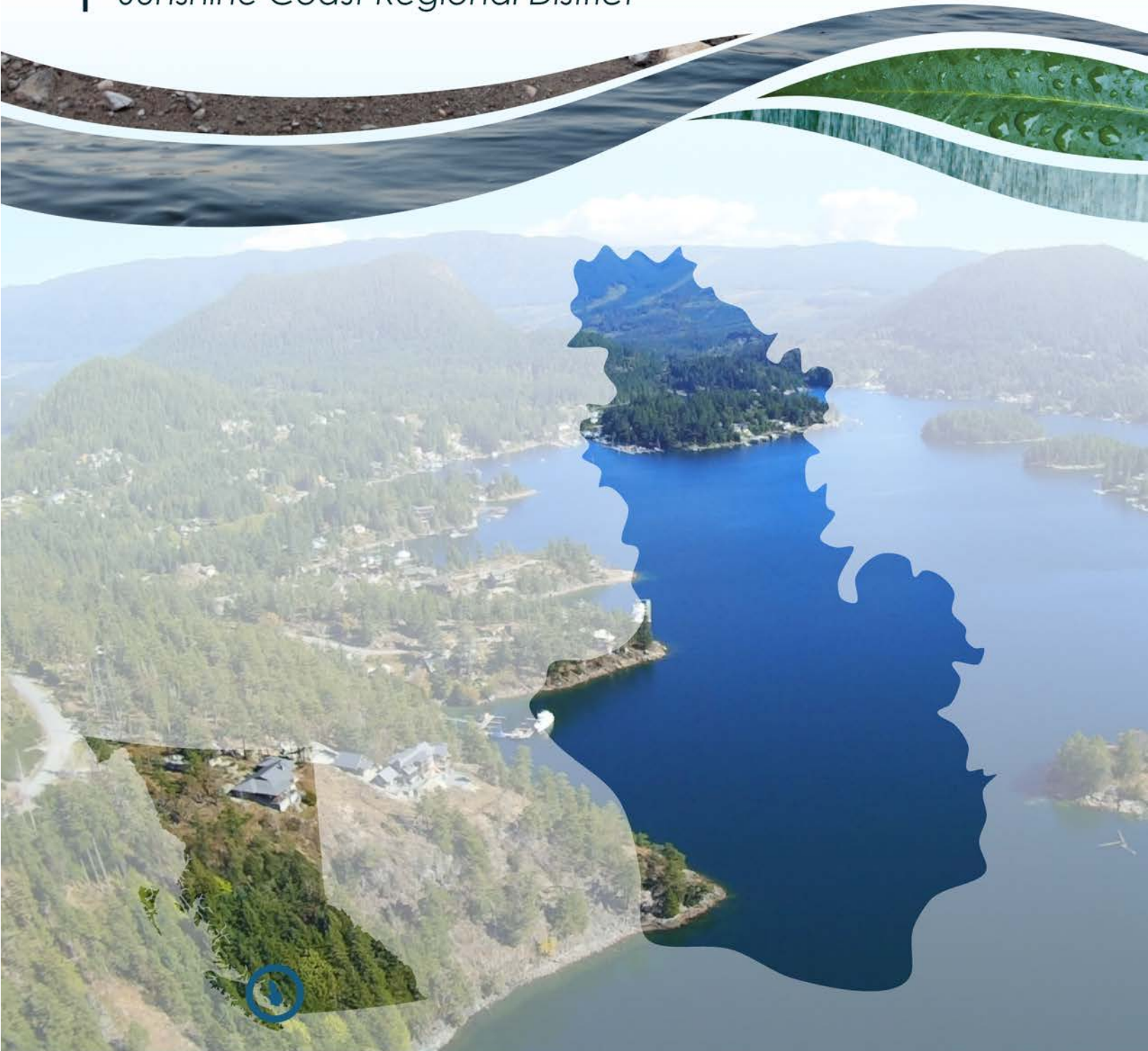
IN CAMERA

That the public be excluded from attendance at the meeting in accordance with Section 90 (1) (a) of the Community Charter – “personal information about an identifiable individual who holds or is being considered for a position as an officer, employee or agent of the municipality or another position appointed by the municipality.”

ADJOURNMENT

AGRICULTURE WATER DEMAND MODEL

Sunshine Coast Regional District



April 2020

AGRICULTURE WATER DEMAND MODEL

Report for Sunshine Coast Regional District

April 2020

Authors:

Stephanie Tam, P.Eng.

Water Management Engineer
British Columbia Ministry of Agriculture
Innovation and Adaption Services Branch
Abbotsford, B.C.

Ted van der Gulik, P.Eng.

President
Partnership for Water Sustainability in British Columbia
Abbotsford, B.C.

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DISCLAIMER

The data that is presented in this report provides the best estimates for agriculture water demand that can be generated at this time. While every effort has been made to ensure the accuracy and completeness of the data, the information provided in this report should not be considered as final. The Governments of Canada and British Columbia are committed to working with industry partners. Opinions expressed in this document are those of the authors and not necessarily those of the Governments of Canada and British Columbia, or other funding partners identified above.

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- **Ron Fretwell**
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- **Denise Neilsen**
Retired Research Scientist
Summerland Research and Development Centre
Agriculture and Agri-Food Canada

In the original development of the model algorithms, climate change scenarios and model development. Without their effort, the development of the model would not have been possible.

There are others who have been involved with the preparation and collection of data for the development of the Agriculture Water Demand Model in the project area, as well as mapping, graphics and cover design. The authors wish to express appreciation to the following individuals for their contribution for the tasks noted.

Alex Cannon	Environment and Climate Change Canada	Climate data downscaling
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Michael Dykes	Ministry of Agriculture	Land use data quality control
Daniel Rajasooria	Ministry of Agriculture	Land use survey
Chris Zabek	Ministry of Agriculture	Land use survey
Akansha Vaish	Ministry of Agriculture	Land use mapping
Anna Vu	Ministry of Agriculture	Cover and graphics design

Photo Credit:

The authors would like to thank Sunshine Coast Regional District for providing the photo for the report cover.

1. Background

The Agriculture Water Demand Model (AWDM or “Model”) was first developed in the Okanagan Watershed. It was initiated in response to rapid population growth, drought conditions from climate change, and the overall increased demand for water. Many of the watersheds in British Columbia (B.C.) are fully allocated already or may be in the next 15 to 20 years. The AWDM helps to understand current agricultural water use and to fulfil the Province’s commitment under the “*Living Water Smart – BC Water Plan*” to reserve water for agricultural lands. The Model can be used to establish agricultural water reserves throughout the various watersheds in B.C. by providing current and future agricultural water use data.

Climate change scenarios developed by the University of British Columbia (UBC) and the Summerland Research and Development Centre predict an increase in agricultural water demand due to warmer and longer summers and lower precipitation during summer months in the future.

The Model provides current and future agricultural water demands. It calculates water use on a property-by-property basis, and sums each property to obtain a total water demand for the entire basin or each sub-basin. Data on crop type, irrigation system type, soil texture and climate are used to calculate the water demand. Climate data from year 2003 was used to represent the highest water demands in one of the hottest and driest years on record, and year 1997 climate data was used to represent the water demand in a wet year. Lands within the Agriculture Land Reserve (ALR) in Sunshine Coast Regional District (SCRD) are shown in green in Figure 1.

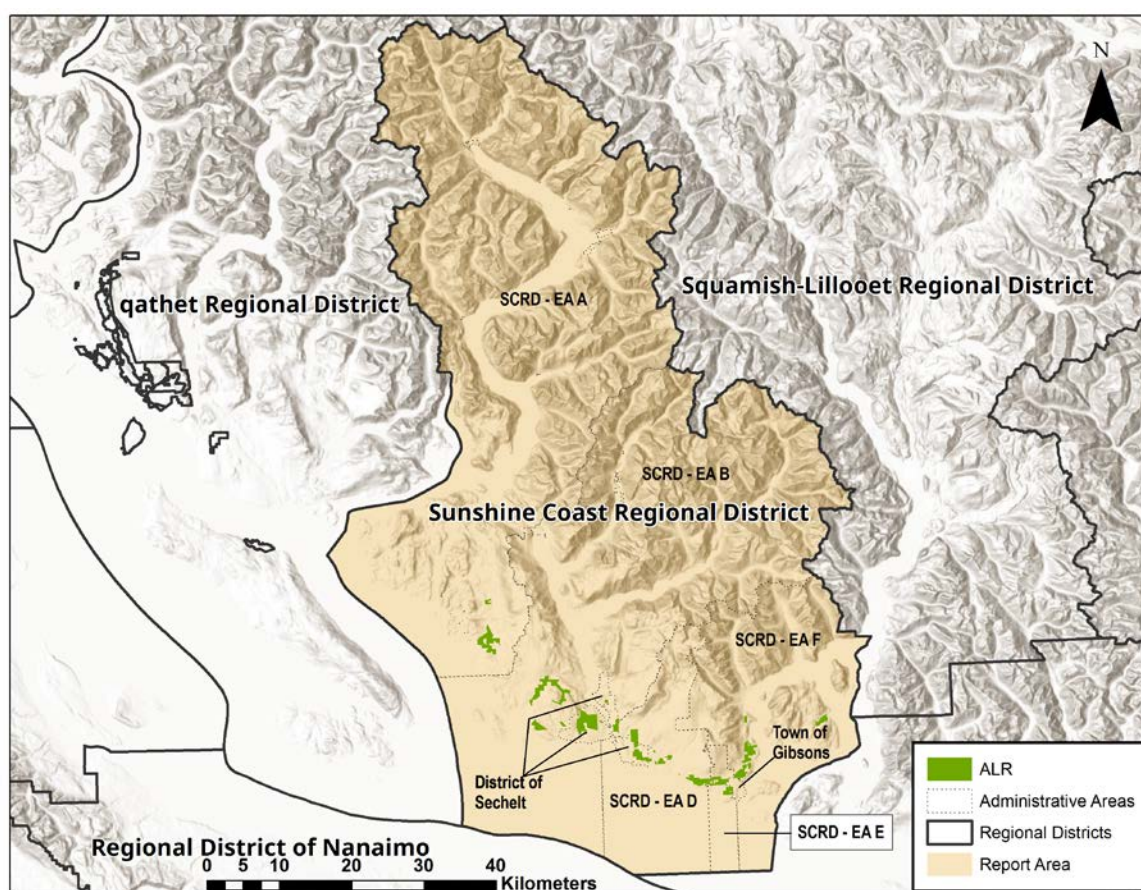


Figure 1 Map of Sunshine Coast Regional District

2. Methodology

The Model is based on a Geographic Information System (GIS) database that contains data on crop type, irrigation system type, soil texture and climate. An explanation of how the data is compiled for each variable is provided in this section. Figure 2 shows the surveyed area including all properties within the ALR and areas that were zoned for agriculture by the local governments. The survey was conducted by the Ministry of Agriculture (AGRI) staff, and professional contractors and summer students hired by the Ministry of Agriculture.

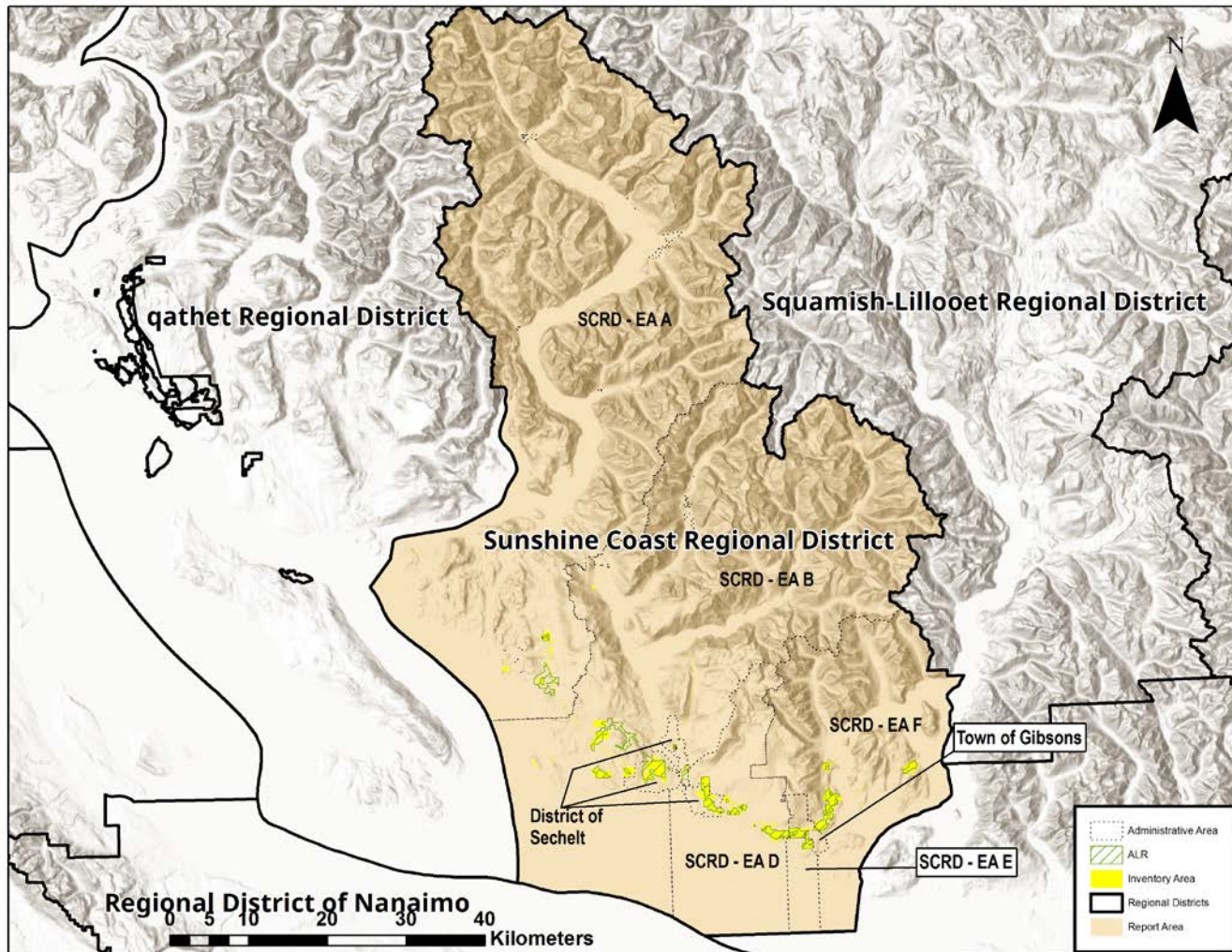


Figure 2 Map of the Surveyed Area

2.1. Cadastre and Polygon

Cadastre data was provided by the Integrated Cadastral Information Society (ICIS). All of the cadastre data was unified into one seamless cover for the entire project area. This process allows the Model to calculate water demand for each parcel and to report out on sub-basins, local governments, water purveyors or aquifers by summing the data for those areas. Aerial photographs were used to conduct an initial review of crop type by cadastre. Within each cadastre, permanent physical structures (e.g., farmstead and driveways) were separated from cropping areas by creating new polygons, and excluded from the calculation of water demand. If the difference in crop type

could be identified on the aerial photographs, the polygon would be split so each new polygon would contain a unique crop type. This data was entered in the GIS land use database that was used by the field crew to conduct and complete the Agricultural Land Use Inventory (ALUI).

2.2 Agricultural Land Use Inventory (ALUI)

The survey crew uses the land use database created to verify data about each property. Surveys were done in the summer of 2019. The survey crew drove by each property and checked the database for accuracy using visual observation and the aerial photographs on the survey maps. A Professional Agrologist with local knowledge verified what was on the site, and a GIS technician altered the codes in the database as necessary. When the survey was completed for the entire project area, post-survey data quality control was conducted to ensure the additional polygons were accurately entered into the database.

The smallest unit for which water use is calculated are the polygons within each cadastre. A polygon is determined by a change in crop type or irrigation system type within a cadastre. Polygons are designated as blue lines within each cadastre as shown in Figure 3 which provides an enhanced view of a cadastre containing three polygons. Each cadastre has a unique identifier as does each polygon. The polygon identifier is acknowledged by PolygonID. This allows the survey team to call up the cadastre in the database, review the number of polygons within the cadastre and ensure the land use is coded accurately for each polygon.

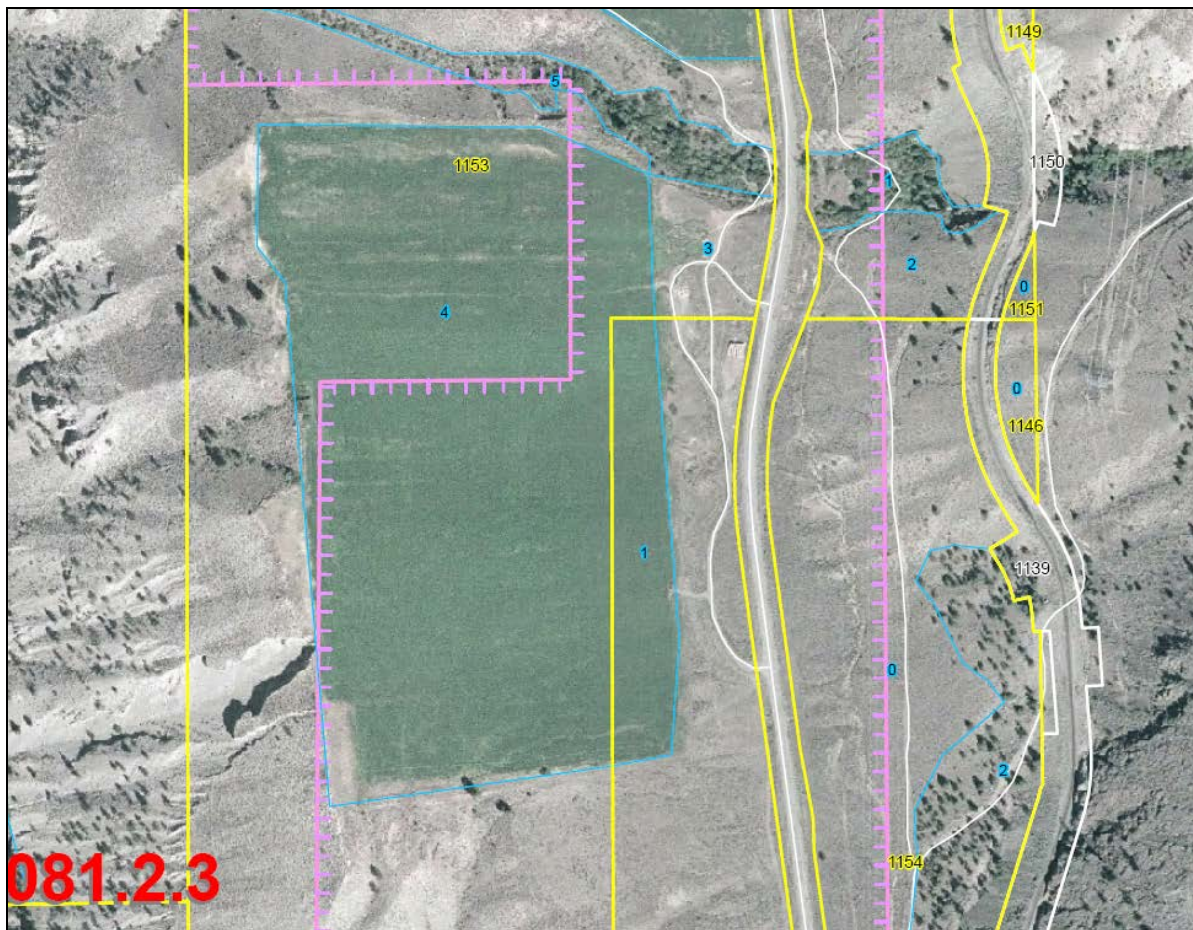


Figure 3 Cadastre with Polygons

2.3 Soil Information

Soil data was obtained digitally from the British Columbia Ministry of Environment. Soil attributes required for this project was the soil texture, the available water storage capacity, and the peak infiltration rate for each texture type.

The intersection of soil boundaries with the cadastre and land use polygons creates additional polygons that the Model uses to calculate water demand. Figure 4 shows how the land use information is divided into additional polygons using the soil boundaries. The Model calculates water demand using every different combination of crop, soil and irrigation system as identified by each polygon.

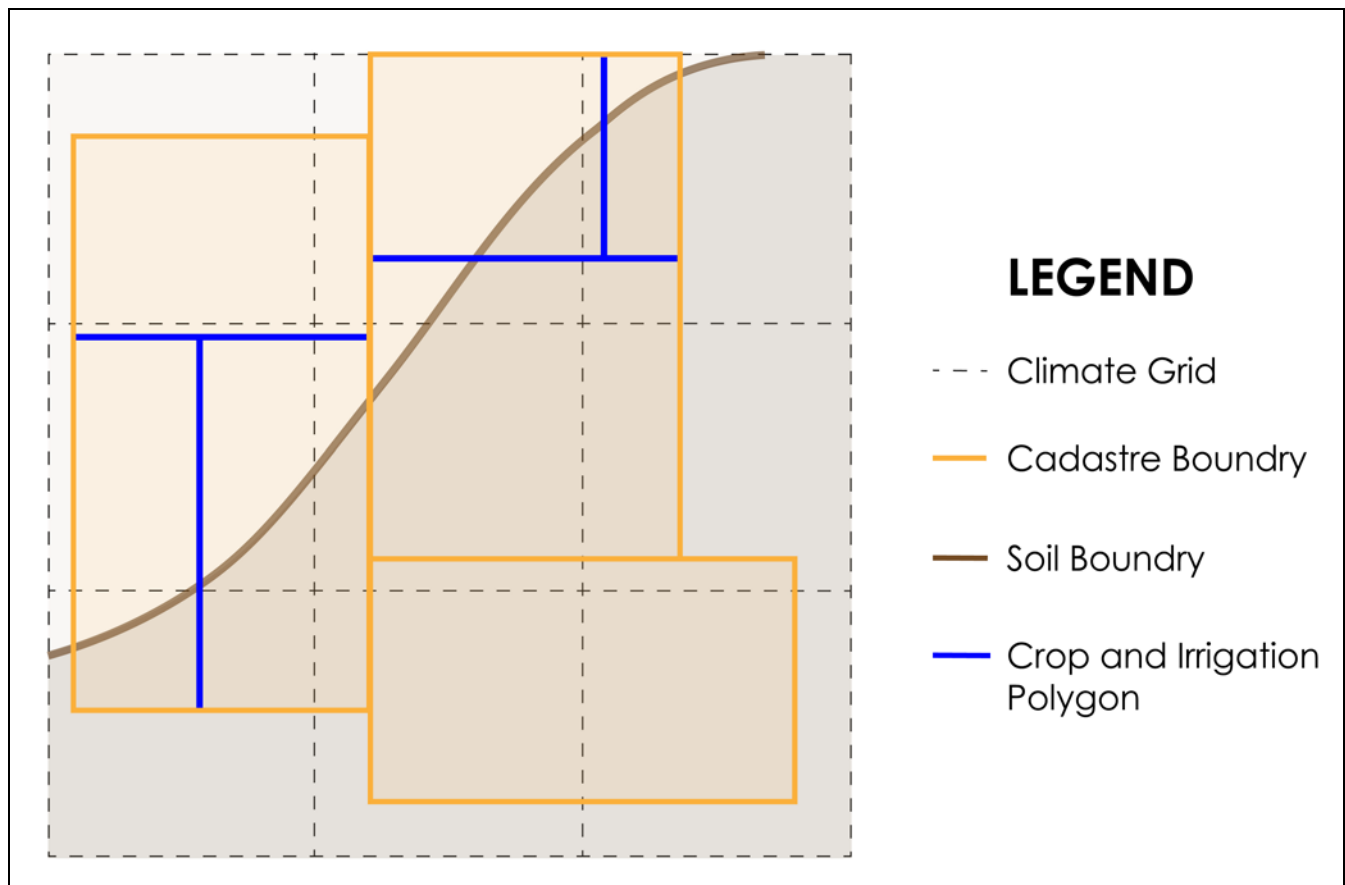


Figure 4 Polygon Attributes

2.4 Climate Information

The agricultural water demand is calculated using climate data, crop type, irrigation system type and soil texture. The climate generally gets cooler and wetter from south to north and as elevation increases. To incorporate the climatic diversity, climate layers were developed for the entire Province on a 500 metre by 500 metre grid. Each grid cell contains daily climate data, minimum and maximum temperature (T_{\min} and T_{\max}), and precipitation all of which allow the Model to calculate a daily reference evapotranspiration rate (ET_o) value. A range of agro-climatic indices such as growing degree days (GDD), corn heat units (CHU), frost free days and temperature sum (T-sum) can also be calculated for each grid cell based on temperature data. These values are used to determine seeding dates and the length of the growing season in the Model.

The climate dataset has been developed by using data collected from climate stations across the Province from 1961 to 2010. This climate dataset was then interpolated to provide a climate data layer for the entire Province on the 500 metre by 500 metre grid. The climate grid cell that is prominent for a cadastre boundary is assigned to that cadastre. Additional polygons are not generated with the climate grid.

The attributes attached to each climate grid cell include:

- Latitude
- Longitude
- Elevation
- Aspect
- Slope
- Daily Precipitation
- Daily T_{\min} and T_{\max}

A climate database contains T_{\min} , T_{\max} , T_{mean} and Precipitation for each day of the year from 1961 until 2010. The parameters that need to be selected, calculated and stored within the Model are evapotranspiration (ET_o), T-sum, effective precipitation (EP), frost free days, first frost date, GDD with base temperatures of 5 °C and 10 °C, and CHU. These climate and crop parameters are used to determine the growing season length as well as the beginning and end of the growing season in Julian day.

3. Model Calculations

The Model calculates the water demand for each polygon by using crop type, irrigation system type, soil texture and climate data as explained below. Each polygon was assigned an ID number as mentioned previously.

3.1 Crop

The CropID is an attribute of the PolygonID as each polygon contains a single crop. The crop information is collected (as observed during the land use survey) and stored with the PolygonID. CropID provides cropping attributes to the Model for calculating water use for each polygon. CropID along with the climate data is also used to calculate the growing season length and the beginning and end of the growing season. The attributes for CropID include rooting depth, availability coefficient, crop coefficient and a drip factor.

- Rooting depth is the rooting depth for a mature crop in a deep soil.
- An availability coefficient is assigned to each crop. The availability coefficient is used with the IrrigID to determine the soil moisture available to the crop for each PolygonID.
- The crop coefficient adjusts the calculated ET_o for the stages of crop growth during the growing season. Crop coefficient curves have been developed for every crop. The crop coefficient curve allows the Model to calculate water demand with an adjusted daily ET_o value throughout the growing season.
- The drip factor is used in the water use calculation for polygons where drip irrigation systems are used. Since the Model calculates water use by area, the drip factor adjusts the percentage of area irrigated by the drip system for that crop.

3.2 Irrigation

The IrrigID is an attribute of the PolygonID as each polygon has a single irrigation system type operating. The irrigation system type is collected (as observed during the land use survey) and stored with the PolygonID. The land use survey determines if a polygon has an irrigation system operating, what the system type is, and if the system is being used. The IrrigID contains an irrigation efficiency listed as an attribute.

Two of the IrrigID, Overtreedrip and Overtreemicro are polygons that have two systems in place. Two irrigation IDs occur when an overhead irrigation system has been retained to provide crop cooling or frost protection. In this case, the efficiency factors for drip and microsprinkler are used in the Model.

3.3 Soil

The digitized soil database came from the British Columbia Ministry of Environment. In addition, soil data provided by Agriculture and Agri-Food Canada (AAFC) was also used to generate multiple soil layers within each polygon. Each parcel was assigned the most predominant soil

polygon, and then for each crop field within that soil polygon, the most predominant texture within the crop's rooting depth was determined and assigned to the crop field.

Note that textures could repeat at different depths. The combined total of the thicknesses determined the most predominant texture. For example, a layer of 20 cm sand, followed by 40 cm clay and then 30 cm of sand would have sand be designated as the predominant soil texture.

The attributes attached to the SoilID is the Available Water Storage Capacity (AWSC) which is calculated using the soil texture and crop rooting depth.

The Maximum Soil Water Deficit (MSWD) is calculated to decide the parameters for the algorithm that is used to determine the Irrigation Requirement (IR). The Soil Moisture Deficit (SMD) at the beginning of the season is calculated using the same terms as the MSWD.

3.4 Climate

The climate data in the Model is used to calculate a daily reference evapotranspiration rate (ET_0) for each climate grid cell. The data that is required to calculate this value are:

- Elevation, metres (m)
- Latitude, degrees ($^{\circ}$)
- Minimum Temperature, degree Celsius ($^{\circ}\text{C}$)
- Maximum Temperature, degree Celsius ($^{\circ}\text{C}$)
- Classification as Coastal or Interior
- Classification as Arid or Humid
- Julian Day

Data that is assumed or are constants in this calculation are:

- Wind speed 2 m/s
- Albedo or canopy reflection coefficient, 0.23
- Solar constant, G_{sc} $0.082 \text{ MJ}^{-2}\text{min}^{-1}$
- Interior and Coastal coefficients, K_{Rs} 0.16 for interior locations
0.19 for coastal locations
- Humid and arid region coefficients, K_o 0 $^{\circ}\text{C}$ for humid/sub-humid climates
2 $^{\circ}\text{C}$ for arid/semi-arid climates

4. Livestock Water Use

Livestock type was observed and recorded during the land use survey as listed in Table 1. Livestock scale was also observed and entered into the database: very small, small, medium, large, very large, and very very large. The Model calculates an estimated livestock water demand using the livestock scale observed. Water use for each animal type is calculated differently depending on requirements. For example, for a dairy milking cow, the water demand for each animal includes, drinking, preparation for milking, pen and barn cleaning, milking system washout, bulk tank washout and milking parlor washing. However, for a dry dairy cow, the demand only includes drinking and pen and barn cleaning.

The water use is estimated on a daily basis per animal even though the facility is not cleaned daily. For example, for a broiler operation, the water use for cleaning a barn is calculated as 4 hours of pressure washing per cycle at a flow rate of 10 gallons per minute (gpm), multiplied by 6 cycles per barn with each barn holding 50,000 birds. On a daily basis, this is quite small with a value of 0.01 Litres per day per bird applied.

For all cases, the daily livestock water demand is applied to the farm location. However, in the case of beef, the livestock spend parts of the year on the range. Since the actual location of the animals cannot be ascertained, the water demand is applied to the home farm location, even though most of the demand will not be from this location. Therefore, the animal water demand on a watershed scale will work well, but not when the demand is segregated into sub-watersheds or groundwater areas.

The estimates used for each livestock are shown in Table 1.

Table 1 Livestock Water Demand (Litres/day)				
Animal Type	Drinking	Milking Preparation	Barn Component	Total
Milking Dairy Cow	65	5	15	85
Dry Cow	45		5	50
Swine	12		0.5	12.5
Poultry – Broiler	0.16		0.01	0.17
Poultry – Layer	0.08		0.01	0.09
Turkeys	0.35		0.01	0.36
Goats	8			8
Sheep	8			8
Beef – range, steer, bull, heifer	50			50
Horses	50			50

5. Report Area

The Sunshine Coast Regional District (SCRD) encompasses District of Sechelt, Town of Gibsons, and five Electoral Areas (Figure 5).

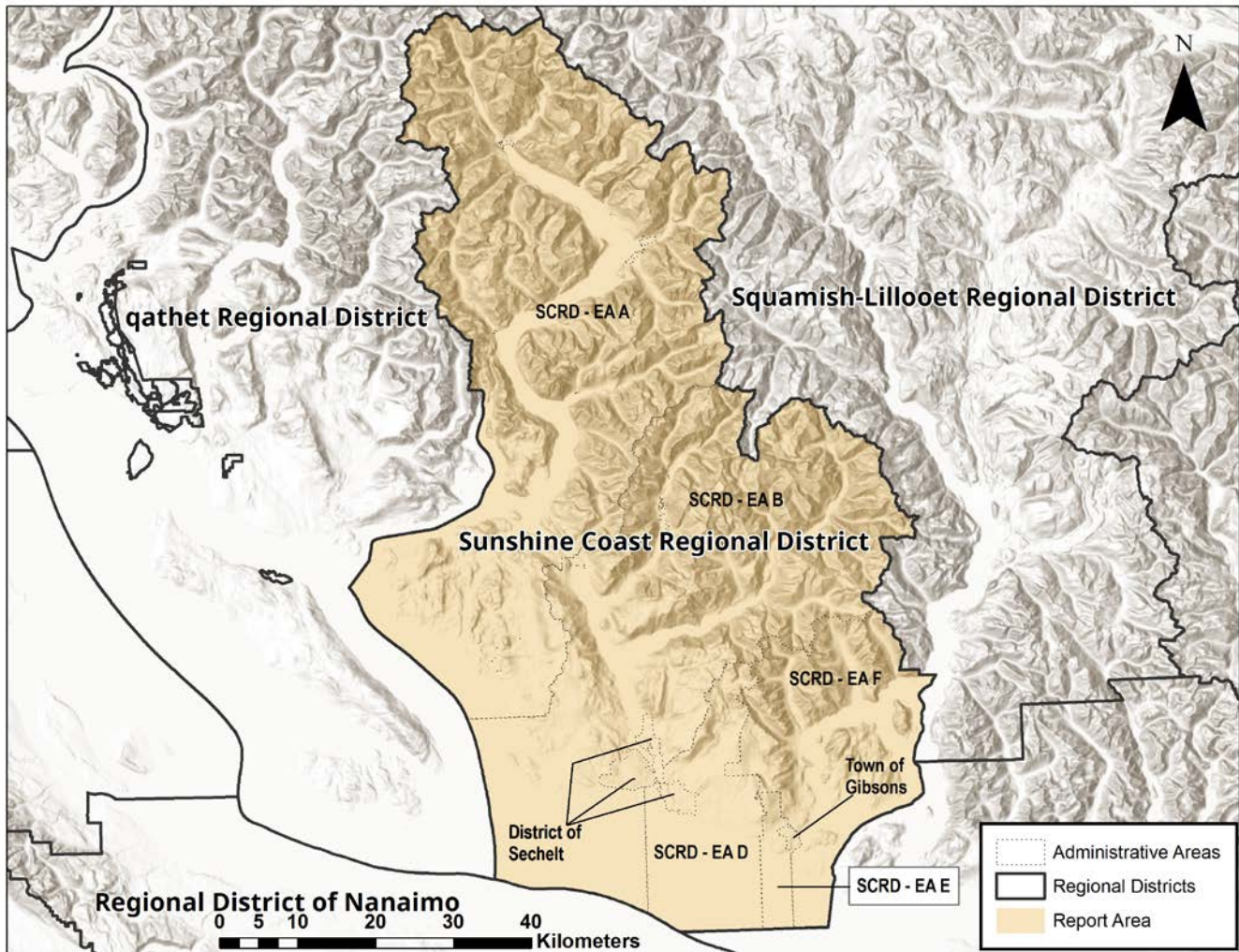


Figure 5 Administrative Areas in Sunshine Coast Regional District

6. Agricultural Water Demand Results

The Agriculture Water Demand Model (AWDM or “Model”) can generate modelled results using a series of pre-developed scenarios. The Appendix in this report includes summary tables of the modelled results. Climate data from years 1997 and 2003 were chosen as they represent a relatively wet year and dry year respectively. Most results in this report are based on climate data from year 2003 which represents the maximum water demand. Results using climate change scenarios in years 2053, 2056 and 2059 are also presented.

6.1 Annual Crop Water Demand – Tables A and B

The Model offers a selection of three irrigation management factors: good, average and poor. Unless otherwise noted, average management was used in the tables. Appendix Table A provides the annual irrigation water demand based on the crop and irrigation systems observed in the survey year, year 2003 climate data, and average irrigation management. Table B provides the same data for year 1997 climate data.

The total irrigated acreage in SCRD is 49.5 hectares (ha), including 15.5 ha of forage, and 14.8 ha of vegetable. In SCRD, 6 ha is supplied by licensed surface water sources, and 43.5 ha is irrigated with groundwater. Although groundwater licensing is required under the *Water Sustainability Act* (WSA) as of February 29, 2016, no or minimal groundwater licences were issued since then in the project area. Parcels that were observed to have irrigation were assumed to obtain water from aquifers if surface water licences do not exist and that the parcel is not purveyed by the local government.

The total annual irrigation demand was 276,365 m³ in 2003, and dropped to 163,173 m³ in 1997. During a wet year like 1997, the demand was only 59% of a hot dry year like 2003.

6.2 Annual Water Demand by Irrigation System – Table C

The irrigation demand can also be summarized by irrigation system type as shown in Table C. The more efficient irrigation system for vegetable is drip (including overtreedrip) which irrigates 3.8 ha in the project area, and for forage is low-pressure pivot which are not used in this area. There is also a large portion of the forage irrigated by less efficient sprinkler systems (including wheeline). Sprinkler and wheeline irrigate 40.9 ha (83%) of the agricultural crops.

6.3 Annual Water Demand by Soil Texture – Table D

The Model calculates water demand on a property by property basis and can summarize the data for each soil texture as shown in Table D. Where soil texture data is missing, the soil texture has been defaulted to sandy loam, i.e., “Sandy Loam (defaulted)”.

6.4 Annual Water Demand by Subbasin – Table E

The Model calculates water demand on a property by property basis and can summarize the data for each subbasin as shown in Table E.

6.5 Annual Water Demand by Water Purveyor – Table F

The Model calculates water demand on a property by property basis and can summarize the data for each water purveyor as shown in Table F. In SCRD, all water licences are held by private landowners.

6.6 Annual Water Demand by Local Government – Table G

The Model calculates water demand on a property by property basis and can summarize the data for irrigated area within each local government as shown in Table G.

6.7 Annual Water Demand by Electoral Area – Table H

The Model calculates water demand on a property by property basis and can summarize the data for irrigated area within each electoral area as shown in Table H.

6.8 Improved Irrigation Efficiency and Good Management – Table I

There is an opportunity to reduce water use by converting irrigation systems to a higher efficiency for some crops. For example, drip systems could be used for all fruit crops, vegetable crops and some of the other horticultural crops, but not forage crops. In addition, using better management such as irrigation scheduling techniques will also reduce water use, especially for forage where drip conversion is not possible. Table I provides a scenario of water demand if all sprinkler systems are converted to drip systems for horticultural crops in the project area, as well as converting irrigation systems to low-pressure pivot systems for forage fields over 10 ha, using good irrigation management. In this case, the water demand for 2003 would reduce from 276,365 m³ to 197,488 m³ (29% reduction).

6.9 Livestock Water Use – Table J

The Model provides an estimate of water use for livestock. The estimate is based on the number of animals in the project area as determined by the latest census, the drinking water required for each animal per day and the barn or milking parlour wash water. Values used are shown in Table J. For the project area, the amount of livestock water is estimated at 47,106 m³.

6.10 Crop Water Demand with Climate Change (Year 2050s Climate) for High Demand Years Using Surveyed Crops and Irrigation Systems and Good Management – Table K

The Model also has access to climate change information until the year 2100. While data can be run for each year, three driest years in the 2050s were selected to give a representation of climate change. Figure 6 shows the climate change results which indicate 2053, 2056, and 2059 generate the highest annual ET₀ and lowest annual precipitation. Therefore, these three years were used in this report. Table K provides the results of climate change on irrigation demand for the three years selected using crop types and irrigation system types captured in the land use survey. Surveyed crop and irrigation system types were used to show the increase due to climate change alone, with no other changes taking place.

Figure 7 shows all of the climate change scenario runs for the Okanagan using 12 climate change models from year 1960 to 2100. This work was compiled by Denise Neilsen, a retired research

scientist at the Agriculture and Agri-Food Canada – Summerland Research and Development Centre. There is a lot of scatter in this figure, but it is obvious that there is a trend of increasing water demand.

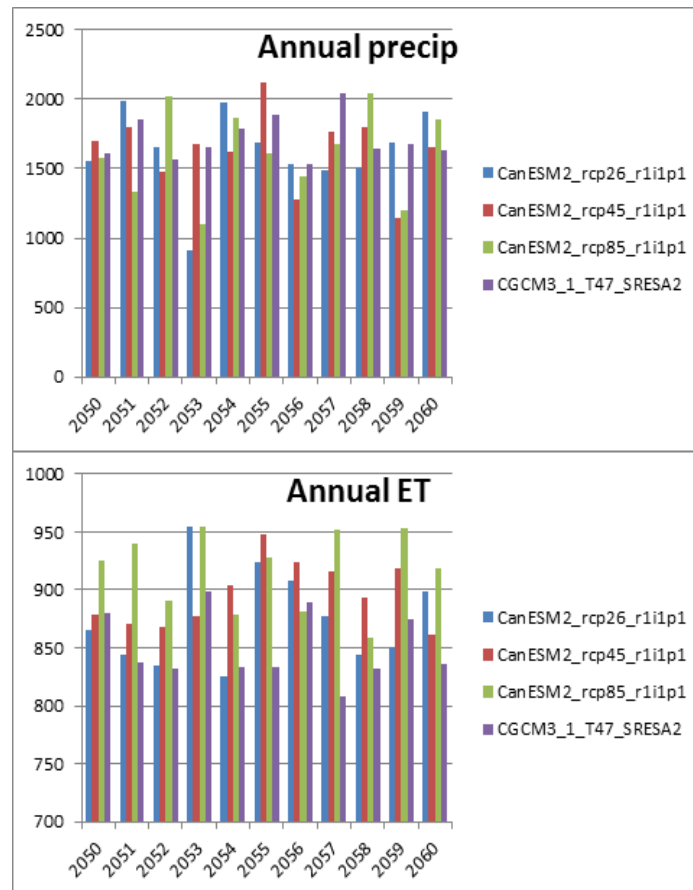


Figure 6 Annual ET and Effective Precipitation in Year 2050s

The three climate change models used in this report are access1 rcp85, canESM2 rcp85 and cnrm-cm5 rcp85. Running only three climate change models on three selected future years in the project area is not sufficient to provide a trend like in Figure 7. What the results do show is that in an extreme climate scenario, it is possible to have an annual water demand that is 67% higher than what was experienced in year 2003 based on canESM2 rcp85 climate model in year 2053. More runs of the climate change models will be required to better estimate a climate change trend for the region.

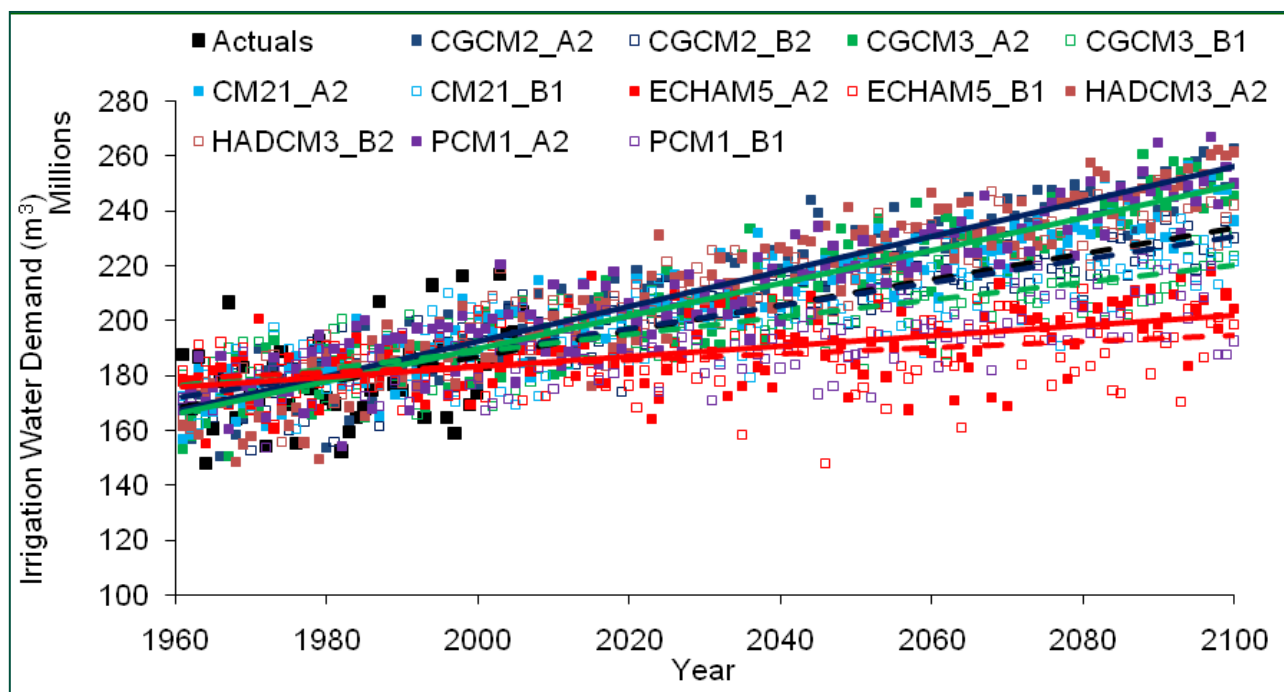


Figure 7 Future Irrigation Demand for All Outdoor Uses in the Okanagan in Response to Observed Climate Data (Actuals) and Future Climate Data Projected from a Range of Global Climate Models

6.11 Water Demand by Crop with Buildout, Year 2003 Climate, and Good Management – Table L

An agricultural irrigated buildout scenario was developed that looked at potential agricultural lands that could be irrigated in the future. The rules used to establish where potential additional agricultural lands were located are as follows:

- within 1,000 m of water supply (lake)
- within 1,000 m of water supply (water course)
- within 1,000 m of water supply (wetland)
- within 1,000 m of high productivity aquifer
- within 1,000 m of water purveyor
- within 125 m elevation from the surface water source to the property
- with Ag Capability class 1-4 only where available
- must be within the ALR
- below 750 m average elevation
- must be private ownership

Permanent physical structure (e.g., farmstead, houses, driveways) are not considered to be available for the buildout scenario. For the areas that are determined to be eligible for future buildout, a crop type and irrigation system type need to be applied. Where a crop already exists in the land use inventory, that crop would remain and an irrigation system type assigned. If no crop exists, then a crop type and an irrigation system type would be assigned as per the criteria below:

- 40% berries – 100% drip
- 30% forage – 50% sprinkler, 50% low-pressure centre pivot
- 30% vegetables – 100% drip

Figure 8 indicates the location of agricultural land that is currently irrigated (blue) and the land that can be potentially irrigated (red). Based on the scenario provided for the project area, the additional agricultural land that could be irrigated is 555 ha, which is an increase in irrigated acreage of 1,120%. The water demand for a year like 2003 would then be about 2 million m³ assuming efficient irrigation systems and good management.

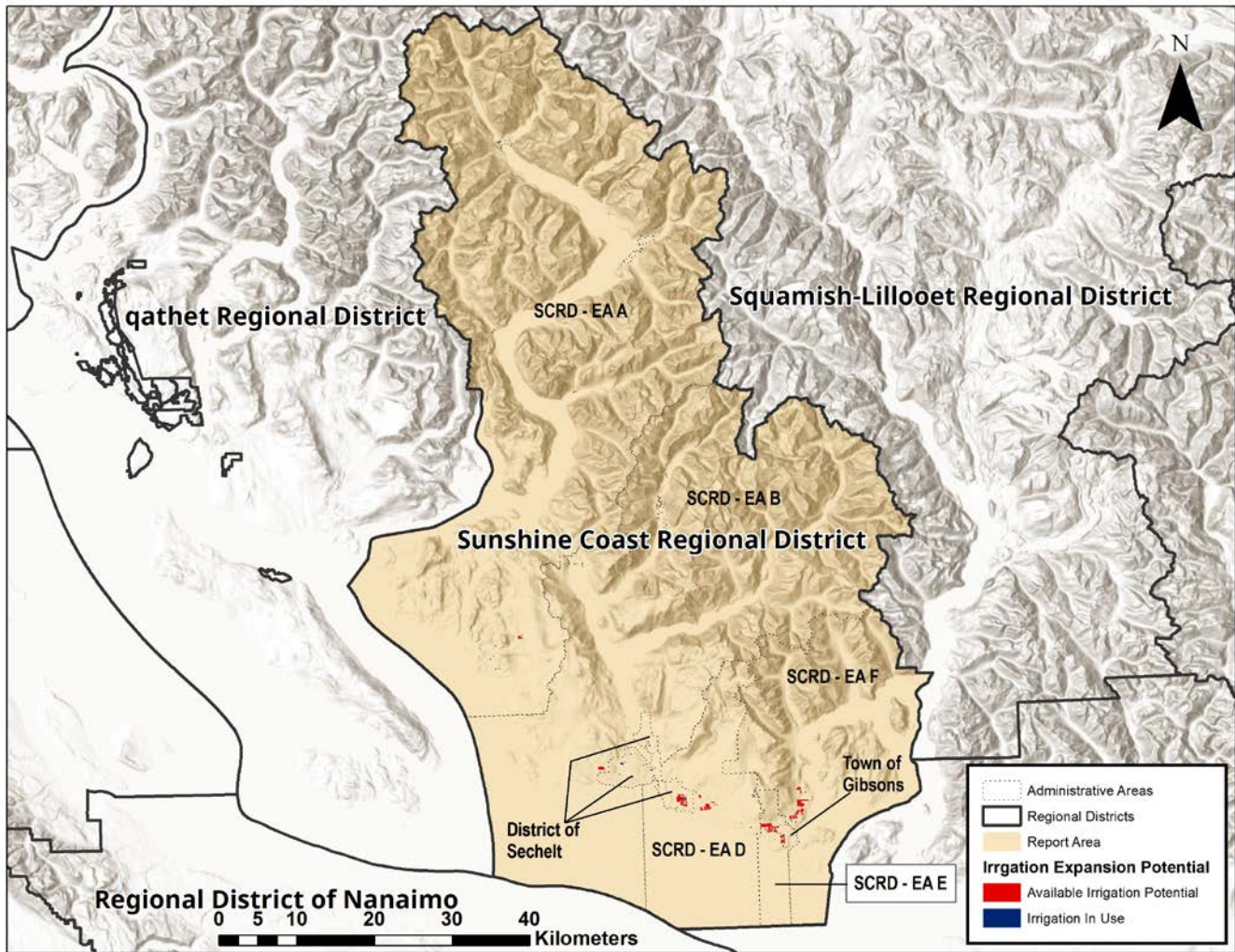


Figure 8 Irrigation Expansion Potential for the Project Area

6.12 Crop Water Demand with Buildout, Climate Change (Year 2050s Climate for High Demand Years), and Good Management – Table M

The same irrigation expansion and cropping scenario used to generate the values in Table K were used to generate the water demand with climate change as shown in Table M. See discussion under Table L section. When climate change is added to the buildout scenario, the water demand increases from almost half a million m³ to 3.7 million m³ (a further 715% increase) based on climate change model canESM2 rcp85 in Year 2053 using the highest potential scenario.

6.13 Water Demand by Irrigation System with Buildout, Year 2003 Climate, and Good Management – Table N

Table N provides an account of the irrigation systems used by area for the buildout scenario in the previous two examples. Note that pivot irrigation (especially low-pressure type) is expected to be used for forage field over 10 ha in size to be economically feasible.

6.14 Water Demand by Soil Texture with Buildout, Year 2003 Climate, and Good Management – Table O

Table O provides the water demand by soil type for the buildout scenario used in this report. Comparing these values with the result in Table D will provide information on the possible increased water demand by soil type for the projected irrigated areas.

6.15 Water Demand by Subbasin with Buildout, Year 2003 Climate, and Good Management – Table P

Table P provides the water demand by subbasin for the buildout scenario used in this report. Comparing these values with the result in Table E will provide information on the possible increased water demand in each subbasin for the projected irrigated areas.

6.16 Water Demand by Water Purveyor with Buildout, Year 2003 Climate, and Good Management – Table Q

Table Q provides the water demand by water purveyor for the buildout scenario used in this report. Comparing these values with the result in Table F will provide information on the possible increased water demand by each water purveyor for the projected irrigated areas. Naming convention for water purveyors follows the approved version published by GeoBC.

6.17 Water Demand by Local Government with Buildout, Year 2003 Climate, and Good Management – Table R

Table R provides the water demand by local government for the buildout scenario used in this report. Comparing these values with the result in Table G will provide information on the possible increased water demand in each local government for the projected irrigated areas.

6.18 Water Demand by Electoral Area with Buildout, Year 2003 Climate, and Good Management – Table S

Table S provides the water demand by electoral area for the buildout scenario used in this report. Comparing these values with the result in Table H will provide information on the possible increased water demand in each electoral area for the projected irrigated areas.

Literature

Cannon, A.J., and Whitfield, P.H. (2002), Synoptic map classification using recursive partitioning and principle component analysis. *Monthly Weather Rev.* 130:1187-1206.

Cannon, A.J. (2008), Probabilistic multi-site precipitation downscaling by an expanded Bernoulli-gamma density network. *Journal of Hydrometeorology*. <http://dx.doi.org/10.1175%2F2008JHM960.1>
Intergovernmental Panel on Climate Change (IPCC) (2008), Fourth Assessment Report –AR4. <http://www.ipcc.ch/ipccreports/ar4-syr.htm>

Merritt, W, Alila, Y., Barton, M., Taylor, B., Neilsen, D., and Cohen, S. 2006. Hydrologic response to scenarios of climate change in the Okanagan Basin, British Columbia. *J. Hydrology*. 326: 79-108.

Neilsen, D., Smith, S., Frank, G., Koch, W., Alila, Y., Merritt, W., Taylor, B., Barton, M, Hall, J. and Cohen, S. 2006. Potential impacts of climate change on water availability for crops in the Okanagan Basin, British Columbia. *Can. J. Soil Sci.* 86: 909-924.

Neilsen, D., Duke, G., Taylor, W., Byrne, J.M., and Van der Gulik T.W. (2010). Development and Verification of Daily Gridded Climate Surfaces in the Okanagan Basin of British Columbia. *Canadian Water Resources Journal* 35(2), pp. 131-154. <http://www4.agr.gc.ca/abstract-resume/abstract-resume.htm?lang=eng&id=21183000000448>

Allen, R. G., Pereira, L. S., Raes, D. and Smith, M. 1998. Crop evapotranspiration Guidelines for computing crop water requirements. FAO Irrigation and Drainage Paper 56. United Nations Food and Agriculture Organization. Rome. 100pp

Appendix Tables

Appendix Table A Water Demand by Crop Using Year 2003 Climate and Average Management

Appendix Table B Water Demand by Crop Using Year 1997 Climate and Average Management

Appendix Table C Water Demand by Irrigation System Using Year 2003 Climate and Average Management

Appendix Table D Water Demand by Soil Texture Using Year 2003 Climate and Average Management

Appendix Table E Water Demand by Subbasin Using Year 2003 Climate and Average Management

Appendix Table F Water Demand by Water Purveyor Using Year 2003 Climate and Average Management

Appendix Table G Water Demand by Local Government Using Year 2003 Climate and Average Management

Appendix Table H Water Demand by Electoral Area Using Year 2003 Climate and Average Management

Appendix Table I Water Demand by Crop Using Improved Irrigation System Efficiency, Year 2003 Climate, and Good Management

Appendix Table J Water Demand by Animal Type Using Year 2003 Climate

Appendix Table K Crop Water Demand with Climate Change (Year 2050s Climate for High Demand Years) Using Surveyed Crops and Irrigation Systems and Good Management

Appendix Table L Water Demand by Crop with Buildout, Year 2003 Climate, and Good Management

Appendix Table M Crop Water Demand with Buildout, Climate Change (Year 2050s Climate for High Demand Years), and Good Management

Appendix Table N Water Demand by Irrigation System with Buildout, Year 2003 Climate, and Good Management

Appendix Table O Water Demand by Soil with Buildout, Year 2003 Climate, and Good Management

Appendix Table P Water Demand by Subbasin with Buildout, Year 2003 Climate, and Good Management

Appendix Table Q Water Demand by Water Purveyor with Buildout, Year 2003 Climate, and Good Management

Appendix Table R Water Demand by Local Government with Buildout, Year 2003 Climate, and Good Management

Appendix Table S Water Demand by Electoral Area with Buildout, Year 2003 Climate, and Good Management

Appendix Table A. Water Demand by Crop Using Year 2003 Climate and Average Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Crop Group	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Apple	0.5	2,715	546	0	0	0	3.5	16,325	473	3.9	19,040	482
Berry	0	0	0	0	0	0	0.4	1,507	405	0.4	1,507	405
Blueberry	0	0	0	0	0	0	0.5	1,528	318	0.5	1,528	318
Cherry	0	73	505	0	0	0	0	0	0	0	73	505
Forage	4.9	36,797	748	0	0	0	10.6	63,860	605	15.5	100,656	651
Fruit	0	0	0	0	0	0	5.3	33,070	619	5.3	33,070	619
Grape	0	0	0	0	0	0	0.3	791	254	0.3	791	254
Nursery Floriculture	0	0	0	0	0	0	0.1	227	259	0.1	227	259
Nursery Shrubs/Trees	0	0	0	0	0	0	2.6	11,674	443	2.6	11,674	443
Pasture/Grass	0	0	0	0	0	0	1.2	5,826	482	1.2	5,826	482
Raspberry	0	46	382	0	0	0	0.2	1,306	540	0.3	1,352	533
Recreational Turf	0	0	0	0	0	0	2.3	12,584	554	2.3	12,584	554
Sweetcorn	0.3	909	331	0	0	0	0	0	0	0.3	909	331
Vegetable	0.3	1,353	465	0	0	0	14.6	66,955	460	14.8	68,308	460
	6	41,925	697	0	0	0	43.5	234,439	539	49.50	276,365	558

Appendix Table B. Water Demand by Crop Using Year 1997 Climate and Average Management

Year: 1997	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Crop Group	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Apple	0.5	1,710	344	0	0	0	3.5	9,205	267	3.9	10,914	276
Berry	0	0	0	0	0	0	0.4	822	221	0.4	822	221
Blueberry	0	0	0	0	0	0	0.5	1,024	213	0.5	1,024	213
Cherry	0	44	305	0	0	0	0	0	0	0	44	305
Forage	4.9	24,030	488	0	0	0	10.6	38,006	360	15.5	62,037	401
Fruit	0	0	0	0	0	0	5.3	20,578	385	5.3	20,578	385
Grape	0	0	0	0	0	0	0.3	244	78	0.3	244	78
Nursery Floriculture	0	0	0	0	0	0	0.1	161	184	0.1	161	184
Nursery Shrubs/Trees	0	0	0	0	0	0	2.6	6,361	242	2.6	6,361	242
Pasture/Grass	0	0	0	0	0	0	1.2	3,546	294	1.2	3,546	294
Raspberry	0	25	204	0	0	0	0.2	753	312	0.3	778	307
Recreational Turf	0	0	0	0	0	0	2.3	9,188	404	2.3	9,188	404
Sweetcorn	0.3	597	217	0	0	0	0	0	0	0.3	597	217
Vegetable	0.3	962	331	0	0	0	14.6	45,917	316	14.8	46,879	316
	6	27,399	456	0	0	0	43.5	153,601	353	49.50	163,173	343

Appendix Table C. Water Demand by Irrigation System Using Year 2003 Climate and Average Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Irrigation System	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Drip	0	0	0	0	0	0	2.4	18,772	775	2.4	18,772	775
Landscapesprinkler	0	0	0	0	0	0	2.3	12,584	554	2.3	12,584	554
Microsprinkler	0	33	735	0	0	0	0.1	1,000	726	0.1	1,033	726
Overtreedrip	0	0	0	0	0	0	1.4	4,734	338	1.4	4,734	338
Sprinkler	6	41,893	697	0	0	0	28.5	150,759	529	34.5	192,652	558
Ssovertree	0	0	0	0	0	0	2.4	11,201	468	2.4	11,201	468
Wheelline	0	0	0	0	0	0	6.4	35,390	554	6.4	35,390	554
	6	41,925	697	0	0	0	43.5	234,439	539	49.50	276,365	558

Appendix Table D. Water Demand by Soil Using Year 2003 Climate and Average Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Soil Texture	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Cultured Medium	0	33	735	0	0	0	2	18,788	937	2	18,820	936
Loam	0	0	0	0	0	0	0.6	2,867	469	0.6	2,867	469
Loamy Sand	0.2	741	492	0	0	0	7.5	39,248	524	7.6	39,989	524
Organic	0	0	0	0	0	0	0.6	2,229	396	0.6	2,229	396
Sand	5.9	41,152	702	0	0	0	21.4	117,243	547	27.3	158,394	581
Sandy Loam	0	0	0	0	0	0	0.8	4,161	499	0.8	4,161	499
Sandy Loam (defaulted)	0	0	0	0	0	0	0.4	1,369	317	0.4	1,369	317
Silt Loam	0	0	0	0	0	0	8.3	42,406	508	8.3	42,406	508
Silty Clay	0	0	0	0	0	0	1.7	5,795	339	1.7	5,795	339
Silty Clay Loam	0	0	0	0	0	0	0.1	334	330	0.1	334	330
	6	41,925	697	0	0	0	43.5	234,439	539	49.50	276,365	558

Appendix Table E. Water Demand by Subbasin Using Year 2003 Climate and Average Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Subbasin	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Amderson Creek	0	0	0	0	0	0	0.3	2,985	928	0.3	2,985	928
Carlson Creek	0.2	761	497	0	0	0	12.1	58,311	482	12.3	59,073	482
Gambier Creek	0	0	0	0	0	0	0.6	2,951	493	0.6	2,951	493
Jervis Inlet	0	0	0	0	0	0	1.5	10,716	694	1.5	10,716	694
Langdale Creek	0	0	0	0	0	0	0.5	2,198	427	0.5	2,198	427
Malcolm Creek	0	13	730	0	0	0	21.8	118,705	544	21.8	118,717	544
Roberts Creek	0	0	0	0	0	0	0	114	576	0	114	576
Wilson Creek	5.9	41,152	702	0	0	0	6.6	38,459	586	12.4	79,611	641
	6	41,925	697	0	0	0	43.5	234,439	539	49.50	276,365	558

Appendix Table F. Water Demand by Water Purveyor Using Year 2003 Climate and Average Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Water Purveyor	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Private	6	41,925	697	0	0	0	43.5	234,439	539	49.5	276,365	558
	6	41,925	697	0	0	0	43.5	234,439	539	49.5	276,365	558
	6	41,925	697	0	0	0	43.5	234,439	539	49.50	276,365	558

Appendix Table G. Water Demand by Local Government Using Year 2003 Climate and Average Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Local Government	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
District Of Sechelt	6	41,913	697	0	0	0	16.2	84,828	525	22.2	126,741	571
Sunshine Coast Regional District	0	13	730	0	0	0	27.2	149,083	547	27.2	149,096	547
Town Of Gibsons	0	0	0	0	0	0	0.1	528	506	0.1	528	506
	6	41,925	697	0	0	0	43.5	234,439	539	49.50	276,365	558

Appendix Table H. Water Demand by Electoral Area Using Year 2003 Climate and Average Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Electoral Area	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Other	6	41,913	697	0	0	0	16.3	85,356	525	22.3	127,269	571
SCRD Electoral Area A (Egmont / Pender Harbour)	0	0	0	0	0	0	1.5	10,373	705	1.5	10,373	705
SCRD Electoral Area B (Halfmoon Bay)	0	0	0	0	0	0	0.4	2,160	536	0.4	2,160	536
SCRD Electoral Area D (Roberts Creek)	0	13	730	0	0	0	6.5	31,781	492	6.5	31,794	492
SCRD Electoral Area E (Elphinstone)	0	0	0	0	0	0	10.5	62,227	593	10.5	62,227	593
SCRD Electoral Area F (West Howe Sound)	0	0	0	0	0	0	8.4	42,543	506	8.4	42,543	506
	6	41,925	697	0	0	0	43.5	234,439	539	49.5	276,365	558

Appendix Table I. Water Demand by Crop Using Improved Irrigation System Efficiency, Year 2003 Climate, and Good Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Crop Group	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Apple	0.5	1,493	300	0	0	0	3.5	10,081	292	3.9	11,574	293
Berry	0	0	0	0	0	0	0.4	1,493	402	0.4	1,493	402
Blueberry	0	0	0	0	0	0	0.5	1,461	304	0.5	1,461	304
Cherry	0	42	290	0	0	0	0	0	0	0	42	290
Forage	4.9	36,074	733	0	0	0	10.6	61,237	580	15.5	97,312	629
Fruit	0	0	0	0	0	0	5.3	17,888	335	5.3	17,888	335
Grape	0	0	0	0	0	0	0.3	774	248	0.3	774	248
Nursery Floriculture	0	0	0	0	0	0	0.1	217	248	0.1	217	248
Nursery Shrubs/Trees	0	0	0	0	0	0	2.6	11,435	434	2.6	11,435	434
Pasture/Grass	0	0	0	0	0	0	1.2	5,654	468	1.2	5,654	468
Raspberry	0	45	374	0	0	0	0.2	1,281	530	0.3	1,326	523
Recreational Turf	0	0	0	0	0	0	2.3	12,337	543	2.3	12,337	543
Sweetcorn	0.3	876	319	0	0	0	0	0	0	0.3	876	319
Vegetable	0.3	685	236	0	0	0	14.6	34,414	236	14.8	35,099	236
	6	39,216	653	0	0	0	41.5	158,272	381	47.50	197,488	416

Appendix Table J. Water Demand by Animal Type Using Year 2003 Climate

Year: 2003	Water Demand (m3)
Animal Type	
Beef	5,475
Goats	2,570
Horses	32,430
Poultry - broiler	543
Poultry - laying	287
Sheep	4,774
Swine	1,027
	47,106

Appendix Table K. Crop Water Demand with Climate Change (Year 2050s Climate for High Demand Years) Using Surveyed Crops and Irrigation Systems and Good Management

	Climate Model									Crop Irrigation Total		
	Access1 rcp85			CanESM2 rcp85			cnrm-cm5 rcp85					
Year	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
2053	49.50	307,786	621	49.50	461,472	932	49.50	242,014	489	49.50	337,091	681
2056	49.50	326,486	659	49.50	237,785	480	49.50	192,298	388	49.50	252,190	509
2059	49.50	318,044	642	49.50	435,981	880	49.50	245,854	496	49.50	333,293	673

Appendix Table L. Water Demand by Crop with Buildout, Year 2003 Climate, and Good Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Crop Group	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Apple	0.5	2,644	531	0	0	0	3.5	15,982	463	3.9	18,627	472
Berry	142.40	345,891	243	0	0	0	143	318,038	222	285.40	663,929	233
Blueberry	0	0	0	0	0	0	0.5	1,461	304	0.5	1,461	304
Cherry	0	70	484	0	0	0	0	0	0	0	70	484
Forage	82.4	477,527	579	0	0	0	111.7	533,686	478	194.10	1,011,214	521
Fruit	0	0	0	0	0	0	5.3	32,411	607	5.3	32,411	607
Grape	0	0	0	0	0	0	0.3	774	248	0.3	774	248
Nursery Floriculture	0.00	0	0	0	0	0	0.1	217	248	0.10	217	248
Nursery Shrubs/Trees	0	0	0	0	0	0	2.6	11,435	434	2.6	11,435	434
Pasture/Grass	0	0	0	0	0	0	1.2	5,654	468	1.2	5,654	468
Raspberry	0	45	374	0	0	0	0.2	1,281	530	0.30	1,326	523
Recreational Turf	0	0	0	0	0	0	2.3	12,337	543	2.3	12,337	543
Sweetcorn	0.3	876	319	0	0	0	0	0	0	0.3	876	319
Vegetable	50.8	121,941	240	0	0	0	54.8	152,876	279	105.6	274,817	260
	276.40	948,995	343	0	0	0	325.6	1,086,152	334	604.00	2,053,967	340

Appendix Table M. Crop Water Demand with Buildout, Climate Change (Year 2050s Climate for High Demand Years), and Good Management

	Climate Model									Crop Irrigation Total		
	Access1 rcp85			CanESM2 rcp85			cnrm-cm5 rcp85					
Year	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
2053	604.00	2,589,736	429	604.00	3,763,071	623	604.00	1,903,556	315	604.00	2,752,121	456
2056	604.00	2,814,538	466	604.00	1,956,364	324	604.00	1,353,182	224	604.00	2,041,361	338
2059	604.00	2,465,724	408	604.00	3,571,784	591	604.00	1,806,005	299	604.00	2,614,504	433

Appendix Table N. Water Demand by Irrigation System with Buildout, Year 2003 Climate, and Good Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Irrigation System	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Drip	192.90	466,505	242	0	0	0	185.3	422,619	228	378.20	889,125	235
Landscapesprinkler	0	0	0	0	0	0	2.3	12,337	543	2.3	12,337	543
Microsprinkler	0	33	735	0	0	0	0.1	1,000	726	0.1	1,033	726
Overtreedrip	0	0	0	0	0	0	1.4	4,620	330	1.4	4,620	330
PivotLP	22.8	125,193	549	0	0	0	77.4	361,036	466	100.2	486,229	485
Sprinkler	60.7	357,297	589	0	0	0	52.2	258,674	495	112.9	615,971	545
Ssovertree	0	0	0	0	0	0	2.4	10,872	454	2.4	10,872	454
Wheelline	0	0	0	0	0	0	6.4	33,781	529	6.4	33,781	529
	276.40	949,027	343	0	0	0	327.6	1,104,940	337	604.00	2,053,967	340

Appendix Table O. Water Demand by Soil with Buildout, Year 2003 Climate, and Good Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Soil Texture	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Cultured Medium	0	33	735	0	0	0	2	18,788	937	2	18,820	936
Loam	7.5	48,512	645	0	0	0	1.7	6,198	370	9.2	54,710	595
Loamy Sand	69	229,727	333	0	0	0	28.8	116,662	405	97.8	346,389	354
Organic	0	0	0	0	0	0	2	5,080	248	2	5,080	248
Sand	149.4	469,003	314	0	0	0	175.6	594,881	339	325	1,063,884	327
Sandy Loam	2.8	15,752	565	0	0	0	0.8	4,099	492	3.60	19,851	548
Sandy Loam (defaulted)	13.6	38,394	283	0	0	0	0.4	1,339	310	14	39,733	283
Silt Loam	20.3	94,591	467	0	0	0	80.7	257,726	319	100.9	352,317	349
Silty Clay	13.9	53,015	381	0	0	0	7.8	16,835	216	21.7	69,850	322
Silty Clay Loam	0	0	0	0	0	0	27.7	83,333	300	27.7	83,333	300
	276.40	949,027	343	0	0	0	327.6	1,104,940	337	604.00	2,053,967	340

Appendix Table P. Water Demand by Subbasin with Buildout, Year 2003 Climate, and Good Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Subbasin	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Anderson Creek	5.90	15,101	256	0	0	0	0.3	2,985	928	6.20	18,086	291
Carlson Creek	33.3	166,864	501	0	0	0	12.1	56,106	463	45.4	222,970	491
Chapman Creek	0	0	0	0	0	0	1.1	2,363	214	1.1	2,363	214
Gambier Creek	0	0	0	0	0	0	0.6	2,893	484	0.6	2,893	484
Jervis Inlet	28.1	73,618	262	0	0	0	60.3	189,415	314	88.4	263,033	298
Langdale Creek	0	0	0	0	0	0	45.9	162,861	355	45.9	162,861	355
Malcolm Creek	119.6	381,334	319	0	0	0	95.2	349,616	367	214.8	730,950	340
Myers Creek	4.1	14,718	361	0	0	0	0	0	0	4.1	14,718	361
Roberts Creek	2.5	9,405	379	0	0	0	0	112	568	2.5	9,517	381
Wilson Creek	83	287,987	347	0	0	0	112	338,588	302	195.1	626,575	321
	276.40	949,027	343	0	0	0	327.6	1,104,940	337	604.00	2,053,967	340

Appendix Table Q. Water Demand by Water Purveyor with Buildout, Year 2003 Climate, and Good Management

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Water Purveyor	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Sechelt First Nation	2.7	7,452	272	0	0	0	0	0	0	2.7	7,452	272
	2.7	7,452	272	0	0	0	0	0	0	2.7	7,452	272
Private	273.70	941,576	344	0	0	0	327.6	1,104,940	337	601.30	2,046,516	340
	273.70	941,576	344	0	0	0	327.6	1,104,940	337	601.30	2,046,516	340
	276.40	949,027	343	0	0	0	327.6	1,104,940	337	604.00	2,053,967	340

Appendix Table R. Water Demand by Local Government with **Buildout, Year 2003 Climate, and Good Management**

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Local Government	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
District Of Sechelt	6.50	42,092	652	0	0	0	122.7	385,313	314	129.20	427,405	331
Sechelt First Nation	2.7	7,452	272	0	0	0	0	0	0	2.7	7,452	272
Sunshine Coast Regional District	261.9	881,870	337	0	0	0	204.7	719,105	351	466.7	1,600,975	343
Town Of Gibsons	5.3	17,614	332	0	0	0	0.1	521	499	5.4	18,136	335
	276.40	949,027	343	0	0	0	327.6	1,104,940	337	604.00	2,053,967	340

Appendix Table S. Water Demand by Electoral Area with **Buildout, Year 2003 Climate, and Good Management**

Year: 2003	Water Source									Total		
	Surface Water			Reclaimed Water			Groundwater					
Electoral Area	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)	Irrigated Area (ha)	Irrigation Demand (m³)	Avg.Req. (mm)
Other	14.5	67,158	463	0	0	0	122.8	385,834	314	137.3	452,992	330
SCRD Electoral Area A (Egmont / Pender Harbour)	13.6	38,352	283	0	0	0	1.5	10,343	703	15	48,696	324
SCRD Electoral Area B (Halfmoon Bay)	29.9	157,631	526	0	0	0	0.4	2,140	531	30.4	159,771	526
SCRD Electoral Area D (Roberts Creek)	79.7	257,095	323	0	0	0	6.5	31,147	482	86.1	288,242	335
SCRD Electoral Area E (Elphinstone)	114.3	363,707	318	0	0	0	42	172,080	409	156.3	535,787	343
SCRD Electoral Area F (West Howe Sound)	24.5	65,085	266	0	0	0	154.4	503,394	326	178.9	568,479	318
	276.4	949,027	343	0	0	0	327.6	1,104,940	337	604	2,053,967	340

SUNSHINE COAST REGIONAL DISTRICT**AREA A - EGMONT/PENDER HARBOUR
ADVISORY PLANNING COMMISSION****April 29, 2020**

RECOMMENDATIONS FROM THE AREA 'A' ADVISORY PLANNING COMMISSION MEETING
HELD ONLINE VIA ZOOM

PRESENT:	Chair	Peter Robson
	Members	Dennis Burnham Catherine McEachern Jane McOuat Yovhan Burega Tom Silvey Janet Dickin Sean McAllistar Gordon Littlejohn Gordon Politeski Alan Skelly
ALSO PRESENT:	Electoral Area A Director	Leonard Lee (Non-Voting Board Liaison)
	Recording Secretary	Kelly Kammerle
	Public	6
REGRETS:	Member	Alex Thomson

CALL TO ORDER 7:00 p.m.

ELECTION OF VICE CHAIR

Vice Chair position has been tabled until the May meeting.

AGENDA The agenda was adopted with amendment to remove Report #13 Telus
Telecommunication Tower at Cawley Point as per the Planning Department

DELEGATIONS

- Sue Grayson, Zoning Amendment Bylaw 337.122 and OCP Amendment Bylaw 708.2 Application (BC Ferries Earls Cove)
- Development Variance Permit Application DVP00054, (Vanderhaeghe)
 - Lorna Vanderhaeghe – homeowner, Amy Adams – representing the designer, Kai Jenkins – contractor
 - Martin & Barbara Aidelbaum – neighbours

MINUTES

Area A Minutes

The Egmont/Pender Harbour (Area A) APC Minutes of February 26, 2020 & March 25, 2020 Meeting Cancelled were approved as circulated.

The following minutes were received for information:

- Halfmoon Bay (Area B) APC Minutes of February 25, 2020
- Roberts Creek (Area D) APC Minutes of February 24, 2020
- Elphinstone (Area E) APC Minutes of February 26, 2020
- West Howe Sound (Area F) APC Minutes of February 25, 2020
- Planning and Community Development Committee Minutes of February 13 & March 12, 2020

REPORTS

Development Variance Permit Application DVP00054 (Vanderhaeghe)

Recommendation No. 1

*Development Variance Permit Application DVP00054
(Vanderhaeghe)*

The Area A APC reviewed Development Variance Permit Application DVP00054 (Vanderhaeghe) and recommends the following:

- Subject to the applicant's strict compliance with the conditions set out in the staff report, the scope of the variance requested does not seem unreasonable.
- The Area A APC has serious concerns with a variance being granted in the face of daily continued construction where two stop-work orders have been issued, setting a dangerous precedent. We recognize the applicant has suffered significant delays through the planning process, but if the variance is granted, penalties may be appropriate to ensure compliance.
- The Area A APC notes that only very recently have notices been sent by the SCRD to the relevant neighbours and we have heard from the adjacent neighbour who has strong objections to the variance. The Area A APC feels it is important that the SCRD board receive and hear neighbours input prior to making any decision on this application.

Provincial Referral – shashishalhem Proposed Names – Area A & D

Recommendation No. 2 & D

Provincial Referral – shashishalhem Proposed Names – Area A

The Area A APC discussed the following:

The APC is strongly opposed to the proposed name change which would see the designation Madeira Park being dropped entirely.

The proposed name change ignores the historical importance to our local community of the name Madeira Park, ignores the inconvenience and cost that will be the lot of those of us living here as we

are forced to change our addresses, and turns a blind, forgetful eye to the coming together of European and local indigenous peoples exemplified by the union of Joseph Gonsalves and his First Nations wife, Susan, and the well-earned progress of their family and descendants, many of whom bear a version of the Gonsalves's name to this day.

The APC feels has been little meaningful attempt by the Provincial Government to consult local residents, and no consideration given to the historical importance of Madeira Park.

The discussion in staff's report of pronunciation and IT difficulties has little relevance to today's residents of Madeira Park.

And so, as committed as our Federal, Provincial and Regional Governments are to reconciliation, the APC feels that true reconciliation should be a meaningful positive process for all parties and this measure will lead us away from that and should be abandoned in favour of measures more likely to further harmonious reconciliation.

BC Timber Sales (BCTS) Operating Plan 2020-2024

Recommendation No. 3 BC Timber Sales (BCTS) Operating Plan 2020-2024

The Area A APC declines to make a recommendation on cut blocks outside of Area A and will defer comments about those cut blocks to the appropriate APCs. The APC has not reviewed the planning details of the two cut blocks referred to as Britain West and defer making a recommendation about them at this time with the following comments:

- The APC supports the SCRD's request that the harvest plans should incorporate cumulative impacts, including groundwater impacts and storm runoff, into their harvest plans and recommends the establishment of a cumulative effects impact assessments framework.
- The APC recommends that the BCTS 2020–2024 Operating Plan be denied until there is a meaningful consultation with stakeholders and specifically regarding the imminent 2020 cut plan. It appears that there has been a consistent lack of response to SCRD concerns since about 2010.
- The 2020 harvest plans are already in motion and we feel the BCTS is moving ahead with just token lip service to address concerns of those impacted by their harvest plans.
- The APC is especially concerned about the density of harvest areas for the North Lake/Egmont area which this APC believes will significantly impact both tourism and water quality in the area. The APC has requested meaningful consultation with other stakeholders in the past, yet the harvest plans detailed in Attachment B do not reflect any changes to BCTS's current harvest plans.
- The APC requests that the Ministry Forests, Lands, Natural Resources & Rural Development refer all harvesting plans for SCRD areas including Area A and SCRD refer those plans to the appropriate APC. This includes Forest Licences and other forest harvesting tenures located on the Sunshine Coast.

Zoning Amendment Bylaw 337.122 and OCP Amendment Bylaw 708.2 Application (BC Ferries Earls Cove)

Recommendation No. 4

Zoning Amendment Bylaw 337.122 and OCP Amendment Bylaw

708.2 Application (BC Ferries Earls Cove)

The APC would like more information before an informed recommendation can be made.
The following comments/concerns were voiced:

- Sue Grayson neighbour and owner of the Cove Restaurant has concerns with the rezoning proposal as there was no consultation with neighbouring property owners.
- The ferries could construct a fence around the terminal, as they did in Langdale, basically cutting off the Cove Restaurant.
- BC Ferries is talking about putting food services and allowing food trucks in and this would have a huge financial impact on the current, long-established restaurant.
- Would like consultation with BC Ferries to see what their future plans are.
- Is there a possibility of eliminating restaurant and food truck use from the Marine Transportation Zone.

Provincial Referral CRN00105 for a Private Moorage 2412248 (Watton)

Recommendation No. 5
(Watton)

Provincial Referral CRN00105 for a Private Moorage 2412248

The Area A APC recommends the approval of Provincial Referral CRN00105 for a private Moorage 2412248 (Watton) with the following recommendations:

- SCRD requirements are met.

NEW BUSINESS

DIRECTOR'S REPORT

The Director's report was received.

NEXT MEETING May 27, 2020

ADJOURNMENT 9:45 p.m.