

**DRINKING WATER AND WATERSHED
PROTECTION - REGIONAL GROUNDWATER
LEVEL ANALYSIS FOR SUMMER 2020**

Submitted To:



Water Services

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Submitted By:

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1.0 INTRODUCTION

1.1 Background

The Drinking Water & Watershed Protection (DWWP) program was established by the Regional District of Nanaimo (RDN) in 2008, to address education, science, and policy development for water resource protection in the seven major water regions, that distinguish the main watersheds (Study Area; Figure 1). From north to south these water regions include:

- Big Qualicum,
- Little Qualicum,
- French Creek,
- Englishman River,
- Nanoose and South Wellington,
- Nanaimo River (including Cedar-Yellow Point), and
- Gabriola.

The RDN's current focus is related to improving the understanding of groundwater conditions for potential groundwater shortage response and to build awareness of general groundwater conditions in the region. As part of the program initiative, the RDN has instrumented and is actively monitoring 31 Volunteer Observation Well (VOW) locations as part of the "Volunteer Observation Well Network" (VOWN; Figure 2). Groundwater level data collected from the VOWN is supplemented with publicly available data from the Provincial Groundwater Observation Well Network (PGOWN), managed by the Ministry of Forest, Lands, Natural Resources and Rural Development (FLNRORD). Within the Study Area, the PGOWN consists of 23 active Observation Well (OW) locations (Figure 2).

1.2 Objective and Scope of Work

Under a Standing Offer Agreement for consulting hydrogeological services, Waterline Resources Inc. (Waterline) was requested to work collaboratively with the RDN to assess groundwater conditions within the Study Area. The goal was to provide the RDN Board, regional water managers and the public with an analysis and summary of aquifer water levels, to inform potential groundwater shortage response and build awareness of groundwater conditions. To meet this objective, Waterline conducted the following scope of work:

- **Task 1** – Compiled and reviewed groundwater level data for OW and VOW locations completed across multiple surficial and bedrock mapped aquifers. Correlated the various water service wells (well list provided by the RDN) to the respective aquifer(s), which are providing groundwater to small water systems, RDN water service areas, water works/improvement districts and municipal water service areas; and
- **Task 2** – Analysed historical and seasonal groundwater level trends for each mapped aquifer.

This report provides a summary of the work completed by Waterline including the results of the groundwater level trend analyses to support discussions at the RDN's board committee meeting schedule for June 9th, 2020.

1.3 Data Management and Review

Waterline has developed an online geodatabase mapping tool for groundwater management and assessment known as Enviro Web Services (EWS). EWS provides access to various public hydrogeological and environmental data sets, including some project specific water infrastructure data provided by the RDN. Specific groundwater and surface water related information contained in our geodatabase includes water well records, aquifer mapping information, surficial and bedrock geology mapping, surface water features (watersheds, streams and creeks) and terrain mapping, all used to assess groundwater flow regimes and groundwater-surface water interconnections.

The EWS viewer tool provided a one-window approach for quickly obtaining and overlaying pertinent information regarding the Study Area, thereby, allowing for an efficient compilation of data locations and assessment of groundwater level trends for the various mapped aquifers across the water regions. Public datasets accessed through EWS included:

- BC Ministry of Environment (BC MoE, 2013) – Terrain Inventory Mapping;
- BC Ministry of Environment (BC MoE, 2020) – Provincial Wells and Aquifer Databases;
- British Columbia Geological Survey (BCGS; Cui et al., 2017) – Bedrock Mapping;
- Environment and Natural Resources Canada (Environment Canada, 2020) – Climate Normals and Real - Time Precipitation Data; and
- The Freshwater Atlas (FLNRORD, 2011) – Watersheds and Stream Network Data.

In addition to the publicly available data, the RDN provide specific data layers that were used in this assessment, including:

- Water Region Boundaries;
- RDN Water Service Areas, Water Works/Improvement Districts and Municipal Water Service Areas; and
- Water Service Wells.

2.0 SETTING

2.1 Hydrogeological Conditions

The surficial and bedrock geology across the Study Area was mapped by the BC Ministry of Environment (BC MoE, 2013) and the BC Geological Survey (Cui et al., 2017). Across the Study Area, groundwater is sourced from both surficial and bedrock aquifers (Figure 3). These water bearing units were mapped by the BC Ministry of Environment (BC MoE, 2020) and are based on the available geological information and lithological descriptions from registered water well drilling

reports submitted to the Province by individual well owners or the drillers themselves. A brief description of the surficial and bedrock conditions are as follows:

Surficial sediments accumulate in topographical lows, where glacial (fluvial, and marine) and modern day (alluvial, marine and colluvial) depositional environments have deposited clays, silt, sand, and gravels (BC MoE, 2013; Figure 4). A concentration of surficial sediments near present day streams, rivers and lakes have formed most of the surficial aquifers in the water regions (BC MoE, 2020; Figure 4). Depending on the distribution of finer grained sediments such as clays and silts, the surficial aquifers are either categorized as confined or unconfined. Regional groundwater flow patterns in surficial aquifers typically mimic surface topography and can be influenced by boundary conditions (no-flow or constant head) creating various pressure differences such as flowing artesian conditions (BC MoE, 2020).

Bedrock underlies the surficial sediments or is exposed at surface where surficial sediments have been eroded (Cui et al., 2017). Near the shoreline, bedrock is generally composed of sedimentary rocks (Nanaimo Group), while further inland the bedrock composition changes to intrusive plutonic or volcanic rocks (Cui et al., 2017; Figure 5). Across the Study Area, most of the bedrock aquifer are within the Nanaimo Group Formation and are composed of interbedded shales, conglomerates, siltstones, and sandstones (BC MoE, 2020). These bedrock aquifers are characterized by the frequency and continuity of fractures (secondary porosity) which are the dominant component of groundwater storage (BC MoE, 2020). Groundwater flow is generally controlled by regional pressure gradients that depend on the heterogeneity of these fractures (BC MoE, 2020).

2.2 Environmental Conditions

2.2.1 Climate Normal Data

Environment Canada has compiled Climate “Normals” (1981-2010) for temperature and precipitation (rainfall and snowfall) data from several climate stations across eastern Vancouver Island (Figure 6). A range for the mean monthly temperature and precipitation across the Study Area, from Gabriola Island (Climate Station ID # 1023042) and Port Alberni Cox Lake (Climate Station ID # 1036208; upland/inland) climate stations are presented in Table 1 (Environment Canada, 2020). This overview provides context of the varying climate conditions for both the coastal weather setting, which is the watershed discharge area for all surface and local groundwater in each water region, and the upland/inland weather setting, which is the upper recharge area for all downgradient surface water and groundwater features in each water region.

Table 1: Historical Mean Monthly Climate Data for Climate Station ID # 1023042 & 1036208

Metric	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Monthly Temp (°C)	2-4	4	6	9	12	15	17	17-18	14-15	9-10	6	3-4
Mean Monthly ppt. (mm)	147-367	96-217	92-228	63-145	48-90	43-70	25-31	27-58	40-60	86-215	157-376	141-343

Notes: Temp means temperature, °C means degree in Celsius, ppt means precipitation, mm means millimetres.



Generally, the lower temperatures and upper precipitation values represent the upland/inland areas where ground surface elevations are higher. Precipitation trends indicate the greatest monthly accumulation of rainfall is from October to April (wet season). During the remainder of the year (May to September) monthly rainfall accumulation is much less and this period is considered the dry season. These trends were compared with modelled precipitation patterns for the Study Area, that were presented in the RDN Phase One Water Budget Project (Waterline, 2013). In this water budget study, precipitation was modelled for both coastal and inland environments. Total annual precipitation near the coast ranged from 900-1500 mm, with total annual precipitation inland greater than 2000 mm (Waterline, 2013). These predictions generally agree with the Climate Normals (Environment Canada, 2020; Table 1).

2.2.2 Real-time Climate Data

Real time precipitation data for the Study Area was collected at the Nanaimo Airport (Climate Station ID # 1025365; Figure 6), with records current to the end of April 2020 (Environment Canada, 2020). The total yearly precipitation amounts and the precipitation accumulation for the period of January through April, are summarized in Table 2. This data was used for the discussion of groundwater level data from both the VOWN and PGOWN.

Table 2: Real-time Precipitation Data for Climate Station ID # 1025365

Year	2013	2014	2015	2016	2017	2018	2019	2020	Average (2013 to 2020)
Total Yearly ppt (mm)	756	1151	1035	1540	1060	1085	1235	-	1123*
Jan to Apr ppt (mm)	314	515	402	676	542	437	322	501	464

Notes: ppt means precipitation, mm means millimetres; * average value was calculated for 2013 to 2019 only

2.3 Groundwater Recharge Conditions

Groundwater recharge for both surficial and bedrock aquifers within the Study Area can be correlated with precipitation patterns on Eastern Vancouver Island. Groundwater levels can also be influenced by surface water bodies such as streams, rivers, and lakes, which are themselves recharged by seasonal precipitation conditions. Additionally, groundwater contributes to environmental flow needs for most of these surface water systems, as it is an important component of baseflow. Increased precipitation during the wet season typically results in increasing groundwater levels, while limited precipitation in the dry season results in declining groundwater levels. For the three aquifer types, *unconfined surficial*, *confined surficial*, and *bedrock*, recharge of groundwater varies as follows:

1. In unconfined surficial aquifers, precipitation directly infiltrates into the subsurface and therefore increases in groundwater level can be directly correlated to periods of increased precipitation (BC MoE, 2020).
2. In confined surficial aquifers, recharge of groundwater is indirectly the result of precipitation and is a muted response to seasonal changes (BC MoE, 2020). Where the aquifer is

confined by a thin aquitard layer (impermeable layer) or is partially confined near an aquifer boundary, a more direct connection to precipitation can be observed (BC MoE, 2020).

3. In bedrock aquifers, precipitation directly contributes to recharge where fractures are exposed at or near surface (BC MoE, 2020). This typically happens inland and at higher elevations in the watershed or where overlying low permeability sediments confining the bedrock aquifer are thinner. Like confined aquifers, responses to precipitation can be muted due to the general discontinuity of the bedrock fractures and the lag time for water to infiltrate through the confining sediments above (BC MoE, 2020).

2.4 Groundwater Service Infrastructure

In the Study Area, small water systems, RDN water service areas, water works/improvement districts and municipal water service areas, all rely on one or more water service well for groundwater supply (Figure 7). Across the Study Area, 282 water service wells (also referred to as water supply or water works wells) were identified by the RDN through an active search of the Provincial wells database (BC MoE, 2020). Each well is registered and can be identified by a unique well tag number and associated well owner name. The wells are associated with either a surficial or bedrock aquifer based on the well completion information and lithology description provided on the driller's log for the individual well. A complete list of water service wells identified by the RDN is included in Table A1 (Appendix A).

It should be noted that in addition to the listed water service wells provided by the RDN, there are "other" registered groundwater users listed in the Provincial wells database (BC MoE, 2020) not classified as water supply or water works. These well types included commercial & industrial, irrigation, and domestic (private wells; un-serviced area). Unfortunately, the groundwater well records can be inaccurate, as the well class, the well status and well use can be misleading or can change without notification. In addition, not all users are registered and therefore are not included in the wells database (BC MoE, 2020). In the Province of British Columbia, the Water Sustainability Act – Water Sustainability Regulations (BC MoE, 2019b) requires that only new (since 2016) wells be registered with FLNRORD.

3.0 METHODOLOGY

3.1 Compilation of Groundwater Level Data

The RDN technical staff members downloaded and calibrated groundwater level data from the VOWN on May 6, 2020. The data was manually collected from transducers, which record pressure on an hourly frequency. Similarly, groundwater level data for the PGOWN was collected by pressure transducers but was either downloaded manually by FLNRORD technical staff members or reported as live readings from Supervisory Control and Data Acquisition (SCADA) systems. As such, some of the OW data from the PGOWN is current to December 2019 (manually downloaded data) while others are current to May 2020 (SCADA data).

Both the VOWN and PGOWN data sets, were provided to Waterline in digital format (.csv or .xlsx) for data compilation. Of the 31 VOWs, data for 30 locations (excluding VOW O7) was provided for this analysis. For each group of well(s) corresponding to a mapped aquifer, the water level data was reviewed prior to assessing historical and seasonal trends. To accurately quantify trends in the groundwater level data, Waterline performed a series steps to clean the water level data and remove artificial increases or decreases in the data that could affect the probability of detecting a significant trend. These steps included:

1. Removing false groundwater level data that resulted from instrument shifts (e.g., removing transducers from the well);
2. Removing zero values associated with data gaps in the groundwater level data, for periods greater than 1-day; and
3. Calculating a 6-hour and daily moving average from the reported hourly data.

3.2 Historical Groundwater Level Trend Analysis

Cleaned groundwater level data were plotted for each observation well on a time-series chart. The trends analysis was performed by applying a linear regression trend line to the data, taking the slope of the trend line, and calculating a displacement value (in centimetres) for the change in water level year over year. Trends in historical groundwater level data (dating back to 2013) for each aquifer provided insight into changing environmental conditions or potentially increased water demand from an aquifer. Waterline used long-term trend categories developed by the MOE, as part of their Environmental Reporting initiative (BC MoE,2019a) to qualify this displacement value. The four trend categories are summarized in Table 3:

Table 3: Historical Aquifer Trend Categories

Trend Type	Change in Water Level (cm/year)
Increasing Groundwater Conditions	> +3
Stable Groundwater Conditions	+/-3
Declining (Moderate) Groundwater Conditions	< -3 and > -10
Declining (Large) Groundwater Conditions	< -10

3.3 Seasonal Groundwater Level Trend Analysis

Cleaned groundwater level data for each year of record, for each observation well was plotted on year over year time-series charts. Seasonal groundwater levels were compared to determine the potential for groundwater shortage conditions during the summer of 2020 (upcoming dry season). Depending on the aquifer type (surficial or bedrock), it is expected that the yearly maximum and minimum water levels will correspond directly or indirectly to seasonal precipitation data. To qualify how groundwater level data from the beginning of January to the end of April 2020 can help predict potential groundwater shortage during the dry season of 2020, Waterline associated three seasonal aquifer trend categories (Table 4) based on the deviation from the seasonal average trend line. For context:



- A **low groundwater shortage** potential is reflective of past years where water levels reported for water service wells or private wells maintained an above average hydraulic head (distance from the bottom of the well to the non-pumping water level) and few changes to operational use were necessary during the dry season. Groundwater helped maintain environmental flow needs of surface water systems during the dry season.
- A **moderate groundwater shortage** potential is reflective of past years where water service wells or private wells reported normal changes in hydraulic head during the dry season, with some modifications to well operations. Groundwater fluctuations had limited impacts on environmental flow needs of the various surface water systems during the dry season.
- A **high groundwater shortage** potential is reflective of past years where elevated water restriction(s) was enforced (2014; Julie Pisani, pers. comm., May 15, 2020) and environmental flow needs for the various surface water systems were impacted by a low groundwater table during the dry season. Curtailment of groundwater use for water service wells or private wells was suggested or implemented for non-essential use.

Table 4: Seasonal Aquifer Trend Categories

2020 Groundwater Level Trend	Groundwater Shortage Potential
Above Average	Low
Average	Moderate
Below Average	High

4.0 RESULTS

The observation well locations, the associated mapped aquifers and water service wells across the Study Area were grouped based on water region and summarized in Table 5. Using available groundwater level data from the PGOWN and VOWN, historical and seasonal groundwater trends were generated for each aquifer to determine changing groundwater conditions; also summarized in Table 5. Groundwater level charts for each observation well, dating back to the start of the VOWN groundwater data collection (2013), are compiled in Appendix B (Figure B1 to B53). Similarly, groundwater level charts for each observation well, showing year-over-year seasonal data are compiled in Appendix C (Figure C1 to C53).

For each aquifer, the assessment of historical and seasonal groundwater level trends was limited by the available data, including the number of observation wells within each water region/aquifer and the amount of data collected which ranged between 2 and 7 years of data. Where well data is spatially sparse, local scale fluctuations in groundwater levels may unduly influence the assessed trends. Where monitoring data is temporally sparse, the assessed trends may not accurately reflect long-term trends. As such, Waterline considered the longest period of record (7-years) dating back to the start of the VOWN groundwater data collection (2013), as the most representative of overall trends; as included in Table 5. Summaries of the historical and season trends for individual observation wells are included as Table B1 (Appendix B) and Table C1 (Appendix C), respectively.

Table 5: Overview of Groundwater Observation Locations and Conditions for the Water Regions

Water Regions	Observation Wells		Mapped Aquifer Number and Type	Historical Groundwater Level Trend (2013-2020)	Seasonal Groundwater Level Trend 2020	Associated Groundwater Level Charts (Figure #)	Water Service Wells (Provided by the RDN) Correlated to Each Mapped Aquifer	Total Number of Registered Wells Correlated to Each Mapped Aquifer
	Active Provincial Groundwater Observation Wells	RDN Volunteer Observation Wells (Site Name and Number)						
Big Qualicum	OW 310	-	416-Surficial (CON)	Increasing	Average	• Figure B1, C1	• Deep Bay Water Works – 7 Wells • Bowser Water Works – 3 Wells	36
	OW 427	-	665-Surficial (UNC)	Stable	-	• Figure B2, C2	• Qualicum Bay Horne Lake Water District – 1 Well	29
Little Qualicum	OW 391 and OW 426	-	662-Surficial (CON)	Increasing	Above	• Figure B3-B4 • Figure C3-C4	• Qualicum Bay Horne Lake Water District – 3 Wells • Small Water Systems - 3 Wells	332
	OW 389	-	664-Surficial (UNC)	Increasing	Below	• Figure B5, C5	• Town of Qualicum Beach – 9 Wells • Regional District of Nanaimo – 2 Wells • Small Water Systems - 1 Well	43
French Creek	OW 295	Rinvold (VOW 16)	217-Surficial (CON)	Moderate Decline	Average	• Figure B6-B7 • Figure C6-C7	• Town of Qualicum Beach – 6 Wells • Regional District of Nanaimo – 7 Wells • EPCOR Utilities – 1 Well • Small Water Systems - 12 Wells	32
	-	Lowrys (VOW 15)	212 – Bedrock	Increasing	Average	• Figure B8, C8	• Small Water Systems - 1 Well	19
Englishman River	OW 314 and OW 424	Hodges (VOW 14) and Fourneau (VOW 01)	216-Surficial (CON)	Increasing	Above	• Figure B9-B12 • Figure B9-C12	• City of Parksville – 20 Wells • EPCOR Utilities – 5 Wells • Small Water Systems - 6 Wells	21
	OW 287	Middlegate (VOW 18)	220 – Bedrock	Large Decline	Below	• Figure B13-B14 • Figure C13-C14	• BC Parks – Vancouver Island Region – 1 Well • Small Water Systems - 7 Wells	279
Nanoose and South Wellington	-	Bigggs (VOW 12)	167-Surficial (CON)	Increasing	Below	• Figure B15, C15	• Small Water Systems - 2 Wells	18
	OW 388	-	211 – Bedrock	Large Decline	Below	• Figure B16, C16	• Small Water Systems - 2 Wells	214
	-	Sea Blush (VOW 13), Northwind (VOW 02) and Elm (VOW 03)	213 – Bedrock	Increasing	Average	• Figure B17-B19 • Figure C17-C19	• Small Water Systems - 14 Wells	132
	-	B2, B3, B4, B7 and B9	214 – Bedrock	Increasing	Average	• Figure B20-B24 • Figure C20-C24	• Regional District of Nanaimo – 1 Well • Small Water Systems - 3 Wells	40
	OW 394	NWB (VOW 27) and Florence (VOW 26)	218 – Bedrock	Stable to Increasing	Average	• Figure B25-B27 • Figure C25-C27	• Regional District of Nanaimo – 2 Wells • Small Water Systems - 5 Wells	41
	OW 232 and OW 340	Southwind (VOW 28)	215-Surficial (CON)	Stable	Below	• Figure B28-B30 • Figure C28-C30	• District of Lantzville – 7 Wells • Nanoose First Nation – 3 Wells • Small Water Systems - 5 Wells	138
	OW 393 and OW 396	Sanders (VOW 25)	219-Surficial (CON)	Stable	Average	• Figure B31-B33 • Figure C21-C33	• Regional District of Nanaimo – 9 Wells • EPCOR Utilities – 1 Well • Small Water Systems - 9 Wells	53
	OW 392	O3	1098-Surficial (CON)	Stable to Moderate Decline	Below	• Figure B34-B35 • Figure C34-C35	• Qualicum School District – 2 Wells • Regional District of Nanaimo – 14 Wells • Small Water Systems - 1 Well	89
Gabriola	OW 316 and OW196	Mander (VOW 08) and Descansco (VOW 07)	709 – Bedrock	Stable to Large Decline	Below	• Figure B36-B39 • Figure C36-C39	• Small Water Systems - 9 Wells	1041
Nanaimo River	OW 437	Hallberg (VOW 04)	160-Surficial (CON)	Increasing	Below	• Figure B40-B41 • Figure C40-C41	• Small Water Systems - 1 Well	36
	OW 390	Brightman (VOW 24)	163-Surficial (CON)	Increasing	Below	• Figure B42-B43 • Figure C42-C43	-	17
	OW 312	-	161-Surficial (UNC)	Stable	-	• Figure B44, C44	• North Cedar Water Works – 11 Wells • Small Water Systems - 4 Wells	205
	OW 432	Pylades (VOW 06), DeCourcy (VOW 19), Ritten (VOW 20), Rosalie (VOW 21), Gould (VOW 22) and Haro (VOW 23)	162 – Bedrock	Stable to Moderate Decline	Below	• Figure B45-B51 • Figure C44-C51	• Regional District of Nanaimo – 1 Wells • Chemainus First Nation – 6 Wells • Shell Beach Water Utility – 4 Wells • Small Water Systems - 21 Wells	1237
	OW 435	Grandom (VOW 05)	165 – Bedrock	Increasing to moderate Decline	Below	• Figure B52-B53 • Figure C52-C53	• Small Water Systems - 5 Wells	326

Notes: - indicates no data available; CON indicates surficial aquifer is confined; UNC indicates surficial aquifer is unconfined; The total number of registered wells, including private domestic wells, correlated to an aquifer were obtained from the Provincial wells database (BC MoE, 2020)

5.0 GROUNDWATER TRENDS

The groundwater shortage potentials that were assessed for summer 2020 and general aquifer conditions across the Study Area, are subject to change during the months following this data review. Unforeseen changes in environmental conditions such as below or above average precipitation during the beginning of the dry season (May to July), and or changes in water use, can alter the current groundwater level trends and the potential groundwater shortage expected during the peak of the dry season (August and September).

Based on the results of the assessment, provided in Table 5, the groundwater conditions for the mapped aquifers in each water region are summarized in the following subsections.

5.1 Big Qualicum Water Region

In the Big Qualicum water region, there are two active observations wells used to monitor two mapped aquifers (Figure 8). The aquifer conditions are summarized as follows:

- The historical groundwater level trend for confined surficial **Aquifer 416** is increasing since the record low precipitation totals in 2013 (Table 2) and the resulting record low groundwater levels in 2014 (Figure B1). However, groundwater levels in 2020 are comparable to seasonal averages suggesting a moderate potential for groundwater shortage this summer (Figure C1).
- The historical groundwater level trend for unconfined **Aquifer 665** is stable based on the limited available data; a large data gap was noted between mid-2016 to mid-2019 (Figure B2). In 2020, no data was downloaded from OW 427 (only active observation well) and therefore a 2020 seasonal trend could not be inferred (Figure C2).

5.2 Little Qualicum Water Region

In the Little Qualicum water region, there are three active observations wells used to monitor two mapped aquifers (Figure 9). The aquifer conditions are summarized as follows:

- Using the observation well data with the largest period of record, the historical groundwater level trends for confined **Aquifer 662** suggest groundwater levels are increasing overtime (Figures B3 to B4). The groundwater level trend has been rebounding since the end of 2014, after average to below average yearly precipitation amounts were record in 2013 and 2014 (Table 2). Groundwater levels in 2020 are above seasonal averages, suggesting low potential for groundwater shortage this summer (Figures C3 to C4).
- The historical groundwater level trend for unconfined **Aquifer 664** is increasing overtime, with a direct response to seasonal precipitation (Figure B5). However, groundwater levels in 2020 are below seasonal averages, suggesting a high potential for groundwater shortage this summer (Figure C5).

5.3 French Creek Water Region

In the French Creek water region, there are three active observations wells used to monitor two mapped aquifers (Figure 10). The aquifer conditions are summarized as follows:

- Using the observation well data with the largest period of record, the historical groundwater level trend for confined **Aquifer 217** indicate a moderate decline in water levels overtime, with a delayed response to seasonal precipitation (Figure B6). Groundwater levels in 2020 are comparable to seasonal values, suggesting a moderate potential for groundwater shortage this summer (Figure C6). Groundwater level trends over a shorter period of record (2018 – 2020), appear to be declining at a greater rate, with 2020 groundwater levels below the seasonal average (Figure B7, C7).
- Underlying Aquifer 217 is bedrock **Aquifer 212** (Nanaimo Group Formation). Aquifer 212 has experienced an increasing groundwater level trend since 2018 (Figure B8). Recharge to Aquifer 212, appears to be a muted response of precipitation patterns (Figure B8). The 2020 groundwater levels are comparable to the seasonal average, suggesting a moderate potential for groundwater shortage this summer (Figure C8).

5.4 Englishman River Water Region

In the Englishman River water region, there are six active observations wells used to monitor two mapped aquifers (Figure 11). The aquifer conditions are summarized as follows:

- Using the observation well data with the largest period or record, the historical groundwater level trends for confined **Aquifer 216** indicate an increase in water levels overtime (Figures B9 to B12). Like Aquifer 217 (both aquifers are adjacent and interconnected; BC MoE, 2020), groundwater level fluctuations in Aquifer 216 is a delayed response to precipitation. Groundwater levels in 2020 are above seasonal average, suggesting a low potential for groundwater shortage this summer (Figures C9 to C12). Groundwater level trends over a shorter period of record (2018 – 2020), appear to be declining at a greater rate, with 2020 groundwater levels below the seasonal average (Figures B11, C11).
- Using the observation well data with the largest period of record, the historical groundwater level trend for bedrock **Aquifer 220** (Nanaimo Group Formation) indicate a large rate of decline in water levels overtime (Figure B13). The 2020 groundwater levels are below the seasonal average (Figure C13), suggesting a high potential for groundwater shortage this summer. However, groundwater level trends over a shorter period of record (2018 – 2020), appear to be increasing, with average groundwater levels in 2020 (Figures B14, C14).

5.5 Nanoose and South Wellington Water Region

In the South Wellington to Nanoose water region, there are 21 active observations wells used to monitor eight mapped aquifers (Figure 12). The aquifer conditions are summarized as follows:

- The historical groundwater level trend for confined **Aquifer 167** (period of record is 2016-2020) is increasing overtime (Figure B15), with a direct response to increased precipitation and an expected connection with local surface water features such as Westwood Lake (BC MoE, 2020; Figure 12). However, groundwater levels in 2020 are below to the seasonal averages, suggesting a high potential for groundwater shortage this summer (Figure C15).
- The bedrock **Aquifer 211** (Nanaimo Group Formation) underlies Aquifer 167 and has experienced a large decline in groundwater levels overtime (Figure B16). Yearly fluctuations in groundwater levels can be correlated to precipitation patterns, with a sharp decrease during the dry season when groundwater storage is depleted (Figure B16). The 2020 groundwater levels are below the seasonal average, suggesting a high potential for groundwater shortage this summer (Figure C16).
- The general historical groundwater level trend for bedrock **Aquifer 213** (Fractured Crystalline Rock) and bedrock **Aquifers 214 and 218** (Nanaimo Group Formation) are stable to increasing with yearly fluctuations in groundwater levels correlated to seasonal changes in precipitation (Figures B17 to B 27). With multiple wells completed in each aquifer, localized trends were observed in the groundwater data that contradicted the overall increasing trend (e.g., VOW 13; Figure B19). Across the aquifers, 2020 groundwater levels are generally comparable to the seasonal averages (Figures C17 to C27), suggesting a moderate potential for groundwater shortage this summer.
- Using the observation well data with the largest period of record, the historical groundwater level trends for confined **Aquifers 215 and 219** are stable (Figures B28 to B33). However, 2020 groundwater levels for Aquifer 215 are below the seasonal average, suggesting a high potential for groundwater shortage this summer; while 2020 groundwater levels for Aquifer 219 are comparable to seasonal average, suggesting a moderate potential for groundwater shortage this summer (Figures C28 to C33).
- A confined aquifer (**Aquifer 1098**) has been mapped underlying Aquifer 219 (BC MoE, 2020; Figure 12). A range of groundwater level trends ranging from stable to a moderate decline were reported for Aquifer 1098 (Figures B34 to B35). Despite having a thicker confining layer, groundwater recharge responds to seasonal precipitation patterns. Recharge is expected near the aquifer boundaries where the overlying confining layer(s) are thinner (BC MoE, 2020). In 2020, groundwater levels were blow the seasonal average, suggesting a high potential for groundwater shortage this summer (Figures C34 to C35).

5.6 Gabriola Water Region

In the Gabriola water region, there are four active observations wells used to monitor one mapped aquifer (Figure 12). The aquifer conditions are summarized as follows:

- The historical groundwater level trends for bedrock **Aquifer 709** (Nanaimo Group Formation) suggest a stable to large decline in water levels overtime (Figures B36 to B39). Where data was recorded, groundwater levels in 2020 are below the seasonal average, suggesting a high potential for groundwater shortage this summer (Figures C36 to C39).

5.7 Nanaimo River Water Region

In the Nanaimo River water region, there are 14 active observations wells used to monitor five mapped aquifers (Figure 13). The aquifer conditions are summarized as follows:

- Using the observation well data with the largest period of record, the historical groundwater level trends for the confined (**Aquifer 160 and 163**) and unconfined (**Aquifer 161**) aquifers, indicate increasing to stable groundwater levels, respectively (Figures B40 to B44). Groundwater recharge in Aquifer 161 correspond more directly with precipitation patterns than Aquifers 160 and 163. Where 2020 data was reported, groundwater levels for Aquifer 160 are below the seasonal average, suggesting a high potential for groundwater shortage this summer (Figure C40 to 41). For Aquifer 163, the 2020 groundwater levels are below the seasonal average, suggesting a high potential for groundwater shortage this summer (Figures C42 to C43). No 2020 groundwater level data was reported for Aquifer 161 (Figure C44).
- Using the observation well data with the largest period of record, the historical groundwater level trends for bedrock **Aquifers 162 and 165** (both Nanaimo Group Formation), indicate groundwater conditions are variable across the aquifers. Excluding groundwater level fluctuations from seasonal precipitation trends (delayed response), increasing to moderate declining trends were observed (Figure B45 to B53). The 2020 groundwater levels are generally below the seasonal average (Figure C45 to C53), suggesting a high potential for groundwater shortage this summer.

5.8 Potential Causes for Groundwater Level Trends

As precipitation is one of the main environmental factors contributing to aquifer recharge, variability in yearly precipitation during the wet season for the period of record (2013 -2020; Table 2) is a driving factor for the observed groundwater level trends. For the different aquifer types, groundwater recharge is either a direct or delayed response to seasonal precipitation. For aquifers with multiple wells completed at varying locations relative to coastal and inland climate zones, the observed groundwater level trends can be variable based on local recharge conditions. Yearly and monthly precipitation amounts are expected to increase with increasing elevation and distance to the coastal environment, affecting the groundwater level in the aquifer at each well differently.

Despite correlation between groundwater recharge and precipitation, groundwater level trends are not always directly correlated to these environmental changes and instead may be the result of changing water demand. The use of both water service wells and private wells in each aquifer, contribute to changes in the groundwater levels for the aquifer. In addition to groundwater being a source for environmental flow needs (helping sustain baseflow conditions) of many surface water

systems (streams, rivers, and lakes), the total groundwater withdrawal can change over time due to changing land use types and increased population. With finite groundwater storage in each aquifer and fluctuating recharge during seasonal precipitation events, groundwater level trends are expected to continue to change with future water demand.

6.0 DATA GAPS

This desktop study was based on regional mapping of groundwater aquifers and the lithology descriptions provide by the driller's logs (BC MoE, 2020). Waterline has reviewed these public data sets for the correlation of water service wells (for serviced and un-serviced areas) and observation wells, with the various water bearing units (mapped and unmapped aquifer). However, several data gaps were noted during the correlation of the water service wells provided by the RDN and in reviewing the observation data from both the VOWN and PGOWN. This resulted in incomplete historical and seasonal trend analysis and or the inability to associate trends with the various water service well users. A detailed list of data gaps is included below:

- Nine water service wells, of which two are RDN water service wells, were not associated with a mapped aquifer given the limited information provided in the driller's logs (Appendix A; Figure 14). In some instances, several mapped aquifers exist in one location (unconfined, confined and bedrock) and more investigation is required to determine the proper completion interval;
- Twenty-five water service wells (three are City of Nanaimo water service wells and one is an RDN water service well) are completed outside of a mapped aquifer (Figure 14) suggesting these wells were drilled after mapping was completed and or are associated with an aquifer of limited extent, such that it would not be considered a regional aquifer (Appendix A; Figure 14);
- The water service wells across the Study Area, did not considered all potential water supply or water works wells due to inconsistencies in the Provincial database (BC MoE, 2020). Water service wells classified as Commercial & industrial, irrigation or that have the well status "new" were missed in some cases. In addition, the total number of wells correlated to an aquifer, only include registered wells. Although registration is encouraged, groundwater users pre-2016, both domestic and non-domestic, are not required to register their wells Under the Water Sustainability Act – Water Sustainability Regulations (BC MoE, 2019b); and
- Water service wells were identified in nine aquifers (3-bedrock and 6-surficial) that are not being monitored by either the PGOWN or VOWN. The aquifer, the associated water service well(s) and the other registered wells correlated with the aquifer are summarized in Table 6 and displayed in Figures 15 and Figure 16.

Table 6: Mapped Aquifers in the Study Area Without Observation Well Data

Water Regions	Mapped Aquifer Number and Type	Correlated Water Service Wells Provided by the RDN	Total Number of Registered Wells Correlated to Each Mapped Aquifer	Groundwater Demand and Aquifer Stress Index
Big Qualicum	414-Surficial (UNC)	<ul style="list-style-type: none"> Small Water Systems - 1 Well 	47	High & More Stressed
	421-Surficial (CON)	<ul style="list-style-type: none"> Small Water Systems - 1 Well 	11	Low & N/A
Little Qualicum	661-Surficial (UNC)	<ul style="list-style-type: none"> BC Parks – Vancouver Island Region – 1 Well Small Water Systems - 1 Well 	19	Moderate & Less Stressed
	663-Surficial (UNC)	<ul style="list-style-type: none"> Regional District of Nanaimo – 1 Well Small Water Systems - 1 Well 	112	Low & Low Stressed
Englishman River	209-Surficial (CON)	<ul style="list-style-type: none"> Small Water Systems - 2 Wells 	136	Low & N/A
	221-Surficial (CON)	<ul style="list-style-type: none"> City of Parksville – 1 Well 	11	Low & Low Stressed
Nanaimo River	164-Bedrock	<ul style="list-style-type: none"> Small Water Systems - 1 Well 	161	Moderate & N/A
Gabriola	964-Bedrock	<ul style="list-style-type: none"> Small Water Systems - 1 Well 	65	Moderate & N/A

Notes: **CON** indicates surficial aquifer is confined; **UNC** indicates surficial aquifer is unconfined; The total number of registered wells correlated to an aquifer, the aquifer demand and the aquifer stress index were all obtained from the Provincial wells and aquifer database (BC MoE, 2020); **N/A** indicates that no aquifer stress index was assigned due to insufficient data for assessment. For reference, groundwater demand corresponds to the number of registered groundwater wells correlated to an aquifer relative to the areal extent aquifer (km²; BC MoE, 2020). While aquifer stress is qualified based on a mathematical assessment of the known groundwater withdrawal rate (cubic meter per year; m³/year), the recharge rate (m³/year) and the expected environmental flow needs (m³/year).

7.0 CONCLUSIONS AND RECOMMENDATIONS

In reviewing groundwater level data for the VOWN and PGOWN, historical and seasonal groundwater level charts were produced for 54 OW and VOW locations. One or more observation well was associated with each aquifer, with varying amounts of data dating back to the implementation of the VOWN in 2013.

Groundwater level trends for both surficial and bedrock aquifers were variable and included increasing, stable, and declining (moderate and large) trends. The aquifers with the largest rates of groundwater level decline were consistently bedrock aquifers completed in the Nanaimo Group Formation. Based on the 2020 groundwater level data compiled to date, very few aquifers exhibit levels above seasonal averages, and most were comparable or below the seasonal average. If these trends continue through the spring (start of the dry season), a moderate to high potential for groundwater shortages can be expected across the Study Area during the peak of the dry season this summer.

Causes for the observed groundwater level trends in the monitored aquifers are in some part attributed to groundwater recharge conditions in the form of seasonal precipitation. Groundwater level trends for an aquifer can vary spatially, as yearly, and monthly precipitation amounts increase with increased elevation and distance from the coastal environment. Water demand from unserved areas, small water systems, RDN water service areas, water works/improvement districts and municipal water service areas also contribute to changing groundwater level trends. This is additional to groundwater being a source of environmental flow needs (helping sustain baseflow conditions) for many surface water systems (streams, rivers, and lakes).

To improve the understanding of groundwater conditions within the Study Area and address data gaps in the observation well networks, Waterline recommends instrumenting one or more registered groundwater well in each of the nine aquifers where there are no observation wells associated with the VOWN or PGOWN. As the FLNRORD is continually updating and reviewing their PGOWN, a collaborative approach to future monitoring of the nine aquifers could be taken. A priority ranking of which aquifer requires monitoring should be completed based on the level of groundwater demand and the aquifer stress index assigned to each aquifer by the FLNRORD (Table 6; BC MoE, 2020).

For the best management of groundwater resources in the seven water regions, Waterline suggest that the RDN continue advocating that all non-domestic groundwater users pre-2016, with wells listed as Commercial & industrial, irrigation, water supply or water works, register and license their existing groundwater use under the Water Sustainability Act – Water Sustainability Regulations (BC MoE, 2019b). This initiative allows FLNRORD to effectively consider groundwater demand and accurately assess aquifer stress which can be used for determining groundwater shortage potential. In additional, the RDN might consider advocating that all domestic groundwater users, with private wells drilled pre-2016, register their well status with the ministry of FLNRORD. At the very least, this additional information will allow for better aquifer mapping and assessment of domestic groundwater use, that can also be used for subsequent studies of groundwater conditions.

8.0 CERTIFICATION

This document was prepared under the direction of a professional geoscientist registered in the Province of British Columbia.

Waterline Resources Inc. trusts that the information provided in this document is sufficient for your requirements. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

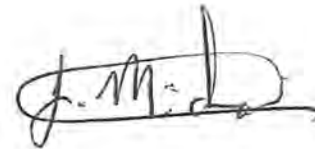
Respectfully submitted,

Waterline Resources Inc.

Reviewed by:



Simon Wing, B.Sc., P. Geo
Intermediate Hydrogeologist



Jan Michaelian, B.Sc., P. Geo.
Principal Hydrogeologist

9.0 REFERENCES

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10.0 LIMITATIONS AND USE

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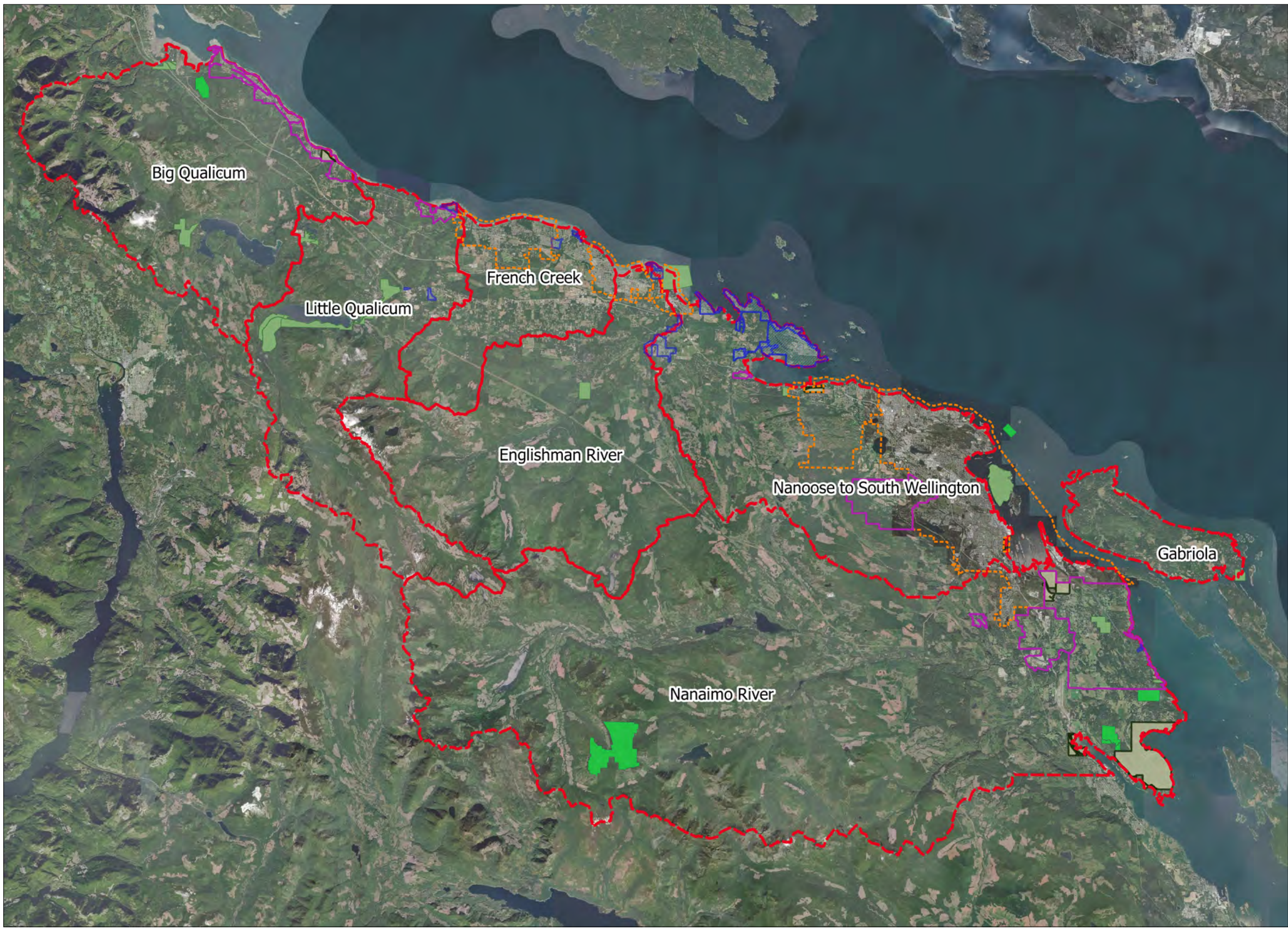
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- Figure 4: **Distribution of Surficial Sediments and Mapped Surficial Aquifers**
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- Figure 6: **Location of Climate Stations for Climate Normals and Real-time Data**
- Figure 7: **Map of Water Service Wells for Serviced and Un-serviced Areas**
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- Figure 15: **Unmonitored Aquifers between Big Qualicum and Englishman River Water Regions**
- Figure 16: **Unmonitored Aquifers between South Wellington and Nanaimo River Water Regions**




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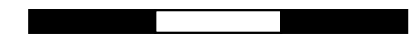
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-  Water Works/Improvement Districts
-  Municipal Water Service Areas
-  Water Regions
-  First Nations Reserve
- Parks and Protected Areas**
-  Provincial Park
-  Ecological Reserve

PROJECT
 Drinking Water and Watershed Protection Program - Regional
 Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE
**Nanaimo Water Regions and Water
 Service Areas (Study Area)**

	PREPARED BY: Waterline Resources Inc.	FIGURE 1
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
	REVISED: -	

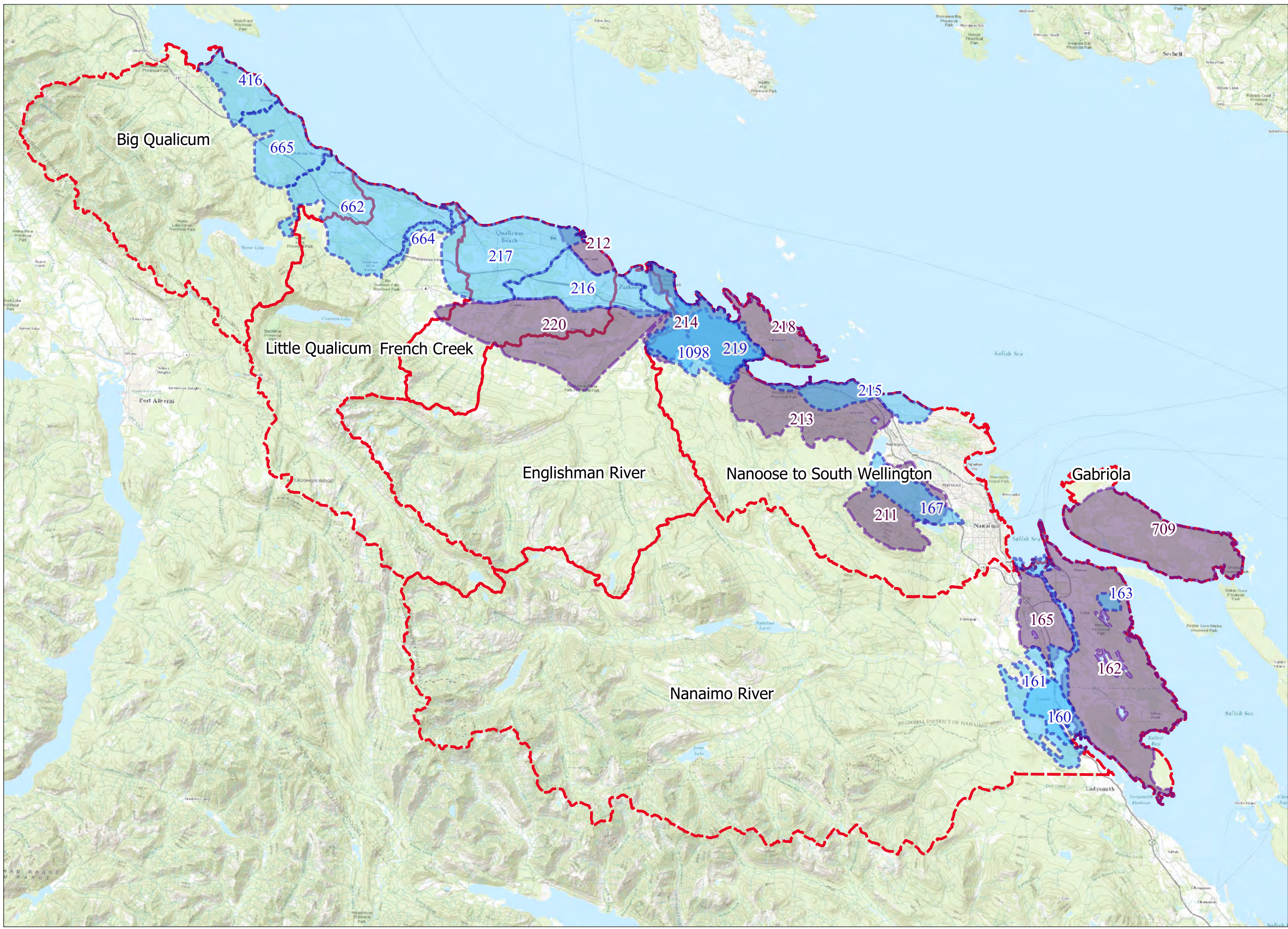
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Scale: 1:300000

Coordinate system: WGS 84 / Pseudo Mercator

Sources:
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 World Imagery: ESRI wms service, http://server.arcgisonline.com/arcgis/rest/services/World_Imagery/MapServer/WMTS



LEGEND:

- Water Regions
- Aquifer in Overburden (ID #)
- Aquifer in Bedrock (ID #)

*Note: only mapped aquifers associated with known VOWN and PGOWN locations are displayed.

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 Drinking Water and Watershed Protection Program - Regional
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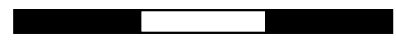
TITLE
**Regionally Mapped Surficial and
 Bedrock Aquifers**



PREPARED BY: Waterline Resources Inc.
PROJECT: 2590-20-001
COMPILED BY: MS
DATE ISSUED: 2020-May-27
REVISED: -

FIGURE 3

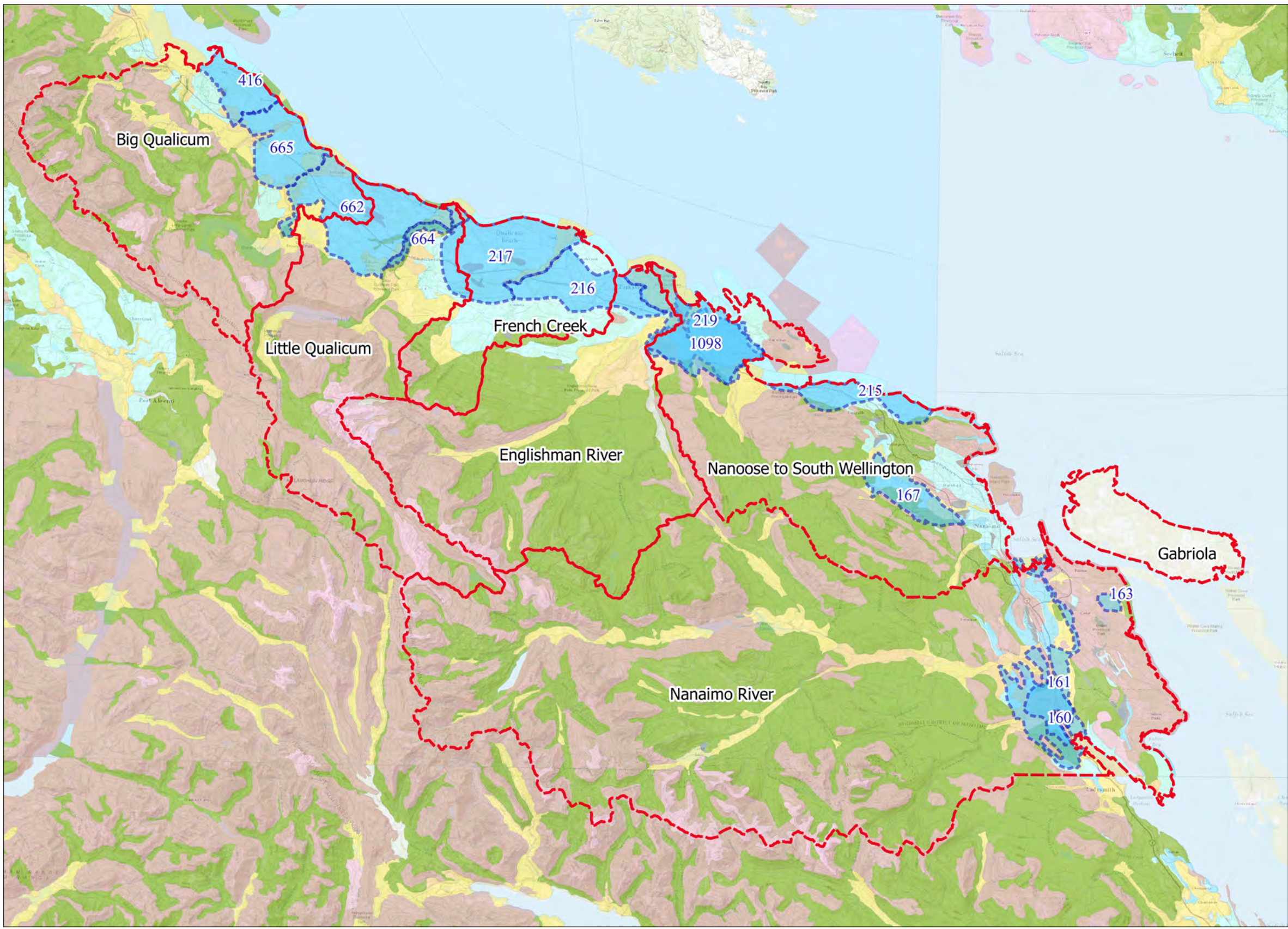
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Scale: 1:300000

Coordinate system: WGS 84 / Pseudo Mercator

Sources:
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 Regional District of Nanaimo.
 World Topographic Map: ESRI wms service, http://server.arcgisonline.com/arcgis/rest/services/World_Topo_Map/MapServer/WMTS?



LEGEND:

- Water Regions
- Aquifer in Overburden

Surficial Sediment

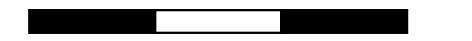
- Anthropogenic Material
- Bedrock
- Colluvium
- Fluvial Material
- Morainial Material (till)
- Glaciofluvial Material
- Glaciomarine Material
- Marine Material
- Organic Material
- Undifferentiated Material
- Not Classified

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 Drinking Water and Watershed Protection Program - Regional
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 Submitted to the Regional District of Nanaimo Water Services

TITLE
**Distribution of Surficial Sediment and
 Mapped Surficial Aquifers**

	PREPARED BY: Waterline Resources Inc.	FIGURE 4
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
	REVISED:	

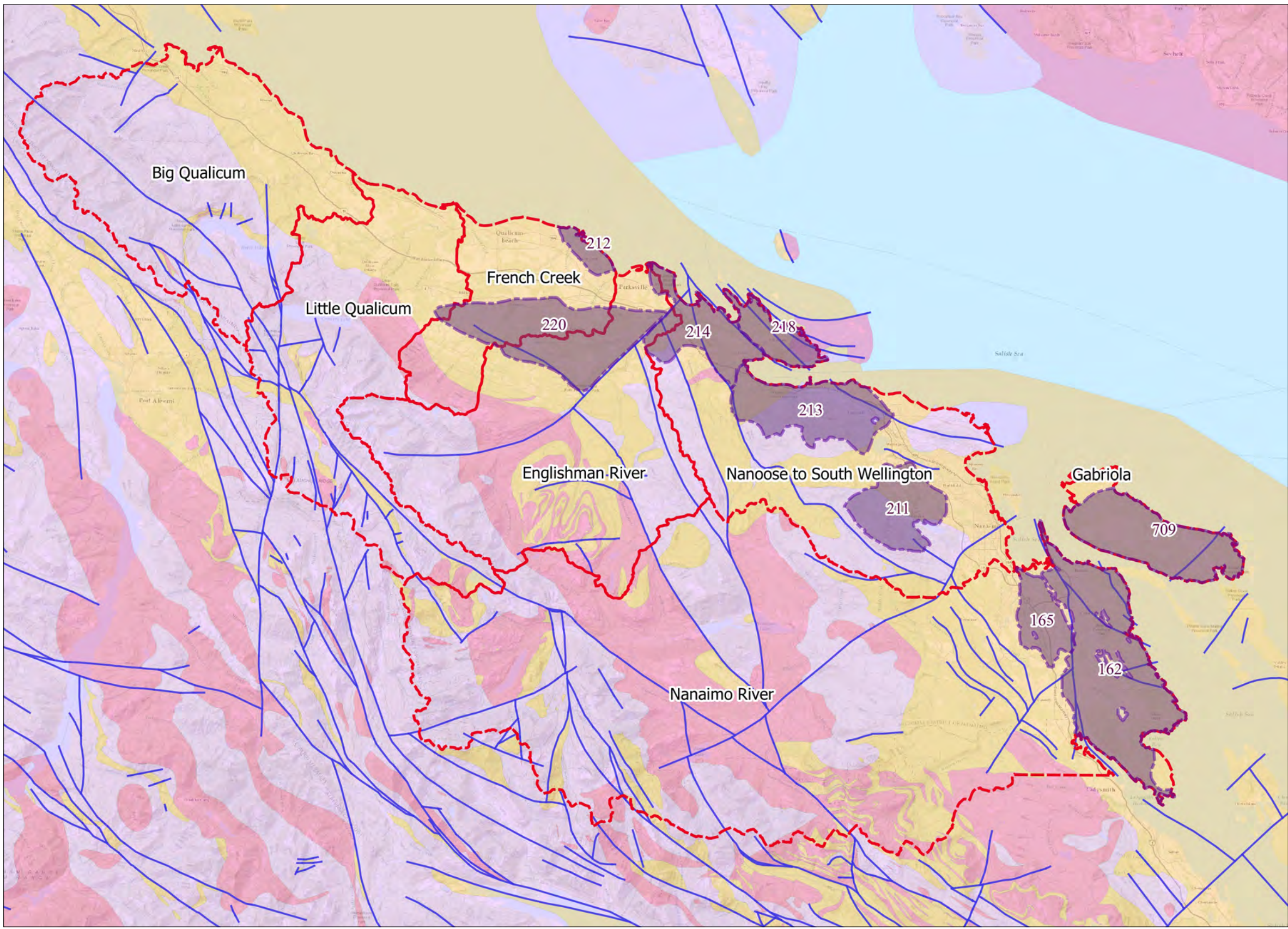
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Coordinate system: WGS 84 / Pseudo Mercator

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LEGEND:

- Water Regions
- Aquifer in Bedrock
- Fault

Bedrock Geology

- Intrusive
- Sedimentary
- Volcanic

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 Drinking Water and Watershed Protection Program - Regional
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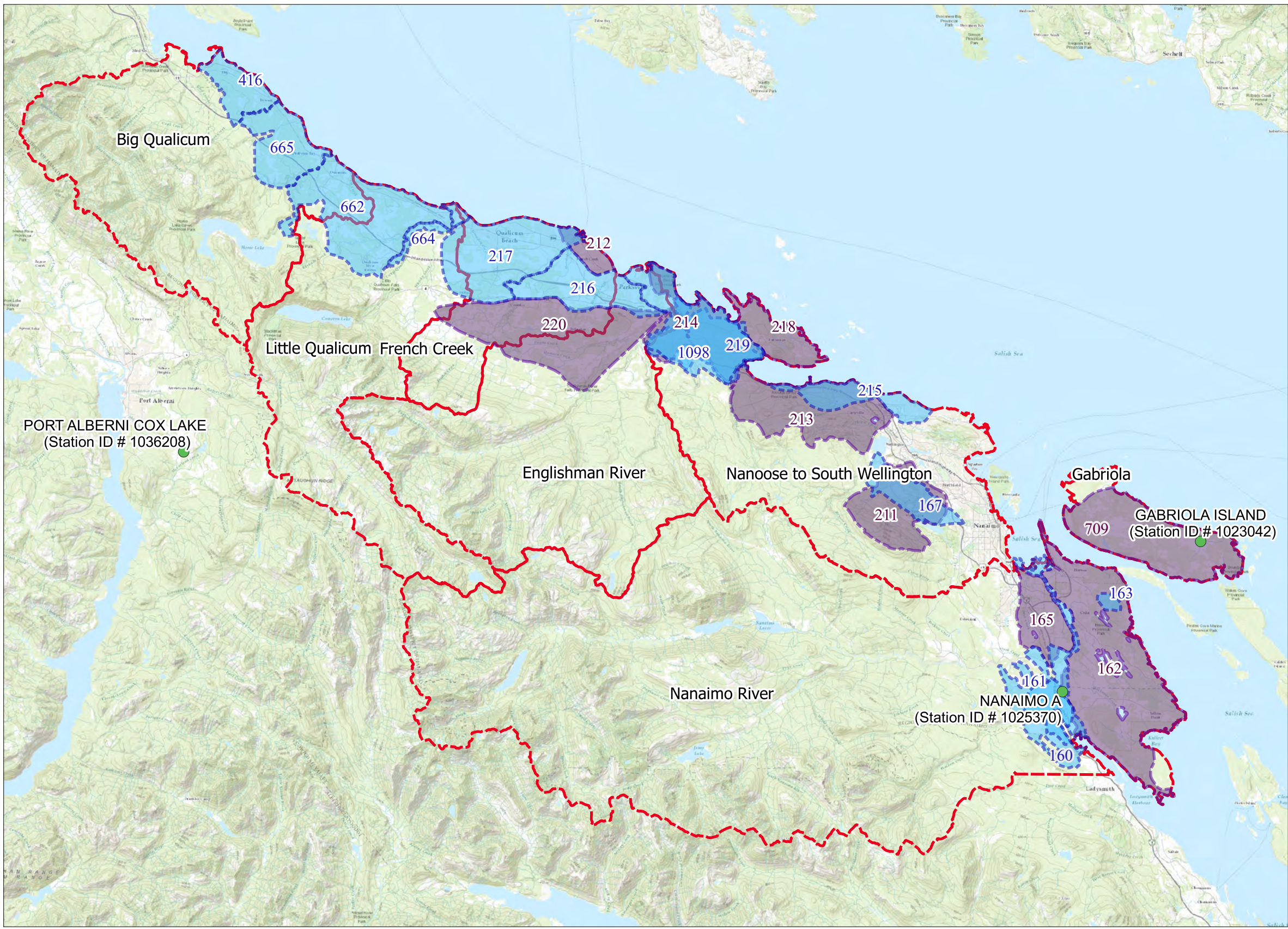
TITLE
**Distribution of Bedrock Geology and
 Mapped Bedrock Aquifers**

	PREPARED BY: Waterline Resources Inc.	FIGURE 5
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
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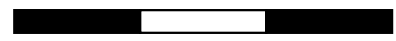
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- LEGEND:**
- BC Climate Normals
 - Water Regions
 - Aquifer in Overburden
 - Aquifer in bedrock

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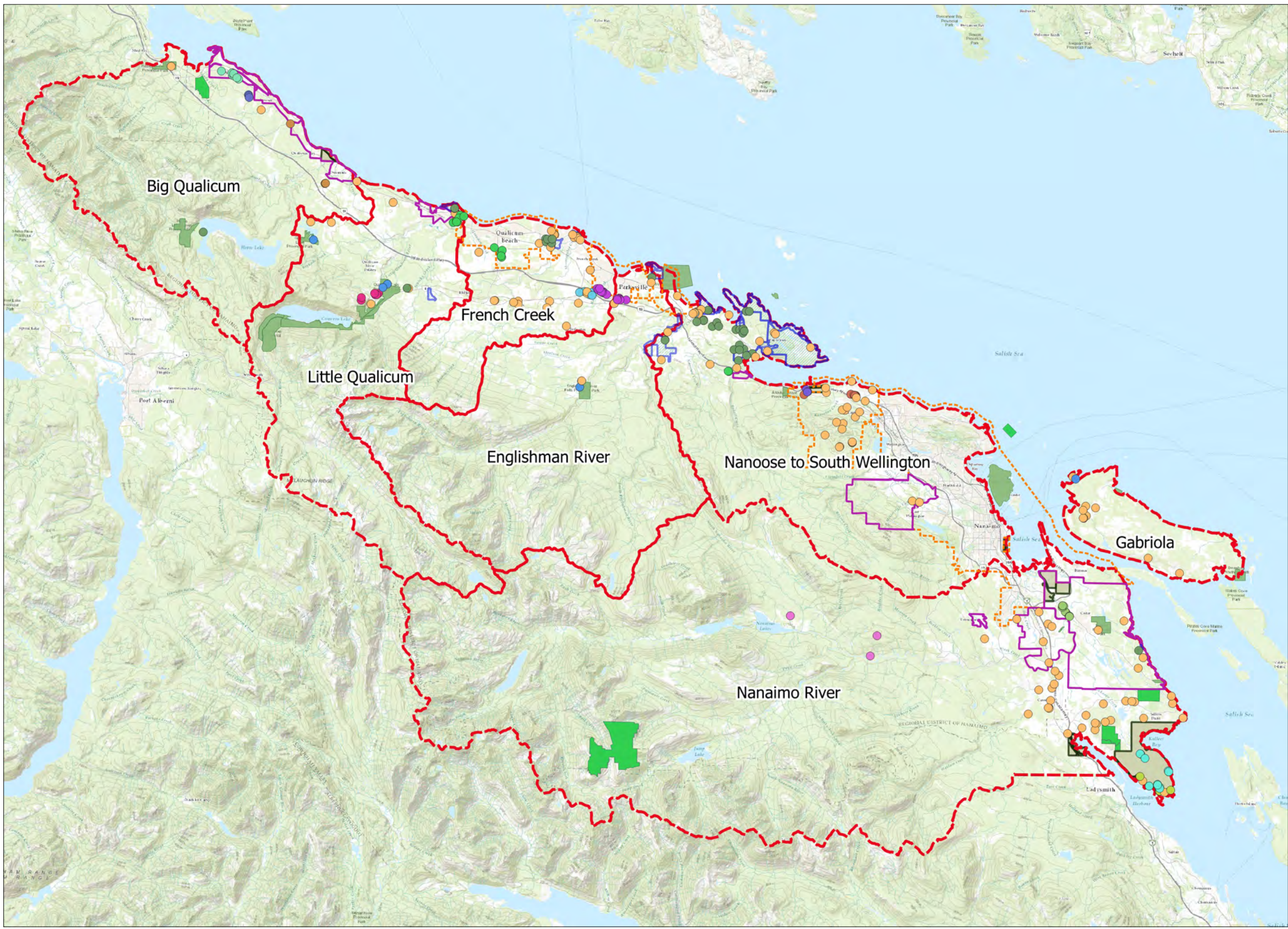
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PROJECT
 Drinking Water and Watershed Protection Program - Regional
 Groundwater Level Analysis for Summer 2020
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TITLE
**Location of Climate Stations for
 Climate Normals and Real-time Data**

PREPARED BY: Waterline Resources Inc.
PROJECT: 2590-20-001
COMPILED BY: MS
DATE ISSUED: 2020-May-27
REVISED: -

FIGURE 6



LEGEND:

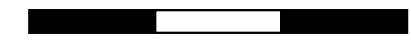
- Water Service Wells**
- Bowser Waterworks Dist.
 - Deep Bay Waterworks Dist.
 - Qualicum Bay Home Lake Water Dist.
 - Little Qualicum River Village
 - Town of Qualicum Beach
 - Regional District of Nanaimo
 - City of Parksville
 - District of Lantzville
 - City of Nanaimo
 - Chemainus First Nation
 - North Cedar Water Works
 - Shell Beach Water Utility
 - EPCOR Utilities
 - Nanoose First Nations
 - BC Parks
 - Small Water System Wells
- Water Service Areas**
- ▨ RDN Water Service Areas
 - ▭ Water Works/Improvement Districts
 - ▨ Municipal Water Service Areas
 - ▭ Water Regions
- Parks and Protected Areas**
- ▭ First Nations Reserve
 - ▭ Provincial Park
 - ▭ Ecological Reserve

PROJECT
 Drinking Water and Watershed Protection Program - Regional
 Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE
Water Service Wells for Served and Un-served Areas

	PREPARED BY: Waterline Resources Inc.	FIGURE 7
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
	REVISED:	

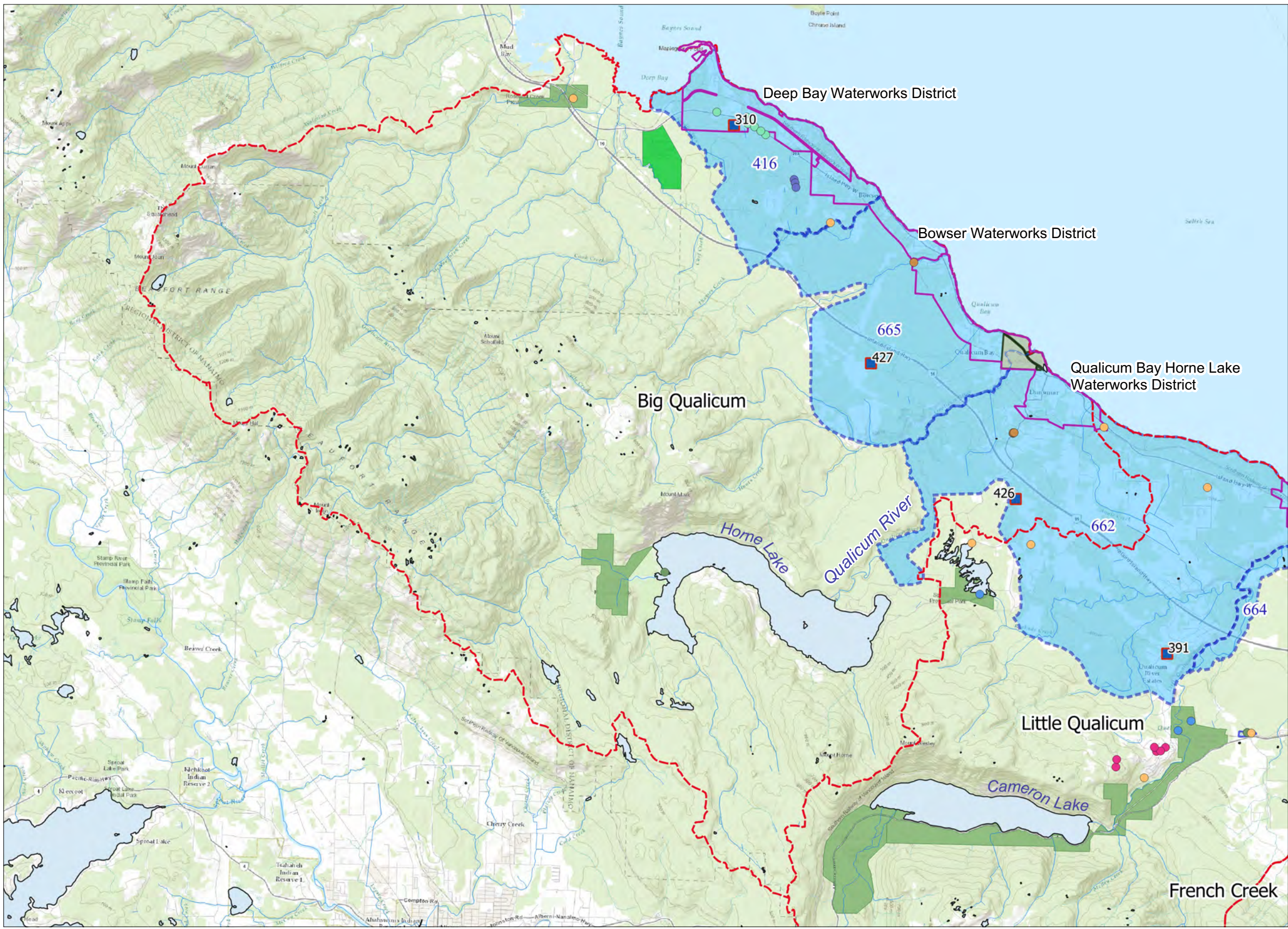
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LEGEND:

- Provincial Observation Well Network
- Water Service Wells**
- Bowser Waterworks Dist.
- Deep Bay Waterworks Dist.
- Qualicum Bay Home Lake Water Dist.
- Little Qualicum River Village
- Regional District of Nanaimo
- BC Parks
- Small Water System Wells
- Creek/Stream/River
- Lakes
- RDN Water Service Areas
- Water Works/Improvement Districts
- Water Regions
- First Nations Reserve
- Parks and Protected Areas**
- Provincial Park
- Ecological Reserve
- Aquifer in Overburden

PROJECT
 Drinking Water and Watershed Protection Program - Regional Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE **Groundwater Service Infrastructure and Observation Well Network for the Big Qualicum Water Region**

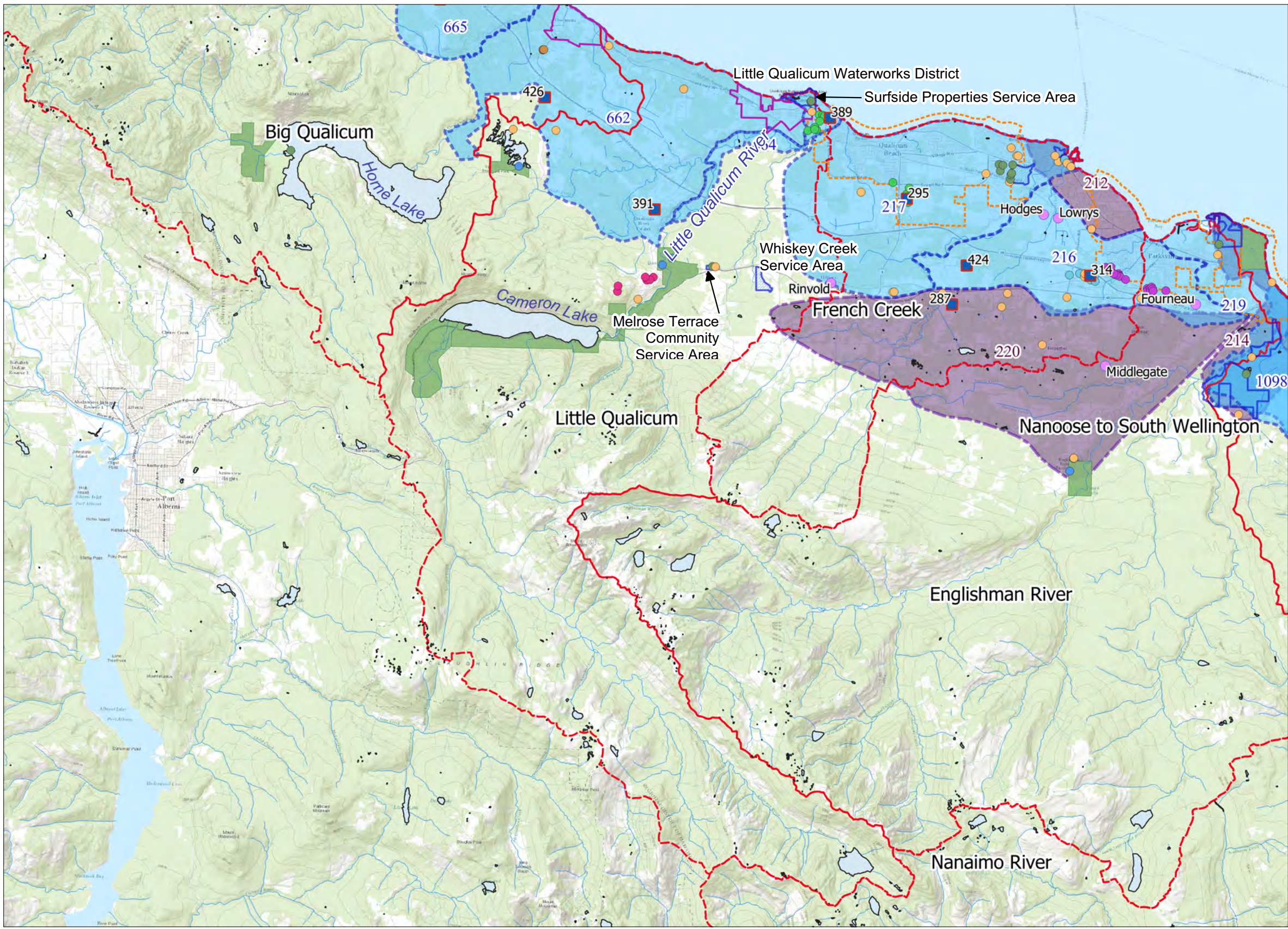
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	PROJECT: 2590-20-001	
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	DATE ISSUED: 2020-May-27	
	REVISED:	

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Scale: 1:105000

Coordinate system: WGS 84 / Pseudo Mercator

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LEGEND:

- RDN Volunteer Observation Well Network (VOWN)
- Provincial Observation Well Network

Water Service Wells

- Qualicum Bay Home Lake Water Dist.
- Little Qualicum River Village
- Town of Qualicum Beach
- Regional District of Nanaimo
- City of Parksville
- EPCOR Utilities
- BC Parks
- Small Water System Wells

- Creek/Stream/River
- Lakes
- RDN Water Service Areas
- Water Works/Improvement Districts
- Municipal Water Service Areas
- Water Regions
- First Nations Reserve

Parks and Protected Areas

- Provincial Park
- Aquifer in Overburden
- Aquifer in bedrock

PROJECT
 Drinking Water and Watershed Protection Program - Regional Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE **Groundwater Service Infrastructure and Observation Well Network for the Little Qualicum Water Region**

	PREPARED BY: Waterline Resources Inc.	FIGURE 9
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
	REVISED:	

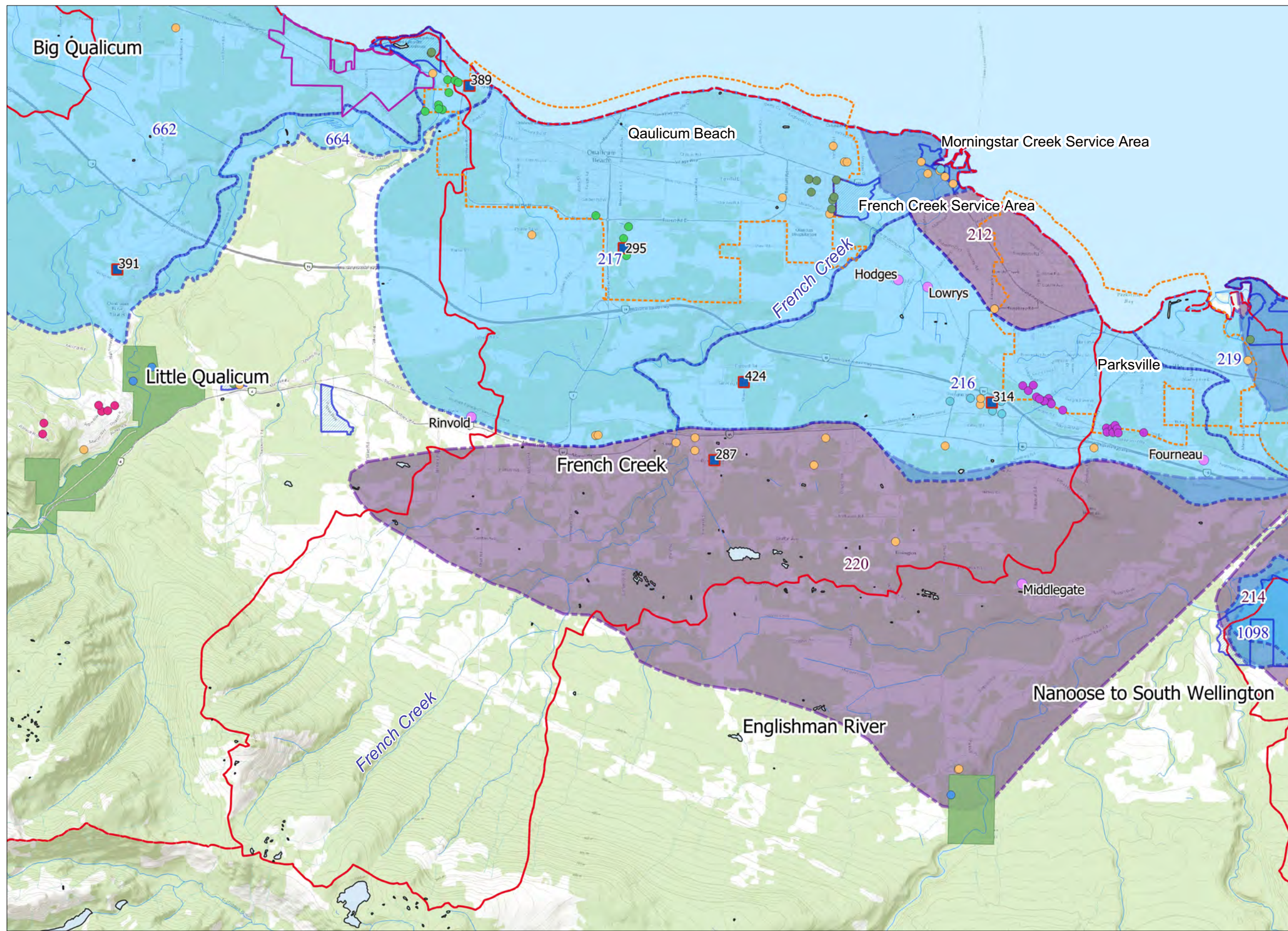
0 2 4 6 8 km



Scale: 1:145000

Coordinate system: WGS 84 / Pseudo Mercator

Sources:
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LEGEND:

- RDN Volunteer Observation Well Network (VOWN)
- Provincial Observation Well Network
- Water Service Wells**
- Little Qualicum River Village
- Town of Qualicum Beach
- Regional District of Nanaimo
- City of Parksville
- EPCOR Utilities
- BC Parks
- Small Water System Wells
- Lakes
- Creek/Stream/River
- RDN Water Service Areas
- Water Works/Improvement Districts
- Municipal Water Service Areas
- Water Regions
- Provincial Park
- Aquifer in Overburden
- Aquifer in bedrock

PROJECT
 Drinking Water and Watershed Protection Program - Regional Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE
Groundwater Service Infrastructure and Observation Well Network for the French Creek Water Region

PREPARED BY: Waterline Resources Inc.	FIGURE 10
PROJECT: 2590-20-001	
COMPILED BY: MS	
DATE ISSUED: 2020-May-27	
REVISED:	

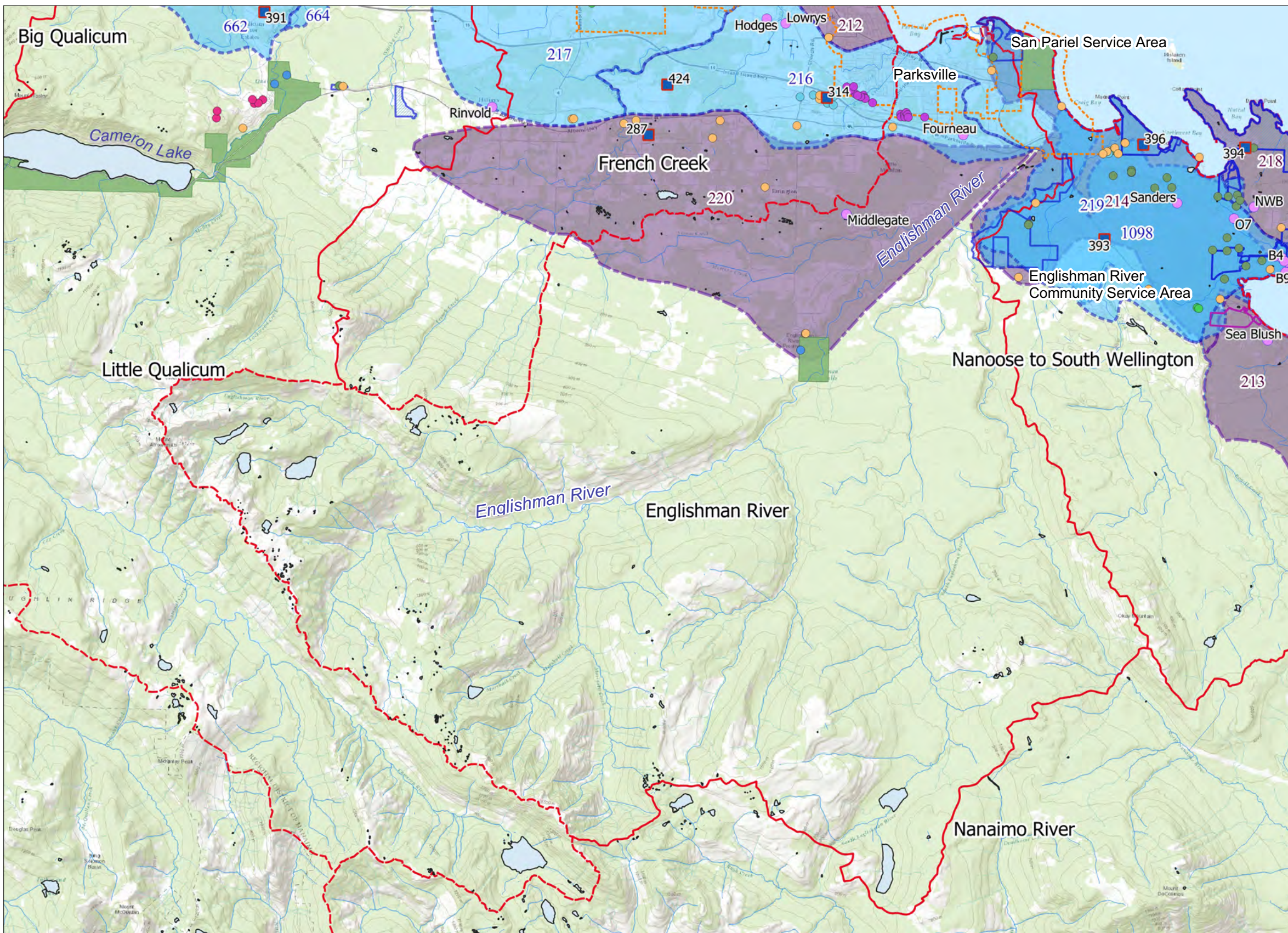
Sources:
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 World Topographic Map: ESRI wms service, http://server.arcgisonline.com/arcgis/rest/services/World_Topo_Map/MapServer/WMTS

0 1 2 3 4 km



Scale: 1:72500

Coordinate system: WGS 84 / Pseudo Mercator



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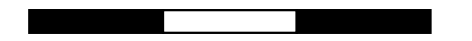
- RDN Volunteer Observation Well Network (VOWN)
- Provincial Observation Well Network
- Water Service Wells**
- Little Qualicum River Village
- Town of Qualicum Beach
- Regional District of Nanaimo
- City of Parksville
- EPCOR Utilities
- BC Parks
- Small Water System Wells
- Creek/Stream/River
- Lakes
- RDN Water Service Areas
- Water Works/Improvement Districts
- Municipal Water Service Areas
- Water Regions
- Provincial Park
- Aquifer in Overburden
- Aquifer in bedrock

PROJECT
 Drinking Water and Watershed Protection Program - Regional Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE **Groundwater Service Infrastructure and Observation Well Network for the Englishman River Water Region**

	PREPARED BY: Waterline Resources Inc.	FIGURE 11
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
	REVISED:	

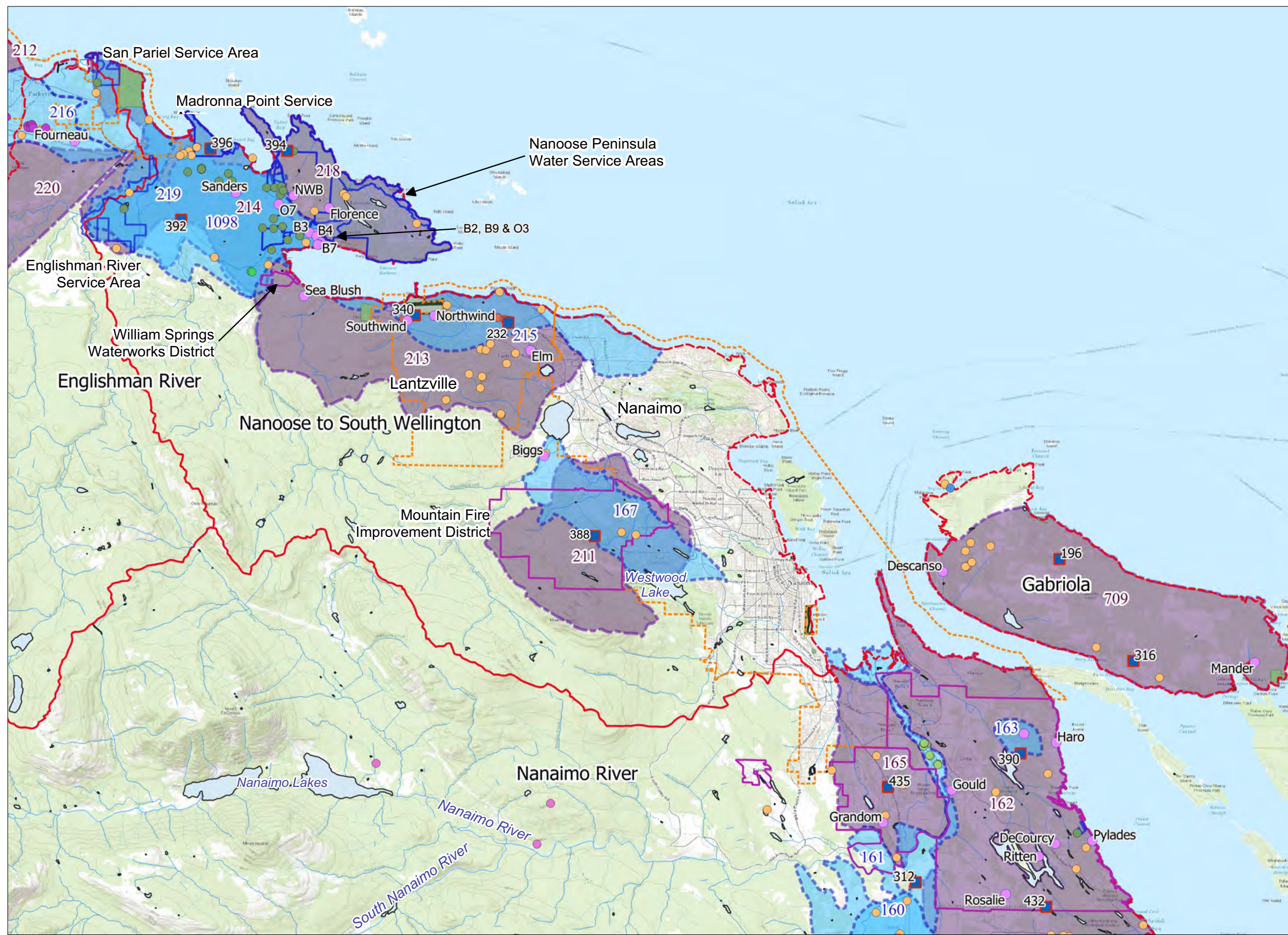
0 2 4 6 km



Scale: 1:113000

Coordinate system: WGS 84 / Pseudo Mercator

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- LEGEND:**
- RDN Volunteer Observation Well Network (VOWN)
 - Provincial Observation Well Network
- Water Service Wells**
- Town of Qualicum Beach
 - Regional District of Nanaimo
 - City of Parksville
 - District of Lantzville
 - City of Nanaimo
 - Cedar Water Works
 - EPCOR Utilities
 - Nanoose First Nations
 - BC Parks
 - Small Water System Wells
- Creek/Stream/River
 - Lakes
 - RDN Water Service Areas
 - Water Works/Improvement Districts
 - Municipal Water Service Areas
 - Water Regions
 - First Nations Reserve
 - Provincial Park
 - Aquifer in Overburden
 - Aquifer in bedrock

PROJECT
 Drinking Water and Watershed Protection Program - Regional Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE
Groundwater Service Infrastructure and Observation Well Network for the Nanoose, South Wellington and Gabriola Water Regions

PREPARED BY: Waterline Resources Inc.	FIGURE 12
PROJECT: 2590-20-001	
COMPILED BY: MS	
DATE ISSUED: 2020-May-27	
REVISED:	

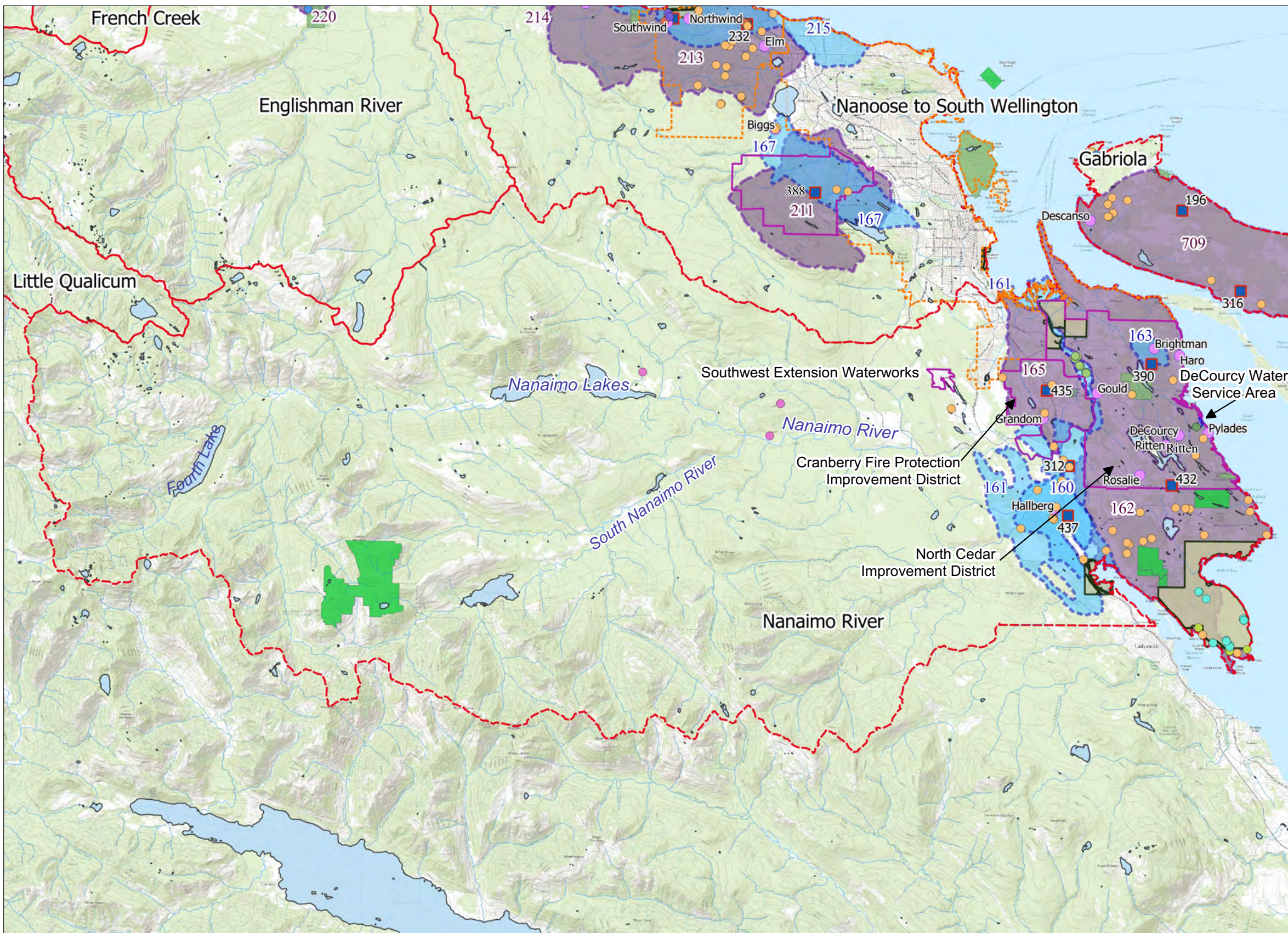
0 2 4 6 8 10 km



Scale: 1:150000

Coordinate system: WGS 84 / Pseudo Mercator

Sources:
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LEGEND:

- RDN Volunteer Observation Well Network (VOWN)
- Provincial Observation Well Network
- Water Service Wells**
 - Regional District of Nanaimo
 - District of Lantzville
 - City of Nanaimo
 - Chemainus First Nation
 - North Cedar Water Works
 - Shell Beach Water Utility
 - Nanoose First Nations
 - BC Parks
 - Small Water System Wells
- Creek/Stream/River
- Lake
- RDN Water Service Areas
- Water Works/Improvement Districts
- Municipal Water Service Areas
- Water Regions
- First Nations Land
- Parks and Protected Areas**
 - Provincial Park
 - Ecological Reserve
 - Aquifer in Overburden
 - Aquifer in bedrock

PROJECT
 Drinking Water and Watershed Protection Program - Regional Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE **Groundwater Service Infrastructure and Observation Well Network for the Nanaimo River Water Region**

	PREPARED BY: Waterline Resources Inc.	FIGURE 13
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
	REVISED:	

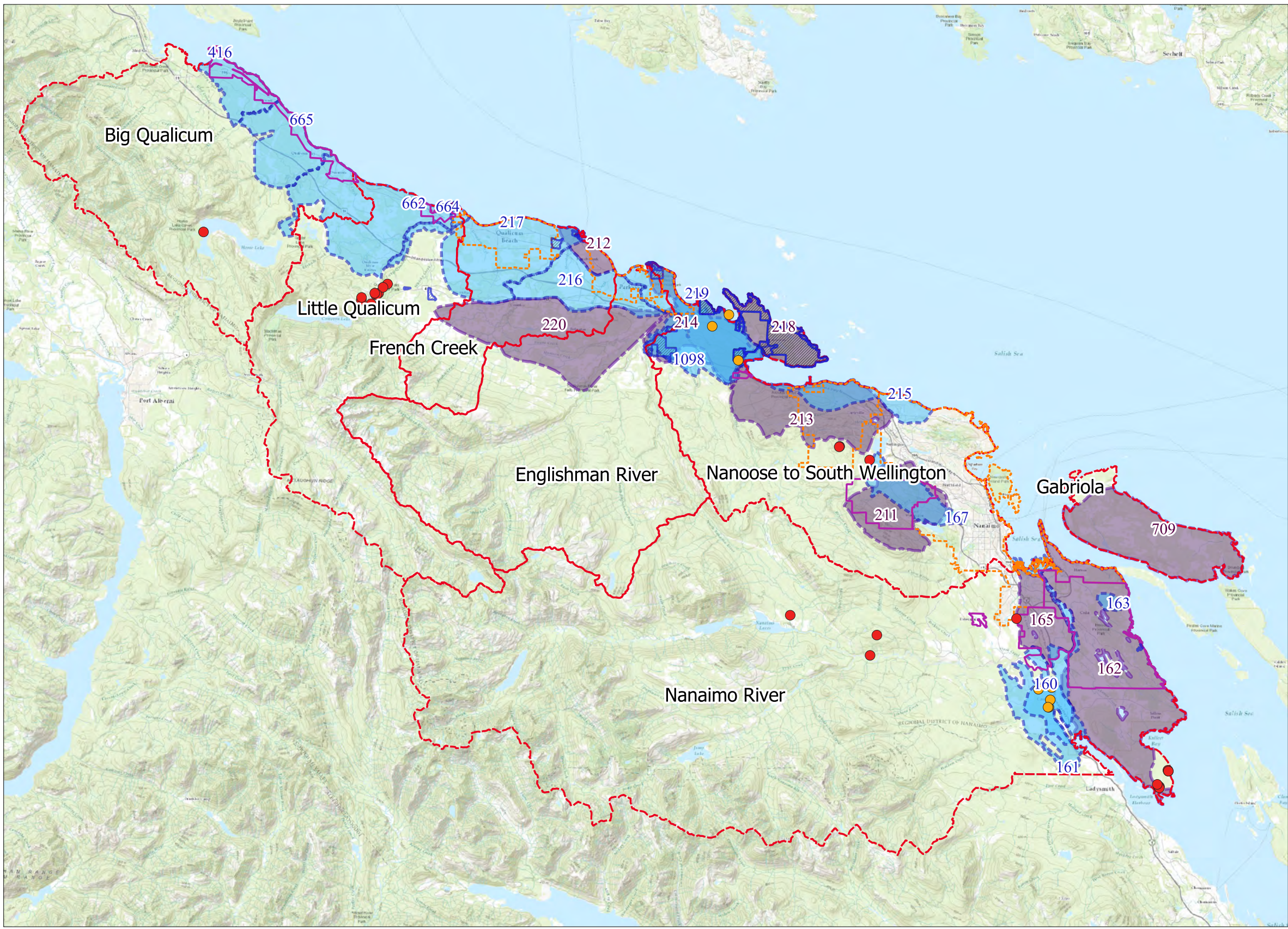
0 2 4 6 8 10 km



Scale: 1:190000

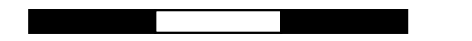
Coordinate system: WGS 84 / Pseudo Mercator

Sources:
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 World Topographic Map: ESRI wms service, http://server.arcgisonline.com/arcgis/rest/services/World_Topo_Map/MapServer/WMTS



- LEGEND:**
- Water Service Wells
 - No Mapped Aquifer
 - Unknown Aquifer
 - ▨ RDN Water Service Areas
 - ▭ Water Works/Improvement Districts
 - ▭ Municipal Water Service Areas
 - ▭ Water Regions
 - ▭ Aquifer in Overburden
 - ▭ Aquifer in bedrock

0 5 10 15 km



Scale: 1:300000

Coordinate system: WGS 84 / Pseudo Mercator

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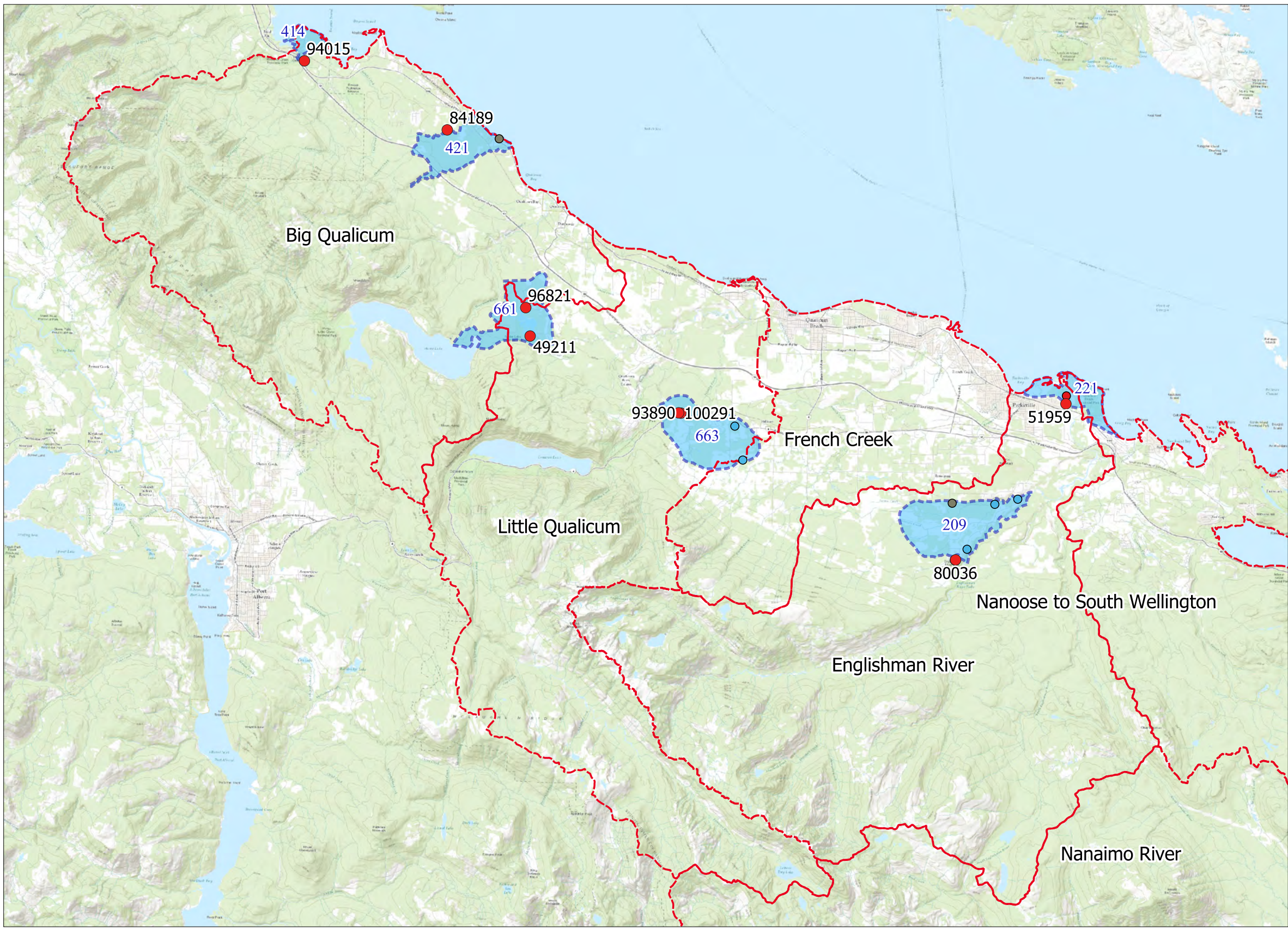
PROJECT
 Drinking Water and Watershed Protection Program - Regional
 Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE
**Water Service Wells Associated with
 Unmapped or Unknown Aquifers**

PREPARED BY: Waterline Resources Inc.
PROJECT: 2590-20-001
COMPILED BY: MS
DATE ISSUED: 2020-May-27
REVISED: -

FIGURE 14





LEGEND:

- Water Service Wells
- Registered Groundwater Well Locations
- Private Domestic
- Water Works
- Unknown Well Use
- Water Regions
- Aquifer in Overburden

PROJECT
 Drinking Water and Watershed Protection Program - Regional
 Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE
**Unmonitored Aquifers between Big Qualicum
 and Englishman River Water Regions**

	PREPARED BY: Waterline Resources Inc.	FIGURE 15
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
	REVISED:	

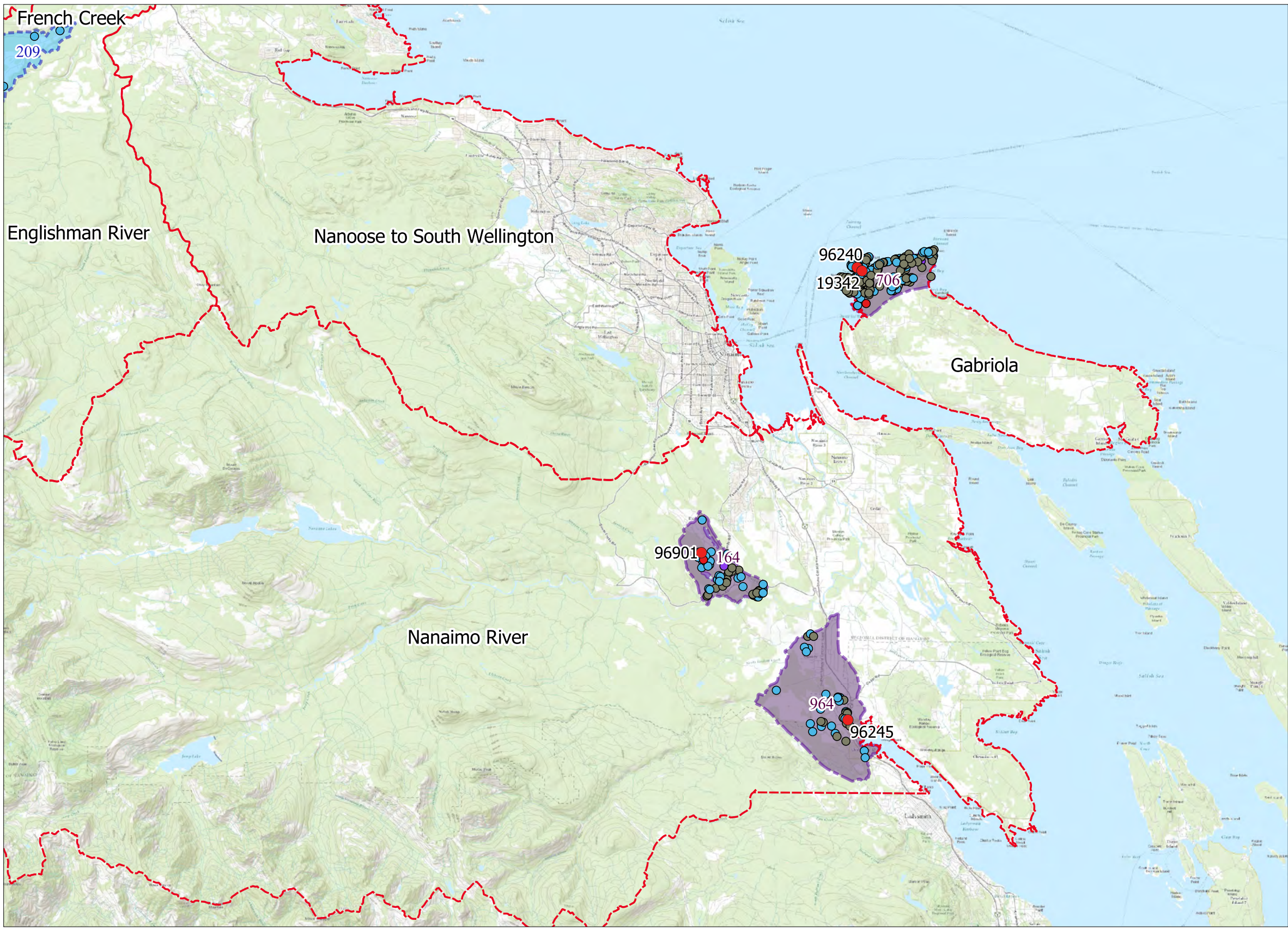
0 2 4 6 8 10 km



Scale: 1:189000

Coordinate system: WGS 84 / Pseudo Mercator

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- LEGEND:**
- Water Service Wells
 - Registered Groundwater Well Locations
 - Private Domestic
 - Water Works
 - Water Supply System
 - Commercial & Industrial
 - Unknown Well Use
 - Water Regions
 - Aquifer in Overburden
 - Aquifer in bedrock

0 2 4 6 8 10 km



Scale: 1:170000

Coordinate system: WGS 84 / Pseudo Mercator

PROJECT
 Drinking Water and Watershed Protection Program - Regional
 Groundwater Level Analysis for Summer 2020
 Submitted to the Regional District of Nanaimo Water Services

TITLE
**Unmonitored Aquifers between South
 Wellington and Nanaimo River Water Regions**

	PREPARED BY: Waterline Resources Inc.	FIGURE 16
	PROJECT: 2590-20-001	
	COMPILED BY: MS	
	DATE ISSUED: 2020-May-27	
	REVISED:	

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Appendix A – List of Water Service Wells and Associated Mapped Aquifers

Table A1: List of Water Supply Wells and Associated Mapped Aquifers

Well Owner	Well License Status	Well Tag Number	Aquifer Number	Aquifer Subtype	Status of Aquifer Monitoring	Reported Water Depth (m)	Well Drilled Depth (m)	Bedrock Depth (m)	Lithology
ISLAND TIMBERLANDS LIMITED PARTNERSHIP	UNLICENSED	107507	UNK	-	-	7	52	-	SURF
ANDERSON	UNLICENSED	104621	UNK	-	-	-	0	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	48870	UNK	-	-	48	95	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75339	UNK	-	-	-	0	-	SURF
DISTRICT 89 CHRISTIAN EDUCATION SOCIETY	UNLICENSED	94087	UNK	-	-	-	0	-	SURF
HARSHBERG / TIMBERLANDS MOBILE HOME PARK	UNLICENSED	93909	UNK	-	-	25	30	-	SURF
NORLIE	UNLICENSED	104614	UNK	-	-	-	0	-	SURF
LOWE	UNLICENSED	104626	UNK	-	-	-	0	-	SURF
RUKIN	UNLICENSED	104623	UNK	-	-	-	0	-	SURF
BRANNINEN LAKE CAMPGROUND	UNLICENSED	13285	NM	-	-	-	2	-	SURF
CHEMAINUS FIRST NATION	UNLICENSED	80123	NM	-	-	8	11	-	SURF
CHEMAINUS FIRST NATION	UNLICENSED	74952	NM	-	-	16	32	-	SURF
BC PARKS - VANCOUVER ISLAND REGION	UNLICENSED	26039	NM	-	-	22	137	37	BED
LITTLE QUALICUM RIVER VILLAGE	UNLICENSED	85679	NM	-	-	11	19	33	SURF
LITTLE QUALICUM RIVER VILLAGE	UNLICENSED	85680	NM	-	-	9	17	-	SURF
CITY OF NANAIMO	UNLICENSED	81920	NM	-	-	-	14	-	SURF
CITY OF NANAIMO	UNLICENSED	81921	NM	-	-	-	19	-	SURF
CHEMAINUS FIRST NATION	UNLICENSED	74957	NM	-	-	-	49	-	SURF
LITTLE QUALICUM RIVER VILLAGE	UNLICENSED	85685	NM	-	-	5	25	24	SURF
LITTLE QUALICUM RIVER VILLAGE	UNLICENSED	85687	NM	-	-	1	8	29	SURF
LITTLE QUALICUM RIVER VILLAGE	UNLICENSED	85689	NM	-	-	-	93	2	BED
BC PARKS - VANCOUVER ISLAND REGION	UNLICENSED	94083	NM	-	-	-	3	-	UNK
LANTZVILLE FOOTHILLS ESTATES LTD	UNLICENSED	94374	NM	-	-	1	203	12	BED
CITY OF NANAIMO	UNLICENSED	87292	NM	-	-	3	26	41	SURF
CHEMAINUS FIRST NATION	UNLICENSED	106681	NM	-	-	7	15	-	SURF
STOLZ	UNLICENSED	104622	NM	-	-	-	0	-	UNK
LANTZVILLE FOOTHILLS ESTATES LTD	UNLICENSED	94375	NM	-	-	12	154	1	BED
LITTLE QUALICUM RIVER VILLAGE	UNLICENSED	107028	NM	-	-	-	122	-	BED
CHEMAINUS FIRST NATION	UNLICENSED	96829	NM	-	-	7	9	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	86267	NM	-	-	-	12	-	SURF
WILLIAMS	UNLICENSED	96503	NM	-	-	9	38	41	SURF
CHEMAINUS FIRST NATION	UNLICENSED	96848	NM	-	-	31	75	76	SURF
CHEMAINUS FIRST NATION	UNLICENSED	96838	NM	-	-	30	73	-	SURF
CHEMAINUS FIRST NATION	UNLICENSED	96843	NM	-	-	31	73	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	40102	1098	Confined sand and gravel - glacial	AM	28	50	67	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	46979	1098	Confined sand and gravel - glacial	AM	37	58	59	SURF
QUALICUM SCHOOL DIST	UNLICENSED	55733	1098	Confined sand and gravel - glacial	AM	-	98	-	SURF
QUALICUM SCHOOL DIST	UNLICENSED	55734	1098	Confined sand and gravel - glacial	AM	12	35	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75321	1098	Confined sand and gravel - glacial	AM	47	75	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75341	1098	Confined sand and gravel - glacial	AM	21	52	57	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75319	1098	Confined sand and gravel - glacial	AM	40	76	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75342	1098	Confined sand and gravel - glacial	AM	12	26	32	SURF
RANDLE	UNLICENSED	108133	1098	Confined sand and gravel - glacial	AM	28	55	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	101720	1098	Confined sand and gravel - glacial	AM	16	29	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75323	1098	Confined sand and gravel - glacial	AM	12	87	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75320	1098	Confined sand and gravel - glacial	AM	12	70	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	96379	1098	Confined sand and gravel - glacial	AM	10	23	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	100191	1098	Confined sand and gravel - glacial	AM	5	32	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	44157	1098	Confined sand and gravel - glacial	AM	35	53	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	40733	1098	Confined sand and gravel - glacial	AM	32	53	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	104502	1098	Confined sand and gravel - glacial	AM	46	61	-	SURF
REBERG	UNLICENSED	96245	964	Fractured sedimentary rock	ANM	41	91	-	BED
RCMP	UNLICENSED	92099	709	Fractured sedimentary rock	AM	-	4573	-	BED
GABRIOLA GARDEN HOMES SOCIETY	UNLICENSED	93888	709	Fractured sedimentary rock	AM	5	61	-	BED
GABRIOLA AGRICULTURAL HALL SOCIETY	UNLICENSED	29960	709	Fractured sedimentary rock	AM	3	30	1	BED
RCMP	UNLICENSED	92098	709	Fractured sedimentary rock	AM	-	3049	-	BED
SCHOOL DISTRICT #68	UNLICENSED	96530	709	Fractured sedimentary rock	AM	17	79	-	BED
RCMP PROPERTY MANAGEMENT	UNLICENSED	96533	709	Fractured sedimentary rock	AM	18	67	-	BED

CHISSUM	UNLICENSED	106485	709	Fractured sedimentary rock	AM	37	72	-	BED
RCMP PROPERTY MANAGEMENT	UNLICENSED	96526	709	Fractured sedimentary rock	AM	-	91	-	BED
GABRIOLA ISLAND COMMUNITY HALL ASSOCIATION	UNLICENSED	99600	709	Fractured sedimentary rock	AM	-	30	-	BED
BC PARKS - VANCOUVER ISLAND REGION	UNLICENSED	19342	706	Fractured sedimentary rock	ANM	4	36	4	BED
PLAHUT	UNLICENSED	96240	706	Fractured sedimentary rock	ANM	16	79	-	BED
QUALICUM BAY HORNE LAKE WATER DISTRICT	UNLICENSED	96887	665	Unconfined sand and gravel aquifer - medium stream system	AM	-	0	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	28459	664	Unconfined sand and gravel aquifer - small stream system	AM	2	9	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75325	664	Unconfined sand and gravel aquifer - small stream system	AM	3	10	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	108901	664	Unconfined sand and gravel aquifer - small stream system	AM	-	14	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	108898	664	Unconfined sand and gravel aquifer - small stream system	AM	-	19	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	16084	664	Unconfined sand and gravel aquifer - small stream system	AM	4	12	-	SURF
CEDAR GROVE RV AND CAMPGROUND	UNLICENSED	80074	664	Unconfined sand and gravel aquifer - small stream system	AM	3	15	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	108902	664	Unconfined sand and gravel aquifer - small stream system	AM	4	11	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	108903	664	Unconfined sand and gravel aquifer - small stream system	AM	4	0	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	108899	664	Unconfined sand and gravel aquifer - small stream system	AM	-	17	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	108900	664	Unconfined sand and gravel aquifer - small stream system	AM	-	18	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	108904	664	Unconfined sand and gravel aquifer - small stream system	AM	3	0	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	102924	664	Unconfined sand and gravel aquifer - small stream system	AM	2	20	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	93890	663	Unconfined sand and gravel - late glacial outwash	ANM	19	29	-	SURF
SHB ENTERPRISES MELROSE PROPERTIES LTD	UNLICENSED	100291	663	Unconfined sand and gravel - late glacial outwash	ANM	4	13	-	SURF
WERNER DREIBINGER	UNLICENSED	54887	662	Confined sand and gravel - glacial	AM	50	96	-	SURF
LEVICK	UNLICENSED	103914	662	Confined sand and gravel - glacial	AM	67	78	-	SURF
QUALICUM BAY HORNE LAKE WATER DISTRICT	UNLICENSED	110569	662	Confined sand and gravel - glacial	AM	1	27	-	SURF
QUALICUM BAY HORNE LAKE WATER DISTRICT	UNLICENSED	96893	662	Confined sand and gravel - glacial	AM	3	30	-	SURF
QUALICUM BAY HORNE LAKE WATER DISTRICT	UNLICENSED	96521	662	Confined sand and gravel - glacial	AM	-	27	-	SURF
SPIDER LAKE SPRINGS CAMPGROUND	UNLICENSED	96700	662	Confined sand and gravel - glacial	AM	3	13	-	SURF
BC PARKS - VANCOUVER ISLAND REGION	UNLICENSED	49211	661	Unconfined sand and gravel - late glacial outwash	ANM	3	12	-	SURF
SPYDER LAKE RESORT	UNLICENSED	96821	661	Unconfined sand and gravel - late glacial outwash	ANM	-	15	-	SURF
LAND & WATER BC INC	UNLICENSED	84189	421	Confined sand and gravel - glacial	ANM	-	35	81	SURF
DEEP BAY WATER DIST	UNLICENSED	99102	416	Confined sand and gravel - glacial	AM	1	0	-	SURF
BOWSER WATERWORKS DISTRICT	UNLICENSED	110980	416	Confined sand and gravel - glacial	AM	-	45	-	SURF
DEEP BAY WATER DIST	UNLICENSED	28807	416	Confined sand and gravel - glacial	AM	2	25	-	SURF
DEEP BAY WATER DIST	UNLICENSED	28811	416	Confined sand and gravel - glacial	AM	2	15	-	SURF
BOWSER WATERWORKS DISTRICT	UNLICENSED	110979	416	Confined sand and gravel - glacial	AM	5	45	-	SURF
DEEP BAY WATER DIST	UNLICENSED	22088	416	Confined sand and gravel - glacial	AM	5	21	-	SURF
DEEP BAY WATER DIST	UNLICENSED	102152	416	Confined sand and gravel - glacial	AM	1	23	-	SURF
DEEP BAY WATER DIST	UNLICENSED	96930	416	Confined sand and gravel - glacial	AM	-	26	-	SURF
DEEP BAY WATER DIST	UNLICENSED	74923	416	Confined sand and gravel - glacial	AM	1	23	-	SURF
BOWSER WATERWORKS DISTRICT	UNLICENSED	18591	416	Confined sand and gravel - glacial	AM	1	5	-	SURF
ALL BEST HOLDING COMPANY	UNLICENSED	94015	414	Unconfined sand and gravel - deltaic	ANM	5	26	-	SURF
CITY OF PARKSVILLE	UNLICENSED	51959	221	Unconfined sand and gravel - deltaic	ANM	2	15	14	SURF
COOMBS GENERAL STORE	UNLICENSED	94086	220	Fractured sedimentary rock	AM	-	0	-	BED
COOMBS COUNTRY FAIR	UNLICENSED	94610	220	Fractured sedimentary rock	AM	3	67	3	BED
A CHILD'S PLACE	UNLICENSED	94611	220	Fractured sedimentary rock	AM	5	33	-	BED
BC PARKS - VANCOUVER ISLAND REGION	UNLICENSED	40049	220	Fractured sedimentary rock	AM	15	95	32	BED
SMITH	UNLICENSED	86886	220	Fractured sedimentary rock	AM	2	68	2	BED
ZELLOC HOLDINGS LIMITED	UNLICENSED	93946	220	Fractured sedimentary rock	AM	5	8	-	BED
WILLOW MOBILE HOME PARK	UNLICENSED	93912	220	Fractured sedimentary rock	AM	2	5	-	BED
DOUGAN & MARLEY	UNLICENSED	111192	219	Confined sand and gravel - glacial	AM	-	16	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75338	219	Confined sand and gravel - glacial	AM	-	0	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	40309	219	Confined sand and gravel - glacial	AM	10	37	35	SURF
PACIFIC SHORES DEV.	UNLICENSED	59354	219	Confined sand and gravel - glacial	AM	-	11	16	SURF
VOIGT	UNLICENSED	84175	219	Confined sand and gravel - glacial	AM	-	43	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75343	219	Confined sand and gravel - glacial	AM	-	17	16	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75322	219	Confined sand and gravel - glacial	AM	51	72	-	SURF
FAIRWINDS	UNLICENSED	96793	219	Confined sand and gravel - glacial	AM	1	12	-	SURF
TIGH-NA-MARA RESORT	UNLICENSED	96943	219	Confined sand and gravel - glacial	AM	19	28	-	SURF
EPCOR UTILITIES	UNLICENSED	98377	219	Confined sand and gravel - glacial	AM	-	15	-	SURF
FAIRWINDS REAL ESTATE INC.	UNLICENSED	94246	219	Confined sand and gravel - glacial	AM	-	13	-	SURF
FAIRWINDS REAL ESTATE INC.	UNLICENSED	94247	219	Confined sand and gravel - glacial	AM	-	12	-	SURF

REGIONAL DISTRICT OF NANAIMO	UNLICENSED	94530	219	Confined sand and gravel - glacial	AM	2	8	8	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	99117	219	Confined sand and gravel - glacial	AM	12	26	32	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	90381	219	Confined sand and gravel - glacial	AM	3	29	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	99119	219	Confined sand and gravel - glacial	AM	12	21	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	101780	219	Confined sand and gravel - glacial	AM	23	0	-	SURF
TIMBERSTONE DEVELOPMENTS LTD	UNLICENSED	96542	219	Confined sand and gravel - glacial	AM	-	21	-	SURF
MCKINNON	UNLICENSED	105088	219	Confined sand and gravel - glacial	AM	-	12	-	BED
FAIRWINDS DEVELOPMEN	UNLICENSED	57720	218	Fractured sedimentary rock	AM	5	146	5	BED
FAIRWINDS DEVELOPMEN	UNLICENSED	57760	218	Fractured sedimentary rock	AM	-	146	3	BED
BEL OAKS WATERWORKS LTD	UNLICENSED	33907	218	Fractured sedimentary rock	AM	2	88	1	BED
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75327	218	Fractured sedimentary rock	AM	12	130	-	SURF
FAIRWINDS	UNLICENSED	96886	218	Fractured sedimentary rock	AM	-	0	-	BED
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75328	218	Fractured sedimentary rock	AM	-	107	-	BED
ARBUTUS PARK ESTATES LTD	UNLICENSED	96927	218	Fractured sedimentary rock	AM	24	59	59	BED
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	43090	217	Confined sand and gravel - glacial	AM	18	48	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	26661	217	Confined sand and gravel - glacial	AM	13	43	-	SURF
EPCOR UTILITIES	UNLICENSED	75535	217	Confined sand and gravel - glacial	AM	3	13	19	SURF
COOMBS COUNTRY CAMPGROUND	UNLICENSED	87986	217	Confined sand and gravel - glacial	AM	-	23	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	108897	217	Confined sand and gravel - glacial	AM	15	26	-	SURF
KRAUSE	UNLICENSED	87175	217	Confined sand and gravel - glacial	AM	-	98	35	SURF
(COOMBS COUNTRY CAMPGROUND) DOKEY RESOURCES LTD	UNLICENSED	86362	217	Confined sand and gravel - glacial	AM	5	20	-	SURF
HOLMES	UNLICENSED	96600	217	Confined sand and gravel - glacial	AM	28	47	95	SURF
NORWOOD HOLDINGS LTD	UNLICENSED	96808	217	Confined sand and gravel - glacial	AM	22	45	-	SURF
FRENCH CREEK ESTATES LTD.	UNLICENSED	97589	217	Confined sand and gravel - glacial	AM	2	10	20	SURF
KUHN	UNLICENSED	104459	217	Confined sand and gravel - glacial	AM	23	61	49	SURF
FRENCH CREEK ESTATES LTD.	UNLICENSED	97148	217	Confined sand and gravel - glacial	AM	8	15	13	SURF
FRENCH CREEK ESTATES LTD.	UNLICENSED	97150	217	Confined sand and gravel - glacial	AM	4	20	16	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	803	217	Confined sand and gravel - glacial	AM	11	25	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75347	217	Confined sand and gravel - glacial	AM	-	0	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75344	217	Confined sand and gravel - glacial	AM	23	58	73	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	32242	217	Confined sand and gravel - glacial	AM	6	28	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	41896	217	Confined sand and gravel - glacial	AM	17	53	-	SURF
FRENCH CREEK ESTATES LTD.	UNLICENSED	75534	217	Confined sand and gravel - glacial	AM	3	20	19	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	805	217	Confined sand and gravel - glacial	AM	12	26	-	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75345	217	Confined sand and gravel - glacial	AM	26	64	-	SURF
PINTAIL ESTATES	UNLICENSED	75533	217	Confined sand and gravel - glacial	AM	-	39	-	SURF
PINTAIL ESTATES	UNLICENSED	75532	217	Confined sand and gravel - glacial	AM	1	38	42	SURF
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	75346	217	Confined sand and gravel - glacial	AM	-	48	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	20138	217	Confined sand and gravel - glacial	AM	6	43	-	SURF
TOWN OF QUALICUM BEACH	UNLICENSED	3158	217	Confined sand and gravel - glacial	AM	16	41	41	SURF
CITY OF PARKSVILLE	UNLICENSED	107046	216	Confined sand and gravel - glacial	AM	-	25	29	SURF
CITY OF PARKSVILLE	UNLICENSED	107092	216	Confined sand and gravel - glacial	AM	-	22	24	SURF
EPCOR UTILITIES	UNLICENSED	102151	216	Confined sand and gravel - glacial	AM	18	30	38	SURF
EPCOR UTILITIES	UNLICENSED	97122	216	Confined sand and gravel - glacial	AM	3	20	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107099	216	Confined sand and gravel - glacial	AM	-	35	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107091	216	Confined sand and gravel - glacial	AM	5	26	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107094	216	Confined sand and gravel - glacial	AM	13	38	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107096	216	Confined sand and gravel - glacial	AM	-	37	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107111	216	Confined sand and gravel - glacial	AM	-	40	1	SURF
CITY OF PARKSVILLE	UNLICENSED	107112	216	Confined sand and gravel - glacial	AM	-	0	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107040	216	Confined sand and gravel - glacial	AM	7	32	32	SURF
CITY OF PARKSVILLE	UNLICENSED	107110	216	Confined sand and gravel - glacial	AM	-	38	-	SURF
OCEAN VILLA HOMES	UNLICENSED	96538	216	Confined sand and gravel - glacial	AM	38	46	-	SURF
CITY OF PARKSVILLE	UNLICENSED	96288	216	Confined sand and gravel - glacial	AM	8	28	30	SURF
CITY OF PARKSVILLE	UNLICENSED	107113	216	Confined sand and gravel - glacial	AM	2	10	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107055	216	Confined sand and gravel - glacial	AM	-	30	32	SURF
CITY OF PARKSVILLE	UNLICENSED	95022	216	Confined sand and gravel - glacial	AM	3	26	-	SURF
CITY OF PARKSVILLE	UNLICENSED	95023	216	Confined sand and gravel - glacial	AM	4	27	-	SURF
CITY OF PARKSVILLE	UNLICENSED	39215	216	Confined sand and gravel - glacial	AM	-	31	30	SURF
CITY OF PARKSVILLE	UNLICENSED	37482	216	Confined sand and gravel - glacial	AM	-	30	31	SURF

EPCOR UTILITIES	UNLICENSED	54994	216	Confined sand and gravel - glacial	AM	7	24	-	SURF
EPCOR UTILITIES	UNLICENSED	83544	216	Confined sand and gravel - glacial	AM	-	32	32	SURF
CITY OF PARKSVILLE	UNLICENSED	107122	216	Confined sand and gravel - glacial	AM	-	10	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107119	216	Confined sand and gravel - glacial	AM	-	31	-	SURF
ARNSVILLE	UNLICENSED	93945	216	Confined sand and gravel - glacial	AM	15	43	-	SURF
CITY OF PARKSVILLE	UNLICENSED	107121	216	Confined sand and gravel - glacial	AM	-	25	-	SURF
EPCOR UTILITIES	UNLICENSED	97094	216	Confined sand and gravel - glacial	AM	20	36	-	SURF
ZORKIN'S INVESTMENTS CORPORATION	UNLICENSED	97104	216	Confined sand and gravel - glacial	AM	7	29	30	SURF
ZORKIN'S INVESTMENTS CORPORATION	UNLICENSED	97107	216	Confined sand and gravel - glacial	AM	-	15	34	SURF
PARKSVILLE ACRES	UNLICENSED	96885	216	Confined sand and gravel - glacial	AM	2	23	-	SURF
PARKSVILLE ACRES	UNLICENSED	96605	216	Confined sand and gravel - glacial	AM	-	16	-	SURF
DISTRICT OF LANTZVILLE	UNLICENSED	96583	215	Confined sand and gravel - glacial	AM	-	0	-	SURF
DISTRICT OF LANTZVILLE	UNLICENSED	96889	215	Confined sand and gravel - glacial	AM	29	51	51	SURF
NANOOSE FIRST NATION	UNLICENSED	96194	215	Confined sand and gravel - glacial	AM	9	43	45	SURF
MALASPINA DEVELOPMENTS LTD.	UNLICENSED	102122	215	Confined sand and gravel - glacial	AM	-	0	-	SURF
LANTZVILLE PROPERTIES	UNLICENSED	96536	215	Confined sand and gravel - glacial	AM	2	11	11	SURF
DISTRICT OF LANTZVILLE	UNLICENSED	108678	215	Confined sand and gravel - glacial	AM	2	0	-	SURF
DISTRICT OF LANTZVILLE	UNLICENSED	108680	215	Confined sand and gravel - glacial	AM	-	22	-	SURF
NANOOSE FIRST NATION	UNLICENSED	50253	215	Confined sand and gravel - glacial	AM	11	30	29	SURF
DISTRICT OF LANTZVILLE	UNLICENSED	111406	215	Confined sand and gravel - glacial	AM	-	21	25	SURF
DISTRICT OF LANTZVILLE	UNLICENSED	52000	215	Confined sand and gravel - glacial	AM	-	27	27	SURF
NANOOSE FIRST NATION	UNLICENSED	50292	215	Confined sand and gravel - glacial	AM	-	14	-	SURF
BRISTOLL ESTATE	UNLICENSED	13325	215	Confined sand and gravel - glacial	AM	-	0	-	SURF
LANTZVILLE HOLDINGS	UNLICENSED	16668	215	Confined sand and gravel - glacial	AM	-	12	-	SURF
DISTRICT OF LANTZVILLE	UNLICENSED	52042	215	Confined sand and gravel - glacial	AM	-	16	-	SURF
GEI PROPERTY	UNLICENSED	85127	215	Confined sand and gravel - glacial	AM	-	11	11	SURF
PETRO-CAN SERVICE STATION	UNLICENSED	96496	214	Fractured sedimentary rock	AM	2	108	44	BED
RING CONTRACTING	UNLICENSED	96789	214	Fractured sedimentary rock	AM	5	17	-	BED
SOUND CONT LTD	UNLICENSED	78051	214	Fractured sedimentary rock	AM	-	61	-	BED
CHANG	UNLICENSED	96730	213	Fractured crystalline bedrock	AM	-	143	-	BED
LANTZVILLE FOOTHILLS ESTATES LTD	UNLICENSED	94376	213	Fractured crystalline bedrock	AM	8	154	5	BED
LANTZVILLE FOOTHILLS ESTATES INC.	UNLICENSED	102111	213	Fractured crystalline bedrock	AM	-	122	8	BED
LANTZVILLE FOOTHILLS ESTATES INC.	UNLICENSED	102153	213	Fractured crystalline bedrock	AM	-	117	4	BED
LONE TREE PROPERTIES	UNLICENSED	111256	213	Fractured crystalline bedrock	AM	27	287	2	BED
LANTZVILLE FOOTHILLS ESTATES INC.	UNLICENSED	102110	213	Fractured crystalline bedrock	AM	7	105	7	BED
LANTZVILLE PROJECTS LTD	UNLICENSED	96711	213	Fractured crystalline bedrock	AM	17	282	-	BED
LONE TREE PROPERTIES	UNLICENSED	110511	213	Fractured crystalline bedrock	AM	-	218	1	BED
LONE TREE PROPERTIES	UNLICENSED	110512	213	Fractured crystalline bedrock	AM	-	210	-	BED
LANTZVILLE PROJECTS	UNLICENSED	80038	213	Fractured crystalline bedrock	AM	4	111	33	BED
LANTZVILLE PROJECTS	UNLICENSED	75121	213	Fractured crystalline bedrock	AM	46	313	9	BED
WHITE PINES MOBILE HOME PARK	UNLICENSED	93910	213	Fractured crystalline bedrock	AM	-	26	-	BED
LANTZVILLE PROJECTS	UNLICENSED	80039	213	Fractured crystalline bedrock	AM	-	264	7	BED
ALISTAIR MAZERALL	UNLICENSED	75122	213	Fractured crystalline bedrock	AM	38	306	4	BED
OAKLEAF MGMT & J EAT	UNLICENSED	47593	212	Fractured sedimentary rock	AM	3	16	15	BED
SCHOOL DISTRICT #68	UNLICENSED	93891	211	Fractured sedimentary rock	AM	-	0	-	BED
WESTERN CANADIAN TIMBER PRODUCTS	UNLICENSED	113079	211	Fractured crystalline bedrock	AM	27	75	21	BED
ENGLISHMAN RIVER FALLS MOBILE HOME PARK	UNLICENSED	80036	209	Confined sand and gravel - glacial	ANM	2	9	-	SURF
ENGLISHMAN RIVER FALLS MOBILE HOME PARK	UNLICENSED	80037	209	Confined sand and gravel - glacial	ANM	2	8	-	SURF
SCOUT PROPERTIES	UNLICENSED	81667	167	Confined sand and gravel - glacial	AM	2	10	-	SURF
SCOUT PROPERTIES	UNLICENSED	81666	167	Confined sand and gravel - glacial	AM	2	13	-	SURF
HAYWOOD	UNLICENSED	104615	165	Fractured sedimentary rock	AM	-	0	-	BED
F&M INSTALLATIONS	UNLICENSED	104613	165	Fractured sedimentary rock	AM	-	0	-	BED
PLUMMER	UNLICENSED	86898	165	Fractured sedimentary rock	AM	22	74	-	BED
WILDPLAY LIMITED	UNLICENSED	93947	165	Fractured sedimentary rock	AM	46	56	-	BED
KOSTNIUK	UNLICENSED	95145	165	Fractured sedimentary rock	AM	-	38	5	BED
LONG	UNLICENSED	96901	164	Fractured sedimentary rock	ANM	5	92	-	BED
BORTHWICK	UNLICENSED	96257	162	Fractured sedimentary rock	AM	11	62	-	BED
STEEL	UNLICENSED	96258	162	Fractured sedimentary rock	AM	11	91	-	BED
CHEMAINUS FIRST NATION	UNLICENSED	96851	162	Fractured sedimentary rock	AM	-	7	7	BED
BENOIT	UNLICENSED	96254	162	Fractured sedimentary rock	AM	21	49	-	BED

SHEMIN	UNLICENSED	96228	162	Fractured sedimentary rock	AM	-	0	-	BED
YELLOW POINT LODGE	UNLICENSED	96936	162	Fractured sedimentary rock	AM	8	44	6	BED
CENAM CONSTRUCTION	UNLICENSED	68884	162	Fractured sedimentary rock	AM	-	183	14	BED
CENAM CONSTRUCTION	UNLICENSED	68848	162	Fractured sedimentary rock	AM	-	216	1	BED
CHEMAMUS FIRST NATION	UNLICENSED	80122	162	Fractured sedimentary rock	AM	-	0	-	BED
CENAM CONSTRUCTION	UNLICENSED	68899	162	Fractured sedimentary rock	AM	18	131	6	BED
CHEMAMUS FIRST NATION	UNLICENSED	74954	162	Fractured sedimentary rock	AM	16	41	41	BED
SHELLWOOD PROPERTIES	UNLICENSED	35348	162	Fractured sedimentary rock	AM	11	32	9	BED
SHELL BEACH WATER UTILITY	UNLICENSED	84677	162	Fractured sedimentary rock	AM	-	6	1	BED
WIGGINS	UNLICENSED	84123	162	Fractured sedimentary rock	AM	-	8	-	BED
YELLOWPOINT CRANBERRIES	UNLICENSED	93913	162	Fractured sedimentary rock	AM	9	0	-	BED
HUNTER	UNLICENSED	96214	162	Fractured sedimentary rock	AM	-	134	-	BED
SHELL BEACH WATER UTILITY	UNLICENSED	84678	162	Fractured sedimentary rock	AM	-	0	2	BED
REGIONAL DISTRICT OF NANAIMO	UNLICENSED	48340	162	Fractured sedimentary rock	AM	29	61	1	BED
TOMCZYK	UNLICENSED	96234	162	Fractured sedimentary rock	AM	14	49	-	BED
CHEMAMUS FIRST NATION	UNLICENSED	96844	162	Fractured sedimentary rock	AM	-	48	47	BED
KORPI	UNLICENSED	96219	162	Fractured sedimentary rock	AM	13	43	-	BED
STOROZ	UNLICENSED	96231	162	Fractured sedimentary rock	AM	11	63	-	BED
CHEMAMUS FIRST NATION	UNLICENSED	96834	162	Fractured sedimentary rock	AM	-	0	39	BED
TIARA (BHL) HOLDINGS INC	UNLICENSED	110346	162	Fractured sedimentary rock	AM	-	128	1	BED
CHEMAMUS FIRST NATION	UNLICENSED	74953	162	Fractured sedimentary rock	AM	-	45	45	BED
MERMAID COVE RESORT	UNLICENSED	27971	162	Fractured sedimentary rock	AM	10	61	-	BED
HEMER	UNLICENSED	94804	162	Fractured sedimentary rock	AM	-	39	1	BED
SAINSBURY GROUP HOLDINGS INC	UNLICENSED	93898	162	Fractured sedimentary rock	AM	4	11	-	BED
SHELL BEACH WATER UTILITY	UNLICENSED	51036	162	Fractured sedimentary rock	AM	5	19	4	BED
SHELL BEACH WATER UTILITY	UNLICENSED	28899	162	Fractured sedimentary rock	AM	8	24	24	BED
BORGE LARSEN	UNLICENSED	43025	162	Fractured sedimentary rock	AM	27	88	1	BED
GLOBE CONSTRUCTION	UNLICENSED	54166	162	Fractured sedimentary rock	AM	30	184	2	BED
DAVIS	UNLICENSED	96213	161	Unconfined sand and gravel aquifer - medium stream system	AM	2	5	-	SURF
R AKENHEAD	UNLICENSED	7256	161	Unconfined sand and gravel aquifer - medium stream system	AM	-	0	-	SURF
O.C.I. BOAT HARBOUR	UNLICENSED	59560	161	Unconfined sand and gravel aquifer - medium stream system	AM	2	23	-	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	96932	161	Unconfined sand and gravel aquifer - medium stream system	AM	4	11	11	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	100426	161	Unconfined sand and gravel aquifer - medium stream system	AM	4	11	11	SURF
MINISTRY OF HIGHWAYS	UNLICENSED	108692	161	Unconfined sand and gravel aquifer - medium stream system	AM	13	26	-	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	105246	161	Unconfined sand and gravel aquifer - medium stream system	AM	4	16	34	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	105336	161	Unconfined sand and gravel aquifer - medium stream system	AM	4	9	9	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	45476	161	Unconfined sand and gravel aquifer - medium stream system	AM	4	12	-	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	39913	161	Unconfined sand and gravel aquifer - medium stream system	AM	3	12	-	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	110140	161	Unconfined sand and gravel aquifer - medium stream system	AM	4	11	-	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	70344	161	Unconfined sand and gravel aquifer - medium stream system	AM	-	12	-	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	22597	161	Unconfined sand and gravel aquifer - medium stream system	AM	4	11	-	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	16537	161	Unconfined sand and gravel aquifer - medium stream system	AM	2	9	-	SURF
NORTH CEDAR WATER WORKS	UNLICENSED	44179	161	Unconfined sand and gravel aquifer - medium stream system	AM	3	12	9	SURF
RONDALYN RESORT	UNLICENSED	93897	160	Confined sand and gravel - glacial	AM	-	0	-	SURF

Notes:

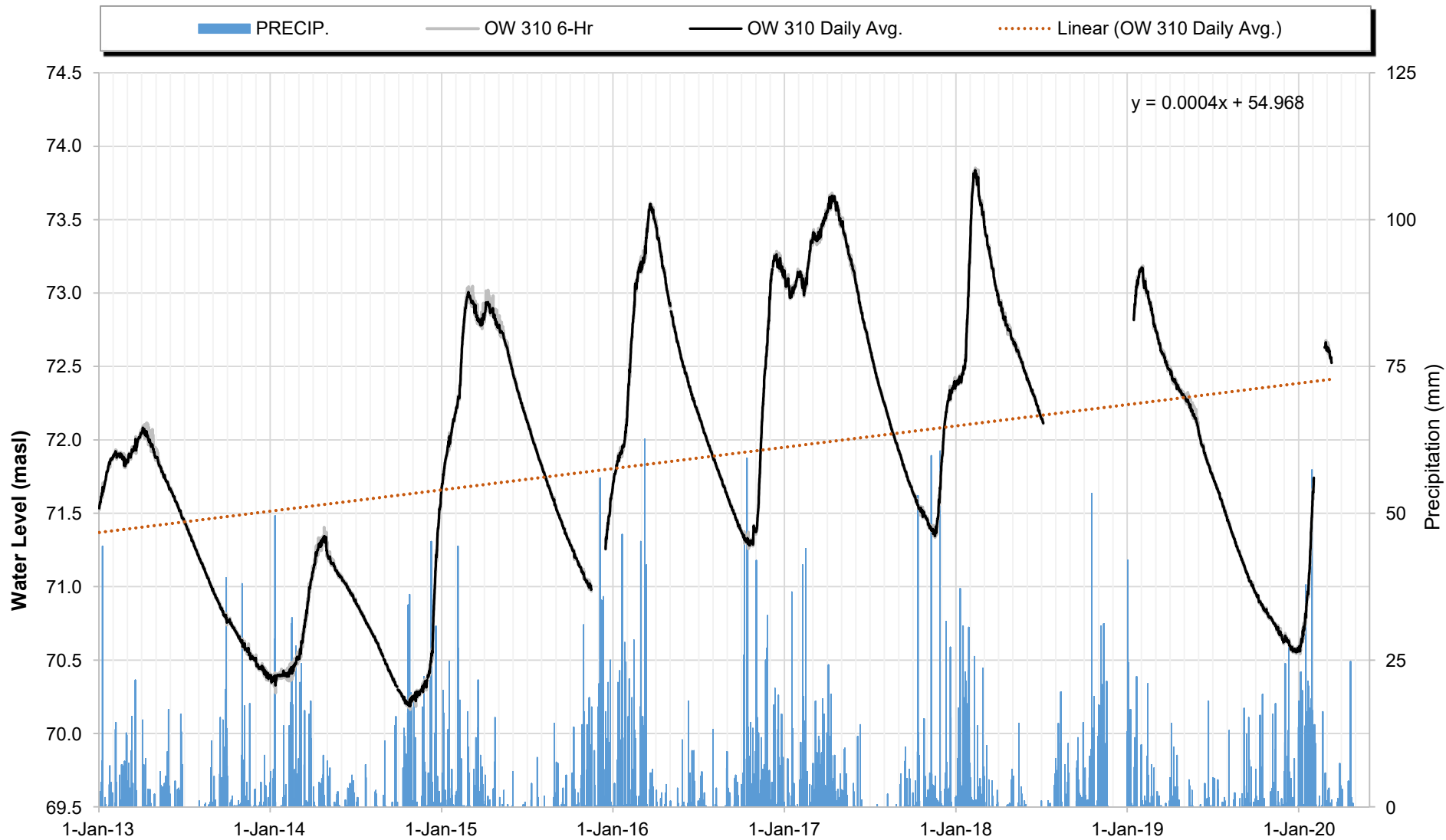
- - No Data Available
- BED** - Bedrock
- SURF** - Surficial
- UM** - Aquifer Unmapped
- UNK** - Unknown
- AM** - Aquifer Monitored by the VOWN or PGOWN
- ANM** - Aquifer not Monitored by the VOWN or PGOWN

Appendix B – Historical Groundwater Level Charts

Table B1: Long-Term Groundwater Trend Results for the VOWN and PGOWN

CHART NUMBER	WATER REGION	OBS WELL NUMBER	AQUIFER	AQUIFER TYPE	TRENDLINE EQUATION (y = mx + b)					
					m	b	01-Jan-19	01-Jan-20	DIFFERENCE	RESULT
1	Big Qualicum	OW 310	416	Surficial	4.0E-04	55.0	72.4	72.5	14.6	DIFFERENCE = 14.6 cm/year
2		OW 427	665	Surficial	5.0E-05	62.0	64.2	64.2	1.8	DIFFERENCE = 1.8 cm/year
3		OW391	662	Surficial	7.0E-04	54.1	84.5	84.8	25.6	DIFFERENCE = 25.6 cm/year
4	Little Qualicum	OW 426	662	Surficial	2.0E-04	60.5	69.2	69.3	7.3	DIFFERENCE = 7.3 cm/year
5		OW389	664	Surficial	2.0E-04	-0.3	8.4	8.5	7.3	DIFFERENCE = 7.3 cm/year
6	French Creek	OW 295	217	Surficial	-1.0E-04	82.0	77.7	77.6	-3.7	DIFFERENCE = -3.7 cm/year
7		VOW 16	217	Surficial	-6.0E-04	133.6	107.5	107.3	-21.9	DIFFERENCE = -21.9 cm/year
8		VOW 15	212	Bedrock	6.9E-03	-273.2	26.7	29.3	251.9	DIFFERENCE = 251.9 cm/year
9	Englishmen River	OW 314	216	Surficial	2.0E-04	53.2	61.9	62.0	7.3	DIFFERENCE = 7.3 cm/year
10		OW 424	216	Surficial	5.0E-04	65.6	87.3	87.5	18.2	DIFFERENCE = 18.2 cm/year
11		VOW 14	216	Surficial	-1.0E-03	75.6	32.2	31.8	-36.5	DIFFERENCE = -36.5 cm/year
12		VOW 01	216	Surficial	5.0E-04	22.4	44.2	44.3	18.2	DIFFERENCE = 18.2 cm/year
13		OW 287	220	Bedrock	-8.0E-04	136.7	101.9	101.6	-29.2	DIFFERENCE = -29.2 cm/year
14		VOW 18	220	Bedrock	3.0E-04	145.7	158.7	158.8	11.0	DIFFERENCE = 11.0 cm/year
15		VOW 12	167	Surficial	2.0E-04	77.0	85.7	85.7	7.3	DIFFERENCE = 7.3 cm/year
16	OW 388	211	Bedrock	-2.2E-03	227.2	131.6	130.8	-80.3	DIFFERENCE = -80.3 cm/year	
17	VOW 02	213	Bedrock	1.5E-03	-12.1	53.1	53.6	54.7	DIFFERENCE = 54.7 cm/year	
18	VOW 03	213	Bedrock	1.5E-03	14.5	79.7	80.2	54.7	DIFFERENCE = 54.7 cm/year	
19	VOW 13	213	Bedrock	-8.0E-04	160.5	125.7	125.4	-29.2	DIFFERENCE = -29.2 cm/year	
20	VOW B2	214	Bedrock	1.1E-03	-48.0	-0.2	0.2	40.1	DIFFERENCE = 40.1 cm/year	
21	VOW B3	214	Bedrock	2.7E-03	-113.4	4.0	5.0	98.6	DIFFERENCE = 98.6 cm/year	
22	VOW B4	214	Bedrock	9.0E-04	-37.4	1.7	2.0	32.8	DIFFERENCE = 32.8 cm/year	
23	VOW B7	214	Bedrock	2.0E-04	-3.4	5.3	5.3	7.3	DIFFERENCE = 7.3 cm/year	
24	VOW B9	214	Bedrock	1.6E-03	-68.4	1.2	1.8	58.4	DIFFERENCE = 58.4 cm/year	
25	OW394	218	Bedrock	6.0E-05	6.1	8.7	8.7	2.2	DIFFERENCE = 2.2 cm/year	
26	VOW 27	218	Bedrock	3.0E-04	55.6	68.6	68.8	11.0	DIFFERENCE = 11.0 cm/year	
27	VOW 26	218	Bedrock	1.3E-03	26.0	82.5	83.0	47.4	DIFFERENCE = 47.4 cm/year	
28	OW 232	215	Surficial	4.0E-04	46.7	64.1	64.3	14.6	DIFFERENCE = 14.6 cm/year	
29	OW 340	215	Surficial	3.0E-05	62.9	64.2	64.2	1.1	DIFFERENCE = 1.1 cm/year	
30	VOW 28	215	Surficial	-2.0E-04	21.6	12.9	12.9	-7.3	DIFFERENCE = -7.3 cm/year	
31	OW 393	219	Surficial	1.0E-04	81.4	85.8	85.8	3.7	DIFFERENCE = 3.7 cm/year	
32	OW 396	219	Surficial	4.0E-05	22.8	24.6	24.6	1.5	DIFFERENCE = 1.5 cm/year	
33	VOW 25	219	Surficial	5.0E-04	3.7	25.4	25.6	18.3	DIFFERENCE = 18.3 cm/year	
34	OW 392	1098	Surficial	1.0E-04	65.8	70.2	70.2	3.7	DIFFERENCE = 3.7 cm/year	
35	VOW 03	1098	Surficial	-5.0E-05	0.8	-1.3	-1.4	-1.8	DIFFERENCE = -1.8 cm/year	
36	OW 316	709	Bedrock	1.0E-05	63.8	64.3	64.3	0.4	DIFFERENCE = 0.4 cm/year	
37	OW 196	709	Bedrock	-2.0E-04	115.2	106.5	106.5	-7.3	DIFFERENCE = -7.3 cm/year	
38	VOW 08	709	Bedrock	-3.0E-04	22.3	9.3	9.2	-10.9	DIFFERENCE = -10.9 cm/year	
39	VOW 07	709	Bedrock	-4.0E-04	21.9	4.5	4.4	-14.6	DIFFERENCE = -14.6 cm/year	
40	OW 437	160	Surficial	-1.6E-03	102.0	32.5	31.9	-58.4	DIFFERENCE = -58.4 cm/year	
41	VOW 04	160	Surficial	1.0E-04	32.4	36.7	36.8	3.6	DIFFERENCE = 3.6 cm/year	
42	VOW 24	163	Surficial	-7.0E-04	71.8	41.3	41.1	-25.5	DIFFERENCE = -25.5 cm/year	
43	OW 390	163	Surficial	5.0E-04	10.7	32.5	32.6	18.2	DIFFERENCE = 18.2 cm/year	
44	OW 312	161	Surficial	-6.0E-05	33.1	30.5	30.5	-2.2	DIFFERENCE = -2.2 cm/year	
45	OW 432	162	Bedrock	-1.0E-04	50.3	46.0	46.0	-3.6	DIFFERENCE = -3.6 cm/year	
46	VOW 06	162	Bedrock	2.0E-05	2.3	3.2	3.2	0.7	DIFFERENCE = 0.7 cm/year	
47	VOW 19	162	Bedrock	1.2E-03	-10.9	41.3	41.7	43.8	DIFFERENCE = 43.8 cm/year	
48	VOW 20	162	Bedrock	-2.0E-04	42.6	33.9	33.8	-7.3	DIFFERENCE = -7.3 cm/year	
49	VOW 21	162	Bedrock	6.0E-04	-0.1	26.0	26.2	21.9	DIFFERENCE = 21.9 cm/year	
50	VOW 22	162	Bedrock	-6.0E-05	34.0	31.4	31.4	-2.2	DIFFERENCE = -2.2 cm/year	
51	VOW 23	162	Bedrock	-3.0E-04	21.0	7.9	7.8	-10.9	DIFFERENCE = -10.9 cm/year	
52	OW 435	165	Bedrock	-2.0E-04	35.9	27.2	27.1	-7.3	DIFFERENCE = -7.3 cm/year	
53	VOW 05	165	Bedrock	3.0E-04	11.4	24.4	24.5	10.9	DIFFERENCE = 10.9 cm/year	


- - No Data Available
OW - Wells associated with the PGOWN
VOW - Wells associated with the VOWN
m - Slope of the linear regression trend line
b - Y-intercept

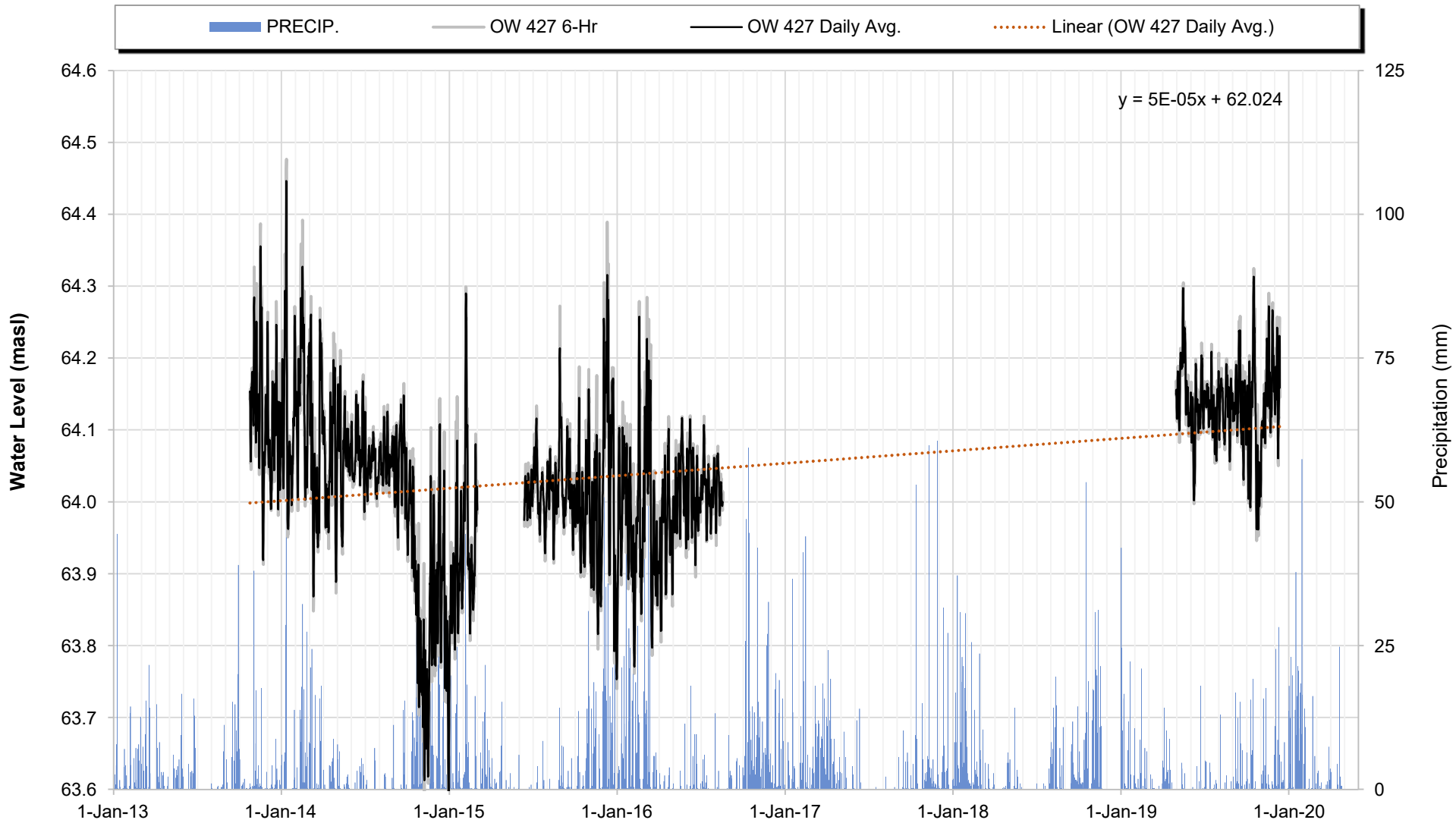


NOTES:

Observation Well is Associated with Aquifer 414

Aquifer 414 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 310 (WR1 - Big Qualicum)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-1	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		

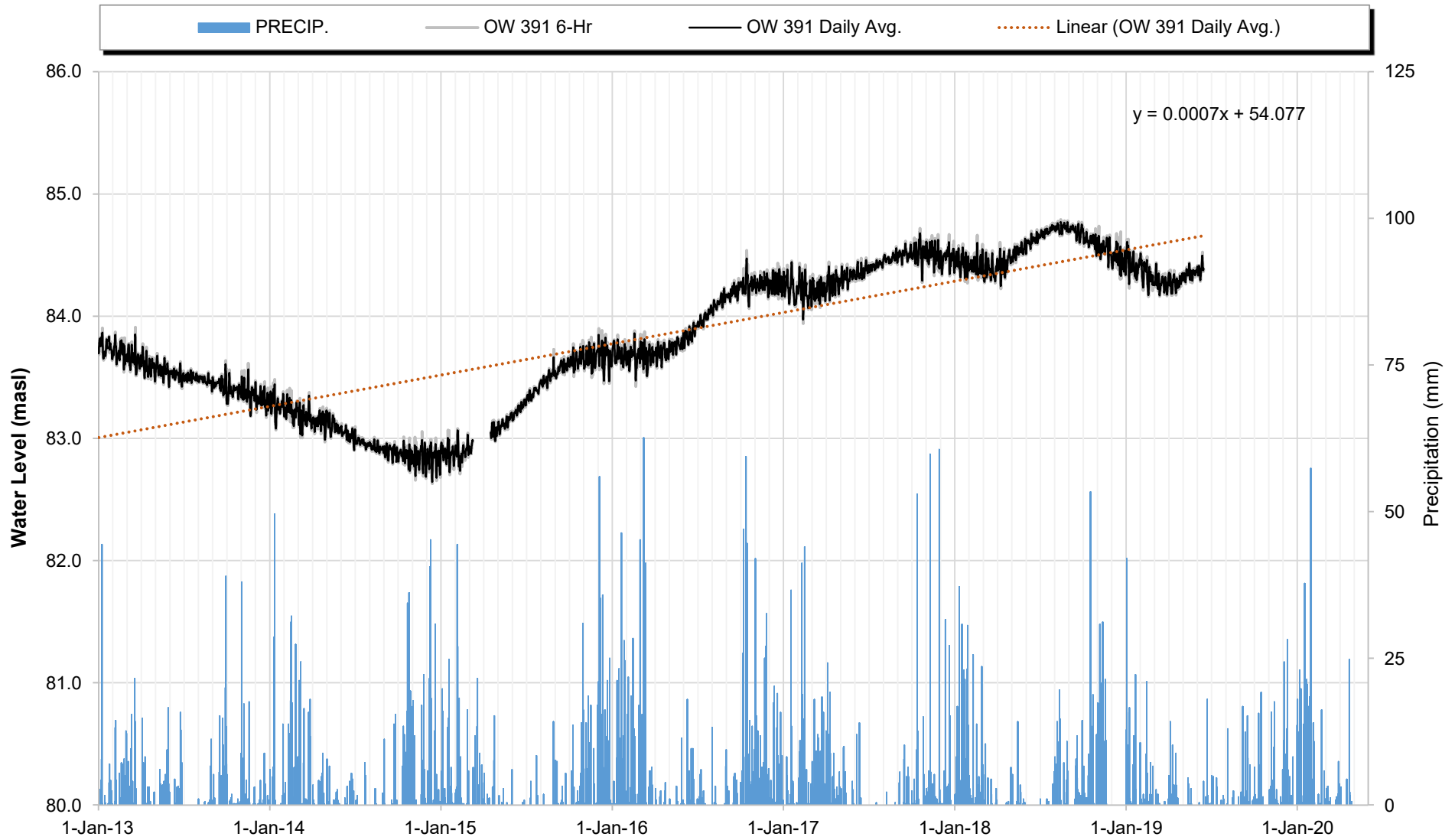


NOTES:

Observation Well is Associated with Aquifer 665


Aquifer 665 is Unconfined Surficial Sediments

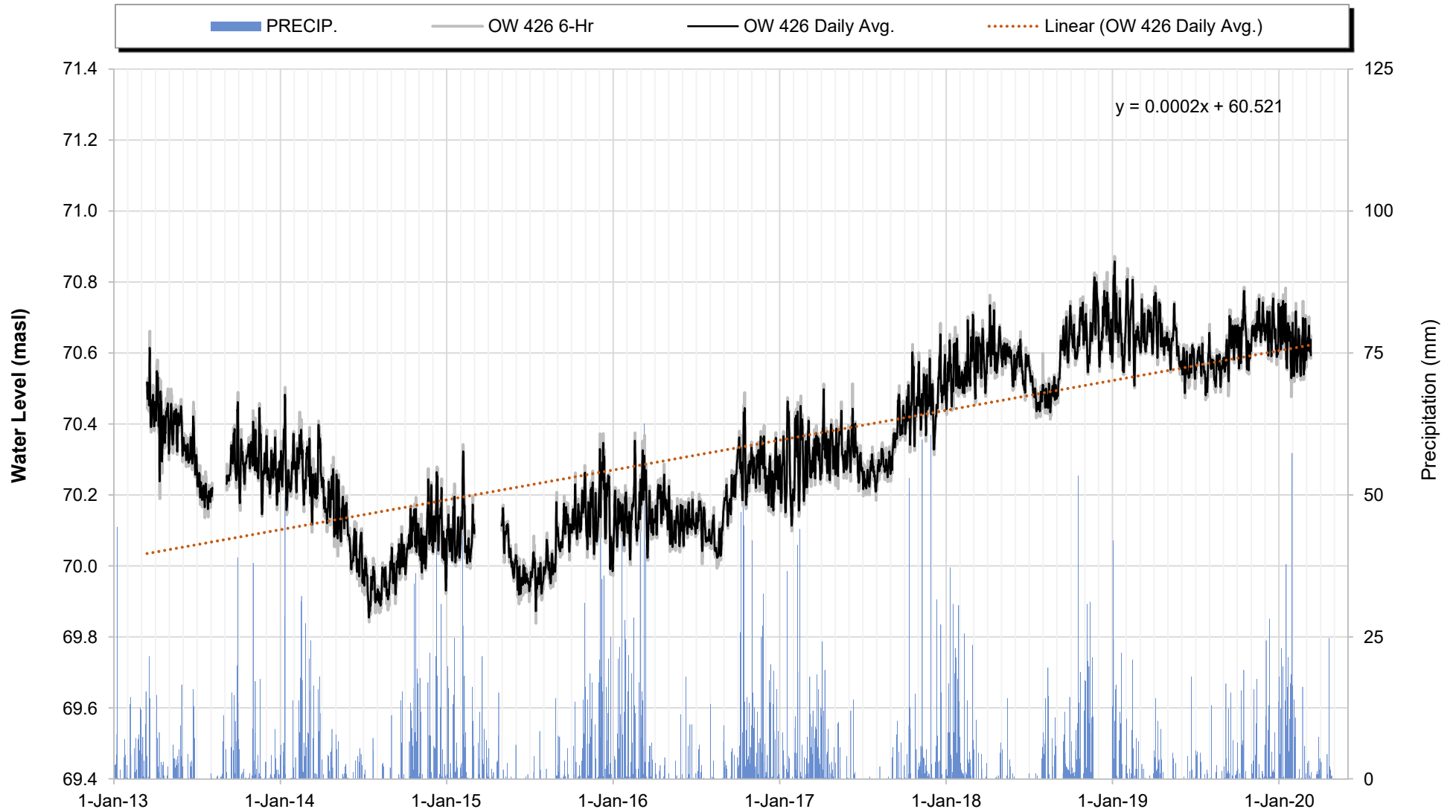
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 427 (WR1 - Big Qualicum)		FIGURE B-2
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 662
 Aquifer 662 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		HISTORICAL GROUNDWATER LEVEL CHART OW 391 (WR2 - Little Qualicum)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-3
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

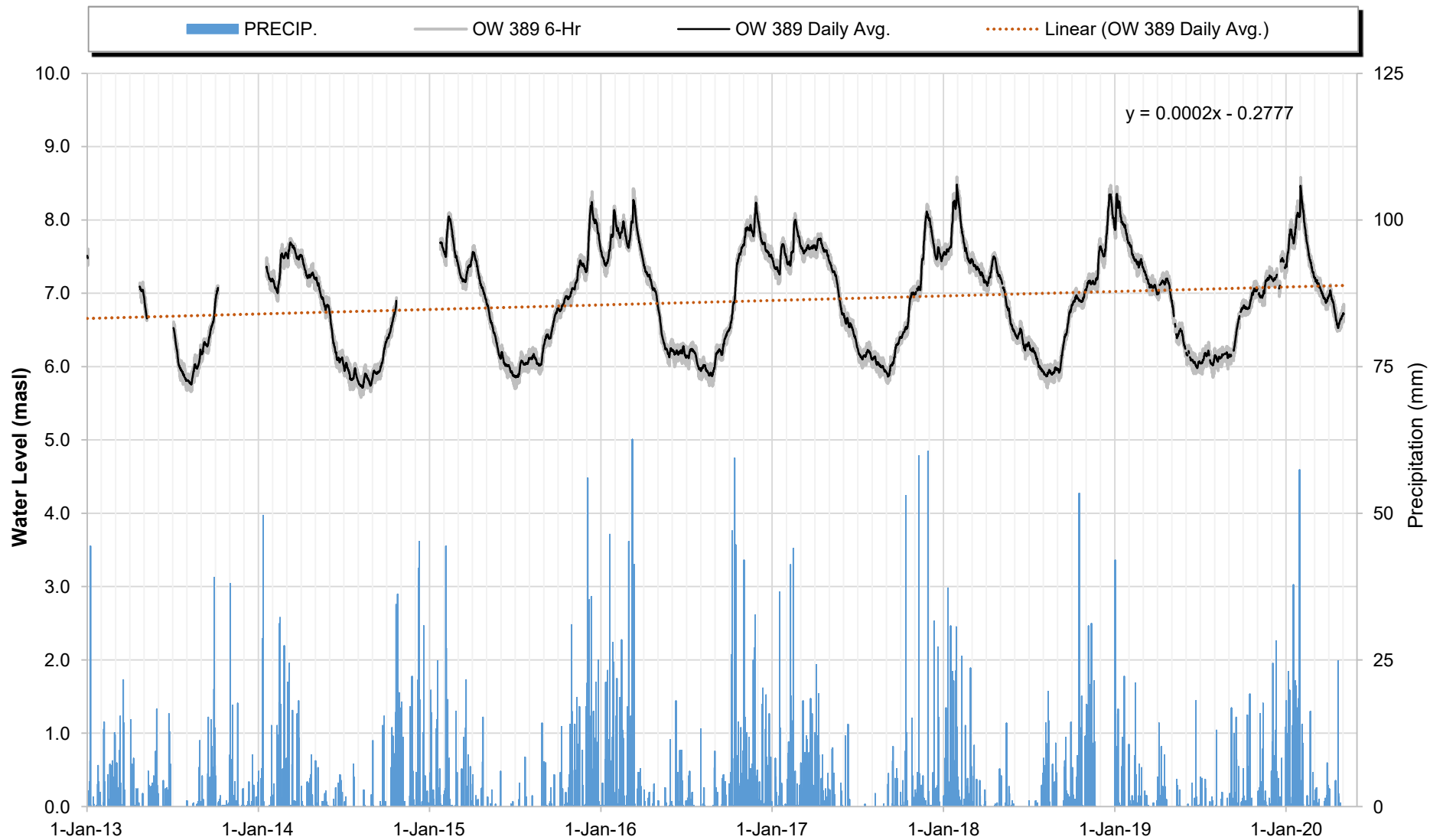


NOTES:

Observation Well is Associated with Aquifer 662

Aquifer 662 is Confined Surficial Sediments

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 426 (WR2 - Little Qualicum)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-4	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:

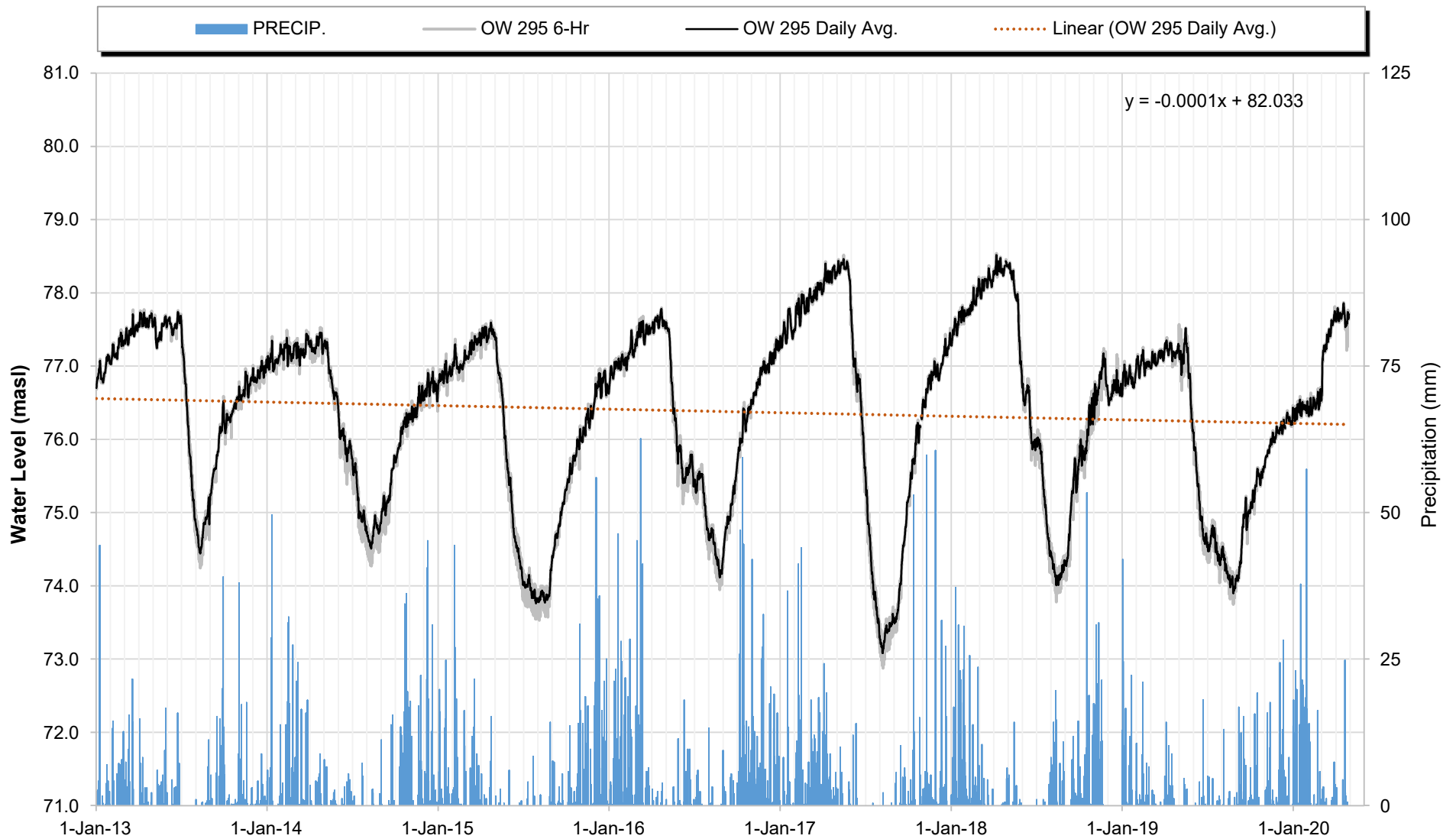
Observation Well is Associated with Aquifer 664
 Aquifer 664 is Unconfined Surficial Sediments

PROJECT
**DRINKING WATER AND WATERSHED PROTECTION -
 REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020**

TITLE
**HISTORICAL GROUNDWATER LEVEL CHART
 OW 389 (WR2 - Little Qualicum)**


Waterline
 PREPARED BY: WATERLINE RESOURCES INC.
 PROJECT: 2590-20-001
 COMPILED BY: REW
 DATE ISSUED: 2020-05-25
 REVISED: FINAL

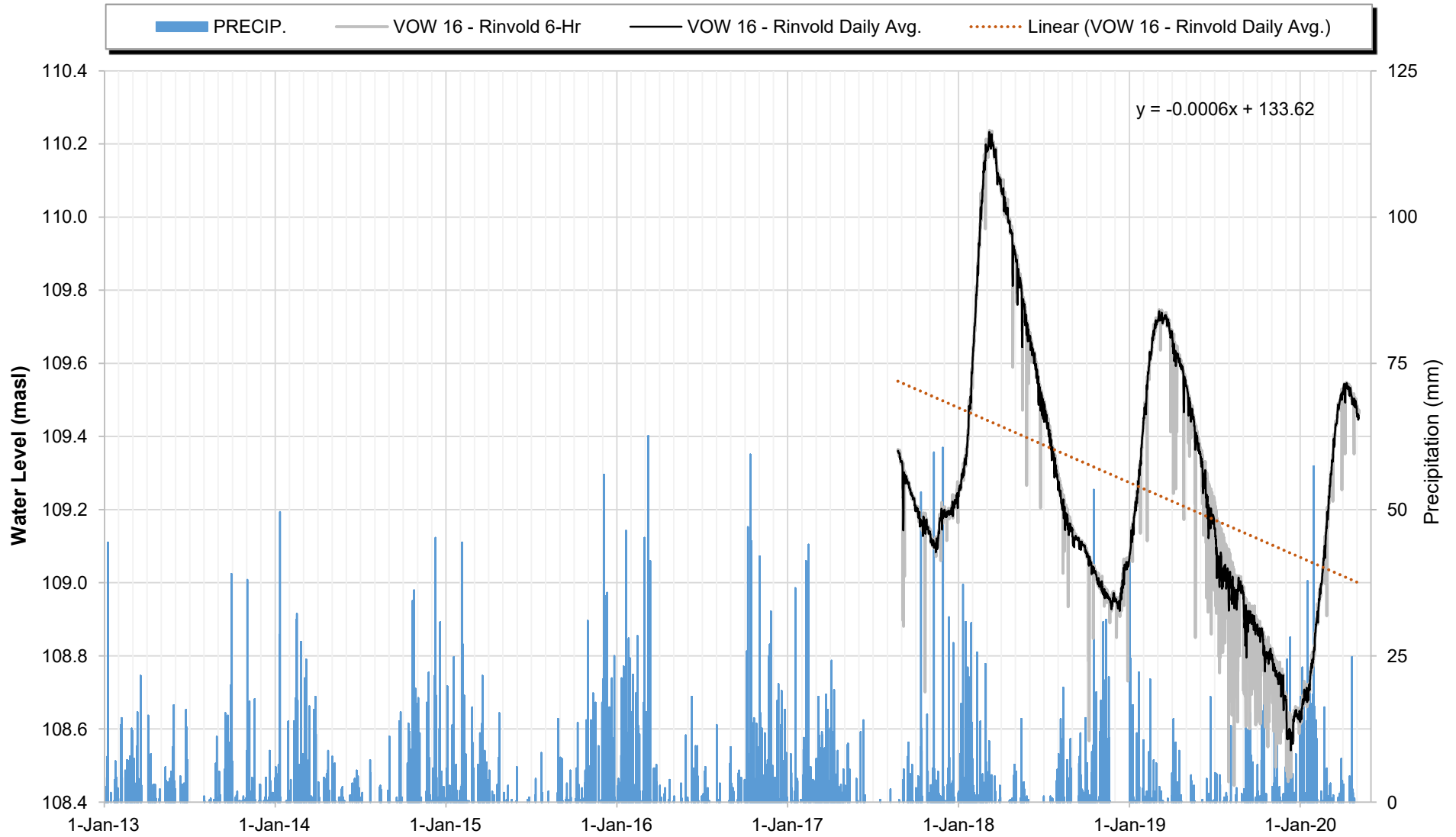
FIGURE B-5



NOTES:


Observation Well is Associated with Aquifer 217
 Aquifer 217 is Confined Surficial Sediments

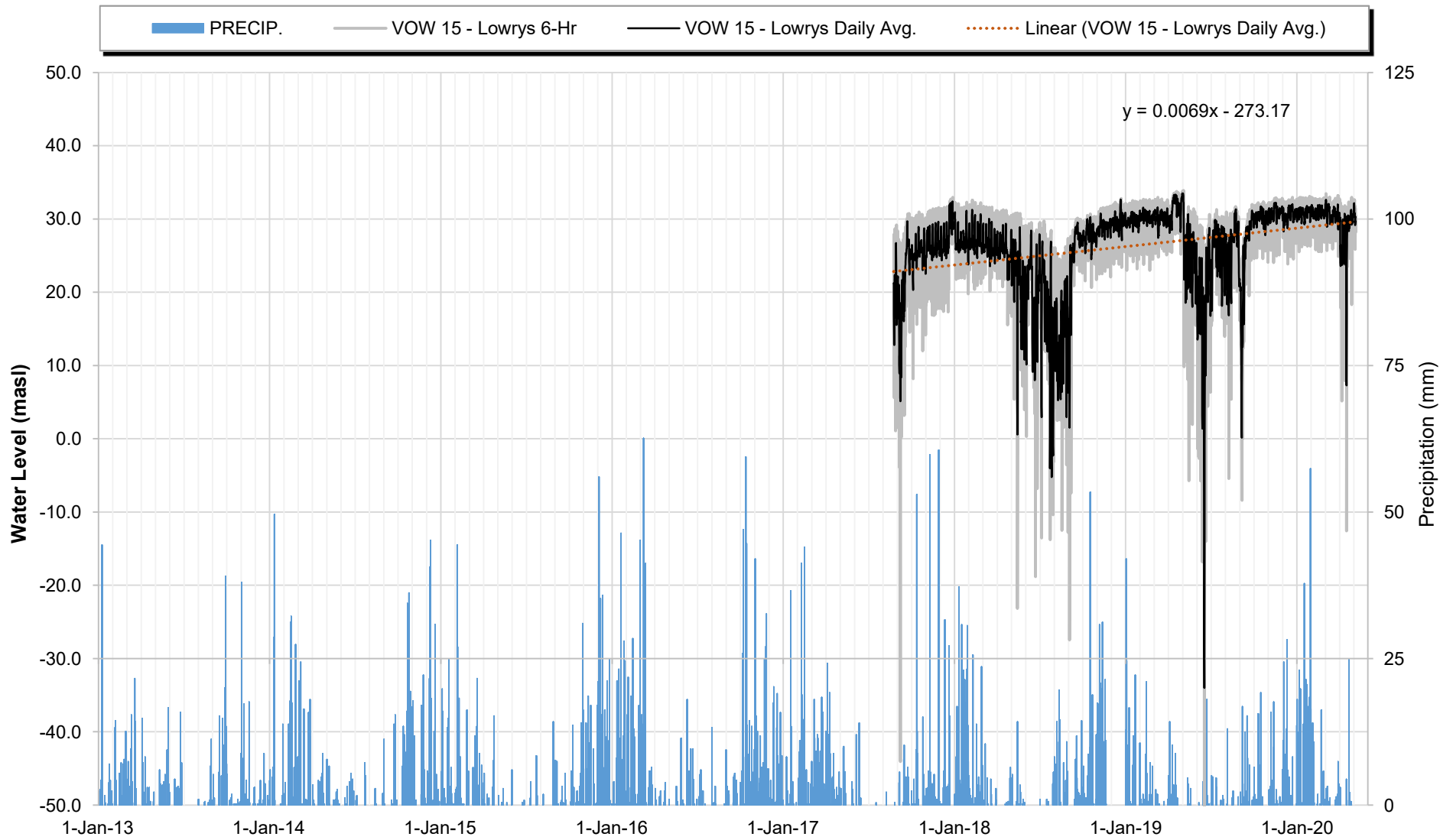
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW295 (WR3 - French Creek)		FIGURE B-6
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 217
 Aquifer 217 is Confined Surficial Sediments

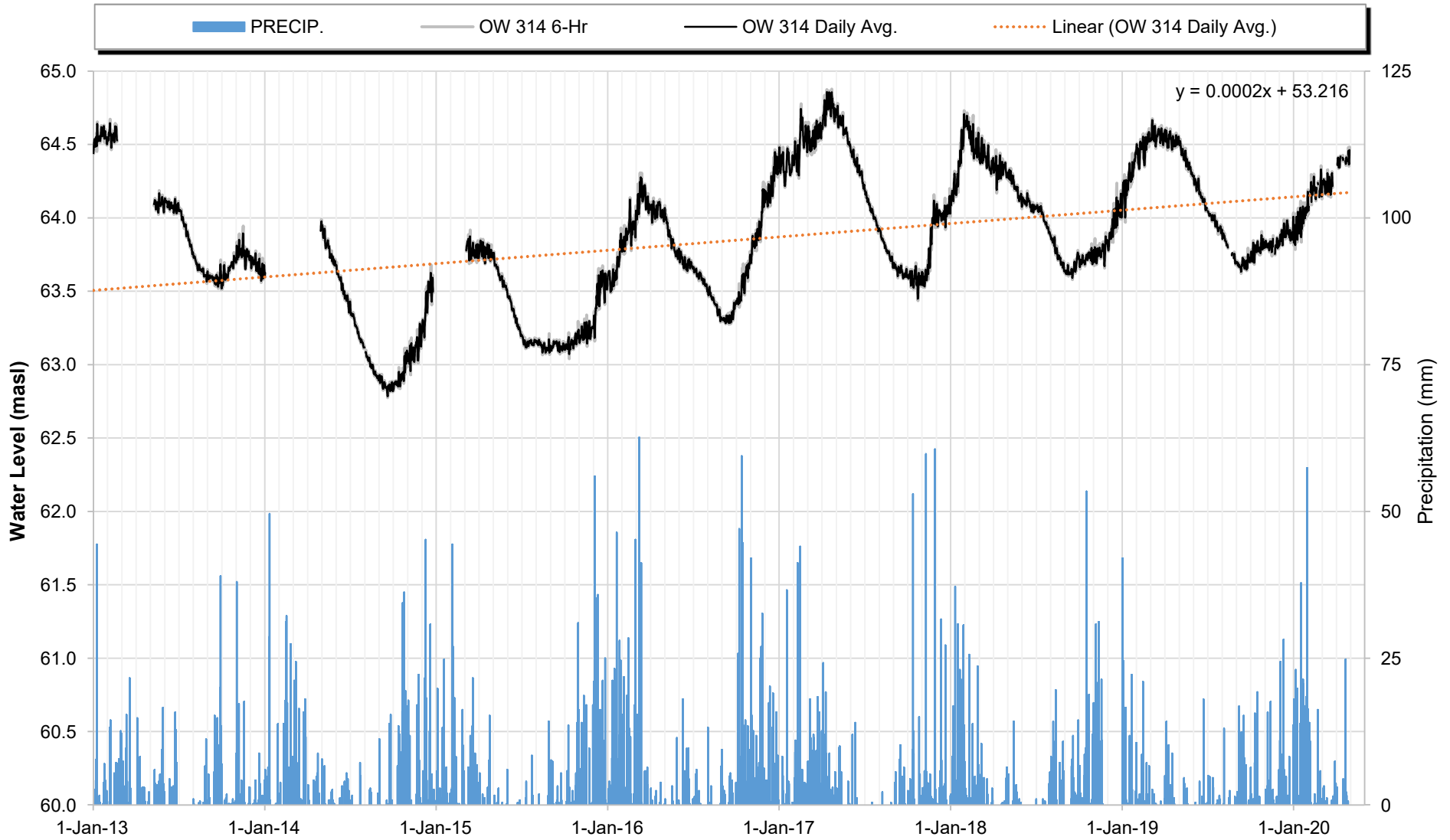
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW 16 - Rinvoid (WR3 - French Creek)	
	PREPARED BY:	WATERLINE RESOURCES INC.	
	PROJECT:	2590-20-001	
	COMPILED BY:	REW	
	DATE ISSUED:	2020-05-25	
	REVISED:	FINAL	
			FIGURE B-7



NOTES:


Observation Well is Associated with Aquifer 212
 Aquifer 212 is Fractured Bedrock

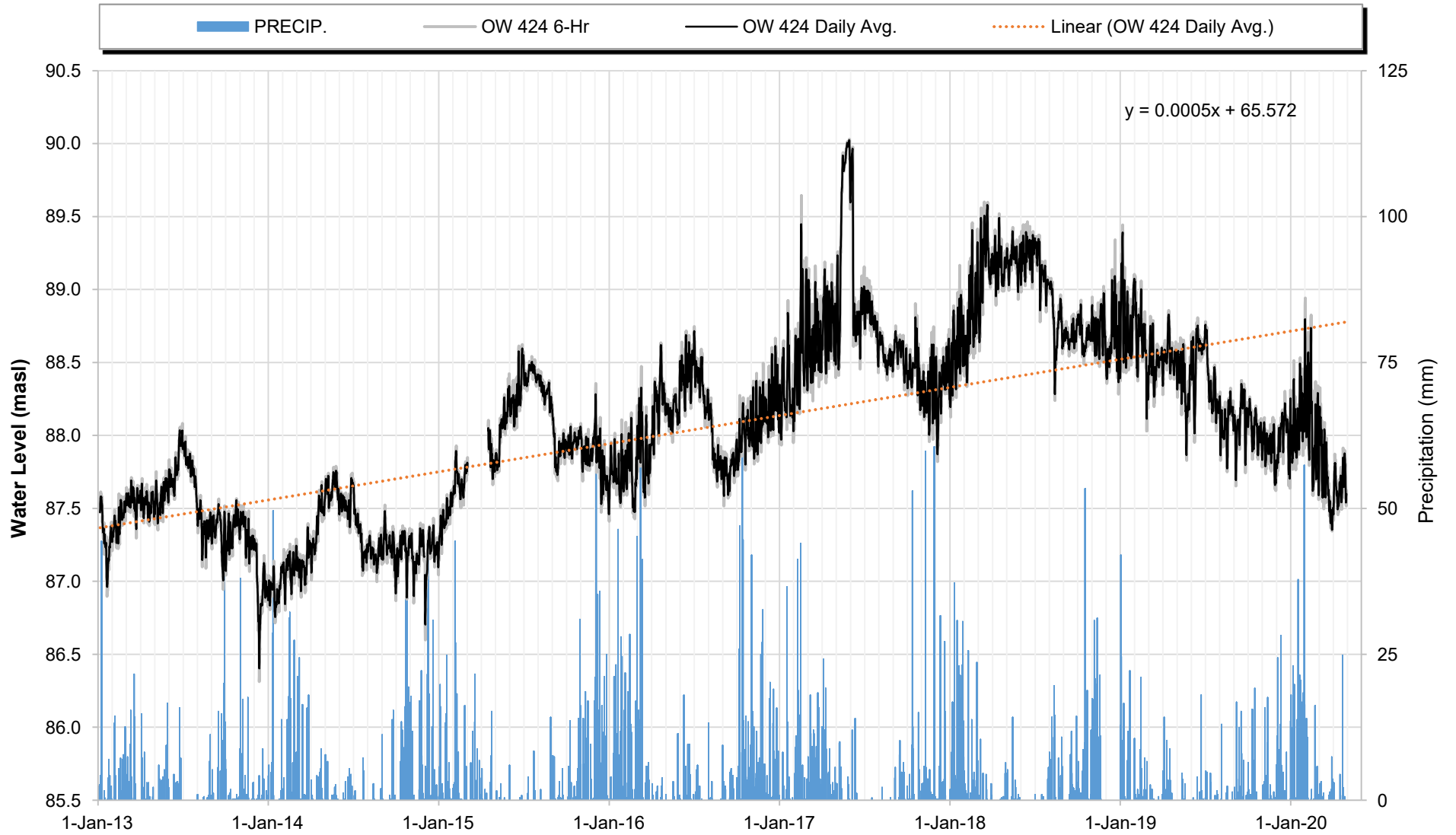
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW 15 - Lowrys (WR3 - French Creek)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-8	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:


Observation Well is Associated with Aquifer 216
 Aquifer 216 is Confined Surficial Sediments

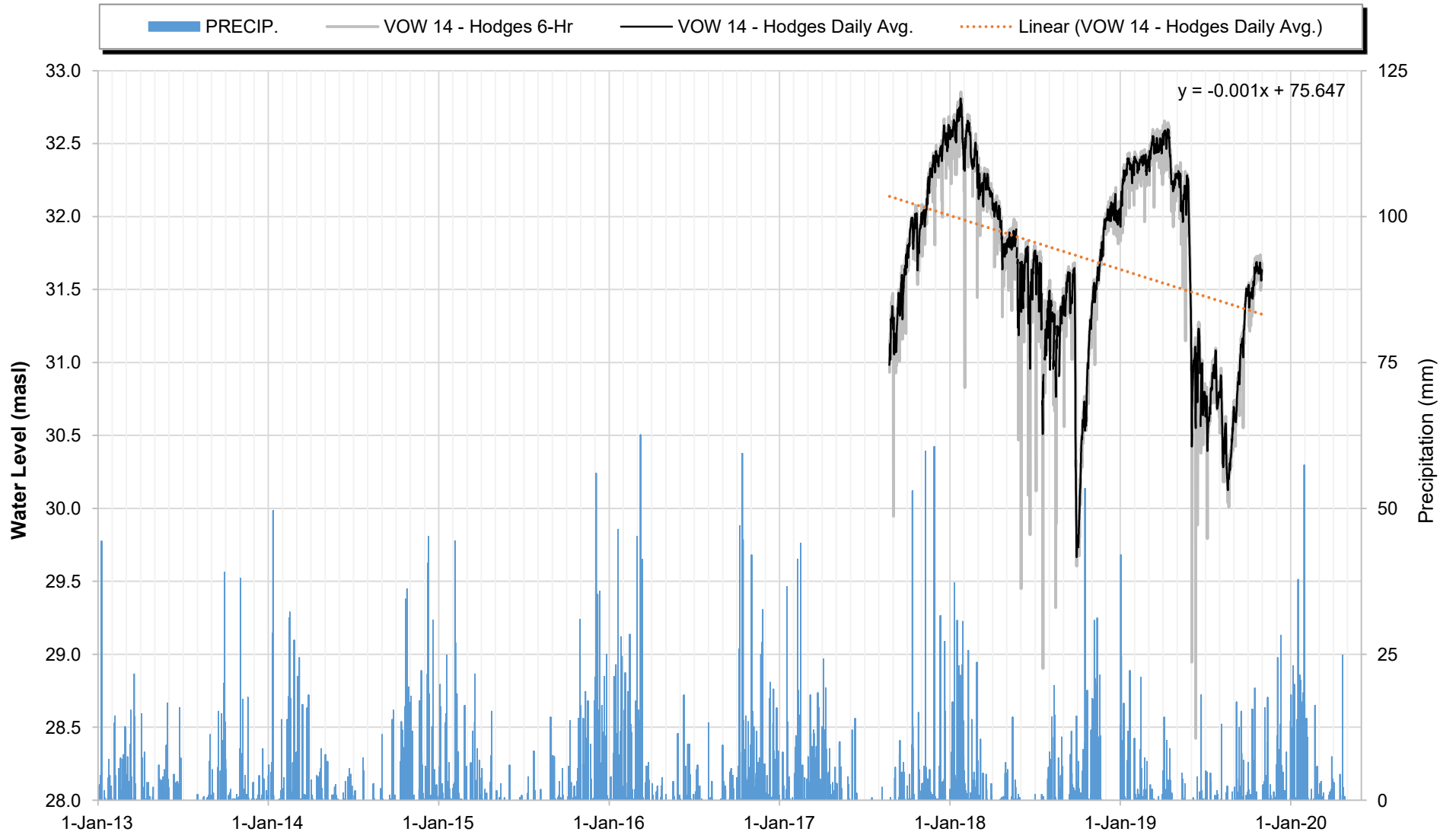
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 314 (WR4 - Englishman River)		FIGURE B-9
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 216
 Aquifer 216 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 424 (WR4 - Englishman River)		FIGURE B-10
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

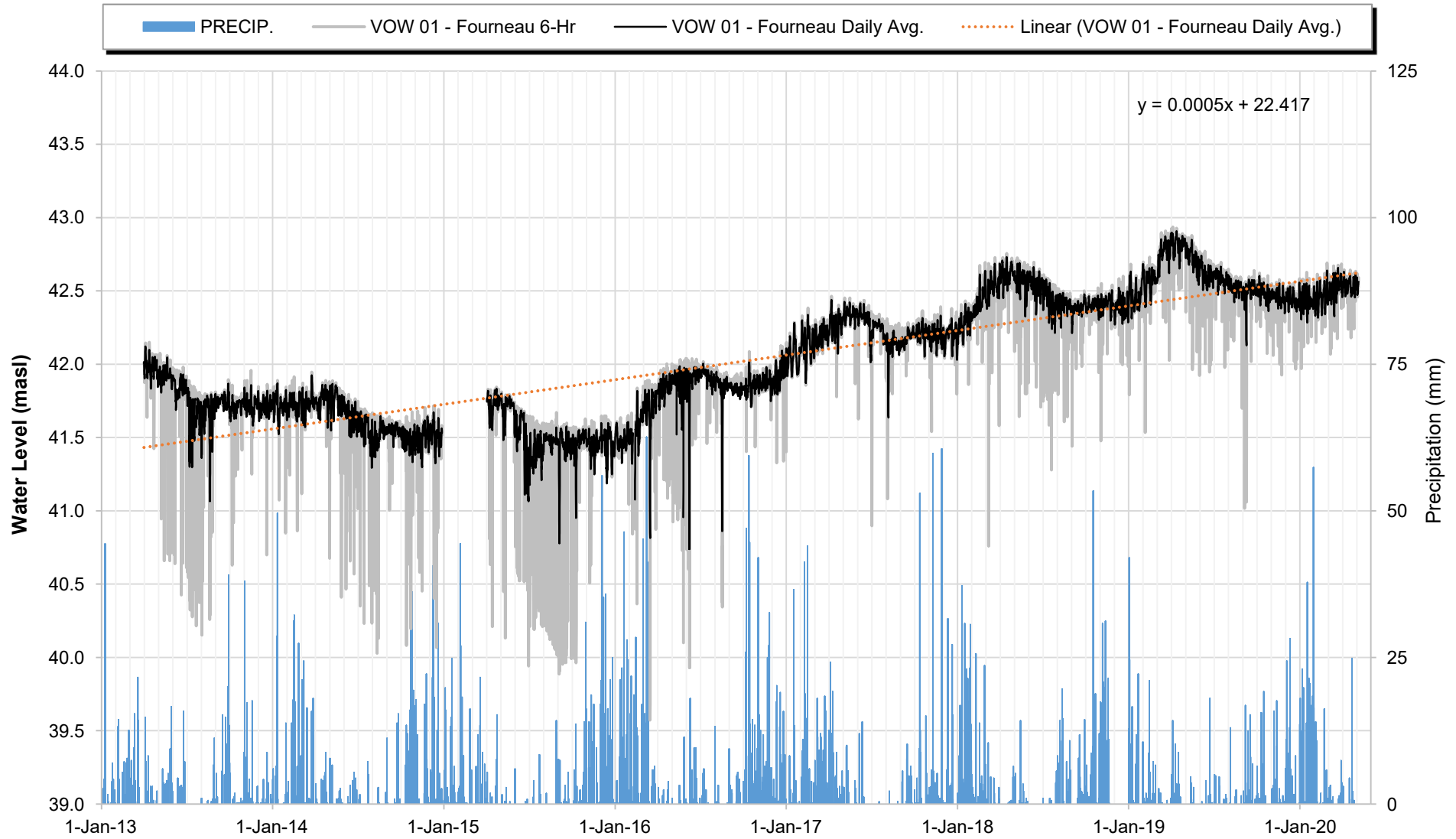


NOTES:

Observation Well is Associated with Aquifer 216


Aquifer 216 is Confined Surficial Sediments

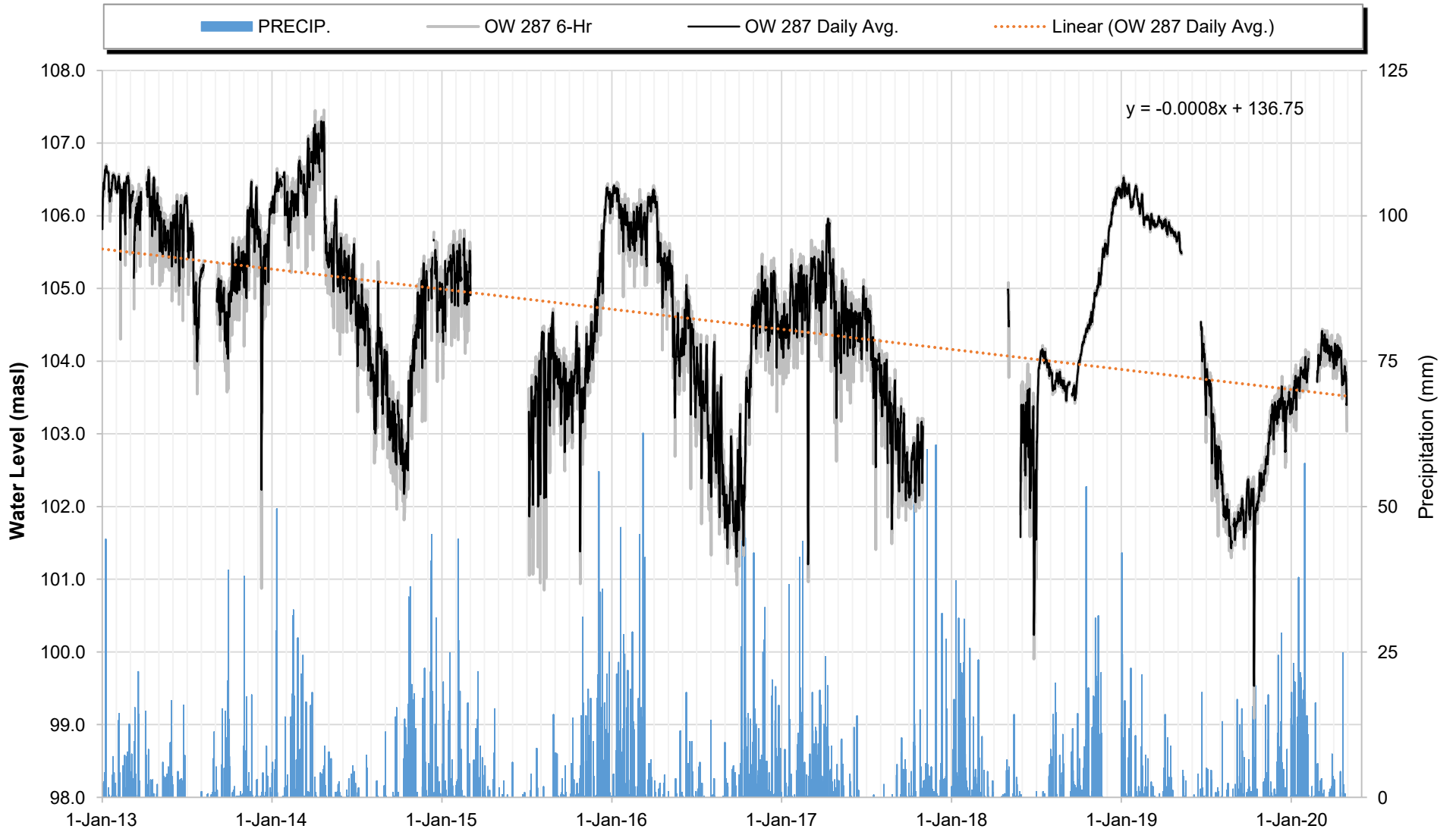
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 14 - Hodges (WR4 - Englishman River)		FIGURE B-11
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 216
 Aquifer 216 is Confined Surficial Sediments

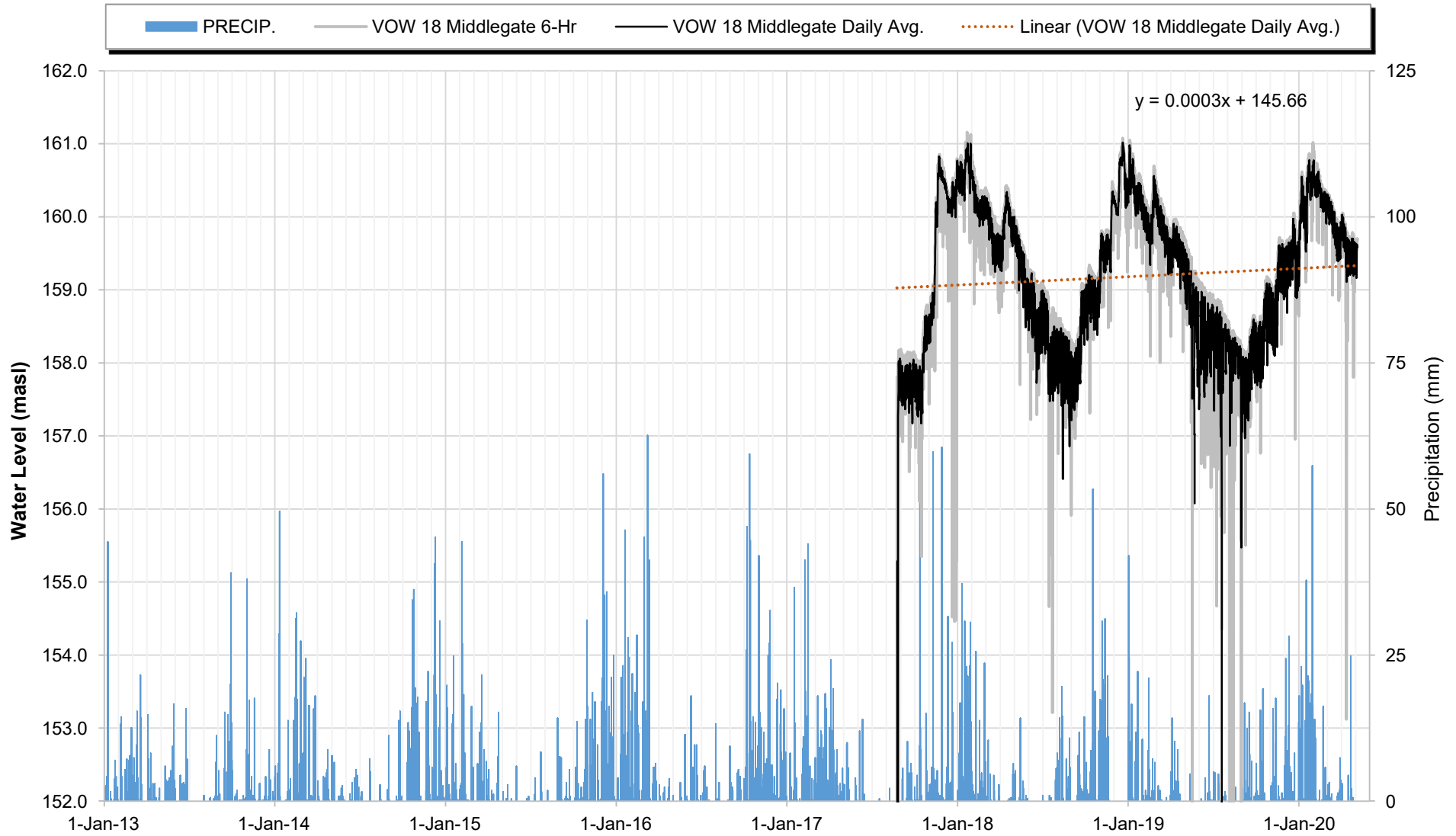
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 01 - Fourneau (WR4 - Englishman River)		FIGURE B-12
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 220
 Aquifer 220 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 287 (WR4 - Englishman River)		FIGURE B-13
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

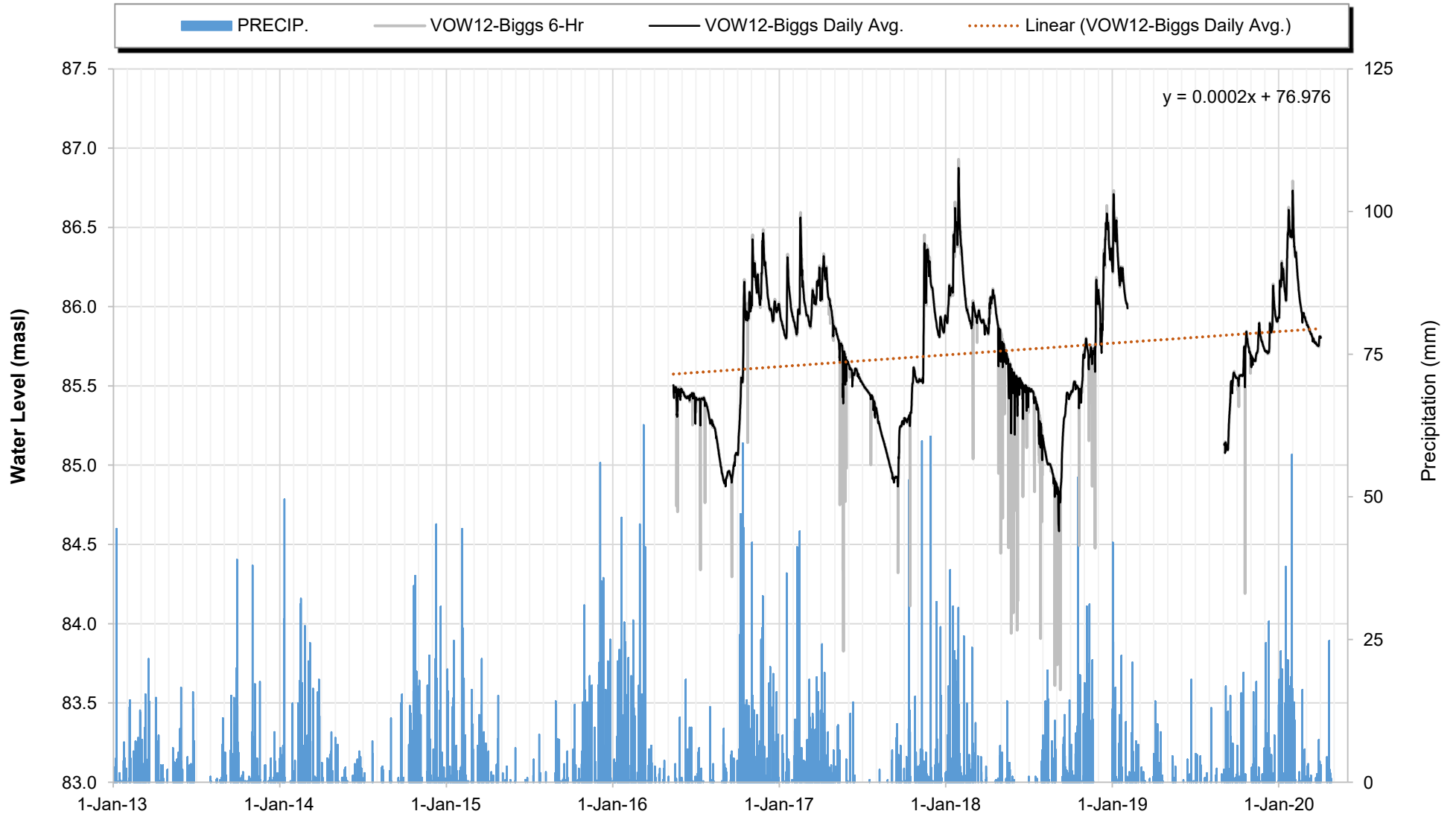


NOTES:

Observation Well is Associated with Aquifer 220


Aquifer 220 is Fractured Bedrock

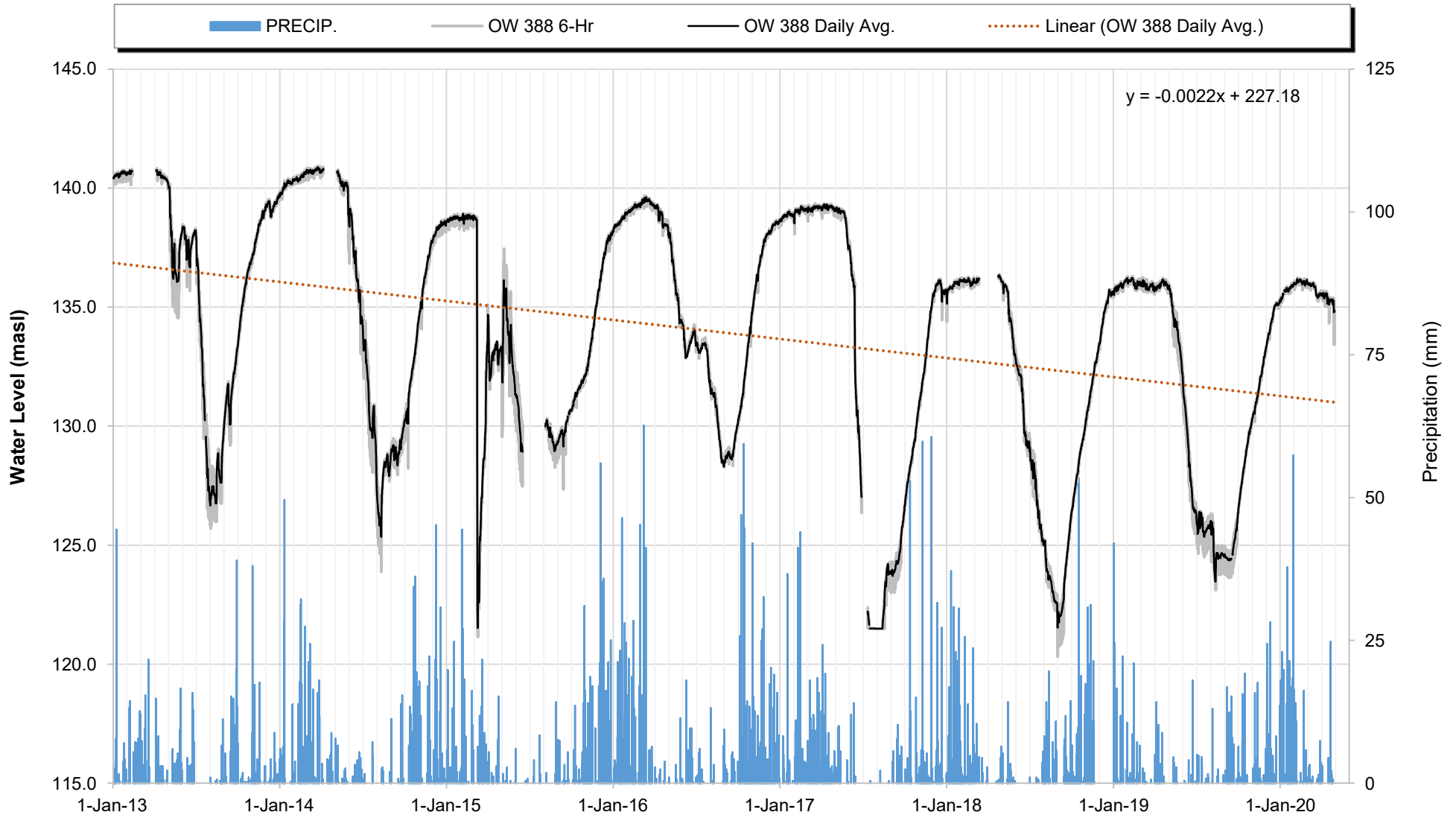
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 18 - Middlegate (WR4 - Englishman River)		FIGURE B-14
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 167
 Aquifer 167 is Confined Surficial Sediments

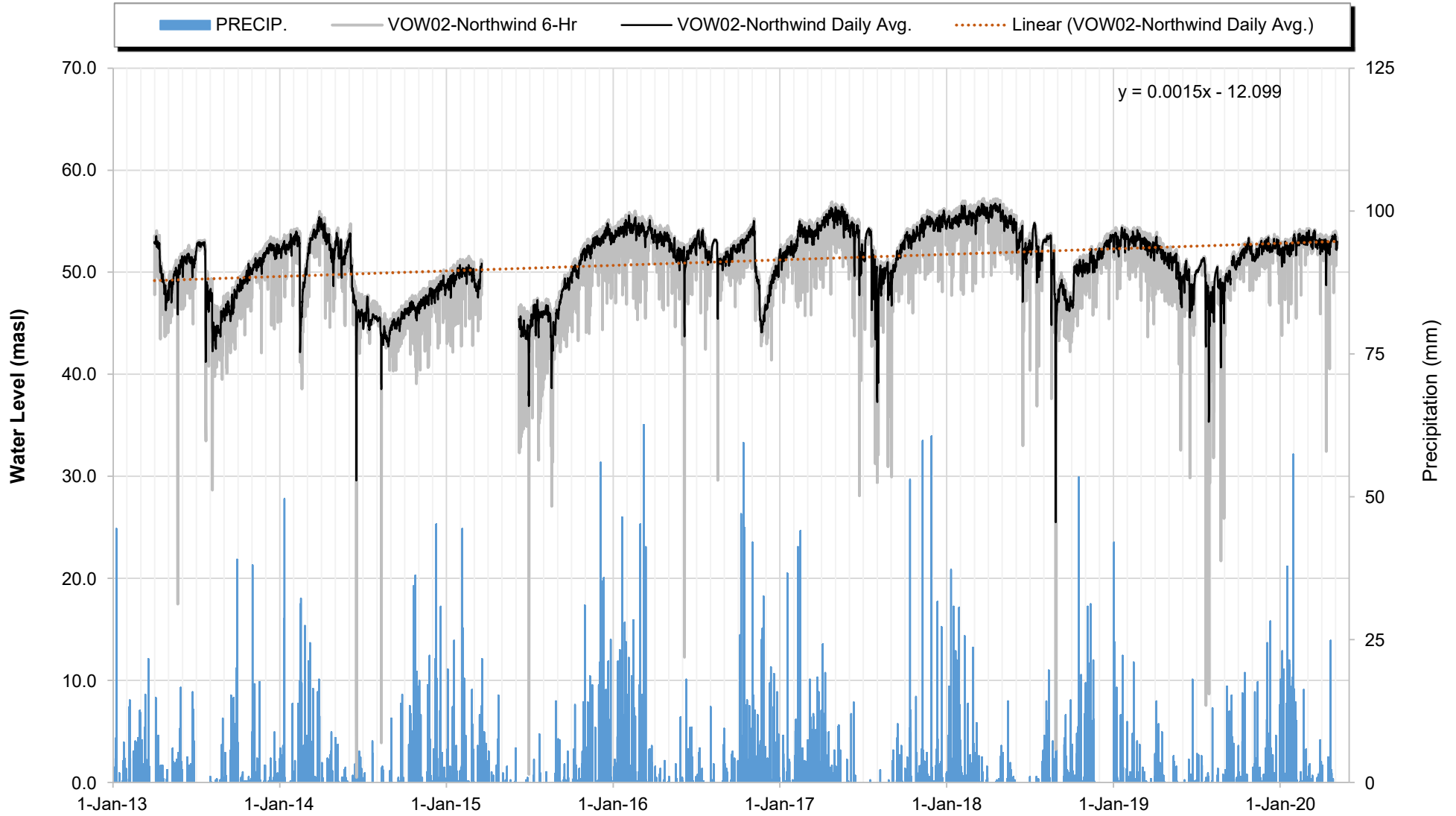
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 12 - Biggs (WR5 - Nanoose)		FIGURE B-15
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 211
 Aquifer 211 is Fractured Bedrock

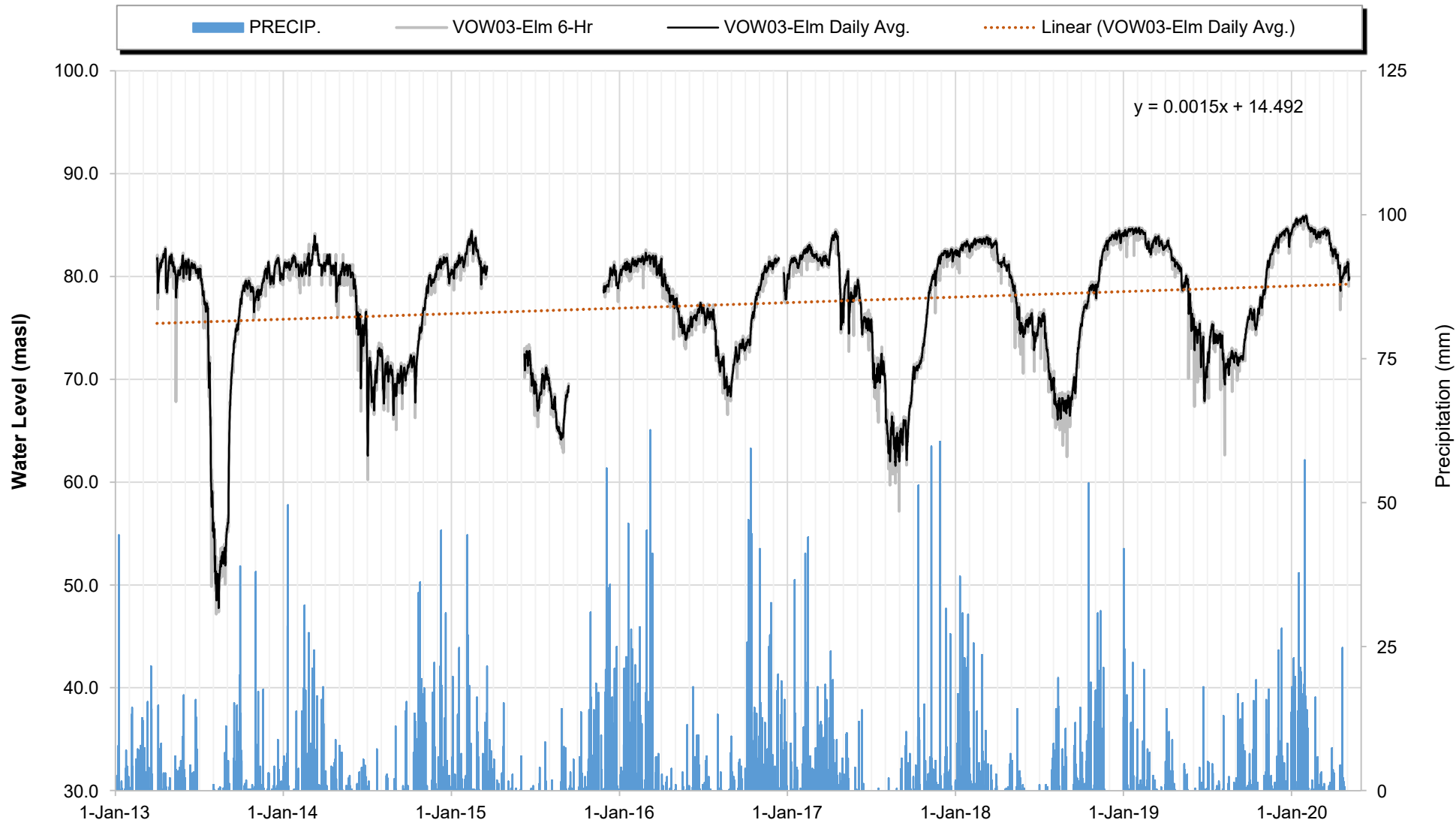
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 388 (WR5 - Nanoose)	
	PREPARED BY:	WATERLINE RESOURCES INC.	
	PROJECT:	2590-20-001	
	COMPILED BY:	REW	
	DATE ISSUED:	2020-05-25	
	REVISED:	FINAL	
			FIGURE B-16



NOTES:

Observation Well is Associated with Aquifer 213
 Aquifer 213 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 02 - Northwind (WR5 - Nanoose)		FIGURE B-17
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

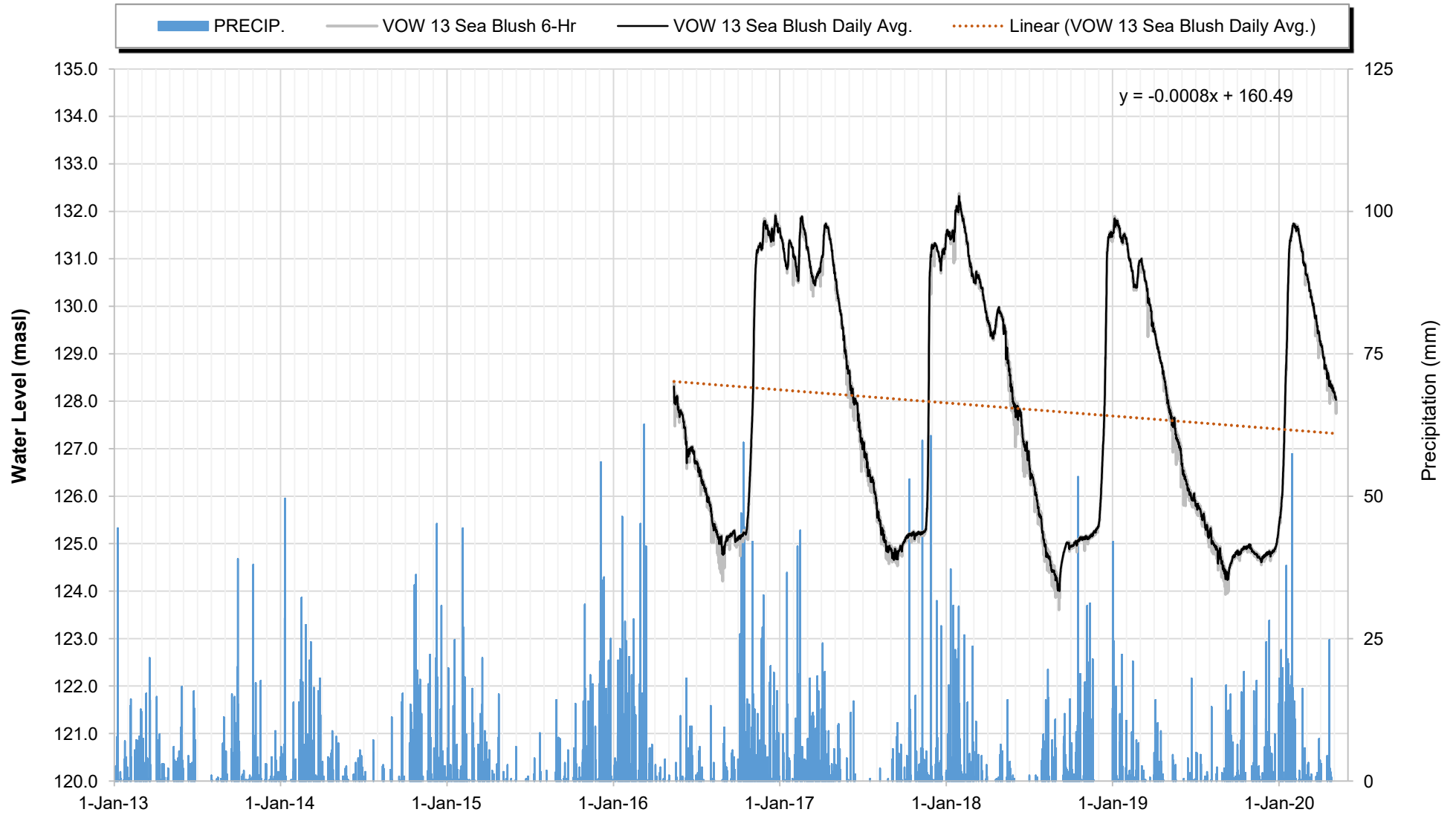


NOTES:

Observation Well is Associated with Aquifer 213

Aquifer 213 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 03 - Elm (WR5 - Nanoose)		FIGURE B-18
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

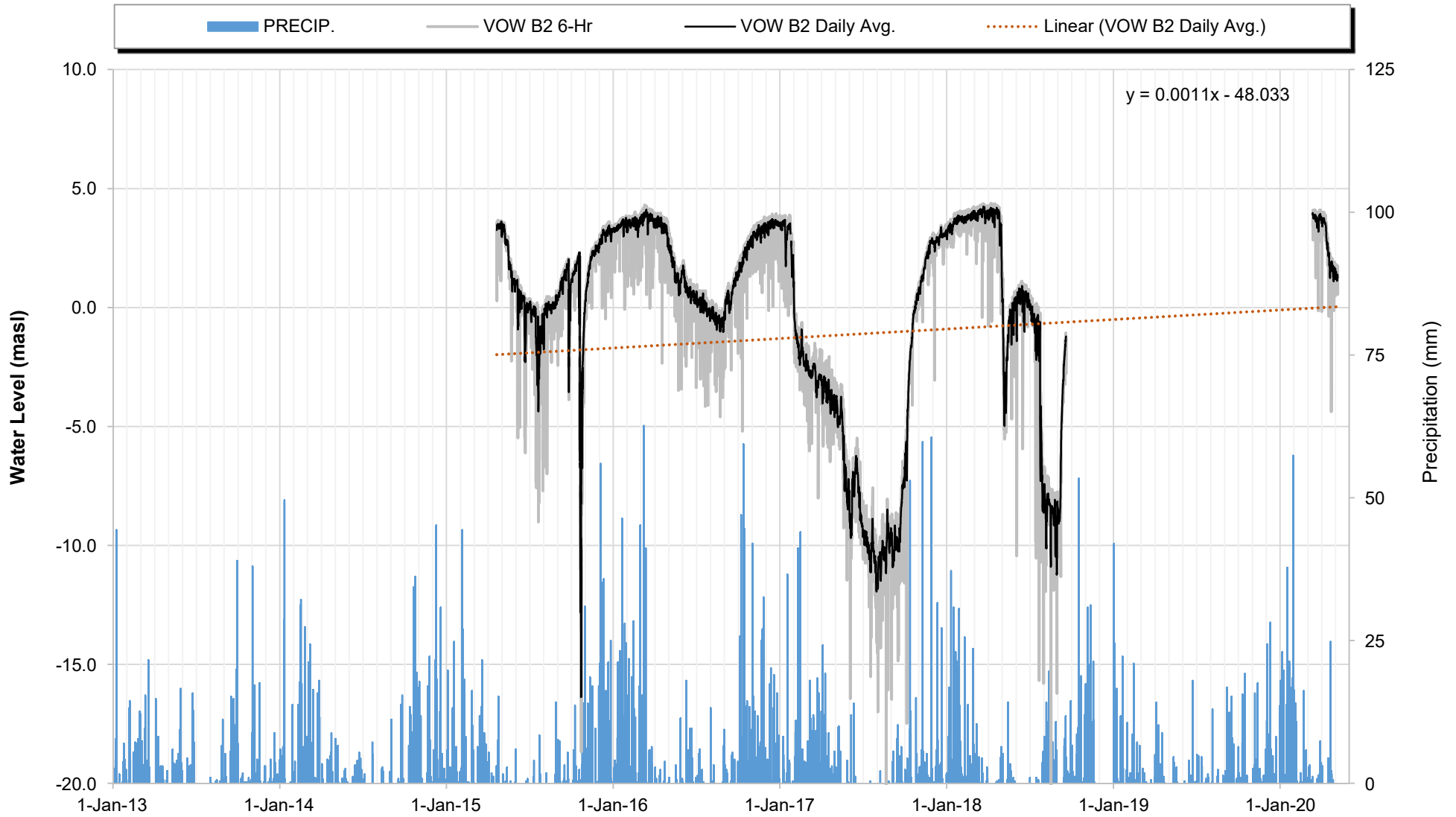


NOTES:

Observation Well is Associated with Aquifer 213


Aquifer 213 is Fractured Bedrock

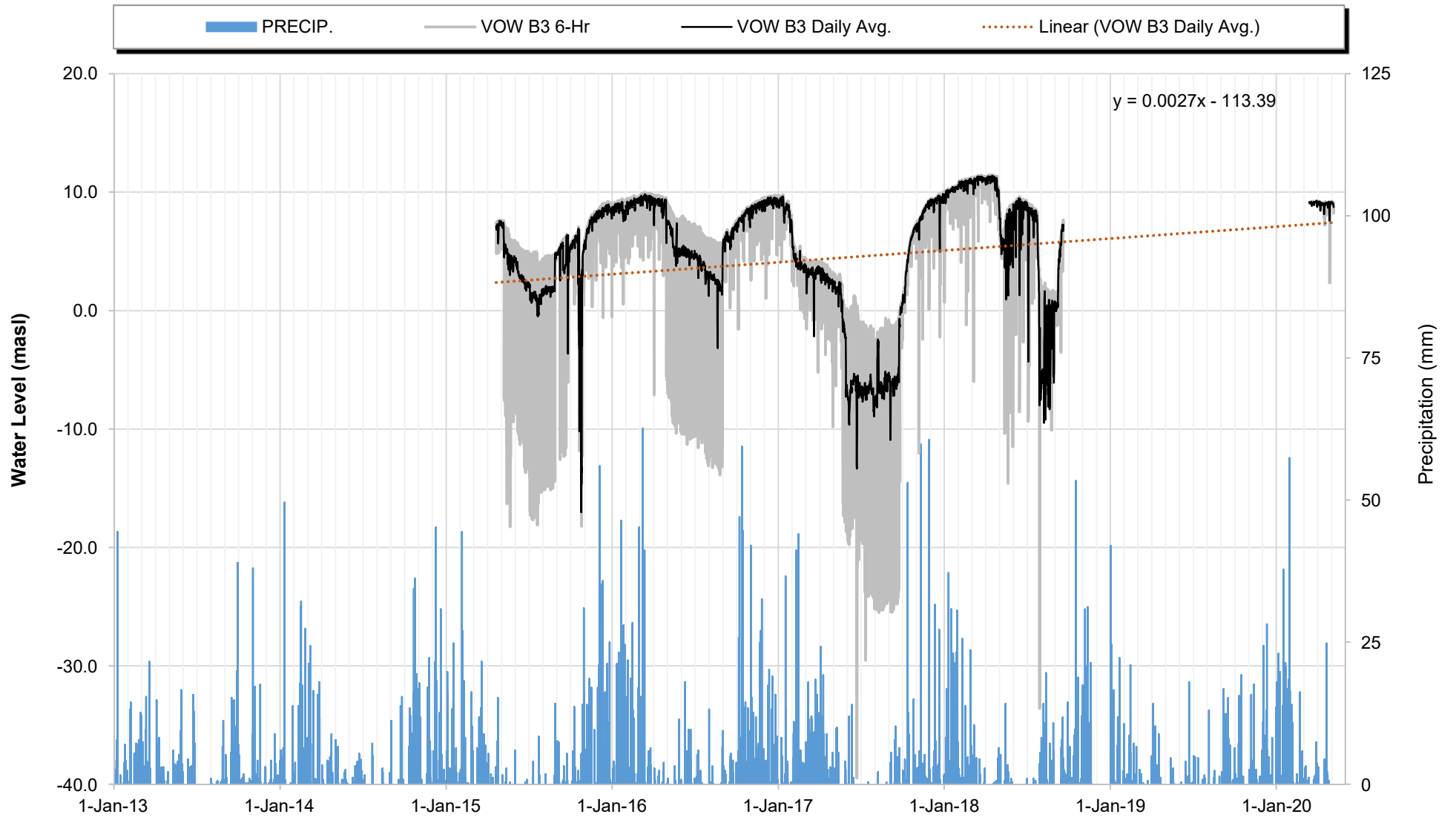
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 13 - Sea Blush (WR5 - Nanoose)		FIGURE B-19
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock

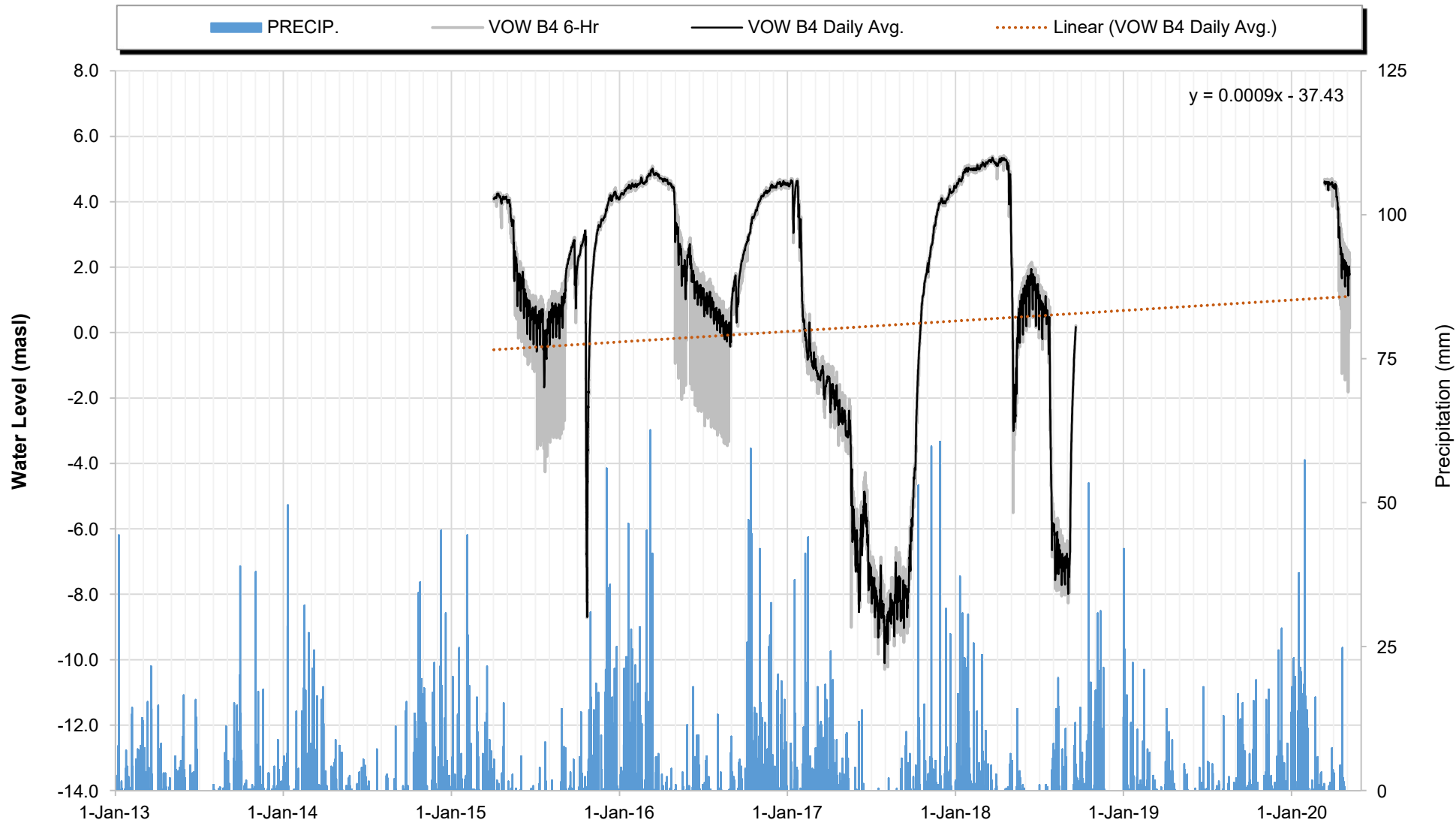
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW B2 (WR5 - Nanoose)		FIGURE B-20
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock

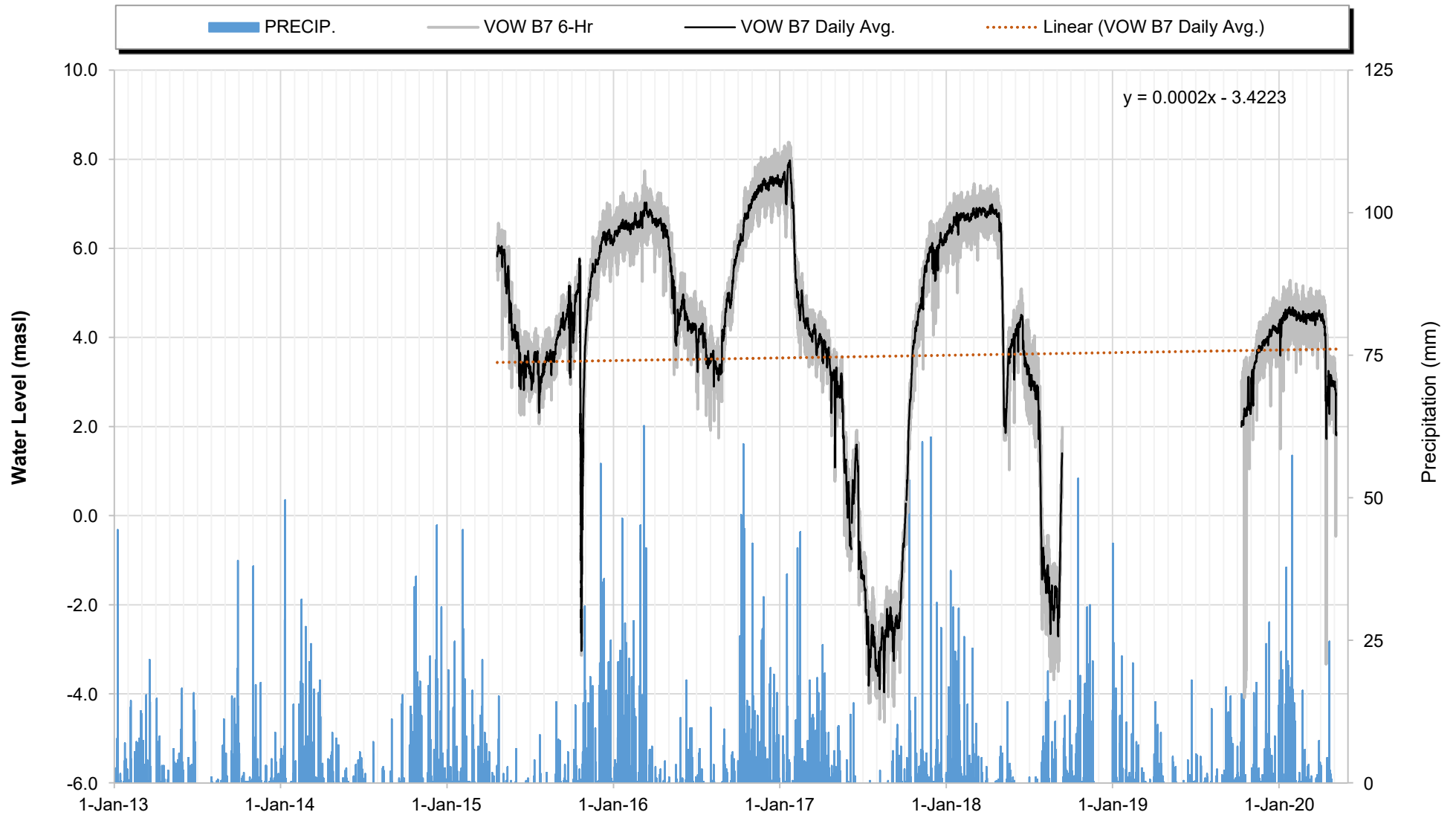
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW B3 (WR5 - Nanoose)	
	PREPARED BY:	WATERLINE RESOURCES INC.	
	PROJECT:	2590-20-001	
	COMPILED BY:	REW	
	DATE ISSUED:	2020-05-25	
	REVISED:	FINAL	
			FIGURE B-21



NOTES:


Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock

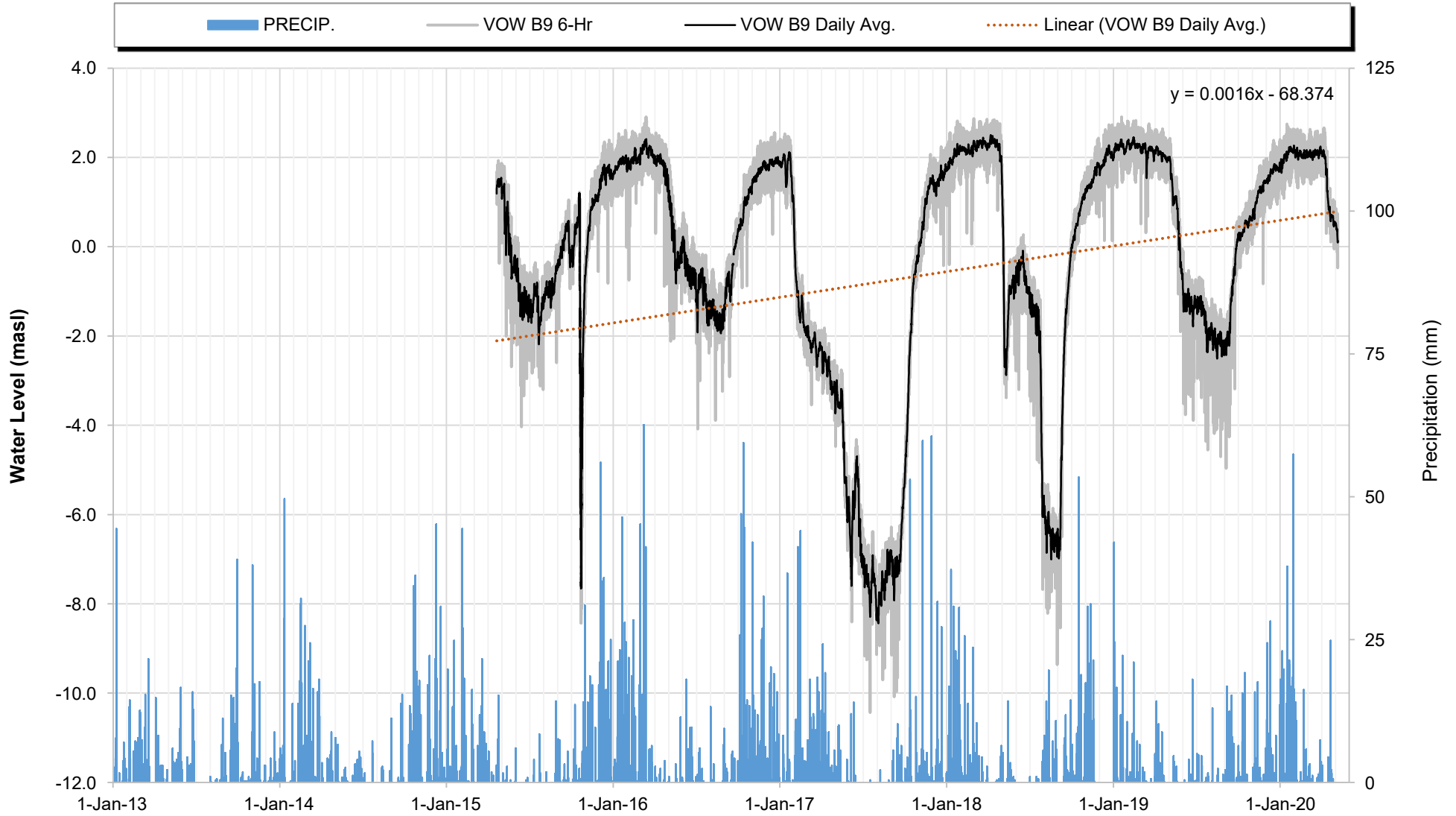
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW B4 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-22	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:

Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW B7 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-23	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		

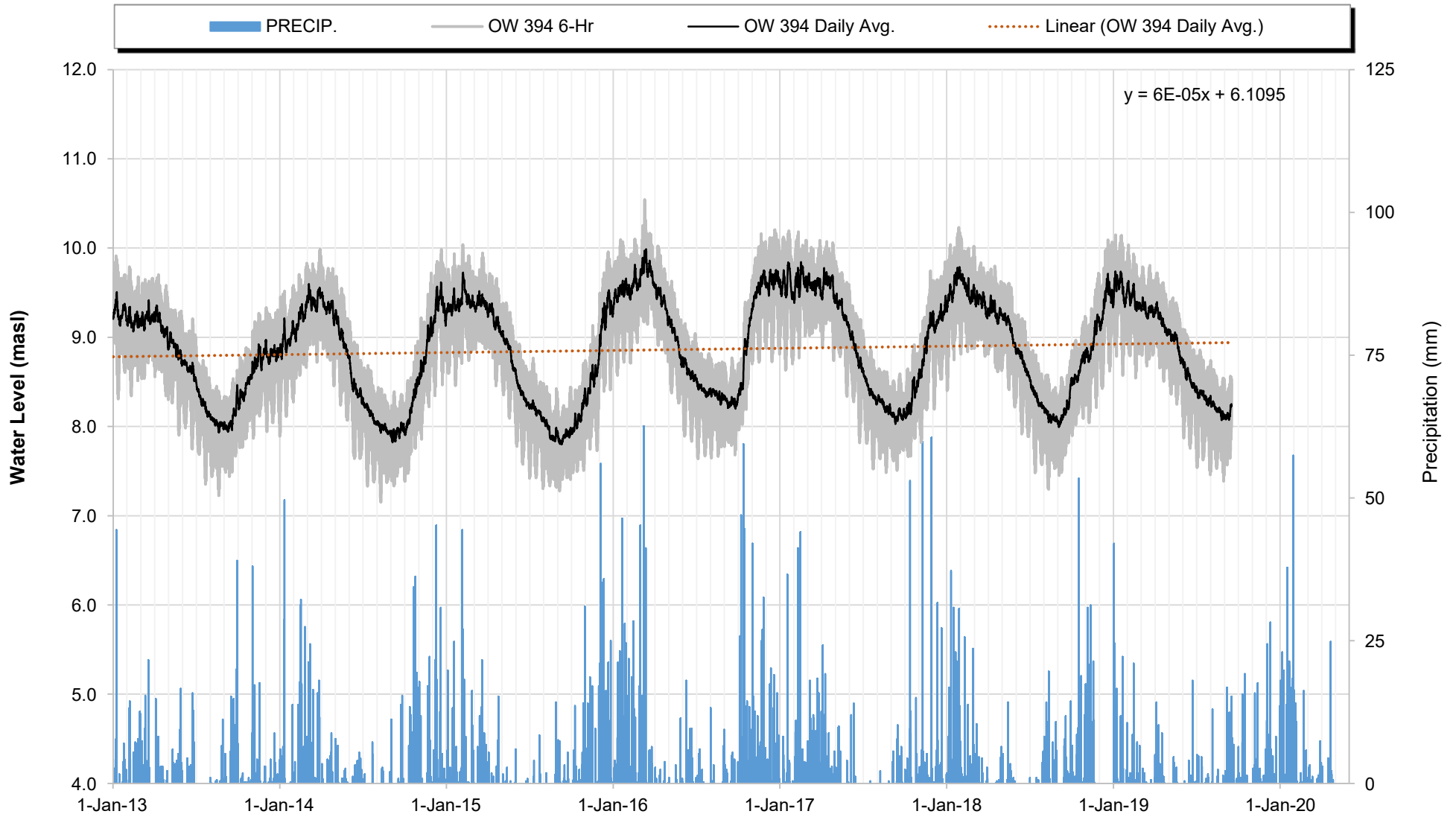


NOTES:

Observation Well is Associated with Aquifer 214


Aquifer 214 is Fractured Bedrock

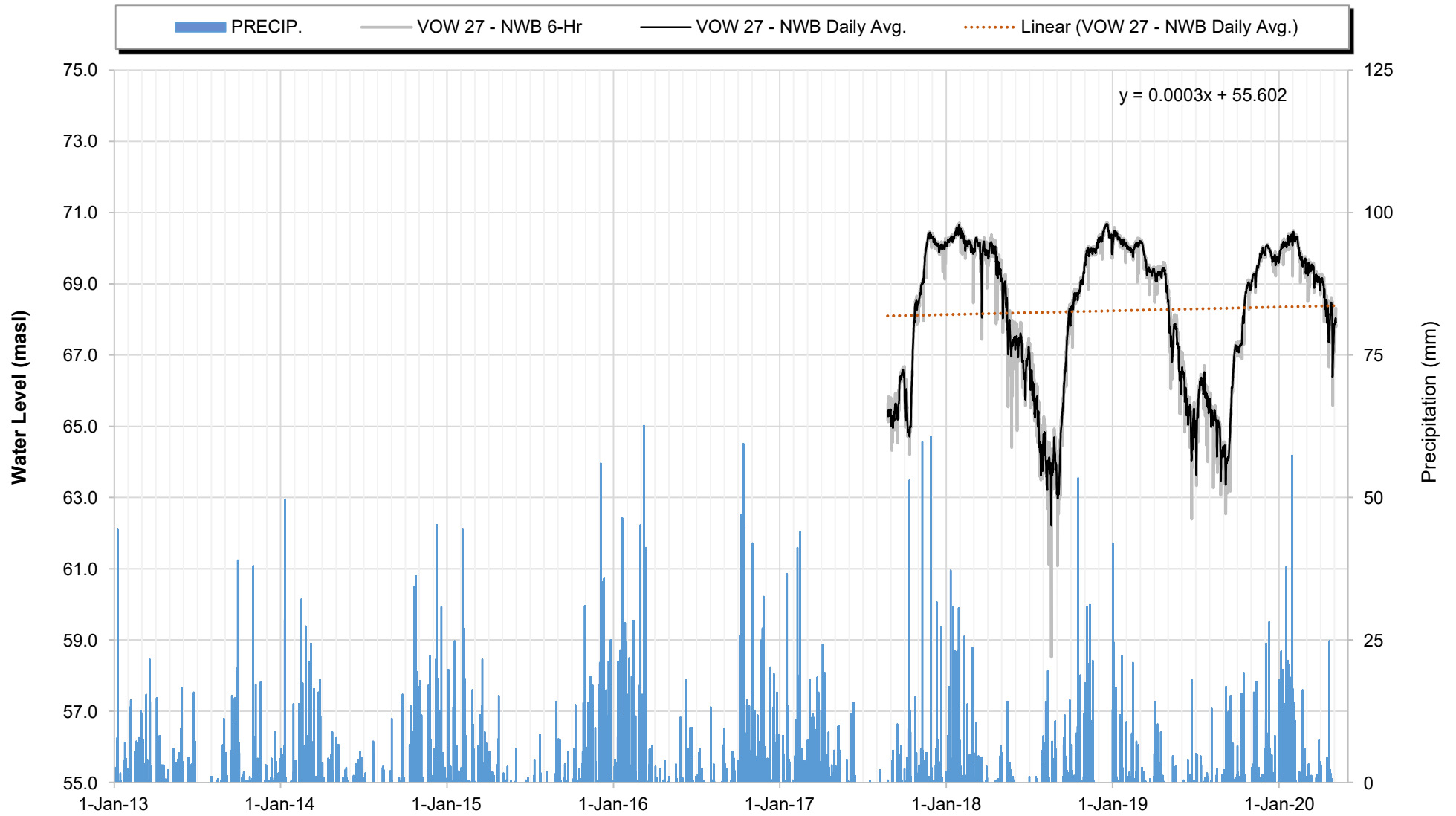
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW B9 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-24	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:

Observation Well is Associated with Aquifer 218
 Aquifer 218 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 394 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-25	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		

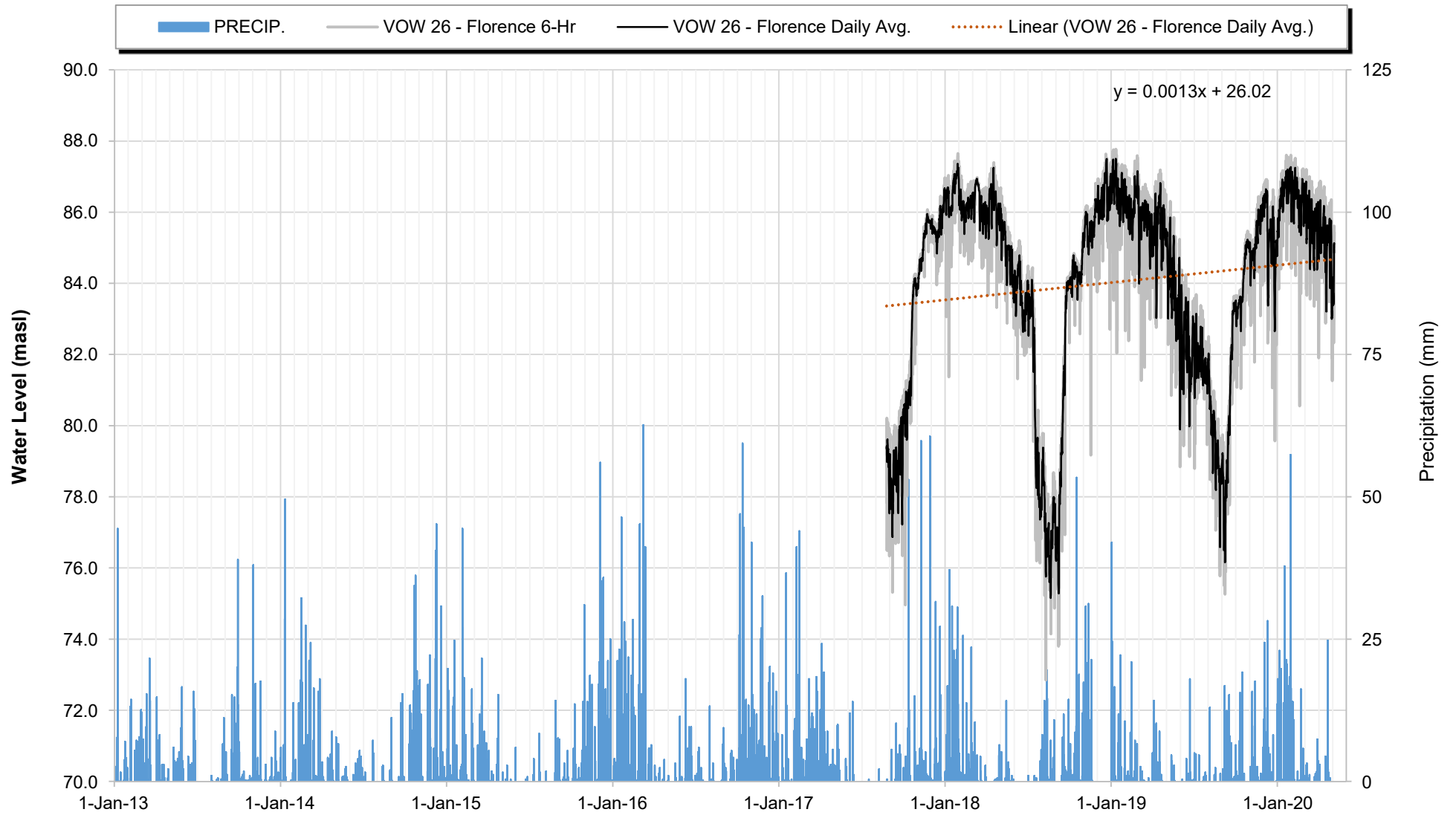


NOTES:

Observation Well is Associated with Aquifer 218


Aquifer 218 is Fractured Bedrock

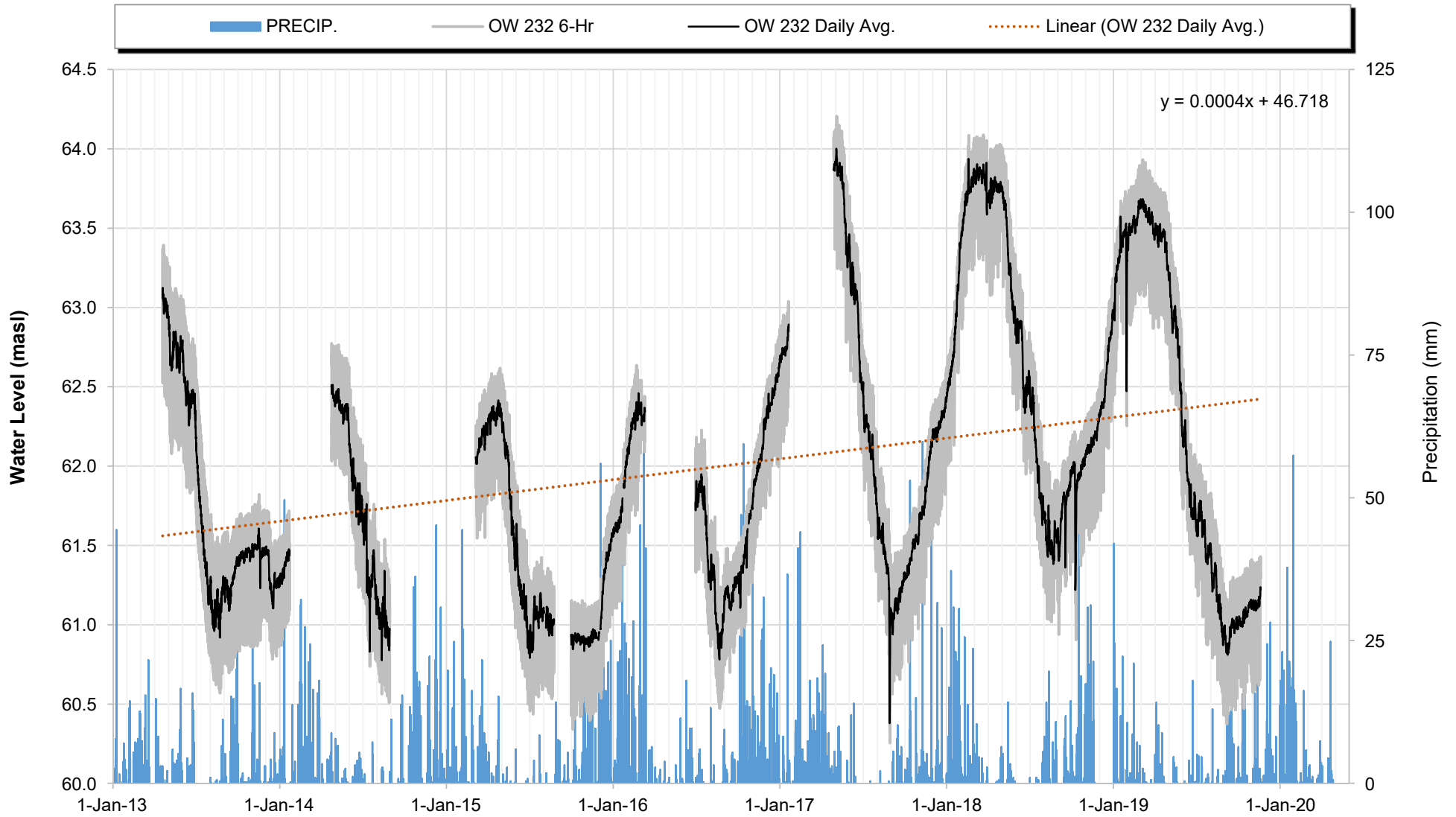
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW 27 - NWB (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-26	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:

Observation Well is Associated with Aquifer 218
 Aquifer 218 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 26 - Florence (WR5 - Nanoose)		FIGURE B-27
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

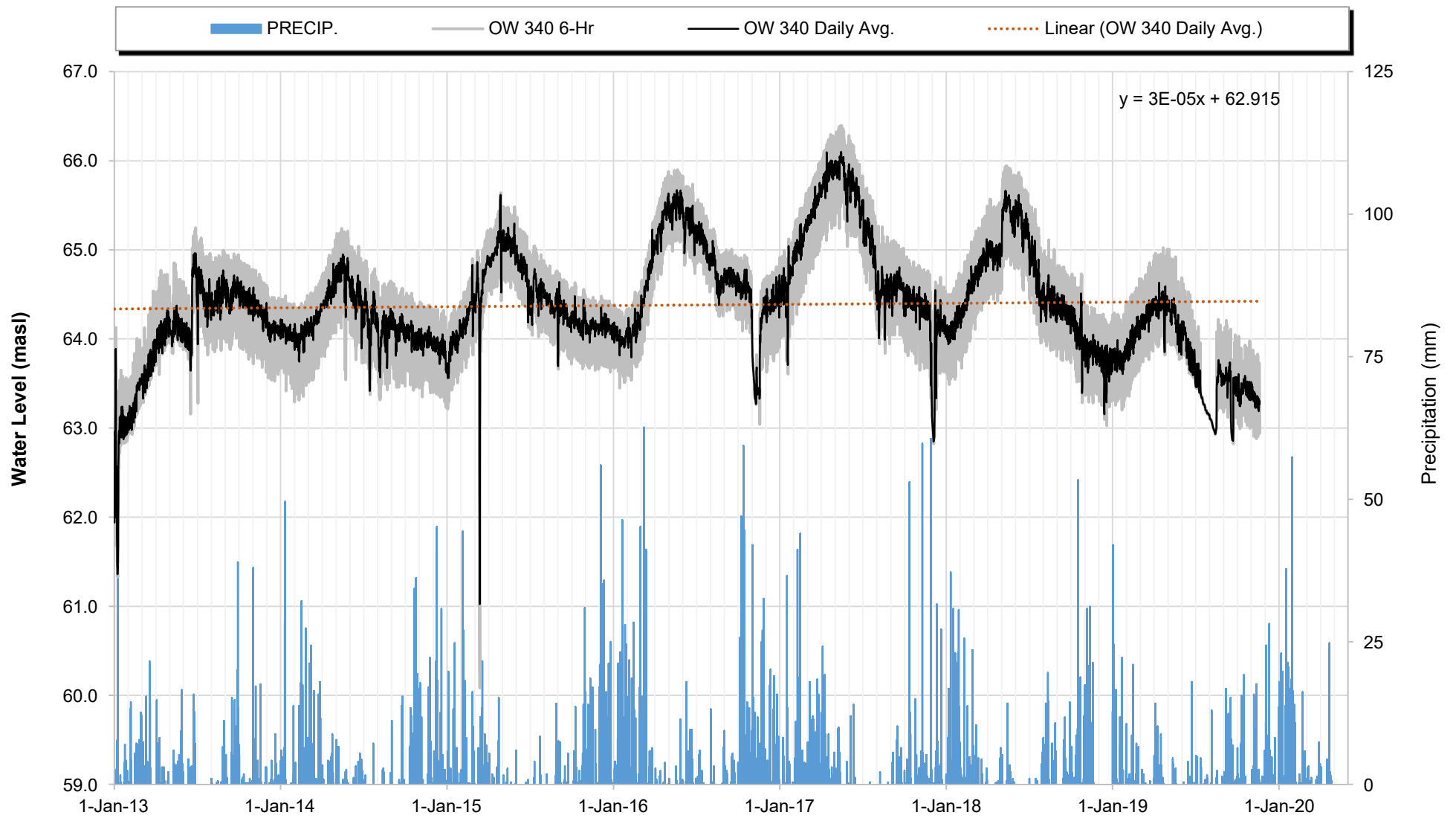


NOTES:

Observation Well is Associated with Aquifer 215

Aquifer 215 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 232 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-28	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		

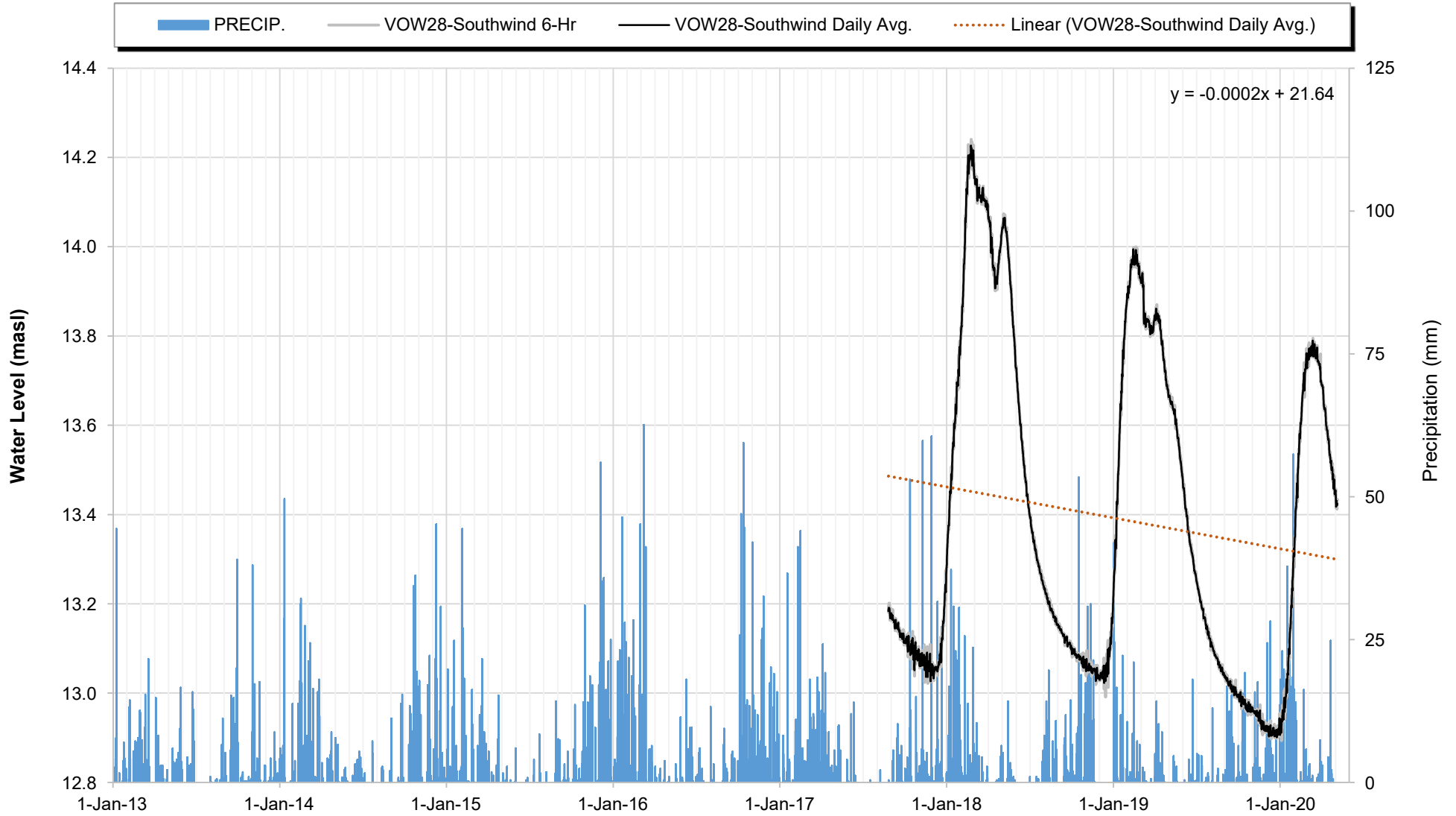


NOTES:

Observation Well is Associated with Aquifer 215

Aquifer 215 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 340 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-29	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		

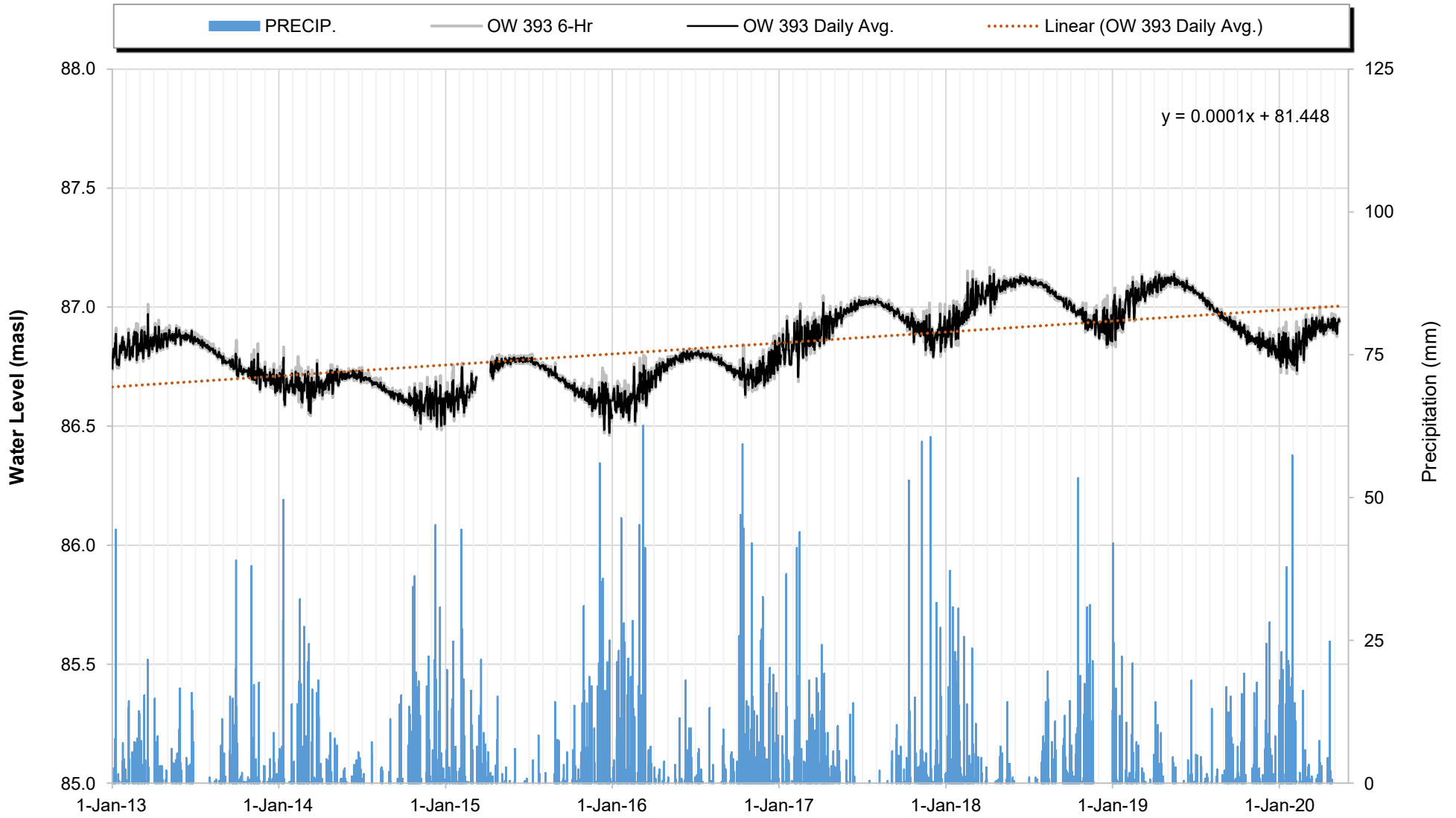


NOTES:

Observation Well is Associated with Aquifer 215

Aquifer 215 is Confined Surficial Sediments


PROJECT	DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE	HISTORICAL GROUNDWATER LEVEL CHART VOW 28 - Southwind (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-30
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

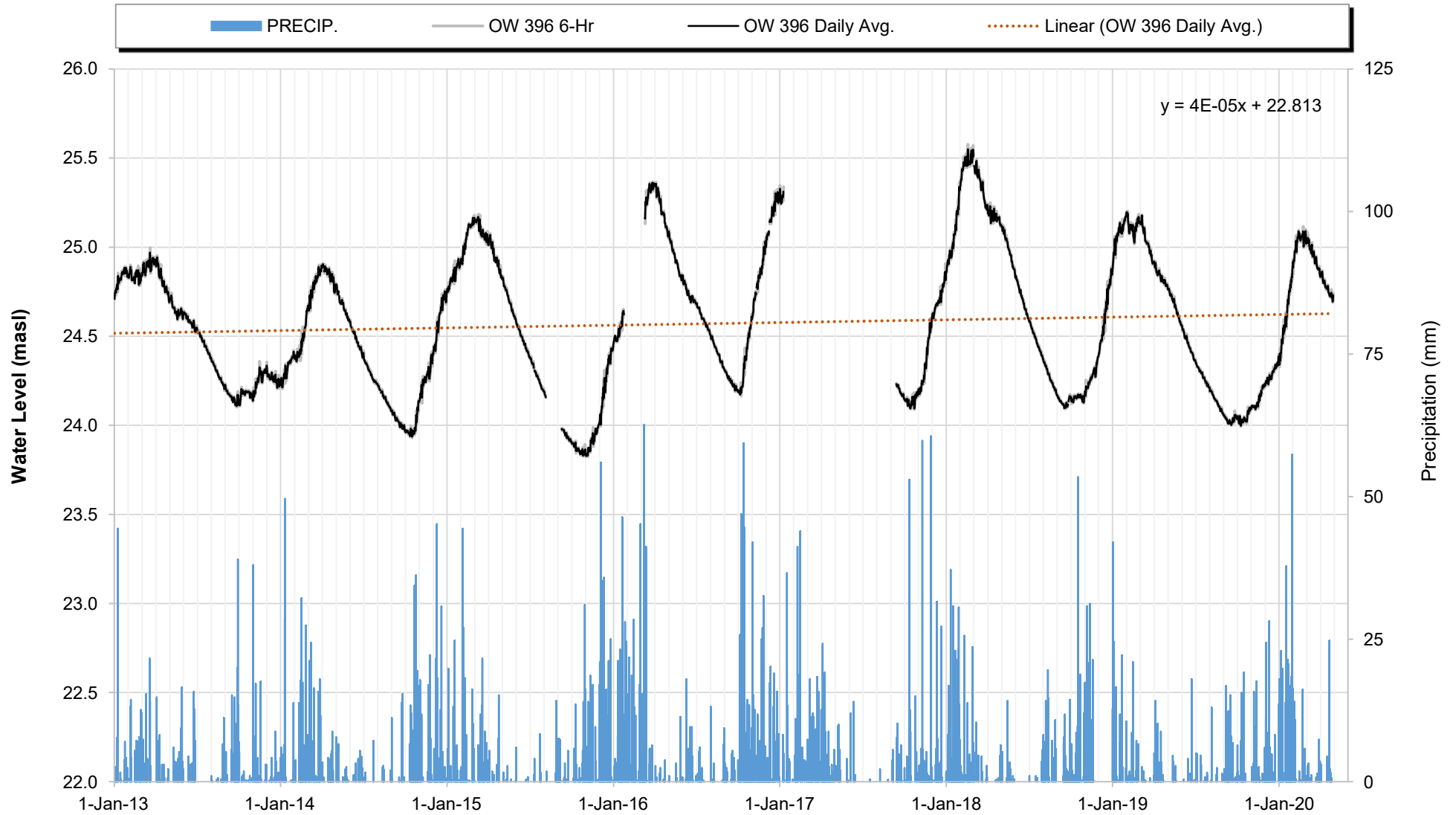


NOTES:

Observation Well is Associated with Aquifer 219

Aquifer 219 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 393 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-31	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		

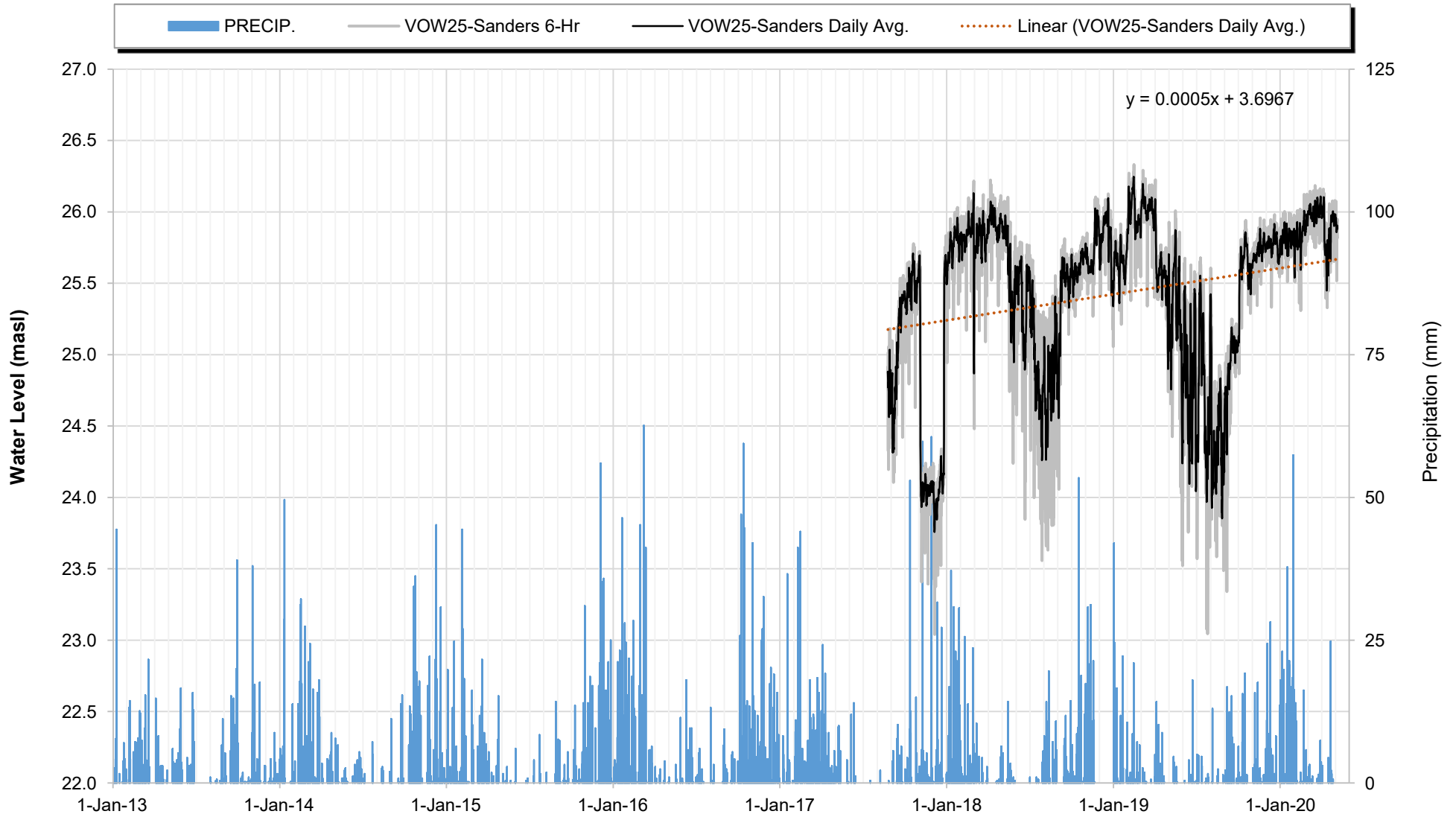


NOTES:

Observation Well is Associated with Aquifer 219


Aquifer 219 is Confined Surficial Sediments

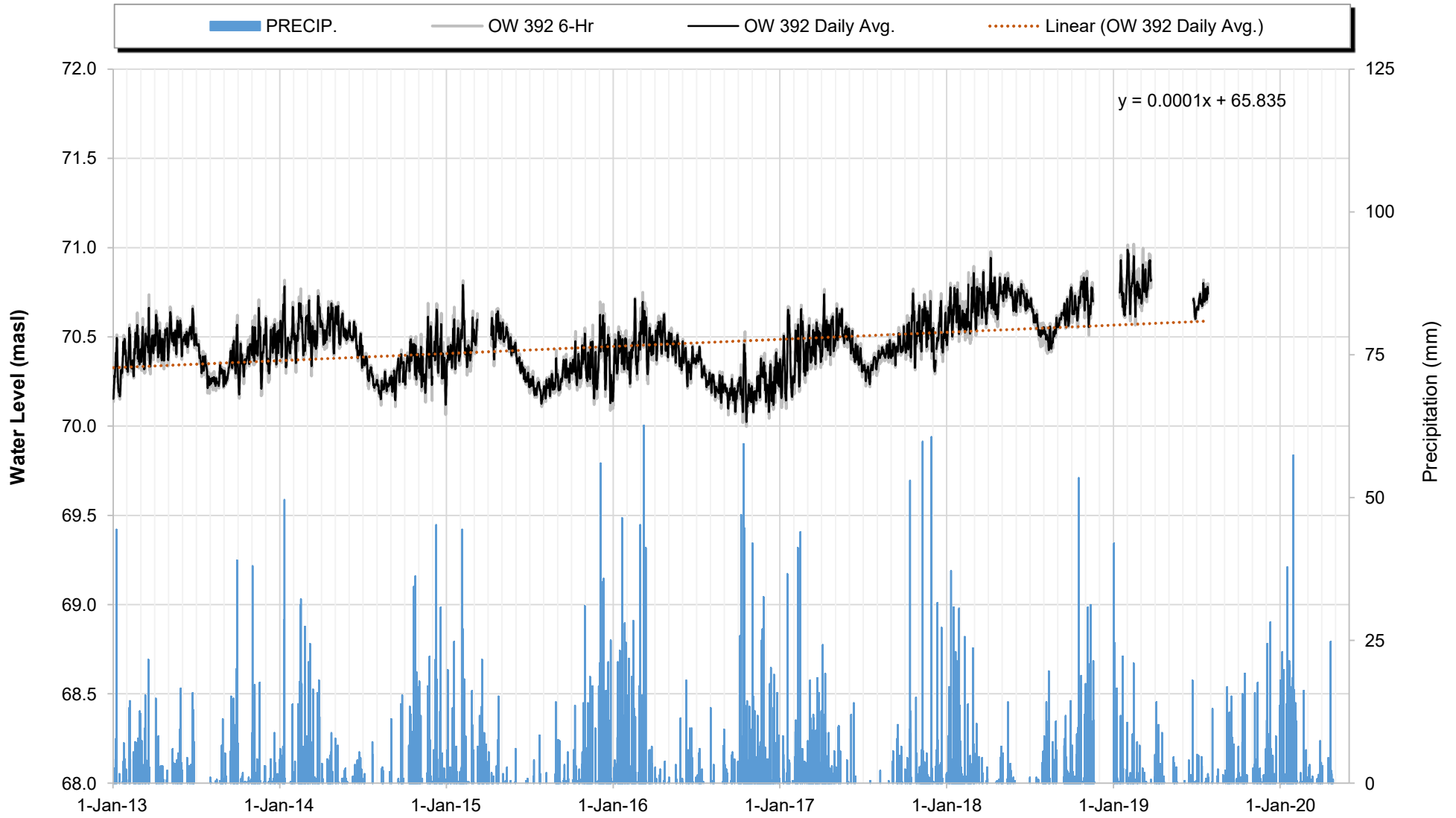
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 396 (WR5 - Nanoose)	
	PREPARED BY:	WATERLINE RESOURCES INC.	
	PROJECT:	2590-20-001	
	COMPILED BY:	REW	
	DATE ISSUED:	2020-05-25	
	REVISED:	FINAL	
			FIGURE B-32



NOTES:

Observation Well is Associated with Aquifer 219
 Aquifer 219 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 25 - Sanders (WR5 - Nanoose)		FIGURE B-33
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

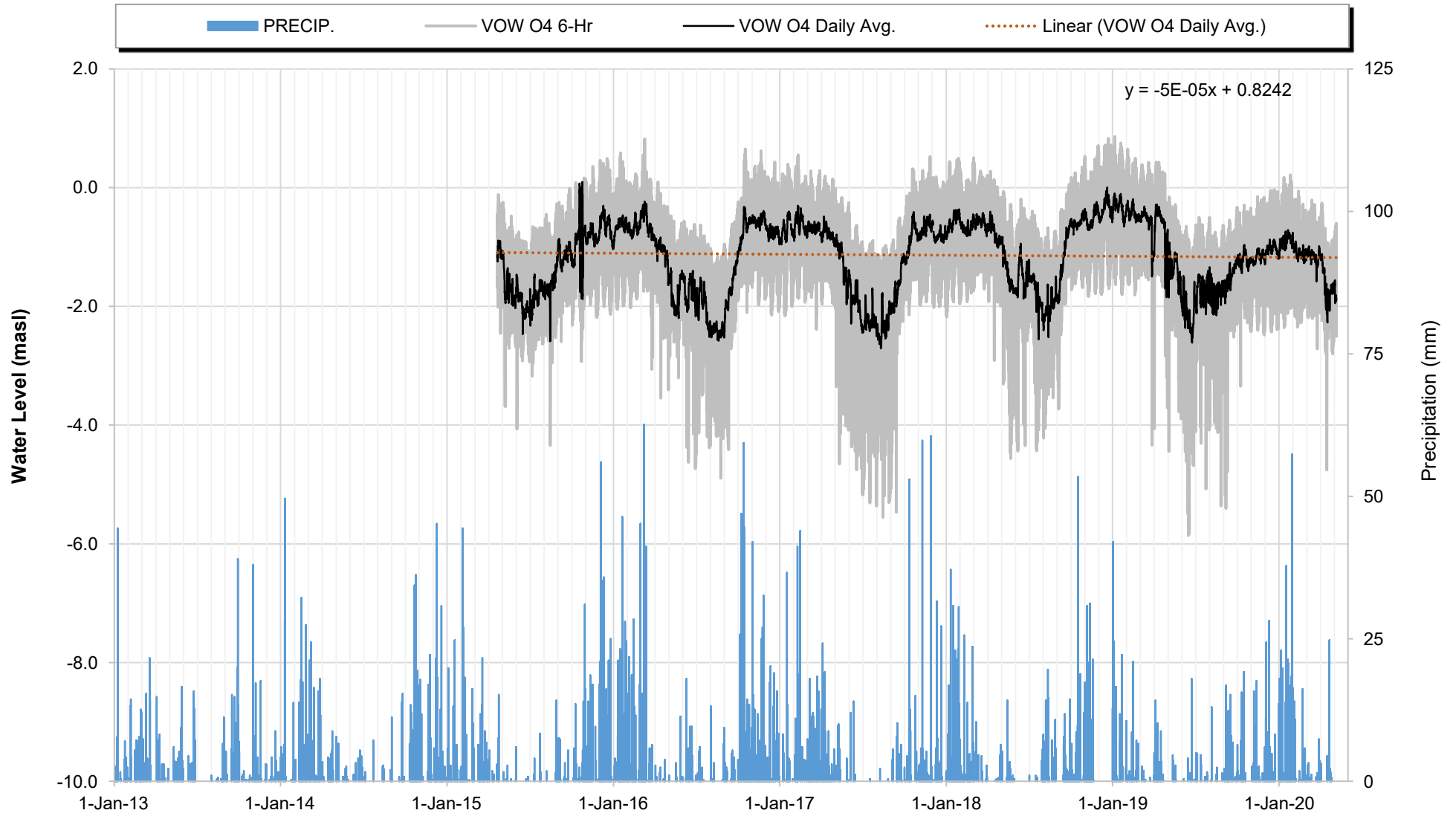


NOTES:

Observation Well is Associated with Aquifer 1098

Aquifer 1098 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART OW 392 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-34	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		

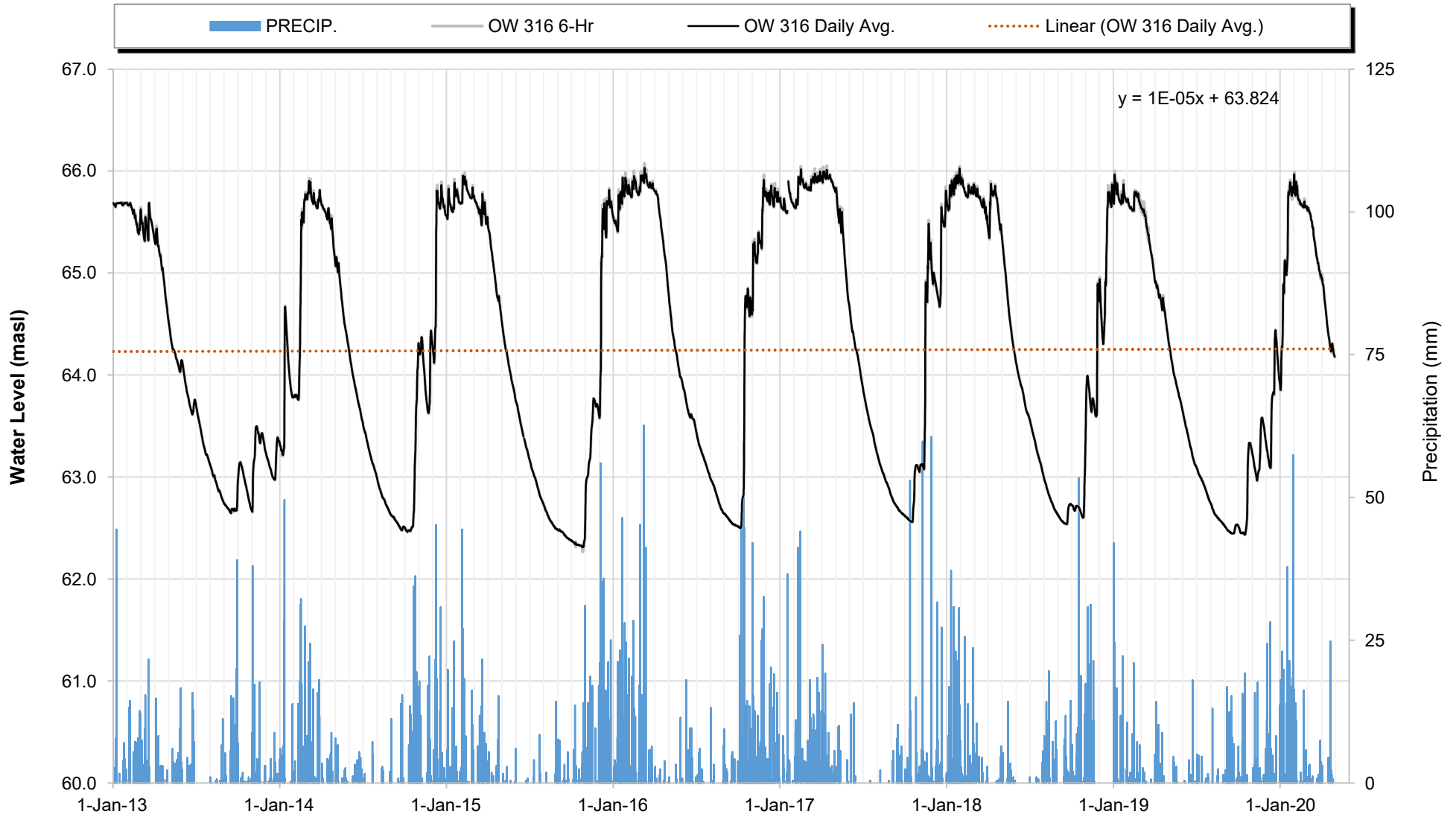


NOTES:

Observation Well is Associated with Aquifer 1098


Aquifer 1098 is Confined Surficial Sediments

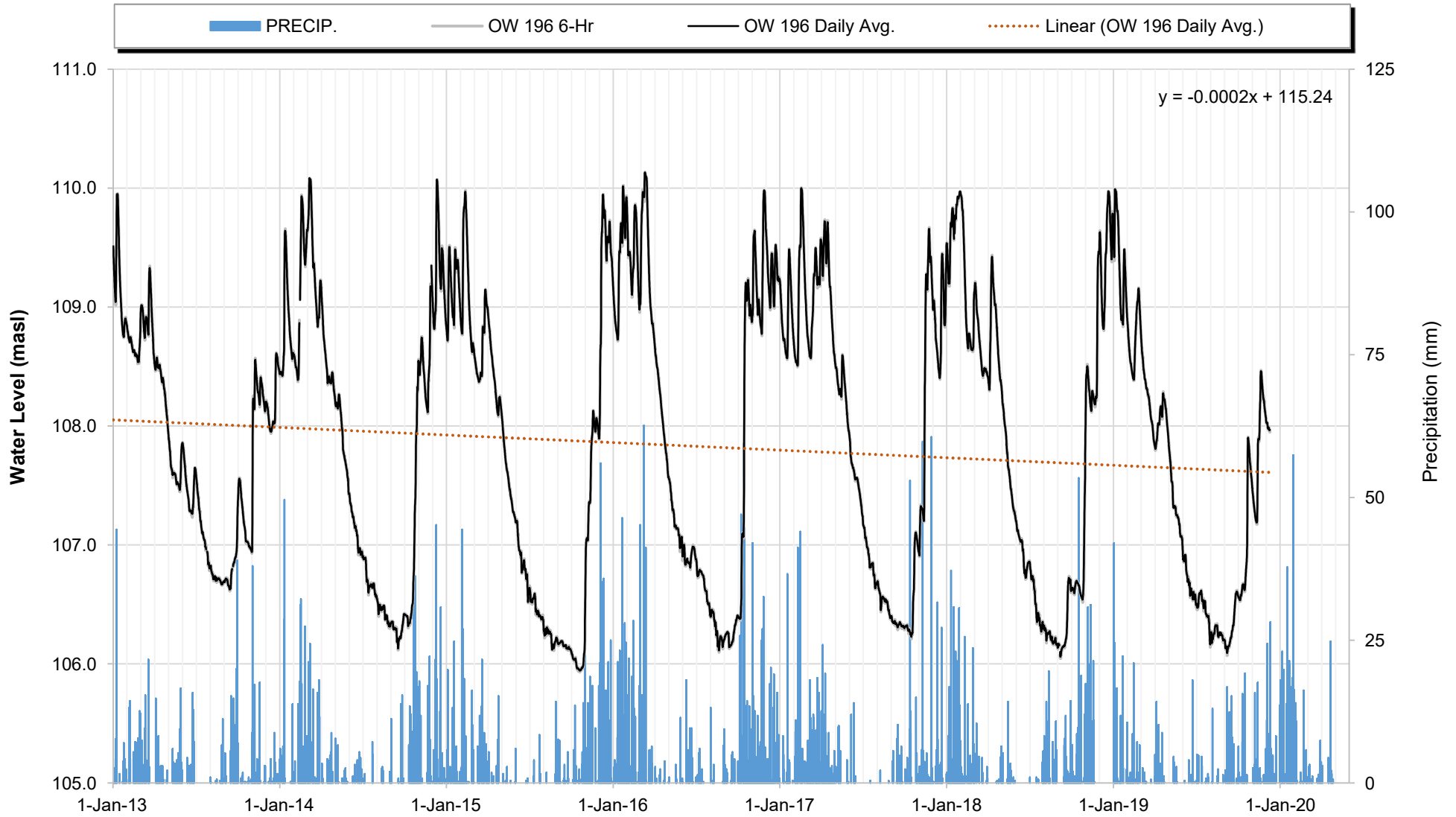
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW O3 (WR5 - Nanoose)		FIGURE B-35
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 709
 Aquifer 709 is Fractured Bedrock

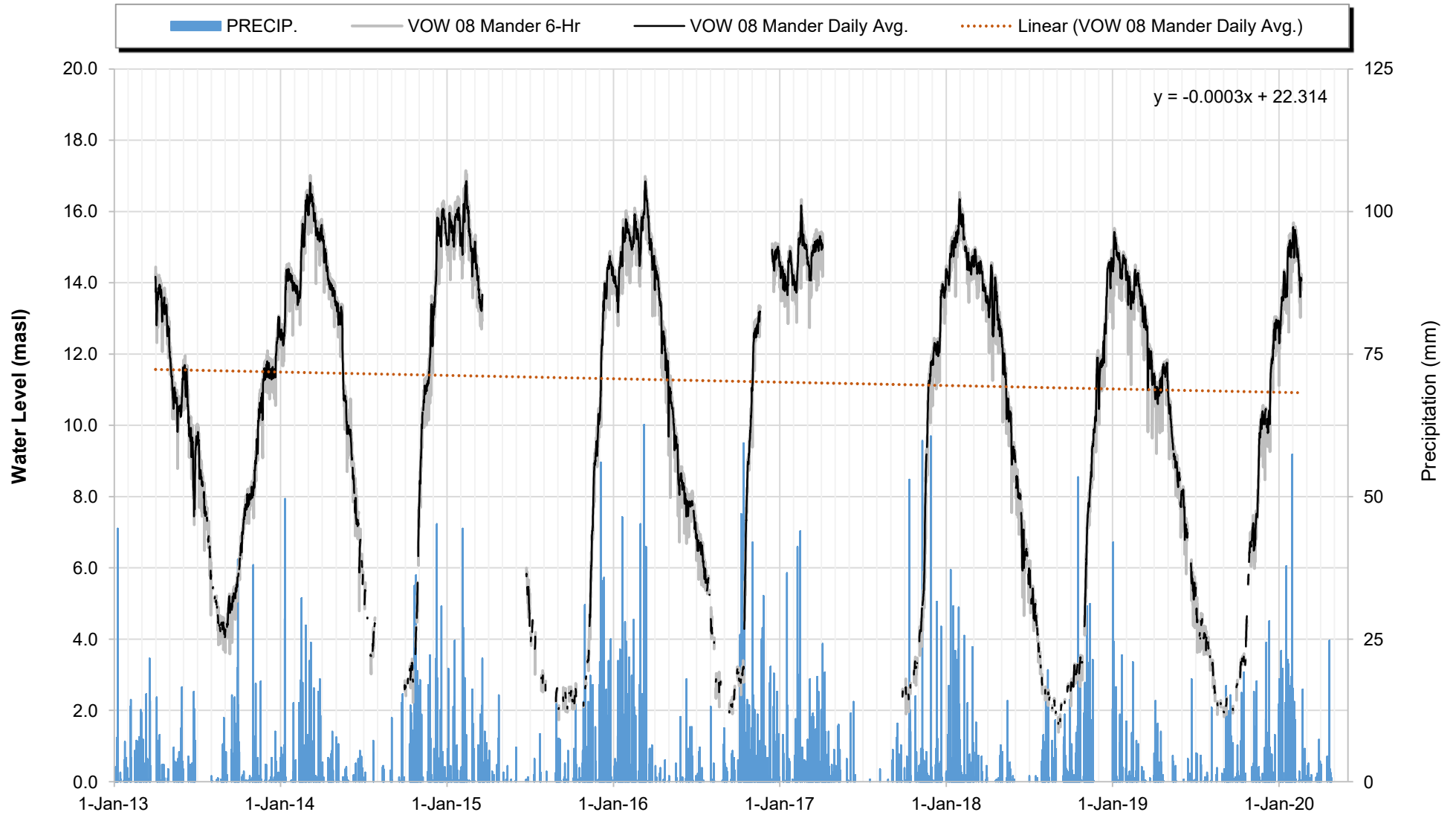
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 316 (WR7 - Gabriola)		FIGURE B-36
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 709
 Aquifer 709 is Fractured Bedrock

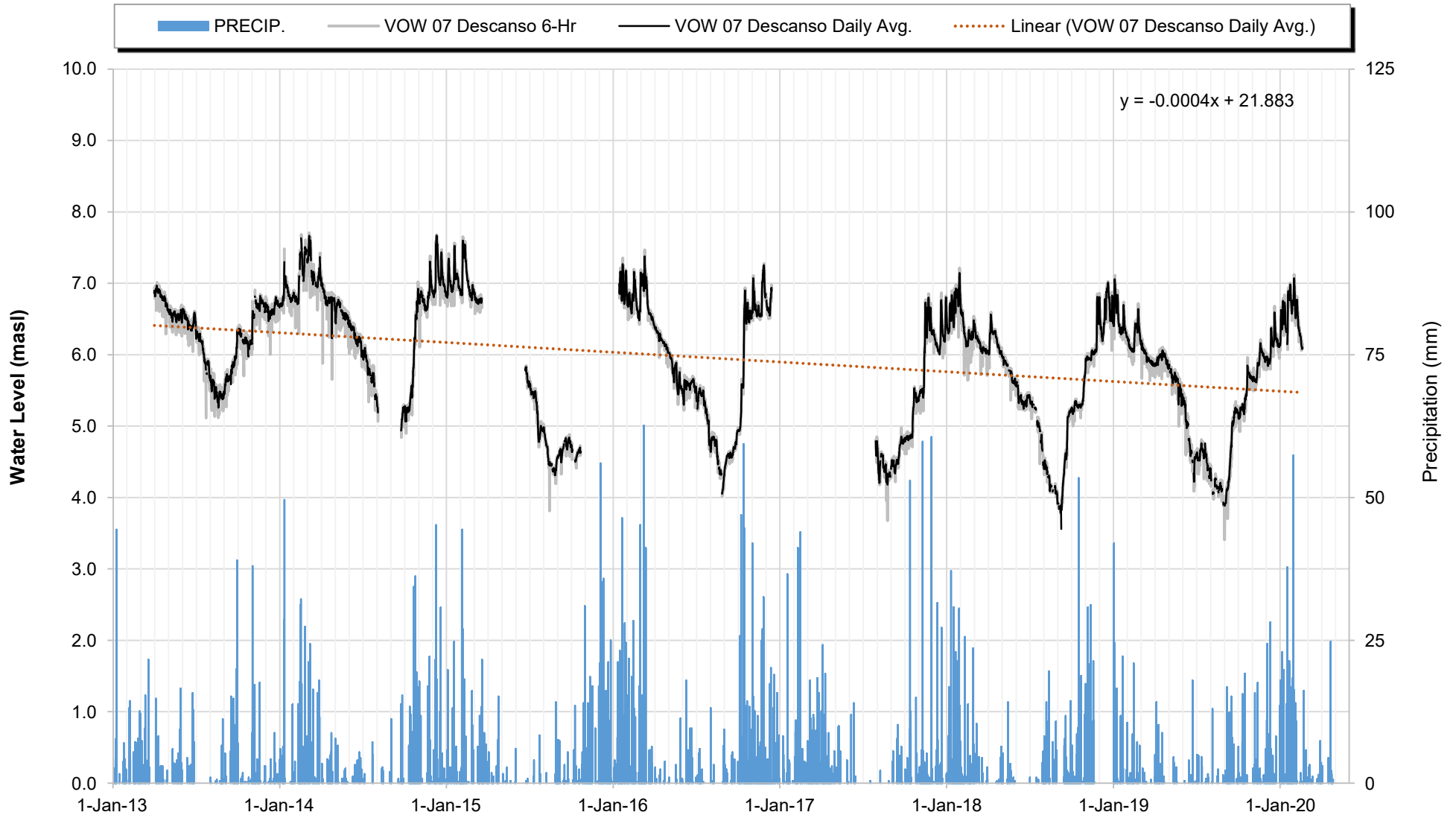
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 196 (WR7 - Gabriola)		FIGURE B-37
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 709
 Aquifer 709 is Fractured Bedrock

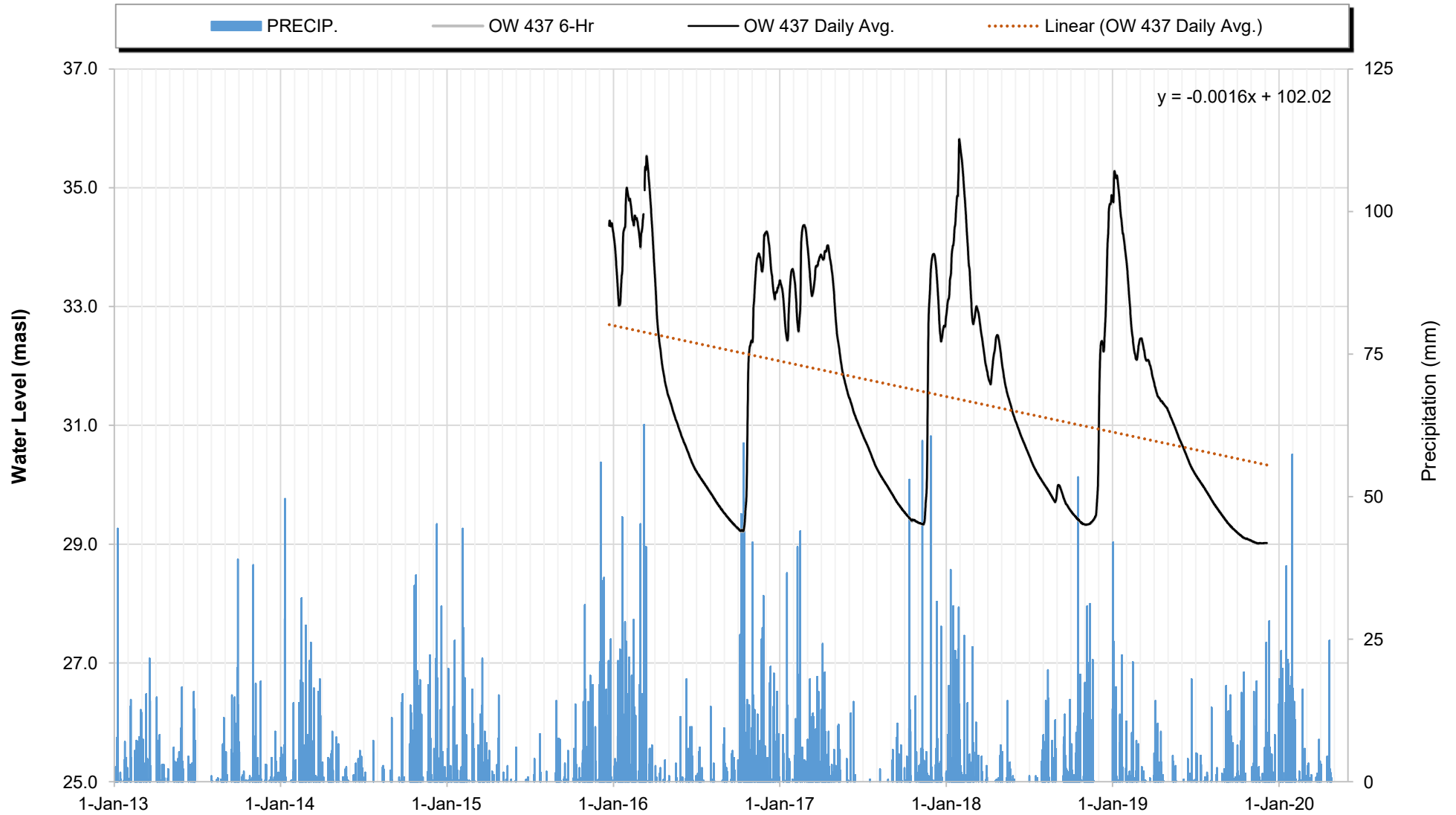
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW 08 - Mander (WR7 - Gabriola)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-38	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:


Observation Well is Associated with Aquifer 709
 Aquifer 709 is Fractured Bedrock

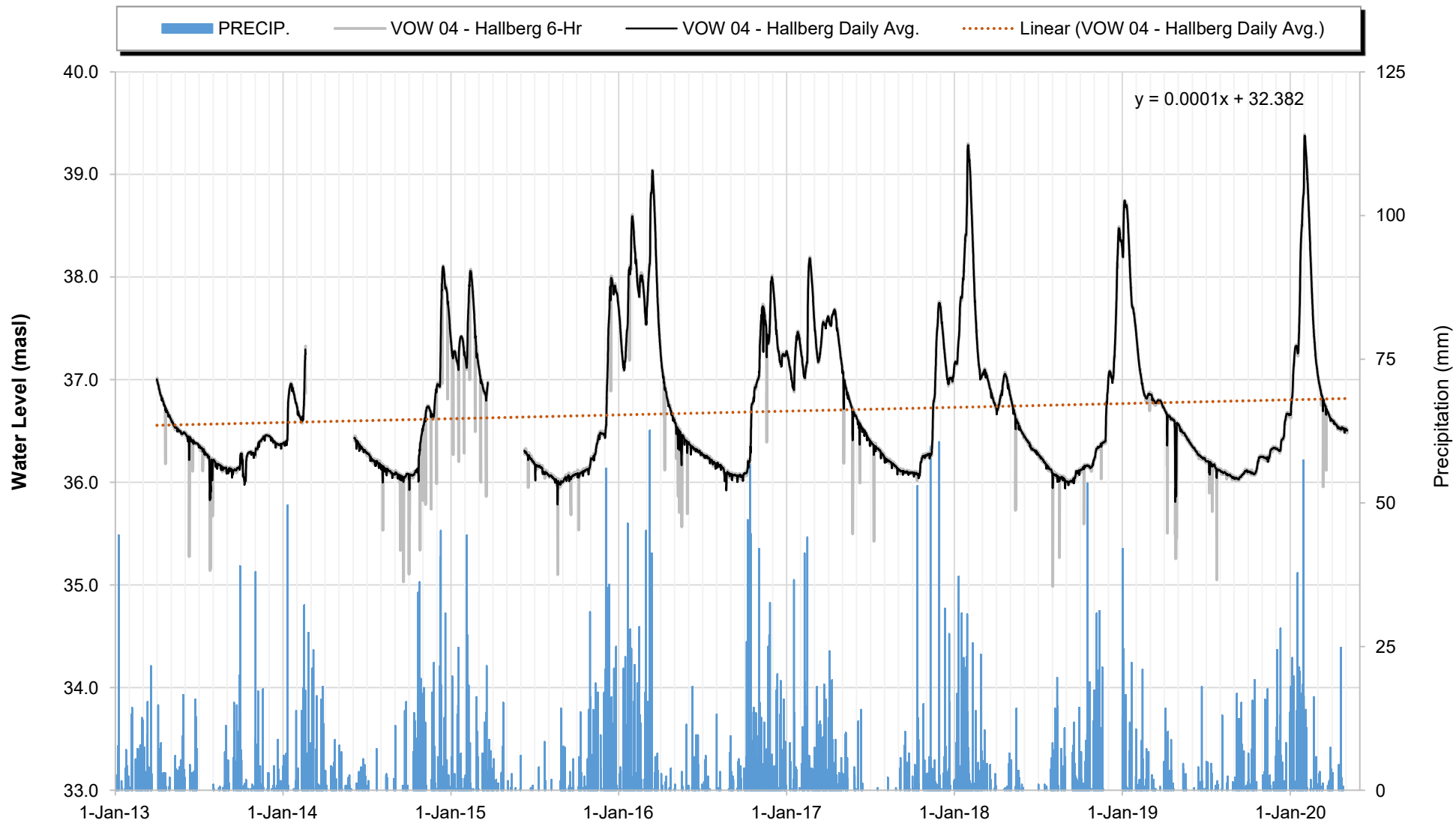
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 07 - Descanso (WR7 - Gabriola)		FIGURE B-39
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 160
 Aquifer 160 is Confined Surficial Sediments

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		HISTORICAL GROUNDWATER LEVEL CHART OW 437 (WR6 - Nanaimo River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-40
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 160

Aquifer 160 is Confined Surficial Sediments

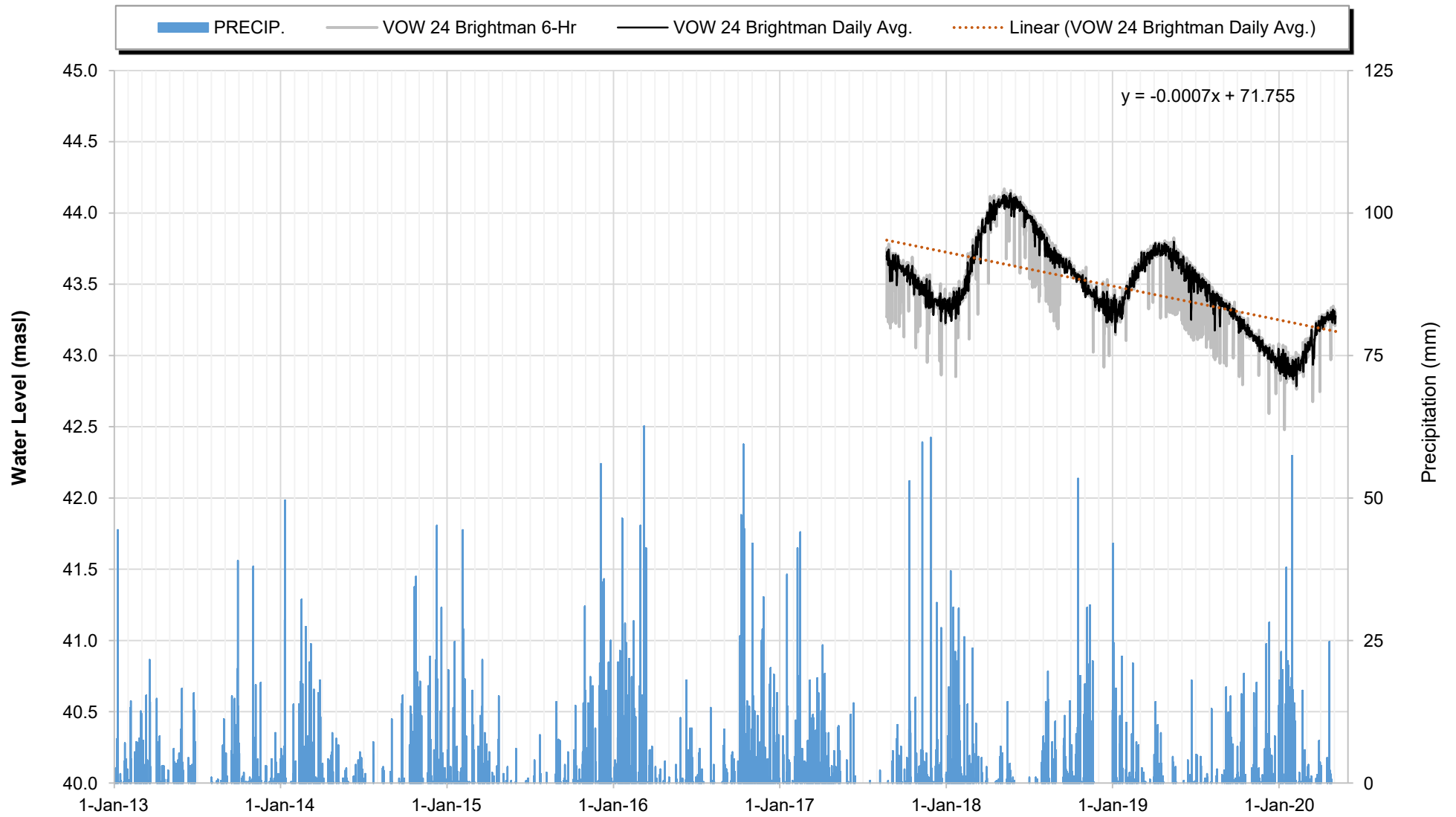
PROJECT
**DRINKING WATER AND WATERSHED PROTECTION -
 REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020**

TITLE
**HISTORICAL GROUNDWATER LEVEL CHART
 VOW 04 - Hallberg (WR6 - Nanaimo River)**



PREPARED BY: WATERLINE RESOURCES INC.
 PROJECT: 2590-20-001
 COMPILED BY: REW
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FIGURE B-41

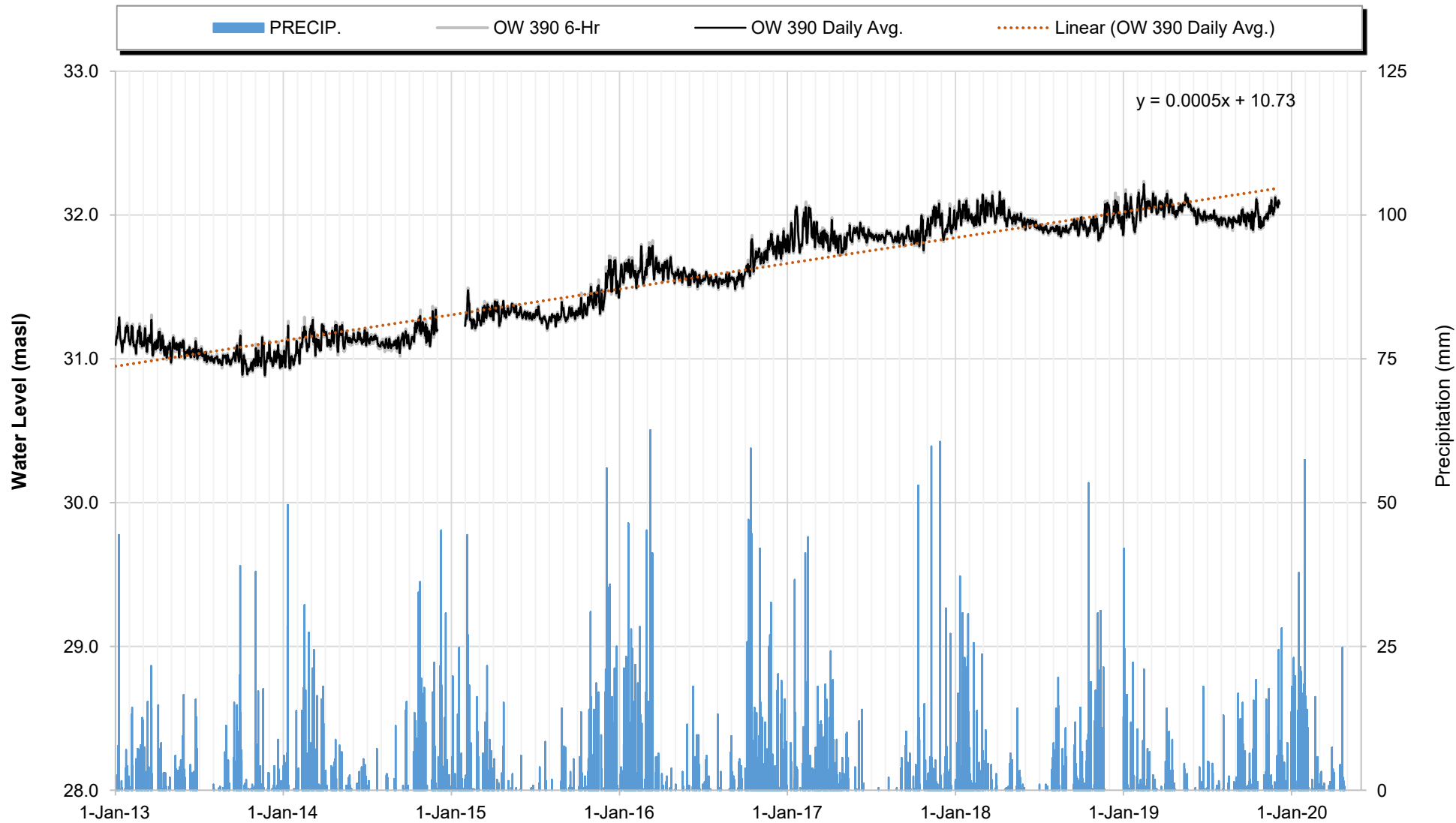


NOTES:

Observation Well is Associated with Aquifer 163


Aquifer 163 is Confined Surficial Sediments

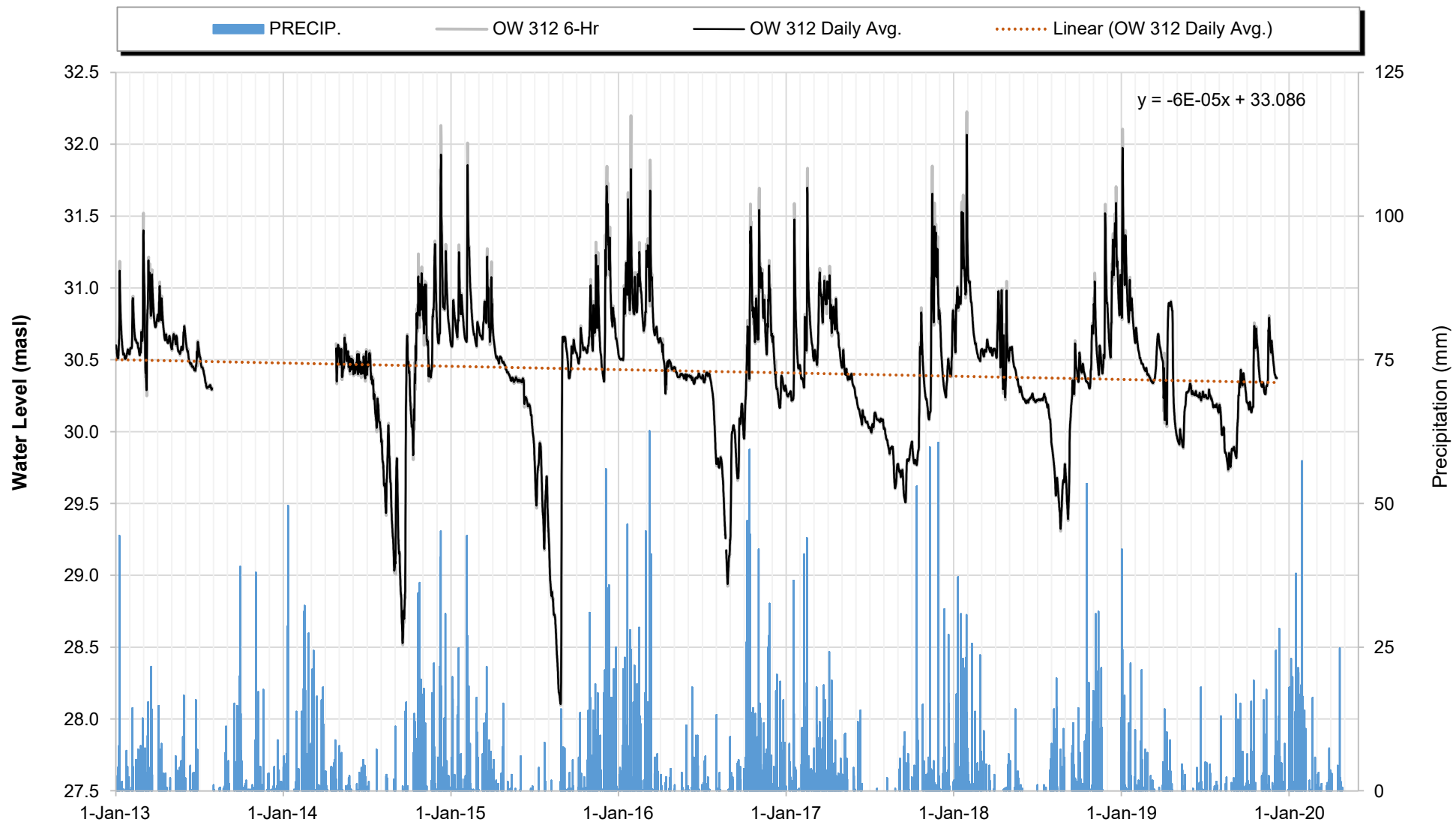
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 24 - Brightman (WR6 - Nanaimo River)		FIGURE B-42
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 163
 Aquifer 163 is Confined Surficial Sediments

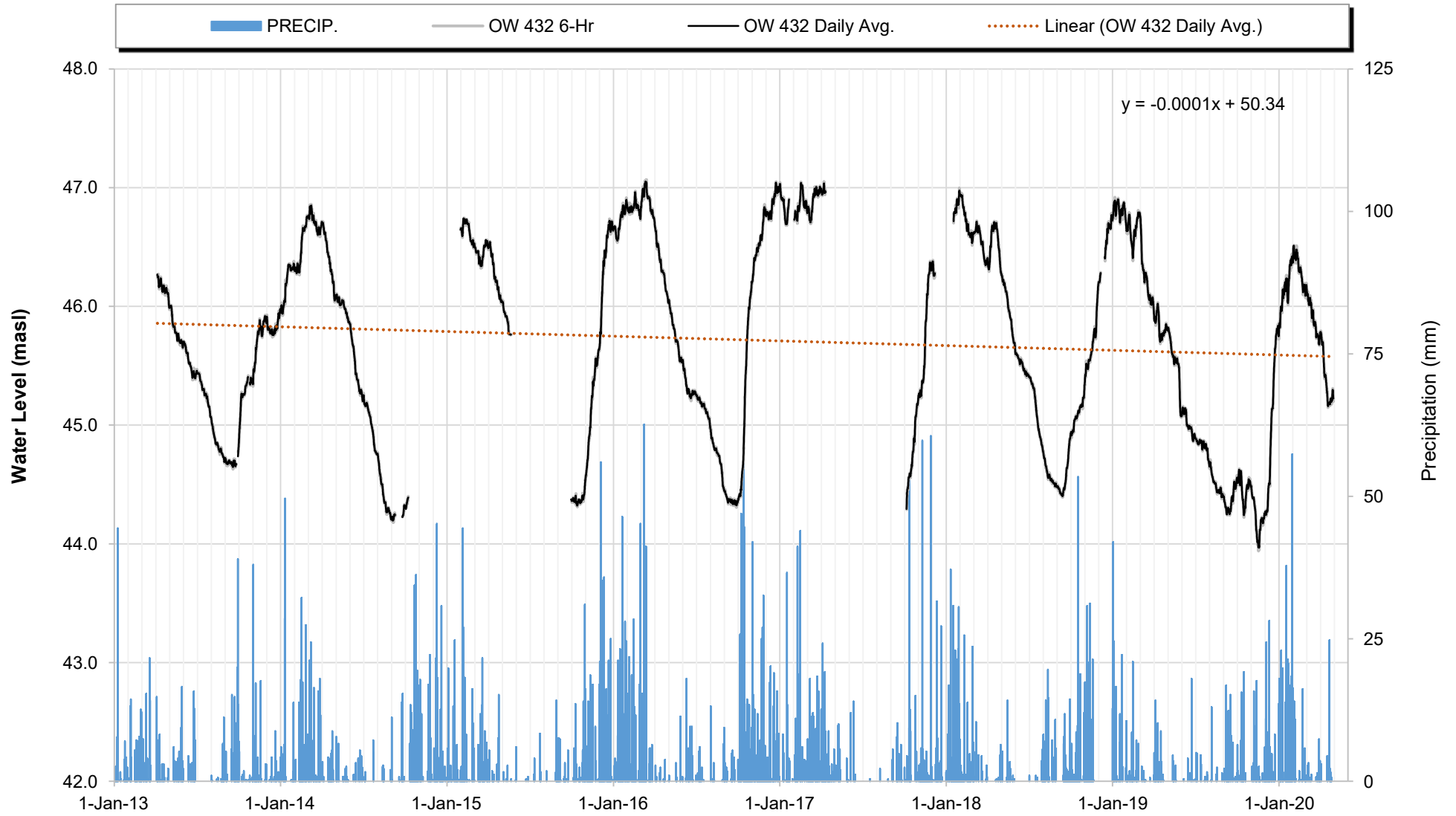
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 390 (WR6 - Nanaimo River)		FIGURE B-43
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 161
 Aquifer 161 is Unconfined Surficial Sediments

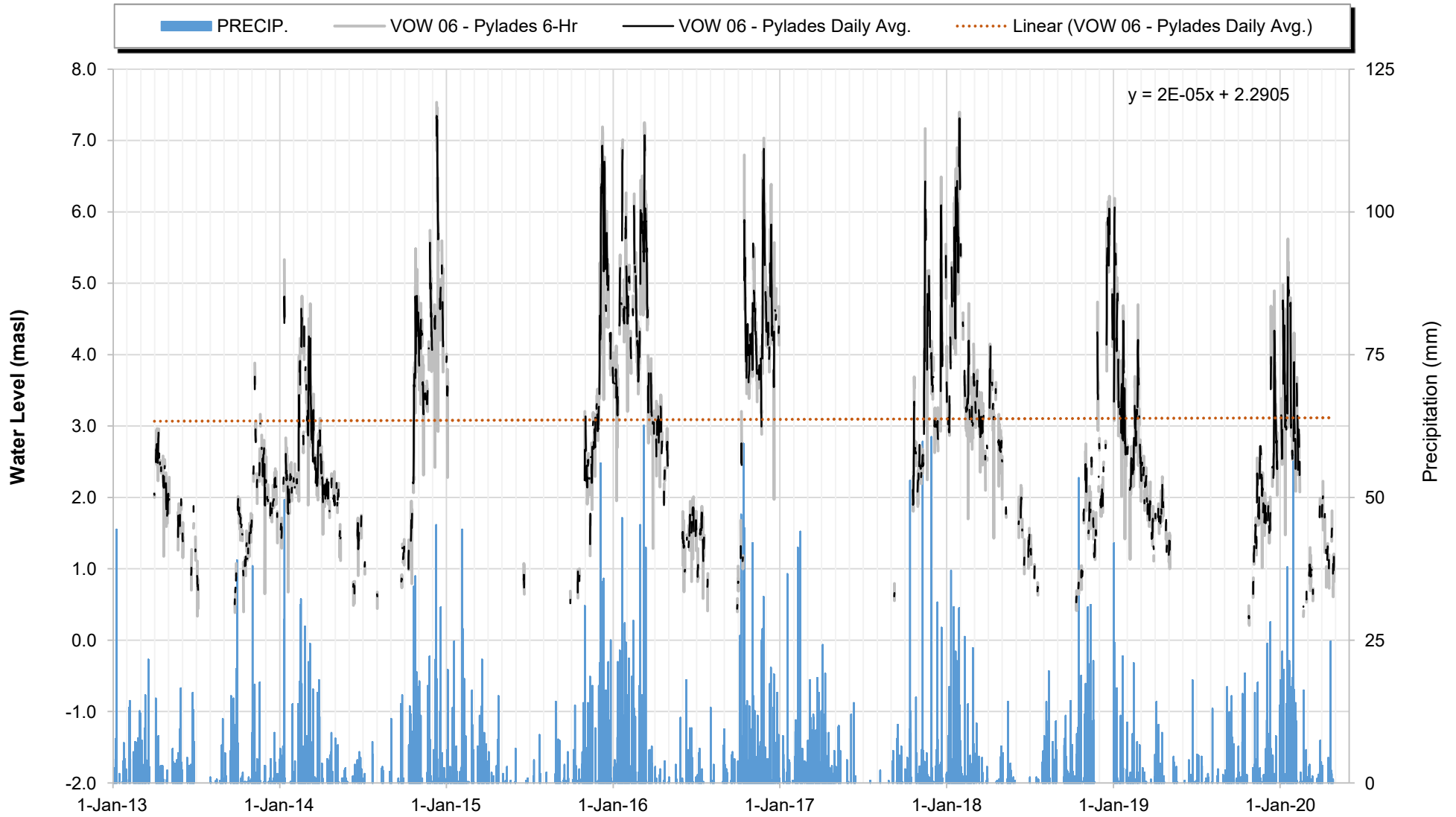
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 312 (WR6 - Nanaimo River)		FIGURE B-44
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock

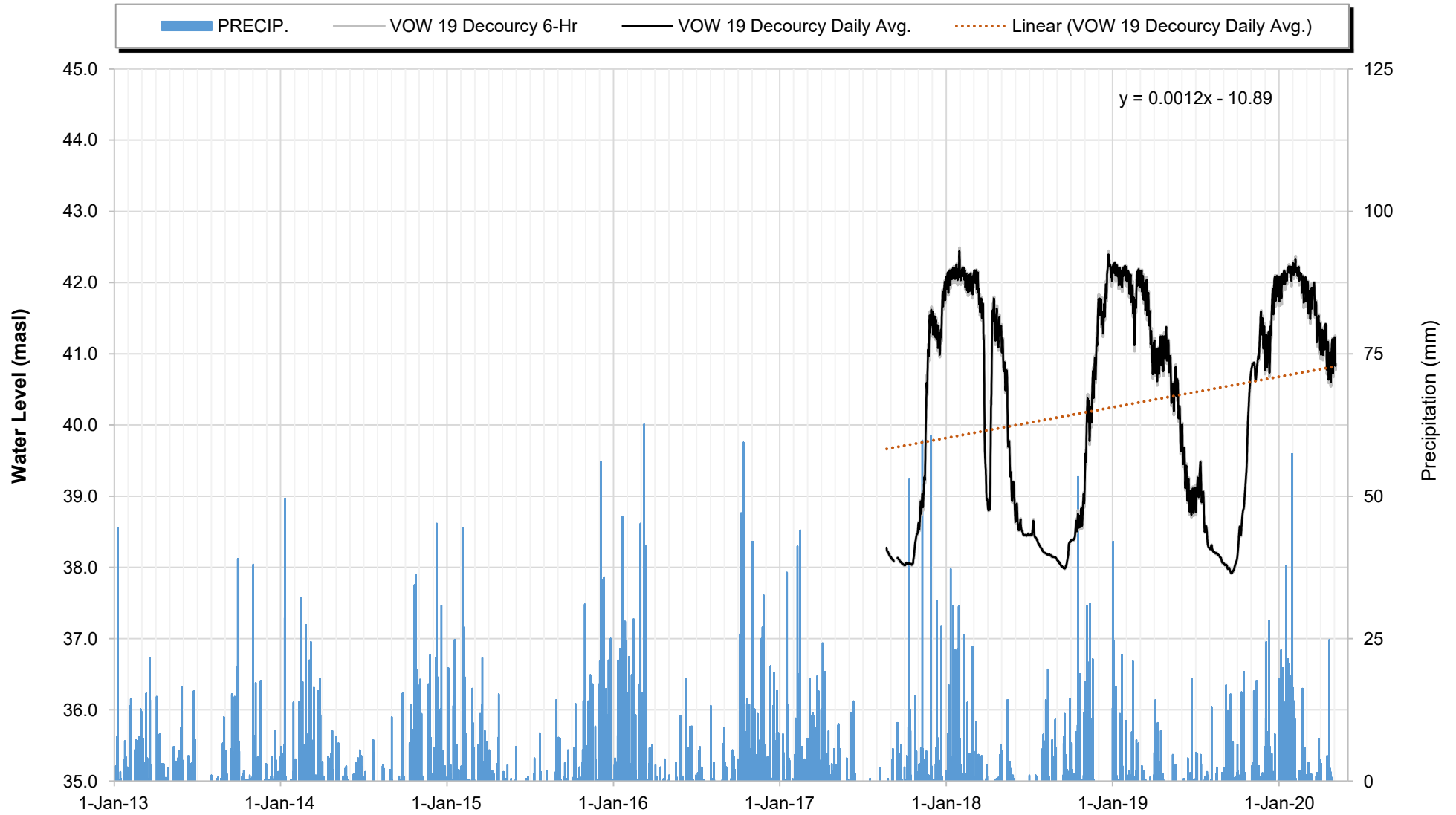
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 432 (WR6 - Nanaimo River)		FIGURE B-45
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock

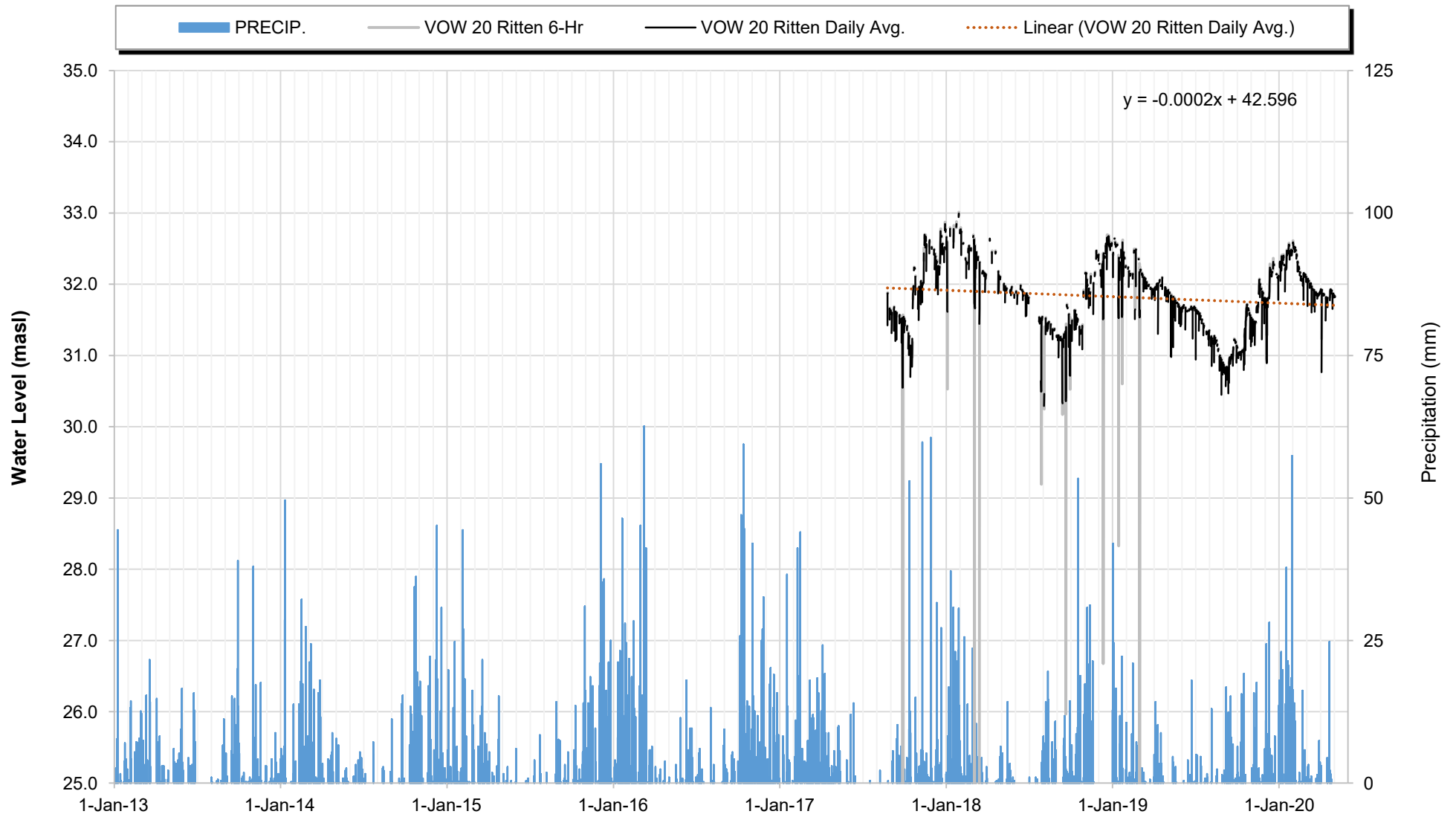
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 06 - Pylades (WR6 - Nanaimo River)		FIGURE B-46
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock

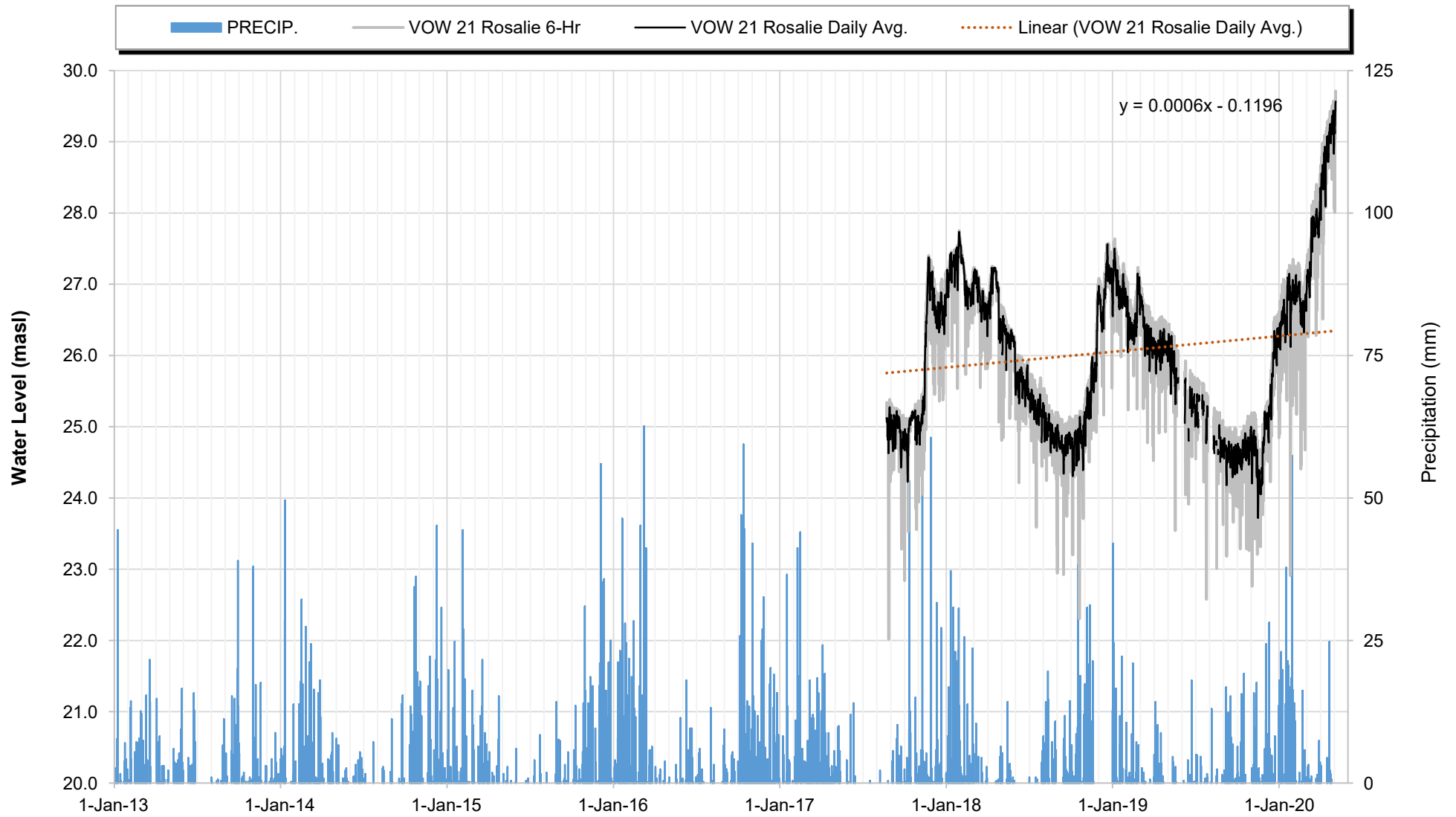
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW 19 - DeCourcy (WR6 - Nanaimo River)	
	PREPARED BY:	WATERLINE RESOURCES INC.	
	PROJECT:	2590-20-001	
	COMPILED BY:	REW	
	DATE ISSUED:	2020-05-25	
	REVISED:	FINAL	
			FIGURE B-47



NOTES:


Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock

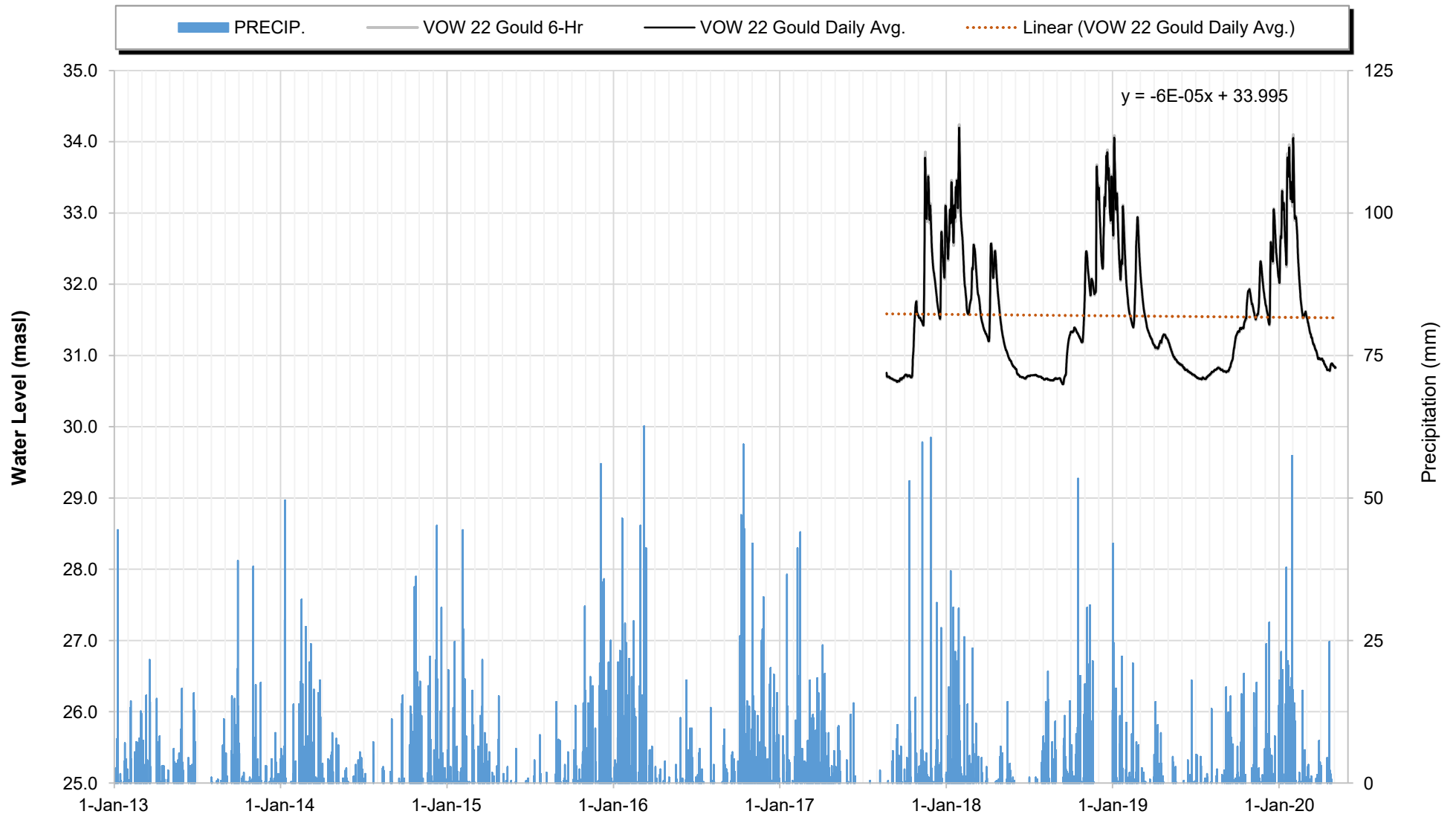
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 20 - Ritten (WR6 - Nanaimo River)		FIGURE B-48
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock

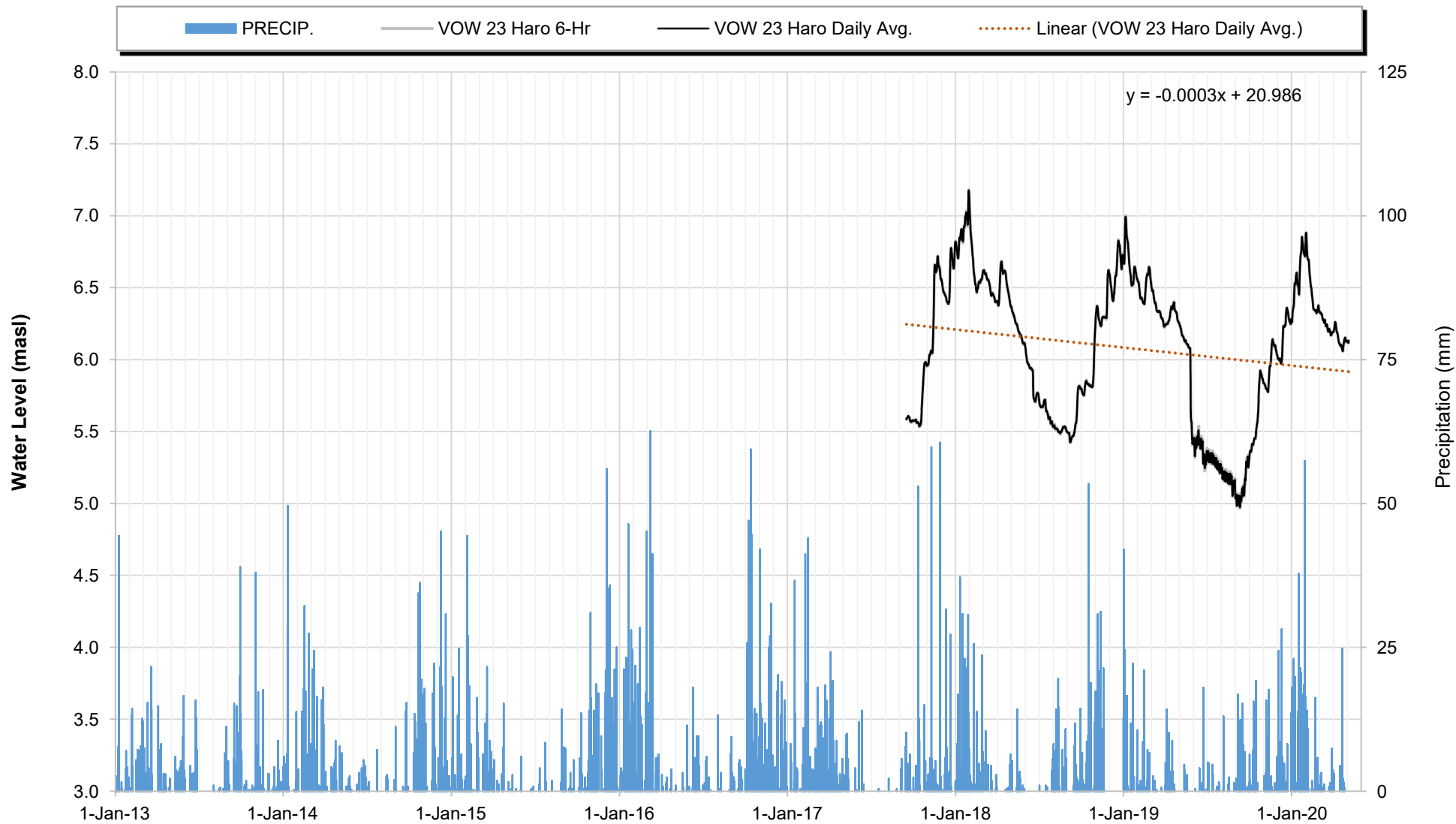
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW 21 - Rosalie (WR6 - Nanaimo River)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE B-49	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:


Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock

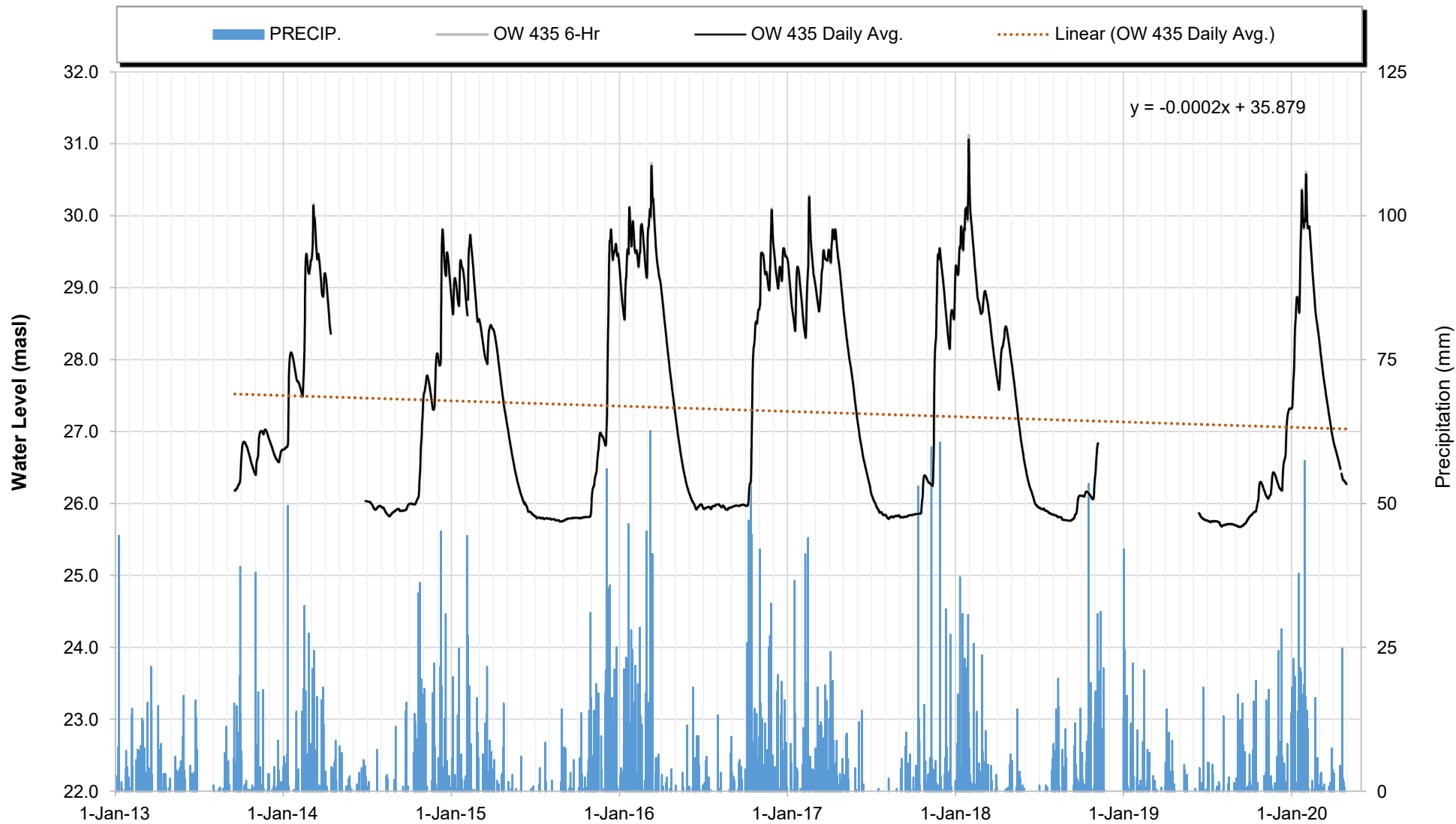
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		HISTORICAL GROUNDWATER LEVEL CHART VOW 22 - Gould (WR6 - Nanaimo River)	
	PREPARED BY:	WATERLINE RESOURCES INC.	
	PROJECT:	2590-20-001	
	COMPILED BY:	REW	
	DATE ISSUED:	2020-05-25	
	REVISED:	FINAL	
			FIGURE B-50



NOTES:


Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock

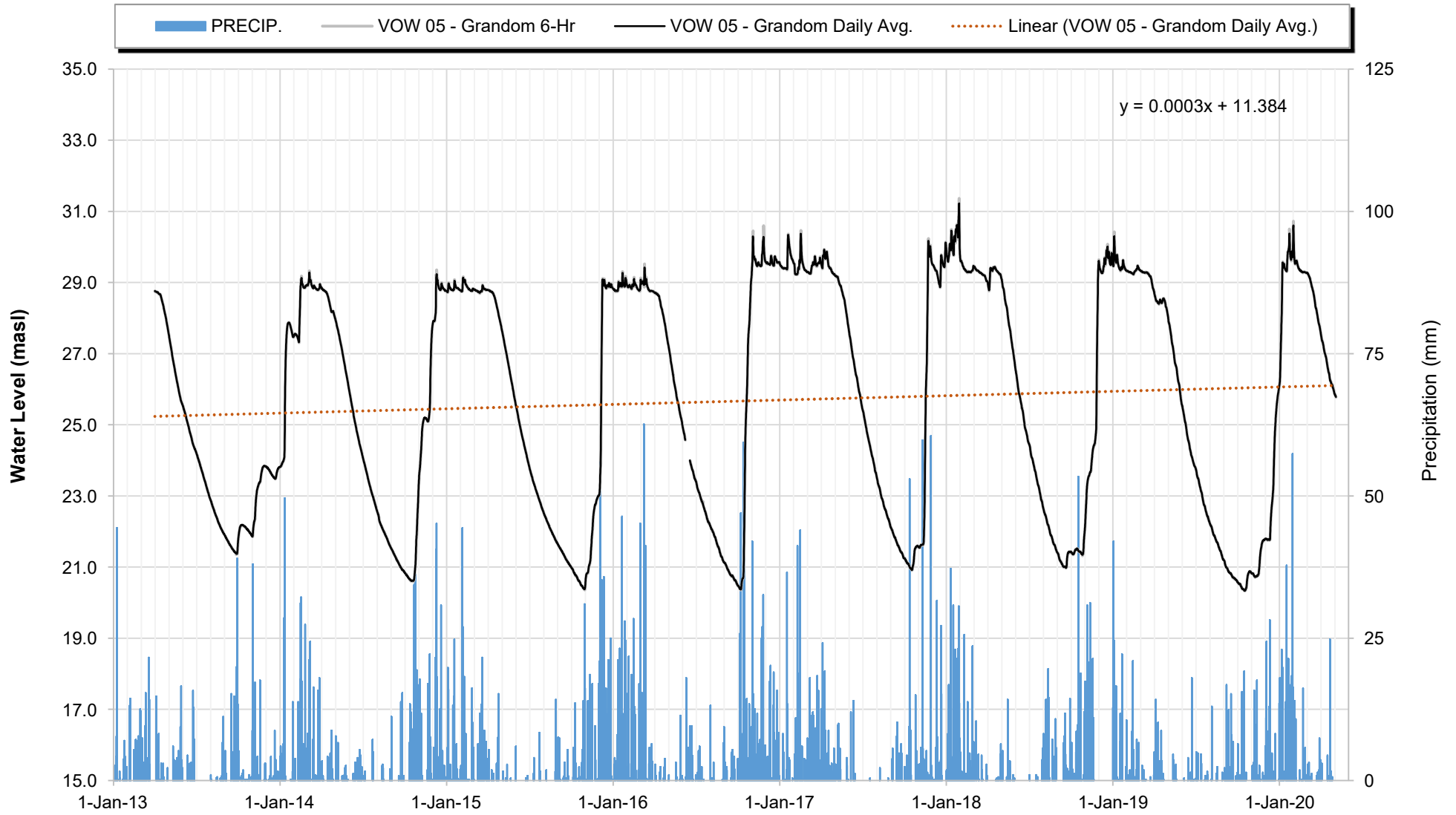
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART VOW 23 - Haro (WR6 - Nanaimo River)		FIGURE B-51
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well Associated with Aquifer 165
 Aquifer 165 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
HISTORICAL GROUNDWATER LEVEL CHART OW 435 (WR6 - Nanaimo River)		FIGURE B-52
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 165

Aquifer 165 is Fractured Bedrock

PROJECT		<p>DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020</p>
TITLE		
<p>HISTORICAL GROUNDWATER LEVEL CHART VOW 05 - Grandom (WR6 - Nanaimo River)</p>		<p>FIGURE B-53</p>
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

Appendix C – Seasonal Groundwater Level Charts

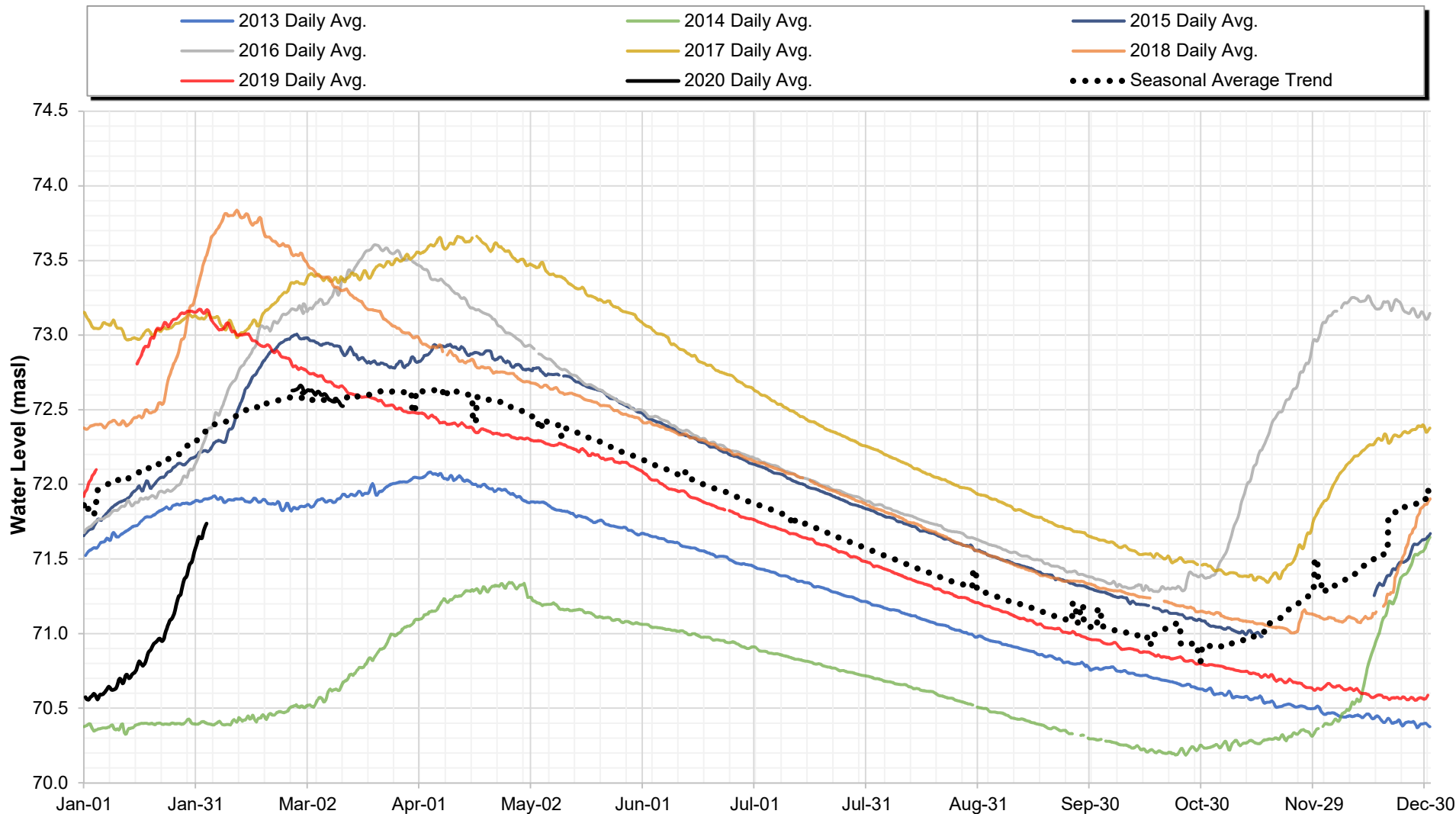


Table C1: Seasonal (Year-over-Year) Groundwater Trend Results for the VOWN and PGOWN

CHART ID	WATER REGION	OBS WELL NUMBER	AQUIFER	AQUIFER TYPE	TREND RESULTS
1	Big Qualicum	OW 310	416	Surficial	AVERAGE
2		OW 427	665	Surficial	-
3	Little Qualicum	OW391	662	Surficial	-
4		OW 426	662	Surficial	ABOVE
5		OW389	664	Surficial	BELOW
6	French Creek	OW 295	217	Surficial	AVERAGE
7		VOW 16	217	Surficial	BELOW
8		VOW 15	212	Bedrock	AVERAGE
9	Englishmen River	OW 314	216	Surficial	ABOVE
10		OW 424	216	Surficial	BELOW
11		VOW 14	216	Surficial	-
12		VOW 01	216	Surficial	ABOVE
13		OW 287	220	Bedrock	BELOW
14		VOW 18	220	Bedrock	AVERAGE
15	Nanoose and South Wellington	VOW 12	167	Surficial	BELOW
16		OW 388	211	Bedrock	BELOW
17		VOW 02	213	Bedrock	AVERAGE
18		VOW 03	213	Bedrock	ABOVE
19		VOW 13	213	Bedrock	BELOW
20		VOW B2	214	Bedrock	AVERAGE
21		VOW B3	214	Bedrock	ABOVE
22		VOW B4	214	Bedrock	AVERAGE
23		VOW B7	214	Bedrock	BELOW
24		VOW B9	214	Bedrock	AVERAGE
25		OW394	218	Bedrock	-
26		VOW 27	218	Bedrock	BELOW
27		VOW 26	218	Bedrock	AVERAGE
28		OW 232	215	Surficial	-
29		OW 340	215	Surficial	-
30		VOW 28	215	Surficial	BELOW
31		OW 393	219	Surficial	AVERAGE
32		OW 396	219	Surficial	BELOW
33		VOW 25	219	Surficial	ABOVE
34		OW 392	1098	Surficial	-
35	VOW 03	1098	Surficial	BELOW	
36	Gabriola	OW 316	709	Bedrock	BELOW
37		OW 196	709	Bedrock	-
38		VOW 08	709	Bedrock	AVERAGE
39		VOW 07	709	Bedrock	BELOW
40	Nanaimo River	OW 437	160	Surficial	-
41		VOW 04	160	Surficial	BELOW
42		VOW 24	163	Surficial	BELOW
43		OW 390	163	Surficial	-
44		OW 312	161	Surficial	-
45		OW 432	162	Bedrock	BELOW
46		VOW 06	162	Bedrock	BELOW
47		VOW 19	162	Bedrock	AVERAGE
48		VOW 20	162	Bedrock	AVERAGE
49		VOW 21	162	Bedrock	ABOVE
50		VOW 22	162	Bedrock	BELOW
51		VOW 23	162	Bedrock	BELOW
52		OW 435	165	Bedrock	BELOW
53		VOW 05	165	Bedrock	BELOW


Notes:

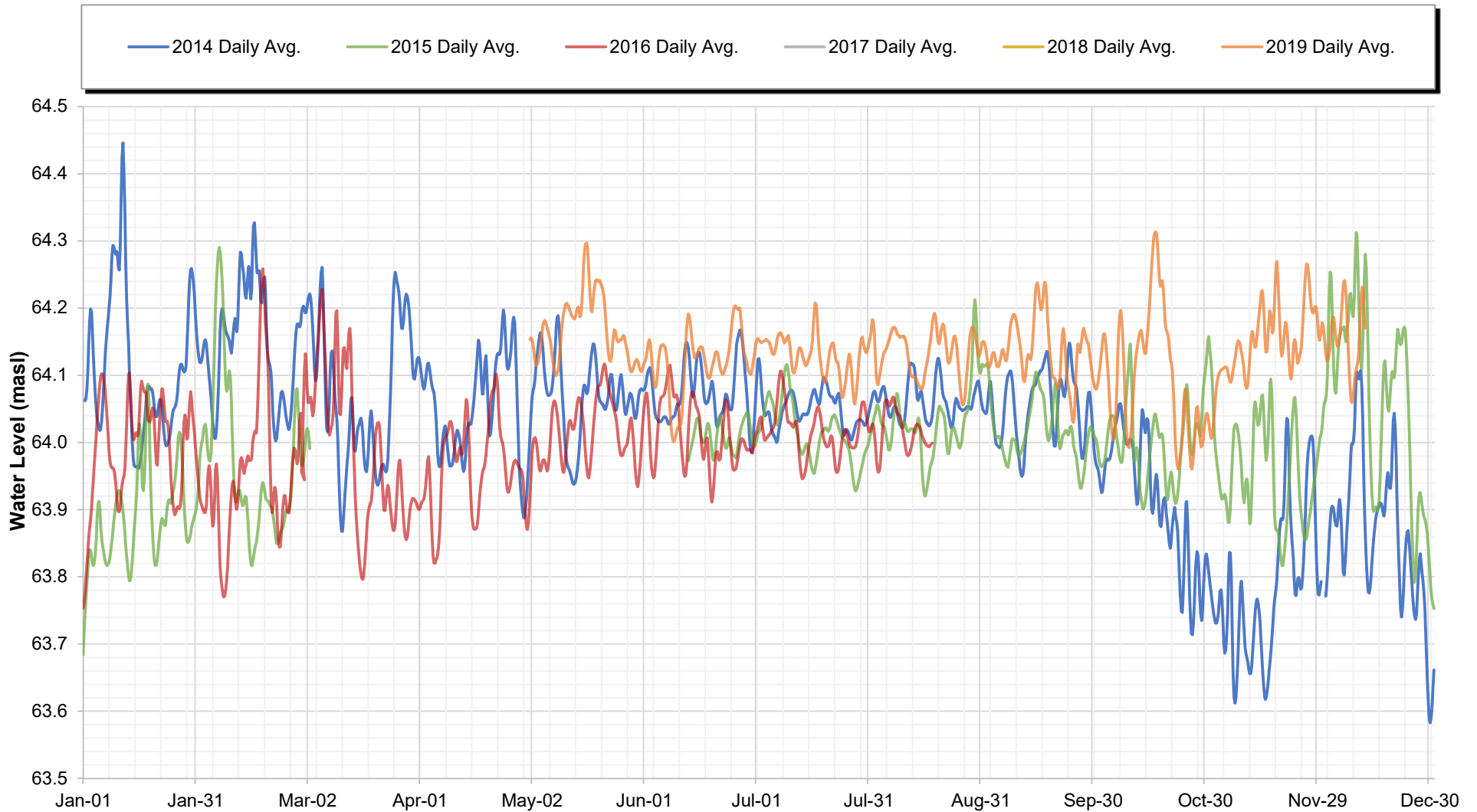
- No Data Available
- Wells associated with the PGOWN
- Wells associated with the VOWN



NOTES:

Observation Well is Associated with Aquifer 414
 Aquifer 414 is Confined Surficial Sediments

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART OW 310 (WR1 - Big Qaulicum)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-1
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




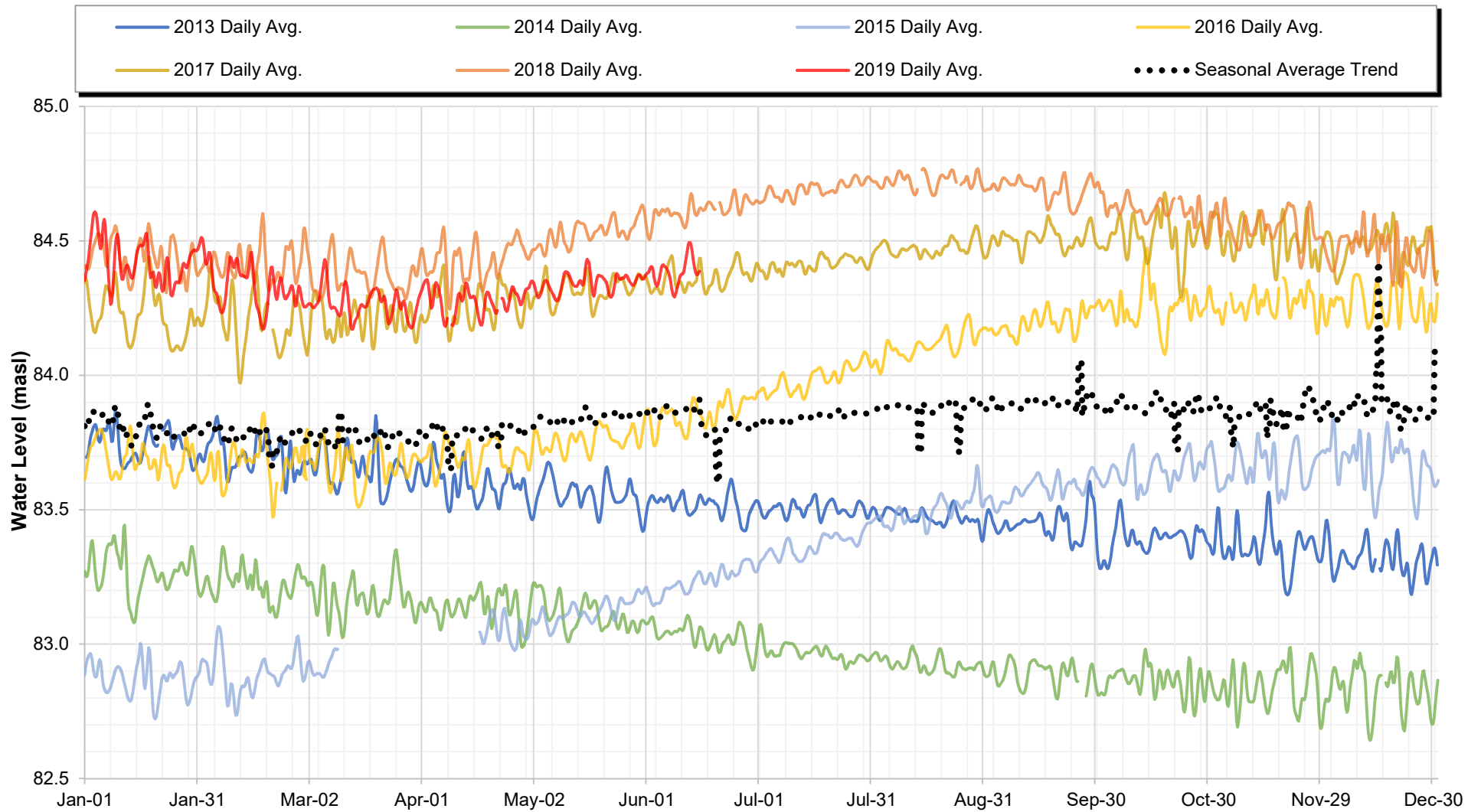
NOTES:

Observation Well is Associated with Aquifer 665

Aquifer 665 is Unconfined Surficial Sediments


No Seasonal Average Trend Presented due to Irregular Data Gaps. No 2020 Groundwater Level Data Available

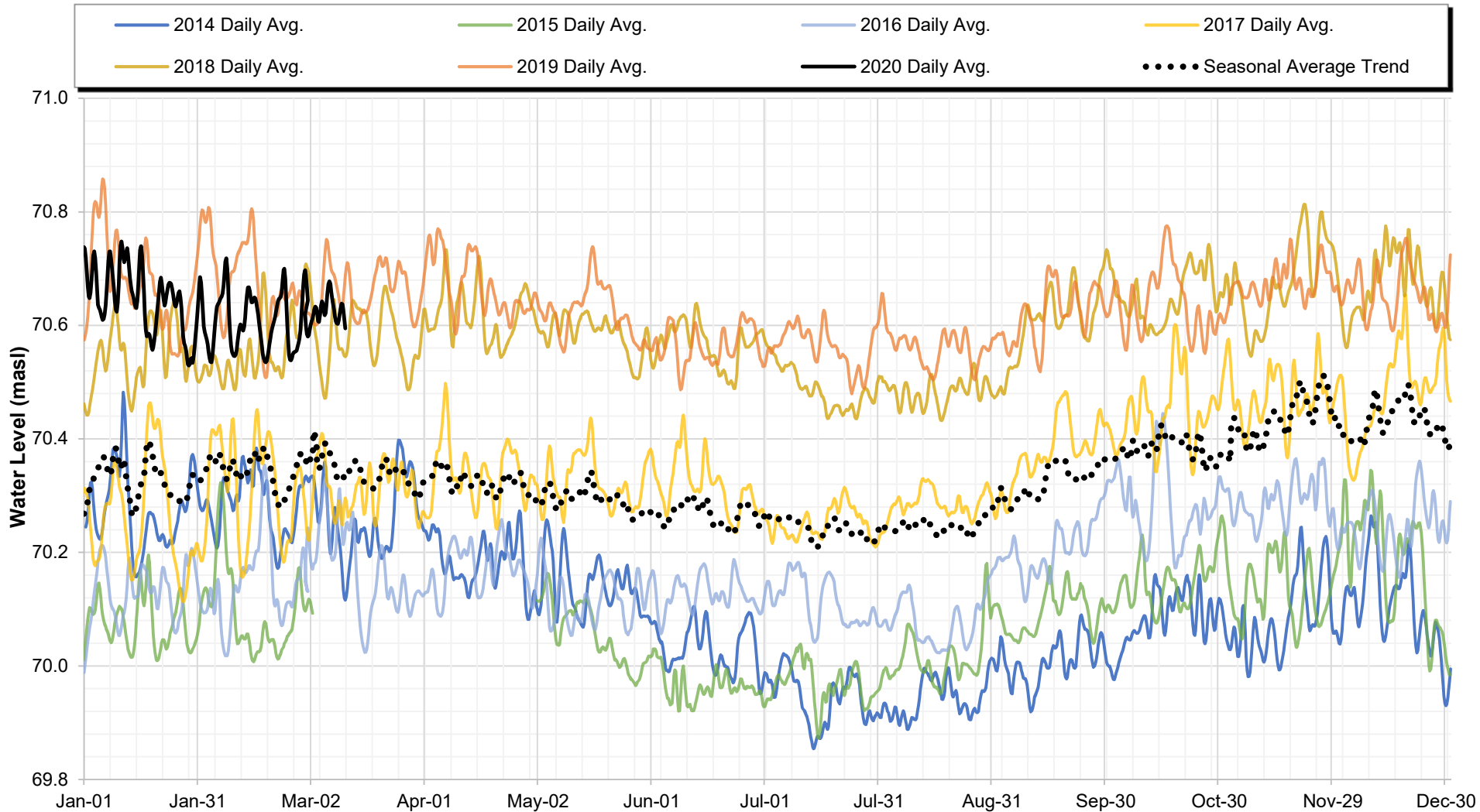
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART OW 427 (WR1 - Big Qaulicum)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-2
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 662
 Aquifer 662 is Confined Surficial Sediments
 No 2020 Groundwater Level Data Available

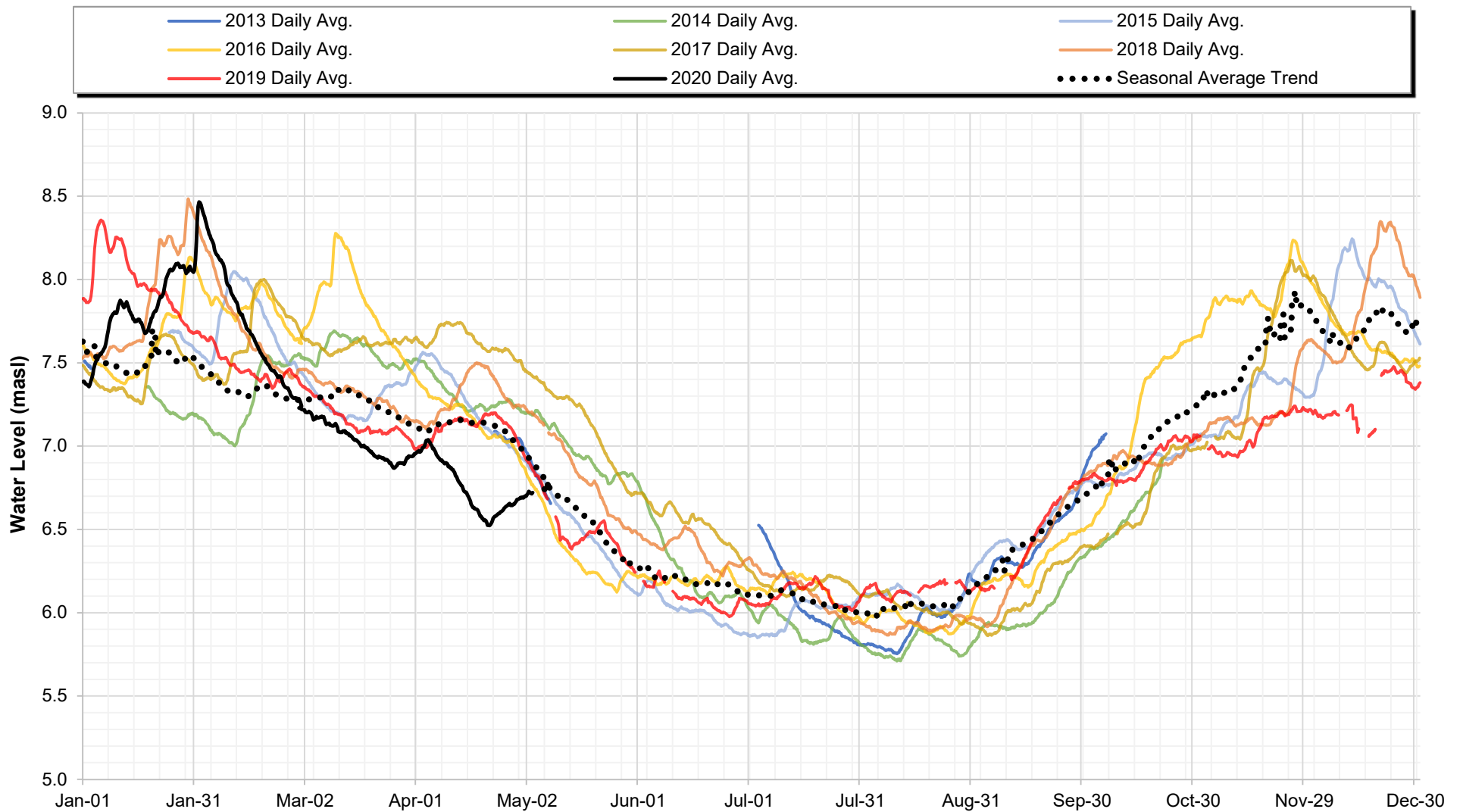
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART OW 391 (WR2 - Little Qaulicum)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-3
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 662
 Aquifer 662 is Confined Surficial Sediments

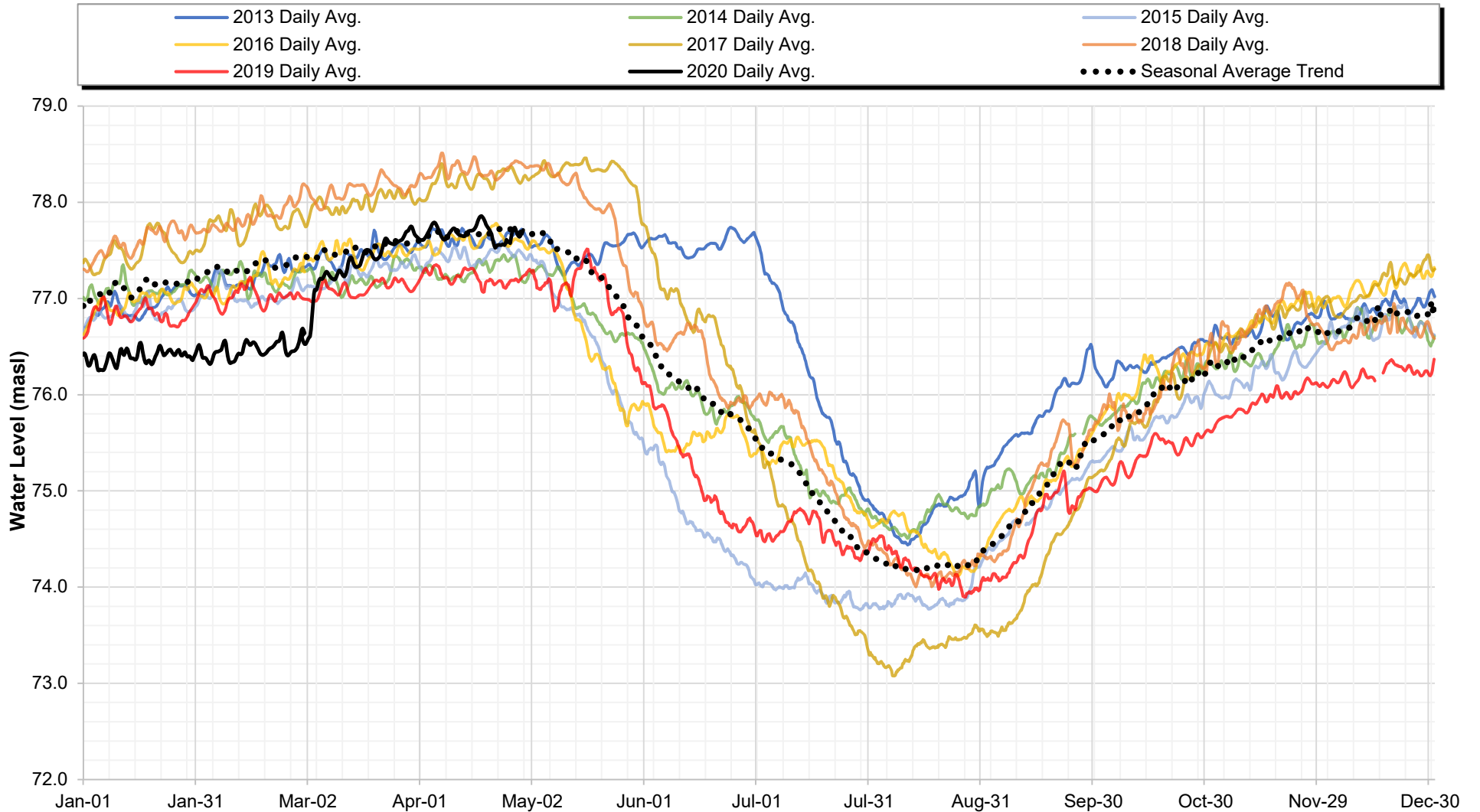
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART OW 426 (WR2 - Little Qaulicum)		FIGURE C-4
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 664
 Aquifer 664 is Unconfined Surficial Sediments

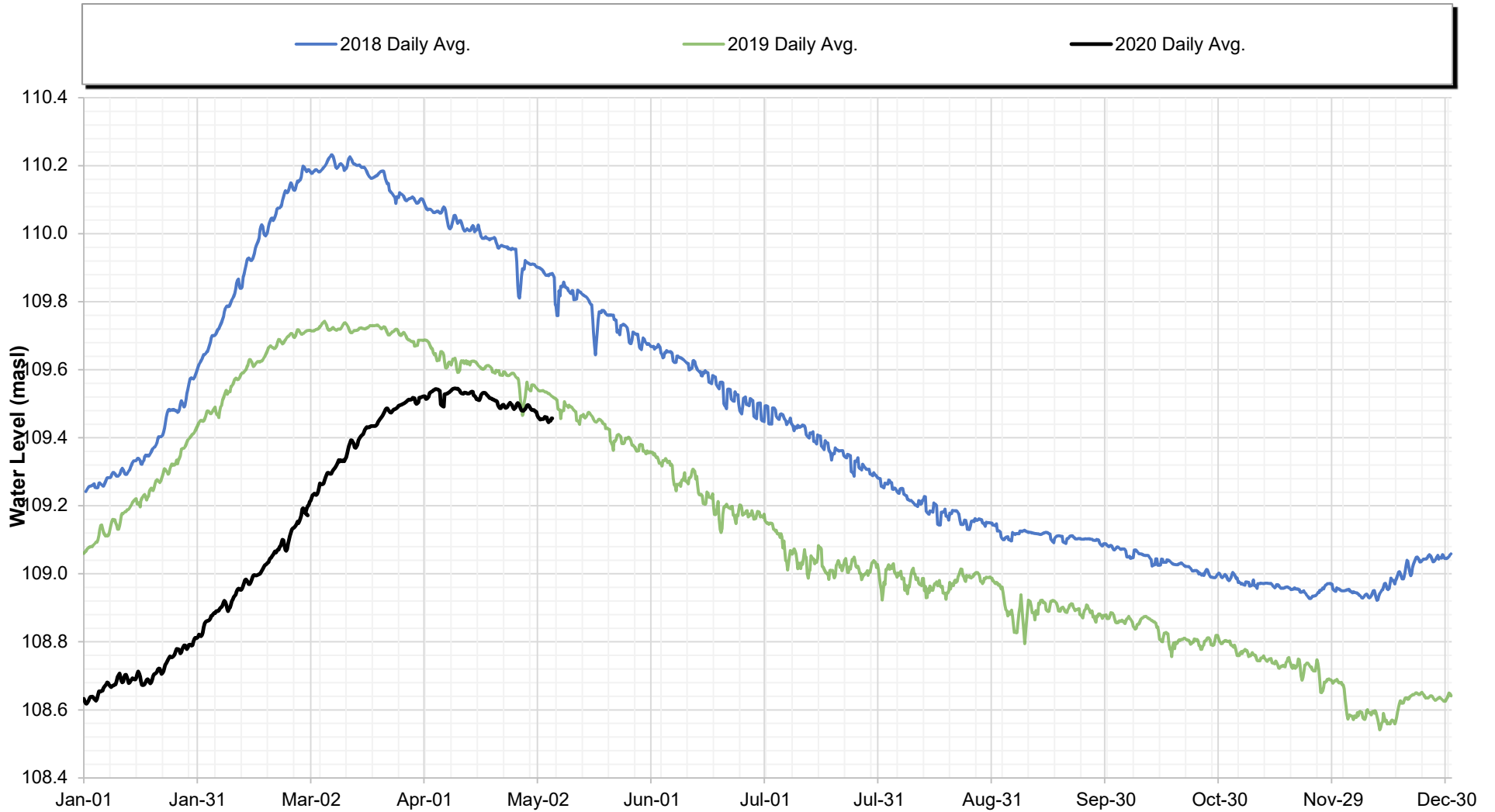
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART OW 389 (WR2 - Little Qaulicum)		FIGURE C-5
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 217
 Aquifer 217 is Confined Surficial Sediments

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		SEASONAL GROUNDWATER LEVEL CHART OW 295 (WR3 - French Creek)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-6	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25 REVISED: FINAL		




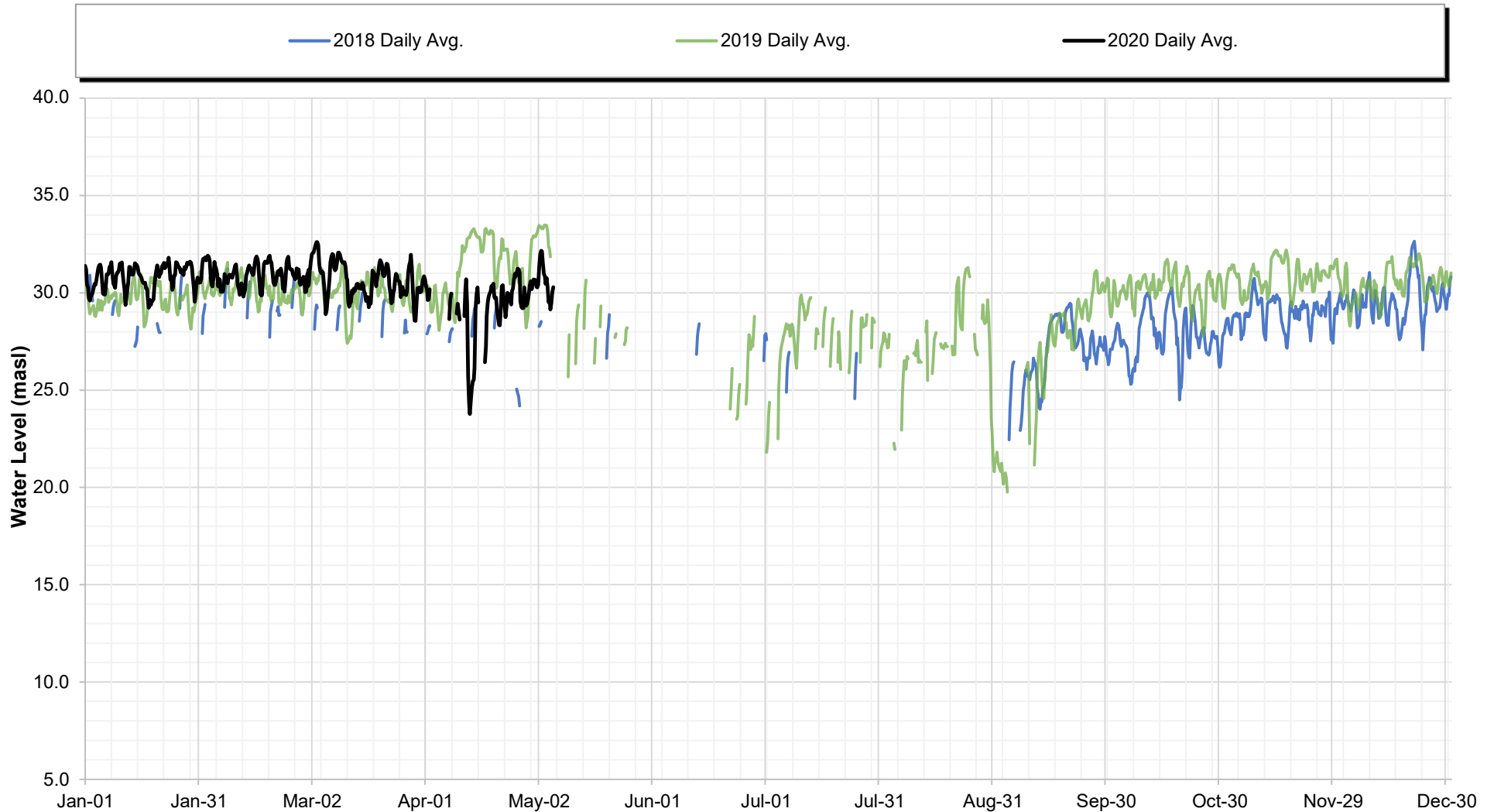
NOTES:

Observation Well is Associated with Aquifer 217

Aquifer 217 is Confined Surficial Sediments

No Seasonal Average Trend Provided if <3 -years of Data Compiled

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 16 - Rinvoid (WR3 - French Creek)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-7
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




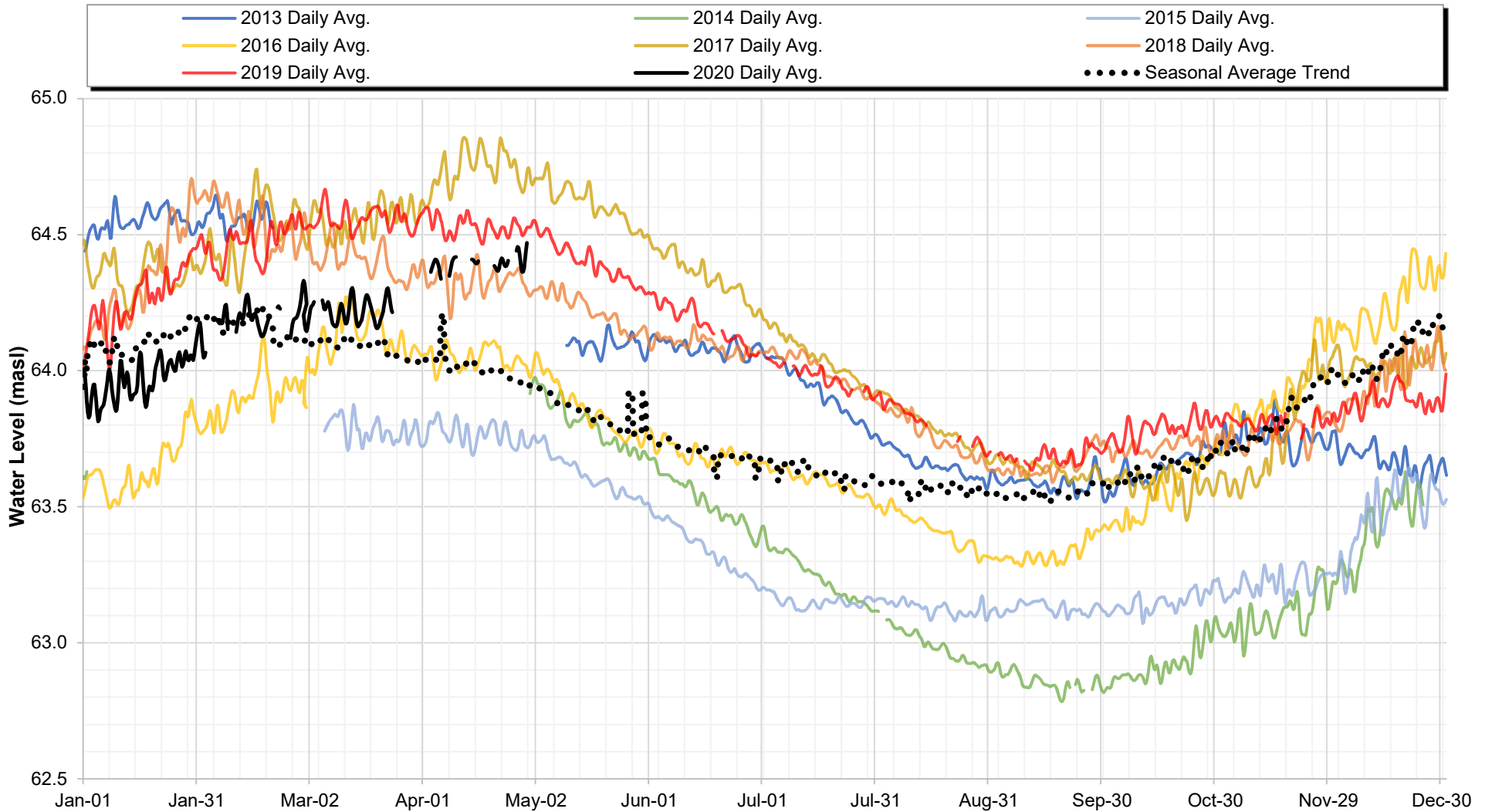
NOTES:

Observation Well is Associated with Aquifer 212

Aquifer 212 is Fractured Bedrock

No Seasonal Average Trend Provided if <3 -years of Data Compiled


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 15 - Lowrys (WR3 - French Creek)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-8
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

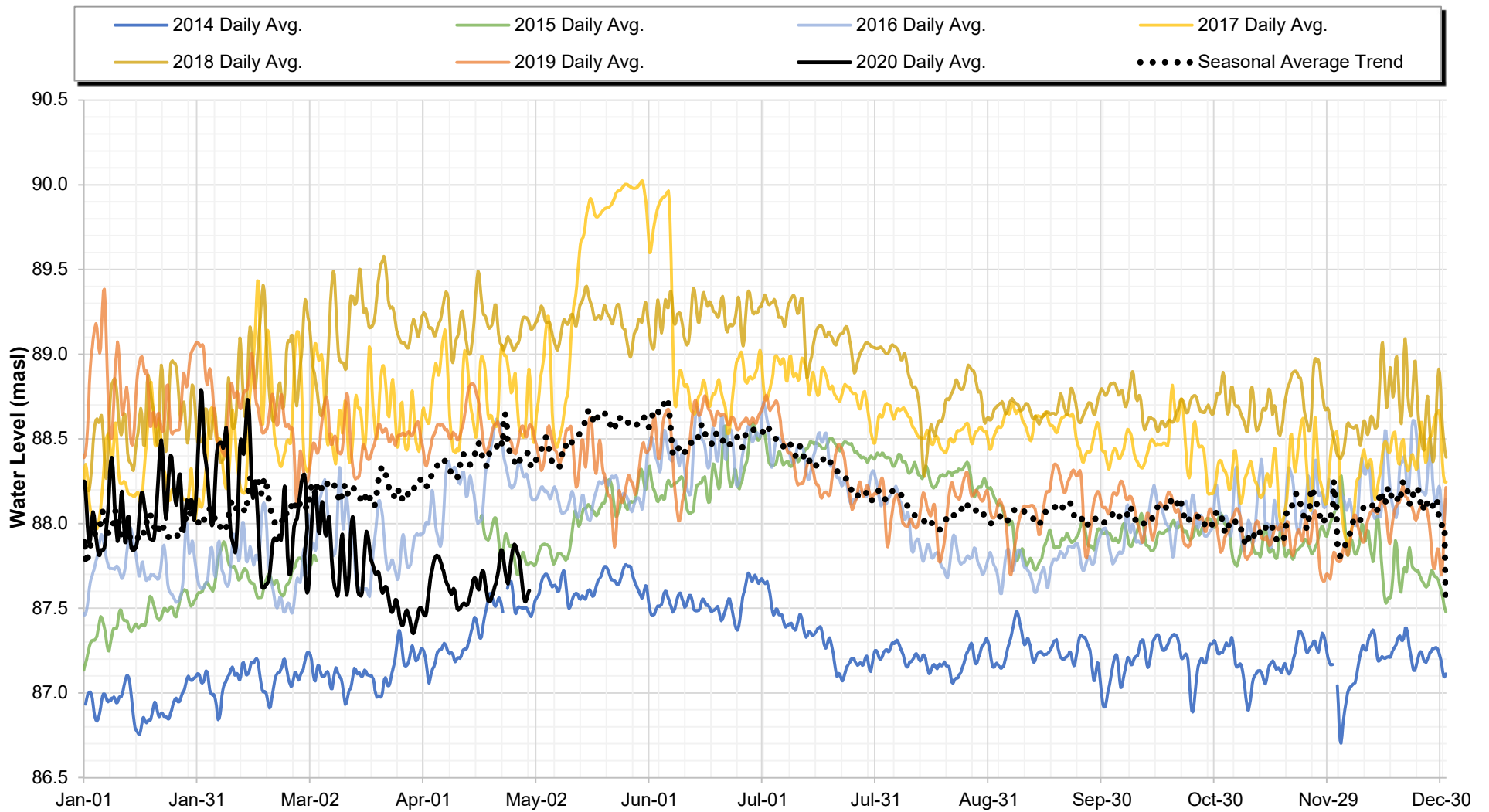


NOTES:

Observation Well is Associated with Aquifer 216


Aquifer 216 is Confined Surficial Sediments

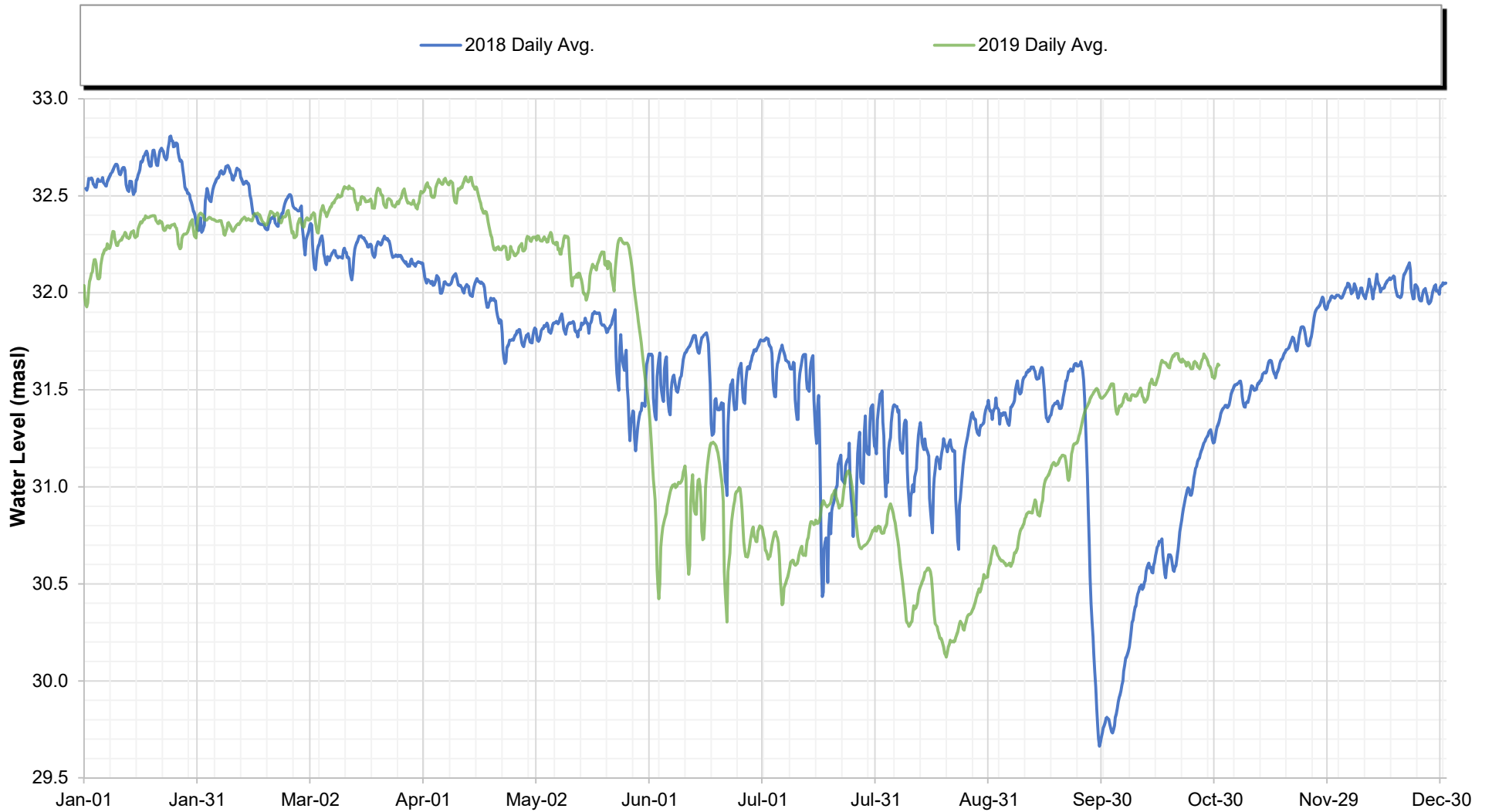
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART OW 314 (WR4 - Englishman River)		FIGURE C-9
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 216
 Aquifer 216 is Confined Surficial Sediments

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART OW 424 (WR4 - Englishman River)		FIGURE C-10
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




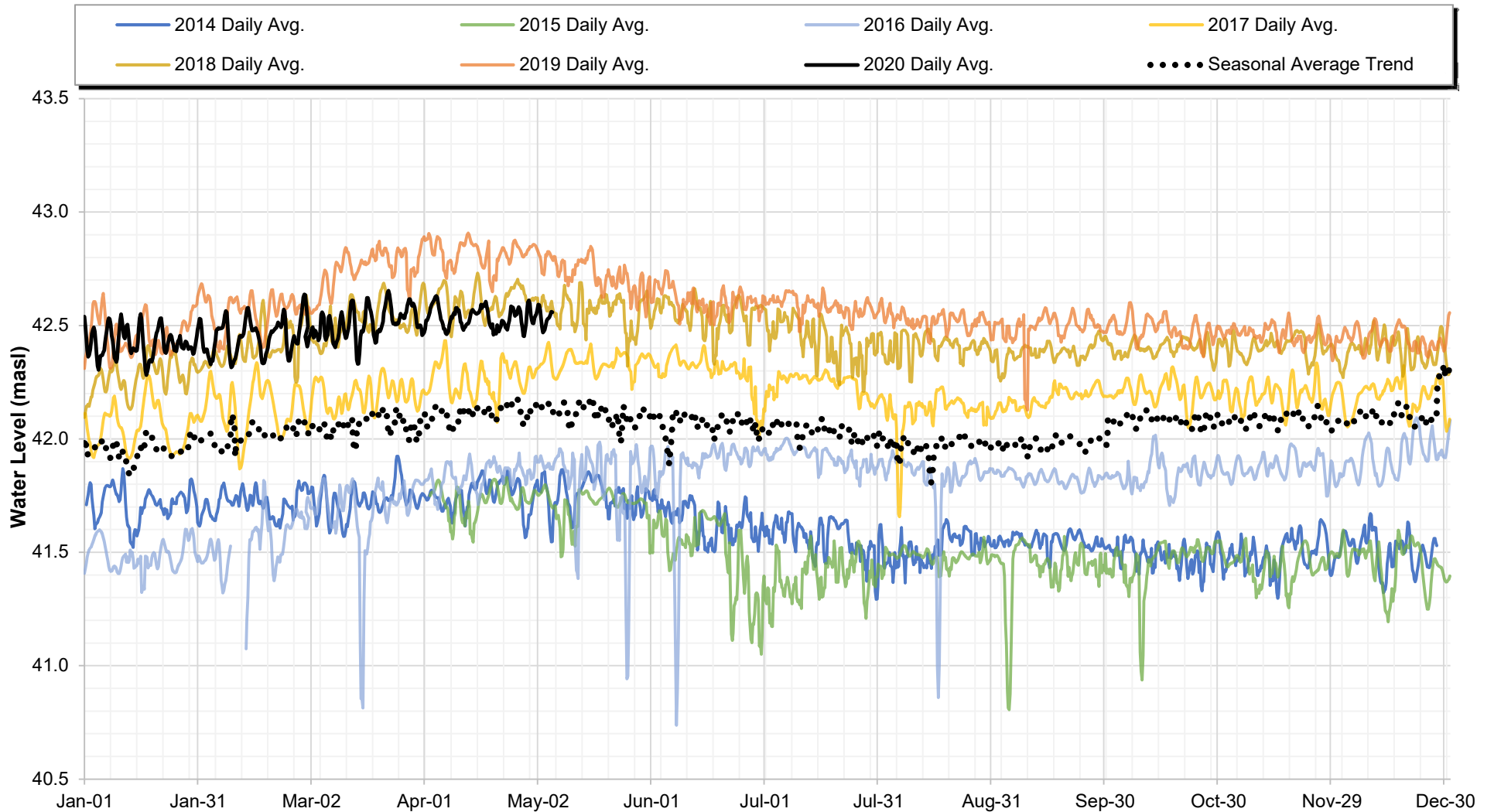
NOTES:

Observation Well is Associated with Aquifer 216

Aquifer 216 is Confined Surficial Sediments

No Seasonal Average Trend Provided if <3 -years of Data Compiled. No 2020 Groundwater Level Data Available


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 14 - Hodges (WR4 - Englishman River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-11
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

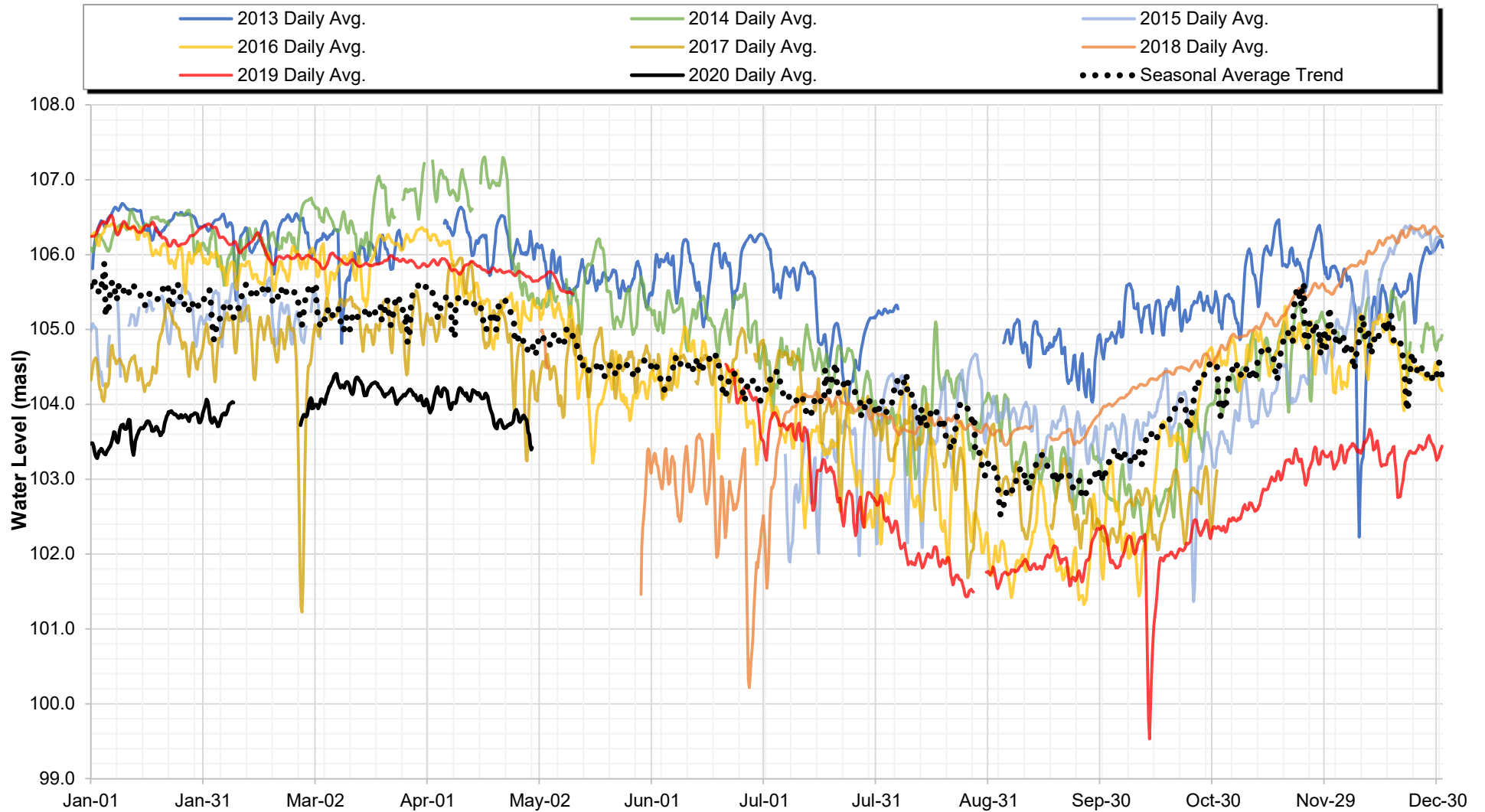


NOTES:

Observation Well is Associated with Aquifer 216


Aquifer 216 is Confined Surficial Sediments

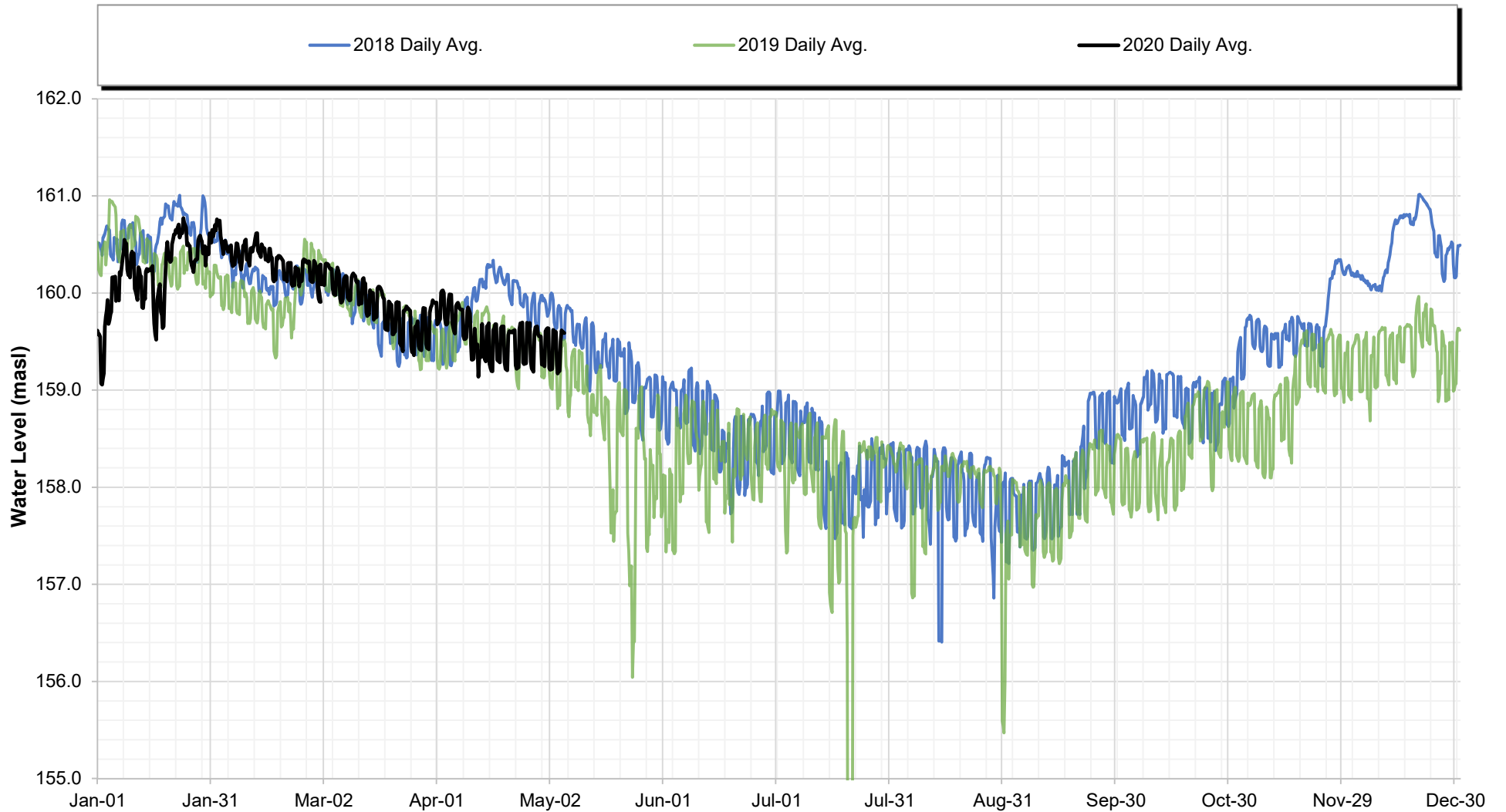
PROJECT	DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE	SEASONAL GROUNDWATER LEVEL CHART VOW 01 - Fourneau (WR4 - Englishman River)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-12
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 220
 Aquifer 220 is Fractured Bedrock

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART OW 287 (WR4 - Englishman River)		FIGURE C-13
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




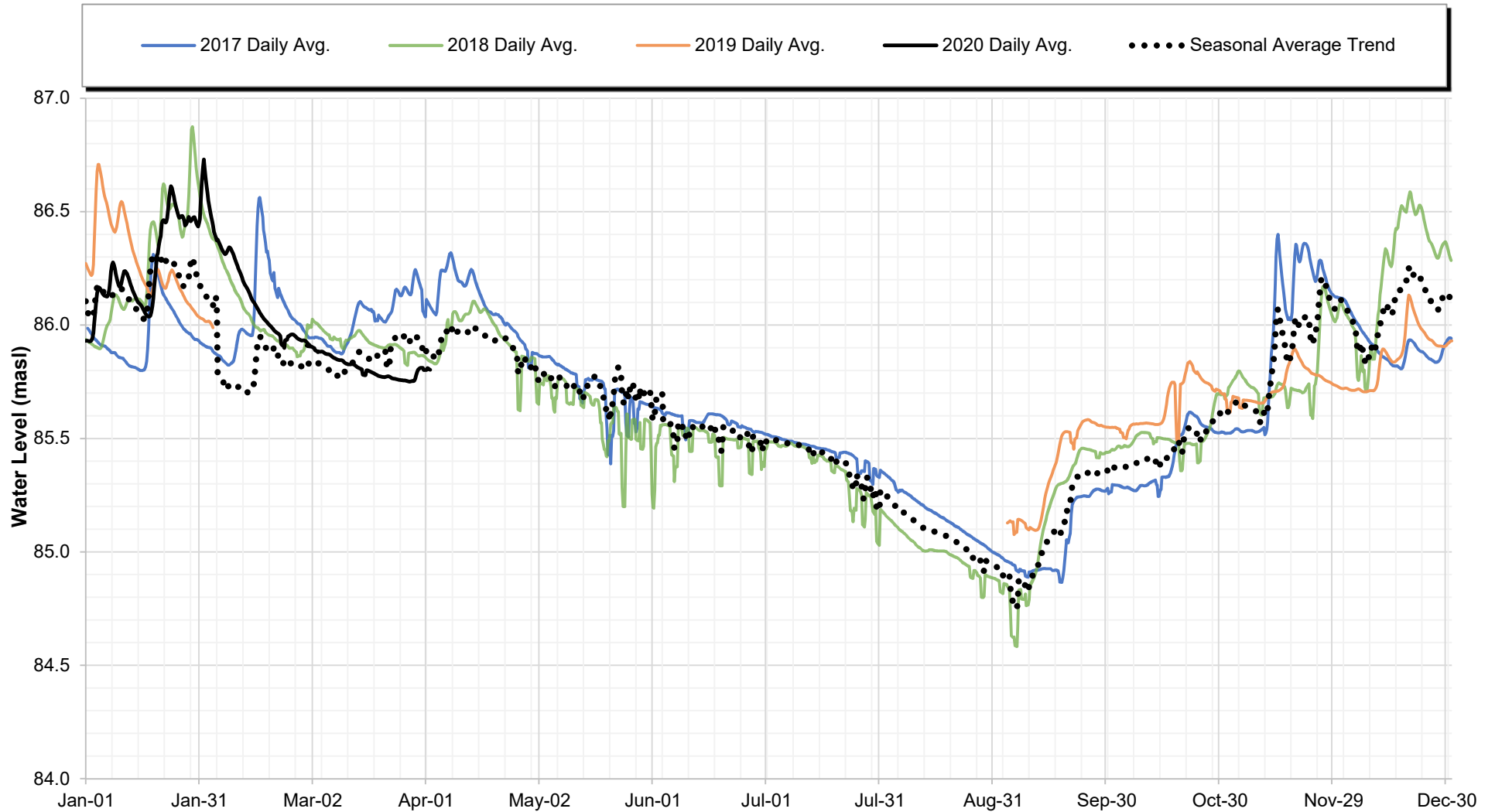
NOTES:

Observation Well is Associated with Aquifer 220

Aquifer 220 is Fractured Bedrock


No Seasonal Average Trend Provided if <3 -years of Data Compiled

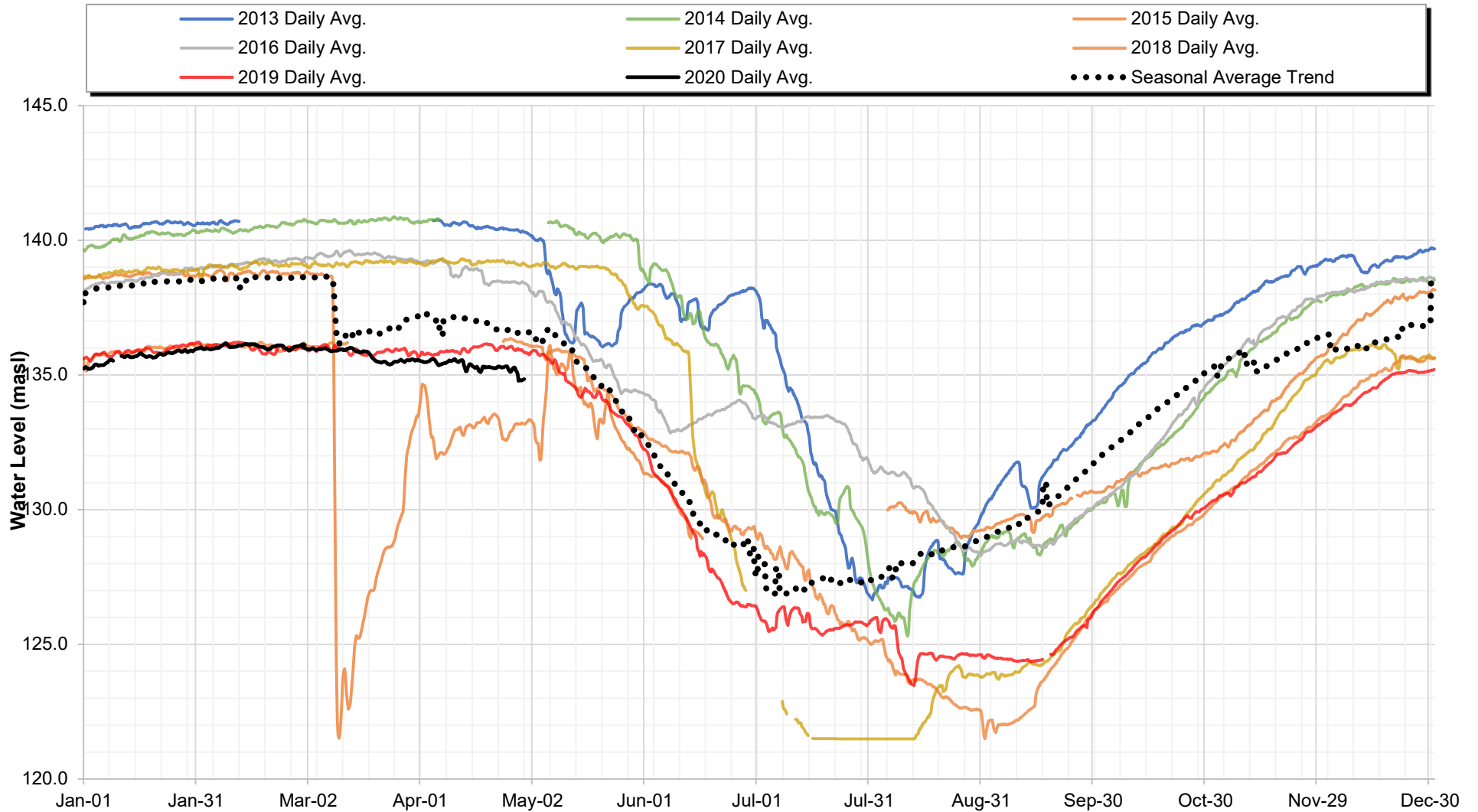
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 18 - Middlegate (WR4 - Englishman River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-14
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 167
 Aquifer 167 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART VOW 12 - Biggs (WR5 - Nanoose)		FIGURE C-15
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

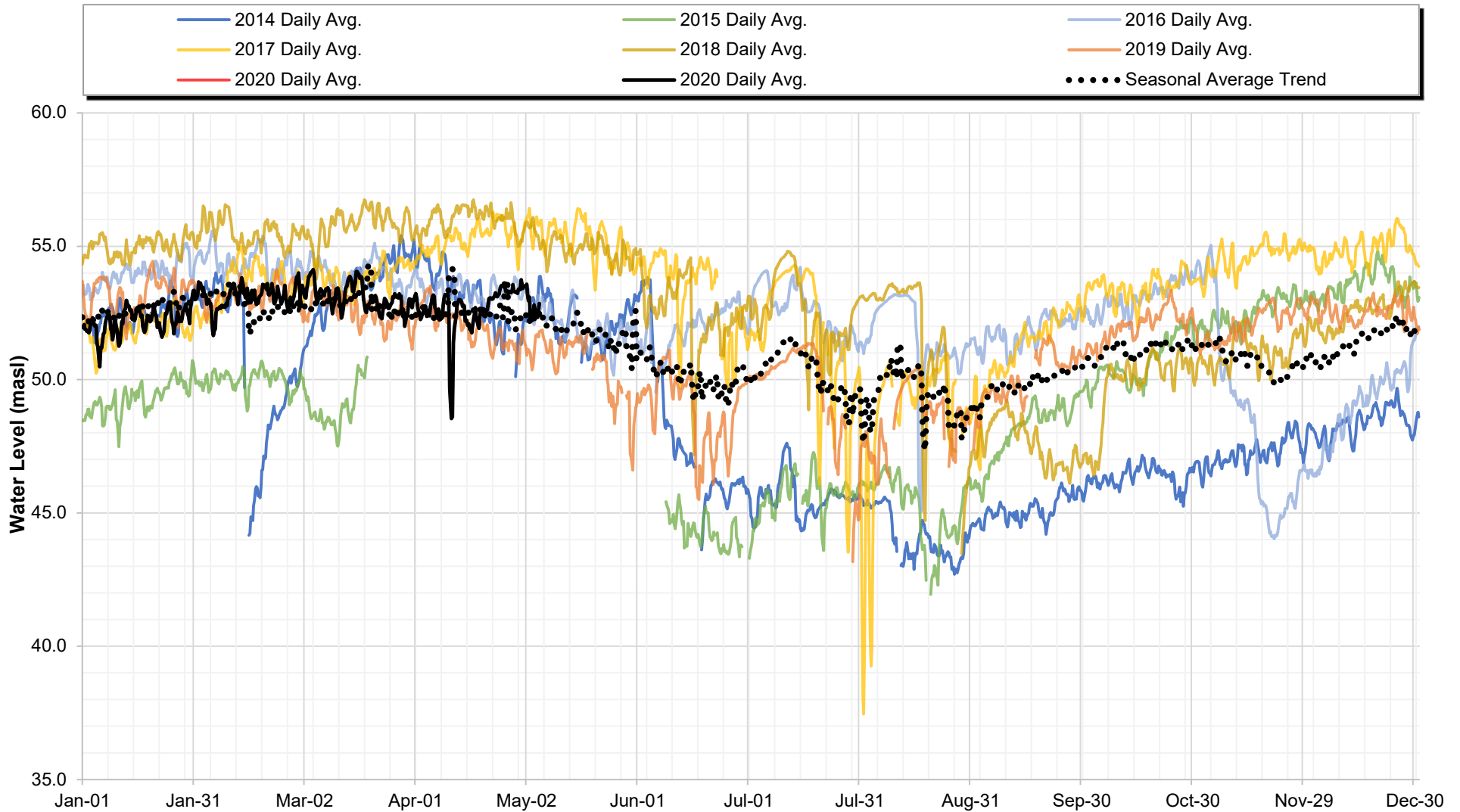


NOTES:

Observation Well is Associated with Aquifer 211

Aquifer 211 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		SEASONAL GROUNDWATER LEVEL CHART OW 388 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-16	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25 REVISED: FINAL		

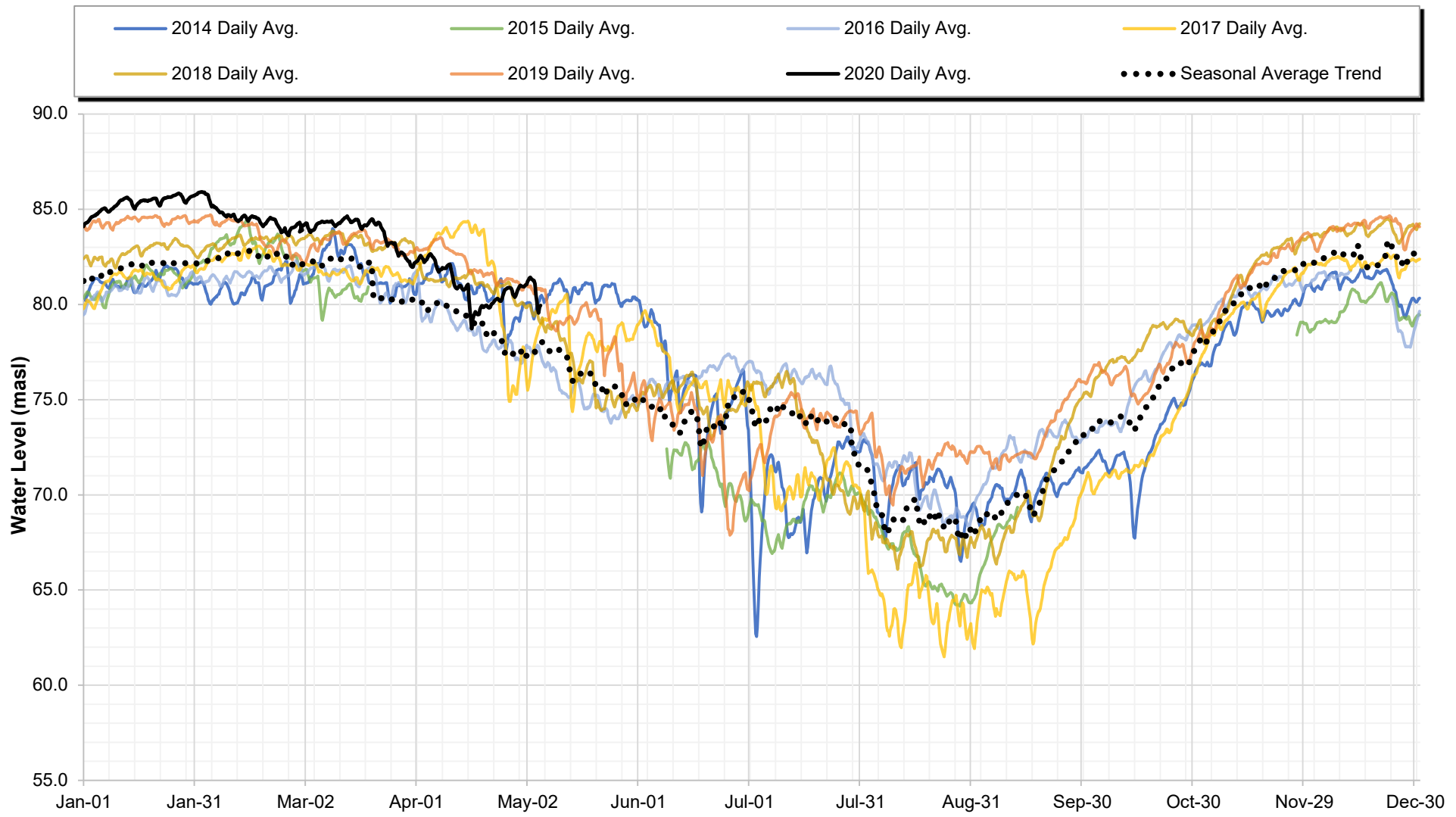


NOTES:

Observation Wellis Associated with Aquifer 213


Aquifer 213 is Fractured Bedrock

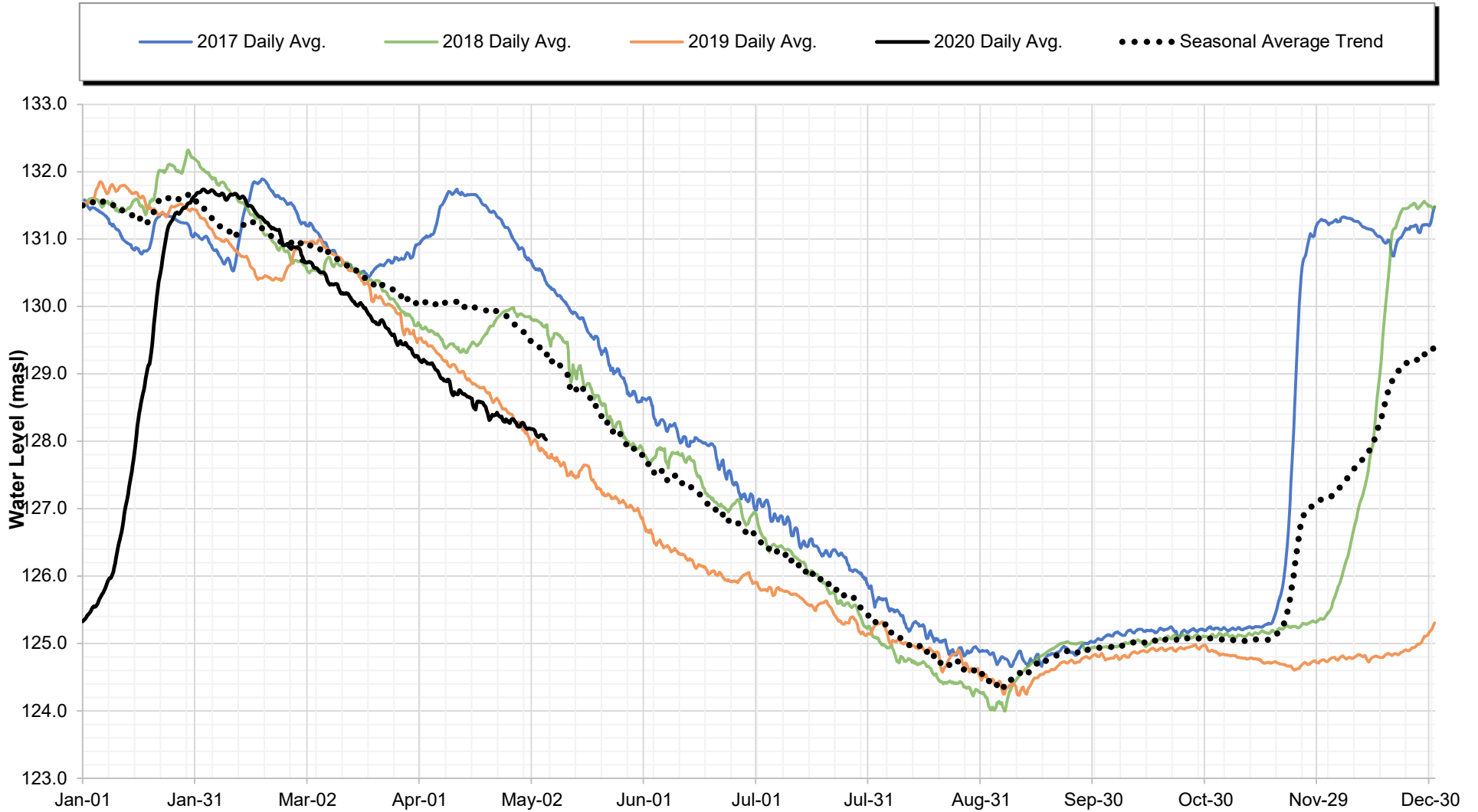
PROJECT		<p>DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020</p>
TITLE		
<p>SEASONAL GROUNDWATER LEVEL CHART VOW 02 - Northwind (WR5 - Nanoose)</p>		<p>FIGURE C-17</p>
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 213
 Aquifer 213 is Fractured Bedrock

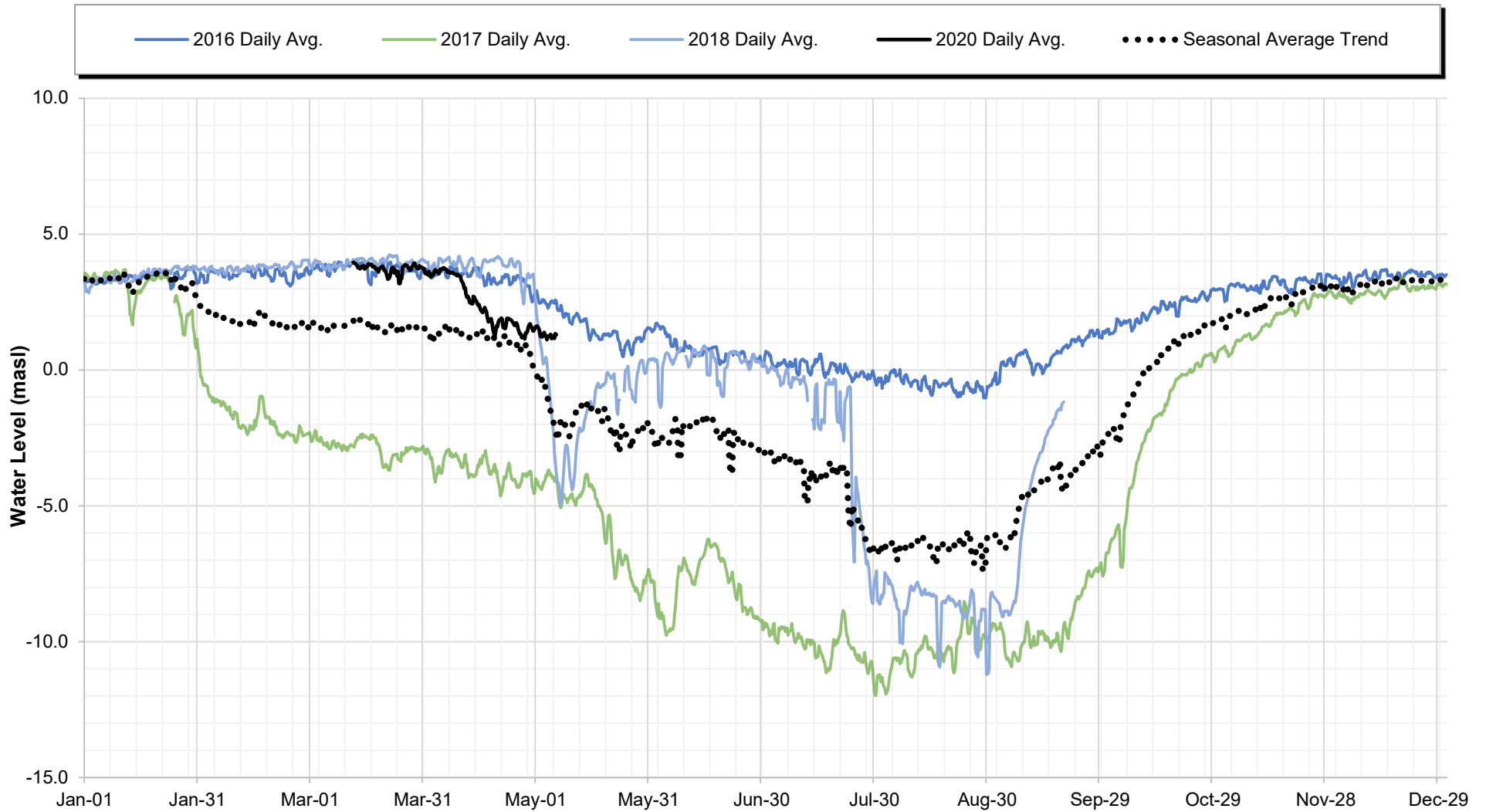
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 03 - Elm (WR5 - Nanoose)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-18
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 213
 Aquifer 213 is Fractured Bedrock

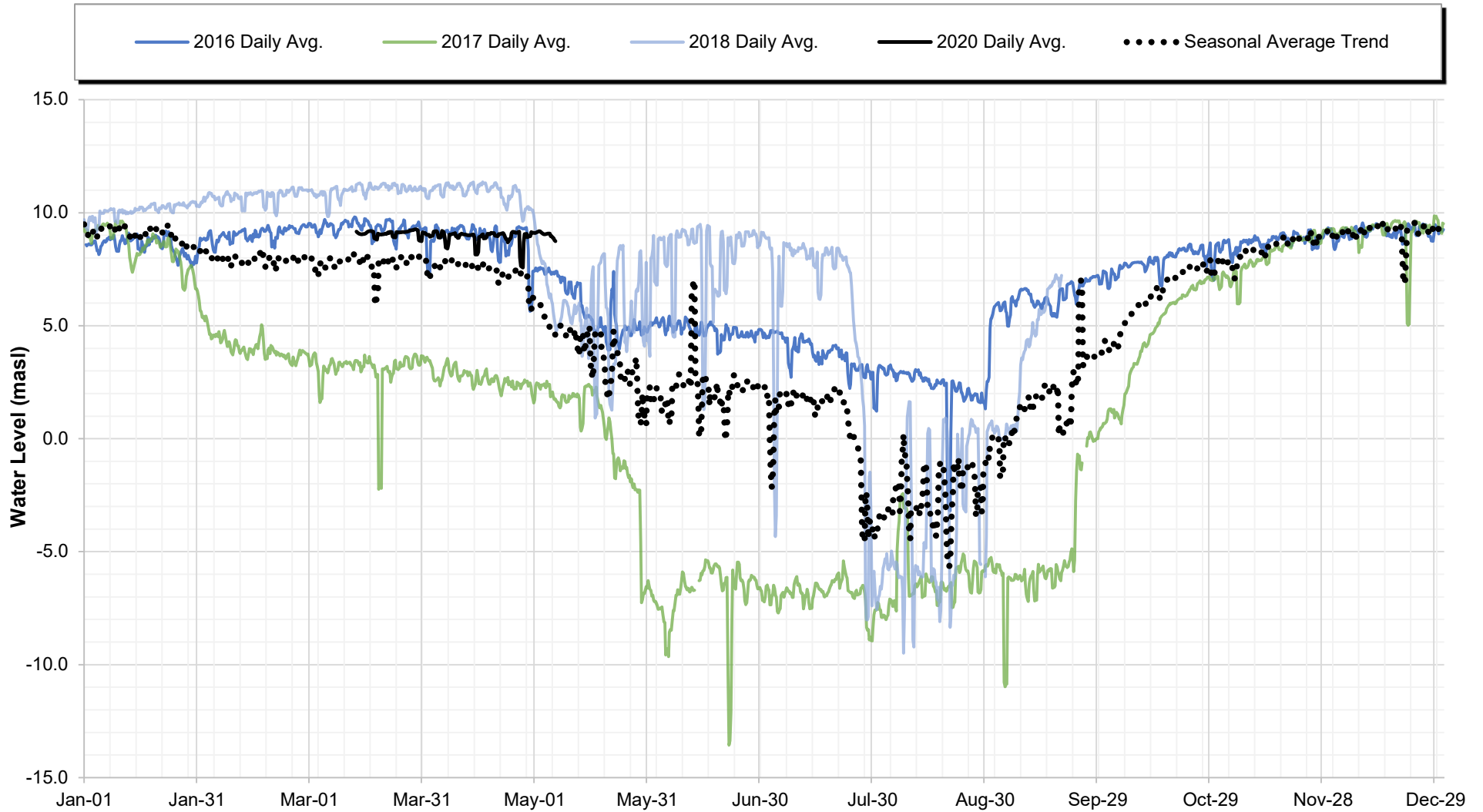
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 13 - Sea Blush (WR5 - Nanoose)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-19
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock

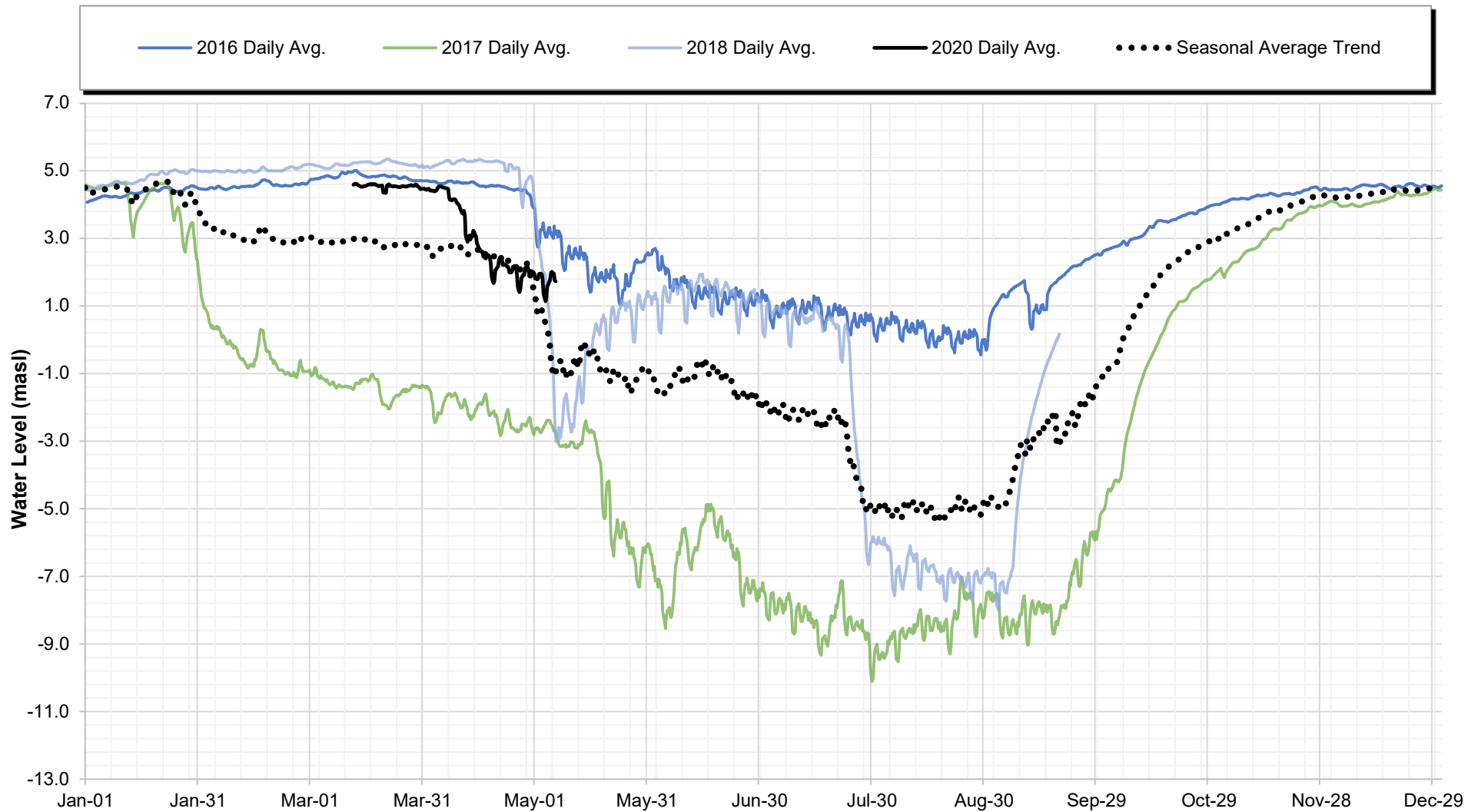
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW B2 (WR5 - Nanoose)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-20
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock

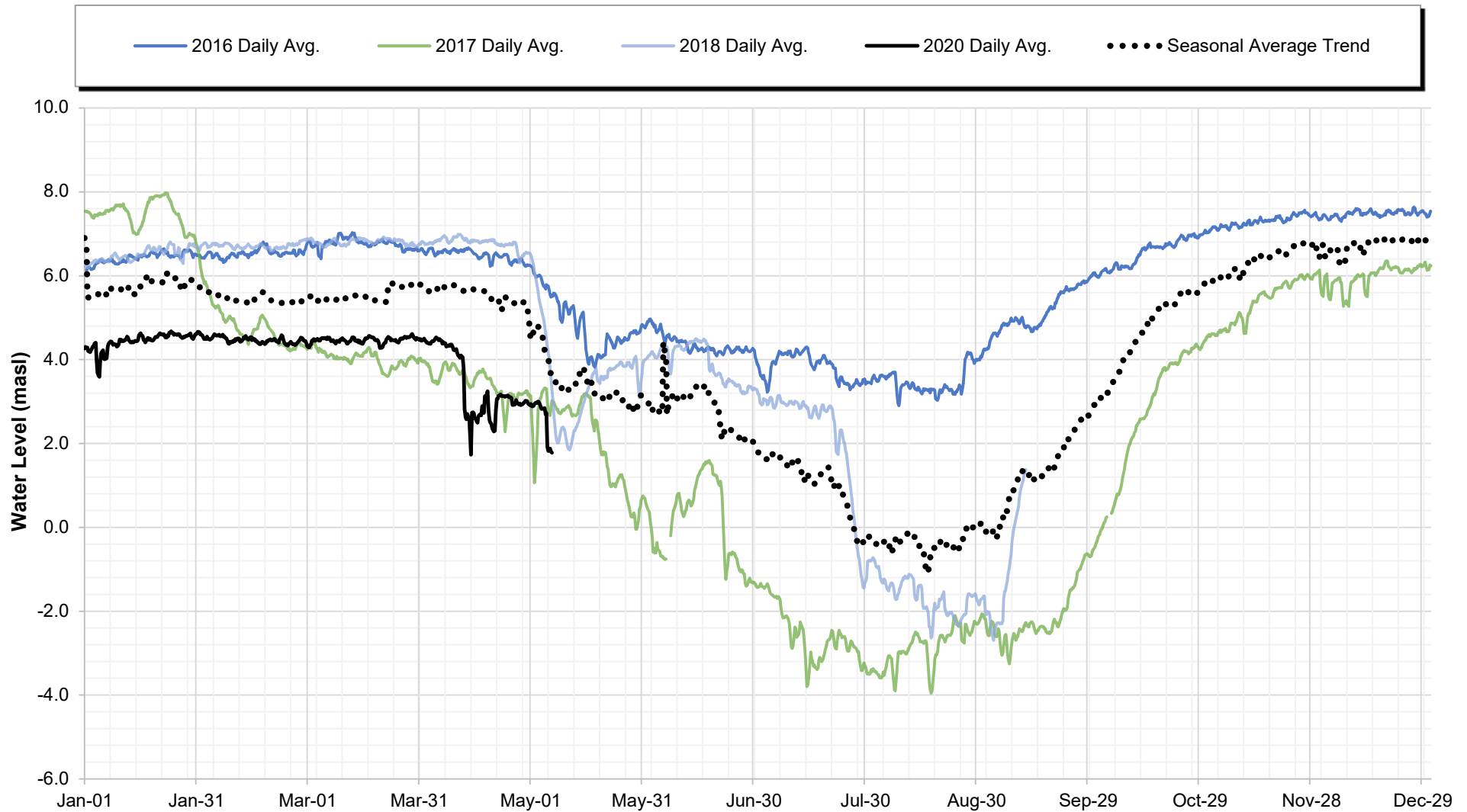
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART VOW B3 (WR5 - Nanoose)		FIGURE C-21
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock

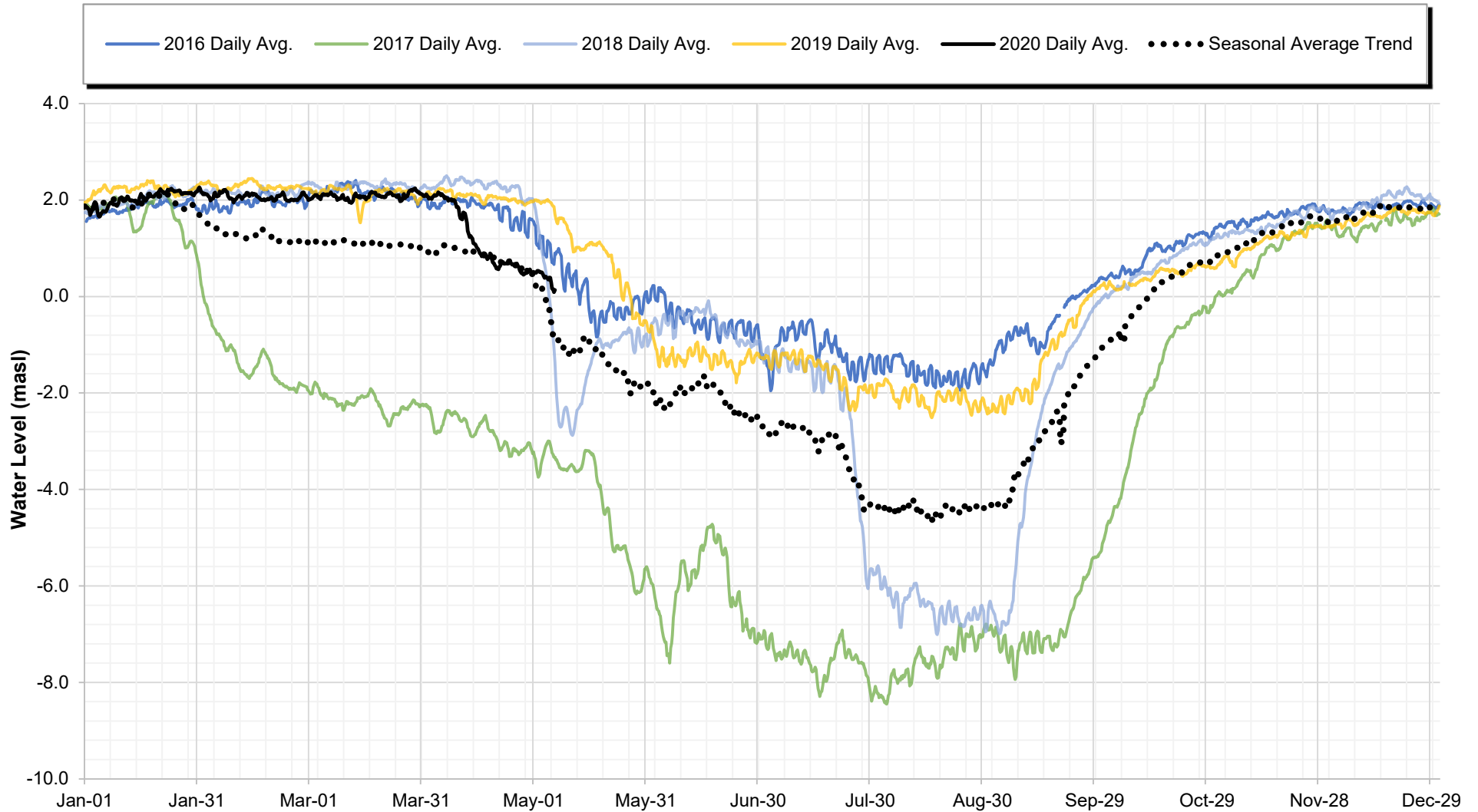
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART VOW B4 (WR5 - Nanoose)		FIGURE C-22
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock

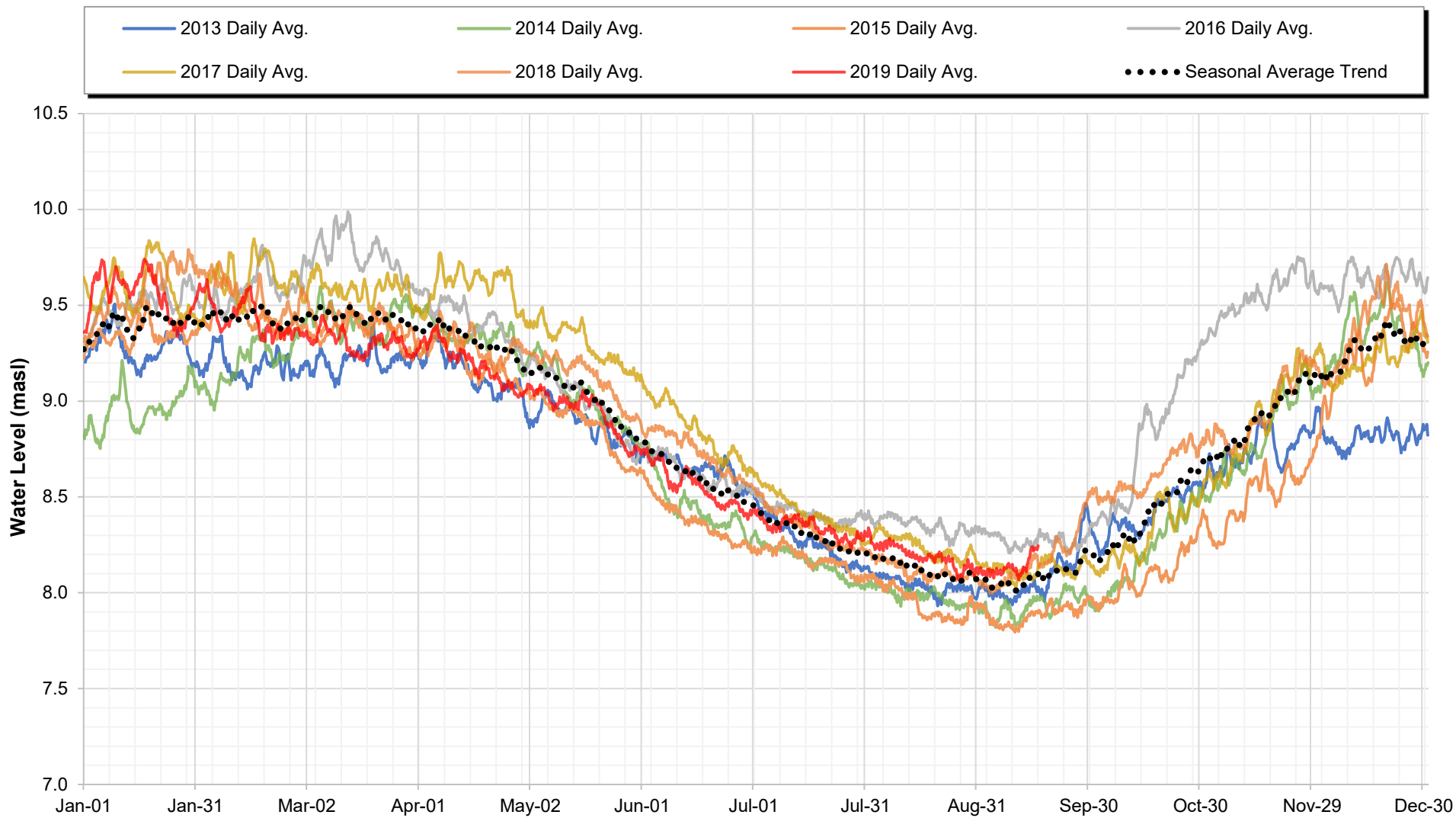
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		SEASONAL GROUNDWATER LEVEL CHART VOW B7 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-23	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:


Observation Well is Associated with Aquifer 214
 Aquifer 214 is Fractured Bedrock

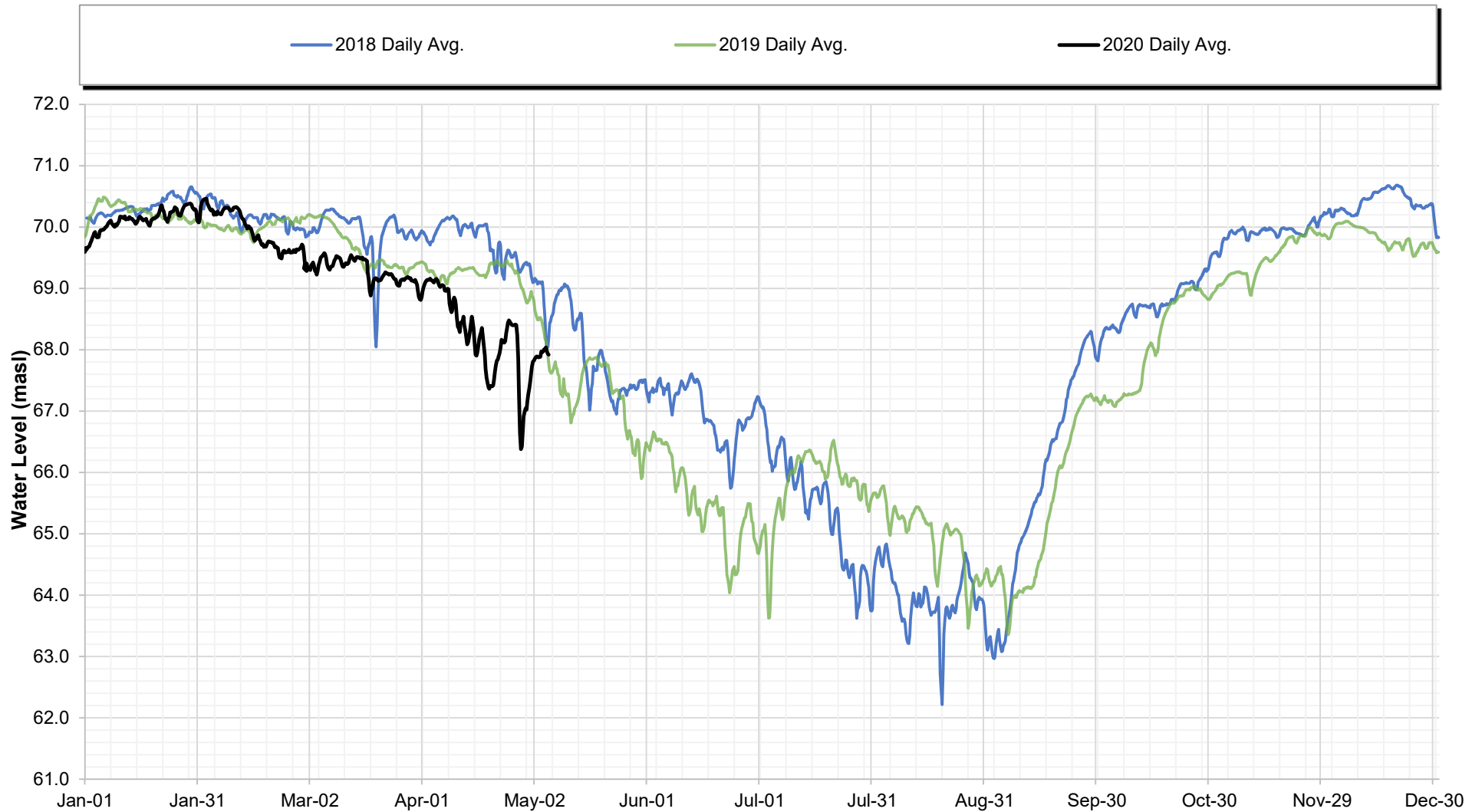
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART VOW B9 (WR5 - Nanoose)		FIGURE C-24
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 218
 Aquifer 218 is Fractured Bedrock
 No 2020 Groundwater Level Data Available

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		SEASONAL GROUNDWATER LEVEL CHART OW 394 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-25	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		




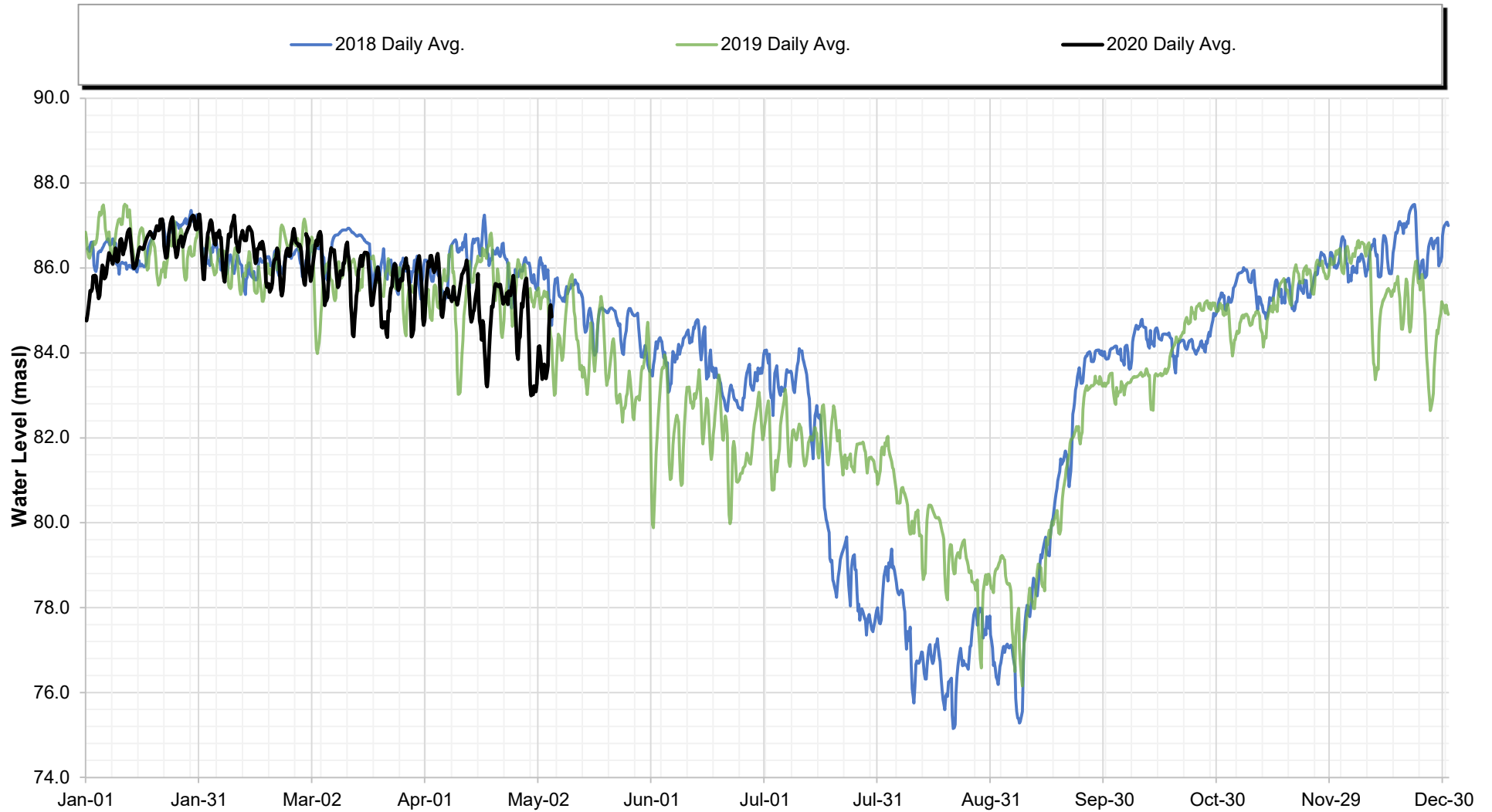
NOTES:

Observation Well is Associated with Aquifer 218

Aquifer 218 is Fractured Bedrock

No Seasonal Average Trend Provided if <3 -years of Data Compiled

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 27 - NWB (WR5 - Nanoose)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-26
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




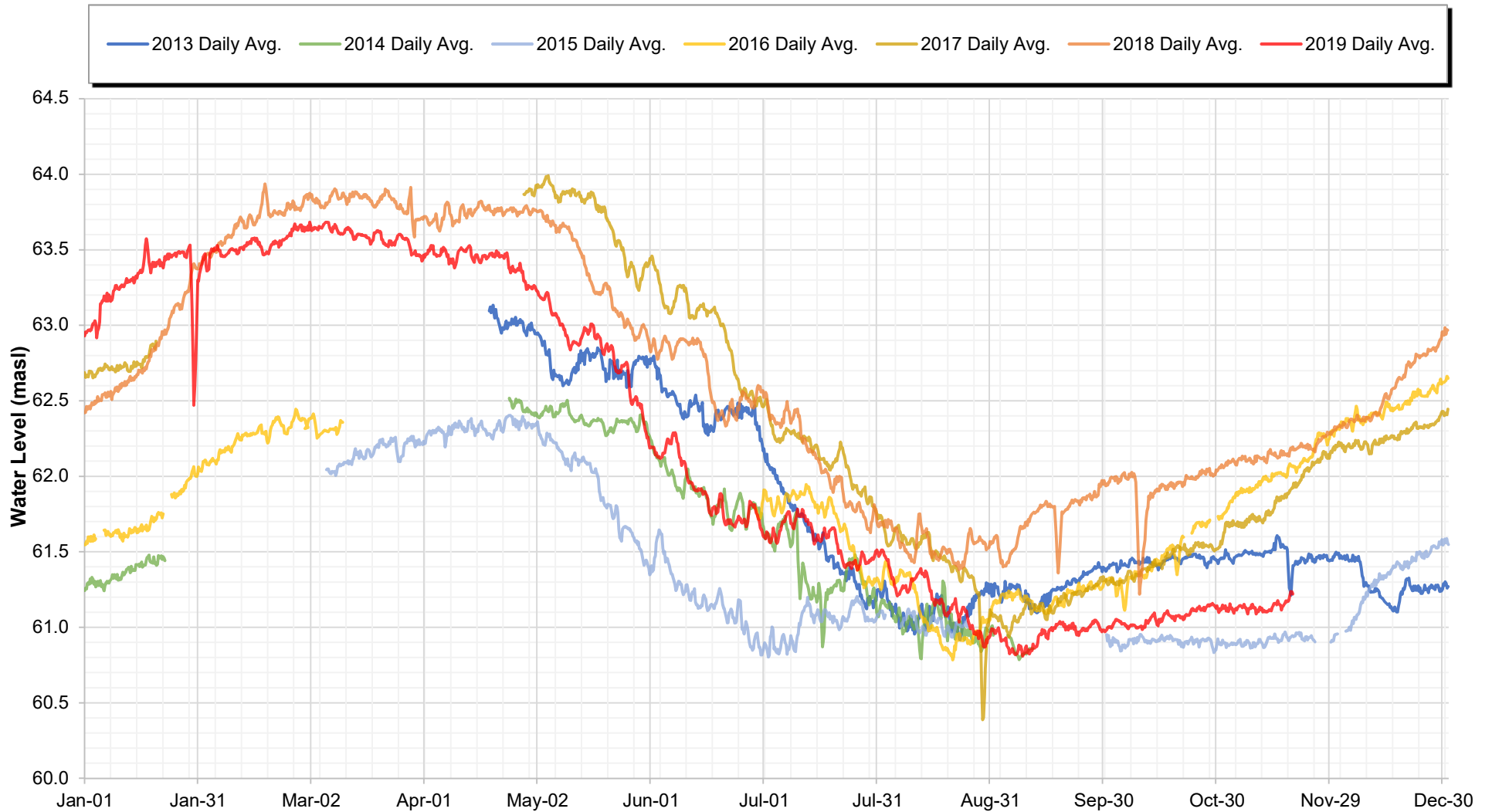
NOTES:

Observation Well is Associated with Aquifer 218

Aquifer 218 is Fractured Bedrock

No Seasonal Average Trend Provided if <3 -years of Data Compiled

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 26 - Florence (WR5 - Nanoose)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-27
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

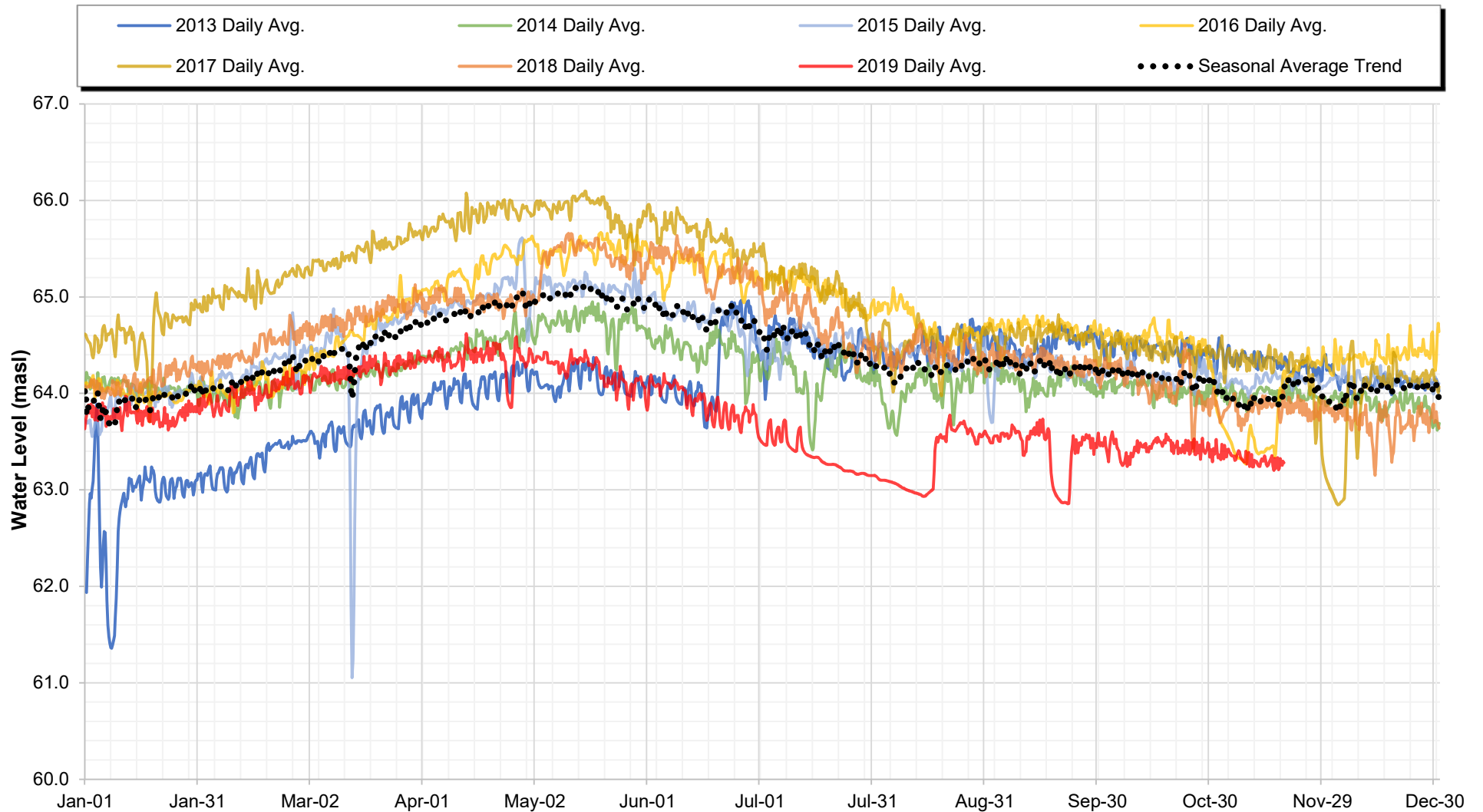
Observation Well is Associated with Aquifer 215

Aquifer 215 is Confined Surficial Sediments

No Seasonal Average Trend Presented due to Irregular Data Gaps. No 2020 Groundwater Level Data Available


PROJECT		<p>DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020</p> <p>TITLE</p> <p>SEASONAL GROUNDWATER LEVEL CHART OW 232 (WR5 - Nanoose)</p>	<p>FIGURE C-28</p>
PREPARED BY: WATERLINE RESOURCES INC.			
PROJECT: 2590-20-001			
COMPILED BY: REW			
DATE ISSUED: 2020-05-25			
REVISED: FINAL			

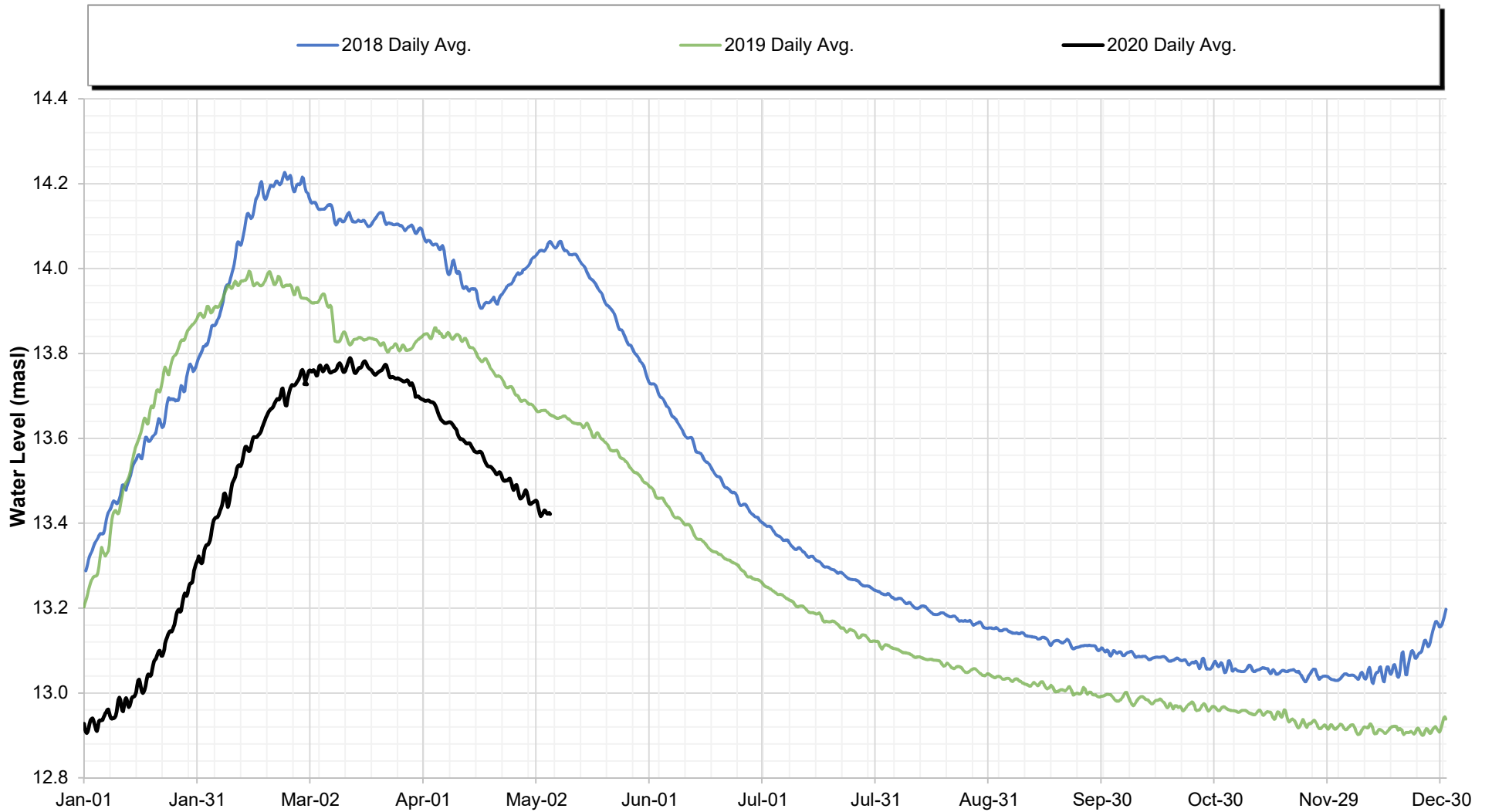




NOTES:

Observation Well is Associated with Aquifer 215
 Aquifer 215 is Confined Surficial Sediments
 No 2020 Groundwater Level Data Available

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		SEASONAL GROUNDWATER LEVEL CHART OW 340 (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-29	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		




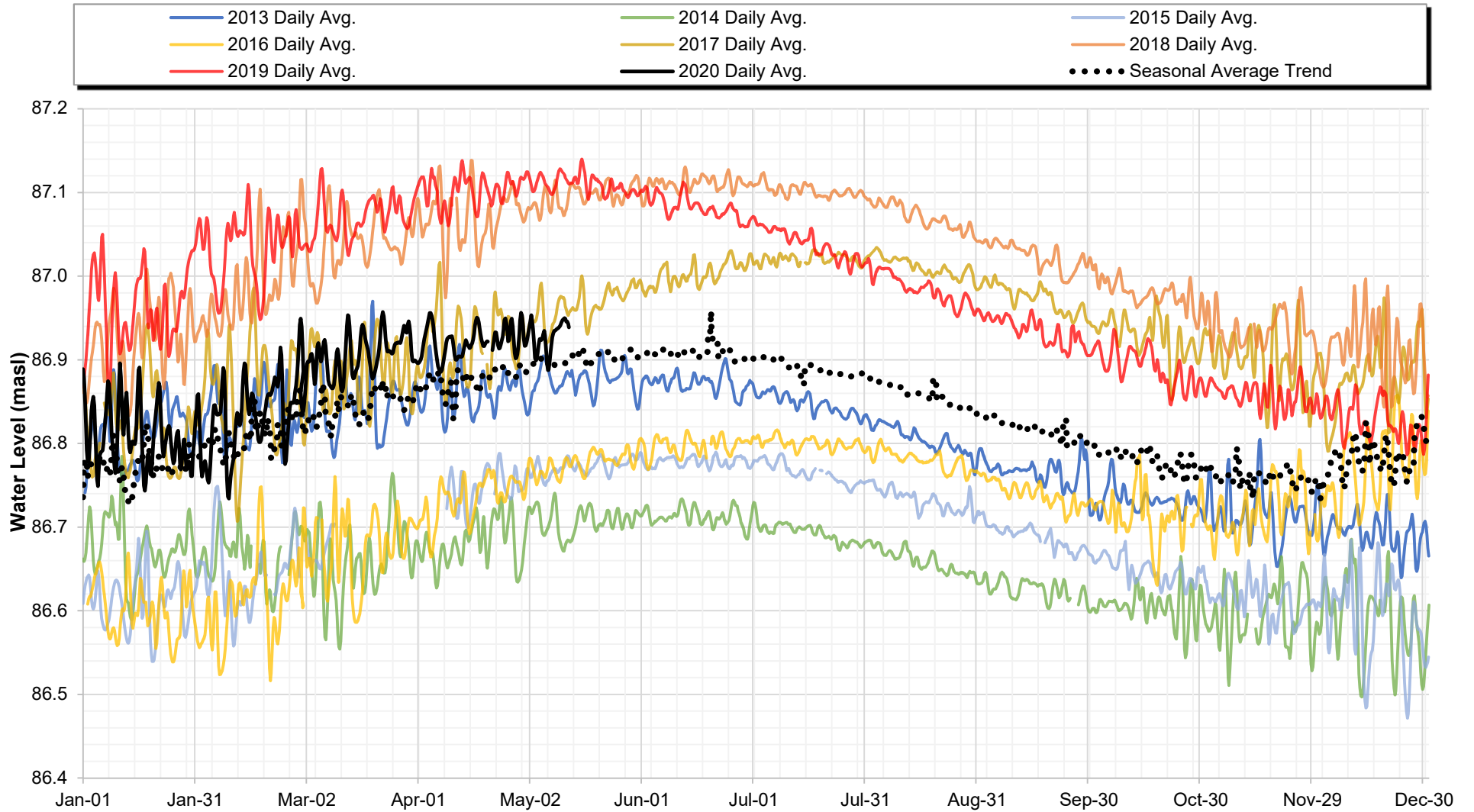
NOTES:

Observation Well is Associated with Aquifer 215

Aquifer 215 is Confined Surficial Sediments

No Seasonal Average Trend Provided if <3 -years of Data Compiled


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 28 - Southwind (WR5 - Nanoose)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-30
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

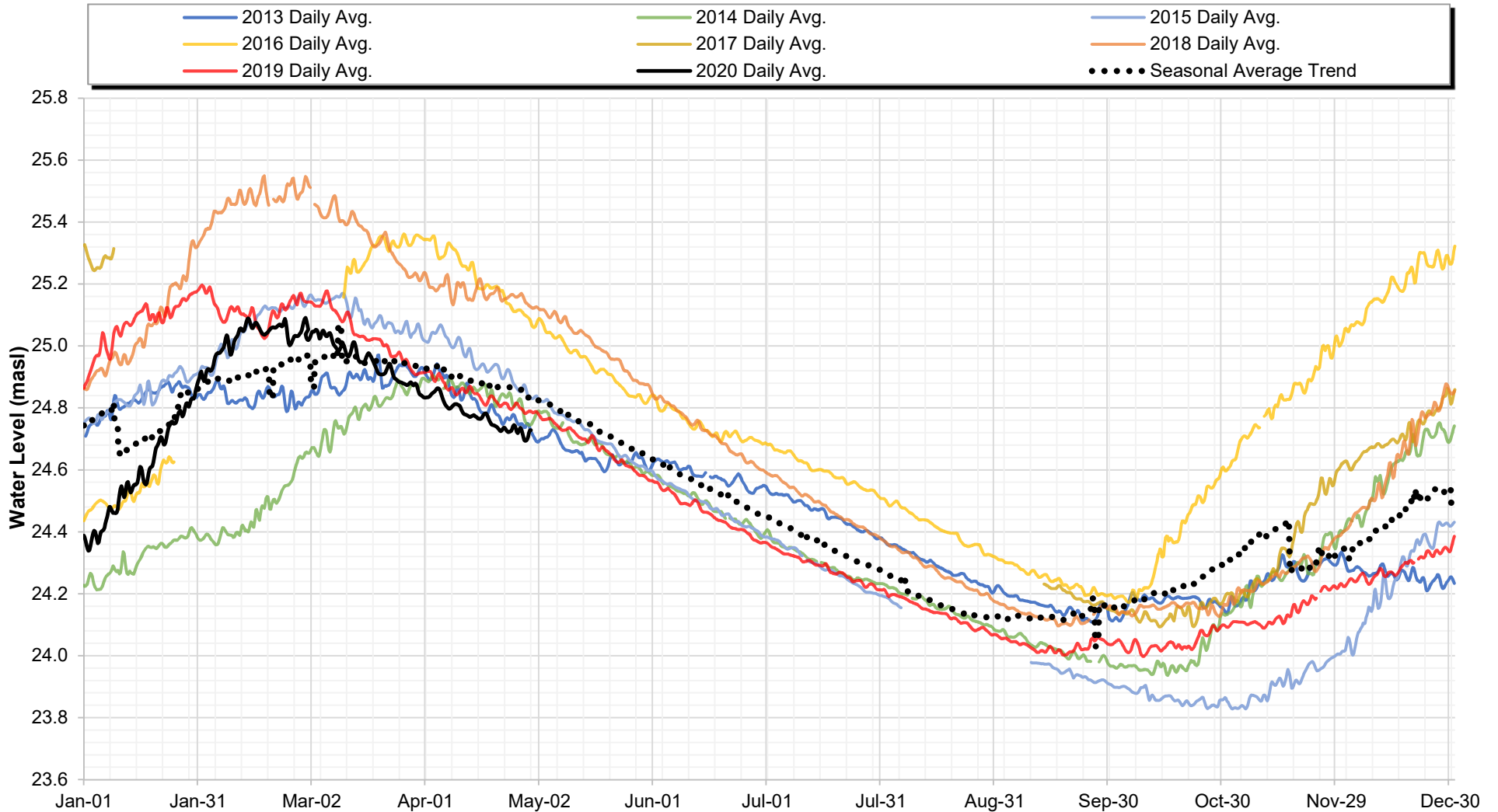


NOTES:

Observation Well is Associated with Aquifer 219

Aquifer 219 is Confined Surficial Sediments


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHART OW 393 (WR5 - Nanoose)		FIGURE C-31
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

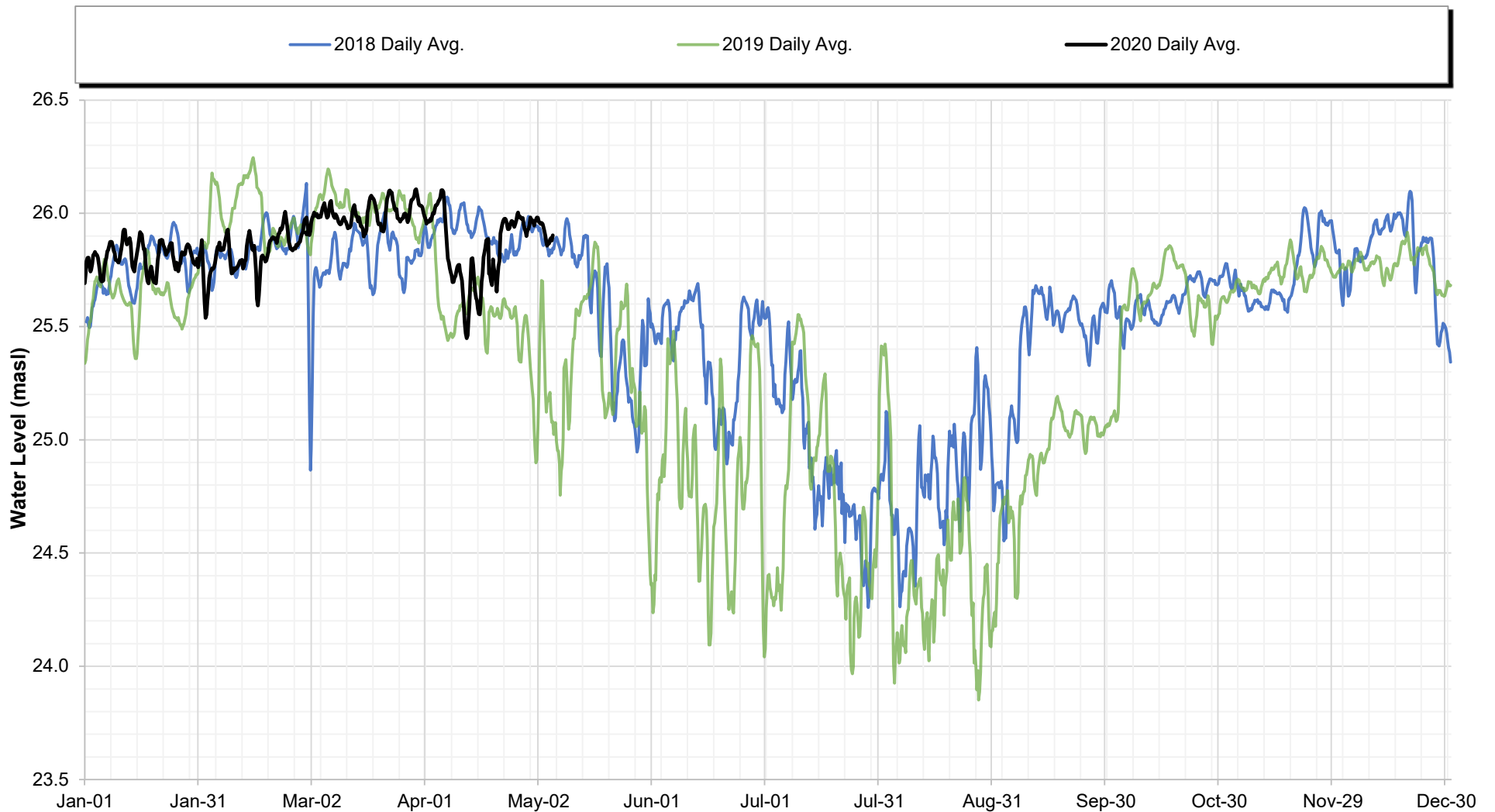


NOTES:

Observation Well is Associated with Aquifer 219

Aquifer 219 is Confined Surficial Sediments

PROJECT		<p>DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020</p>
TITLE		
<p>SEASONAL GROUNDWATER LEVEL CHART OW 396 (WR5 - Nanoose)</p>		<p>FIGURE C-32</p>
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




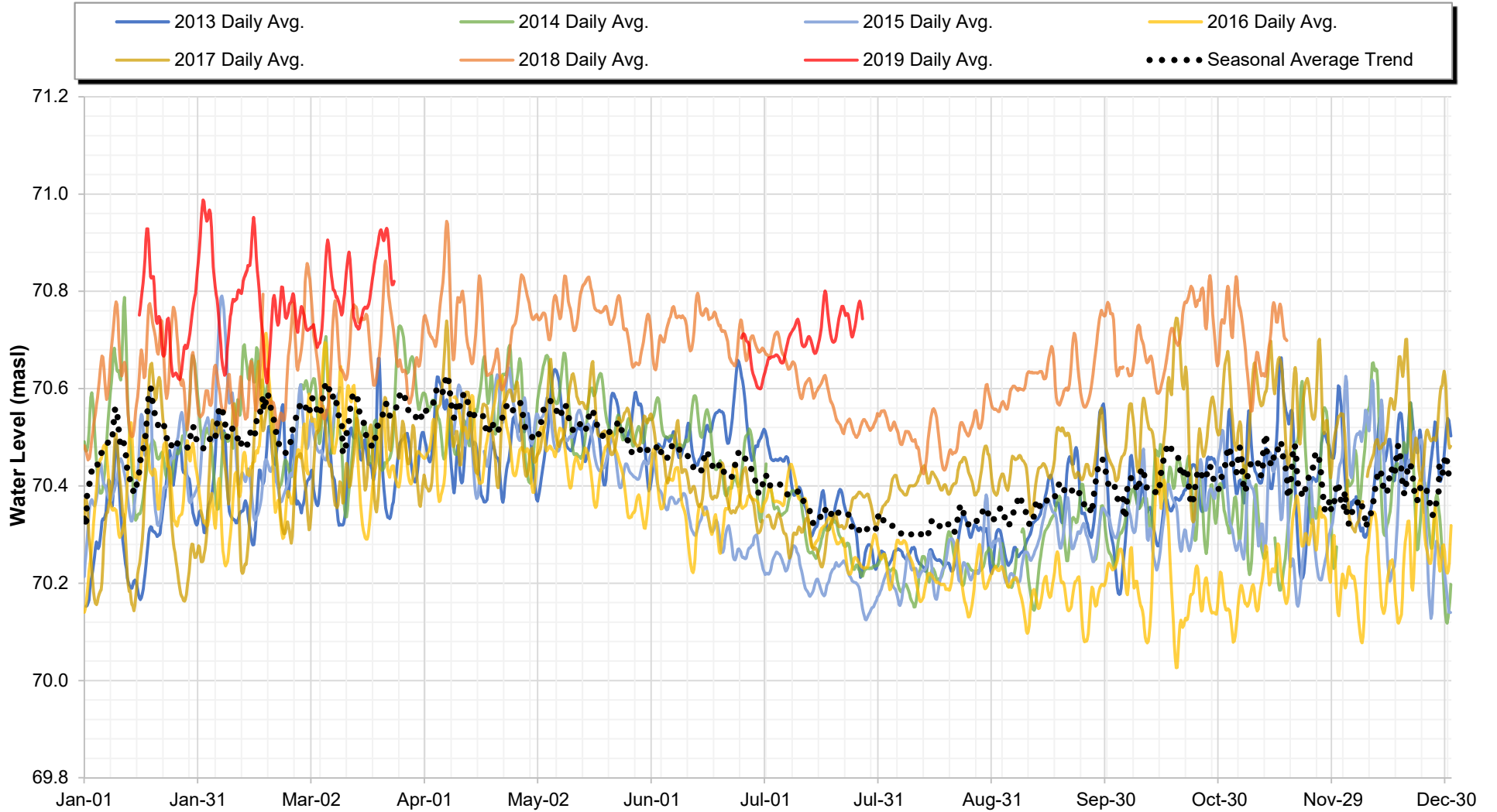
NOTES:

Observation Well is Associated with Aquifer 219

Aquifer 219 is Confined Surficial Sediments


No Seasonal Average Trend Provided if <3 -years of Data Compiled

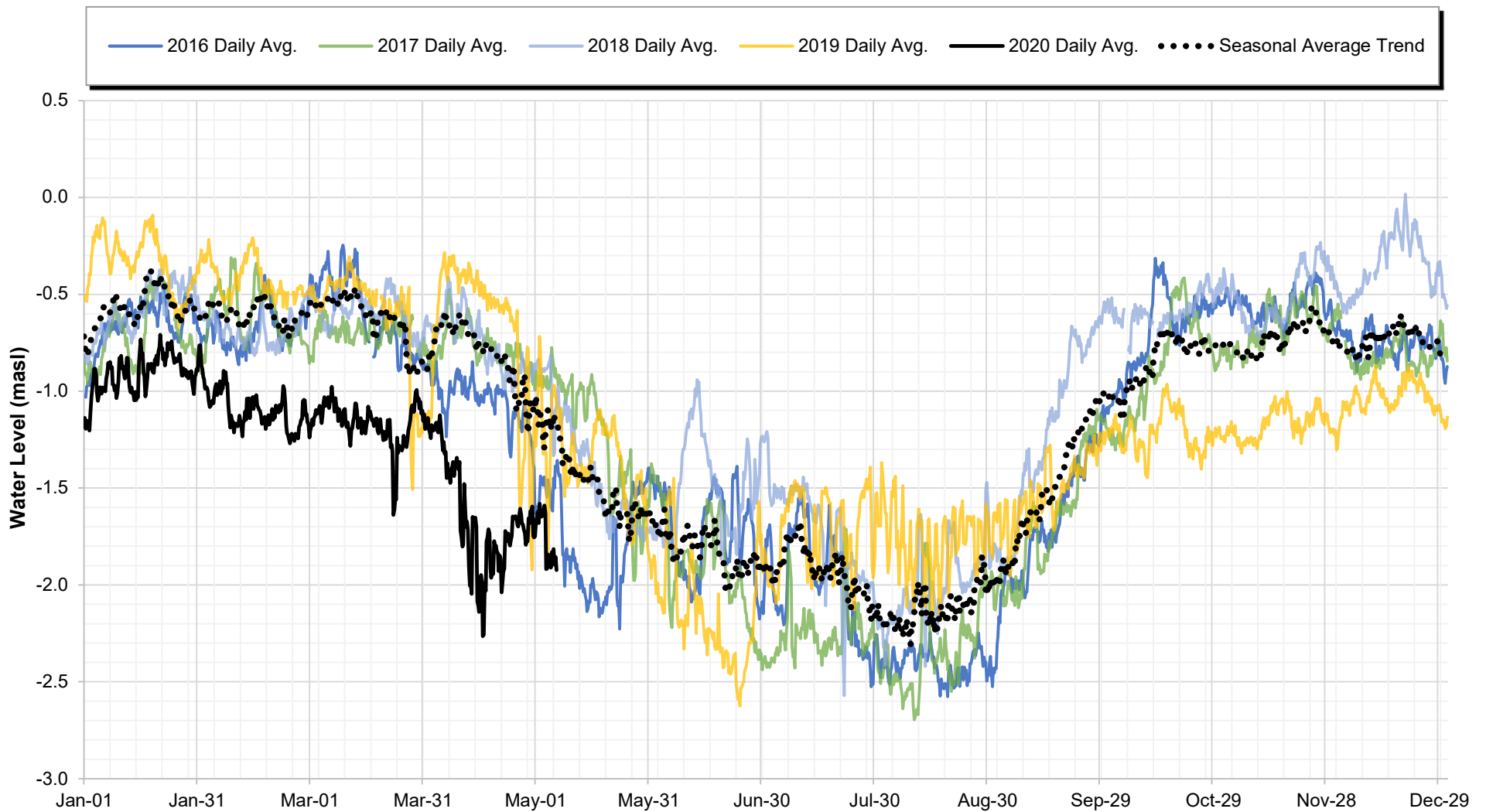
PROJECT	DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE	SEASONAL GROUNDWATER LEVEL CHART VOW 25 - Sanders (WR5 - Nanoose)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-33
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 1098
 Aquifer 1098 is Confined Surficial Sediments
 No 2020 Groundwater Level Data Available


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART OW 392 (WR5 - Nanoose)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-34
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

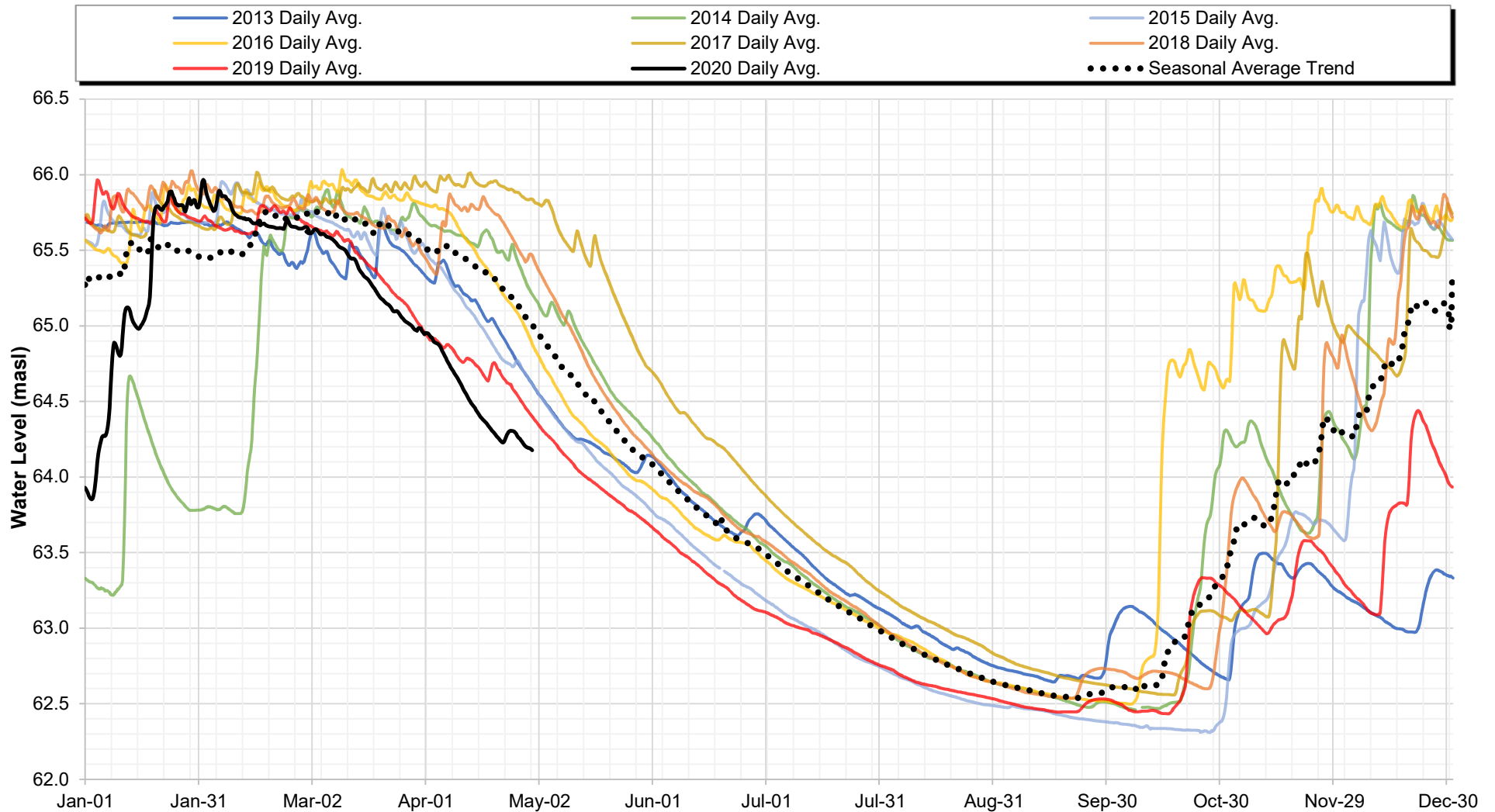


NOTES:

Observation Well is Associated with Aquifer 1098


Aquifer 1098 is Confined Surficial Sediments

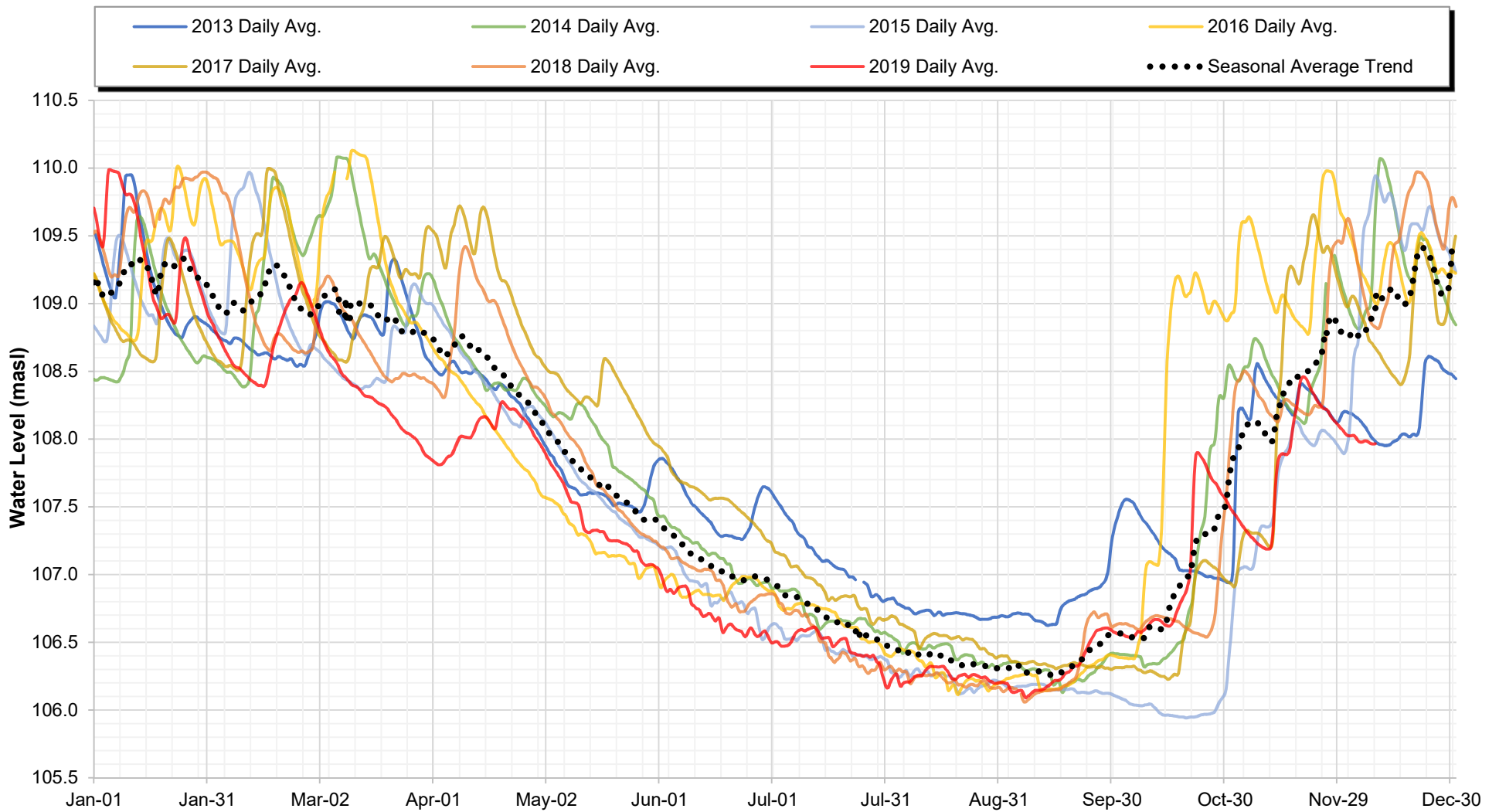
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW O3 (WR5 - Nanoose)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-35
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 709
 Aquifer 709 is Fractured Bedrock

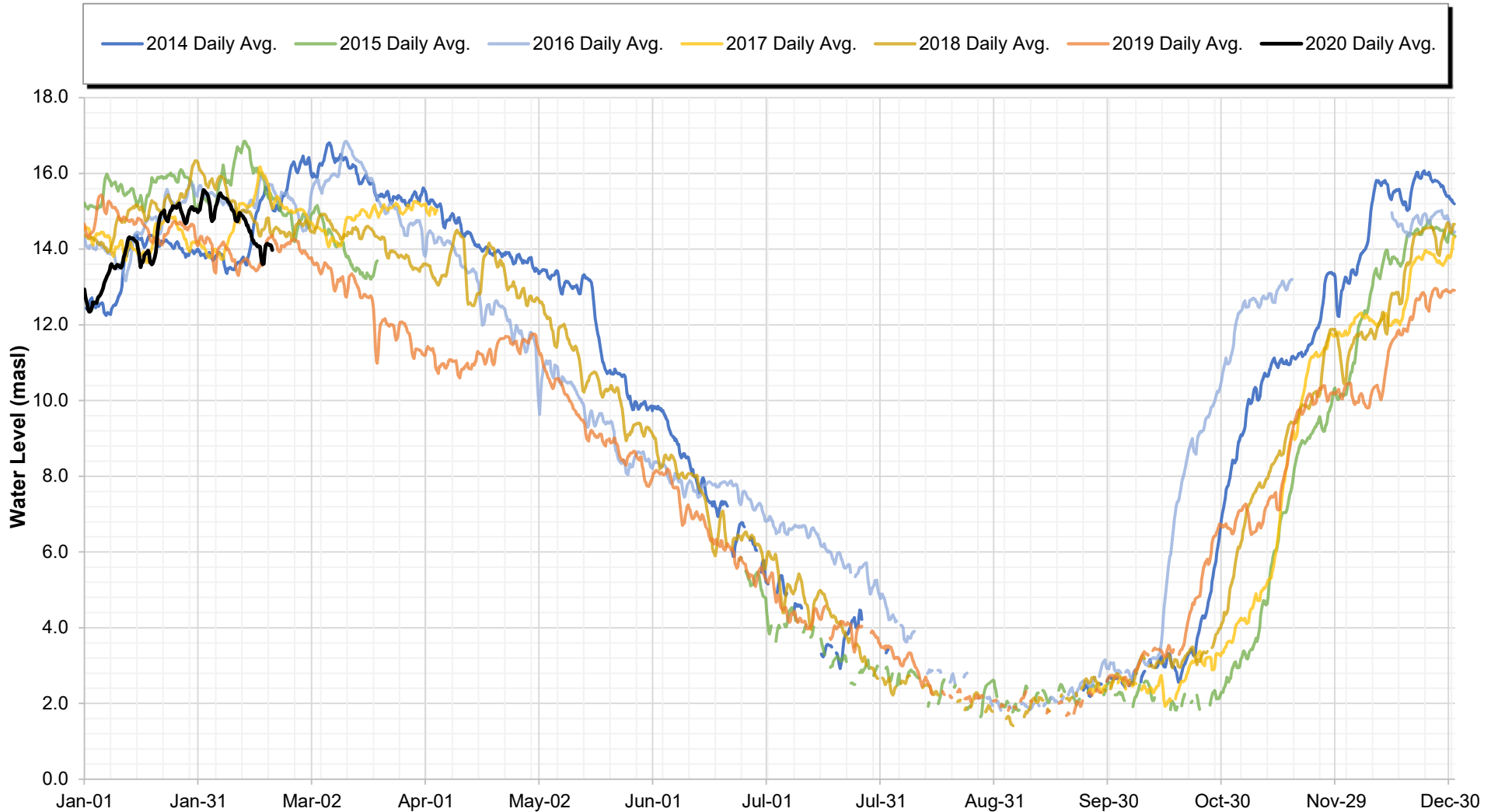
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		SEASONAL GROUNDWATER LEVEL CHART OW 316 (WR7 - Gabriola)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-36	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25		
	REVISED: FINAL		



NOTES:

Observation Well is Associated with Aquifer 709
 Aquifer 709 is Fractured Bedrock
 No 2020 Groundwater Level Data Available

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART OW 196 (WR7 - Gabriola)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-37
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




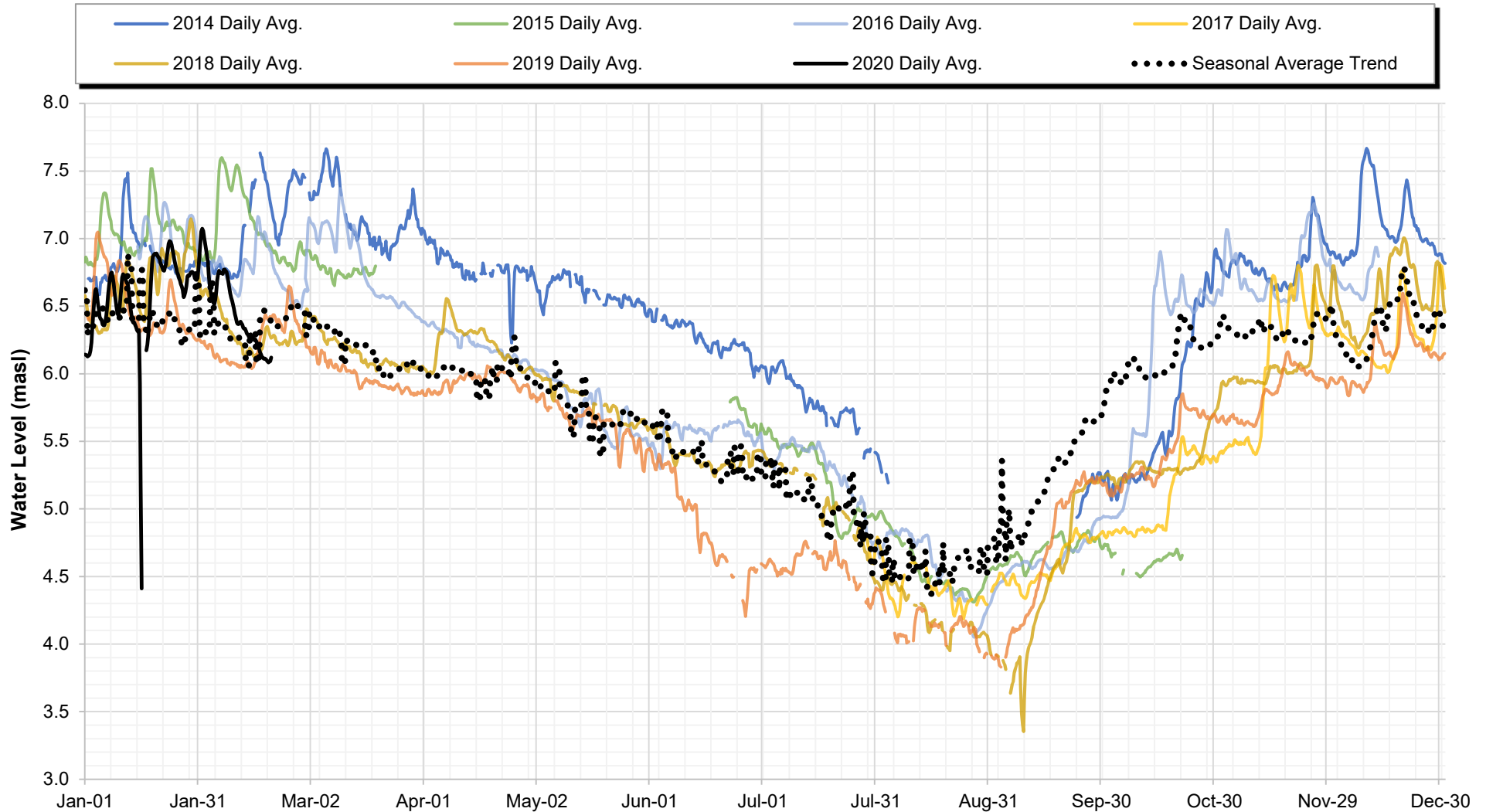
NOTES:

Observation Well is Associated with Aquifer 709

Aquifer 709 is Fractured Bedrock


No Seasonal Average Trend Presented due to Irregular Data Gaps

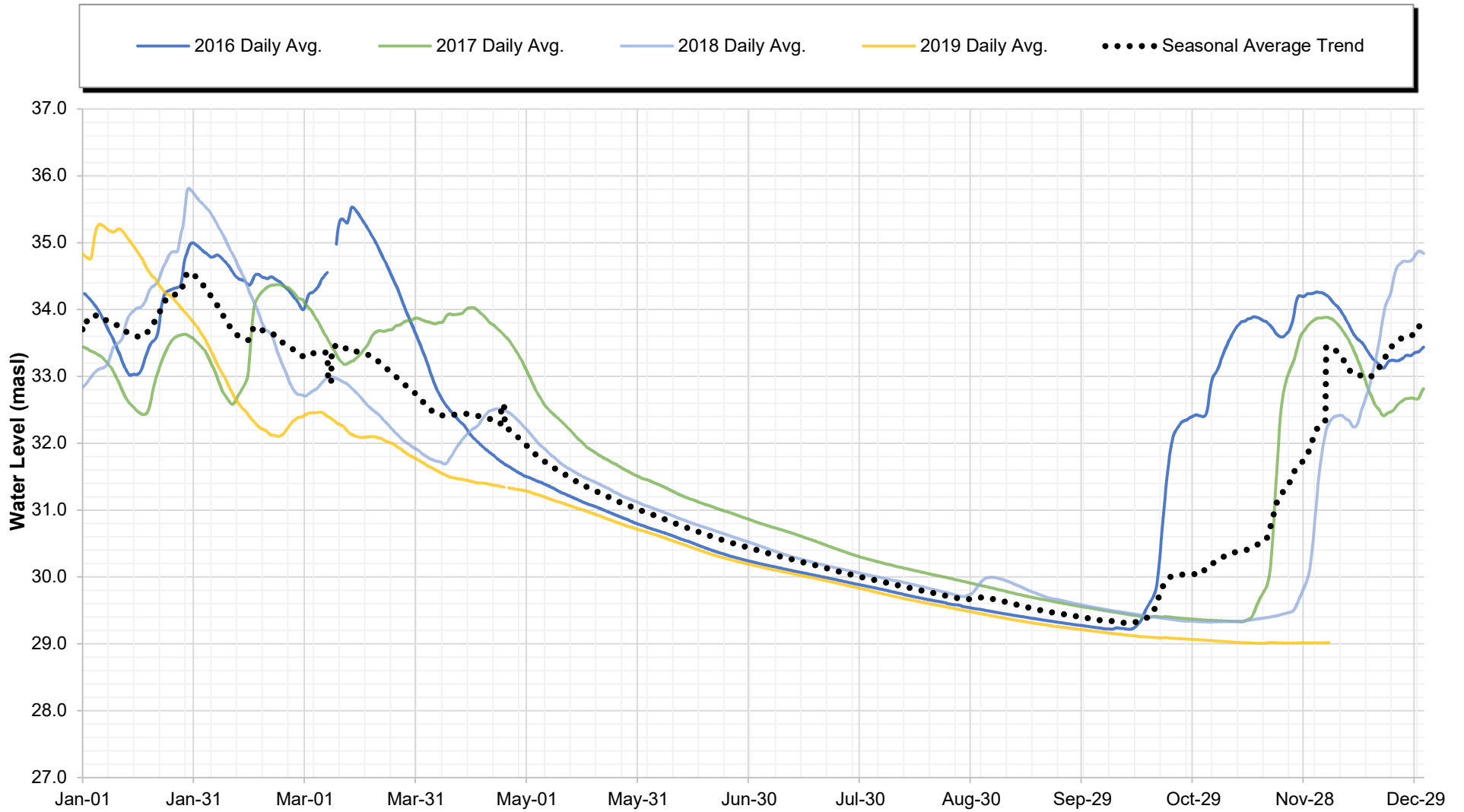
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 08 - Mander (WR7 - Gabriola)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-38
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 709
 Aquifer 709 is Fractured Bedrock

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 07 - Descanso (WR7 - Gabriola)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-39
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




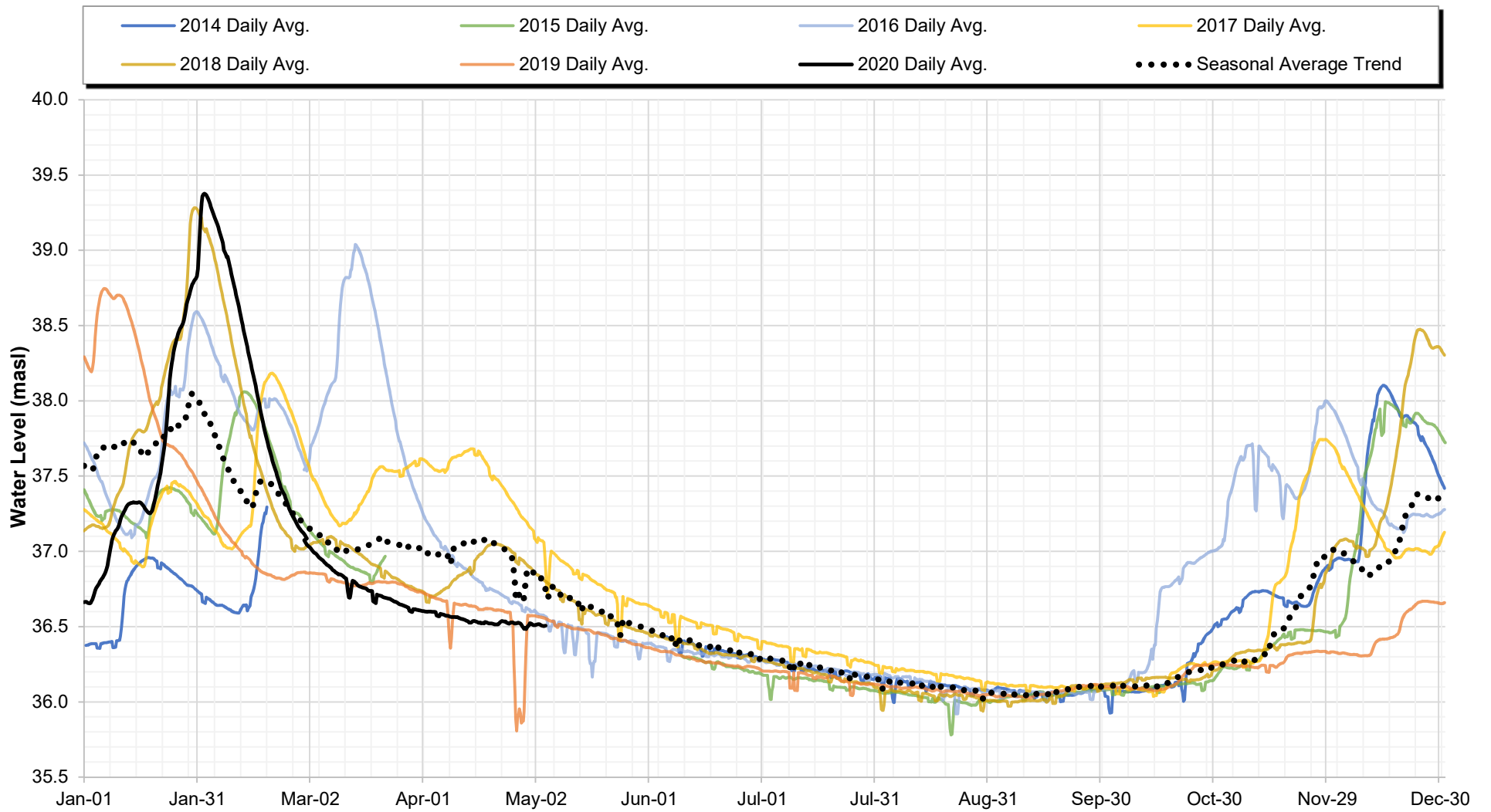
NOTES:

Observation Well is Associated with Aquifer 160

Aquifer 160 is Confined Surficial Sediments


No 2020 Groundwater Level Data Available

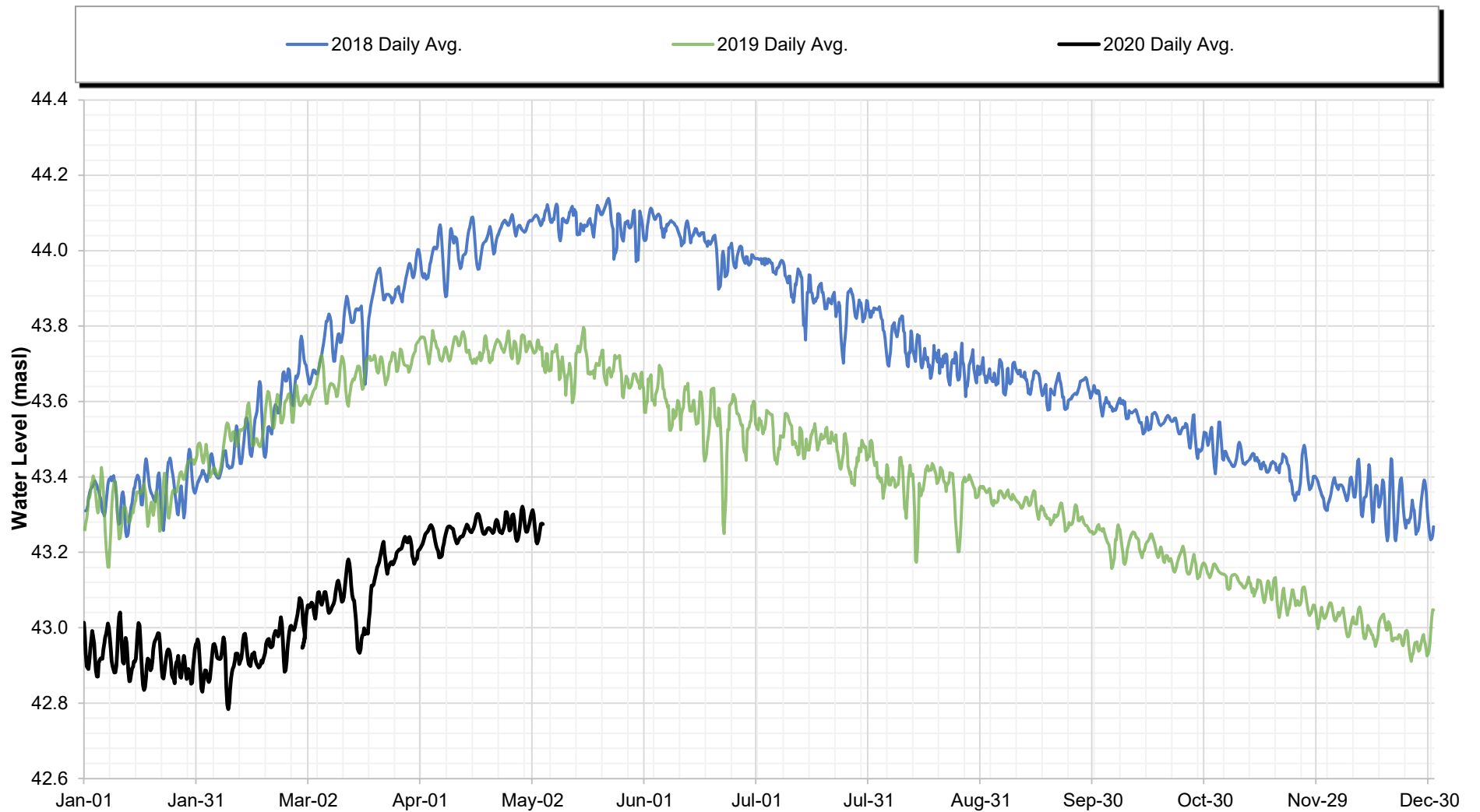
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART OW 437 (WR6 - Nanaimo River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-40
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 160
 Aquifer 160 is Confined Surficial Sediments

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHART VOW 04 - Hallberg (WR6 - Nanaimo River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-41
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	




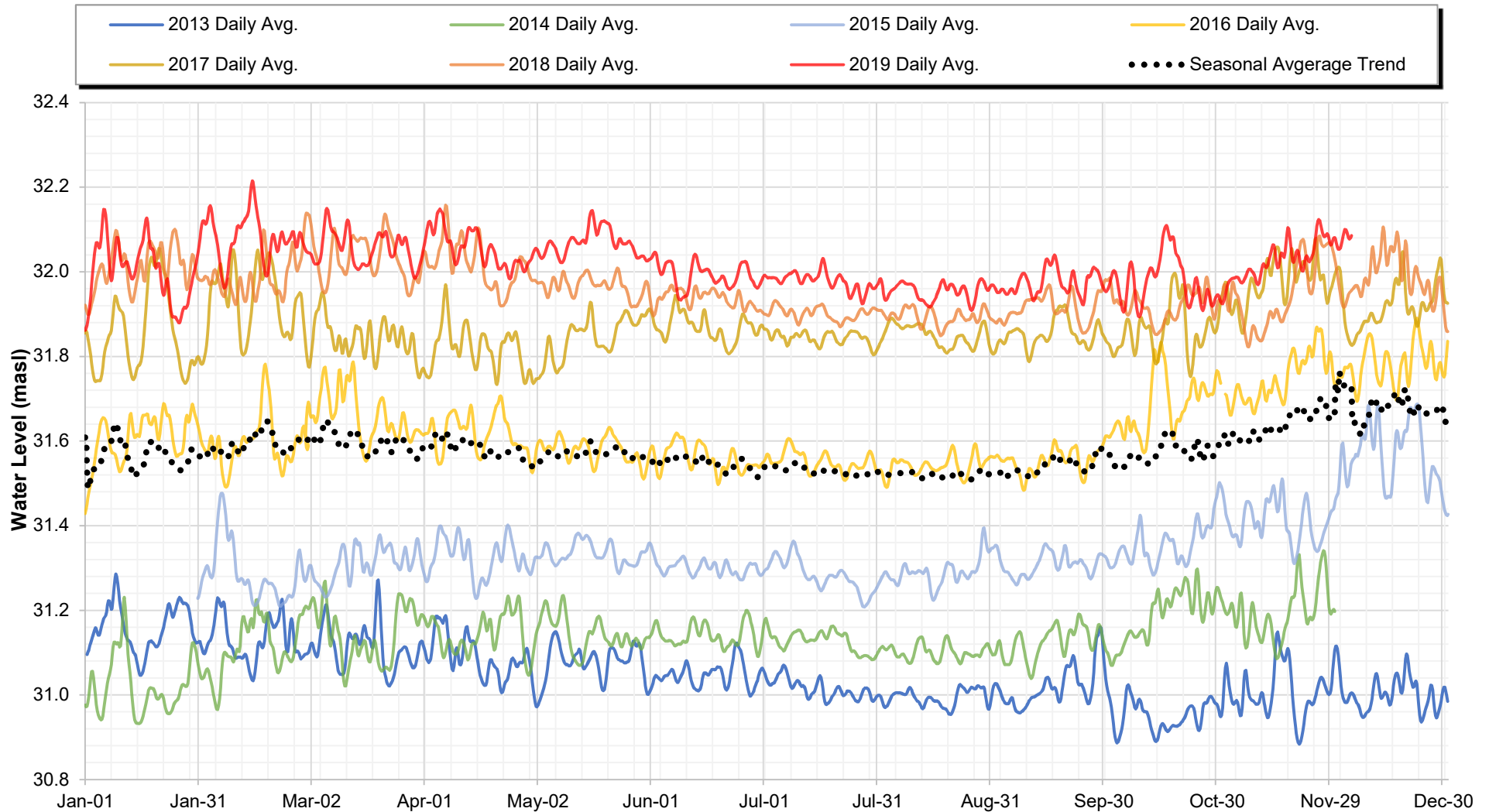
NOTES:

Observation Well is Associated with Aquifer 163

Aquifer 163 is Confined Surficial Sediments


No Seasonal Average Trend Provided if <3 -years of Data Compiled.

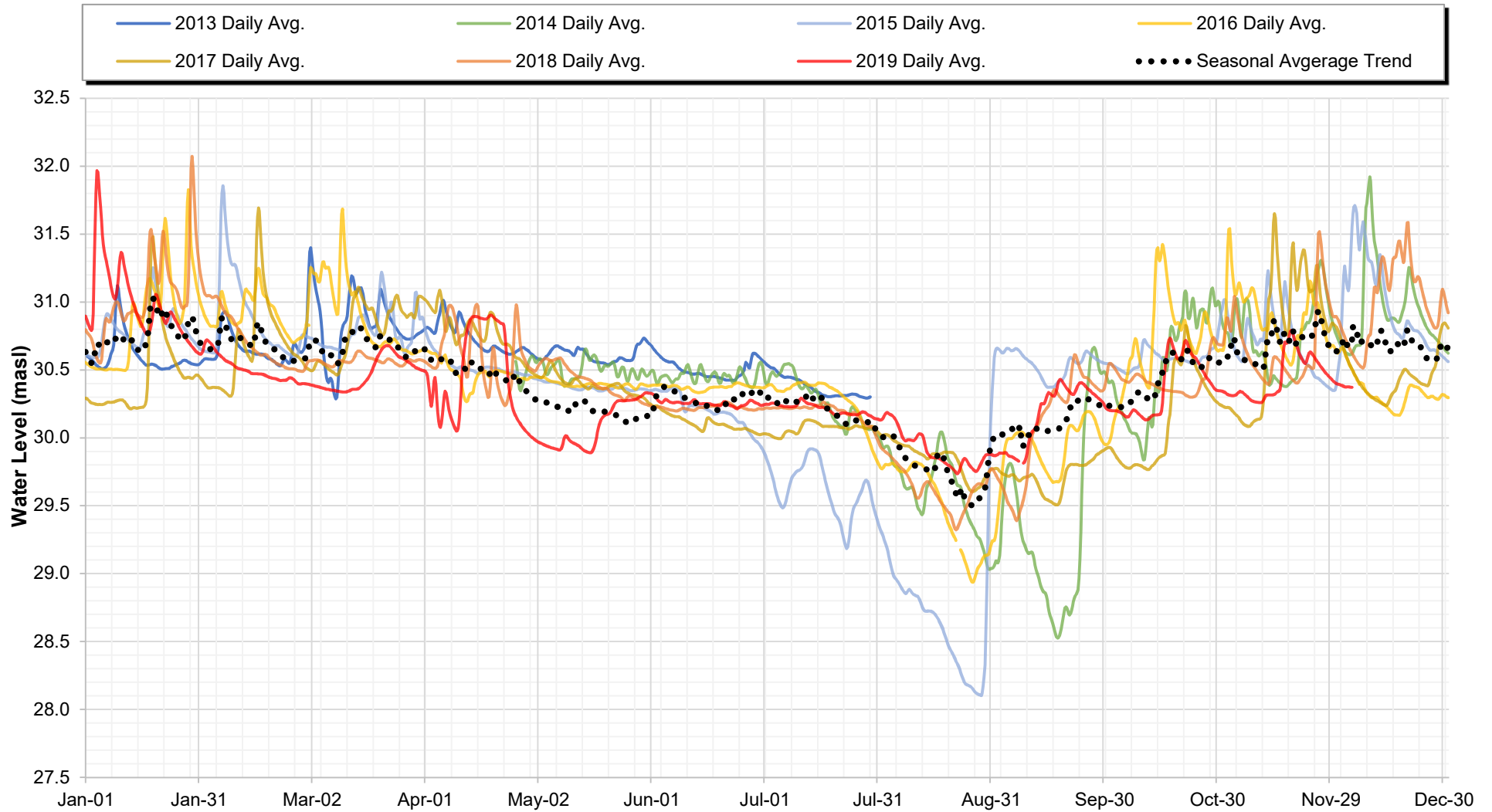
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHARTS VOW 24 - Brightman (WR6 - Nanaimo River)		FIGURE C-42
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 163
 Aquifer 163 is Confined Surficial Sediments
 No 2020 Groundwater Level Data Available

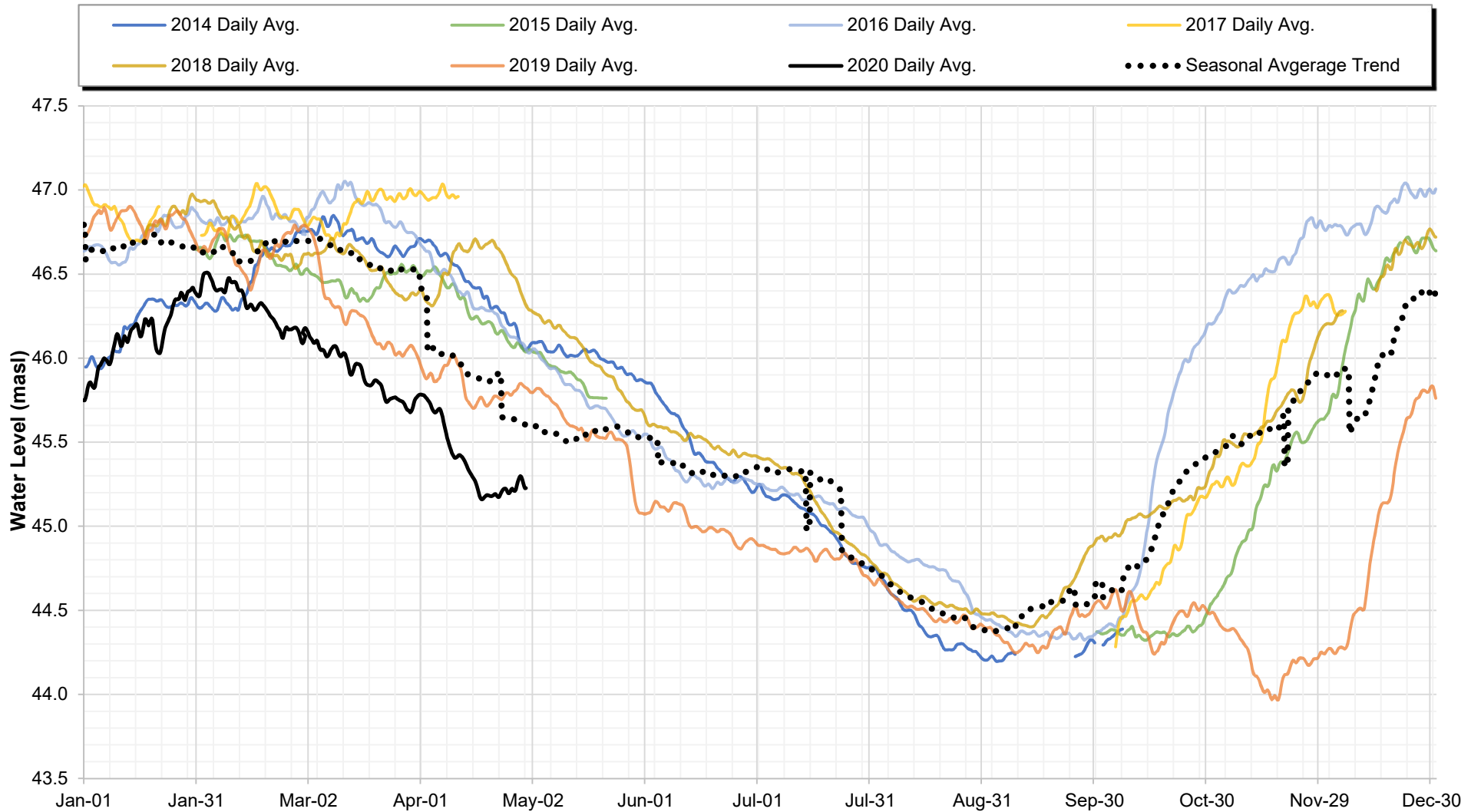
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHARTS OW 390 (WR6 - Nanaimo River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-43
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 161
 Aquifer 161 is Unconfined Surficial Sediments
 No 2020 Groundwater Level Data Available

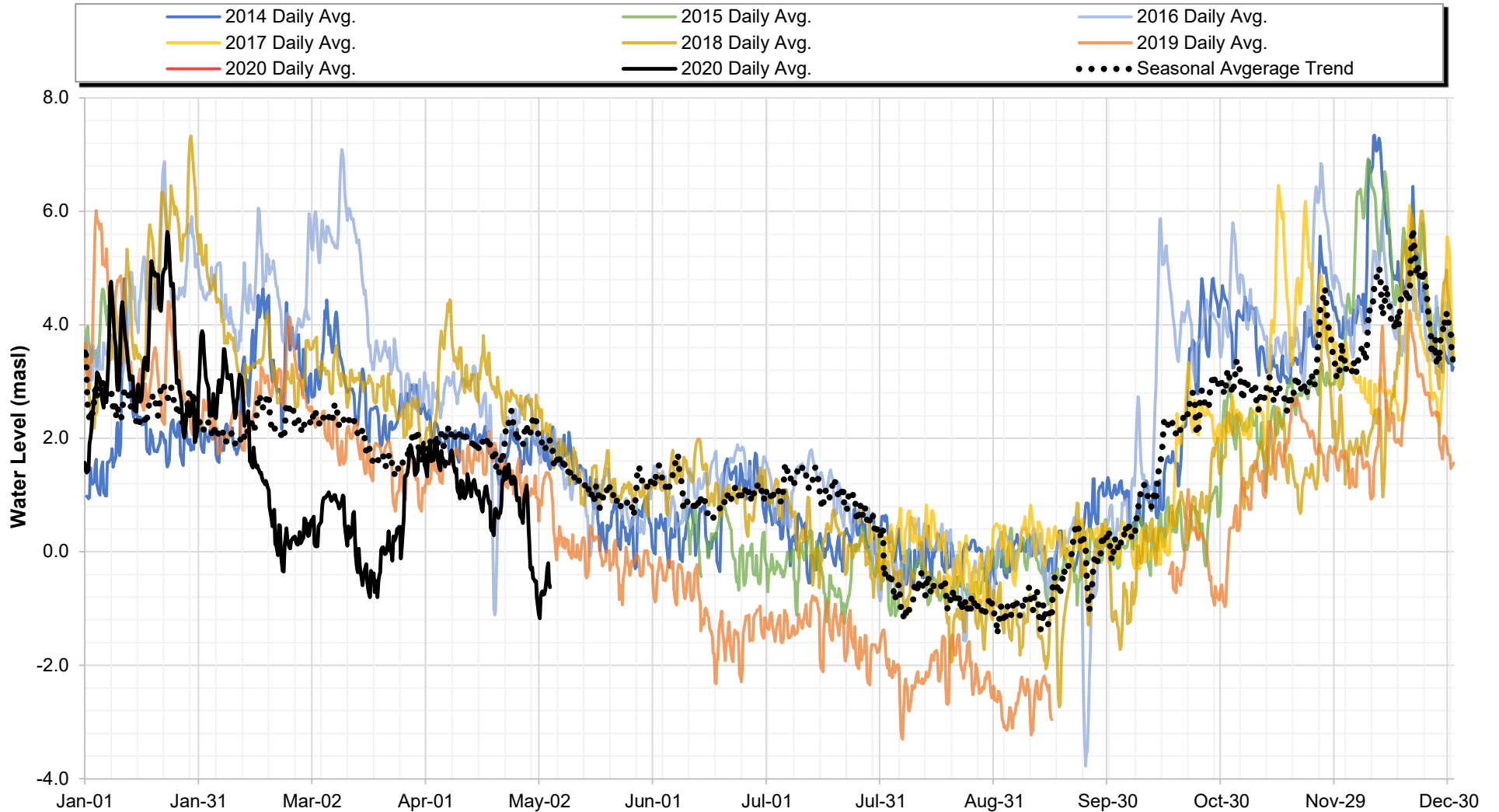
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHARTS OW 312 (WR6 - Nanaimo River)		FIGURE C-44
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock


PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHARTS OW 432 (WR6 - Nanaimo River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-45
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	

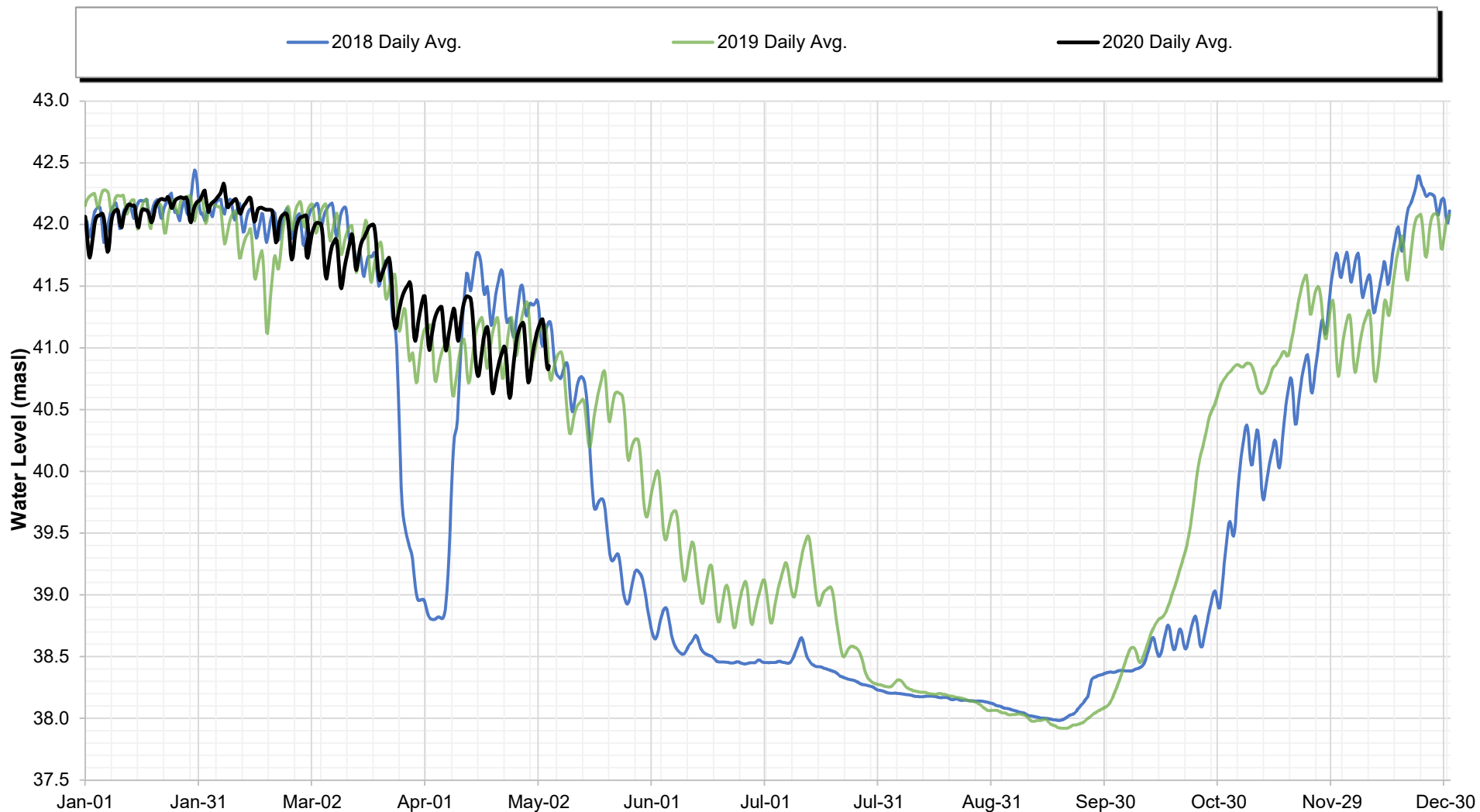


NOTES:

Observation Well is Associated with Aquifer 162

Aquifer 162 is Fractured Bedrock

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHARTS VOW 06 - Pylades (WR6 - Nanaimo River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-46
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 162

Aquifer 162 is Fractured Bedrock

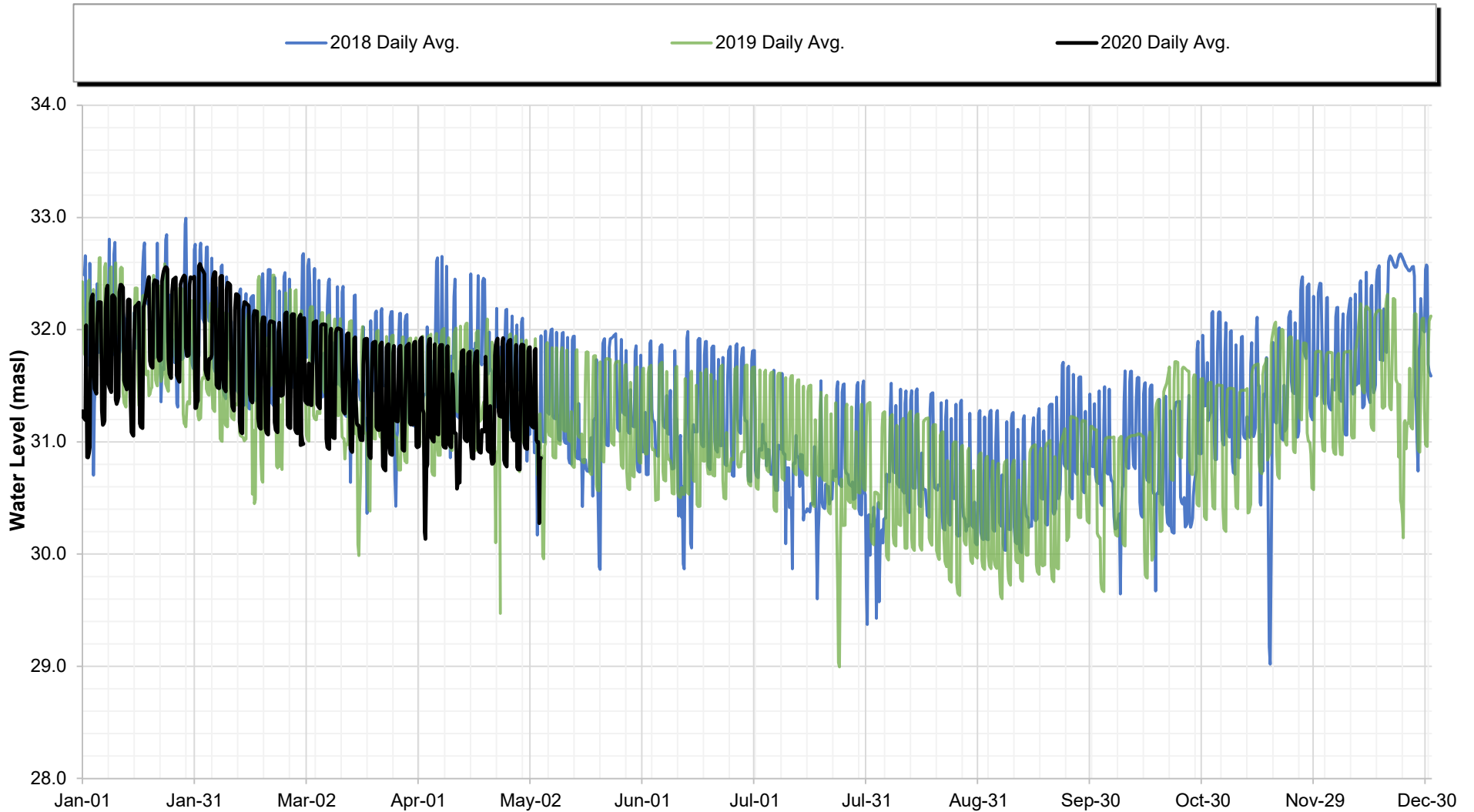
No Seasonal Average Trend Provided if <3 -years of Data Compiled

PROJECT
**DRINKING WATER AND WATERSHED PROTECTION -
 REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020**

TITLE
**SEASONAL GROUNDWATER LEVEL CHARTS
 VOW 19 - DeCourcy (WR6 - Nanaimo River)**

Waterline
 PREPARED BY: WATERLINE RESOURCES INC.
 PROJECT: 2590-20-001
 COMPILED BY: REW
 DATE ISSUED: 2020-05-25
 REVISED: FINAL

FIGURE C-47




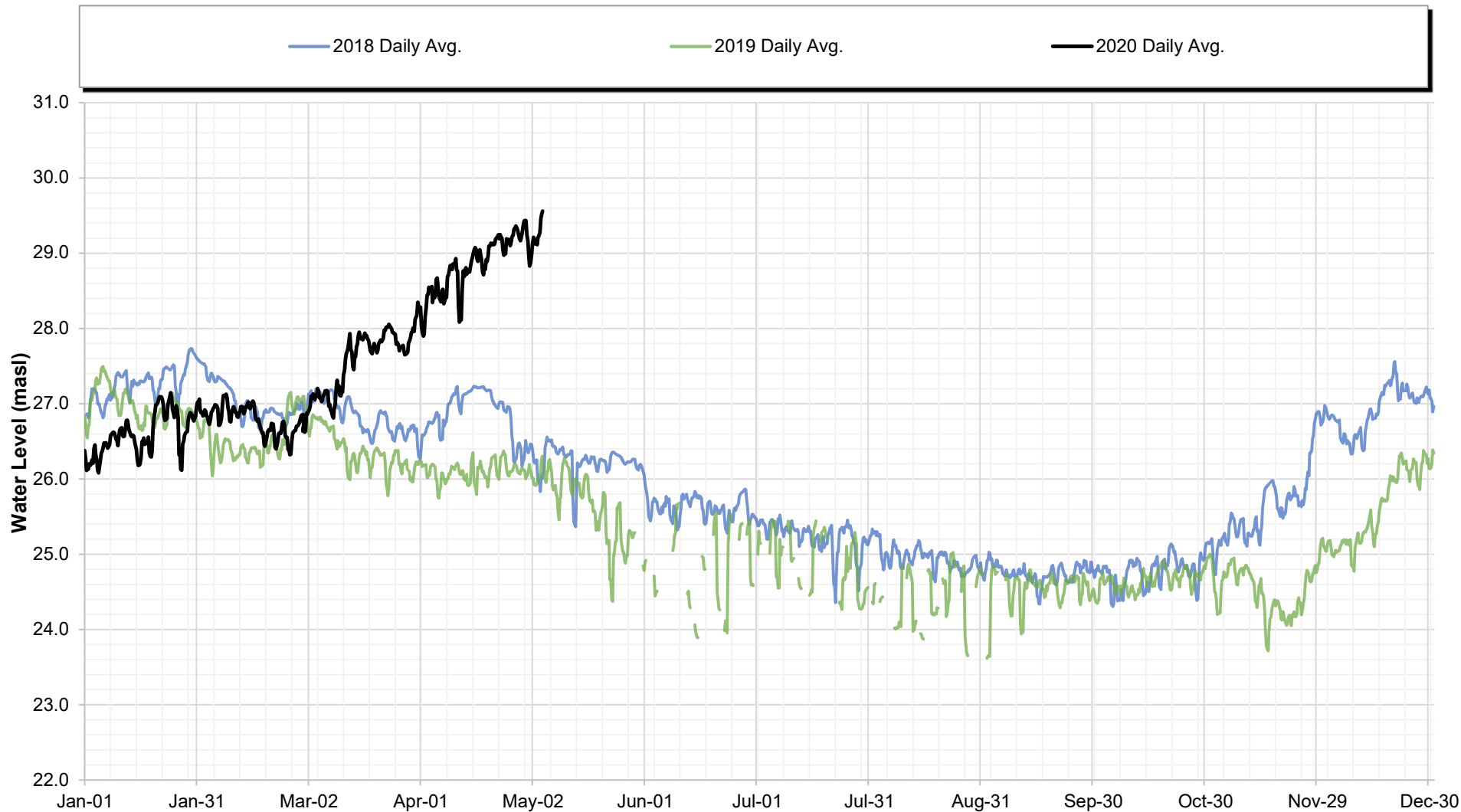
NOTES:

Observation Well is Associated with Aquifer 162

Aquifer 162 is Fractured Bedrock

No Seasonal Average Trend Provided if <3 -years of Data Compiled

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHARTS VOW 20 - Ritten (WR6 - Nanaimo River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-48
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:

Observation Well is Associated with Aquifer 162

Aquifer 162 is Fractured Bedrock

No Seasonal Average Trend Provided if <3 -years of Data Compiled

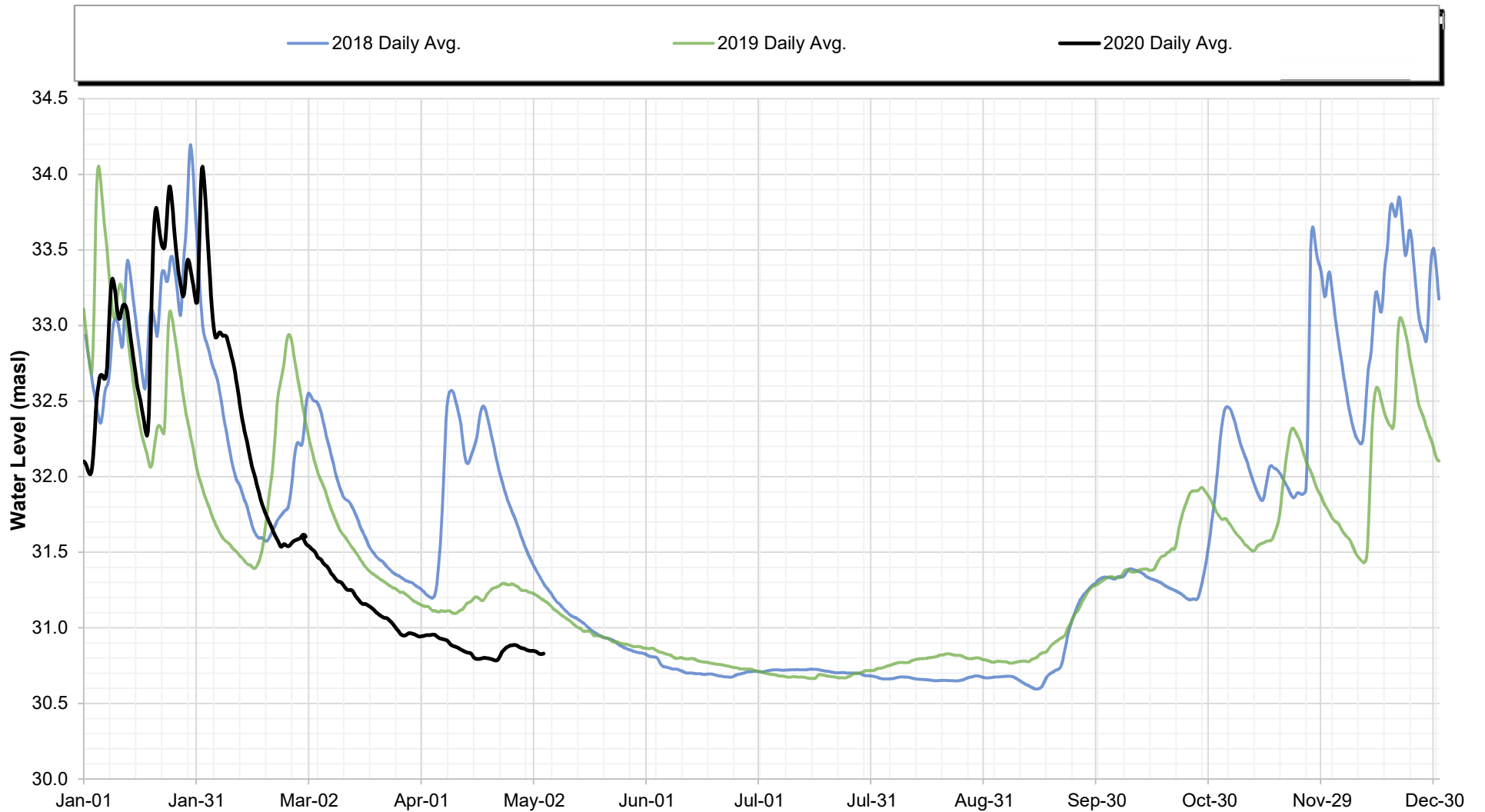
PROJECT
**DRINKING WATER AND WATERSHED PROTECTION -
 REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020**

TITLE
**SEASONAL GROUNDWATER LEVEL CHARTS
 VOW 21 - Rosalie (WR6 - Nanaimo River)**



PREPARED BY: WATERLINE RESOURCES INC.
 PROJECT: 2590-20-001
 COMPILED BY: REW
 DATE ISSUED: 2020-05-25
 REVISED: FINAL

FIGURE C-49




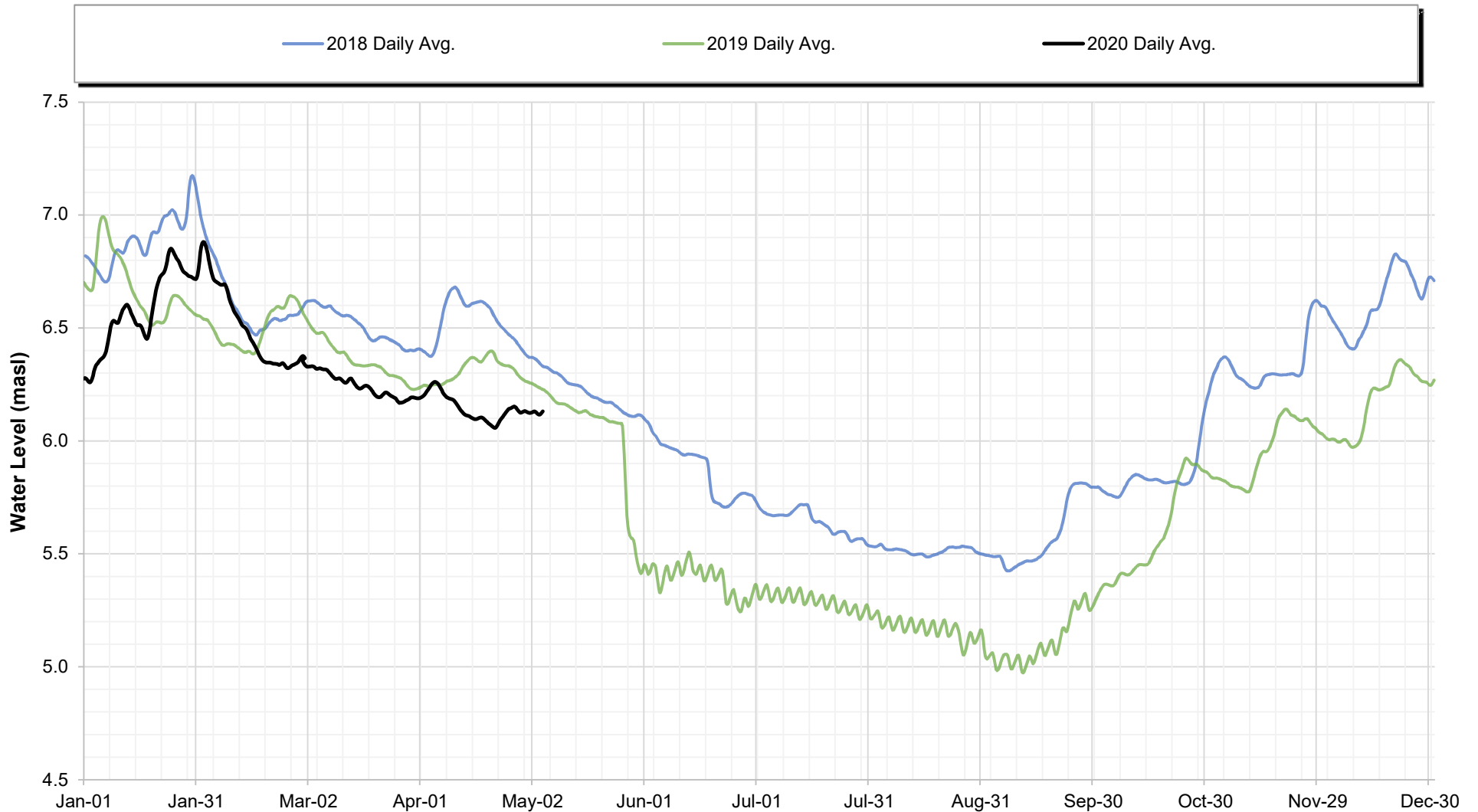
NOTES:

Observation Well is Associated with Aquifer 162

Aquifer 162 is Fractured Bedrock

No Seasonal Average Trend Provided if <3 -years of Data Compiled

PROJECT	DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE	SEASONAL GROUNDWATER LEVEL CHARTS VOW 22 - Gould (WR6 - Nanaimo River)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-50
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25 REVISED: FINAL	




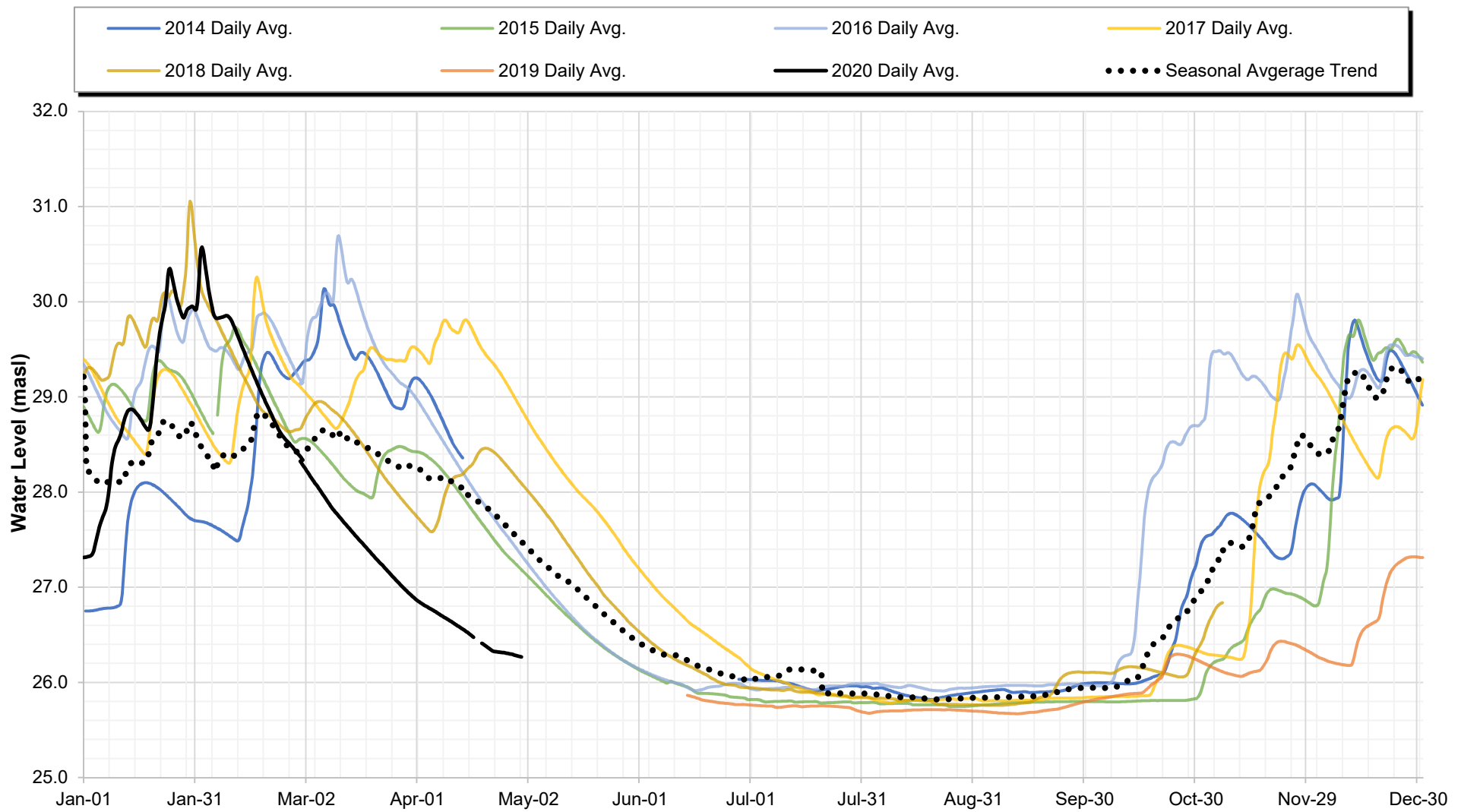
NOTES:

Observation Well is Associated with Aquifer 162

Aquifer 162 is Fractured Bedrock


No Seasonal Average Trend Provided if <3 -years of Data Compiled

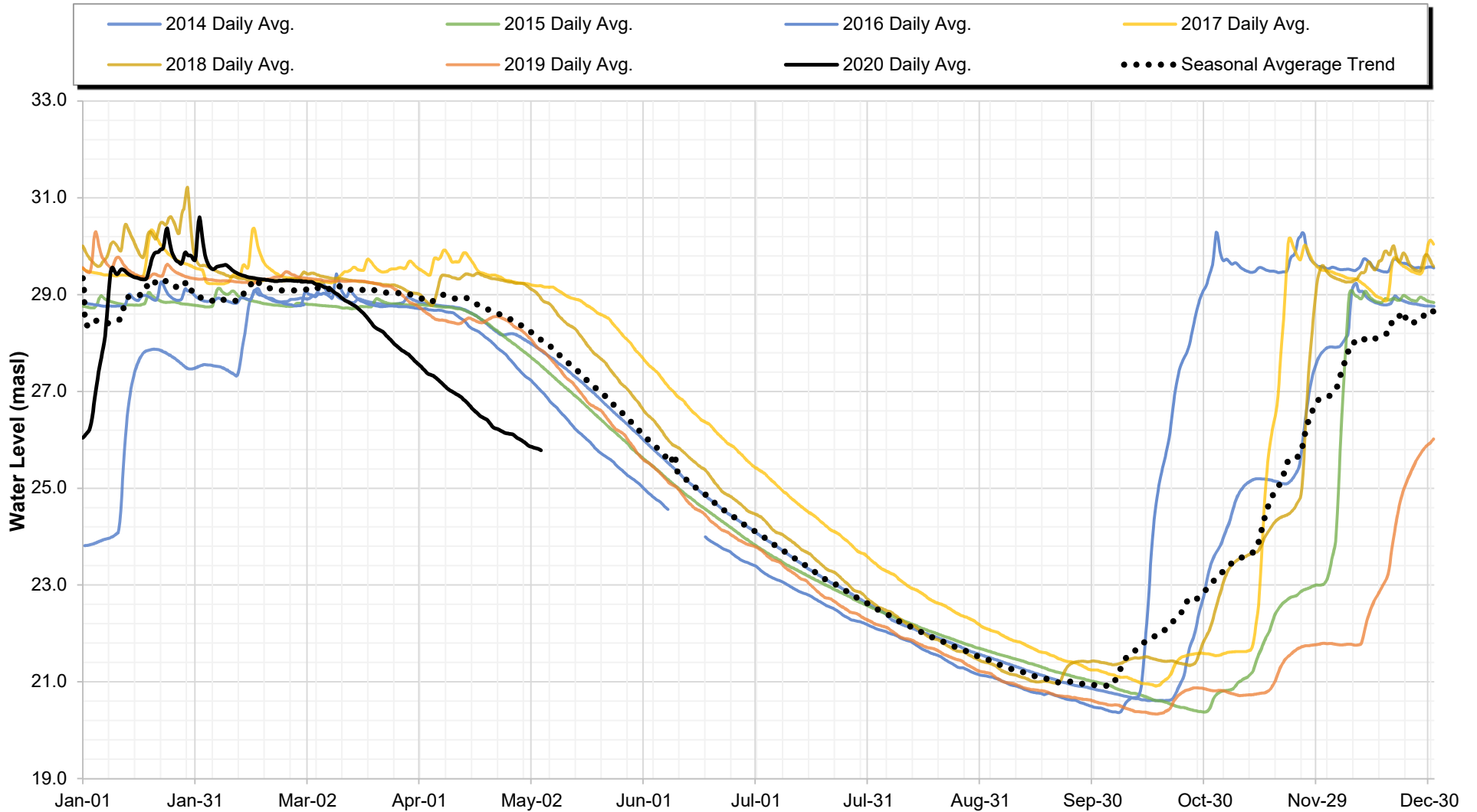
PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
		SEASONAL GROUNDWATER LEVEL CHARTS VOW 23 - Haro (WR6 - Nanaimo River)
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-51
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	



NOTES:


Observation Well is Associated with Aquifer 165
 Aquifer 162 is Fractured Bedrock

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020	
TITLE		SEASONAL GROUNDWATER LEVEL CHARTS OW 435 (WR6 - Nanaimo River)	
	PREPARED BY: WATERLINE RESOURCES INC.	FIGURE C-52	
	PROJECT: 2590-20-001		
	COMPILED BY: REW		
	DATE ISSUED: 2020-05-25 REVISED: FINAL		



NOTES:

Observation Well is Associated with Aquifer 162
 Aquifer 162 is Fractured Bedrock

PROJECT		DRINKING WATER AND WATERSHED PROTECTION - REGIONAL GROUNDWATER LEVEL ANALYSIS SUMMER 2020
TITLE		
SEASONAL GROUNDWATER LEVEL CHARTS VOW 05 - Grandom (WR6 - Nanaimo River)		FIGURE C-53
	PREPARED BY: WATERLINE RESOURCES INC.	
	PROJECT: 2590-20-001	
	COMPILED BY: REW	
	DATE ISSUED: 2020-05-25	
	REVISED: FINAL	