APPENDIX G

Hydrogeology Assessment

Block 27 Hydrogeological Existing Conditions Report
Vaughan, Ontario

Block 27 Landowners Group

Block 27 Hydrogeological Existing Conditions Report
Vaughan, Ontario

Block 27 Landowners Group

R.J. Burnside & Associates Limited
6990 Creditview Road, Unit 2
Mississauga ON L5N 8R9 CANADA

August 2022
300050116.0000

Distribution List

No. of Hard Copies	PDF	Email	Organization Name
0	Yes	Yes	Delta Urban Inc.
0	Yes	Yes	LEA Consulting Ltd.
0	Yes	Yes	Stonybrook Consulting Inc.

Record of Revisions

Revision	Date	Description
-	August 17, 2022	Initial Submission

R.J. Burnside & Associates Limited

Report Prepared By:

Jackie Shaw, P.Eng.
Groundwater Resources Engineer
JS:bs

Report Reviewed By:

Travis Mikel, P.Geo.
Senior Hydrogeologist
TM:bs

Table of Contents

Tables

Figures

Appendices

Disclaimer

Other than by the addressee, copying or distribution of this document, in whole or in part, is not permitted without the express written consent of R.J. Burnside & Associates Limited.

In the preparation of the various instruments of service contained herein, R.J. Burnside & Associates Limited was required to use and rely upon various sources of information (including but not limited to: reports, data, drawings, observations) produced by parties other than R.J. Burnside & Associates Limited. For its part R.J. Burnside & Associates Limited has proceeded based on the belief that the third party/parties in question produced this documentation using accepted industry standards and best practices and that all information was therefore accurate, correct and free of errors at the time of consultation. As such, the comments, recommendations and materials presented in this instrument of service reflect our best judgment in light of the information available at the time of preparation. R.J. Burnside & Associates Limited, its employees, affiliates and subcontractors accept no liability for inaccuracies or errors in the instruments of service provided to the client, arising from deficiencies in the aforementioned third party materials and documents.

R.J. Burnside & Associates Limited makes no warranties, either express or implied, of merchantability and fitness of the documents and other instruments of service for any purpose other than that specified by the contract.

4.0 Introduction

R.J. Burnside & Associates Limited was retained by the Block 27 Landowners Group to complete a hydrogeological assessment of the Block 27 lands in the City of Vaughan. The Block 27 lands (herein referred to as the Subject Lands) are bound by Kirby Road to the north, Keele Street to the east, Teston Road to the south and Jane Street to the west (Figure 4.1.1) and are located within the jurisdiction of the Toronto and Region Conservation Authority (TRCA).

The Block 27 Master Environmental Servicing Plan (MESP) and Block 27 Collector Roads Municipal Class Environmental Assessment (MCEA) study are underway for the Block 27 Community Area (Block 27) in support of the Block 27 development.

The Block 27 Collector Roads MCEA is following the MCEA process for a Schedule 'C' project in accordance with the Municipal Class Environmental Assessment (Municipal Engineers Association, October 2000, as amended in 2007, 2011 and 2015), and will complete Phases 3 and 4 of the MCEA process. The purpose of the Block 27 Collector Roads MCEA study is to develop, identify, evaluate and recommend alternative design options for the collector road network within Block 27 and to support long-term growth and the efficient movement of goods and people in the area.

The MESP forms part of the Block Plan process. The purpose of the MESP is to characterize existing conditions and address a range of environmental and servicing issues associated with proposed development areas including the protection and management of surface water, groundwater, fluvial geomorphology, terrestrial and aquatic resources and the identification of the Natural Heritage Network and municipal servicing needs, including stormwater management, sanitary and water servicing, and site grading requirements.

To minimize duplication of work, enhance efficiencies and utilize currently available data/analyses, the Block 27 Collector Roads MCEA is utilizing all environmental data gathered as part of the MESP. The MESP project team and Block 27 EA project teams have been closely working together since the on-set of the EA study. All investigations and information gathered as part of the MESP has been used by the EA to inform the study.

To provide agencies and stakeholders with the existing environmental data collected as part of the MESP, that is being utilized by the MCEA for the road alignment alternative evaluation, select existing conditions sections of the MESP have been prepared in stand-alone reports to allow agencies and stakeholders to review environmental data collected since the North Vaughan New Communities Transportation Master Plan and comment on the road alignment alternative evaluation tables. This information supplements Technical Memo #1 (March 2022) prepared as part of the Block 27 Major

Collector MCEA on existing conditions. The following report is an excerpt of sections of the draft MESP on drainage and hydrogeological existing conditions. It will also form part of the MESP documentation currently being prepared. The section numbering from the MESP has been retained for consistency.

4.1 Physical Setting

4.1.1 Physiography

The Subject Lands are located on the till plain on the south slope of the Oak Ridges Moraine (ORM). The ORM is a 160 km long, east west oriented ridge of sand, silt and gravel deposits that forms a divide between the Lake Ontario and Lake Simcoe watersheds and acts as an important recharge area for local watercourses. The ORM is located approximately 350 km northeast of the Subject Lands at the closest point. The South Slope physiographic region is characterized by rolling till plains sloping down from the ORM (Chapman and Putnam, 1984). Deeply incised watercourse valleys, which originate on the ORM, are prominent features along the South Slope region.

4.1.2 Topography

The Subject Lands are characterized by gently rolling to undulating topography, with a general overall slope towards the southwest. The maximum relief amplitude across the Subject Lands is approximately 60 m. Analysis of the detailed topographical mapping indicates the highest elevations occur at the northeast corner of the Subject Lands where the ground reaches an elevation of about 305 metres above sea level (masl) (Figure 4.1.1). The lowest elevation is found along the lower reaches of Drainage Feature 1 in the southwest corner of the Subject Lands, where the ground elevation is less than 250 masl at Teston Road (Figure 4.1.1).

4.1.3 Drainage

The Subject Lands are predominantly located within the Upper West Don subwatershed, with a small component along the west boundary draining to the East Purpleville Creek subwatershed. To illustrate the drainage conditions on the Subject Lands, Figure 4.1.1 has been prepared to show the drainage features. The figure also shows the locations of mapped wetlands (Beacon, 2022).

Six main drainage features have been mapped on the Subject Lands and are identified as Drainage Features 1 (DF1) through Drainage Feature 6 (DF6) on Figure 4.1.1. DF1 flows from north to south in the western portion of the Subject Lands, entering the Subject Lands approximately 700 m east of Jane Street at Kirby Road, and existing approximately 250 m east of Jane Street at Teston Road.

Drainage Feature 2 (DF2) is a short, swale feature that arises on the Subject Lands approximately 200 m north of Teston Road and flows to the southeast, exiting the Subject Lands at a culvert approximately 750 m east of Jane Street.

Drainage Feature 3 (DF3) has two contributing drainage features, identified as DF3-1 and DF3-2. DF 3-2 enters the Subject Lands at Keele Street approximately 550 m south of Kirby Road and flows to the west, across the rail line, before turning to the south. DF3-1 arises on the Subject Lands mid-block and flows to the south, converging with DF3-2 approximately 625 m north of Teston Road. Following the convergence of DF3-1 and DF3-2, DF3 flows to the south, exiting the Subject Lands at Teston Road, approximately 950 m east of Jane Street.

Drainage Feature 4 (DF4) arises on the Subject Lands mid-block and flows to the south, before bending to the southwest and converging with DF3 approximately 50 m north of Teston Road.

Drainage Feature 5 (DF5) has two contributing drainage features identified as DF5-1 and DF5-2. DF5-1 arises on the Subject Lands approximately 500 m north of Teston Road and flows to the southwest/south. DF5-2 arises on the Subject Lands approximately 400 m north Teston Road and flows to the west. DF5-1 and DF5-2 converge approximately 250 m north of Teston Road to form DF5, which flows to the south and exits the Subject Lands approximately 700 m west of Keele Street.

Drainage Feature 6 (DF6) bisects the southeast corner of the Subject Lands, entering at Keele Street approximately 200 m north of Teston Road, and exiting at Teston Road approximately 150 m west of Keele Street.

4.1.4 Geology

Regional surficial geology mapping published by the Ontario Geological Survey (2003) shows that the majority of the Subject Lands is covered by clayey silt to silt till. Alluvium deposits, consisting of silt, sand and gravel, are mapped along the lower reaches of DF1 in the southwestern portion of the Subject Lands.

Bedrock beneath the Subject Lands consists of layered grey shale bedrock of the Georgian Bay Formation (OGS, 1991). The regional data available from the Oak Ridges Moraine Groundwater Program (ORMGP) website suggest the bedrock surface slopes from northeast to southwest across the Subject Lands, from elevations of approximately 130 masl to 90 masl, or approximately 160 m to 170 m below ground surface (mbgs).

4.1.5 Regional Hydrostratigraphy

Regional hydrogeological modelling completed by the TRCA for the Don River Watershed (2009) identified eight main layers form the hydrostratigraphic framework of

the ORM in the SWS area. Beginning from the ground surface (youngest sediments) and in order of increasing depth and age, these hydrostratigraphic layers are:

1. Halton (aquitard);
2. Oak Ridges (aquifer);
3. Newmarket (aquitard);
4. Meltwater Channel (aquifer);
5. Thorncliffe (aquifer);
6. Sunnybrook (aquitard);
7. Scarborough (aquifer); and,
8. Upper Bedrock (aquitard).

Cross-sections through the Don River Watershed prepared by the TRCA (2009) identified three major overburden aquifer systems within the Humber Watershed. These are described in order of increasing depth as the:

1. Oak Ridges Aquifer Complex (ORAC), formed within the ORM sediments and sometimes referred to as the Upper Aquifer;
2. Thorncliffe Aquifer (or Middle Aquifer), formed by the sandy sediments of the Thorncliffe Formation and generally separated from the overlying ORAC by the Newmarket till aquitard; and,
3. Scarborough Aquifer (Lower Aquifer), formed by sandy sediments of the Scarborough Formation overlying the bedrock, and separated from the Thorncliffe Aquifer by the Sunnybrook aquitard.

The reported general elevation ranges for these regional aquifers in the vicinity of the Subject Lands are as follows:

1. ORAC: 160 masl – 260 masl;
2. Thorncliffe Aquifer: 140 masl – 160 masl (if present); and,
3. Scarborough Aquifer: 60 masl – 140 masl.

4.2 Site Conditions

4.2.1 Surficial Geology

Soil Engineers Ltd. completed a geotechnical investigation for the Subject Lands in 2010, which included the drilling of 75 boreholes to investigate the soil conditions. Drilling was completed at an additional seven locations as part of the hydrogeological study completed by Cole Engineering in 2010. The boreholes were drilled to depths ranging between 6.3 m and 30.9 m. The borehole locations are shown on Figure 4.2.2 and copies of the hydrogeological well logs (prepared by Cole Engineering) are provided in Appendix C1. The geotechnical boreholes logs are presented in the Soil Engineers Ltd. report for the Block 27 lands, dated January 2011.

Review of these borehole logs shows they generally confirm the published surficial geology mapping, with the majority of the boreholes encountering silty clay till at surface, ranging from 2.3 m to 10.4 m in thickness. Silt and sandy silt deposits, extending to depths of 1.5 mbgs, were encountered at surface in the northeast corner of the Subject Lands (BH10-11, BH10-46 and MW10-82s/d) with sandier deposits (sand, silty sand, and sand and silt) encountered at surface further south (south of DF3-2) immediately west of Keele Street (BH10-43, BH10-80s/d and BH10-81s/d), which extended to depths of 0.8 mbgs to 4.1 mbgs. A deposit of fine sand to silty sand was encountered at surface in MW10-66 and MW10-78s/d, located along DF3-2 mid-block, extending to a depth of 1.5 mbgs to 3.0 mbgs and a deposit of silty sand, extending to a depth of 4.2 mbgs was encountered at surface at MW10-83s/d, located just west of DF1. These surficial sands and silts were found to be underlain by silty clay or silty clay till at each borehole location. Layers of sand and silt were encountered at various depths within the till deposits.

4.2.2 Site Stratigraphy

As part of the hydrogeological investigation completed by Cole Engineering for the SWS, a series of cross-sections through the Subject Lands were prepared to illustrate the local stratigraphy. The cross-sections showed that extensive silt and sand layers underlie the Subject Lands, which are overlain by deposits of silty clay till, interpreted to be the Halton till. In the northern portion of the Subject Lands, thinner sand and silt layers (less than 5 m) are found between elevations of 260 masl and 285 masl, whereas thicker sand and silt layers, greater than 15 m in thickness, are found in the southern and central portions of the Subject Lands below an elevation of 260 masl. It is interpreted that these layers are hydraulically connected and form part of the ORAC. The full thickness of the ORAC was not penetrated by any on-site monitoring wells; however, based on a review of the regional data available from the ORMGP website, the ORAC is expected to be approximately 50 m in thickness in the vicinity of the Subject Lands.

The data available from the ORMGP website suggests that the ORAC is underlain by channel silt and sand layers, and the Newmarket till is absent in the vicinity of the Subject Lands. The Thorncliffe aquifer is mapped underlying the channel sand; however, it is thin and in the northern portion of the Subject Lands, absent. Where mapped, it is expected to be found at an elevation of approximately 180 masl in the vicinity of the Subject Lands, or about 90 mbgs.

4.2.3 Hydraulic Conductivity

Various methods can be used to evaluate soil hydraulic conductivity (K), i.e., the ease with which water can move through soil. Soil characteristics and grainsize data provide a general estimate of bulk hydraulic conductivity, whereas single well response tests are used to assess in situ conditions at specific locations. Both methods were used to estimate the K of the soils on the Subject Lands.

4.2.3.1 Grainsize Estimates of Hydraulic Conductivity

During the geotechnical investigation on the Subject Lands, representative soil samples from the various geological units encountered were collected and analyzed for grainsize distribution (Appendix C2). These grainsize data and soil characteristics were used to provide a general estimate of hydraulic conductivity and infiltration potential of the sediments beneath the Subject Lands. A summary of the hydraulic conductivity estimated from the grainsize analyses, using the Hazen estimation method, is provided below in Table 4.2.1.

Table 4.2.1: Summary of Hydraulic Conductivity

Soil Type	Interpreted Hydrostratigraphic Unit	Hydraulic Conductivity (cm/sec) Hazen Method	Potential Infiltration Rate (mm/hour)*
Silty Clay Till	Halton Till	10^{-7}	<12
Sandy Silt Till	Halton Till	10^{-5} to 10^{-6}	12 – 30
Silt/Sandy Silt	ORAC	10^{-4} to 10^{-6}	12 – 50
Silty Sand/Sand	ORAC	10^{-2} to 10^{-3}	75 – 150

*Based on Table C1 in Appendix C: Credit Valley Conservation and Toronto and Region Conservation Authority Low Impact Development Stormwater Management Planning and Design Guide document, 2010.

4.2.3.2 In-Situ Estimates of Hydraulic Conductivity

To assess the in-situ hydraulic conductivity of the shallow soils, in-situ hydraulic conductivity testing was completed as part of the SWS by Cole Engineering in MW10-67, MW10-70, MW10-73, MW10-76s, MW10-78s, MW10-79s and MW10-82s (refer to Figure 4.2.1 for monitoring well location). The results of these tests show the following:

- MW10-67, MW10-79s and MW10-82s are screened in soils described as silty clay till, clayey silt and silty clay. The results of the bail-down tests completed at these locations suggest low to moderate hydraulic conductivities ranging from 2.7×10^{-7} cm/sec to 7.2×10^{-5} cm/sec.

- MW10-73 is screened in a silty fine sand deposit. The results of the testing at this location suggest a moderate hydraulic conductivity of 5.0×10^{-5} cm/sec. This value is lower than would be expected for this soil type.

- MW10-76s and MW10-78s are screened across layers of silty clay till, silty sand and silt. The results of the bail-down tests completed at these locations suggest

relatively higher hydraulic conductivities of 2.6 x 10^{-4} cm/sec and 1.4 x 10^{-3} cm/sec, respectively.

- MW10-70 is screened across silty clay till and silty sand. The results of the bail-down test completed at this location suggest a moderate hydraulic conductivity if 3.2 x 10^{-5} cm/sec. This value is more indicative of the silty clay till soils than the silty sand screened at this location.

The test results are provided in Appendix C3 and the calculated hydraulic conductivity values are summarized below in Table 4.2.2.

Table 4.2.2: Summary of Hydraulic Conductivity – Single Well Response Tests

Soil Type	Interpreted Hydrostratigraphic Unit	Hydraulic Conductivity (cm/sec) In Situ Bail Test	Potential Infiltration Rate (mm/hour)*
Silty Clay Till	Halton Till	2.7 x 10^{-7} to 7.2 x 10^{-5}	<12 – 30
Silt and Fine Sand	ORAC	5.0 x 10^{-5} to 1.4 x 10^{-3}	30 – 75

*Based on Table C1 in Appendix C: Credit Valley Conservation and Toronto and Region Conservation Authority Low Impact Development Stormwater Management Planning and Design Guide document, 2010.

The results of the in-situ hydraulic conductivity testing are consistent with the estimates provided using the Hazen method to analyze the grainsize testing data.

4.2.4 Hydrologic Features

4.2.4.1 Drainage Features

Monitoring of the drainage features has been completed by IBI over a three-year period to evaluate the potential groundwater/surface water interactions within these features. The extensive monitoring program was developed in consultation with the TRCA and included regular spot flow measurements, surface water level measurements at staff gauges and groundwater level measurements in piezometers. The results of the monitoring program are provided in the Final Report: Groundwater and Surface Water Monitoring, 2018 to 2021, Block 27 Groundwater and Surface Water Investigation (IBI, 2022). Based on the results of the monitoring program, the following conclusions were provided in the IBI report:

- Drainage Feature 1 (DF1) was found to be an intermittent feature in the northern and central portions of the Subject Lands. The lower reaches of the drainage feature, closer to Teston Road, were found to have permanent flow which is interpreted to be supported by groundwater discharge.

- The upper portion of Drainage Feature 2 (DF2) was found to be farmed through and consist of a broad vegetated swale in the lower portion. The feature was found to have ephemeral flow, observed to be dry during most monitoring events, with flows only noted during the early spring and in response to large rainfall events. This feature is interpreted to be supported by surface water runoff, with no indication of groundwater.

- Drainage Feature 3-1 (DF3-1) was found to have ephemeral flow, with dry conditions during most monitoring rounds, and minor flow only observed in the spring and fall. This feature is interpreted to be supported by surface water runoff, with no indication of groundwater.

- Drainage Feature 3-2 (DF3-2) was found to have permanent flow near Keele Street (east of the rail line), which transitioned to intermittent flow downstream. The permanent flow appears to be a result of stormwater discharge from an existing stormwater management pond located on the east side of Keele Street, which outlets to Drainage Feature 3-2 (DF3-2). This drainage feature is interpreted to be supported by surface water runoff.

- Drainage Feature 3 (DF3) was found to have permanent flow, which is interpreted to be supported by groundwater discharge.

- Drainage Feature 4 (DF4) was found to have intermittent flow, transitioning to permanent flow at the downstream end just before the confluence with Drainage Feature 3 (DF3). It is interpreted that seasonal groundwater discharge occurs along the lower reaches of the drainage feature.

- Drainage Feature 5 (DF5) and the two contributing reaches (DF5-1 DF5-2) were found to have ephemeral flow, with the features observed to be dry during most monitoring events and flows only noted in response to rainfall events. These features are interpreted to be supported by surface water runoff, with no indication of groundwater.

- Drainage Feature 6 (DF6) was found to have ephemeral flow, with flows only noted in the feature during the early spring following snowmelt. This feature is interpreted to be supported by surface water runoff, with no indication of groundwater.

4.2.4.2 Wetlands

There are several wetland features located on the Subject lands. A total of 16 wetlands were mapped by the Ministry of Natural Resources and Fisheries (MNRF) as Provincially Significant Wetlands (PSWs) in 2017. The location and labelling of wetlands presented on figures in the Groundwater and Surface Water Monitoring Report (IBI, 2022) are based on the MNRF data (2017). The wetlands were instrumented with piezometers

and staff gauges by IBI to measure groundwater and surface water levels and the groundwater and surface water levels in the wetlands were monitored over a three-year period by IBI. The detailed results of the monitoring program and hydrographs for each monitoring station are provided in the IBI 2022 report submitted under separate cover. A copy of the hydrographs is provided in Appendix C4. The locations of the monitoring stations are shown on Figure 4.2.1 and the key findings with respect to the wetland water conditions are discussed for each wetland in the subsections below, followed by a summary table (Table 4.2.3) noting the key findings for each wetland.

As part of the MESP, feature boundary surveys were prepared based on feature boundary staking exercises completed with the MNRF and the TRCA. In many locations, site fieldwork has refined wetland boundaries to reflect site fieldwork. MNRF wetland labels have been maintained with the exception of WT7 and WT12 labels that have been revised to identify differing parts of large wetlands. WT7 has been broken into WT7-1, WT7-2 and WT7-3, and WT12 has been broken down into six parts, WT12-1 through WT12-6 based on their locations and differing characteristics. The MESP presents the refined wetland boundaries and labels.

WT7-1

WT7-1 is located at the southwest corner of the Block 27 lands, along DF1 (Figure 4.2.1). WT7-1 is a large Y-shaped organic swamp dominated by Yellow Birch with lesser occurrences of Eastern Hemlock, Sugar Maple, White Pine, Black Ash, with drainages running down the middle of each arm and joining near the middle of the unit. Evident seepage areas occur in this community. Rare or uncommon species occur.

WT7-1 was instrumented with piezometer nests and staff gauges at three monitoring stations, identified as SW-FBWB_1, FBWB_2 and FBWB_3, by IBI in 2018. FBWB_3 is located along a small drainage feature which converges with DF1, and SW-FBWB_1 and FBWB_2 are located along the main branch of DF1, with SW-FBWB_1 located immediately north of Teston Road, and FBWB_2 just north of the convergence with the smaller drainage feature. Surface water spot-flow monitoring was also completed by IBI at station SW-FBWB_1.

The results of the monitoring at FBWB_3 show that the groundwater levels in this portion of the wetland ranged from dry at 0.6 m below ground surface (bgs) to 0.09 m above ground surface (ags) in the shallow piezometer and 1.57 mbgs to 0.18 mbgs in the deeper piezometer. The groundwater levels in the shallow piezometer were consistently higher than the groundwater levels in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions. A datalogger installed at the staff gauge shows that surface water is present in the drainage feature through the wetland, up to a depth of about 0.25 m in the spring and fall, with mainly dry conditions throughout the summer months.

The results of the monitoring at FBWB_2 show that the groundwater levels at this location ranged from 0.4 mbgs to 0.22 mags in the shallow piezometer and from 0.8 mbgs to 0.21 mags in the deeper piezometer. The groundwater levels in the deeper piezometer were generally found to be higher than the groundwater levels in the shallower piezometer, showing an upward hydraulic gradient.

The results of the monitoring at SW-FBWB_1 show that the groundwater levels at this location ranged from 1.06 mbgs to 0.06 mbgs in the shallow piezometer and from 0.12 mbgs to 1.53 mags in the deeper piezometer. The groundwater levels in the deeper piezometer were found to be consistently higher than the groundwater levels in the shallower piezometer, showing an upward hydraulic gradient and discharge conditions. Permanent flow was observed in DF1 through this portion of WT7-1, with baseflows measured from 3.0 L/s to 5.9 L/s during the summer low flow periods.

Based on the monitoring results, it is interpreted that groundwater discharge provides baseflow to the portion of WT7-1 within the valley associated with DF1. Further upslope, the monitoring data from the portion of the wetland extending to the northeast, suggest this portion of the feature relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT7-2 and WT7-3

WT7-2 and WT7-3 are small wetland features located along DF1, approximately 550 m north of Teston Road, with WT7-3 located immediately north of WT7-2 (Figure 4.2.1). These mineral forb meadow marsh units consist primarily of Panicled Aster, Hairy Willowherb, Rice Cutgrass, Reed Canary Grass, and Green Bulrush with patches of shrubs including Red-osier Dogwood and willows.

WT7-2 was instrumented with a piezometer nest and staff gauge at monitoring station FBWB_5 by IBI in 2018. WT7-3 was not specifically instrumented; however, similar hydrogeological conditions to WT7-2 are expected in this feature.

The results of the monitoring at FBWB_5 indicate that the groundwater levels in this wetland ranged from 0.69 mbgs to 0.14 mags in the shallow piezometer and 0.94 mbgs to 0.13 mbgs in the deeper piezometer. The groundwater levels in the shallow piezometer were consistently higher than the groundwater levels in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions. A datalogger installed at the staff gauge shows that surface water is present within the drainage feature flowing through this wetland up to a depth of about 0.4 m in the spring and fall, with mainly dry conditions throughout the summer months. The groundwater levels in the shallow piezometer mimic the surface water levels, rising above ground surface when surface water is present in the feature, and rapidly declining below ground surface once the feature dries.

It is interpreted from the monitoring data that WT17-2 and WT17-3 rely on surface water inputs (surface water runoff as well as direct precipitation) and have a recharge function.

WT8

WT8 is a long, narrow wetland located along DF1, immediately north of WT7-3 (Figure 4.2.1). This large unit occurs consists of a mosaic of forbs and grasses dominated mineral meadow marches primarily comprised of Panicled Aster, Hairy Willowherb, Reed Canary Grass, Redtop, and various sedges with pockets of Broad-leaved Cattail. Amphibian breeding occurs in this unit.

WT8 was instrumented with piezometer nests and staff gauges at two monitoring stations, identified as SW-FBWB_2 and FBWB_6, by IBI in 2018. SW-FBWB_2 is located near the south end of WT8 and FBWB_6 is located near the north end. Flow monitoring was also completed by IBI at station SW-FBWB_2.

The results of the monitoring at SW-FBWB_2 indicate that the groundwater levels in this portion of the wetland typically ranged from 0.82 mbgs to 0 mbgs in the shallow piezometer; however, one reading of 0.62 mags was recorded in April 2020. In the deeper piezometer, groundwater levels ranged from 1.27 mbgs to 0.05 mags. The groundwater levels in the deeper piezometer showed much more seasonal variability, rising to ground surface in the spring and falling more than 1 mbgs through the summer, whereas the shallow piezometer remained fairly consistent through 2020 and 2021 at a depth of approximately 0.4 mbgs. As such, apparent hydraulic gradients reversals are observed, with upward gradients in the spring and downward gradients in the summer.

Datalogger readings from the staff gauge installed at SW-FBWB_2 show that surface water is typically present in the drainage feature which flows through this wetland up to a depth of 0.4 m in the spring months, and the feature is found to be dry at this location through the summer and fall seasons. The groundwater levels in the shallow piezometer were consistently below the surface water levels at the staff gauge. The groundwater levels in the deeper piezometer were found to be below the surface water level in the spring of 2019, and at a similar level in the spring of 2020 and 2021. The flow monitoring at SW-FBWB_2 found baseflows in DF1 through the wetland to range from 0.2 L/s to 0.3 L/s in the spring, with the feature generally found dry by early spring.

The results of the monitoring at FBWB_6 show that the groundwater levels have ranged from dry at 1.26 mbgs to 0.01 mags in the shallow piezometer and dry at 2.04 mbgs to 0.08 mags in the deeper piezometer. The datalogger readings from the staff gauge show that surface water is present in the drainage feature flowing through this wetland up to a depth of about 0.2 m during the spring, and mostly dry conditions are observed throughout the summer and fall. The groundwater levels were found to rise to ground surface during the spring months, when surface water was present in the feature, and drop rapidly through the summer when the surface water dried. Although apparent

gradient reversals are observed during the summer months (i.e., the groundwater levels in the deeper piezometer are higher than the groundwater levels in the shallow piezometer, suggesting an upward gradient), this appears to be the result of a lagged response in the deeper piezometer rather than a true gradient reversal. The lagged response is due to the low hydraulic conductivity of the till soils and the slow and limited movement of groundwater in these soils.

It is interpreted from the monitoring data for WT8 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT9

WT9 is a small wetland feature located along DF1 immediately north of WT8, approximately 600 m south of Kirby Road (Figure 4.2.1). This small mineral meadow marsh unit is comprised of wetland and upland plants, primarily Reed Canary Grass, Panicled Aster, Hairy Willowherb, Tall Goldenrod and Canada Thistle.

WT9 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as FBWB_7 by IBI in 2018. The results of the monitoring at FBWB_7 show that the groundwater levels have ranged from dry at 1.20 mbgs to 0.09 mbgs in the shallow piezometer and dry at 1.67 mbgs to 0.22 mbgs in the deeper piezometer. The datalogger readings from the staff gauge show that surface water is present within the drainage feature flowing through this wetland up to a depth of about 0.3 m during the spring, and dry conditions are observed throughout the summer and fall. The groundwater levels were found to be similar to the surface water level in the feature during the spring and drop rapidly through the summer when the surface water dried. Although apparent gradient reversals are observed during the summer months (i.e., the groundwater levels in the deeper piezometer are higher than the groundwater levels in the shallow piezometer, suggesting an upward gradient), this appears to be the result of a lagged response in the deeper piezometer rather than a true gradient reversal.

It is interpreted from the monitoring data for WT8 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT11

WT11 is located in the northeastern portion of Block 27, immediately west of the rail line and south of Kirby Road (Figure 4.2.1). This mineral meadow marsh unit is dominated by Reed Canary Grass and includes a dug pond with a surrounding ring of cattail species. The presence of open water areas within this units supports substantial amphibian breeding productivity.

WT11 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as GW-FBWB_4 by IBI in 2018. The results of the monitoring at GW-FBWB_4 show that the groundwater levels have ranged from 0.73 mbgs to 0.65 mags in the shallow piezometer and 0.34 mbgs to 0.75 mags in the deeper piezometer. It is noted that readings were not obtained on several occasions (particularly through 2021) due to the piezometers being fully submerged and not accessible for monitoring. The datalogger readings from the staff gauge show that surface water is present in the feature up to depths greater than 1 m during the spring and fall, and dry conditions were periodically observed in the summer of 2018, 2019 and 2020. The staff gauge and datalogger were fully submerged during all monitoring rounds in 2021, and as such the datalogger could not be downloaded. Comparison of the surface water and groundwater levels in the feature show that the groundwater levels are consistently lower than the surface water levels, showing a downward hydraulic gradient and recharge conditions.

It is interpreted from the monitoring data for WT11 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT12-1

WT12-1 is located immediately north of Teston Road along DF2 (Figure 4.2.1). This mall mineral meadow marsh unit (MAM2-2) is dominated by Reed Canary Grass, Common Reed and Hybrid Cattail.

WT12-1 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as GW-FBWB_9 by IBI in 2018. The results of the monitoring at GW-FBWB_9 show that the groundwater levels have ranged from 0.51 mbgs to 0.32 mags in the shallow piezometer and 1.3 mbgs to 0.16 mags in the deeper piezometer. The groundwater level in the shallow piezometer is typically higher than the groundwater level in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions; however, apparent gradient reversals are observed during the summer months (i.e., the groundwater levels in the deeper piezometer are higher than the groundwater levels in the shallow piezometer, suggesting an upward gradient). This apparent gradient reversal appears to be the result of a lagged response in the deeper piezometer rather than a true gradient reversal.

A datalogger installed at the staff gauge shows that surface water is present in the feature up to depths of about 0.25 m in the spring and fall, with intermittently dry conditions throughout the summer months. The groundwater levels in the shallow piezometer are similar to the surface water levels, rising above ground surface when surface water is present in the feature, and dropping below ground surface once the feature dries.

It is interpreted from the monitoring data for WT12-1 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT12-2

WT12-2 is located along DF4, immediately north of Teston Road (Figure 4.2.1). This mineral thicket swamp community is dominated by shrubs including Red Osier Dogwood and willow shrubs as well as patches of shrubs. Groundwater seepage and areas of organics occur within this community, with presence of rare or uncommon species.

WT12-2 was instrumented with piezometer nests and staff gauges at three monitoring stations, identified as BW-GW_661, GW-FBWB_10 and GW-FBWB-SW_1, by IBI in 2018. BW-GW_661 is located at the northeast end of the feature, GW-FBWB_10 is located in the middle of the feature and GW-FBWB-SW_1 is located at the southwest end of the feature, at Teston Road. Surface water spot-flow monitoring was also completed by IBI at station GW-FBWB-SW_1.

The results of the monitoring at BW-GW_661 indicate that the groundwater levels in this portion of the wetland ranged from 1.29 mbgs to 0.01 mags in the shallow piezometer and 0.68 mbgs to 0.25 mbgs in the deeper piezometer. The groundwater levels in the deeper piezometer showed seasonal variations generally within a 0.5 m range, whereas the groundwater levels in the shallower piezometer ranged by more than 1.2 m seasonally. The variation results in occasional apparent gradient reversals, with the groundwater levels in the shallow piezometer slightly higher in the spring and the groundwater levels in the deeper piezometer higher in the summer and fall months (discharge gradients). A datalogger installed at the staff gauge shows that surface water is periodically present within the drainage feature through this wetland up to depths of about 0.25 m in the spring and fall, with mainly dry conditions throughout the summer months.

The results of the monitoring at GW-FBWB_10 show that the groundwater levels at this location ranged from 0.02 mags to 0.84 mags in the shallow piezometer and from 0.08 mags to 0.85 mags in the deeper piezometer. The groundwater levels in the deeper piezometer were generally found to be higher than the groundwater levels in the shallower piezometer, showing an upward hydraulic gradient, and discharge conditions along the bank. A datalogger installed at the staff gauge shows that permanent surface water flow is present within the drainage feature that flows through the wetland. The groundwater levels in the deeper piezometer are typically higher than the surface water levels, again showing an upward hydraulic gradient and discharge conditions.

The results of the monitoring at GW-FBWB-SW_1 show that the groundwater levels at this location ranged from 0.67 mbgs to 0.12 mbgs in the shallow piezometer and from 0.48 mbgs to 0.12 mbgs in the deeper piezometer. The groundwater levels in the

shallow piezometer were generally found to be higher than the groundwater levels in the deeper piezometer, showing downward hydraulic gradient, and recharge conditions. A datalogger installed at the staff gauge shows that permanent surface water flow is present within the drainage feature that flows through this wetland. The groundwater levels in the piezometers are consistently lower than the surface water levels, again showing a downward hydraulic gradient and recharge conditions. Stream flow monitoring completed in DF4 through this portion of WT12-2 showed baseflows ranging from 0.9 L/s to 2.5 L/s during the summer low flow periods.

Based on the results of the monitoring data within WT12-2, it is interpreted that the upstream portion of the wetland (in the vicinity of BW_GW_661) relies of surface water inputs (surface water runoff as well as direct precipitation); however, groundwater discharge occurs in the central portion of the feature (in the vicinity of GW-FBWB_10) providing perennial baseflow conditions in this portion of the wetland. The groundwater discharge area appears to the limited to the central portion of the wetland, with recharge conditions apparent further downstream in the area of GW-FBWB-SW_1. This localized discharge may be due to the drainage feature intersecting a sand lens within the till in this area of the wetland.

WT12-3

WT12-3 is located along DF3, extending partially up the 3-1 and 3-2 branches (Figure 4.2.1). This large unit consists of a shallow marsh dominated by cattail species with inclusion of broad-leaved sedges patches primarily comprised of Lakebank Sedge and Tussock Sedge. Southern portions of this unit are thicket swamps mostly dominated by Red-osier Dogwood. Amphibian breeding occurs in this unit.

WT12-3 was instrumented with piezometer nests and staff gauges at three monitoring stations, identified as GW_3, GW-FBWB_8 and FBWB_10, by IBI in 2018. GW_3 is located along DF3-1 at the north end of the wetland, GW-FBWB_8 is located along DF3-1 immediately upstream of the convergence with DF3-2 and FBWB_10 is located in the central portion of the wetland, along DF3.

The results of the monitoring at GW_3 indicate that the groundwater levels in this portion of the wetland ranged from dry at 0.85 mbgs to 0.0 mbgs in the shallow piezometer and 1.74 mbgs to 0.04 mags in the deeper piezometer. A datalogger installed at the staff gauge shows that surface water is present within the drainage feature that flows through this portion of the wetland up to a depth of about 0.3 m in the spring and fall, with mainly dry conditions throughout the summer months. The groundwater levels in the shallow and deeper piezometers are similar during the spring and fall showing little gradient and rise to ground surface when surface water is present. During the summer months, the groundwater level declines rapidly as the feature dries. An additional piezometer was installed in the streambed at this location in May 2019 in order to directly compare the groundwater and surface water levels. Data from this additional piezometer show that

groundwater levels ranged from dry at 1.22 mbgs to 0.1 mags and were consistently lower than the surface water levels outside the piezometer, showing a downward gradient.

The results of the monitoring at GW-FBWB_8 indicate that the groundwater levels in this portion of the wetland ranged from dry at 1.34 mbgs to 0.01 mbgs in the shallow piezometer and 0.95 mbgs to 0.14 mbgs in the deeper piezometer. The groundwater levels in the deeper piezometer were typically higher than the groundwater level in the shallow piezometer, showing an upward hydraulic gradient and discharge conditions; however, groundwater levels are consistently below ground surface. A datalogger installed at the staff gauge within the drainage feature through this portion of the wetland shows that surface water is periodically present up to a depth of about 0.15 m in the spring and fall, with mainly dry conditions throughout the summer months. The surface water level in the feature is consistently higher than the groundwater levels, indicating a downward hydraulic gradient and recharge conditions when water is present in the feature.

The results of the monitoring at FBWB_10 indicate that the groundwater levels in this portion of the wetland ranged from 0.2 mags to 0.12 mags in the shallow piezometer and 0.1 mbgs to 0.43 mags in the deeper piezometer. The groundwater levels in the deeper piezometer were consistently higher than the groundwater levels in the shallower piezometer, showing an upward gradient and discharge conditions. A datalogger installed at the staff gauge shows that surface water is perennially present within the feature.

Based on the results of the monitoring data within WT12-3, it is interpreted that the upstream portion of the wetland along DF3-1 (in the vicinity of GW_3 and GW-FBWB_8) relies of surface water inputs (surface water runoff as well as direct precipitation); however, groundwater discharge occurs in the central portion of the feature (in the vicinity of FBWB_10) providing perennial baseflow conditions in this portion of the wetland.

WT12-4

WT12-4 is located along DF3-2, just north of the convergence with the 3-1 branch (Figure 4.2.1). This wetland unit consists almost exclusively of cattail species; it also includes a large Common Reed patch. Amphibian breeding occurs in this unit.

WT12-4 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as SW-FBWB_3, by IBI in 2018. The results of the monitoring at SW-FBWB_3 indicate that the groundwater levels ranged from 1.08 mbgs to 0.17 mbgs in the shallow piezometer and 1.12 mbgs to 0.19 mbgs in the deeper piezometer. An additional piezometer installed within the streambed shows that the groundwater level in the streambed piezometer ranged from 0.45 mbgs to 0.12 mags. Comparison of the

groundwater levels in the streambed piezometer to the surface water levels at the staff gauge show that the surface water level is consistently higher than the groundwater level, showing a downward hydraulic gradient. A datalogger installed at the staff gauge shows that surface water is present within the drainage feature flowing through this wetland up to a depth of about 0.55 m the spring and fall, with periodically dry conditions throughout the summer months, between rainfall events.

It is interpreted from the monitoring data for WT12-4 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT12-5

WT12-5 is a long, narrow wetland located along DF4, immediately upstream of WT12-2 (Figure 4.2.1). This wetland unit corresponds to unstaked PSW portions mapped by MNRF. Although that are currently and regularly farmed, they appear to maintain wetland vegetation overtime including almost exclusively Reed Canary Grass.

WT12-5 was instrumented with piezometer nests and staff gauges at two monitoring stations, identified as GW_4 and GW-2, by IBI in 2018. GW_4 is located near the north end of WT12-5 and GW_2 is located near the south end.

The results of the monitoring at GW_4 indicate that the groundwater levels in this portion of the wetland ranged from 0.8 mbgs to 0.12 mags in the shallow piezometer and 1.2 mbgs to 0.19 mags in the deeper piezometer. The groundwater levels in the shallow and deeper piezometers are very similar, showing little gradient. An additional piezometer was installed in the streambed at this location in May 2019 in order to directly compare the groundwater and surface water levels. Data from this additional piezometer show that groundwater levels ranged from 0.81 mbgs to 0.18 mags and reflect the surface water levels outside the piezometer.

A datalogger installed at the staff gauge shows that surface water is present within the drainage feature through this portion of the wetland up to a depth of about 0.2 m in the spring and fall, with mainly dry conditions throughout the summer months. The groundwater levels in the piezometers are similar to the surface water levels in the feature, rising to ground surface when surface water is present and rapidly declining below ground surface as the feature dries through the summer.

The results of the monitoring at GW_2 indicate that the groundwater levels in this portion of the wetland ranged from 1.44 mbgs to 0.23 mbgs in the shallow piezometer and 1.25 mbgs to 0.54 mbgs in the deeper piezometer. The groundwater level in the shallow piezometer is typically higher than the groundwater level in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions; however, apparent gradient reversals are observed during the late spring/summer months (i.e., the

groundwater levels in the deeper piezometer are higher than the groundwater levels in the shallow piezometer, suggesting an upward gradient). This apparent gradient reversal appears to be the result of a lagged response in the deeper piezometer rather than a true gradient reversal. A datalogger installed at the staff gauge shows that surface water is present in the spring and fall, with periodically dry conditions throughout the summer months. The surface water level in the feature is consistently higher than the groundwater levels.

It is interpreted from the monitoring data for WT12-5 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT12-6

WT12-6 is a small wetland feature located mid-way along DF4, approximately 400 m north of Teston Road (Figure 4.2.1). This small mineral meadow marsh unit is comprised of wetland and upland plants, primarily Reed Canary Grass, Panicled Aster, Hairy Willowherb, Tall Goldenrod as well as Common Reed.

WT12-6 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as GW-FBWB_2, by IBI in 2018. The results of the monitoring at GW-FBWB_2 indicate that the groundwater levels typically ranged from dry at 1.02 mbgs to 0.16 mbgs in the shallow piezometer and dry at 1.98 mbgs to 0.42 mbgs in the deeper piezometer. The groundwater levels in the shallower piezometer are consistently higher than the groundwater levels in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions. A datalogger installed at the staff gauge shows that surface water is present within the drainage feature through the wetland up to a depth of about 0.2 m the spring and fall, with dry conditions throughout the summer months.

It is interpreted from the monitoring data for WT12-6 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT13

WT13 is located in a wooded area in the north central portion of Block 27, approximately 450 m south of Kirby Road (Figure 4.2.1). This swamp community consists of mid-aged Silver Maple. Portions of the swamp unit retains standing water during spring.

WT13 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as FBWB_8, by IBI in 2018. The results of the monitoring at FBWB_8 indicate that the groundwater levels ranged from dry at 1.35 mbgs to 0.30 mags in the shallow piezometer and dry at 2.22 mbgs to 0.27 mbgs in the deeper piezometer. The

groundwater levels in the shallower piezometer are consistently higher than the groundwater levels in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions. A datalogger installed at the staff gauge shows that surface water is present in the feature during the spring, with surface water levels rising to approximately 0.3 m depth. Dry conditions are observed throughout the summer and fall months, with periodic surface water only present following large rainfall events.

It is interpreted from the monitoring data for WT13 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT16

WT16 is a small wetland located along DF3-2 west of the rail line (Figure 4.2.1). This small mineral meadow marsh unit is dominated by Reed Canary Grass.

WT16 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as FBWB_12, by IBI in 2018. The results of the monitoring at FBWB_12 indicate that the groundwater levels ranged from 0.77 mbgs to 0.01 mags in the shallow piezometer and dry at 2.36 mbgs to 0.12 mags in the deeper piezometer. The groundwater levels in the shallow and deeper piezometers were similar through 2018 and 2019, the groundwater levels in the deeper piezometer were slightly higher than in the shallow piezometer in the spring of 2020, showing a slight upward gradient, and were higher in the shallow piezometer in the fall of 2020 and through 2021, showing a downward gradient. A datalogger installed at the staff gauge shows that surface water is present within the drainage feature through the wetland up to a depth of about 0.4 m during the spring and fall, and intermittently through the summer. The surface water levels in the feature are consistently higher than the groundwater levels, showing a downward gradient and recharge conditions.

It is interpreted from the monitoring data for WT16 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function. Stormwater discharge from the stormwater management pond located on the east side of Keele Street provides flow to DF3-2 and surface water to this feature.

WT17

WT17 is located along DF3-2 east of the rail line (Figure 4.2.1). It consists of a mineral meadow marsh community dominated by Reed Canary Grass.

WT17 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as FBWB_14, by IBI in 2018. The results of the monitoring at FBWB_14 indicate that the groundwater levels ranged from dry at 0.28 mbgs to 0.01 mags in the

shallow piezometer. At the deeper piezometer, groundwater levels typically ranged from 0.52 mbgs to 0.01 mbgs. The groundwater levels in the shallow piezometer were typically higher than the groundwater levels in the deeper piezometer, showing a downward gradient and recharge conditions; however, slight reversals were noted in the spring of 2019 and 2020. A datalogger installed at the staff gauge shows that surface water is present within the drainage feature through the wetland up to a depth of about 0.5 m during the spring and fall, and intermittently through the summer. The surface water levels in the feature are typically higher than the groundwater levels, showing a downward gradient and recharge conditions, with the exception of the spring of 2019 and 2020, when the groundwater levels were slightly higher than the surface water level, showing discharge conditions.

It is interpreted from the monitoring data for WT17 that the wetland predominantly relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function; however, seasonal groundwater discharge may occur in the spring. Stormwater discharge from the stormwater management pond located on the east side of Keele Street provides flow to DF3-2 and surface water to this feature.

WT18

WT18 is located immediately west of Keele Street in the northeast of the Block 27 lands (Figure 4.2.1). This mineral meadow marsh unit is dominated by Reed Canary Grass including a small ponding area with abundant Common Duckweed in its center. The presence of open water areas within this units supports substantial amphibian breeding productivity.

WT18 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as FBWB_11, by IBI in 2018. The results of the monitoring at FBWB_11 indicate that the groundwater levels ranged from dry at 2.20 mbgs to 0.36 mags in the shallow piezometer and ranged from dry at 3.12 mbgs to 0.77 mags in the deeper piezometer. The groundwater levels in the deeper piezometer were typically higher than the groundwater levels in the shallower piezometer, showing an upward gradient and discharge conditions. A datalogger installed at the staff gauge shows that surface water is present in the feature during the spring, and that water levels reach more than 1 m in depth, with the wetland drying through the summer and fall of 2020 and 2021. However, the wetland was found to hold water through the summer of 2019. The surface water levels in the feature were generally the same or higher than the groundwater levels, showing a downward gradient and recharge conditions, with the exception of the spring of 2019 and 2020, when the groundwater levels in the deeper piezometer were slightly higher than the surface water level, showing discharge conditions.

It is interpreted from the monitoring data for WT18 that the wetland predominantly relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function; however, seasonal groundwater discharge may occur in the spring.

WT19

WT19 is a small wetland located along DF4 (Figure 4.2.1). This very small mineral meadow marsh unit is almost entirely dominated by Reed Canary Grass.

WT19 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as GW-FBWB_7, by IBI in 2018. The results of the monitoring at GW-FBWB_7 indicate that groundwater levels ranged from dry at 1.17 mbgs to 0.07 mags in the piezometer installed directly in the streambed of the drainage feature and were consistently lower than the surface water levels outside the piezometer, showing a downward gradient. A datalogger installed at the staff gauge shows that surface water is present within the drainage feature through the wetland up to a depth of about 0.2 m during the spring and fall, and dry conditions were present through the summer.

It is interpreted from the monitoring data for WT19 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT20

WT20 is a small wetland located upstream of WT19 along DF4 (Figure 4.2.1). This mineral meadow marsh community dominated by Redtop along with various sedges and rushes.

WT20 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as GW-FBWB_6, by IBI in 2018. The results of the monitoring at GW-FBWB_6 indicate that the groundwater levels ranged from dry at 0.86 mbgs to 0.18 mags in the shallow piezometer and dry at 2.06 mbgs to 0.14 mags in the deeper piezometer. The groundwater level in the shallow piezometer is typically higher than the groundwater level in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions; however, apparent gradient reversals are observed in the late spring/early summer (i.e., the groundwater levels in the deeper piezometer are higher than the groundwater levels in the shallow piezometer, suggesting an upward gradient). This apparent gradient reversal appears to be the result of a lagged response in the deeper piezometer rather than a true gradient reversal.

A datalogger installed at the staff gauge shows that surface water is present within the drainage feature through the wetland up to a depth of about 0.3 m during the spring and fall, with dry conditions noted through the summer. The groundwater levels in the piezometers mimic the surface water levels, rising above ground surface when surface water is present in the feature, and rapidly declining below ground surface once the feature dries.

It is interpreted from the monitoring data for WT20 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WT21

WT21 is a small wetland located at the north end of DF4 (Figure 4.2.1). This small mineral meadow marsh community features Reed Canary Grass, sedges, Redtop, and Ditch Stonecrop. Amphibian breeding occurs in this unit.

WT21 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as GW-FBWB_3, by IBI in 2018. The results of the monitoring at GW-FBWB_3 indicate that the groundwater levels typically ranged from dry at 1.34 mbgs to 0.31 mags in the shallow piezometer and dry at 2.04 mbgs to 0.16 mags in the deeper piezometer. The groundwater level in the shallow piezometer is consistently higher than the groundwater level in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions. A datalogger installed at the staff gauge shows that surface water is present in the feature during the spring, with dry conditions typically noted through the summer and fall. However, the wetland did re-wet in the fall of 2021. The groundwater level in the shallow piezometer mimics the surface water level, rising above ground surface when surface water is present in the feature, and rapidly declining below ground surface once the feature dries.

It is interpreted from the monitoring data for WT21 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WTA-1

WTA-1 is located along DF5-1 in the southeastern portion of the Block 27 lands (Figure 4.2.1). This marsh is comprised of communities dominated by cattails, notably Narrow-leaved Cattail, as well as Jewelweed and communities dominated by Reed Canary Grass and upland plants (Tall Goldenrod, Milkweed, Smooth Brome).

WTA-1 was instrumented with a piezometer nest and staff gauge at a monitoring station identified as GW-FBWB_5, by IBI in 2018. The results of the monitoring at GW-FBWB_5 indicate that the groundwater levels ranged from 1.12 mbgs to 0.07 mags in the shallow piezometer and from 0.66 mbgs to 0.06 mags in the deeper piezometer. The groundwater levels in the piezometers are similar through the spring, rising to ground surface. During the summer months, the groundwater levels fall to 0.2 m to more than 0.5 m below ground surface. A datalogger installed at the staff gauge shows very little water present in the feature during the spring, and dry conditions throughout most of the year.

It is interpreted from the monitoring data for WTA-1 that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function and the recharge supports a seasonally high-water table.

WTA-2 and WTB

WTA-2 and WTB are located along DF5-2 in the southeastern portion of the Block 27 lands (Figure 4.2.1). WTA-2 is a very small community dominated by Red-osier Dogwood. WTB is a deciduous swamp community which has an elongated canopy dominated by Hybrid Crack Willow, Eastern Cottonwood, and Manitoba Maple. The groundcover includes wetland plants such as Panicled Aster and Jewelweed but is also comprised of abundant upland plants such as Tall Goldenrod, Canada Thistle, Garlic Mustard, and Wood Avens. WTA-2 and WTB are only separated by a small patch of cultural woodland.

WTB was instrumented with a piezometer nest and staff gauge at a monitoring station identified as FBWB_1, by IBI in 2018. WTA-2 was not specifically instrumented; however, similar hydrogeological conditions to WTB are expected in this feature.

The results of the monitoring at FBWB_1 indicate that the groundwater levels ranged from dry at 1.34 mbgs to 0.03 mags in the shallow piezometer and from dry at 1.96 mbgs to 0.01 mags in the deeper piezometer. The groundwater level in the shallow piezometer is typically higher than the groundwater level in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions; however, apparent gradient reversals are observed in the late spring/early summer (i.e., the groundwater levels in the deeper piezometer are higher than the groundwater levels in the shallow piezometer, suggesting an upward gradient). This apparent gradient reversal appears to be the result of a lagged response in the deeper piezometer rather than a true gradient reversal.

A datalogger installed at the staff gauge shows that shallow surface water (up to a depth of about 0.1 m) is present in the drainage feature though the wetland during the spring, with dry conditions noted through the summer and fall. The groundwater levels in the piezometers mimic the surface water levels, rising to ground surface when surface water is present in the feature, and rapidly declining below ground surface once the feature dries.

It is interpreted from the monitoring data that WTA-2 and WTB rely on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

WTC

WTC is located along DF6 at the southeastern corner of the Block 27 lands (Figure 4.2.1). This elongated strip of meadow marsh communities (MAM2-2) is dominated by Reed Canary Grass and upland species such as Tall Goldenrod, Smooth Brome and Canada Thistle.

WTC was instrumented with a piezometer nest and staff gauge at a monitoring station identified as GW_5, by IBI in 2018. The results of the monitoring at GW_5 indicate that the groundwater levels ranged from 0.87 mbgs to 0.09 mbgs in the shallow piezometer and from 1.03 mbgs to 0.34 mbgs in the deeper piezometer. The groundwater level in the shallow piezometer is typically higher than the groundwater level in the deeper piezometer, showing a downward hydraulic gradient and recharge conditions; however, apparent gradient reversals are observed in the summer (i.e., the groundwater levels in the deeper piezometer are higher than the groundwater levels in the shallow piezometer, suggesting an upward gradient). This apparent gradient reversal appears to be the result of a lagged response in the deeper piezometer rather than a true gradient reversal. A datalogger installed at the staff gauge shows that the feature is mostly dry throughout the year.

It is interpreted from the monitoring data for WTC that the wetland relies on surface water inputs (surface water runoff as well as direct precipitation) and will have a recharge function.

4.2.4.3 Summary of Hydrologic Features

The key findings of the monitoring of the drainage features and wetlands across the Subject Lands have been summarized in Table 4.2.3 below.

Table 4.2.3: Summary of Drainage and Wetland Characterization

Drainage Feature/Wetland Label	Dominant Wetland Type	Relies on Surface Water and Precipitation	Recharge Conditions Present	Groundwater Discharge Provides Permanent Baseflow	Seasonal Groundwater Discharge Provides Intermittent Baseflow
Drainage Feature 1 – U/S intermittent; D/S permanent					
WT7-1	Organic Swamp	x	-	x	-
WT7-2 and WT7-3	Mineral Meadow Marshes	x	x	-	-
WT8	Mineral Meadow Marsh	x	x	-	-
WT9	Mineral Meadow Marsh	x	x	-	-
Drainage Feature 2 – Ephemeral					
WT12-1	Mineral Meadow Marsh	x	-	-	-
Drainage Feature 3-1 – Ephemeral					
Drainage Feature 3-2 – U/S permanent; D/S intermittent					
WT12-4	Mineral Shallow Marsh	x	x	-	-
WT16	Mineral Meadow Marsh	x	x	-	-
WT17	Mineral Meadow Marsh	x	x (seasonal)	-	x
Drainage Feature 3 – Permanent					
WT12-3	Mineral Shallow Marsh	x	x (u/s portion)	x (central portion)	-
Drainage Feature 4 – U/S intermittent; D/S permanent					
WT12-2	Mineral Thicket Swamp	x	x (u/s portion)	x (central portion)	-
WT12-5	Mineral Meadow Marsh	x	x	-	-
WT12-6	Mineral Meadow Marsh	x	x	-	-
WT19	Mineral Meadow Marsh	x	x	-	-
WT20	Mineral Meadow Marsh	x	x	-	-
WT21	Mineral Meadow Marsh	x	x	-	-
Drainage Feature 5 – Ephemeral					
WTA-1	Mineral Shallow Marsh	x	x	-	-
WTA-2	Mineral Thicket Swamp	x	x	-	-
WTB	Mineral Deciduous Swamp	x	x	-	-
Drainage Feature 6 – Ephemeral					
WTC	Mineral Meadow Marsh	x	x	-	-
Isolated Wetlands					
WT11	Mineral Meadow Marsh	x	x	-	-
WT13	Mineral Deciduous Swamp	x	x	-	-
WT18	Mineral Meadow Marsh	x	x (seasonal)	-	x

4.2.5 Groundwater Flow Conditions

4.2.5.1 Groundwater Levels

Monitoring of groundwater levels was completed on a quarterly basis in 25 on-site monitoring wells from June 2019 to August 2021 by Burnside and on a bi-monthly basis between October 2010 and October 2012 by Cole Engineering as part of the SWS. This monitoring was completed in addition to the IBI monitoring program, which focused on assessment of the features on the Subject Lands, to ensure that sufficient data were available to understand the depths to groundwater across the Subject Lands in order to assess potential low impact development (LID) measures, construction constraints and potential dewatering requirements. The groundwater monitoring data are summarized in Table C-5-1, Appendix C5. An automatic water level recorder was installed in six monitoring wells (MW10-65, MW10-67, MW10-70, MW10-79s, MW10-79d and MW10-82s) to record continuous water levels. Hydrographs for each monitoring location are provided in Appendix C5.

Several piezometers were installed to measure the groundwater levels and vertical hydraulic gradients directly along drainage features and within wetlands on the Subject Lands. The results of the monitoring and measured gradients within the wetlands are discussed in Section 4.1.4.

The groundwater monitoring data indicate the following (refer to Figure 4.2.1 for the monitoring well locations and the data tables and hydrograph figures from the IBI Monitoring report in Appendix C4):

- The seasonally high groundwater levels vary with topography across the Subject Lands. Groundwater is generally encountered within 1 m of ground surface in the topographically lower areas along the drainage features, with above ground water levels noted along the lower reaches of DF1, DF3 and DF4 and the upper reaches of DF3-2. The interpreted depth of groundwater is deeper in the topographically higher areas of the Subject Lands, with water depths greater than 4 mbgs found in the northeastern portion. The interpreted depth to seasonally high groundwater in the shallow soils has been mapped and is provided as Figure 4.2.3.

- The groundwater levels vary seasonally, with the highest levels observed in the spring and lowest levels observed in the late summer/early fall. Seasonal fluctuations of 2 m to 4 m were generally observed in the shallow monitoring wells. Less fluctuation was observed in the deeper wells, typically varying by 1 m to 2 m seasonally.

- Nine monitoring well nests were installed across the Subject Lands (MW10-64/MW10-65, MW10-66/MW10-78s/d, MW10-67/MW10-68, MW10-76s/d, MW10-79s/d, MW10-80s/d, MW10-81s/d, MW10-82s/d and MW10-83s/d;

Figure 4.2.1). The groundwater levels measured at these locations show the following:

- The groundwater level in the shallow well in the MW10-67/MW10-68, MW10-79s/d, MW10-80s/d, MW10-81s/d and MW10-82s/d nests is higher than the corresponding deep well, indicating downward gradients (recharge conditions) at these locations. These well nests are located in the northeastern portion of the Subject Lands (Figures C5-5, C5-9, C5-10, C5-11 and C5-12, Appendix C5).

- The groundwater levels are the same in the wells installed at the MW10-66/MW10-78s/d well nest, showing no gradient at this location (Figure C5-4, Appendix C5).

- In the three well nests installed in the southwestern portion of the Subject Lands (MW10-64/MW10-65, MW10-76s/d and MW10-83s/d), the deeper well had a higher groundwater level than the corresponding shallow well, with flowing conditions observed at MW10-65, indicating discharge conditions in the southwestern portion of the Subject Lands (Figures C5-3, C5-8 and C5-13, Appendix C5).

4.2.5.2 Groundwater Flow

Areas where water from precipitation infiltrates into the ground and moves vertically downward are known as recharge areas. Recharge areas are generally associated with areas of topographically higher relief. Areas where groundwater moves vertically upward are discharge areas and these generally occur in areas of topographically lower relief, such as along watercourse valleys. Areas of recharge and discharge may occur in local, intermediate, and more regional groundwater flow systems. Local groundwater flow systems involve a relatively short and shallow flow path that closely follows the detailed topography such that infiltrating water at any given location discharges a relatively short distance away (e.g., up to a few hundred metres) along the nearest slopes or watercourse. Some water may infiltrate and follow much deeper and longer flow paths (hundreds to thousands of metres) to recharge underlying aquifers and discharge to more distant features and watercourses, possibly a very long way from the source of recharge. Such conditions may be referred to as intermediate and/or regional groundwater flow systems depending on the scale of analysis.

To illustrate the local scale groundwater flow conditions in the shallow soils, groundwater elevation data obtained from the monitoring wells and drive-point piezometers in April 2020 are provided on Figure 4.2.4, along with the interpreted groundwater elevation contours for the area. Arrows perpendicular to the groundwater elevation contours illustrate the interpreted direction of the relatively shallow groundwater movement within the surficial overburden sediments. The interpretation is that the water table reflects the

general surface topography, i.e., the shallow groundwater flow patterns tend to mimic the surface water flow patterns with flow moving generally to the southwest and converging the lower reaches of DF1 and DF3 (Figure 4.2.4).

4.2.6 Water Quality

4.2.6.1 Groundwater Quality

As part of the SWS, groundwater water samples were collected from six monitoring wells (MW10-66, MW10-76s, MW10-76d, MW10-78s, MW10-82s and MW10-82d) on two occasions (September 2011 and November 2012) to assess the shallow groundwater quality. MW10-66, MW10-78s and MW10-82d are screened in the sand and silt layers interpreted to be part of the ORAC, and MW10-76s, MW10-76d and MW10-82s are screened in the shallow till soils. The results of the analyses are provided in Appendix C6. Note that groundwater sampling was also completed as part of the private well survey to characterize the local drinking water quality; those test results are discussed in Section 4.2.5. The laboratory results for the tested groundwater monitoring wells within the Subject Lands show the following:

- High sodium and chloride concentrations were reported for MW10-82d in both samples. Sodium was reported at a concentration of 170 mg/L and 160 mg/L in the September 2011 and November 2012 samples, respectively. Chloride was reported at concentrations of 290 mg/L and 270 mg/L in September 2011 and November 2012, respectively. MW10-82d is located close to Kirby Road and Keele Street and may be impacted by road salt usage along these roads. It is noted, however, that the shallow well at this location (MW10-82s) had much lower concentrations of sodium and chloride, suggesting that the impact is in the sand layer, which may be closer to surface upgradient of the Subject Lands.

- Nitrate was detected at all sample locations, with the exception of MW10-76d, indicating the groundwater in the area has been affected by nitrate sources, which may include agricultural practices. The highest concentrations were reported for MW10-78s, which is located in the central portion of the Subject Lands and screen in a sand layer interpreted to be part of the ORAC. MW10-76d is located in the southwest portion of the Subject Lands, where upward gradients are present, which would limit the impact of the deeper soil units from surficial activities.

4.3 Discussion of Source Protection Mapping

4.3.1 Significant Groundwater Recharge Areas

Ecologically Significant Groundwater Recharge Areas (ESGRA) have been mapped by the TRCA and are reproduced on Figure 4.2.5. This figure shows that ESGRAs have been mapped in the eastern portion of the Subject Lands. The purpose of the mapping

is to identify potential linkages between groundwater recharge areas and ecological features (i.e., wetlands, watercourses, etc.). ESGRAs are listed as one type of significant groundwater recharge area in TRCA's Stormwater Management Criteria (2012), and the criteria requires that proponents maintain pre-development recharge rates and appropriate distribution to the fullest extent possible, ensuring the protection of related hydrologic and ecologic functions. It is, however, noted in the Stormwater Management Criteria that some areas may not be suitable for recharge measures (e.g., areas of high-water table, areas of steep slopes, areas where soil infiltration rates are less than 15 mm/hour, etc.), and in those areas the proponent should make every effort to maintain overall infiltration across the site.

The CTC Source Protection Region Proposed Updated Approved Assessment Report, Toronto and Region Source Protection Area (February 2015) shows that the majority of the Subject Lands are mapped as being within a Significant Groundwater Recharge Area (SGRA). The SGRA mapping is shown on Figure 4.2.5. Although mapped as being within a significant recharge area, the scale of mapping is broad and some variation in conditions are expected based on more site-specific mapping.

The findings from the hydrogeological study of the Subject Lands confirm that groundwater recharge areas (areas with downward flow gradients) are generally located in the topographically higher areas. As discussed in Section 4.2.6.1, the groundwater monitoring results show that the majority of the well nests (MW10-67/MW10-68, MW10-79s/d, MW10-80s/d, MW10-81s/d and MW10-82s/d; shown on Figure 4.2.1) have downward gradients. However, as discussed in Section 4.2.1 herein, the Subject Lands are covered by a layer of relatively low hydraulic conductivity silty clay till, and as such, the actual amount of water that infiltrates and moves through the subsurface over most of the area is expected to be limited.

Upward gradients and discharge conditions are found in the southwestern portion of the Subject Lands (MW10-64/MW10-65, MW10-76s/d and MW10-83s/d, shown on Figure 4.2.1). As discussed in Section 4.2.4 above, perennial flow is observed in the lower reaches of DF1 and DF3, and groundwater discharge is interpreted along the lower reaches of these features, where the ORAC is found to be thick and close to surface. It is interpreted that groundwater discharge from this regional aquifer provides baseflow to these watercourses.

Similar to ESGRAs, SGRAs are also listed as one type of significant groundwater recharge area in TRCA's Stormwater Management Criteria (2012), and the same criteria requiring the maintenance of pre-development recharge rates, to the extent feasible based on site conditions, applies.

4.3.2 Aquifer Vulnerability

Aquifer Vulnerability mapping has been prepared by TRCA as part of the Source Water Protection planning for the area. The mapping prepared by TRCA has been reproduced on Figure 4.2.6. This mapping shows that an area in the centre of the Subject Lands has mapped as an area of high aquifer vulnerability.

There are areas across the Subject Lands where the ORAC is interpreted to be close to surface and may be vulnerable to activities at surface. The Source Water Protection policies include land use restrictions in areas of high aquifer vulnerability which have been determined to pose a high risk to contamination of the underlying aquifers. None of the restricted lands uses are proposed on the Subject Lands. The application of road salt is identified as a potential threat to drinking water quality; however, road salt application will be managed by the municipality as per York Region's Salt Management Plan and Guidance for Best Management Practices for Road Salt Usage Standards to minimize any impacts. With the use of Best Management Practices, the proposed development is not expected to pose a threat to the groundwater quality of the underlying aquifers.

4.3.3 Wellhead Protection Areas

Groundwater resources are typically used for municipal supplies, rural domestic water supplies and irrigation. The communities of Maple and Woodbridge, located to the south and southeast of the Subject Lands, are supplied with lake-based municipal water and the proposed development will be municipally serviced from Lake Ontario. Municipal groundwater supply wells are located in the communities of Kleinburg to the southwest, Nobleton to the northwest and King City to the north. The Subject Lands are not located within the Wellhead Protection Areas (WHPAs) for water quality for any of these water supply wells.

Wellhead Protection Areas – Quantity (WHPA-Qs) have been identified in the CTC Source Protection Plan as vulnerable areas to protect the quantity of water required by a municipality to meet their current or future water needs. The Subject Lands are mapped within a WHPA-Q area. Policy REC-1 Clause 1) in the CTC Source Protection Plan requires a water balance assessment for the development and the implementation of best management practices such as low impact development (LID) measures with the goal of maintaining pre-development recharge for all major development applications. The Source Protection Plan was amended (in force and effect as of March 25, 2019) such that Clause 2) of policy REC-1, which requires off-site recharge enhancement to compensate for any predicted loses if pre-development recharge cannot be maintained on-site, does not apply to applications for development on lands downgradient from municipal supply wells in the Toronto and Region Source Protection Area (i.e., the Subject Lands).

4.4 Local Groundwater Use

The properties immediately surrounding the Subject Lands currently obtain water supply from private water supply wells. The MECP well records (Appendix C7) list more than 200 records within 500 m of the Subject Lands. Review of these records indicates that no wells extended all the way through the overburden sediments to the bedrock. 66 of the well records are associated with well abandonment or the well use was not provided. 58 of the well records are listed as observation wells, test holes or monitoring wells and the remaining 87 well records were listed as water supply wells.

The overburden water supply wells are screened at various depths but are generally drilled to elevations between 210 masl and 260 masl. It is interpreted that that these wells target the extensive aquifer which is found beneath the Subject Lands (interpreted to be the ORAC; refer to Section 4.2.3 herein). The test yields recorded in the majority of the well records are between 0.3 L/s and 1 L/s (5 lgpm and 15 lgpm); however, approximately 10% of the wells have recorded yields of 1.3 L/s or greater (20 lgpm or greater). The reported well yields are generally considered good and more than sufficient for typical domestic use.

4.4.1 Private Well Survey

To confirm local groundwater usage, Burnside completed a survey of private domestic wells within a 500 m radius of the Subject Lands. This survey was completed by sending cover letters explaining the purpose of the survey along with a well survey questionnaire to be filled in by the residents. The questionnaire included questions regarding the type of well (drilled/dug), depth, usage, treatment, water quality and quantity concerns. A self-addressed and stamped envelope was also included with instructions on how to return the completed form to the Burnside office. The survey included the mailing of well questionnaire forms to 48 properties and only one well survey form was returned.

In order to obtain more responses, a door-to-door survey was completed by Burnside on June 15, 2022, which included the same properties included in the mail out survey (i.e., properties with potential water supply wells within 500 m of the Subject Lands). During the door-to-door survey, if permission was granted by the resident a water quality sample was obtained. A summary of the information provided in the resident responses from both the mail out and door-to-door surveys is provided in Table C-8-1, Appendix C8.

During the door-to-door survey, 13 properties were confirmed to be vacant, and four properties were confirmed to be connected to the municipal water supply. Of the remaining 31 properties, well survey forms were received from three properties (11666 Keele Street, 2440 Teston Road and 2480 Kirby Road). Drilled wells were reported at 11666 Keele Street and 2440 Teston Road, and two wells, one drilled and

one dug, were reported at 2480 Kirby Road. The drilled well at 2480 Kirby Road services the golf course and the dug well services a house on the property. The well at 2440 Teston Road has a reported depth of approximately 20 m, the drilled well at 2480 Kirby Road has a reported depth of 49 m, the dug well at 2480 Kirby Road has a reported depth of 11 m and the depth of the well at 11666 Keele Street is unknown.

In addition to the information obtained during the 2022 survey, results from a well survey completed in 2021 for a nearby development, which included the properties along Jane Street adjacent to the Subject Lands, were reviewed. These results are included in the report entitled "Well Survey Report, Block 34E Lands, Vaughan" dated July 2021 and prepared by Burnside. During the 2021 well survey, three drilled wells and two dug wells along Jane Street were confirmed. Two of the drilled wells had depths of 26 mbgs and the remaining three respondents did not know the specific depth of their well. A summary of the results from the 2021 well survey is included in Table C-8-1, Appendix C8.

Based on the interpreted stratigraphy of the area, the well depths reported to be between 20 m and 49 m generally correspond with the sand layer interpreted to be the ORAC (refer to Section 4.2.3). The shallow (11 m) well, and the dug wells along Jane Street likely target shallow sand layers within the Halton till. These findings are consistent with the review of the MECP well records for the area described above.

The residents generally reported that they had sufficient water supply, with the exception of one respondent who noted insufficient water supply from their well for their needs. This well is a dug well which services a church, and they use the well water for cooking, cleaning and outdoor uses, but not for drinking. Staining on fixtures and rust in the water (which generally indicates high iron concentrations) were reported by several residents. A sulphurous odour was reported by three residents (Table C-8-1, Appendix C8).

Water quality samples were obtained from two water supply wells during the 2022 survey and five water supply wells during the 2021 survey. The samples were sent to a laboratory for analysis of general metals, inorganics, and microbiological parameters. The water quality data are provided in Table C-8-2, Appendix C8. The results of the water quality analyses were compared to the Ontario Drinking Water Quality Standards (ODWQS) and show the following:

- Total hardness of the samples was generally high (above the ODWQS of 80 to 100 mg/L), with concentrations ranging from 263 mg/L to 546 mg/L. Colour was reported above the ODWQS of 5 TCU for all samples with the exception of one sample. The level of hardness and colour encountered may reflect the influence of various minerals on water quality; however, these are aesthetic parameters commonly elevated in groundwater and pose no threat to human health.

- Nitrate was detected in two samples (both from shallow dug wells), where concentrations of 4.44 mg/L and 5.47 mg/L were reported, which is below the ODWQS of 10 mg/L. The results suggest that the shallow dug wells have been affected by the surrounding agricultural land use (common nitrate sources include fertilizers and manure) or septic effluent; however, the deeper drilled wells have not been impacted by nitrates, suggesting that the deeper aquifers are well protected from activities at surface.

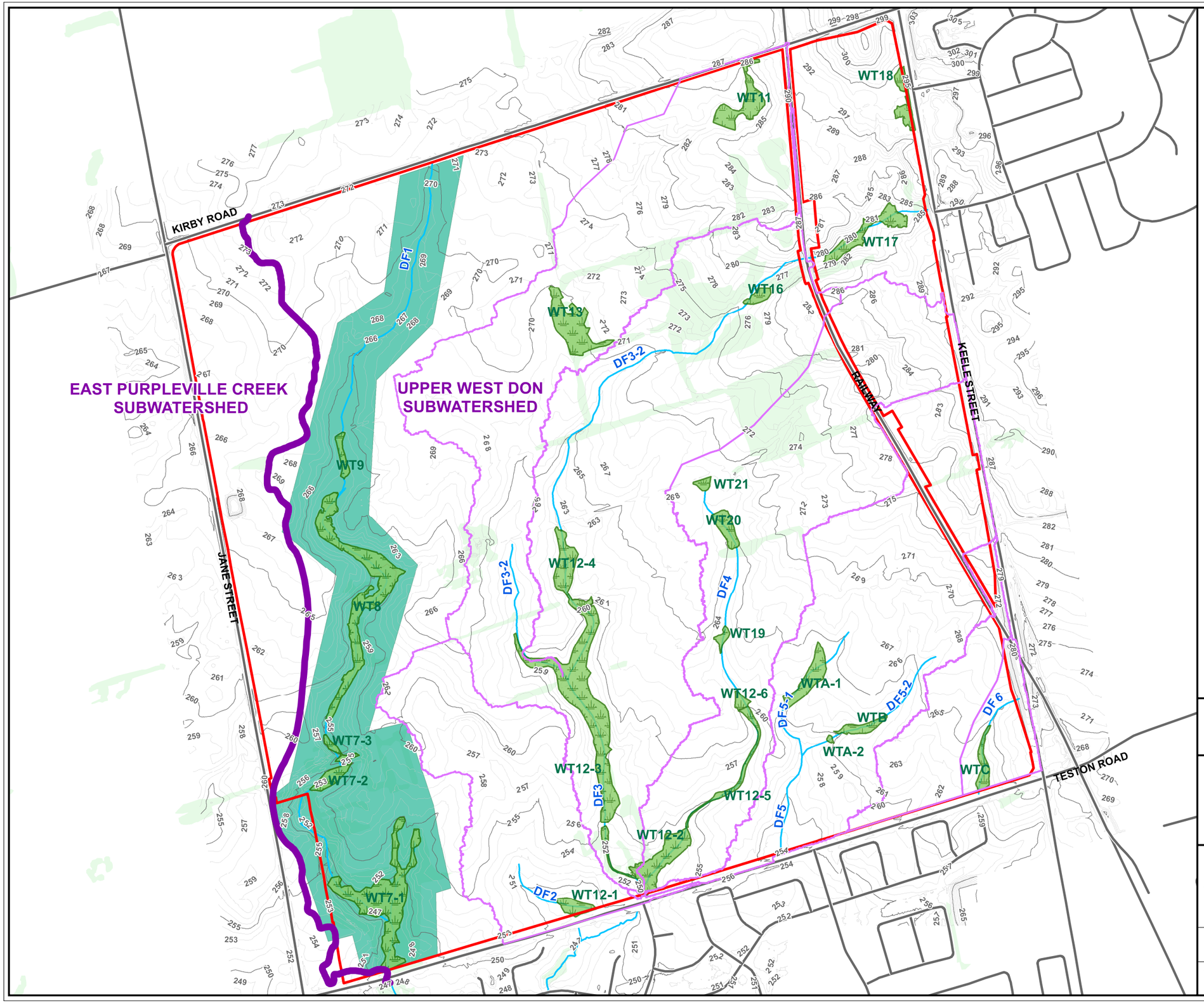
- High iron concentrations, exceeding the ODWQS of 0.3 mg/L, were reported in the samples obtained from the deeper drilled wells. Reported concentrations ranged from 0.79 mg/L to 4.47 mg/L at these locations. Lower concentrations, ranging from 0.019 mg/L to 0.036 mg/L, were reported in the samples obtained from the shallow dug wells. Several residents did note rust discolouration in their water and staining on fixtures during the well survey, which is an indication of high iron concentrations.

- Manganese was reported above the ODWQS guideline of 0.05 mg/L in two samples, with concentrations ranging from 0.057 mg/L and 0.081 mg/L reported. No other exceedances of manganese were reported. Both the iron and manganese ODWQS are aesthetic objectives because high concentrations of these metals can cause staining of fixtures and nuisance affects.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Figures



Legend

- SUBJECT LANDS
- SUBWATERSHED BOUNDARY
- SUBCATCHMENT BOUNDARY
- GREENBELT BOUNDARY
- ROADWAY
- DRAINAGE FEATURE
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals - masl)
- WETLAND (BEACON, 2022)
- WOODED AREA

N

0 100 200 300 400 500 600 700 800

Metres

BURNSIDE

Client / Report

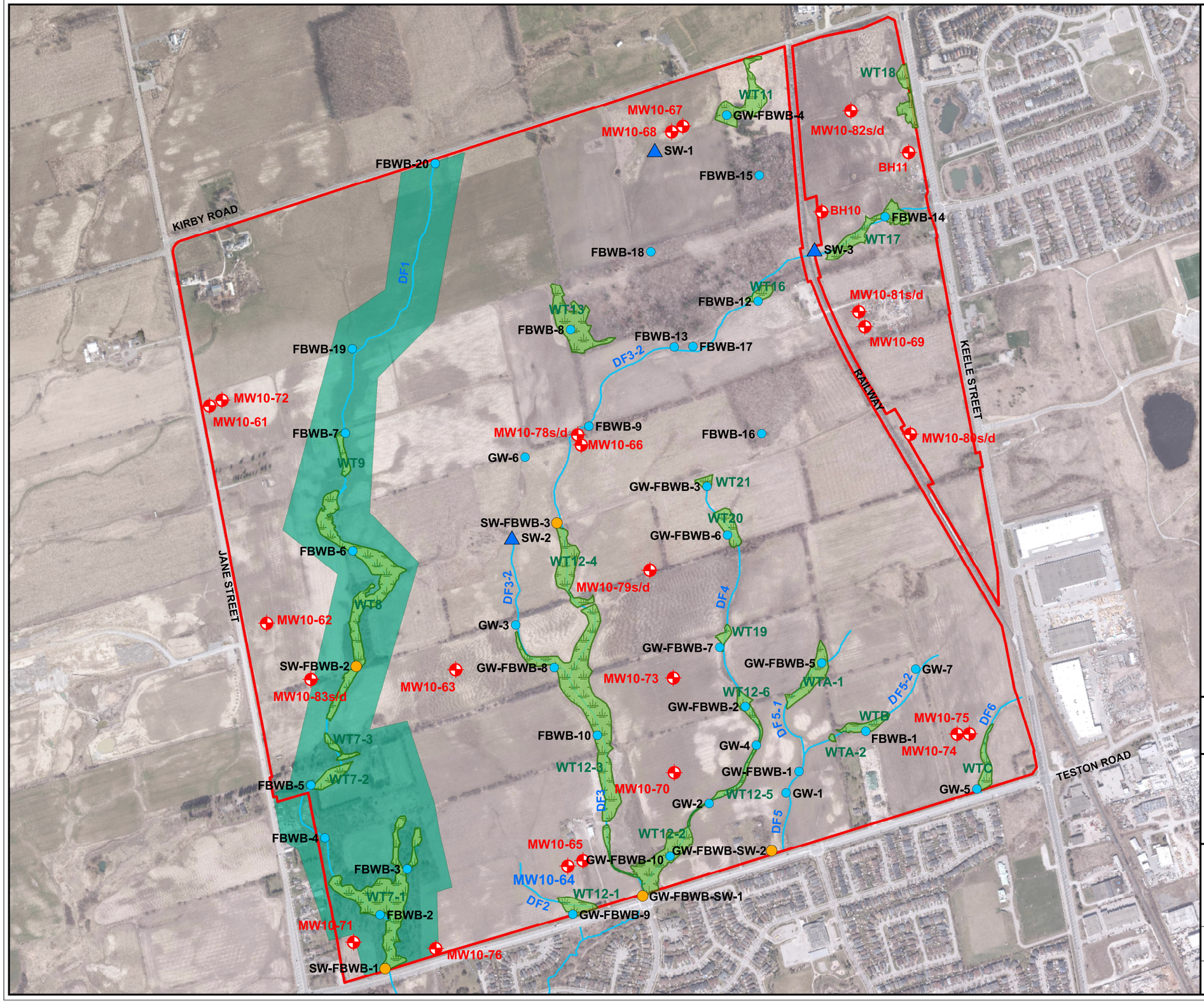
BLOCK 27 LANDOWNERS GROUP
VAUGHAN, ONTARIO
HYDROGEOLOGICAL EXISTING CONDITIONS REPORT

Figure Title

TOPOGRAPHY AND DRAINAGE

Drawn	Checked	Date	Figure No.
SK	JS	AUGUST 2022	4.1.1
Scale		Project No.	
1:10,000		300050116	

File Path: Nigel/Shared Work Areas/A:\050116 Block 27\06_GIS\050116 Topography & Drainage.mxd Print Date: 2022/08/15 Time: 02:49 PM



Legend

- SUBJECT LANDS
- DRAINAGE FEATURE
- WETLAND (BEACON, 2022)
- GREENBELT BOUNDARY
- PIEZOMETER / SURFACE FLOW MONITORING STATION
- PIEZOMETER
- MONITORING WELL
- SURFACE WATER MONITORING LOCATION

N

0 100 200 300 400 500 600 700 800

Metres

BURNSIDE

Client / Report

BLOCK 27 LANDOWNERS GROUP
VAUGHAN, ONTARIO
HYDROGEOLOGICAL EXISTING CONDITIONS REPORT

Figure Title

MONITORING LOCATIONS

Drawn	Checked	Date	Figure No.
SK	JS	AUGUST 2022	4.2.1
Scale		Project No.	
1:10,000		300050116	

File Path: Nigel/Shared Work Areas/A:\050116 Block 27\06_GIS\050116 Monitoring Network.mxd Print Date: 2022/08/15 Time: 02:58 PM

Legend

- SUBJECT LANDS
- DRAINAGE FEATURE
- WETLAND (BEACON, 2022)
- MONITORING WELL
- BOREHOLE
- MECP WELL RECORD LOCATION

BURNSIDE

Client / Report

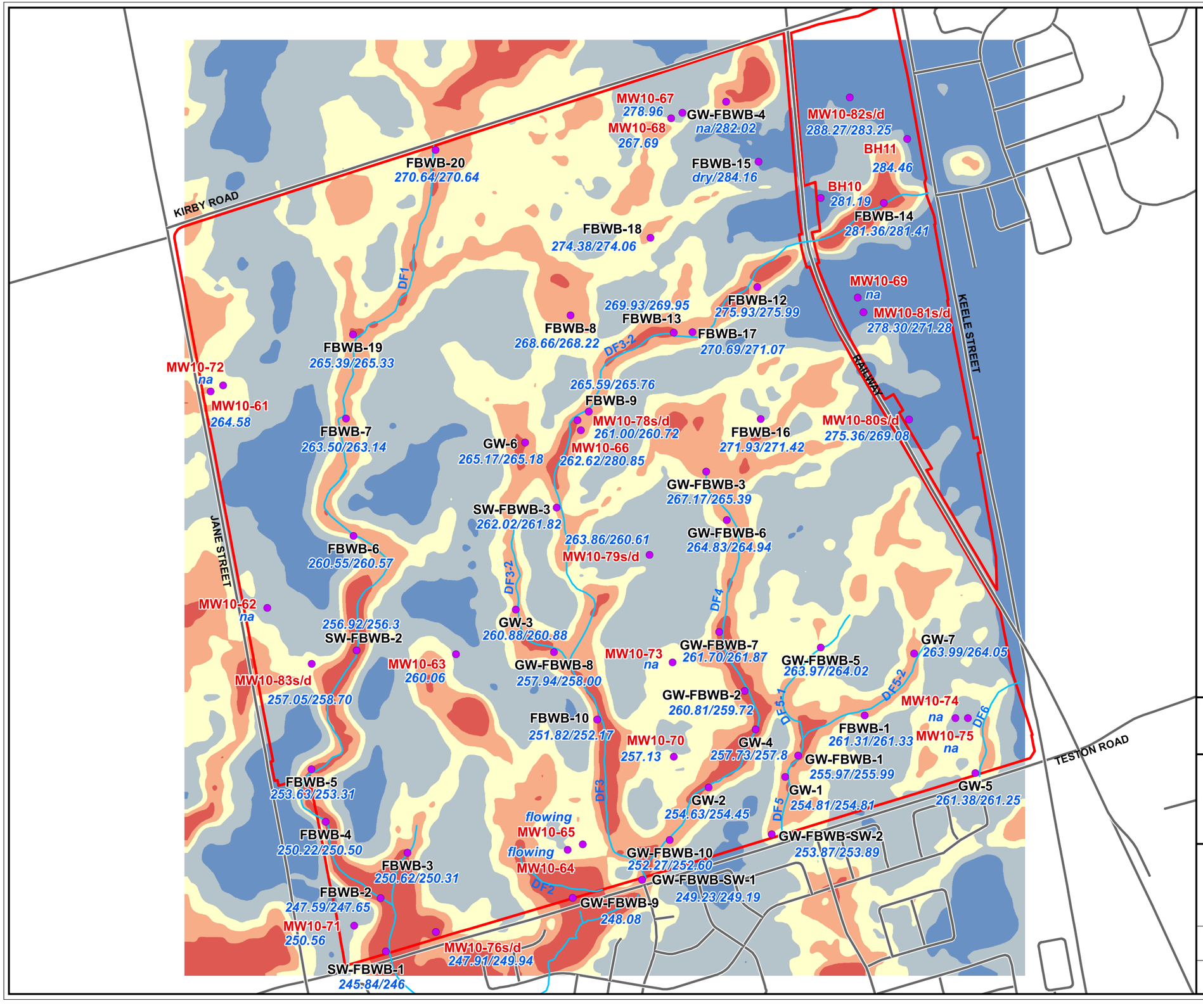
BLOCK 27 LANDOWNERS GROUP
VAUGHAN, ONTARIO
HYDROGEOLOGICAL EXISTING CONDITIONS REPORT

Figure Title

BOREHOLE, MONITORING WELL AND MECP WELL LOCATIONS

Drawn	Checked	Date	Figure No.
SK	JS	AUGUST 2022	4.2.2
Scale		Project No.	
1:10,000		300050116	

File Path: Nigel/Shared Work Areas/A:\1050116 Block 27\06_GIS\050116 Borehole, Well Locations.mxd Print Date: 2022/08/11 Time: 07:23 PM



BURNSIDE

Client / Report

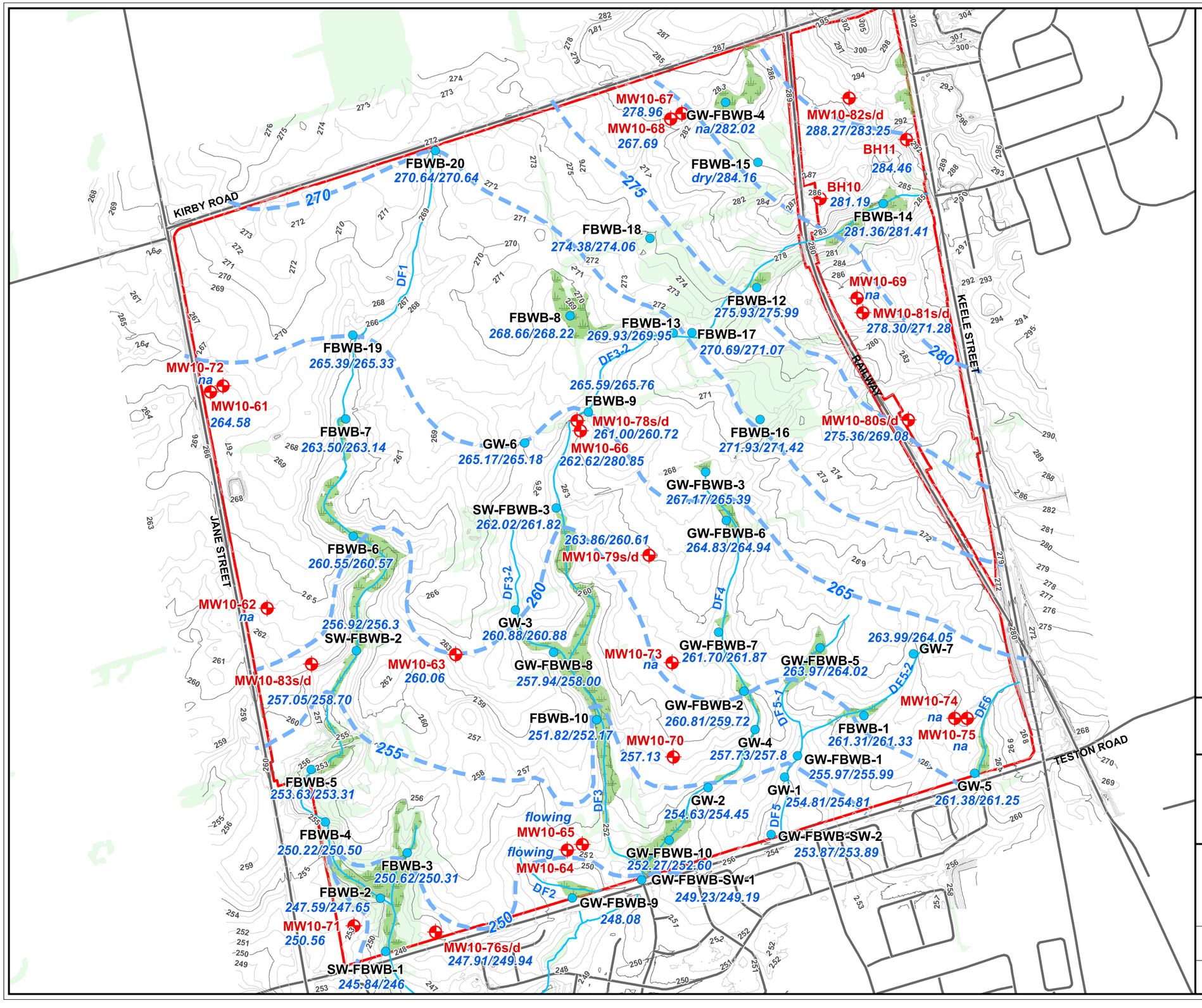
BLOCK 27 LANDOWNERS GROUP
VAUGHAN, ONTARIO
HYDROGEOLOGICAL EXISTING CONDITIONS REPORT

Figure Title

DEPTH TO GROUNDWATER FROM EXISTING GRADE

Drawn	Checked	Date	Figure No.
SK	JS	AUGUST 2022	4.2.3
Scale		Project No.	
1:10,000		300050116	

File Path: Nigel/Shared Work Areas/A:\050116 Block 27\06_GIS\050116 Depth to Groundwater.mxd Print Date: 2022/08/15 Time: 03:05 PM



Legend

- SUBJECT LANDS
- ROADWAY
- DRAINAGE FEATURE
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals - masl)
- WETLAND (BEACON, 2022)
- WOODED AREA
- PIEZOMETER
- MONITORING WELL
- INTERPRETED GROUNDWATER CONTOUR (masl)
- *178.39* MEASURED WATER LEVEL (APRIL, 2020)

BURNSIDE

Client / Report

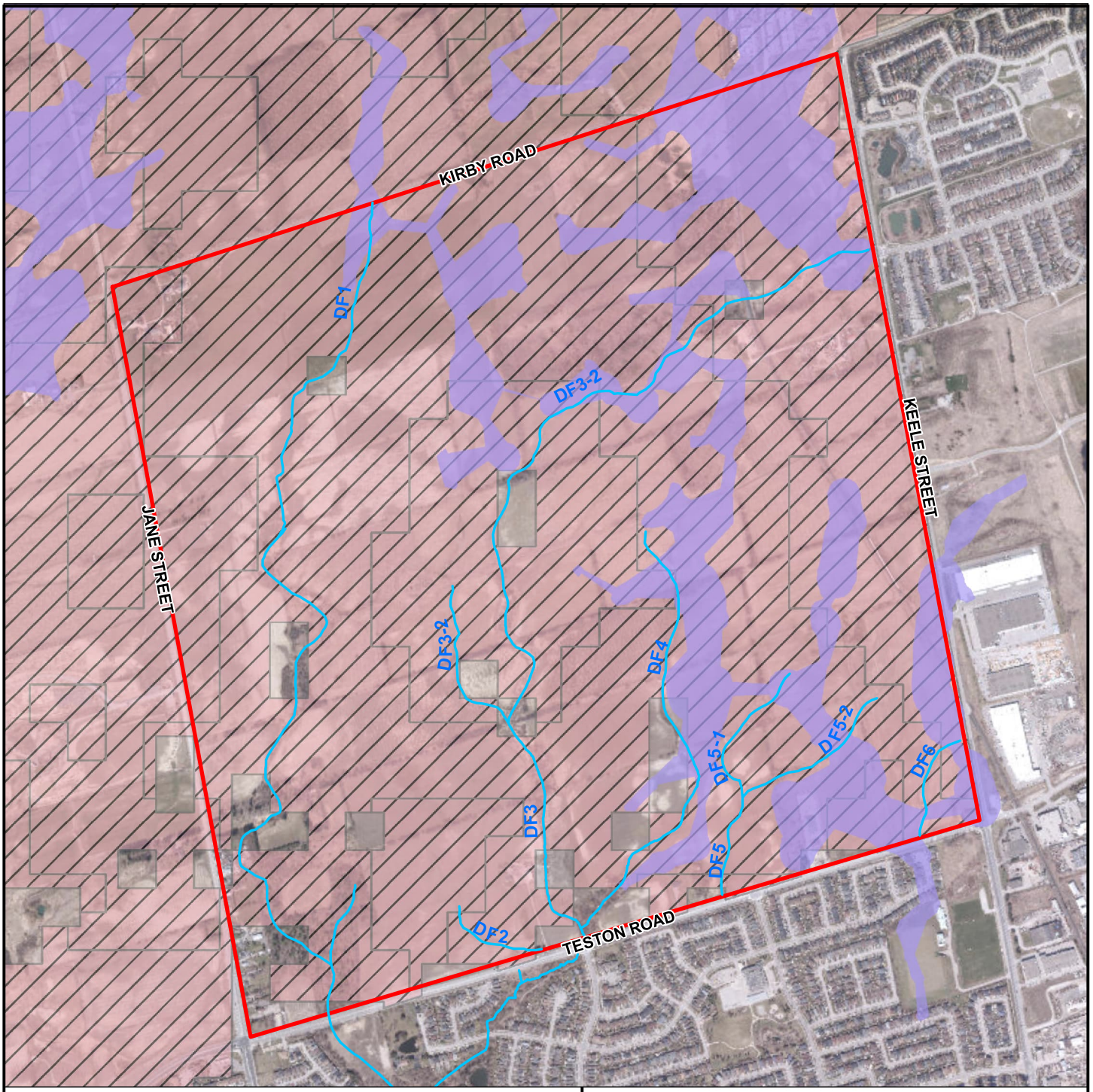
BLOCK 27 LANDOWNERS GROUP
VAUGHAN, ONTARIO
HYDROGEOLOGICAL EXISTING CONDITIONS REPORT

Figure Title

INTERPRETED SHALLOW GROUNDWATER FLOW

Drawn	Checked	Date	Figure No.
SK	JS	AUGUST 2022	4.2.4
Scale		Project No.	
1:10,000		300050116	

File Path: Nigel/Shared Work Areas/A:\050116 Block 27\06_GIS\050116 Groundwater Flow.mxd Print Date: 2022/08/15 Time: 03:11 PM



LEGEND

- SUBJECT LANDS
- DRAINAGE FEATURE
- ECOLOGICALLY SIGNIFICANT GROUNDWATER RECHARGE AREAS (TRCA)
- SIGNIFICANT GROUNDWATER RECHARGE AREAS (TRCA)

0 100 200 400 600 800 1,000
Metres

N

BURNSIDE

Client / Report

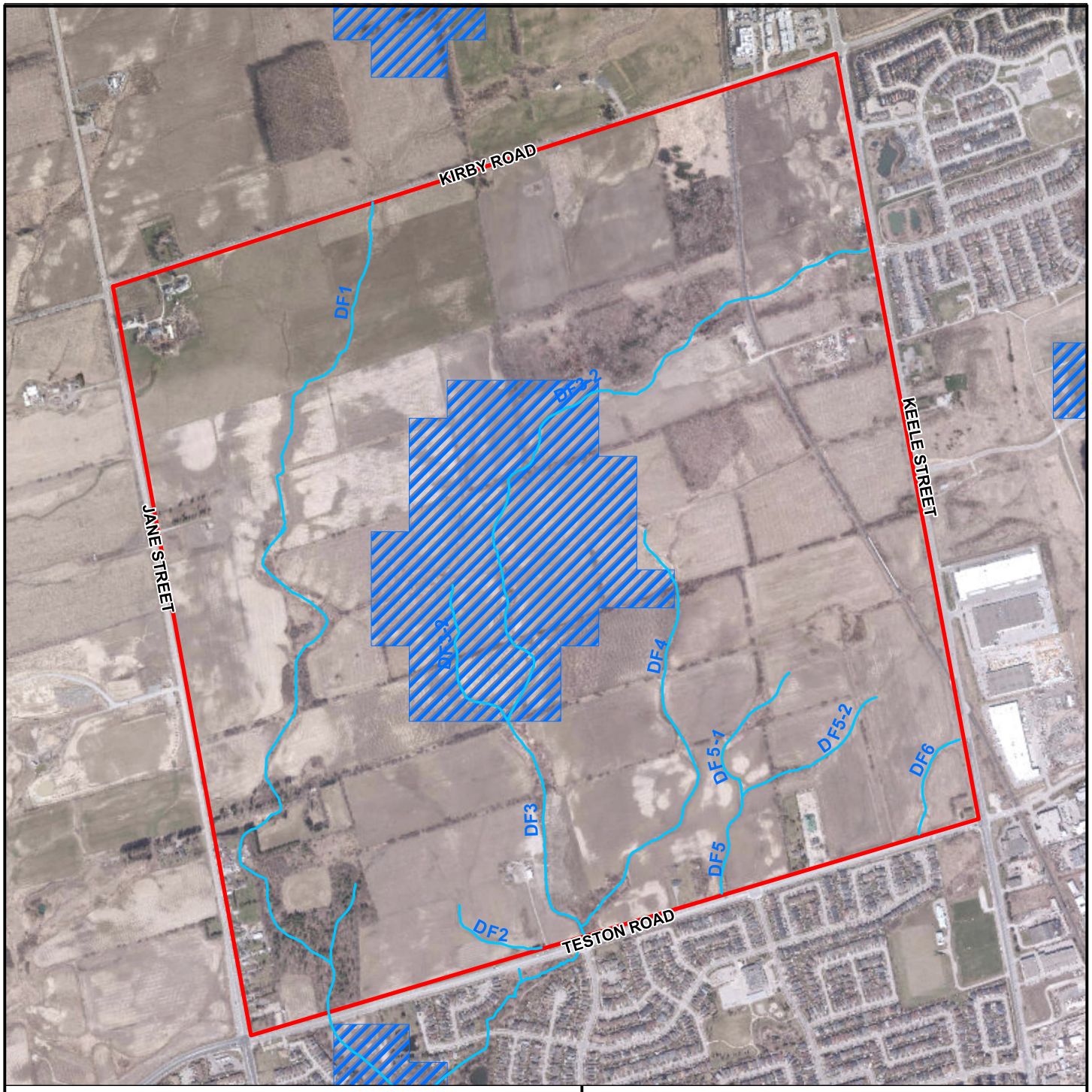
BLOCK 27 LANDOWNERS GROUP
VAUGHAN, ONTARIO
HYDROGEOLOGICAL EXISTING CONDITIONS REPORT

Figure Title:

RECHARGE AREAS

Drawn	Checked	Date	Figure No.
SK	JS	AUGUST 2022	4.2.5
Scale		Project No.	
1:15,000		300050116	

File Path: Nigel/Shared Work Areas/A:\050116 Block 27\06_GIS\050116 Recharge Areas.mxd Print Date: 2022/08/15 Time: 03:15 PM



LEGEND

SUBJECT LANDS

HIGHLY VULNERABLE AQUIFER AREAS

Sources:

1. Ministry of Natural Resources and Forestry, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Highly Vulnerable Aquifer areas data obtained from York Region Open Data.

0 100 200 400 600 800 1,000

Metres

N

BURNSIDE

Client / Report

BLOCK 27 LANDOWNERS GROUP
VAUGHAN, ONTARIO
HYDROGEOLOGICAL EXISTING CONDITIONS REPORT

Figure Title:

AQUIFER VULNERABILITY

Drawn	Checked	Date	Figure No.
SK	JS	AUGUST 2022	4.2.6
Scale		Project No.	
1:15,000		300050116	

File Path: Nigel/Shared Work Areas/A:\050116 Block 27\06_GIS\050116 Aquifer Vulnerability.mxd Print Date: 2022/08/15 Time: 03:18 PM

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C1

Hydrogeological Borehole Logs

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-76D

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 31/8/10 **COMPLETED** 31/8/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Cloudy to sunny, 30 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1			TOPSOIL (silty CLAY) dry to moist, light brown, stiff, trace gravel and vegetation root	Cement seal	SS 1	4-4-9-9 (13)	
2			0.76				
3	1		clayey SILT dry to moist, light brown, compact, trace fine sand		SS 2	3-5-11-12 (16)	
4							
5			1.52 dry to moist, light brown, compact, some fine sand		SS 3	4-11-15-23 (26)	
6	2						
7			2.29				
8			dry to moist, light brown, dense, some fine sand		SS 4	12-17-20-23 (37)	
9							
10	3		3.05	50 mm diameter solid PVC pipe			
11			moist to wet, light brown, compact, trace fine sand wet, light brown, silty SAND from 3.05 m to 3.20 m		SS 5A 5B	9-10-13-13 (23)	
12							
13	4		3.81 silty CLAY moist, light grey, hard, trace fine sand		SS 6	7-10-23-30 (33)	
14							
15			4.57 dry to moist, light grey, hard, trace fine sand		SS 7A 7B	12-18-30-25 (48)	
16			4.89				
17	5		SILT moist to wet, light grey, dense				
18			5.33 sandy SILT moist to wet, light grey, very dense		SS 8	1-20-32-36 (52)	
19							
20	6			Bentonite hole plug			
21					SS 9A 9B	10-14-14-47 (28)	
22			6.50 CLAY				
23	7		6.86 moist, light grey, very stiff, trace silt and fine sand clayey SILT		SS 10	15-14-17-22 (31)	
24			moist, light grey, dense, some fine sand				
25			7.62				
26	8		moist, light grey, dense, some fine sand and trace coarse sand		SS 11	10-15-26-30 (41)	
27							
28							
29	9						
30			9.14				
31			dry to moist, light grey, very dense, trace fine sand SAND with some clay observed at 9.45 m to 9.53 m		SS 12A 12B	15-27-36-43 (63)	
32							
	10						

(Continued Next Page)

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-76D

CLIENT Block 27 Landowner's Group

PROJECT NAME Hydrogeological Investigation for Block 27

PROJECT NUMBER L10-189

PROJECT LOCATION Block 27, Vaughan, Ontario

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
34			dry to moist, light grey, very dense, trace fine sand SAND with some clay observed at 9.45 m to 9.53 m *(continued)*				
35			10.67				
36	11		moist to wet, light grey, compact, trace fine sand		SS 13	6-9-11-17 (20)	
37			11.43				
38			moist to wet, light grey, very dense, trace fine sand		SS 14	14-17-50 (67)	
39	12						
40			12.19				
41			SILT moist to wet, light grey, compact, trace fine sand		SS 15	14-10-8-18 (18)	
42							
43	13						
44							
45			13.72	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
46	14		CLAY moist to wet, light grey, hard, trace silt and fine sand		SS 16	32-50	
47							
48							
49	15						
50			15.24				
51			moist to wet, light grey, hard		SS 17	18-16-22-28 (38)	
52			15.85				

Bottom of borehole at 15.85 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-76S

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 31/8/10 **COMPLETED** 31/8/10
GROUND ELEVATION _____ **HOLE SIZE** 152 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 6" Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Cloudy to sunny, 30 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1–2			TOPSOIL (silty CLAY) dry to moist, light brown, stiff, trace gravel and vegetation root				
			0.76				
3–4	1		clayey SILT dry to moist, light brown, compact, trace fine sand				
5			1.52 dry to moist, light brown, compact, some fine sand	Bentonite hole plug			
6–7	2			50 mm diameter solid PVC pipe			
7–8			2.29 dry to moist, light brown, dense, some fine sand				
9–10	3		3.05 moist to wet, light brown, compact, trace fine sand wet, light brown, silty SAND from 3.05 m to 3.20 m				
11–12			3.81				
13	4		silty CLAY moist, light grey, hard, trace fine sand				
14–15			4.57 dry to moist, light grey, hard, trace fine sand				
16	5		4.89 SILT moist to wet, light grey, dense	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
17–18			5.33 sandy SILT moist to wet, light grey, very dense				
19			5.94				

Bottom of borehole at 5.94 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-78D

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 25/8/10 **COMPLETED** 25/8/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Cloudy, 22 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM (Casing Top Elev: (m))	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
1			0.25 TOPSOIL (clayey SILT) moist, dark brown, loose, trace sand	Cement seal	SS 1A 1B	1-3-4-5 (7)	
2			sandy SILT				
			0.76 moist, light grey, loose				
3	1		silty SAND		SS 2	3-6-9-10 (15)	
4			moist to wet, light grey, compact, fine				
5			1.52				
6	2		clayey SILT moist, light grey, compact, trace fine sand fine SAND observed at 1.67 m to 1.76 m and at 2.39 m to 2.49 m		SS 3	9-9-10-10 (19)	
7							
8					SS 4	10-11-16-22 (27)	
9							
10	3		3.05	50 mm diameter solid PVC pipe			
11			moist, light grey, very dense, trace fine sand		SS 5A 5B	11-22-31-27 (53)	
			3.41				
12			silty SAND				
			3.81 wet, light brownish grey, very dense, fine				
13	4		clayey SILT		SS 6A 6B	18-34-45-50 (79)	
			4.11 moist, light grey, very dense, trace fine sand				
14			SILT				
15			4.57 wet, light greyish brown, very dense, trace fine sand				
16	5		wet, light greyish brown, dense, trace fine sand		SS 7	12-19-26-35 (45)	
17							
			5.33				
18			silty SAND		SS 8	18-26-32-40 (58)	
19			wet, light brownish grey, very dense, fine	Bentonite hole plug			
20	6		6.10				
21			wet, light brownish grey, dense, fine		SS 9	14-17-23-40 (40)	
22							
			6.86				
23	7		SILT		SS 10	14-18-35-50 (53)	
24			wet, light brownish grey, very dense, some fine sand				
25							
26	8				SS 11	14-23-40-50 (63)	
27							
			8.38				
28			wet, light brownish grey, dense, some fine sand		SS 12	14-19-24-40 (43)	
29	9						
30			9.14				
31			silty SAND		SS 13	1-13-25-37 (38)	
32			wet, light brownish grey, dense, fine				
	10						

(Continued Next Page)

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-78D

CLIENT Block 27 Landowner's Group

PROJECT NAME Hydrogeological Investigation for Block 27

PROJECT NUMBER L10-189

PROJECT LOCATION Block 27, Vaughan, Ontario

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
34			silty SAND wet, light brownish grey, dense, fine *(continued)*				
35			10.67				
36	11		wet, light brown, very dense, fine		SS 14	13-28-50 (78)	
37			11.43				
38			SILT wet, light greyish brown, compact, some fine sand silty SAND observed at 12.73 m, hint of oxidation (orange stain)		SS 15	1-11-15-27 (26)	
39	12						
40					SS 16	1-1-15-20 (16)	
41							
42			12.95				
43	13		wet, light greyish brown, dense, some fine sand		SS 17	11-14-18-36 (32)	
44							
45			13.72	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
46	14		wet, light greyish brown, loose, some fine sand, trace clay		SS 18	9-4-5-11 (9)	
47							
48							
49	15						
50			15.24				
51			sandy SILT wet, light grey, compact		SS 19	7-8-16-23 (24)	
52			15.85				

Bottom of borehole at 15.85 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-78S

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 26/8/10 **COMPLETED** 26/8/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Cloudy, 22 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
			0.25 TOPSOIL (clayey SILT) moist, dark brown, loose, trace sand	Casing Top Elev: (m)			
1			sandy SILT				
2			0.76 moist, light grey, loose				
3	1		silty SAND moist to wet, light grey, compact, fine				
4							
5			1.52				
6			clayey SILT moist, light grey, compact, trace fine sand fine SAND observed at 1.67 m to 1.76 m and at 2.39 m to 2.49 m	Bentonite hole plug 50 mm diameter solid PVC pipe			
7	2						
8							
9							
10	3		3.05				
11			moist, light grey, very dense, trace fine sand 3.41				
12			silty SAND wet, light brownish grey, very dense, fine				
13	4		3.81 clayey SILT				
14			4.11 moist, light grey, very dense, trace fine sand SILT				
15			4.57 wet, light greyish brown, very dense, trace fine sand				
16			wet, light greyish brown, dense, trace fine sand				
17	5			50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
18			5.33				
			silty SAND wet, light brownish grey, very dense, fine				
			5.79				

Bottom of borehole at 5.79 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-79D

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 24/8/10 **COMPLETED** 24/8/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Cloudy to sunny, 24 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1			TOPSOIL (silty CLAY) moist, dark brown, stiff, trace vegetation root	Soil Cutting	SS 1	2-3-6-8 (9)	
2			0.76				
3	1		0.96 dry to moist, dark brown, hard		SS 2A 2B	13-24-26-33 (50)	
4			SILT and CLAY moist, light grey, very dense, trace fine sand				
5			1.52				
6	2		clayey SILT dry to moist, light brown, compact, trace fine sand		SS 3	8-12-16-16 (28)	
7			2.29				
8			SILT and CLAY dry to moist, light brown, dense, trace fine sand		SS 4	10-15-29-50 (44)	
9							
10	3		3.05	50 mm diameter solid PVC pipe			
11			dry to moist, light brown, very dense, trace fine sand		SS 5A 5B	16-24-40-50 (64)	
12			3.50				
13	4		SILT 3.81 dry to moist, light grey, very dense		SS 6A 6B	17-21-21-26 (42)	
14			clayey SILT 4.21 dry to moist, light brown, dense, trace fine sand, hint of oxidation (orange stain)				
15			4.57 silty CLAY				
16	5		dry to moist, light grey, hard		SS 7	6-9-33-50 (42)	
17			clayey SILT dry to moist, light grey, dense, trace gravel,				
18			5.33 SAND observed at 5.06 m to 5.10 m dry to moist, light grey, very dense, trace fine sand	Bentonite hole plug	SS 8	36-50	
19							
20	6						
21					SS 9	25-32-50 (82)	
22							
23	7						
24							
25			7.62				
26	8		silty SAND wet, light greyish brown, compact, fine		SS 10	1-6-15-17 (21)	
27							
28							
29	9						
30			9.14				
31			SAND wet, dark brown, loose, fine, trace silt		SS 11	4-2-4-13 (6)	
32							
	10						

COLE UPDATED TEMPLATE BLOCK 27 BOREHOLE LOGS.GPJ GINT STD CANADA LAB.GDT 8/3/11

(Continued Next Page)

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-79D

CLIENT Block 27 Landowner's Group

PROJECT NAME Hydrogeological Investigation for Block 27

PROJECT NUMBER L10-189

PROJECT LOCATION Block 27, Vaughan, Ontario

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
34			SAND wet, dark brown, loose, fine, trace silt *(continued)*				
35			10.67				
36	11		clayey SILT dry to moist, light greyish brown, very dense		SS 12	14-41-50 (91)	
37							
38							
39	12						
40			12.19				
41			dry to moist, light grey, very dense, trace fine sand		SS 13	50	
42							
43	13			50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
44							
45			13.72				
46	14		CLAY dry to moist, light grey, hard, trace silt		SS 14	37-50	
47							
48							
49	15			Soil Cave-in			
50			15.24				
51			clayey SILT moist to wet, light grey, very dense		SS 15	34-41-50 (91)	
52			15.85				

Bottom of borehole at 15.85 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-79S

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 24/8/10 **COMPLETED** 24/8/10
GROUND ELEVATION _____ **HOLE SIZE** 152 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 6" Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Cloudy to sunny, 24 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1			TOPSOIL (silty CLAY) moist, dark brown, stiff, trace vegetation root				
2			0.76				
3	1		0.96 dry to moist, dark brown, hard SILT and CLAY moist, light grey, very dense, trace fine sand				
4			1.52				
5			clayey SILT dry to moist, light brown, compact, trace fine sand				
6	2						
7			2.29	50 mm diameter solid PVC pipe			
8			SILT and CLAY dry to moist, light brown, dense, trace fine sand				
9							
10	3		3.05	Bentonite hole plug			
11			dry to moist, light brown, very dense, trace fine sand				
12			3.50				
13	4		SILT 3.81 dry to moist, light grey, very dense clayey SILT				
14			4.21 dry to moist, light brown, dense, trace fine sand, hint of oxidation (orange stain)				
15			4.57 silty CLAY dry to moist, light grey, hard				
16	5		clayey SILT dry to moist, light grey, dense, trace gravel,				
17			5.33 SAND observed at 5.06 m to 5.10 m dry to moist, light grey, very dense, trace fine sand				
18							
19							
20	6						
21							
22							
23	7			50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
24							
25			7.62				

Bottom of borehole at 7.62 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-80D

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 23/8/10 **COMPLETED** 23/8/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Cloudy, 24 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1			TOPSOIL (SILT and CLAY) moist, dark brown, loose		SS 1	4-4-5-5 (9)	
2							
			0.76				
3	1		moist to wet, dark brown, loose		SS 2	3-3-3-3 (6)	
4							
5							
6			1.81		SS 3	1-2-4-9 (6)	
7	2		silty SAND moist, dark brown, loose, fine				
			2.29				
8			moist to wet, dark brown, dense, fine, trace of gravel		SS 4	12-14-20-12 (34)	
9							
10	3		3.05	50 mm diameter solid PVC pipe			
11			moist to wet, light brownish grey, dense, fine		SS 5	10-18-19-22 (37)	
12							
			3.81				
13	4		moist to wet, light brownish grey, compact, fine		SS 6A 6B	7-8-13-22 (21)	
			4.14				
14			clayey SILT dry to moist, light brownish grey, compact				
15			4.57				
16	5		silty SAND wet, light brownish grey, dense, fine		SS 7	13-21-26-32 (47)	
17							
18							
19							
20	6		6.10	Bentonite hole plug			
21			silty CLAY dry to moist, grey, hard, hint of oxidation (reddish stain)		SS 8	10-26-50 (76)	
22							
			6.86				
23	7		moist, grey, hard, trace gravel, hint of oxidation (reddish stain)		SS 9	31-47-50 (97)	
24							
25			7.62				
26	8		moist to wet, grey, hard SAND observed at 7.72 m to 7.80 m, hint of oxidation (reddish stain)		SS 10	34-50	
27							
28							
29	9						
30			9.14				
31			CLAY moist, grey, hard, trace silt		SS 11	50	
32							
	10						

(Continued Next Page)

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-80D

CLIENT Block 27 Landowner's Group

PROJECT NAME Hydrogeological Investigation for Block 27

PROJECT NUMBER L10-189

PROJECT LOCATION Block 27, Vaughan, Ontario

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
34			CLAY moist, grey, hard, trace silt *(continued)*				
35			10.67				
36	11		moist to wet, grey, hard, sand lens observed at 10.71 m to 10.75 m		SS 12	49-50	
37							
38							
39	12						
40			12.19				
41			12.44 silty SAND wet, light brown, very dense, fine		SS 13A 13B	20-30-38-50 (68)	
42			SILT wet, light greyish brown, very dense				
43	13						
44							
45			13.72	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
46	14		silty SAND wet, light greyish brown, very dense, fine		SS 14	23-42-50 (92)	
47							
48							
49	15						
50							
51					SS 15	13-27-50 (77)	
52			15.85				

Bottom of borehole at 15.85 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-80S

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 23/8/10 **COMPLETED** 23/8/10
GROUND ELEVATION _____ **HOLE SIZE** 152 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 6" Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Cloudy, 24 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1–3	1		TOPSOIL (SILT and CLAY) moist, dark brown, loose	Cement seal			
			0.76 moist to wet, dark brown, loose				
4–6			1.81	Bentonite hole plug			
6–8	2		silty SAND moist, dark brown, loose, fine 2.29 moist to wet, dark brown, dense, fine, trace of gravel	50 mm diameter solid PVC pipe			
9–10	3		3.05 moist to wet, light brownish grey, dense, fine				
11–13	4		3.81 moist to wet, light brownish grey, compact, fine 4.14				
14–15			clayey SILT dry to moist, light brownish grey, compact 4.57	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
16	5		silty SAND wet, light brownish grey, dense, fine 5.18				

Bottom of borehole at 5.18 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-81D

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 20/8/10 **COMPLETED** 20/8/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Sunny, 26 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1			SAND and SILT dry to moist, light grey, compact, some vegetation root	Cement seal	SS 1	2-6-6-7 (12)	
2							
			0.76				
3	1		clayey SILT dry to moist, brownish grey, compact, some vegetation root		SS 2	6-5-6-8 (11)	
4							
5			1.52				
6			moist, dark brown, compact, trace gravel		SS 3	2-4-10-14 (14)	
7	2						
			2.29				
8			dry to moist, brown, very dense		SS 4A 4B	6-17-46-50 (63)	
9			2.74				
10	3		SAND and SILT 3.05 dry to moist, light greyish brown, very dense, fine	50 mm diameter solid PVC pipe			
11			silty SAND dry to moist, light brown, very dense, fine, trace clay		SS 5	21-50	
12							
13	4				SS 6	13-37-50 (87)	
14							
15			4.57				
16	5		clayey SILT dry to moist, light brown, very dense, trace fine sand		SS 7	19-26-50 (76)	
17							
			5.33				
18			5.43 moist, light brown, very dense, trace fine sand		SS 8A 8B	23-42-50 (92)	
19			SAND dry to moist, light greyish brown, very dense, fine				
20	6		6.10	Bentonite hole plug			
21			silty SAND moist, light brown, very dense, fine, trace clay		SS 9	30-50-50 (100)	
22							
			6.86				
23	7		dry to moist, light brown, very dense, fine, trace clay		SS 10	43-50	
24							
25			7.62				
26	8		sandy SILT dry to moist, light grey, very dense		SS 11	26-44-50 (94)	
27							
28							
29	9						
30			9.14				
31			moist, light grey, very dense		SS 12	33-50	
32							
	10						

(Continued Next Page)

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-81D

CLIENT Block 27 Landowner's Group

PROJECT NAME Hydrogeological Investigation for Block 27

PROJECT NUMBER L10-189

PROJECT LOCATION Block 27, Vaughan, Ontario

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
34			moist, light grey, very dense *(continued)*				
35							
36	11				SS 13	23-46-50 (96)	
37							
38							
39	12						
40			12.19				
41			clayey SILT moist to wet, light brownish yellow, very dense		SS 14	24-50	
42							
43	13						
44							
45			13.72				
46	14		wet, light brownish yellow, dense	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill	SS 15	19-19-30-50 (49)	
47							
48							
49	15						
50							
51					SS 16	29-48-50 (98)	
52			15.85				

Bottom of borehole at 15.85 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-81S

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 20/8/10 **COMPLETED** 20/8/10
GROUND ELEVATION _____ **HOLE SIZE** 152 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 6" Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Sunny, 26 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1–2			SAND and SILT dry to moist, light grey, compact, some vegetation root	Cement seal			
			0.76				
3–4	1		clayey SILT dry to moist, brownish grey, compact, some vegetation root				
5–6			1.52 moist, dark brown, compact, trace gravel	50 mm diameter solid PVC pipe			
7–8	2		2.29 dry to moist, brown, very dense	Bentonite hole plug			
9			2.74				
10	3		SAND and SILT dry to moist, light greyish brown, very dense, fine				
			3.05 silty SAND dry to moist, light brown, very dense, fine, trace clay				
11–13	4						
14–15			4.57				
16–17	5		clayey SILT dry to moist, light brown, very dense, trace fine sand				
			5.33				
18			5.43 moist, light brown, very dense, trace fine sand	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
19			SAND dry to moist, light greyish brown, very dense, fine				
20	6		6.10				

Bottom of borehole at 6.10 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-82D

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 13/8/10 **COMPLETED** 13/8/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY AR **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Sunny, 28 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1			TOPSOIL dark brown	Cement seal	SS 1	1-5-57 (62)	
2			0.76				
3	1		SILT dry, compact, trace clay		SS 2	4-6-8 (14)	
4							
5			1.52				
6	2		silty CLAY dry, brown, very stiff, trace of sand and pebble		SS 3	7-13-16 (29)	
7							
8			2.29 dry, light brown, hard, trace pebble		SS 4	9-14-19 (33)	
9							
10	3		3.05	50 mm diameter solid PVC pipe			
11			dry, light brown, very stiff, trace sand, pockets of red discoloration		SS 5	7-12-55 (67)	
12							
13	4		3.81 brown, very stiff, trace gravel	Soil Cutting	SS 6A 6B	6-10-12 (22)	
14			4.17 moist, grey, very stiff				
15			4.57 moist, grey, very stiff, trace sand		SS 7A 7B	6-6-15 (21)	
16	5		4.95				
17			SILT				
18			5.33 brown, compact, fine CLAY grey, very stiff, trace silt		SS 8	3-11-11 (22)	
19							
20	6		6.10				
21			silty CLAY grey		SS 9		
22			6.71				
23	7		grey, hard		SS 10	6-12-22-26 (34)	
24			7.11 7.21 7.32 SAND grey, dense, medium				
25			silty CLAY grey, hard		SS 11		
26	8		grey, trace pebble				
27							
28							
29				Bentonite hole plug			
30	9		9.14				
31			clayey SILT light brown, very dense, trace fine sand		SS 12	35-50	
32							
	10						

(Continued Next Page)

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-82D

CLIENT Block 27 Landowner's Group

PROJECT NAME Hydrogeological Investigation for Block 27

PROJECT NUMBER L10-189

PROJECT LOCATION Block 27, Vaughan, Ontario

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
34			clayey SILT light brown, very dense, trace fine sand *(continued)*				
35			10.67				
36	11		silty SAND wet, light brown, very dense, medium		SS 13	21-36-50 (86)	
37							
38							
39	12						
40			12.19	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
41			moist, light brown, very dense, medium		SS 14	30-50	
42			12.80				
43	13		13.06 sandy SILT dark brown, very dense		SS 15A 15B	33-64-50 (114)	
44			silty CLAY grey, hard, trace sand				
45			13.72				
46	14		sandy CLAY moist, grey		SS		
47			14.33				

Bottom of borehole at 14.33 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-82S

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 16/8/10 **COMPLETED** 16/8/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY AR **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Sunny, 28 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1			TOPSOIL dark brown	Cement seal			
2			0.76				
3	1		SILT dry, compact, trace clay				
4							
5			1.52				
6			silty CLAY dry, brown, very stiff, trace of sand and pebble				
7	2			50 mm diameter solid PVC pipe			
8			2.29 dry, light brown, hard, trace pebble				
9							
10	3		3.05	Bentonite hole plug			
11			dry, light brown, very stiff, trace sand, pockets of red discoloration				
12							
13	4		3.81 brown, very stiff, trace gravel				
14			4.17 moist, grey, very stiff				
15			4.57 moist, grey, very stiff, trace sand				
16	5		4.95				
17			SILT brown, compact, fine				
18			5.33 CLAY grey, very stiff, trace silt				
19							
20	6		6.10				
21			silty CLAY grey				
22			6.71				
23	7		grey, hard	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
24			7.11 7.21 SAND				
25			7.32 grey, dense, medium 7.62 silty CLAY grey, hard grey, trace pebble				

Bottom of borehole at 7.62 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-83D

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 1/9/10 **COMPLETED** 1/9/10
GROUND ELEVATION _____ **HOLE SIZE** 203 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 8" Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Sunny, 30 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
				Casing Top Elev: (m)			
1			TOPSOIL (clayey SILT) dry to moist, dark brown, compact, some fine sand, trace vegetation root		SS 1	2-5-6-8 (11)	
2							
3	1				SS 2A 2B	4-6-7-14 (13)	
4			1.08 silty SAND moist, light greyish brown, compact, fine				
5			1.52 moist to wet, light greyish brown, compact, fine		SS 3	6-10-11-15 (21)	
6	2						
7			2.29 wet, light greyish brown, very dense, fine		SS 4	12-28-28-27 (56)	
8							
9							
10	3		3.05 wet, light greyish brown, dense, fine, hint of oxidation observed at 4.17 m to 4.24 m (orange stain)	50 mm diameter solid PVC pipe	SS 5	13-19-24-31 (43)	
11							
12							
13	4				SS 6A 6B	15-22-18-30 (40)	
14			4.24 clayey SILT moist, light grey, dense, trace fine sand				
15							
16	5				SS 7	1-18-22-21 (40)	
17							
18			5.33 moist, light grey, compact, some fine sand		SS 8	1-7-11-12 (18)	
19							
20	6		6.10 moist to wet, light grey, compact, some fine sand				
21					SS 9	7-11-11-20 (22)	
22				Bentonite hole plug			
23	7						
24							
25			7.62 moist to wet, light grey, very dense, some fine sand				
26	8				SS 10	25-37-50 (87)	
27							
28							
29	9						
30			9.14				
31			CLAY moist to wet, light grey, hard, trace silt		SS 11	50	
32							
	10						

(Continued Next Page)

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-83D

CLIENT Block 27 Landowner's Group

PROJECT NAME Hydrogeological Investigation for Block 27

PROJECT NUMBER L10-189

PROJECT LOCATION Block 27, Vaughan, Ontario

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
34			CLAY moist to wet, light grey, hard, trace silt *(continued)*				
35							
36	11				SS 12	29-38-50 (88)	
37							
38							
39	12						
40							
41					SS 13A 13B	17-26-20-29 (46)	
42			12.65 sandy SILT wet, light grey, dense, fine, trace clay				
43	13						
44							
45			13.72 SILT and CLAY moist to wet, light grey, very dense, trace fine sand				
46	14				SS 14	20-29-33-50 (62)	
47							
48							
49	15						
50			15.24 silty SAND wet, dark grey, very dense, fine * driller flushed the borehole with water before taking out the split spoon, limited sample recovery	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill	SS 15	1-10-24-50 (34)	
51							
52	16						
53							
54							
55			16.76 wet, dark grey, loose, fine				
56	17				SS 16	1-4-5-7 (9)	
			17.37				

Bottom of borehole at 17.37 meters.

Cole Engineering Group
70 Valleywood Drive, Markham, ON
L3R 9R6
Telephone: 905-940-6161
Fax: 905-940-2064

COLE ENGINEERING
Experience Enhancing Excellence

BOREHOLE NUMBER MW-83S

CLIENT Block 27 Landowner's Group
PROJECT NAME Hydrogeological Investigation for Block 27
PROJECT NUMBER L10-189
PROJECT LOCATION Block 27, Vaughan, Ontario
DATE STARTED 1/9/10 **COMPLETED** 1/9/10
GROUND ELEVATION _____ **HOLE SIZE** 152 mm (Outer Dia.)
DRILLING CONTRACTOR Strong Soil Search
GROUND WATER LEVELS:
DRILLING METHOD Track Mounted Rig, CME 55, 6" Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY XX **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Sunny, 30 C
AFTER DRILLING ---

DEPTH (ft)	DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	CGI (ppm)
1–3	1		TOPSOIL (clayey SILT) dry to moist, dark brown, compact, some fine sand, trace vegetation root	Casing Top Elev: (m) Bentonite hole plug			
			1.08 silty SAND moist, light greyish brown, compact, fine				
4–6			1.52 moist to wet, light greyish brown, compact, fine				
6–8	2		2.29 wet, light greyish brown, very dense, fine	50 mm diameter solid PVC pipe			
9–12	3		3.05 wet, light greyish brown, dense, fine, hint of oxidation observed at 4.17 m to 4.24 m (orange stain)	50 mm diameter, schedule 40, 0.01 slot PVC screen with sand fill			
			3.96				

Bottom of borehole at 3.96 meters.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

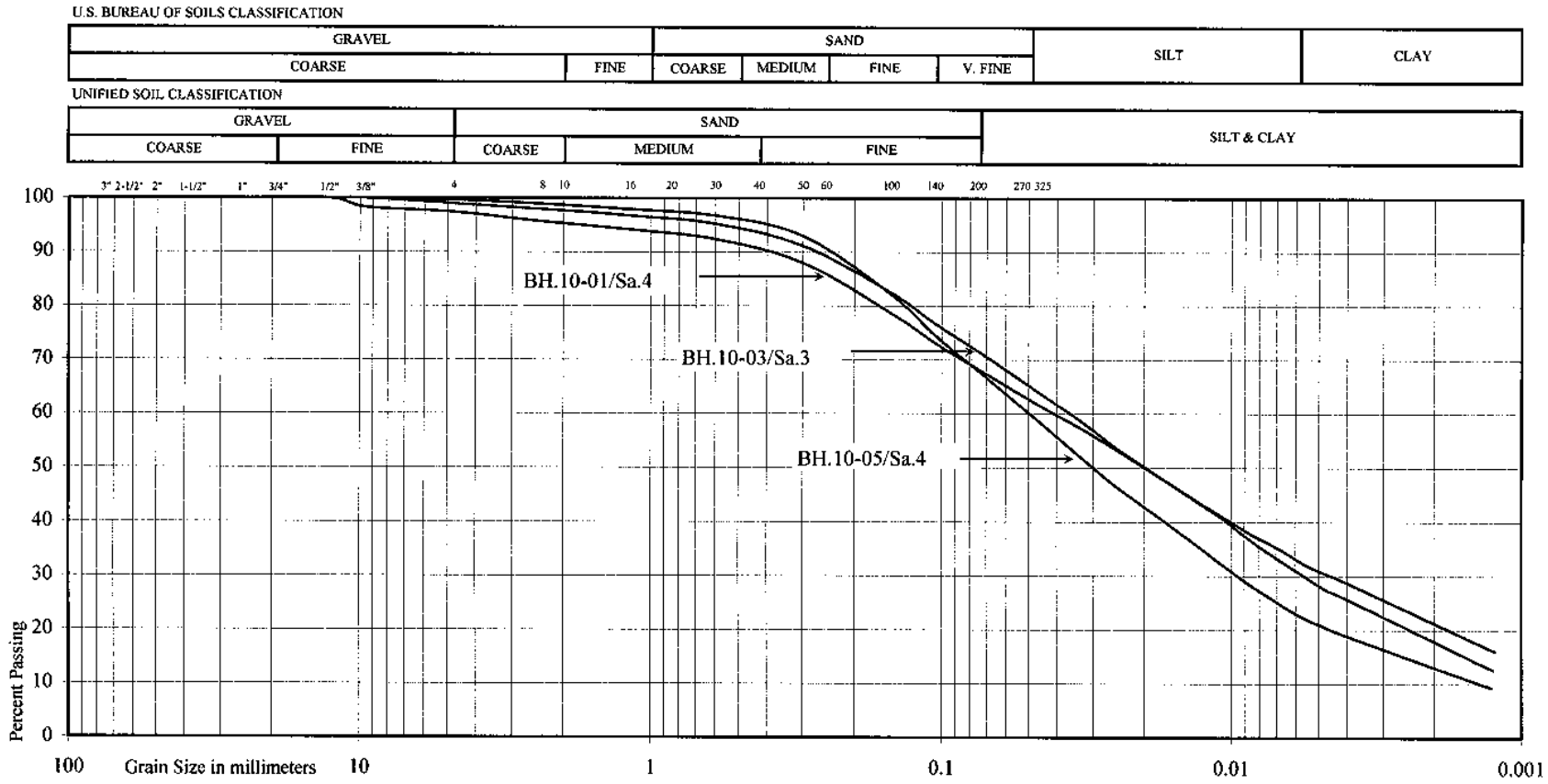
Appendix C2

Grainsize Analyses

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-01	10-03	10-05
Sample No:	4	3	4
Depth (m):	2.6	1.8	2.6
Elevation (m):	265.3	264.3	264.3

BH./Sa.	10-01/4	10-03/3	10-05/4
Liquid Limit (%) =	27	26	22
Plastic Limit (%) =	17	16	15
Plasticity Index (%) =	10	10	7
Moisture Content (%) =	10	13	16
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}	10^{-7}

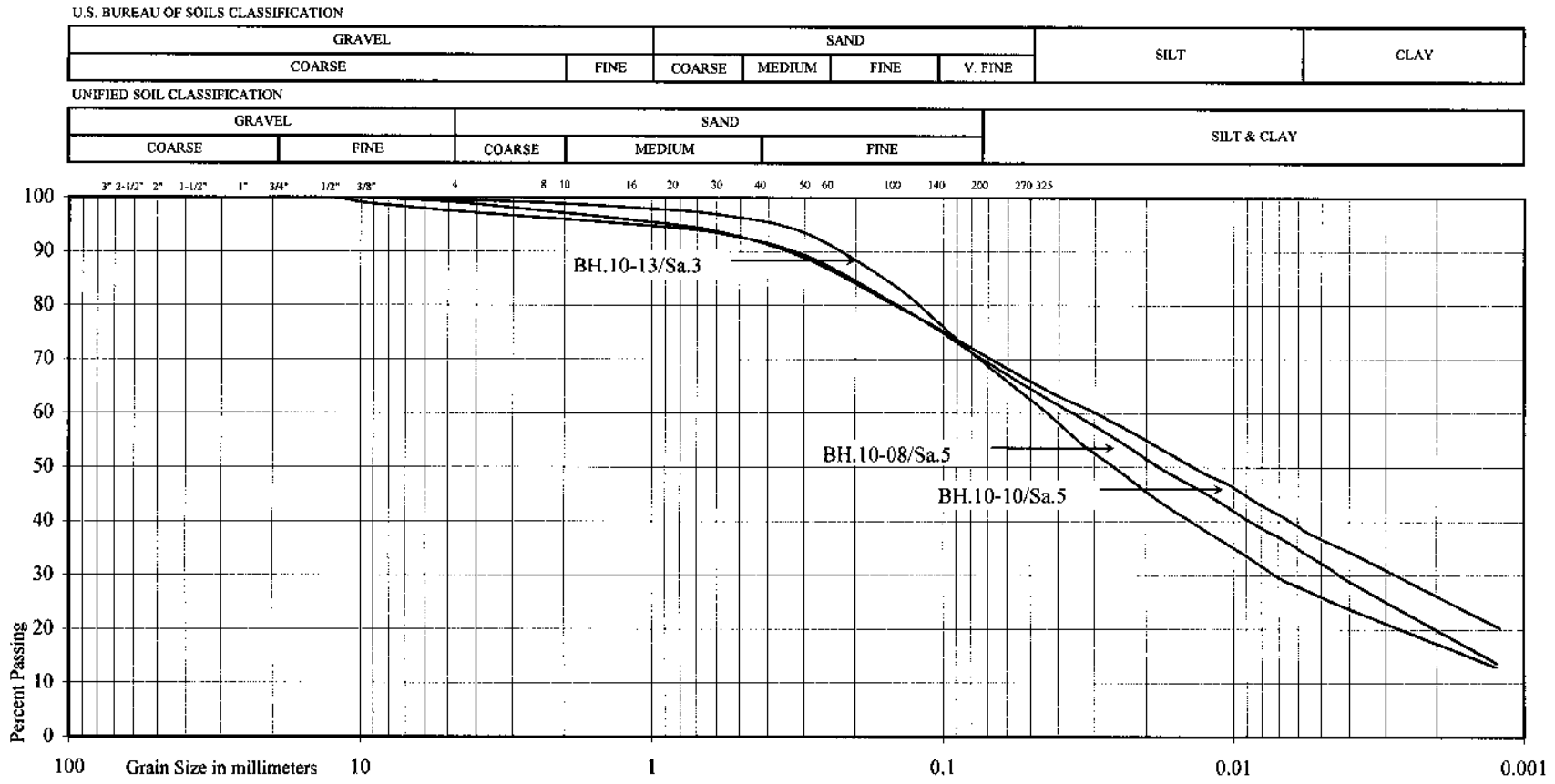
Classification of Sample [& Group Symbol]: SILTY CLAY, Till
sandy, a trace of gravel

Figure: 76

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-08	10-10	10-13
Sample No:	5	5	3
Depth (m):	3.3	3.3	1.8
Elevation (m):	272.3	295.6	260.4

BH./Sa.	10-08/5	10-10/5	10-13/3
Liquid Limit (%) =	27	29	25
Plastic Limit (%) =	17	17	16
Plasticity Index (%) =	10	12	9
Moisture Content (%) =	10	13	12
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}	10^{-7}

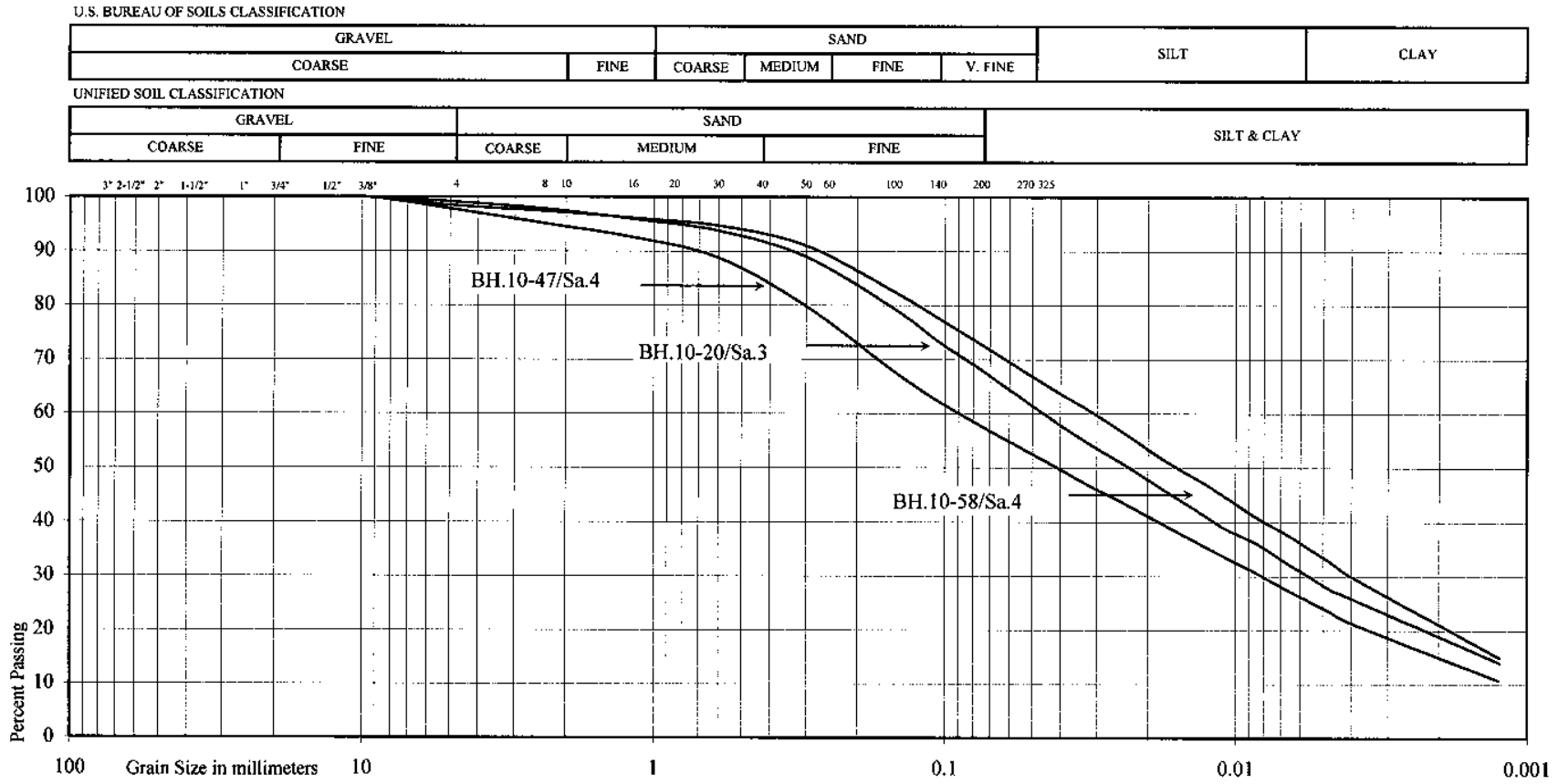
Classification of Sample [& Group Symbol]: SILTY CLAY, Till
sandy, a trace of gravel

Figure: 77

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-20	10-47	10-58
Sample No:	3	4	4
Depth (m):	1.8	2.6	2.6
Elevation (m):	261.2	289.1	255.4

BH./Sa.	10-20/3	10-47/4	10-58/4
Liquid Limit (%) =	26	23	28
Plastic Limit (%) =	16	15	17
Plasticity Index (%) =	10	8	11
Moisture Content (%) =	11	14	11
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}	10^{-7}

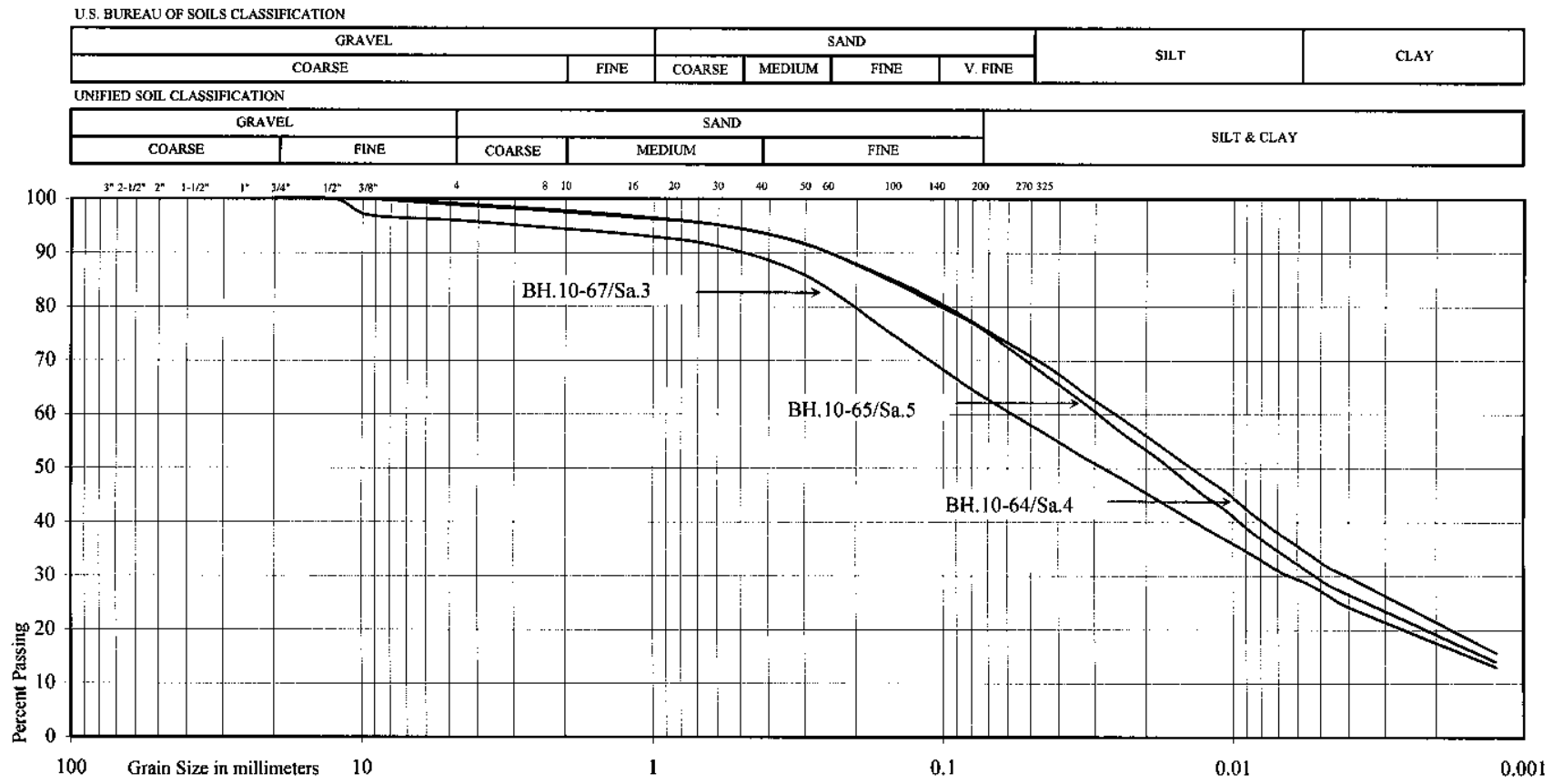
Classification of Sample [& Group Symbol]: SILTY CLAY, Till
sandy, a trace of gravel

Figure: 78

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-64	10-65	10-67
Sample No:	4	5	3
Depth (m):	2.6	3.3	1.8
Elevation (m):	249.4	249.7	281.3

BH./Sa.	10-64/4	10-65/5	10-67/3
Liquid Limit (%) =	28	26	25
Plastic Limit (%) =	17	16	16
Plasticity Index (%) =	11	10	9
Moisture Content (%) =	11	8	12
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}	10^{-7}

Classification of Sample [& Group Symbol]: SILTY CLAY, Till
sandy, a trace of gravel

Figure: 79

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

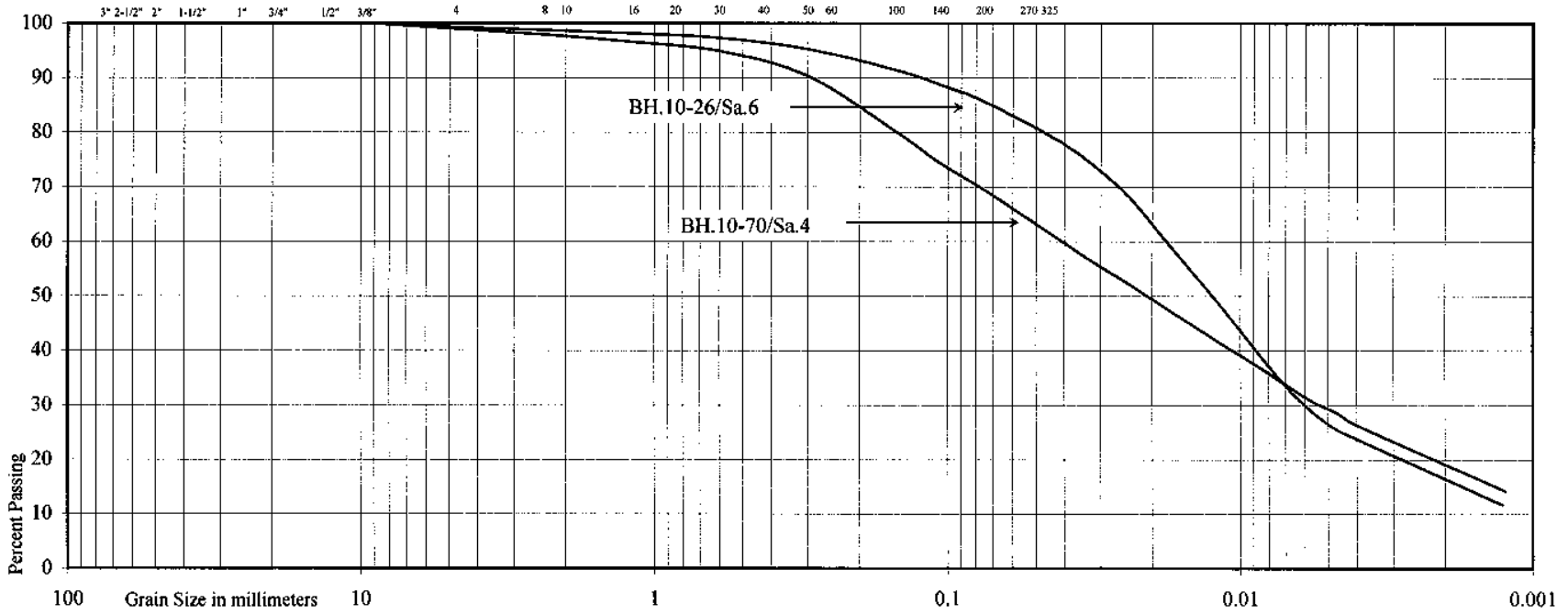
Reference No: 1007-S084

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project:	Proposed Residential Development	
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan	
Borehole No:	10-26	10-70
Sample No:	6	4
Depth (m):	4.8	2.6
Elevation (m):	251.4	256.4

BH./Sa.	10-26/6	10-70/4
Liquid Limit (%) =	25	26
Plastic Limit (%) =	15	16
Plasticity Index (%) =	10	10
Moisture Content (%) =	10	11
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}

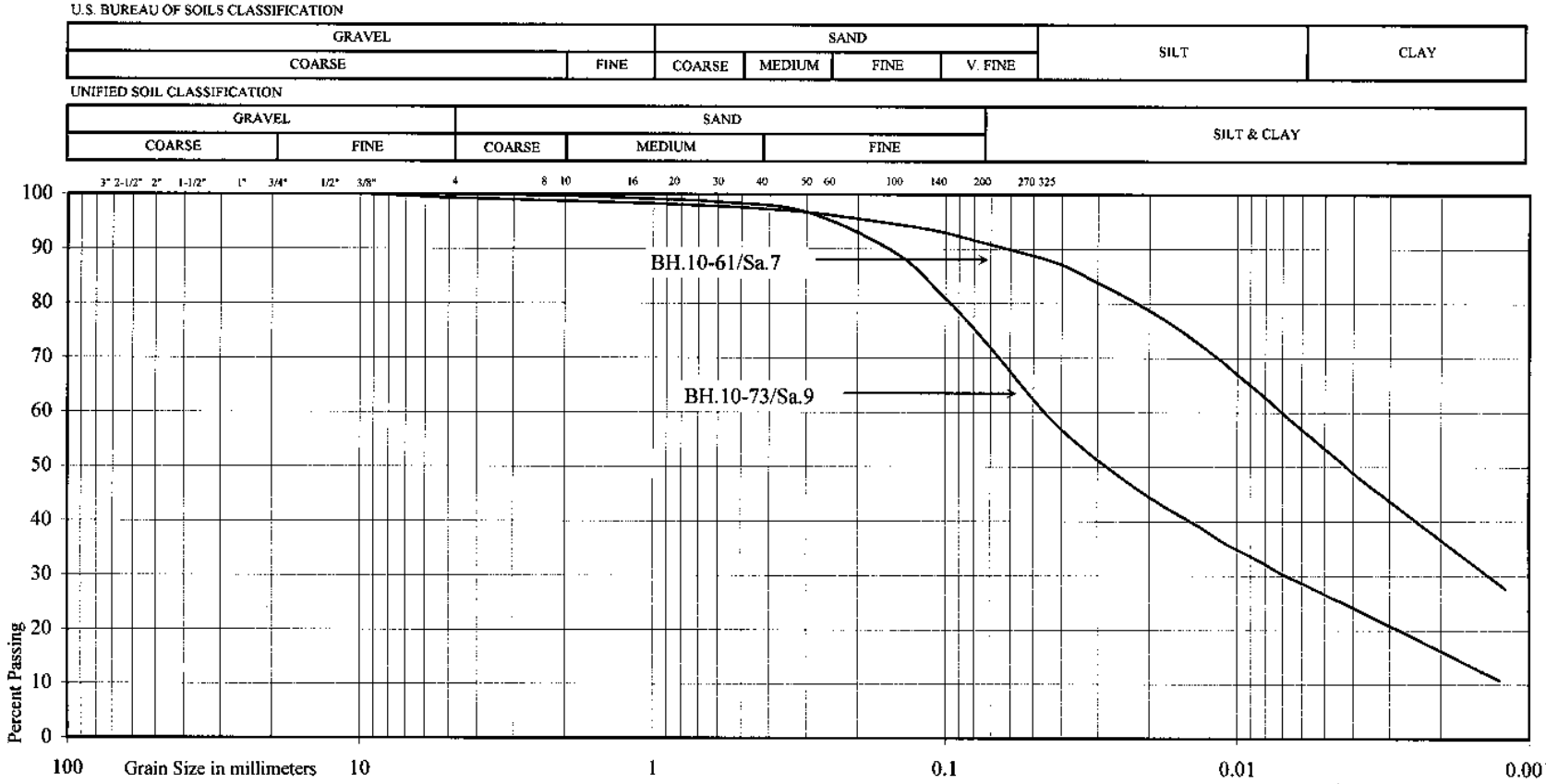
Classification of Sample [& Group Symbol]: SILTY CLAY, Till
some sand to sandy, a trace of gravel

Figure: 80

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development	
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan	
Borehole No:	10-61	10-73
Sample No:	7	9
Depth (m):	4.9	6.4
Elevation (m):	261.1	256.1

BH./Sa.	10-61/7	10-73/9
Liquid Limit (%) =	34	25
Plastic Limit (%) =	20	16
Plasticity Index (%) =	14	9
Moisture Content (%) =	19	20
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}

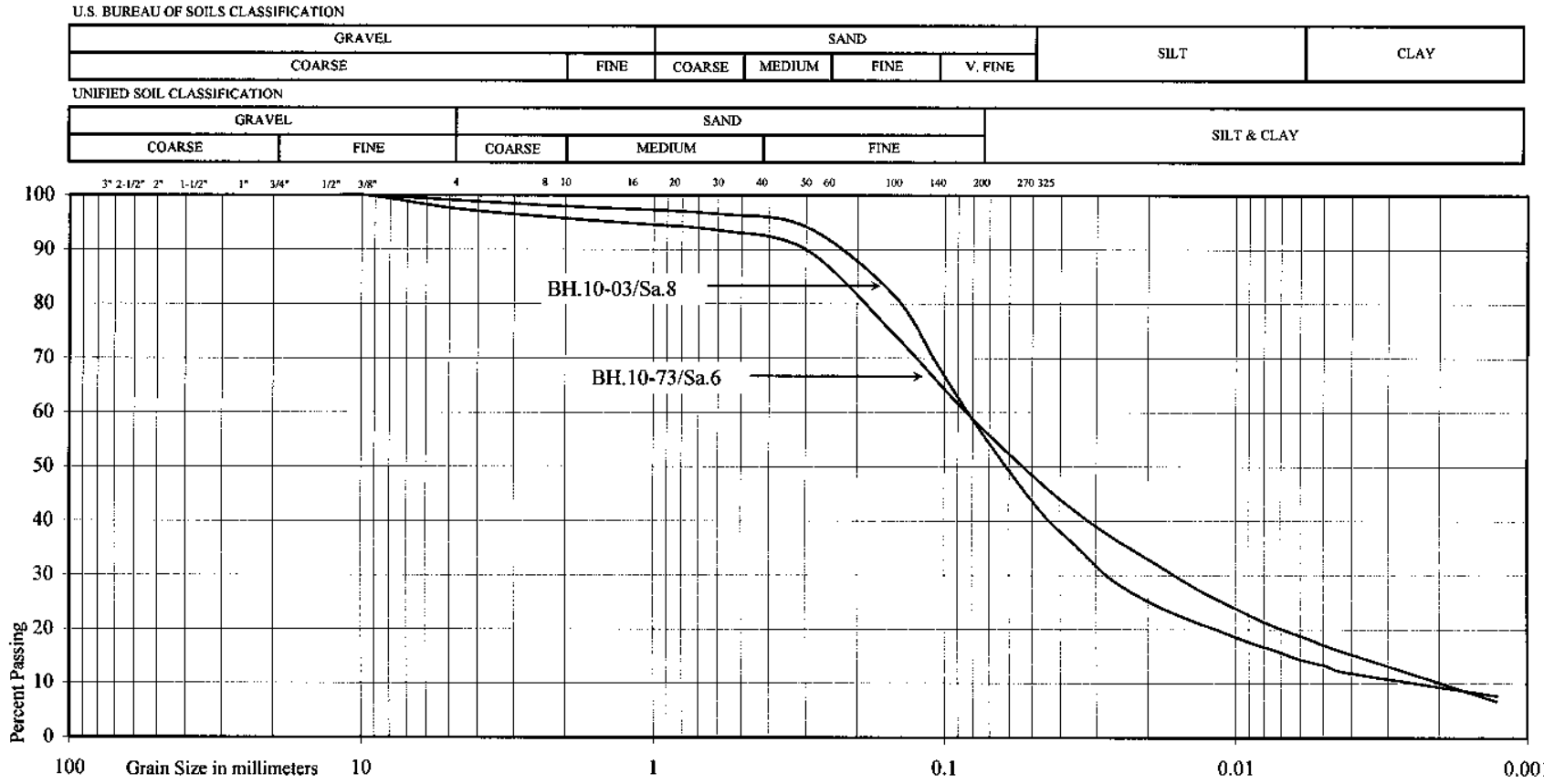
Classification of Sample [& Group Symbol]: SILTY CLAY
sandy, traces of sand and gravel

Figure: 81

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development	
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan	
Borehole No:	10-03	10-73
Sample No:	8	6
Depth (m):	7.9	4.0
Elevation (m):	258.2	258.5

BH./Sa.	10-03/8	10-73/6
Liquid Limit (%) =	-	-
Plastic Limit (%) =	-	-
Plasticity Index (%) =	-	-
Moisture Content (%) =	10	9
Estimated Permeability (cm./sec.) =	10^{-5}	10^{-6}

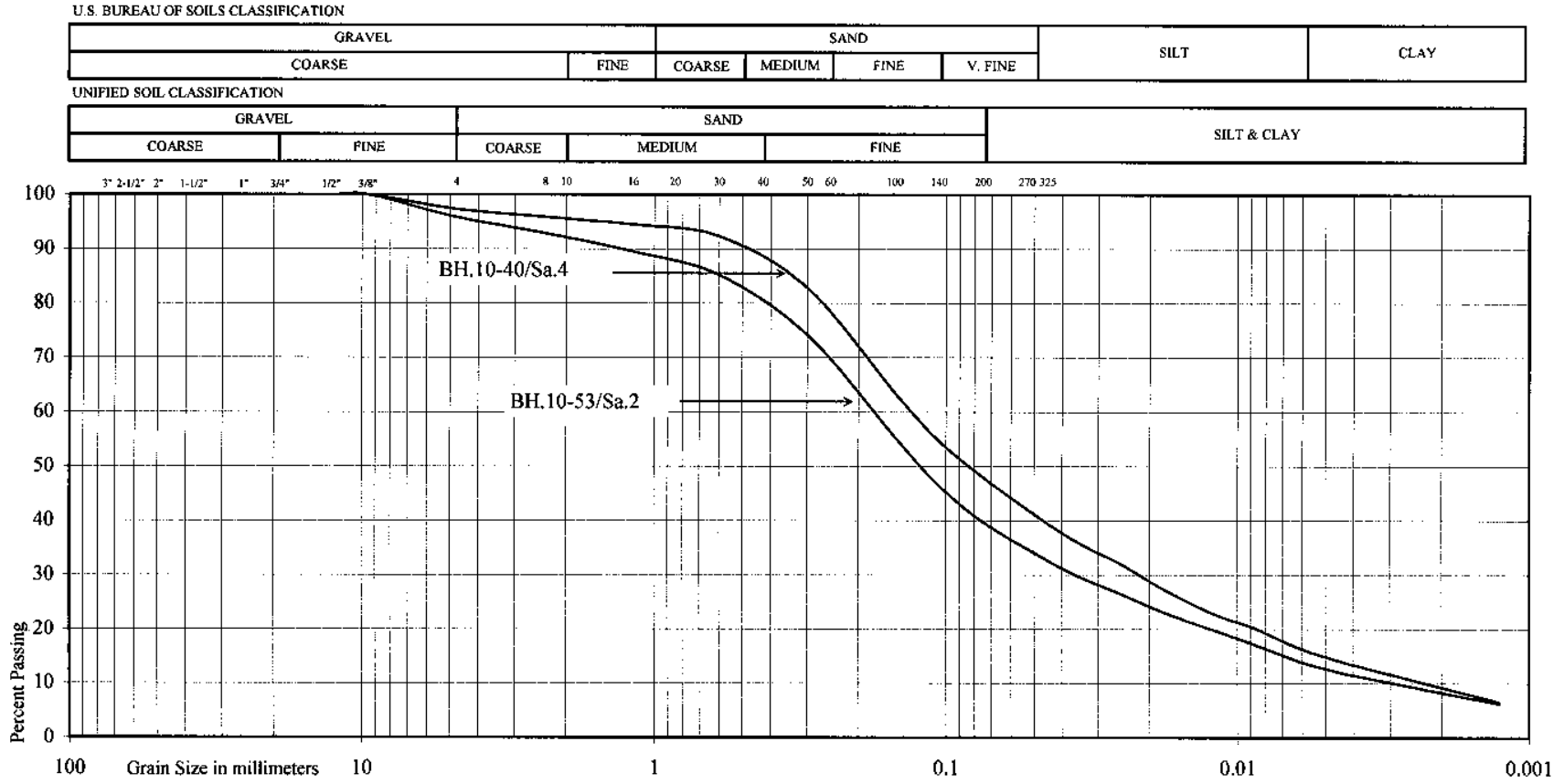
Classification of Sample [& Group Symbol]: SANDY SILT, Till
some clay, a trace of gravel

Figure: 82

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development	
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan	
Borehole No:	10-40	10-53
Sample No:	4	2
Depth (m):	2.6	1.0
Elevation (m):	277.0	280.0

BH./Sa.	10-40/4	10-53/2
Liquid Limit (%) =	-	-
Plastic Limit (%) =	-	-
Plasticity Index (%) =	-	-
Moisture Content (%) =	10	10
Estimated Permeability (cm./sec.) =	10^{-5}	10^{-6}

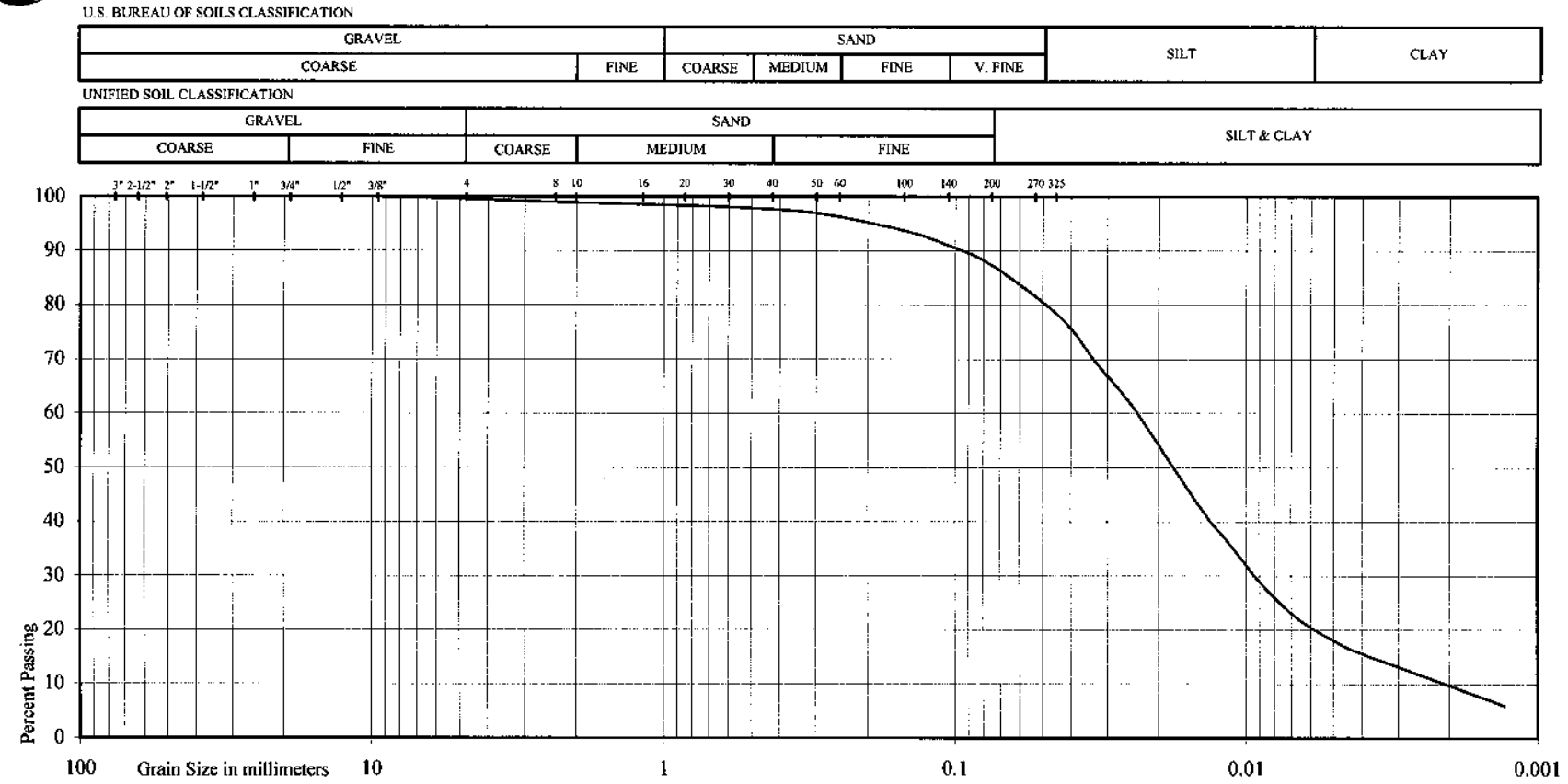
Classification of Sample [& Group Symbol]: SILTY SAND, Till
some clay, a trace of gravel

Figure: 83

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project: Proposed Residential Development

Location: Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan

Borehole No: 10-15

Sample No: 5

Depth (m): 3.2

Elevation (m): 264.2

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = 14

Estimated Permeability (cm./sec.) = 10^{-6}

Classification of Sample [& Group Symbol]: SILT

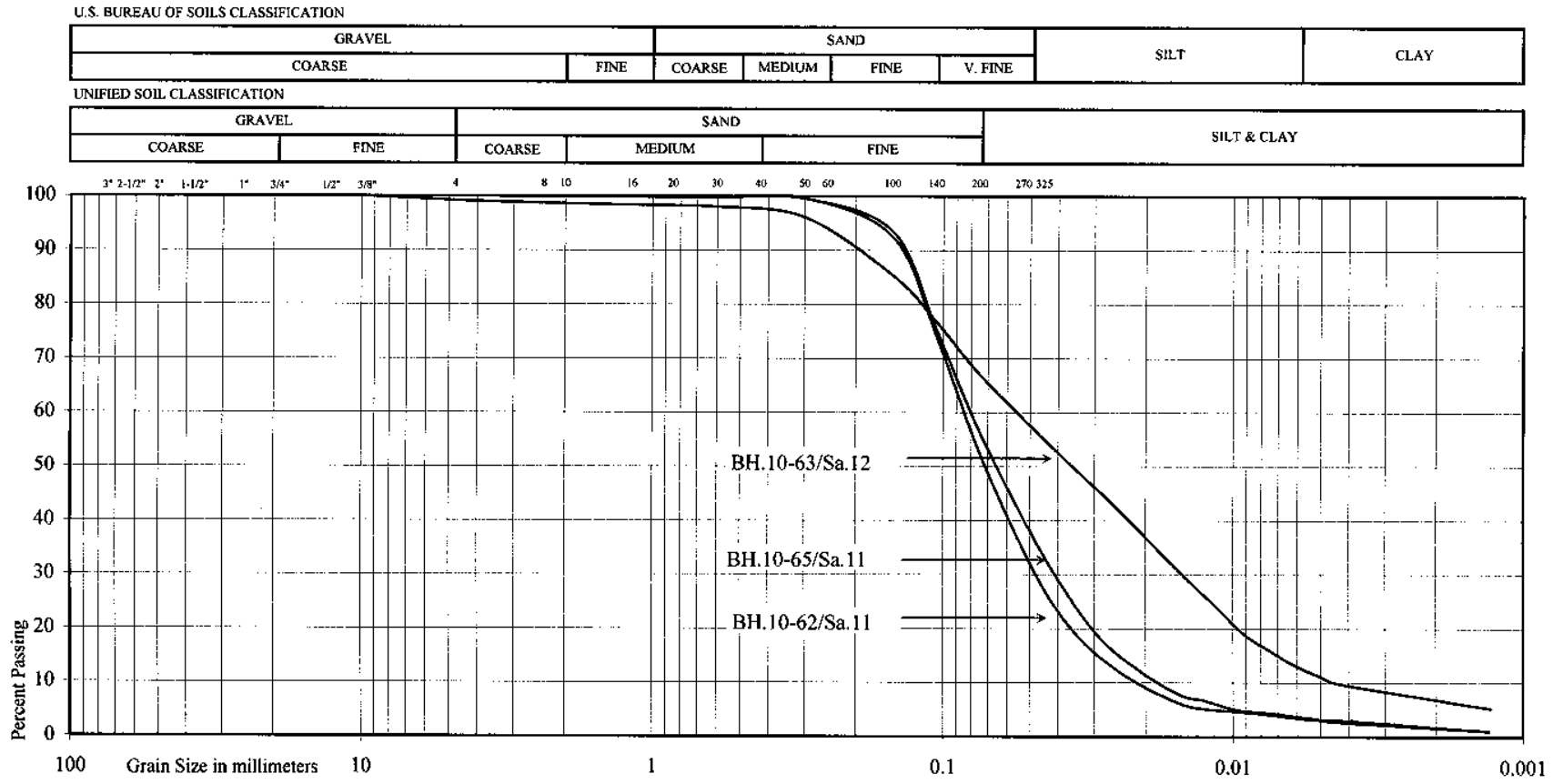
some sand and clay, a trace of gravel

Figure: 84

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-62	10-63	10-65
Sample No:	11	12	11
Depth (m):	9.4	13.8	9.4
Elevation (m):	254.4	249.8	243.6

BH./Sa.	10-62/11	10-63/12	10-65/11
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	19	16	20
Estimated Permeability (cm./sec.) =	10^{-4}	10^{-5}	10^{-4}

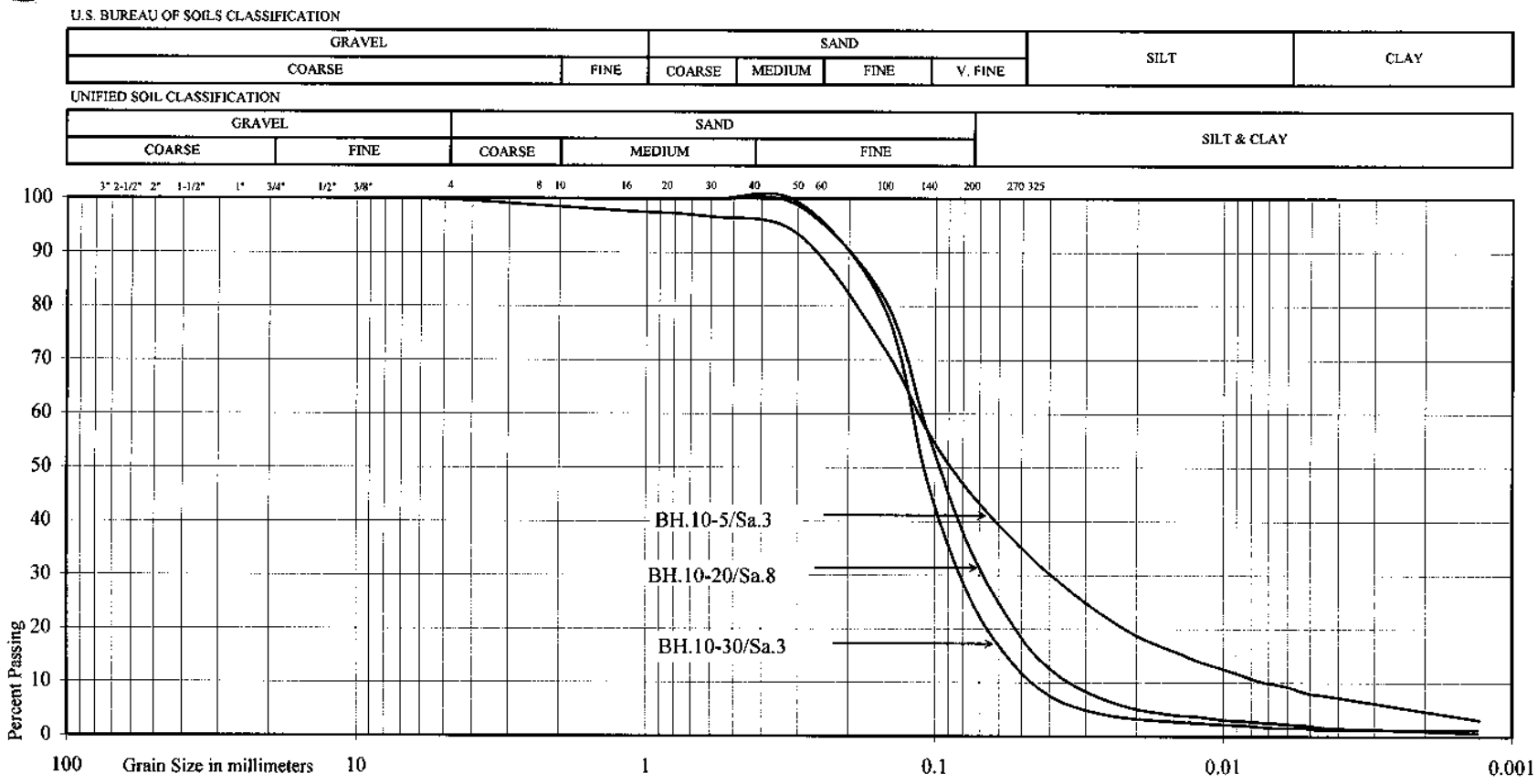
Classification of Sample [& Group Symbol]: SANDY SILT
a trace to some clay and gravel

Figure: 85

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-5	10-20	10-30
Sample No:	3	8	3
Depth (m):	1.8	7.9	1.8
Elevation (m):	265.1	255.1	253.8

BH./Sa.	10-5/3	10-20/8	10-30/3
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	11	18	22
Estimated Permeability (cm./sec.) =	10^{-5}	10^{-3}	10^{-3}

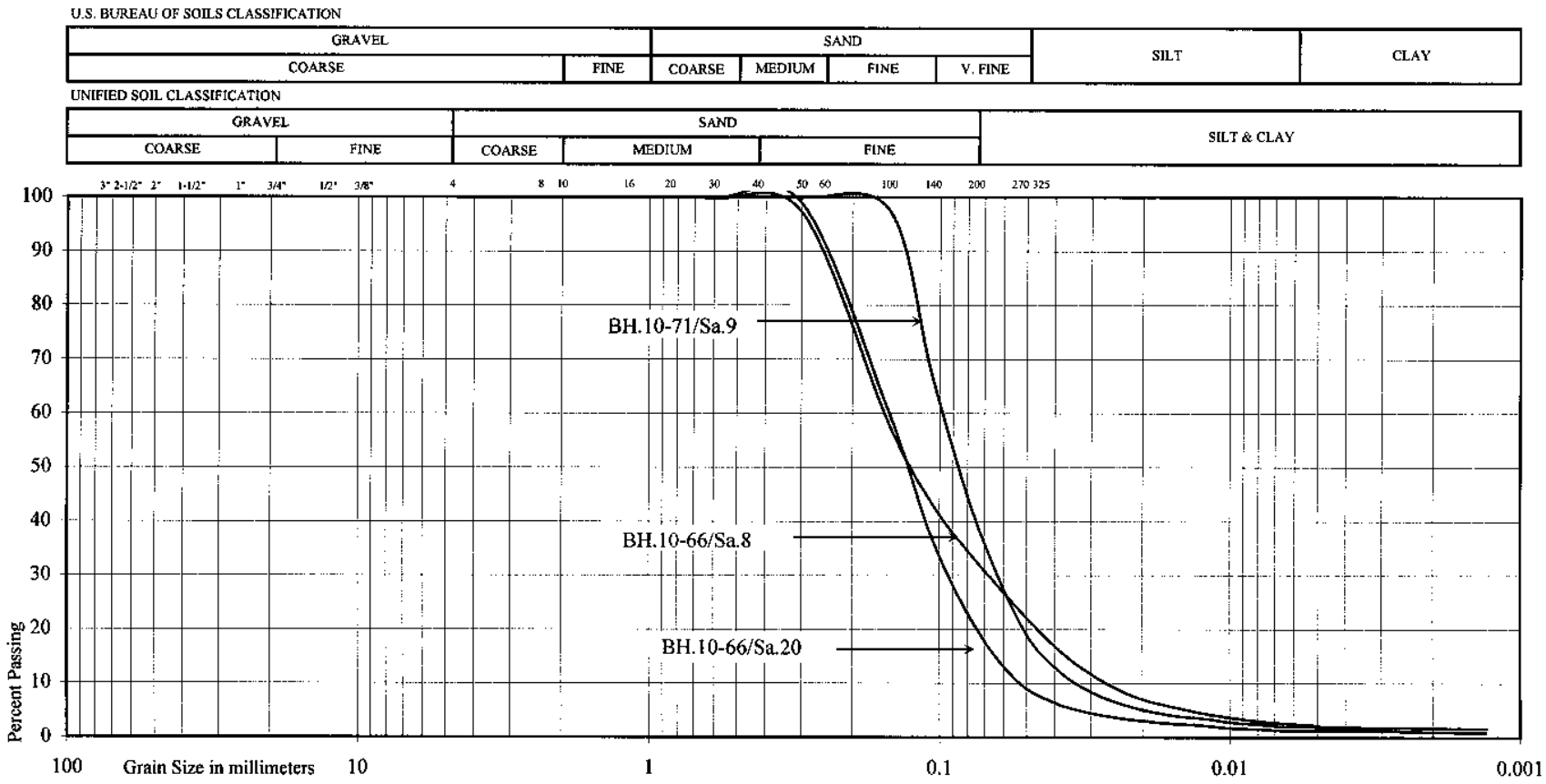
Classification of Sample [& Group Symbol]: SILTY FINE SAND
a trace of clay

Figure: 86

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 1007-S084



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-66	10-66	10-71
Sample No:	8	20	9
Depth (m):	7.8	26.2	6.2
Elevation (m):	256.5	238.1	245.5

BH./Sa.	10-66/8	10-66/20	10-71/9
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	21	21	21
Estimated Permeability (cm./sec.) =	10^{-3}	10^{-3}	10^{-3}

Classification of Sample [& Group Symbol]: SILTY FINE SAND
a trace of clay

Figure: 87

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

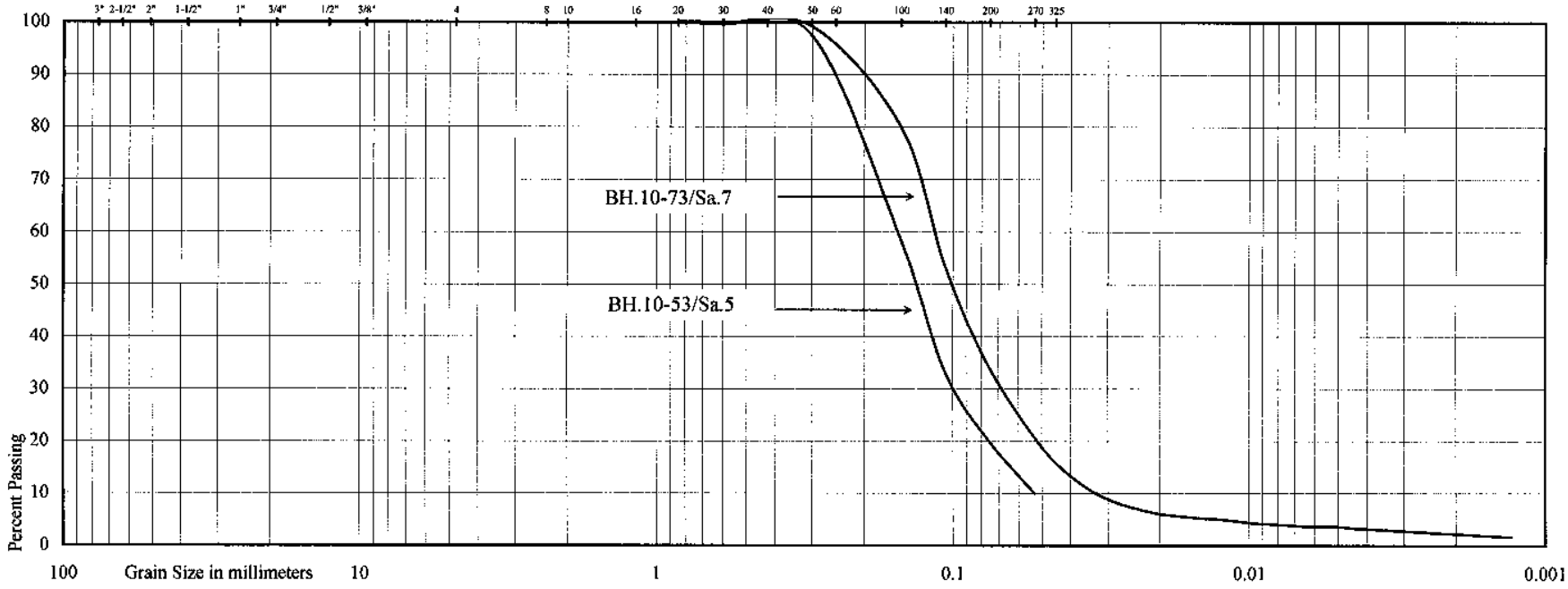
Reference No: 1007-S084

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project:	Proposed Residential Development		BH./Sa.	10-53/5	10-73/7
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		Liquid Limit (%) =	-	-
			Plastic Limit (%) =	-	-
Borehole No:	10-53	10-73	Plasticity Index (%) =	-	-
Sample No:	5	7	Moisture Content (%) =	8	20
Depth (m):	3.2	4.9	Estimated Permeability		
Elevation (m):	277.8	257.6	(cm./sec.) =	10^{-3}	10^{-3}

Classification of Sample [& Group Symbol]: SILTY FINE SAND
a trace of clay

Figure: 88

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

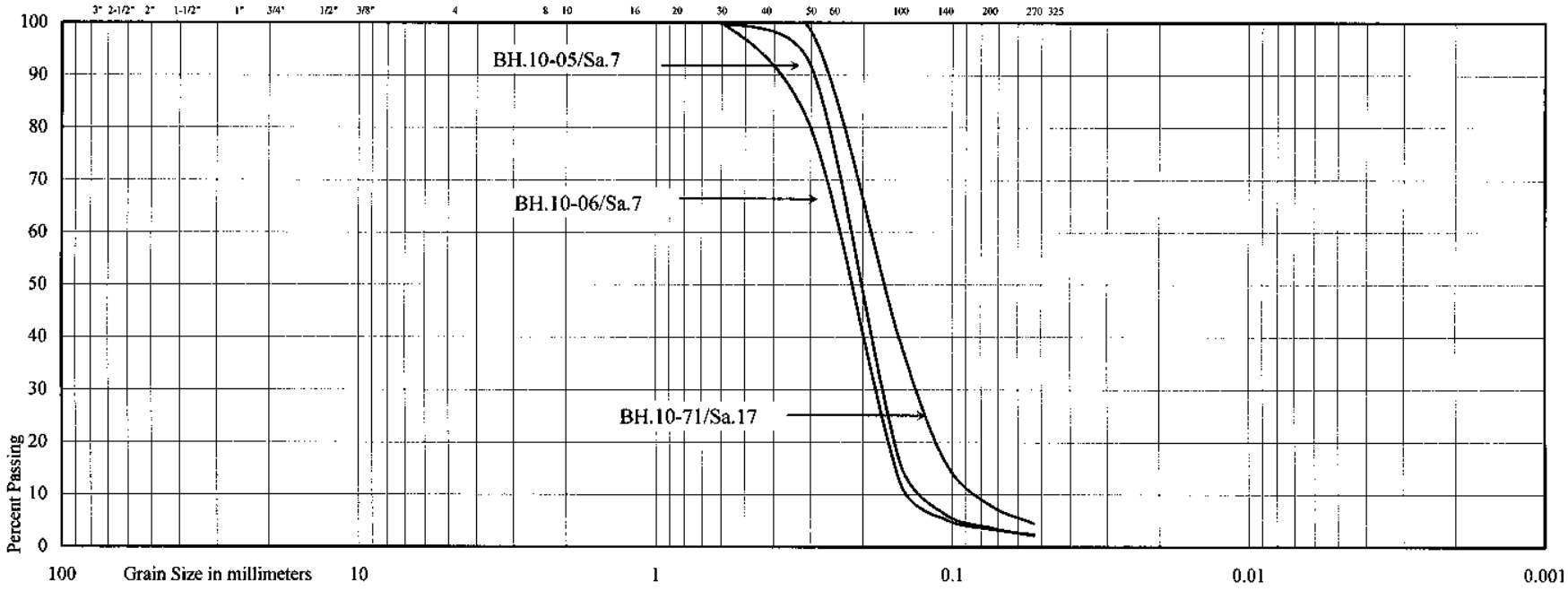
Reference No: 1007-S084

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-05	10-06	10-71
Sample No:	7	7	17
Depth (m):	6.3	6.3	18.6
Elevation (m):	260.6	264.3	233.1

BH./Sa.	10-05/7	10-06/7	10-71/17
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	20	18	20
Estimated Permeability (cm./sec.) =	10^{-2}	10^{-2}	10^{-2}

Classification of Sample [& Group Symbol]: FINE SAND
a trace of silt

Figure: 89

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

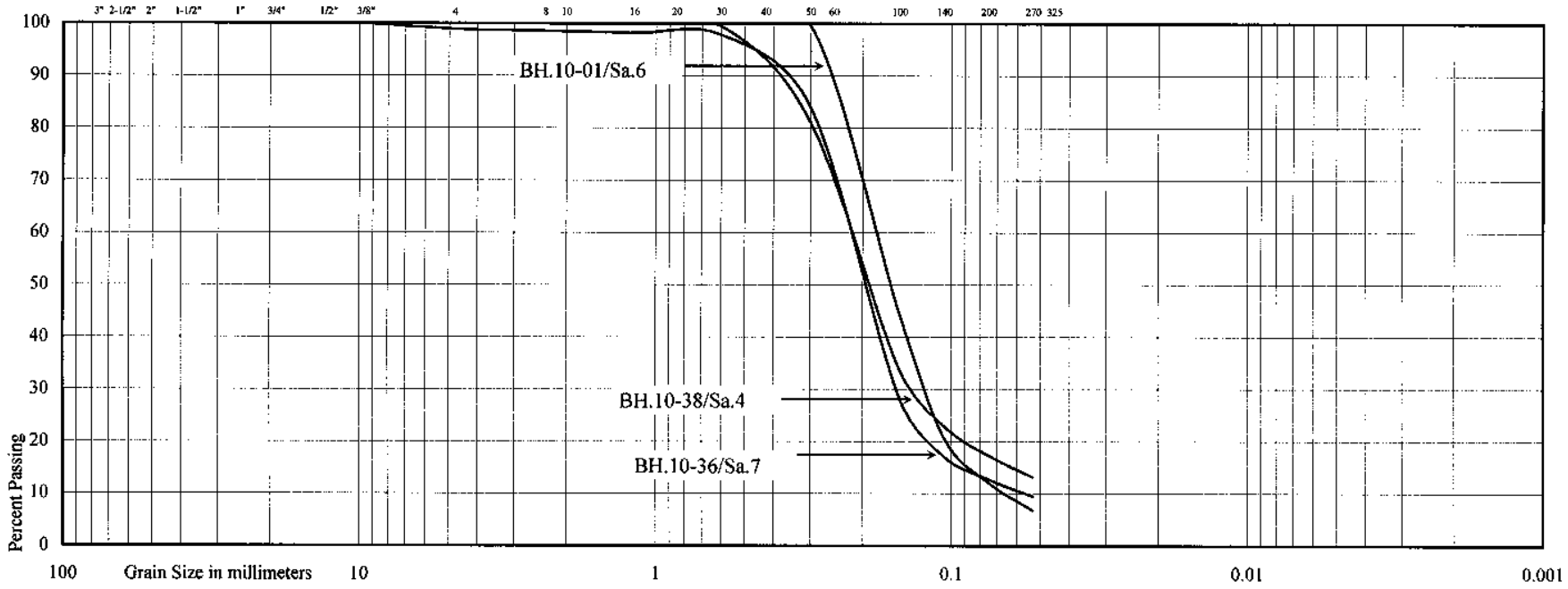
Reference No: 1007-S084

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project:	Proposed Residential Development		
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan		
Borehole No:	10-01	10-36	10-38
Sample No:	6	7	4
Depth (m):	4.9	6.3	2.6
Elevation (m):	263.0	260.5	272.2

BH./Sa.	10-01/6	10-36/7	10-38/4
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	18	17	7
Estimated Permeability (cm./sec.) =	10^{-3}	10^{-3}	10^{-3}

Classification of Sample [& Group Symbol]: FINE SAND
some silt and a trace of gravel

Figure: 90

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

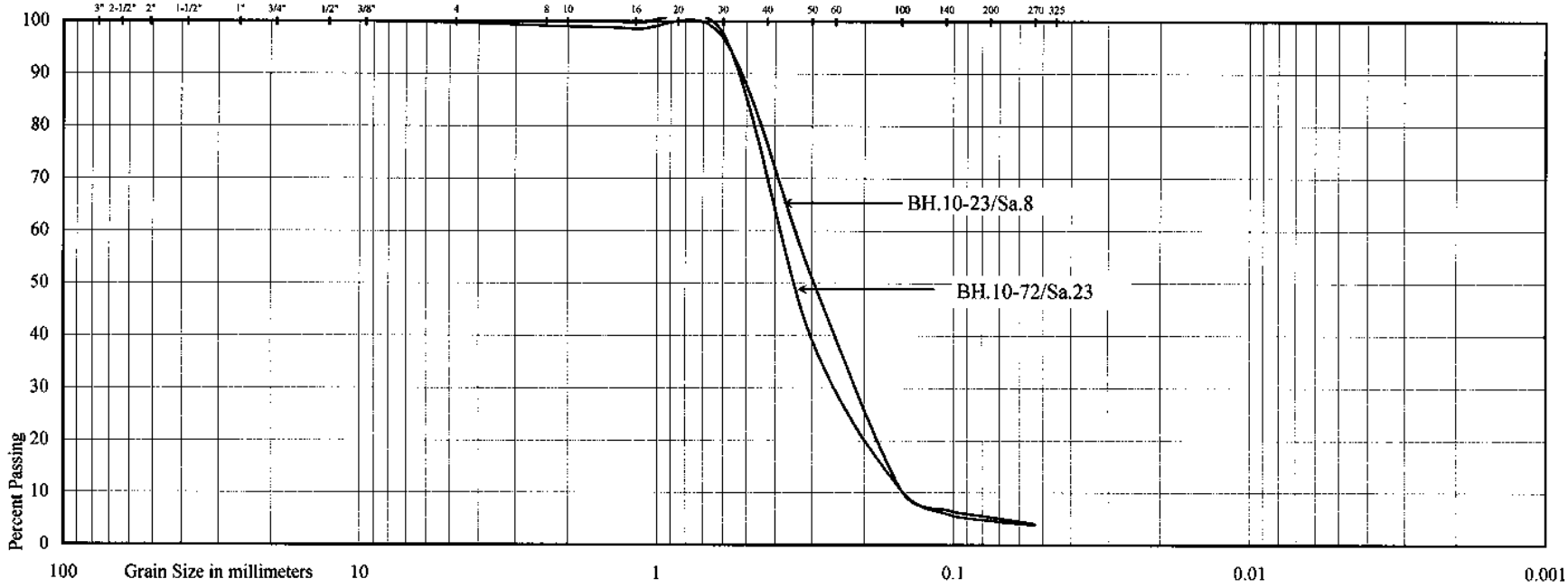
Reference No: 1007-S084

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project:	Proposed Residential Development	
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan	
Borehole No:	10-23	10-72
Sample No:	8	23
Depth (m):	7.8	30.7
Elevation (m):	272.9	235.5

BH./Sa.	10-23/8	10-72/23
Liquid Limit (%) =	-	-
Plastic Limit (%) =	-	-
Plasticity Index (%) =	-	-
Moisture Content (%) =	4	20
Estimated Permeability (cm./sec.) =	10^{-2}	10^{-2}

Classification of Sample [& Group Symbol]: FINE TO MEDIUM SAND
traces of silt and gravel

Figure: 91

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

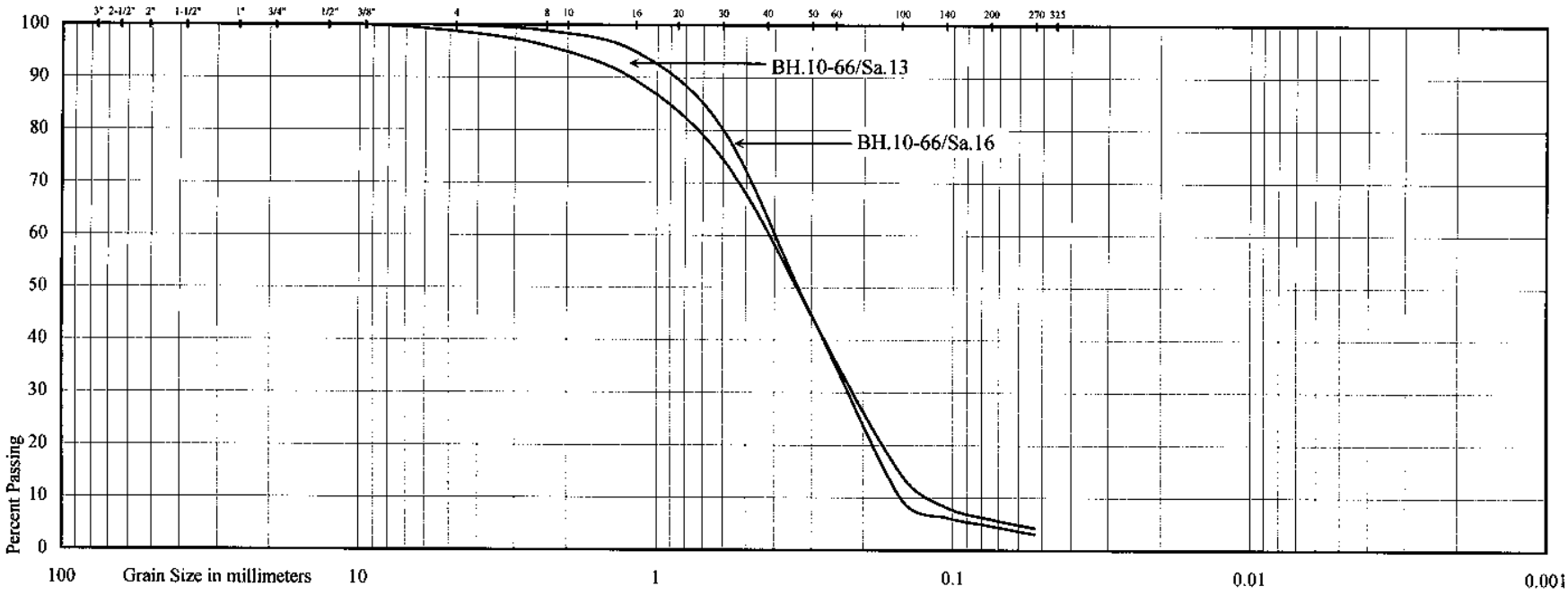
Reference No: 1007-S084

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project:	Proposed Residential Development	
Location:	Block 27, Area bounded by Keele Street, Teston Road, Jane Street and Kirby Road, City of Vaughan	
Borehole No:	10-66	10-66
Sample No:	13	16
Depth (m):	15.5	19.3
Elevation (m):	248.8	245.0

BH./Sa.	10-66/13	10-66/16
Liquid Limit (%) =	-	-
Plastic Limit (%) =	-	-
Plasticity Index (%) =	-	-
Moisture Content (%) =	20	17
Estimated Permeability (cm./sec.) =	10^{-2}	10^{-2}

Classification of Sample [& Group Symbol]: FINE TO MEDIUM SAND
traces of silt and gravel

Figure: 92

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C3

Hydraulic Conductivity Analyses

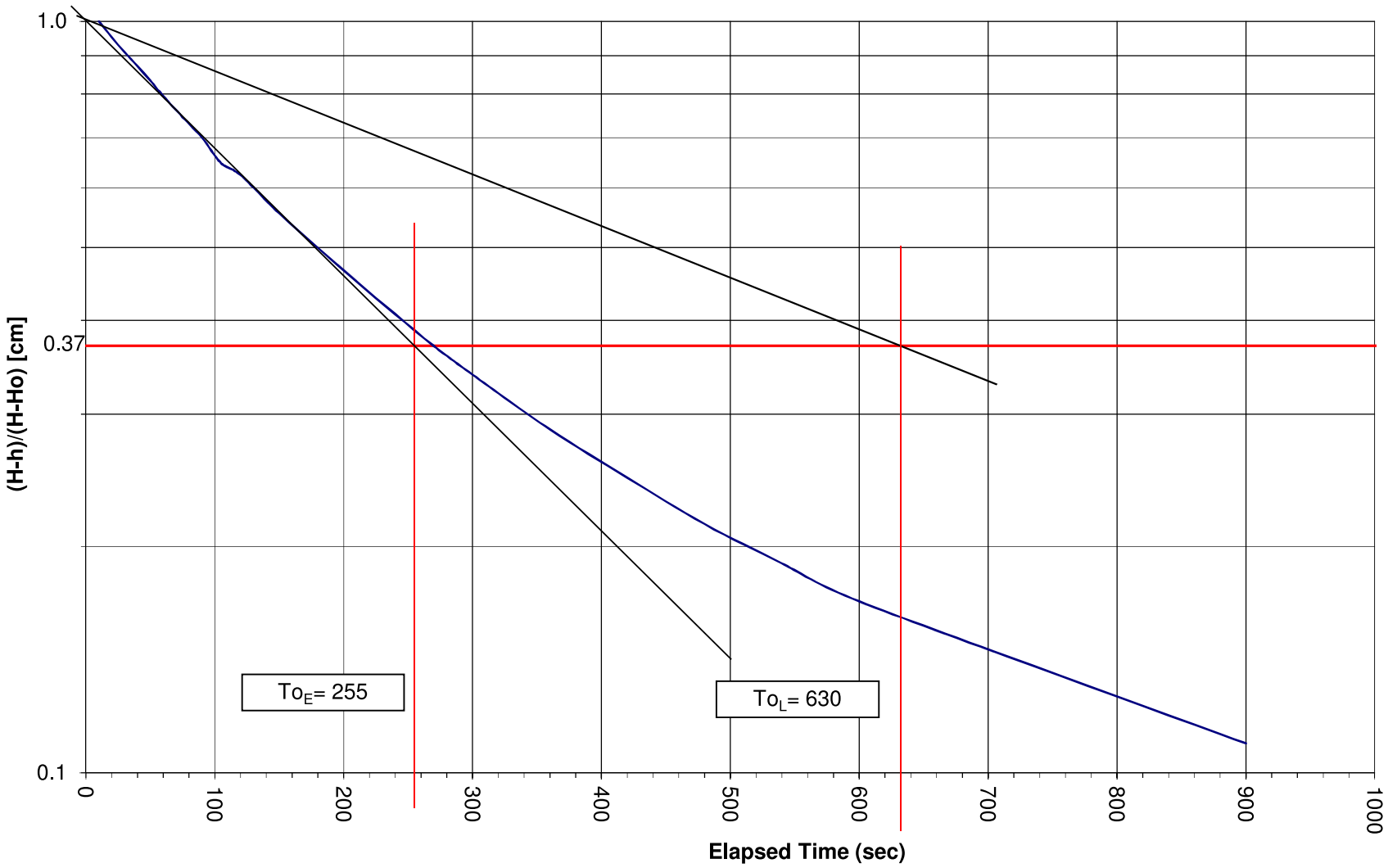
Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-76S (Test 1)

Date: 7-Jan-11

Conducted By:	X.X		H:	4.76	m	Static Water Level
Well Depth:	7.05	mbtor	Ho:	0.6	m	Head at time = 0
Stick Up:	-	m	ToE:	3.8	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	2.29	mbtor	r:	0.0254	m	Radius of MW
Recovery:	90.3%	%	K:	2.55E-06	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	6.490	93.510	4.204	4.204	1.000
20	6.290	93.710	4.004	4.204	0.952
30	6.110	93.890	3.824	4.204	0.910
40	5.950	94.050	3.664	4.204	0.872
50	5.790	94.210	3.504	4.204	0.833
60	5.630	94.370	3.344	4.204	0.795
75	5.420	94.580	3.134	4.204	0.745
90	5.230	94.770	2.944	4.204	0.700
105	5.007	94.993	2.721	4.204	0.647
120	4.910	95.090	2.624	4.204	0.624
150	4.620	95.380	2.334	4.204	0.555
180	4.385	95.615	2.099	4.204	0.499
210	4.180	95.820	1.894	4.204	0.451
240	4.000	96.000	1.714	4.204	0.408
270	3.840	96.160	1.554	4.204	0.370
300	3.710	96.290	1.424	4.204	0.339
360	3.490	96.510	1.204	4.204	0.286
420	3.325	96.675	1.039	4.204	0.247
480	3.187	96.813	0.901	4.204	0.214
540	3.085	96.915	0.799	4.204	0.190
600	2.997	97.003	0.711	4.204	0.169
900	2.746	97.254	0.460	4.204	0.109

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-76S (Test 1)

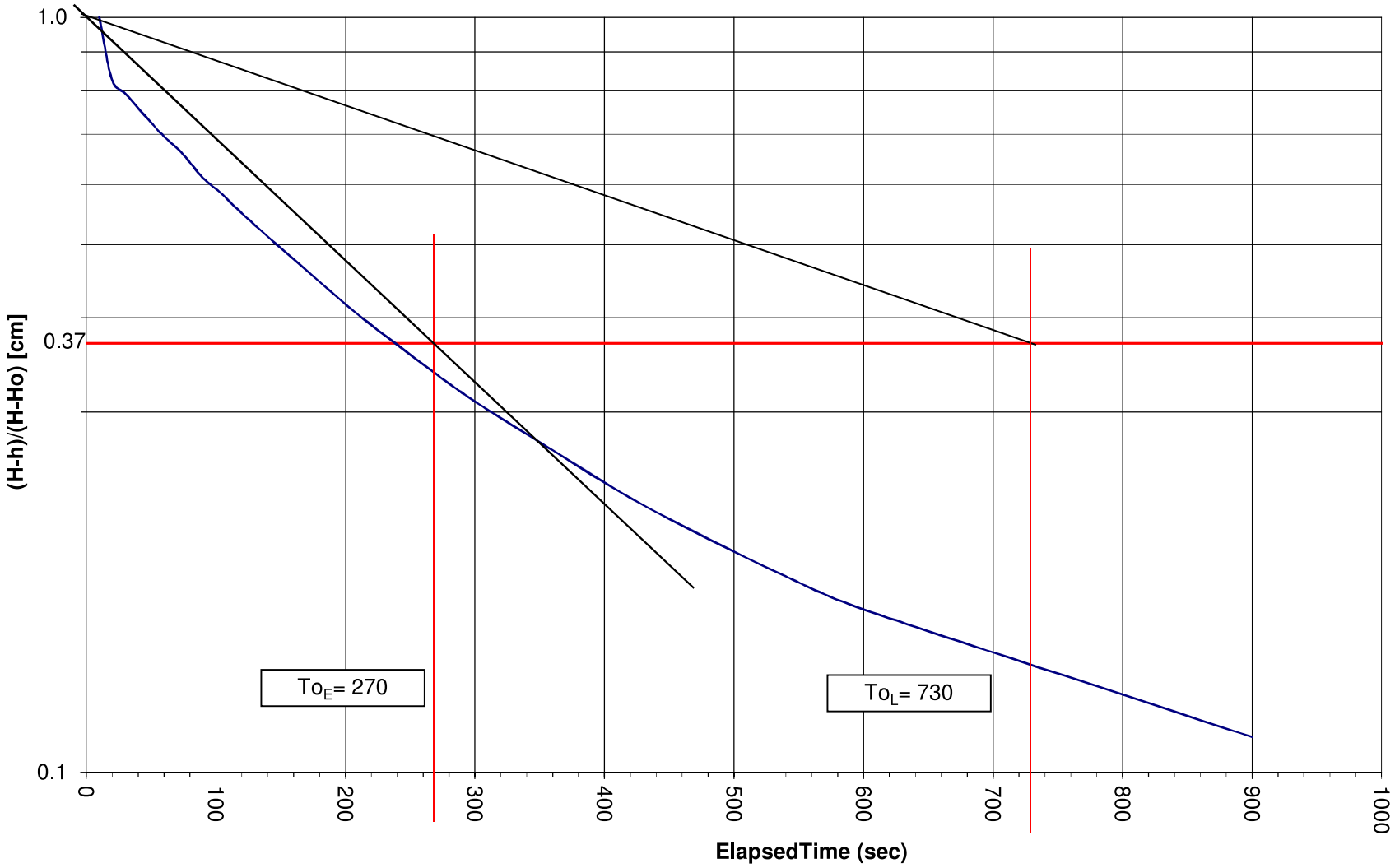


Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-76S (Test 2)

Date:	7-Jan-11					
Conducted By:	X.X		H:	4.76	m	Static Water Level
Well Depth:	7.05	mbtor	Ho:	0.3	m	Head at time = 0
Stick Up:	-	m	ToE:	4.5	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	2.29	mbtor	r:	0.0254	m	Radius of MW
Recovery:	89.6%	%	K:	2.12E-06	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	6.720	93.280	4.434	4.434	1.000
20	5.940	94.060	3.654	4.434	0.824
30	5.800	94.200	3.514	4.434	0.793
40	5.650	94.350	3.364	4.434	0.759
50	5.500	94.500	3.214	4.434	0.725
60	5.370	94.630	3.084	4.434	0.696
75	5.200	94.800	2.914	4.434	0.657
90	5.002	94.998	2.716	4.434	0.613
105	4.870	95.130	2.584	4.434	0.583
120	4.725	95.275	2.439	4.434	0.550
150	4.480	95.520	2.194	4.434	0.495
180	4.265	95.735	1.979	4.434	0.446
210	4.075	95.925	1.789	4.434	0.403
240	3.920	96.080	1.634	4.434	0.369
270	3.780	96.220	1.494	4.434	0.337
300	3.660	96.340	1.374	4.434	0.310
360	3.470	96.530	1.184	4.434	0.267
420	3.310	96.690	1.024	4.434	0.231
480	3.190	96.810	0.904	4.434	0.204
540	3.092	96.908	0.806	4.434	0.182
600	3.015	96.985	0.729	4.434	0.164
900	2.780	97.220	0.494	4.434	0.111

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-76S (Test 2)



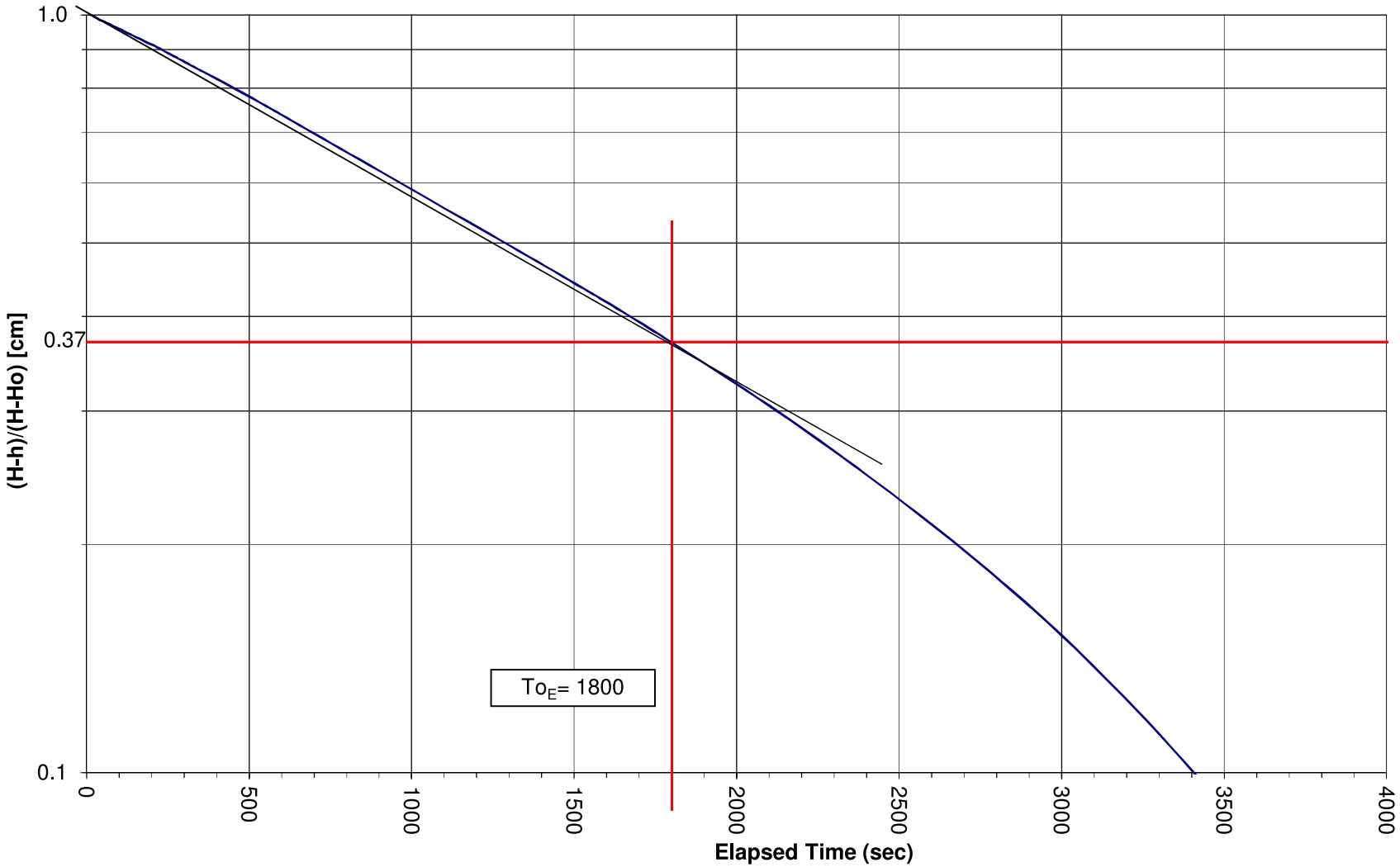
Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-70

Date: 7-Jan-11

Conducted By:	X.X		H:	4.12	m	Static Water Level
Well Depth:	7.14	mbtor	Ho:	0.0	m	Head at time = 0
Stick Up:	-	m	ToE:	30.0	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	3.02	mbtor	r:	0.0254	m	Radius of MW
Recovery:	100.0%	%	K:	3.18E-07	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	7.120	92.880	4.104	4.104	1.000
20	7.102	92.898	4.086	4.104	0.996
30	7.081	92.919	4.065	4.104	0.990
40	7.057	92.943	4.041	4.104	0.985
50	7.040	92.960	4.024	4.104	0.981
60	7.025	92.975	4.009	4.104	0.977
75	6.997	93.003	3.981	4.104	0.970
90	6.965	93.035	3.949	4.104	0.962
105	6.939	93.061	3.923	4.104	0.956
120	6.910	93.090	3.894	4.104	0.949
150	6.855	93.145	3.839	4.104	0.935
180	6.800	93.200	3.784	4.104	0.922
210	6.748	93.252	3.732	4.104	0.909
240	6.688	93.312	3.672	4.104	0.895
270	6.632	93.368	3.616	4.104	0.881
300	6.575	93.425	3.559	4.104	0.867
360	6.465	93.535	3.449	4.104	0.840
420	6.360	93.640	3.344	4.104	0.815
480	6.252	93.748	3.236	4.104	0.788
540	6.148	93.852	3.132	4.104	0.763
600	6.044	93.956	3.028	4.104	0.738
1503	4.830	95.170	1.814	4.104	0.442
1803	4.530	95.470	1.514	4.104	0.369
2103	4.265	95.735	1.249	4.104	0.304
2403	4.028	95.972	1.012	4.104	0.247
2703	3.820	96.180	0.804	4.104	0.196
3003	3.638	96.363	0.622	4.104	0.151
3303	3.476	96.524	0.460	4.104	0.112
3603	3.341	96.659	0.325	4.104	0.079
3903	3.232	96.768	0.216	4.104	0.053
4203	3.150	96.850	0.134	4.104	0.033

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-70

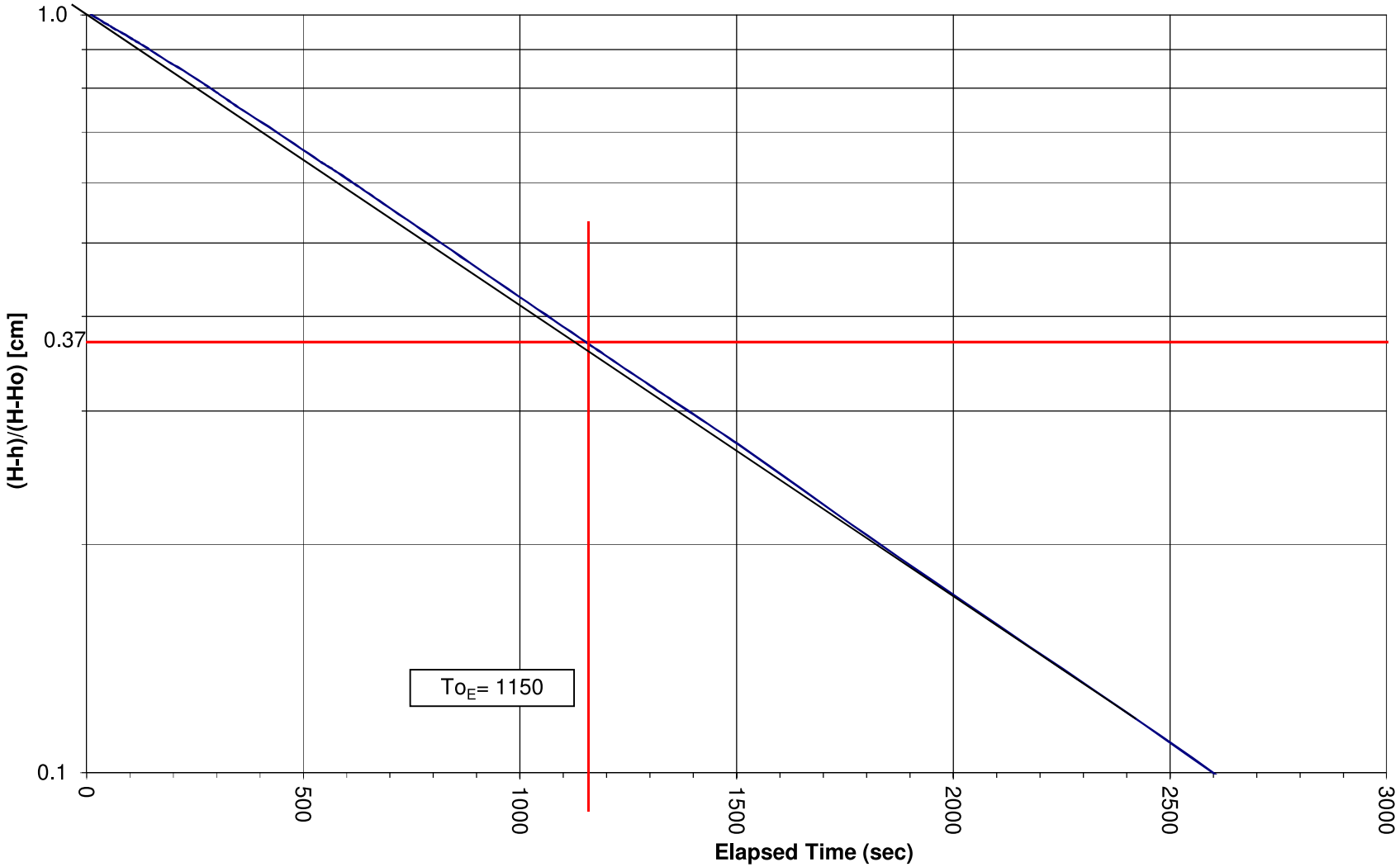


Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-73

Date:	7-Jan-11					
Conducted By:	X.X		H:	4.35	m	Static Water Level
Well Depth:	6.98	mbtor	Ho:	0.1	m	Head at time = 0
Stick Up:	-	m	ToE:	19.2	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	2.63	mbtor	r:	0.0254	m	Radius of MW
Recovery:	100.0%	%	K:	4.98E-07	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	6.925	93.075	4.294	4.294	1.000
20	6.893	93.107	4.262	4.294	0.993
30	6.860	93.140	4.229	4.294	0.985
40	6.825	93.175	4.194	4.294	0.977
50	6.795	93.205	4.164	4.294	0.970
60	6.760	93.240	4.129	4.294	0.962
75	6.715	93.285	4.084	4.294	0.951
90	6.670	93.330	4.039	4.294	0.941
105	6.620	93.380	3.989	4.294	0.929
120	6.575	93.425	3.944	4.294	0.918
150	6.480	93.520	3.849	4.294	0.896
180	6.380	93.620	3.749	4.294	0.873
210	6.295	93.705	3.664	4.294	0.853
240	6.204	93.796	3.573	4.294	0.832
270	6.115	93.885	3.484	4.294	0.811
300	6.023	93.977	3.392	4.294	0.790
360	5.845	94.155	3.214	4.294	0.748
420	5.687	94.313	3.056	4.294	0.712
480	5.530	94.470	2.899	4.294	0.675
540	5.378	94.622	2.747	4.294	0.640
600	5.242	94.758	2.611	4.294	0.608
1202	4.150	95.850	1.519	4.294	0.354
1502	3.797	96.203	1.166	4.294	0.272
1802	3.514	96.487	0.883	4.294	0.206
2102	3.304	96.697	0.673	4.294	0.157
2402	3.146	96.854	0.515	4.294	0.120
2702	3.022	96.978	0.391	4.294	0.091
3002	2.932	97.068	0.301	4.294	0.070
3302	2.858	97.142	0.227	4.294	0.053
3602	2.804	97.196	0.173	4.294	0.040
3902	2.762	97.238	0.131	4.294	0.030

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-73

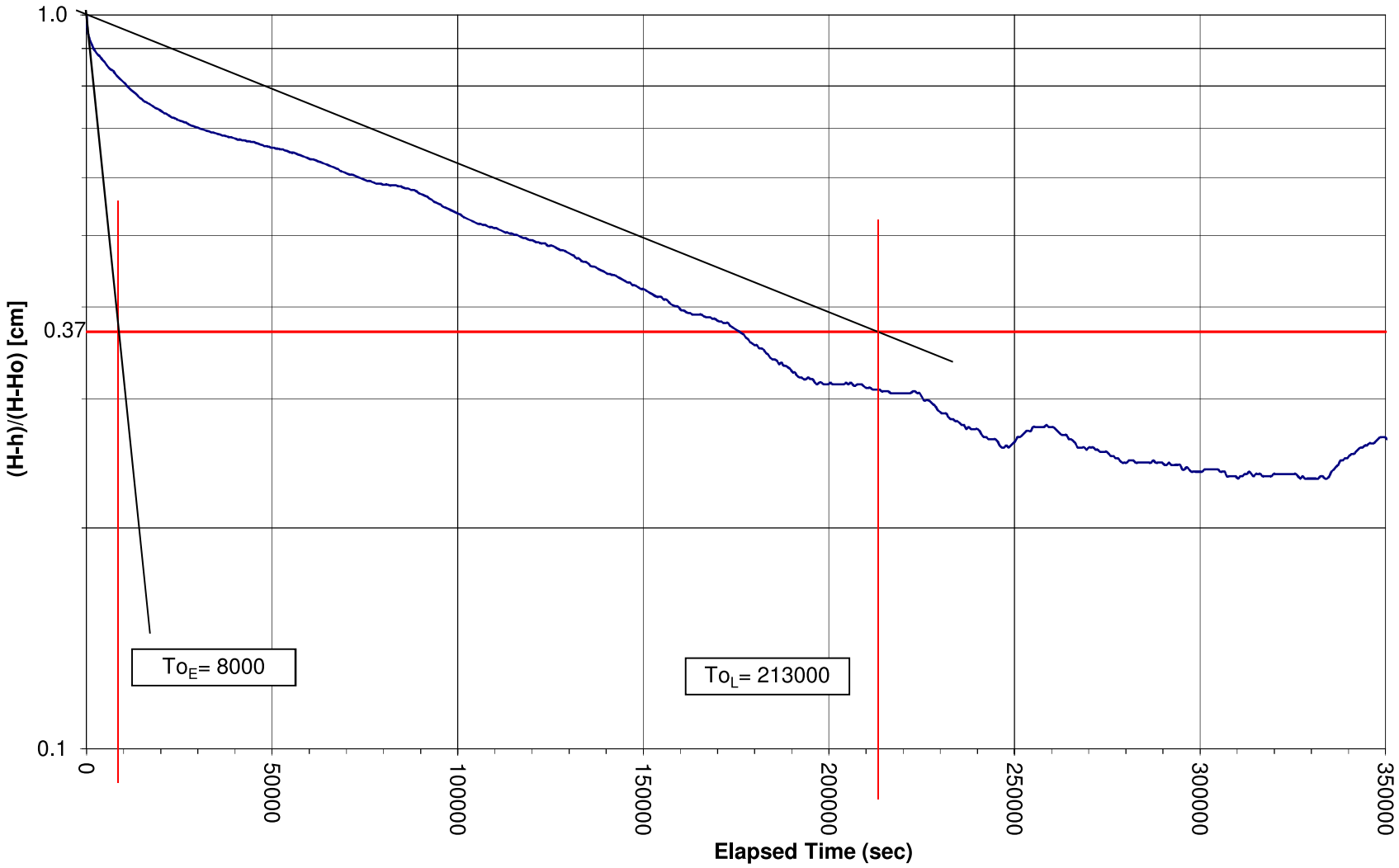


Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-82S

Date:	7-Jan-11					
Conducted By:	X.X		H:	1.36	m	Static Water Level
Well Depth:	8.48	mbtor	Ho:	0.1	m	Head at time = 0
Stick Up:	-	m	ToE:	3550.0	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	7.12	mbtor	r:	0.0254	m	Radius of MW
Recovery:	78.0%	%	K:	2.69E-09	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	8.350	91.650	1.229	1.229	1.000
20	8.336	91.664	1.215	1.229	0.989
30	8.329	91.671	1.208	1.229	0.983
40	8.323	91.677	1.202	1.229	0.978
50	8.321	91.679	1.200	1.229	0.976
60	8.319	91.681	1.198	1.229	0.975
75	8.314	91.686	1.193	1.229	0.971
90	8.311	91.689	1.190	1.229	0.968
105	8.310	91.690	1.189	1.229	0.967
120	8.307	91.693	1.186	1.229	0.965
150	8.303	91.697	1.182	1.229	0.962
180	8.298	91.702	1.177	1.229	0.958
210	8.296	91.704	1.175	1.229	0.956
240	8.291	91.709	1.170	1.229	0.952
270	8.288	91.712	1.167	1.229	0.950
300	8.287	91.713	1.166	1.229	0.949
360	8.284	91.716	1.163	1.229	0.946
420	8.278	91.722	1.157	1.229	0.941
480	8.274	91.726	1.153	1.229	0.938
540	8.271	91.729	1.150	1.229	0.936
600	8.269	91.731	1.148	1.229	0.934
900	8.256	91.744	1.135	1.229	0.924
1200	8.246	91.754	1.125	1.229	0.915
1815	8.229	91.771	1.108	1.229	0.902
2425	8.216	91.784	1.095	1.229	0.891
3008	8.206	91.794	1.085	1.229	0.883
3608	8.200	91.800	1.079	1.229	0.878
4208	8.189	91.811	1.068	1.229	0.869
4808	8.181	91.819	1.060	1.229	0.862
5408	8.170	91.830	1.049	1.229	0.854
6008	8.162	91.838	1.041	1.229	0.847

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-82S



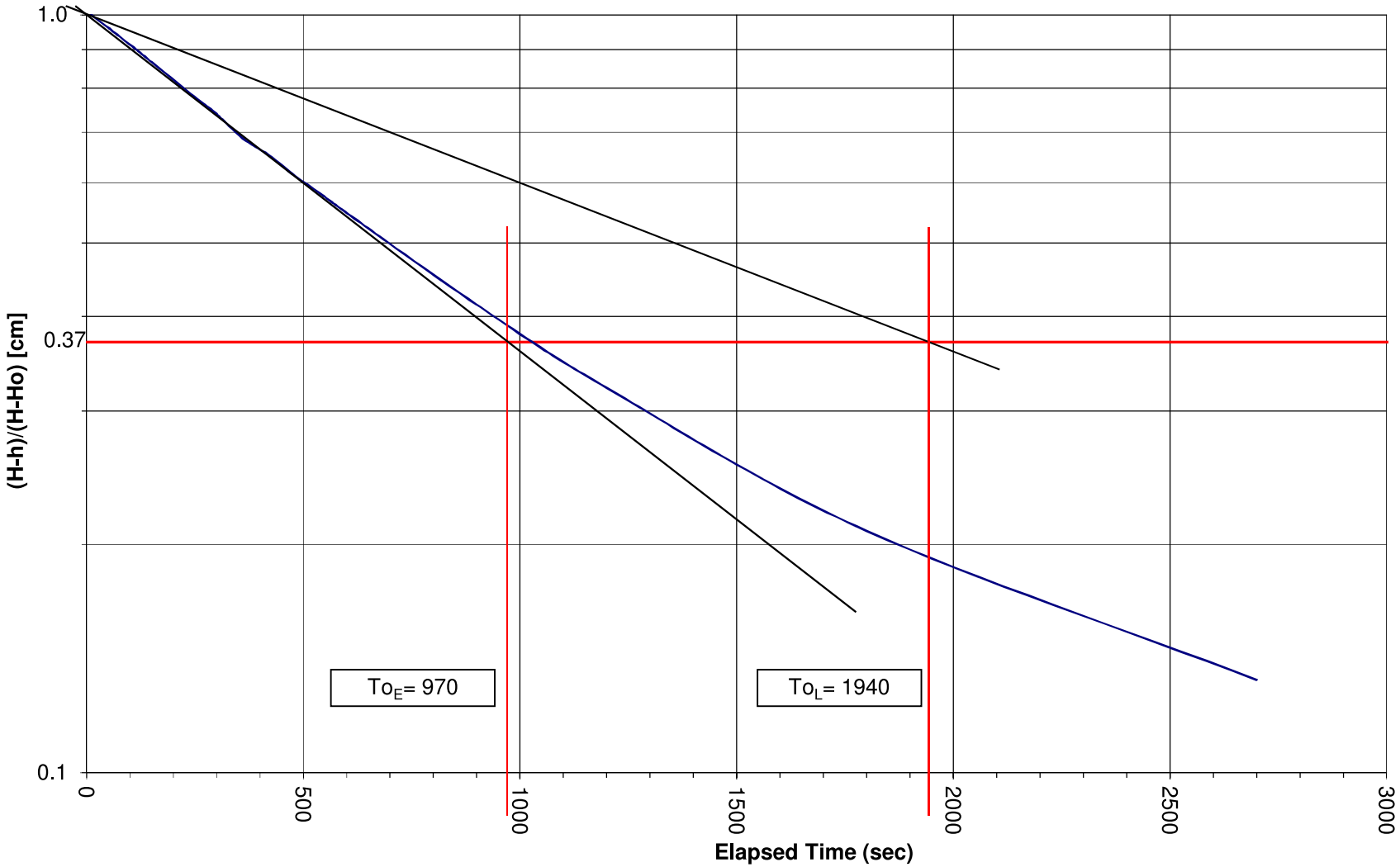
Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-79S

Date: 12-Jan-11

Conducted By:	X.X		H:	6.14	m	Static Water Level
Well Depth:	9.01	mbtor	Ho:	0.2	m	Head at time = 0
Stick Up:	-	m	ToE:	16.2	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	2.87	mbtor	r:	0.0254	m	Radius of MW
Recovery:	87.1%	%	K:	5.91E-07	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	8.840	91.160	5.972	5.972	1.000
20	8.780	91.220	5.912	5.972	0.990
30	8.725	91.275	5.857	5.972	0.981
40	8.665	91.335	5.797	5.972	0.971
50	8.610	91.390	5.742	5.972	0.961
60	8.550	91.450	5.682	5.972	0.951
75	8.465	91.535	5.597	5.972	0.937
90	8.375	91.625	5.507	5.972	0.922
105	8.295	91.705	5.427	5.972	0.909
120	8.210	91.790	5.342	5.972	0.895
150	8.040	91.960	5.172	5.972	0.866
180	7.880	92.120	5.012	5.972	0.839
210	7.720	92.280	4.852	5.972	0.812
240	7.565	92.435	4.697	5.972	0.787
270	7.425	92.575	4.557	5.972	0.763
300	7.285	92.715	4.417	5.972	0.740
360	6.971	93.029	4.103	5.972	0.687
420	6.769	93.231	3.901	5.972	0.653
480	6.531	93.469	3.663	5.972	0.613
540	6.335	93.665	3.467	5.972	0.581
600	6.140	93.860	3.272	5.972	0.548
900	5.344	94.656	2.476	5.972	0.415
1200	4.791	95.209	1.923	5.972	0.322
1800	4.113	95.887	1.245	5.972	0.208
2700	3.660	96.340	0.792	5.972	0.133

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-79S



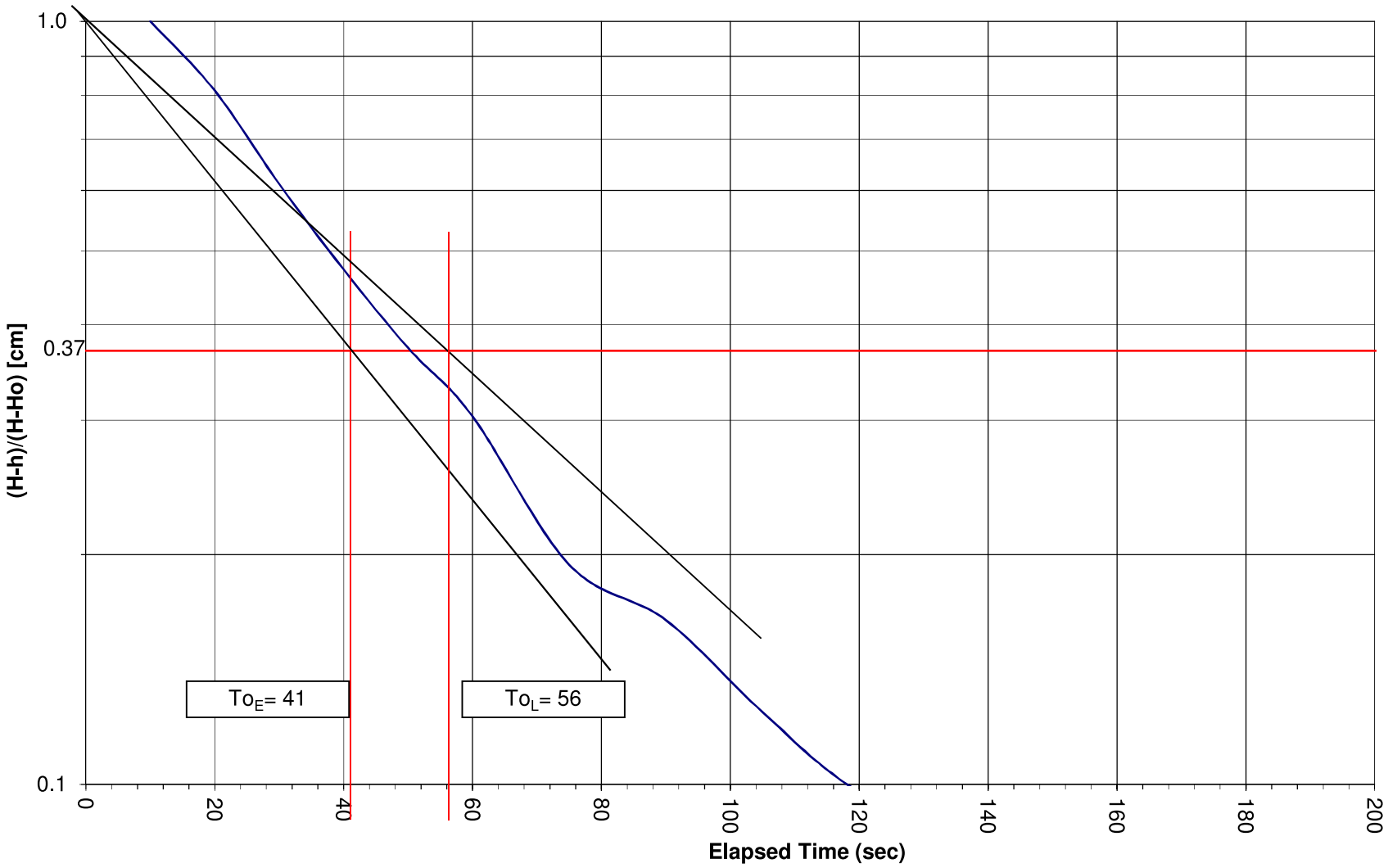
Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-78S (Test 1)

Date: 12-Jan-11

Conducted By:	X.X		H:	1.59	m	Static Water Level
Well Depth:	6.88	mbtor	Ho:	0.6	m	Head at time = 0
Stick Up:	-	m	ToE:	0.7	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	5.30	mbtor	r:	0.0254	m	Radius of MW
Recovery:	99.2%	%	K:	1.40E-05	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	6.300	93.700	1.005	1.005	1.000
20	6.110	93.890	0.815	1.005	0.811
30	5.910	94.090	0.615	1.005	0.612
40	5.770	94.230	0.475	1.005	0.473
50	5.670	94.330	0.375	1.005	0.373
60	5.600	94.400	0.305	1.005	0.303
75	5.490	94.510	0.195	1.005	0.194
90	5.460	94.540	0.165	1.005	0.164
105	5.420	94.580	0.125	1.005	0.124
120	5.393	94.607	0.098	1.005	0.098
150	5.365	94.635	0.070	1.005	0.070
180	5.348	94.652	0.053	1.005	0.053
210	5.338	94.662	0.043	1.005	0.043
240	5.330	94.670	0.035	1.005	0.035
270	5.326	94.674	0.031	1.005	0.031
300	5.324	94.676	0.029	1.005	0.029
390	5.316	94.684	0.021	1.005	0.021
420	5.315	94.685	0.020	1.005	0.020
480	5.312	94.688	0.017	1.005	0.017
540	5.309	94.691	0.014	1.005	0.014
600	5.307	94.693	0.012	1.005	0.012

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-78S (Test 1)



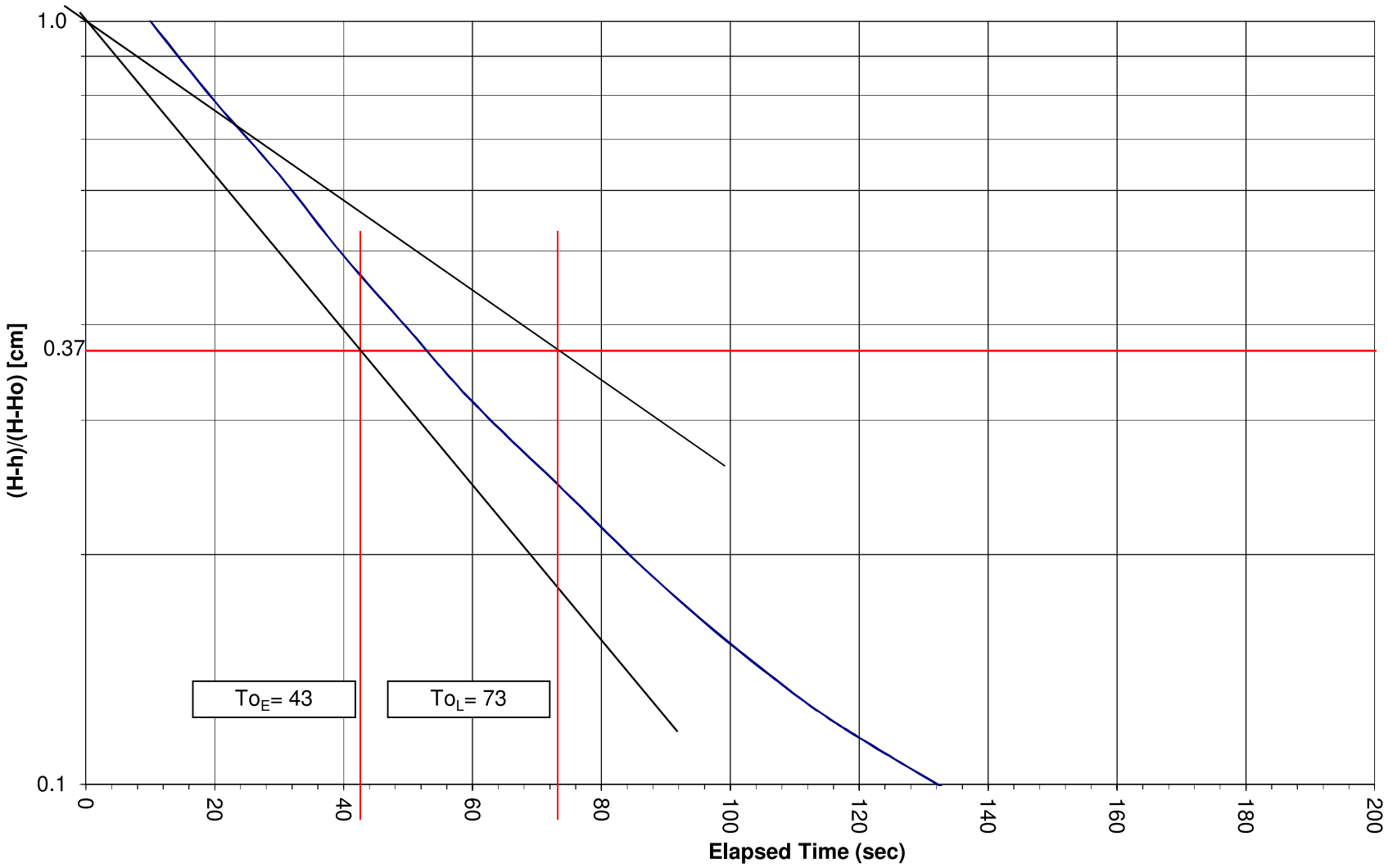
Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-78S (Test 2)

Date: 12-Jan-11

Conducted By:	X.X		H:	1.59	m	Static Water Level
Well Depth:	6.88	mbtor	Ho:	0.6	m	Head at time = 0
Stick Up:	-	m	ToE:	0.7	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	5.30	mbtor	r:	0.0254	m	Radius of MW
Recovery:	98.7%	%	K:	1.33E-05	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	6.320	93.680	1.025	1.025	1.000
20	6.100	93.900	0.805	1.025	0.785
30	5.940	94.060	0.645	1.025	0.629
40	5.800	94.200	0.505	1.025	0.493
50	5.700	94.300	0.405	1.025	0.395
60	5.620	94.380	0.325	1.025	0.317
75	5.540	94.460	0.245	1.025	0.239
90	5.480	94.520	0.185	1.025	0.180
105	5.440	94.560	0.145	1.025	0.141
120	5.413	94.587	0.118	1.025	0.115
150	5.380	94.620	0.085	1.025	0.083
180	5.362	94.638	0.067	1.025	0.065
210	5.350	94.650	0.055	1.025	0.054
240	5.345	94.655	0.050	1.025	0.049
270	5.336	94.664	0.041	1.025	0.040
300	5.335	94.665	0.040	1.025	0.039
390	5.329	94.671	0.034	1.025	0.033
420	5.325	94.675	0.030	1.025	0.029
480	5.322	94.678	0.027	1.025	0.026
540	5.319	94.681	0.024	1.025	0.023
600	5.316	94.684	0.021	1.025	0.020

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-78S (Test 2)



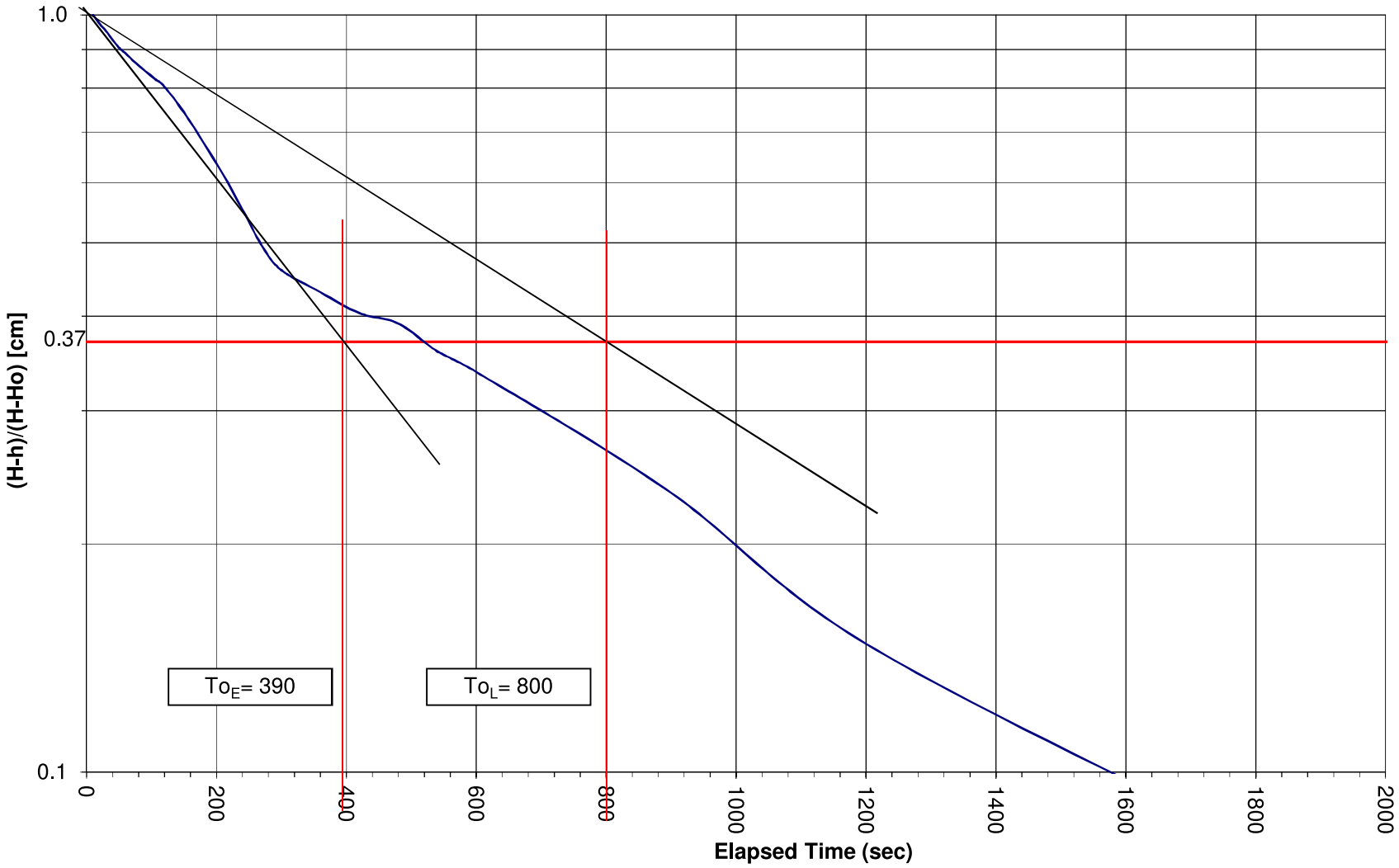
Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-67

Date: 12-Jan-11

Conducted By:	X.X		H:	1.94	m	Static Water Level
Well Depth:	7.00	mbtor	Ho:	0.1	m	Head at time = 0
Stick Up:	-	m	ToL:	13.3	min	
Ground Elevation:	100.000	masl	L:	1.524	m	Screen Length
Well Elevation:	100.000	masl	R:	0.1016	m	Radius of Borehole
Initial Water Level:	5.05	mbtor	r:	0.0254	m	Radius of MW
Recovery:	92.4%	%	K:	7.17E-07	m/s	r2ln(L/R)/(2LTo)

Time (seconds)	WL (mtoc)	WL (masl)	H-h	H-Ho	(H-h)/(H-Ho)
10	6.900	93.100	1.848	1.848	1.000
20	6.850	93.150	1.798	1.848	0.973
30	6.810	93.190	1.758	1.848	0.951
40	6.765	93.235	1.713	1.848	0.927
50	6.725	93.275	1.673	1.848	0.905
60	6.695	93.305	1.643	1.848	0.889
75	6.650	93.350	1.598	1.848	0.865
90	6.610	93.390	1.558	1.848	0.843
105	6.573	93.427	1.521	1.848	0.823
120	6.537	93.463	1.485	1.848	0.804
150	6.425	93.575	1.373	1.848	0.743
180	6.305	93.695	1.253	1.848	0.678
210	6.190	93.810	1.138	1.848	0.616
240	6.075	93.925	1.023	1.848	0.554
270	5.967	94.033	0.915	1.848	0.495
300	5.902	94.098	0.850	1.848	0.460
360	5.847	94.153	0.795	1.848	0.430
420	5.798	94.202	0.746	1.848	0.404
480	5.775	94.225	0.723	1.848	0.391
540	5.716	94.284	0.664	1.848	0.359
600	5.676	94.324	0.624	1.848	0.338
900	5.484	94.516	0.432	1.848	0.234
1200	5.325	94.675	0.273	1.848	0.148
1800	5.200	94.800	0.148	1.848	0.080

Appendix C: In-Situ Hydraulic Conductivity Analyses - MW10-67



BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C4

Groundwater Elevations (Features)

Table 1a: Mini Piezometers - Groundwater Levels (mbgs)

Station ID	Ground Elev (masl)	Depth to Bottom (mbgs)	Top of riser above grade (m)	11-May-18	19-Jul-18	8-Aug-18	10-Aug-18	13-Aug-18	31-Aug-18	11-Sep-18	18-Sep-18	26-Sep-18	26-Nov-18	26-Mar-19
GW_1S	255.2	1.21	0.99	-	-	-	-	-	-	1.12	-	-	0.44	0.41
GW_1D	255.2	1.42	0.77	-	-	-	-	-	-	1.14	-	-	1.13	0.41
GW_2S	255.1	1.45	0.74	-	-	-	0.68	-	-	0.82	0.82	-	0.34	0.35
GW_2D	255.0	2.15	0.86	-	-	-	1.25	-	-	1.08	1.05	-	0.85	0.68
GW_3S	260.9	0.85	0.72	-	-	-	-	-	Dry	-	-	-	0.10	0.06
GW_3D	260.9	1.75	1.06	-	-	-	-	-	0.87	-	-	-	0.06	-0.02
GW_3_DF_Inside	260.8	1.22	0.35	-	-	-	-	-	-	-	-	-	-	-
GW_3_DF_Outside	260.8	1.22	0.35	-	-	-	-	-	-	-	-	-	-	-
GW_4S	257.7	1.25	0.60	-	0.05	-0.04	-	-0.04	-	0.28	-	-	-0.10	0.07
GW_4D	257.7	2.02	0.76	-	0.14	0.22	-	0.22	-	0.42	-	-	-0.16	0.02
GW_4_Creek_Inside	257.6	1.13	0.44	-	-	-	-	-	-	-	-	-	-	-
GW_4_Creek_Outside	257.6	1.13	0.44	-	-	-	-	-	-	-	-	-	-	-
GW_5S	261.6	1.02	0.83	-	-	-	-	-	-	0.69	-	-	0.37	0.23
GW_5D	261.6	1.96	0.82	-	-	-	-	-	-	1.48	-	-	0.88	0.65
GW_6S	265.2	1.04	0.53	-	-	-	-	-	0.76	-	-	-	-	-0.08
GW_6D	265.2	2.25	1.49	-	-	-	-	-	2.14	-	-	-	-	0.00
GW_7S	264.1	1.32	0.87	-	-	1.06	-	-	-	1.24	-	-	1.27	0.04
GW_7D	264.2	2.10	1.03	-	-	1.11	-	-	-	1.43	-	-	Dry	0.74
GW-FBWB_1S	256.2	1.09	1.10	-	-	0.84	-	-	-	0.81	-	-	0.40	0.22
GW-FBWB_1D	256.2	1.66	0.83	-	-	0.86	-	-	-	0.79	-	-	0.43	0.25
GW-FBWB_2S	260.4	1.02	0.82	-	-	-	-	-	-	0.75	-	0.40	0.67	0.26
GW-FBWB_2D	260.4	1.98	0.80	-	-	-	-	-	-	0.67	-	0.89	0.70	0.56
GW-FBWB_3S	266.9	1.34	0.85	-	-	-	-	-	1.27	-	-	-0.11	-0.11	-0.31
GW-FBWB_3D	266.9	2.04	1.09	-	-	-	-	-	1.89	-	-	1.56	1.56	-0.15
GW-FBWB_4S	281.6	1.42	0.77	-	-	-	-	-	-	0.15	-	-	-	-
GW-FBWB_4D	281.7	2.37	0.76	-	-	-	-	-	-	-0.75	-	-	-	-
GW-FBWB_5S	264.0	1.20	1.00	-	-	0.21	-	-	-	0.19	-	-	1.12	0.06
GW-FBWB_5D	264.0	2.28	0.84	-	-	0.20	-	-	-	0.61	-	-	-	0.04
GW-FBWB_6S	264.8	0.86	0.99	-	-	-	0.34	-	0.32	-	-	-	-0.17	-0.16
GW-FBWB_6D	264.8	2.06	1.05	-	-	-	1.04	-	0.68	-	-	-	0.31	1.69
GW-FBWB_7S	261.7	1.32	0.53	1.26	0.55	-	0.67	-	-	0.70	-	-	0.10	0.16
GW-FBWB_7D	261.7	2.02	0.76	2.02	0.38	-	0.38	-	-	0.58	-	-	-0.02	-0.14
GW-FBWB_7_Creek_Inside	261.6	1.17	0.40	-	-	-	-	-	-	-	-	-	-	-
GW-FBWB_7_Creek_Outside	261.6	1.17	0.40	-	-	-	-	-	-	-	-	-	-	-
GW-FBWB_8S	258.2	1.34	0.49	-	0.91	-	0.74	-	-	-	0.65	-	0.43	0.08
GW-FBWB_8D	258.2	2.32	0.49	-	1.61	-	1.35	-	-	-	1.08	-	0.70	0.23
GW-FBWB_9S	248.0	1.37	0.47	1.37	0.13	0.03	-	-	-	0.19	-	-	-0.06	0.01
GW-FBWB_9D	248.0	2.32	0.46	2.32	0.58	0.37	-	-	-	0.26	-	-	0.19	0.13
GW-FBWB_10S	251.8	1.02	0.84	-	-	-0.15	-	-	-0.09	-0.22	-0.22	-	-0.06	-0.06
GW-FBWB_10D	251.8	2.20	0.85	-	-	-0.43	-	-	1.10	-0.44	-0.41	-	-0.16	-0.34
GW-FBWB_10_Creek_Inside	251.7	0.95	1.52	-	-	-	-	-	-	-	-	-	-	-
GW-FBWB_10_Creek_Outside	251.7	0.95	1.52	-	-	-	-	-	-	-	-	-	-	-
FBWB_1S	261.3	1.34	0.86	-	-	-	-	-	-	1.30	-	-	0.18	0.00
FBWB_1D	261.4	1.96	1.17	-	-	-	-	-	-	1.70	-	-	0.63	0.04
FBWB_2S	247.5	0.84	1.36	-	-	-	-	-	-0.14	-	-	-	-0.22	-
FBWB_2D	247.5	2.25	0.87	-	-	-	-	-	-0.18	-	-	-	-0.21	-
FBWB_3S	250.5	0.60	0.66	-	-	-	-	-	0.31	-	-	-	-0.06	0.25
FBWB_3D	250.5	1.71	0.49	-	-	-	-	-	0.62	-	-	-	0.18	0.44
FBWB_4S	249.7	1.42	0.78	-	-	-	-	-	-	-	-	-	-0.03	0.14
FBWB_4D	249.7	2.28	0.84	-	-	-	-	-	-	-	-	-	-	-0.84
FBWB_5S	253.5	0.80	1.39	-	-	-	-	-	-	-	0.53	-	0.24	-0.12
FBWB_5D	253.5	1.12	1.07	-	-	-	-	-	-	-	0.94	-	0.76	0.29
FBWB_6S	260.5	1.26	0.94	-	-	-	-	-	0.79	-	1.14	-	0.15	0.00
FBWB_6D	260.5	2.04	1.08	-	-	-	-	-	0.78	-	1.10	-	0.16	0.07
FBWB_7S	263.7	1.20	1.00	-	-	-	-	-	1.07	-	1.65	-	0.48	0.13
FBWB_7D	263.7	1.67	1.46	-	-	-	-	-	1.66	-	1.38	-	1.05	0.47
FBWB_8S	268.5	1.35	0.84	-	-	-	-	-	-	0.74	-	-	0.54	-
FBWB_8D	268.5	2.22	0.90	-	-	-	-	-	-	1.51	-	-	1.25	-
FBWB_9S	266.0	1.08	0.48	-	-	-	-	-	-	0.90	-	-	0.56	0.24
FBWB_9D	266.0	2.06	0.74	-	-	-	-	-	-	1.89	-	-	1.56	0.78
FBWB_10S	254.4	1.41	0.78	-	-	-	-	-	-	-	0.08	-	-	-
FBWB_10D	254.4	2.30	0.83	-	-	-	-	-	-	-	-0.31	-	-	-
FBWB_11S	292.5	1.40	0.80	-	-	-	-	-	-	-0.27	-	-	-	-
FBWB_11D	292.5	2.26	0.86	-	-	-	-	-	-	-0.24	-	-	-	-
FBWB_12S	276.0	1.57	0.63	-	-	-	-	-	-	0.41	-	-	0.16	0.15
FBWB_12D	276.0	2.36	0.77	-	-	-	-	-	-	1.12	-	-	0.16	0.15
FBWB_13S	270.5	1.14	0.42	-	-	-	-	-	-	1.51	-	-	1.06	0.79
FBWB_13D	270.5	2.10	0.70	-	-	-	-	-	-	2.44	-	-	2.05	1.15
FBWB_14S	281.3	1.35	0.84	-	-	-	-	-	-	-	0.23	-	0.11	0.07
FBWB_14D	281.4	2.26	0.88	-	-	-	-	-	-	-	0.35	-	0.19	0.14
FBWB_15S	285.5	0.98	0.59	-	-	-	-	-	-	-	Dry	-	Dry	0.98
FBWB_15D	285.5	2.03	1.10	-	-	-	-	-	-	-	Dry	-	Dry	2.04
FBWB_16S	272.0	1.09	0.48	-	-	-	-	-	-	-	Dry	-	1.09	Dry
FBWB_16D	272.0	1.88	0.62	-	-	-	-	-	-	-	Dry	-	1.88	Dry
FBWB_17S	271.0	1.54	0.66	-	-	-	-	-	-	1.09	-	-	0.35	1.17
FBWB_17D	271.1	2.38	0.76	-	-	-	-	-	-	2.11	-	-	1.41	0.93
FBWB_18S	275.5	1.15	1.05	-	-	-	-	-	-	Dry	-	-	Dry	1.14
FBWB_18D	275.5	1.99	1.14	-	-	-	-	-	-	Dry	-	-	1.98	1.48
FBWB_19S	265.5	1.03	1.14	-	-	-	-	-	Dry	-	Dry	-	Dry	0.55
FBWB_19D	265.5	2.01	1.12	-	-	-	-	-	Dry	-	Dry	-	Dry	0.61
FBWB_20S	270.6	1.16	1.04	-	-	-	-	-	1.02	-	0.99	-	0.38	0.00
FBWB_20D	270.6	2.24	0.51	-	-	-	-	-	1.67	-	2.14	-	0.97	0.53
SW-FBWB_1S	246.0	1.35	0.85	-	-	-	-	-	-	-	0.22	-	0.11	Dry
SW-FBWB_1D	246.0	2.14	1.53	-	-	-	-	-	-	-	0.06	-	-0.61	Dry
SW-FBWB_2S	256.3	1.12	1.08	-	-	-	-	-	0.82	-	0.47	-	0.19	0.11
SW-FBWB_2D	256.3	1.87	1.26	-	-	-	-	-	0.13	-	0.43	-	0.02	-0.06
SW-FBWB_3S	261.4	1.08	0.48	-	-	-	-	-	0.89	-	0.82	-	0.63	0.28
SW-FBWB_3D	261.4	2.06	0.74	-	-	-	-	-	0.15	-	0.04	-	-0.27	-0.64
SW-FBWB_3_Creek_Inside	261.4	0.78	0.78	-	-	-	-	-	-	-	-	-	-	-
Sw-FBWB_3_Creek_Outside	261.4	0.78	0.78	-	-	-	-	-	-	-	-	-	-	-
GW-FBWB-SW_1S	249.4	2.34	0.42	-	0.32	-	-	-	-	-	0.39	-	0.26	0.17
GW-FBWB-SW_1D	249.4	3.01	1.59	-	0.39	-	-	-	-	-	0.41	-	0.18	0.14
GW-FBWB-SW_2S	253.8	1.27	0.57	-	0.29	0.71	-	-	-	1.30	-	-	-0.10	-0.02
GW-FBWB-SW_2D	253.8	2.20	0.58	-	0.45	0.86	-	-	-	1.34	-	-	-0.08	-0.02
BW-GW_661S	254.31	1.55	0.25	-	-	-	-	-	-	-	-	-	1.80	0.01
BW-GW_661D	254.31	2.05	0.82	-	-	-	-	-	-	-	-	-	2.87	0.51

Table 1a: Mini Piezometers - Groundwater Levels (mbgs)

Station ID	Ground Elev (masl)	Depth to Bottom (mbgs)	Top of riser above grade (m)	1-May-19	19-Jun-19	10-Jul-19	5-Sep-19	3-Apr-20	3-Jun-20	15-Sep-20	25-Nov-20	24-Mar-21	13-May-21	17-Sep-21	6-Dec-21
GW_1S	255.2	1.21	0.99	0.38	0.53	0.90	1.20	0.39	0.59	Dry	Dry	0.44	0.58	Dry	0.42
GW_1D	255.2	1.42	0.77	0.41	0.64	1.13	1.41	0.42	0.85	Dry	0.97	0.45	0.88	1.09	0.44
GW_2S	255.1	1.45	0.74	0.38	0.58	0.86	1.43	0.42	0.93	0.93	0.86	0.32	0.83	0.90	0.22
GW_2D	255.0	2.15	0.86	0.56	0.53	0.56	0.87	0.60	0.58	0.58	0.92	0.72	0.64	1.12	0.74
GW_3S	260.9	0.85	0.72	0.00	0.31	0.69	0.85	0.01	0.74	Dry	Dry	-	0.32	0.85	0.06
GW_3D	260.9	1.75	1.06	-0.04	0.20	0.70	1.74	-0.02	0.53	Dry	Dry	-	0.14	1.57	-0.03
GW_3_DF_Inside	260.8	1.22	0.35	0.06	-0.04	0.13	1.11	-0.10	-0.04	Dry	1.16	-	0.88	1.06	0.88
GW_3_DF_Outside	260.8	1.22	0.35	-0.19	-0.05	-	0.00	-0.19	Dry	Dry	-	-	Dry	Dry	-0.21
GW_4S	257.7	1.25	0.60	-0.05	0.07	0.38	0.84	0.01	0.06	0.06	0.78	0.06	0.14	0.62	-0.12
GW_4D	257.7	2.02	0.76	-0.13	0.02	1.19	0.79	-0.06	0.02	0.02	0.74	0.00	0.10	0.58	-0.19
GW_4_Creek_Inside	257.6	1.13	0.44	-0.27	-0.17	0.13	0.70	-0.08	-0.03	-0.03	-	-	-0.13	0.35	-0.31
GW_4_Creek_Outside	257.6	1.13	0.44	-0.16	-0.17	-	-	-0.06	-	-	-	-	Dry	Dry	-0.26
GW_5S	261.6	1.02	0.83	0.08	0.54	0.87	0.81	0.19	0.69	0.87	0.75	0.70	0.71	0.80	0.61
GW_5D	261.6	1.96	0.82	0.42	0.51	0.61	1.02	0.34	0.58	-0.46	0.91	0.91	0.86	0.92	0.68
GW_6S	265.2	1.04	0.53	0.00	0.74	1.00	1.04	0.02	Dry	Dry	Dry	0.69	Dry	Dry	Dry
GW_6D	265.2	2.25	1.49	0.01	0.93	1.79	2.25	-0.01	1.98	Dry	Dry	0.74	1.88	Dry	1.44
GW_7S	264.1	1.32	0.87	0.04	0.61	0.83	0.98	0.14	0.83	1.22	Dry	Dry	Dry	1.26	Dry
GW_7D	264.2	2.10	1.03	0.13	0.68	0.96	1.43	0.12	0.83	0.60	1.74	0.31	1.35	1.73	1.45
GW-FBWB_1S	256.2	1.09	1.10	-	0.24	0.44	1.09	0.22	0.28	Dry	0.93	0.34	0.25	Dry	-
GW-FBWB_1D	256.2	1.66	0.83	-	0.26	0.45	1.33	0.22	0.30	1.22	1.13	0.45	0.30	0.98	-
GW-FBWB_2S	260.4	1.02	0.82	0.17	0.15	0.31	1.03	-0.37	0.50	0.50	Dry	0.66	0.48	Dry	0.77
GW-FBWB_2D	260.4	1.98	0.80	0.49	0.42	0.56	0.69	0.67	0.59	0.59	Dry	1.12	1.01	1.24	0.97
GW-FBWB_3S	266.9	1.34	0.85	-0.30	-0.22	-0.54	1.32	-0.28	0.39	Dry	-0.26	0.04	1.10	-0.03	-0.03
GW-FBWB_3D	266.9	2.04	1.09	0.69	1.67	1.65	1.66	1.52	1.49	1.77	1.53	1.30	0.86	0.64	0.64
GW-FBWB_4S	281.6	1.42	0.77	-	-0.65	-0.20	0.73	-	-0.32	0.19	-0.16	-	-	-	-
GW-FBWB_4D	281.7	2.37	0.76	-	-0.46	-0.44	-0.29	-0.37	-0.33	0.34	-0.08	-	-	-	-
GW-FBWB_5S	264.0	1.20	1.00	0.00	-0.07	0.11	0.61	0.03	0.03	0.27	0.26	0.15	0.18	0.67	0.11
GW-FBWB_5D	264.0	2.28	0.84	-0.06	-0.03	0.09	0.32	-0.02	0.03	0.59	0.56	0.08	0.16	0.66	0.11
GW-FBWB_6S	264.8	0.86	0.99	-0.10	-0.04	-0.18	1.17	-0.06	0.08	0.08	-	-0.06	0.00	1.15	-0.08
GW-FBWB_6D	264.8	2.06	1.05	-0.05	-0.02	0.00	1.81	-0.13	0.06	0.06	1.73	0.02	-0.01	1.94	-0.01
GW-FBWB_7S	261.7	1.32	0.53	-0.04	-0.07	0.49	0.95	0.05	0.20	0.20	0.75	0.15	0.42	1.15	0.10
GW-FBWB_7D	261.7	2.02	0.76	-0.17	-0.19	-0.04	0.44	-0.16	-0.06	-0.06	0.68	0.03	0.15	0.88	-0.21
GW-FBWB_7_Creek_Inside	261.6	1.17	0.40	-0.10	-0.12	0.41	0.83	0.05	0.41	0.41	Dry	-	0.34	1.02	-0.04
GW-FBWB_7_Creek_Outside	261.6	1.17	0.40	-0.11	-0.12	-	-	-0.07	-	-	Dry	-	Dry	Dry	-0.26
GW-FBWB_8S	258.2	1.34	0.49	0.04	0.02	0.06	0.55	0.24	0.17	0.85	Dry	0.45	0.35	0.65	0.34
GW-FBWB_8D	258.2	2.32	0.49	0.16	0.11	0.12	0.36	0.20	0.14	0.49	0.92	0.41	0.34	0.51	0.35
GW-FBWB_9S	248.0	1.37	0.47	0.38	-0.31	-0.20	0.51	-0.13	-0.16	0.41	0.21	-0.06	-0.16	0.18	-0.13
GW-FBWB_9D	248.0	2.32	0.46	0.63	-0.16	0.00	0.40	-0.06	0.01	0.31	0.17	0.02	-0.07	1.30	-0.10
GW-FBWB_10S	251.8	1.02	0.84	-0.12	-	-0.17	1.34	-0.02	-0.04	-0.04	1.04	-0.84	-0.16	-0.25	-0.32
GW-FBWB_10D	251.8	2.20	0.85	-0.45	-	-0.35	1.96	-0.37	-0.44	-0.44	1.94	-0.85	-0.36	-0.42	-0.07
GW-FBWB_10_Creek_Inside	251.7	0.95	1.52	-0.53	-	-0.56	-0.62	-0.18	-0.67	-0.67	-	-	-0.61	-0.64	-
GW-FBWB_10_Creek_Outside	251.7	0.95	1.52	-0.12	-	0.00	-	-0.18	-0.06	-0.06	-	-	-	-	-
FBWB_1S	261.3	1.34	0.86	-0.03	0.04	1.15	1.31	0.00	0.15	Dry	Dry	0.05	0.58	Dry	0.00
FBWB_1D	261.4	1.96	1.17	0.03	-0.01	0.59	1.92	0.03	0.29	Dry	Dry	0.25	0.21	Dry	0.57
FBWB_2S	247.5	0.84	1.36	-0.12	-0.08	-0.09	0.40	-0.09	-0.06	-0.14	-0.09	-0.01	-0.08	-0.07	-0.08
FBWB_2D	247.5	2.25	0.87	-0.18	-0.16	-0.15	0.80	-0.15	-0.15	-0.14	-0.13	-0.13	-0.15	0.72	-0.18
FBWB_3S	250.5	0.60	0.66	-0.09	-0.07	0.19	0.60	-0.08	-0.02	Dry	Dry	-0.01	-0.08	Dry	-0.07
FBWB_3D	250.5	1.71	0.49	0.22	0.25	0.63	1.47	0.24	0.29	1.57	0.69	0.26	0.22	1.16	0.24
FBWB_4S	249.7	1.42	0.78	-0.32	-0.35	-0.38	-0.42	-0.56	-0.51	-0.53	-0.63	0.00	-0.50	-0.43	0.15
FBWB_4D	249.7	2.28	0.84	-0.84	-0.84	-0.84	-0.84	-0.84	-0.84	-0.84	-0.84	-0.84	-0.84	-0.84	-0.84
FBWB_5S	253.5	0.80	1.39	-0.13	-0.12	-0.07	0.41	-0.13	-0.09	0.56	0.69	-0.11	-0.11	-0.10	-0.03
FBWB_5D	253.5	1.12	1.07	0.18	0.13	0.17	0.63	0.19	0.18	0.71	0.82	0.33	0.24	0.69	0.34
FBWB_6S	260.5	1.26	0.94	0.02	-	0.58	1.24	-0.01	0.24	0.84	0.93	0.10	0.21	Dry	0.11
FBWB_6D	260.5	2.04	1.08	-0.07	-	0.47	1.23	-0.03	0.04	Dry	1.71	0.29	0.09	1.76	0.31
FBWB_7S	263.7	1.20	1.00	0.08	0.17	0.59	1.19	0.16	0.81	Dry	Dry	0.23	0.47	Dry	0.23
FBWB_7D	263.7	1.67	1.46	0.22	0.28	0.40	1.22	0.54	0.55	Dry	Dry	1.24	0.77	Dry	0.84
FBWB_8S	268.5	1.35	0.84	-0.30	0.31	0.09	1.35	-0.16	0.55	Dry	Dry	0.80	0.49	Dry	Dry
FBWB_8D	268.5	2.22	0.90	0.39	0.56	0.36	1.95	0.28	0.65	Dry	1.84	2.20	2.03	1.67	Dry
FBWB_9S	266.0	1.08	0.48	0.31	0.54	-	0.91	0.39	Dry	Dry	1.01	0.31	Dry	0.66	0.33
FBWB_9D	266.0	2.06	0.74	0.36	0.70	-	0.78	0.24	1.46	Dry	0.49	0.94	1.40	1.04	1.18
FBWB_10S	254.4	1.41	0.78	-0.11	-0.12	-0.09	-0.06	-0.11	-0.12	-0.01	-0.11	-0.02	-0.08	-0.06	-0.09
FBWB_10D	254.4	2.30	0.83	-0.43	-0.42	-0.34	-0.34	0.09	-0.41	-0.29	-0.28	-0.35	-0.29	-0.29	-0.42
FBWB_11S	292.5	1.40	0.80	-	-0.36	-0.35	-0.27	-	-0.05	Dry	Dry	-	1.12	1.19	-
FBWB_11D	292.5	2.26	0.86	-	-0.76	-0.69	0.25	-	-0.54	Dry	Dry	-	0.53	0.42	-
FBWB_12S	276.0	1.57	0.63	0.08	-	0.10	0.76	0.08	0.13	-	-0.01	-	0.10	0.63	0.01
FBWB_12D	276.0	2.36	0.77	0.07	-	0.08	0.71	0.03	0.05	-	Dry	-	0.36	0.70	-0.12
FBWB_13S	270.5	1.14	0.42	0.52	1.02	1.51	1.45	0.52	1.38	-	0.43	0.57	1.46	0.93	0.58
FBWB_13D	270.5	2.10	0.70	0.53	1.04	2.46	2.39	0.50	1.45	-	0.89	1.62	2.20	1.20	0.71
FBWB_14S	281.3	1.35	0.84	0.01	-	0.15	0.06	-0.01	0.04	0.15	0.28	0.19	0.09	0.02	-0.20
FBWB_14D	281.4	2.26	0.88	0.04	-	0.22	0.33	0.01	0.20	0.28	0.52	0.32	0.23	0.32	-0.23
FBWB_15S	285.5	0.98	0.59	Dry	Dry	Dry	0.98	Dry	Dry	Dry	0.98	Dry	Dry	Dry	Dry
FBWB_15D	285.5	2.03	1.10	1.44	Dry	Dry	2.03	1.35	Dry	Dry	Dry	Dry	Dry	Dry	Dry
FBWB_16S	272.0	1.09	0.48	0.11	Dry	1.07	1.09	0.07	Dry	Dry	1.10	Dry	Dry	Dry	0.95
FBWB_16D	272.0	1.88	0.62	Dry	0.83	1.34	1.88	0.58	0.14	0.14	1.90	1.89	Dry	Dry	Dry
FBWB_17S	271.0	1.54	0.66	0.15	0.18	1.05	1.08	0.35	0.46	0.87	0.85	1.15	0.41	0.57	0.13
FBWB_17D	271.1	2.38	0.76	0.11	0.53	2.08	1.22	0.00	1.08	1.33	1.85	1.96	0.48	0.63	0.23
FBWB_18S	275.5	1.15	1.05	Dry	Dry	Dry	1.14	1.13	Dry	Dry	Dry	Dry	Dry	0.70	Dry
FBWB_18D	275.5	1.99	1.14	1.34	Dry	1.96	1.98	1.44	Dry	Dry	Dry	Dry	Dry	0.78	Dry
FBWB_19S	265.5	1.03	1.14	-0.10	0.71	Dry	1.04	0.11	Dry	Dry	Dry	1.06	Dry	Dry	Dry
FBWB_19D	265.5	2.01	1.12	0.02	0.58	1.48	2.00	0.17	1.60	Dry	Dry	1.74	Dry	Dry	1.05
FBWB_20S	270.6	1.16	1.04	-0.03	0.01	0.32	0.81	-0.04	0.46	Dry	Dry	0.47	0.15	1.11	0.03
FBWB_20D	270.6	2.24	0.51	0.86	0.33	1.10	2.17	-0.06	1.31	Dry	Dry	1.64	1.39	Dry	1.03
SW-FBWB_1S	246.0	1.35	0.85	0.09	0.16	0.20	0.21	0.12	1.09	0.25	0.25	0.21	0.21	0.25	-
SW-FBWB_1D	246.0	2.14	1.53	-1.51	-1.56	-1.56	-1.56	-0.04	0.00	-2.48	-1.47	0.07	0.07	0.15	-
SW-FBWB_2S	256.3	1.12	1.08	0.00	0.04	0.06	0.56	-0.62	0.32	0.36	0.39	0.37	0.32	0.33	0.24
SW-FBWB_2D	256.3	1.87	1.26	-0.03	0.01	0.24	1.07	-0.01	0.06	1.27	0.60	0.01	0.01	0.96	0.04
SW-FBWB_3S	261.4	1.08	0.48	0.27	0.25	0.39	0.03	-0.45	0.44	1.09	1.14	0.56	0.38	0.94	0.42
SW-FBWB_3D	261.4	2.06	0.74	-0.59	-0.58	-0.37	0.03	-0.45	-0.43	0.24	0.29	-0.13	-0.34	0.17	-0.29
SW-FBWB_3_Creek_Inside	261.4	0.78	0.78	0.12	-0.09	-0.12	0.15	-0.02	-0.07	0.19	0.45	-	-0.09	0.02	0.01
Sw-FBWB_3_Creek_Outside	261.4	0.78	0.78	-0.26	-0.21	-0.12	0.01	-0.31	-0.16	-	-	-0.30	-	-0.19	-0.34
GW-FBWB-SW_1S	249.4	2.34	0.42	0.14	0.14	0.22	0.40	0.16	0.17	0.57	0.26	0.17	0.15	0.41	0.19
GW-FBWB-SW_1D	249.4	3.01	1.59	0.11	0.18	0.30	0.47	0.17	0.20	0.41	0.17	0.18	0.16	0.41	0.14
GW-FBWB-SW_2S	253.8	1.27	0.57	-0.09	0.03	0.76	1.25	-0.06	0.17	Dry	Dry	0.49	0.25	Dry	0.77
GW-FBWB-SW_2D	253.8	2.20	0.58	-0.09	0.40	1.13	1.73	-0.06	0.50	1.70	1.48	0.16	0.56	Dry	-0.06
BW-GW_661S	254.31	1.55	0.25	0.26	0.60	0.97	1.26	0.61	1.04	1.04	1.18	0.44	0.62	0.84	0.47
BW-GW_661D	254.31	2.05	0.82	0.29	0.25	0.33	0.69	0.40	0.69	0.69	0.68	0.49	0.45	0.48	0.42

Table 1b: Mini Piezometers - Groundwater Levels (masl)

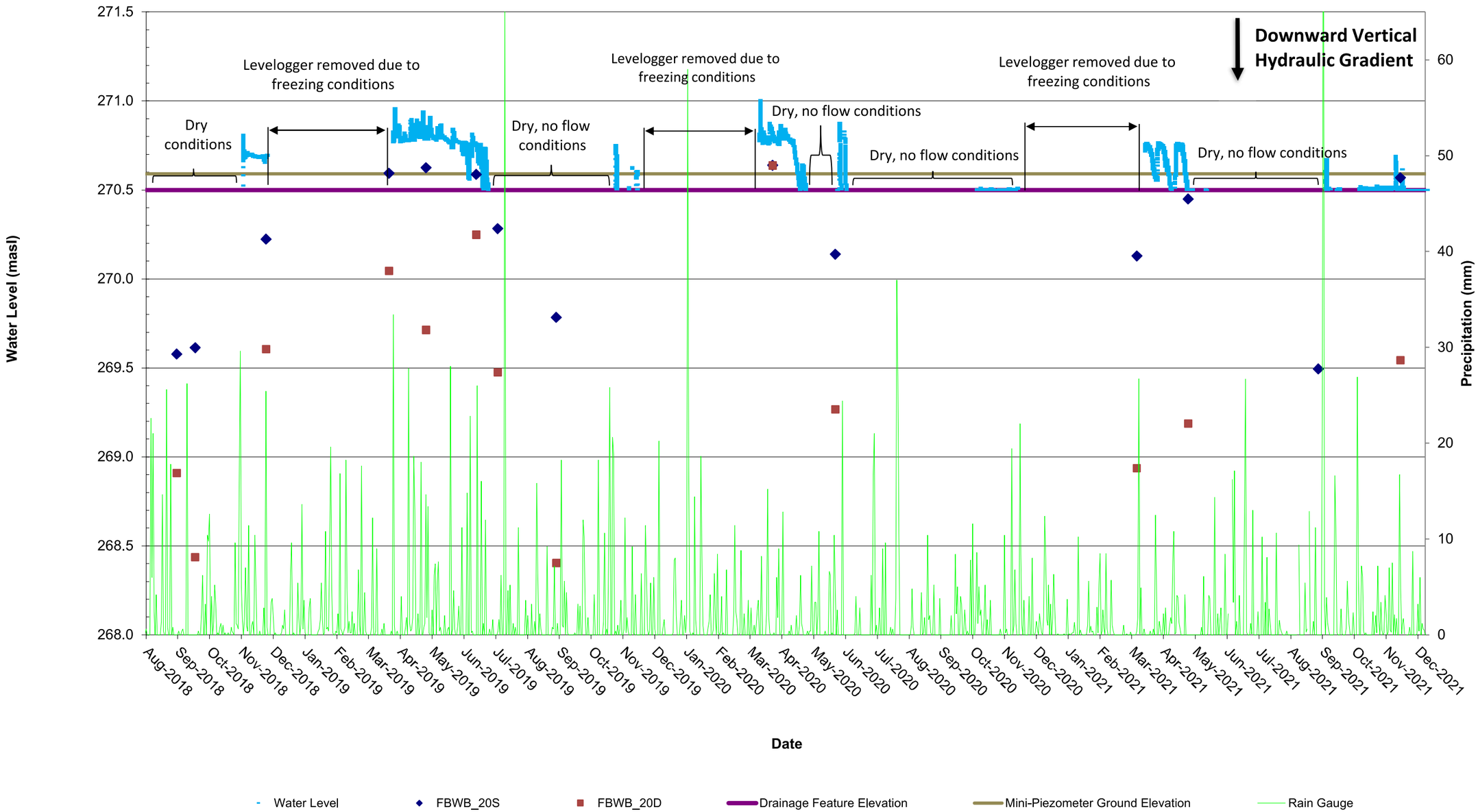
Station ID	Ground Elev (masl)	Depth to Bottom (mbgs)	Top of Riser Above Grade (m)	11-May-18	19-Jul-18	8-Aug-18	10-Aug-18	13-Aug-18	31-Aug-18	11-Sep-18	18-Sep-18	26-Sep-18	26-Nov-18	26-Mar-19	1-May-19
GW_1S	255.2	1.21	0.99	-	-	-	-	-	-	254.09	-	-	254.76	254.79	254.82
GW_1D	255.2	1.42	0.77	-	-	-	-	-	-	254.09	-	-	254.10	254.82	254.81
GW_2S	255.1	1.45	0.74	-	-	-	254.37	-	-	254.23	254.23	-	254.71	254.71	254.67
GW_2D	255.0	2.15	0.86	-	-	-	253.80	-	-	253.96	254.00	-	254.19	254.37	254.49
GW_3S	260.9	0.85	0.72	-	-	-	-	-	Dry	-	-	-	260.79	260.83	260.89
GW_3D	260.9	1.75	1.06	-	-	-	-	-	259.99	-	-	-	260.81	260.89	260.90
GW_3_DF_Inside	260.8	1.22	0.35	-	-	-	-	-	-	-	-	-	-	-	260.74
GW_3_DF_Outside	260.8	1.22	0.35	-	-	-	-	-	-	-	-	-	-	-	260.99
GW_4S	257.7	1.25	0.60	-	257.69	257.78	-	257.78	-	257.46	-	-	257.84	257.67	257.79
GW_4D	257.7	2.02	0.76	-	257.61	257.52	-	257.52	-	257.33	-	-	257.90	257.72	257.88
GW_4_Creek_Inside	257.6	1.13	0.44	-	-	-	-	-	-	-	-	-	-	-	257.85
GW_4_Creek_Outside	257.6	1.13	0.44	-	-	-	-	-	-	-	-	-	-	-	257.74
GW_5S	261.6	1.02	0.83	-	-	-	-	-	-	260.88	-	-	261.19	261.34	261.48
GW_5D	261.6	1.96	0.82	-	-	-	-	-	-	260.12	-	-	260.71	260.94	261.17
GW_6S	265.2	1.04	0.53	-	-	-	-	-	264.43	-	-	-	-	265.27	265.19
GW_6D	265.2	2.25	1.49	-	-	-	-	-	263.03	-	-	-	-	265.18	265.16
GW_7S	264.1	1.32	0.87	-	-	263.08	-	-	-	262.89	-	-	262.86	264.10	264.09
GW_7D	264.2	2.10	1.03	-	-	263.05	-	-	-	262.73	-	-	Dry	263.42	264.04
GW-FBWB_1S	256.2	1.09	1.10	-	-	255.36	-	-	-	255.38	-	-	255.79	255.97	-
GW-FBWB_1D	256.2	1.66	0.83	-	-	255.36	-	-	-	255.43	-	-	255.79	255.97	-
GW-FBWB_2S	260.4	1.02	0.82	-	-	-	-	-	-	259.69	-	260.04	259.77	260.18	260.27
GW-FBWB_2D	260.4	1.98	0.80	-	-	-	-	-	-	259.72	-	259.50	259.69	259.83	259.91
GW-FBWB_3S	266.9	1.34	0.85	-	-	-	-	-	265.62	-	-	267.00	267.00	267.20	267.19
GW-FBWB_3D	266.9	2.04	1.09	-	-	-	-	-	265.02	-	-	265.34	265.34	267.06	266.22
GW-FBWB_4S	281.6	1.42	0.77	-	-	-	-	-	-	281.45	-	-	-	-	-
GW-FBWB_4D	281.7	2.37	0.76	-	-	-	-	-	-	282.40	-	-	-	-	-
GW-FBWB_5S	264.0	1.20	1.00	-	-	263.79	-	-	-	263.81	-	-	262.89	263.94	264.00
GW-FBWB_5D	264.0	2.28	0.84	-	-	263.80	-	-	-	263.39	-	-	-	263.96	264.07
GW-FBWB_6S	264.8	0.86	0.99	-	-	-	264.43	-	264.45	-	-	-	264.93	264.93	264.86
GW-FBWB_6D	264.8	2.06	1.05	-	-	-	263.76	-	264.12	-	-	-	264.50	263.11	264.85
GW-FBWB_7S	261.7	1.32	0.53	260.49	261.20	-	261.08	-	-	261.05	-	-	261.65	261.59	261.79
GW-FBWB_7D	261.7	2.02	0.76	259.69	261.33	-	261.33	-	-	261.13	-	-	261.74	261.85	261.88
GW-FBWB_7_Creek_Inside	261.6	1.17	0.40	-	-	-	-	-	-	-	-	-	-	-	261.75
GW-FBWB_7_Creek_Outside	261.6	1.17	0.40	-	-	-	-	-	-	-	-	-	-	-	261.76
GW-FBWB_8S	258.2	1.34	0.49	-	257.27	-	257.44	-	-	-	257.52	-	257.75	258.10	258.14
GW-FBWB_8D	258.2	2.32	0.49	-	256.59	-	256.85	-	-	-	257.11	-	257.49	257.97	258.04
GW-FBWB_9S	248.0	1.37	0.47	246.64	247.88	247.98	-	-	-	247.82	-	-	248.07	247.99	247.63
GW-FBWB_9D	248.0	2.32	0.46	245.70	247.44	247.66	-	-	-	247.76	-	-	247.83	247.89	247.39
GW-FBWB_10S	251.8	1.02	0.84	-	-	251.95	-	-	251.90	252.02	252.02	-	251.86	251.86	251.92
GW-FBWB_10D	251.8	2.20	0.85	-	-	252.23	-	-	250.70	252.24	252.21	-	251.96	252.15	252.25
GW-FBWB_10_Creek_Inside	251.7	0.95	1.52	-	-	-	-	-	-	-	-	-	-	-	252.25
GW-FBWB_10_Creek_Outside	251.7	0.95	1.52	-	-	-	-	-	-	-	-	-	-	-	251.85
FBWB_1S	261.3	1.34	0.86	-	-	-	-	-	-	260.01	-	-	261.13	261.31	261.34
FBWB_1D	261.4	1.96	1.17	-	-	-	-	-	-	259.66	-	-	260.74	261.33	261.34
FBWB_2S	247.5	0.84	1.36	-	-	-	-	-	247.64	-	-	-	247.72	-	247.62
FBWB_2D	247.5	2.25	0.87	-	-	-	-	-	247.68	-	-	-	247.71	-	247.68
FBWB_3S	250.5	0.60	0.66	-	-	-	-	-	250.23	-	-	-	250.61	250.29	250.63
FBWB_3D	250.5	1.71	0.49	-	-	-	-	-	249.92	-	-	-	250.36	250.11	250.32
FBWB_4S	249.7	1.42	0.78	-	-	-	-	-	-	-	-	-	249.69	249.52	249.98
FBWB_4D	249.7	2.28	0.84	-	-	-	-	-	-	-	-	-	-	250.50	250.50
FBWB_5S	253.5	0.80	1.39	-	-	-	-	-	-	-	252.97	-	253.26	253.62	253.64
FBWB_5D	253.5	1.12	1.07	-	-	-	-	-	-	-	252.56	-	252.74	253.21	253.32
FBWB_6S	260.5	1.26	0.94	-	-	-	-	-	259.76	-	259.40	-	260.39	260.54	260.52
FBWB_6D	260.5	2.04	1.08	-	-	-	-	-	259.76	-	259.44	-	260.38	260.47	260.62
FBWB_7S	263.7	1.20	1.00	-	-	-	-	-	262.58	-	262.01	-	263.18	263.52	263.57
FBWB_7D	263.7	1.67	1.46	-	-	-	-	-	262.02	-	262.29	-	262.63	263.21	263.46
FBWB_8S	268.5	1.35	0.84	-	-	-	-	-	-	267.76	-	-	267.96	-	268.80
FBWB_8D	268.5	2.22	0.90	-	-	-	-	-	-	266.99	-	-	267.25	-	268.12
FBWB_9S	266.0	1.08	0.48	-	-	-	-	-	-	265.08	-	-	265.41	265.74	265.67
FBWB_9D	266.0	2.06	0.74	-	-	-	-	-	-	264.11	-	-	264.45	265.22	265.65
FBWB_10S	254.4	1.41	0.78	-	-	-	-	-	-	-	254.28	-	-	-	254.47
FBWB_10D	254.4	2.30	0.83	-	-	-	-	-	-	-	254.73	-	-	-	254.85
FBWB_11S	292.5	1.40	0.80	-	-	-	-	-	-	292.77	-	-	-	-	-
FBWB_11D	292.5	2.26	0.86	-	-	-	-	-	-	292.74	-	-	-	-	-
FBWB_12S	276.0	1.57	0.63	-	-	-	-	-	-	275.60	-	-	275.85	275.87	275.93
FBWB_12D	276.0	2.36	0.77	-	-	-	-	-	-	274.91	-	-	275.86	275.87	275.95
FBWB_13S	270.5	1.14	0.42	-	-	-	-	-	-	268.94	-	-	269.39	269.66	269.93
FBWB_13D	270.5	2.10	0.70	-	-	-	-	-	-	268.01	-	-	268.40	269.30	269.92
FBWB_14S	281.3	1.35	0.84	-	-	-	-	-	-	-	281.12	-	281.24	281.28	281.34
FBWB_14D	281.4	2.26	0.88	-	-	-	-	-	-	-	281.07	-	281.24	281.28	281.39
FBWB_15S	285.5	0.98	0.59	-	-	-	-	-	-	-	Dry	-	Dry	284.55	Dry
FBWB_15D	285.5	2.03	1.10	-	-	-	-	-	-	-	Dry	-	Dry	283.47	284.07
FBWB_16S	272.0	1.09	0.48	-	-	-	-	-	-	-	Dry	-	270.91	Dry	271.89
FBWB_16D	272.0	1.88	0.62	-	-	-	-	-	-	-	Dry	-	270.12	Dry	Dry
FBWB_17S	271.0	1.54	0.66	-	-	-	-	-	-	269.95	-	-	270.69	269.87	270.89
FBWB_17D	271.1	2.38	0.76	-	-	-	-	-	-	268.96	-	-	269.66	270.14	270.96
FBWB_18S	275.5	1.15	1.05	-	-	-	-	-	-	Dry	-	-	Dry	274.36	Dry
FBWB_18D	275.5	1.99	1.14	-	-	-	-	-	-	Dry	-	-	273.52	274.02	274.16
FBWB_19S	265.5	1.03	1.14	-	-	-	-	-	Dry	-	Dry	-	Dry	264.95	265.60
FBWB_19D	265.5	2.01	1.12	-	-	-	-	-	Dry	-	Dry	-	Dry	264.89	265.48
FBWB_20S	270.6	1.16	1.04	-	-	-	-	-	269.58	-	269.61	-	270.22	270.59	270.62
FBWB_20D	270.6	2.24	0.51	-	-	-	-	-	268.91	-	268.44	-	269.60	270.04	269.71
SW-FBWB_1S	246.0	1.35	0.85	-	-	-	-	-	-	-	245.74	-	245.85	Dry	245.87
SW-FBWB_1D	246.0	2.14	1.53	-	-	-	-	-	-	-	245.90	-	246.57	Dry	247.47
SW-FBWB_2S	256.3	1.12	1.08	-	-	-	-	-	255.48	-	255.83	-	256.11	256.19	256.30
SW-FBWB_2D	256.3	1.87	1.26	-	-	-	-	-	256.16	-	255.86	-	256.27	256.35	256.32
SW-FBWB_3S	261.4	1.08	0.48	-	-	-	-	-	260.48	-	260.55	-	260.74	261.09	261.10
SW-FBWB_3D	261.4	2.06	0.74	-	-	-	-	-	261.22	-	261.33	-	261.64	262.01	261.96
SW-FBWB_3_Creek_Inside	261.4	0.78	0.78	-	-	-	-	-	-	-	-	-	-	-	261.28
Sw-FBWB_3_Creek_Outside	261.4	0.78	0.78	-	-	-	-	-	-	-	-	-	-	-	261.66
GW-FBWB-SW_1S	249.4	2.34	0.42	-	249.07	-	-	-	-	-	249.00	-	249.13	249.22	249.25
GW-FBWB-SW_1D	249.4	3.01	1.59	-	248.97	-	-	-	-	-	248.95	-	249.18	249.22	249.25
GW-FBWB-SW_2S	253.8	1.27	0.57	-	253.52	253.10	-	-	-	252.51	-	-	253.91	253.83	253.90
GW-FBWB-SW_2D	253.8	2.20	0.58	-	253.38	252.97	-	-	-	252.49	-	-	253.91	253.85	253.92
BW-GW_661S	254.31	1.55	0.25	-	-	-	-	-	-	-	-	-	252.51	254.30	254.05
BW-GW_661D	254.31	2.05	0.82	-	-	-	-	-	-	-	-	-	251.44	253.80	254.02

Table 1b: Mini Piezometers - Groundwater Levels (masl)

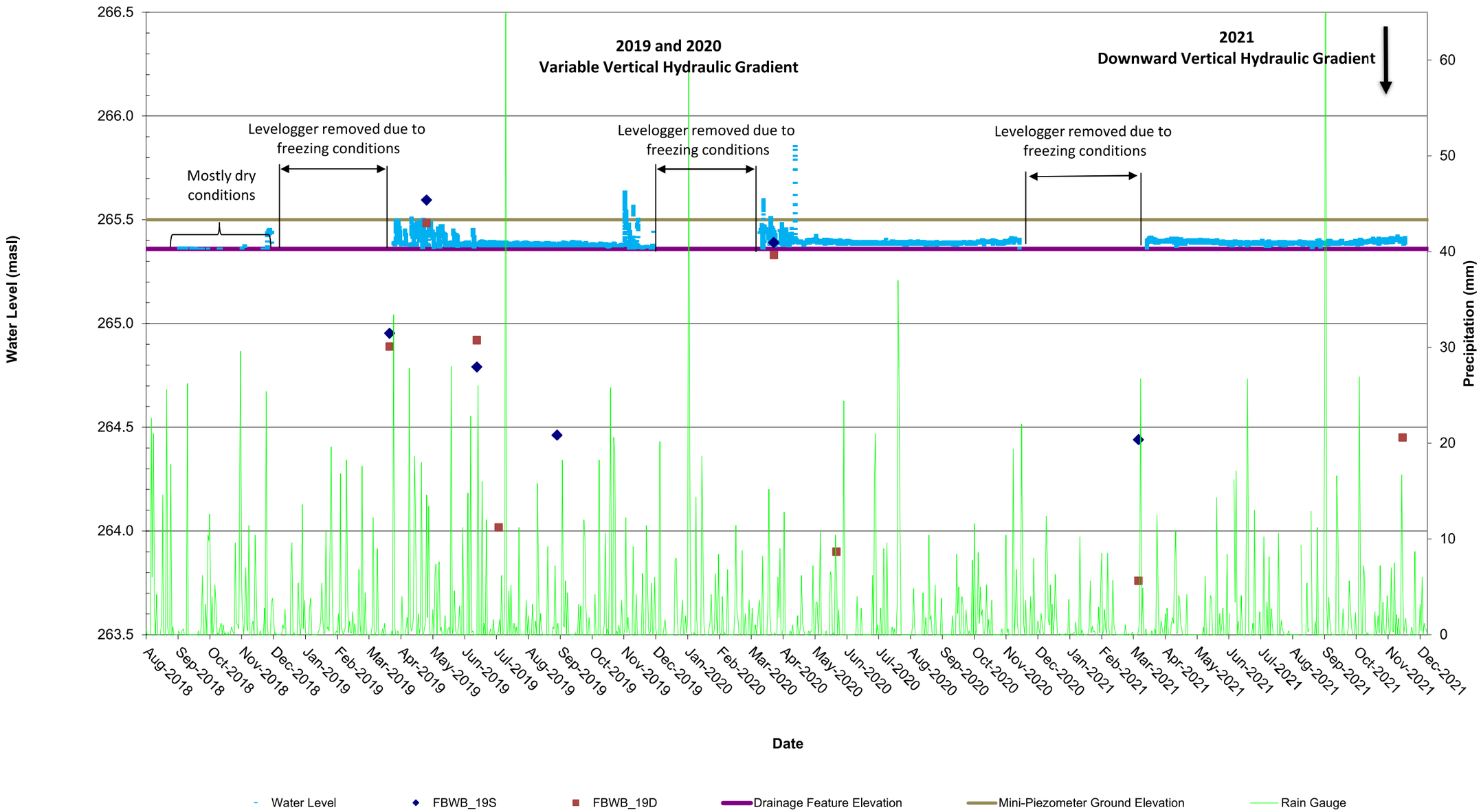
Station ID	Ground Elev (masl)	Depth to Bottom (mbgs)	Top of Riser Above Grade (m)	19-Jun-19	10-Jul-19	5-Sep-19	3-Apr-20	3-Jun-20	15-Sep-20	25-Nov-20	24-Mar-21	13-May-21	17-Sep-21	6-Dec-21
GW_1S	255.2	1.21	0.99	254.67	254.31	254.00	254.81	254.614	Dry	Dry	254.76	254.62	Dry	254.78
GW_1D	255.2	1.42	0.77	254.59	254.09	253.81	254.81	254.378	Dry	254.26	254.78	254.35	254.14	254.79
GW_2S	255.1	1.45	0.74	254.47	254.20	253.62	254.63	254.12	254.12	254.19	254.73	254.22	254.15	254.83
GW_2D	255.0	2.15	0.86	254.51	254.48	254.18	254.45	254.47	254.47	254.13	254.33	254.41	253.93	254.30
GW_3S	260.9	0.85	0.72	260.58	260.20	260.04	260.88	260.15	Dry	Dry	-	260.57	260.04	260.83
GW_3D	260.9	1.75	1.06	260.67	260.16	259.13	260.88	260.33	Dry	Dry	-	260.72	259.29	260.89
GW_3_DF_Inside	260.8	1.22	0.35	260.84	260.67	259.69	260.90	260.84	Dry	259.64	-	259.92	259.75	259.92
GW_3_DF_Outside	260.8	1.22	0.35	260.85	-	260.80	260.99	Dry	Dry	-	-	Dry	Dry	261.01
GW_4S	257.7	1.25	0.60	257.67	257.36	256.90	257.73	257.68	257.68	256.96	257.68	257.60	257.12	257.86
GW_4D	257.7	2.02	0.76	257.72	256.55	256.95	257.80	257.72	257.72	257.00	257.74	257.64	257.16	257.93
GW_4_Creek_Inside	257.6	1.13	0.44	257.75	257.45	256.87	257.65	257.60	257.60	-	-	257.70	257.22	257.89
GW_4_Creek_Outside	257.6	1.13	0.44	257.75	-	-	257.63	-	-	-	-	Dry	Dry	257.83
GW_5S	261.6	1.02	0.83	261.03	260.69	260.75	261.38	260.88	260.70	260.82	260.87	260.86	260.77	260.96
GW_5D	261.6	1.96	0.82	261.08	260.98	260.57	261.25	261.01	262.05	260.68	260.68	260.73	260.67	260.91
GW_6S	265.2	1.04	0.53	264.45	264.19	264.15	265.17	Dry	Dry	Dry	264.50	Dry	Dry	Dry
GW_6D	265.2	2.25	1.49	264.24	263.39	262.93	265.18	263.19	Dry	Dry	264.43	263.29	Dry	263.74
GW_7S	264.1	1.32	0.87	263.52	263.30	263.15	263.99	263.30	262.91	Dry	Dry	Dry	262.87	Dry
GW_7D	264.2	2.10	1.03	263.49	263.20	262.74	264.05	263.33	263.57	262.43	263.85	262.82	262.43	262.71
GW-FBWB_1S	256.2	1.09	1.10	255.95	255.75	255.11	255.97	255.91	Dry	255.26	255.85	255.94	Dry	-
GW-FBWB_1D	256.2	1.66	0.83	255.96	255.77	254.89	255.99	255.92	255.00	255.09	255.77	255.92	255.24	-
GW-FBWB_2S	260.4	1.02	0.82	260.28	260.13	259.41	260.81	259.94	259.94	Dry	259.78	259.96	Dry	259.67
GW-FBWB_2D	260.4	1.98	0.80	259.97	259.83	259.70	259.72	259.80	259.80	Dry	259.28	259.38	259.15	259.42
GW-FBWB_3S	266.9	1.34	0.85	267.11	267.43	265.57	267.17	266.50	Dry	267.15	266.85	265.79	266.92	266.92
GW-FBWB_3D	266.9	2.04	1.09	265.24	265.26	265.24	265.39	265.42	265.14	265.38	265.61	266.05	266.27	266.27
GW-FBWB_4S	281.6	1.42	0.77	282.25	281.81	280.87	-	281.92	281.41	281.76	-	-	-	-
GW-FBWB_4D	281.7	2.37	0.76	282.11	282.09	281.94	282.02	281.98	281.31	281.73	-	-	-	-
GW-FBWB_5S	264.0	1.20	1.00	264.07	263.90	263.40	263.97	263.97	263.73	263.74	263.85	263.82	263.33	263.89
GW-FBWB_5D	264.0	2.28	0.84	264.03	263.91	263.68	264.02	263.97	263.41	263.44	263.92	263.84	263.34	263.89
GW-FBWB_6S	264.8	0.86	0.99	264.81	264.95	263.60	264.83	264.69	264.69	-	264.82	264.77	263.62	264.85
GW-FBWB_6D	264.8	2.06	1.05	264.83	264.80	263.00	264.94	264.75	264.75	263.08	264.79	264.82	262.87	264.81
GW-FBWB_7S	261.7	1.32	0.53	261.82	261.26	260.80	261.70	261.55	261.55	261.00	261.59	261.33	260.60	261.65
GW-FBWB_7D	261.7	2.02	0.76	261.91	261.76	261.27	261.87	261.77	261.77	261.03	261.68	261.56	260.84	261.93
GW-FBWB_7_Creek_Inside	261.6	1.17	0.40	261.77	261.24	260.82	261.60	261.24	261.24	Dry	-	261.31	260.63	261.69
GW-FBWB_7_Creek_Outside	261.6	1.17	0.40	261.77	-	-	261.72	-	-	Dry	-	Dry	Dry	261.91
GW-FBWB_8S	258.2	1.34	0.49	258.16	258.12	257.63	257.94	258.01	257.33	Dry	257.73	257.83	257.53	257.84
GW-FBWB_8D	258.2	2.32	0.49	258.09	258.08	257.84	258.00	258.05	257.71	257.28	257.79	257.86	257.69	257.85
GW-FBWB_9S	248.0	1.37	0.47	248.32	248.21	247.50	248.14	248.17	247.59	247.80	248.06	248.17	247.83	248.13
GW-FBWB_9D	248.0	2.32	0.46	248.18	248.03	247.62	248.08	248.01	247.71	247.85	248.00	248.09	246.72	248.12
GW-FBWB_10S	251.8	1.02	0.84	-	251.97	250.46	251.82	251.84	251.84	250.77	252.64	251.96	252.05	252.12
GW-FBWB_10D	251.8	2.20	0.85	-	252.15	249.84	252.17	252.24	252.24	249.86	252.65	252.16	252.22	251.88
GW-FBWB_10_Creek_Inside	251.7	0.95	1.52	-	252.28	252.35	251.91	252.400	252.400	-	-	252.34	252.37	-
GW-FBWB_10_Creek_Outside	251.7	0.95	1.52	-	251.72	-	251.91	251.790	251.790	-	-	-	-	-
FBWB_1S	261.3	1.34	0.86	261.27	260.16	260.01	261.31	261.16	Dry	Dry	261.26	260.73	Dry	261.31
FBWB_1D	261.4	1.96	1.17	261.37	260.77	259.45	261.33	261.07	Dry	Dry	261.11	261.15	Dry	260.79
FBWB_2S	247.5	0.84	1.36	247.58	247.59	247.10	247.59	247.56	247.64	247.59	247.51	247.58	247.57	247.58
FBWB_2D	247.5	2.25	0.87	247.66	247.65	246.70	247.65	247.65	247.64	247.63	247.63	247.65	246.78	247.68
FBWB_3S	250.5	0.60	0.66	250.61	250.36	249.94	250.62	250.56	Dry	Dry	250.55	250.62	Dry	250.61
FBWB_3D	250.5	1.71	0.49	250.29	249.91	249.07	250.31	250.25	248.98	249.85	250.28	250.32	249.38	250.30
FBWB_4S	249.7	1.42	0.78	250.01	250.05	250.08	250.22	250.17	250.19	250.29	249.66	250.16	250.09	249.51
FBWB_4D	249.7	2.28	0.84	250.50	250.50	250.50	250.50	250.50	250.50	250.50	250.50	250.50	250.50	250.50
FBWB_5S	253.5	0.80	1.39	253.62	253.57	253.09	253.63	253.59	252.94	252.81	253.61	253.61	253.60	253.53
FBWB_5D	253.5	1.12	1.07	253.37	253.33	252.87	253.31	253.32	252.79	252.68	253.17	253.26	252.81	253.16
FBWB_6S	260.5	1.26	0.94	-	259.96	259.30	260.55	260.30	259.70	259.61	260.44	260.33	Dry	260.43
FBWB_6D	260.5	2.04	1.08	-	260.07	259.31	260.57	260.50	Dry	258.83	260.25	260.45	258.79	260.23
FBWB_7S	263.7	1.20	1.00	263.49	263.06	262.47	263.50	262.85	Dry	Dry	263.43	263.19	Dry	263.43
FBWB_7D	263.7	1.67	1.46	263.40	263.28	262.46	263.14	263.13	Dry	Dry	262.44	262.91	Dry	262.83
FBWB_8S	268.5	1.35	0.84	268.19	268.42	267.16	268.66	267.95	Dry	Dry	267.71	268.01	Dry	Dry
FBWB_8D	268.5	2.22	0.90	267.95	268.14	266.55	268.22	267.85	Dry	266.66	266.30	266.47	266.83	Dry
FBWB_9S	266.0	1.08	0.48	265.44	-	265.07	265.59	Dry	Dry	264.97	265.67	Dry	265.32	265.65
FBWB_9D	266.0	2.06	0.74	265.31	-	265.23	265.76	264.54	Dry	265.51	265.06	264.60	264.96	264.83
FBWB_10S	254.4	1.41	0.78	254.48	254.45	254.42	254.47	254.48	254.37	254.47	254.38	254.44	254.42	254.44
FBWB_10D	254.4	2.30	0.83	254.85	254.76	254.76	254.33	254.83	254.72	254.71	254.78	254.72	254.72	254.84
FBWB_11S	292.5	1.40	0.80	292.86	292.85	292.77	-	292.55	Dry	Dry	-	291.39	291.31	-
FBWB_11D	292.5	2.26	0.86	293.27	293.19	292.26	-	293.04	Dry	Dry	-	291.97	292.08	-
FBWB_12S	276.0	1.57	0.63	-	275.91	275.25	275.93	275.88	-	276.02	-	275.91	275.38	276.00
FBWB_12D	276.0	2.36	0.77	-	275.94	275.32	275.99	275.97	-	Dry	-	275.66	275.32	276.14
FBWB_13S	270.5	1.14	0.42	269.43	268.94	269.00	269.93	269.07	-	270.02	269.88	268.99	269.52	269.87
FBWB_13D	270.5	2.10	0.70	269.41	267.99	268.06	269.95	269.00	-	269.56	268.83	268.25	269.25	269.74
FBWB_14S	281.3	1.35	0.84	-	281.20	281.28	281.36	281.31	281.20	281.07	281.16	281.26	281.33	281.55
FBWB_14D	281.4	2.26	0.88	-	281.21	281.09	281.41	281.22	281.14	280.90	281.10	281.19	281.10	281.65
FBWB_15S	285.5	0.98	0.59	Dry	Dry	284.55	Dry	Dry	Dry	284.55	Dry	Dry	Dry	Dry
FBWB_15D	285.5	2.03	1.10	Dry	Dry	283.47	284.16	Dry	Dry	Dry	Dry	Dry	Dry	Dry
FBWB_16S	272.0	1.09	0.48	Dry	270.93	270.91	271.93	Dry	Dry	270.90	Dry	Dry	Dry	271.05
FBWB_16D	272.0	1.88	0.62	271.17	270.66	270.12	271.42	271.86	271.86	270.10	270.11	Dry	Dry	Dry
FBWB_17S	271.0	1.54	0.66	270.86	269.99	269.96	270.69	270.58	270.17	270.19	269.89	270.63	270.47	270.91
FBWB_17D	271.1	2.38	0.76	270.54	268.99	269.85	271.07	269.99	269.74	269.22	269.11	270.59	270.44	270.84
FBWB_18S	275.5	1.15	1.05	Dry	Dry	274.36	274.38	Dry	Dry	Dry	Dry	Dry	274.80	Dry
FBWB_18D	275.5	1.99	1.14	Dry	273.55	273.53	274.06	Dry	Dry	Dry	Dry	Dry	274.72	Dry
FBWB_19S	265.5	1.03	1.14	264.79	Dry	264.46	265.39	Dry	Dry	Dry	264.44	Dry	Dry	Dry
FBWB_19D	265.5	2.01	1.12	264.92	264.02	263.50	265.33	263.90	Dry	Dry	263.76	Dry	Dry	264.45
FBWB_20S	270.6	1.16	1.04	270.59	270.28	269.78	270.64	270.14	Dry	Dry	270.13	270.45	269.49	270.57
FBWB_20D	270.6	2.24	0.51	270.25	269.47	268.40	270.64	269.27	Dry	Dry	268.94	269.19	Dry	269.54
SW-FBWB_1S	246.0	1.35	0.85	245.80	245.76	245.75	245.84	244.87	245.71	245.71	245.75	245.75	245.71	-
SW-FBWB_1D	246.0	2.14	1.53	247.52	247.52	247.52	246.00	245.96	248.44	247.43	245.89	245.89	245.81	-
SW-FBWB_2S	256.3	1.12	1.08	256.27	256.25	255.75	256.92	255.98	255.94	255.91	255.93	255.98	255.97	256.06
SW-FBWB_2D	256.3	1.87	1.26	256.28	256.05	255.23	256.30	256.23	255.02	255.69	256.28	256.28	255.33	256.25
SW-FBWB_3S	261.4	1.08	0.48	261.12	260.98	260.82	262.02	260.93	260.28	260.23	260.81	260.99	260.43	260.95
SW-FBWB_3D	261.4	2.06	0.74	261.95	261.74	261.34	261.82	261.80	261.13	261.08	261.50	261.71	261.20	261.66
SW-FBWB_3_Creek_Inside	261.4	0.78	0.78	261.49	261.52	261.25	261.42	261.47	261.21	260.95	-	261.49	261.38	261.39
Sw-FBWB_3_Creek_Outside	261.4	0.78	0.78	261.61	261.52	261.39	261.71	261.56	-	-	261.70	-	261.59	261.74
GW-FBWB-SW_1S	249.4	2.34	0.42	249.25	249.17	248.99	249.23	249.22	248.82	249.13	249.22	249.24	248.98	249.20
GW-FBWB-SW_1D	249.4	3.01	1.59	249.18	249.06	248.89	249.19	249.16	248.95	249.19	249.18	249.20	248.95	249.22
GW-FBWB-SW_2S	253.8	1.27	0.57	253.78	253.05	252.56	253.87	253.64	Dry	Dry	253.32	253.56	Dry	253.05
GW-FBWB-SW_2D	253.8	2.20	0.58	253.44	252.70	252.10	253.89	253.33	252.13	252.35	253.67	253.27	Dry	253.89
BW-GW_661S	254.31	1.55	0.25	253.71	253.35	253.05	253.70	253.27	253.27	253.13	253.87	253.69	253.47	253.85
BW-GW_661D	254.31	2.05	0.82	254.06	253.98	253.62	253.91	253.62	253.62	253.63	253.82	253.86	253.83	253.89

Drainage Feature 1 – Hydrographs

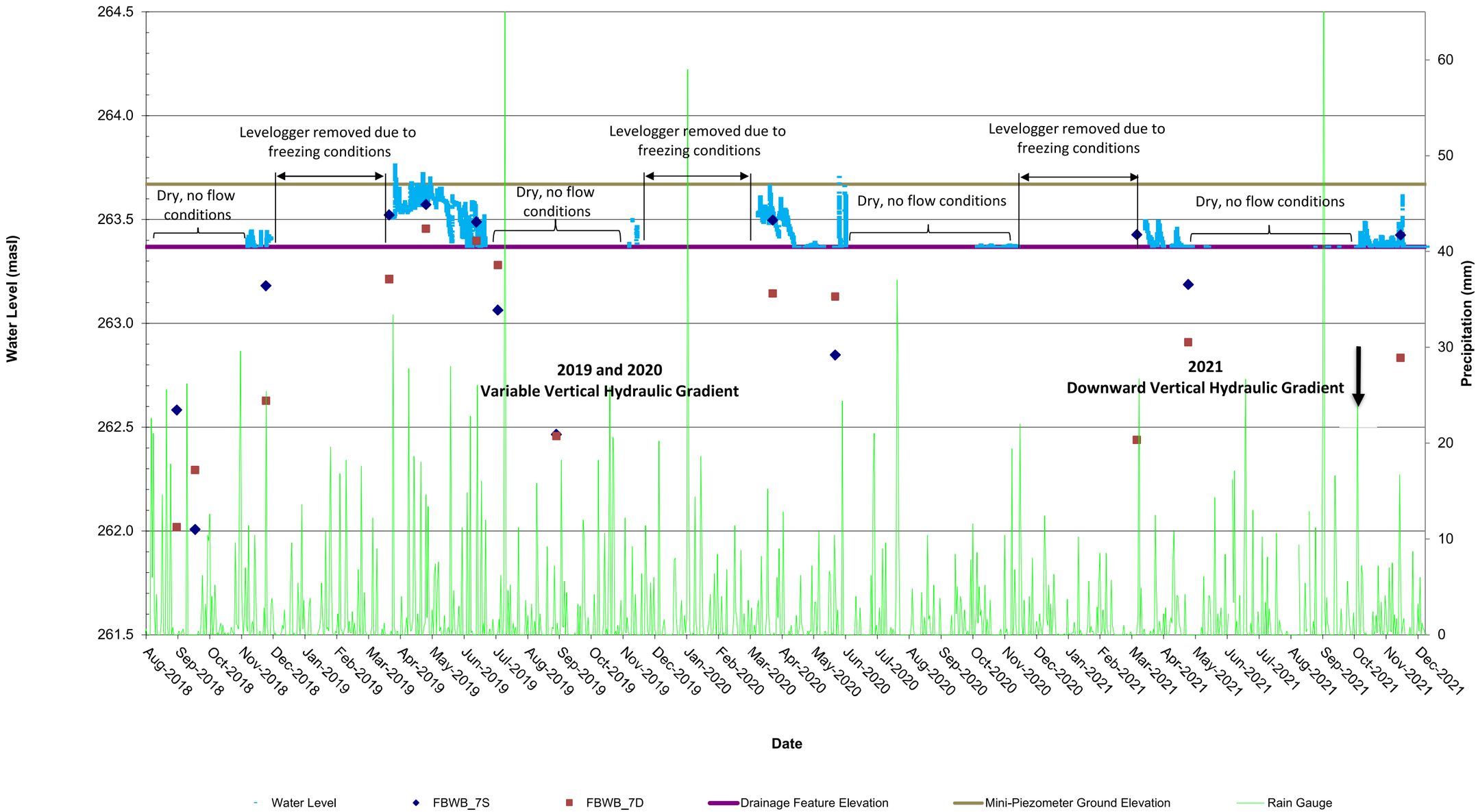
Hydrograph of FBWB_20



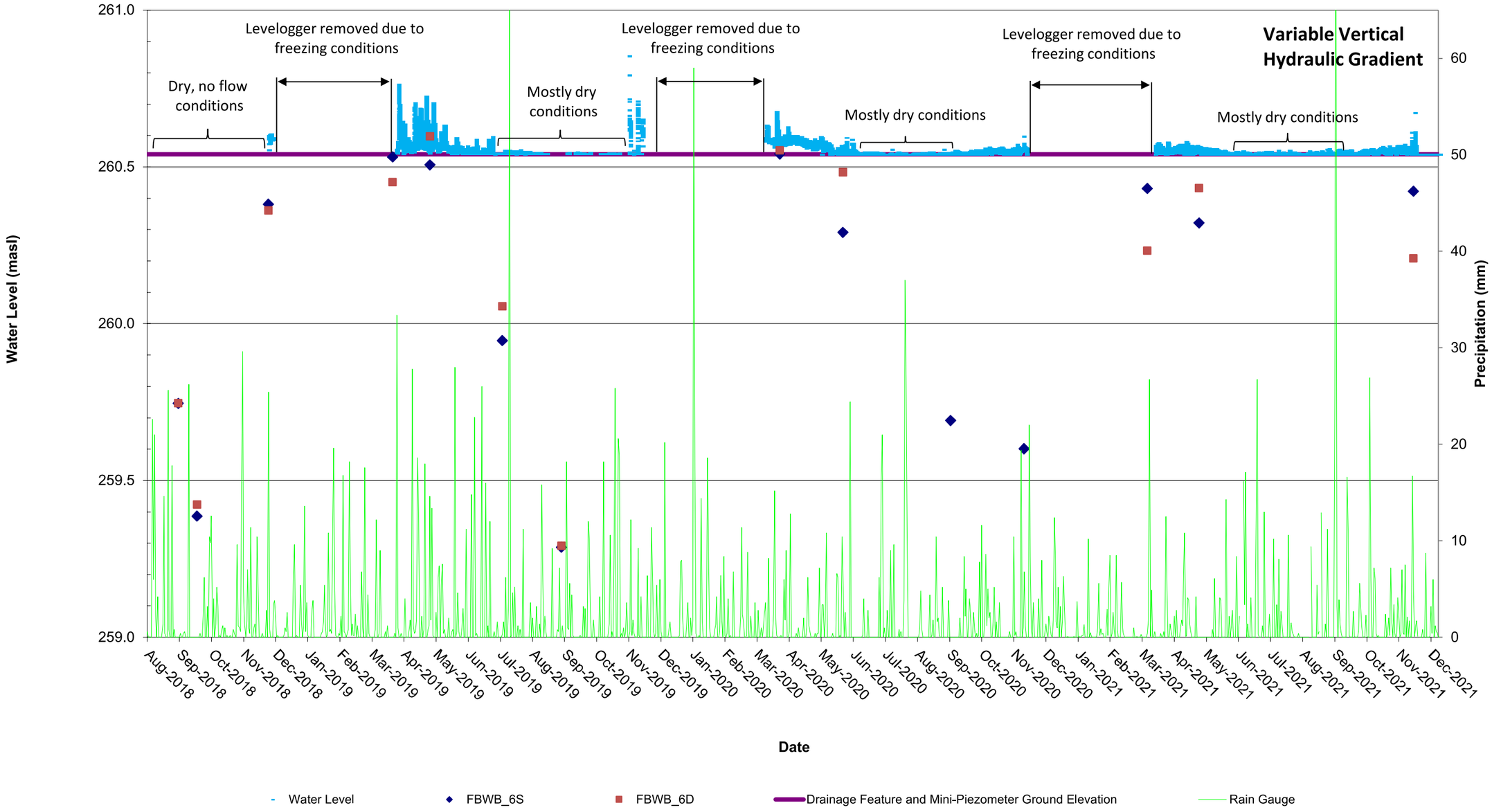
Hydrograph of FBWB_19



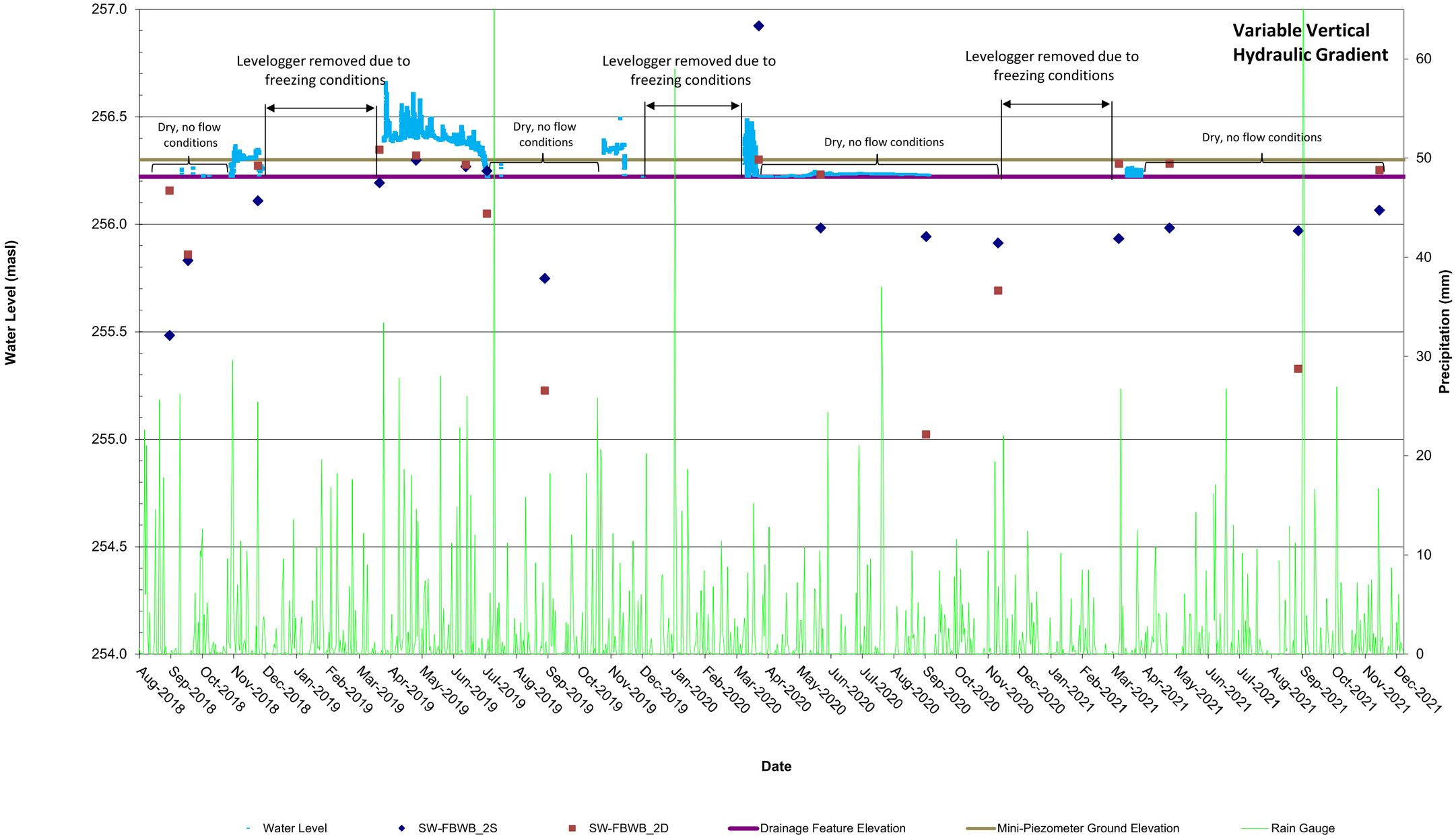
Hydrograph of FBWB_7



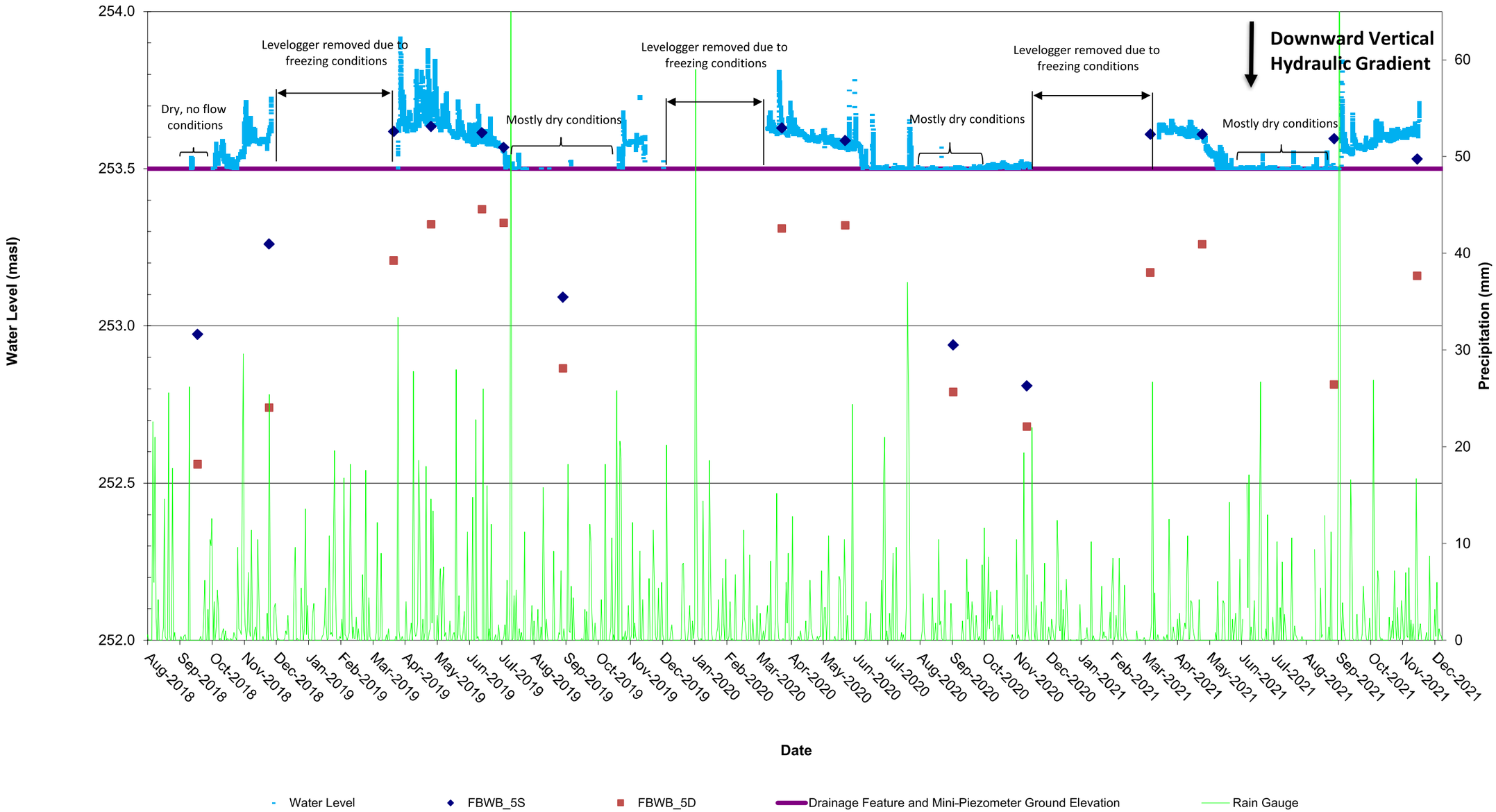
Hydrograph of FBWB_6



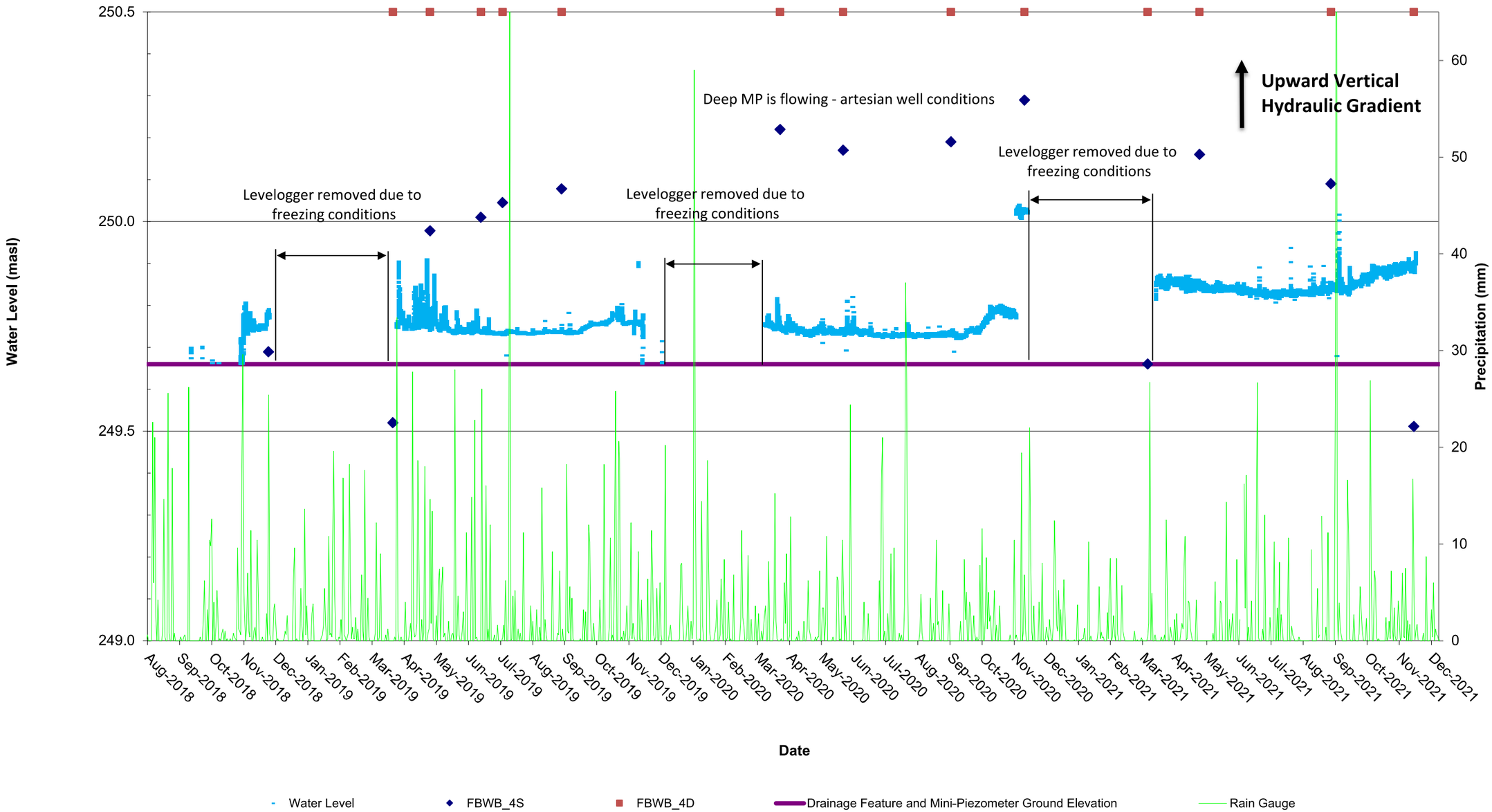
Hydrograph of SW_FBWB_2



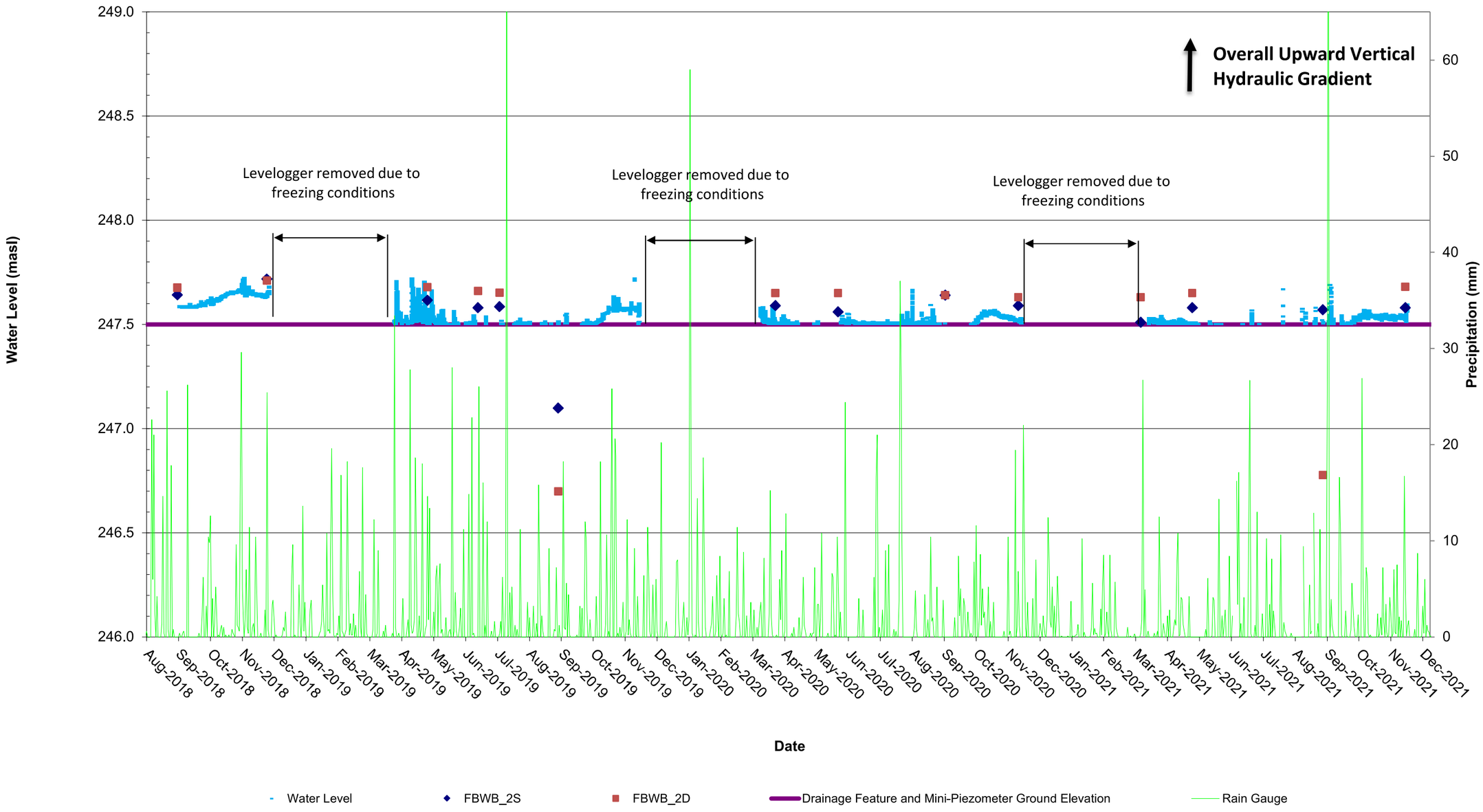
Hydrograph of FBWB_5



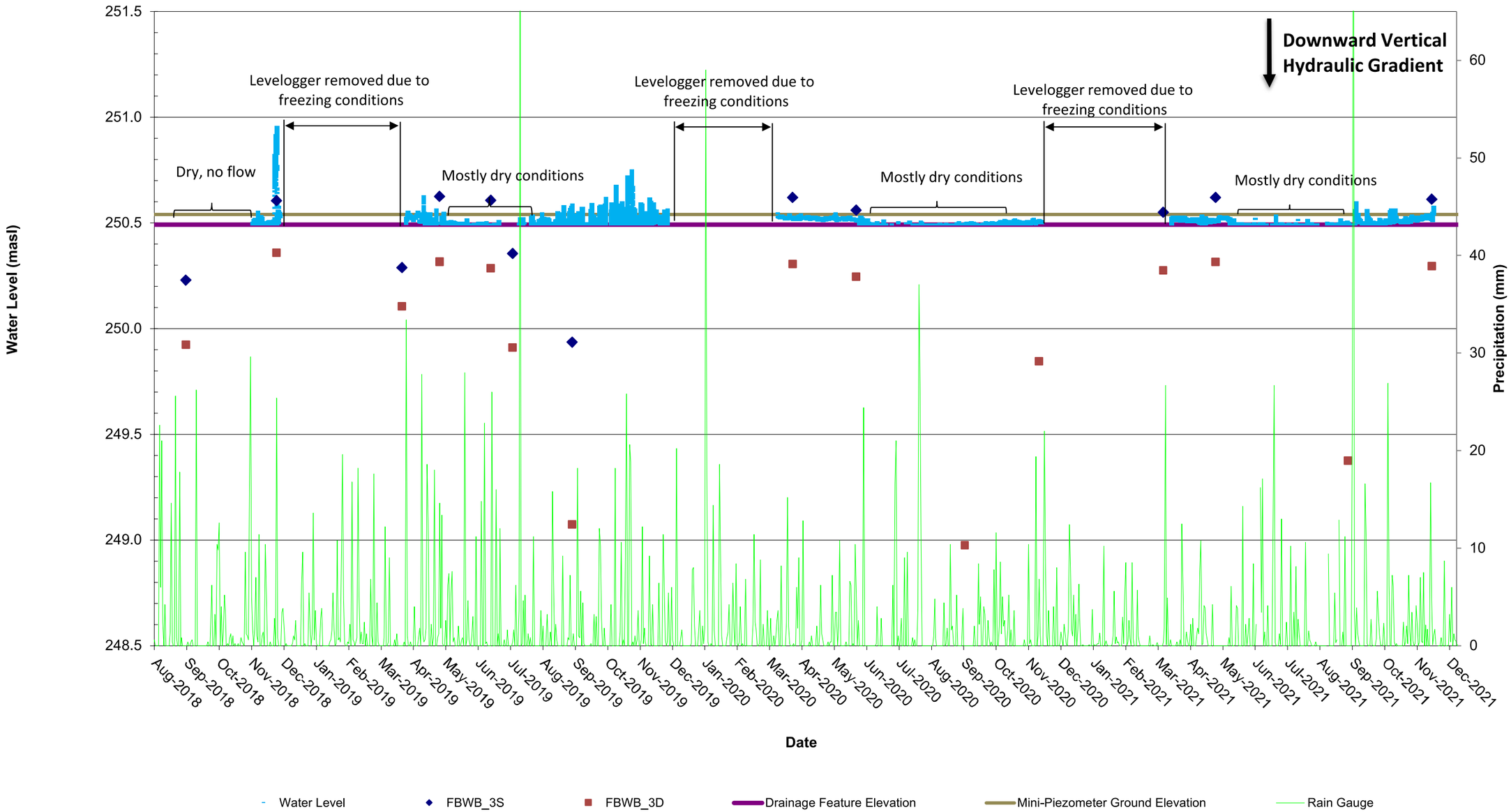
Hydrograph of FBWB_4



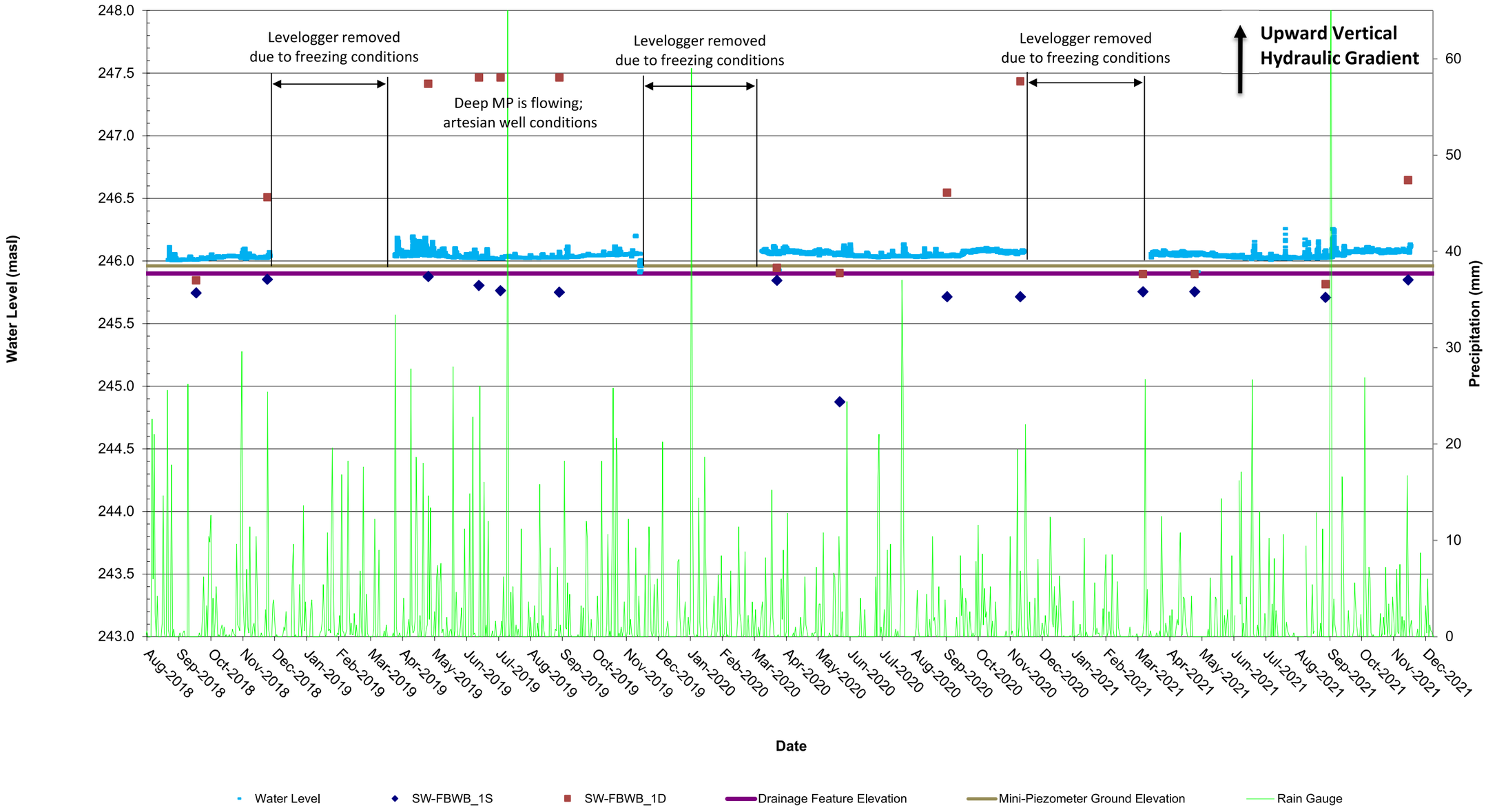
Hydrograph of FBWB_2



Hydrograph of FBWB_3

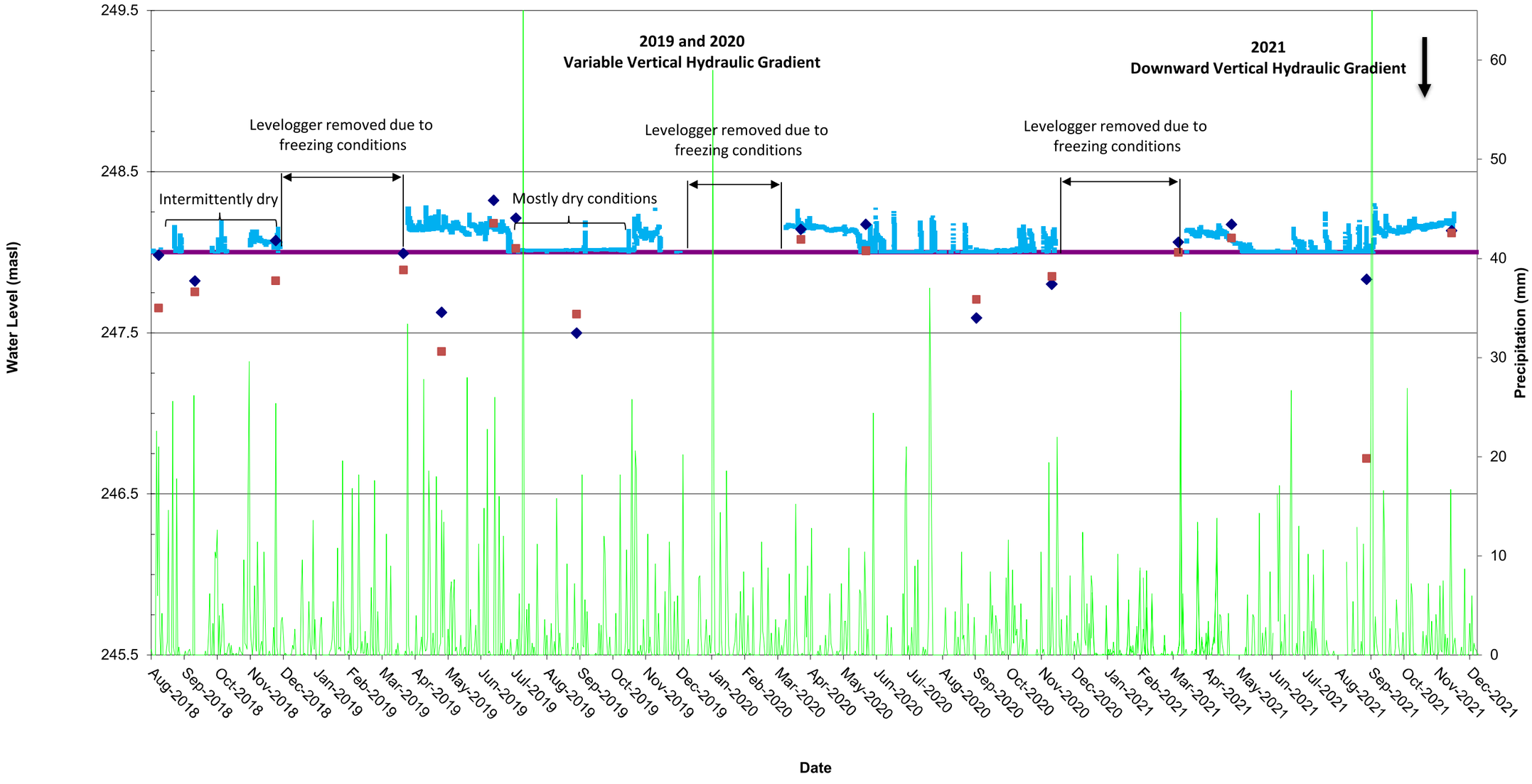


Hydrograph of SW_FBWB_1



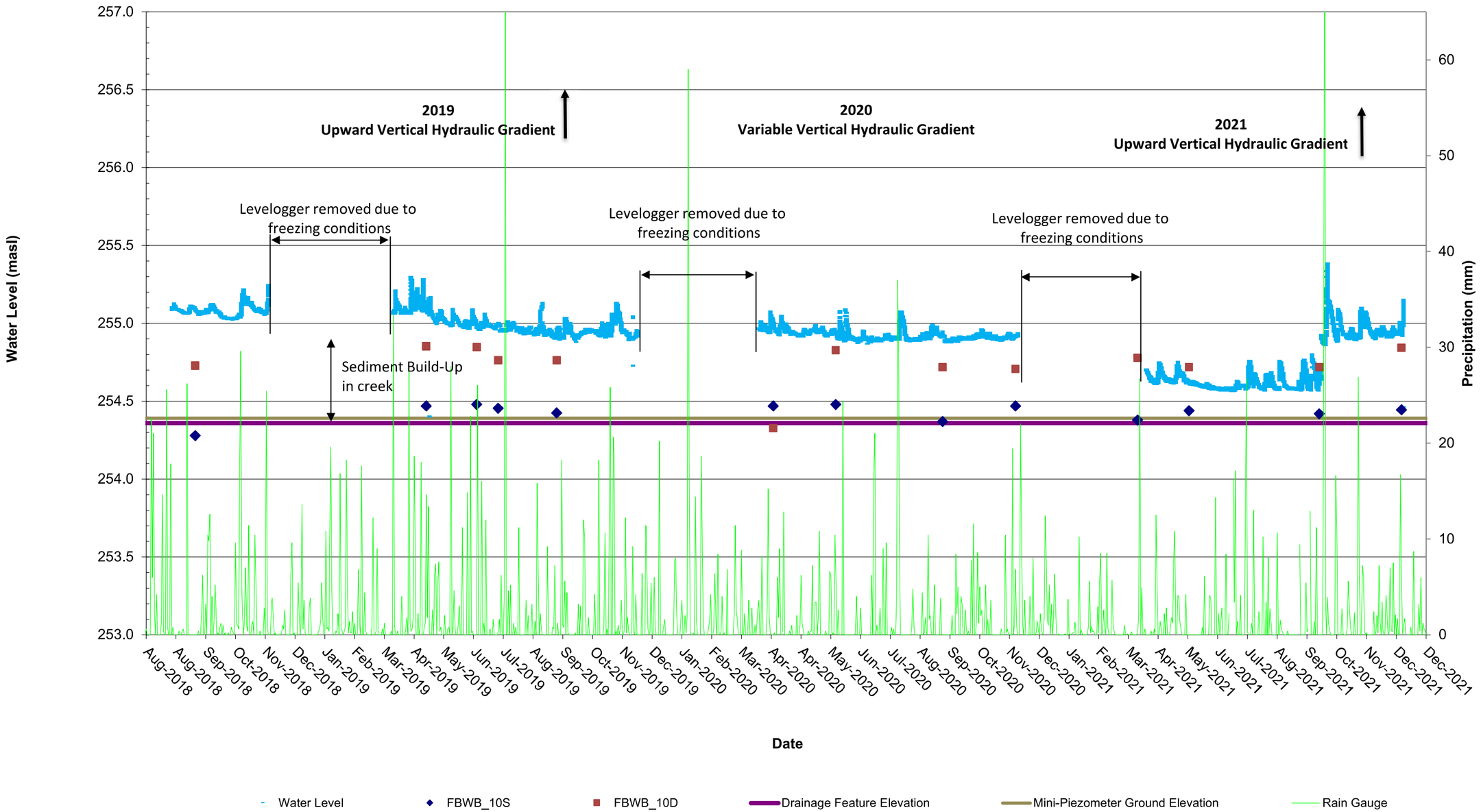
Drainage Feature 2 – Hydrographs

Hydrograph of GW-FBWB_9

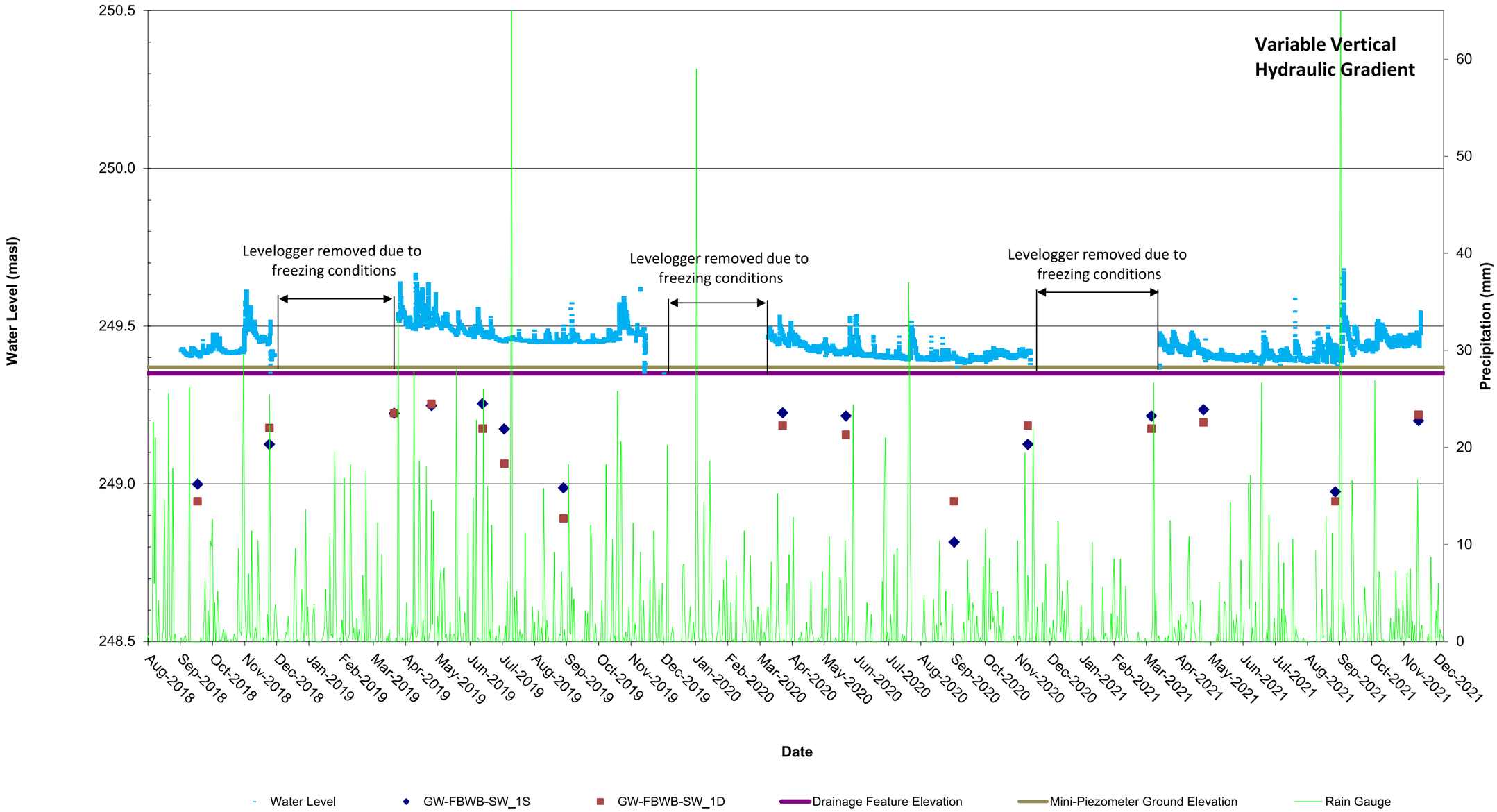


Drainage Feature 3 – Hydrographs

Hydrograph of FBWB_10

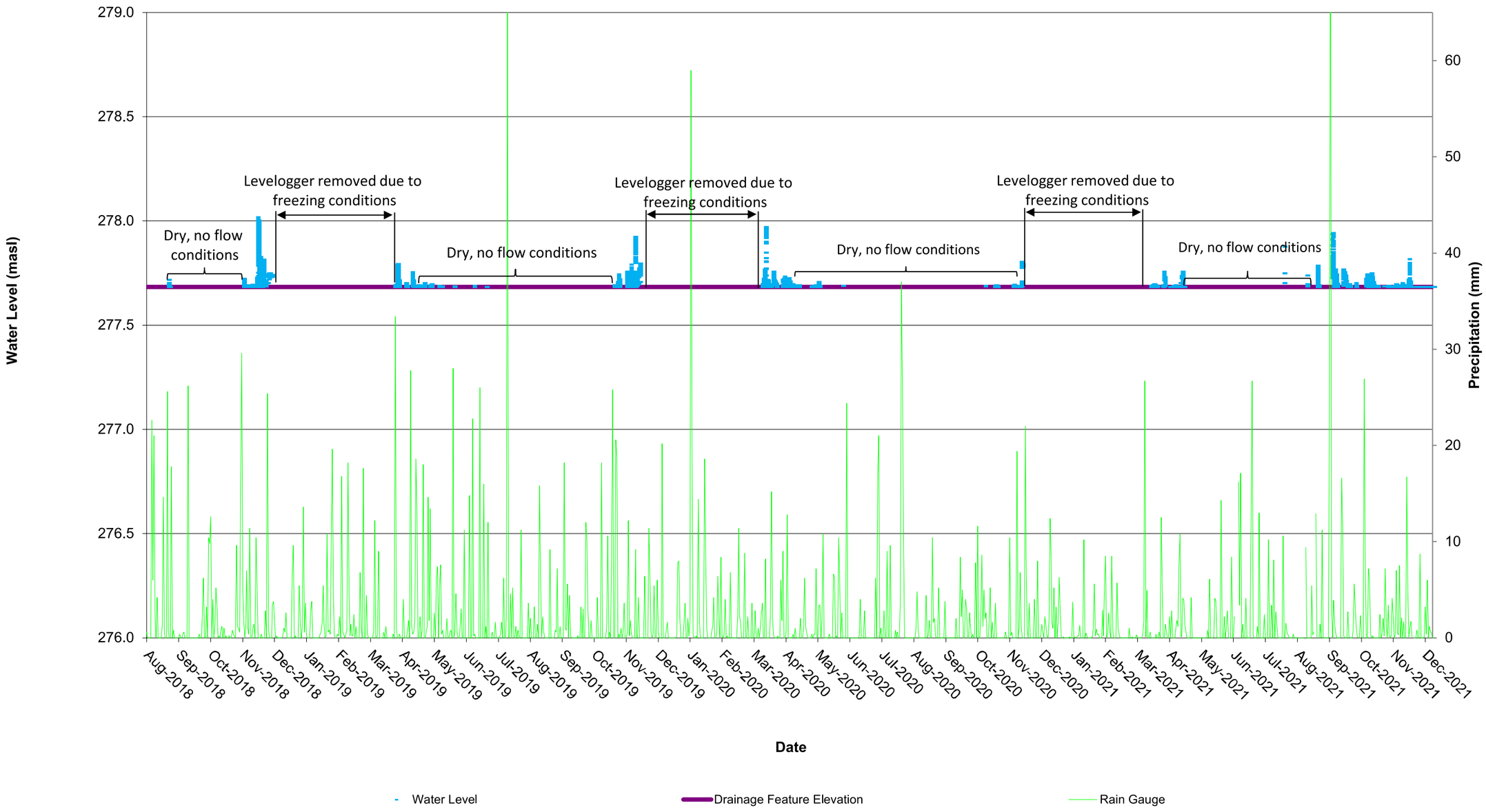


Hydrograph of GW-FBWB-SW_1

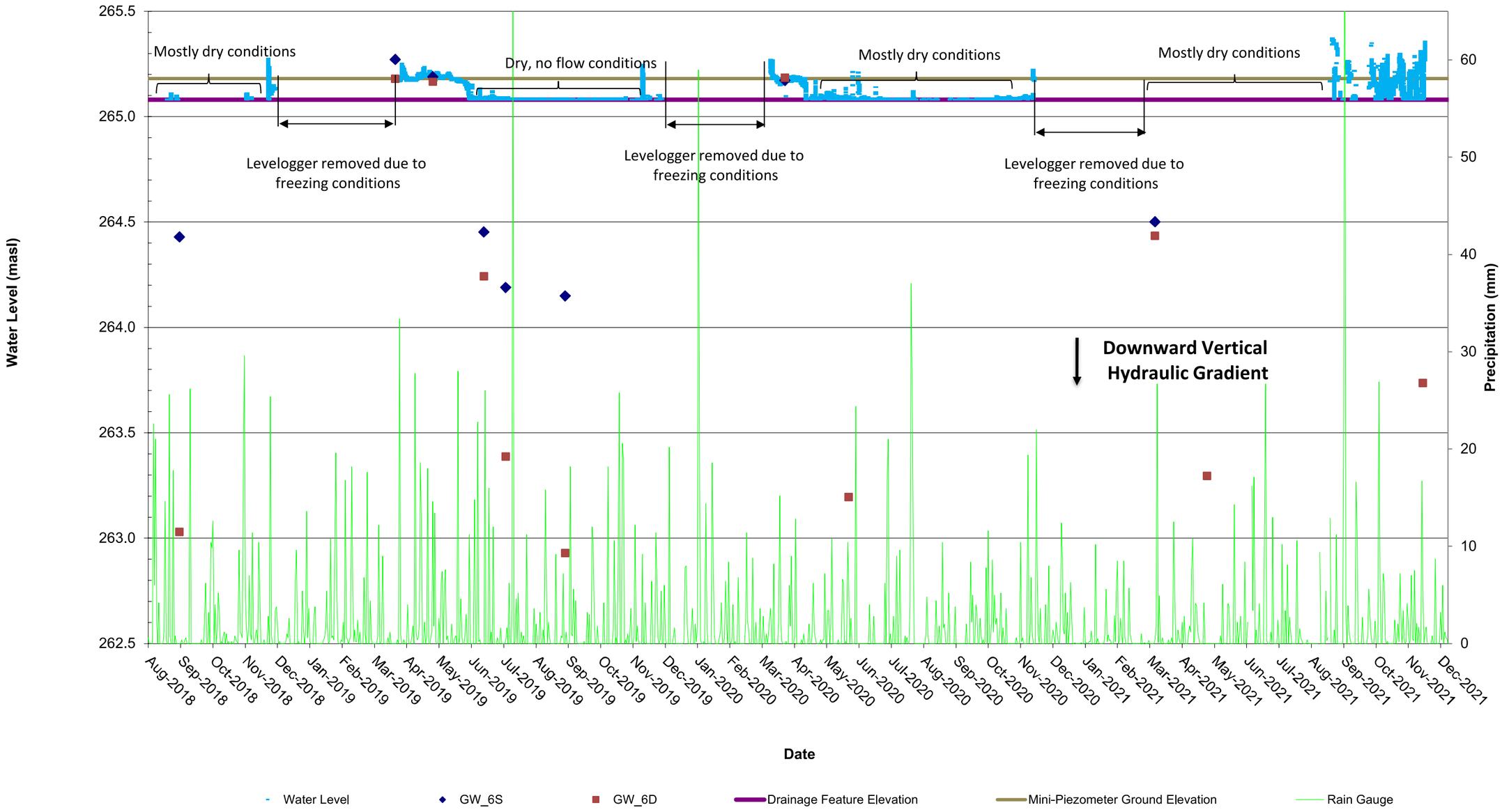


Drainage Feature 3-1 – Hydrographs

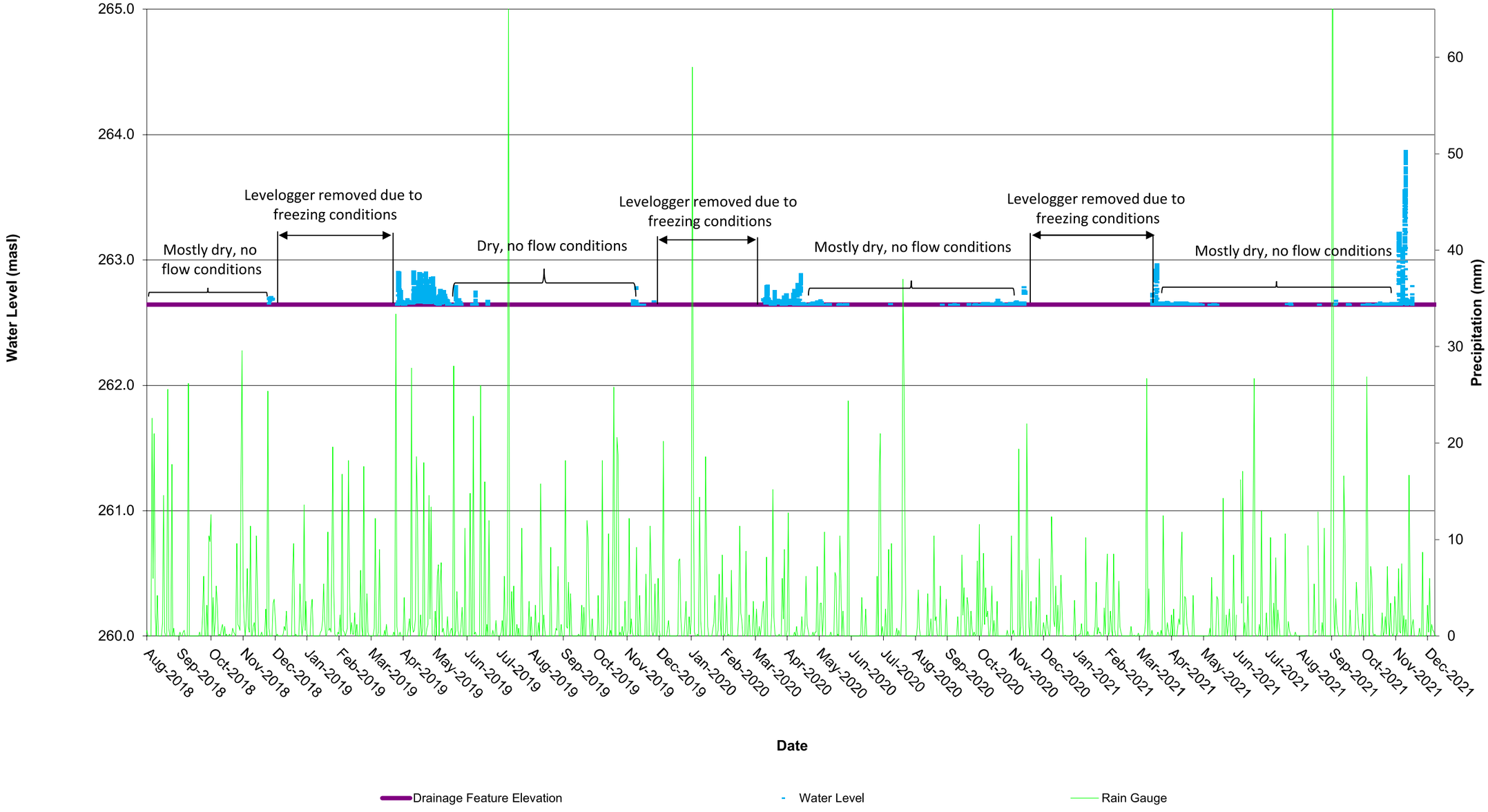
Hydrograph of SW_1



Hydrograph of GW_6

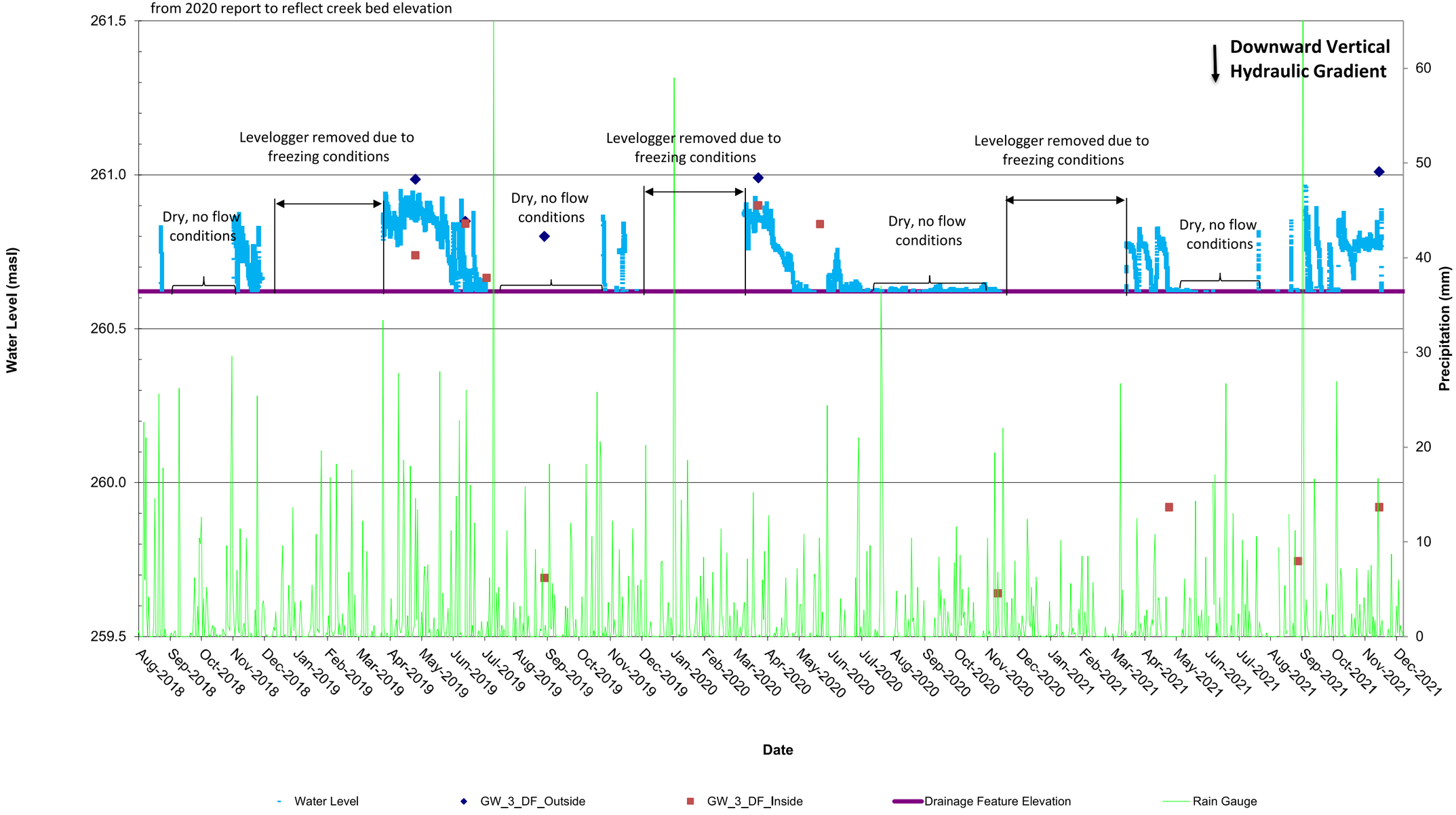


Hydrograph of SW_2

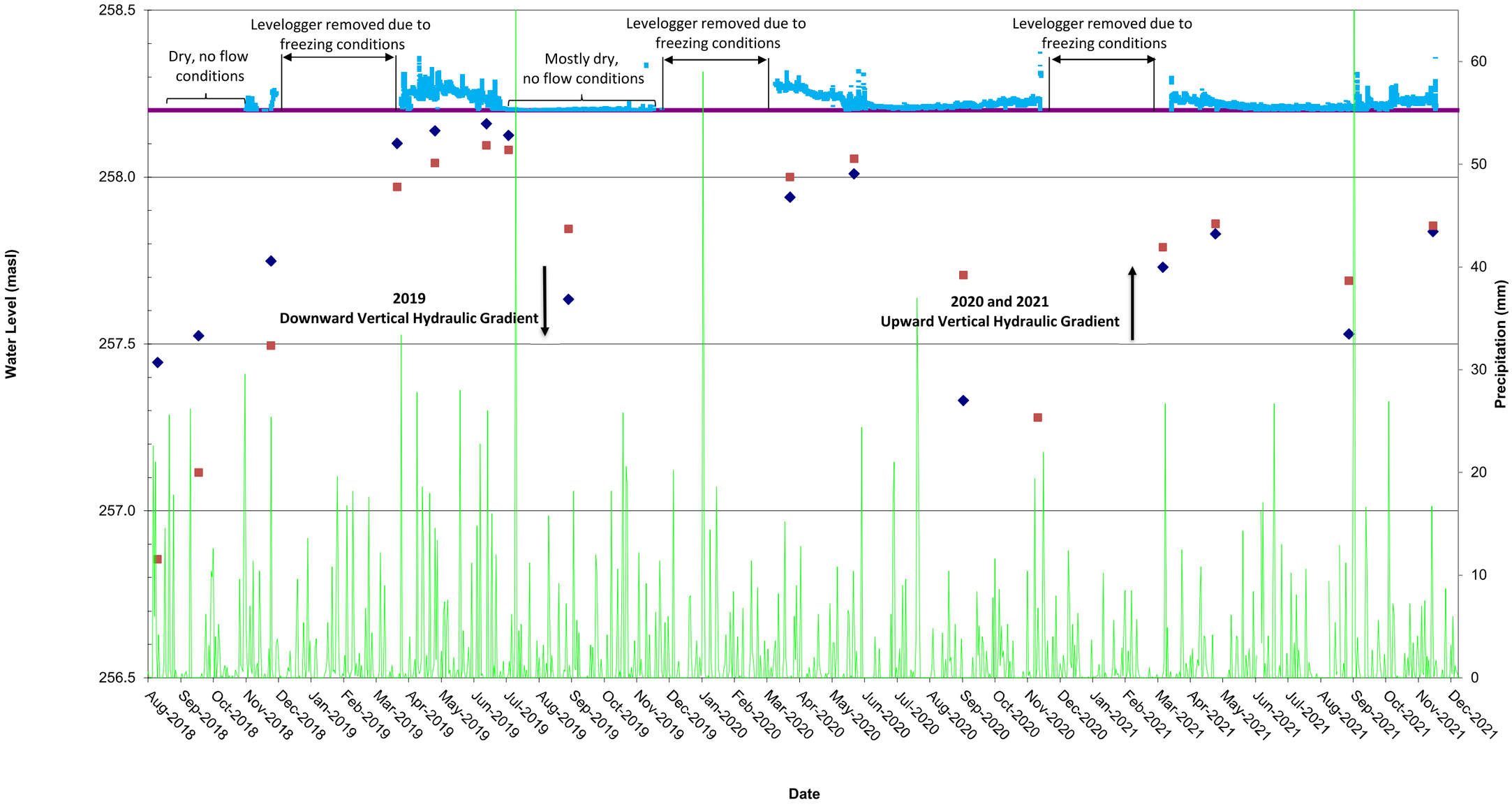


Hydrograph of GW_3

Note: Ground surface elevation has been adjusted from 2020 report to reflect creek bed elevation

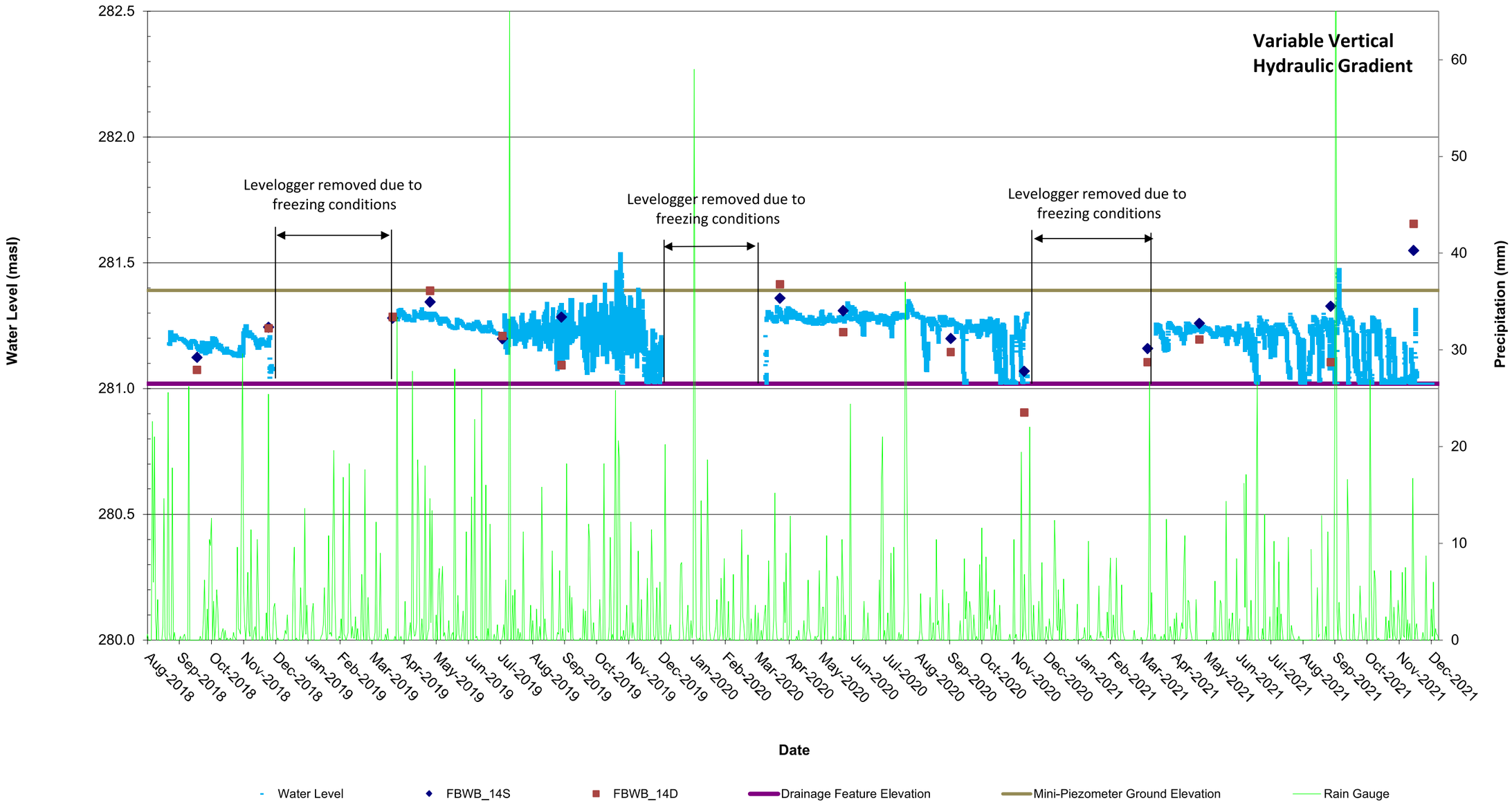


Hydrograph of GW-FBWB_8

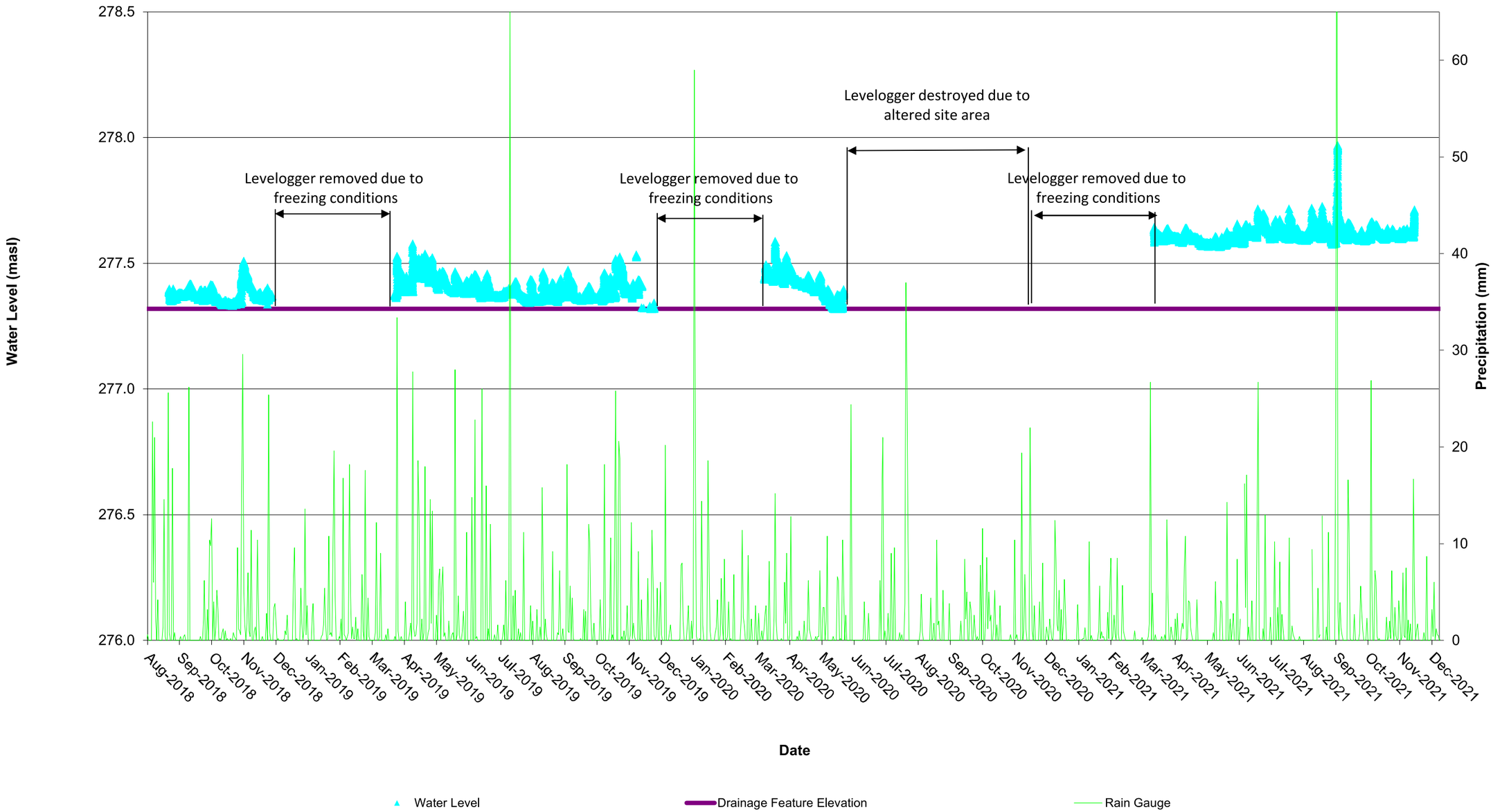


Drainage Feature 3-2 – Hydrographs

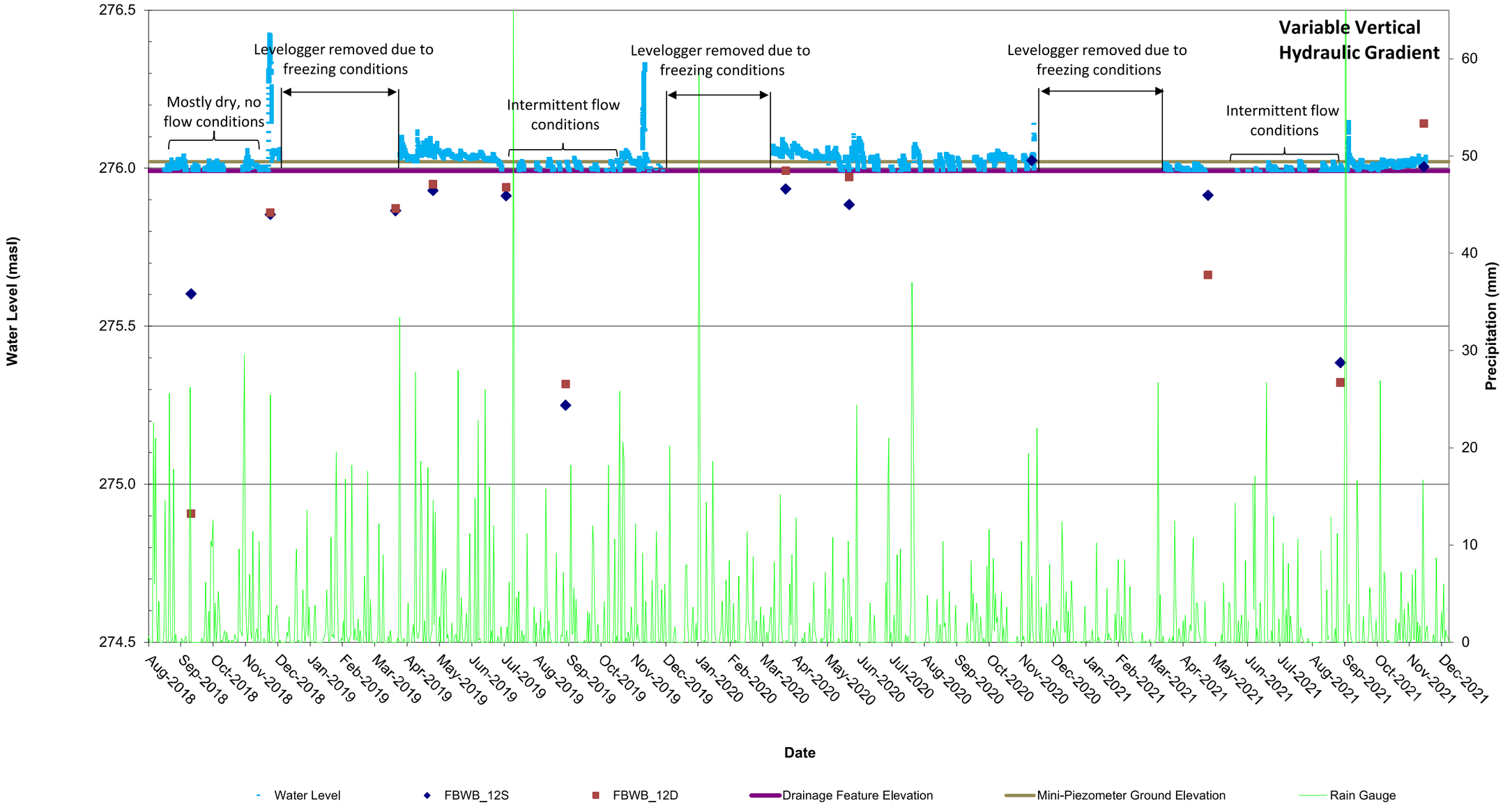
Hydrograph of FBWB_14



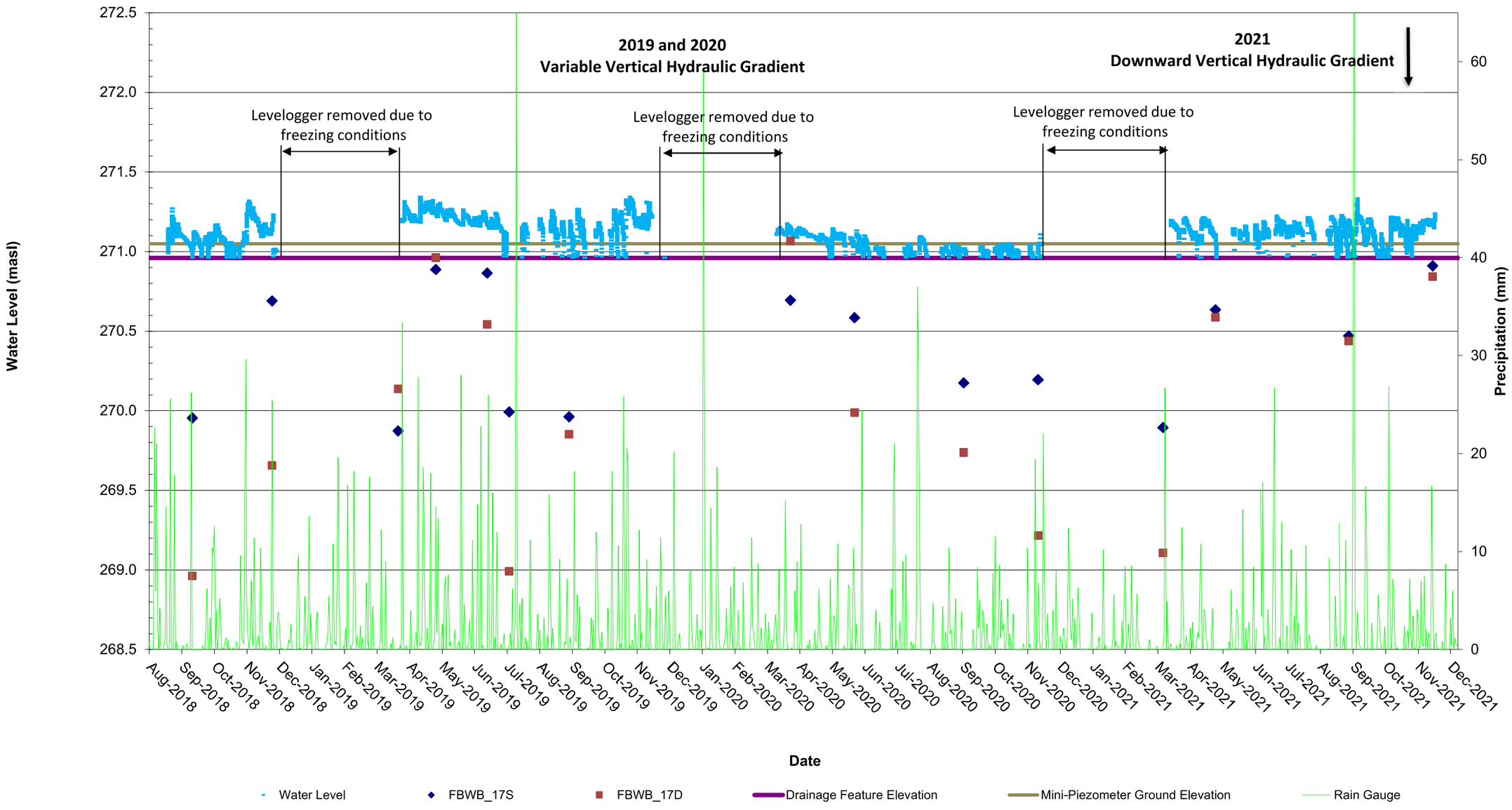
Hydrograph of SW_3



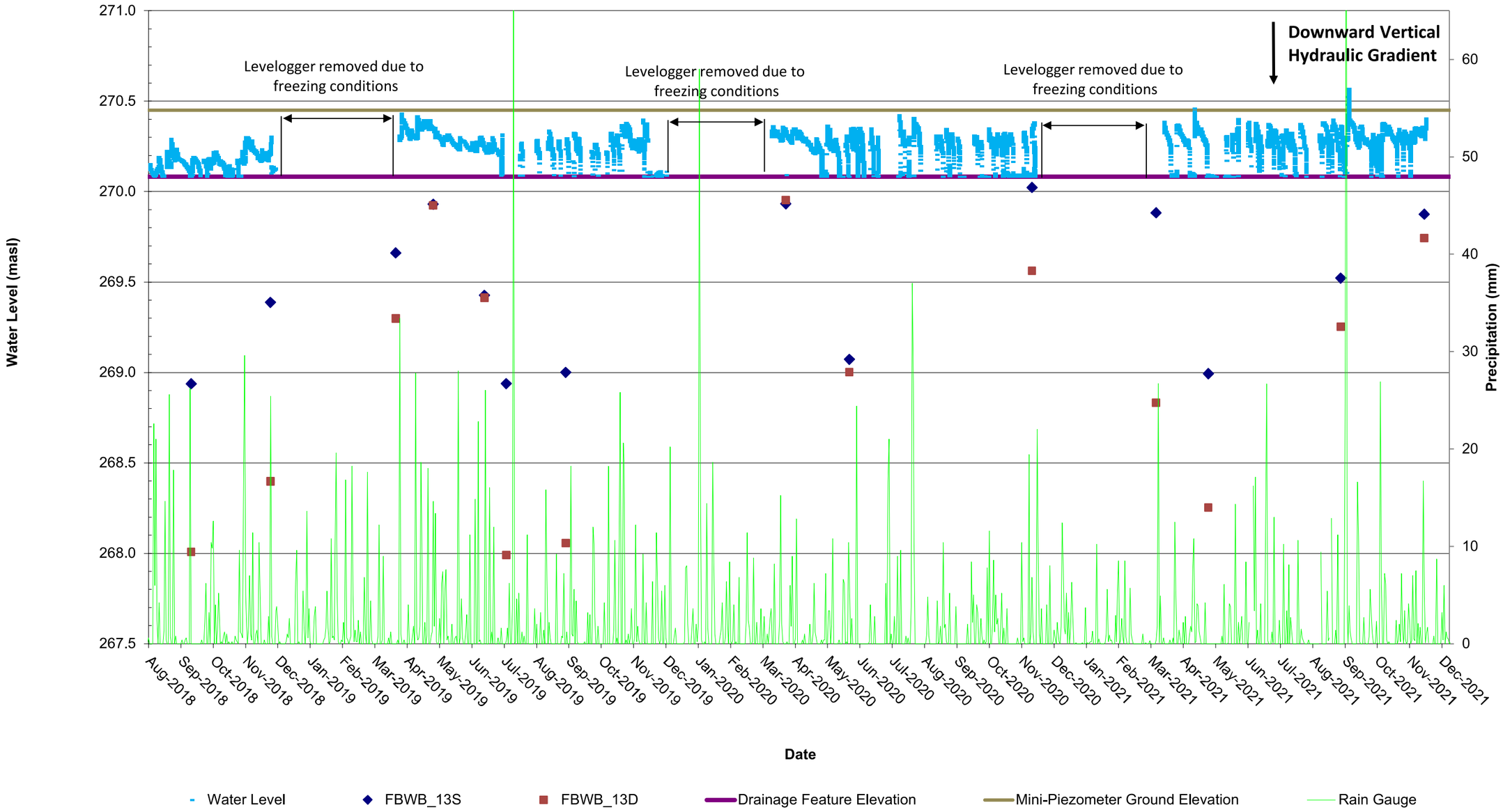
Hydrograph of FBWB_12



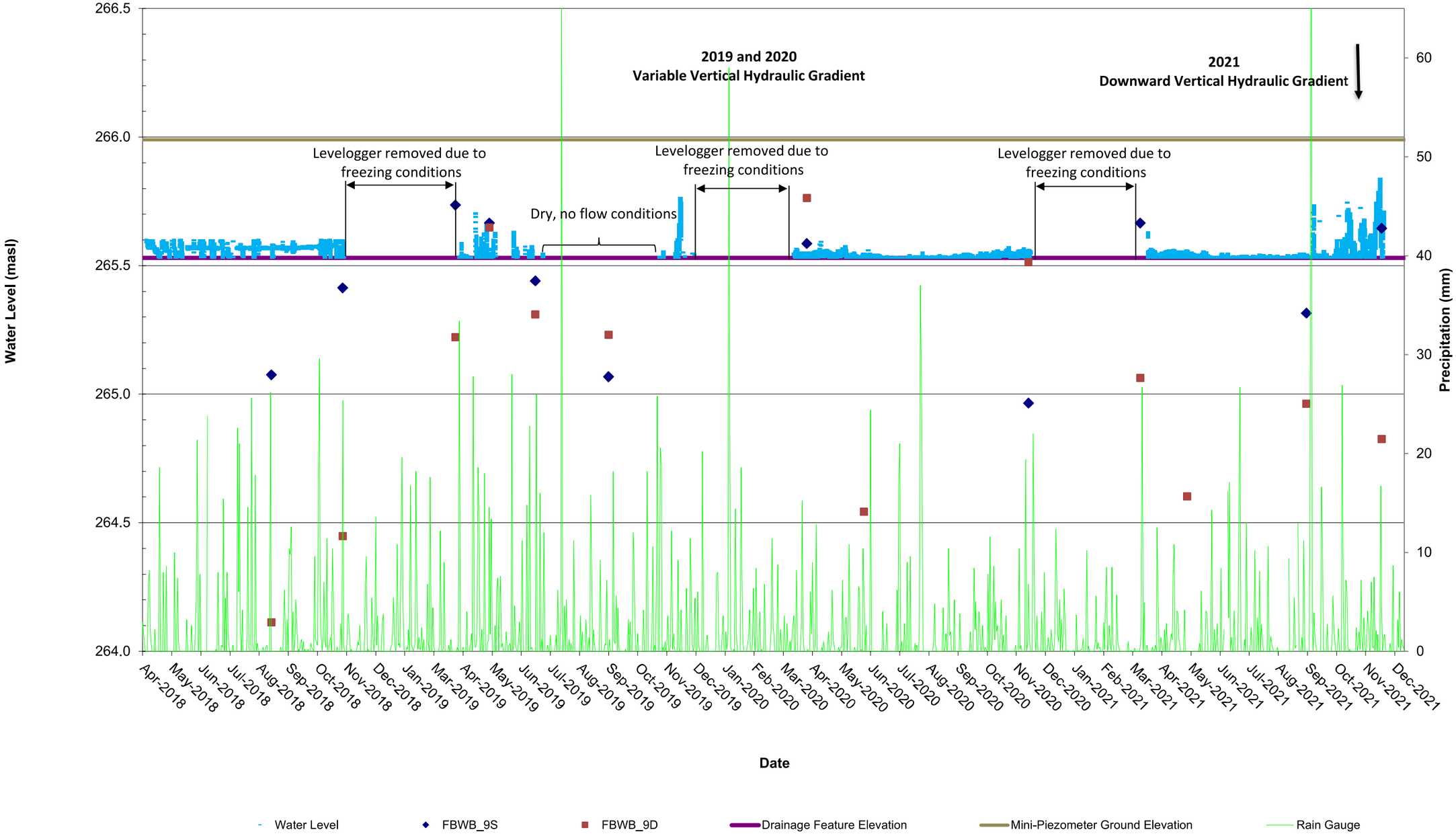
Hydrograph of FBWB_17



Hydrograph of FBWB_13

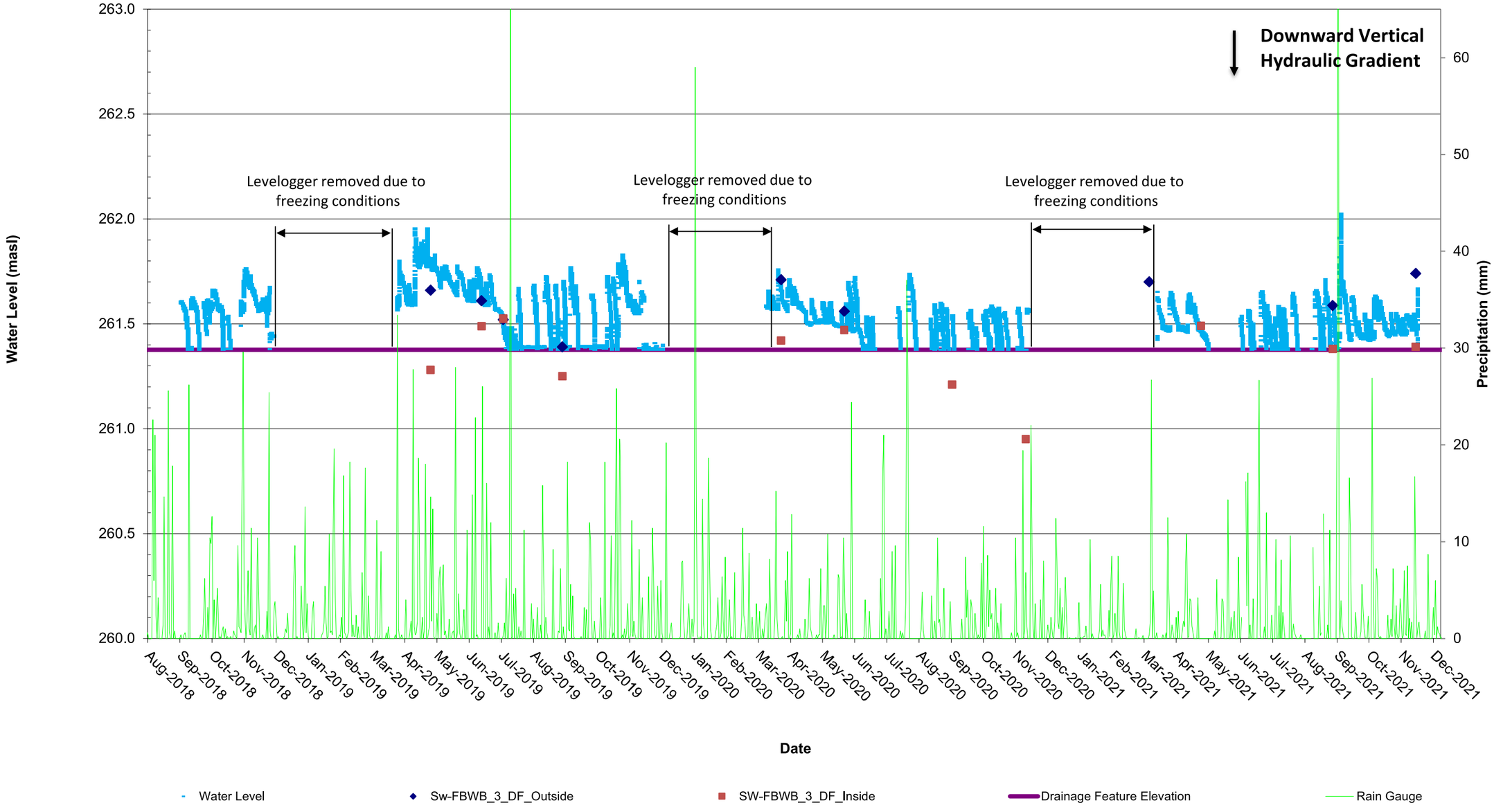


Hydrograph of FBWB_9



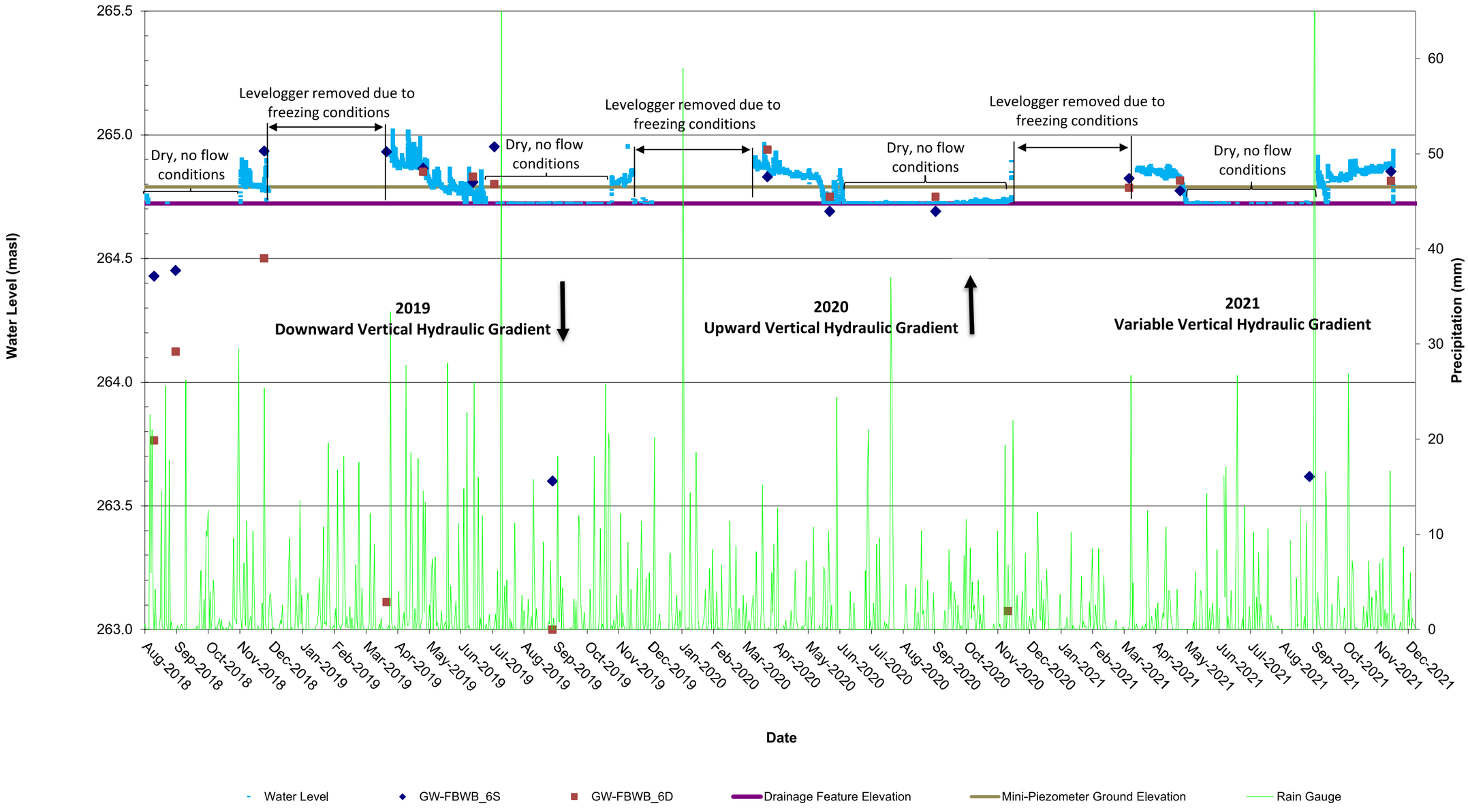
Hydrograph of SW-FBWB_3

Note: Ground surface elevation has been adjusted from 2020 report to reflect creek bed elevation

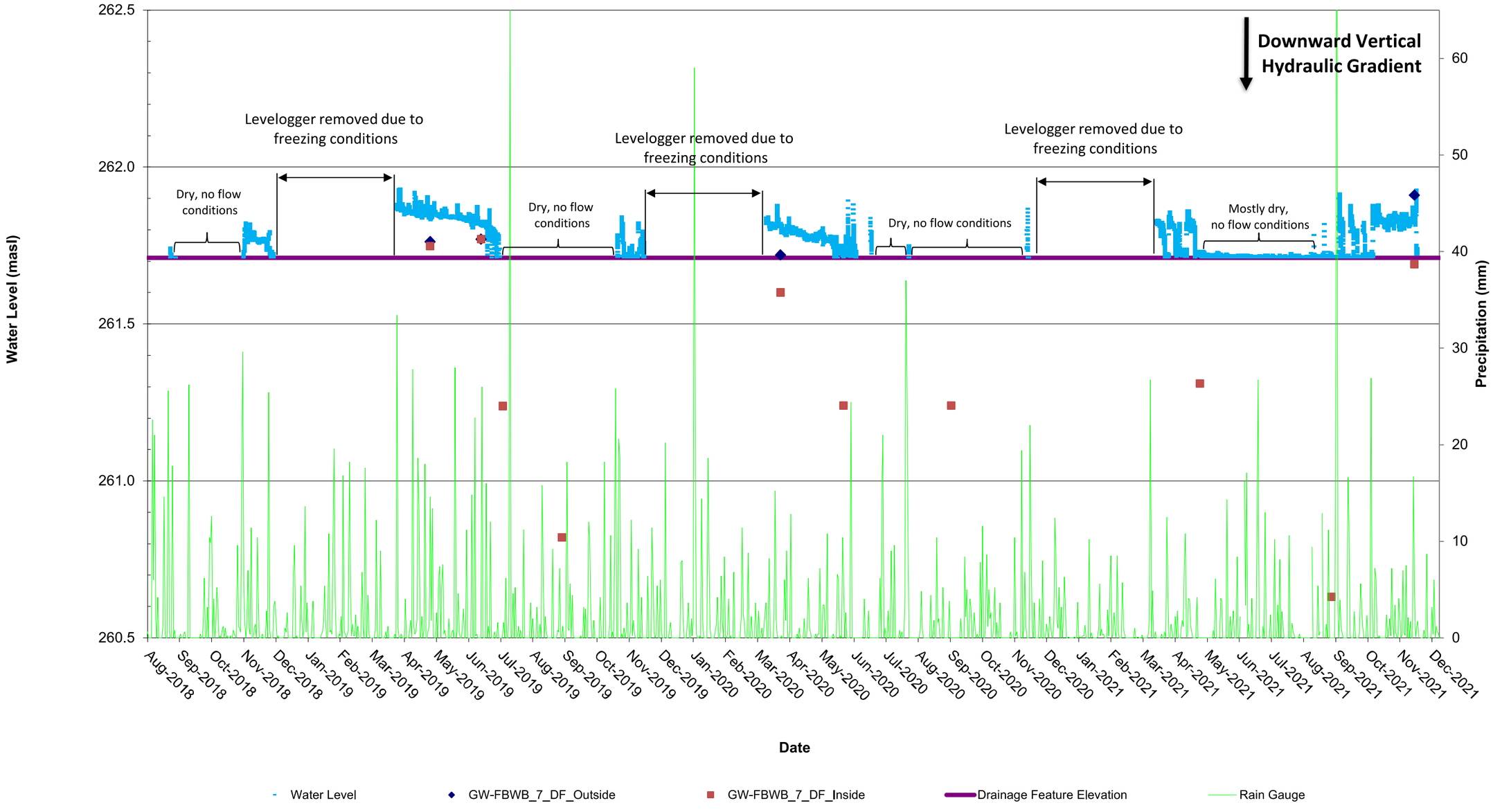


Drainage Feature 4 – Hydrographs

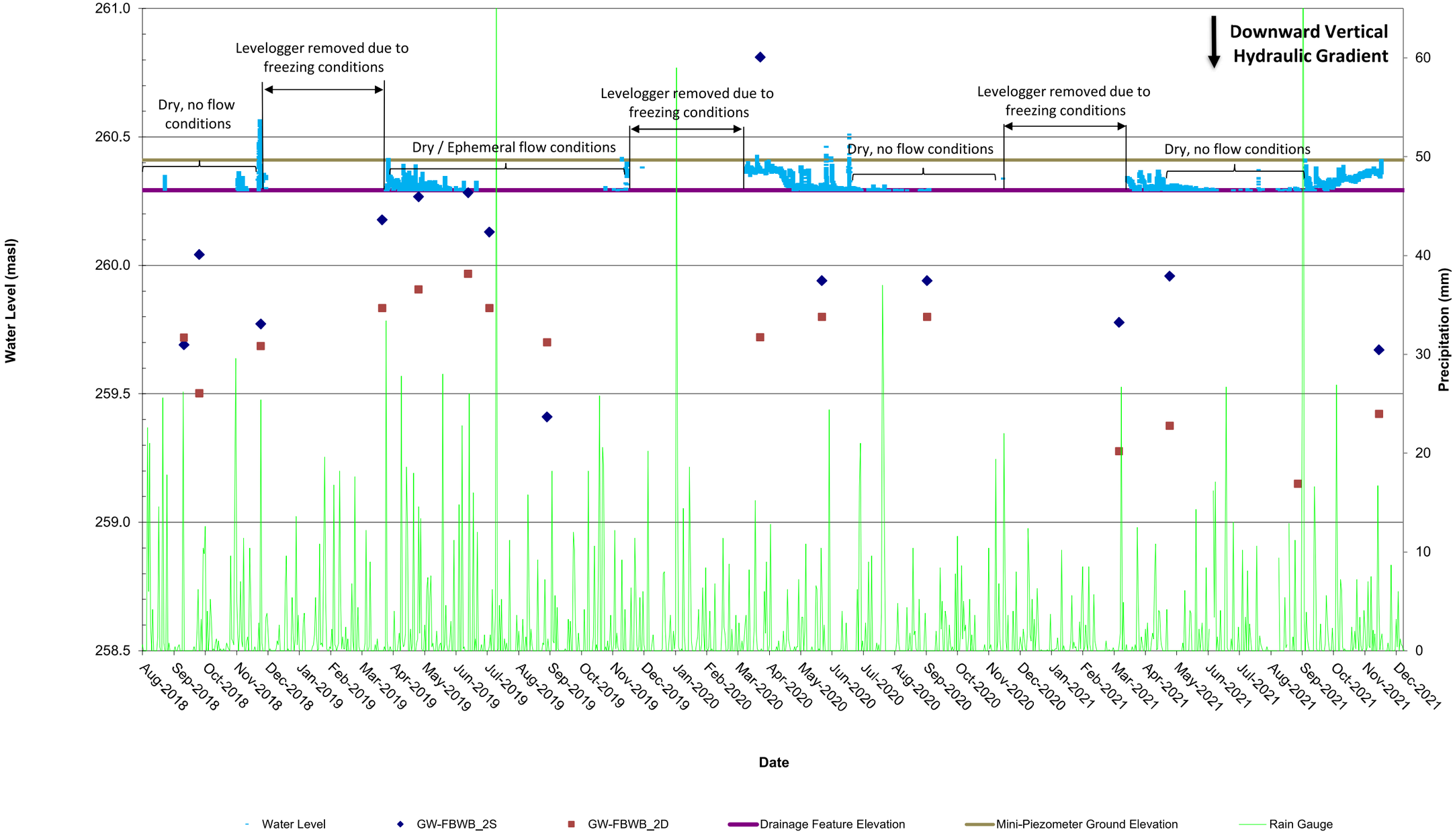
Hydrograph of GW-FBWB_6



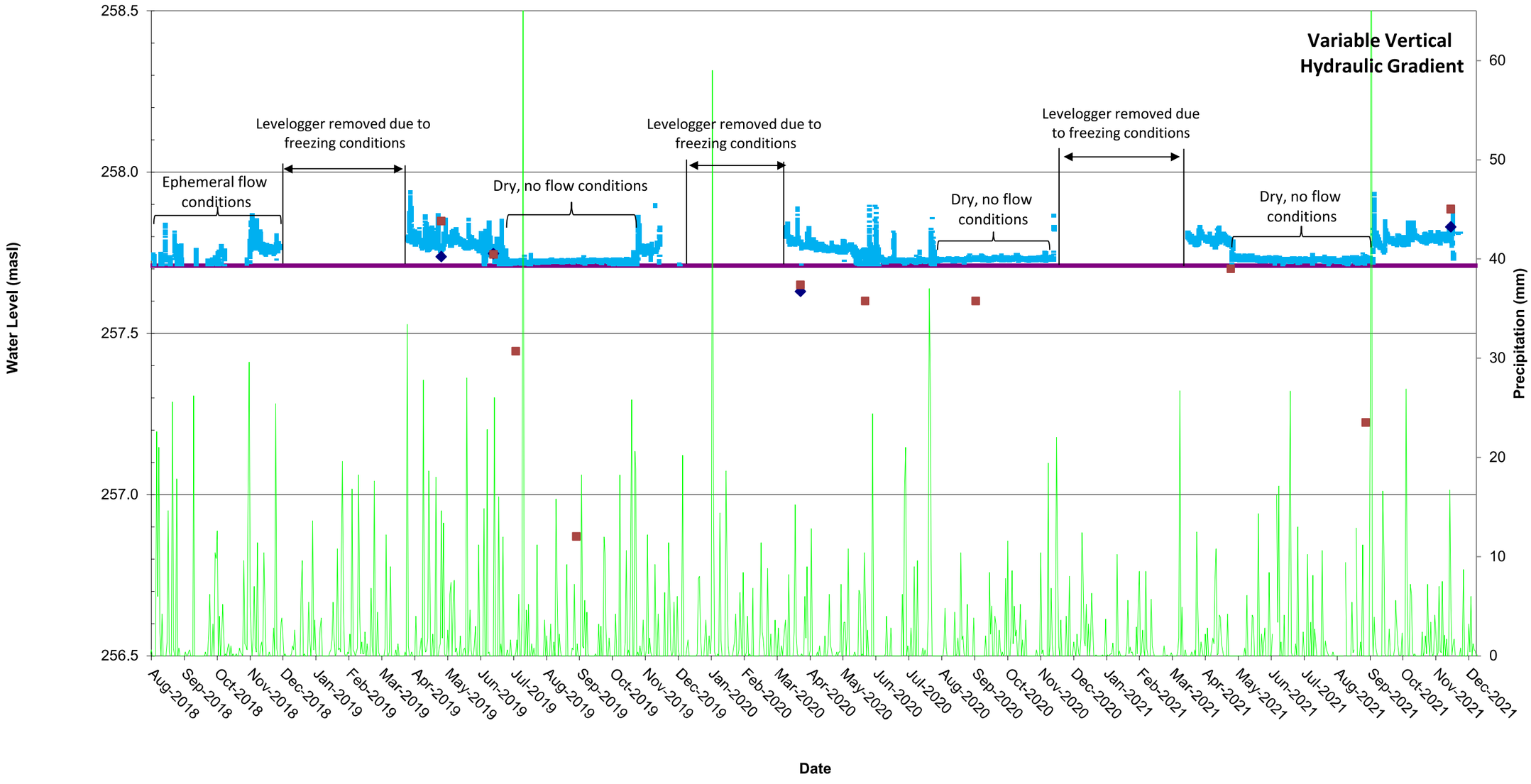
Hydrograph of GW-FBWB_7 (Drainage Feature)



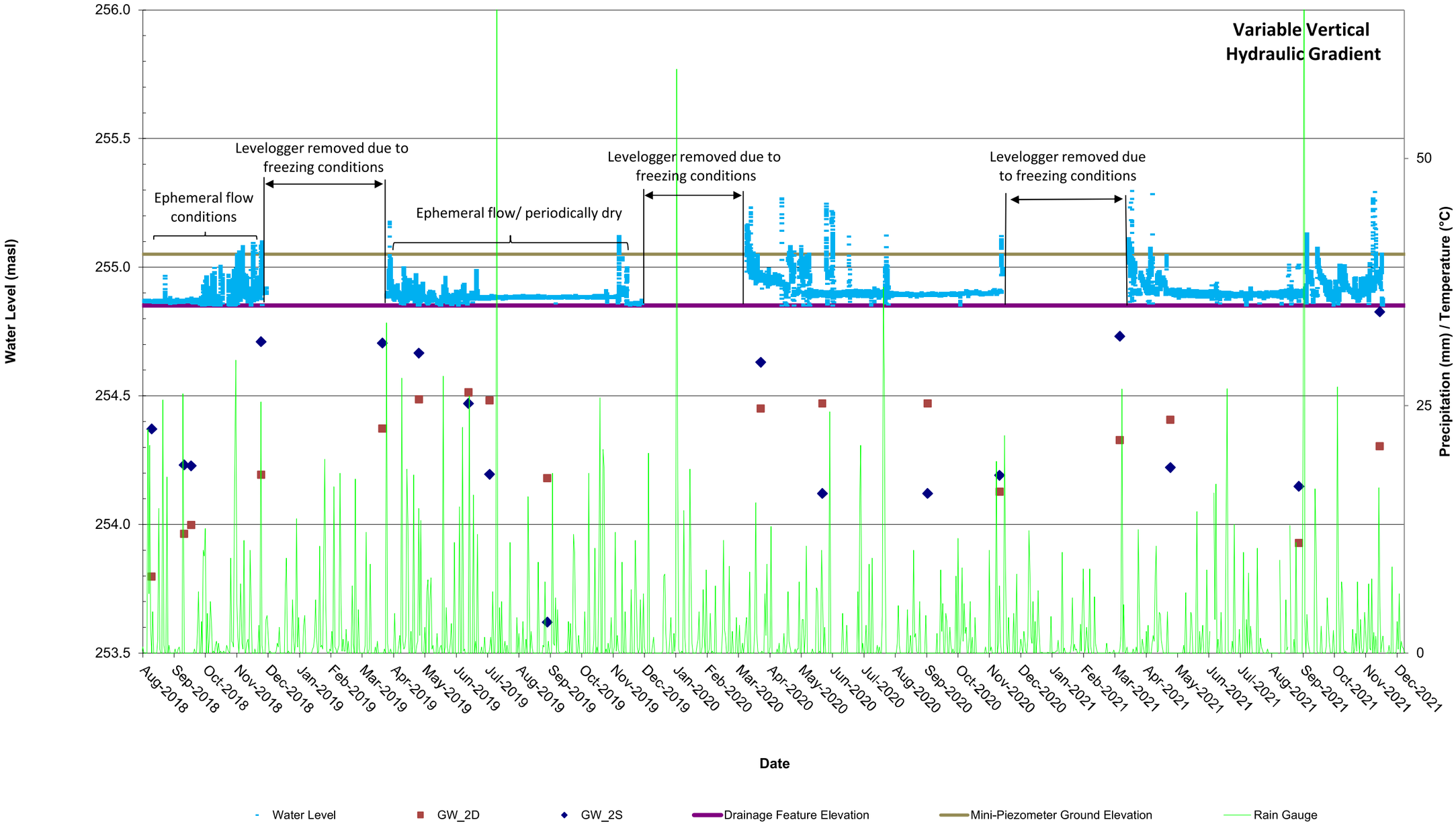
Hydrograph of GW-FBWB_2



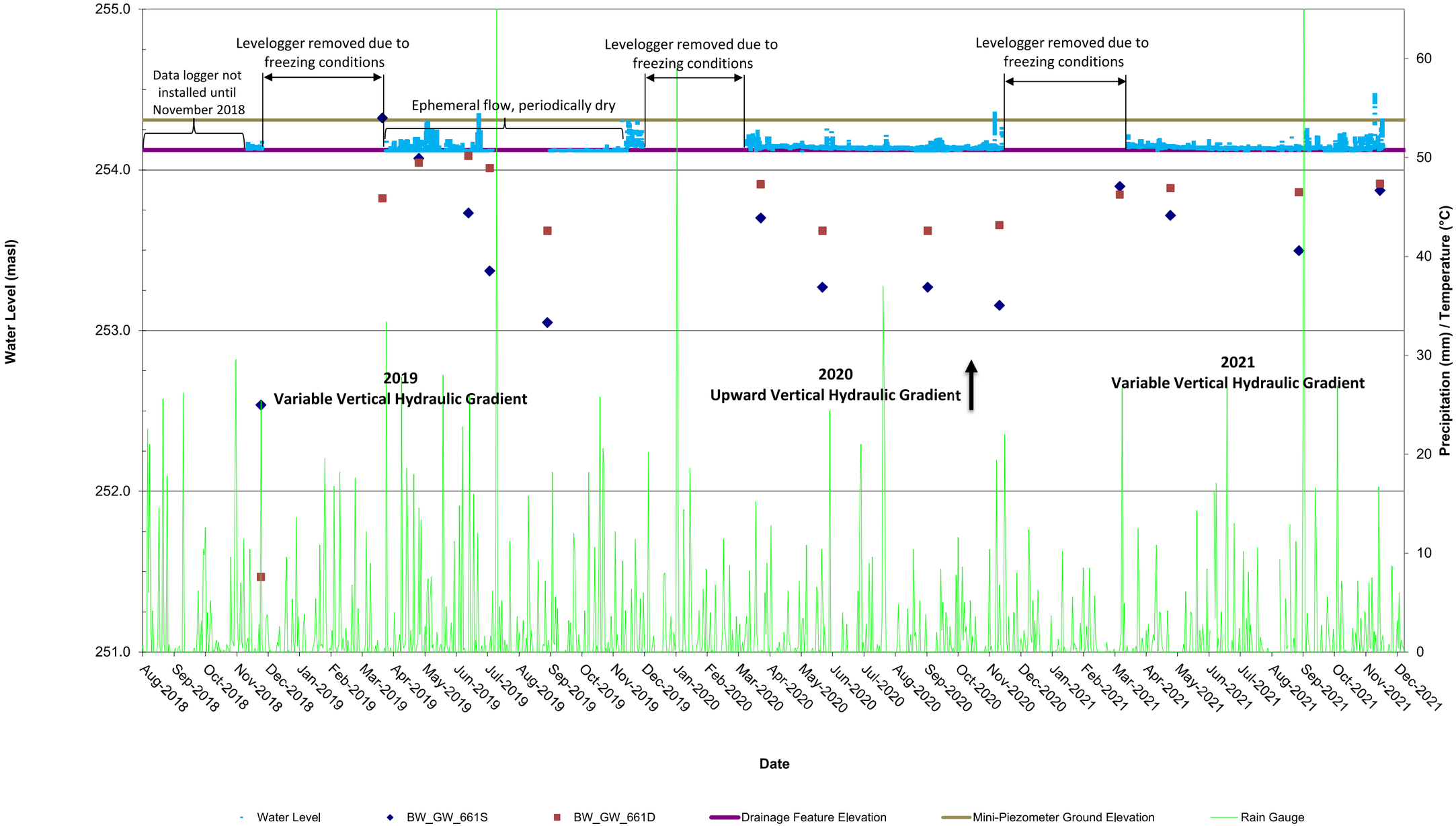
Hydrograph of GW_4 (Drainage Feature)



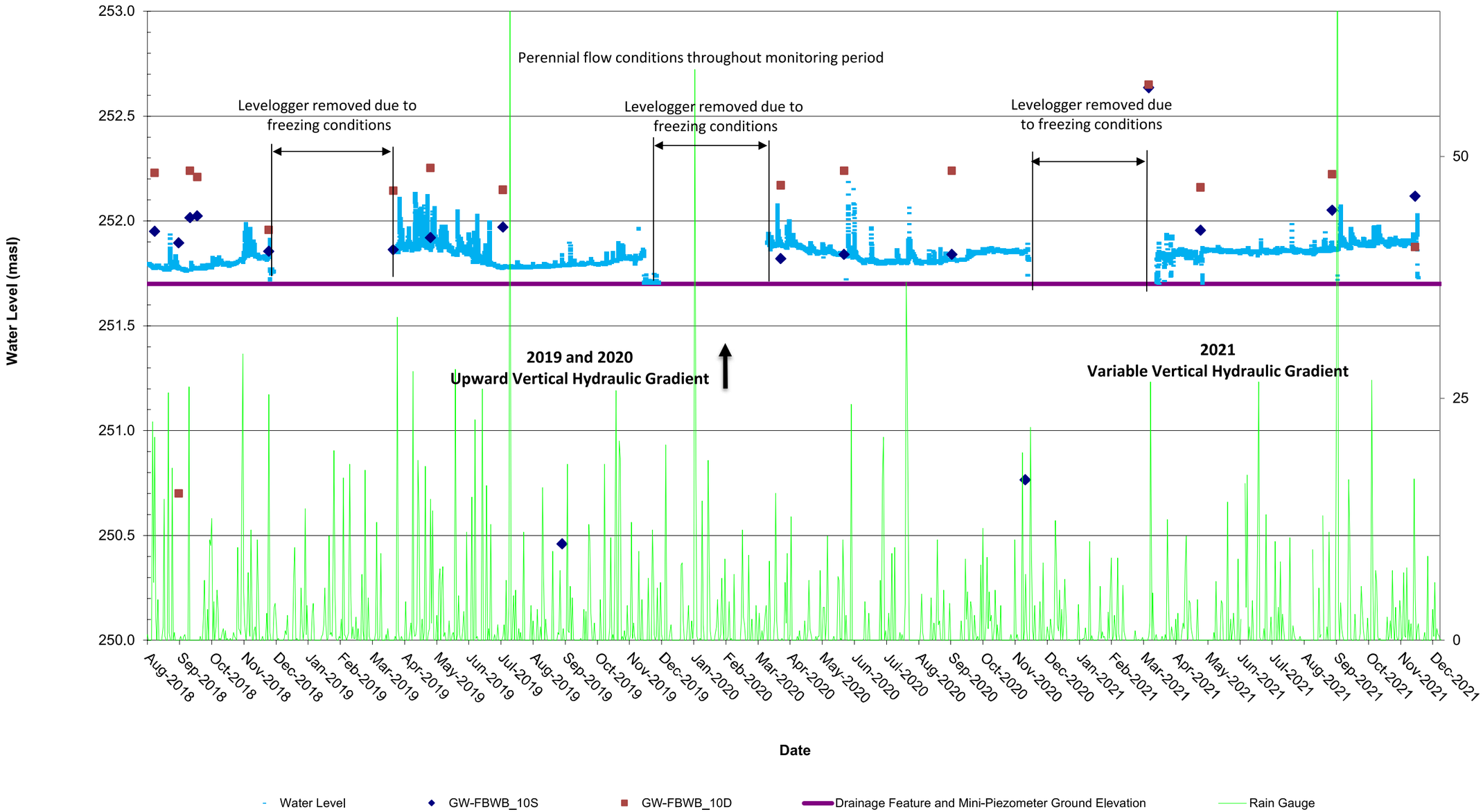
Hydrograph of GW_2



Hydrograph of BW-GW_661

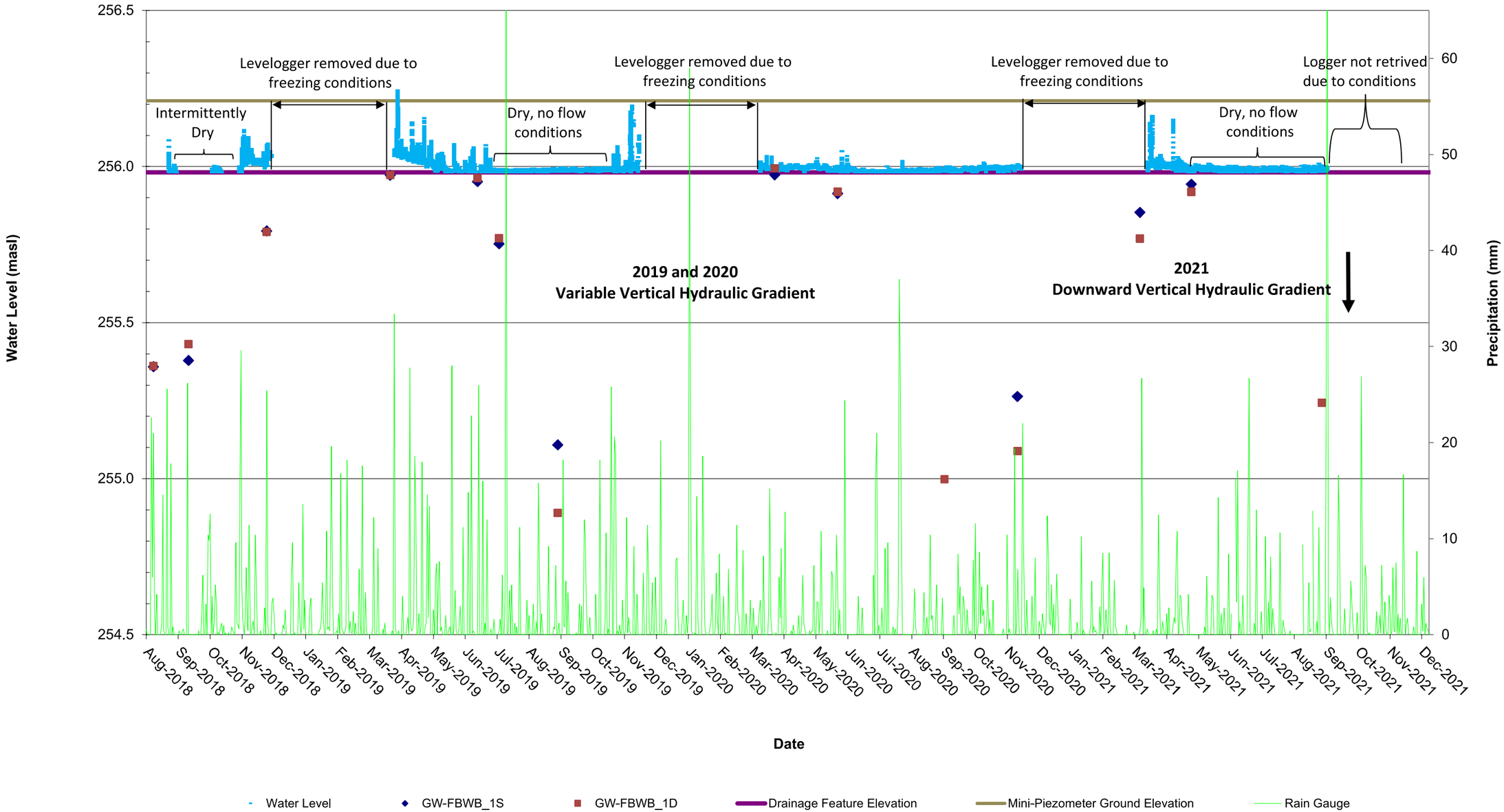


Hydrograph of GW-FBWB_10

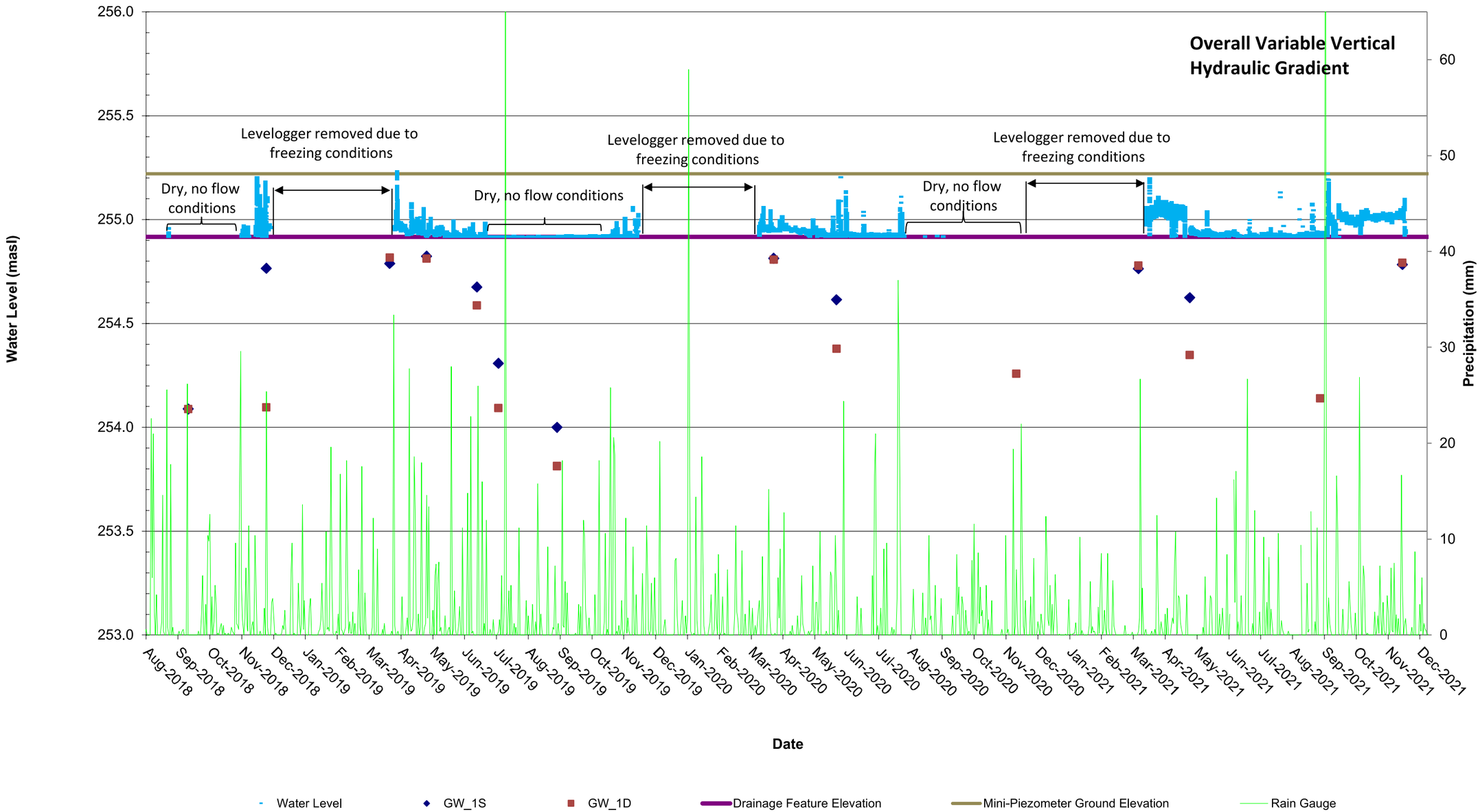


Drainage Feature 5 – Hydrographs

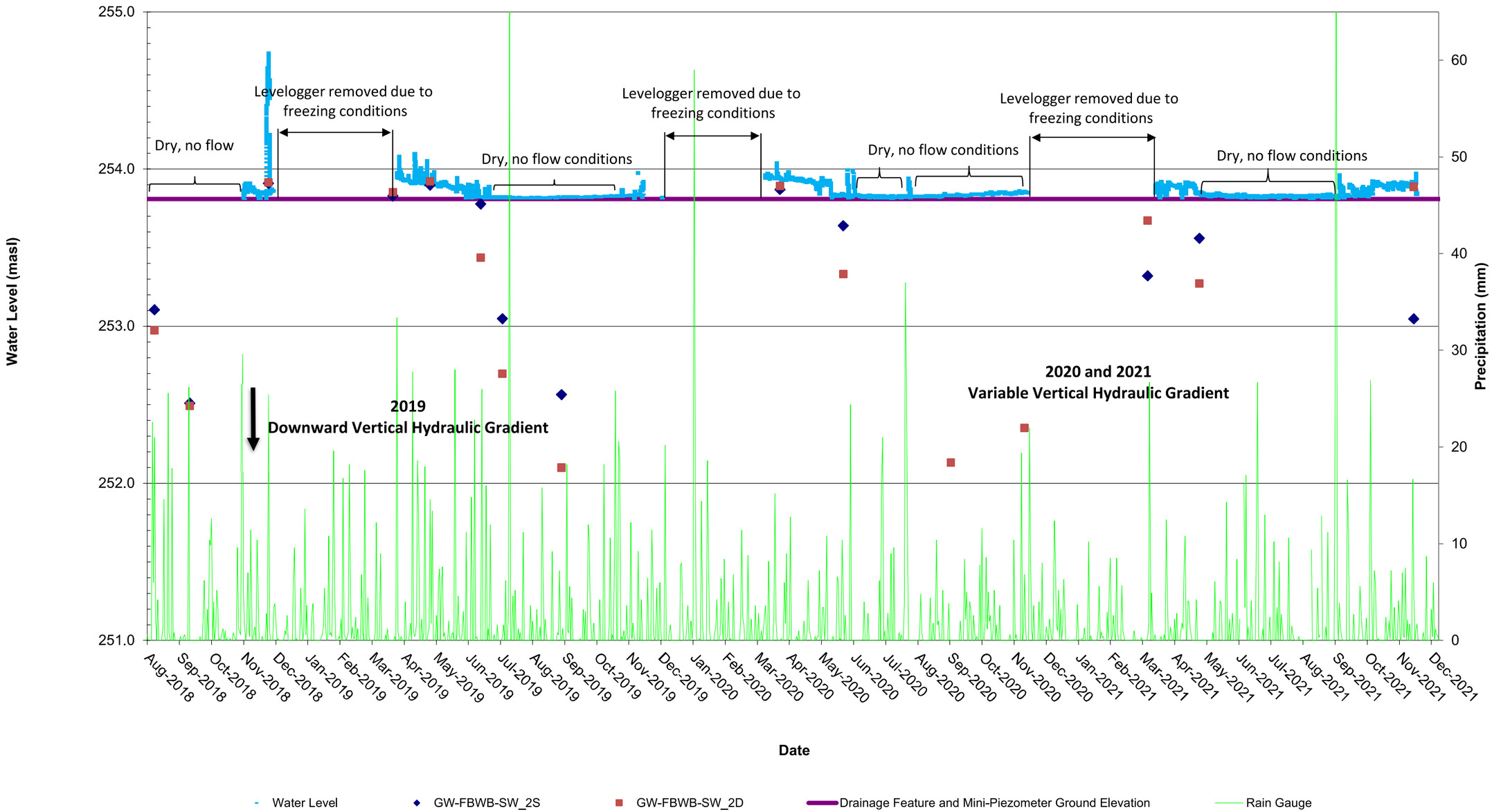
Hydrograph of GW-FBWB_1



Hydrograph of GW_1

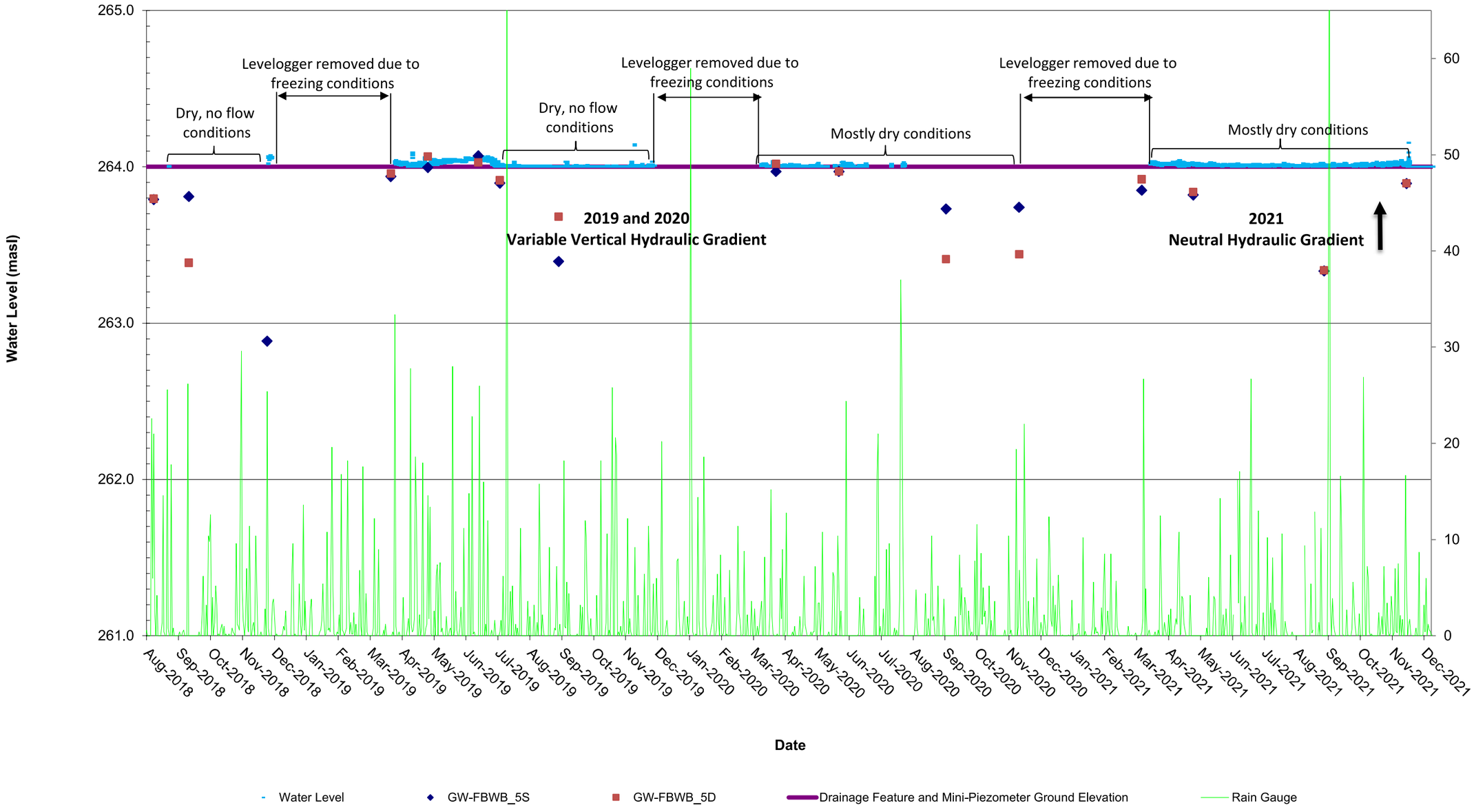


Hydrograph of GW-FBWB-SW_2



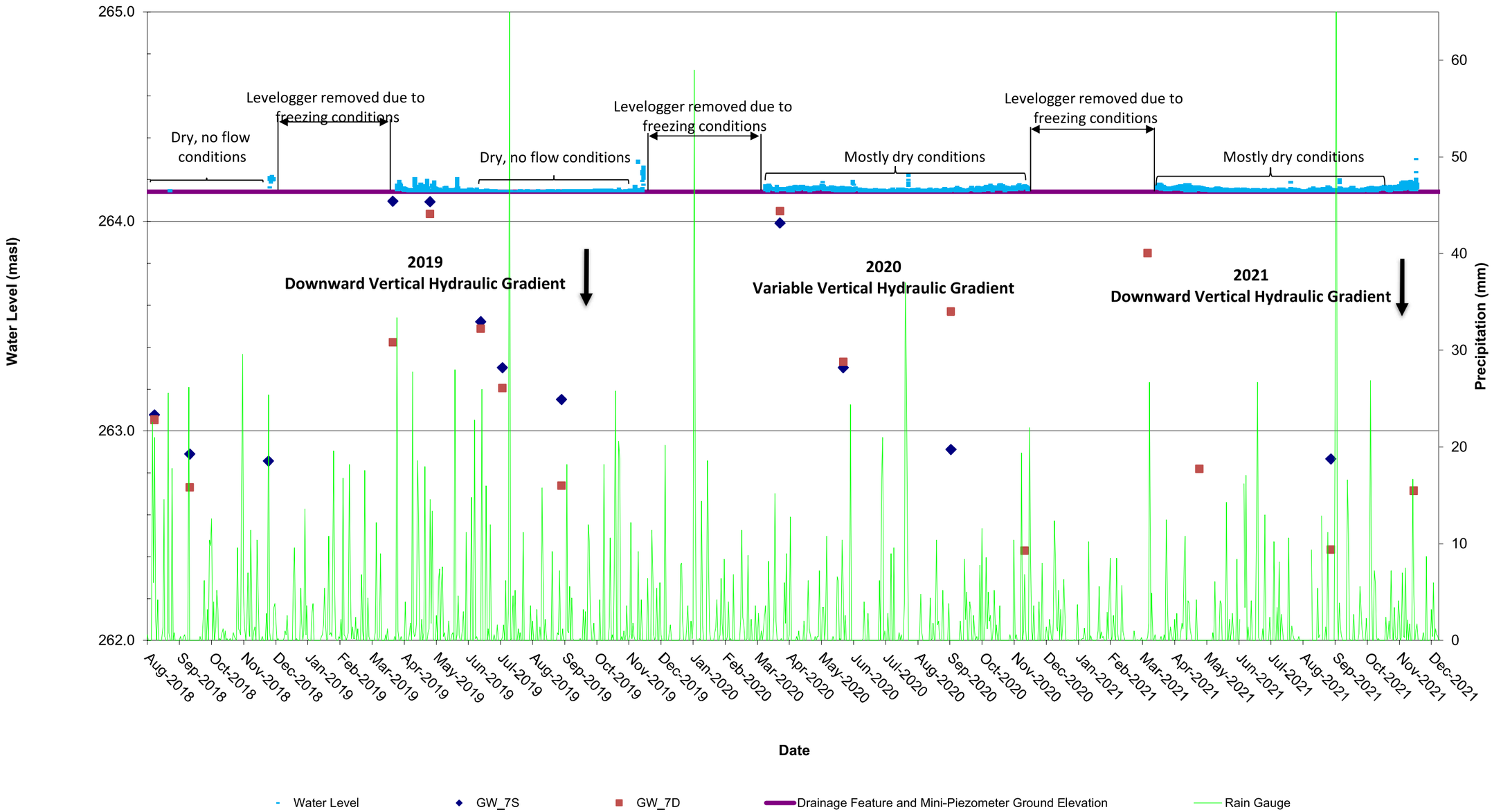
Drainage Feature 5-1 – Hydrographs

Hydrograph of GW_FBWB_5

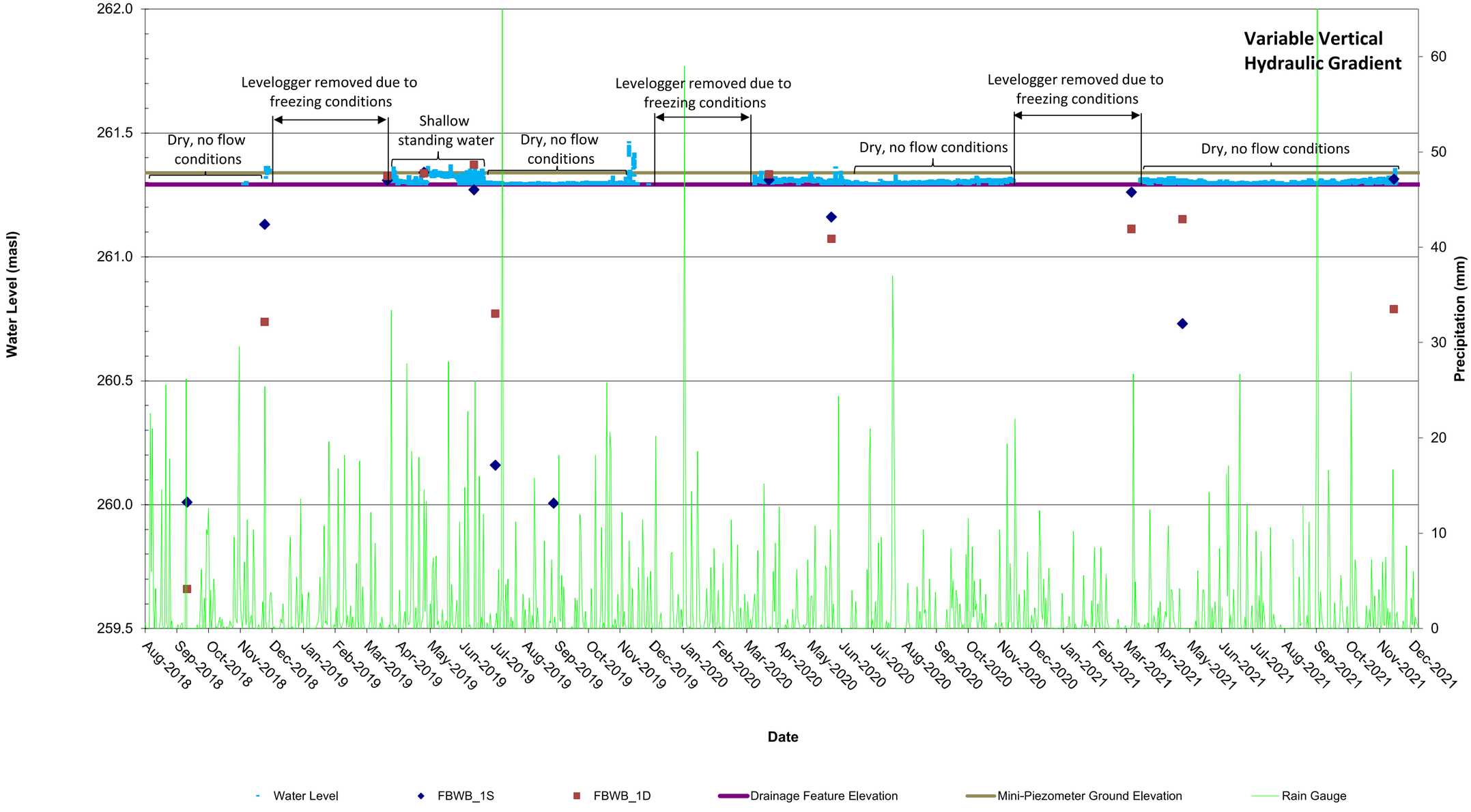


Drainage Feature 5-2 – Hydrographs

Hydrograph of GW_7

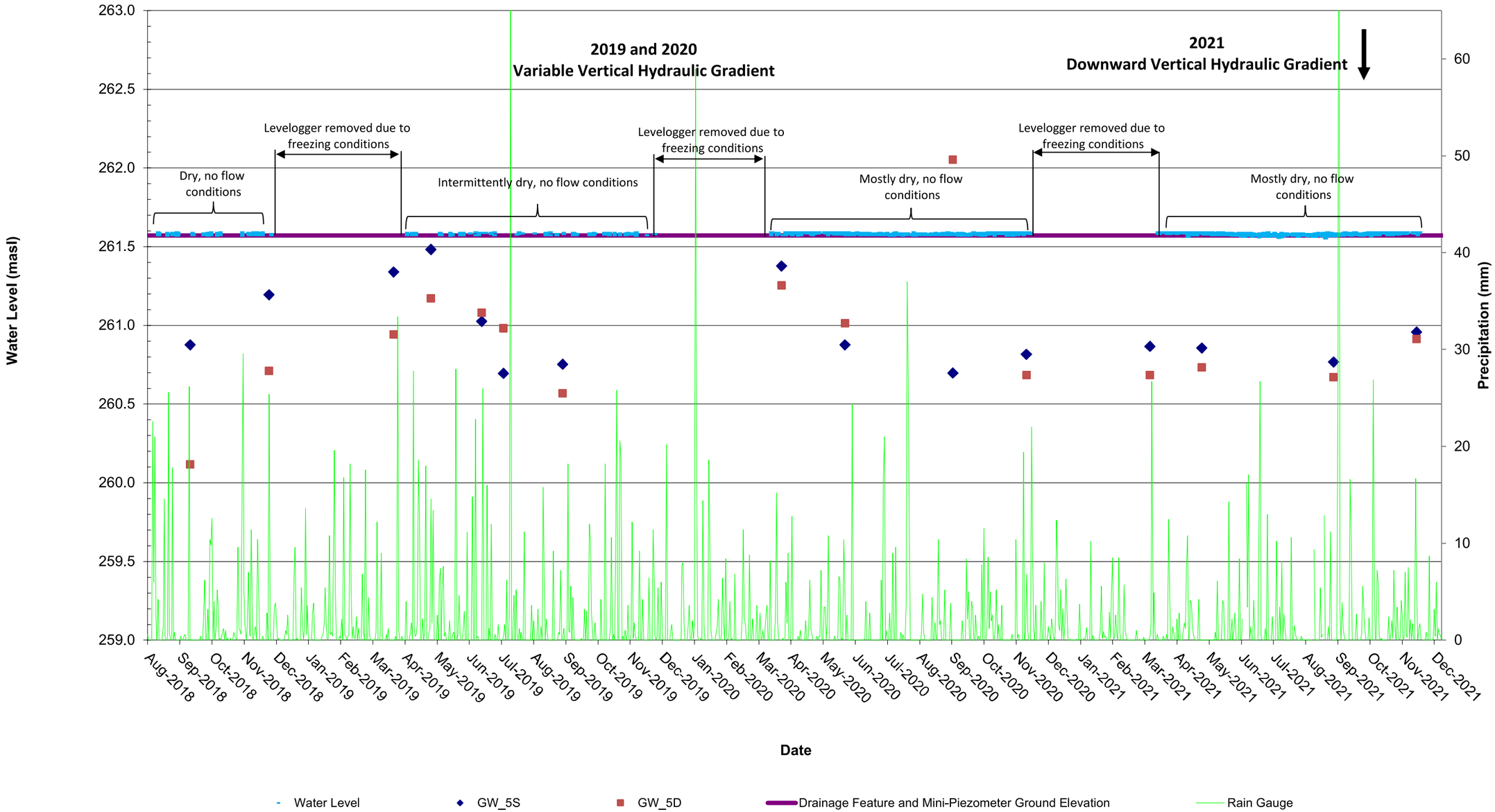


Hydrograph of FBWB_1



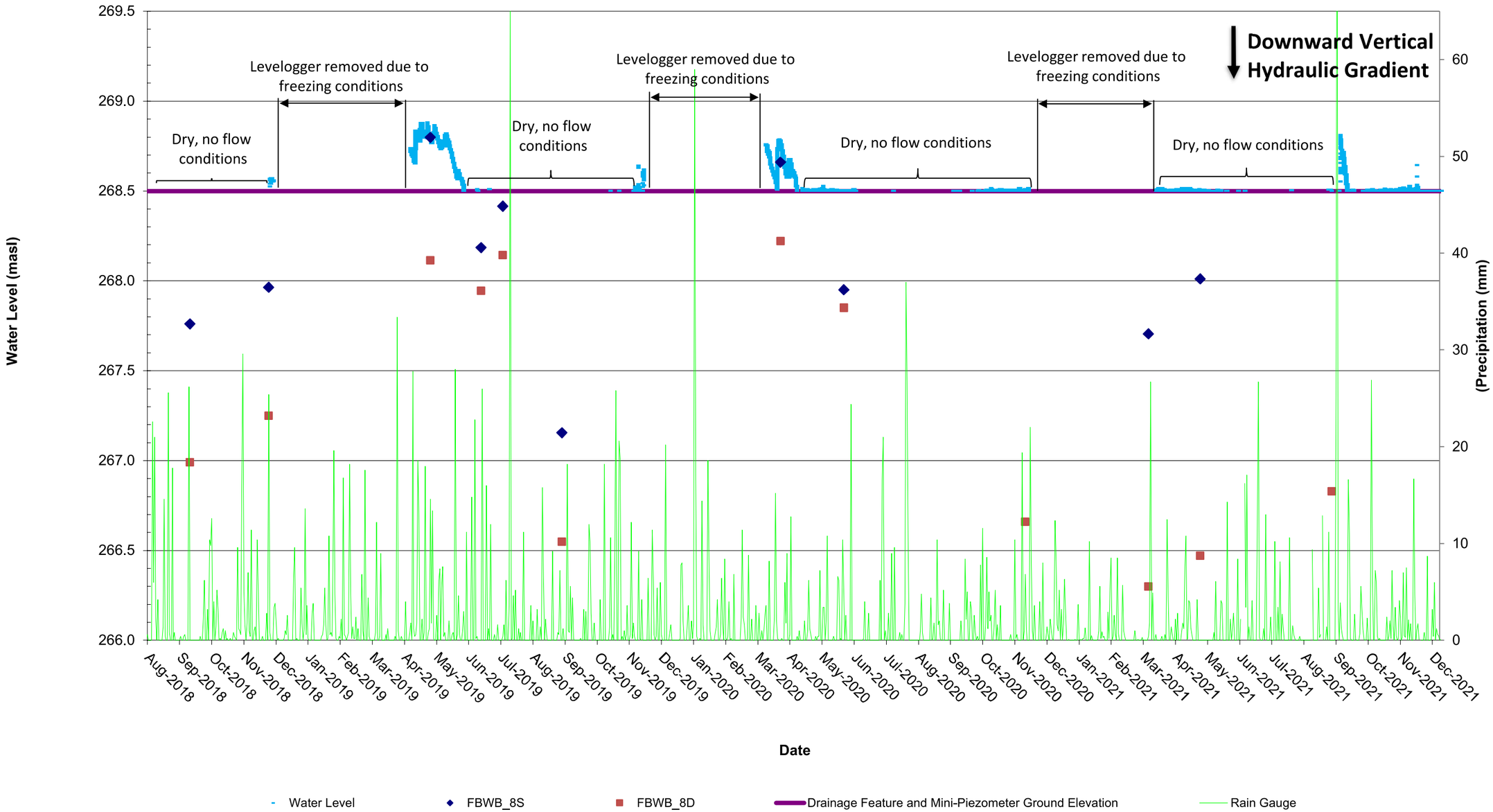
Drainage Feature 6 – Hydrographs

Hydrograph of GW_5

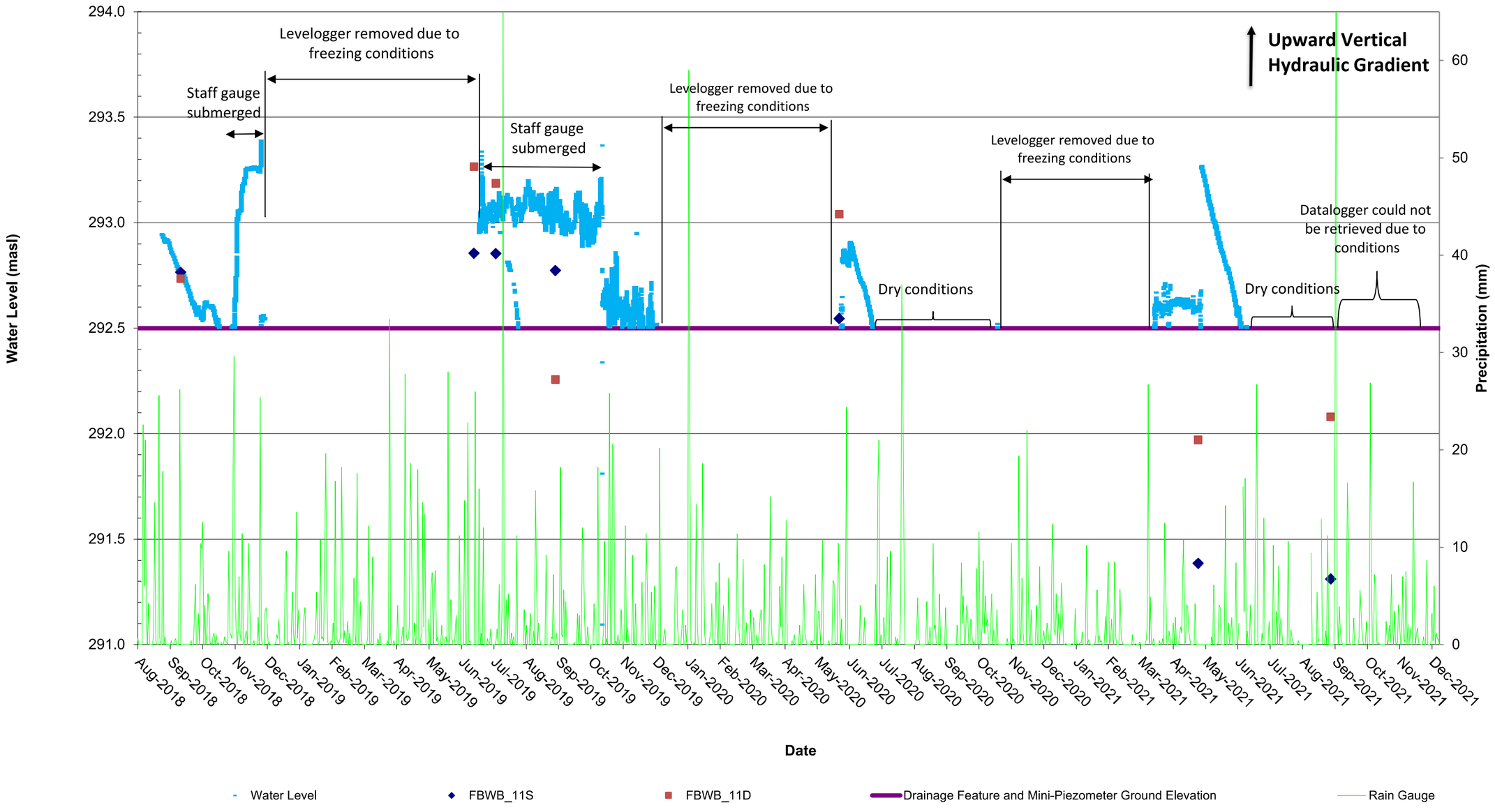


Wetland and Woodland Hydrographs

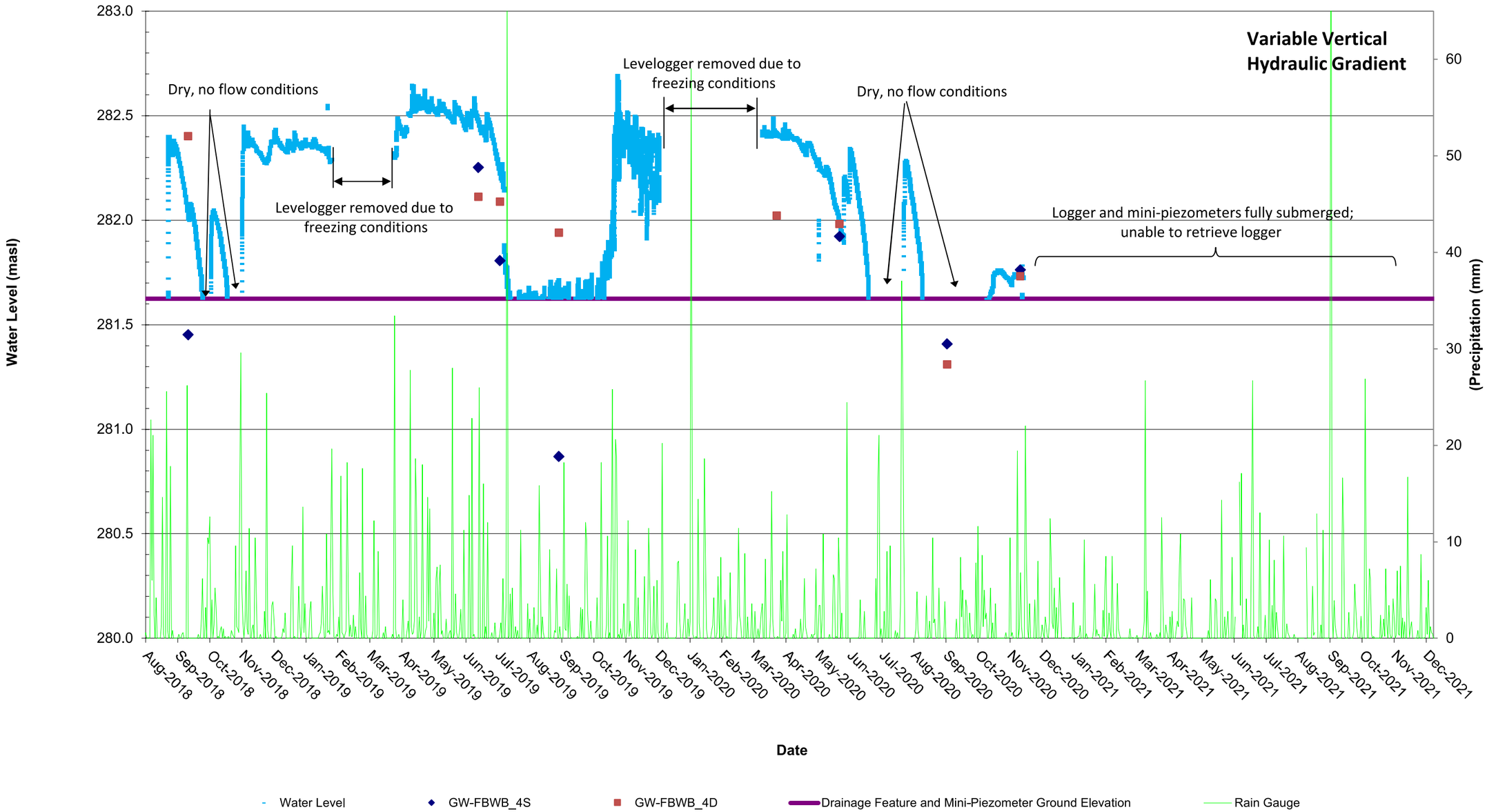
Hydrograph of FBWB_8



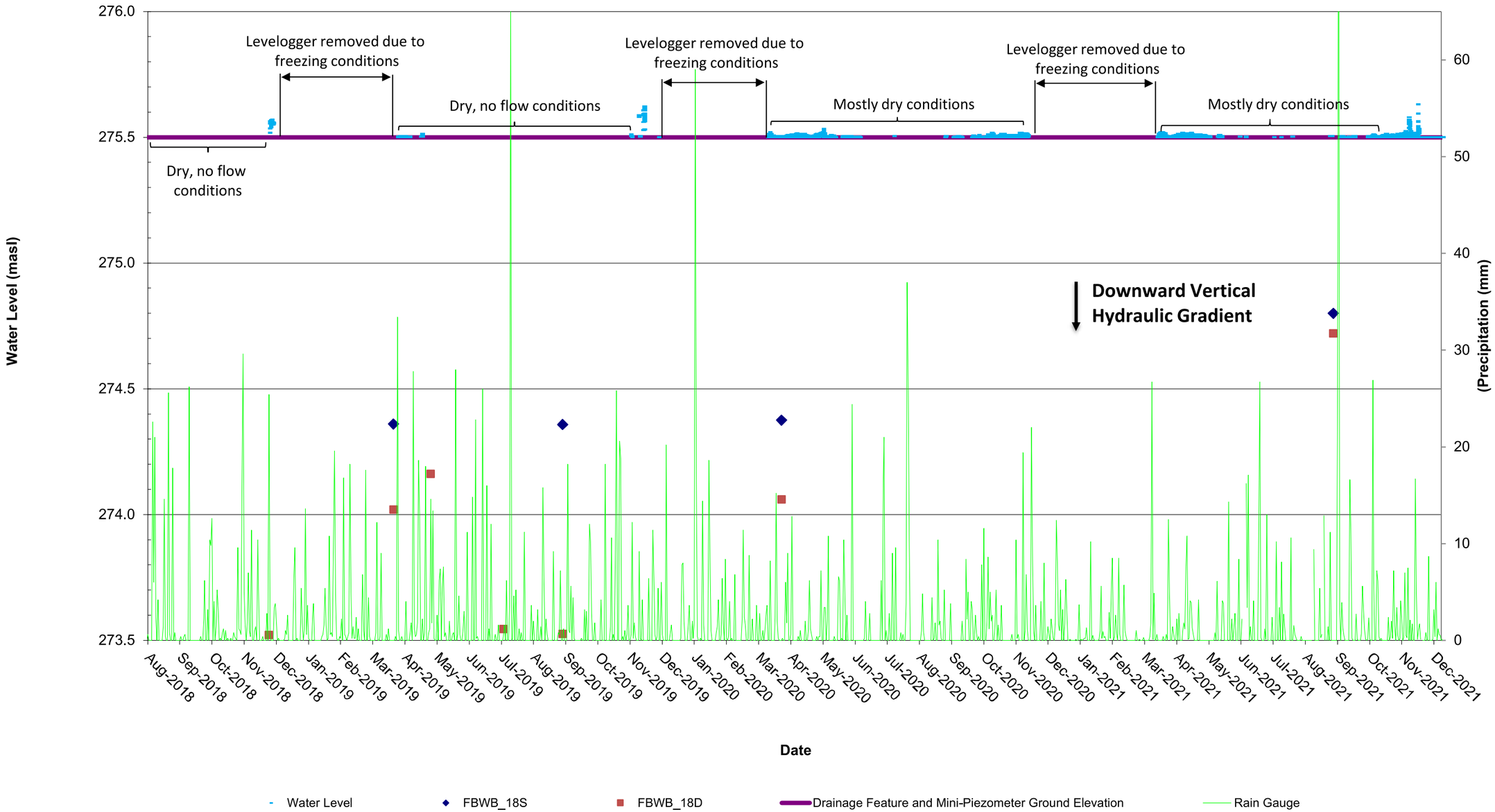
Hydrograph of FBWB_11



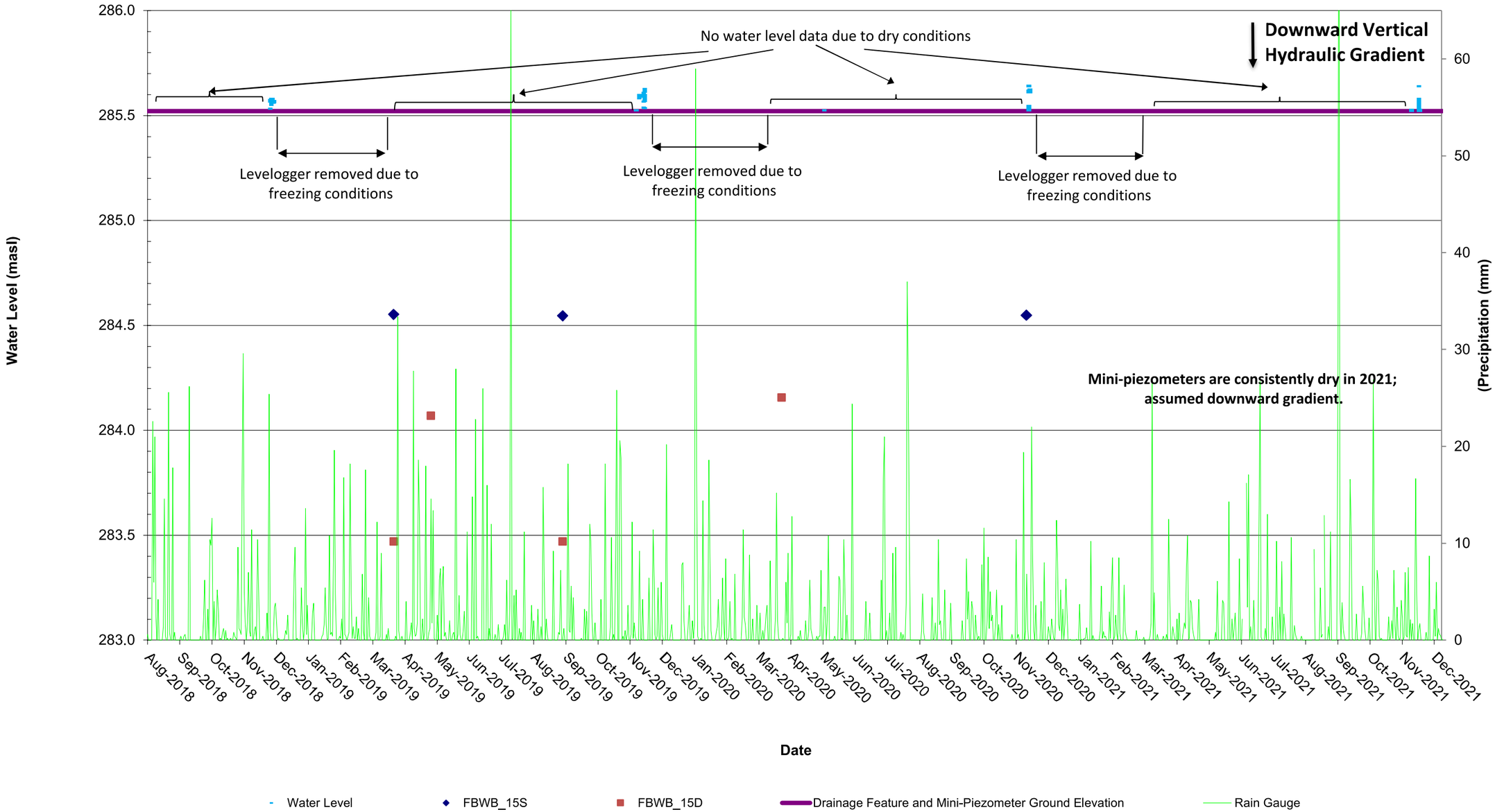
Hydrograph of GW-FBWB_4



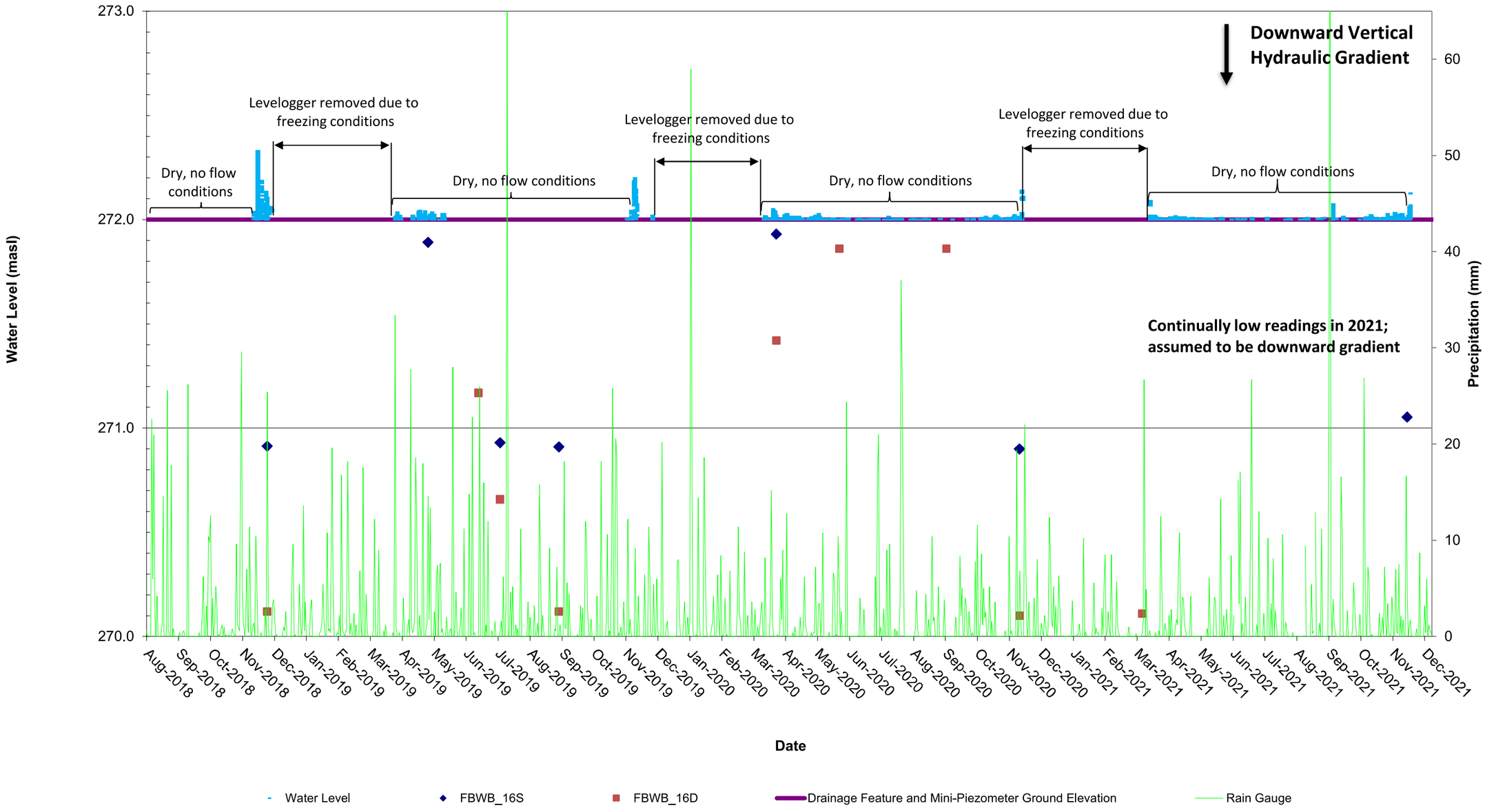
Hydrograph of FBWB_18



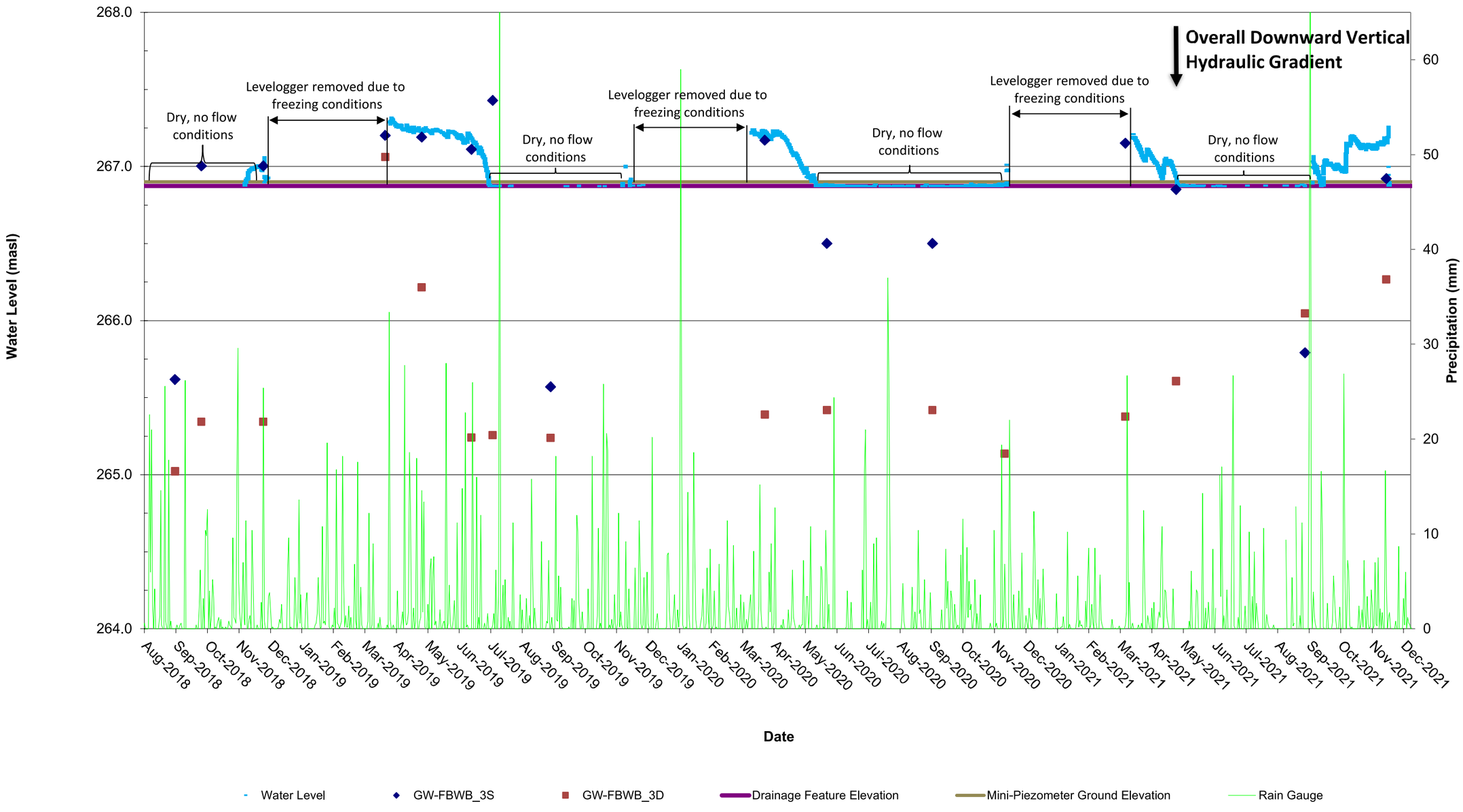
Hydrograph of FBWB_15



Hydrograph of FBWB_16



Hydrograph of GW-FBWB_3



BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C5

Groundwater Elevations (Monitoring Wells)

Table C5-1
Groundwater Elevations

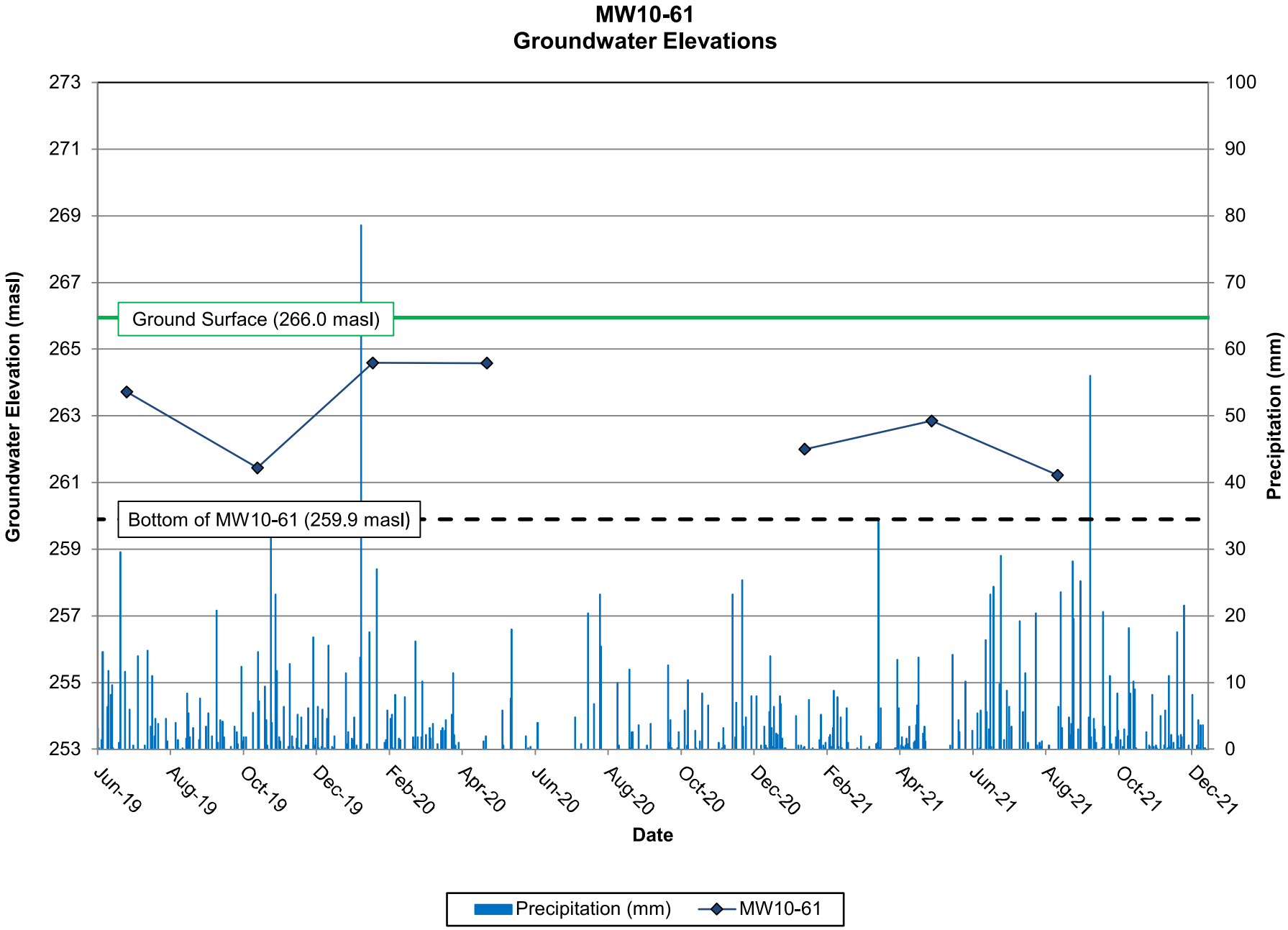
Well	Well Depth (mbgl)	Ground Surface Elevation (masl)	26-Jun-2019		15-Oct-2019		21-Jan-2020		27-Apr-2020		24-Jul-2020	
			Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)
MW10-61	**6.05**	**265.95**	2.23	263.72	4.51	261.44	1.36	264.59	1.37	264.58	-	-
MW10-63	**15.00**	**263.62**	4.24	259.38	5.26	258.36	3.73	259.89	3.56	260.06	4.80	258.82
MW10-64	**5.83**	**252.98**	-0.85	253.83	-0.39	253.37	Frozen	Frozen	Flowing	Flowing	-0.72	253.70
MW10-65	**15.40**	**253.20**	Flowing	Flowing	Flowing	Flowing	Frozen	Frozen	Flowing	Flowing	Flowing	Flowing
MW10-66	**24.36**	**264.26**	3.78	260.48	4.17	260.09	3.93	260.33	3.38	260.88	3.95	260.31
MW10-67	**5.93**	**283.11**	4.59	278.52	4.94	278.17	2.81	280.30	4.15	278.96	4.76	278.35
MW10-68	**15.56**	**283.04**	15.30	267.74	15.28	267.76	15.42	267.62	15.35	267.69	15.35	267.69
MW10-70	**6.01**	**259.03**	2.62	256.41	3.05	255.98	1.56	257.47	1.90	257.13	2.78	256.25
MW10-71	**24.20**	**251.74**	1.66	250.08	1.86	249.88	1.54	250.20	1.48	250.26	1.81	249.93
MW10-76s	**6.08**	**249.22**	1.80	247.42	2.24	246.98	1.14	248.08	1.31	247.91	2.00	247.22
MW10-76d	**15.39**	**249.23**	-0.27	249.50	-0.50	249.73	Frozen	Frozen	-0.71	249.94	-0.37	249.60
MW10-78s	**5.90**	**264.26**	3.84	260.42	4.25	260.01	3.91	260.35	3.26	261.00	4.02	260.24
MW10-78d	**15.57**	**264.17**	3.75	260.42	4.15	260.02	3.96	260.21	3.45	260.72	3.93	260.24
MW10-79s	**8.06**	**266.04**	3.02	263.02	4.03	262.01	2.06	263.98	2.18	263.86	3.51	262.53
MW10-79d	**14.36**	**266.04**	5.37	260.67	5.90	260.14	6.13	259.91	5.43	260.61	6.04	260.00
MW10-80s	**5.26**	**280.20**	5.08	275.12	5.16	275.04	4.74	275.46	4.84	275.36	5.10	275.10
MW10-80d	**15.66**	**280.20**	11.73	268.47	12.03	268.17	12.43	267.77	11.12	269.08	11.41	268.79
MW10-81s	**6.20**	**284.36**	-	-	-	-	6.00	278.36	6.06	278.30	6.07	278.29
MW10-81d	**15.77**	**284.21**	-	-	-	-	13.50	270.71	12.93	271.28	Damaged	Damaged
MW10-82s	**7.56**	**293.36**	6.02	287.34	6.77	286.59	5.86	287.50	5.09	288.27	6.14	287.22
MW10-82d	**15.27**	**293.40**	10.78	282.62	11.37	282.03	11.40	282.00	10.15	283.25	11.10	282.30
MW10-83s	**4.05**	**258.80**	2.34	256.46	3.01	255.79	1.49	257.31	1.75	257.05	2.69	256.11
MW10-83d	**17.13**	**258.67**	0.36	258.31	0.78	257.89	0.35	258.32	-0.03	258.70	0.55	258.12
BH10	**6.89**	**287.30**	-	-	-	-	-	-	-	-	6.10	281.20
BH11	**11.20**	**291.50**	-	-	-	-	-	-	-	-	7.36	284.14

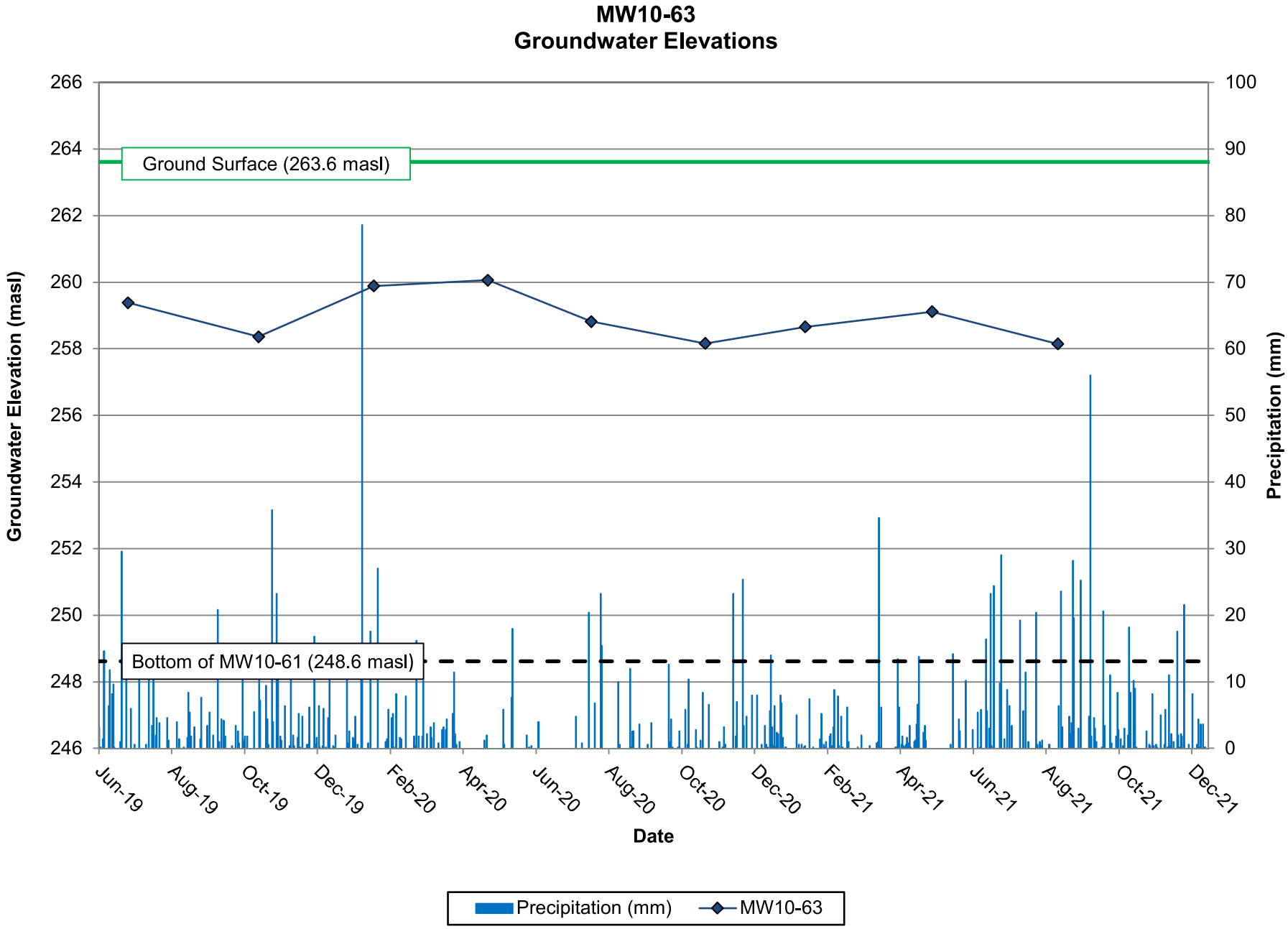
"-" denotes data unavailable
mbgs - metres below ground level
masl - metres above sea level

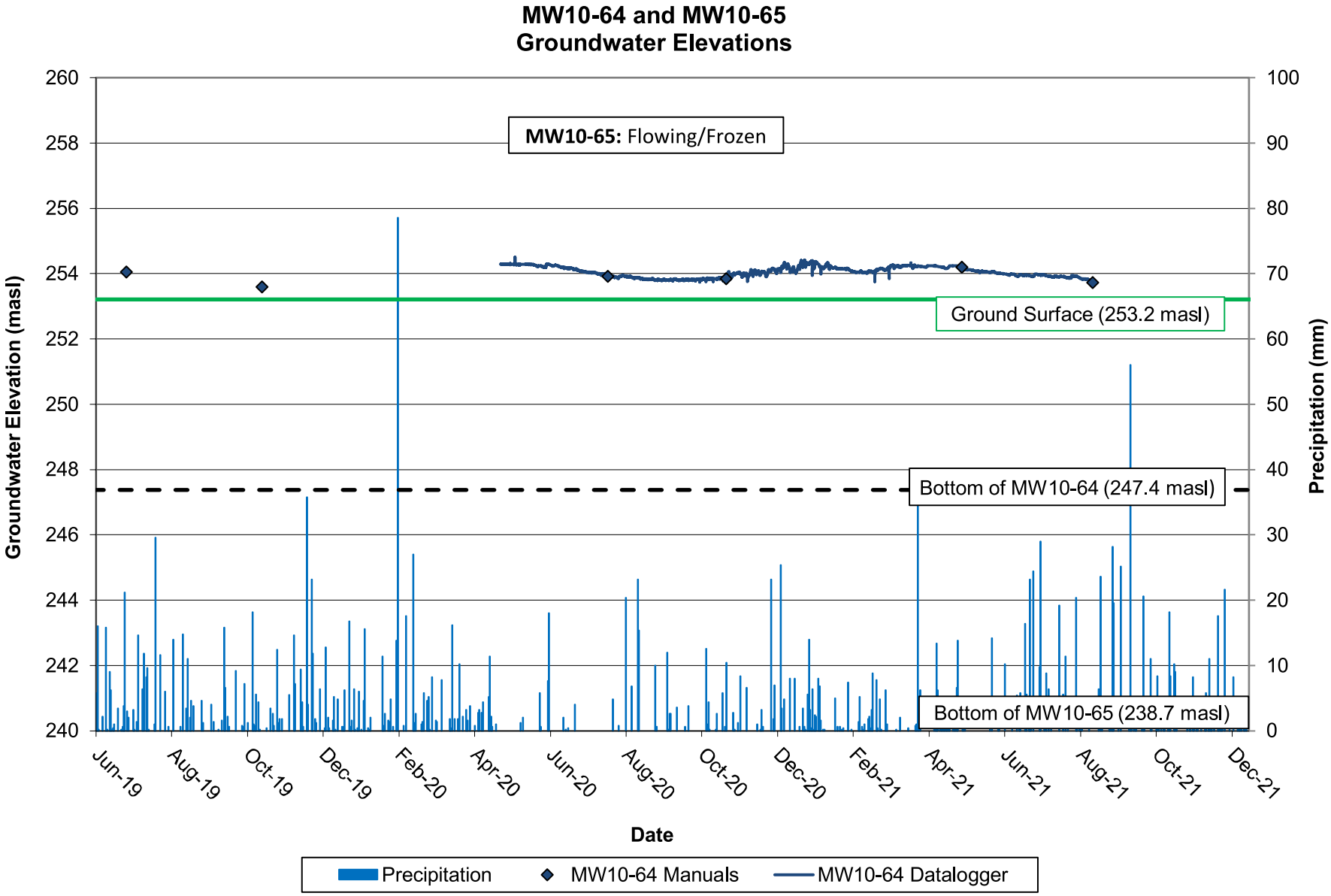
Table C5-1
Groundwater Elevations

Well	Well Depth (mbgl)	Ground Surface Elevation (masl)	29-Oct-2020		22-Jan-2021		10-May-2021		25-Aug-2021	
			Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)
MW10-61	**6.05**	**265.95**	-	-	3.95	262.00	3.10	262.85	4.73	261.22
MW10-63	**15.00**	**263.62**	5.46	258.16	4.96	258.66	4.51	259.11	5.47	258.15
MW10-64	**5.83**	**252.98**	-0.64	253.62	Frozen	Frozen	-0.99	253.97	-0.52	253.50
MW10-65	**15.40**	**253.20**	Flowing	Flowing	Frozen	Frozen	Flowing	Flowing	Flowing	Flowing
MW10-66	**24.36**	**264.26**	4.21	260.05	4.33	259.93	4.36	259.90	4.74	259.52
MW10-67	**5.93**	**283.11**	5.27	277.84	4.62	278.49	4.38	278.73	4.70	278.41
MW10-68	**15.56**	**283.04**	Dry	Dry	15.35	267.69	15.34	267.70	Dry	Dry
MW10-70	**6.01**	**259.03**	3.14	255.89	2.54	256.49	2.45	256.58	3.32	255.71
MW10-71	**24.20**	**251.74**	1.97	249.77	1.61	250.13	1.81	249.93	2.09	249.65
MW10-76s	**6.08**	**249.22**	2.19	247.03	1.49	247.73	1.06	248.16	2.16	247.06
MW10-76d	**15.39**	**249.23**	-0.20	249.43	0.56	248.67	-0.34	249.57	-0.06	249.29
MW10-78s	**5.90**	**264.26**	4.28	259.98	4.37	259.89	4.38	259.88	4.79	259.47
MW10-78d	**15.57**	**264.17**	4.20	259.97	4.32	259.85	4.32	259.85	4.65	259.52
MW10-79s	**8.06**	**266.04**	4.30	261.74	3.17	262.87	2.80	263.24	4.19	261.85
MW10-79d	**14.36**	**266.04**	6.46	259.58	6.06	259.98	5.97	260.07	6.65	259.39
MW10-80s	**5.26**	**280.20**	5.15	275.05	4.64	275.56	5.08	275.12	Dry	Dry
MW10-80d	**15.66**	**280.20**	11.93	268.27	12.05	268.15	12.89	267.31	13.25	266.95
MW10-81s	**6.20**	**284.36**	6.10	278.26	5.85	278.51	6.08	278.28	-	-
MW10-81d	**15.77**	**284.21**	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged
MW10-82s	**7.56**	**293.36**	7.20	286.16	7.06	286.30	5.74	287.62	-	-
MW10-82d	**15.27**	**293.40**	11.52	281.88	11.05	282.35	11.82	281.58	12.04	281.36
MW10-83s	**4.05**	**258.80**	3.01	255.79	2.35	256.45	2.03	256.77	3.00	255.80
MW10-83d	**17.13**	**258.67**	0.96	257.71	0.85	257.82	0.85	257.82	1.25	257.42
BH10	**6.89**	**287.30**	6.12	281.18	Dry	Dry	6.11	281.19	Dry	Dry
BH11	**11.20**	**291.50**	7.64	283.86	7.45	284.05	7.04	284.46	7.65	283.85

"-" denotes data unavailable
mbgs - metres below ground level
masl - metres above sea level

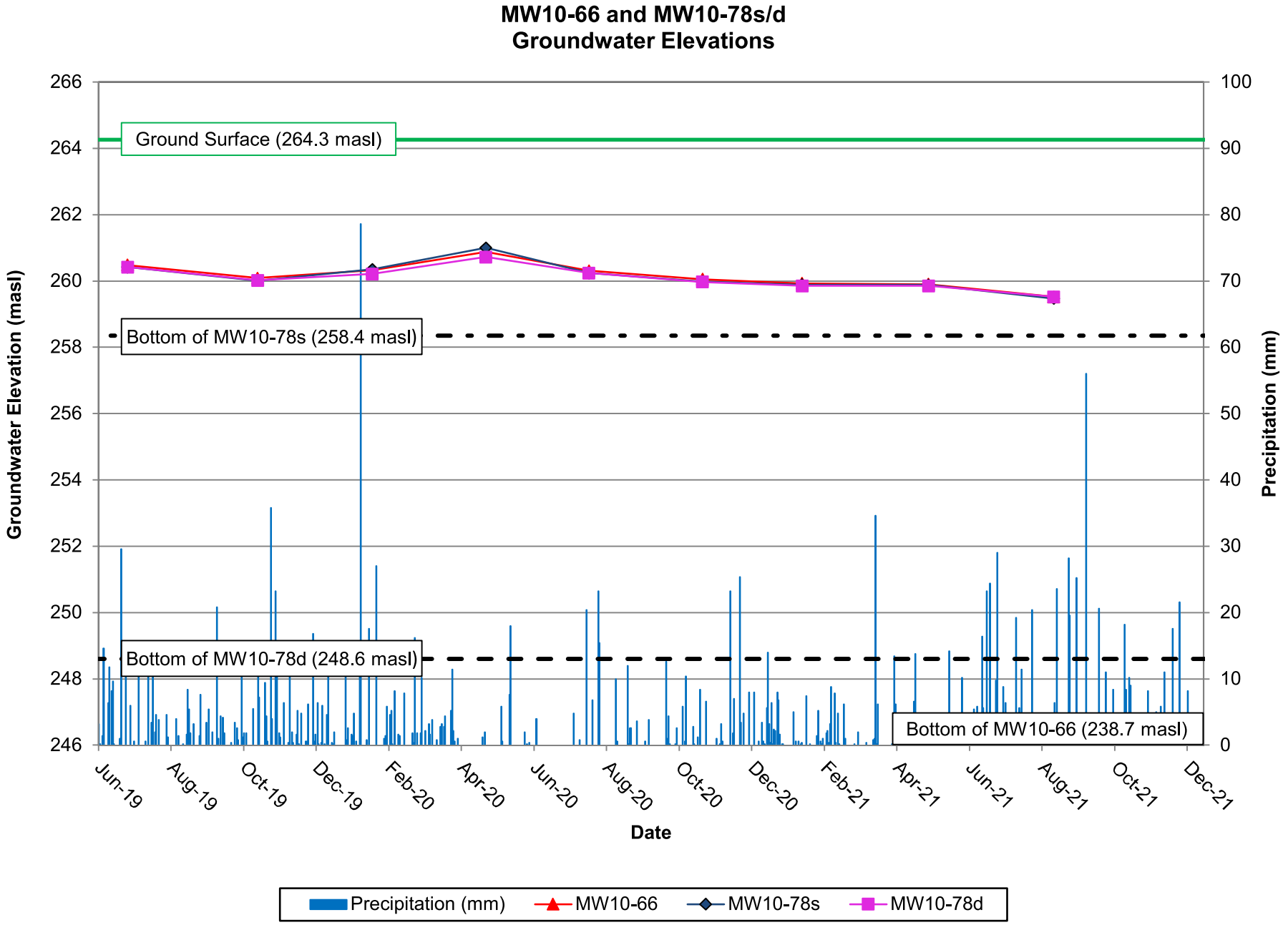

MW10-61
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Ground Surface (266.0 masl)
Bottom of MW10-61 (259.9 masl)
273
271
269
267
265
263
261
259
257
255
253
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Date
Precipitation (mm)
MW10-61

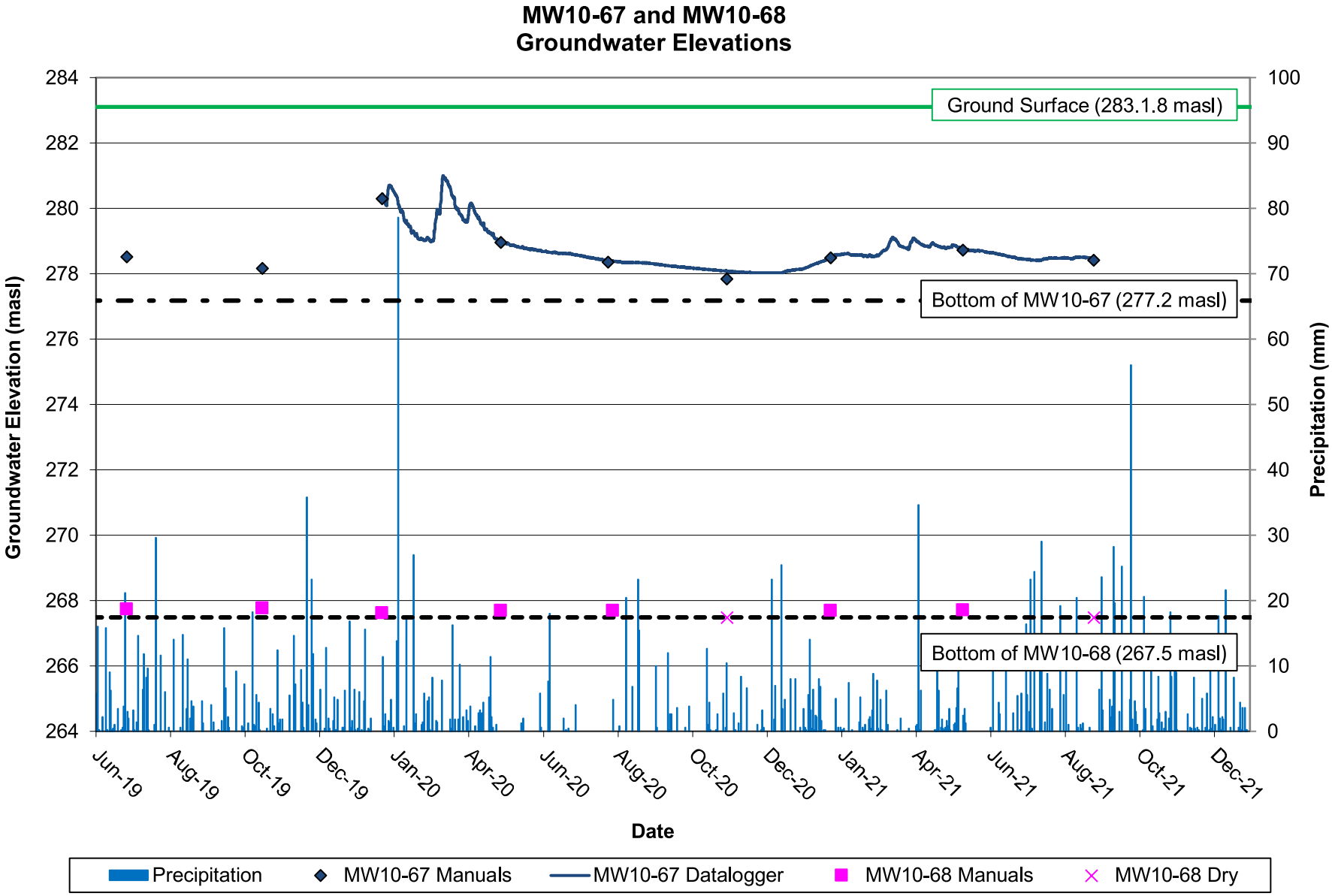

MW10-63
Groundwater Elevations
Ground Surface (263.6 masl)
Bottom of MW10-61 (248.6 masl)
Groundwater Elevation (masl)
Precipitation (mm)
Date
266
264
262
260
258
256
254
252
250
248
246
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Precipitation (mm)
MW10-63



R.J Burnside & Associates Limited
300050116

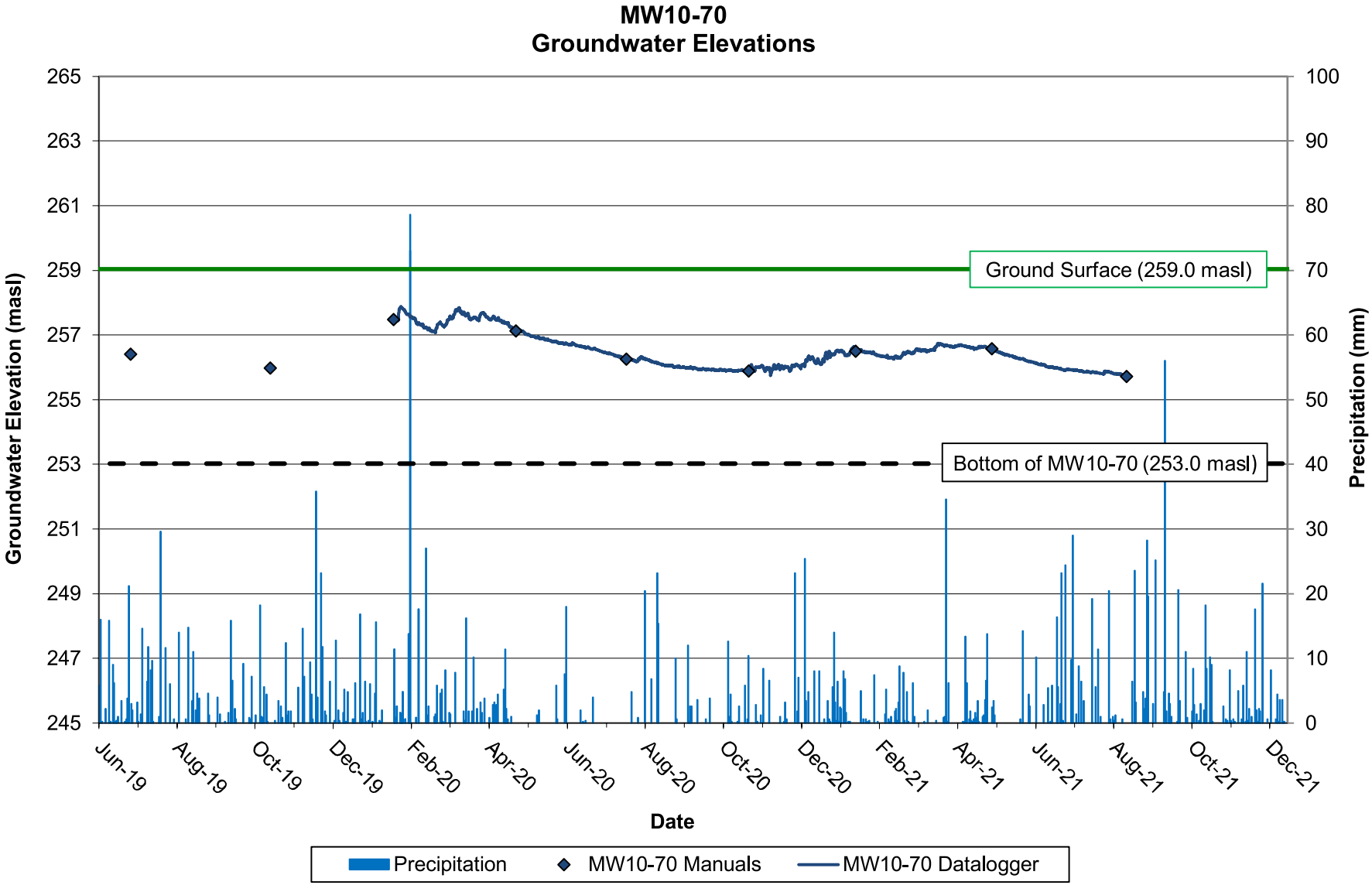
Figure C5-3

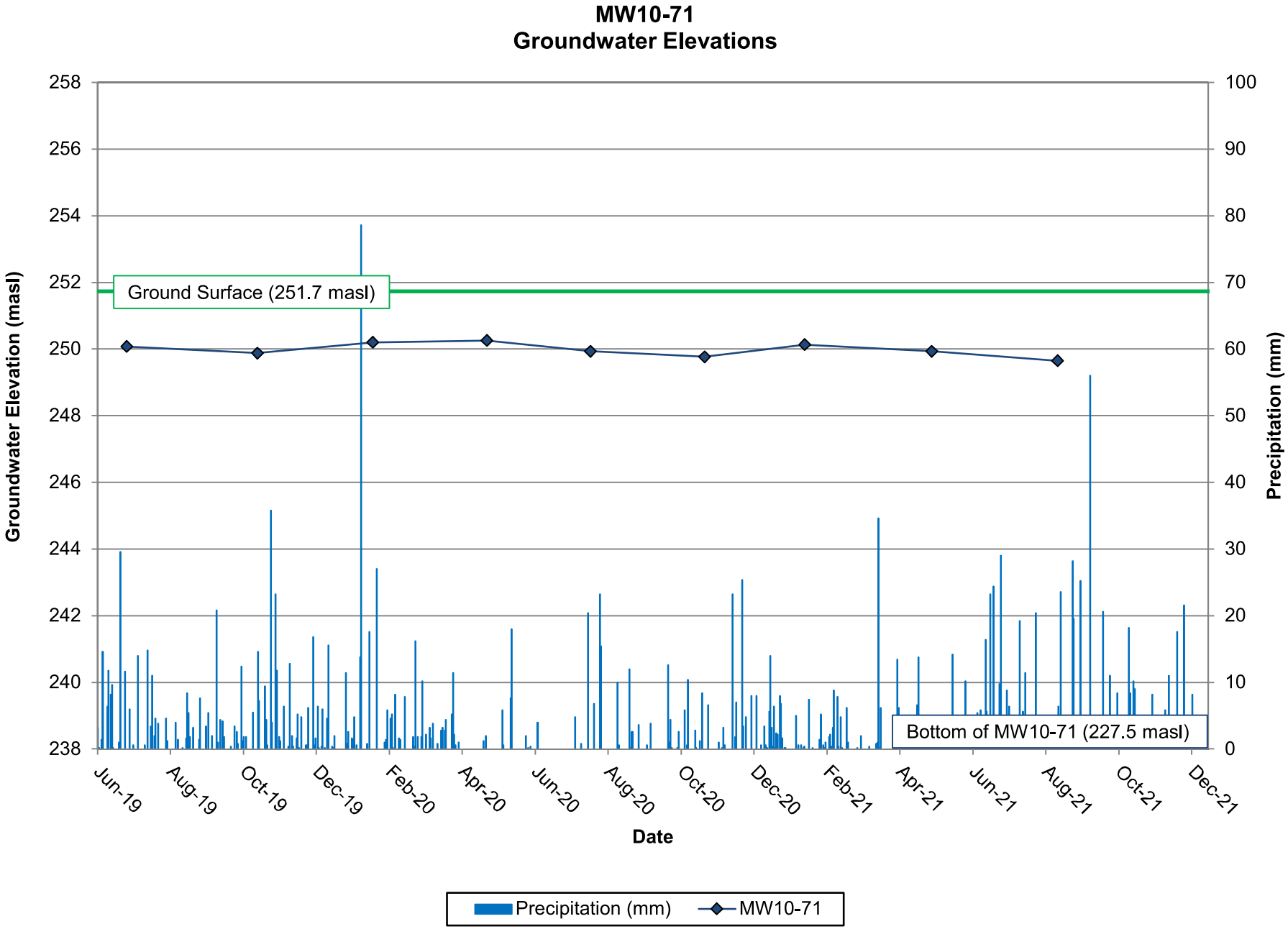

MW10-66 and MW10-78s/d
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Date
Ground Surface (264.3 masl)
Bottom of MW10-78s (258.4 masl)
Bottom of MW10-78d (248.6 masl)
Bottom of MW10-66 (238.7 masl)
266
264
262
260
258
256
254
252
250
248
246
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Precipitation (mm)
MW10-66
MW10-78s
MW10-78d



R.J Burnside & Associates Limited
300050116

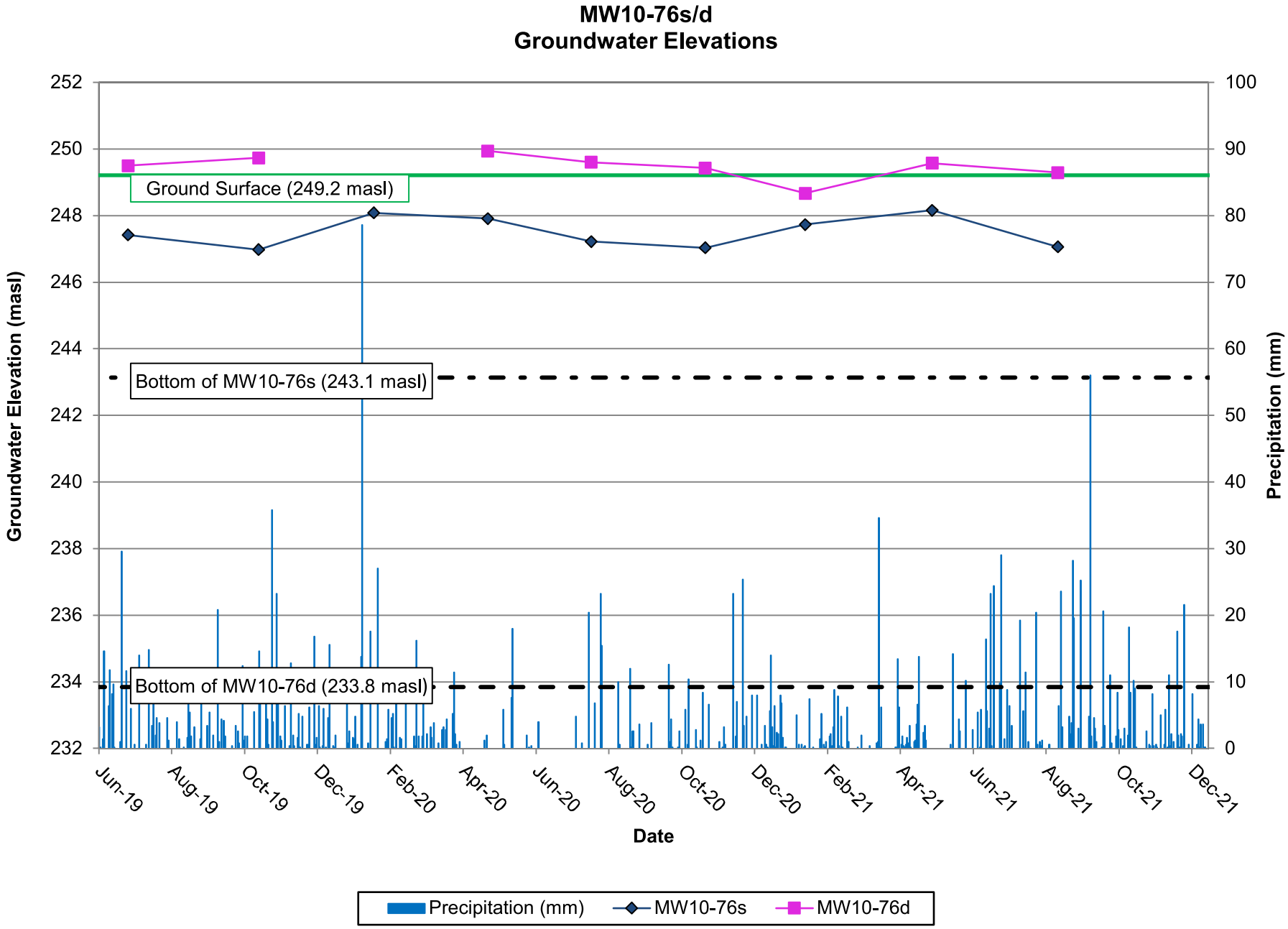
Figure C5-5

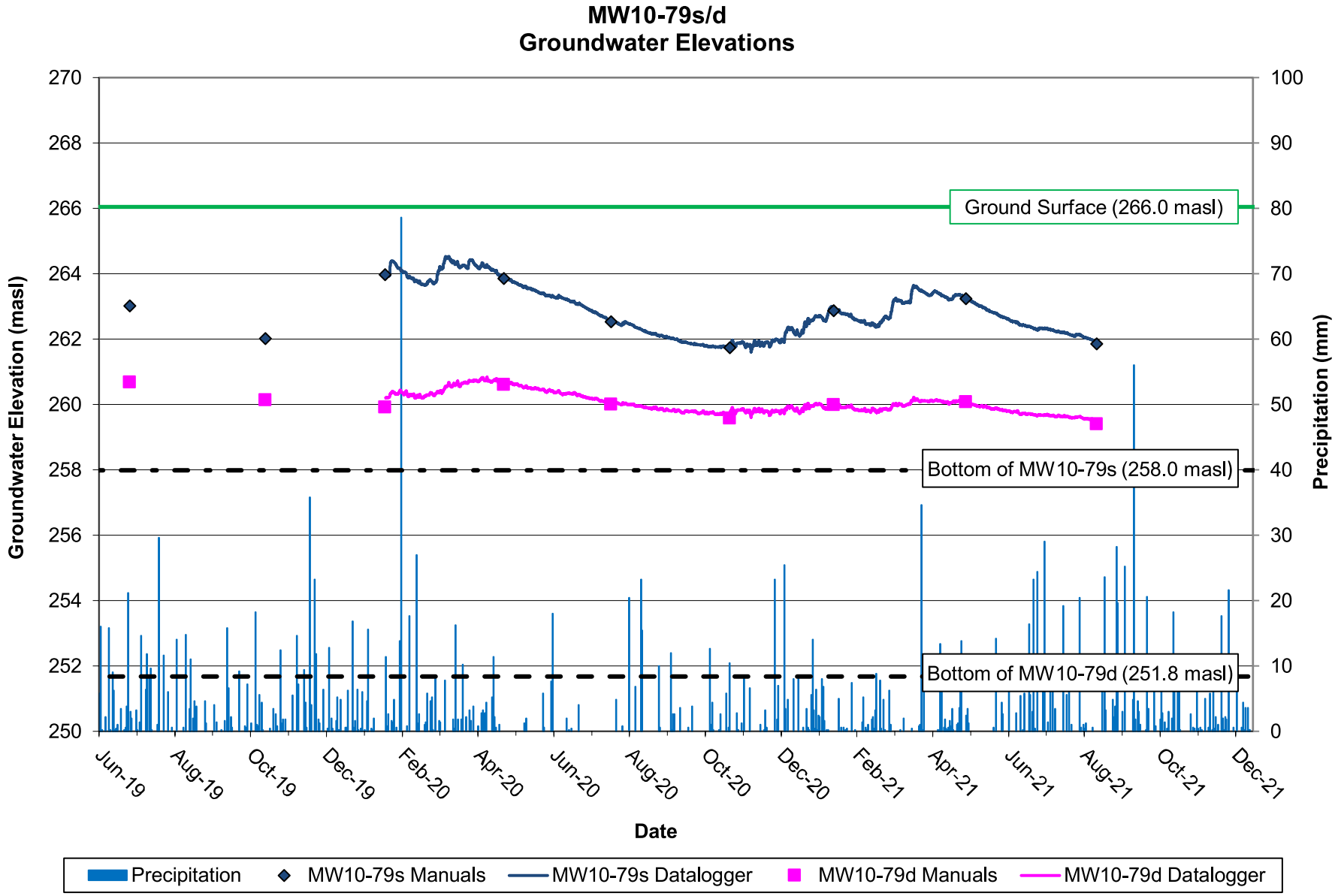

MW10-70
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Date
Ground Surface (259.0 masl)
Bottom of MW10-70 (253.0 masl)
265
263
261
259
257
255
253
251
249
247
245
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Precipitation
MW10-70 Manuals
MW10-70 Datalogger

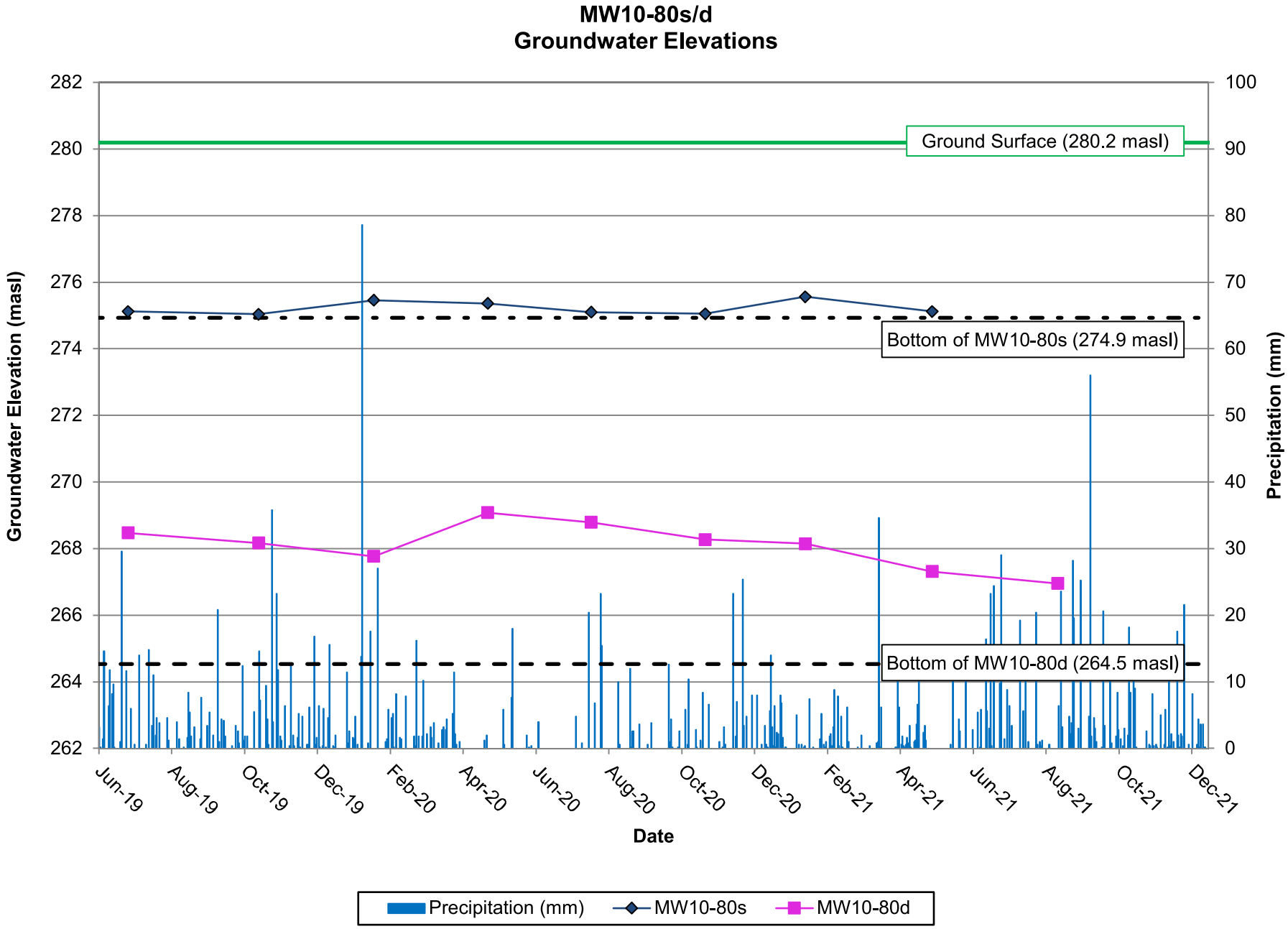


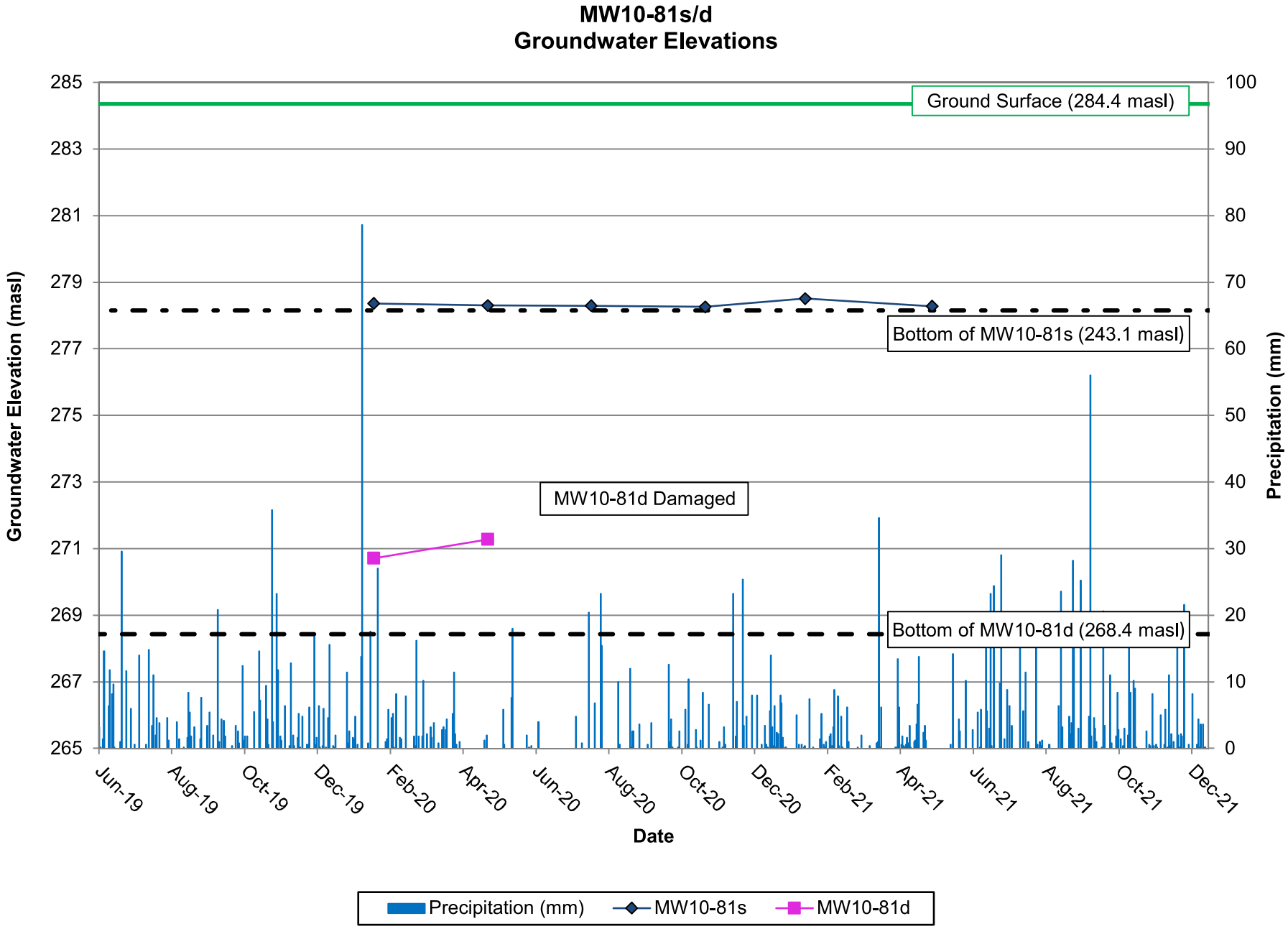
R.J. Burnside & Associates Limited
300050116

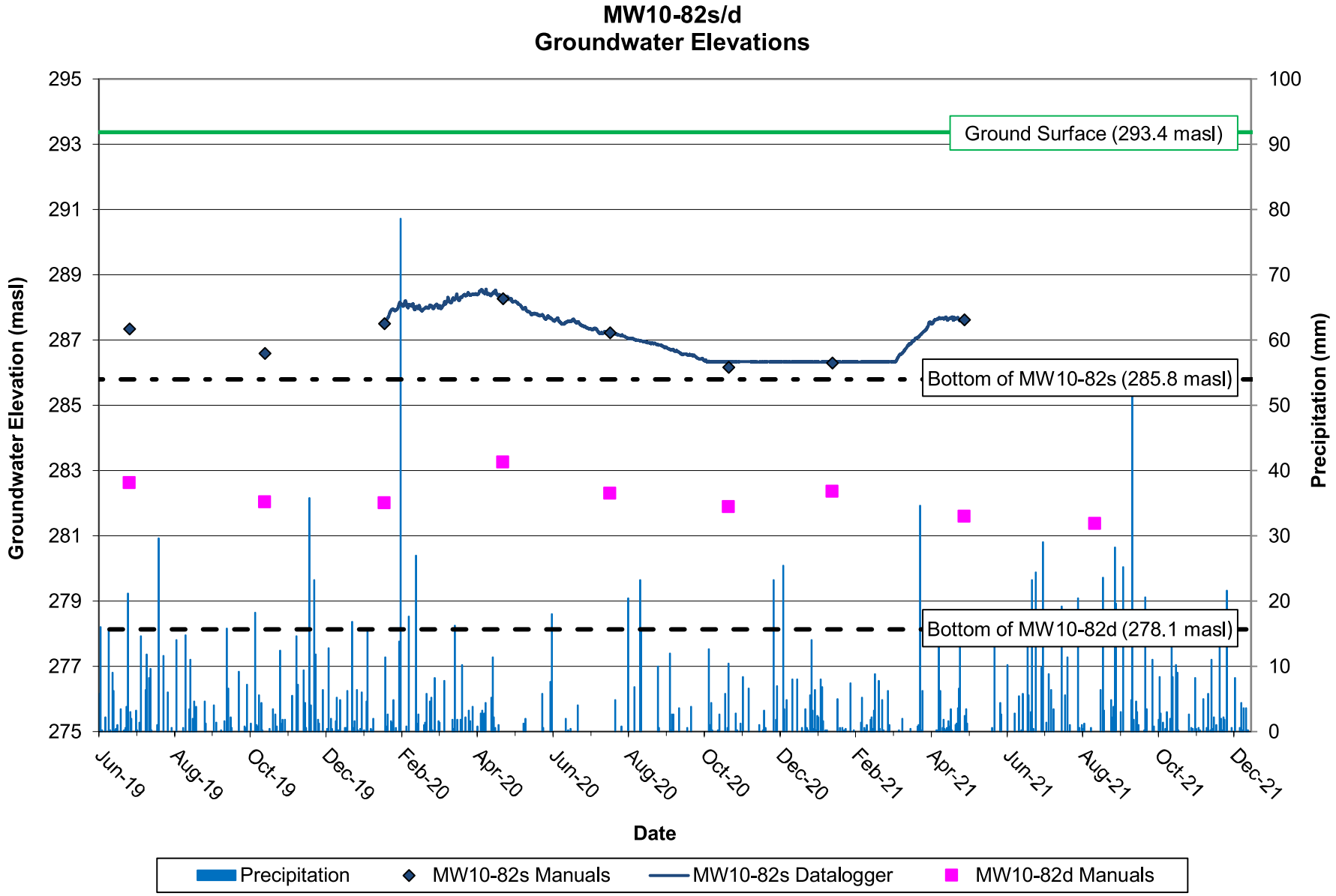
Figure C5-7

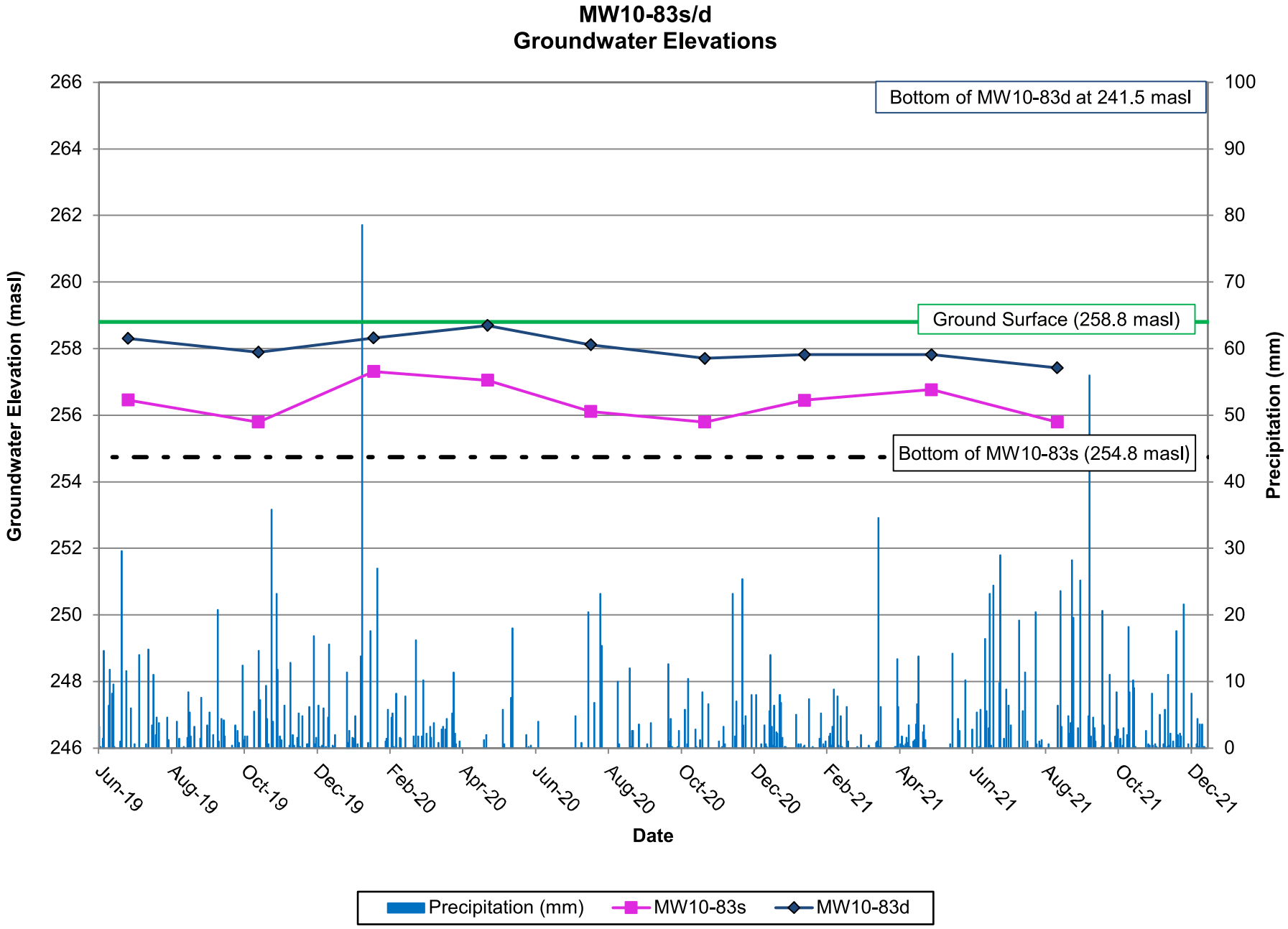

MW10-76s/d
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Date
Ground Surface (249.2 masl)
Bottom of MW10-76s (243.1 masl)
Bottom of MW10-76d (233.8 masl)
252
250
248
246
244
242
240
238
236
234
232
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Precipitation (mm)
MW10-76s
MW10-76d


MW10-79s/d
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Ground Surface (266.0 masl)
Bottom of MW10-79s (258.0 masl)
Bottom of MW10-79d (251.8 masl)
270
268
266
264
262
260
258
256
254
252
250
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Date
Precipitation
MW10-79s Manuals
MW10-79s Datalogger
MW10-79d Manuals
MW10-79d Datalogger


MW10-80s/d
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Date
Ground Surface (280.2 masl)
Bottom of MW10-80s (274.9 masl)
Bottom of MW10-80d (264.5 masl)
282
280
278
276
274
272
270
268
266
264
262
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Precipitation (mm)
MW10-80s
MW10-80d

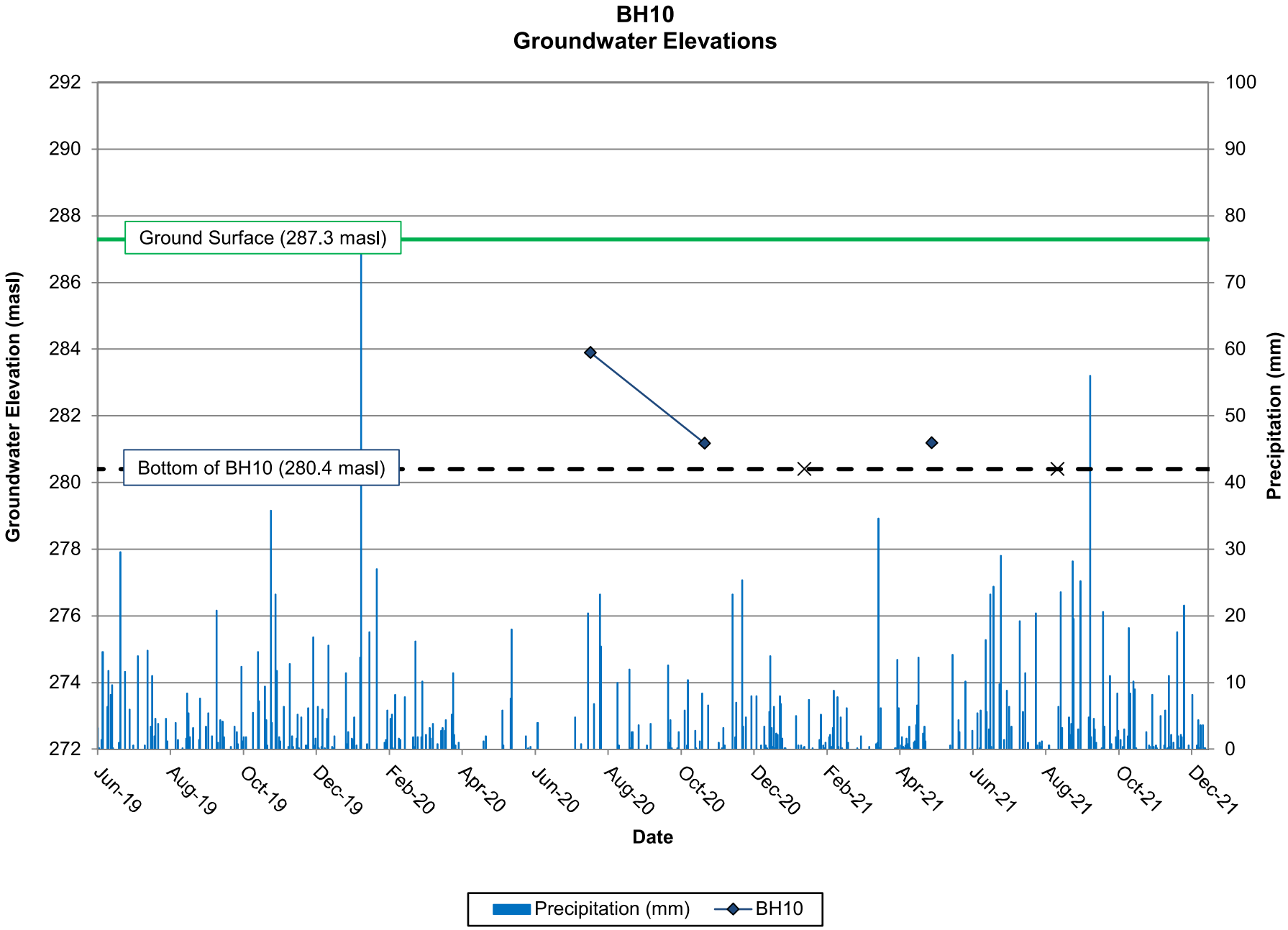

MW10-81s/d
Groundwater Elevations
Ground Surface (284.4 masl)
Bottom of MW10-81s (243.1 masl)
MW10-81d Damaged
Bottom of MW10-81d (268.4 masl)
Groundwater Elevation (masl)
Precipitation (mm)
Date
285
283
281
279
277
275
273
271
269
267
265
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Precipitation (mm)
MW10-81s
MW10-81d

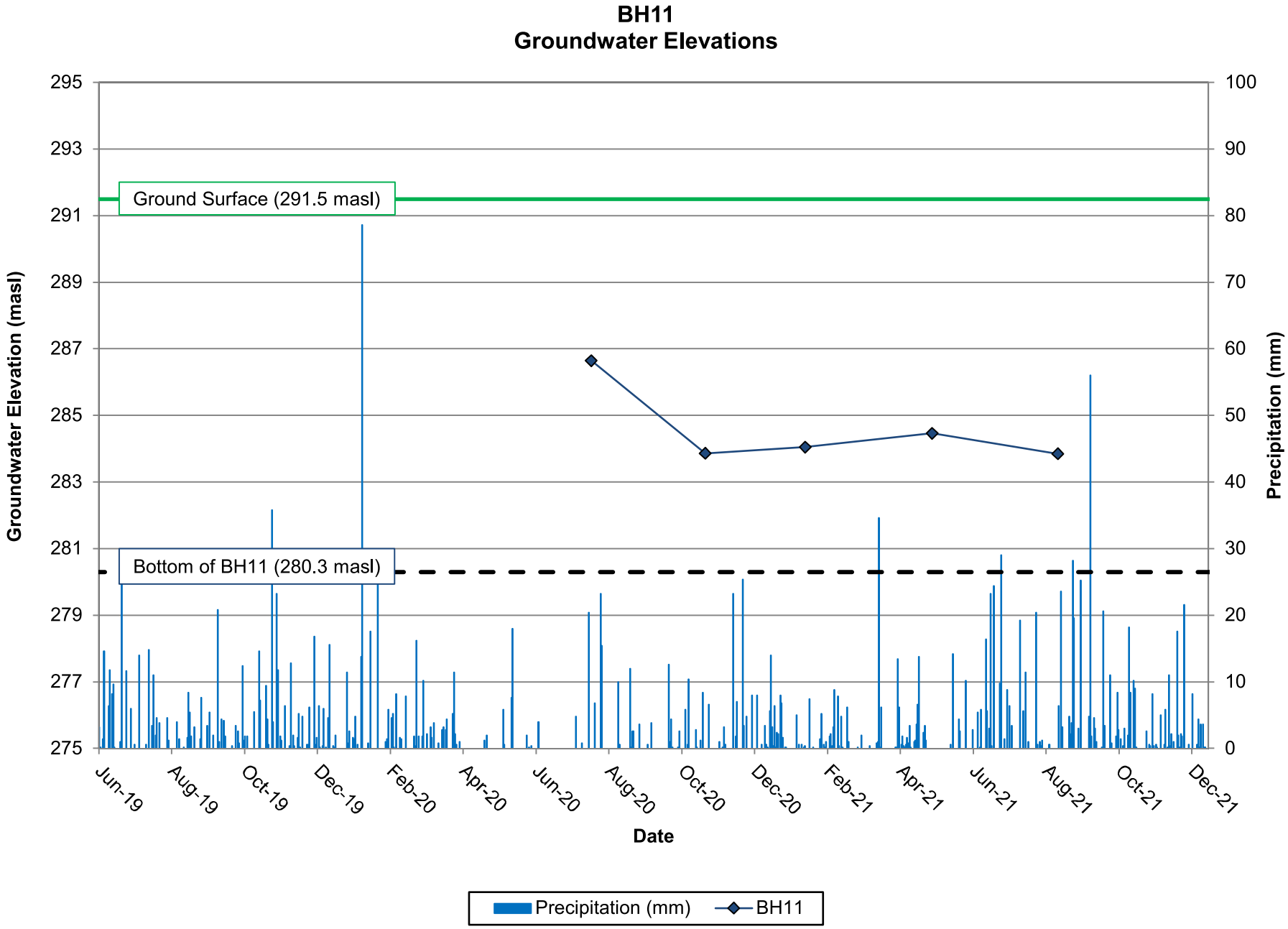

MW10-82s/d
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Date
Ground Surface (293.4 masl)
Bottom of MW10-82s (285.8 masl)
Bottom of MW10-82d (278.1 masl)
295
293
291
289
287
285
283
281
279
277
275
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Precipitation
MW10-82s Manuals
MW10-82s Datalogger
MW10-82d Manuals



R.J. Burnside & Associates Limited
300050116

Figure C5-13


BH10
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Date
Ground Surface (287.3 masl)
Bottom of BH10 (280.4 masl)
292
290
288
286
284
282
280
278
276
274
272
100
90
80
70
60
50
40
30
20
10
0
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Precipitation (mm)
BH10



R.J. Burnside & Associates Limited
300050116

Figure C5-15

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C6

Water Quality

Groundwater Quality Summary

Parameter	Units	Table 1	Table 2	28-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12
				MW10-66	MW10-66	MW10-76S	MW10-76S	MW10-76D	MW10-76D	MW10-78S	MW10-78S	MW10-82S	MW10-82S	MW10-82D	MW10-82D
Calculated Parameters															
Anion Sum	me/L	-	-	8.01	7.84	7.24	8.23	6.01	6.44	6.08	8.99	9.49	9.85	16.3	16.4
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	283	280	277	310	253	280	236	300	305	320	327	360
Calculated TDS	mg/L	-	-	434	432	387	440	334	344	340	486	531	538	955	938
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	3	1.4	3	1.6	3	1.5	2	1.1	3	1.8	2	1.5
Cation Sum	me/L	-	-	7.99	8.18	7.7	8.23	6.42	6.39	5.99	8.67	9.5	9.3	18.5	17.9
Hardness (CaCO3)	mg/L	-	-	380	390	360	390	310	310	290	340	380	360	560	540
Ion Balance (% Difference)	%	-	-	0.11	2.12	3.06	0	3.26	0.45	0.74	1.78	0.07	2.86	6.43	4.39
Langelier Index (@ 20C)	N/A	-	-	1.08	0.805	1.05	0.797	0.976	0.744	0.908	0.65	1.08	0.797	1.11	0.893
Langelier Index (@ 4C)	N/A	-	-	0.832	0.557	0.797	0.549	0.727	0.495	0.659	0.402	0.831	0.55	0.862	0.647
Saturation pH (@ 20C)	N/A	-	-	6.94	6.93	7.01	6.94	7.05	7.02	7.07	6.93	6.95	6.96	6.78	6.75
Saturation pH (@ 4C)	N/A	-	-	7.18	7.18	7.26	7.19	7.3	7.26	7.32	7.18	7.2	7.21	7.02	7
Inorganics															
Total Ammonia-N	mg/L	-	-	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.23	0.17
Conductivity	umho/cm	-	-	753	750	680	780	555	600	580	870	838	900	1710	1800
Dissolved Organic Carbon	mg/L	-	-	0.9	0.66	0.9	0.67	0.8	0.76	0.7	0.93	1.5	1.2	1.7	1.5
Orthophosphate (P)	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH	pH	-	-	8.02	7.74	8.06	7.74	8.02	7.76	7.98	7.58	8.03	7.76	7.89	7.65
Dissolved Sulphate (SO4)	mg/L	-	-	74	71	39	33	38	37	14	20	150	150	74	62
Alkalinity (Total as CaCO3)	mg/L	-	-	286	280	280	310	256	280	238	300	308	330	329	360
Dissolved Chloride (Cl)	mg/L	790	790	26	25	29	33	4	3	8	76	11	9	290	270
Nitrite (N)	mg/L	-	-	<0.01	<0.01	<0.01	0.019	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate (N)	mg/L	-	-	0.1	<0.1	0.2	6	<0.1	<0.1	11	6.7	<0.1	0.16	1.1	1.5
Nitrate + Nitrite	mg/L	-	-	0.1	<0.1	0.2	6	<0.1	<0.1	11	6.7	<0.1	0.16	1.1	1.5
Metals															
Dissolved Aluminum (Al)	ug/L	-	-	<5	<5	15	<5	<5	<5	<5	<5	<5	81	<5	46
Dissolved Antimony (Sb)	ug/L	1.5	6	<0.5	<0.5	<0.5	0.53	<0.5	0.59	<0.5	1.2	<0.5	0.71	<0.5	0.8
Dissolved Arsenic (As)	ug/L	13	25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Barium (Ba)	ug/L	610	1000	59	58	150	140	100	91	44	53	85	79	170	130
Dissolved Beryllium (Be)	ug/L	0.5	4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Boron (B)	ug/L	1700	5000	<10	<10	13	16	<10	<10	<10	<10	18	20	32	29
Dissolved Cadmium (Cd)	ug/L	0.5	2.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Calcium (Ca)	ug/L	-	-	120000	120000	97000	100000	94000	93000	96000	110000	110000	100000	180000	170000
Dissolved Chromium (Cr)	ug/L	11	50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Cobalt (Co)	ug/L	3.8	3.8	0.7	0.78	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5

Groundwater Quality Summary

Parameter	Units	Table 1	Table 2	28-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12	23-Sep-11	7-Nov-12
				MW10-66	MW10-66	MW10-76S	MW10-76S	MW10-76D	MW10-76D	MW10-78S	MW10-78S	MW10-82S	MW10-82S	MW10-82D	MW10-82D
Calculated Parameters															
Dissolved Copper (Cu)	ug/L	5	87	1	<1	<1	<1	<1	<1	1	<1	<1	1.4	1	1.2
Dissolved Iron (Fe)	ug/L	-	-	<100	190	<100	<100	910	790	<100	<100	<100	<100	<100	*<100*
Dissolved Lead (Pb)	ug/L	1.9	10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Magnesium (Mg)	ug/L	-	-	22000	22000	28000	30000	18000	18000	11000	14000	27000	26000	29000	28000
Dissolved Manganese (Mn)	ug/L	-	-	140	220	49	8	35	44	<2	<2	81	11	64	25
Dissolved Molybdenum (Mo)	ug/L	23	70	0.9	1.1	0.9	1.2	<0.5	0.72	<0.5	0.54	**27**	23	1.6	3.1
Dissolved Nickel (Ni)	ug/L	14	100	<1	<1	2	<1	<1	<1	<1	<1	1	<1	1	<1
Dissolved Phosphorus (P)	ug/L	-	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Dissolved Potassium (K)	ug/L	-	-	1200	1200	3000	2300	1200	1000	470	500	2500	2000	4500	3900
Dissolved Selenium (Se)	ug/L	5	10	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Dissolved Silicon (Si)	ug/L	-	-	6700	6600	5400	6500	9300	8700	5700	5700	4700	4200	7100	6600
Dissolved Silver (Ag)	ug/L	0.3	1.5	<0.1	0.22	0.2	<0.1	**8.3**	<0.1	<0.1	<0.1	0.3	<0.1	0.2	<0.1
Dissolved Sodium (Na)	ug/L	490000	490000	8100	10000	11000	10000	4800	4700	6200	41000	42000	48000	170000	160000
Dissolved Strontium (Sr)	ug/L	-	-	240	240	240	270	190	200	160	220	260	270	410	420
Dissolved Thallium (Tl)	ug/L	0.5	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Titanium (Ti)	ug/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5.7
Dissolved Uranium (U)	ug/L	8.9	20	0.5	0.55	**19**	**13**	<0.1	<0.1	0.2	0.32	2.9	2.3	1.3	1.4
Dissolved Vanadium (V)	ug/L	3.9	6.2	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.63	0.7	<0.5
Dissolved Zinc (Zn)	ug/L	160	1100	37	<5	13	<5	11	<5	12	<5	17	<5	12	<5

Notes:

Table 1 = O.Reg. 153/04 Table 1 Criteria (All type of property use, All type soil texture)

Table 2 = O.Reg. 153/04 Table 2 Criteria (All type of property use, Coarse grained soil texture)

19 Red and bold values indicate an exceedance of Table 1 criteria

8.3 Highlighted values indicate an exceedance of Table 2 criteria

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C7

MECP Well Records

Water Well Records

Thursday, July 14, 2022
7:53:17 PM

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
TORONTO CITY	17 618582 4858205 W	2004/03 6809	2			NU	0013 5	6927751 (Z02681) A002587	BRWN SAND SILT DRY 0007 BRWN UNKN SILT SNDY 0012 BRWN SILT SNDY WBRG 0018
VAUGHAN TOWN (KING)	W	2009/01 7241	2.04			MO		7119459 (M04236) A080381	BRWN CSND HARD 0010 BRWN FSND SILT HARD 0018 GREY SILT SOFT 0024
VAUGHAN TOWN (KING) CON 05 031	17 616677 4860526 W	2008/10 7219	6			NU		7115109 (Z88194) A078247 A	GRVL 0104
VAUGHAN TOWN (KING) CON 05 031	17 616706 4860550 W	2008/10 7219	5.38			NU		7115111 (Z88196) A078269 A	GRVL 0084
VAUGHAN TOWN (KING) CON 05 031	17 616656 4860511 W	2008/10 7219	6			NU		7115110 (Z88195) A078253 A	GRVL 0097
VAUGHAN TOWN (VAUGHA	17 617280 4858258 W	2016/05 7230						7267969 (C33915) A203306 P	
VAUGHAN TOWN (VAUGHA	17 618780 4860922 W	2017/10 7215	2	0016		TH	0025 5	7298839 (Z266510) A238274	BRWN CLAY SILT 0013 GREY CLAY SILT 0025 BRWN SAND SILT 0030
VAUGHAN TOWN (VAUGHA	17 619291 4858912 W	2012/01 7247	2	UT 0008		MT	0015 10	7177290 (Z140549) A124052	BRWN SAND GRVL 0002 BRWN CLAY SAND SILT 0008 BRWN CLAY SAND SILT 0025
VAUGHAN TOWN (VAUGHA	17 619098 4859538 W	2017/03 7247	2			TH MO	0010 10	7297804 (Z258647) A223257	BRWN LOAM CLAY FILL 0010 BRWN SAND DNSE 0020
VAUGHAN TOWN (VAUGHA	17 617257 4858288 W	2017/09 7215	2	UT 0025		TH	0088 10	7296806 (Z264248) A232257	BRWN SAND SLTY 0019 GREY CLAY SILT TILL 0085 GREY SAND SLTY WBRG 0098
VAUGHAN TOWN (VAUGHA	17 617136 4860370 W	2017/08 7215	2			TH	0055 10	7296803 (Z264200) A232251	BRWN FILL 0004 BRWN SILT TILL CLAY 0020 GREY SAND 0023 GREY SILT SAND DNSE 0050 GREY SAND SILT 0065
VAUGHAN TOWN (VAUGHA	17 618459 4860801 W	2017/08 7215	2	UT 0017		TH	0015 10	7296802 (Z264242) A232262	BRWN FILL LOOS 0010 BRWN CLAY SAND GRVL 0021 GREY CLAY SILT DNSE 0025
VAUGHAN TOWN (VAUGHA	17 619203 4858511 W	2006/04 6926	1.89 1.89	FR 0023			0018 5 0061 5	6930164 (Z39596) A035732	BRWN LOAM FILL 0005 GREY SAND SILT 0020 GREY SAND SILT 0026 GREY TILL 0041 GREY SAND SILT 0049 GREY CLAY 0066

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA	17 619406 4859348 W	2016/09 7238	1 2			MO	0006 6 0015 10	7273825 (Z243595) A213466	
VAUGHAN TOWN (VAUGHA	17 619419 4859287 W	2016/09 7238	1 2			MO	0006 6 0015 10	7273824 (Z243596) A213467	
VAUGHAN TOWN (VAUGHA	17 619279 4860229 W	2005/10 1129	1.97				0157 10	7041555 (Z48777) A033846	LOAM SILT SAND 0000 BRWN SAND SILT GRVL 0058 BRWN TILL SILT GRVL 0068 BRWN SAND 0113 BRWN SAND SILT 0137 GREY SILT STNS 0152 GREY SILT CLAY 0174 GREY SILT CLAY 0188
VAUGHAN TOWN (VAUGHA	17 619133 4858887 W	2007/04 6926		0023 0030		NU		7043458 (Z70032) A035726 A	BRWN LOAM FILL 0005 GREY SAND SAND SLTY 0033 GREY TILL SAND 0043 GREY SAND SLTY CLAY 0059 GREY TILL SAND CLAY 0066
VAUGHAN TOWN (VAUGHA	17 617009 4859007 W	2005/06 6032	0.20			NU	0020 5	6929126 (Z05306) A005294	BRWN CLAY SAND 0025
VAUGHAN TOWN (VAUGHA	17 619356 4860689 W	2007/04 7219				NU		7043889 (Z73222) A053243 A	BRWN CLAY FILL 0032
VAUGHAN TOWN (VAUGHA	17 619133 4858887 W	2006/04 6926	1.89 1.89	FR 0024			0018 5 0061 5	6930163 (Z39598) A035726	BRWN LOAM FILL 0005 GREY SAND SILT 0033 GREY TILL SAND 0043 GREY SAND SILT 0059 GREY TILL SAND DRY 0066
VAUGHAN TOWN (VAUGHA	17 619576 4858709 W	2016/05 7383	2			TH	0020 15	7264576 (Z231934) A203595	
VAUGHAN TOWN (VAUGHA	17 619596 4858753 W	2016/05 7383	2			TH	0020 15	7264574 (Z231932) A203593	
VAUGHAN TOWN (VAUGHA	17 619576 4858711 W	2016/05 7383	2	0055			0060 20	7264567 (Z231995) A203588	
VAUGHAN TOWN (VAUGHA	17 619595 4858755 W	2016/05 7383	2	0055		TH	0060 15	7264566 (Z231994) A203589	
VAUGHAN TOWN (VAUGHA	17 616514 4859949 W	2014/08 7230						7239172 (C29237) A167969 P	
VAUGHAN TOWN (VAUGHA	17 619346 4858812 W	2019/03 7241	2		///:	MT	0038 10	7341292 (Z310369) A265641	BLCK ---- 0000 BRWN SAND 0048
VAUGHAN TOWN (VAUGHA	17 616636 4858896 W	2014/02 7472	2.04			MO	0045 10	7218773 (Z185011) A161378	BRWN FSND SILT PCKD 0006 GREY SILT FSND PCKD 0055

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA	17 616680 4858482 W	2014/02 7472	2.04			MO	0045 10	7218772 (Z185012) A161379	BRWN FSND SILT PCKD 0006 GREY SILT FSND PCKD 0055
VAUGHAN TOWN (VAUGHA	17 617204 4858249 W	2014/03 7215						7218436 (C25475) A118029 A P	
VAUGHAN TOWN (VAUGHA	17 617204 4858249 W	2012/04 7215						7194695 (C17441) A121138 P	
VAUGHAN TOWN (VAUGHA	17 619203 4858511 W	2007/04 6926				NU		7043459 (Z70033) A035732 A	GREY LOAM FILL 0005 GREY SAND SLTY 0020 GREY SAND SLTY TILL 0026 GREY TILL 0041 GREY SAND SLTY CLAY 0049 GREY SAND CLYY TILL 0066
VAUGHAN TOWN (VAUGHA	17 618588 4860367 W	2018/11 7464	2		///:	MO	0015 5	7331137 (Z282358) A250087	BRWN LOAM 0001 BRWN SILT SAND 0015 BRWN SAND 0020
VAUGHAN TOWN (VAUGHA	17 619279 4860229 W	2005/10 1129						7049157 (Z65277) A033846 A	
VAUGHAN TOWN (VAUGHA	17 617320 4858338 W	2018/06 7215	40			TH	0025 10	7315922 (Z285595) A246850	FILL 0003 BRWN SILT CLAY 0022 BRWN SILT SAND HARD 0025
VAUGHAN TOWN (VAUGHA	17 617315 4858337 W	2018/06 7215	40			TH	0015 10	7315924 (Z285594) A246858	FILL 0003 BRWN SILT CLAY HARD 0015
VAUGHAN TOWN (VAUGHA	17 616642 4860454 W	2007/08 6809	2		///:	MO		7052347 (Z63346) A057034	BRWN SILT TILL DRY 0010 GREY SILT TILL 0020
VAUGHAN TOWN (VAUGHA	17 616981 4859809 W	2018/11 7464	2		///:	MO	0015 5	7331138 (Z282357) A250688	BRWN SILT 0020
VAUGHAN TOWN (VAUGHA	17 617316 4858343 W	2018/09 7201	2			MO	0025 10	7320982 (Z287515) A239862	BRWN SILT SAND 0035
VAUGHAN TOWN (VAUGHA	17 617317 4858344 W	2018/09 7201	2			MO	0025 10	7320983 (Z287514) A239863	BRWN SILT SAND 0035
VAUGHAN TOWN (VAUGHA	17 617329 4858351 W	2018/09 7201	2			MO	0026 10	7320984 (Z287512) A239865	BRWN SILT SAND 0036
VAUGHAN TOWN (VAUGHA	17 619393 4858824 W	2019/03 7241	2		///:	MT	0040 10	7341384 (Z310370) A263416	BLCK ---- 0000 BRWN SAND 0050

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA	17 616679 4859488 W	2017/10 7472	0.80			MO	0015 10	7305215 (Z269053) A241086	BRWN LOAM LOOS 0001 BRWN CLAY SAND PCKD 0025
VAUGHAN TOWN (VAUGHA	17 617608 4858284 W	2007/02 7247	1.57			NU	0010 5	7049063 (Z70015) A013323	BRWN FILL LOAM 0000 GREY CLAY TILL SLTY 0015
VAUGHAN TOWN (VAUGHA	17 617321 4858350 W	2018/06 7215	40			TH	0015 10	7315923 (Z285592) A246859	FILL 0003 BRWN SILT CLAY HARD 0015
VAUGHAN TOWN (VAUGHA 03 028	17 619005 4859934 W	2006/08 7147	1.25			NU	0005 10	6930637 (Z53705) A041529	BLCK LOAM 0002 BRWN CLAY SLTY TILL 0015
VAUGHAN TOWN (VAUGHA 04 025	17 619090 4858612 W	2004/12 6875	1.25	FR 0013	///:	NU	0055 5	6928724 (Z22816) A022555	BRWN SILT GRVL SAND 0015 GREY TILL CLAY GRVL 0030
VAUGHAN TOWN (VAUGHA 04 025	17 619093 4858603 W	2004/12 6875	1.25	FR 0050	///:	NU	0055 5 0025 5	6928725 (Z16928) A022554	BRWN SILT GRVL SAND 0015 GREY TILL 0050 GREY SAND SILT 0060
VAUGHAN TOWN (VAUGHA 04 025	17 619094 4858600 W	2005/01 6875	3.94	FR 0050	23/43/1/24:0		0040 20	6928726 (Z22815) A022556	BRWN SILT GRVL SAND 0015 GREY TILL CLAY 0050 GREY SAND SILT 0060
VAUGHAN TOWN (VAUGHA 04 025	17 617423 4857936 W	2004/05 1663	14.1		///:	NU		6929024 (Z24744) A	
VAUGHAN TOWN (VAUGHA 04 031	17 618171 4860799 W	2005/05 1663	6.21	FR 0131	81/82/100/1:0	DO IR	0151 8	6929027 (Z24750) A013036	BLCK LOAM 0001 BRWN CLAY SAND 0012 GREY CLAY GRVL 0067 GREY MSND 0078 GREY CLAY CLAY 0088 BRWN MSND FSND 0149 GREY MSND GRVL 0159
VAUGHAN TOWN (VAUGHA 05 031	17 616371 4860195 W	1987/08 1663	6	FR 0078	13/115/90/1:0	DO	0120 3	6919295 (NA)	BLCK LOAM 0002 BRWN CLAY GRVL 0013 BLUE CLAY 0026 GREY FSND 0032 BLUE CLAY SAND GRVL 0078 GREY FSND 0096 GREY MSND FSND 0104 GREY MSND 0115 GREY CSND 0125 GREY FSND 0136 BLUE CLAY SAND 0140
VAUGHAN TOWN (VAUGHA 121	17 619085 4860382 W	2005/06 4868	30			ST		6929238 (Z28860) A	
VAUGHAN TOWN (VAUGHA 5 27	17 616903 4858768 W	2007/10 7219			///:	NU		7100630 (Z67281) A060717 A	BRWN CLAY SAND 0017 0018
VAUGHAN TOWN (VAUGHA 5 27	17 616907 4858783 W	2007/10 7219			15///:	NU		7100633 (Z67280) A060721 A	GRVL 0084
VAUGHAN TOWN (VAUGHA CON 02 026	17 618755 4858820 W	1981/09 2801	6 2		35///:	NU	0035 31	6916545 ()	BRWN SILT CLAY FSND 0006 BRWN FSND FGVL 0013 BRWN SILT FSND SNDS 0015 BRWN FSND 0034 FSND SLTY 0044 GREY SILT CLAY STKY 0055 GREY SILT CLAY SOFT 0064 GREY SILT CLAY HARD 0067

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 03 024	17 619415 4858523 W	1980/04 1663	5	FR 0160	31/165/50/0:45	CO	0174 6	6915790 ()	BRWN CLAY SAND GRVL 0047 BLUE CLAY 0058 GREY FSND CLAY 0120 BLUE CLAY 0131 GREY FSND SILT 0162 GREY CSND MGRD 0182 GREY FSND 0187
VAUGHAN TOWN (VAUGHA CON 03 025	17 619346 4858811 W	2019/03 7241	2		///:	MT	0025 10	7329869 (Z308138) A265652	BLCK ---- 0000 BRWN SAND 0018 BRWN SAND 0026 GREY SAND SILT 0035
VAUGHAN TOWN (VAUGHA CON 03 025	17 619394 4858825 W	2019/03 7241	2		///:	MT	0020 10	7329870 (Z308139) A265653	BLCK ---- 0000 BRWN SAND 0016 BRWN SAND 0020 BRWN SAND SILT 0026 GREY SILT SAND 0030
VAUGHAN TOWN (VAUGHA CON 03 025	17 619615 4858783 W	1978/08 1663	5	FR 0150	62/150/7/2:0	CO	0155 3	6914980 ()	BRWN CLAY SAND 0094 YLLW CLAY SAND GRVL 0120 GREY FSND 0125 BLUE CLAY 0132 GREY FSND MSND 0172
VAUGHAN TOWN (VAUGHA CON 03 025	17 619235 4858813 W	1978/11 3108	6	UK 0135	35/132/10/2:0	IN	0137 3	6914766 ()	BLUE CLAY FILL 0007 YLLW CLAY 0022 YLLW CLAY SNDY 0055 YLLW SAND 0060 YLLW GRVL CLAY SNDY 0092 BRWN SAND 0105 BRWN SAND 0140
VAUGHAN TOWN (VAUGHA CON 03 025	17 619665 4858873 W	1976/11 3108	6	UK 0106 FR 0205	57/216/25/5:0	IN	0207 10	6913686 ()	BRWN CLAY STNS 0012 BRWN SAND 0075 BRWN SAND CLAY 0081 BLUE CLAY GRVL 0106 BLUE SAND 0115 BLUE CLAY GVLY 0144 BLUE CSND 0155 BLUE CLAY SNDY 0205 BLUE FSND 0217
VAUGHAN TOWN (VAUGHA CON 03 025	17 619413 4858852 W	2019/03 7241	2		///:	MT	0036 10	7329871 (Z308148) A265654	BLCK ---- 0000 BRWN SAND 0022 BRWN SAND SILT 0040 BRWN SAND 0046
VAUGHAN TOWN (VAUGHA CON 03 025	17 619435 4858783 W	1977/07 3108	6	FR 0150	57/170/30/5:0	CO	0170 8	6914110 ()	BRWN CLAY 0003 BRWN CLAY SNDY 0017 BRWN CLAY GVLY SNDY 0085 BLUE CLAY SNDY 0101 BRWN SAND CLAY LYRD 0145 BRWN CSND 0178
VAUGHAN TOWN (VAUGHA CON 03 025	17 619620 4858703 W	2016/05 7383	2	0055		TH	0060 20	7264573 (Z231920) A203590	
VAUGHAN TOWN (VAUGHA CON 03 025	17 619622 4858702 W	2016/05 7383	2			TH	0020 15	7264575 (Z231933) A203594	SAND
VAUGHAN TOWN (VAUGHA CON 03 025	17 619493 4858932 W	1964/06 1622	4	FR 0110	83/114/15/20:0	IN	0118 8	6906485 ()	LOAM 0001 BRWN CLAY MSND 0080 QSND 0099 GREY FSND 0110 MSND CSND 0133
VAUGHAN TOWN (VAUGHA CON 03 025	17 619584 4858794 W	1961/06 2314	5	FR 0131 FR 0167	110///:	NU		6906484 ()	BRWN CLAY MSND 0075 BLUE CLAY 0100 HPAN 0122 FSND MUCK 0131 QSND 0138 MSND CLAY 0145 BLUE CLAY 0167 MSND 0173 FSND MUCK 0180
VAUGHAN TOWN (VAUGHA CON 03 025	17 619406 4858840 W	2019/03 7241	2		///:	MT	0040 10	7329872 (Z308147) A265657	BLCK ---- 0000 BRWN SAND 0020 BRWN SAND SILT 0045 BRWN SAND 0050
VAUGHAN TOWN (VAUGHA CON 03 026	17 619450 4859169 W	2016/09 7238	1 2			MO	0006 6 0015 10	7273823 (Z243597) A213464	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619454 4859090 W	2016/09 7238	1 2			MO	0006 6 0015 10	7273822 (Z243598) A213465	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 03 026	17 619438 4859146 W	2016/09 7238	2			MO	0072 10	7273821 (Z243600) A175245	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619449 4859173 W	2016/09 7238				MO		7273816 (Z243592) A	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619444 4859268 W	2016/09 7238				MO		7273815 (Z243593) A	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619424 4859390 W	2016/09 7238	1 2			MO	0006 6 0015 10	7273826 (Z243594) A213046	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619195 4859151 W	2016/01 7147						7256357 (C30944) P	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619181 4859155 W	2014/11 6946						7232578 (C26365) A175097 P	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619397 4858988 W	1992/01 6518	2	UK 0049		NU		6921857 (116575)	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619598 4859072 W	1992/01 6518	2	FR 0083		NU		6921856 (116576)	
VAUGHAN TOWN (VAUGHA CON 03 026	17 619362 4859178 W	1949/05 1622	2	FR 0050 FR 0080	20//5/2:0	DO ST	0095 5	6906486 ()	LOAM 0001 CLAY 0050 GRVL MSND CLAY 0080 GRVL MSND 0100
VAUGHAN TOWN (VAUGHA CON 03 027	17 619378 4859612 W	1955/09 1622	4	FR 0134	90/105/3/14:0	DO	0130 4	6906487 ()	PRDG 0006 CLAY 0018 BRWN MSND 0130 BLCK MSND 0134
VAUGHAN TOWN (VAUGHA CON 03 027	17 619114 4859542 W	2017/11 7147	1.97				0010 10	7300082 (Z271245) A223257 A	
VAUGHAN TOWN (VAUGHA CON 03 027	17 619328 4859565 W	2017/11 7147	1.97				0010 10	7300083 (Z271244) A	
VAUGHAN TOWN (VAUGHA CON 03 027	17 619172 4859468 W	2017/11 7147	1.97				0010 10	7300084 (Z271243) A	
VAUGHAN TOWN (VAUGHA CON 03 028	17 618995 4860083 W	1969/07 5203	5	FR 0153	54/145/12/8:0	DO	0164 4	6909496 ()	BRWN CLAY 0039 BLUE SILT CLAY 0047 BLUE CLAY 0153 QSND 0160 MSND 0168
VAUGHAN TOWN (VAUGHA CON 03 028	17 619220 4860009 W	1959/09 2801	5					6906490 ()	LOAM 0001 CLAY MSND GRVL 0043 MSND CLAY 0062 FSND CLAY 0162 MSND 0185 MSND SILT CLAY 0394 CLAY 0424
VAUGHAN TOWN (VAUGHA CON 03 028	17 619395 4860021 W	1961/02 1622	4	FR 0125	90/130/2/8:0	DO	0125 4	6906492 ()	PRDG 0006 BRWN CLAY 0019 STNS GRVL 0030 BRWN MSND 0080 BLUE CLAY 0090 BLUE CLAY MSND 0105 BRWN MSND 0118 FSND 0130

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 03 028	17 619315 4860143 W	1977/06 2801	1			NU CO		6914316 ()	BRWN CLAY 0007 BRWN FSND 0009 BRWN CLAY 0018 GREY CLAY STNS 0056 GRVL SAND 0063 BRWN FSND PCKD 0103 FSND SILT 0107 SAND FGVL 0112 FSND 0118 GREY CLAY FSND SLTY 0134 FSND SLTY LOOS 0137 GREY CLAY SAND FGVL 0141 GREY CLAY HARD 0153 SAND FGVL CLAY 0158 SAND FGVL CLAY 0173 FSND CLAY LYRD 0179 SAND FGVL 0184 FSND CLAY LYRD 0197 FSND FGVL CLAY 0262
VAUGHAN TOWN (VAUGHA CON 03 028	17 619066 4859735 W	1986/05 1663	6	FR 0130	97/138/4/1:30	DO	0141 3	6918525 (NA)	BLCK LOAM 0001 BRWN CLAY GRVL 0014 BLUE CLAY GRVL 0023 BRWN CLAY SAND 0062 BLUE CLAY GRVL 0129 GREY MSND 0146 BLUE CLAY 0150
VAUGHAN TOWN (VAUGHA CON 03 028	17 619056 4859772 W	1955/01 4823	4	FR 0124	100/108/4/48:0	DO	0129 4	6906489 ()	LOAM 0002 YLLW CLAY STNS 0028 YLLW CLAY MSND 0035 YLLW CLAY STNS 0045 YLLW CLAY MSND 0085 BLUE CLAY MSND SILT 0124 MSND SILT 0129 CSND 0133
VAUGHAN TOWN (VAUGHA CON 03 028	17 619048 4859740 W	7147		UT 0020				7319908 (Z271380) A	
VAUGHAN TOWN (VAUGHA CON 03 029	17 619069 4860324 W	1959/09 2801	5					6906493 ()	LOAM 0001 CLAY MSND 0006 MSND GRVL 0013 CLAY MSND GRVL 0156 FSND CLAY 0177 MSND SILT CLAY 0210 CLAY MSND 0347
VAUGHAN TOWN (VAUGHA CON 03 030	17 618952 4860771 W	1954/08 1622	4	FR 0164	120/140/8/2:0	DO	0172 4	6906496 ()	LOAM 0002 BLUE CLAY 0025 YLLW MSND 0027 BLUE CLAY MSND STNS 0067 BLUE CLAY STNS 0090 BLUE CLAY 0164 BLUE MSND 0176
VAUGHAN TOWN (VAUGHA CON 03 031	17 618887 4861302 W	1960/01 4102	30	FR 0040	40//1/:	DO ST		6906507 ()	BLUE CLAY MSND 0084
VAUGHAN TOWN (VAUGHA CON 03 031	17 618885 4861160 W	1994/09 1663	6	FR 0114	118/144/5/1:30	ST	0141 3	6923114 (140689)	BRWN CLAY SAND 0023 BLUE CLAY GRVL SAND 0034 BRWN CLAY 0052 BRWN FSND 0059 BLUE CLAY SAND 0108 GREY MSND 0114 GREY SAND CLAY 0121 GREY FSND 0144 GREY SAND SILT 0157 BLUE CLAY SAND SILT 0168
VAUGHAN TOWN (VAUGHA CON 03 031	17 618876 4861126 W	1961/09 2407	4	FR 0150	120/130/5/24:0	DO ST	0153 3	6906508 ()	PRDG 0070 BLUE CLAY 0090 BLUE MSND CLAY 0140 FSND 0150 CSND 0156
VAUGHAN TOWN (VAUGHA CON 04 024	17 619105 4858426 W	1992/02 6518	2	FR 0015		NU		6921852 (116585)	
VAUGHAN TOWN (VAUGHA CON 04 024	17 617328 4857881 W	1989/08 1663	6	FR 0063	41/69/12/1:45	DO	0069 3	6921125 (26945)	BRWN LOAM 0001 BRWN CLAY GRVL 0023 BRWN SAND 0063 GRVL 0077 BLUE CLAY GRVL 0095
VAUGHAN TOWN (VAUGHA CON 04 025	17 617611 4858035 W	2003/12 1663	6.21	FR 0089	-2/40/21/1:0	DO	0088 5	6927548 (Z07467) A001428	BRWN CLAY 0012 GREY CLAY 0026 GREY FSND SILT 0088 GREY MSND CSND 0093 GREY FSND SILT 0104
VAUGHAN TOWN (VAUGHA CON 04 025	17 619166 4858852 W	1992/01 6518	2	FR 0035		NU		6921858 (116574)	
VAUGHAN TOWN (VAUGHA CON 04 025	17 618595 4858603 W	1972/11 3108	7	UK 0115	23/117/3/3:0	DO	0116 3	6911183 ()	BLCK LOAM 0003 BRWN CLAY SAND 0022 BLUE CLAY GRVL 0069 BLUE CLAY SAND 0078 BLUE CLAY 0115 BLUE FSND 0119
VAUGHAN TOWN (VAUGHA CON 04 025	17 617361 4857864 W	2009/09 3108				NU		7131756 (Z66970) A	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 04 025	17 619203 4858673 W	2006/04 6926	1.89 1.89	FR 0023			0018 5 0061 5	6930162 (Z39597) A035733	BRWN LOAM FILL 0005 GREY SAND SILT 0018 GREY SAND SILT 0028 GREY TILL SAND 0043 GREY SILT CLAY 0051 GREY SAND SAND 0066
VAUGHAN TOWN (VAUGHA CON 04 025	17 618650 4858650 W	1997/04 3108	30		10///:	NU		6923907 (166681) A	PRDG 0030
VAUGHAN TOWN (VAUGHA CON 04 025	17 619203 4858673 W	2007/04 6926				NU		7043460 (Z70034) A035733 A	BRWN LOAM FILL 0005 GREY SAND SLTY 0018 GREY SAND SLTY 0028 GREY TILL SAND 0043 GREY SAND SLTY CLAY 0051 GREY TILL SNDY CLAY 0066
VAUGHAN TOWN (VAUGHA CON 04 025	17 618885 4858745 W	1992/01 6518	2	FR 0023		NU		6921859 (116573)	
VAUGHAN TOWN (VAUGHA CON 04 025	17 617362 4858220 W	1974/10 1663	5	FR 0060	45/70/3/2:0	DO	0074 4	6912549 ()	BRWN SAND FILL 0006 GREY CLAY GRVL 0019 BLUE CLAY 0029 BLUE CLAY GRVL 0036 BRWN FSND 0064 GREY FSND MSND 0078 GREY FSND CLAY 0080
VAUGHAN TOWN (VAUGHA CON 04 025	17 617250 4858268 W	1954/12 1622	4	FR 0078	33/46/8/4:0	DO	0073 5	6906599 ()	FILL 0003 CLAY 0042 FSND 0073 CSND 0078
VAUGHAN TOWN (VAUGHA CON 04 025	17 617275 4858179 W	2004/02 3108				NU		6927664 (Z02637) A	
VAUGHAN TOWN (VAUGHA CON 04 025	17 617315 4858073 W	1976/04 1663	5	FR 0070	46/68/3/1:30	DO	0071 4	6913862 ()	BRWN SAND CLAY FILL 0003 YLLW CLAY 0017 BLUE CLAY 0026 YLLW CLAY GRVL 0031 BRWN FSND 0064 BRWN MSND 0068 GREY MSND 0075 BLUE CLAY 0081 GREY FSND 0086 BLUE CLAY 0091 GREY FSND 0097
VAUGHAN TOWN (VAUGHA CON 04 025	17 617214 4858506 W	1967/07 1622	5	FR 0078	-1/60/10/2:0	DO	0092 4	6906601 ()	YLLW CLAY 0029 BLUE CLAY 0069 FSND 0078 GRVL MSND 0096
VAUGHAN TOWN (VAUGHA CON 04 025	17 617335 4858303 W	1978/07 1663	5	FR 0075	17/80/12/1:0	DO	0084 3	6914984 ()	BRWN LOAM 0001 YLLW CLAY GRVL 0031 YLLW SAND CLAY 0047 GREY FSND 0057 BLUE CLAY 0061 GREY SAND CLAY LYRD 0073 GREY FSND 0087 BLUE CLAY SAND 0104 GREY FSND 0133 BLUE CLAY 0142
VAUGHAN TOWN (VAUGHA CON 04 025	17 619036 4858618 W	7147						7333536 (C42923) A269762 P	
VAUGHAN TOWN (VAUGHA CON 04 025	17 618885 4858730 W	1999/03 1663				NU		6925062 (198191) A	BRWN CLAY 0005 YLLW UNKN 0020 BRWN CLAY SNDY 0109 YLLW UNKN 0118
VAUGHAN TOWN (VAUGHA CON 04 025	17 617638 4858258 W	1965/10 5420	30	FR 0020	14///:	DO		6906600 ()	LOAM 0001 YLLW CLAY 0012 BLUE CLAY 0020 MSND 0032
VAUGHAN TOWN (VAUGHA CON 04 026	17 617255 4858443 W	1978/06 3903	6	UK 0073	10/75/4/4:0	DO	0073 6	6914590 ()	BRWN CLAY STNS HARD 0051 BRWN SAND STNS LOOS 0079
VAUGHAN TOWN (VAUGHA CON 04 026	17 617215 4858443 W	1978/10 3108	6	UK 0060	14/60/10/2:0	DO	0067 3	6914763 ()	LOAM 0003 YLLW CLAY HARD STNY 0033 YLLW CLAY SNDY 0043 GREY CLAY SNDY 0059 GREY SAND 0070
VAUGHAN TOWN (VAUGHA CON 04 026	17 617219 4858634 W	1988/05 3108	6	FR 0051	11/67/10/2:0	DO	0069 3	6919616 (26272)	BRWN SAND 0005 BRWN CLAY SAND STNS 0012 BRWN SAND 0015 BRWN CLAY SAND 0020 BLUE CLAY 0039 BLUE CLAY SNDY 0045 BLUE CLAY GRVL 0051 BLUE SAND 0072

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 04 026	17 617245 4858460 W	1987/06 1663	6	FR 0083	7/82/20/1:0	DO	0086 3	6919304 (09154)	BLCK LOAM 0002 BRWN CLAY GRVL 0024 BRWN SAND 0032 BLUE CLAY 0048 GREY FSND 0058 GREY MSND 0081 BLUE CLAY 0083 GREY CSND 0095
VAUGHAN TOWN (VAUGHA CON 04 026	17 617261 4858502 W	2011/09 6915	2.46		33/138/2/1:0	DO	0246 13	7173160 (Z42910) A038444	BRWN CLAY STNS 0066 BLUE CLAY SILT CLAY 0197 BRWN SAND FSND 0262
VAUGHAN TOWN (VAUGHA CON 04 026	17 619128 4858881 W	1960/07 1622	4	FR 0050	20/35/3/15:0	DO	0051 4	6906602 ()	LOAM 0001 BRWN MSND 0022 GRVL 0026 BRWN MSND 0045 FSND 0055
VAUGHAN TOWN (VAUGHA CON 04 026	17 618775 4858825 W	1985/12 1663	6	FR 0075	14/80/12/1:0	DO	0082 3	6918107 ()	BRWN CLAY GRVL 0013 BLUE CLAY 0020 BLUE CLAY SAND GRVL 0023 GREY FSND 0029 BLUE CLAY SAND 0061 GREY CLAY FSND 0073 GREY MSND 0095
VAUGHAN TOWN (VAUGHA CON 04 026	17 617315 4858523 W	1981/06 3903	6	FR 0070	11/70/20/4:0	DO	0074 3	6915931 ()	BRWN CLAY STNS HARD 0049 BRWN SAND STNS LOOS 0077
VAUGHAN TOWN (VAUGHA CON 04 026	17 617734 4858871 W	1961/07 1622	4	FR 0073	30/77/3/8:0	DO	0073 4	6906603 ()	PRDG 0006 BRWN CLAY 0038 BLUE CLAY GRVL 0065 BLUE CLAY 0071 FSND 0077
VAUGHAN TOWN (VAUGHA CON 04 026	17 617965 4858823 W	1981/11 3108	6	UK 0090	3/10/20/0:30	DO	0109 3	6916027 ()	BRWN CLAY GVLY 0018 BLUE CLAY GVLY 0038 BLUE SAND 0041 BLUE CLAY SNDY 0060 BLUE CLAY 0065 BLUE SILT 0083 BLUE SAND 0112
VAUGHAN TOWN (VAUGHA CON 04 026	17 618719 4858820 W	2018/09 1663						7326793 (Z272550)	0080
VAUGHAN TOWN (VAUGHA CON 04 026	17 619129 4858884 W	2004/12 3108				NU		6928544 (Z05913) A	0005
VAUGHAN TOWN (VAUGHA CON 04 026	17 619129 4858884 W	2004/12 3108				NU		6928543 (Z05912) A	
VAUGHAN TOWN (VAUGHA CON 04 026	17 617296 4858327 W	2004/09 3108				NU		6928359 (Z05904) A	
VAUGHAN TOWN (VAUGHA CON 04 026	17 617325 4858322 W	2004/11 1663	30		4///:	NU		6928314 (Z19449) A	
VAUGHAN TOWN (VAUGHA CON 04 026	17 617267 4858303 W	2004/07 1663	6.09	FR 0105	11//15/1:	DO	0107 5	6928030 (Z13093) A007378	BLCK LOAM 0002 BRWN SAND CLAY 0013 GREY CLAY 0018 BRWN CSND GRVL 0024 BLUE CLAY 0039 BRWN FSND SILT 0102 BLUE CLAY 0105 GREY FSND 0113 GREY FSND CLAY SILT 0134
VAUGHAN TOWN (VAUGHA CON 04 026	17 617725 4858513 W	1975/11 3108	6	UK 0081	18/78/9/2:0	DO	0081 3	6913007 ()	BLCK LOAM 0003 BRWN CLAY STNS 0031 GREY CLAY SAND 0067 BLUE CLAY FSND 0081 BLUE FSND 0084
VAUGHAN TOWN (VAUGHA CON 04 026	17 618739 4858833 W	2018/06 1663	6 5	UT	14/38/11/1:	DO	0087 5	7318580 (Z272567) A241713	BRWN CLAY GRVL 0015 GREY CLAY GRVL 0026 GREY FSND 0032 GREY CLAY SAND 0057 GREY FSND 0062 GREY CLAY GRVL 0077 GREY SILT SAND 0086 GREY MSND 0093
VAUGHAN TOWN (VAUGHA CON 04 026	17 618031 4858743 W	1974/08 3108	7	UK 0038	4/30/10/3:0	DO	0044 6	6912139 ()	PRDG 0020 BLUE GRVL SAND CLAY 0038 BLUE MSND 0050
VAUGHAN TOWN (VAUGHA CON 04 026	17 617350 4858547 W	1975/08 4743	6	FR 0065	18/68/5/2:0	DO	0067 8	6912786 ()	GREY LOAM 0001 BRWN CLAY 0015 GREY CLAY GRVL 0060 BRWN FSND 0078

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 04 026	17 618765 4858923 W	1976/05 1663	5	FR 0075	15/75/12/1:0	DO	0075 3	6913864 ()	LOAM 0001 YLLW CLAY GRVL 0011 BLUE CLAY GRVL 0028 GREY MSND CLAY 0034 CLAY GRVL SNDY 0055 GREY MSND 0063 GREY MSND CSND 0087 GREY MSND FSND 0097
VAUGHAN TOWN (VAUGHA CON 04 027	17 617767 4859059 W	1965/10 3108	4	FR 0059	12/40/8/2:0	DO	0062 3	6906607 ()	PRDG 0023 BLUE CLAY 0026 MSND 0048 BLUE CLAY 0059 FSND 0065
VAUGHAN TOWN (VAUGHA CON 04 027	17 617215 4858823 W	1976/07 1663	5	FR 0070	12/80/20/1:0	DO	0086 3	6913877 ()	BRWN CLAY SNDY 0006 YLLW CLAY GRVL 0012 YLLW CLAY 0018 BLUE CLAY SAND 0036 BLUE CLAY 0046 GREY FSND SILT 0047 BLUE CLAY SILT 0061 GREY MSND 0080 MSND CSND 0097
VAUGHAN TOWN (VAUGHA CON 04 027	17 618094 4859188 L	2002/03 1663	6	FR 0058	12/20/20/1:0	DO	0093 4	6926343 (240032)	BRWN CLAY FILL 0002 BRWN CLAY 0017 GREY CLAY GRVL 0019 GREY CLAY 0026 BRWN CLAY 0028 GREY CLAY GRVL 0045 BRWN FSND CLAY LYRD 0058 BRWN MSND 0073 BRWN CSND 0093 BRWN MSND 0098
VAUGHAN TOWN (VAUGHA CON 04 027	17 617196 4858718 W	1953/12 1622	4	FR 0076	18/22/10/5:0	DO	0087 5	6906604 ()	LOAM 0002 YLLW CLAY STNS 0025 BLUE CLAY MSND 0032 BLUE FSND 0036 BLUE CLAY 0076 BLUE MSND 0092
VAUGHAN TOWN (VAUGHA CON 04 027	17 617205 4858723 W	1956/10 1622	4	FR 0012	12/32/6/5:0	DO		6906605 ()	PRDG 0015 FSND 0040
VAUGHAN TOWN (VAUGHA CON 04 027	17 618826 4859467 W	1959/11 3108	4	FR 0078	32/42/10/4:0	DO ST	0078 7	6906606 ()	LOAM 0002 BLUE CLAY 0006 FSND 0056 BLUE CLAY 0078 CSND 0085
VAUGHAN TOWN (VAUGHA CON 04 027	17 618846 4860131 W	1987/07 2407	6	FR 0153	47/10/12/2:0	DO	0151 4	6919526 (09451)	BLCK LOAM 0003 BLUE CLAY 0140 BLUE SAND FSND 0150 BLUE SAND CSND 0157
VAUGHAN TOWN (VAUGHA CON 04 028	17 617758 4859535 W	1962/12 1622	4	FR 0078	30/82/15/2:0	DO	0078 4	6906608 ()	BRWN CLAY 0008 BRWN MSND 0065 CSND 0082
VAUGHAN TOWN (VAUGHA CON 04 028	17 617068 4859051 W	1958/04 1622	4	FR 0155	85/110/4/48:0	DO	0151 4	6906691 ()	PRDG 0044 CLAY MSND 0090 BLUE CLAY 0148 CSND 0155
VAUGHAN TOWN (VAUGHA CON 04 028	17 618955 4860063 W	1971/03 3108	4	UK 0138	110/110/6/2:0	DO	0138 3	6910325 ()	BLCK LOAM 0002 BRWN CLAY SAND 0079 BLUE SAND CLAY 0106 BLUE CLAY GRVL 0127 BLUE CLAY 0133 BLUE GRVL SAND 0137 BLUE CLAY 0138 BLUE MSND 0141
VAUGHAN TOWN (VAUGHA CON 04 028	17 618651 4859880 W	1999/11 1663	6 5	FR 0113	75/77/4/1:	CO	0120 3	6925264 (213465)	PRDR 0080 BLUE CLAY 0090 BRWN FSND 0113 BRWN MSND FSND 0123 BRWN FSND SILT 0133
VAUGHAN TOWN (VAUGHA CON 04 028	17 618649 4859876 W	1993/08 1663	6	FR 0070	/76/3/1:30	CO	0077 3	6922552 (140609)	BRWN CLAY GRVL 0016 BRWN SAND 0019 BRWN CLAY 0026 BRWN SAND 0031 BRWN CLAY GRVL 0048 BRWN CLAY SAND 0052 BLUE CLAY 0057 BRWN FSND 0081 BRWN CLAY SILT 0089 BLUE CLAY 0098
VAUGHAN TOWN (VAUGHA CON 04 028	17 618896 4859930 W	1995/08 3108	6 5	FR 0133	92/115/8/2:0	CO	0114 6	6923387 (156474)	LOAM 0003 BRWN CLAY 0060 BRWN SAND 0085 BLUE CLAY SAND 0113 SAND 0120
VAUGHAN TOWN (VAUGHA CON 04 029	17 618853 4860364 W	1948/11 2501	2	FR 0120	80/115/2/:	DO	0115 5	6906609 ()	BLUE CLAY QSND 0120
VAUGHAN TOWN (VAUGHA CON 04 029	17 617146 4859677 W	2011/09 1663	2		16///:	NU		7176510 (Z131464) A	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 04 029	17 617155 4859677 W	2011/09 1663	2		17///:	NU	0010 10	7176509 (Z131463) A	
VAUGHAN TOWN (VAUGHA CON 04 029	17 617159 4859689 W	2011/09 1663	36		20///:	NU		7176508 (Z131462) A	
VAUGHAN TOWN (VAUGHA CON 04 029	17 617148 4859716 W	2011/09 1663	5					7176507 (Z131461) A	
VAUGHAN TOWN (VAUGHA CON 04 029	17 617157 4859720 W	2010/10 7147	1.97	FR 0008		MO		7153340 (M08121) A107006	BRWN CLAY 0020
VAUGHAN TOWN (VAUGHA CON 04 029	17 617125 4859693 W	1973/02 3108	5	UK 0107	35/90/8/4:0	DO	0108 3	6911461 ()	LOAM 0003 BRWN CLAY SAND 0039 BLUE CLAY SAND 0076 BRWN MSND 0081 BLUE CLAY 0107 GRVL 0111
VAUGHAN TOWN (VAUGHA CON 04 029	17 618523 4860222 W	2019/04 7201	2		///:	MO		7333386 (Z310131) A243584 A	
VAUGHAN TOWN (VAUGHA CON 04 029	17 618916 4860115 W	1997/06 1663	6	FR 0141	91/145/7/1:0	DO	0149 3	6924262 (179138)	BRWN LOAM 0001 BRWN CLAY SAND GRVL 0031 BRWN MSND 0035 BRWN CLAY 0041 BRWN MSND 0044 BLUE CLAY SAND 0124 GREY SILT SAND 0131 BLUE SILT CLAY 0141 GREY FSND 0147 GREY MSND 0154
VAUGHAN TOWN (VAUGHA CON 04 030	17 618533 4860722 W	2019/04 7201	2		///:	MO		7333385 (Z304830) A241204 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618140 4860677 W	1993/03 1508						6922776 (144935)	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618523 4860512 W	2019/04 7201	2		///:	MO		7333383 (Z304832) A243587 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 617622 4860197 W	1993/02 1508						6922777 (144936)	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618547 4860518 W	2019/04 7201	2		///:	MO		7333382 (Z304834) A241202 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618504 4860672 W	1958/05 1515	3	FR 0150	60/145/6/4:0	CO	0153 5	6906501 ()	PRDR 0030 MSND GRVL 0140 QSND 0150 MSND 0158
VAUGHAN TOWN (VAUGHA CON 04 030	17 618037 4860545 W	1954/08 1622	2	FR 0060	60//3/3:0	DO	0065 5	6906610 ()	PRDG 0040 BLUE CLAY 0060 BLUE MSND 0070
VAUGHAN TOWN (VAUGHA CON 04 030	17 618547 4860518 W	2019/04 7201			///:			7333381 (Z304833) A241290 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 616948 4860165 W	1966/08 1622	5	FR 0092	30/92/8/8:0	DO ST	0092 4	6906611 ()	BRWN CLAY 0010 BLUE CLAY 0030 HPAN GRVL 0092 GRVL 0096

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 04 030	17 618721 4860472 W	2019/04 7201	2.25		///:	MO		7333388 (Z310133) A243582 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618832 4860526 W	2019/01 7464	2		///:	MO	0020 10	7332840 (Z282361) A250689	BRWN LOAM 0001 BRWN SAND SILT SLTY 0020 GREY SAND SILT SLTY 0025 GREY SAND WBRG 0030
VAUGHAN TOWN (VAUGHA CON 04 030	17 618524 4860756 W	2019/04 7201	2		///:	MO		7333387 (Z310132) A242400 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618815 4860573 W	1979/10 1663	5	FR 0140	110/125/10/1:30	DO	0145 3	6915399 ()	BRWN LOAM 0001 YLLW CLAY 0014 BLUE CLAY STNS 0027 YLLW CLAY 0034 BRWN SAND 0038 BLUE CLAY SNDY 0109 GREY MSND 0130 BLUE CLAY 0134 GREY FSND 0140 GREY MSND 0154 GREY FSND MGRD 0157
VAUGHAN TOWN (VAUGHA CON 04 030	17 618683 4860658 W	2019/04 7201	2.25		///:	MO		7333391 (Z310142) A242098 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618703 4860835 W	2019/04 7201	2.25		///:	MO		7333390 (Z310141) A243583 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618628 4860513 W	2019/04 7201	2.25		///:	MO		7333389 (Z310134) A241203 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 618498 4860720 W	2019/04 7201	2		///:	MO		7333384 (Z304831) A242432 A	
VAUGHAN TOWN (VAUGHA CON 04 030	17 617071 4859955 W	1994/04 6809						6922627 (144910)	
VAUGHAN TOWN (VAUGHA CON 04 031	17 618190 4860748 W	1997/10 1663	6	FR 0089	70/86/10/1:0	DO	0115 3	6924261 (186440)	BRWN LOAM 0002 BRWN CLAY GRVL 0012 BLUE CLAY 0028 BRWN CLAY SAND GRVL 0073 BLUE CLAY 0089 BRWN CLAY SAND GRVL 0094 BRWN FSND 0114 BRWN MSND 0118 BRWN CSND 0130
VAUGHAN TOWN (VAUGHA CON 04 031	17 618165 4860812 W	1958/07 2318	4	FR 0100	30/70/8/4:0	DO	0107 3	6906612 ()	PRDG 0020 BLUE CLAY 0100 CSND 0110
VAUGHAN TOWN (VAUGHA CON 04 031	17 617265 4860523 W	1977/04 3108	6	UK 0091	53/90/15/2:0	DO	0092 3	6913971 ()	BLCK LOAM 0003 BRWN CLAY SNDY 0018 BRWN CLAY GVLY 0066 GREY CLAY SNDY 0091 BRWN SAND 0095
VAUGHAN TOWN (VAUGHA CON 04 031	17 618694 4860983 W	1994/07 2576	6 6	FR 0170	129//25/2:30	CO	0170 10	6922803 (131037)	LOAM 0001 BRWN CLAY SLTY 0011 GREY SILT 0039 GREY CLAY GRVL 0085 BRWN CLAY GRVL SLTY 0095 GREY CLAY GRVL SLTY 0156 GREY GRVL FGVL 0181 GREY GRVL SAND 0183 GREY CLAY SLTY 0185
VAUGHAN TOWN (VAUGHA CON 04 031	17 617844 4860650 W	1994/02 1129						6922660 (149018)	
VAUGHAN TOWN (VAUGHA CON 04 031	17 617508 4860910 W	1993/03 1508						6922775 (144931)	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 04 032	17 618689 4861399 W	1974/09 2407	5	FR 0137	105/140/2/24:0	DO	0137 6	6912554 ()	BLCK LOAM 0001 BRWN CLAY SAND 0084 BLUE CLAY 0137 BLUE FSND 0143
VAUGHAN TOWN (VAUGHA CON 04 032	17 618715 4861323 W	1984/10 3108	6	FR 0165	119/132/5/3:0	DO	0170 3	6917263 ()	LOAM 0001 BRWN CLAY SAND 0084 BLUE CLAY 0087 BRWN CLAY SAND 0138 BLUE SAND 0142 BLUE CLAY SAND 0165 BLUE SAND 0173
VAUGHAN TOWN (VAUGHA CON 04 032	17 618467 4861265 W	1994/04 1129						6922654 (149017)	
VAUGHAN TOWN (VAUGHA CON 04 032	17 618262 4861219 W	1993/03 1129						6922649 (144933)	
VAUGHAN TOWN (VAUGHA CON 04 032	17 618012 4860943 W	1994/04 1508						6922757 (149013)	
VAUGHAN TOWN (VAUGHA CON 04 032	17 618633 4861317 W	2010/06 6915	6.25		111/132/2/1:0	DO		7150863 (Z42885) A038462	BRWN SAND CLAY SAND 0045 BLUE CLAY STNS 0075 BRWN SAND SILT 0141 BLUE CLAY SILT 0158 BLCK SAND SAND 0171
VAUGHAN TOWN (VAUGHA CON 05 025	17 617124 4857884 W	1989/06 3108	6	FR 0051	51//24/2:0	PS	0053 6	6920414 (49054)	LOAM 0002 BRWN CLAY 0015 BRWN SAND 0018 BRWN CLAY GRVL 0043 BRWN SAND 0053 BLUE SAND 0060
VAUGHAN TOWN (VAUGHA CON 05 025	17 617190 4858037 W	2004/07 3108				NU		6928358 (Z05903) A	
VAUGHAN TOWN (VAUGHA CON 05 025	17 617119 4857896 W	1992/08 3108	6 5	FR 0046	46/52/45/5:0	PS	0053 15	6922017 (095327)	FILL 0003 BRWN CLAY 0024 BLUE CLAY 0042 BRWN SAND 0051 BLUE SAND HARD 0070 BRWN SAND CLAY FSND 0082
VAUGHAN TOWN (VAUGHA CON 05 025	17 617155 4857933 W	1969/06 3108	7	FR 0060	49/54/7/2:0	DO	0062 7	6909267 ()	LOAM 0001 YLLW CLAY MSND 0050 YLLW MSND 0069
VAUGHAN TOWN (VAUGHA CON 05 026	17 617205 4858260 W	1958/04 2318	4	FR 0060	18/24/5/18:0	PS	0075 3	6906686 ()	LOAM 0001 BLUE CLAY 0060 FSND 0078
VAUGHAN TOWN (VAUGHA CON 05 026	17 616802 4858168 W	1987/07 3108	6	FR 0049	49/75/20/1:0	DO	0076 4	6918901 (13828)	BRWN CLAY 0022 BLUE CLAY GVLY STNS 0040 BRWN SAND 0080
VAUGHAN TOWN (VAUGHA CON 05 026	17 616835 4858175 W	1975/06 1663	5	FR 0050	49/75/10/1:0	ST DO	0078 3	6913167 ()	BLCK LOAM 0001 YLLW CLAY 0034 BRWN SAND CLAY 0054 GREY FSND 0063 GREY MSND 0082
VAUGHAN TOWN (VAUGHA CON 05 026	17 617179 4858211 W	2012/07 7215						7188934 (C18470) A118029 P	
VAUGHAN TOWN (VAUGHA CON 05 027	17 617055 4858743 W	1968/08 1622	5	FR 0080	8/58/10/3:0	DO	0102 4	6908701 ()	LOAM 0002 YLLW CLAY 0018 BLUE CLAY 0065 CLAY MSND 0080 MSND 0106
VAUGHAN TOWN (VAUGHA CON 05 027	17 617086 4858793 W	1986/12 1663	6 5	FR 0081	8/82/35/1:30	DO	0086 3	6918501 (07641)	BLCK LOAM 0001 BRWN CLAY GRVL 0019 BLUE CLAY 0021 GREY CLAY SAND 0067 GREY FSND 0080 BLUE CLAY 0081 GREY MSND 0090 GREY FSND 0140
VAUGHAN TOWN (VAUGHA CON 05 028	17 616815 4859123 W	1983/02 3108	6	FR 0070	3/84/7/2:0	DO	0089 3	6916714 ()	BRWN CLAY 0016 BLUE GRVL CLAY SNDY 0042 BLUE GRVL CLAY STNS 0061 BLUE CLAY SNDY 0065 BLUE SAND 0092
VAUGHAN TOWN (VAUGHA CON 05 028	17 616715 4859048 W	1972/01 3108	4	UK 0067	11/67/4/:	DO	0067 3	6910998 ()	PRDG 0005 GREY CLAY GRVL SAND 0063 GREY CLAY SAND 0067 BLUE FSND 0070

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
VAUGHAN TOWN (VAUGHA CON 05 029	17 616767 4859562 W	1993/03 1508						6922771 (144922)	
VAUGHAN TOWN (VAUGHA CON 05 029	17 616805 4859563 W	1968/10 1622	5	FR 0087	24/90/10/3:0	DO	0091 4	6909262 ()	LOAM 0001 CLAY MSND 0065 BLUE CLAY 0087 MSND 0095
VAUGHAN TOWN (VAUGHA CON 05 030	17 616755 4860023 W	1971/03 1663	5	FR 0087	30/60/10/3:0	ST DO	0099 4	6910566 ()	LOAM 0001 YLLW CLAY 0019 BLUE CLAY 0087 GREY CSND 0103
VAUGHAN TOWN (VAUGHA CON 05 030	17 616818 4860218 W	1993/01 1508						6922769 (144919)	
VAUGHAN TOWN (VAUGHA CON 05 031	17 616724 4860517 W	1997/06 3108	6 5	FR 0097	36/38/11/24:0	IR	0097 6	6924001 (166687)	LOAM 0001 BRWN CLAY 0015 BLUE CLAY 0019 BRWN CLAY 0029 BRWN SAND CLAY 0048 BLUE CLAY 0062 SAND 0103
VAUGHAN TOWN (VAUGHA CON 05 031	17 616410 4860198 W	1974/05 3108	7	UK 0093	17/103/5/3:0	DO	0101 3	6912127 ()	BRWN CLAY GRVL 0019 BLUE CLAY 0032 BLUE CLAY GRVL SAND 0048 BLUE CLAY SAND 0062 BLUE CLAY GRVL SAND 0086 BLUE FSND 0097 BLUE MSND FSND 0104
VAUGHAN TOWN (VAUGHA CON 05 031	17 616395 4860360 W	1994/05 6809						6922626 (149014)	
VAUGHAN TOWN (VAUGHA CON 05 031	17 617363 4860481 W	1994/03 6809						6922625 (149016)	
VAUGHAN TOWN (VAUGHA CON 05 031	17 616635 4860503 W	1978/05 3108	6	UK 0085	46/86/35/1:0	DO	0092 6	6914568 ()	BLCK LOAM 0002 BRWN CLAY 0018 BLUE CLAY GVLY 0083 BLUE MSND FSND 0086 BLUE CSND 0098
VAUGHAN TOWN (VAUGHA CON 05 031	17 616715 4860573 W	1980/07 1663	5	FR 0080	35/85/40/1:30	DO	0089 3	6915783 ()	BLCK LOAM 0001 YLLW CLAY GRVL 0012 BRWN SAND 0015 BLUE CLAY 0019 BRWN FSND 0033 BLUE CLAY SNDY 0059 GREY FSND MGRD 0075 GREY CSND GRVL 0096 GREY MSND CLAY 0103

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag . A: Abandonment; P: Partial Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C8

Private Well Survey

Table C8-1: Well Water Survey Responses

Address	Well Information				Groundwater Sample	Comments
	Depth (m)	Date Drilled	Dug/Drilled	Dried		
10811 Jane St	-	-	-	-	-	vacant dwelling
10819 Jane St	-	-	-	-	-	vacant dwelling
10823 Jane St	26.2	1987	drilled	no	yes, in 2021	resident contacted in 2021 from a previous study. Well is monitored. Well is primary water source. Water has not been clear since work started across road. Water cloudy and sometimes black. Water has a rotten egg smell. Water treated with softener.
10871 Jane St	-	-	dug	-	yes, in 2021	resident contacted in 2021 from a previous study. Well is monitored. Well is primary water source. Resident unsure of well information.
10891 Jane St	-	-	dug	3 - 4 times/year	yes, in 2021	no response - left letter. Residents contacted in 2021 from a previous study. Private well is primary use of water. Water is not clear, odourless. No treatment method in use.
10953 Jane St	25.9	~1990	drilled	no	yes, in 2021	resident contacted in 2021 from a previous study. Spoke to resident - no changes to water since 2021. Well used for cooking, cleaning and outdoor use. Water is clear and has an odour. Treated with a softener. Well obstructed at ground level, unable to collect water level.
10967 Jane St	-	-	drilled	-	yes, in 2021	no response - left letter. Resident contacted in 2021 from a previous study. Private well is the primary use of water used for drinking, cooking, cleaning and outdoor use. Not supplemented by external water sources. Water is clear and odourless.
10970 Jane St	-	-	-	-	-	vacant land - dwelling removed
10971 Jane St	-	-	-	-	-	vacant land - dwelling removed
11273 Jane St	-	-	-	-	-	vacant land - dwelling removed
11067 Keele St	-	-	-	-	-	vacant land - dwelling removed
11151 Keele St	-	-	-	-	-	spoke to staff - facility on municipal water
11191 Keele St	-	-	-	-	-	spoke to staff - facility on municipal water
11290 Keele St	-	-	-	-	-	vacant dwelling
11320 Keele St	45.7	-	drilled	-		spoke to resident - left letter to fill out with family, verbally confirmed 150 ft drilled well on property.
11666 Keele St	-	-	drilled	-	-	spoke to tenant - could not locate well, no pre-treatment sample location available. Adequate water supply used for cleaning, do not drink the water, water is rusted colour, high iron, rotten egg smelling, treated with a softener, has had bacteria and is regularly tested.
2480 Kirby Rd	Well #1 - 49 Well #2 - 11	Well #1 - 2004 Well #2 - unknown	Well #1 - drilled Well #2 - dug	no	yes	spoke to golf course owner - two drilled wells on the property, one services the house and the second services the golf course. Groundwater sample obtained from the well that services the house. No treatment in place. Wells are not used for drinking. Does not wish to participate in study.
2400 Kirby Rd	-	-	-	-	-	spoke to manager - facility on municipal water
2985 Teston Rd	-	-	-	-	-	vacant dwelling - landlord confirmed no well on the property
2975 Teston Rd	-	-	-	-	-	landlord confirmed no well on the property
2960 Teston Rd	-	-	-	-	-	vacant dwelling
2889 Teston Rd	-	-	-	-	-	vacant land - dwelling removed
2588 Teston Rd	-	-	-	-	-	vacant dwelling
2546 Teston Rd	-	-	-	-	-	vacant land - dwelling removed
2440 Teston Rd	19.8 - 21.3	1976	drilled	no	yes	spoke to resident - primary source of water with adequate water supply. Water is clear with no odour and has not had any bacteria. Water is treated with softener, filter and UV. Water is not regularly tested.
2190 Teston Rd	-	-	-	-	-	large facility on municipal water

Table C8-2: Well Water Quality Results

			Sample Description	2240 Teston	2480 Kirby
			Date Sampled	06/15/2022	06/15/2022
Parameter	**Unit**	**ODWQS**	**Type of Standard**		
Electrical Conductivity	µS/cm			662	903
pH	pH Units	6.5-8.5	OG	7.75	7.84
Hardness (as CaCO3) (Calculated)	mg/L	80-100	OG	**345**	**375**
Total Dissolved Solids	mg/L	500	AO	416	492
Alkalinity (as CaCO3)	mg/L	30-500	OG	277	312
Fluoride	mg/L	1.5	MAC	<0.05	<0.05
Chloride	mg/L	250	AO	20.7	92.1
Nitrate as N	mg/L	10	MAC	<0.05	5.47
Nitrite as N	mg/L	1	MAC	<0.05	<0.05
Sulphate	mg/L	500	AO	71.2	37.4
Ortho Phosphate as P	mg/L			<0.10	<0.10
Ammonia as N	mg/L			<0.02	<0.02
Total Phosphorus	mg/L			<0.02	<0.02
Dissolved Organic Carbon	mg/L			0.7	1.2
Total Organic Carbon	mg/L			0.9	1.2
Apparent Colour	TCU	5	AO	**69.7**	<2.50
Total Calcium	mg/L			106	119
Total Magnesium	mg/L			19.4	19.0
Total Potassium	mg/L			1.15	1.32
Total Sodium	mg/L	200	AO	4.98	41.9
Total Aluminum	mg/L	0.1	OG	<0.010	<0.010
Total Antimony	mg/L	0.006	IMAC	<0.003	<0.003
Total Arsenic	mg/L	0.01	IMAC	<0.003	<0.003
Total Barium	mg/L	1.0	MAC	0.115	0.060
Total Beryllium	mg/L			<0.001	<0.001
Total Boron	mg/L	5.0	IMAC	<0.010	0.011
Total Cadmium	mg/L	0.005	MAC	<0.001	<0.001
Total Chromium	mg/L	0.05	MAC	<0.003	<0.003
Total Cobalt	mg/L			<0.001	<0.001
Total Copper	mg/L	1	AO	<0.003	0.008
Total Iron	mg/L	0.3	AO	**2.20**	**0.036**
Total Lead	mg/L	0.010	MAC	<0.001	<0.001
Total Manganese	mg/L	0.05	AO	0.049	<0.002
Total Mercury	mg/L	0.001	MAC	<0.0001	<0.0001
Total Molybdenum	mg/L			<0.002	<0.002
Total Nickel	mg/L			<0.003	<0.003
Total Selenium	mg/L	0.05	MAC	<0.002	<0.002
Total Silver	mg/L			<0.002	<0.002
Total Uranium	mg/L	0.02	MAC	<0.002	0.005
Total Vanadium	mg/L			<0.002	<0.002
Total Zinc	mg/L	5.0	AO	<0.020	<0.020
Total Zirconium	mg/L			<0.004	<0.004
Escherichia coli	CFU/100mL	0	MAC	0	0

ODWQS- Ontario Drinking Water Quality Standards
AO- Aesthetic Objective
OG- Operational Guideline
MAC- Maximum Allowable Concentration
IMAC- Interim Maximum Acceptable Concentration
ND- Not detected
NDOGT- No Data; Overgrown with Target, refers to over-crowding microbial growth
Bold- exceeds ODWQS
Underlined- Sodium concentrations exceed the 20 mg/L standard for those with sodium-restricted diets

R.J. Burnside & Associates Limited

R.J. Burnside & Associates Limited 6990 Creditview Road, Unit 2 Mississauga ON L5N 8R9 CANADA
telephone (905) 821-1800 **fax** (519) 941-8120 **web** www.rjburnside.com

BURNSIDE
[THE DIFFERENCE IS OUR PEOPLE]

Technical Memorandum

Date: May 15, 2023 **Project No.:** 300050116.0000

Project Name: Block 27, Vaughan

Client Name: Block 27 Landowners Group Inc.

Submitted To: LEA Consulting Group

Submitted By: Jackie Shaw, P.Eng.

Reviewed By: Dwight Smikle, M.Sc., P.Geo.

R.J. Burnside & Associates Limited (Burnside) was retained by the Block 27 Landowners Group to complete a hydrogeological assessment as part of the Master Environmental Servicing Plan (MESP) for the Block 27 lands in the City of Vaughan. The Block 27 lands are bound by Kirby Road to the north, Keele Street to the east, Teston Road to the south and Jane Street to the west and are located within the jurisdiction of the Toronto and Region Conservation Authority (TRCA).

The Block 27 MESP and Block 27 Collector Roads Municipal Class Environmental Assessment (MCEA) study for the Block 27 Community Area (Block 27) are underway concurrently in support of the Block 27 development. To minimize duplication of work, enhance efficiencies and utilize currently available data/analyses, the Block 27 Collector Roads MCEA is utilizing all environmental data gathered as part of the MESP. The MESP project team and Block 27 EA project teams have been working closely together since the on-set of the EA study. All investigations and information gathered as part of the MESP has been used by the EA to inform the study.

The existing hydrogeological conditions of the Block 27 lands are described in the “Block 27 Hydrogeological Existing Conditions Report, Vaughan, Ontario” prepared by Burnside, dated August 2022. Based on the proposed collector road network, as described in the attached project description, an assessment of the potential impacts to the hydrogeological conditions on the Block 27 lands associated with the proposed construction of the collector road network has been completed and is presented herein.

1.0 Impact Assessment of the Proposed Network and Mitigation Measures

The construction of the proposed collector road network has the potential to impact the hydrogeological conditions in the short-term as a result of construction dewatering activities at watercourse crossings or in excavations for installation of services. In the long-term, potential impacts may result from a reduction in recharge with the addition of hard surfaces to the landscape, and a potential increase in sodium and chloride in the shallow groundwater from road salt application. The potential short-term and long-term impacts, and recommended mitigation measures, are discussed separately below.

1.1 Impacts to Private Wells

A well survey was completed for all properties located within 500 m of the Block 27 lands as part of the MESP study, which included 31 properties with the potential for private water well supply. In 2022, responses were received from 3 residents during the survey completed for the Block 27 lands, and an additional 6 residents located along Jane Street responded to a survey completed as part of a 2021 study for an adjacent development. The results of the surveys identified wells with depths ranging from 11 m to 49 m. Shallow dug wells were identified as part of the surveys along Jane Street, north of Teston Road, and on Kirby Road, west of Keele Street, which may be more susceptible to impacts from the proposed activities.

Road construction has the potential to impact shallow water supply wells that are located in close proximity to the construction. Potential impacts include the temporary lowering of the water table during dewatering in the aquifer in which the well is completed, or the permanent cutting off or removal of sand lenses that contribute to the well. Wells may also be damaged due to vibrations during construction or heavy machinery use. It is expected that this potential exists only in shallow wells in close vicinity to the construction. Wells completed within 15 m of surface are considered the most vulnerable to potential impacts from development as work associated with road construction and installation of services will generally be within the first 15 m of the overburden.

Prior to road construction, a dewatering assessment should be completed to calculate potential dewatering volumes and the potential zone of influence from dewatering activities. Any properties located within close proximity to the construction activities should be re-surveyed prior to construction to identify any shallow wells that could potentially be impacted by the construction. The well survey is recommended to be completed during the detailed design phase of the project. Any wells identified as being susceptible to impacts should have baseline water quality and water levels collected and have water levels monitored through construction.

A well interference and reporting protocol should be established before construction that outlines the actions to be taken should a complaint from a private well owner be received and

ensures that a supply of water is provided for the private resident. Mitigation measures should include the following:

- Notification of residents of proposed construction ahead of startup.
- Provision of contact information for a designated person as part of a response protocol
- A reporting and investigation protocol to address complaints.
- Supply of alternate water source in case of confirmed impact.

1.2 Impacts to Surface Water Features

Several drainage features and wetlands are located on the Block 27 lands, and in the vicinity of the proposed collector road network. Groundwater studies completed for the Block 27 lands suggest that groundwater discharge occurs along the lower reaches of and riparian wetlands along Drainage Feature 1, Drainage Feature 3 and Drainage Feature 4. Dewatering assessments, particularly in the vicinity of any crossing locations, will be required prior to construction which will identify the potential zone of influence from dewatering activities. Any impacts to the drainage features and surrounding wetlands as a result of dewatering (i.e., a reduction in groundwater discharge) would be temporary and surface flows would be supplemented with discharge from the dewatering.

Excavations for road construction may also cut off sand lenses that contribute discharge to drainage features or granular fill placed in excavations may serve to divert groundwater. In all cases it is important to utilize best practices to ensure that groundwater flow directions are maintained to the greatest extent possible. These practices include the use of seepage collars to prevent redirection of groundwater or the placement of granular fill to support groundwater flow.

Erosion and sediment control (ESC) plans will be required to ensure that construction activities do not impact the surface water features. The plans will require various sediment control methods and structures to ensure sediment laden water is not discharged to the surface water features. Water must be discharged to land at least 30 m from any wetland or drainage features. Discharge should be monitored for turbidity to ensure that any sediment in the water is effectively being removed to acceptable levels prior to entering the surface water features. It is noted that based on estimated discharge rates, environmental permissions such as EASR or PTTW may be required.

1.3 Impacts to Groundwater Recharge and Flow

The creation of hard surfaces has the potential to reduce infiltration, which may reduce groundwater levels and subsequent discharge to the local wetlands and watercourses, as well as recharge to underlying aquifers. The Block 27 lands have been mapped in a significant groundwater recharge area (SGRA) and are within a delineated WHPA-Q for water quantity in the Source Protection Mapping (CTC Source Protection Committee, July 2015). As such, implementation of best management practices, with the goal of maintaining pre-development recharge, is required.

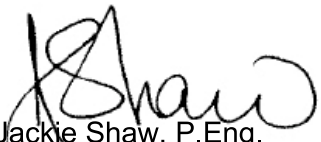
As part of the MESP for the Block 27 lands, water balance calculations will be completed to determine any potential reduction in recharge as a result of the proposed development, which will account for the collector road network. Low impact development (LID) measures to promote infiltration will be incorporated into the stormwater management plans with the goal of maintaining pre-development recharge volumes. With the implementation of LID measures to promote infiltration across the Block 27 lands, no impact to groundwater levels and recharge to aquifers and water supply quantity are anticipated.

Groundwater flow may occur at increased rates along trenches and excavations constructed as part of the servicing works. Industry best practices for construction of service trenches, including the building of cut off walls will ensure that groundwater flow is not re-directed along trenches.

1.4 Impacts to Groundwater Quality

Runoff from winter maintenance activities on roads can infiltrate into the groundwater resulting in elevated sodium and chloride in the groundwater. Road salt application will be managed by the municipality as per York Region's Salt Management Plan and Guidance for Best Management Practices for Road Salt Usage Standards to minimize any impacts.

R.J. Burnside & Associates Limited



Jackie Shaw, P.Eng.
Groundwater Resources Engineer
JS/DS:cl

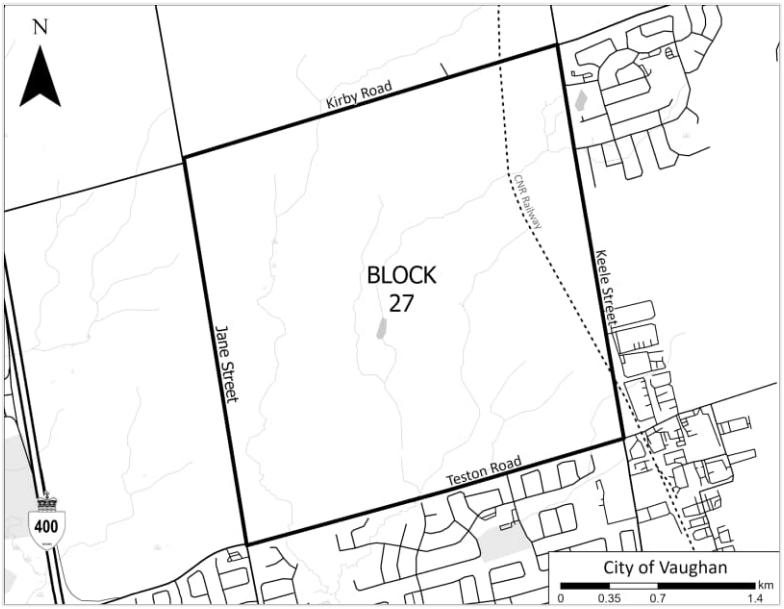
Dwight Smikle, M.Sc., P.Geo.
Vice President - Hydrogeology

Enclosure(s)

Block 27 MCEA Project Description

The City of Vaughan, as co-proponents with the Block 27 Landowners Group Inc., has initiated the Block 27 Collector Roads Municipal Class Environmental Assessment (MCEA) Study for the Block 27 Community Area (Block 27) (see **Figure 1**) in support of the Block 27 development, located within the City of Vaughan, Ontario.

Figure 1: Block 27 Community Area



BACKGROUND

In accordance with the Regional Municipality of York's Official Plan (2010) and the City of Vaughan's Official Plan (2010), the City of Vaughan began the planning process for Block 27 in January 2015. In 2019, the City of Vaughan completed the New Vaughan and New Communities Transportation Master Plan (NVNCTMP) to develop a well-integrated and sustainable transportation network for the North Vaughan study area, including Block 27, to accommodate both existing residents and new residents to 2031 and beyond. The NVNCTMP study followed Approach #1 of the Municipal Class EA guidelines (October 2000, as amended in 2007, 2011, and 2015), established the need and justification for the proposed collector roads, and identified the internal transportation network within the Block 27 Secondary Plan Area. The completion of the NVNCTMP study in 2019 fulfills the requirements of Phases 1 and 2 of the MCEA process.

THE PROCESS

The Block 27 Collector Roads Municipal Class Environment Assessment is following the MCEA process for a Schedule 'C' project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, October 2000, as amended in 2007, 2011, and 2015), and will complete Phases 3 and 4 of the MCEA process. The Block 27 Collector Roads MCEA builds upon the recommendations of the NVNCTMP and Block 27 Secondary Plan work, which identified the transportation requirements for the New Community Areas and determined the preferred collector road network within Block 27 to ensure external connectivity to the broader North Vaughan area.

DESCRIPTION OF THE PROPOSED WORKS

The purpose of the Block 27 Collector Roads MCEA study is to develop, identify, evaluate, and recommend alternative design options for the collector road network within Block 27 and to support sustainable long-term growth and the efficient movement of goods and people in the area. A preferred road network consisting of 8 collector roads (3 major collectors and 5 minor collectors) has been selected based on an evaluation of alternative alignments. The preferred road network is illustrated in **Figure 2** below.

Figure 2: Preferred Road Network